MASTER DRAINAGE REPORT
FOR
DEVELOPMENT UNIT 3 SOUTH
AT
EASTMARK

December 16, 2013
WP# 113697.08

REVIEWED BY
CITY STAFF
BY
1/15/14 DATE
NO COMMENTS.

DMB® Master Developer Approval EASTMARK.
Date 12-19-13
Dir. of Development

Submitted to:

City of Mesa
55 North Center Street
P.O. Box 1466
Mesa, Arizona 85211-1466
Phone: (480) 644-3258

Prepared for:

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REGISTERED PROFESSIONAL ENGINEER (CIVIL)
CERTIFICATE NO.
20952
DARRELL D.
SMITH
Date Signed 12-16-13
ARIZONA, U.S.A.
EXPIRES 6-30-16

WOOD/PATEL
MISSION: CLIENT SERVICE™

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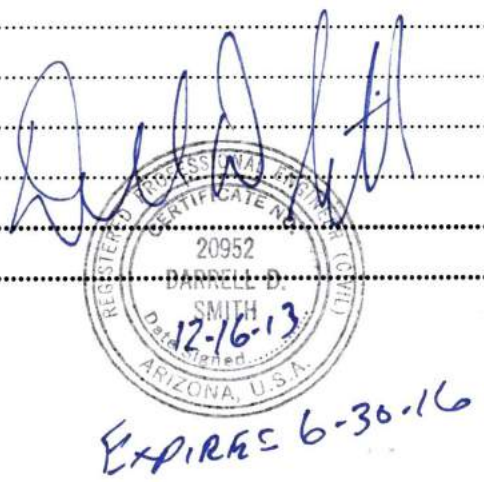

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1.0 INTRODUCTION

1.1 General Background and Project Location

Development Unit 3 South (DU-3S) is located in the southern portion of the Eastmark development, formerly known as Mesa Proving Grounds. The proposed Development Unit 3 South (Site) is approximately 92 acres within the 3,155-acre Eastmark master planned community, in Mesa, Arizona. It is a Planned Community District (PCD) which will include residential and open spaces.

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

The Site is located within a portion of Sections 26 and 27 of Township 1 South, Range 7 East, of the Gila and Salt River Meridian. The Site is bounded by the Powerline Floodway and Ray Road alignment to the north, Pacific Proving Grounds on the south and west, and Inspirian Parkway and Eastmark Development Unit 8 (DU-8) to the east (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 undisturbed desert along the northern, western, and southern boundaries.

In addition, the Powerline Floodway Channel traverses the northern boundary of the Site, south and parallel to the Ray Road alignment. This 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 South Master Drainage Report

The DU-3S Master Drainage Report was prepared to support the development of approximately 391 single-family residential dwelling units with open spaces. 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 stormwater runoff for the development of DU-3S 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.

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 39 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 53 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 north of the DU-3S 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*, dated December 17, 2013, by Wood, Patel and Associates, Inc., has set the drainage criteria for the Site. The update is being submitted for review and approval, concurrent with this DU Master Plan. The report includes a pre-developed condition HEC-1 model (MGPEX.DAT), as well as a full build-out model (EMDU3S.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 1,392 feet MSL, located at the northwest tip 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 northeast to southwest into the Pacific Proving Grounds site, and has been modeled accordingly within the current 100-year, 24-hour FCDMC model and the Master Drainage Report model. The outfall locations along the southern and western boundaries are at existing washes. Proposed 100-year, 2-hour retention will decrease the runoff volume and peak flow produced on the Site.

3.1.1 Northern Boundary

The northern boundary of DU-3S 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 north from entering the Site.

3.1.2 Eastern Boundary

DU-8 lies east of the Site and is currently in the design review process with the City of Mesa. DU-8 will provide retention for the 100-year, 2-hour storm event. In the event runoff exceeds the retention capacity within DU-8, the Site will outfall to Inspirian Road and be conveyed south and west to the Pacific Proving Grounds.

3.1.3 Western Boundary

The western boundary is not impacted by any offsite flows entering the Site. A discharge point to Pacific Proving Grounds is located near the middle of the diagonal portion of the common boundary.

3.1.4 Southern Boundary

There are no offsite impacts crossing the southern boundary. Several existing washes flow across the boundary from Eastmark to Pacific Proving Grounds. In the existing condition, peak flow leaving the Site is approximately 90 cubic feet per second (cfs).

4.0 PROPOSED DRAINAGE CONDITION

4.1 Proposed Drainage Plan

The drainage concept for DU-3S is to route offsite flows around the Site and direct onsite stormwater runoff to retention basins for storage. Offsite runoff north of the Site will be collected and diverted within the Powerline Floodway, preventing any stormwater produced to the north from impacting the Site.

Onsite runoff produced onsite will utilize 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 volume. Refer to Plate 5 – *Post Developed HEC-1 Schematic* for watershed delineations and locations.

Retention basins will be sized to retain the runoff volume from a 100-year, 2-hour storm event in accordance with jurisdictional requirements. 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 will be designed to drain retained runoff within 36 hours after a storm event. Land uses depicted in the hydrologic models are proposed and subject to change.

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

A proposed condition HEC-1 model (EMDU3S.DAT) was created to assess the impact of the developed DU-3S to the downstream drainage infrastructure. The model was created based upon the most current post developed condition model. The watershed within the Eastmark DU-3S was modeled with medium density residential and active open space land uses per the FCDMC's DDMSW program.

Retention for DU-3S was calculated, based on the previously-mentioned land uses, and applied to the proposed condition HEC-1 model. Based on point precipitation frequency

estimates from NOAA Atlas 14, the 100-year, 2-hour precipitation is 2.19 inches. Flows in excess of the 100-year, 2-hour basin capacities within DU-3S will discharge to historic outfall locations. The following table provides a summary of 100-year, 24-hour discharges for the existing and proposed conditions, which indicates decreased peak discharges leaving the Site.

EXISTING CONDITION		PROPOSED CONDITION	
Location ID	**Discharge**	**Location ID**	**Discharge**
C79A1	90 cfs	RET17	5 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 stormwater runoff to retention basins located throughout the Site.

4.4 Retention

4.4.1 Retention Storage

The 100-year, 2-hour required retention volume for DU-3S was estimated to be 10.1 acre-feet based on conceptual land use. 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 volume is based on 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 stormwater 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 South at Eastmark*, the following conclusions can be made:

1. This *Master Drainage Report for Development Unit 3 South 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-3S Master Drainage Report*.

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

4. Onsite retention shall be provided to retain runoff generated by the 100-year, 2-hour storm event for developed areas.

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 for Eastmark*, Wood, Patel and Associates, Inc., December 13, 2013.

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

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

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

5. *2012 Engineering & Design Standards*, City of Mesa, 2012.

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

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

APPENDIX A

Post Developed Data and Hydrology

Hydrology Proposed Condition

100-Year, 24-Hour HEC-1 Output

```
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*                                       *
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*             JUN  1998                 *
*          VERSION 4.1                  *
*                                       *
*  RUN DATE   12DEC13  TIME  10:29:13   *
*                                       *
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*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*        DAVIS, CALIFORNIA 95616        *
*           (916) 756-1104              *
*                                       *
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM


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  184          ID        PROJECT: MESA PROVING GROUNDS
  185          ID
  186          ID        MODEL REVISION DESCRIPTION:
  187          ID
  188          ID        THIS MODEL SHOULD REPLACE WS4-SEM.DAT IN THE HEC-1 RUN SEQUENCE SPECIFIE
  189          ID        BELOW.  REFERENCING WS2-NEM.DSS IS STILL REQUIRED.
  190          ID
  191          ID
  192          ID        THIS IS A 100-YEAR, 2-HOUR RETENTION SCENARIO MODEL USING
  193          ID        THE 20MSF COMMERCIAL SPACE AND 15K DU LAND PLAN PROVIDED
  194          ID        BY SWABACK PARTNERS ON 12/12/07.
  195          ID
  196          ID
  197          ID        THIS MODEL IS AN EXERPT OF THE MODEL PROVIDED BY THE FLOOD CONTROL
  198          ID        DISTRICT OF MARICOPA COUNTY (WS4-SEM.DAT).  WATERSHED 79A WAS UPDATED
  199          ID        AS REQUESTED BY FLOOD CONTROL DISTRICT OF MARICOPA COUNTY TO REDUCE THE
  200          ID        PERCENT IMPERVIOUS VALUE FROM 80% TO 0% TO MATCH THE LAND USE AS MODELED
  201          ID        WITHIN THE EAST MESA ADMP.
  202          ID
  203          ID        MODEL REVISED BY:
  204          ID        WOOD, PATEL & ASSOCIATES, INC.
  205          ID        DANIEL W. MATTHEWS, E.I.T.
  206          ID
  207          ID        FILE PATH:
  208          ID        R:\MESA PROVING GROUNDS\2006\062753\PROJECT SUPPORT\HYDRO\MDR-20-15 LAND
  209          ID        PLAN\2ND SUBMITTAL\POST-DEVELOPED 100YR2HR RETENTION MODEL (MPG20RT2)\
  210          ID        MPG20RT2.DAT
  211          ID
  212          ID   **********************************************************************
  213          ID
  214          ID        FILE: MPG20RT2.DAT
  215          ID
  216          ID        MODEL REVISED: 01-08-08
  217          ID
  218          ID        PROJECT: MESA PROVING GROUNDS
  219          ID
  220          ID        MODEL REVISION DESCRIPTION:
1                                        HEC-1 INPUT                                    PAGE  5

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

  221          ID
  222          ID        THIS MODEL SHOULD REPLACE WS4-SEM.DAT IN THE HEC-1 RUN SEQUENCE SPECIFIE
  223          ID        BELOW.  REFERENCING WS2-NEM.DSS IS STILL REQUIRED.
  224          ID
  225          ID
  226          ID        THIS IS A 100-YEAR, 2-HOUR RETENTION SCENARIO MODEL USING
  227          ID        THE 20MSF COMMERCIAL SPACE AND 15K DU LAND PLAN PROVIDED
  228          ID        BY SWABACK PARTNERS ON 12/12/07.
  229          ID
  230          ID
  231          ID        THIS MODEL IS AN EXERPT OF THE MODEL PROVIDED BY THE FLOOD CONTROL
  232          ID        DISTRICT OF MARICOPA COUNTY (WS4-SEM.DAT).  WATERSHEDS 68A, 68B,
  233          ID        70A, 70B, 71, 73B, 73C, 74B, 74C, 75, 77B, 77C, 78B, 78C, AND 79A
  234          ID        HAVE ALL BEEN UPDATED TO REFLECT CURRENT WATERSHED DELINEATIONS,
  235          ID        NEW DEVELOPMENT, CURRENT RETENTION,AND FLOOD ROUTING.  BASIN 75
  236          ID        HAS BEEN UPDATED TO REFLECT PLANNED DEVELOPEMENT FOR THE MESA
  237          ID        PROVING GROUNDS SITE.
  238          ID
  239          ID        MODEL REVISED BY:
  240          ID        WOOD, PATEL & ASSOCIATES, INC.
  241          ID        DANIEL W. MATTHEWS, E.I.T.
  242          ID
  243          ID        FILE PATH:
  244          ID        R:\MESA PROVING GROUNDS\2006\062753\PROJECT SUPPORT\HYDRO\MDR-20-15 LAND
  245          ID        PLAN\HYDROLOGY\POST-DEVELOPED 100YR2HR RETENTION MODEL (MPG20RT2)\
  246          ID        MPG20RT2.DAT
  247          ID
  248          ID   **********************************************************************
  249          ID
  250          ID
  251          ID   ID  Kirkham Michael:
  252          ID   Last Revised Date:  1/22/03
  253          ID   Filename:  WS4-SEM.DAT
  254          ID
  255          ID   Comments Dated 1/22/03 (CJ)
  256          ID
  257          ID   This model should be used ONLY for the Rittenhouse and Chandler Heights
  258          ID   Basin Design Project - Final Design Analyses.
```

```
259          ID
260          ID    This model is one of several models that represent the EMF watershed.
261          ID    This model covers the Southeast Mesa Area and should reference as a DSS
262          ID    the watershed model for the Northeast Mesa Area (Filename WS2-NEM.DAT).
263          ID
264          ID    This model is necessary to determine the input hydrographs for the
265          ID    Rittenhouse Basin Design HEC-RAS Unsteady State analysis.  To develop
266          ID    the necessary input hydrographs the following models should be run in order.
267          ID    Because the files utilize a TAPE21 file to export import hydrographs
268          ID    between models, prior to running the FIRST model (WS1-NWM.DAT) any existing
269          ID    TAPE21 file in the directory should be deleted.  The run procedure order is:
270          ID
271          ID         1)  WS1-NWM.DAT
272          ID         2)  WS2-NEM.DAT
273          ID         3)  WS3-QCSW.DAT
274          ID         4)  WS4-SEM.DAT (referencing WS2-NEM.DSS for the DSS file)
275          ID         5)  RT1-BASE.DAT
1                                    HEC-1 INPUT                                    PAGE  6

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

276          ID
277          ID    The necessary input hydrographs for the Rittenhouse Basin analysis
278          ID    are determined in RT1-BASE.  In that output file, the hydrograph at
279          ID    RWFLD1 should be exported and used as the input hydrograph at the
280          ID    EMF Reach 4 Cross Section 17.082.  And the hydrograph at RITTEN should
281          ID    be exported and used as the input hydrograph for the Rittenhouse Main
282          ID    Channel at Cross Section 820.00
283          ID
284          ID
285          ID    ********************************************************************
286          ID    **** NOTE BY PRIMATECH ENGINEERS:                              ****
287          ID    **** DATE: 06/12/2001                                          ****
288          ID    **** THE NEW FILE NAME IS: SEBTALT2.DAT                        ****
289          ID    **** THE FILE WAS RENAMED AS <<RTBTALT2.DAT>> FOR THE EAST MARICOPA ****
290          ID    **** FLOODWAY CAPACITY MITIGATION PROJECT, BY FLOOD CONTROL DISTRICT OF ****
291          ID    **** MARICOPA COUNTY.                                          ****
292          ID    **** THE FILE WAS RENAMED <<RTBTALT3.DAT>> AND UPDATED USING GREEN AND  ****
293          ID    **** AMPT FUTURE CONDITIONS FOR BASINS 258 TO 268.             ****
294          ID    ********************************************************************
295          ID
296          ID
297          ID
298          ID     THIS MODEL WAS ORIGINALLY MIDDOUT.DAT
299          ID     IT HAS BEEN MODIFIED BY CPE (7/2000)
300          ID     FOR ALTERNATIVE 2 FOR THE EAST MARICOPA FLOODWAY
301          ID     CAPACITY MITIGATION AND MULTI-USE CORRIDOR STUDY
302          ID     TO ROUTE BOTH THE POWERLINE FLOODWAY
303          ID     AND THE SANTAN FREEWAY CHANNEL INTO THE RAY BASIN PRIOR THEIR OUTFALL
304          ID     INTO THE EMF
305          ID
306          ID    ***************************************************
307          ID
308          ID          Model files changed by Collins/Pina Engineering
309          ID          to reflect multi-use design concepts (recreation
310          ID          and environment) proposed throughout the entire
311          ID          EMF Corridor.    July 2000
312          ID
313          ID
314          ID     VERSION 8.06  CPE 7/31/00
315          ID
316          ID  ***************************************************************************
317          ID
318          ID
319          ID  ***************************************************************************
320          ID   FILENAME: MIDDOUT.DAT
321          ID
322          ID   ALL CIP INFRASTRUCTURE IS IN PLACE, FUTURE CONDITIONS LANDUSE IS IN PLACE
323          ID   FLOW IS ROUTED UP ELLSWORTH ROAD IN A EARTH LINED CHANNEL
324          ID
325          ID  ***************************************************************************
326          ID   PRODUCED BY DIBBLE AND ASSOCIATES AND HOSKIN ENGINEERING CONSULTANTS.
327          ID   File Name: Final8.Dat
328          ID   Revised - Jan. 2000 by SZ (Wood/Patel) From Final7.dat - new 2-V & Sideweir
329          ID   Revised - Jan. 2000 by SZ (Wood/Patel) from Final6.dat - 60% review comments
330          ID   Revised - Dec. 1999 by SZ (Wood/Patel) from Final5.dat
1                                    HEC-1 INPUT                                    PAGE  7

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

331          ID   Revised - Dec. 1999 by SZ (Wood/Patel) from Final4.dat
332          ID   Revised - Nov. 1999 by SZ (Wood/Patel) from Final3.dat
333          ID   Revised - June 1999 by SZ (Wood/Patel) for Final Model from Opt1.dat.
334          ID   Revised - May 1999 by SZ (Wood/Patel) for Option 1, Based on Model SDIB.DAT
335          ID   REVISED - MAY, 1999 BY VAS TO INCORPORATE INCREASE OF SUBBASIN RETENTION AND
336          ID             REVISIONS TO THE REGIONAL DETENTION BASIN STORAGE
337          ID   REVISED - FEB, 1999 BY VALERIE SWICK, FCD OF MARICOPA COUNTY
338          ID   REVISED - MAY, 1998 BY D&A
339          ID
340          ID   REVISED BY VALERIE SWICK, FEB. 26, 1998
341          ID
342          ID   FLOWS FROM DETENTION BASIN LOCATED AT NE CORNER OF ELLIOT AND ELLSWORTH ROADS
343          ID   IS ROUTED TO THE SOUTHWEST BY SIPHON DRAW TO SUBBASIN 70A. FROM THERE THEY
344          ID   WILL BE ROUTED BY A CHANNEL TO THE EMF. FLOWS FROM SUBBASINS ADJACENT TO
345          ID   SANTAN FREEWAY ALIGNMENT WILL BE ROUTED SOUTH TO SUBBASIN 70A WHERE THEY WILL
346          ID   BE COMBINED WITH FLOW IN SIPHON DRAW.
347          ID
348          ID   EAST MESA AREA DRAINAGE MASTER PLAN
349          ID   AREA SOUTH OF SUPERSTITION (U.S. HWY 60)
350          ID   AUGUST 1997
351          ID   SOUTHEAST MESA HIGH RESOLUTION MODEL
352          ID
353          ID   **********FUTURE CONDITION MODEL OF THE WATERSHED**********
354          ID
```

```
355          ID  **********ATTENTION**********************************************************
356          ID    SUBBASINS 75, 79A, 79B, 78E,  LANDUSES WERE NOT
357          ID    CHANGED BECAUSE IT WAS FELT THAT THEIR FUTURE CONDITIONS LANDUSES WOULD BE
358          ID    SIMILAR TO THE EXISTING CONDITIONS LANDUSES.
359          ID    RETENTION VOLUMES WILL ALSO NOT BE UTILIZED FOR SUBBASINS 75, 79A, 79B, 78E
360          ID    SOME QUEEN CREEK SUBBASINS WILL ALSO NOT HAVE RETENTION VOLUMES, EITHER
361          ID    BECAUSE THEY LIE IN PINAL COUNTY AND WE DONT KNOW PINAL COUNTIES PLANS OR
362          ID    THEY LIE IN THE SANTAN MOUNTAINS AND WON'T GET DEVELOPED
363          ID    WILLIAMS GATEWAY AIRPORT (SUBBASINS 80A, 80B, 81A, AND 81B) ARE MODELED AS
364          ID    FUTURE CONDITIONS AND HAVE RETENTION VOLUMES FOR THE 100YR 2HR STORM
365          ID  **************************************************************************
366          ID   FILENAME:  SDIBB.DAT
367          ID
368          ID   THIS MODEL REPRESENTS THE FUTURE CONDITION OF THE WATERSHED.
369          ID   TOTAL DRAINAGE AREA IS APPROXIMATELY 213 SQ. MI.
370          ID   THIS MODEL USES A Kn VALUE OF 0.09 FOR DESERT LAND USE DUE TO SHEET FLOW
371          ID   CONDITIONS.
372          ID
373          ID   100-YEAR 24-HOUR FREQUENCY
374          ID   AREAL REDUCTIONS FROM FCD HYDROLOGY MANUAL
375          ID   THIS MODEL INCLUDES INFLOW FROM NORTH OF THE SUPERSTITION FREEWAY
376          ID   AND EAST OF THE CAP
377          ID
378          ID   DATA FROM THE QUEEN CREEK ADMS HAS BEEN ADDED TO CALCULATE FLOWS INTO THE
379          ID   EMP.   MUSKINGUM ROUTING NSTEPS WERE ADJUSTED TO BE WITHIN THE SUGGESTED
380          ID   RANGE.
381          ID
382          ID   METHODOLOGY
383          ID   THE US CORPS OF ENGINEERS FLOOD HYDROLOGY MODEL HEC-1 DATED SEP1990 VER 4.0
384          ID   SCS TYPE II RAINFALL DISTRIBUTION
385          ID   S-GRAPH HYDROGRAPH
1                                        HEC-1 INPUT                                    PAGE  8

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

386          ID   GREEN AND AMPT INFILTRATION EQUATION USED FOR CALCULATING LOSSES
387          ID   NORMAL DEPTH STORAGE CHANNEL ROUTING
388          ID   APPROXIMATE DIRECTION, LOCATION, AND LENGTH OF THE WASHES HAVE BEEN
389          ID   EVALUATED BASED ON FIELD INVESTIGATION, USGS MAPS, LANDIS AERIAL SURVEYS
390          ID   DATED 1994
391          ID   THE NOAA TECHNICAL MEMORANDUM NOAA ATLAS 2 DEPTH AREA RATIOS
392          ID
393          ID   ORIGINAL STUDY PERFORMED BY LISA C. YOUNG AND AFSHIN AHOURAIYAN, UPDATED BY
394          ID   DAVID DEGERNESS (OCT-DEC, 1996). REVIEWED BY VALERIE A. SWICK
395          ID   AND AMIR MOTAMEDI OF THE FLOOD CONTROL DISTRICT
396          ID   HYDROLOGY BRANCH ENGINEERING DIVISION, FLOOD CONTROL
397          ID   DISTRICT OF MARICOPA COUNTY, DECEMBER - JULY 1995.
398          ID
399          ID   ASSUMED VELOCITY OF 1 FT/SEC FOR SHEET FLOW, 2-3 FT/SEC FOR WASH/NATURAL
400          ID   CHANNEL, 3 FT/SEC FOR ROAD AND GRASS CHANNEL, 10FT/SEC FOR CONCRETE CHANNEL
401          ID
402          ID   VELOCITIES FOR ADMP IMPROVEMENT CHANNELS FROM DIBBLE AND ASSOCIATES
403          ID   SUGGESTED ALTERNATIVES (JULY 1, 1997)
404          ID
405          ID   **************************************************************************
406          ID   **** THE FOLLOWING NOTE WAS ADDED BY PRIMATECH ENGINEERS ON 06-12-2001 ****
407          ID   **************************************************************************
408          ID   NOTE: MUST USE WEBUILD.DSS AS THE DSS FILE TO IMPORT FLOWS ACROSS THE
409          ID        SUPERSTITION FREEWAY.
410          ID   **************************************************************************
411          ID
412          ID
413          ID   NOTE: MUST USE NDIBF.DSS AS THE DSS FILE TO IMPORT FLOWS ACROSS THE
414          ID        SUPERSTITION FREEWAY.
415          ID
416          ID   DDM MCUHP2 SE MESA ADMP - SOUTH OF SUPERSTITION FWY, FUTURE CONDITIONS
             *DIAGRAM
417          IT       5  1APR97     0000      600
418          IO       5
419          IN      15
420          JD    3.60     0.01
421          PC    .000     .002     .005     .008     .011     .014     .017     .020     .023     .026
422          PC    .029     .032     .035     .038     .041     .044     .048     .052     .056     .060
423          PC    .064     .068     .072     .076     .080     .085     .090     .095     .100     .105
424          PC    .110     .115     .120     .126     .133     .140     .147     .155     .163     .172
425          PC    .181     .191     .203     .218     .236     .257     .283     .307     .663     .707
426          PC    .735     .758     .776     .791     .804     .815     .825     .834     .842     .849
427          PC    .856     .863     .869     .875     .881     .887     .893     .898     .903     .908
428          PC    .913     .918     .922     .926     .930     .934     .938     .942     .946     .950
429          PC    .953     .956     .959     .962     .965     .968     .971     .974     .977     .980
430          PC    .983     .986     .989     .992     .995     .998    1.000
431          JD    3.58      1.0
432          JD    3.49      5.0
433          JD    3.38     10.0
434          JD    3.24     30.0
435          JD    3.10     60.0
436          JD    3.05     90.0
437          JD    3.00    120.0
438          JD    2.97    150.0
             * **************************************************************************
             *
1                                        HEC-1 INPUT                                    PAGE  9

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

439          KK      17   BASIN
440          KM    BASIN 17
441          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
442          KM    L=0.92  Lca=0.47  S=19.6  Kn=0.045  LAG=26.8
443          KM    PHOENIX VALLEY S-GRAPH WAS USED FOR THIS BASIN
444          BA   0.138
445          LG    0.25     0.25     4.10     0.55       30
446          UI       0       17       51       88      115      171      190      137      101       71
```

```
447         UI      35      25      17       5       5       5       5       0       0       0
448         UI       0       0       0       0       0       0       0       0       0       0
449         UI       0       0       0       0       0       0       0       0       0       0
450         UI       0       0       0       0       0       0       0       0       0       0
            *
            *

451         KK   RET17  DIVERT
452         KM   RETAIN 100 YR 2 HR RUNOFF VOLUME
            * KO      2
453         DT   17RET     10.1      0.0
454         DI       0   10000
455         DQ       0   10000
            *
456         ZZ
```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE [V] ROUTING {--->} DIVERSION OR PUMP FLOW

NO. [.] CONNECTOR {<---} RETURN OF DIVERTED OR PUMPED FLOW

```
 439          17
               .
               .
 453           .-------->   17RET
 451       RET17
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUN  1998                *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   12DEC13  TIME  10:29:13   *
*                                       *
*****************************************
```

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

FILE: DU3SINT.DAT

MODEL REVISED: 12-12-2013

PROJECT: DEVELOPMENT UNIT 3 SOUTH (DU-3S) AT EASTMARK

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

THIS IS AN INTERIM CONDITION MODEL WHICH REFLECTS THE FLOOD CONTROL DISTRICT'S FULL BUILD OUT MODEL. SINCE THERE ARE NO OFFSITE FLOWS ONLY DU-3S WAS MODELED TO COMPARE PEAK FLOWS LEAVING THE SITE AGAINST THE EXISTING CONDITION PEAK FLOWS.

MODEL REVISION DESCRIPTION:

THE MOST CURRENT POST-DEVELOPED MPG MODEL(EMDU3S.DAT) WAS USED AS THE START TO THIS MODEL.

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

FILE PATH:
R:\MESA PROVING GROUNDS\2011\113697.08\PROJECT SUPPORT\REPORTS\
EASTMARK DU-3S DRAINAGE MASTER REPORT\HYDROLOGY\INTERIM\DU3SINT.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 (EMDU8S.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: EMDU8S.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 100YR2HR 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.                 ****
**********************************************************************


 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

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


**********************************************************************
 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 - 60% 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, 78E,  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, 78E
  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.

 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
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                     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

418 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

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

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

  0 PI        PRECIPITATION PATTERN
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432 JD INDEX STORM NO. 3

STRM 3.49 PRECIPITATION DEPTH

TRDA 5.00 TRANSPOSITION DRAINAGE AREA

0 PI PRECIPITATION PATTERN

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433 JD INDEX STORM NO. 4

STRM 3.38 PRECIPITATION DEPTH

TRDA 10.00 TRANSPOSITION DRAINAGE AREA

0 PI PRECIPITATION PATTERN

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434 JD INDEX STORM NO. 5

STRM 3.24 PRECIPITATION DEPTH

TRDA 30.00 TRANSPOSITION DRAINAGE AREA

0 PI PRECIPITATION PATTERN

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435 JD INDEX STORM NO. 6

STRM 3.10 PRECIPITATION DEPTH

TRDA 60.00 TRANSPOSITION DRAINAGE AREA

0 PI PRECIPITATION PATTERN

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.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
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.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00		

436 JD INDEX STORM NO. 7

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
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.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
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437 JD INDEX STORM NO. 8

STRM 3.00 PRECIPITATION DEPTH

TRDA 120.00 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
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.01	.01	.01	.01	.01	.01	.01	.01	.03	.03
.03	.09	.09	.09	.01	.01	.01	.01	.01	.01
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438 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
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.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
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.00	.00	.00	.00	.00	.00	.00	.00		

1

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			BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
					6-HOUR	24-HOUR	72-HOUR			
+	HYDROGRAPH AT	17	151.	12.42	19.	6.	3.	.13		
+	DIVERSION TO	17RET	151.	12.42	19.	5.	2.	.13		
+	HYDROGRAPH AT	RET17	5.	13.83	2.	1.	0.	.13		

*** 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

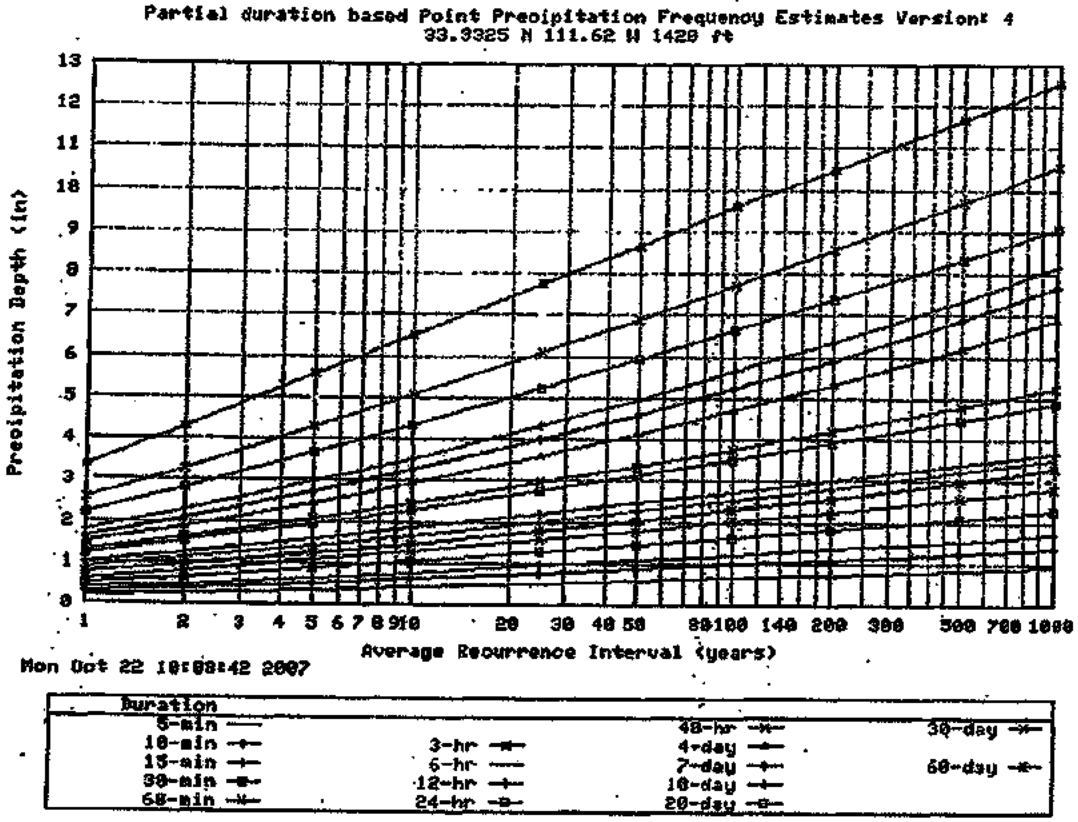
Precipitation Frequency Estimates (inches)

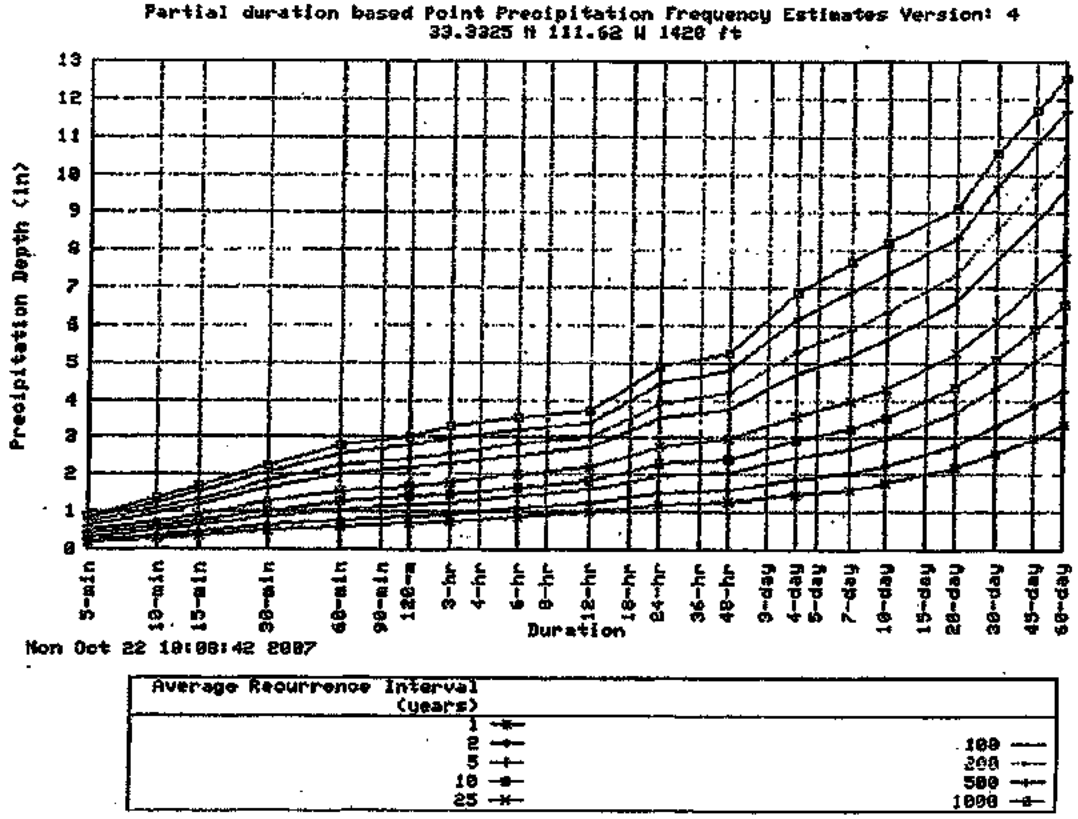
ARI* (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.19	0.29	0.36	0.48	0.60	0.68	0.73	0.88	0.99	1.21	1.27	1.47	1.62	1.77	2.19	2.56	2.99	3.33
2	0.25	0.38	0.47	0.63	0.78	0.89	0.93	1.11	1.26	1.52	1.61	1.87	2.07	2.25	2.81	3.28	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 PRECIPITATION 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
2-hr
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

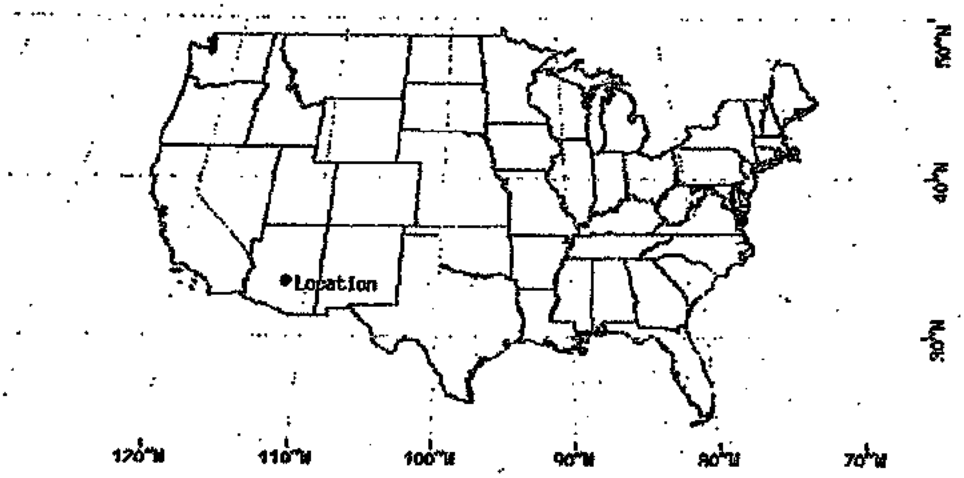
Precipitation Frequency Estimates (inches)

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.

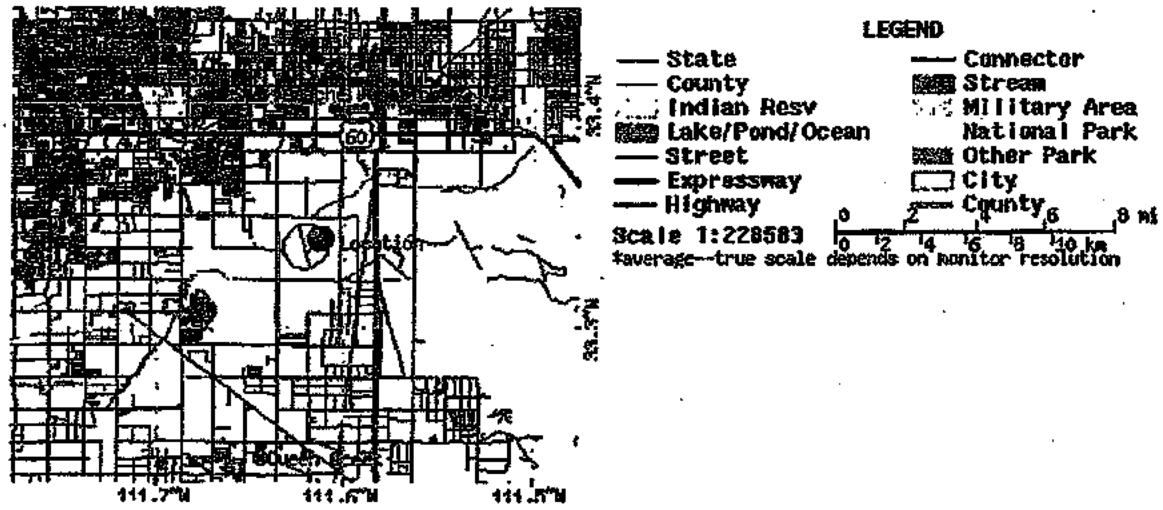
Please refer to the documentation for more information. NOTE: Formatting prevents estimates near zero to appear as zero.

Maps -



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

Post Developed HEC-1 Sub-Basin Data

Table 1 - Post Developed HEC-1 Sub-Basin Data

Description: Sub-basin data based on aerial photo 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)
17	3,722,860	85.47	0.134	4430	0.84	0.92	1412.0	1394.0	2485	0.47
Totals	**3,722,860**	**85.47**	**0.134**							

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

Post Developed HEC-1 Soil Data

Table 2 - Post Developed HEC-1 - Soils Data

Description: Post Developed 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.)
17	2	Antho Gravelly Sandy Loams	0.33	0.001
	55	Gillman Loams	7.33	0.011
	112	Tremant Gravelly Sandy Loams	77.81	0.122
		TOTAL	**85.47**	**0.134**

Post Developed HEC-1 Land Use Data

Table 3 - Post Developed 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
17	3722860	85.5	0.1336	DU3	85.5	Medium Lot Residential (2-4 DU/Acre)	3689532	84.7	0.1323	0.045
						Active Open Space	34848	0.8	0.0013	0.050

Post Developed Onsite Retention Volume Summary

Table 4 - Onsite Retention Volume Summary

Description: Calculation of Required Retention Volume Using the Rational Method

Location Eastmark

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

Known Values: Design storm: 100-yr, 2-hr
Rainfall, D: 2.19 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 (South of the Powerline Floodway)

Retention Basin	Retention Location	Sub-basin		Development Unit		Weighted "C_{100}"	100YR - 2HR Volume Required (acre-feet)	Total 100YR - 2HR Volume Required (acre-feet)
		Contributing Sub-basin	Contributing Sub-basin Area (acres)	Contributing DUs	DU Area Within Sub-basin (acres)			
RET17	DU-3	17	85.50	DU-3	85.50	0.65	10.1	10.1
							Total	**10.1** ac-ft

Eastmark DU-3S Requred Retention Total = 10.1 ac-ft

PLATE 1

Vicinity Map

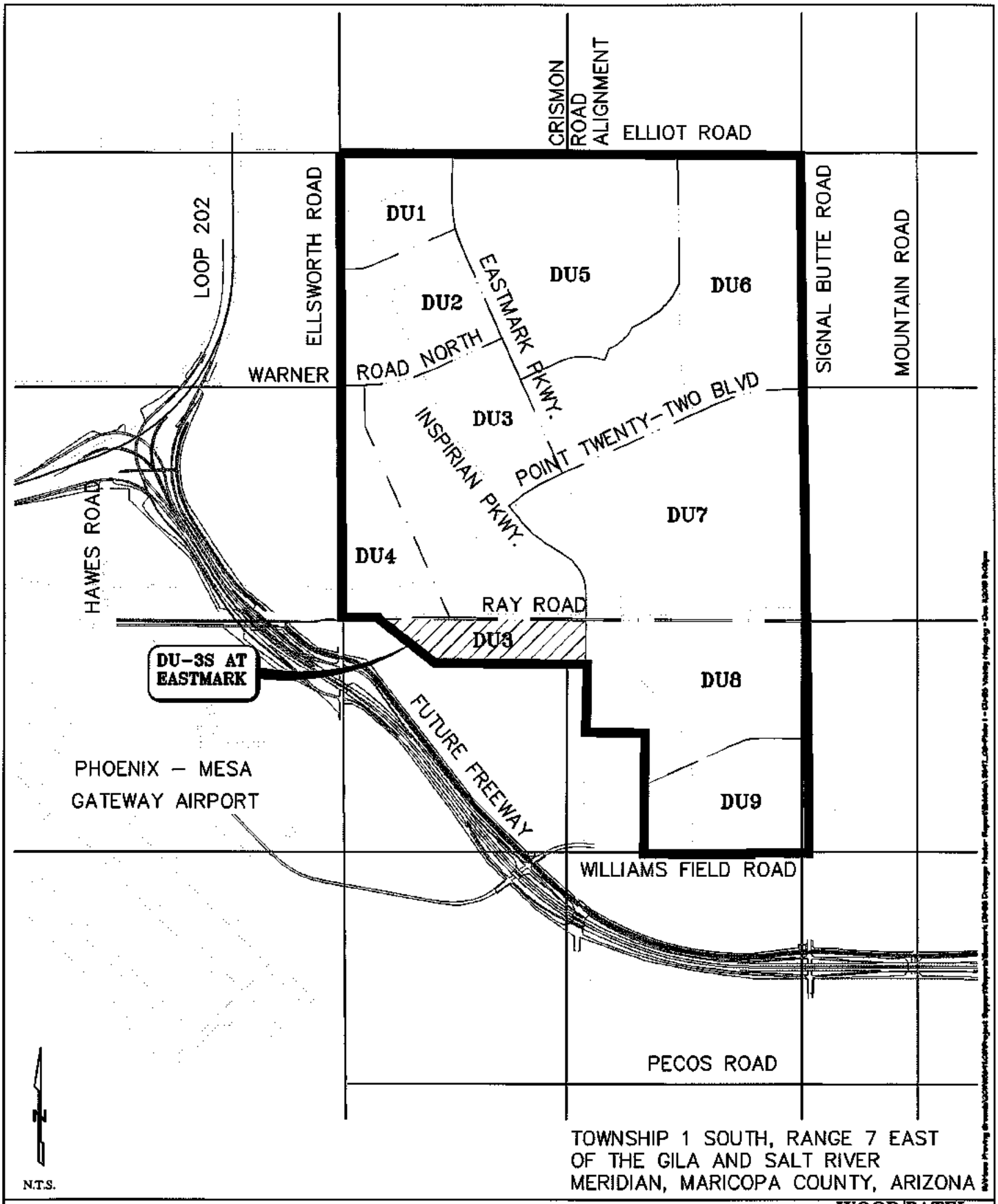


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PLATE 1: VICINITY MAP

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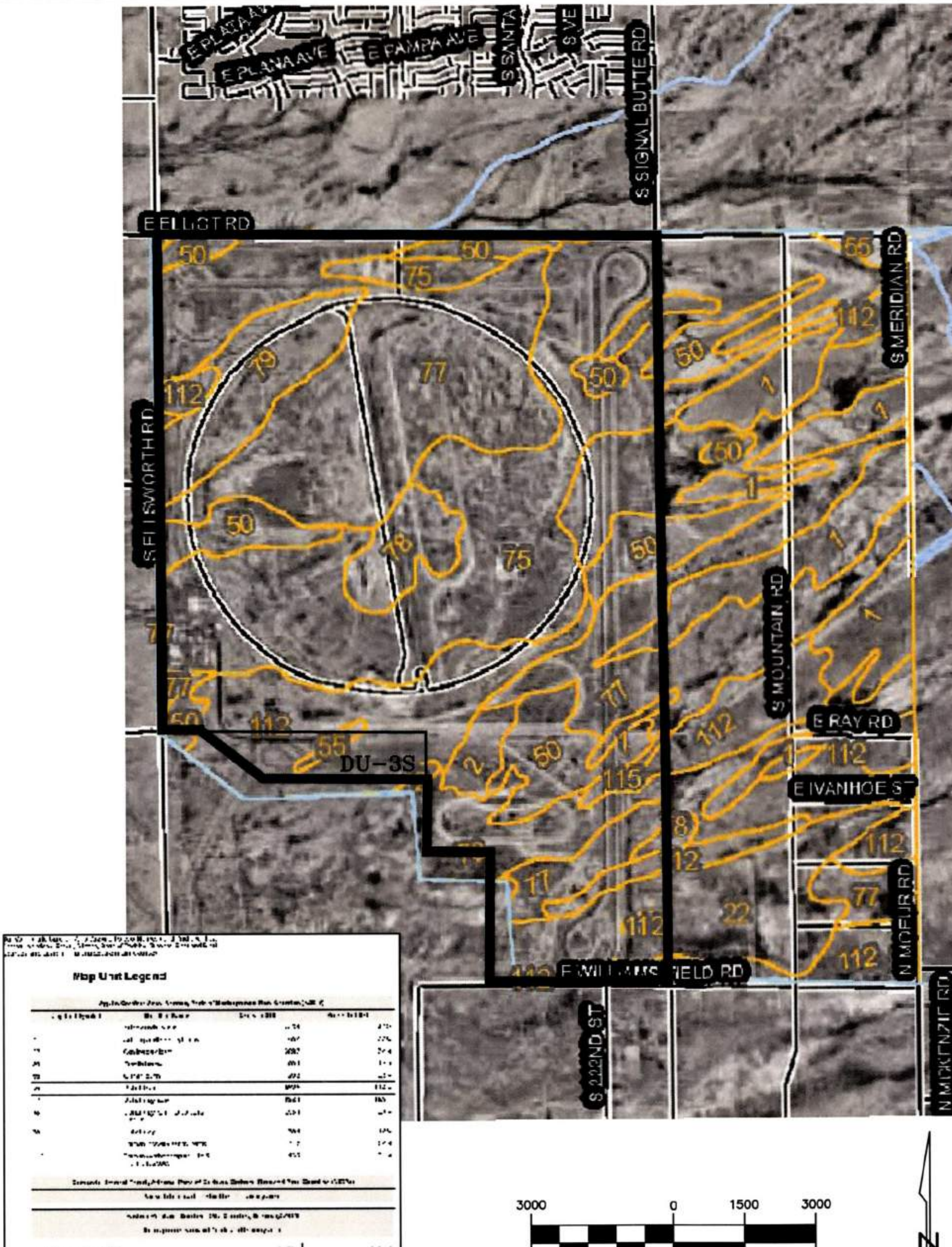
PLATE 2

Soils Map



1 inch = 3000ft.

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PLATE 2: SOILS MAP

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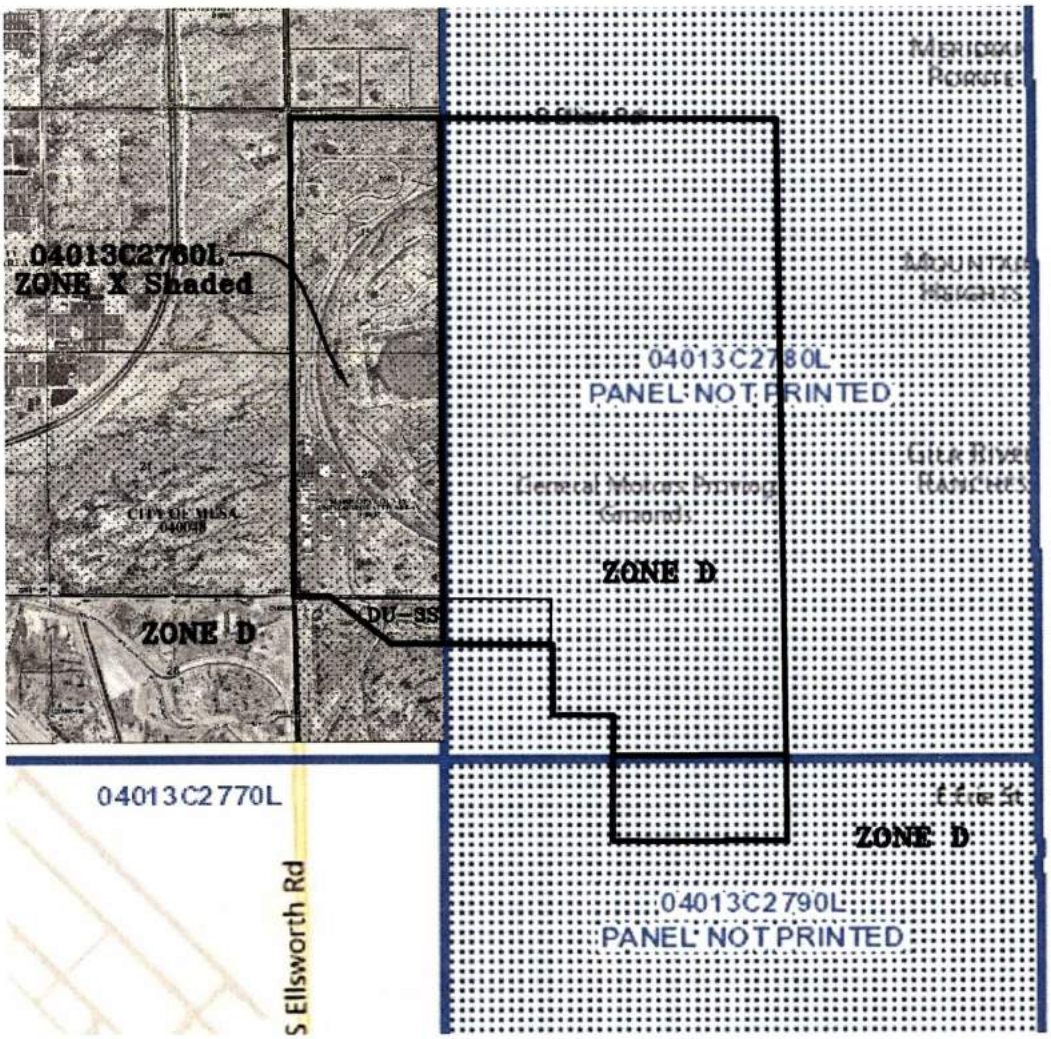
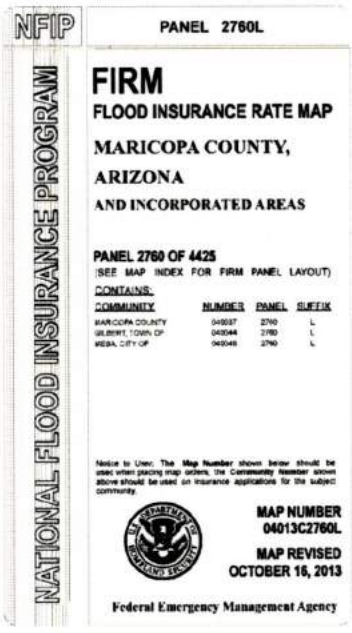
PLATE 3

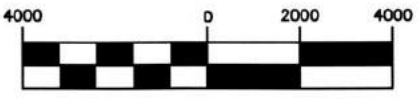
Flood Insurance Rate Map





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.



1 inch = 4000ft.

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PLATE 3: FEMA FIRM MAP

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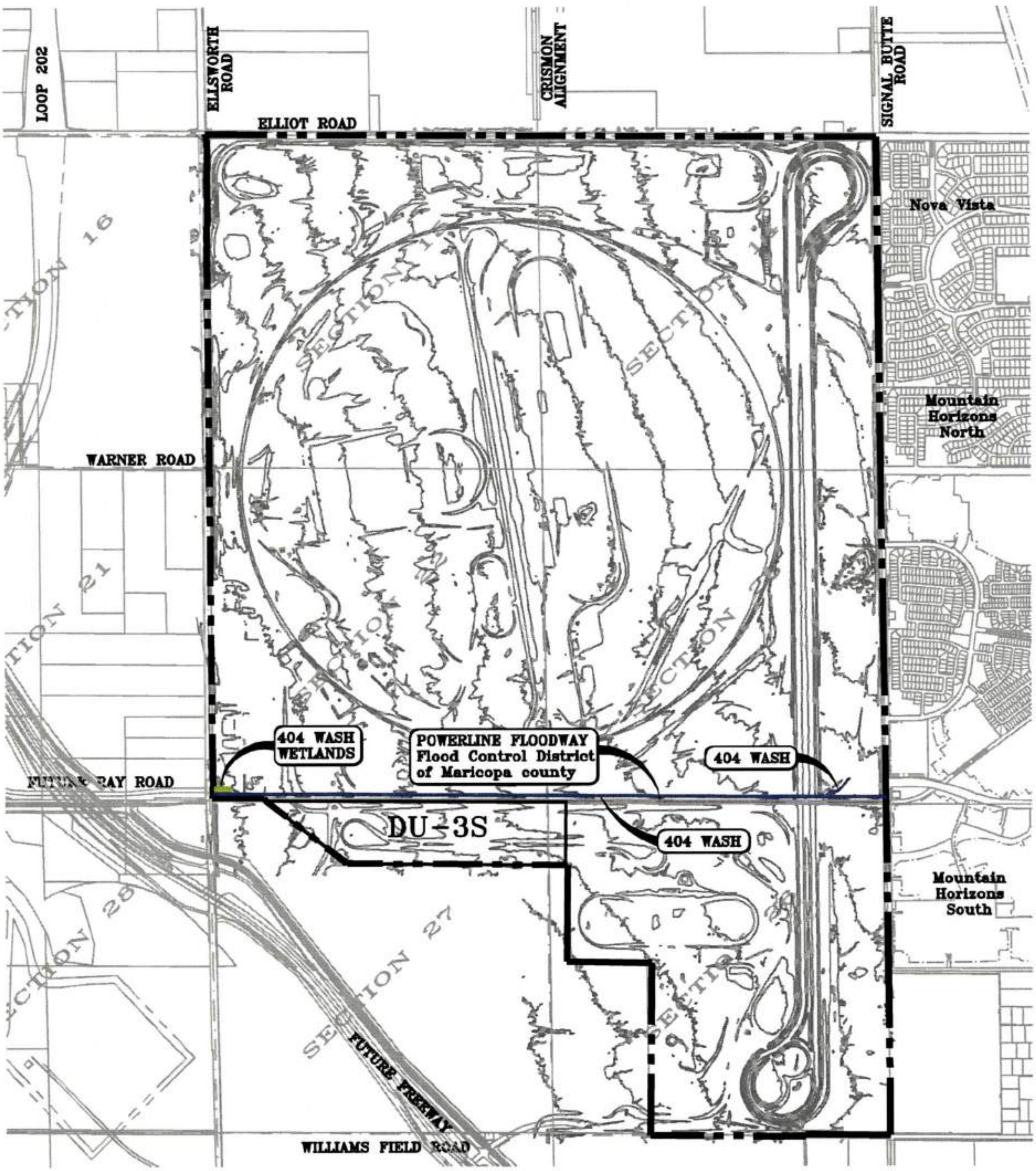
PLATE 4

Section 404 Jurisdictional Delineation Map



LEGEND

404 WASH	(blue line)
404 WASH WETLANDS	(green line)
PROPERTY BOUNDARY	(dash-dot line)
5 FT. CONTOUR	1430

N.T.S.

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PLATE 4: 404 JURISDICTIONAL DELINEATION MAP

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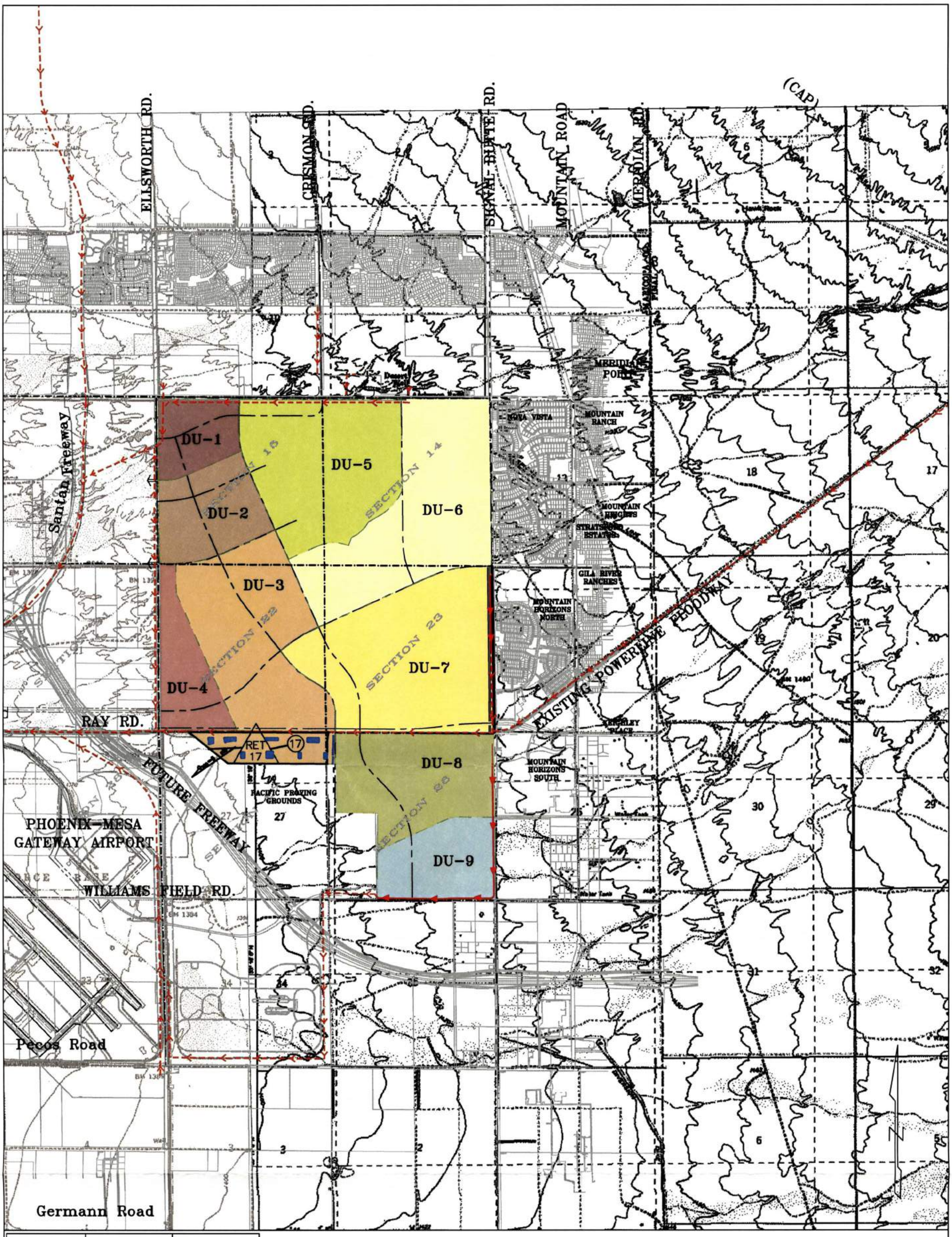
PLATE 5

Post Developed HEC-1 Schematic



LOCATION ID	EXISTING DISCHARGE (CFS)	POST DISCHARGE (CFS)
79A1/ RET17	90 –	– 5

LEGEND

- SUB-BASIN BOUNDARY
- EXISTING STORM DRAIN
- PROPOSED CHANNEL AND/OR STORM DRAIN SYSTEM
- EXISTING CHANNEL OR STORM DRAIN
- ROUTING
- 5 FT. CONTOUR
- FLOW DIRECTION ARROW
- 77C — WATERSHED ID
- 77BTC — ROUTING ID
- C 77C — CONCENTRATION POINT ID
- RET 73B — RETENTION ID

DU-1, DU-2, DU-3, DU-4, DU-5, DU-6, DU-7, DU-8, DU-9

3000 0 1500 3000

Horz. 1 in. = 3000 ft.

PLATE 5: POST DEVELOPED HEC-1 SCHEMATIC

EASTMARK - DEVELOPMENT UNIT 3 SOUTH
MARICOPA COUNTY, ARIZONA

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