MASTER DRAINAGE REPORT
FOR
DEVELOPMENT UNIT 3/4
AT
EASTMARK

April 16, 2014
WP# 113697.09

REVIEWED BY
CITY STAFF
BY
5/1/14 DATE

WOOD/PATEL
MISSION: CLIENT SERVICE™

MASTER DRAINAGE REPORT
FOR
DEVELOPMENT UNIT 3/4
AT
EASTMARK

April 16, 2014
WP# 113697.09

DMB® Master Developer Approval EASTMARK.
_____ Date _____

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Date Signed 04-16-14
ARIZONA, U.S.A.
EXPIRES 06-30-2015

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1.0 INTRODUCTION

1.1 General Background and Project Location

The proposed Development Unit 3/4 (DU 3/4) is anticipated to be an approximate 608-acre Development Unit (DU) within the 3,151-acre Eastmark master planned community in the City of Mesa, Arizona (City). It is a Planned Community District (PCD) which is a mixed-use development that will include single-family residential, multi-family residential, urban mixed-use, commercial mixed-use, industrial, office, hotel, resort, golf, various community uses, and open spaces.

This Master Drainage Report has been prepared in accordance with Wood, Patel & Associates, Inc.'s (Wood/Patel's) understanding of the City and the Flood Control District of Maricopa County (FCDMC) drainage requirements.

The Site is located within a portion of Sections 15, 22, and 23 of Township 1 South, Range 7 East, of the Gila and Salt River Meridian. The Site is bounded by Ray Road to the south (from Ellsworth Road to Inspirian Parkway), Inspirian Parkway on the east (from Ray Road to Point Twenty-Two Boulevard), Point Twenty-Two Boulevard on the south (from Inspirian Parkway to Eastmark Parkway), Eastmark Parkway on the east (from Point Twenty-Two Boulevard to Warner Road), Warner Road on the north, and Ellsworth Road on the west (refer to the attached Plate 1 – *Vicinity Map*).

The Site consists of multiple automotive test tracks and undisturbed desert. The Site was previously used by General Motors as a desert automobile testing facility. The majority of the Site is surrounded by automotive test tracks and/or undisturbed desert along the northern and western boundaries, and a portion the eastern boundary north of Point Twenty-Two Boulevard. The southern half of the eastern boundary is bordered by the Great Park, and the southern boundary is bordered by Ray Road, the Powerline Floodway, and DU 3 South. The Powerline Floodway is a major FCDMC facility that provides conveyance of discharge from the Powerline Flood Retarding Structures, approximately three miles east of the Site, and drainage conveyance for stormwater runoff for areas adjacent to the channel. Ultimately, the flow is conveyed to the East Maricopa Floodway (EMF) west of the Site.

1.2 Scope of the DU 3/4 Master Drainage Report

The DU 3/4 Master Drainage Report was prepared to support the development of approximately 608 acres of varying land use. Proposed land use includes a university campus, middle school, elementary school, library, aquatic center, park, commercial, office, hotel, and high-density residential. The drainage analysis is consistent with procedures and standards of the City of Mesa and the Flood Control District of Maricopa County. The proposed drainage plan provides an outline for the required major drainage facilities for storage and conveyance of storm water runoff for the development of DU 3/4 at Eastmark. Updates to the Master Drainage Report may be required if significant changes are made to the land uses and assumptions utilized to prepare this report.

1.3 Construction Phasing

It is anticipated that construction of the DU 3/4 drainage infrastructure will be phased. Initial development may include a portion of the proposed university campus and a portion of the commercial development at the northeast corner of the Ray Road and Ellsworth Road intersection. It is unknown at this time which portion of the Site will develop in subsequent phases.

2.0 DESCRIPTION OF STUDY AREA

2.1 Existing Soil Conditions

According to the Natural Resources Conservation Service's Soil Survey, Eastmark is located within the Aguila-Carefree soil survey area. The majority of the surface soils onsite are classified as sandy loam, clay loam, or loam. Refer to Plate 2 – *Soils Map* and Appendix A – *Proposed Condition Data and Hydrology* for information pertaining to existing soil conditions.

2.2 Rainfall Seasons

There are two distinct rainfall seasons associated with the desert southwest corresponding to the project area. The first season occurs during the winter months, from November to March, when the area is subjected to occasional storms from the Pacific Ocean. While classified as a rainfall season, there can be long periods where there can be little or no precipitation. Generally, storms occurring during the winter rainfall season are classified as being long-duration, low-intensity storms.

The second rainfall period occurs during the summer months, from June through August, and is commonly referred to as the Monsoon Season. During this season, Arizona is subjected to widespread thunderstorm activity, whose moisture supply originates both in the Gulf of Mexico and along Mexico's west coast. These thunderstorms are typically classified as being short-duration, high-intensity storms, with extreme variability per location.

2.3 FEMA Flood Insurance Rate Map (FIRM)

The Maricopa County, Arizona and Incorporated Areas Flood Insurance Rate Map (FIRM) Panel Number 04013C2760L, dated October 16, 2013, indicates that the western edge of the Site, approximately 407 acres, is within Zone "X" Shaded.

Zone "X" Shaded is defined by FEMA as follows:

> *"Areas of 0.2% annual chance flood: areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood."*

Panel Number 04013C2760L also indicates area beyond the eastern map boundary is within Zone "D". The FEMA website indicates this area is within the Maricopa County, Arizona and Incorporated Areas Flood Insurance Rate Map (FIRM) Panel Number 04013C2780L. The FEMA website shows the panel as not printed and does not indicate a flood zone designation. Based on the Zone "D" markings on Panel Number 04013C2760L, and previously-mapped Panel Number 04013CIND0A, dated September 30, 2005, portions of Eastmark within Panel Number 04013C2780L, approximately 201 acres, is believed to be within a FEMA Zone "D".

Zone "D" is defined by FEMA as follows:

"Areas in which flood hazards are undetermined."

Refer to Plate 3 – *Flood Insurance Rate Map* for an illustration.

2.4 Section 404 Jurisdictional Areas

A Jurisdictional Delineation has been completed by the U.S. Army Corps of Engineers (Corps) for Eastmark. A portion of the Powerline Floodway Channel and a small wash have been designated as Jurisdictional, and lie south of the DU 3/4 boundary. Refer to Plate 4 – *Section 404 Jurisdictional Delineation Map* for the locations of Jurisdictional areas.

Proposed disturbances to the Jurisdictional areas are required to be permitted with the Corps. A Section 404 Individual Permit will be required for disturbance during development, with conditions that must be adhered to.

2.5 Master Drainage Report Update for Eastmark

The *Master Drainage Report Update for Eastmark*, prepared by Wood/Patel and dated December 16, 2013, was approved by the City of Mesa. Additionally, the *Master Drainage Report Update for Eastmark*, prepared by Wood/Patel and dated April 15, 2014 was submitted to the City of Mesa for review and re-approval to incorporate development changes and has set the drainage criteria for the Site. The report includes a pre-developed condition HEC-1 model (MGPEX.DAT), as well as a full build-out model (EMDU34.DAT), which are modified versions of the current flood control district area drainage master plan models. The East Mesa Area Drainage Master Plan (ADMP),

prepared in 1998 by Dibble & Associates, Inc. and Hoskin Ryan Consultants, Inc., is a regional drainage study prepared for the FCDMC.

Eastmark is located in the eastern portion of the study, which is bound by the Flood Retarding Structure (FRS) in Pinal County to the east and the EMF to the west. In general, the area drains northeast to southwest, and outlets into the EMF. The ADMP sets the regional drainage constraints for facilities within the study area of Eastmark. The full build-out model was utilized to verify the development of Eastmark does not negatively impact any drainage infrastructure downstream.

3.0 EXISTING DRAINAGE CONDITION

3.1 Existing Drainage Plan

The Site generally slopes in a southwesterly direction at approximately 0.5 to 1 percent. The peak elevation within the Site is 1419 feet mean sea level (MSL), located near the intersection of Inspirian Parkway and the Powerline Floodway. The lowest elevation within the Site is approximately 1,388 feet MSL, located at the southwest corner of the Site. The Site is covered with typical Sonoran Desert vegetation, including mesquite trees, saguaro cactus, creosote, etc.

The existing site is made up of one sub-basin which drains west to southwest into Ellsworth Road and the Powerline Floodway. This has been modeled accordingly within the current 100-year, 24-hour FCDMC model and the Master Drainage Report model. Proposed 100-year, 24-hour retention for the Great Park, and 100-year, 2-hour storage for the remainder of DU 3/4, will decrease the runoff volume and peak flow produced on the Site.

3.1.1 Northern Boundary

Runoff along the northern boundary flows parallel to the proposed Warner Road alignment. A temporary berm or swale along the north side of Warner Road may be required if Warner Road is constructed at or below existing grade. Near the western end of the northern boundary, future Warner Road intersects with the existing circle race track previously utilized by General Motors. The track is elevated above adjacent ground, and currently retains a large watershed to the east. If Warner Road is constructed below the track berm elevation, a temporary retention basin is required to store runoff from the tributary watershed, and shall be sized to store the 100-year, 24-hour storm event to match existing conditions leaving the site.

3.1.2 Eastern Boundary

Runoff along the northern half of the eastern boundary, adjacent to the future road alignment of Eastmark Parkway, is undeveloped and impacts the Site. If Eastmark Parkway is designed at or below existing grade, a temporary berm and/or swale may be required to collect the offsite flow and divert it northwest

around DU 3/4. Currently within the DU 3/4 boundary, elevated tracks and depressed areas retain runoff for the 100-year, 24-hour storm event. To match existing condition peak flows and runoff volumes leaving the Site, temporary retention for the offsite runoff may be necessary, depending on the roadway design along the DU 3/4 boundary.

The southern half of the eastern boundary adjacent to Inspirian Parkway is bordered by DU 7, which is under construction, and retains the 100-year, 2-hour storm event. During the 100-year, 24-hour storm event, minor flows impact DU 3/4 at the DU 7 outfall locations along the major roadways, which act as the emergency overflow corridors.

3.1.3 Western Boundary

The western boundary is not impacted by any offsite flows entering the Site. Ellsworth Road is located just west of the site. Flows leaving the Site are collected and conveyed within an existing storm drain beneath the roadway, and discharged into the Powerline Floodway, south of Ray Road.

3.1.4 Southern Boundary

There are no offsite impacts crossing the southern boundary. The southern boundary of DU 3/4 is bound by the Powerline Floodway. The floodway provides a low-flow outlet to FRS dams upstream of the Site, as well as stormwater conveyance for areas adjacent to the channel. The channel precludes stormwater generated to the south from entering the Site.

4.0 PROPOSED DRAINAGE CONDITION

4.1 Proposed Drainage Plan

The drainage concept for DU 3/4 is to route offsite flows around the Site and direct onsite storm water runoff to retention basins for storage. Offsite runoff impacting the northern and eastern boundaries will be collected and conveyed with proposed temporary berms and/or swales to temporary retention basins. Temporary basins shall be sized to store runoff from the 100-year, 24-hour storm event for tributary areas to maintain peak flows and runoff volumes leaving the Site at or below pre-development levels.

Onsite runoff will be collected in roadways for overland flow conveyance to localized retention basins. Where street capacities are exceeded, vertical curb and/or underground storm drain systems or roadside channels may be utilized to convey the excess runoff. Refer to Plate 5 – *Interim Condition HEC-1 Schematic* for watershed delineations and locations.

The Great Park retention basins shall be sized to retain runoff volume from a 100-year, 24-hour storm event utilizing a precipitation depth equal to 3.51 inches or greater, in accordance with NOAA Atlas 14. Retention basins for the remainder of DU 3/4 shall be sized to retain runoff volume from a 100-year, 2-hour storm event utilizing a precipitation depth of 2.19 inches or greater. Emergency overflow routes must be provided in the event that retention basin capacities are exceeded due to a storm larger than the design event or back-to-back storms. Retention basins shall be designed to drain retained runoff within 36 hours after a storm event. Land uses depicted in the hydrologic models are conceptual and subject to change, based on the allowable criteria for a PCD.

In all locations, lowest floor elevations shall be set a minimum of 1 foot above the emergency overflow elevation, or any 100-year water surface elevation adjacent the Site, whichever is greater.

4.2 Proposed Condition Hydrology

An interim condition HEC-1 model (DU34INT.DAT) was created to assess the impact of the developed DU 3/4 to the downstream drainage infrastructure. The model was created based upon the most current post developed condition model. The undeveloped

watersheds within Eastmark and outside DU 3/4 were modeled with a low-density employment land use to represent an automotive proving ground, per the FCDMC's DDMSW program, with exception to DU 3/4 and previously master planned DUs that have been developed, are under construction, or in the permitting process. Those areas, including a portion of DU 6N, DU 7, DU 3S, DU 8, and DU 9, were modeled with post-developed land uses. Retention from these developed areas was included within the model.

EXISTING CONDITION		INTERIM CONDITION		FULL BUILD-OUT CONDITION	
Location ID	Discharge	Location ID	Discharge	Location ID	Discharge
CP 75	661cfs	CP75	633 cfs	CP75	633 cfs
79A1	90 cfs	RET17	0 cfs	RET17	0 cfs
79A2	225 cfs	CP19A	61 cfs	CP19A	61 cfs
79A3	156 cfs	RET19	81 cfs	RET19	81 cfs
C79B1	1,090 cfs	78CT79	935 cfs	78CT79	935 cfs

4.3 Proposed Hydraulics

4.3.1 Street Hydraulics

Arterials and major collectors shall be designed to convey the peak flows generated by a 10-year peak storm within the roadway infrastructure, with a spread limited to 1 traffic lane in each direction. All other public roadways shall be designed to convey the peak flows generated by a 10-year peak storm between the curbs. All roadways shall be designed to convey the 100-year storm within the right-of-way and adjacent parkway. Where the peak flows exceed the capacity of the public street to convey the peak flows, storm drains or other drainage facilities shall be installed and sized to carry the excess flows (i.e. when the 10-year peak exceeds the spread criteria or exceeds the curb capacity of the public street, or when the right-of-way cannot convey the 100-year peak flow). Storm drain and/or channel systems will convey storm water runoff to retention basins located throughout the Site.

4.4 Retention

4.4.1 Retention Storage

The 100-year, 24-hour required retention volume for the DU 3/4 Great Park is estimated to be 34.4 acre-feet, based on conceptual land use. The 100-year, 2-hour required retention volume for the remainder of DU 3/4 was estimated to be

70.1 acre-feet. Retention volumes have been included in the HEC-1 model. If actual land uses and required retention volumes vary from this report, updates to this report may be required to analyze impacts to downstream drainage infrastructure.

Refer to *Table 4 – Proposed Condition Onsite Retention Volume Summary* in Appendix A for a detailed summary of required retention volumes. The proposed retention volumes are based on a 100-year, 24-hour precipitation depth of 3.51 inches, and a 100-year, 2-hour precipitation depth of 2.19 inches, obtained from NOAA Atlas 14 Precipitation Frequency Data. Retention basins will be required to dissipate storm water within 36 hours.

4.4.2 Stormwater Quality

The required retention storage volume for the Site exceeds the first flush requirement of storing the first one-half inch of runoff. All runoff will have settlement time within retention basins prior to draining by percolation, drywells, release into natural watercourses, and/or release into existing storm drain systems.

4.5 Maintenance

Ongoing maintenance of the designed or recommended drainage systems will be required to preserve the design integrity and purpose of the drainage system. Failure to provide maintenance can prevent the drainage system from performing to its intended design purpose, and can result in reduced performance. Maintenance is the responsibility of private developers and owners associations for facilities on private property within all easements and private streets, except for drainage structures within public rights-of-way accepted by the City of Mesa for maintenance. Ownership and maintenance responsibilities will be associated with developments discharging to retention facilities and will be managed by the owners associations established for the Site. A regular maintenance program is required to have drainage systems perform to the level of protection or service as presented in this report.

5.0 CONCLUSIONS

Based on the analysis of the *Master Drainage Report for Development Unit 3/4 at Eastmark*, the following conclusions can be made:

1. This *Master Drainage Report for Development Unit 3/4 at Eastmark* is prepared in accordance with Wood, Patel & Associates, Inc.'s understanding of the drainage parameters set by the Flood Control District of Maricopa County, the City of Mesa, and the *Master Drainage Report for Eastmark*.

2. Offsite flows shall be conveyed around the Site adequately, per jurisdictional requirements. FCDMC may require a review of this *DU 3/4 Master Drainage Report*.

3. Peak flows and runoff volumes for the proposed condition 100-year, 24-hour storm shall not negatively impact downstream drainage infrastructure.

4. Temporary offsite collection, conveyance, and retention shall be provided for runoff generated by the 100-year, 24-hour storm event for tributary areas along the northern half of the eastern boundary and the northern boundary.

5. Onsite retention shall be provided to retain runoff generated by the 100-year, 24-hour storm event for the Great Park, and 100-year, 2-hour storm event for the remaining developed areas within DU 3/4.

6. Flow in excess of onsite storage capacity shall outfall to emergency overflow routes.

7. Lowest floor elevations shall be set a minimum of 1 foot above the adjacent 100-year water surface elevation or emergency outfall water surface elevation, whichever is greater.

8. Drainage infrastructure will be designed in accordance with the appropriate criteria, per the City of Mesa and/or Flood Control District of Maricopa County.

9. Ongoing maintenance is required for all drainage systems in order to assure design performance.

6.0 REFERENCES

1. *Master Drainage Report Update for Eastmark*, Wood, Patel and Associates, Inc., December 13, 2013.

2. *Master Drainage Report Update for Eastmark*, Wood, Patel and Associates, Inc., February 2, 2013.

3. *Drainage Design Manual for Maricopa, County, Arizona, Volumes 1 Hydrology,* Flood Control District of Maricopa County, August 15, 2013.

4. *Drainage Design Manual for Maricopa County, Arizona, Volume 2 Hydraulics,* Flood Control District of Maricopa County, August 15, 2013.

5. *Drainage Policies and Standards for Maricopa County*, Arizona, Flood Control District of Maricopa County, Draft January 2013.

6. *2012 Engineering & Design Standards*, City of Mesa, 2012.

7. *Flood Insurance Rate Map 04013C2760L,* Federal Emergency Management Agency (FEMA), October 16, 2013.

8. *HEC-1 Flood Hydrograph Package,* U.S. Army Corps of Engineers, June 1998.

9. *Master Drainage Report Update for Eastmark*, Wood, Patel and Associates, Inc., April 15, 2014.

APPENDIX A

Interim Condition Data and Hydrology

Hydrology Interim Condition

100-Year, 24-Hour HEC-1 Output

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          THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
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          DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
          KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

111          ID       THIS MODEL SHOULD REPLACE WS4-SEM.DAT IN THE HEC-1 RUN SEQUENCE SPECIFIE
112          ID       BELOW.  REFERENCING WS2-NEM.DSS IS STILL REQUIRED.
113          ID
114          ID       THIS IS A POST DEVELOPED MODEL REVISION TO REFLECT UPDATED PLANNING
115          ID       FOR DEVELOPMENT UNIT 7 (DU7)PROVIDED BY ARIZONA LAND DESIGN ON 09/02/201
116          ID       09/02/2011.
117          ID
118          ID       MODEL REVISION DESCRIPTION:
119          ID
120          ID       THIS MODEL IS AN EXERPT OF THE MODEL PROVIDED BY THE FLOOD CONTROL
121          ID       DISTRICT OF MARICOPA COUNTY (WS4-SEM.DAT).  ONSITE WATERSHEDS WERE
122          ID       UPDATED TO REFLECT A GRADING PLAN PROVIDED BY LD TEAM ON 8/30/2011.
123          ID       MODELING OF THE POWERLINE FLOODWAY HAS BEEN UPDATED TO REFLECT THE
124          ID       EXISTING SECTIONS AND SLOPE PER AS-BUILT DRAWINGS ACROSS THE MPG
125          ID       SITE.
126          ID
127          ID       MODEL REVISED BY:
128          ID       WOOD, PATEL & ASSOCIATES, INC.
129          ID       DANIEL W. MATTHEWS, E.I.T.
130          ID
131          ID       FILE PATH:
132          ID       R:\MESA PROVING GROUNDS\2011\113697\PROJECT SUPPORT\REPORTS\
133          ID       DRAINAGE\HYDROLOGY\MPGDU7.DAT
134          ID
135          ID
136          ID   ***********************************************************************
137          ID
138          ID       FILE: MPG20RT2.DAT
139          ID
140          ID       MODEL REVISED: 04-25-2011
141          ID
142          ID       PROJECT: MESA PROVING GROUNDS
143          ID
144          ID       THIS MODEL SHOULD REPLACE WS4-SEM.DAT IN THE HEC-1 RUN SEQUENCE SPECIFIE
145          ID       BELOW.  REFERENCING WS2-NEM.DSS IS STILL REQUIRED.
146          ID
147          ID       THIS IS A 100-YEAR, 2-HOUR RETENTION SCENARIO MODEL USING
148          ID       THE 20MSF COMMERCIAL SPACE AND 15K DU LAND PLAN PROVIDED
149          ID       BY SWABACK PARTNERS ON 12/12/07.
150          ID
151          ID       MODEL REVISION DESCRIPTION:
152          ID
153          ID       THIS MODEL IS AN EXERPT OF THE MODEL PROVIDED BY THE FLOOD CONTROL
154          ID       DISTRICT OF MARICOPA COUNTY (WS4-SEM.DAT).  ONSITE WATERSHEDS 01 AND
155          ID       20 WERE UPDATED TO REFLECT THE INCORPORATION OF THE FIRST SOLAR SITE
156          ID       IN THE NORTHEAST CORNER OF DU-6.  WATERSHED 02 WAS SPLIT INTO 02A AND
157          ID       02B.  LAND USE WAS CHANGED TO INDUSTRIAL FOR 02B AND ENTIRELEY
158          ID       RESIDENTIAL FOR 02A.
159          ID       THE FIRST SOLAR SITE RUNOFF WILL NOW BE RETAINED ENTIRELY ONSITE.
160          ID
161          ID       MODEL REVISED BY:
162          ID       WOOD, PATEL & ASSOCIATES, INC.
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 163          ID        STEPHEN M. SCINTO, P.E.
 164          ID
 165          ID        FILE PATH:
1                                        HEC-1 INPUT                                                    PAGE  4

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 166          ID        R:\MESA PROVING GROUNDS\2010\103564.04\PROJECT SUPPORT\REPORTS\
 167          ID        DRAINAGE\HYDROLOGY\POST-DEVELOPED 100YR2HR RETENTION MODEL\
 168          ID        MPG20RT2.DAT
 169          ID
 170          ID     ***********************************************************************
 171          ID
 172          ID        FILE: MPG20RT2.DAT
 173          ID
 174          ID        MODEL REVISED: 09-16-08
 175          ID
 176          ID        PROJECT: MESA PROVING GROUNDS
 177          ID
 178          ID        THIS MODEL SHOULD REPLACE WS4-SEM.DAT IN THE HEC-1 RUN SEQUENCE SPECIFIE
 179          ID        BELOW.  REFERENCING WS2-NEM.DSS IS STILL REQUIRED.
 180          ID
 181          ID        THIS IS A 100-YEAR, 2-HOUR RETENTION SCENARIO MODEL USING
 182          ID        THE 20MSF COMMERCIAL SPACE AND 15K DU LAND PLAN PROVIDED
 183          ID        BY SWABACK PARTNERS ON 12/12/07.
 184          ID
 185          ID        MODEL REVISION DESCRIPTION:
 186          ID
 187          ID        THIS MODEL IS AN EXERPT OF THE MODEL PROVIDED BY THE FLOOD CONTROL
 188          ID        DISTRICT OF MARICOPA COUNTY (WS4-SEM.DAT).  ONSITE WATERSHEDS 01, 02,
 189          ID        03, AND 06 WERE UPDATED TO REFLECT THE CURRENT GOLF COURSE
 190          ID        CONFIGURATION.
 191          ID
 192          ID        MODEL REVISED BY:
 193          ID        WOOD, PATEL & ASSOCIATES, INC.
 194          ID        DANIEL W. MATTHEWS, E.I.T.
 195          ID
 196          ID        FILE PATH:
 197          ID        R:\MESA PROVING GROUNDS\2006\062753\PROJECT SUPPORT\HYDRO\MDR-20-15 LAND
 198          ID        PLAN\2ND SUBMITTAL(COM)\HYDROLOGY\MPG20RT2.DAT
 199          ID
 200          ID     ***********************************************************************
 201          ID
 202          ID        FILE: MPG20RT2.DAT
 203          ID
 204          ID        MODEL REVISED: 05-15-08
 205          ID
 206          ID        PROJECT: MESA PROVING GROUNDS
 207          ID
 208          ID        MODEL REVISION DESCRIPTION:
 209          ID
 210          ID        THIS MODEL SHOULD REPLACE WS4-SEM.DAT IN THE HEC-1 RUN SEQUENCE SPECIFIE
 211          ID        BELOW.  REFERENCING WS2-NEM.DSS IS STILL REQUIRED.
 212          ID
 213          ID
 214          ID        THIS IS A 100-YEAR, 2-HOUR RETENTION SCENARIO MODEL USING
 215          ID        THE 20MSF COMMERCIAL SPACE AND 15K DU LAND PLAN PROVIDED
 216          ID        BY SWABACK PARTNERS ON 12/12/07.
 217          ID
 218          ID
 219          ID        THIS MODEL IS AN EXERPT OF THE MODEL PROVIDED BY THE FLOOD CONTROL
 220          ID        DISTRICT OF MARICOPA COUNTY (WS4-SEM.DAT).  WATERSHED 79A WAS UPDATED
1                                        HEC-1 INPUT                                                    PAGE  5

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 221          ID        AS REQUESTED BY FLOOD CONTROL DISTRICT OF MARICOPA COUNTY TO REDUCE THE
 222          ID        PERCENT IMPERVIOUS VALUE FROM 80% TO 0% TO MATCH THE LAND USE AS MODELED
 223          ID        WITHIN THE EAST MESA ADMP.
 224          ID
 225          ID        MODEL REVISED BY:
 226          ID        WOOD, PATEL & ASSOCIATES, INC.
 227          ID        DANIEL W. MATTHEWS, E.I.T.
 228          ID
 229          ID        FILE PATH:
 230          ID        R:\MESA PROVING GROUNDS\2006\062753\PROJECT SUPPORT\HYDRO\MDR-20-15 LAND
 231          ID        PLAN\2ND SUBMITTAL\POST-DEVELOPED 100YR2HR RETENTION MODEL (MPG20RT2)\
 232          ID        MPG20RT2.DAT
 233          ID
 234          ID     ***********************************************************************
 235          ID
 236          ID        FILE: MPG20RT2.DAT
 237          ID
 238          ID        MODEL REVISED: 01-08-08
 239          ID
 240          ID        PROJECT: MESA PROVING GROUNDS
 241          ID
 242          ID        MODEL REVISION DESCRIPTION:
 243          ID
 244          ID        THIS MODEL SHOULD REPLACE WS4-SEM.DAT IN THE HEC-1 RUN SEQUENCE SPECIFIE
 245          ID        BELOW.  REFERENCING WS2-NEM.DSS IS STILL REQUIRED.
 246          ID
 247          ID
 248          ID        THIS IS A 100-YEAR, 2-HOUR RETENTION SCENARIO MODEL USING
 249          ID        THE 20MSF COMMERCIAL SPACE AND 15K DU LAND PLAN PROVIDED
 250          ID        BY SWABACK PARTNERS ON 12/12/07.
 251          ID
 252          ID
 253          ID        THIS MODEL IS AN EXERPT OF THE MODEL PROVIDED BY THE FLOOD CONTROL
 254          ID        DISTRICT OF MARICOPA COUNTY (WS4-SEM.DAT).  WATERSHEDS 68A, 68B,
 255          ID        70A, 70B, 71, 73B, 73C, 74B, 74C, 75, 77B, 77C, 78B, 78C, AND 79A
 256          ID        HAVE ALL BEEN UPDATED TO REFLECT CURRENT WATERSHED DELINEATIONS,
 257          ID        NEW DEVELOPMENT, CURRENT RETENTION,AND FLOOD ROUTING.  BASIN 75
 258          ID        HAS BEEN UPDATED TO REFLECT PLANNED DEVELOPEMENT FOR THE MESA
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 259          ID        PROVING GROUNDS SITE.
 260          ID
 261          ID        MODEL REVISED BY:
 262          ID        WOOD, PATEL & ASSOCIATES, INC.
 263          ID        DANIEL W. MATTHEWS, E.I.T.
 264          ID
 265          ID        FILE PATH:
 266          ID        R:\MESA PROVING GROUNDS\2006\062753\PROJECT SUPPORT\HYDRO\MDR-20-15 LAND
 267          ID        PLAN\HYDROLOGY\POST-DEVELOPED 100YR2HR RETENTION MODEL (MPG20RT2)\
 268          ID        MPG20RT2.DAT
 269          ID
 270          ID    ***********************************************************************
 271          ID
 272          ID
 273          ID    ID  Kirkham Michael:
 274          ID    Last Revised Date:  1/22/03
 275          ID    Filename:  WS4-SEM.DAT
1                                          HEC-1 INPUT                                    PAGE  6

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 276          ID
 277          ID    Comments Dated 1/22/03 (CJ)
 278          ID
 279          ID    This model should be used ONLY for the Rittenhouse and Chandler Heights
 280          ID    Basin Design Project - Final Design Analyses.
 281          ID
 282          ID    This model is one of several models that represent the EMF watershed.
 283          ID    This model covers the Southeast Mesa Area and should reference as a DSS
 284          ID    the watershed model for the Northeast Mesa Area (Filename WS2-NEM.DAT).
 285          ID
 286          ID    This model is necessary to determine the input hydrographs for the
 287          ID    Rittenhouse Basin Design HEC-RAS Unsteady State analysis.  To develop
 288          ID    the necessary input hydrographs the following models should be run in order.
 289          ID    Because the files utilize a TAPE21 file to export import hydrographs
 290          ID    between models, prior to running the FIRST model (WS1-NWM.DAT) any existing
 291          ID    TAPE21 file in the directory should be deleted.  The run procedure order is:
 292          ID
 293          ID         1)  WS1-NWM.DAT
 294          ID         2)  WS2-NEM.DAT
 295          ID         3)  WS3-QCSW.DAT
 296          ID         4)  WS4-SEM.DAT (referencing WS2-NEM.DSS for the DSS file)
 297          ID         5)  RT1-BASE.DAT
 298          ID
 299          ID    The necessary input hydrographs for the Rittenhouse Basin analysis
 300          ID    are determined in RT1-BASE.  In that output file, the hydrograph at
 301          ID    RWFLD1 should be exported and used as the input hydrograph at the
 302          ID    EMF Reach 4 Cross Section 17.082.  And the hydrograph at RITTEN should
 303          ID    be exported and used as the input hydrograph for the Rittenhouse Main
 304          ID    Channel at Cross Section 820.00
 305          ID
 306          ID
 307          ID    ***********************************************************************
 308          ID    **** NOTE BY PRIMATECH ENGINEERS:                                  ****
 309          ID    **** DATE: 06/12/2001                                              ****
 310          ID    **** THE NEW FILE NAME IS: SEBTALT2.DAT                            ****
 311          ID    **** THE FILE WAS RENAMED AS <<RTBTALT2.DAT>> FOR THE EAST MARICOPA ****
 312          ID    **** FLOODWAY CAPACITY MITIGATION PROJECT, BY FLOOD CONTROL DISTRICT OF ****
 313          ID    **** MARICOPA COUNTY.                                              ****
 314          ID    **** THE FILE WAS RENAMED <<RTBTALT3.DAT>> AND UPDATED USING GREEN AND ****
 315          ID    **** AMPT FUTURE CONDITIONS FOR BASINS 258 TO 268.                 ****
 316          ID    ***********************************************************************
 317          ID
 318          ID
 319          ID
 320          ID     THIS MODEL WAS ORIGINALLY MIDDOUT.DAT
 321          ID     IT HAS BEEN MODIFIED BY CPE (7/2000)
 322          ID     FOR ALTERNATIVE 2 FOR THE EAST MARICOPA FLOOWAY
 323          ID     CAPACITY MITIGATION AND MULTI-USE CORRIDOR STUDY
 324          ID     TO ROUTE BOTH THE POWERLINE FLOOWAY
 325          ID     AND THE SANTAN FREEWAY CHANNEL INTO THE RAY BASIN PRIOR THEIR OUTFALL
 326          ID     INTO THE EMF
 327          ID
 328          ID    ***************************************************************
 329          ID
 330          ID         Model files changed by Collins/Pina Engineering
1                                          HEC-1 INPUT                                    PAGE  7

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 331          ID         to reflect multi-use design concepts (recreation
 332          ID         and environment) proposed throughout the entire
 333          ID         EMF Corridor.    July 2000
 334          ID
 335          ID
 336          ID     VERSION 8.06  CPE 7/31/00
 337          ID
 338          ID  ***********************************************************************
 339          ID
 340          ID
 341          ID  ***********************************************************************
 342          ID   FILENAME: MIDDOUT.DAT
 343          ID
 344          ID   ALL CIP INFRASTRUCTURE IS IN PLACE, FUTURE CONDITIONS LANDUSE IS IN PLACE
 345          ID   FLOW IS ROUTED UP ELLSWORTH ROAD IN A EARTH LINED CHANNEL
 346          ID
 347          ID  ***********************************************************************
 348          ID   PRODUCED BY DIBBLE AND ASSOCIATES AND HOSKIN ENGINEERING CONSULTANTS.
 349          ID   File Name: Final8.Dat
 350          ID   Revised - Jan. 2000 by SZ (Wood/Patel) From Final7.dat - new Z-V & Sideweir
 351          ID   Revised - Jan. 2000 by SZ (Wood/Patel) from Final6.dat - 60% review comments
 352          ID   Revised - Dec. 1999 by SZ (Wood/Patel) from Final5.dat
 353          ID   Revised - Dec. 1999 by SZ (Wood/Patel) from Final4.dat
 354          ID   Revised - Nov. 1999 by SZ (Wood/Patel) from Final3.dat
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355          ID   Revised - June 1999 by SZ (Wood/Patel) for Final Model from Optl.dat.
356          ID   Revised - May 1999 by SZ (Wood/Patel) for Option 1, Based on Model SDIB.DAT
357          ID   REVISED - MAY, 1999 BY VAS TO INCORPORATE INCREASE OF SUBBASIN RETENTION AND
358          ID            REVISIONS TO THE REGIONAL DETENTION BASIN STORAGE
359          ID   REVISED - FEB, 1999 BY VALERIE SWICK, FCD OF MARICOPA COUNTY
360          ID   REVISED - MAY, 1998 BY D&A
361          ID
362          ID   REVISED BY VALERIE SWICK, FEB. 26, 1998
363          ID
364          ID   FLOWS FROM DETENTION BASIN LOCATED AT NE CORNER OF ELLIOT AND ELLSWORTH ROADS
365          ID   IS ROUTED TO THE SOUTHWEST BY SIPHON DRAW TO SUBBASIN 70A. FROM THERE THEY
366          ID   WILL BE ROUTED BY A CHANNEL TO THE EMF. FLOWS FROM SUBBASINS ADJACENT TO
367          ID   SANTAN FREEWAY ALIGNMENT WILL BE ROUTED SOUTH TO SUBBASIN 70A WHERE THEY WILL
368          ID   BE COMBINED WITH FLOW IN SIPHON DRAW.
369          ID
370          ID   EAST MESA AREA DRAINAGE MASTER PLAN
371          ID   AREA SOUTH OF SUPERSTITION (U.S. HWY 60)
372          ID   AUGUST 1997
373          ID   SOUTHEAST MESA HIGH RESOLUTION MODEL
374          ID
375          ID   ***********FUTURE CONDITION MODEL OF THE WATERSHED************************
376          ID
377          ID  ************ATTENTION*****************************************************
378          ID    SUBBASINS 75, 79A, 79B, 78E,  LANDUSES WERE NOT
379          ID    CHANGED BECAUSE IT WAS FELT THAT THEIR FUTURE CONDITIONS LANDUSES WOULD BE
380          ID    SIMILAR TO THE EXISTING CONDITIONS LANDUSES.
381          ID    RETENTION VOLUMES WILL ALSO NOT BE UTILIZED FOR SUBBASINS 75, 79A, 79B, 78E
382          ID    SOME QUEEN CREEK SUBBASINS WILL ALSO NOT HAVE RETENTION VOLUMES, EITHER
383          ID    BECAUSE THEY LIE IN PINAL COUNTY AND WE DONT KNOW PINAL COUNTIES PLANS OR
384          ID    THEY LIE IN THE SANTAN MOUNTAINS AND WON'T GET DEVELOPED
385          ID    WILLIAMS GATEWAY AIRPORT (SUBBASINS 80A, 80B, 81A, AND 81B) ARE MODELED AS
1                                          HEC-1 INPUT                                          PAGE  8

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

386          ID    FUTURE CONDITIONS AND HAVE RETENTION VOLUMES FOR THE 100YR 2HR STORM
387          ID  ***********************************************************************
388          ID   FILENAME:  SDIBB.DAT
389          ID
390          ID   THIS MODEL REPRESENTS THE FUTURE CONDITION OF THE WATERSHED.
391          ID   TOTAL DRAINAGE AREA IS APPROXIMATELY 213 SQ. MI.
392          ID   THIS MODEL USES A fn VALUE OF 0.09 FOR DESERT LAND USE DUE TO SHEET FLOW
393          ID   CONDITIONS.
394          ID
395          ID   100-YEAR 24-HOUR FREQUENCY
396          ID   AREAL REDUCTIONS FROM FCD HYDROLOGY MANUAL
397          ID   THIS MODEL INCLUDES INFLOW FROM NORTH OF THE SUPERSTITION FREEWAY
398          ID   AND EAST OF THE CAP
399          ID
400          ID   DATA FROM THE QUEEN CREEK ADMS HAS BEEN ADDED TO CALCULATE FLOWS INTO THE
401          ID   EMF.   MUSKINGUM ROUTING NSTEPS WERE ADJUSTED TO BE WITHIN THE SUGGESTED
402          ID   RANGE.
403          ID
404          ID   METHODOLOGY
405          ID   THE US CORPS OF ENGINEERS FLOOD HYDROLOGY MODEL HEC-1 DATED SEP1990 VER 4.0
406          ID   SCS TYPE II RAINFALL DISTRIBUTION
407          ID   S-GRAPH HYDROGRAPH
408          ID   GREEN AND AMPT INFILTRATION EQUATION USED FOR CALCULATING LOSSES
409          ID   NORMAL DEPTH STORAGE CHANNEL ROUTING
410          ID   APPROXIMATE DIRECTION, LOCATION, AND LENGTH OF THE WASHES HAVE BEEN
411          ID   EVALUATED BASED ON FIELD INVESTIGATION, USGS MAPS, LANDIS AERIAL SURVEYS
412          ID   DATED 1994
413          ID   THE NOAA TECHNICAL MEMORANDUM NOAA ATLAS 2 DEPTH AREA RATIOS
414          ID
415          ID   ORIGINAL STUDY PERFORMED BY LISA C. YOUNG AND AFSHIN AHOURAIYAN, UPDATED BY
416          ID   DAVID DEGERNESS (OCT-DEC, 1996). REVIEWED BY VALERIE A. SWICK
417          ID   AND AMIR MOTAMEDI OF THE FLOOD CONTROL DISTRICT
418          ID   HYDROLOGY BRANCH ENGINEERING DIVISION, FLOOD CONTROL
419          ID   DISTRICT OF MARICOPA COUNTY, DECEMBER - JULY 1995.
420          ID
421          ID   ASSUMED VELOCITY OF 1 FT/SEC FOR SHEET FLOW, 2-3 FT/SEC FOR WASH/NATURAL
422          ID   CHANNEL, 3 FT/SEC FOR ROAD AND GRASS CHANNEL, 10FT/SEC FOR CONCRETE CHANNEL
423          ID
424          ID   VELOCITIES FOR ADMP IMPROVEMENT CHANNELS FROM DIBBLE AND ASSOCIATES
425          ID   SUGGESTED ALTERNATIVES (JULY 1, 1997)
426          ID
427          ID   ***********************************************************************
428          ID   **** THE FOLLOWING NOTE WAS ADDED BY PRIMATECH ENGINEERS ON 06-12-2001 ****
429          ID   ***********************************************************************
430          ID   NOTE: MUST USE NEBUILD.DSS AS THE DSS FILE TO IMPORT FLOWS ACROSS THE
431          ID         SUPERSTITION FREEWAY.
432          ID   ***********************************************************************
433          ID
434          ID
435          ID   NOTE: MUST USE NDIBF.DSS AS THE DSS FILE TO IMPORT FLOWS ACROSS THE
436          ID         SUPERSTITION FREEWAY.
437          ID
438          ID   DDM MCUHP2 SE MESA ADMP - SOUTH OF SUPERSTITION FWY, FUTURE CONDITIONS
             *DIAGRAM
439          IT       5  1APR97    0000     600
1                                          HEC-1 INPUT                                          PAGE  9

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

440          IO       5
441          IN      15
442          JD    3.60    0.01
443          PC    .000    .002    .005    .008    .011    .014    .017    .020    .023    .026
444          PC    .029    .032    .035    .038    .041    .044    .048    .052    .056    .060
445          PC    .064    .068    .072    .076    .080    .085    .090    .095    .100    .105
446          PC    .110    .115    .120    .126    .133    .140    .147    .155    .163    .172
447          PC    .181    .191    .203    .218    .236    .257    .283    .387    .663    .707
448          PC    .735    .758    .776    .791    .804    .815    .825    .834    .842    .849
449          PC    .856    .863    .869    .875    .881    .887    .893    .898    .903    .908
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450   PC   .913   .918   .922   .926   .930   .934   .938   .942   .946   .950
451   PC   .953   .956   .959   .962   .965   .968   .971   .974   .977   .980
452   PC   .983   .986   .989   .992   .995   .998  1.000
453   JD  3.58    1.0
454   JD  3.49    5.0
455   JD  3.38   10.0
456   JD  3.24   30.0
457   JD  3.10   60.0
458   JD  3.05   90.0
459   JD  3.00  120.0
460   JD  2.97  150.0
      * ***********************************************************************
      *

461   KK    73A
462   KM   BASIN 73A
463   KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
464   KM    L=      2.3  Lca=      1.0   S=   34.9  Kn= .093  LAG=  94.5
465   KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
466   BA     .95
467   LG     .35    .36   5.00    .27    .00
468   UI     34.    34.    34.    34.    84.   117.   134.   158.   171.   185.
469   UI    197.   214.   232.   254.   274.   317.   381.   429.   424.   369.
470   UI    332.   303.   282.   263.   240.   220.   202.   185.   169.   157.
471   UI    134.   107.    90.    60.    60.    57.    55.    54.    34.    34.
472   UI     34.    34.    16.    10.    10.    10.    10.    10.    10.    10.
473   UI     10.    10.    10.    10.    10.    10.     0.     0.     0.     0.
474   UI      0.     0.     0.     0.     0.     0.     0.     0.     0.     0.
      *
      *

475   KK   73ATB   ROUTE
476   KM   ROUTE FLOW FROM BASIN 73A THROUGH THE MOUNTAIN HEIGHTS DEVELOPEMENT FROM
477   KM   MERIDIAN ROAD TO MOUNTAIN ROAD.
478   RS       2    FLOW      -1
479   RC   0.045   0.040   0.045    2830  0.0050    0.00
480   RX    0.00    5.00   10.00   20.00  120.00  130.00  135.00  140.00
481   RY    4.00    3.00    2.50    0.00    0.00    2.50    3.00    4.00
      *
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LINE  ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

482   KK    73B   BASIN
483   KM   BASIN 73B
484   KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
485   KM    L=0.56  Lca=0.28  S=30.4  Kn=0.040  LAG=14.9
486   KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
487   BA   0.425
488   LG    0.25    0.25    5.40    0.27      30
489   UI     169     530     973     829     481     180      73      30       0       0
490   UI       0       0       0       0       0       0       0       0       0       0
      *
      *

491   KK  RET73B  DIVERT
492   KM   RETAIN 80% OF THE 100 YR 2 HR RUNOFF VOLUME
493   DT  73BRET    39.5     0.0
494   DI       0   10000
495   DQ       0   10000
      *
      *

496   KK   CP73B COMBINE
497   KM   COMBINE HYDROGRAPHS 73ATB AND BASIN 73B
498   HC       2
      *
      *

499   KK   73BTC   ROUTE
500   KM   ROUTE FLOW THROUGH THE NOVA VISTA DEVELOPEMENT FROM MOUNTAIN ROAD TO
501   KM   SIGNAL BUTTE ROAD.
502   RS       4    FLOW      -1
503   RC   0.045   0.040   0.045    4500  0.0050    0.00
504   RX    0.00    5.00   10.00   22.00  122.00  134.00  139.00  144.00
505   RY    4.00    3.50    3.00    0.00    0.00    3.00    3.50    4.00
      *
      *

506   KK    73C   BASIN
507   KM   BASIN 73C
508   KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
509   KM    L=1.33  Lca=0.30  S=22.6  Kn=0.040  LAG=22.5
510   KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
511   BA   0.585
512   LG    0.25    0.25    5.40    0.27      30
513   UI      88     344     512     764    1019     695     488     287     149      68
514   UI      31      27      26       0       0       0       0       0       0       0
515   UI       0       0       0       0       0       0       0       0       0       0
      *
      *
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LINE  ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

516   KK  RET73C  DIVERT
517   KM   RETAIN 80% OF THE 100 YR 2 HR RUNOFF VOLUME
518   DT  73CRET    37.2     0.0
519   DI       0   10000
520   DQ       0   10000
      *
```

```
                *
521             KK   CP73C COMBINE
522             KM   COMBINE HYDROGRAPHS 73BTC AND BASIN 73C
523             HC       2
                *
                *

524             KK  73T74C   ROUTE
525             KM   ROUTE FLOW SOUTH ALONG THE WEST SIDE OF SIGNAL BUTTE ROAD IN AN
526             KM   ENGINEERED CHANNEL FROM WARNER ROAD TO THE POWERLINE FLOODWAY.
527             RS      20    FLOW      -1
528             RC   0.032   0.032   0.032    4670   .0024
529             RX       0       5      10      31      69    79.5    84.5    89.5
530             RY     3.5     3.5     3.5       0       0     3.5     3.5     3.5
                *
                * ***********************************************************************
                *

531             KK     74A
532             KM   BASIN 74A
533             KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
534             KM    L=       2.4  Lca=       1.0   S=   42.2  Kn= .095  LAG=  92.9
535             KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
                * KO     2       2
536             BA     .75
537             LG     .35     .36    5.00     .27     .00
538             UI     27.     27.     27.     27.     73.     96.    111.    129.    140.    151.
539             UI    163.    175.    193.    208.    228.    268.    317.    362.    327.    287.
540             UI    260.    239.    222.    206.    187.    171.    160.    142.    132.    118.
541             UI     99.     79.     56.     48.     47.     45.     45.     32.     27.     27.
542             UI     27.     19.      8.      8.      8.      8.      8.      8.      8.      8.
543             UI      8.      8.      8.      8.      8.      0.      0.      0.      0.      0.
544             UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
                *
                *

545             KK   74ATB   ROUTE
546             KM   ROUTE FLOW FROM BASIN 74A VIA THE POWERLINE FLOODWAY FROM MERIDIAN ROAD TO
547             KM   MOUNTAIN ROAD. FLOW ENTERS THE POWERLINE FLOODWAY VIA A 75FT WEIR ON THE
548             KM   NORTHWEST CORNER OF THE MERIDIAN ROAD AND POWERLINE FLOODWAY INTERSECTION.
549             RS       1    FLOW      -1
550             RC   0.013   0.013   0.013    3200  0.0060    0.00
551             RX    0.00    7.00   21.50   30.00   36.00   44.50   59.00   66.00
552             RY    6.00    5.50    5.50    0.00    0.00    5.50    5.50    6.00
                *
                *
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LINE            ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

553             KK     74B   BASIN
554             KM   BASIN 74B
555             KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
556             KM    L=1.31  Lca=0.41  S=23.7  Kn=0.040  LAG=24.9
557             KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
558             BA   0.333
559             LG    0.25    0.25    5.80    0.22      30
560             UI      45     154     245     330     528     430     318     229     122      76
561             UI      44      18      14      14       0       0       0       0       0       0
562             UI       0       0       0       0       0       0       0       0       0       0
                *
                *

563             KK  RET74B  DIVERT
564             KM   RETAIN 80% OF THE 100 YR 2 HR RUNOFF VOLUME
565             DT  74BRET    17.8     0.0
566             DI       0   10000
567             DQ       0   10000
                *
                *

568             KK   CP74B COMBINE
569             KM   COMBINE HYDROGRAPHS 74ATB AND BASIN 74B
570             HC       2
                *
                *

571             KK   74BTC   ROUTE
572             KM   ROUTE FLOW VIA THE POWERLINE FLOODWAY FROM MOUNTAIN ROAD TO SIGNAL BUTTE
573             KM   ROAD.
574             RS       1    FLOW      -1
575             RC   0.013   0.013   0.013    3100  0.0055    0.00
576             RX    0.00    7.00   21.50   30.00   36.00   44.50   59.00   66.00
577             RY    6.00    5.50    5.50    0.00    0.00    5.50    5.50    6.00
                *
                *

578             KK     74C   BASIN
579             KM   BASIN 74C
580             KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
581             KM    L=1.22  Lca=0.40  S=25.4  Kn=0.040  LAG=23.7
582             KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
583             BA   0.345
584             LG    0.25    0.17    6.80    0.15      30
585             UI      48     180     276     386     588     428     310     211      97      65
586             UI      35      15      15      16       0       0       0       0       0       0
587             UI       0       0       0       0       0       0       0       0       0       0
                *
                *
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LINE            ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
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```
588          KK  RET74C  DIVERT
589          KM   RETAIN 80% OF THE 100 YR 2 HR RUNOFF VOLUME
590          DT  74CRET    22.6      0.0
591          DI       0   10000
592          DQ       0   10000
             *
             *

593          KK   CP74C COMBINE
594          KM   COMBINE HYDROGRAPHS 73T74C, 74BTC, AND BASIN 74C
             * KO      2
595          HC       3
             *
             *

596          KK  74CT75
597          KM  ROUTE FLOW FROM IN THE POWERLINE FLOODWAY FROM CP74C TO CP75
598          RS       3    FLOW      -1
599          RC   0.030   0.013   0.030   10700   .0047
600          RX    0.00    5.60   20.10   30.00   39.00   49.90   69.40   75.00
601          RY    6.25    7.25    7.25    0.00    0.00    7.25    7.25    6.25
             *
             *

602          KK    10   BASIN
603          KM    BASIN 10
604          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
605          KM    L=1.11  Lca=0.56  S=18.9  Kn=0.045  LAG=30.9
606          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
607          BA   0.171
608          LG    0.25    0.19    6.60    0.17      31
609          UI       0      19      45      87     111     143     216     198     151     117
610          UI      88      52      32      23      16       6       6       6       6       0
611          UI       0       0       0       0       0       0       0       0       0       0
612          UI       0       0       0       0       0       0       0       0       0       0
613          UI       0       0       0       0       0       0       0       0       0       0
             *
             *

614          KK   RET10  DIVERT
615          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
616          DT   10RET   18.32      0.0
617          DI       0   10000
618          DQ       0   10000
             *
             *

619          KK   10T75
620          KM  ROUTE FLOW FROM NORTH SIDE RAY FROM CP10 TO CP75 WITHIN RAY ROAD
621          RS       1    FLOW      -1
622          RC   0.030   0.015   0.030    6320   .0060
623          RX       0    17.5      18      57      73     112   112.5     130
624          RY     1.0    0.50     0.0     0.8     0.8     0.0     0.5     1.0
             *
             *
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

625          KK     02B   BASIN
626          KM    BASIN 02B
627          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
628          KM    L=0.58  Lca=0.26  S=17.2  Kn=0.040  LAG=16.3
629          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
630          BA   0.146
631          LG    0.25    0.25    4.80    0.39      55
632          UI       0      48     154     262     314     189      92      41      15       9
633          UI       0       0       0       0       0       0       0       0       0       0
634          UI       0       0       0       0       0       0       0       0       0       0
635          UI       0       0       0       0       0       0       0       0       0       0
636          UI       0       0       0       0       0       0       0       0       0       0
             *
             *

637          KK  RET02B  DIVERT
638          KM  RETAIN 100 YR 2 HR RUNOFF VOLUME
639          DT  02BRET    14.5       0
640          DI       0   10000
641          DQ       0   10000
             *
             *

642          KK   2BT12   ROUTE
643          KM  ROUTE FLOW IN EXCESS OF RETENTION CAPACITY AROUND EXISTING TRACKS TO WARNER
644          KM  AND ELLSWORTH ROADS
645          RS      10    FLOW      -1
646          RC   0.035   0.035   0.035   11520  0.0036
647          RX    0.00       5      10      15    1015    1020    1025    1030
648          RY    2.00    1.50    1.00    0.00    0.00    1.00    1.50    2.00
             *
             *

649          KK      75   BASIN
650          KM    BASIN 75
651          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
652          KM    L=1.97  Lca=1.55  S=25.2  Kn=0.060  LAG=74.3
653          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
654          KM
655          BA   1.970             .15
656          LG    0.10    0.15    8.00    0.12       3
657          UI       0      89      89      89     208     320     387     443     491     536
```

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 658        UI     592     663     736     896    1103    1129     954     839     758     696
 659        UI     617     554     496     444     391     309     237     158     155     147
 660        UI     136      89      89      89      41      27      27      27      27      27
 661        UI      27      27      27      27      27       0       0       0       0       0
            *

 662        KK      7A   BASIN
 663        KM    BASIN 7A
 664        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 665        KM    L=0.59  Lca=0.27  S=20.3  Kn=0.047  LAG=19.0
 666        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
 667        BA   0.085
```



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LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 668        LG   0.25    0.15    8.80    0.09      33
 669        UI      0      19      68     104     171     128      84      42      21      10
 670        UI      5       5       0       0       0       0       0       0       0       0
 671        UI      0       0       0       0       0       0       0       0       0       0
 672        UI      0       0       0       0       0       0       0       0       0       0
 673        UI      0       0       0       0       0       0       0       0       0       0
            *
            *

 674        KK  RET07A  DIVERT
 675        KM  RETAIN 100 YR 2 HR RUNOFF VOLUME + ADDITIONAL VOLUME
 676        DT  07ARET    17.2       0.0
 677        DI      0   10000
 678        DQ      0   10000
            *
            *

 679        KK   7AT12
 680        KM   ROUTE FLOW FROM BASIN 7A TO BASIN 12
 681        RS      1    FLOW      -1
 682        RC  0.030   0.015   0.030    1920   .0042
 683        RX      0    17.5      18      57      73     112   112.5     130
 684        RY    1.0    0.50     0.0     0.8     0.8     0.0     0.5     1.0
            *
            *

 685        KK      07   BASIN
 686        KM    BASIN 07
 687        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 688        KM    L=0.46  Lca=0.21  S=30.4  Kn=0.040  LAG=12.4
 689        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
 690        BA   0.116
 691        LG   0.24    0.19    6.60    0.20      47
 692        UI      0      69     203     334     189      68      22      10       0       0
 693        UI      0       0       0       0       0       0       0       0       0       0
 694        UI      0       0       0       0       0       0       0       0       0       0
 695        UI      0       0       0       0       0       0       0       0       0       0
 696        UI      0       0       0       0       0       0       0       0       0       0
            *
            *

 697        KK   RET07  DIVERT
 698        KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
 699        DT   07RET    17.2     0.0
 700        DI      0   10000
 701        DQ      0   10000
            *
            *

 702        KK    7T12
 703        KM   ROUTE FLOW FROM BASIN 5 TO BASIN 12
 704        RS      5    FLOW      -1
 705        RC  0.030   0.015   0.003    3160   .0036
 706        RX      0     7.5       8      38      43      73    73.5      81
 707        RY    0.8     0.5       0     0.6     0.6       0     0.5     0.8
            *
            *
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LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 708        KK      12   BASIN
 709        KM    BASIN 12
 710        KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 711        KM    L=0.63  Lca=0.21  S=25.4  Kn=0.042  LAG=15.2
 712        KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
 713        BA   0.157
 714        LG   0.26    0.25    6.00    0.25      57
 715        UI      0      60     187     344     315     184      72      32      11      11
 716        UI      0       0       0       0       0       0       0       0       0       0
 717        UI      0       0       0       0       0       0       0       0       0       0
 718        UI      0       0       0       0       0       0       0       0       0       0
 719        UI      0       0       0       0       0       0       0       0       0       0
            *
            *

 720        KK   RET12  DIVERT
 721        KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
 722        DT   12RET   14.20     0.0
 723        DI      0   10000
 724        DQ      0   10000
            *
            *

 725        KK    CP12
 726        KM    COMBINE HYDROGRAPHS 2BT12, BASIN 75, 7AT12, 7T12, AND RET12
 727        HC      5
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                 *
                 *

 728             KK   12T13
 729             KM  ROUTE FLOW FROM BASIN 12 TO BASIN 13
 730             RS       3    FLOW      -1
 731             RC   0.030   0.015   0.030    2600   .0014
 732             RX       0    17.5      18      57      73     112   112.5     130
 733             RY     2.0    1.00     0.5     0.0     0.0     0.5     0.8     2.0
                 *
                 *

 734             KK      06   BASIN
 735             KM    BASIN 08
 736             KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 737             KM    L=1.51  Lca=0.94  S=19.2  Kn=0.042  LAG=39.4
 738             KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
 739             BA   0.617
 740             LG    0.25    0.25    5.80    0.23      34
 741             UI       0      53      75     198     265     317     385     514     655     527
 742             UI     433     353     288     228     135      91      80      53      39      16
 743             UI      16      16      16      16       0       0       0       0       0       0
 744             UI       0       0       0       0       0       0       0       0       0       0
 745             UI       0       0       0       0       0       0       0       0       0       0
                 *
                 *
1                                                HEC-1 INPUT                                                    PAGE 17

LINE             ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 746             KK   RET08  DIVERT
 747             KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
 748             DT   08RET   55.69     0.0
 749             DI       0   10000
 750             DQ       0   10000
                 *
                 *

 751             KK     8T9
 752             KM  ROUTE FLOW FROM BASIN 8 TO BASIN 9
 753             RS       4    FLOW      -1
 754             RC   0.030   0.015   0.030    1410   .0053
 755             RX       0    17.5      18      57      73     112   112.5     130
 756             RY     1.0    0.50     0.0     0.8     0.8     0.0     0.5     1.0
                 *
                 *

 757             KK      09   BASIN
 758             KM    BASIN 09
 759             KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 760             KM    L=0.73  Lca=0.35  S=21.9  Kn=0.042  LAG=20.0
 761             KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
 762             BA   0.126
 763             LG    0.26    0.25    5.60    0.30      38
 764             UI       0      25      92     139     231     198     134      80      36      21
 765             UI       7       7       0       0       0       0       0       0       0       0
 766             UI       0       0       0       0       0       0       0       0       0       0
 767             UI       0       0       0       0       0       0       0       0       0       0
 768             UI       0       0       0       0       0       0       0       0       0       0
                 *
                 *

 769             KK   RET09  DIVERT
 770             KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
 771             DT   09RET    11.0     0.0
 772             DI       0   10000
 773             DQ       0   10000
                 *
                 *

 774             KK     CP9
 775             KM    COMBINE HYDROGRAPHS 8T9 AND RET09
 776             HC       2
                 *
                 *

 777             KK    9T13
 778             KM  ROUTE FLOW FROM BASIN 9 TO BASIN 13
 779             RS       6    FLOW      -1
 780             RC   0.030   0.015   0.030    4020   .0045
 781             RX       0    17.5      18      57      73     112   112.5     130
 782             RY     1.0    0.50     0.0     0.8     0.8     0.0     0.5     1.0
                 *
                 *
1                                                HEC-1 INPUT                                                    PAGE 18

LINE             ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 783             KK    13   BASIN
 784             KM    BASIN 13
 785             KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 786             KM    L=0.70  Lca=0.42  S=30.0  Kn=0.053  LAG=25.1
 787             KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
 788             BA   0.200
 789             LG    0.29    0.25    5.00    0.41      49
 790             UI       0      27      90     146     196     309     262     192     139      77
 791             UI      45      28      12       8       8       0       0       0       0       0
 792             UI       0       0       0       0       0       0       0       0       0       0
 793             UI       0       0       0       0       0       0       0       0       0       0
 794             UI       0       0       0       0       0       0       0       0       0       0
                 *
                 *
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 795          KK   RET13  DIVERT
 796          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
 797          DT   13RET   16.00     0.0
 798          DI       0   10000
 799          DQ       0   10000
              *
              *

 800          KK    11   BASIN
 801          KM    BASIN 11
 802          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 803          KM    L-1.27  Lca=0.63  S=22.0  Kn=0.026  LAG=19.1
 804          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
 805          BA   0.308
 806          LG    0.24    0.25    5.70    0.25      57
 807          UI       0      69     244     372     615     466     307     155      78      37
 808          UI      17      17       0       0       0       0       0       0       0       0
 809          UI       0       0       0       0       0       0       0       0       0       0
 810          UI       0       0       0       0       0       0       0       0       0       0
 811          UI       0       0       0       0       0       0       0       0       0       0
              *
              *

 812          KK   RET11  DIVERT
 813          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
 814          DT   11RET   32.92     0.0
 815          DI       0   10000
 816          DQ       0   10000
              *
              *

 817          KK   11T13
 818          KM  ROUTE FLOW FROM RET11 TO CP13
 819          RS       2    FLOW      -1
 820          RC   0.030   0.015   0.030    1410   .0050
 821          RX       0    17.5      18      57      73     112   112.5     130
 822          RY     1.0    0.50     0.0     0.8     0.8     0.0     0.5     1.0
              *
              *
1                                          HEC-1 INPUT                                                    PAGE 19

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 823          KK    CP13
 824          KM    COMBINE HYDROGRAPHS 12T13, 9T13, 11T13, AND RET13
 825          HC       4
              *
              *

 826          KK   13T75
 827          KM  ROUTE FLOW FROM BASIN 13 TO BASIN CP75
 828          RS       1    FLOW      -1
 829          RC   0.030   0.015   0.030    1230   .0016
 830          RX       0    17.5      18      57      73     112   112.5     130
 831          RY     2.0    1.00     0.5     0.0     0.0     0.5     0.8     2.0
              *
              *

 832          KK      14   BASIN
 833          KM    BASIN 14
 834          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 835          KM    L=0.35  Lca=0.12  S=25.7  Kn=0.034  LAG=07.9
 836          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
 837          BA   0.093
 838          LG    0.20    0.25    5.20    0.34      80
 839          UI       0     136     378     166      31       0       0       0       0       0
 840          UI       0       0       0       0       0       0       0       0       0       0
 841          UI       0       0       0       0       0       0       0       0       0       0
 842          UI       0       0       0       0       0       0       0       0       0       0
 843          UI       0       0       0       0       0       0       0       0       0       0
              *
              *

 844          KK   RET14  DIVERT
 845          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
 846          DT   14RET    9.80     0.0
 847          DI       0   10000
 848          DQ       0   10000
              *
              *

 849          KK    CP75 COMBINE
 850          KM  COMBINE HYDROGRAPHS 74CT75, 10T75, 13T75, AND RET14
              * KO      2
 851          HC       4
              *
              * ***********************************************************************
              *

 852          KK     77A
 853          KM  BASIN 77A
 854          KM  THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 855          KM  L=      2.9  Lca=      1.5   S=   31.1  Kn= .092  LAG= 119.0
 856          KM  PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
 857          BA    1.74
 858          LG     .35     .36    5.00     .27     .00
 859          UI     49.     49.     49.     49.     49.    108.    162.    185.    205.    230.
1                                          HEC-1 INPUT                                                    PAGE 20

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 860          UI    244.    264.    278.    293.    311.    333.    358.    380.    406.    462.
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```
861          UI    537.    584.    659.    601.    541.    496.    461.    430.    407.    385.
862          UI    362.    334.    311.    293.    273.    252.    238.    226.    189.    161.
863          UI    141.    104.     87.     87.     83.     81.     81.     73.     49.     49.
864          UI     49.     49.     49.     22.     15.     15.     15.     15.     15.     15.
865          UI     15.     15.     15.     15.     15.     15.     15.     15.     15.     15.
866          UI     15.      0.      0.      0.      0.      0.      0.      0.      0.      0.
867          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             *
             *

868          KK   77ATB   ROUTE
869          KM  ROUTE BASIN 77A THROUGH THE KEIGHLEY PLACE SUBDIVISION FROM MERIDIAN ROAD TO
870          KM  TO MOUNTAIN ROAD.
871          RS       1    FLOW      -1
872          RC   0.045   0.040   0.045    3000  0.0050    0.00
873          RX    0.00    5.00   10.00   37.00   47.00   74.00   79.00   84.00
874          RY    5.50    5.00    4.50    0.00    0.00    4.50    5.00    5.50
             *
             *

875          KK     77B   BASIN
876          KM  BASIN 77B
877          KM  THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
878          KM  L=0.56  Lca=0.26  S=28.6  Kn=0.047  LAG=17.2
879          KM  PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
880          BA   0.349
881          LG    0.19    0.25    5.40    0.30      18
882          UI     100     337     536     757     486     273     113      54      20      21
883          UI       0       0       0       0       0       0       0       0       0       0
             *
             *

884          KK  RET77B  DIVERT
885          KM  RETAIN 80% OF THE 100 YR 2 HR RUNOFF VOLUME
886          DT  77BRET    16.5     0.0
887          DI       0   10000
888          DQ       0   10000
             *
             *

889          KK   CF77B COMBINE
890          KM  COMBINE HYDROGRAPHS 77ATB AND 77B.
891          HC       2
             *
             *

892          KK   77BTC   ROUTE
893          KM  ROUTE FLOW THROUGH THE MOUNTAIN HORIZONS (SOUTH) DEVELOPEMENT FROM MOUNTAIN
894          KM  ROAD TO SIGNAL BUTTE ROAD.
895          RS       3    FLOW      -1
896          RC   0.045   0.040   0.045    4750  0.0042    0.00
897          RX    0.00    5.00   10.00   20.00   85.00  105.00  110.00  115.00
898          RY    5.00    4.00    3.00    0.00    0.00    3.00    4.00    5.00
             *
             *
```



```
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

899          KK     77C   BASIN
900          KM  BASIN 77C
901          KM  THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
902          KM  L=0.76  Lca=0.51  S=23.7  Kn=0.040  LAG=22.0
903          KM  PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
904          BA   0.279
905          LG    0.25    0.25    6.00    0.21      30
906          UI      42     172     257     388     485     324     228     119      66      38
907          UI      14      13      13       0       0       0       0       0       0       0
             *
             *

908          KK  RET77C  DIVERT
909          KM  RETAIN 80% OF THE 100 YR 2 HR RUNOFF VOLUME
910          DT  77CRET    16.8     0.0
911          DI       0   10000
912          DQ       0   10000
             *
             *

913          KK    C77C COMBINE
914          KM  COMBINE HYDROGRAPHS 77BTC AND 77C
915          HC       2
             *
             *

916          KK  77CT78   ROUTE
917          KM  ROUTE FLOW SOUTH ALONG THE WEST SIDE OF SIGNAL BUTTE ROAD IN AN ENGINEERED
918          KM  CHANNEL FROM RAY ROAD TO WILLIAMS FIELD ROAD.
919          RS       4    FLOW      -1
920          RC   0.032   0.032   0.032    4435  0.0020    0.00
921          RX    0.00    5.00   10.00   24.00  124.00  138.00  143.00  148.00
922          RY    4.50    4.00    3.50    0.00    0.00    3.50    4.00    4.50
             *
             *

923          KK     78A
924          KM  BASIN 78A
925          KM  THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
926          KM  L=      3.3  Lca=      1.3   S=   30.2  Kn= .090  LAG= 118.0
927          KM  PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
928          BA    1.88
929          LG     .35     .36    5.00     .27     .00
930          UI     54.     54.     54.     54.     54.    124.    176.    203.    227.    252.
```

```
931          UI    268.    290.    305.    322.    342.    366.    396.    417.    451.    515.
932          UI    612.    641.    716.    643.    579.    531.    494.    464.    437.    417.
933          UI    385.    356.    334.    315.    290.    270.    255.    233.    206.    159.
934          UI    153.     95.     95.     95.     88.     88.     88.     65.     54.     54.
935          UI     54.     54.     45.     16.     16.     16.     16.     16.     16.     16.
936          UI     16.     16.     16.     16.     16.     16.     16.     16.     16.     16.
937          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
938          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             *
             *
1                                          HEC-1 INPUT                                          PAGE 22

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

939          KK   78ATB   ROUTE
940          KM  ROUTE FLOW FROM 78A TO 78B VIA WASH CROSSING COUNTY LINE
941          RS       7    FLOW      -1
942          RC   0.045   0.040   0.045    3500  0.0042    0.00
943          RX    0.00  500.00  980.00 1003.00 1007.00 1031.00 1511.00 2011.00
944          RY    4.50    3.50    3.00    0.00    0.00    3.00    3.50    4.50
             *
             *

945          KK     78B   BASIN
946          KM  BASIN 78B
947          KM  THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
948          KM  L=0.60  Lca=0.40  S=31.7  Kn=0.050  LAG=21.7
949          KM  PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
950          BA   0.396
951          LG    0.30    0.17    6.80    0.15      15
952          UI      61     254     371     576     682     457     315     156      90      48
953          UI      20      19       0       0       0       0       0       0       0       0
             *
             * CURRENTLY THERE IS NO EXISTING RETENTION OR PLANNED RETENTION FOR BASIN 78B
             * DUE TO THE CURRENT LAND USE OF LARGE LOT RESIDENTIAL.
             *

954          KK    C78B COMBINE
955          KM  COMBINE HYDROGRAPHS 78ATB AND 78B
956          HC       2
             *
             *

957          KK   78BTC   ROUTE
958          KM  ROUTE 78B TO 78C VIA WASH CROSSING MOUNTAIN ROAD, THEN SOUTH ALONG
959          KM  WESTERN EDGE OF 78C.
960          RS       3    FLOW      -1
961          RC   0.035   0.022   0.035    4500  0.0033    0.00
962          RX    0.00  100.00  110.00  115.00  120.00  125.00  130.00  135.00
963          RY    5.00    4.00    3.50    0.00    0.00    3.50    8.00    9.00
             *
             *

964          KK     78C   BASIN
965          KM  BASIN 78C
966          KM  THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
967          KM  L=0.50  Lca=0.30  S=31.8  Kn=0.048  LAG=17.4
968          KM  PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
969          BA   0.288
970          LG    0.18    0.15    7.60    0.14       6
971          UI      80     273     428     624     405     236      96      48      17      16
972          UI       0       0       0       0       0       0       0       0       0       0
             *
             *
1                                          HEC-1 INPUT                                          PAGE 23

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

973          KK  RET78C  DIVERT
974          KM  RETAIN 80% OF THE 100 YR 2 HR RUNOFF VOLUME
975          DT  78CRET     2.2     0.0
976          DI       0   10000
977          DQ       0   10000
             *
             *

978          KK    C78C COMBINE
979          KM  COMBINE HYDROGRAPHS 78BTC AND 78C.
980          HC       2
             *
             *

981          KK   C78C2 COMBINE
982          KM  COMBINE HYDROGRAPHS 77CT78 AND C78C.
             * KO      2
983          HC       2
             *
             *

984          KK  78CT79   ROUTE
985          KM  ROUTE 78C TO 79A FROM SIGNAL BUTTE ROAD TO THE PROPERTY BOUNDARY APPROXIMATEL
986          KM  1/4 MILE TO THE WEST OF SIGNAL BUTTE ROAD VIA ENGINEERED CHANNEL.
987          RS       2    FLOW      -1
988          RC   0.032   0.032   0.032    4215  0.0033    0.00
989          RX    0.00    5.00   10.00   26.00   81.00   97.00  102.00  107.00
990          RY    5.00    4.50    4.00    0.00    0.00    4.00    4.50    5.00
             *
             * ***********************************************************************
             *

991          KK      20   BASIN
992          KM    BASIN 20
```

```
 993          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 994          KM    L=1.02  Lca=0.45  S=17.6  Kn=0.044  LAG=27.3
 995          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
 996          BA   0.306
 997          LG    0.25    0.15    8.00    0.10      32
 998          UI       0      38     110     194     253     365     440     317     238     173
 999          UI      88      62      38      17      12      12      12       0       0       0
1000          UI       0       0       0       0       0       0       0       0       0       0
1001          UI       0       0       0       0       0       0       0       0       0       0
1002          UI       0       0       0       0       0       0       0       0       0       0
              *
              *

1003          KK   RET20  DIVERT
1004          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
1005          DT   20RET   23.90     0.0
1006          DI       0   10000
1007          DQ       0   10000
              *
              * ***********************************************************************
              *
1                                          HEC-1 INPUT                                          PAGE 24

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1008          KK      16   BASIN
1009          KM    BASIN 16
1010          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1011          KM    L=0.44  Lca=0.21  S=34.1  Kn=0.045  LAG=13.4
1012          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1013          BA   0.106
1014          LG    0.25    0.17    6.80    0.16      31
1015          UI       0      54     160     285     188      84      33       8       8       0
1016          UI       0       0       0       0       0       0       0       0       0       0
1017          UI       0       0       0       0       0       0       0       0       0       0
1018          UI       0       0       0       0       0       0       0       0       0       0
1019          UI       0       0       0       0       0       0       0       0       0       0
              *
              *

1020          KK   RET16  DIVERT
1021          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
1022          DT   16RET    8.20     0.0
1023          DI       0   10000
1024          DQ       0   10000
              *
              *

1025          KK      18   BASIN
1026          KM    BASIN 18
1027          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1028          KM    L=0.72  Lca=0.33  S=25.0  Kn=0.045  LAG=20.4
1029          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1030          BA   0.320
1031          LG    0.25    0.25    5.80    0.24      27
1032          UI       0      60     226     341     561     514     348     218      96      59
1033          UI      21      16      16       0       0       0       0       0       0       0
1034          UI       0       0       0       0       0       0       0       0       0       0
1035          UI       0       0       0       0       0       0       0       0       0       0
1036          UI       0       0       0       0       0       0       0       0       0       0
              *
              *

1037          KK   RET18  DIVERT
1038          KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
1039          DT   18RET   24.70     0.0
1040          DI       0   10000
1041          DQ       0   10000
              *
              *

1042          KK   18T19   ROUTE
1043          KM  ROUTE FLOW FROM BASIN 18 TO BASIN 19
1044          RS       1    FLOW      -1
1045          RC   0.030   0.015   0.003    1040   .0040
1046          RX       0     7.5       8      38      43      73    73.5      81
1047          RY     0.8     0.5       0     0.6     0.6       0     0.5     0.8
              *
              *
1                                          HEC-1 INPUT                                          PAGE 25

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

1048          KK   CP19A COMBINE
1049          KM  COMBINE HYDROGRAPHS RET16 AND 18T19
              * KO      2
1050          HC       2
              *
              *

1051          KK      19   BASIN
1052          KM    BASIN 19
1053          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
1054          KM    L=0.50  Lca=0.20  S=20.0  Kn=0.044  LAG=14.9
1055          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
1056          BA   0.102
1057          LG    0.24    0.15    8.40    0.09      40
1058          UI       0      41     126     233     201     114      44      18       7       0
1059          UI       0       0       0       0       0       0       0       0       0       0
1060          UI       0       0       0       0       0       0       0       0       0       0
1061          UI       0       0       0       0       0       0       0       0       0       0
1062          UI       0       0       0       0       0       0       0       0       0       0
```

```
*
*

KK   RET19  DIVERT
KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
* KO     2
DT   19RET    8.40     0.0
DI       0   10000
DQ       0   10000
*
*

KK      17   BASIN
KM    BASIN 17
KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
KM    L=0.92  Lca=0.47  S=19.6  Kn=0.045  LAG=26.8
KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
BA   0.135
LG    0.25    0.25    4.10    0.55      30
UI       0      17      51      88     116     172     191     138     102      72
UI      36      25      17       5       5       5       5       0       0       0
UI       0       0       0       0       0       0       0       0       0       0
UI       0       0       0       0       0       0       0       0       0       0
UI       0       0       0       0       0       0       0       0       0       0
*
*

KK   RET17  DIVERT
KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
* KO     2
DT   17RET   12.47     0.0
DI       0   10000
DQ       0   10000
*
```

```
          1085          ZZ
1
                SCHEMATIC DIAGRAM OF STREAM NETWORK
INPUT
 LINE     (V) ROUTING          (--->| DIVERSION OR PUMP FLOW

 NO.      (.) CONNECTOR        (<---| RETURN OF DIVERTED OR PUMPED FLOW

 461        73A
             V
             V
 475       73ATB
             .
             .
 482         .          73B
             .            .
             .            .
 493         .            .-------> 73BRET
 491         .       RET73B
             .            .
             .            .
 496       CP73B............
             V
             V
 499       73BTC
             .
             .
 506         .          73C
             .            .
             .            .
 518         .            .-------> 73CRET
 516         .       RET73C
             .            .
             .            .
 521       CP73C............
             V
             V
 524      73T74C
             .
             .
 531         .          74A
             .            V
             .            V
 545         .       74ATB
             .            .
             .            .
 553         .            .         74B
             .            .          .
             .            .          .
 565         .            .          .-------> 74BRET
 563         .            .      RET74B
             .            .          .
             .            .          .
 568         .       CP74B............
             .            V
             .            V
 571         .       74BTC
             .            .
             .            .
 578         .            .         74C
             .            .          .
             .            .          .
 590         .            .          .-------> 74CRET
 588         .            .      RET74C
             .            .          .
             .            .          .
 593       CP74C........................
             V
             V
 596      74CT75
             .
             .
 602         .         10
             .            .
             .            .
 616         .            .-------> 10RET
 614         .       RET10
             .            V
             .            V
 619         .       10T75
             .            .
             .            .
 625         .            .         02B
             .            .          .
             .            .          .
 639         .            .          .-------> 02BRET
 637         .            .      RET02B
             .            .          V
             .            .          V
 642         .            .      2BT12
             .            .          .
             .            .          .
 649         .            .          .         75
             .            .          .          .
             .            .          .          .
 662         .            .          .          .         7A
             .            .          .          .          .
             .            .          .          .          .
 676         .            .          .          .          .-------> 07ARET
 674         .            .          .          .     RET07A
             .            .          .          .          V
             .            .          .          .          V
 679         .            .          .          .     7AT12
             .            .          .          .          .
```

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685                                                  07
                                                      .
699                                                   .-------> 07RET
697                                             RET07
                                                      V
                                                      V
702                                              7T12
                                                      .
708                                                   .          12
                                                      .           .
722                                                   .           .-------> 12RET
720                                                   .       RET12
                                                      .           .
725                                       CP12.......................................
                                                 V
                                                 V
728                                       12T13
                                                 .
734                                                 08
                                                    .
748                                                 .-------> 08RET
746                                               RET08
                                                    V
                                                    V
751                                                 8T9
                                                    .
757                                                 .          09
                                                    .           .
771                                                 .           .-------> 09RET
769                                                 .       RET09
                                                    .           .
774                                                 CP9............
                                                    V
                                                    V
777                                               9T13
                                                    .
783                                                 .       13
                                                    .           .
797                                                 .           .-------> 13RET
795                                                 .       RET13
                                                    .           .
800                                                 .           .        11
                                                    .           .         .
814                                                 .           .         .-------> 11RET
812                                                 .           .       RET11
                                                    .           .           V
                                                    .           .           V
817                                                 .           .       11T13
                                                    .           .         .
823                                       CP13...................................
                                                 V
                                                 V
826                                       13T75
                                                 .
832                                                 14
                                                    .
846                                                 .-------> 14RET
844                                               RET14
                                                    .
849                 CP75...................................
                                                 .
852                                         77A
                                                 V
                                                 V
868                                       77ATB
                                                 .
875                                                 .         77B
                                                    .          .
886                                                 .          .-------> 77BRET
884                                               RET77B
                                                    .          .
889                                       CP77B............
                                                 V
                                                 V
892                                       77BTC
                                                 .
899                                                 .         77C
                                                    .          .
910                                                 .          .-------> 77CRET
908                                               RET77C
```

```
                .           .           .
                .           .           .
 913            .       C77C............
                .           V
                .           V
 916            .      77CT78
                .           .
                .           .
 923            .           .        78A
                .           .         V
                .           .         V
 939            .           .      78ATB
                .           .           .
                .           .           .
 945            .           .           .        78B
                .           .           .          .
                .           .           .          .
 954            .           .      C78B............
                .           .         V
                .           .         V
 957            .           .      78BTC
                .           .           .
                .           .           .
 964            .           .           .        78C
                .           .           .          .
                .           .           .          .
 975            .           .           .          .-------> 78CRET
 973            .           .           .     RET78C
                .           .           .          .
                .           .           .          .
 978            .           .      C78C............
                .           .           .
                .           .           .
 981            .      C78C2............
                .           V
                .           V
 984            .      78CT79
                .           .
                .           .
 991            .           .         20
                .           .           .
                .           .           .
1005            .           .           .-------> 20RET
1003            .           .      RET20
                .           .           .
                .           .           .
1008            .           .           .         16
                .           .           .          .
                .           .           .          .
1022            .           .           .          .-------> 16RET
1020            .           .           .     RET16
                .           .           .          .
                .           .           .          .
1025            .           .           .          .         18
                .           .           .          .          .
                .           .           .          .          .
1039            .           .           .          .          .-------> 18RET
1037            .           .           .          .     RET18
                .           .           .          .          V
                .           .           .          .          V
1042            .           .           .          .     18T19
                .           .           .          .          .
                .           .           .          .          .
1048            .           .           .     CP19A............
                .           .           .          .
                .           .           .          .
1051            .           .           .          .         19
                .           .           .          .          .
                .           .           .          .          .
1065            .           .           .          .          .-------> 19RET
1063            .           .           .          .     RET19
                .           .           .          .          .
                .           .           .          .          .
1068            .           .           .          .          .         17
                .           .           .          .          .          .
                .           .           .          .          .          .
1082            .           .           .          .          .          .-------> 17RET
1080            .           .           .          .          .     RET17
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUN   1998               *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   16APR14  TIME  10:57:55   *
*                                       *
*****************************************
```

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****************************************
*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*    HYDROLOGIC ENGINEERING CENTER     *
*          609 SECOND STREET           *
*       DAVIS, CALIFORNIA 95616        *
*          (916) 756-1104              *
*                                      *
****************************************
```

FILE: DU34INT.DAT

MODEL REVISED: 04-16-2014

PROJECT: MASTER DRAINAGE REPORT FOR DU 3/4 AT EASTMARK

THIS MODEL IS AN EXERPT OF THE FULL BUILD OUT MODEL. NO REFERENCE TO OTHER MODELS IS REQUIRED TO RUN THIS MODEL

MODEL REVISION DESCRIPTION:

THIS IS AN INTERIM CONDITION MODEL WHICH REFLECTS THE FLOOD CONTROL DISTRICT'S FULL BUILD OUT MODEL FOR AREA OUTSIDE OF EASTMARK. IT INCLUDES ONSITE MODELING FOR AREAS THAT HAVE HAD DETAILED MASTER PLANS PREPARED AND THE REMAINING ONSITE IS CONTEMPLATED AS EXISTING LAND USE.

MODEL REVISED BY:
WOOD, PATEL & ASSOCIATES, INC.
DANIEL MATTHEWS, P.E.

FILE PATH:
R:\MESA PROVING GROUNDS\2011\113697.09\PROJECT SUPPORT\REPORTS\DRAINAGE\
DU 3-4 DRAINAGE MASTER PLAN\HYDROLOGY\INTERIM\DU34INT.DAT

****

FILE: EMDU34.DAT

MODEL REVISED: 04-14-2014

PROJECT: EASTMARK MASTER DRAINAGE UPDATE FOR DEVELOPMENT UNIT 3/4

THIS IS A POST DEVELOPED MODEL REVISION TO REFLECT PLANNED LAND USES FOR DEVELOPMENT UNIT 3/4 (DU-3/4).

MODEL REVISION DESCRIPTION:

THIS MODEL IS AN EXERPT OF THE MODEL PROVIDED BY THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY (WS4-SEM.DAT). LAND USES FOR DU-3S ARE CONSISTENT WITH THE PREVIOUS MODEL (EMDU3S.DAT) THEREFORE RESULTING PEAK FLOWS HAVE REMAINED THE SAME.

MODEL REVISED BY:
WOOD, PATEL & ASSOCIATES, INC.
DANIEL MATTHEWS, P.E.

FILE PATH:
R:\MESA PROVING GROUNDS\2011\113697.09\PROJECT SUPPORT\REPORTS\
EASTMARK OVERALL DRAINAGE MASTER UPDATE\HYDROLOGY\PROPOSED\EMDU34.DAT

****

FILE: EMDU3S.DAT

MODEL REVISED: 12-11-2013

PROJECT: EASTMARK MASTER DRAINAGE UPDATE FOR DEVELOPMENT UNIT 3 SOUTH

THIS IS A POST DEVELOPED MODEL REVISION TO REFLECT PLANNED LAND USES FOR DEVELOPMENT UNIT 3 SOUTH (DU-3S).

MODEL REVISION DESCRIPTION:

THIS MODEL IS AN EXERPT OF THE MODEL PROVIDED BY THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY (WS4-SEM.DAT). LAND USES FOR DU-3S ARE CONSISTENT WITH THE PREVIOUS MODEL (EMDU89.DAT) THEREFORE RESULTING PEAK FLOWS HAVE REMAINED THE SAME.

MODEL REVISED BY:
WOOD, PATEL & ASSOCIATES, INC.
DANIEL MATTHEWS, P.E.

FILE PATH:
R:\MESA PROVING GROUNDS\2011\113697.08\PROJECT SUPPORT\REPORTS\
EASTMARK OVERALL DRAINAGE MASTER UPDATE\HYDROLOGY\PROPOSED\EMDU3S.DAT

****

FILE: EMDU89.DAT

MODEL REVISED: 1-22-2013

PROJECT: EASTMARK 646

THIS IS A POST DEVELOPED MODEL REVISION TO REFLECT UPDATED PLANNING FOR DEVELOPMENT UNITS 8&9 (DU 8&9).

MODEL REVISION DESCRIPTION:

THIS MODEL IS AN EXERPT OF THE MODEL PROVIDED BY THE FLOOD CONTROL
DISTRICT OF MARICOPA COUNTY (WS4-SEM.DAT). ONSITE WATERSHEDS WERE
UPDATED TO REFLECT CURRENT PLAN FOR DEVELOPMENT UNITS 8 & 9.

MODEL REVISED BY:
WOOD, PATEL & ASSOCIATES, INC.
DARREN E. SMITH, P.E.

FILE PATH:
R:\MESA PROVING GROUNDS\2012\123835\PROJECT SUPPORT\REPORTS\
DRAINAGE\HYDROLOGY\PROPOSED\EMDU89.DAT

****

FILE: MPGDU7.DAT

MODEL REVISED: 09-07-2011

PROJECT: MESA PROVING GROUNDS

THIS MODEL SHOULD REPLACE WS4-SEM.DAT IN THE HEC-1 RUN SEQUENCE SPECIFIE
BELOW. REFERENCING WS2-NEM.DSS IS STILL REQUIRED.

THIS IS A POST DEVELOPED MODEL REVISION TO REFLECT UPDATED PLANNING
FOR DEVELOPMENT UNIT 7 (DU7)PROVIDED BY ARIZONA LAND DESIGN ON 09/02/201
09/02/2011.

MODEL REVISION DESCRIPTION:

THIS MODEL IS AN EXERPT OF THE MODEL PROVIDED BY THE FLOOD CONTROL
DISTRICT OF MARICOPA COUNTY (WS4-SEM.DAT). ONSITE WATERSHEDS WERE
UPDATED TO REFLECT A GRADING PLAN PROVIDED BY LD TEAM ON 8/30/2011.
MODELING OF THE POWERLINE FLOODWAY HAS BEEN UPDATED TO REFLECT THE
EXISTING SECTIONS AND SLOPE PER AS-BUILT DRAWINGS ACROSS THE MPG
SITE.

MODEL REVISED BY:
WOOD, PATEL & ASSOCIATES, INC.
DANIEL W. MATTHEWS, E.I.T.

FILE PATH:
R:\MESA PROVING GROUNDS\2011\113697\PROJECT SUPPORT\REPORTS\
DRAINAGE\HYDROLOGY\MPGDU7.DAT

****

FILE: MPG20RT2.DAT

MODEL REVISED: 04-25-2011

PROJECT: MESA PROVING GROUNDS

THIS MODEL SHOULD REPLACE WS4-SEM.DAT IN THE HEC-1 RUN SEQUENCE SPECIFIE
BELOW. REFERENCING WS2-NEM.DSS IS STILL REQUIRED.

THIS IS A 100-YEAR, 2-HOUR RETENTION SCENARIO MODEL USING
THE 20MSF COMMERCIAL SPACE AND 15K DU LAND PLAN PROVIDED
BY SWABACK PARTNERS ON 12/12/07.

MODEL REVISION DESCRIPTION:

THIS MODEL IS AN EXERPT OF THE MODEL PROVIDED BY THE FLOOD CONTROL
DISTRICT OF MARICOPA COUNTY (WS4-SEM.DAT). ONSITE WATERSHEDS 01 AND
20 WERE UPDATED TO REFLECT THE INCORPORATION OF THE FIRST SOLAR SITE
IN THE NORTHEAST CORNER OF DU-6. WATERSHED 02 WAS SPLIT INTO 02A AND
02B. LAND USE WAS CHANGED TO INDUSTRIAL FOR 02B AND ENTIRELEY
RESIDENTIAL FOR 02A.
THE FIRST SOLAR SITE RUNOFF WILL NOW BE RETAINED ENTIRELY ONSITE.

MODEL REVISED BY:
WOOD, PATEL & ASSOCIATES, INC.
STEPHEN M. SCINTO, P.E.

FILE PATH:
R:\MESA PROVING GROUNDS\2010\103564.04\PROJECT SUPPORT\REPORTS\
DRAINAGE\HYDROLOGY\POST-DEVELOPED 100Y82HR RETENTION MODEL\
MPG20RT2.DAT

****

FILE: MPG20RT2.DAT

MODEL REVISED: 09-16-08

PROJECT: MESA PROVING GROUNDS

THIS MODEL SHOULD REPLACE WS4-SEM.DAT IN THE HEC-1 RUN SEQUENCE SPECIFIE
BELOW. REFERENCING WS2-NEM.DSS IS STILL REQUIRED.

THIS IS A 100-YEAR, 2-HOUR RETENTION SCENARIO MODEL USING
THE 20MSF COMMERCIAL SPACE AND 15K DU LAND PLAN PROVIDED
BY SWABACK PARTNERS ON 12/12/07.

MODEL REVISION DESCRIPTION:

THIS MODEL IS AN EXERPT OF THE MODEL PROVIDED BY THE FLOOD CONTROL
DISTRICT OF MARICOPA COUNTY (WS4-SEM.DAT). ONSITE WATERSHEDS 01, 02,
03, AND 06 WERE UPDATED TO REFLECT THE CURRENT GOLF COURSE
CONFIGURATION.

MODEL REVISED BY:
WOOD, PATEL & ASSOCIATES, INC.
DANIEL W. MATTHEWS, E.I.T.

FILE PATH:
R:\MESA PROVING GROUNDS\2006\062753\PROJECT SUPPORT\HYDRO\MDR-20-15 LAND PLAN\2ND SUBMITTAL(COM)\HYDROLOGY\MPG20RT2.DAT

****

FILE: MPG20RT2.DAT

MODEL REVISED: 05-15-08

PROJECT: MESA PROVING GROUNDS

MODEL REVISION DESCRIPTION:

THIS MODEL SHOULD REPLACE WS4-SEM.DAT IN THE HEC-1 RUN SEQUENCE SPECIFIE BELOW. REFERENCING WS2-NEM.DSS IS STILL REQUIRED.

THIS IS A 100-YEAR, 2-HOUR RETENTION SCENARIO MODEL USING THE 20MSF COMMERCIAL SPACE AND 15K DU LAND PLAN PROVIDED BY SWABACK PARTNERS ON 12/12/07.

THIS MODEL IS AN EXERPT OF THE MODEL PROVIDED BY THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY (WS4-SEM.DAT). WATERSHED 79A WAS UPDATED AS REQUESTED BY FLOOD CONTROL DISTRICT OF MARICOPA COUNTY TO REDUCE THE PERCENT IMPERVIOUS VALUE FROM 80% TO 0% TO MATCH THE LAND USE AS MODELED WITHIN THE EAST MESA ADMP.

MODEL REVISED BY:
WOOD, PATEL & ASSOCIATES, INC.
DANIEL W. MATTHEWS, E.I.T.

FILE PATH:
R:\MESA PROVING GROUNDS\2006\062753\PROJECT SUPPORT\HYDRO\MDR-20-15 LAND PLAN\2ND SUBMITTAL\POST-DEVELOPED 100YR2HR RETENTION MODEL (MPG20RT2)\MPG20RT2.DAT

****

FILE: MPG20RT2.DAT

MODEL REVISED: 01-08-08

PROJECT: MESA PROVING GROUNDS

MODEL REVISION DESCRIPTION:

THIS MODEL SHOULD REPLACE WS4-SEM.DAT IN THE HEC-1 RUN SEQUENCE SPECIFIE BELOW. REFERENCING WS2-NEM.DSS IS STILL REQUIRED.

THIS IS A 100-YEAR, 2-HOUR RETENTION SCENARIO MODEL USING THE 20MSF COMMERCIAL SPACE AND 15K DU LAND PLAN PROVIDED BY SWABACK PARTNERS ON 12/12/07.

THIS MODEL IS AN EXERPT OF THE MODEL PROVIDED BY THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY (WS4-SEM.DAT). WATERSHEDS 68A, 68B, 70A, 70B, 71, 73B, 73C, 74B, 74C, 75, 77B, 77C, 78B, 78C, AND 79A HAVE ALL BEEN UPDATED TO REFLECT CURRENT WATERSHED DELINEATIONS, NEW DEVELOPMENT, CURRENT RETENTION, AND FLOOD ROUTING. BASIN 75 HAS BEEN UPDATED TO REFLECT PLANNED DEVELOPEMENT FOR THE MESA PROVING GROUNDS SITE.

MODEL REVISED BY:
WOOD, PATEL & ASSOCIATES, INC.
DANIEL W. MATTHEWS, E.I.T.

FILE PATH:
R:\MESA PROVING GROUNDS\2006\062753\PROJECT SUPPORT\HYDRO\MDR-20-15 LAND PLAN\HYDROLOGY\POST-DEVELOPED 100YR2HR RETENTION MODEL (MPG20RT2)\MPG20RT2.DAT

****

ID Kirkham Michael:
Last Revised Date: 1/22/03
Filename: WS4-SEM.DAT

Comments Dated 1/22/03 (CJ)

This model should be used ONLY for the Rittenhouse and Chandler Heights Basin Design Project - Final Design Analyses.

This model is one of several models that represent the EMF watershed. This model covers the Southeast Mesa Area and should reference as a DSS the watershed model for the Northeast Mesa Area (Filename WS2-NEM.DAT).

This model is necessary to determine the input hydrographs for the Rittenhouse Basin Design HEC-RAS Unsteady State analysis. To develop the necessary input hydrographs the following models should be run in order. Because the files utilize a TAPE21 file to export import hydrographs between models, prior to running the FIRST model (WS1-NWM.DAT) any existing TAPE21 file in the directory should be deleted. The run procedure order is:

1) WS1-NWM.DAT
2) WS2-NEM.DAT
3) WS3-QCSW.DAT
4) WS4-SEM.DAT (referencing WS2-NEM.DSS for the DSS file)
5) RT1-BASE.DAT

The necessary input hydrographs for the Rittenhouse Basin analysis are determined in RT1-BASE. In that output file, the hydrograph at RWFLD1 should be exported and used as the input hydrograph at the EMF Reach 4 Cross Section 17.082. And the hydrograph at RITTEN should be exported and used as the input hydrograph for the Rittenhouse Main Channel at Cross Section 820.00

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*****************************************************************************
**** NOTE BY PRIMATECH ENGINEERS:                                          ****
**** DATE: 06/12/2001                                                      ****
**** THE NEW FILE NAME IS: SEBTALT2.DAT                                    ****
**** THE FILE WAS RENAMED AS <<RTBTALT2.DAT>> FOR THE EAST MARICOPA        ****
**** FLOODWAY CAPACITY MITIGATION PROJECT, BY FLOOD CONTROL DISTRICT OF    ****
**** MARICOPA COUNTY.                                                      ****
**** THE FILE WAS RENAMED <<RTBTALT3.DAT>> AND UPDATED USING GREEN AND     ****
**** AMPT FUTURE CONDITIONS FOR BASINS 258 TO 268.                         ****
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THIS MODEL WAS ORIGINALLY MIDDOUT.DAT
IT HAS BEEN MODIFIED BY CPE (7/2000)
FOR ALTERNATIVE 2 FOR THE EAST MARICOPA FLOODWAY
CAPACITY MITIGATION AND MULTI-USE CORRIDOR STUDY
TO ROUTE BOTH THE POWERLINE FLOODWAY
AND THE SANTAN FREEWAY CHANNEL INTO THE RAY BASIN PRIOR THEIR OUTFALL
INTO THE EMF

*****************************************************************

      Model files changed by Collins/Pina Engineering
      to reflect multi-use design concepts (recreation
      and environment) proposed throughout the entire
      EMF Corridor.    July 2000

VERSION 8.06  CPE 7/31/00
*****************************************************************************
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FILENAME: MIDDOUT.DAT

ALL CIP INFRASTRUCTURE IS IN PLACE, FUTURE CONDITIONS LANDUSE IS IN PLACE
FLOW IS ROUTED UP ELLSWORTH ROAD IN A EARTH LINED CHANNEL

*****************************************************************************
PRODUCED BY DIBBLE AND ASSOCIATES AND HOSKIN ENGINEERING CONSULTANTS.
File Name: Final8.Dat
Revised - Jan. 2000 by SZ (Wood/Patel) from Final7.dat - new Z-V & Sideweir
Revised - Jan. 2000 by SZ (Wood/Patel) from Final6.dat - 608 review comments
Revised - Dec. 1999 by SZ (Wood/Patel) from Final5.dat
Revised - Dec. 1999 by SZ (Wood/Patel) from Final4.dat
Revised - Nov. 1999 by SZ (Wood/Patel) from Final3.dat
Revised - June 1999 by SZ (Wood/Patel) for Final Model from Opt1.dat.
Revised - May 1999 by SZ (Wood/Patel) for Option 1, Based on Model SDIB.DAT
REVISED - MAY, 1999 BY VAS TO INCORPORATE INCREASE OF SUBBASIN RETENTION AND
          REVISIONS TO THE REGIONAL DETENTION BASIN STORAGE
REVISED - FEB. 1999 BY VALERIE SWICK, FCD OF MARICOPA COUNTY
REVISED - MAY, 1998 BY D&A

REVISED BY VALERIE SWICK, FEB. 26, 1998

FLOWS FROM DETENTION BASIN LOCATED AT NE CORNER OF ELLIOT AND ELLSWORTH ROADS
IS ROUTED TO THE SOUTHWEST BY SIPHON DRAW TO SUBBASIN 70A. FROM THERE THEY
WILL BE ROUTED BY A CHANNEL TO THE EMF. FLOWS FROM SUBBASINS ADJACENT TO
SANTAN FREEWAY ALIGNMENT WILL BE ROUTED SOUTH TO SUBBASIN 70A WHERE THEY WILL
BE COMBINED WITH FLOW IN SIPHON DRAW.

EAST MESA AREA DRAINAGE MASTER PLAN
AREA SOUTH OF SUPERSTITION (U.S. HWY 60)
AUGUST 1997
SOUTHEAST MESA HIGH RESOLUTION MODEL

***********FUTURE CONDITION MODEL OF THE WATERSHED************************

************ATTENTION*****************************************************
SUBBASINS 75, 79A, 79B, 78B,  LANDUSES WERE NOT
CHANGED BECAUSE IT WAS FELT THAT THEIR FUTURE CONDITIONS LANDUSES WOULD BE
SIMILAR TO THE EXISTING CONDITIONS LANDUSES.
RETENTION VOLUMES WILL ALSO NOT BE UTILIZED FOR SUBBASINS 75, 79A, 79B, 78B
SOME QUEEN CREEK SUBBASINS WILL ALSO NOT HAVE RETENTION VOLUMES, EITHER
BECAUSE THEY LIE IN PINAL COUNTY AND WE DONT KNOW PINAL COUNTIES PLANS OR
THEY LIE IN THE SANTAN MOUNTAINS AND WON'T GET DEVELOPED
WILLIAMS GATEWAY AIRPORT (SUBBASINS 80A, 80B, 81A, AND 81B) ARE MODELED AS
FUTURE CONDITIONS AND HAVE RETENTION VOLUMES FOR THE 100YR 2HR STORM
*****************************************************************************
FILENAME:  SDIBB.DAT

THIS MODEL REPRESENTS THE FUTURE CONDITION OF THE WATERSHED.
TOTAL DRAINAGE AREA IS APPROXIMATELY 213 SQ. MI.
THIS MODEL USES A Kn VALUE OF 0.09 FOR DESERT LAND USE DUE TO SHEET FLOW
CONDITIONS.

100-YEAR 24-HOUR FREQUENCY
AREAL REDUCTIONS FROM FCD HYDROLOGY MANUAL
THIS MODEL INCLUDES INFLOW FROM NORTH OF THE SUPERSTITION FREEWAY
AND EAST OF THE CAP

DATA FROM THE QUEEN CREEK ADMS HAS BEEN ADDED TO CALCULATE FLOWS INTO THE
EMF.   MUSKINGUM ROUTING NSTEPS WERE ADJUSTED TO BE WITHIN THE SUGGESTED
RANGE.
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                    METHODOLOGY
                    THE US CORPS OF ENGINEERS FLOOD HYDROLOGY MODEL HEC-1 DATED SEP1990 VER 4.0
                    SCS TYPE II RAINFALL DISTRIBUTION
                    S-GRAPH HYDROGRAPH
                    GREEN AND AMPT INFILTRATION EQUATION USED FOR CALCULATING LOSSES
                    NORMAL DEPTH STORAGE CHANNEL ROUTING
                    APPROXIMATE DIRECTION, LOCATION, AND LENGTH OF THE WASHES HAVE BEEN
                    EVALUATED BASED ON FIELD INVESTIGATION, USGS MAPS, LANDIS AERIAL SURVEYS
                    DATED 1994
                    THE NOAA TECHNICAL MEMORANDUM NOAA ATLAS 2 DEPTH AREA RATIOS

                    ORIGINAL STUDY PERFORMED BY LISA C. YOUNG AND AFSHIN AHOURAIYAN, UPDATED BY
                    DAVID DEGERNESS (OCT-DEC, 1996). REVIEWED BY VALERIE A. SWICK
                    AND AMIR MOTAMEDI OF THE FLOOD CONTROL DISTRICT
                    HYDROLOGY BRANCH ENGINEERING DIVISION, FLOOD CONTROL
                    DISTRICT OF MARICOPA COUNTY, DECEMBER - JULY 1995.

                    ASSUMED VELOCITY OF 1 FT/SEC FOR SHEET FLOW, 2-3 FT/SEC FOR WASH/NATURAL
                    CHANNEL, 3 FT/SEC FOR ROAD AND GRASS CHANNEL, 10FT/SEC FOR CONCRETE CHANNEL

                    VELOCITIES FOR ADMP IMPROVEMENT CHANNELS FROM DIBBLE AND ASSOCIATES
                    SUGGESTED ALTERNATIVES (JULY 1, 1997)

                    ***********************************************************************
                    **** THE FOLLOWING NOTE WAS ADDED BY PRIMATECH ENGINEERS ON 06-12-2001 ****
                    ***********************************************************************
                    NOTE: MUST USE NEBUILD.DSS AS THE DSS FILE TO IMPORT FLOWS ACROSS THE
                          SUPERSTITION FREEWAY.
                    ***********************************************************************


                    NOTE: MUST USE NDIBF.DSS AS THE DSS FILE TO IMPORT FLOWS ACROSS THE
                          SUPERSTITION FREEWAY.

                    DDM MCUHP2 SE MESA ADMP - SOUTH OF SUPERSTITION FWY, FUTURE CONDITIONS

440 IO          OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE

   IT           HYDROGRAPH TIME DATA
                       NMIN          5  MINUTES IN COMPUTATION INTERVAL
                      IDATE     1APR97  STARTING DATE
                      ITIME       0000  STARTING TIME
                         NQ        600  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE     3APR97  ENDING DATE
                     NDTIME       0155  ENDING TIME
                      ICENT         19  CENTURY MARK

                 COMPUTATION INTERVAL     .08 HOURS
                      TOTAL TIME BASE   49.92 HOURS

        ENGLISH UNITS
             DRAINAGE AREA          SQUARE MILES
             PRECIPITATION DEPTH    INCHES
             LENGTH, ELEVATION      FEET
             FLOW                   CUBIC FEET PER SECOND
             STORAGE VOLUME         ACRE-FEET
             SURFACE AREA           ACRES
             TEMPERATURE            DEGREES FAHRENHEIT

442 JD          INDEX STORM NO. 1
                       STRM      3.60  PRECIPITATION DEPTH
                       TRDA       .01  TRANSPOSITION DRAINAGE AREA

443 PI            PRECIPITATION PATTERN
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453 JD          INDEX STORM NO. 2
                       STRM      3.58  PRECIPITATION DEPTH
                       TRDA      1.00  TRANSPOSITION DRAINAGE AREA

  0 PI            PRECIPITATION PATTERN
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454 JD        INDEX STORM NO. 3
                STRM        3.49  PRECIPITATION DEPTH
                TRDA        5.00  TRANSPOSITION DRAINAGE AREA

  0 PI          PRECIPITATION PATTERN
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                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
455 JD        INDEX STORM NO. 4
                STRM        3.38  PRECIPITATION DEPTH
                TRDA       10.00  TRANSPOSITION DRAINAGE AREA

  0 PI          PRECIPITATION PATTERN
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .01       .00       .01
                .01       .01       .01       .01       .01       .01       .01       .01       .03       .03
                .03       .09       .09       .09       .01       .01       .01       .01       .01       .01
                .01       .01       .01       .01       .01       .01       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
456 JD        INDEX STORM NO. 5
                STRM        3.24  PRECIPITATION DEPTH
                TRDA       30.00  TRANSPOSITION DRAINAGE AREA

  0 PI          PRECIPITATION PATTERN
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                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .01       .00       .01
                .01       .01       .01       .01       .01       .01       .01       .01       .03       .03
                .03       .09       .09       .09       .01       .01       .01       .01       .01       .01
                .01       .01       .01       .01       .01       .01       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00
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457 JD INDEX STORM NO. 6

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                STRM        3.10  PRECIPITATION DEPTH
                TRDA       60.00  TRANSPOSITION DRAINAGE AREA

  0 PI        PRECIPITATION PATTERN
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .01       .00       .01
                .01       .01       .01       .01       .01       .01       .01       .01       .03       .03
                .03       .09       .09       .09       .01       .01       .01       .01       .01       .01
                .01       .01       .01       .01       .01       .01       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00
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458 JD INDEX STORM NO. 7

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                STRM        3.05  PRECIPITATION DEPTH
                TRDA       90.00  TRANSPOSITION DRAINAGE AREA

  0 PI        PRECIPITATION PATTERN
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .01       .00       .01
                .01       .01       .01       .01       .01       .01       .01       .01       .03       .03
                .03       .09       .09       .09       .01       .01       .01       .01       .01       .01
                .01       .01       .01       .01       .01       .01       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00
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459 JD INDEX STORM NO. 8

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                STRM        3.00  PRECIPITATION DEPTH
                TRDA      120.00  TRANSPOSITION DRAINAGE AREA
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0 PI          PRECIPITATION PATTERN
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .01       .00       .01
                .01       .01       .01       .01       .01       .01       .01       .01       .03       .03
                .03       .09       .09       .09       .01       .01       .01       .01       .01       .01
                .01       .01       .01       .01       .01       .01       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00
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460 JD        INDEX STORM NO. 9
                STRM        2.97  PRECIPITATION DEPTH
                TRDA      150.00  TRANSPOSITION DRAINAGE AREA

0 PI          PRECIPITATION PATTERN
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .01       .00       .01
                .01       .01       .01       .01       .01       .01       .01       .01       .03       .03
                .03       .09       .09       .09       .01       .01       .01       .01       .01       .01
                .01       .01       .01       .01       .01       .01       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00
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HYDROGRAPH MULTIPLIED BY .15

HYDROGRAPH MULTIPLIED BY .15

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HYDROGRAPH MULTIPLIED BY .15

WARNING EXCESS AT PONDING LESS THAN ZERO FOR PERIOD. EXCESS SET TO ZERO

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+	HYDROGRAPH AT	73A	378.	13.33	96.	24.	12.	.95		
+	ROUTED TO	73ATB	355.	13.50	96.	24.	12.	.95		
+	HYDROGRAPH AT	73B	748.	12.08	68.	20.	10.	.43		
+	DIVERSION TO	73BRET	748.	12.08	68.	20.	10.	.43		
+	HYDROGRAPH AT	RET73B	4.	20.75	2.	1.	0.	.43		
+	2 COMBINED AT	CP73B	355.	13.50	96.	25.	12.	1.38		
+	ROUTED TO	73BTC	332.	13.83	95.	24.	12.	1.38		
+	HYDROGRAPH AT	73C	822.	12.25	94.	28.	14.	.58		
+	DIVERSION TO	73CRET	822.	12.25	70.	19.	9.	.58		
+	HYDROGRAPH AT	RET73C	501.	12.42	33.	10.	5.	.58		
+	2 COMBINED AT	CP73C	441.	12.42	124.	33.	16.	1.96		
+	ROUTED TO	73T74C	347.	14.08	122.	33.	16.	1.96		
+	HYDROGRAPH AT	74A	306.	13.33	77.	19.	9.	.75		
+	ROUTED TO	74ATB	300.	13.42	77.	19.	9.	.75		
+	HYDROGRAPH AT	74B	455.	12.25	55.	16.	8.	.33		
+	DIVERSION TO	74BRET	455.	12.25	33.	9.	4.	.33		
+	HYDROGRAPH AT	RET74B	382.	12.33	27.	8.	4.	.33		
+	2 COMBINED AT	CP74B	445.	12.33	103.	27.	13.	1.08		
+	ROUTED TO	74BTC	410.	12.42	103.	27.	13.	1.08		
+	HYDROGRAPH AT	74C	516.	12.25	62.	18.	9.	.34		
+	DIVERSION TO	74CRET	516.	12.25	42.	11.	5.	.34		
+	HYDROGRAPH AT	RET74C	360.	12.42	25.	7.	3.	.34		
+	3 COMBINED AT	CP74C	713.	12.42	239.	64.	31.	3.39		
+	ROUTED TO	74CT75	525.	12.67	238.	64.	31.	3.39		
+	HYDROGRAPH AT	10	216.	12.42	30.	9.	4.	.17		
+	DIVERSION TO	10RET	216.	12.42	30.	9.	4.	.17		
+	HYDROGRAPH AT	RET10	0.	.00	0.	0.	0.	.17		
+	ROUTED TO	10T75	0.	.00	0.	0.	0.	.17		
+	HYDROGRAPH AT	02B	249.	12.17	28.	9.	4.	.15		
+	DIVERSION TO	02BRET	249.	12.17	26.	7.	4.	.15		
+	HYDROGRAPH AT	RET02B	17.	13.00	6.	2.	1.	.15		
+	ROUTED TO	2BT12	6.	19.75	5.	2.	1.	.15		

+	HYDROGRAPH AT	75	197.	13.17	45.	11.	6.	1.97
+	HYDROGRAPH AT	7A	148.	12.25	17.	5.	2.	.09
+	DIVERSION TO	07ARET	148.	12.25	17.	5.	2.	.09
+	HYDROGRAPH AT	RET07A	0.	.00	0.	0.	0.	.09
+	ROUTED TO	7AT12	0.	.00	0.	0.	0.	.09
+	HYDROGRAPH AT	07	237.	12.17	23.	7.	3.	.12
+	DIVERSION TO	07RET	237.	12.17	23.	7.	3.	.12
+	HYDROGRAPH AT	RET07	0.	.00	0.	0.	0.	.12
+	ROUTED TO	7T12	0.	.00	0.	0.	0.	.12
+	HYDROGRAPH AT	12	291.	12.17	32.	11.	5.	.16
+	DIVERSION TO	12RET	291.	12.17	26.	7.	3.	.16
+	HYDROGRAPH AT	RET12	117.	12.42	11.	3.	2.	.16
+	5 COMBINED AT	CP12	213.	13.08	55.	16.	8.	2.47
+	ROUTED TO	12T13	207.	13.25	55.	16.	8.	2.47
+	HYDROGRAPH AT	08	636.	12.58	105.	32.	15.	.62
+	DIVERSION TO	08RET	636.	12.58	103.	28.	13.	.62
+	HYDROGRAPH AT	RET08	23.	14.33	12.	4.	2.	.62
+	ROUTED TO	8T9	23.	14.58	11.	4.	2.	.62
+	HYDROGRAPH AT	09	191.	12.25	21.	7.	3.	.13
+	DIVERSION TO	09RET	191.	12.25	20.	6.	3.	.13
+	HYDROGRAPH AT	RET09	8.	13.33	3.	1.	1.	.13
+	2 COMBINED AT	CP9	27.	14.58	14.	5.	2.	.74
+	ROUTED TO	9T13	23.	15.08	14.	5.	2.	.74
+	HYDROGRAPH AT	13	266.	12.33	36.	12.	6.	.20
+	DIVERSION TO	13RET	266.	12.33	29.	8.	4.	.20
+	HYDROGRAPH AT	RET13	108.	12.67	12.	4.	2.	.20
+	HYDROGRAPH AT	11	514.	12.25	63.	21.	10.	.31
+	DIVERSION TO	11RET	514.	12.25	60.	17.	8.	.31
+	HYDROGRAPH AT	RET11	29.	13.33	12.	4.	2.	.31
+	ROUTED TO	11T13	26.	13.50	12.	4.	2.	.31
+	4 COMBINED AT	CP13	224.	13.25	80.	27.	13.	3.72
+	ROUTED TO	13T15	222.	13.33	80.	27.	13.	3.72
+	HYDROGRAPH AT	14	220.	12.08	22.	8.	4.	.09
+	DIVERSION TO	14RET	220.	12.08	17.	5.	2.	.09
	HYDROGRAPH AT							

+		RET14	84.	12.25	8.	3.	1.	.09
+	4 COMBINED AT	CP75	633.	13.08	300.	87.	42.	7.38
+	HYDROGRAPH AT	77A	556.	13.75	174.	43.	21.	1.74
+	ROUTED TO	77ATB	525.	13.83	173.	43.	21.	1.74
+	HYDROGRAPH AT	77B	542.	12.17	48.	14.	7.	.35
+	DIVERSION TO	77BRET	529.	12.08	31.	8.	4.	.35
+	HYDROGRAPH AT	RET77B	455.	12.25	20.	5.	3.	.35
+	2 COMBINED AT	CP77B	529.	13.83	191.	49.	23.	2.09
+	ROUTED TO	77BTC	503.	14.08	188.	49.	23.	2.09
+	HYDROGRAPH AT	77C	407.	12.25	46.	14.	7.	.28
+	DIVERSION TO	77CRET	407.	12.25	31.	8.	4.	.28
+	HYDROGRAPH AT	RET77C	280.	12.33	19.	5.	3.	.28
+	2 COMBINED AT	C77C	510.	14.08	206.	54.	26.	2.37
+	ROUTED TO	77CT78	493.	14.42	202.	54.	26.	2.37
+	HYDROGRAPH AT	78A	601.	13.75	188.	47.	23.	1.88
+	ROUTED TO	78ATB	520.	14.42	187.	47.	23.	1.88
+	HYDROGRAPH AT	78B	598.	12.25	62.	17.	8.	.40
+	2 COMBINED AT	C78B	608.	12.25	245.	64.	31.	2.28
+	ROUTED TO	78BTC	501.	14.75	245.	64.	31.	2.28
+	HYDROGRAPH AT	78C	494.	12.17	44.	11.	5.	.29
+	DIVERSION TO	78CRET	83.	11.75	4.	1.	1.	.29
+	HYDROGRAPH AT	RET78C	494.	12.17	40.	10.	5.	.29
+	2 COMBINED AT	C78C	821.	12.17	283.	73.	35.	2.56
+	2 COMBINED AT	C78C2	946.	14.58	470.	124.	60.	4.93
+	ROUTED TO	78CT79	935.	14.75	466.	124.	60.	4.93
+	HYDROGRAPH AT	20	434.	12.42	59.	18.	8.	.31
+	DIVERSION TO	20RET	434.	12.42	45.	12.	6.	.31
+	HYDROGRAPH AT	RET20	227.	12.67	19.	5.	3.	.31
+	HYDROGRAPH AT	16	210.	12.17	19.	6.	3.	.11
+	DIVERSION TO	16RET	210.	12.17	15.	4.	2.	.11
+	HYDROGRAPH AT	RET16	61.	12.42	5.	2.	1.	.11
+	HYDROGRAPH AT	18	479.	12.25	51.	15.	7.	.32
+	DIVERSION TO	18RET	479.	12.25	47.	12.	6.	.32
+	HYDROGRAPH AT	RET18	40.	12.83	8.	3.	1.	.32
+	ROUTED TO	18T19	32.	12.92	8.	3.	1.	.32

+	2 COMBINED AT	CP19A	61.	12.42	13.	4.	2.	.43
+	HYDROGRAPH AT	19	200.	12.17	21.	6.	3.	.10
+	DIVERSION TO	19RET	200.	12.17	16.	4.	2.	.10
+	HYDROGRAPH AT	RET19	81.	12.42	7.	2.	1.	.10
+	HYDROGRAPH AT	17	152.	12.42	19.	6.	3.	.14
+	DIVERSION TO	17RET	152.	12.42	19.	6.	3.	.14
+	HYDROGRAPH AT	RET17	0.	.00	0.	0.	0.	.14

*** NORMAL END OF HEC-1 ***

NOAA Atlas Precipitation Data

POINT PRECIPITATION FREQUENCY ESTIMATES FROM NOAA ATLAS 14

Arizona 33.3325 N 111.62 W 1420 feet

from "Precipitation-Frequency Atlas of the United States" NOAA Atlas 14, Volume 1, Version 4
G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M. Yekta, and D. Riley
NOAA, National Weather Service, Silver Spring, Maryland, 2006

Extracted: Mon Oct 22 2007

Confidence Limits | Seasonality | Location Maps | Other Info. | GIS data | Maps | Help | D

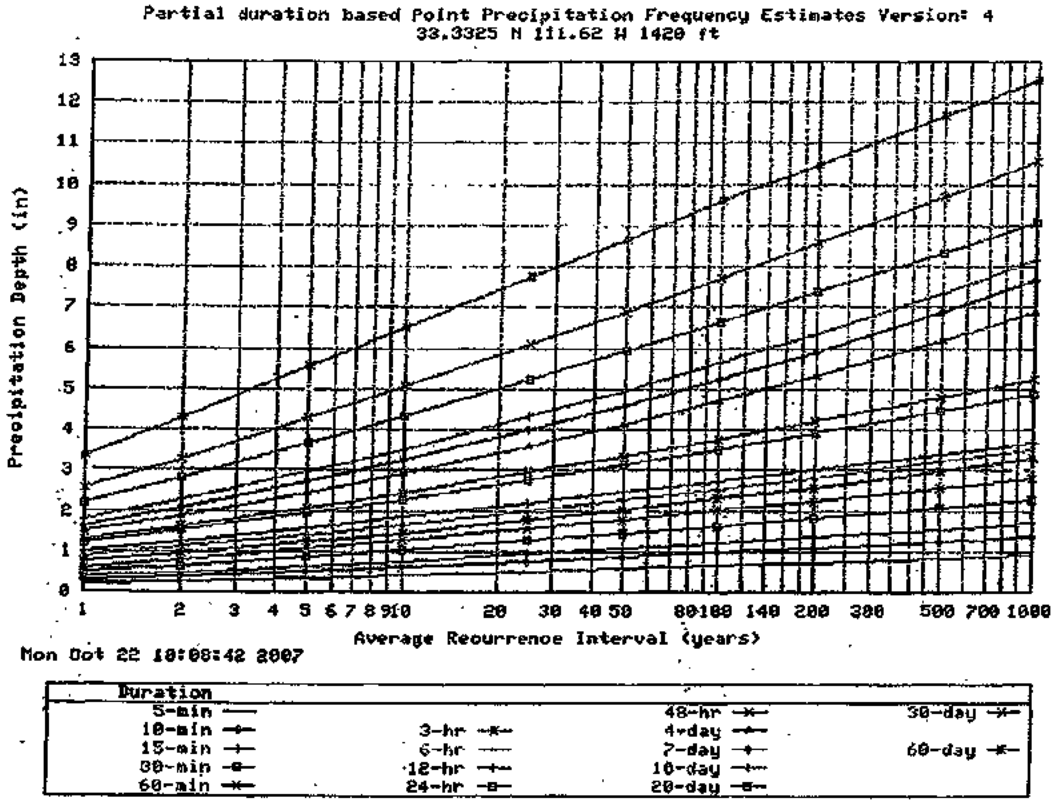
Precipitation Frequency Estimates (inches)

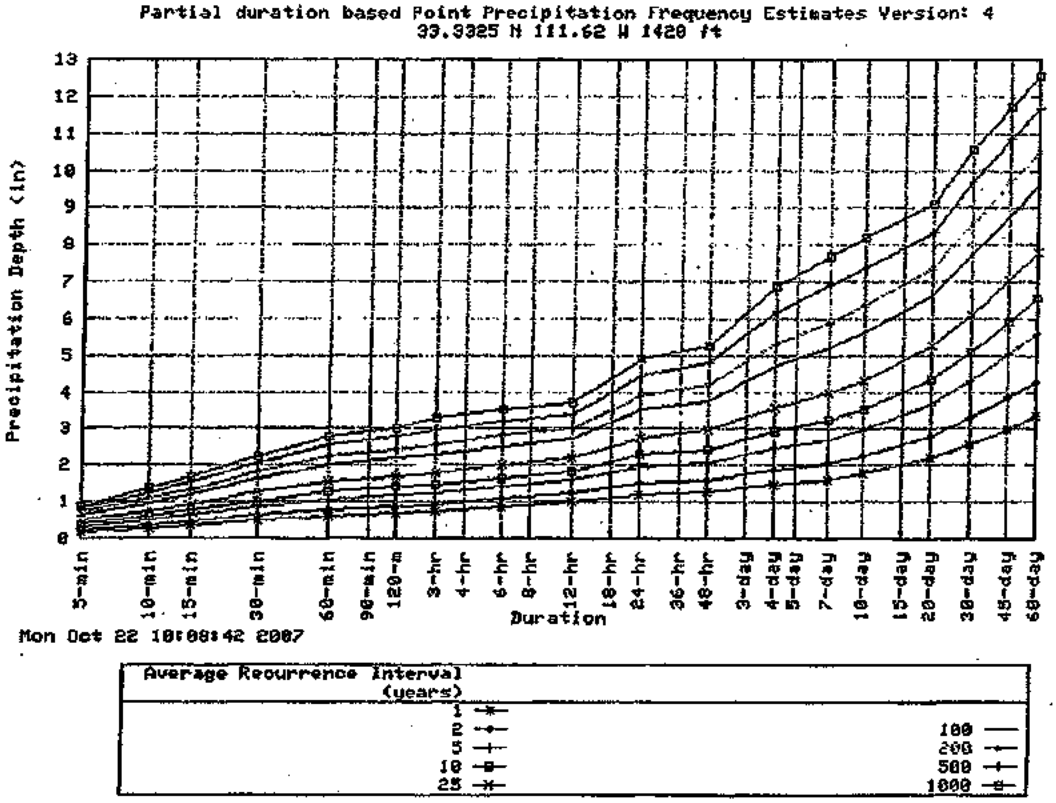
ARI* (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.19	0.29	0.36	0.48	0.60	0.68	0.73	0.88	0.99	1.21	1.27	1.47	1.62	1.77	2.19	2.56	2.99	3.33
2	0.25	0.38	0.47	0.63	0.78	0.89	0.93	1.11	1.26	1.52	1.61	1.87	2.07	2.25	2.81	3.28	3.84	4.28
5	0.34	0.51	0.64	0.85	1.06	1.18	1.22	1.42	1.58	1.95	2.08	2.45	2.71	2.96	3.68	4.29	5.02	5.58
10	0.40	0.61	0.76	1.03	1.27	1.40	1.45	1.66	1.84	2.29	2.44	2.92	3.24	3.52	4.35	5.06	5.90	6.53
25	0.50	0.76	0.94	1.26	1.56	1.71	1.77	2.00	2.19	2.75	2.95	3.59	3.98	4.32	5.25	6.10	7.05	7.76
50	0.57	0.86	1.07	1.44	1.78	1.95	2.03	2.26	2.46	3.12	3.35	4.13	4.59	4.96	5.94	6.91	7.93	8.68
100	0.64	0.97	1.21	1.63	2.01	2.19	2.30	2.54	2.74	3.51	3.77	4.70	5.24	5.64	6.65	7.73	8.81	9.60
200	0.71	1.09	1.35	1.81	2.24	2.44	2.58	2.82	3.02	3.90	4.20	5.31	5.92	6.36	7.37	8.57	9.69	10.49
500	0.81	1.24	1.53	2.06	2.56	2.78	2.97	3.21	3.40	4.45	4.79	6.17	6.89	7.36	8.35	9.70	10.84	11.66
1000	0.89	1.35	1.68	2.26	2.79	3.04	3.28	3.52	3.69	4.88	5.25	6.87	7.68	8.17	9.10	10.57	11.71	12.53

Text version of table

* These precipitation frequency estimates are based on a partial duration series. ARI is the Average Recurrence Interval. Please refer to the documentation for more information. NOTE: Formatting forces estimates near zero to appear as zero.

MESA PROVING GROUNDS ONSITE PRECEPITATION DEPTHS


Partial duration based Point Precipitation Frequency Estimates Version: 4
33.3325 N 111.62 W 1420 ft
Precipitation Depth (in)
Average Recurrence Interval (years)
Mon Oct 22 10:08:42 2007
Duration
5-min
10-min
15-min
30-min
60-min
3-hr
6-hr
12-hr
24-hr
48-hr
4-day
7-day
10-day
20-day
30-day
60-day



Confidence Limits -

* Upper bound of the 90% confidence interval Precipitation Frequency Estimates (inches)																		
ARI** (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.23	0.35	0.44	0.59	0.73	0.82	0.89	1.03	1.14	1.36	1.42	1.62	1.79	1.95	2.42	2.81	3.29	3.65
2	0.30	0.46	0.57	0.77	0.96	1.06	1.14	1.31	1.44	1.72	1.81	2.07	2.28	2.48	3.10	3.60	4.22	4.70
5	0.41	0.62	0.77	1.04	1.29	1.41	1.49	1.67	1.81	2.19	2.33	2.70	2.99	3.25	4.05	4.70	5.51	6.12
10	0.49	0.75	0.93	1.25	1.54	1.68	1.76	1.95	2.10	2.57	2.74	3.22	3.57	3.86	4.79	5.54	6.48	7.16
25	0.60	0.91	1.13	1.52	1.88	2.04	2.14	2.33	2.49	3.09	3.30	3.94	4.38	4.73	5.77	6.68	7.75	8.52
50	0.68	1.04	1.29	1.74	2.15	2.32	2.44	2.63	2.79	3.50	3.75	4.54	5.05	5.43	6.54	7.56	8.71	9.53
100	0.77	1.17	1.45	1.95	2.42	2.61	2.76	2.95	3.11	3.93	4.22	5.18	5.76	6.18	7.33	8.48	9.69	10.55
200	0.86	1.30	1.61	2.17	2.69	2.90	3.09	3.28	3.43	4.38	4.71	5.86	6.53	6.97	8.13	9.41	10.67	11.55
500	0.98	1.49	1.84	2.48	3.07	3.30	3.56	3.74	3.88	5.01	5.40	6.83	7.62	8.11	9.24	10.69	11.98	12.88
1000	1.07	1.63	2.02	2.72	3.36	3.63	3.94	4.11	4.24	5.53	5.95	7.63	8.53	9.02	10.11	11.71	12.99	13.88

* The upper bound of the confidence interval at 90% confidence level is the value which 5% of the simulated quantile values for a given frequency are greater than.
** These precipitation frequency estimates are based on a partial duration series. ARI is the Average Recurrence Interval.
Please refer to the documentation for more information. NOTE: Formatting prevents estimates near zero to appear as zero.

*** Lower bound of the 90% confidence interval**

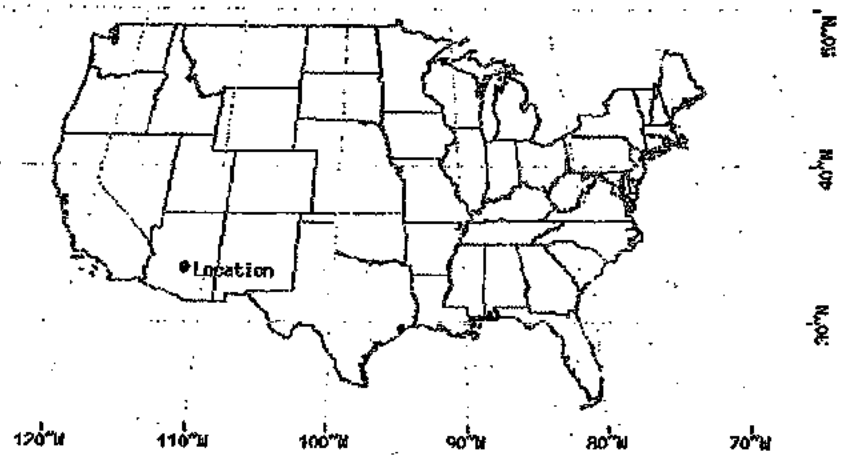
Precipitation Frequency Estimates (inches)

ARI** (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.16	0.24	0.30	0.41	0.50	0.58	0.61	0.76	0.87	1.08	1.14	1.34	1.48	1.61	1.99	2.33	2.72	3.04
2	0.21	0.32	0.40	0.53	0.66	0.75	0.79	0.96	1.10	1.37	1.44	1.70	1.88	2.06	2.55	2.98	3.49	3.90
5	0.28	0.43	0.53	0.71	0.88	0.99	1.03	1.22	1.39	1.74	1.86	2.22	2.46	2.69	3.34	3.90	4.56	5.08
10	0.34	0.51	0.63	0.85	1.05	1.17	1.21	1.42	1.60	2.04	2.18	2.64	2.93	3.19	3.93	4.60	5.35	5.93
25	0.41	0.62	0.76	1.03	1.27	1.41	1.46	1.69	1.88	2.43	2.61	3.23	3.58	3.90	4.73	5.52	6.38	7.03
50	0.46	0.70	0.86	1.16	1.44	1.58	1.64	1.88	2.09	2.73	2.94	3.69	4.10	4.44	5.33	6.22	7.14	7.83
100	0.51	0.77	0.96	1.29	1.59	1.75	1.82	2.07	2.29	3.04	3.27	4.17	4.64	5.01	5.94	6.93	7.90	8.62
200	0.56	0.84	1.05	1.41	1.75	1.91	2.01	2.26	2.49	3.34	3.60	4.66	5.20	5.60	6.54	7.63	8.63	9.38
500	0.62	0.94	1.16	1.57	1.94	2.12	2.25	2.51	2.73	3.74	4.03	5.34	5.96	6.40	7.33	8.55	9.58	10.35
1000	0.66	1.00	1.25	1.68	2.08	2.27	2.42	2.68	2.92	4.04	4.35	5.88	6.57	7.03	7.92	9.23	10.28	11.05

* The lower bound of the confidence interval at 90% confidence level is the value which 5% of the simulated quantile values for a given frequency are less than.
** These precipitation frequency estimates are based on a partial duration maxima series. ARI is the Average Recurrence Interval.

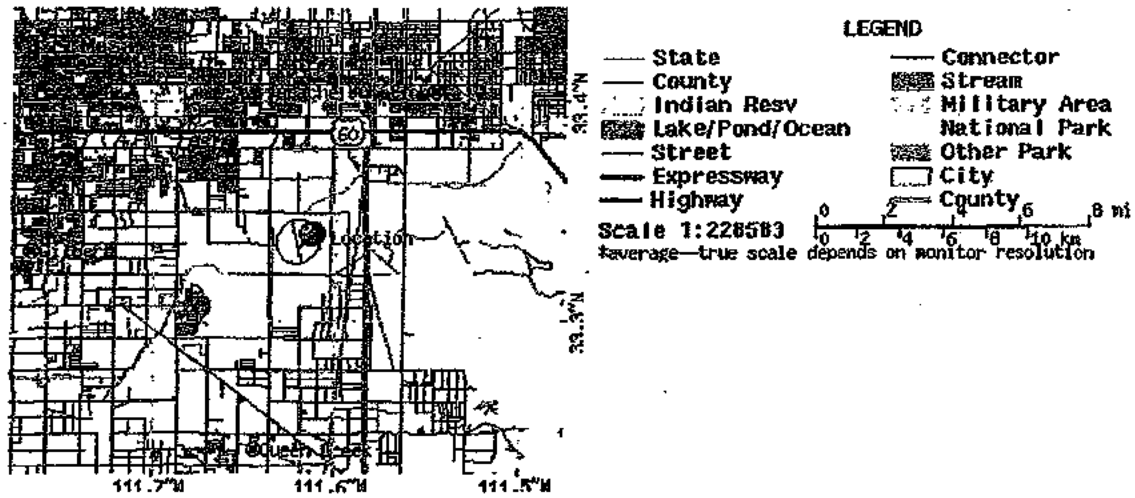
Please refer to the documentation for more information. NOTE: Formatting prevents estimates near zero to appear as zero.

Maps -



These maps were produced using a direct map request from the U.S. Census Bureau Mapping and Cartographic Resources Tiger Map Server.

Please read disclaimer for more information.



Other Maps/Photographs -

View USGS digital orthophoto quadrangle (DOQ) covering this location from TerraServer; USGS Aerial Photograph may also be available
from this site. A DOQ is a computer-generated image of an aerial photograph in which image displacement caused by terrain relief and camera tilts has been removed. It combines the image characteristics of a photograph with the geometric qualities of a map. Visit the USGS for more information.

Watershed/Stream Flow Information -

Find the Watershed for this location using the U.S. Environmental Protection Agency's site.

Climate Data Sources -

Precipitation frequency results are based on data from a variety of sources, but largely NCDC. The following links provide general information
about observing sites in the area, regardless of if their data was used in this study. For detailed information about the stations used in this study,
please refer to our documentation.

Using the National Climatic Data Center's (NCDC) station search engine, locate other climate stations within:

+/-30 minutes ...OR... +/-1 degree of this location (33.3325/-111.62). Digital ASCII data can be obtained directly from NCDC.

Find Natural Resources Conservation Service (NRCS) SNOTEL (SNOwpack TELemetry) stations by visiting the Western Regional Climate Center's state-specific SNOTEL station maps.

Hydrometeorological Design Studies Center
DOC/NOAA/National Weather Service
1325 East-West Highway
Silver Spring, MD 20910

(301) 713-1669
Questions?: HDSC.Questions@noaa.gov

Disclaimer

Interim Condtion HEC-1 Sub-Basin Data

Table 1 - Interim Condition HEC-1 Sub-Basin Data

Description: Sub-basin data based on aerial photo and existing and proposed topography

Location Eastmark - East Mesa, Arizona

Reference: DDMSW Version 4.6.0

ONSITE BASINS										
Sub-Basin ID	Basin Area (sq. ft.)	Basin Area (acres)	Basin Area (sq. mi)	Length (ft)	Length (mi)	Length +10% (mi)1	USGE (ft)	DSGE (ft)	Lca (ft)	Lca (mi)
75	54,926,288	1,260.93	1.970	11520	2.18	2.18	1450.0	1395.0	8168	1.55
2B	4,082,708	93.73	0.146	2780	0.53	0.58	1460.0	1450.0	1390	0.26
7	3,242,052	74.43	0.116	2230	0.42	0.46	1418.0	1404.0	1129	0.21
7A	2,361,171	54.21	0.085	2870	0.54	0.59	1415.0	1403.0	1450	0.27
8	17,189,557	394.62	0.617	7230	1.37	1.51	1444.0	1415.0	4980	0.94
9	3,508,834	80.55	0.126	3470	0.66	0.73	1424.0	1408.0	1848	0.35
10	4,769,777	109.50	0.171	5320	1.01	1.11	1444.0	1423.0	2970	0.56
11	8,574,374	196.84	0.308	6080	1.15	1.27	1425.0	1397.0	3352	0.63
12	4,362,893	100.16	0.157	3002	0.57	0.63	1409.0	1393.0	1087	0.21
13	5,584,406	128.20	0.200	3701	0.70	0.77	1411.0	1390.0	2218	0.42
14	2,596,893	59.62	0.093	1670	0.32	0.35	1397.0	1388.0	634	0.12
16	2,949,384	67.71	0.106	2134	0.40	0.44	1425.0	1410.0	1100	0.21
17	3,772,296	86.60	0.135	4430	0.84	0.92	1412.0	1394.0	2485	0.47
18	8,921,616	204.81	0.320	3445	0.65	0.72	1435.0	1420.0	1761	0.33
19	2,856,235	65.57	0.102	2394	0.45	0.50	1420.0	1410.0	1082	0.20
20	8,518,170	195.55	0.306	4890	0.93	1.02	1430.0	1412.0	2361	0.45
Totals	**138,216,654**	**3173.03**	**4.958**							

OFFSITE BASINS (EAST OF SIGNAL BUTTE ROAD)								
Sub-Basin ID	Basin Area (sq. ft.)	Basin Area (acres)	Basin Area (sq. mi)	Length (ft)	Length (mi)	USGE (ft)	DSGE (ft)	Lca (mi)
73A	26,400,845	606.08	0.947	12144	2.30	1567.3	1487.0	1.00
73B	11,854,970	272.15	0.425	2957	0.56	1487.0	1470.0	0.28
73C	16,310,497	374.44	0.585	7022	1.33	1480.0	1450.0	0.30
74A	21,020,314	482.56	0.754	12672	2.40	1563.0	1461.7	1.00
74B	9,278,312	213.00	0.333	6917	1.31	1490.0	1459.0	0.41
74C	9,606,165	220.53	0.345	6442	1.22	1471.0	1440.0	0.40
77A	48,480,538	1,112.96	1.739	15312	2.90	1559.0	1468.8	1.50
77B	9,740,171	223.60	0.349	2957	0.56	1469.0	1453.0	0.26
77C	7,769,721	178.37	0.279	4013	0.76	1457.0	1439.0	0.51
78A	52,467,149	1,204.48	1.882	19536	3.70	1558.0	1452.6	2.10
78B	11,047,090	253.61	0.396	3168	0.60	1460.0	1441.0	0.40
78C	8,018,731	184.08	0.288	2640	0.50	1448.0	1432.1	0.30
Totals	**231,994,503**	**5325.86**	**8.322**					

Notes:
1) 10% was added to onsite watercourse lengths to account for future roadway curvature.

Interim Condition HEC-1 Soil Data

Table 2 - Interim Condition HEC-1 - Soils Data

Description: Interim Condition Soil Data

Location Eastmark - East Mesa, Arizona

Reference: NRCS Web Soil Survey
Aguila-Carefree Area Soil Survey

Sub-Basin ID	Soil Id	Soil Type	Area (acres)	Area (sq. mi.)
75	1	Antho Sandy Loams	3.43	0.005
	50	Estrella Loams	72.05	0.113
	75	Mohall Loam	272.10	0.425
	77	Mohall Clay Loam	671.16	1.049
	78	Mohall Clay Loam, Calcareous Solum	50.02	0.078
	79	Mohall Clay	170.24	0.266
	112	Tremant Gravelly Sandy Loams	21.91	0.034
		TOTAL	**1260.91**	**1.970**
2B	1	Antho Sandy Loams	10.33	0.016
	50	Estrella Loams	1.89	0.003
	75	Mohall Loam	81.51	0.127
		TOTAL	**93.73**	**0.146**
7	50	Estrella Loams	13.60	0.021
	75	Mohall Loam	25.70	0.040
	77	Mohall Clay Loam	22.20	0.035
	78	Mohall Clay Loam, Calcareous Solum	12.93	0.020
		TOTAL	**74.43**	**0.116**
7A	50	Estrella Loams	0.57	0.001
	77	Mohall Clay Loam	53.64	0.084
		TOTAL	**54.21**	**0.085**
8	1	Antho Sandy Loams	10.69	0.017
	50	Estrella Loams	45.04	0.070
	75	Mohall Loam	168.75	0.264
	77	Mohall Clay Loam	114.36	0.179
	78	Mohall Clay Loam, Calcareous Solum	7.12	0.011
	112	Tremant Gravelly Sandy Loams	48.66	0.076
		TOTAL	**394.62**	**0.617**
9	75	Mohall Loam	44.57	0.070
	78	Mohall Clay Loam, Calcareous Solum	19.95	0.031
	112	Tremant Gravelly Sandy Loams	16.03	0.025
		TOTAL	**80.55**	**0.126**
10	1	Antho Sandy Loams	6.50	0.010
	2	Antho Gravelly Sandy Loams	11.32	0.018
	50	Estrella Loams	27.71	0.043
	77	Mohall Clay Loam	59.78	0.093
	112	Tremant Gravelly Sandy Loams	3.99	0.006
	115	Tremant Gravelly Sandy Loams	0.20	0.000
		TOTAL	**109.50**	**0.170**
11	55	Gilman Loams	2.04	0.003
	77	Mohall Clay Loam	77.25	0.121
	112	Tremant Gravelly Sandy Loams	117.55	0.184
		TOTAL	**196.84**	**0.308**
12	50	Estrella Loams	51.61	0.081
	75	Mohall Loam	17.90	0.028
	77	Mohall Clay Loam	25.98	0.041
	79	Mohall Clay	4.67	0.007
		TOTAL	**100.16**	**0.157**
13	50	Estrella Loams	1.01	0.002
	75	Mohall Loam	127.18	0.199
		TOTAL	**128.19**	**0.201**
14	50	Estrella Loams	10.93	0.017
	75	Mohall Loam	19.99	0.031
	77	Mohall Clay Loam	10.25	0.016
	112	Tremant Gravelly Sandy Loams	18.43	0.029
		TOTAL	**59.60**	**0.093**
73A	N/A	No Data Available	606.08	0.947
		TOTAL	**606.08**	**0.947**
73B	1	Antho Sandy Loams	73.75	0.115
	50	Estrella Loams	10.61	0.017
	55	Gilman Loams	15.78	0.025
	75	Mohall Loam	62.59	0.098
	77	Mohall Clay Loam	80.28	0.125
	112	Tremant Gravelly Sandy Loams	29.14	0.046
		TOTAL	**272.15**	**0.426**

Sub-Basin ID	Soil Id	Soil Type	Area (acres)	Area (sq. mi.)
73C	1	Antho Sandy Loams	76.01	0.119
	50	Estrella Loams	85.37	0.133
	75	Mohall Loam	128.81	0.201
	77	Mohall Clay Loam	84.25	0.132
		TOTAL	**374.44**	**0.585**
74A	N/A	No Data Available	482.56	0.754
		TOTAL	**482.56**	**0.754**
74B	1	Antho Sandy Loams	112.04	0.175
	77	Mohall Clay Loam	97.34	0.152
	112	Tremant Gravelly Sandy Loams	3.62	0.006
		TOTAL	**213.00**	**0.333**
74C	1	Antho Sandy Loams	55.57	0.087
	50	Estrella Loams	11.47	0.018
	77	Mohall Clay Loam	136.29	0.213
	112	Tremant Gravelly Sandy Loams	16.76	0.026
	115	Tremant-Antho Complex, 1-5 %Slopes	0.44	0.001
		TOTAL	**220.53**	**0.345**
16	2	Antho Gravelly Sandy Loams	11.70	0.018
	78	Mohall Clay Loam, Calcareous Solum	40.70	0.064
	112	Tremant Gravelly Sandy Loams	15.31	0.024
		TOTAL	**67.71**	**0.106**
17	2	Antho Gravelly Sandy Loams	1.46	0.002
	55	Gillman Loams	7.33	0.011
	112	Tremant Gravelly Sandy Loams	77.81	0.122
		TOTAL	**86.60**	**0.135**
18	1	Antho Sandy Loams	4.81	0.008
	2	Antho Gravelly Sandy Loams	20.60	0.032
	50	Estrella Loams	79.40	0.124
	77	Mohall Clay Loam	28.50	0.045
	78	Mohall Clay Loam, Calcareous Solum	47.25	0.074
	112	Tremant Gravelly Sandy Loams	13.37	0.021
	115	Tremant-Antho Complex, 1-5 %Slopes	10.88	0.017
		TOTAL	**204.81**	**0.321**
19	50	Estrella Loams	4.37	0.007
	77	Mohall Clay Loam	22.72	0.036
	78	Mohall Clay Loam, Calcareous Solum	38.48	0.060
		TOTAL	**65.57**	**0.103**
20	22	Contine Clay Loam	118.34	0.185
	77	Mohall Clay Loam	27.87	0.044
	112	Tremant Gravelly Sandy Loams	49.34	0.077
		TOTAL	**195.55**	**0.306**
77A	N/A	No Data Available	1112.96	1.739
		TOTAL	**1112.96**	**1.739**
77B	1	Antho Sandy Loams	76.92	0.120
	77	Mohall Clay Loam	81.39	0.127
	112	Tremant Gravelly Sandy Loams	65.29	0.102
		TOTAL	**223.60**	**0.349**
77C	1	Antho Sandy Loams	4.82	0.008
	77	Mohall Clay Loam	74.56	0.117
	78	Mohall Clay Loam, Calcareous Solum	9.10	0.014
	112	Tremant Gravelly Sandy Loams	89.54	0.140
	115	Tremant-Antho Complex, 1-5 %Slopes	0.35	0.001
		TOTAL	**178.37**	**0.280**
78A	N/A	No Data Available	1204.48	1.882
		TOTAL	**1204.48**	**1.882**
78B	22	Contine Clay Loam	66.95	0.105
	77	Mohall Clay Loam	79.63	0.124
	112	Tremant Gravelly Sandy Loams	107.03	0.167
		TOTAL	**253.61**	**0.396**
78C	22	Contine Clay Loam	128.67	0.201
	77	Mohall Clay Loam	2.76	0.004
	112	Tremant Gravelly Sandy Loams	52.65	0.082
		TOTAL	**184.08**	**0.287**

Interim Condition HEC-1 Land Use Data

Table 3 - Interim Condition HEC-1 Land Use Data

Description: Land use data based on proposed development

Location Eastmark - East Mesa, Arizona

Reference: DDMSW Version 4.6.0

Sub-Basin ID	Basin Area (sq. ft.)	Basin Area (acres)	Basin Area (sq. mi)	DU	DU Area (ac)	Land Use	Land Use Area (sq. ft.)	Land Use Area (acres)	Land Use Area (sq. mi.)	Kn
75	54926288	1260.9	1.9702	DU 1, DU 2, DU 5, DU 6N, DU 6S	1260.9	Desert	54926288	1260.9	1.970	
2B	4082708	93.7	0.1464	DU6N	93.7	Industrial	4082708	93.7	0.146	0.050
7	3242052	74.4	0.1163	DU3/4	74.4	Very High Density Residential (>15 DU/Acre)	940896	21.6	0.034	0.030
						Educational	217800	5.0	0.008	0.055
						Institutional	1058508	24.3	0.038	0.040
						Active Open Space	1023660	23.5	0.037	0.050
7A	2361171	54.2	0.0847	DU3/4	54.2	Educational	435600	10.0	0.016	0.055
						Institutional	291852	6.7	0.010	0.040
						Active Open Space	1285020	29.5	0.046	0.050
						General Transportation	348480	8.0	0.013	0.030
8	17189557	394.6	0.6166	DU7	387.9	Medium Lot Residential (2-4 DU/Acre)	9243432	212.2	0.332	0.045
						Small Lot Residential (4-10 DU/Acre)	6464304	148.4	0.232	0.040
						High Density Residential (10-15 DU/Acre)	753588	17.3	0.027	0.030
						Institutional	304920	7.0	0.011	0.040
						Active Open Space	130680	3.0	0.005	0.050
				—	6.7	General Transportation	317988	7.3	0.011	0.030
9	3508634	80.6	0.1259	DU3/4	10.4	Very High Density Residential (>15 DU/Acre)	453024	10.4	0.016	0.030
				DU7	70.2	High Density Residential (10-15 DU/Acre)	871200	20.0	0.031	0.030
						Educational	871200	20.0	0.031	0.055
						Institutional	283140	6.5	0.010	0.040
						Active Open Space	1032372	23.7	0.037	0.050
10	4769777	109.5	0.1711	DU7	106.8	Medium Lot Residential (2-4 DU/Acre)	4652208	106.8	0.167	0.045
				—	2.7	General Transportation	119210	2.7	0.004	0.030
11	8574374	196.8	0.3075	DU7	10.6	Active Open Space	113256	2.6	0.004	0.050
						General Commercial	239580	5.5	0.009	0.035
						Institutional	108900	2.5	0.004	0.040
				DU3/4	173.0	Very High Density Residential (>15 Du/Acre)	7535880	173.0	0.270	0.025
				—	13.2	General Transportation	574992	13.2	0.021	0.030
12	4362893	100.2	0.1566	DU3/4	99.3	Educational	2090880	48.0	0.075	0.055
						Office General	1232748	28.3	0.044	0.035
						Very High Density Residential (>15 Du/Acre)	1001880	23.0	0.036	0.025
				—	0.9	General Transportation	39204	0.9	0.001	0.035
13	5584406	128.2	0.2003	DU3/4	126.2	Educational	4922280	113.0	0.177	0.055
						Office General	574992	13.2	0.021	0.035
				—	2.0	General Transportation	87120	2.0	0.003	0.035
14	2598893	59.6	0.0931	DU3/4	59.6	Office General	326700	7.5	0.012	0.035
						General Commercial	1742400	40.0	0.063	0.035
						Tourist and Vistor Accomodations	108900	2.5	0.004	0.030
						General Transportation	418176	9.6	0.015	0.030
73A	26400845	606.1	0.9470	—	—	Passive Open Space	26400845	606.1	0.947	0.093
73B	11854970	272.2	0.4253	—	—	Small Lot Residential (4-10 DU/Acre)	11854970	272.2	0.425	0.040
73C	16310497	374.4	0.5850	—	—	Small Lot Residential (4-10 DU/Acre)	16310497	374.4	0.585	0.040
74A	21020314	482.6	0.7541	—	—	Passive Open Space	21020314	482.6	0.754	0.095
74B	9278312	213.0	0.3326	—	—	Small Lot Residential (4-10 DU/Acre)	9278312	213.0	0.333	0.040
74C	9606165	220.5	0.3445	—	—	Small Lot Residential (4-10 DU/Acre)	9606165	220.5	0.345	0.040
16	2949384	67.7	0.1058	DU3S	5.7	Medium Lot Residential (2-4 DU/Acre)	248292	5.7	0.009	0.045
				DU9	62.0	Medium Lot Residential (2-4 DU/Acre)	2456784	56.4	0.088	0.045
						Active Open Space	121968	2.8	0.004	0.050
						General Transportation	121968	2.8	0.004	0.030
17	3772296	86.6	0.1353	DU3S	86.6	Medium Lot Residential (2-4 DU/Acre)	3737448	85.8	0.134	0.045
						Active Open Space	34848	0.8	0.001	0.050
18	8921616	204.8	0.3200	DU8	204.8	Medium Lot Residential (2-4 DU/Acre)	6904260	158.5	0.248	0.045
						Large Lot Residential (1-2 DU/Acre)	871200	20.0	0.031	0.045
						Active Open Space	927828	21.3	0.033	0.050
						General Transportation	217800	5.0	0.008	0.030
19	2856235	65.6	0.1025	DU9	65.6	Medium Lot Residential (2-4 DU/Acre)	2121372	48.7	0.076	0.045
						Institutional	540144	12.4	0.019	0.040
						Active Open Space	100188	2.3	0.004	0.050
						General Transportation	95832	2.2	0.003	0.030
20	8518170	195.6	0.3056	DU8	16.5	Medium Lot Residential (2-4 DU/Acre)	586060	13.5	0.021	0.045
						Active Open Space	108900	2.5	0.004	0.050
						General Transportation	108900	2.5	0.004	0.030
				DU9	164.2	Medium Lot Residential (2-4 DU/Acre)	6664680	153.0	0.239	0.045
						Active Open Space	487872	11.2	0.018	0.050
				—	12.9	General Transportation	561924	12.9	0.020	0.030
77A	48480538	1113.0	1.7391	—	—	Passive Open Space	48480538	1113.0	1.739	0.092
77B	9740171	223.6	0.3494	—	—	Passive Open Space	3985740	91.5	0.143	0.050
						Medium Lot Residential (2-4 DU/Acre)	5771700	132.5	0.207	0.045
77C	7769721	178.4	0.2788	—	—	Small Lot Residential (4-10 DU/Acre)	7779616	178.6	0.279	0.040
78A	52467149	1204.5	1.8820	—	—	Passive Open Space	52467149	1204.5	1.882	0.090
78B	11047090	253.6	0.3963	—	—	Large Lot Residential (1-2 DU/Acre)	11038104	253.4	0.396	0.050
78C	8018731	184.1	0.2877	—	—	Passive Open Space	4991976	114.6	0.179	0.050
						Large Lot Residential (1-2 DU/Acre)	3009996	69.1	0.108	0.045

Interim Condition HEC-1 Routing Data

Table 4 - Interim Condition HEC-1 Routing Data

Description: Routing parameters based on proposed channels and drainage corridors

Location Eastmark - East Mesa, Arizona

Reference: DDMSW Version 4.6.0

Routing ID	Routing Method	LOB N	CHAN N	ROB N	Length (ft)	Slope (ft/ft)	RX1	RX2	LB	RX4	RX5	RB	RX7	RX8	RY1	RY2	LB	RY4	RY5	RB	RY7	RY8
74CT75	Normal Depth	0.030	0.013	0.030	10500	0.0038	0.0	15.0	16.5	25.0	33.0	41.5	43.0	58.0	6.80	6.60	5.60	0.00	0.00	5.60	6.80	6.80
10T75	Normal Depth	0.030	0.015	0.030	6320	0.0060	0.0	17.5	18.0	57.0	73.0	112.0	112.5	130.0	1.00	0.50	0.00	0.80	0.80	0.00	0.50	1.00
2BT12	Normal Depth	0.035	0.035	0.035	11520	0.0036	0.0	5.0	10.0	15.0	1015.0	1020.0	1025.0	1030.0	2.00	1.50	1.00	0.00	0.00	1.00	1.50	2.00
7AT12	Normal Depth	0.030	0.015	0.030	1920	0.0042	0.0	17.5	18.0	57.0	73.0	112.0	112.5	130.0	1.00	0.50	0.00	0.80	0.80	0.00	0.50	1.00
7T12	Normal Depth	0.030	0.015	0.030	3160	0.0036	0.0	7.5	8.0	38.0	43.0	73.0	73.5	81.0	0.80	0.50	0.00	0.60	0.60	0.00	0.50	0.80
12T13	Normal Depth	0.030	0.015	0.030	2600	0.0014	0.0	17.5	18.0	57.0	73.0	112.0	112.5	130.0	2.00	1.00	0.50	0.00	0.00	0.50	1.00	2.00
8T9	Normal Depth	0.030	0.015	0.030	1410	0.0053	0.0	17.5	18.0	57.0	73.0	112.0	112.5	130.0	1.00	0.50	0.00	0.80	0.80	0.00	0.50	1.00
9T13	Normal Depth	0.030	0.015	0.030	4020	0.0045	0.0	17.5	18.0	57.0	73.0	112.0	112.5	130.0	1.00	0.50	0.00	0.80	0.80	0.00	0.50	1.00
11T13	Normal Depth	0.030	0.015	0.030	1410	0.0050	0.0	17.5	18.0	57.0	73.0	112.0	112.5	130.0	1.00	0.50	0.00	0.80	0.80	0.00	0.50	1.00
13T75	Normal Depth	0.030	0.015	0.030	1230	0.0016	0.0	17.5	18.0	57.0	73.0	112.0	112.5	130.0	2.00	1.00	0.50	0.00	0.00	0.50	1.00	2.00
18T19	Normal Depth	0.030	0.015	0.030	1040	0.0040	0.0	7.5	8.0	38.0	43.0	73.0	73.5	81.0	0.80	0.50	0.00	0.60	0.60	0.00	0.50	0.80
77CT78	Normal Depth	0.032	0.032	0.032	4435	0.0020	0.0	5.0	10.0	24.0	124.0	138.0	143.0	148.0	4.50	4.00	3.50	0.00	0.00	3.50	4.00	4.50
78CT79	Normal Depth	0.032	0.032	0.032	4215	0.0033	0.0	5.0	10.0	26.0	81.0	97.0	102.0	107.0	5.00	4.50	4.00	0.00	0.00	4.00	4.50	5.00
73ATB	Normal Depth	0.045	0.040	0.045	2830	0.0060	0.0	5.0	10.0	20.0	120.0	130.0	135.0	140.0	4.00	3.00	2.50	0.00	0.00	2.50	3.00	4.00
73BTC	Normal Depth	0.045	0.040	0.045	4500	0.0050	0.0	5.0	10.0	22.0	122.0	134.0	139.0	144.0	4.00	3.50	3.00	0.00	0.00	3.00	3.50	4.00
73T74C	Normal Depth	0.032	0.032	0.032	4670	0.0024	0.0	5.0	10.0	31.0	69.0	79.5	84.5	89.5	3.50	3.50	3.50	0.00	0.00	3.50	3.50	3.50
74ATB	Normal Depth	0.013	0.013	0.013	3200	0.0060	0.0	7.0	21.5	30.0	36.0	44.5	59.0	66.0	6.00	5.50	5.50	0.00	0.00	5.50	5.50	6.00
74BTC	Normal Depth	0.013	0.013	0.013	3100	0.0065	0.0	7.0	21.5	30.0	36.0	44.5	59.0	66.0	6.00	5.50	5.50	0.00	0.00	5.50	5.50	6.00
77ATB	Normal Depth	0.045	0.040	0.045	3000	0.0050	0.0	5.0	10.0	37.0	47.0	74.0	79.0	84.0	5.50	5.00	4.50	0.00	0.00	4.50	5.00	5.50
77BTC	Normal Depth	0.045	0.040	0.045	4750	0.0042	0.0	5.0	10.0	20.0	85.0	105.0	110.0	115.0	5.00	4.00	3.00	0.00	0.00	3.00	4.00	5.00
78ATB	Normal Depth	0.045	0.040	0.045	3500	0.0042	0.0	500.0	980.0	1003.0	1007.0	1031.0	1511.0	2011.0	4.50	3.50	3.00	0.00	0.00	3.00	3.50	4.50
78BTC	Normal Depth	0.035	0.022	0.035	4500	0.0033	0.0	100.0	110.0	115.0	120.0	125.0	130.0	135.0	5.00	4.00	3.50	0.00	0.00	3.50	8.00	9.00

Interim Condition Onsite Retention Volume Summary

Table 5 - Interim Condition Onsite Retention Volume Summary

Description: Calculation of Required Retention Volume Using the Rational Method

Location Eastmark

Reference: Drainage Design Manual for Maricopa County, Vol. 1, Hydrology

Known Values: Design storm: 100-yr, 2-hr 100-yr, 24-hr
Rainfall, D: 2.19 inches 3.51 inches

Calc. Values: V = DAC
Where: V = Retention Volume Required
D = Depth of Rainfall (ft)
A = Area of Watershed Contributing
C = Runoff Coefficient

Retention - 100YR, 2HR Volumes (North of the Powerline Floodway)

Retention Basin	Retention Location	Sub-basin: Contributing Sub-basin	Sub-basin: Contributing Sub-basin Area (acres)	Development Unit: Contributing DUs	Development Unit: DU Area Within Sub-basin (acres)	Weighted "C_{100}"	Required Storm Event Retention	Volume Required (acre-feet)	Total Volume Required (acre-feet)	Volume Provided (acre-feet)	Total Volume Provided (acre-feet)	Modeled HEC-1 Retention Volume (acre-feet)
RET02B[1]	DU6N	2B	93.7	DU6N	93.7	0.90	100-Year, 2-Hour	15.4	15.4	14.50	14.50	15.40
RET07	DU3/4	7	74.4	DU3/4	74.4	0.79	100-Year, 24-Hour	17.2	17.2	--	--	17.20
RET07A	DU2 DU3/4	7A	76.8	FUTURE DU 2	22.6	0.90	100-Year, 24-Hour	5.9	17.2	--	--	17.20
				DU3/4	54.2	0.71		11.3		--		
RET08[2]	DU6S DU7	8	458.8	FUTURE DU6S	63.6	0.79	100-Year, 2-Hour	9.2	59.9	--	45.29	55.69
				DU7	387.9	0.70		49.5		45.29		
				---	7.3	0.90		1.2		--		
RET09	DU3/4 DU7	9	80.6	DU3/4	10.4	0.90	100-Year, 2-Hour	1.7	11.0	--	.59	11.00
				DU7	70.2	0.73		9.3		.59		
RET10[2]	DU7	10	109.5	DU7	106.8	0.66	100-Year, 2-Hour	13.2	13.2	10.55	18.32	18.32
				---	2.7					7.77		
RET11	DU3/4 DU7	11	196.8	DU7	10.6	0.83	100-Year, 2-Hour	1.6	32.2	2.32	2.32	32.92
				DU3/4	173.0	0.90		28.4		--		
				---	13.2	0.90		2.2		--		
RET12	DU3/4	12	100.2	DU3/4	99.3	0.78	100-Year, 2-Hour	14.1	14.2	--	--	14.20
				---	0.9	0.90		0.1		--		
RET13	DU3/4	13	128.2	DU3/4	126.2	0.68	100-Year, 2-Hour	15.7	16.0	--	--	16.00
				---	2.0	0.90		0.3		--		
RET14	DU3/4	14	59.6	DU3/4	59.6	0.90	100-Year, 2-Hour	9.8	9.8	--	--	9.80
							Total	206.1	206.1	81.02	81.02	207.73 ac-ft

1. Retention provided volume for RET02B was taken from the First Solar Final Drainage Report, where only approximately half of 2B is developed.
2. Retention provided volumes for RET08 and RET10 were taken from DU7 and Ray Road Final Drainage Reports and improvement plans.

Retention - 100YR, 2HR Volumes (South of the Powerline Floodway)

Retention Basin	Retention Location	Sub-basin: Contributing Sub-basin	Sub-basin: Contributing Sub-basin Area (acres)	Development Unit: Contributing DUs	Development Unit: DU Area Within Sub-basin (acres)	Weighted "C_{100}"	Required Storm Event Retention	Volume Required (acre-feet)	Total Volume Required (acre-feet)	Volume Provided (acre-feet)	Total Volume Provided (acre-feet)	Modeled HEC-1 Retention Volume (acre-feet)
RET16	DU3S DU9	16	67.7	DU3S	5.7	0.65	100-Year, 2-Hour	0.7	8.2	--	--	8.20
				DU9	62.0	0.66		7.5		--		
RET17	DU3S	17	86.6	DU3S	86.6	0.65	100-Year, 2-Hour	10.3	10.3	12.47	12.47	12.47
RET18	DU8	18	204.8	DU8	204.8	0.66	100-Year, 2-Hour	24.7	24.7	--	--	24.70
RET19	DU9	19	65.6	DU9	65.6	0.70	100-Year, 2-Hour	8.4	8.4	--	--	8.40
RET20	DU8 DU9	20	195.6	DU8	18.5	0.68	100-Year, 2-Hour	2.3	23.9	--	--	23.90
				DU9	164.2	0.65		19.5		--		
				---	12.9	0.90		2.1		--		
							Total	75.5	75.5	12.47	12.47	77.67 ac-ft

Eastmark Requred Retention Total =	**281.6**	**ac-ft**
Current Eastmark Provided Retention Total =	**93.5**	**ac-ft**
Current Eastmark Modeled Retention Total =	**285.4**	**ac-ft**

PLATE 1

Vicinity Map

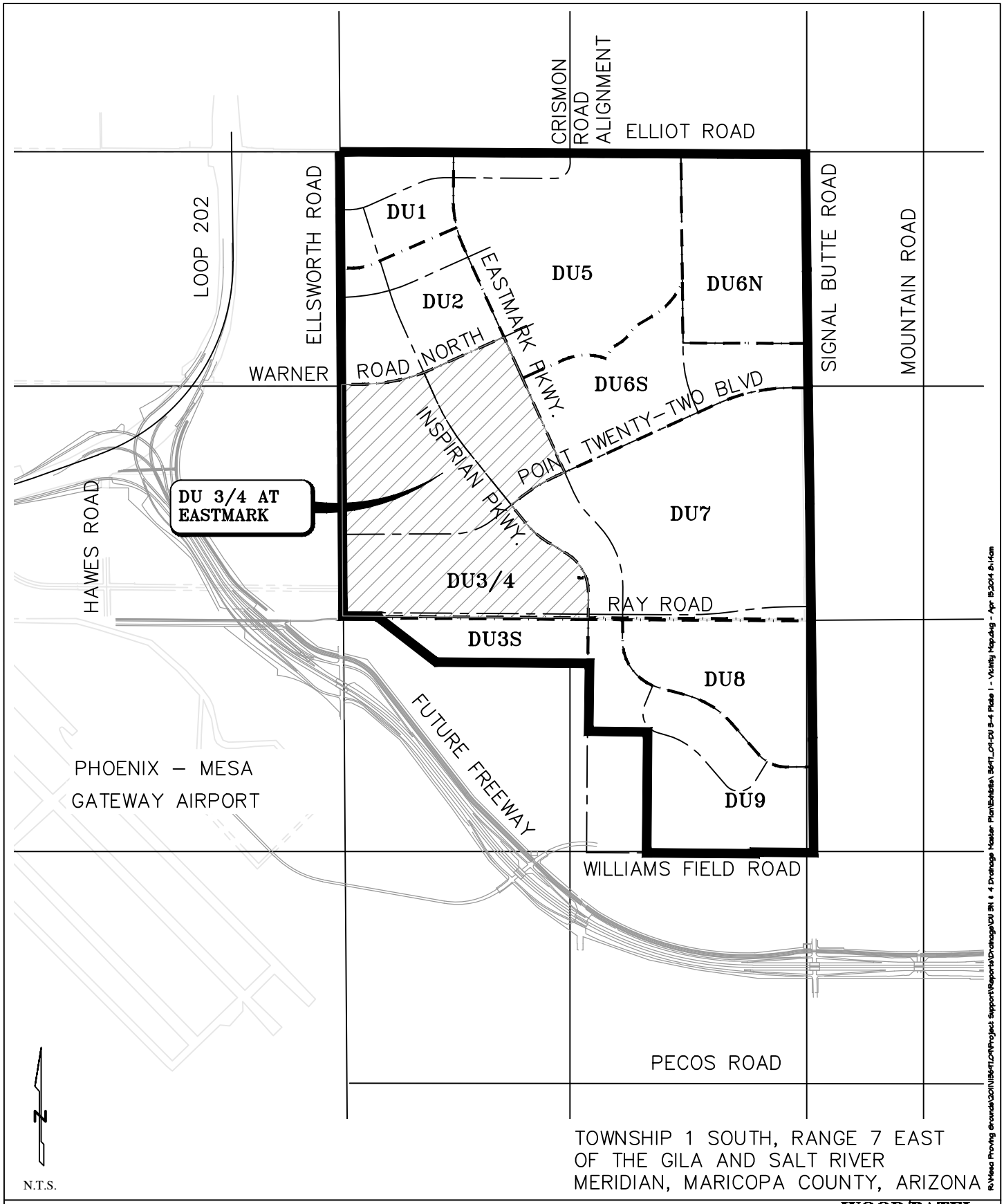


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PLATE 1: VICINITY MAP

EASTMARK
MESA, ARIZONA

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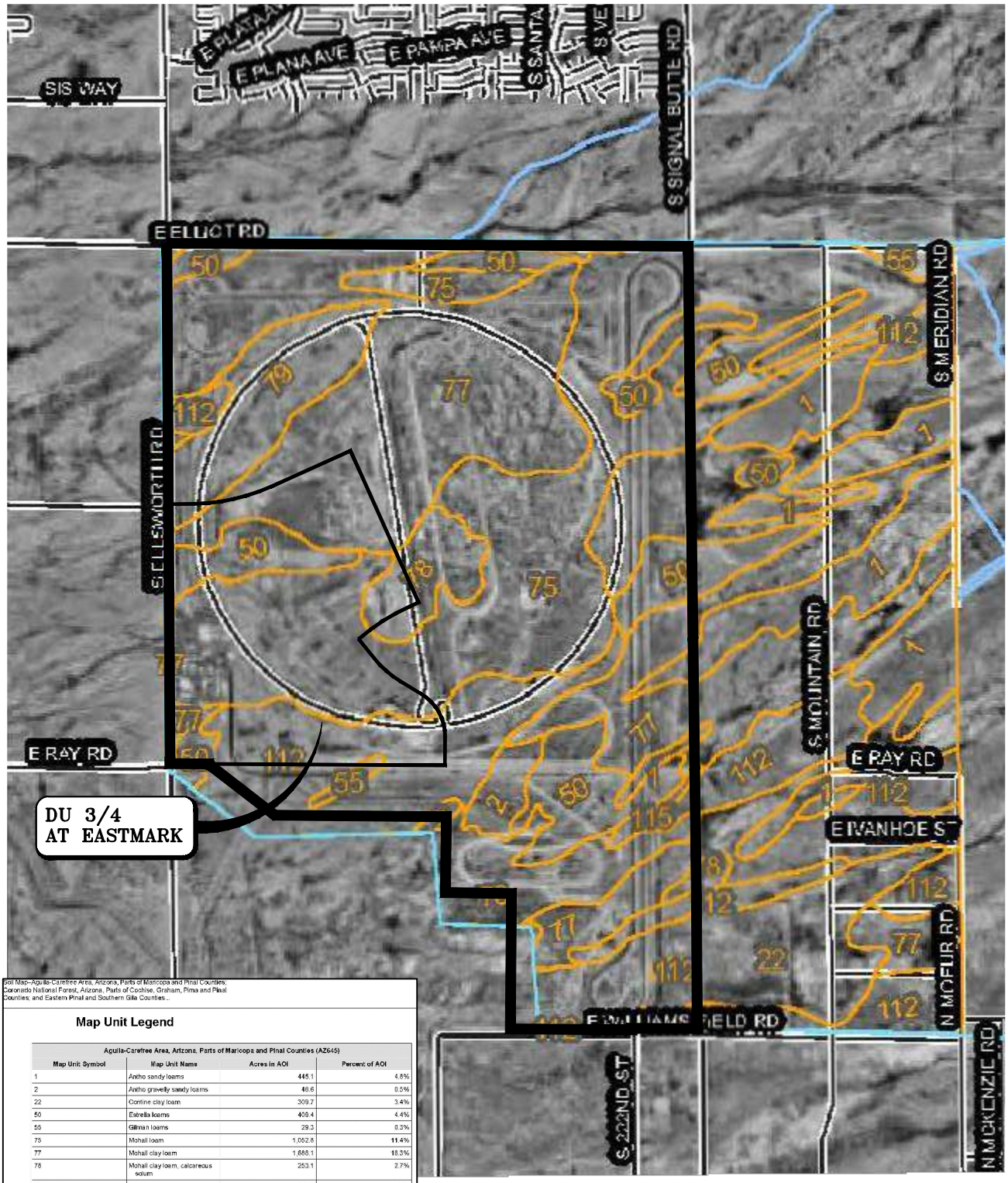
PLATE 2

Soils Map



Soil Map--Aguila-Carefree Area, Arizona, Parts of Maricopa and Pinal Counties; Coronado National Forest, Arizona, Parts of Cochise, Graham, Pima and Pinal Counties; and Eastern Pinal and Southern Gila Counties...

Map Unit Legend

Aguila-Carefree Area, Arizona, Parts of Maricopa and Pinal Counties (AZ645)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
1	Antho sandy loams	445.1	4.8%
2	Antho gravelly sandy loams	46.6	0.5%
22	Contine clay loam	309.7	3.4%
50	Estrella loams	409.4	4.4%
55	Gilman loams	29.3	0.3%
75	Mohall loam	1,052.8	11.4%
77	Mohall clay loam	1,688.1	18.3%
78	Mohall clay loam, calcareous solum	253.1	2.7%
79	Mohall clay	179.4	1.9%
112	Tremant gravelly sandy loams	771.5	8.4%
115	Tremant-Antho complex, 1 to 5 percent slopes	13.2	0.1%
Coronado National Forest, Arizona, Parts of Cochise, Graham, Pima and Pinal Counties (AZ723)			
No soil data available for this soil survey area.			
Eastern Pinal and Southern Gila Counties, Arizona (AZ661)			
No map units selected for this soil survey area.			
Totals for Area of Interest (AOI)		9,214.9	100.0%

3000 0 1500 3000

1 inch = 3000 ft.

N

R:\Mesa Proving Grounds\2011\1154TL01\Project Support\Reports\Drainage\DU 3/4 & 4 Drainage Master Plan\Exhibits\ 3647_L01-DU 3-4 Plate 2-Soils Mapping - Apr 15 2014 8:16am

PLATE 2: SOILS MAP

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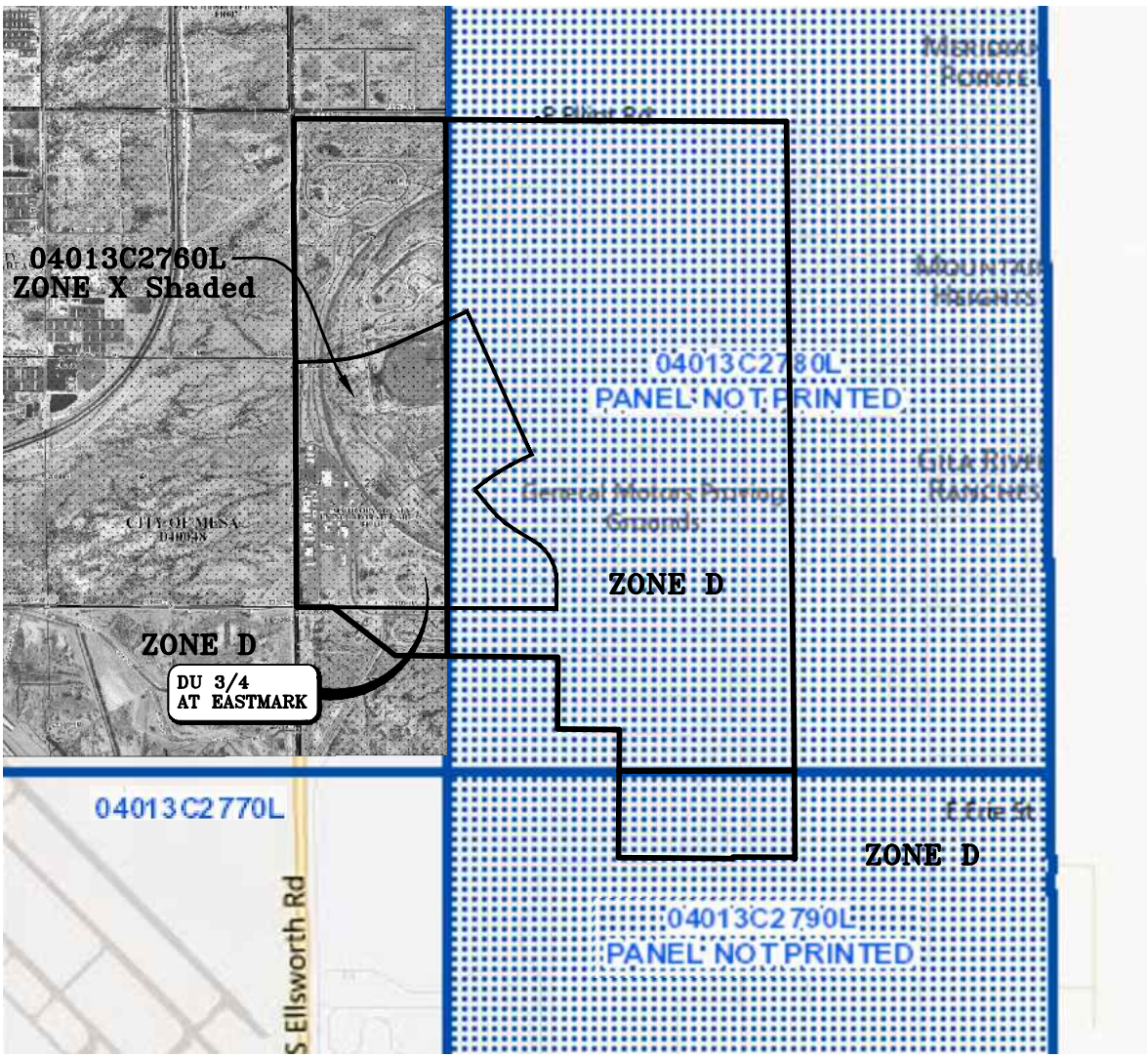
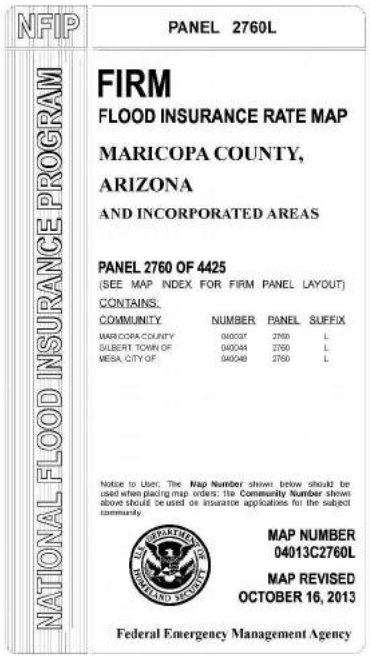
PLATE 3

Flood Insurance Rate Map




NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 2760L

FIRM

FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA

AND INCORPORATED AREAS

PANEL 2760 OF 4425

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MARICOPA COUNTY	040037	2760	L
GILBERT, TOWN OF	040044	2760	L
MESA, CITY OF	040048	2760	L

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

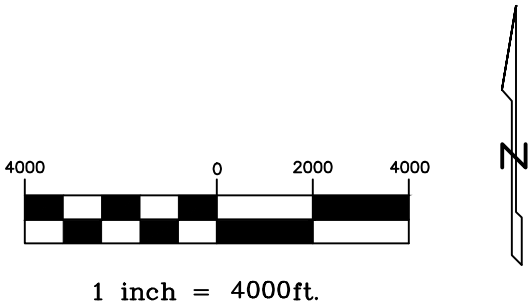
MAP NUMBER
04013C2760L

MAP REVISED
OCTOBER 16, 2013

Federal Emergency Management Agency

Zone "X" Shaded is defined by FEMA as follows:
Areas of 0.2% annual chance flood: areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

Zone "D" is defined by FEMA as follows:
Areas in which flood hazards are undetermined.



R:\Mesa Proving Grounds\2011\1954TLCM\Project Support\Reports\Drainage\DU 3/4 & 4 Drainage Master Plan\Exhibits\ 3647_CH-DU 3-4 Plate 3-FEMA FIRM Map.dwg - Apr 15,2014 8:15am

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PLATE 3: FEMA FIRM MAP

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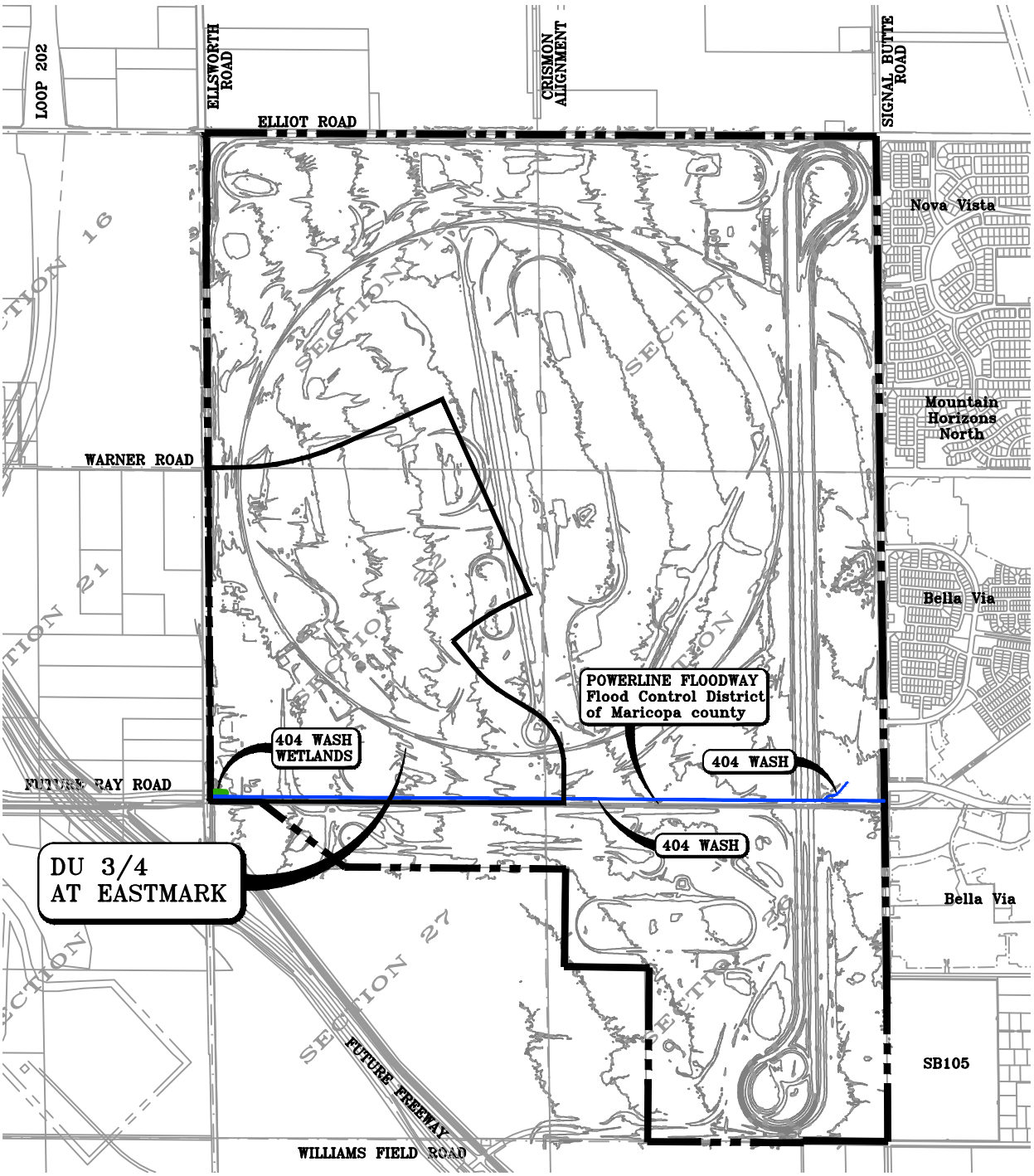
PLATE 4

Section 404 Jurisdictional Delineation Map



LEGEND

404 WASH	
404 WASH WETLANDS	
PROPERTY BOUNDARY	
5 FT. CONTOUR	1430

N.T.S.

R:\Mesa Proving Grounds\2011\1154TLON\Project Support\Reports\Drainage\DU 3-4 Drainage Master Plan\Exhibits\ 3647_04-DU 3-4 Plate 4-Jurisdiction Exhibit.dwg - Apr 15,2014 6:41am

PLATE 4: 404 JURISDICTIONAL DELINEATION MAP

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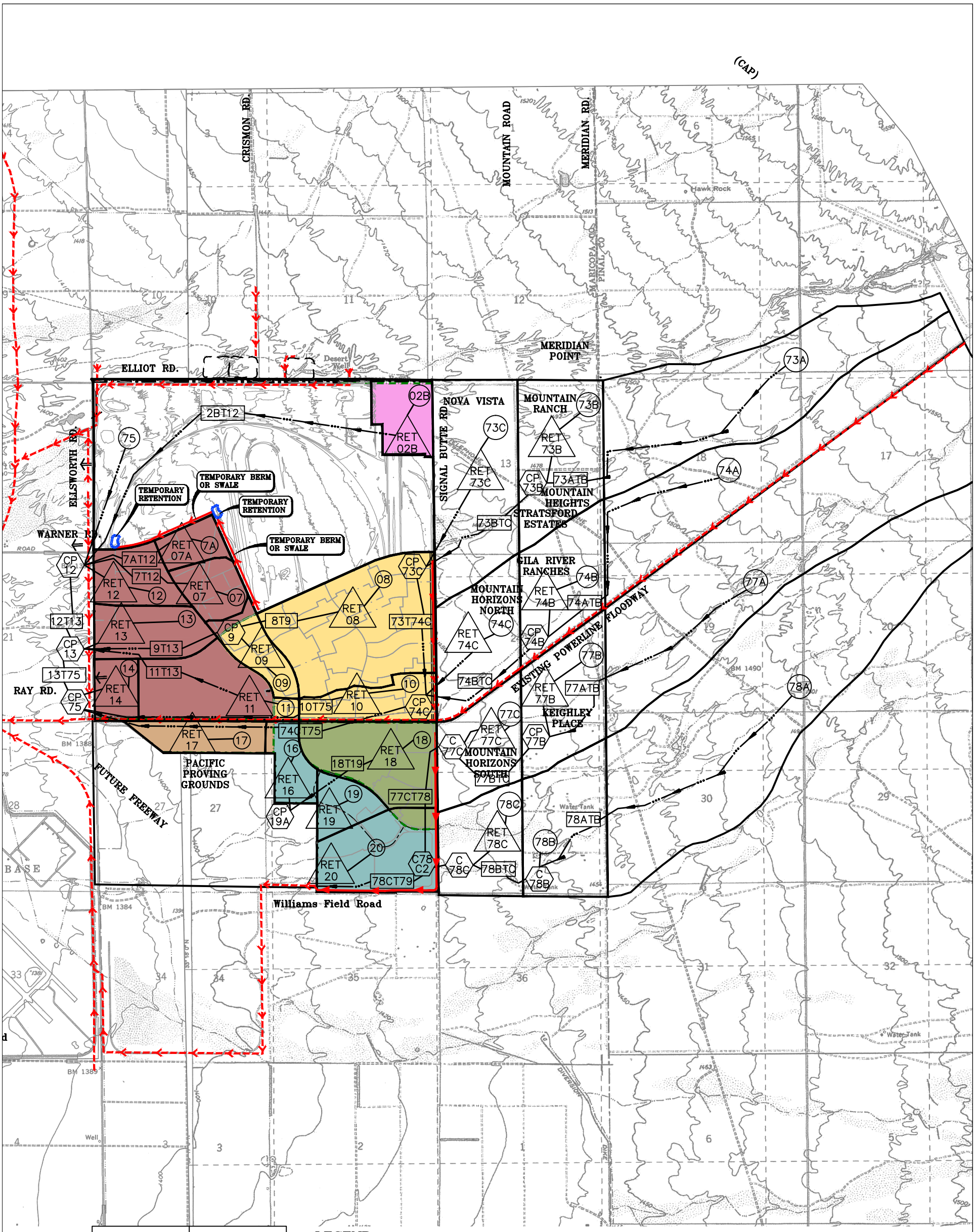
PLATE 5

Interim Condition HEC-1 Schematic



LOCATION ID	DISCHARGE (CFS)
CP75	633
RET17	0
CP19A	61
RET19	81
78CT79	935

3000 0 1500 3000

Horz. 1 in. = 3000 ft.

LEGEND

- SUB-BASIN BOUNDARY
- EXISTING STORM DRAIN
- PROPOSED TEMPORARY BERM OR SWALE
- EXISTING CHANNEL OR STORM DRAIN
- ROUTING
- 5 FT. CONTOUR
- FLOW DIRECTION ARROW
- TEMPORARY RETENTION
- 77C WATERSHED ID
- 77BTC ROUTING ID
- C 77C CONCENTRATION POINT ID
- RET 73B RETENTION ID
- DU 3/4
- DU 3S
- DU 6N
- DU 7
- DU 8
- DU 9

NOT FOR CONSTRUCTION OR RECORDING

PLATE 5: INTERIM CONDITION HEC-1 SCHEMATIC

DU 3/4 AT EASTMARK

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