"FINAL" INTERIOR DRAINAGE REPORT

CAMELBACK RANCH LEVEE DESIGN PROJECT

CONTRACT NO. FCD 95-15

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APRIL 1998

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III. INTRODUCTION

DMJM has been engaged by the Flood Control District of Maricopa County, (Contract No. FCD 95-15) to design soil cement levee improvements for the following locations:

- East bank of Agua Fria River, from the transverse diversion spur dike north of Indian School Road to the Agua Fria-New River Junction.
- East bank of New River, from the Agua Fria-New River Junction to the Bethany Home Road alignment.

The proposed improvements are shown on Figure 1 on page 2 and are located in Township 2 North, Range 1 East, in Sections 18 and 19 of the Salt River Gila Base and Meridian, Maricopa County, Arizona.

The goals and objectives for the Camelback Ranch Levee Design project is to produce plans, specification and estimate for the construction of a new soil cement levee, in two construction phases, to prepare the necessary documentation for obtaining a Conditional Letter of Map Revision (CLOMR) from the Federal Emergency Management Agency (FEMA) and to meet the conditions agreed to with the U.S. Army Corps of Engineers (COE) for the construction of the Arizona Canal Diversion Channel (ACDC).

The South Phase consists of a soil cement levee that runs along the east bank of the Agua Fria River connecting from the southeast spur dike at the Camelback Road bridge to the existing transverse diversion dike, north of Indian School Road.

Replace with Figure 1

The North Phase consists of a soil cement levee from the embankment of Camelback Road, north, along the west property line of Camelback Ranch, along the east side of the Agua Fria River to the existing soil cement levee embankment along the Bethany Home Road alignment, along the east side of the New River. The levee runs along the east bank of Agua Fria River to the New River junction where it turns to the northeast and runs along the east bank of New River. The North Phase is scheduled to begin construction after the South Phase is completed. See Figure 1 on page 2 for the proposed levee alignment.

A. PURPOSE OF REPORT

The purpose of this report is to evaluate and document the existing on-site drainage conditions for the Camelback Ranch Levee Design project and make recommendations for incorporating drainage improvements into the design. In addition this report will be incorporated into the CLOMR to remove the flood plain delineation from the subject property.

B. BACKGROUND AND OVERVIEW

During the 1980's development was accelerating in west Phoenix. Camelback Ranch was investigated and conceptually planned by several developers during the 1980's before the Willden-Red River Joint Venture filed an application with the City of Phoenix (COP) for Planned Community District (PCD) zoning in April 1988, case #108-88-4. See Figure 1 on page 2 for the boundaries of the Camelback Ranch property. This PCD application was approved by the Phoenix City Council, with stipulations, on November 1, 1988, with subsequent amendments.

The PCD called for commercial and office uses at the northwest and southwest corners of Camelback Road and 107th Avenue, a major park on approximately 90 acres along the north edge of the property, and a variety of residential densities throughout the balance of the property. The City of Phoenix purchased the 90 acre

park site along the north edge of the property. The plan also required that the developer to construct a levee along the north and west edges of the property to remove it from the floodplain. The basic design concept for the levee was approved by the Flood Control District of Maricopa County (FCDMC). Another key zoning stipulation was that construction on the project must begin within three (3) years of adoption of the PCD. Due to the economic climate in the late 1980's and early 1990's, construction on the project including the levees, was never started. The original developer obtained several time extensions from the City of Phoenix. Ultimately, the property reverted to the lender and then to the Resolution Trust Corporation (RTC). During this time the FCDMC was under pressure to construct the levees or acquire flood control easements over the entire Camelback Ranch property plus a number of the existing homes east of 107th Avenue and north of Camelback Road which were now in the Standard Project Flood (SPF) zone. Due to the depressed real estate prices at the time, the FCDMC determined that it could purchase the entire Camelback Ranch property for about the same cost as the flood control easements. When the property was made available by the RTC the FCDMC purchased it. The levee on the north portion of Camelback Ranch, in the original PCD, required its construction across two areas of property not owned by the developer. One of these areas is owned by the City of Glendale who is not inclined to allow the levee to be constructed there and result in the development of additional residential uses in the flight path of the Glendale Municipal Airport. Therefore this portion of the levee was moved further south, to within the City of Phoenix's corporate boundary, when the FCDMC performed their alternative levee analysis. The FCDMC purchased the Camelback Ranch property in order to fulfill its obligation to provide flood protection to property that was brought under the SPF designation due to the increased flow in the New River resulting from the construction of the ACDC. Provision for this additional flood protection was a condition of the COE's approval of the ACDC.

FCDMC's goals for Camelback Ranch are:

- Sell all available land after the levees are designed and constructed.

- Sell this available land at the highest price based on a land use plan and zoning approved by the City of Phoenix.
- Sell this available land in the shortest time possible consistent with receiving the best reasonable price.
- Construct the South Phase (south of Camelback Road), sell that portion of the property and use the proceeds of the sale to construct the levee for the North Phase (north of Camelback Road).

The width of the Agua Fria River within the project limits ranges from approximately 1,400-feet where it is channelized, south of Indian School Road to approximately 2,700-feet between Indian School Road and Camelback Road. The FEMA 100-year flood boundary for the Agua Fria River, shows a flood boundary that ranges from approximately 1,400-feet in the channelized portion, south of Indian School Road, to approximately 11,000-feet in width south of the confluence of the Agua Fria and New Rivers. Along the east side of the 100-year flood boundary approximately 457-acres of the 584 -acre Camelback Ranch property is within the 100-year flood boundary. In addition, approximately 15-acres of partially developed residential land, lying east of 107th Avenue between Camelback Road and the Bethany Home Road alignment are within the 100-year flood boundary.
There is a sand and gravel mining operation owned by Johnson-Stewart Materials L.L.C. within the project limits. For the south parcel of the Camelback Ranch Property an agreement between Johnson-Stewart and the FCD has been made for a right-of-way easement for the proposed levee. The easement is 100 feet wide and it extends from the northern most transverse diversion dike north of Indian School Road to the southeast spur dike at Camelback Road bridge.

C. INTERIOR DRAINAGE

The total on-site drainage area for the Camelback Ranch Property is 517.12 acres and it is bound by the Bethany Home Road alignment to the north, Campbell

Avenue to the south, 107th Avenue to the east and the proposed levee along the Agua Fria River-New River to the west. Refer to Figure 2, Subbasin Map, on page 7.

Camelback Road is elevated above the adjacent properties, and therefore divides the watershed into two areas. The north area on-site drainage subbasin (referred to as subbasin area DA2) is bound by the Bethany Home Road alignment to the north, Camelback Road to the south, 107th Avenue to the east and the proposed soil cement levee to the west.

The south area on-site drainage subbasin (referred to as subbasin area DA3) is bound by Camelback Road to the north, Campbell Avenue to the south, 107th Avenue to the east and the 113th Avenue alignment to the west.

Replace with Figure 2

There are two off-site drainage areas that impact the on-site areas and are located adjacent to both the north and south areas. The off-site area contributing to the north area (subbasin area DA1) is located east of the Camelback Ranch Property and is bound by the Bethany Home Alignment to the north, Camelback Road to the south, 107th Avenue to the west and the Roosevelt Irrigation District (RID) Canal to the east. The off-site drainage area in the south area (subbasin area DA4) is located west of the Camelback Ranch Property and is bound by Camelback Road to the north, Campbell Avenue to the south, 113th Avenue alignment to the east and the proposed levee along the Agua Fria River on the west. See Figure 2 on the previous page for the drainage areas and subbasin boundaries.

Both drainage areas drain towards the southwest with the slope for the north area being 0.273 percent and the south area 0.316 percent. The vegetative cover for the developed subbasin DA1 is five percent for the land use type Light Density Residential (L.D.R.) and 15.0 percent for Very Light Density Residential (V.L.D.R.). The remaining existing land use is agricultural with a vegetative cover of 50.0 percent.

Runoff from the north area will concentrate along the north embankment of the Camelback Road and the proposed levee. Since the proposed levee could prevent the north area from draining into the Agua Fria River, a detention basin with a levee penetration pipe is proposed to be constructed at the southwest corner of the north area. The detention basin will allow for the metered release of storm water once the flows in the Agua Fria River has subsided. The south area will continue to drain as per existing conditions.

IV. OBJECTIVES

The objectives of the Interior Drainage Report are as follows:

- Determine the peak runoff flows from the 100-yr, 6-hr event for both the north and south area for existing conditions.
- Determine the existing condition peak runoff volume from the 100-yr, 6-hr storm for sizing a detention basin in the north area.
- Determine the peak runoff volume from the 100-yr, 2-hr (City of Phoenix requirement) event for the north area future conditions to size a levee penetration pipe to drain the detention basin within 36 hours after the flows have subsided in the Agua Fria River.
- To ensure that back water from penetrations through the levee will not impact interior drainage behind the levee.
- To meet FEMA requirements of section 65.10 and therefore not impound more than one foot of stormwater behind the levee.

V. CONCLUSIONS

For the north area, the 100-yr, 6-hr existing condition peak runoff from subbasin area (referred as DA) DA1 is 199 cubic feet per second (cfs) and DA2 is 192 cfs. These two subbasins combine and therefore, the 100-yr, 6-hr existing peak runoff is 366 cfs and require 54 acre feet (ac-ft) of detention storage. For the 100-yr, 2-hr future conditions (PCD), the north area will generate a peak runoff flow of 507 cfs and require 67 ac-ft of detention storage. A 36-inch concrete penetration pipe with a drop inlet structure will be required to drain the detention basin. Results from the HEC-1 models show that the 54 ac-ft detention basin for existing conditions, with the 36-inch concrete pipe will drain the basin in 22 hours, once the flows in the Agua Fria River has subsided. It also shows that the detention basin can be increased in storage to 67 ac-ft for future PCD conditions and the same 36-inch concrete pipe will drain within 27 hours, once the flows in the Agua Fria River has subsided. It is recommended that the right-of-way for the 54 ac-ft basin be reserved so that the basin can be maintained by the FCDMC until the basin is expanded for its post development configuration. The expansion of the detention basin from 54 ac-ft to 67 ac-ft can be easily accomplished by widening the basin to the north and east. At the time the basin is expanded an agreement can be made between the FCDMC and the new owner to take over the maintenance of the basin. A flapgate will be required on the outlet of the penetration pipe that will drain the detention basin into the Agua Fria River. The flapgate will prevent backwater from flows in the river from impacting interior drainage behind the levee.

The two subbasins in the south area, DA3 and DA4, have a 100-yr, 6-hr existing condition peak runoff of 131 cfs and 14 cfs respectively. These two subbasins will continue to drain to the south as per existing conditions. Table 1, on page 11, summarizes the subbasin areas and peak runoff flows.

Based on normal depth calculations, the depth of flow behind the levee will not exceed 0.37 feet in the north area and 0.39 feet in the south area. Therefore, the

impoundment criteria set by the committee on "A Levee Policy For The National Flood Insurance Program" will be met.

SUBBASIN AREAS, PEAK RUNOFF FLOWS AND VOLUMES FOR THE 100-YR, 6-HR STORM EVENT EXISTING CONDITION AND 100-YR, 2-HR STORM EVENT FUTURE CONDITION

NORTH AREA

SUBBASIN	AREA (ac.)	Q peak (cfs) EXISTING	Q peak (cfs) FUTURE
DA1	193.47	199	*N/A
DA2	280.45	192	N/A
TOTAL PEAK FLOW (cfs) =		366	663
TOTAL STORAGE VOLUME (ac-ft) =		54	67

SOUTH AREA

SUBBASIN	AREA (ac.)	Q peak (cfs) EXISTING	Q peak (cfs) FUTURE
DA3	236.67	131	N/A
DA4	38.91	14	N/A
TOTAL PEAK FLOW (cfs) =		145	158

TABLE 1

*N/A – not applicable sub basins were sub divided for future developed conditions.

VI. PROCEDURES AND METHODOLOGIES

This section documents the procedures and methodologies used for hydrology, detention basin sizing and hydraulics within this report.

The FCD controls the Camelback Ranch property. The City of Phoenix (COP) through its drainage policies, ordinances, and retention basin requirements for proposed developments will require that the proposed development retain the 100-yr, 2-hr event for proposed conditions. Therefore, the interior drainage system behind the proposed levees were designed and analyzed using existing conditions.

The only exception to the above was for the design of the outlet penetration pipe through the soil cement levee in the north area. Both the existing and proposed PCD hydrologic conditions were evaluated to size the outlet pipe. The existing conditions hydrology was used to develop a runoff hydrograph of the north area so that a detention basin can be designed to retain the 100-yr, 6-hr runoff. When the area is developed, the detention storage requirements will increase, subsequently, the outlet pipe will have to be increased to drain the detention basin within 36 hours. To avoid reconstructing the pipe, which would require removal of a portion of the levee, when the area is developed, the future condition hydrology was developed to compute a runoff hydrograph for the north area so that a penetration pipe can be sized to drain the future detention basin within 36 hours.

A. HYDROLOGY

The following lists the procedures, methodologies and standards that were used to develop the hydrologic model (HEC-1) for the interior drainage on the Camelback Ranch Levee Design project.

1. Standards Used

- Drainage Design Manual for Maricopa County, Arizona - Volume 1, Hydrology was used to develop the hydrological parameters.
- HEC-1 was used for the hydrological computations.
- Drainage Design Menu System (DDMS) version 1.1 was used to develop the HEC-1 model.
- Rainfall loss parameters were calculated using the Green and Ampt infiltration equation. Loss parameters were obtained from the Soil Conservation Service's soil survey of Maricopa County Central Part II supplied by the FCD's ,Geographic Information Systems (GIS) group in digital format.
- Land use types were derived based on present usage for the existing conditions model.
- Land use types for the future development conditions model were derived from the existing PCD.
- The Clark Unit Hydrograph method was used to calculate the peak runoff flows.

2. HEC-1 Parameters

a. Watershed Delineation

The overall watershed was delineated using topographic mapping provided by the FCD GIS group, for Maryvale Area Drainage Master Study (ADMS), reviews of previous reports including the Coe and Van Loo Engineering Inc. Camelback Ranch Floodplain and Interior Drainage Report and field reconnaissance to verify their overall delineation.

The watershed was divided into two areas, called the north and south area, at Camelback Road because it's raised high enough in elevation that it prevents the storm water runoff from crossing the roadway. The north and south areas were divided into two subbasins, DA1 and DA2 for the north area, DA3 and DA4 for the south area. Subbasin DA2 and DA3 are the Camelback Ranch Property owned by the FCD and DA1 and DA4 are owned by private parties. Once the areas were subdivided Microstation was used to determine the areas of each subbasin.

b. Time of Concentration

The flow paths for obtaining the time of concentrations were determined by: 1) taking into account variables such as, the longest flow paths and the flow paths that appear to carry the majority of the runoff flows; 2) making field visits to approximate actual flow paths adjacent to and through the Camelback Ranch property and 3) using topographic mapping. Using the these three components subbasin concentration points were determined to be at the lowest elevation where the flow path outlets the subbasin. Flow path, elevation, length and slope were estimated from the topographic mapping.

c. Routing

The Muskingum-Cunge routing was used in the north area for routing runoff from subbasin DA1 through DA2. The routing flow path was modeled as a V-ditch with 6:1 side slopes. It traverses along the north embankment of Camelback Road from the concentration point of subbasin DA1 (107th Avenue and Camelback Road) to where the proposed levee ties into the north embankment at Camelback Road. Other parameters used for Muskingum-Cunge routing are shown in Figure 2 on page 7 and in the HEC-1 model.

d. Rainfall

The precipitation depths were estimated using the NOAA ATLAS II isopluvial maps. The PREFRE program provided with DDMS was used to calculate the return year rainfall depths. The 100 year 6-hour rainfall depth was determined by using the storm distribution pattern number 1.4 with an aerial reduction factor of .987. The rainfall depth for the 100-yr, 6-hr storm is 2.96 inches. The 100-yr, 2-hr precipitation depth is 2.64 inches.

e. Soils Type

The soil types found in the four subbasins are shown in Figure 3 on page 16. Soil types were identified by merging of the Soil Conservation Service's soil survey of Maricopa County Central Part II with the topographic mapping digital files. The soil type areas were calculated by using area measurement in Microstation. The soils types and the corresponding loss rate parameters were identified within the DDMS software and determined from default lookup tables included within the software. A breakdown of the soils types per subbasin and the Green Ampt Loss rates associated with the soils type are listed in Table 2 on page 17.

f. Land Use

The land use for the subbasins were determined by their present use for the existing condition model. For subbasins DA2, DA3 and DA4 the land use is agricultural even though it is zoned for residential. Subbasin DA1 is partially developed and classified as Very Light Density Residential (V.L.D.R., zoned as RE-43) and Light Density Residential (L.D.R., zoned RE-35). Figure 4 on page 18 shows the land usage per subbasin for existing conditions and Table 2 on page 17 shows the associated Green Ampt loss rates. Land use used for the future conditions model is described in subsection C.1., Outlet Design.

Reserved for figure 3

Replace with table 2

Replace with figure 4

3. HEC-1 Data Input

The HEC-1 data input was created by DDMS and the default lookup tables. Table 2 on page 17 lists the area weighted loss rates associated with the soil types and land usage calculated by the DDMS program that was input into HEC-1 model. Located in the appendix are printouts of the HEC-1 data input and output. Printout CBRANCH.OUT reflects the existing conditions. Printout CBR-PCDA.OUT is the HEC-1 model used to determine the future detention volume requirements of the north area PCD so that the penetration pipe could be sized.

B. DETENTION BASIN SIZING

The detention basin located in the north area is sized based on combining subbasins DA1 and DA2 and calculating the area under the hydrograph from the HEC-1 existing condition model. The existing condition outflow volume for the 100-yr, 6-hr storm event was used to size the detention basin. The detention basin was sized to retain the full amount of storm water runoff volume in the event that the Agua Fria River is flowing and there may be a time delay before the river subsides and the outlet can begin to discharge. The detention basin does not include freeboard due to the desire to maximize the amount of land to be developed. Figure 5 on page 20 shows the predeveloped detention basin size and location. Detention was also determined for the post developed (100-yr, 2-hr storm) conditions. The ultimate developer can add the additional storage to the basin by widening it when development occurs.

Replace with Figure 5

C. HYDRAULICS

1. Outlet Design

The outlet (i.e. penetration pipe) was designed to drain the future developed PCD conditions. As previously discussed, when the area is developed, the detention storage requirements will increase. This in turn will increase the penetration pipe diameter to increase the discharge rate required to drain the detention basin within the 36 hour time requirement. To avoid reconstructing the pipe and levee once the north area is developed, the future condition hydrology was used, from the Master Drainage Report For Camelback Ranch Planned Community District Amendment Case No. 108-B-88-05 prepared by DMJM, to develop a runoff hydrograph for the north area so that the penetration pipe could be sized to drain the detention basin within 36 hours.

The detention basin will be expanded to detain the full 100-year, 2-hour runoff volume of 67 ac-ft for the north area. The size of the detention basin will be approximately 18 acres. The basin will have approximate dimensions of 770 feet (east-west) by 985 feet (north-south), with an average depth of 4.25 feet. The depth of the basin is controlled by the outlet elevation at the southwest corner of the basin and may not exceed 4.5 feet. The detention basin will be graded to drain to the outlet at the southwest corner of the basin. The depth varies from 4.0 feet at northwest, northeast, and southeast corners of the basin to 4.5 feet deep at the outlet at the southwest corner of the basin. The basin will have side slopes of 4:1. There will be no freeboard incorporated into the design of the detention basin to allow for maximum land available for development.

A culvert analysis using FHWA's computer program HY8, for a concrete pipe, was performed and a stage versus discharge curve was plotted. From the curve, a stage versus discharge table was computed using increments of 0.50 feet of depth. A corresponding stage versus storage volume table was tabulated so that the values could be entered into the Modified Puls routing in the HEC-1 model. The detention basin being analyzed, by using Modified Puls routing in the HEC-1 model, ensures that the detention basin will drain within the 36 hour requirement, after the flows in the Agua Fria River have subsided.

Due to the flat conditions and the need to minimize the detention basin size and penetration pipe size, a modified drop inlet structure was analyzed to increase the discharge capacity. The modified drop inlet structure allows for a greater head above the pipe, in relation to the water surface depth in the detention basin, so that the pipe can operate in a more efficient manner. To ensure that the modified inlet will allow enough flow into the pipe a weir flow analysis ($Q = CLH^{3/2}$) was performed on the inlet structure to determine if more flow can enter the inlet than the pipe can discharge. A weir coefficient of 3.0 was used and the length on the inlet opening of 7.75 ft. for the weir length (L).

The pipe was analyzed for two conditions. The first condition assumes minimal flow in the Agua Fria River (flow below flapgate at the penetration pipe outlet) while the penetration pipe discharges as the detention basin begins to fill. The second condition assumes that the Agua Fria River is flowing full, the flapgate is closed, the detention basin fills up completely before the river subsides and then the detention basin begins to drain. The detention basin was sized for the worse case scenario where the basin fills (due to the river flowing full) and then drains.

2. Impoundment Behind the Levee

Normal depth calculations were performed at two locations behind the levee using the modified Manning's equation to verify the depth of flow.
The modified Manning's equation is:

$$Q = 0.56/n \; S_x^{1.67} \; S^{0.5} \; T^{2.67}$$

where
- n = Manning's coefficient
- S_x = the cross slope
- S = the longitudinal slope
- T = the width of flow

See Figure 5 on page 19 for the cross section locations. One calculation was performed for the north area and one for the south area. To be conservative, the total 100-yr, 6-hr peak runoff flow was used to calculate the depth of flow behind the levee. The modified Manning's equation was used due to the shallow depth of flow and the wide width of flow. A Manning roughness coefficient "n" value of 0.040 was used to simulate post grading condition behind the levee with minimal vegetative growth.

VII. DESIGN RECOMMENDATIONS

A. NORTH AREA

1. Detention Basin

The detention basin will be designed to detain the full 100-yr, 6-hr runoff volume of 54 ac-ft in the event the Agua Fria River is flowing full. The detention basin was assumed to be square, 770 feet wide by 770 feet long, with an average depth of 4.25 feet. The detention basin will be graded at a slope of 0.0007 '/ft so that it can drain to the outlet. The depth varies from four feet at the upstream end to 4.5 feet deep at the downstream (outlet) end with side slopes of 4:1. There will be no freeboard incorporated into the design of the detention basin so that there will be maximum land available for development. Erosion protection for the inlet to the detention basin will be incorporated into the final design.

The post developed detention basin will need to be 780 feet by 985 feet (assumed square), it will have 4:1 side slopes and have an average depth of 4.25 feet.

2. Outlet to the Agua Fria River

A 36-inch concrete pipe will be used to drain the detention basin for the existing and future conditions within the 36-hr requirement. A headwall and flap gate will be designed at the 36-inch outlet to the Agua Fria River to prevent backwater into the interior drainage system. A modified drop inlet structure [modified Maricopa Association of Governments (M.A.G.) Standard Detail No. 501-5] will be required at the entrance to the pipe. The modified drop inlet structure will add an additional one half foot of head at the pipe entrance to optimize the pipe performance. It will also have an access barrier for safety. Since the detention basin will store more than three feet of water, safety fencing will be placed around the entire detention basin.

In addition, a 15 foot wide maintenance road, with ramps down to the floor of the basin, will be included.

B. SOUTH AREA

The south area will be drained through the Johnson-Stewart property and discharge into the Agua Fria River behind the north Indian School Road transverse spur dike by means of a swale.

VIII. HYDROLOGIC AND HYDRAULIC CALCULATIONS

A. INTERIOR DRAINAGE CALCULATIONS

The interior drainage calculations are shown in Appendix A and in the HEC-1 computer output hardcopies.

The following lists the HEC-1 models included in Appendix A:

CBRANCH.DAT	Models the existing 100-yr, 6-hr conditions.
CBRANCH2.DAT	Analyzes detention basin for existing 100-yr, 6-hr conditions where the basin drains as the basin fills.
CBR-EXTB.DAT	Analyzes detention basin for existing 100-yr, 6-hr conditions where the basin drains after the basin reaches the maximum storage capacity.
CBR-PCDA.DAT	Analyzes detention basin for PCD 100-yr, 2-hr conditions where the basin drains as the basin fills.
CBR-PCDB.DAT	Analyzes detention basin for PCD 100-yr, 2-hr conditions where the basin drains after the basin reaches the maximum storage capacity.

B. HYDRAULIC CALCULATIONS

The hydraulic calculations are included in Appendix B. The following lists the calculations performed and the methods used.

Culvert Analysis	FHWA's HY8 see file: 1-36.
Detention Basin Sizing	Excel spreadsheet. file:DET-SZ.XLS.
Stage Volume Calculations Existing Conditions	Existing Conditions Excel spreadsheet. file: STG-VOL1.XLS.
Stage Volume Calculations PCD Conditions	Excel spreadsheet. file: STG-VOL2.XLS.
Stage/Storage/Discharge Existing Conditions	Analyzes 36" concrete pipe for stage vs. discharge curve for existing conditions file: 1-36EXT.XLS.
Stage/Storage/Discharge PCD Conditions	Analyzes 36-inch concrete pipe for stage versus discharge and defines curve for PCD conditions file: 1-36PCD.XLS.
Modified Inlet Analysis	Analyzes modified inlet capacity using the weir flow equation File: WEIR.XLS.
Depth of Impoundment Behind Levee	Calculates the depth of flow behind levee utilizing modified Manning equation file: LEVEEEQ.XLS.

IX. REFERENCES

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X. APPENDIX

A. INTERIOR DRAINAGE CALCULATIONS

B. HYDRAULIC CALCULATIONS

APPENDIX A

INTERIOR DRAINAGE CALCULATIONS

CBRANCH.DAT

Models the existing 100-yr, 6-hr conditions.

```
1 ****************************************                                    ****************************************
  *                                      *                                    *                                      *
  *  FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                                    *   U.S. ARMY CORPS OF ENGINEERS       *
  *          SEPTEMBER 1990              *                                    *   HYDROLOGIC ENGINEERING CENTER      *
  *           VERSION 4.0                *                                    *         609 SECOND STREET            *
  *                                      *                                    *      DAVIS, CALIFORNIA 95616         *
  *  RUN DATE  04/22/1996  TIME  16:39:04 *                                    *          (916) 756-1104              *
  *                                      *                                    *                                      *
  ****************************************                                    ****************************************

                                        X     X  XXXXXXX   XXXXX           X
                                        X     X  X        X     X         XX
                                        X     X  X        X                X
                                        XXXXXXX  XXXX     X        XXXXX   X
                                        X     X  X        X                X
                                        X     X  X        X     X          X
                                        X     X  XXXXXXX   XXXXX         XXX

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

1                                                   HEC-1 INPUT                                                    PAGE  1

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

    1           ID   CBRANCH.DAT
    2           ID   CAMELBACK RANCH LEVEE DESIGN PROJECT EXISTING CONDITIONS HYDROLOGY
    3           ID   100-YR, 6-HR STORM EVENT
    4           ID
    5           IT       3                     250
    6           IO       3
                * DDM   ***** Inserted *****

    7           KK     DA1
    8           KM   SUB-BASIN DA1
    9           KM   6-HOUR RAINFALL, PATTERN NO. 1.40 WAS USED TO FIND TC & R FOR THIS BASIN
   10           KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .987
   11           KM     L = 1.08  Kb = .049  Adj. Slope =   10.0
   12           BA    .302
   13           IN      15
   14           KM   RAINFALL DEPTH OF 3.00 WAS SPACIALLY REDUCED AS SHOWN BY THE PB RECORD
   15           PB   2.961
   16           KM   THE FOLLOWING PC RECORD USED A 6-HOUR STORM WITH A PATTERN No. OF 1.40
   17           PC    .000    .008    .016    .025    .033    .041    .050    .058    .066    .075
   18           PC    .087    .099    .119    .148    .230    .407    .778    .881    .919    .945
   19           PC    .957    .968    .980    .990   1.000
   20           LG    .300    .250   6.000    .200  11.000
   21           UC   1.058    .829
   22           UA       0       5      16      30      65      77      84      90      94      97
   23           UA     100
                * DDM   ***** Inserted *****

   24           KK   DA1-2
   25           KM   ROUTING SUBBASIN 1 THROUGH 2
   26           RD    3900   .0026    .030            TRAP       0       6     YES
                *

   27           KK   DA2
   28           KM   SUB-BASIN DA2
   29           KM   6-HOUR RAINFALL, PATTERN NO. 1.40 WAS USED TO FIND TC & R FOR THIS BASIN
   30           KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .987
   31           KM     L = 1.38  Kb = .089  Adj. Slope =   13.0
   32           BA    .438
   33           LG   .500    .250   6.000    .220    . 000
   34           UC   1.500   1.202
   35           UA       0       3       5       8      12      20      43      75      90      96
   36           UA     100
                * DDM   ***** Inserted *****

   37           KK   C1-2
   38           KM   COMBINE DA1 WITH DA2
   39           HC
                *
   40           KO       1       2
                *
1                                                   HEC-1 INPUT                                                    PAGE  2

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

```
 41          KK     DA3
 42          KM   SUB-BASIN DA3
 43          KM   6-HOUR RAINFALL, PATTERN NO. 1.40 WAS USED TO FIND TC & R FOR THIS BASIN
 44          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .987
 45          KM     L         Kb = .091  Adj. Slope =   15.0
 46          BA    .370
 47          LG    .500    .250   5.100    .400    .000
 48          UC   1.500   1.199
 49          UA       0       3       5       8      12      20      43      75      90      96
 50          UA     100
             * DDM   ***** Inserted *****

 51          KK     DA4
 52          KM   SUB-BASIN DA4
 53          KM   6-HOUR RAINFALL, PATTERN NO. 1.40 WAS USED TO FIND TC & R FOR THIS BASIN
 54          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .987
 55          KM     L =  .51  Kb = .110  Adj. Slope =   10.0
 56          BA    .061
 57          LG    .500    .250   4.350    .610    .000
 58          UC   1.500   1.668
 59          UA       0       3       5       8      12      20      43      75      90      96
 60          UA     100
             *

 61          KK   C3-4
 62          KM      COMBINE DA3 WITH DA4
 63          HC
 64          ZZ
1*************************************                                    *************************************
*                                   *                                    *                                   *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1)*                                    *   U.S. ARMY CORPS OF ENGINEERS    *
*          SEPTEMBER 1990           *                                    *   HYDROLOGIC ENGINEERING CENTER   *
*           VERSION 4.0             *                                    *         609 SECOND STREET         *
*                                   *                                    *      DAVIS, CALIFORNIA 95616      *
* RUN DATE  04/22/1996  TIME  16:39:04 *                                 *          (916) 756-1104           *
*                                   *                                    *                                   *
*************************************                                    *************************************


                        CBRANCH.DAT
                        CAMELBACK RANCH LEVEE DESIGN PROJECT EXISTING CONDITIONS HYDROLOGY
                        100-YR, 6-HR STORM EVENT

 6 IO          OUTPUT CONTROL VARIABLES
                     IPRNT          3  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE

   IT          HYDROGRAPH TIME DATA
                      NMIN          3  MINUTES IN COMPUTATION INTERVAL
                     IDATE      1    0  STARTING DATE
                     ITIME       0000  STARTING TIME
                        NQ        250  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE      1    0  ENDING DATE
                    NDTIME       1227  ENDING TIME
                    ICENT          19  CENTURY MARK

               COMPUTATION INTERVAL     .05 HOURS
                    TOTAL TIME BASE   12.45 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


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


          **************
          *            *
  7 KK    *       DA1  *
          *            *
          **************
                        SUB-BASIN DA1
                        6-HOUR RAINFALL, PATTERN NO. 1.40 WAS USED TO FIND TC & R FOR THIS BASIN
                        THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .987
                          L = 1.08  Kb = .049  Adj. Slope =   10.0
                        RAINFALL DEPTH OF 3.00 WAS SPACIALLY REDUCED AS SHOWN BY THE PB RECORD
                        THE FOLLOWING PC RECORD USED A 6-HOUR STORM WITH A PATTERN No. OF 1.40

 13 IN          TIME DATA FOR INPUT TIME SERIES
                     JXMIN         15  TIME INTERVAL IN MINUTES
                    JXDATE      1    0  STARTING DATE
```

```
                JXTIME          0  STARTING TIME

          SUBBASIN RUNOFF DATA

 12 BA        SUBBASIN CHARACTERISTICS
                TAREA         .30  SUBBASIN AREA

              PRECIPITATION DATA

 16 PB          STORM        2.96  BASIN TOTAL PRECIPITATION

 16 PI          INCREMENTAL 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
                  .01       .01       .01       .01       .01       .02       .02       .02       .02       .02
                  .04       .04       .04       .04       .04       .07       .07       .07       .07       .07
                  .02       .02       .02       .02       .02       .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

 20 LG        GREEN AND AMPT LOSS RATE
                STRTL         .30  STARTING LOSS
                  DTH         .25  MOISTURE DEFICIT
                 PSIF        6.00  WETTING FRONT SUCTION
                XKSAT         .20  HYDRAULIC CONDUCTIVITY
                RTIMP       11.00  PERCENT IMPERVIOUS AREA

 21 UC        CLARK UNITGRAPH
                  TC         1.06  TIME OF CONCENTRATION
                   R          .83  STORAGE COEFFICIENT

 22 UA        ACCUMULATED-AREA VS. TIME,  11 ORDINATES
                  .0       5.0      16.0      30.0      65.0      77.0      84.0      90.0      94.0      97.0
               100.0

                                                  ***

                                          UNIT HYDROGRAPH PARAMETERS
                                   CLARK   TC=  1.06 HR,       R=   .83 HR
                                  SNYDER   TP=   .59 HR,      CP=   .42

                                            UNIT HYDROGRAPH
                                        97 END-OF-PERIOD ORDINATES
            3.        8.       16.       26.       38.       50.       70.      100.      125.      136.
          140.      141.      140.      139.      137.      134.      131.      127.      122.      119.
          115.      110.      104.       98.       92.       87.       82.       77.       72.       68.
           64.       60.       57.       53.       50.       47.       45.       42.       40.       37.
           35.       33.       31.       29.       28.       26.       24.       23.       22.       20.
           19.       18.       17.       16.       15.       14.       13.       13.       12.       11.
           10.       10.        9.        9.        8.        8.        7.        7.        6.        6.
            6.        5.        5.        5.        5.        4.        4.        4.        4.        3.
            3.        3.        3.        3.        2.        2.        2.        2.        2.        2.
            2.        2.        2.        1.        1.        1.        1.

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

                    HYDROGRAPH AT STATION      DA1

  TOTAL RAINFALL =    2.96, TOTAL LOSS =    1.37, TOTAL EXCESS =    1.59

 PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     12.45-HR
+  (CFS)       (HR)
                          (CFS)
+   199.       4.55                 51.         25.         25.         25.
                         (INCHES)  1.563       1.580       1.580       1.580
                          (AC-FT)   25.         25.         25.         25.

                         CUMULATIVE AREA =     .30 SQ MI


+++ *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
 24 KK    *     DA1-2  *
          *            *
          **************
                    ROUTING SUBBASIN 1 THROUGH 2

          HYDROGRAPH ROUTING DATA

 26 RD        MUSKINGUM-CUNGE CHANNEL ROUTING
                    L       3900.  CHANNEL LENGTH
                    S       .0026  SLOPE
```

```
                    N        .030  CHANNEL ROUGHNESS COEFFICIENT
                   CA         .00  CONTRIBUTING AREA
                SHAPE        TRAP  CHANNEL SHAPE
                   WD         .00  BOTTOM WIDTH OR DIAMETER
                    Z        6.00  SIDE SLOPE

                                                  ***
                          COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                COMPUTATION TIME STEP
          ELEMENT    ALPHA       M          DT         DX        PEAK    TIME TO     VOLUME    MAXIMUM
                                                                          PEAK                  CELERITY
                                             (MIN)      (FT)      (CFS)    (MIN)       (IN)      (FPS)

            MAIN       .87      1.33        3.00     487.50     196.22   288.00       1.58       3.80

                                     INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

            MAIN       .87      1.33        3.00                196.22   288.00       1.58

NTINUITY SUMMARY (AC-FT) - INFLOW= .2545E+02 EXCESS= .0000E+00 OUTFLOW= .2541E+02 BASIN STORAGE= .3491E-02 PERCENT ERROR=    .1


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

                   HYDROGRAPH AT STATION    DA1-2

 PEAK FLOW     TIME                      MAXIMUM AVERAGE FLOW
                                  6-HR       24-HR       72-HR     12.45-HR
+  (CFS)       (HR)
                        (CFS)
+    196.      4.80                51.         25.         25.         25.
                      (INCHES)    1.560       1.578       1.578       1.578
                       (AC-FT)     25.         25.         25.         25.

                     CUMULATIVE AREA =     .30 SQ MI


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


          **************
          *            *
27 KK     *     DA2    *
          *            *
          **************
                         SUB-BASIN DA2
                         6-HOUR RAINFALL, PATTERN NO. 1.40 WAS USED TO FIND TC & R FOR THIS BASIN
                         THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .987
                           L = 1.38  Kb = .089  Adj. Slope =   13.0

            SUBBASIN RUNOFF DATA

32 BA         SUBBASIN CHARACTERISTICS
                    TAREA         .44  SUBBASIN AREA

              PRECIPITATION DATA

16 PB               STORM        2.96  BASIN TOTAL PRECIPITATION

 16 PI          INCREMENTAL 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
                    .01       .01       .01       .01       .01       .02       .02       .02       .02       .02
                    .04       .04       .04       .04       .04       .07       .07       .07       .07       .07
                    .02       .02       .02       .02       .02       .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

33 LG         GREEN AND AMPT LOSS RATE
                    STRTL         .50  STARTING LOSS
                      DTH         .25  MOISTURE DEFICIT
                     PSIF        6.00  WETTING FRONT SUCTION
                    XKSAT         .22  HYDRAULIC CONDUCTIVITY
                    RTIMP         .00  PERCENT IMPERVIOUS AREA

 34 UC        CLARK UNITGRAPH
                      TC        1.50  TIME OF CONCENTRATION
                       R        1.20  STORAGE COEFFICIENT

 35 UA        ACCUMULATED-AREA VS. TIME,  11 ORDINATES
                      .0       3.0       5.0       8.0      12.0      20.0      43.0      75.0      90.0      96.0
                   100.0
```

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                                                  ***

                                        UNIT HYDROGRAPH PARAMETERS
                                   CLARK   TC=  1.50 HR,       R=  1.20 HR
                                  SNYDER   TP=  1.27 HR,      CP=   .69

                                        UNIT HYDROGRAPH
                                   146 END-OF-PERIOD ORDINATES
              1.       3.       6.       7.       9.      10.      11.      13.      15.      17.
             19.      22.      25.      30.      35.      46.      62.      77.      95.     115.
            135.     148.     153.     159.     160.     158.     156.     154.     151.     148.
            143.     137.     132.     126.     121.     116.     112.     107.     103.      98.
             94.      91.      87.      83.      80.      77.      74.      71.      68.      65.
             62.      60.      57.      55.      53.      51.      49.      47.      45.      43.
             41.      39.      38.      36.      35.      33.      32.      31.      29.      28.
             27.      26.      25.      24.      23.      22.      21.      20.      19.      19.
             18.      17.      16.      16.      15.      15.      14.      13.      13.      12.
             12.      11.      11.      10.      10.      10.       9.       9.       8.       8.
              8.       7.       7.       7.       7.       6.       6.       6.       6.       5.
              5.       5.       5.       5.       4.       4.       4.       4.       4.       4.
              3.       3.       3.       3.       3.       3.       3.       3.       2.       2.
              2.       2.       2.       2.       2.       2.       2.       2.       2.       2.
              1.       1.       1.       1.       1.       1.

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

                     HYDROGRAPH AT STATION    DA2

   TOTAL RAINFALL =    2.96, TOTAL LOSS =    1.70, TOTAL EXCESS =    1.26

PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                   6-HR       24-HR       72-HR     12.45-HR
+  (CFS)      (HR)
                            (CFS)
+    192.     5.15                 59.         29.         29.         29.
                          (INCHES)     1.243       1.256       1.256       1.256
                           (AC-FT)       29.         29.         29.         29.

                          CUMULATIVE AREA =     .44 SQ MI


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


            **************
            *            *
 37 KK      *     C1-2   *
            *            *
            **************
                          COMBINE DA1 WITH DA2

 40 KO            OUTPUT CONTROL VARIABLES
                        IPRNT          1  PRINT CONTROL
                        IPLOT          2  PLOT CONTROL
                        QSCAL         0.  HYDROGRAPH PLOT SCALE

 39 HC            HYDROGRAPH COMBINATION
                        ICOMP          2  NUMBER OF HYDROGRAPHS TO COMBINE

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

                                        HYDROGRAPH AT STATION    C1-2
                                            SUM OF  2 HYDROGRAPHS
*****************************************************************************************************************************
                                 *                                *                                *                                *
 DA MON HRMN  ORD      FLOW      *  DA MON HRMN  ORD      FLOW    *  DA MON HRMN  ORD      FLOW    *  DA MON HRMN  ORD      FLOW
                                 *                                *                                *                                *
  1     0000    1        0.      *   1     0309   64        2.    *   1     0618  127      137.    *   1     0927  190        7.
  1     0003    2        0.      *   1     0312   65        2.    *   1     0621  128      131.    *   1     0930  191        6.
  1     0006    3        0.      *   1     0315   66        2.    *   1     0624  129      125.    *   1     0933  192        6.
  1     0009    4        0.      *   1     0318   67        2.    *   1     0627  130      119.    *   1     0936  193        6.
  1     0012    5        0.      *   1     0321   68        2.    *   1     0630  131      114.    *   1     0939  194        5.
  1     0015    6        0.      *   1     0324   69        2.    *   1     0633  132      109.    *   1     0942  195        5.
  1     0018    7        0.      *   1     0327   70        2.    *   1     0636  133      104.    *   1     0945  196        5.
  1     0021    8        0.      *   1     0330   71        2.    *   1     0639  134      100.    *   1     0948  197        5.
  1     0024    9        0.      *   1     0333   72        2.    *   1     0642  135       95.    *   1     0951  198        5.
  1     0027   10        0.      *   1     0336   73        3.    *   1     0645  136       91.    *   1     0954  199        4.
  1     0030   11        0.      *   1     0339   74        3.    *   1     0648  137       87.    *   1     0957  200        4.
  1     0033   12        0.      *   1     0342   75        3.    *   1     0651  138       83.    *   1     1000  201        4.
  1     0036   13        0.      *   1     0345   76        4.    *   1     0654  139       79.    *   1     1003  202        4.
  1     0039   14        0.      *   1     0348   77        4.    *   1     0657  140       76.    *   1     1006  203        4.
  1     0042   15        0.      *   1     0351   78        6.    *   1     0700  141       72.    *   1     1009  204        4.
  1     0045   16        0.      *   1     0354   79        7.    *   1     0703  142       69.    *   1     1012  205        3.
  1     0048   17        0.      *   1     0357   80        9.    *   1     0706  143       66.    *   1     1015  206        3.
  1     0051   18        0.      *   1     0400   81       11.    *   1     0709  144       63.    *   1     1018  207        3.
  1     0054   19        0.      *   1     0403   82       14.    *   1     0712  145       60.    *   1     1021  208        3.
  1     0057   20        0.      *   1     0406   83       16.    *   1     0715  146       58.    *   1     1024  209        3.
```

1	0100	21	0.	*	1	0409	84	21.	*	1	0718	147	55.	*	1	1027	210	3.
1	0103	22	0.	*	1	0412	85	29.	*	1	0721	148	53.	*	1	1030	211	3.
1	0106	23	0.	*	1	0415	86	44.	*	1	0724	149	50.	*	1	1033	212	3.
1	0109	24	0.	*	1	0418	87	66.	*	1	0727	150	48.	*	1	1036	213	2.
1	0112	25	0.	*	1	0421	88	92.	*	1	0730	151	46.	*	1	1039	214	2.
1	0115	26	1.	*	1	0424	89	121.	*	1	0733	152	44.	*	1	1042	215	2.
1	0118	27	1.	*	1	0427	90	151.	*	1	0736	153	42.	*	1	1045	216	2.
1	0121	28	1.	*	1	0430	91	181.	*	1	0739	154	40.	*	1	1048	217	2.
1	0124	29	1.	*	1	0433	92	209.	*	1	0742	155	38.	*	1	1051	218	2.
1	0127	30	1.	*	1	0436	93	236.	*	1	0745	156	37.	*	1	1054	219	2.
1	0130	31	1.	*	1	0439	94	260.	*	1	0748	157	35.	*	1	1057	220	2.
1	0133	32	1.	*	1	0442	95	282.	*	1	0751	158	34.	*	1	1100	221	2.
1	0136	33	1.	*	1	0445	96	302.	*	1	0754	159	32.	*	1	1103	222	1.
1	0139	34	1.	*	1	0448	97	321.	*	1	0757	160	31.	*	1	1106	223	1.
1	0142	35	1.	*	1	0451	98	338.	*	1	0800	161	29.	*	1	1109	224	1.
1	0145	36	1.	*	1	0454	99	351.	*	1	0803	162	28.	*	1	1112	225	1.
1	0148	37	1.	*	1	0457	100	360.	*	1	0806	163	27.	*	1	1115	226	0.
1	0151	38	1.	*	1	0500	101	365.	*	1	0809	164	26.	*	1	1118	227	0.
1	0154	39	1.	*	1	0503	102	366.	*	1	0812	165	25.	*	1	1121	228	0.
1	0157	40	1.	*	1	0506	103	363.	*	1	0815	166	23.	*	1	1124	229	0.
1	0200	41	1.	*	1	0509	104	359.	*	1	0818	167	22.	*	1	1127	230	0.
1	0203	42	1.	*	1	0512	105	352.	*	1	0821	168	21.	*	1	1130	231	0.
1	0206	43	2.	*	1	0515	106	343.	*	1	0824	169	20.	*	1	1133	232	0.
1	0209	44	2.	*	1	0518	107	332.	*	1	0827	170	19.	*	1	1136	233	0.
1	0212	45	2.	*	1	0521	108	321.	*	1	0830	171	19.	*	1	1139	234	0.
1	0215	46	2.	*	1	0524	109	309.	*	1	0833	172	18.	*	1	1142	235	0.
1	0218	47	2.	*	1	0527	110	297.	*	1	0836	173	17.	*	1	1145	236	0.
1	0221	48	2.	*	1	0530	111	285.	*	1	0839	174	16.	*	1	1148	237	0.
1	0224	49	2.	*	1	0533	112	272.	*	1	0842	175	15.	*	1	1151	238	0.
1	0227	50	2.	*	1	0536	113	260.	*	1	0845	176	15.	*	1	1154	239	0.
1	0230	51	2.	*	1	0539	114	249.	*	1	0848	177	14.	*	1	1157	240	0.
1	0233	52	2.	*	1	0542	115	237.	*	1	0851	178	13.	*	1	1200	241	0.
1	0236	53	2.	*	1	0545	116	227.	*	1	0854	179	13.	*	1	1203	242	0.
1	0239	54	2.	*	1	0548	117	216.	*	1	0857	180	12.	*	1	1206	243	0.
1	0242	55	2.	*	1	0551	118	207.	*	1	0900	181	12.	*	1	1209	244	0.
1	0245	56	2.	*	1	0554	119	197.	*	1	0903	182	11.	*	1	1212	245	0.
1	0248	57	2.	*	1	0557	120	188.	*	1	0906	183	10.	*	1	1215	246	0.
1	0251	58	2.	*	1	0600	121	180.	*	1	0909	184	10.	*	1	1218	247	0.
1	0254	59	2.	*	1	0603	122	172.	*	1	0912	185	9.	*	1	1221	248	0.
1	0257	60	2.	*	1	0606	123	164.	*	1	0915	186	9.	*	1	1224	249	0.
1	0300	61	2.	*	1	0609	124	157.	*	1	0918	187	8.	*	1	1227	250	0.
1	0303	62	2.	*	1	0612	125	150.	*	1	0921	188	8.	*				
1	0306	63	2.	*	1	0615	126	143.	*	1	0924	189	7.	*				
				*					*					*				

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

PEAK FLOW      TIME                            MAXIMUM AVERAGE FLOW
                                         6-HR          24-HR         72-HR       12.45-HR
+   (CFS)       (HR)
                              (CFS)
+       366.       5.05                  109.            53.           53.            53.
                           (INCHES)     1.370          1.388         1.388          1.388
                            (AC-FT)       54.            55.           55.            55.

                         CUMULATIVE AREA =      .74 SQ MI

1                                                          STATION     C1-2

                        (O) OUTFLOW
           0.        40.        80.       120.       160.       200.       240.       280.       320.       360.       400.         0.         0.
DAHRMN PER
 10000   10---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
 10003   20         .         .         .         .         .         .         .         .         .         .         .         .
 10006   30         .         .         .         .         .         .         .         .         .         .         .         .
 10009   40         .         .         .         .         .         .         .         .         .         .         .         .
 10012   50         .         .         .         .         .         .         .         .         .         .         .         .
 10015   60         .         .         .         .         .         .         .         .         .         .         .         .
 10018   70         .         .         .         .         .         .         .         .         .         .         .         .
 10021   80         .         .         .         .         .         .         .         .         .         .         .         .
 10024   90         .         .         .         .         .         .         .         .         .         .         .         .
 10027  100         .         .         .         .         .         .         .         .         .         .         .         .
 10030  110 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10033  120         .         .         .         .         .         .         .         .         .         .         .         .
 10036  130         .         .         .         .         .         .         .         .         .         .         .         .
 10039  140         .         .         .         .         .         .         .         .         .         .         .         .
 10042  150         .         .         .         .         .         .         .         .         .         .         .         .
 10045  160         .         .         .         .         .         .         .         .         .         .         .         .
 10048  170         .         .         .         .         .         .         .         .         .         .         .         .
 10051  180         .         .         .         .         .         .         .         .         .         .         .         .
 10054  190         .         .         .         .         .         .         .         .         .         .         .         .
 10057  200         .         .         .         .         .         .         .         .         .         .         .         .
 10100  210 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10103  220         .         .         .         .         .         .         .         .         .         .         .         .
 10106  230         .         .         .         .         .         .         .         .         .         .         .         .
 10109  240         .         .         .         .         .         .         .         .         .         .         .         .
 10112  250         .         .         .         .         .         .         .         .         .         .         .         .
 10115  260         .         .         .         .         .         .         .         .         .         .         .         .
 10118  270         .         .         .         .         .         .         .         .         .         .         .         .
 10121  280         .         .         .         .         .         .         .         .         .         .         .         .
 10124  290         .         .         .         .         .         .         .         .         .         .         .         .
 10127  300         .         .         .         .         .         .         .         .         .         .         .         .
 10130  310 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10133  320         .         .         .         .         .         .         .         .         .         .         .         .
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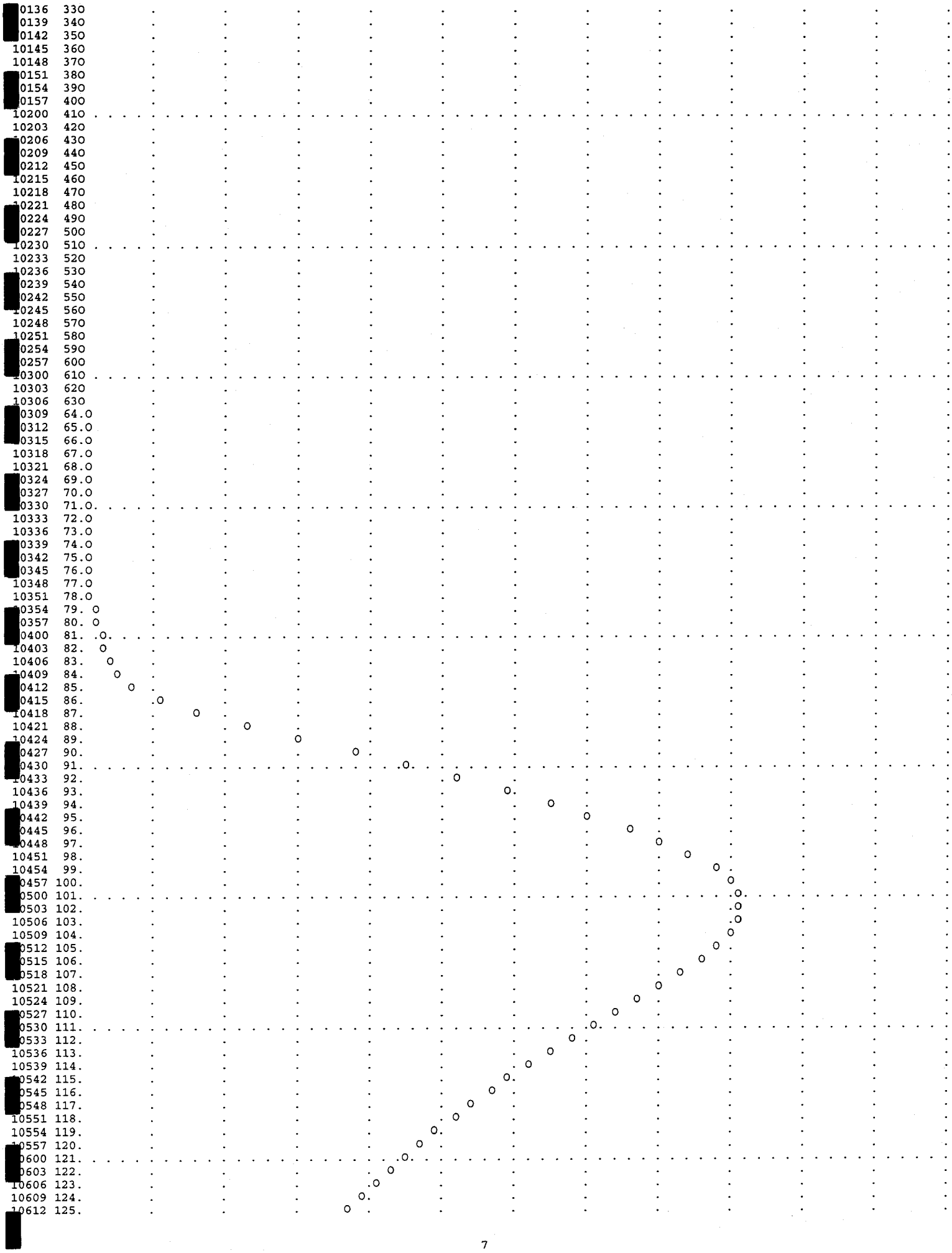
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10215 460
10218 470
10221 480
10224 490
10227 500
10230 510
10233 520
10236 530
10239 540
10242 550
10245 560
10248 570
10251 580
10254 590
10257 600
10300 610
10303 620
10306 630
10309 64.0
10312 65.0
10315 66.0
10318 67.0
10321 68.0
10324 69.0
10327 70.0
10330 71.0
10333 72.0
10336 73.0
10339 74.0
10342 75.0
10345 76.0
10348 77.0
10351 78.0
10354 79.
10357 80.
10400 81.
10403 82.
10406 83.
10409 84.
10412 85.
10415 86.
10418 87.
10421 88.
10424 89.
10427 90.
10430 91.
10433 92.
10436 93.
10439 94.
10442 95.
10445 96.
10448 97.
10451 98.
10454 99.
10457 100.
10500 101.
10503 102.
10506 103.
10509 104.
10512 105.
10515 106.
10518 107.
10521 108.
10524 109.
10527 110.
10530 111.
10533 112.
10536 113.
10539 114.
10542 115.
10545 116.
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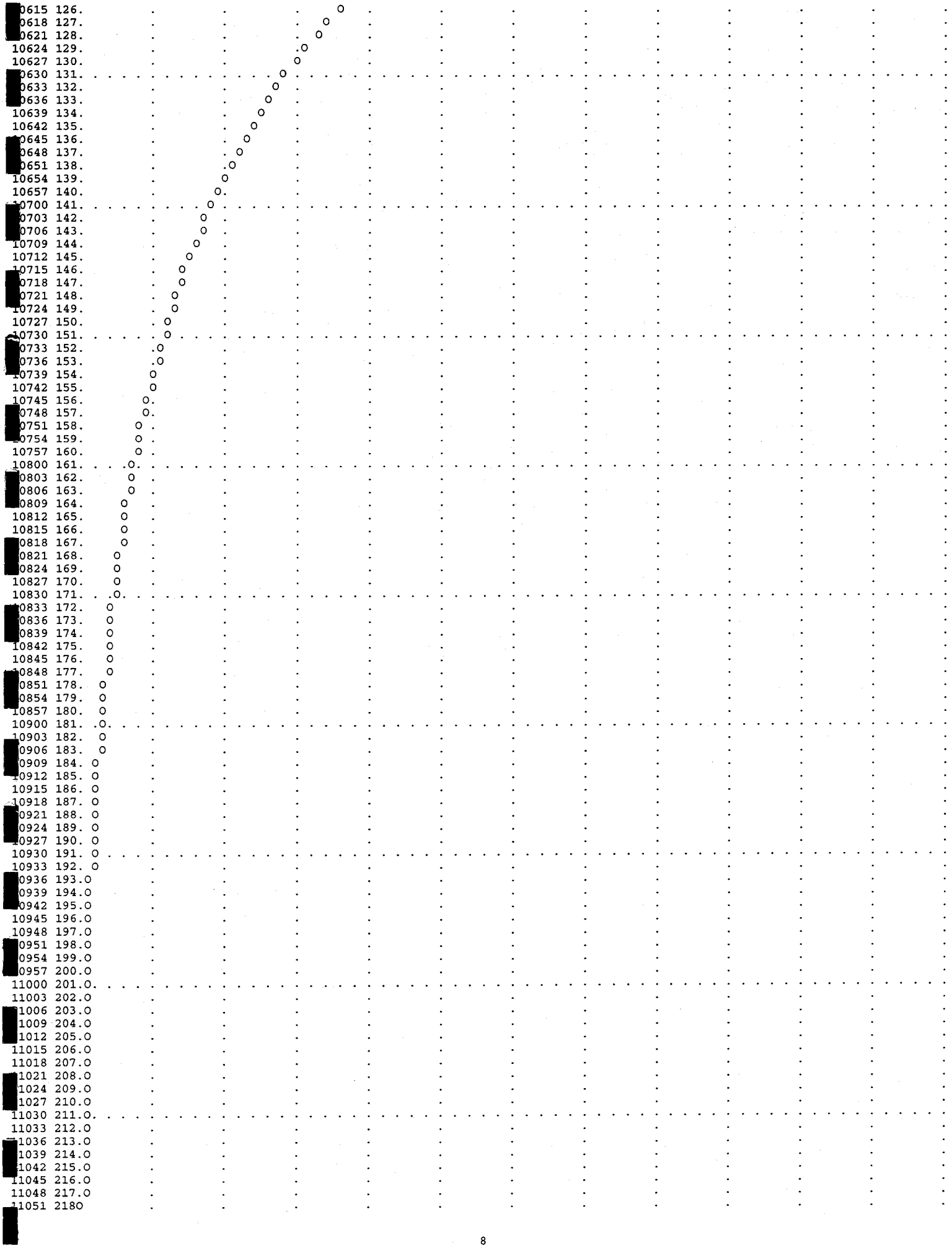
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10906 183.
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10915 186.
10918 187.
10921 188.
10924 189.
10927 190.
10930 191.
10933 192.
10936 193.
10939 194.
10942 195.
10945 196.
10948 197.
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10954 199.
10957 200.
11000 201.
11003 202.
11006 203.
11009 204.
11012 205.
11015 206.
11018 207.
11021 208.
11024 209.
11027 210.
11030 211.
11033 212.
11036 213.
11039 214.
11042 215.
11045 216.
11048 217.
11051 218

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11054 2190         .         .         .         .         .         .         .         .         .         .         .         .
11057 2200         .         .         .         .         .         .         .         .         .         .         .         .
11100 2210 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
11103 2220         .         .         .         .         .         .         .         .         .         .         .         .
11106 2230         .         .         .         .         .         .         .         .         .         .         .         .
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11118 2270         .         .         .         .         .         .         .         .         .         .         .         .
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11127 2300         .         .         .         .         .         .         .         .         .         .         .         .
11130 2310 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
11133 2320         .         .         .         .         .         .         .         .         .         .         .         .
11136 2330         .         .         .         .         .         .         .         .         .         .         .         .
11139 2340         .         .         .         .         .         .         .         .         .         .         .         .
11142 2350         .         .         .         .         .         .         .         .         .         .         .         .
11145 2360         .         .         .         .         .         .         .         .         .         .         .         .
11148 2370         .         .         .         .         .         .         .         .         .         .         .         .
11151 2380         .         .         .         .         .         .         .         .         .         .         .         .
11154 2390         .         .         .         .         .         .         .         .         .         .         .         .
11157 2400         .         .         .         .         .         .         .         .         .         .         .         .
11200 2410 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
11203 2420         .         .         .         .         .         .         .         .         .         .         .         .
11206 2430         .         .         .         .         .         .         .         .         .         .         .         .
11209 2440         .         .         .         .         .         .         .         .         .         .         .         .
11212 2450         .         .         .         .         .         .         .         .         .         .         .         .
11215 2460         .         .         .         .         .         .         .         .         .         .         .         .
11218 2470         .         .         .         .         .         .         .         .         .         .         .         .
11221 2480         .         .         .         .         .         .         .         .         .         .         .         .
11224 2490         .         .         .         .         .         .         .         .         .         .         .         .
11227 2500---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.---------.
1
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* *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***
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                 **************
                 *            *
41 KK            *       DA3  *
                 *            *
                 **************
                              SUB-BASIN DA3
                              6-HOUR RAINFALL, PATTERN NO. 1.40 WAS USED TO FIND TC & R FOR THIS BASIN
                              THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .987
                                L         Kb = .091  Adj. Slope =   15.0

                 SUBBASIN RUNOFF DATA

46 BA              SUBBASIN CHARACTERISTICS
                        TAREA         .37  SUBBASIN AREA

                   PRECIPITATION DATA

16 PB                   STORM        2.96  BASIN TOTAL PRECIPITATION

16 PI                INCREMENTAL 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
                        .01       .01       .01       .01       .01       .02       .02       .02       .02       .02
                        .04       .04       .04       .04       .04       .07       .07       .07       .07       .07
                        .02       .02       .02       .02       .02       .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

47 LG              GREEN AND AMPT LOSS RATE
                        STRTL         .50  STARTING LOSS
                          DTH         .25  MOISTURE DEFICIT
                         PSIF        5.10  WETTING FRONT SUCTION
                        XKSAT         .40  HYDRAULIC CONDUCTIVITY
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

48 UC              CLARK UNITGRAPH
                           TC        1.50  TIME OF CONCENTRATION
                            R        1.20  STORAGE COEFFICIENT

49 UA              ACCUMULATED-AREA VS. TIME,  11 ORDINATES
                          .0       3.0       5.0       8.0      12.0      20.0      43.0      75.0      90.0      96.0
                       100.0

                                                   ***

                                          UNIT HYDROGRAPH PARAMETERS
                                     CLARK   TC=  1.50 HR,       R=  1.20 HR
                                   SNYDER   TP=  1.27 HR,      CP=   .69
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                                   UNIT HYDROGRAPH
                                146 END-OF-PERIOD ORDINATES
      1.      3.      5.      6.      7.      8.      9.     11.     13.     14.
     16.     18.     21.     26.     30.     39.     52.     65.     80.     98.
    115.    125.    130.    134.    136.    134.    132.    130.    127.    125.
    121.    116.    111.    107.    102.     98.     94.     90.     87.     83.
     80.     77.     73.     70.     68.     65.     62.     60.     57.     55.
     53.     50.     48.     46.     45.     43.     41.     39.     38.     36.
     35.     33.     32.     31.     29.     28.     27.     26.     25.     24.
     23.     22.     21.     20.     19.     19.     18.     17.     16.     16.
     15.     14.     14.     13.     13.     12.     12.     11.     11.     10.
     10.     10.      9.      9.      8.      8.      8.      7.      7.      7.
      7.      6.      6.      6.      6.      5.      5.      5.      5.      4.
      4.      4.      4.      4.      4.      3.      3.      3.      3.      3.
      3.      3.      3.      3.      2.      2.      2.      2.      2.      2.
      2.      2.      2.      2.      2.      2.      1.      1.      1.      1.
      1.      1.      1.      1.      1.      1.

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

                    HYDROGRAPH AT STATION      DA3

 TOTAL RAINFALL =    2.96, TOTAL LOSS =    1.95, TOTAL EXCESS =    1.01

 PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                   6-HR       24-HR       72-HR     12.45-HR
+  (CFS)       (HR)
                          (CFS)
+   131.      5.15                39.         19.         19.         19.
                        (INCHES)    .991       1.002       1.002       1.002
                         (AC-FT)    20.         20.         20.         20.

                       CUMULATIVE AREA =     .37 SQ MI


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


          **************
          *            *
51 KK     *       DA4  *
          *            *
          **************
                        SUB-BASIN DA4
                        6-HOUR RAINFALL, PATTERN NO. 1.40 WAS USED TO FIND TC & R FOR THIS BASIN
                        THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .987
                          L =  .51  Kb = .110  Adj. Slope =   10.0

            SUBBASIN RUNOFF DATA

56 BA         SUBBASIN CHARACTERISTICS
                    TAREA         .06  SUBBASIN AREA

              PRECIPITATION DATA

16 PB               STORM        2.96  BASIN TOTAL PRECIPITATION

16 PI           INCREMENTAL 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
                    .01       .01       .01       .01       .01       .02       .02       .02       .02       .02
                    .04       .04       .04       .04       .04       .07       .07       .07       .07       .07
                    .02       .02       .02       .02       .02       .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

57 LG         GREEN AND AMPT LOSS RATE
                    STRTL         .50  STARTING LOSS
                      DTH         .25  MOISTURE DEFICIT
                     PSIF        4.35  WETTING FRONT SUCTION
                    XKSAT         .61  HYDRAULIC CONDUCTIVITY
                    RTIMP         .00  PERCENT IMPERVIOUS AREA

58 UC         CLARK UNITGRAPH
                       TC        1.50  TIME OF CONCENTRATION
                        R        1.67  STORAGE COEFFICIENT

59 UA         ACCUMULATED-AREA VS. TIME,  11 ORDINATES
                      .0       3.0       5.0       8.0      12.0      20.0      43.0      75.0      90.0      96.0
                   100.0

                                                  ***

                                   UNIT HYDROGRAPH PARAMETERS
                              CLARK   TC=  1.50 HR,       R=  1.67 HR
                             SNYDER   TP=  1.29 HR,      CP=   .55
```

UNIT HYDROGRAPH
196 END-OF-PERIOD ORDINATES

0.	0.	1.	1.	1.	1.	1.	1.	2.	2.
2.	2.	3.	3.	4.	5.	6.	8.	10.	12.
14.	16.	16.	17.	17.	17.	17.	17.	17.	17.
16.	16.	15.	15.	15.	14.	14.	13.	13.	13.
12.	12.	11.	11.	11.	10.	10.	10.	10.	9.
9.	9.	8.	8.	8.	8.	8.	7.	7.	7.
7.	6.	6.	6.	6.	6.	6.	5.	5.	5.
5.	5.	5.	5.	4.	4.	4.	4.	4.	4.
4.	4.	3.	3.	3.	3.	3.	3.	3.	3.
3.	3.	3.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.				

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

HYDROGRAPH AT STATION DA4

TOTAL RAINFALL = 2.96, TOTAL LOSS = 2.17, TOTAL EXCESS = .80

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	12.45-HR
		(CFS)				
14.	5.15		5.	2.	2.	2.
		(INCHES)	.760	.787	.787	.787
		(AC-FT)	2.	3.	3.	3.

CUMULATIVE AREA = .06 SQ MI

*** ***

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**************
*            *
*     C3-4   *
*            *
**************
```

61 KK

COMBINE DA3 WITH DA4

63 HC HYDROGRAPH COMBINATION
ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

***

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

HYDROGRAPH AT STATION C3-4

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	12.45-HR
		(CFS)				
145.	5.15		44.	22.	22.	22.
		(INCHES)	.958	.971	.971	.971
		(AC-FT)	22.	22.	22.	22.

CUMULATIVE AREA = .43 SQ MI

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 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
HYDROGRAPH AT	DA1	199.	4.55	51.	25.	25.	.30		
ROUTED TO	DA1-2	196.	4.80	51.	25.	25.	.30		
HYDROGRAPH AT	DA2	192.	5.15	59.	29.	29.	.44		
2 COMBINED AT	C1-2	366.	5.05	109.	53.	53.	.74		

```
      HYDROGRAPH AT
+                     DA3       131.    5.15          39.         19.         19.        .37

      HYDROGRAPH AT
+                     DA4        14.    5.15           5.          2.          2.        .06

      2 COMBINED AT
+                    C3-4       145.    5.15          44.         22.         22.        .43
1
                                   SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                                       (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                   INTERPOLATED TO
                                                                COMPUTATION INTERVAL
        ISTAQ    ELEMENT      DT       PEAK    TIME TO     VOLUME      DT       PEAK    TIME TO     VOLUME
                                                  PEAK                                    PEAK

                            (MIN)     (CFS)     (MIN)      (IN)     (MIN)     (CFS)     (MIN)       (IN)

          DA1-2  MANE        3.00    196.22    288.00      1.58      3.00    196.22    288.00       1.58

NTINUITY SUMMARY (AC-FT) - INFLOW= .2545E+02 EXCESS= .0000E+00 OUTFLOW= .2541E+02 BASIN STORAGE= .3491E-02 PERCENT ERROR=    .1


* NORMAL END OF HEC-1 ***
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CBRANCH2.DAT

Analyzes detention basin for existing 100-yr, 6-hr conditions where the basin drains as the basin fills.

```
1**************************************                    **************************************
                                     *                    *                                    *
  FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                    *   U.S. ARMY CORPS OF ENGINEERS     *
*          SEPTEMBER 1990            *                    *   HYDROLOGIC ENGINEERING CENTER    *
*           VERSION 4.0              *                    *         609 SECOND STREET          *
                                     *                    *      DAVIS, CALIFORNIA 95616       *
 RUN DATE  04/22/1996  TIME  16:50:52 *                    *          (916) 756-1104            *
                                     *                    *                                    *
**************************************                    **************************************

X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X               X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX         XXX
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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

```
1                                          HEC-1 INPUT                                                    PAGE  1

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

    1           ID   CBRANCH2.DAT
    2           ID   CAMELBACK RANCH LEVEE DESIGN PROJECT EXISTING CONDITIONS HYDROLOGY
    3           ID   100-YR, 6-HR STORM EVENT
    4           ID   DETENTION BASIN ANALYSIS
    5           ID
    6           ID
    7           IT      10                     250
    8           IO       5
                * DDM   ***** Inserted *****

    9           KK     DA1
   10           KM   SUB-BASIN DA1
   11           KM   6-HOUR RAINFALL, PATTERN NO. 1.40 WAS USED TO FIND TC & R FOR THIS BASIN
   12           KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .987
   13           KM     L = 1.08  Kb = .049  Adj. Slope =   10.0
   14           BA    .302
   15           IN      15
   16           KM   RAINFALL DEPTH OF 3.00 WAS SPACIALLY REDUCED AS SHOWN BY THE PB RECORD
   17           PB   2.961
   18           KM   THE FOLLOWING PC RECORD USED A 6-HOUR STORM WITH A PATTERN No. OF 1.40
   19           PC    .000    .008    .016    .025    .033    .041    .050    .058    .066    .075
   20           PC    .087    .099    .119    .148    .230    .407    .778    .881    .919    .945
   21           PC    .957    .968    .980    .990   1.000
   22           LG    .300    .250   6.000    .200  11.000
   23           UC   1.058    .829
   24           UA       0       5      16      30      65      77      84      90      94      97
   25           UA     100
                * DDM   ***** Inserted *****

   26           KK   DA1-2
   27           KM   ROUTING SUBBASIN 1 THROUGH 2
   28           RD    3900   .0026    .030            TRAP       0       6     YES
                *

   29           KK   DA2
   30           KM   SUB-BASIN DA2
   31           KM   6-HOUR RAINFALL, PATTERN NO. 1.40 WAS USED TO FIND TC & R FOR THIS BASIN
   32           KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .987
   33           KM     L = 1.38  Kb = .089  Adj. Slope =   13.0
   34           BA    .438
   35           LG   .500    .250   6.000    .220    . 000
   36           UC   1.500   1.202
   37           UA       0       3       5       8      12      20      43      75      90      96
   38           UA     100
                * DDM   ***** Inserted *****

   39           KK   C1-2
   40           KM   COMBINE DA1 WITH DA2
   41           HC
                *
1                                          HEC-1 INPUT                                                    PAGE  2

  LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
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 42          KK   ROUTE
 43          KM       1-36" CONCRETE PIPE
 44          RS       1    FLOW      -1
 45          SV       0   .0010    .002    2.06    8.35   14.70   21.12   27.62   34.18   40.82
 46          SV   47.56   54.32
 47          SQ       0     3.0     7.0    12.0    18.0    27.5    37.5    47.5    52.5    57.0
 48          SQ    60.0    63.0
 49          SE  1018.0  1018.5    1019  1019.5  1020.0  1020.5  1021.0  1021.5  1022.0  1022.5
 50          SE  1023.0  1023.5
             *
 51          KO       1       2
             *

 52          KK     DA3
 53          KM   SUB-BASIN DA3
 54          KM   6-HOUR RAINFALL, PATTERN NO. 1.40 WAS USED TO FIND TC & R FOR THIS BASIN
 55          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .987
 56          KM     L         Kb = .091  Adj. Slope =   15.0
 57          BA    .370
 58          LG    .500    .250   5.100    .400    .000
 59          UC   1.500   1.199
 60          UA       0       3       5       8      12      20      43      75      90      96
 61          UA     100
             * DDM   ***** Inserted *****

 62          KK     DA4
 63          KM   SUB-BASIN DA4
 64          KM   6-HOUR RAINFALL, PATTERN NO. 1.40 WAS USED TO FIND TC & R FOR THIS BASIN
 65          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF  .987
 66          KM     L =  .51  Kb = .110  Adj. Slope =   10.0
 67          BA    .061
 68          LG    .500    .250   4.350    .610    .000
 69          UC   1.500   1.668
 70          UA       0       3       5       8      12      20      43      75      90      96
 71          UA     100
             *

 72          KK   C3-4
 73          KM      COMBINE DA3 WITH DA4
 74          HC
 75          ZZ
1****************************************                                    ****************************************
                                        *                                    *                                      *
  FLOOD HYDROGRAPH PACKAGE  (HEC-1)     *                                    *   U.S. ARMY CORPS OF ENGINEERS       *
*           SEPTEMBER 1990              *                                    *   HYDROLOGIC ENGINEERING CENTER      *
*            VERSION 4.0                *                                    *         609 SECOND STREET            *
                                        *                                    *      DAVIS, CALIFORNIA 95616         *
 RUN DATE  04/22/1996  TIME  16:50:52   *                                    *          (916) 756-1104              *
                                        *                                    *                                      *
****************************************                                    ****************************************


                        CBRANCH2.DAT
                        CAMELBACK RANCH LEVEE DESIGN PROJECT EXISTING CONDITIONS HYDROLOGY
                        100-YR, 6-HR STORM EVENT
                        DETENTION BASIN ANALYSIS


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

  IT           HYDROGRAPH TIME DATA
                      NMIN          10  MINUTES IN COMPUTATION INTERVAL
                     IDATE      1    0  STARTING DATE
                     ITIME        0000  STARTING TIME
                        NQ         250  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE      2    0  ENDING DATE
                    NDTIME       1730  ENDING TIME
                    ICENT          19  CENTURY MARK

                COMPUTATION INTERVAL     .17 HOURS
                     TOTAL TIME BASE   41.50 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


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***
```

```
                **************
                *            *
42 KK           *     ROUTE  *
                *            *
                **************

51 KO              OUTPUT CONTROL VARIABLES
                        IPRNT           1  PRINT CONTROL
                        IPLOT           2  PLOT CONTROL
                        QSCAL          0.  HYDROGRAPH PLOT SCALE

                HYDROGRAPH ROUTING DATA

44 RS              STORAGE ROUTING
                        NSTPS           1  NUMBER OF SUBREACHES
                         ITYP        FLOW  TYPE OF INITIAL CONDITION
                       RSVRIC       -1.00  INITIAL CONDITION
                            X         .00 WORKING R AND D COEFFICIENT

45 SV              STORAGE          .0       .0       .0       2.1       8.4      14.7      21.1      27.6      34.2      40.8
                                   47.6     54.3

47 SQ              DISCHARGE        0.       3.       7.       12.       18.       28.       38.       48.       53.       57.
                                   60.      63.

49 SE              ELEVATION     1018.00  1018.50  1019.00  1019.50  1020.00  1020.50  1021.00  1021.50  1022.00  1022.50
                                 1023.00  1023.50

                                                          ***

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN        0. TO        7.
                THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
                THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)
*****************************************************************************************************************************

                                                HYDROGRAPH AT STATION    ROUTE
*****************************************************************************************************************************
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DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	0.	.0	1018.0	*	1		1400	85	32.	17.7	1020.7	*	2		0400	169	0.	.0	1018.0
1		0010	2	0.	.0	1018.0	*	1		1410	86	32.	17.3	1020.7	*	2		0410	170	0.	.0	1018.0
1		0020	3	0.	.0	1018.0	*	1		1420	87	31.	16.9	1020.7	*	2		0420	171	0.	.0	1018.0
1		0030	4	0.	.0	1018.0	*	1		1430	88	30.	16.5	1020.6	*	2		0430	172	0.	.0	1018.0
1		0040	5	0.	.0	1018.0	*	1		1440	89	30.	16.0	1020.6	*	2		0440	173	0.	.0	1018.0
1		0050	6	0.	.0	1018.0	*	1		1450	90	29.	15.6	1020.6	*	2		0450	174	0.	.0	1018.0
1		0100	7	0.	.0	1018.0	*	1		1500	91	28.	15.2	1020.5	*	2		0500	175	0.	.0	1018.0
1		0110	8	0.	.0	1018.1	*	1		1510	92	28.	14.9	1020.5	*	2		0510	176	0.	.0	1018.0
1		0120	9	1.	.0	1018.1	*	1		1520	93	27.	14.5	1020.5	*	2		0520	177	0.	.0	1018.0
1		0130	10	1.	.0	1018.1	*	1		1530	94	27.	14.1	1020.5	*	2		0530	178	0.	.0	1018.0
1		0140	11	1.	.0	1018.2	*	1		1540	95	26.	13.8	1020.4	*	2		0540	179	0.	.0	1018.0
1		0150	12	1.	.0	1018.2	*	1		1550	96	26.	13.4	1020.4	*	2		0550	180	0.	.0	1018.0
1		0200	13	1.	.0	1018.2	*	1		1600	97	25.	13.0	1020.4	*	2		0600	181	0.	.0	1018.0
1		0210	14	2.	.0	1018.3	*	1		1610	98	25.	12.7	1020.3	*	2		0610	182	0.	.0	1018.0
1		0220	15	2.	.0	1018.3	*	1		1620	99	24.	12.4	1020.3	*	2		0620	183	0.	.0	1018.0
1		0230	16	2.	.0	1018.3	*	1		1630	100	24.	12.0	1020.3	*	2		0630	184	0.	.0	1018.0
1		0240	17	2.	.0	1018.3	*	1		1640	101	23.	11.7	1020.3	*	2		0640	185	0.	.0	1018.0
1		0250	18	2.	.0	1018.3	*	1		1650	102	23.	11.4	1020.2	*	2		0650	186	0.	.0	1018.0
1		0300	19	2.	.0	1018.3	*	1		1700	103	22.	11.1	1020.2	*	2		0700	187	0.	.0	1018.0
1		0310	20	2.	.0	1018.3	*	1		1710	104	22.	10.8	1020.2	*	2		0710	188	0.	.0	1018.0
1		0320	21	2.	.0	1018.4	*	1		1720	105	21.	10.5	1020.2	*	2		0720	189	0.	.0	1018.0
1		0330	22	2.	.0	1018.4	*	1		1730	106	21.	10.2	1020.1	*	2		0730	190	0.	.0	1018.0
1		0340	23	3.	.0	1018.5	*	1		1740	107	20.	9.9	1020.1	*	2		0740	191	0.	.0	1018.0
1		0350	24	5.	.0	1018.8	*	1		1750	108	20.	9.7	1020.1	*	2		0750	192	0.	.0	1018.0
1		0400	25	7.	.0	1019.0	*	1		1800	109	20.	9.4	1020.1	*	2		0800	193	0.	.0	1018.0
1		0410	26	7.	.2	1019.0	*	1		1810	110	19.	9.1	1020.1	*	2		0810	194	0.	.0	1018.0
1		0420	27	9.	.9	1019.2	*	1		1820	111	19.	8.9	1020.0	*	2		0820	195	0.	.0	1018.0
1		0430	28	12.	2.6	1019.5	*	1		1830	112	18.	8.6	1020.0	*	2		0830	196	0.	.0	1018.0
1		0440	29	15.	5.5	1019.8	*	1		1840	113	18.	8.3	1020.0	*	2		0840	197	0.	.0	1018.0
1		0450	30	20.	9.4	1020.1	*	1		1850	114	18.	8.1	1020.0	*	2		0850	198	0.	.0	1018.0
1		0500	31	26.	13.8	1020.4	*	1		1900	115	18.	7.9	1020.0	*	2		0900	199	0.	.0	1018.0
1		0510	32	33.	18.3	1020.8	*	1		1910	116	17.	7.6	1019.9	*	2		0910	200	0.	.0	1018.0
1		0520	33	40.	22.5	1021.1	*	1		1920	117	17.	7.4	1019.9	*	2		0920	201	0.	.0	1018.0
1		0530	34	45.	26.0	1021.4	*	1		1930	118	17.	7.1	1019.9	*	2		0930	202	0.	.0	1018.0
1		0540	35	49.	29.0	1021.6	*	1		1940	119	17.	6.9	1019.9	*	2		0940	203	0.	.0	1018.0
1		0550	36	50.	31.4	1021.8	*	1		1950	120	16.	6.7	1019.9	*	2		0950	204	0.	.0	1018.0
1		0600	37	52.	33.4	1021.9	*	1		2000	121	16.	6.5	1019.9	*	2		1000	205	0.	.0	1018.0
1		0610	38	53.	34.9	1022.1	*	1		2010	122	16.	6.2	1019.8	*	2		1010	206	0.	.0	1018.0
1		0620	39	54.	36.2	1022.1	*	1		2020	123	16.	6.0	1019.8	*	2		1020	207	0.	.0	1018.0
1		0630	40	54.	37.1	1022.2	*	1		2030	124	16.	5.8	1019.8	*	2		1030	208	0.	.0	1018.0
1		0640	41	55.	37.8	1022.3	*	1		2040	125	15.	5.6	1019.8	*	2		1040	209	0.	.0	1018.0
1		0650	42	55.	38.3	1022.3	*	1		2050	126	15.	5.4	1019.8	*	2		1050	210	0.	.0	1018.0
1		0700	43	55.	38.6	1022.3	*	1		2100	127	15.	5.2	1019.7	*	2		1100	211	0.	.0	1018.0
1		0710	44	56.	38.7	1022.3	*	1		2110	128	15.	5.0	1019.7	*	2		1110	212	0.	.0	1018.0
1		0720	45	56.	38.7	1022.3	*	1		2120	129	15.	4.8	1019.7	*	2		1120	213	0.	.0	1018.0
1		0730	46	56.	38.6	1022.3	*	1		2130	130	14.	4.6	1019.7	*	2		1130	214	0.	.0	1018.0
1		0740	47	55.	38.5	1022.3	*	1		2140	131	14.	4.4	1019.7	*	2		1140	215	0.	.0	1018.0
1		0750	48	55.	38.2	1022.3	*	1		2150	132	14.	4.2	1019.7	*	2		1150	216	0.	.0	1018.0
1		0800	49	55.	37.9	1022.3	*	1		2200	133	14.	4.0	1019.7	*	2		1200	217	0.	.0	1018.0
1		0810	50	55.	37.5	1022.2	*	1		2210	134	14.	3.8	1019.6	*	2		1210	218	0.	.0	1018.0
1		0820	51	54.	37.1	1022.2	*	1		2220	135	13.	3.6	1019.6	*	2		1220	219	0.	.0	1018.0

1	0830	52	54.	36.6	1022.2	*	1	2230	136	13.	3.4	1019.6	*	2	1230	220	0.	.0	1018.0
1	0840	53	54.	36.1	1022.1	*	1	2240	137	13.	3.2	1019.6	*	2	1240	221	0.	.0	1018.0
1	0850	54	53.	35.5	1022.1	*	1	2250	138	13.	3.1	1019.6	*	2	1250	222	0.	.0	1018.0
1	0900	55	53.	35.0	1022.1	*	1	2300	139	13.	2.9	1019.6	*	2	1300	223	0.	.0	1018.0
1	0910	56	53.	34.4	1022.0	*	1	2310	140	13.	2.7	1019.6	*	2	1310	224	0.	.0	1018.0
1	0920	57	52.	33.8	1022.0	*	1	2320	141	12.	2.5	1019.5	*	2	1320	225	0.	.0	1018.0
1	0930	58	52.	33.2	1021.9	*	1	2330	142	12.	2.4	1019.5	*	2	1330	226	0.	.0	1018.0
1	0940	59	51.	32.6	1021.9	*	1	2340	143	12.	2.2	1019.5	*	2	1340	227	0.	.0	1018.0
1	0950	60	51.	31.9	1021.8	*	1	2350	144	12.	2.0	1019.5	*	2	1350	228	0.	.0	1018.0
1	1000	61	50.	31.3	1021.8	*	2	0000	145	12.	1.9	1019.5	*	2	1400	229	0.	.0	1018.0
1	1010	62	50.	30.6	1021.7	*	2	0010	146	11.	1.7	1019.4	*	2	1410	230	0.	.0	1018.0
1	1020	63	49.	30.0	1021.7	*	2	0020	147	11.	1.6	1019.4	*	2	1420	231	0.	.0	1018.0
1	1030	64	49.	29.4	1021.6	*	2	0030	148	10.	1.4	1019.3	*	2	1430	232	0.	.0	1018.0
1	1040	65	48.	28.7	1021.6	*	2	0040	149	10.	1.3	1019.3	*	2	1440	233	0.	.0	1018.0
1	1050	66	48.	28.1	1021.5	*	2	0050	150	10.	1.1	1019.3	*	2	1450	234	0.	.0	1018.0
1	1100	67	47.	27.5	1021.5	*	2	0100	151	9.	1.0	1019.2	*	2	1500	235	0.	.0	1018.0
1	1110	68	46.	26.8	1021.4	*	2	0110	152	9.	.9	1019.2	*	2	1510	236	0.	.0	1018.0
1	1120	69	45.	26.2	1021.4	*	2	0120	153	9.	.8	1019.2	*	2	1520	237	0.	.0	1018.0
1	1130	70	44.	25.6	1021.3	*	2	0130	154	9.	.6	1019.2	*	2	1530	238	0.	.0	1018.0
1	1140	71	43.	25.0	1021.3	*	2	0140	155	8.	.5	1019.1	*	2	1540	239	0.	.0	1018.0
1	1150	72	43.	24.4	1021.3	*	2	0150	156	8.	.4	1019.1	*	2	1550	240	0.	.0	1018.0
1	1200	73	42.	23.8	1021.2	*	2	0200	157	8.	.3	1019.1	*	2	1600	241	0.	.0	1018.0
1	1210	74	41.	23.3	1021.2	*	2	0210	158	7.	.2	1019.0	*	2	1610	242	0.	.0	1018.0
1	1220	75	40.	22.7	1021.1	*	2	0220	159	7.	.1	1019.0	*	2	1620	243	0.	.0	1018.0
1	1230	76	39.	22.2	1021.1	*	2	0230	160	6.	.0	1018.9	*	2	1630	244	0.	.0	1018.0
1	1240	77	38.	21.6	1021.0	*	2	0240	161	0.	.0	1018.0	*	2	1640	245	0.	.0	1018.0
1	1250	78	37.	21.1	1021.0	*	2	0250	162	0.	.0	1018.0	*	2	1650	246	0.	.0	1018.0
1	1300	79	37.	20.6	1021.0	*	2	0300	163	0.	.0	1018.0	*	2	1700	247	0.	.0	1018.0
1	1310	80	36.	20.1	1020.9	*	2	0310	164	0.	.0	1018.0	*	2	1710	248	0.	.0	1018.0
1	1320	81	35.	19.6	1020.9	*	2	0320	165	0.	.0	1018.0	*	2	1720	249	0.	.0	1018.0
1	1330	82	34.	19.1	1020.8	*	2	0330	166	0.	.0	1018.0	*	2	1730	250	0.	.0	1018.0
1	1340	83	34.	18.7	1020.8	*	2	0340	167	0.	.0	1018.0	*						
1	1350	84	33.	18.2	1020.8	*	2	0350	168	0.	.0	1018.0	*						
						*							*						

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	41.50-HR
+ (CFS)	(HR)					
		(CFS)				
+ 56.	7.33		52.	27.	16.	16.
		(INCHES)	.653	1.377	1.381	1.381
		(AC-FT)	26.	54.	54.	54.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	41.50-HR
+ (AC-FT)	(HR)				
39.	7.33	34.	15.	9.	9.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	41.50-HR
+ (FEET)	(HR)				
1022.34	7.33	1021.97	1020.42	1019.41	1019.41

CUMULATIVE AREA = .74 SQ MI

1 STATION ROUTE

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                    (I) INFLOW,   (O) OUTFLOW
        0.      40.      80.     120.     160.     200.     240.     280.     320.     360.       0.       0.       0.
                                                                            (S) STORAGE
        0.       0.       0.       0.       0.       0.       0.      10.      20.      30.      40.       0.       0.
HRMN PER
 0000   1I---------.---------.---------.---------.---------.---------S---------.---------.---------.---------.---------.---------.
 0010   2I         .         .         .         .         .         S         .         .         .         .         .         .
 10020  3I         .         .         .         .         .         S         .         .         .         .         .         .
 10030  4I         .         .         .         .         .         S         .         .         .         .         .         .
 0040   5I         .         .         .         .         .         S         .         .         .         .         .         .
 0050   6I         .         .         .         .         .         S         .         .         .         .         .         .
 0100   7I         .         .         .         .         .         S         .         .         .         .         .         .
 10110  8I         .         .         .         .         .         S         .         .         .         .         .         .
 10120  9I         .         .         .         .         .         S         .         .         .         .         .         .
 0130   10I        .         .         .         .         .         S         .         .         .         .         .         .
 0140   11I. . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 0150   12I        .         .         .         .         .         S         .         .         .         .         .         .
 10200  13I        .         .         .         .         .         S         .         .         .         .         .         .
 10210  14I        .         .         .         .         .         S         .         .         .         .         .         .
 0220   15I        .         .         .         .         .         S         .         .         .         .         .         .
 0230   16I        .         .         .         .         .         S         .         .         .         .         .         .
 0240   17I        .         .         .         .         .         S         .         .         .         .         .         .
 10250  18I        .         .         .         .         .         S         .         .         .         .         .         .
 10300  19I        .         .         .         .         .         S         .         .         .         .         .         .
 0310   20.I       .         .         .         .         .         S         .         .         .         .         .         .
 0320   21.I. . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 0330   22.I       .         .         .         .         .         S         .         .         .         .         .         .
 10340  23.I       .         .         .         .         .         S         .         .         .         .         .         .
 10350  24.I       .         .         .         .         .         S         .         .         .         .         .         .
 0400   25. OI     .         .         .         .         .         S         .         .         .         .         .         .
 0410   26. O   I .         .         .         .         .         S         .         .         .         .         .         .
 0420   27. O     .         . I       .         .         .         .S        .         .         .         .         .         .
 10430  28.  O    .         .         .         .   I     .         . S       .         .         .         .         .         .
 10440  29.   O   .         .         .         .         .         .   S I   .         .         .         .         .         .
 10450  30.    O  .         .         .         .         .         .       S.        . I       .         .         .         .
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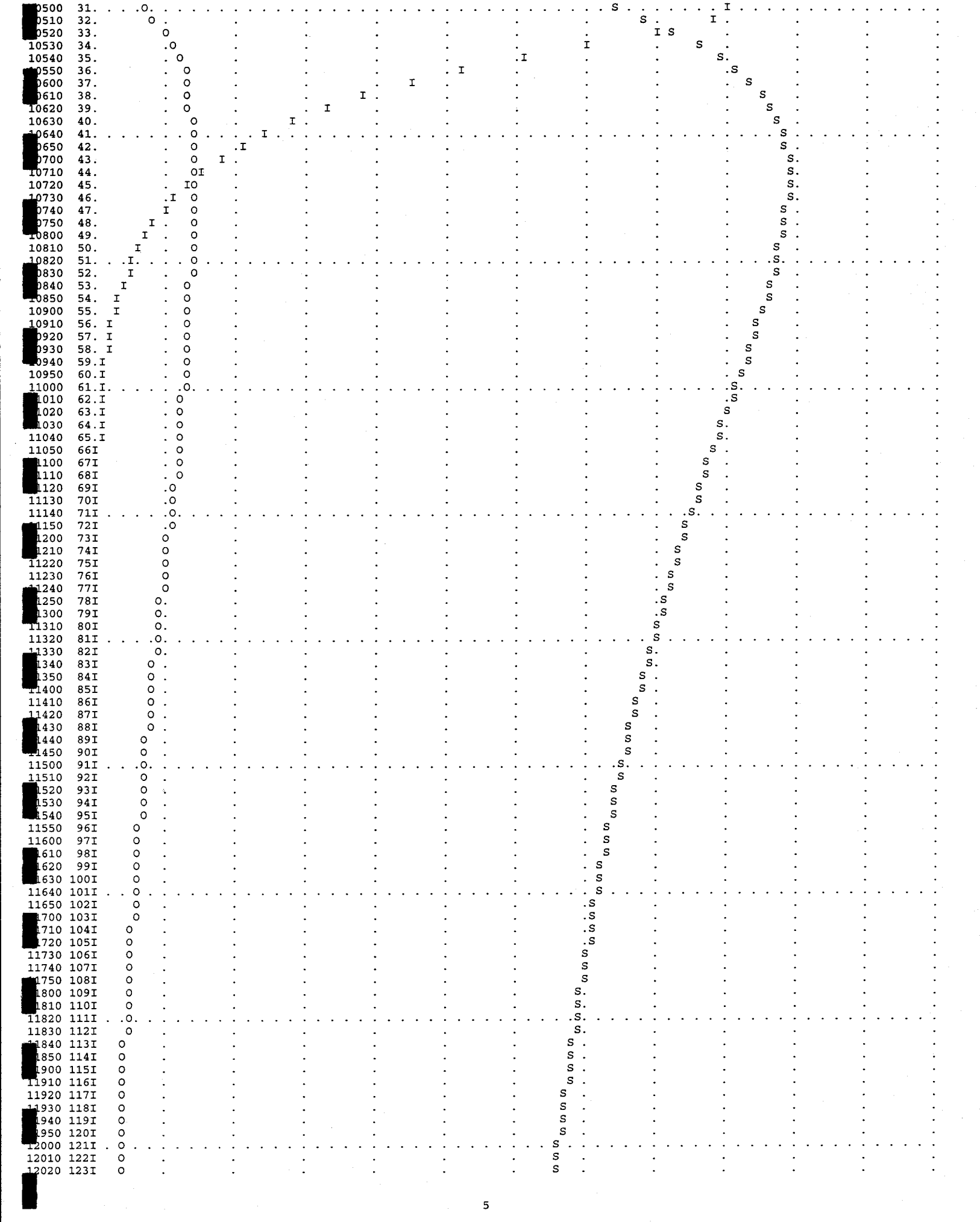

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[redacted]030 124I   O     .         .         .         .         .         .     S   .         .         .         .         .         .
[redacted]040 125I   O     .         .         .         .         .         .     S   .         .         .         .         .         .
[redacted]050 126I   O     .         .         .         .         .         .    S    .         .         .         .         .         .
12100 127I   O     .         .         .         .         .         .    S    .         .         .         .         .         .
12110 128I   O     .         .         .         .         .         .    S    .         .         .         .         .         .
[redacted]120 129I   O     .         .         .         .         .         .    S    .         .         .         .         .         .
[redacted]130 130I   O     .         .         .         .         .         .    S    .         .         .         .         .         .
[redacted]140 131I . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . .
12150 132I   O     .         .         .         .         .         .   S     .         .         .         .         .         .
12200 133I  O      .         .         .         .         .         .   S     .         .         .         .         .         .
[redacted]210 134I  O      .         .         .         .         .         .   S     .         .         .         .         .         .
[redacted]220 135I  O      .         .         .         .         .         .   S     .         .         .         .         .         .
[redacted]230 136I  O      .         .         .         .         .         .  S      .         .         .         .         .         .
12240 137I  O      .         .         .         .         .         .  S      .         .         .         .         .         .
12250 138I  O      .         .         .         .         .         .  S      .         .         .         .         .         .
[redacted]300 139I  O      .         .         .         .         .         .  S      .         .         .         .         .         .
[redacted]310 140I  O      .         .         .         .         .         .  S      .         .         .         .         .         .
[redacted]320 141I .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . . . . . .
[redacted]330 142I  O      .         .         .         .         .         . S       .         .         .         .         .         .
12340 143I  O      .         .         .         .         .         . S       .         .         .         .         .         .
[redacted]350 144I  O      .         .         .         .         .         . S       .         .         .         .         .         .
[redacted]000 145I  O      .         .         .         .         .         . S       .         .         .         .         .         .
[redacted]010 146I  O      .         .         .         .         .         . S       .         .         .         .         .         .
[redacted]020 147I  O      .         .         .         .         .         . S       .         .         .         .         .         .
20030 148I  O      .         .         .         .         .         .S        .         .         .         .         .         .
20040 149I  O      .         .         .         .         .         .S        .         .         .         .         .         .
[redacted]050 150I O       .         .         .         .         .         .S        .         .         .         .         .         .
[redacted]100 151I O . . . . . . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
[redacted]110 152I O       .         .         .         .         .         .S        .         .         .         .         .         .
20120 153I O       .         .         .         .         .         .S        .         .         .         .         .         .
20130 154I O       .         .         .         .         .         .S        .         .         .         .         .         .
[redacted]140 155I O       .         .         .         .         .         .S        .         .         .         .         .         .
[redacted]150 156I O       .         .         .         .         .         S         .         .         .         .         .         .
[redacted]200 157I O       .         .         .         .         .         S         .         .         .         .         .         .
20210 158I O       .         .         .         .         .         S         .         .         .         .         .         .
20220 159I O       .         .         .         .         .         S         .         .         .         .         .         .
[redacted]230 160I O       .         .         .         .         .         S         .         .         .         .         .         .
[redacted]240 161I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
[redacted]250 162I         .         .         .         .         .         S         .         .         .         .         .         .
20300 163I         .         .         .         .         .         S         .         .         .         .         .         .
20310 164I         .         .         .         .         .         S         .         .         .         .         .         .
[redacted]320 165I         .         .         .         .         .         S         .         .         .         .         .         .
[redacted]330 166I         .         .         .         .         .         S         .         .         .         .         .         .
[redacted]340 167I         .         .         .         .         .         S         .         .         .         .         .         .
20350 168I         .         .         .         .         .         S         .         .         .         .         .         .
20400 169I         .         .         .         .         .         S         .         .         .         .         .         .
[redacted]410 170I         .         .         .         .         .         S         .         .         .         .         .         .
[redacted]420 171I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
[redacted]430 172I         .         .         .         .         .         S         .         .         .         .         .         .
20440 173I         .         .         .         .         .         S         .         .         .         .         .         .
20450 174I         .         .         .         .         .         S         .         .         .         .         .         .
[redacted]500 175I         .         .         .         .         .         S         .         .         .         .         .         .
[redacted]510 176I         .         .         .         .         .         S         .         .         .         .         .         .
[redacted]520 177I         .         .         .         .         .         S         .         .         .         .         .         .
[redacted]530 178I         .         .         .         .         .         S         .         .         .         .         .         .
20540 179I         .         .         .         .         .         S         .         .         .         .         .         .
20550 180I         .         .         .         .         .         S         .         .         .         .         .         .
[redacted]600 181I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
[redacted]610 182I         .         .         .         .         .         S         .         .         .         .         .         .
[redacted]620 183I         .         .         .         .         .         S         .         .         .         .         .         .
20630 184I         .         .         .         .         .         S         .         .         .         .         .         .
20640 185I         .         .         .         .         .         S         .         .         .         .         .         .
[redacted]650 186I         .         .         .         .         .         S         .         .         .         .         .         .
[redacted]700 187I         .         .         .         .         .         S         .         .         .         .         .         .
[redacted]710 188I         .         .         .         .         .         S         .         .         .         .         .         .
20720 189I         .         .         .         .         .         S         .         .         .         .         .         .
20730 190I         .         .         .         .         .         S         .         .         .         .         .         .
[redacted]740 191I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
[redacted]750 192I         .         .         .         .         .         S         .         .         .         .         .         .
[redacted]800 193I         .         .         .         .         .         S         .         .         .         .         .         .
20810 194I         .         .         .         .         .         S         .         .         .         .         .         .
20820 195I         .         .         .         .         .         S         .         .         .         .         .         .
[redacted]830 196I         .         .         .         .         .         S         .         .         .         .         .         .
[redacted]840 197I         .         .         .         .         .         S         .         .         .         .         .         .
[redacted]850 198I         .         .         .         .         .         S         .         .         .         .         .         .
20900 199I         .         .         .         .         .         S         .         .         .         .         .         .
20910 200I         .         .         .         .         .         S         .         .         .         .         .         .
[redacted]920 201I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
[redacted]930 202I         .         .         .         .         .         S         .         .         .         .         .         .
[redacted]940 203I         .         .         .         .         .         S         .         .         .         .         .         .
20950 204I         .         .         .         .         .         S         .         .         .         .         .         .
21000 205I         .         .         .         .         .         S         .         .         .         .         .         .
[redacted]010 206I         .         .         .         .         .         S         .         .         .         .         .         .
[redacted]020 207I         .         .         .         .         .         S         .         .         .         .         .         .
[redacted]030 208I         .         .         .         .         .         S         .         .         .         .         .         .
21040 209I         .         .         .         .         .         S         .         .         .         .         .         .
21050 210I         .         .         .         .         .         S         .         .         .         .         .         .
[redacted]100 211I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
[redacted]110 212I         .         .         .         .         .         S         .         .         .         .         .         .
[redacted]120 213I         .         .         .         .         .         S         .         .         .         .         .         .
21130 214I         .         .         .         .         .         S         .         .         .         .         .         .
21140 215I         .         .         .         .         .         S         .         .         .         .         .         .
21150 216I         .         .         .         .         .         S         .         .         .         .         .         .
[redacted]
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 1200 217I         .         .         .         .         .         S         .         .         .         .         .         .
 1210 218I         .         .         .         .         .         S         .         .         .         .         .         .
 1220 219I         .         .         .         .         .         S         .         .         .         .         .         .
21230 220I         .         .         .         .         .         S         .         .         .         .         .         .
21240 221I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 1250 222I         .         .         .         .         .         S         .         .         .         .         .         .
 1300 223I         .         .         .         .         .         S         .         .         .         .         .         .
 1310 224I         .         .         .         .         .         S         .         .         .         .         .         .
21320 225I         .         .         .         .         .         S         .         .         .         .         .         .
21330 226I         .         .         .         .         .         S         .         .         .         .         .         .
 1340 227I         .         .         .         .         .         S         .         .         .         .         .         .
 1350 228I         .         .         .         .         .         S         .         .         .         .         .         .
 1400 229I         .         .         .         .         .         S         .         .         .         .         .         .
21410 230I         .         .         .         .         .         S         .         .         .         .         .         .
21420 231I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 1430 232I         .         .         .         .         .         S         .         .         .         .         .         .
 1440 233I         .         .         .         .         .         S         .         .         .         .         .         .
 1450 234I         .         .         .         .         .         S         .         .         .         .         .         .
21500 235I         .         .         .         .         .         S         .         .         .         .         .         .
21510 236I         .         .         .         .         .         S         .         .         .         .         .         .
21520 237I         .         .         .         .         .         S         .         .         .         .         .         .
 1530 238I         .         .         .         .         .         S         .         .         .         .         .         .
 1540 239I         .         .         .         .         .         S         .         .         .         .         .         .
 1550 240I         .         .         .         .         .         S         .         .         .         .         .         .
21600 241I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
21610 242I         .         .         .         .         .         S         .         .         .         .         .         .
 1620 243I         .         .         .         .         .         S         .         .         .         .         .         .
 1630 244I         .         .         .         .         .         S         .         .         .         .         .         .
 1640 245I         .         .         .         .         .         S         .         .         .         .         .         .
21650 246I         .         .         .         .         .         S         .         .         .         .         .         .
21700 247I         .         .         .         .         .         S         .         .         .         .         .         .
 1710 248I         .         .         .         .         .         S         .         .         .         .         .         .
 1720 249I         .         .         .         .         .         S         .         .         .         .         .         .
 1730 250I---------.---------.---------.---------.---------.---------S---------.---------.---------.---------.---------.---------.
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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	DA1	196.	4.50	51.	13.	7.	.30		
+	ROUTED TO	DA1-2	196.	4.83	51.	13.	7.	.30		
+	HYDROGRAPH AT	DA2	188.	5.17	58.	15.	8.	.44		
+	2 COMBINED AT	C1-2	360.	5.00	108.	27.	16.	.74		
+	ROUTED TO	ROUTE	56.	7.33	52.	27.	16.	.74		
+									1022.34	7.33
+	HYDROGRAPH AT	DA3	127.	5.17	38.	10.	6.	.37		
+	HYDROGRAPH AT	DA4	13.	5.17	5.	1.	1.	.06		
+	2 COMBINED AT	C3-4	140.	5.17	43.	11.	6.	.43		

1

SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
(FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)

ISTAQ	ELEMENT	DT (MIN)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	INTERPOLATED TO COMPUTATION INTERVAL DT (MIN)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)
DA1-2	MANE	10.00	195.63	290.00	1.58	10.00	195.63	290.00	1.58

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2537E+02 EXCESS= .0000E+00 OUTFLOW= .2538E+02 BASIN STORAGE= .3149E-02 PERCENT ERROR= .0

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

CBR-EXTB.DAT

Analyzes detention basin for existing 100-yr, 6-hr conditions where the basin drains after the basin reaches the maximum storage capacity.

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1**************************************                    **************************************
                                      *                    *                                    *
 FLOOD HYDROGRAPH PACKAGE  (HEC-1)    *                    *   U.S. ARMY CORPS OF ENGINEERS     *
*          SEPTEMBER 1990             *                    *   HYDROLOGIC ENGINEERING CENTER    *
*           VERSION 4.0               *                    *         609 SECOND STREET          *
                                      *                    *      DAVIS, CALIFORNIA 95616       *
 RUN DATE  04/22/1996  TIME  17:08:30 *                    *          (916) 756-1104            *
                                      *                    *                                    *
**************************************                    **************************************
```

```
X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X               X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX          XXX
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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

1 HEC-1 INPUT PAGE 1

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

  1           ID   CBR-EXTB.DAT
  2           ID   DETENTION POND ANALYSIS - CAMELBACK RANCH LEVEE
  3           ID   DETENTION POND STARTS FULL AT 54 AC-FT AND MUST DRAIN
  4           ID   IN 36 HOURS (DRAINS INTO THE AGUA FRIA RIVER)
  5           IT      10                    300
  6           KM   1-36" CONCRETE PIPES
  7           IO       1       2
  8           RS       1    STOR   54.32
  9           SV       0   .0010    .002    2.06    8.35   14.70   21.12   27.62   34.18   40.82
 10           SV   47.53   54.32
 11           SQ       0     3.0     7.0    12.0    18.0    27.5    37.5    47.5    52.5    57.0
 12           SQ    60.0    63.0
 13           SE  1018.0  1018.5    1019  1019.5  1020.0  1020.5  1021.0  1021.5  1022.0  1022.5
 14           SE  1023.0  1023.5
              *
 15           ZZ
```

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1**************************************                    **************************************
*                                     *                    *                                    *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                    *   U.S. ARMY CORPS OF ENGINEERS     *
          SEPTEMBER 1990              *                    *   HYDROLOGIC ENGINEERING CENTER    *
           VERSION 4.0                *                    *         609 SECOND STREET          *
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*                                     *                    *                                    *
**************************************                    **************************************
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                    CBR-EXTB.DAT
                    DETENTION POND ANALYSIS - CAMELBACK RANCH LEVEE
                    DETENTION POND STARTS FULL AT 54 AC-FT AND MUST DRAIN
                    IN 36 HOURS (DRAINS INTO THE AGUA FRIA RIVER)

 IT          HYDROGRAPH TIME DATA
                  NMIN          10  MINUTES IN COMPUTATION INTERVAL
                 IDATE      1    0  STARTING DATE
                 ITIME        0000  STARTING TIME
                    NQ         300  NUMBER OF HYDROGRAPH ORDINATES
               NDDATE      3    0  ENDING DATE
               NDTIME        0150  ENDING TIME
               ICENT           19  CENTURY MARK

          COMPUTATION INTERVAL     .17 HOURS
               TOTAL TIME BASE   49.83 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
```

1-36" CONCRETE PIPES

```
 7 IO          OUTPUT CONTROL VARIABLES
                    IPRNT          1  PRINT CONTROL
                    IPLOT          2  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE

            HYDROGRAPH ROUTING DATA

 8 RS          STORAGE ROUTING
                    NSTPS          1  NUMBER OF SUBREACHES
                     ITYP       STOR  TYPE OF INITIAL CONDITION
                   RSVRIC      54.32  INITIAL CONDITION
                        X        .00 WORKING R AND D COEFFICIENT

 9 SV            STORAGE         .0        .0        .0       2.1       8.4      14.7      21.1      27.6      34.2      40.8
                                47.5      54.3

11 SQ          DISCHARGE         0.        3.        7.       12.       18.       28.       38.       48.       53.       57.
                                 60.       63.

13 SE          ELEVATION     1018.00   1018.50   1019.00   1019.50   1020.00   1020.50   1021.00   1021.50   1022.00   1022.50
                             1023.00   1023.50

                                                          ***

* WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN        0. TO        7.
             THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
             THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)
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HYDROGRAPH AT STATION

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A	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	63.	54.3	1023.5	*	1		1640	101	14.	4.2	1019.7	*	2		0920	201	0.	.0	1018.0
1		0010	2	63.	53.5	1023.4	*	1		1650	102	14.	4.0	1019.7	*	2		0930	202	0.	.0	1018.0
1		0020	3	62.	52.6	1023.4	*	1		1700	103	14.	3.8	1019.6	*	2		0940	203	0.	.0	1018.0
1		0030	4	62.	51.7	1023.3	*	1		1710	104	13.	3.6	1019.6	*	2		0950	204	0.	.0	1018.0
1		0040	5	61.	50.9	1023.2	*	1		1720	105	13.	3.4	1019.6	*	2		1000	205	0.	.0	1018.0
1		0050	6	61.	50.0	1023.2	*	1		1730	106	13.	3.2	1019.6	*	2		1010	206	0.	.0	1018.0
1		0100	7	61.	49.2	1023.1	*	1		1740	107	13.	3.0	1019.6	*	2		1020	207	0.	.0	1018.0
1		0110	8	60.	48.4	1023.1	*	1		1750	108	13.	2.9	1019.6	*	2		1030	208	0.	.0	1018.0
1		0120	9	60.	47.5	1023.0	*	1		1800	109	13.	2.7	1019.6	*	2		1040	209	0.	.0	1018.0
1		0130	10	60.	46.7	1022.9	*	1		1810	110	12.	2.5	1019.5	*	2		1050	210	0.	.0	1018.0
1		0140	11	59.	45.9	1022.9	*	1		1820	111	12.	2.3	1019.5	*	2		1100	211	0.	.0	1018.0
1		0150	12	59.	45.1	1022.8	*	1		1830	112	12.	2.2	1019.5	*	2		1110	212	0.	.0	1018.0
1		0200	13	59.	44.3	1022.8	*	1		1840	113	12.	2.0	1019.5	*	2		1120	213	0.	.0	1018.0
1		0210	14	58.	43.5	1022.7	*	1		1850	114	11.	1.9	1019.4	*	2		1130	214	0.	.0	1018.0
1		0220	15	58.	42.7	1022.6	*	1		1900	115	11.	1.7	1019.4	*	2		1140	215	0.	.0	1018.0
1		0230	16	57.	41.9	1022.6	*	1		1910	116	11.	1.5	1019.4	*	2		1150	216	0.	.0	1018.0
1		0240	17	57.	41.1	1022.5	*	1		1920	117	10.	1.4	1019.3	*	2		1200	217	0.	.0	1018.0
1		0250	18	57.	40.3	1022.5	*	1		1930	118	10.	1.3	1019.3	*	2		1210	218	0.	.0	1018.0
1		0300	19	56.	39.5	1022.4	*	1		1940	119	10.	1.1	1019.3	*	2		1220	219	0.	.0	1018.0
1		0310	20	56.	38.8	1022.3	*	1		1950	120	9.	1.0	1019.2	*	2		1230	220	0.	.0	1018.0
1		0320	21	55.	38.0	1022.3	*	1		2000	121	9.	.9	1019.2	*	2		1240	221	0.	.0	1018.0
1		0330	22	55.	37.2	1022.2	*	1		2010	122	9.	.7	1019.2	*	2		1250	222	0.	.0	1018.0
1		0340	23	54.	36.5	1022.2	*	1		2020	123	9.	.6	1019.2	*	2		1300	223	0.	.0	1018.0
1		0350	24	54.	35.8	1022.1	*	1		2030	124	8.	.5	1019.1	*	2		1310	224	0.	.0	1018.0
1		0400	25	53.	35.0	1022.1	*	1		2040	125	8.	.4	1019.1	*	2		1320	225	0.	.0	1018.0
1		0410	26	53.	34.3	1022.0	*	1		2050	126	8.	.3	1019.1	*	2		1330	226	0.	.0	1018.0
1		0420	27	52.	33.6	1022.0	*	1		2100	127	7.	.2	1019.0	*	2		1340	227	0.	.0	1018.0
1		0430	28	51.	32.9	1021.9	*	1		2110	128	7.	.1	1019.0	*	2		1350	228	0.	.0	1018.0
1		0440	29	51.	32.2	1021.8	*	1		2120	129	5.	.0	1018.7	*	2		1400	229	0.	.0	1018.0
1		0450	30	50.	31.5	1021.8	*	1		2130	130	0.	.0	1018.0	*	2		1410	230	0.	.0	1018.0
1		0500	31	50.	30.8	1021.7	*	1		2140	131	0.	.0	1018.0	*	2		1420	231	0.	.0	1018.0
1		0510	32	49.	30.1	1021.7	*	1		2150	132	0.	.0	1018.0	*	2		1430	232	0.	.0	1018.0
1		0520	33	49.	29.4	1021.6	*	1		2200	133	0.	.0	1018.0	*	2		1440	233	0.	.0	1018.0
1		0530	34	48.	28.7	1021.6	*	1		2210	134	0.	.0	1018.0	*	2		1450	234	0.	.0	1018.0
1		0540	35	48.	28.1	1021.5	*	1		2220	135	0.	.0	1018.0	*	2		1500	235	0.	.0	1018.0
1		0550	36	47.	27.4	1021.5	*	1		2230	136	0.	.0	1018.0	*	2		1510	236	0.	.0	1018.0
1		0600	37	46.	26.8	1021.4	*	1		2240	137	0.	.0	1018.0	*	2		1520	237	0.	.0	1018.0
1		0610	38	45.	26.1	1021.4	*	1		2250	138	0.	.0	1018.0	*	2		1530	238	0.	.0	1018.0
1		0620	39	44.	25.5	1021.3	*	1		2300	139	0.	.0	1018.0	*	2		1540	239	0.	.0	1018.0
1		0630	40	43.	24.9	1021.3	*	1		2310	140	0.	.0	1018.0	*	2		1550	240	0.	.0	1018.0
1		0640	41	42.	24.3	1021.2	*	1		2320	141	0.	.0	1018.0	*	2		1600	241	0.	.0	1018.0
1		0650	42	42.	23.8	1021.2	*	1		2330	142	0.	.0	1018.0	*	2		1610	242	0.	.0	1018.0
1		0700	43	41.	23.2	1021.2	*	1		2340	143	0.	.0	1018.0	*	2		1620	243	0.	.0	1018.0
1		0710	44	40.	22.6	1021.1	*	1		2350	144	0.	.0	1018.0	*	2		1630	244	0.	.0	1018.0
1		0720	45	39.	22.1	1021.1	*	2		0000	145	0.	.0	1018.0	*	2		1640	245	0.	.0	1018.0
1		0730	46	38.	21.6	1021.0	*	2		0010	146	0.	.0	1018.0	*	2		1650	246	0.	.0	1018.0
1		0740	47	37.	21.0	1021.0	*	2		0020	147	0.	.0	1018.0	*	2		1700	247	0.	.0	1018.0
1		0750	48	37.	20.5	1021.0	*	2		0030	148	0.	.0	1018.0	*	2		1710	248	0.	.0	1018.0
1		0800	49	36.	20.0	1020.9	*	2		0040	149	0.	.0	1018.0	*	2		1720	249	0.	.0	1018.0
1		0810	50	35.	19.5	1020.9	*	2		0050	150	0.	.0	1018.0	*	2		1730	250	0.	.0	1018.0
1		0820	51	34.	19.1	1020.8	*	2		0100	151	0.	.0	1018.0	*	2		1740	251	0.	.0	1018.0
1		0830	52	34.	18.6	1020.8	*	2		0110	152	0.	.0	1018.0	*	2		1750	252	0.	.0	1018.0
1		0840	53	33.	18.1	1020.8	*	2		0120	153	0.	.0	1018.0	*	2		1800	253	0.	.0	1018.0
1		0850	54	32.	17.7	1020.7	*	2		0130	154	0.	.0	1018.0	*	2		1810	254	0.	.0	1018.0
1		0900	55	31.	17.3	1020.7	*	2		0140	155	0.	.0	1018.0	*	2		1820	255	0.	.0	1018.0

1	0910	56	31.	16.8	1020.7	*	2	0150	156	0.	.0	1018.0	*	2	1830	256	0.	.0	1018.0
1	0920	57	30.	16.4	1020.6	*	2	0200	157	0.	.0	1018.0	*	2	1840	257	0.	.0	1018.0
1	0930	58	30.	16.0	1020.6	*	2	0210	158	0.	.0	1018.0	*	2	1850	258	0.	.0	1018.0
1	0940	59	29.	15.6	1020.6	*	2	0220	159	0.	.0	1018.0	*	2	1900	259	0.	.0	1018.0
1	0950	60	28.	15.2	1020.5	*	2	0230	160	0.	.0	1018.0	*	2	1910	260	0.	.0	1018.0
1	1000	61	28.	14.8	1020.5	*	2	0240	161	0.	.0	1018.0	*	2	1920	261	0.	.0	1018.0
1	1010	62	27.	14.4	1020.5	*	2	0250	162	0.	.0	1018.0	*	2	1930	262	0.	.0	1018.0
1	1020	63	27.	14.1	1020.5	*	2	0300	163	0.	.0	1018.0	*	2	1940	263	0.	.0	1018.0
1	1030	64	26.	13.7	1020.4	*	2	0310	164	0.	.0	1018.0	*	2	1950	264	0.	.0	1018.0
1	1040	65	25.	13.4	1020.4	*	2	0320	165	0.	.0	1018.0	*	2	2000	265	0.	.0	1018.0
1	1050	66	25.	13.0	1020.4	*	2	0330	166	0.	.0	1018.0	*	2	2010	266	0.	.0	1018.0
1	1100	67	24.	12.7	1020.3	*	2	0340	167	0.	.0	1018.0	*	2	2020	267	0.	.0	1018.0
1	1110	68	24.	12.3	1020.3	*	2	0350	168	0.	.0	1018.0	*	2	2030	268	0.	.0	1018.0
1	1120	69	23.	12.0	1020.3	*	2	0400	169	0.	.0	1018.0	*	2	2040	269	0.	.0	1018.0
1	1130	70	23.	11.7	1020.3	*	2	0410	170	0.	.0	1018.0	*	2	2050	270	0.	.0	1018.0
1	1140	71	23.	11.4	1020.2	*	2	0420	171	0.	.0	1018.0	*	2	2100	271	0.	.0	1018.0
1	1150	72	22.	11.1	1020.2	*	2	0430	172	0.	.0	1018.0	*	2	2110	272	0.	.0	1018.0
1	1200	73	22.	10.8	1020.2	*	2	0440	173	0.	.0	1018.0	*	2	2120	273	0.	.0	1018.0
1	1210	74	21.	10.5	1020.2	*	2	0450	174	0.	.0	1018.0	*	2	2130	274	0.	.0	1018.0
1	1220	75	21.	10.2	1020.1	*	2	0500	175	0.	.0	1018.0	*	2	2140	275	0.	.0	1018.0
1	1230	76	20.	9.9	1020.1	*	2	0510	176	0.	.0	1018.0	*	2	2150	276	0.	.0	1018.0
1	1240	77	20.	9.6	1020.1	*	2	0520	177	0.	.0	1018.0	*	2	2200	277	0.	.0	1018.0
1	1250	78	19.	9.3	1020.1	*	2	0530	178	0.	.0	1018.0	*	2	2210	278	0.	.0	1018.0
1	1300	79	19.	9.1	1020.1	*	2	0540	179	0.	.0	1018.0	*	2	2220	279	0.	.0	1018.0
1	1310	80	19.	8.8	1020.0	*	2	0550	180	0.	.0	1018.0	*	2	2230	280	0.	.0	1018.0
1	1320	81	18.	8.6	1020.0	*	2	0600	181	0.	.0	1018.0	*	2	2240	281	0.	.0	1018.0
1	1330	82	18.	8.3	1020.0	*	2	0610	182	0.	.0	1018.0	*	2	2250	282	0.	.0	1018.0
1	1340	83	18.	8.1	1020.0	*	2	0620	183	0.	.0	1018.0	*	2	2300	283	0.	.0	1018.0
1	1350	84	18.	7.8	1020.0	*	2	0630	184	0.	.0	1018.0	*	2	2310	284	0.	.0	1018.0
1	1400	85	17.	7.6	1019.9	*	2	0640	185	0.	.0	1018.0	*	2	2320	285	0.	.0	1018.0
1	1410	86	17.	7.4	1019.9	*	2	0650	186	0.	.0	1018.0	*	2	2330	286	0.	.0	1018.0
1	1420	87	17.	7.1	1019.9	*	2	0700	187	0.	.0	1018.0	*	2	2340	287	0.	.0	1018.0
1	1430	88	17.	6.9	1019.9	*	2	0710	188	0.	.0	1018.0	*	2	2350	288	0.	.0	1018.0
1	1440	89	16.	6.7	1019.9	*	2	0720	189	0.	.0	1018.0	*	3	0000	289	0.	.0	1018.0
1	1450	90	16.	6.4	1019.8	*	2	0730	190	0.	.0	1018.0	*	3	0010	290	0.	.0	1018.0
1	1500	91	16.	6.2	1019.8	*	2	0740	191	0.	.0	1018.0	*	3	0020	291	0.	.0	1018.0
1	1510	92	16.	6.0	1019.8	*	2	0750	192	0.	.0	1018.0	*	3	0030	292	0.	.0	1018.0
1	1520	93	16.	5.8	1019.8	*	2	0800	193	0.	.0	1018.0	*	3	0040	293	0.	.0	1018.0
1	1530	94	15.	5.6	1019.8	*	2	0810	194	0.	.0	1018.0	*	3	0050	294	0.	.0	1018.0
1	1540	95	15.	5.4	1019.8	*	2	0820	195	0.	.0	1018.0	*	3	0100	295	0.	.0	1018.0
1	1550	96	15.	5.2	1019.7	*	2	0830	196	0.	.0	1018.0	*	3	0110	296	0.	.0	1018.0
1	1600	97	15.	4.9	1019.7	*	2	0840	197	0.	.0	1018.0	*	3	0120	297	0.	.0	1018.0
1	1610	98	15.	4.7	1019.7	*	2	0850	198	0.	.0	1018.0	*	3	0130	298	0.	.0	1018.0
1	1620	99	14.	4.5	1019.7	*	2	0900	199	0.	.0	1018.0	*	3	0140	299	0.	.0	1018.0
1	1630	100	14.	4.3	1019.7	*	2	0910	200	0.	.0	1018.0	*	3	0150	300	0.	.0	1018.0
						*							*						

****

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	49.83-HR
+ (CFS)	(HR)					
		(CFS)				
+ 63.	.17		56.	27.	13.	13.
		(INCHES)	.000	.000	.000	.000
		(AC-FT)	28.	54.	54.	54.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	49.83-HR
+ (AC-FT)	(HR)				
54.	.17	40.	16.	8.	8.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	49.83-HR
+ (FEET)	(HR)				
1023.50	.00	1022.42	1020.43	1019.17	1019.17

CUMULATIVE AREA = .00 SQ MI

1 STATION

```
                    (I) INFLOW,   (O) OUTFLOW
        0.      10.      20.      30.      40.      50.      60.      70.      0.       0.       0.       0.       0.
                                                                            (S) STORAGE
        0.       0.       0.       0.       0.       0.       0.      20.     40.      60.       0.       0.       0.
 HYDRMN PER
 10000   1I---------.---------.---------.---------.---------.---------.--O------.---------.------S--.---------.---------.---------.
 10010   2I         .         .         .         .         .         . O       .         .      S  .         .         .         .
 10020   3I         .         .         .         .         .         . O       .         .     S   .         .         .         .
 10030   4I         .         .         .         .         .         . O       .         .     S   .         .         .         .
 10040   5I         .         .         .         .         .         .O        .         .    S    .         .         .         .
 10050   6I         .         .         .         .         .         .O        .         .    S    .         .         .         .
 10100   7I         .         .         .         .         .         .O        .         .    S    .         .         .         .
 10110   8I         .         .         .         .         .         O         .         .   S     .         .         .         .
 10120   9I         .         .         .         .         .         O         .         .   S     .         .         .         .
 10130  10I         .         .         .         .         .         O         .         .  S      .         .         .         .
 10140  11I . . . . . . . . . . . . . . . . . . . . . . . . . . . . .O. . . . . . . . . . .  S. . . . . . . . . . . . . . . . . . . . .
 10150  12I         .         .         .         .         .         O.        .         .  S      .         .         .         .
 10200  13I         .         .         .         .         .         O.        .         . S       .         .         .         .
 10210  14I         .         .         .         .         .        O .        .         . S       .         .         .         .
 10220  15I         .         .         .         .         .        O .        .         .S        .         .         .         .
 10230  16I         .         .         .         .         .       O  .        .         .S        .         .         .         .
 10240  17I         .         .         .         .         .       O  .        .         .S        .         .         .         .
 10250  18I         .         .         .         .         .       O  .        .         S         .         .         .         .
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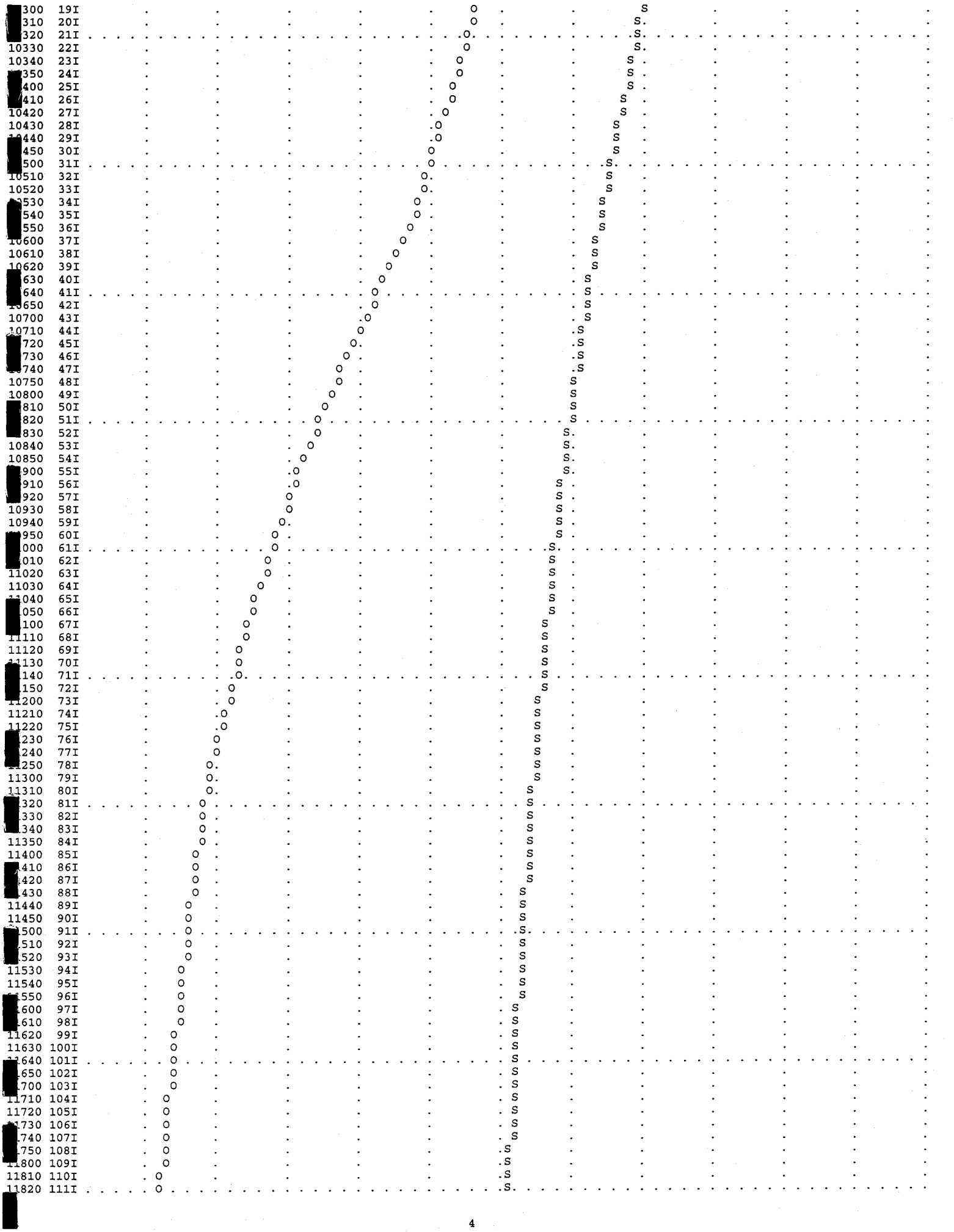
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10310 20I
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10340 23I
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10450 30I
10500 31I
10510 32I
10520 33I
10530 34I
10540 35I
10550 36I
10600 37I
10610 38I
10620 39I
10630 40I
10640 41I
10650 42I
10700 43I
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10720 45I
10730 46I
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10920 57I
10930 58I
10940 59I
10950 60I
11000 61I
11010 62I
11020 63I
11030 64I
11040 65I
11050 66I
11100 67I
11110 68I
11120 69I
11130 70I
11140 71I
11150 72I
11200 73I
11210 74I
11220 75I
11230 76I
11240 77I
11250 78I
11300 79I
11310 80I
11320 81I
11330 82I
11340 83I
11350 84I
11400 85I
11410 86I
11420 87I
11430 88I
11440 89I
11450 90I
11500 91I
11510 92I
11520 93I
11530 94I
11540 95I
11550 96I
11600 97I
11610 98I
11620 99I
11630 100I
11640 101I
11650 102I
11700 103I
11710 104I
11720 105I
11730 106I
11740 107I
11750 108I
11800 109I
11810 110I
11820 111I

```
[redacted]830 112I          . O       .         .         .         .S        .         .         .         .         .         .
[redacted]840 113I          . O       .         .         .         .S        .         .         .         .         .         .
[redacted]850 114I          .O        .         .         .         .S        .         .         .         .         .         .
11900 115I          .O        .         .         .         .S        .         .         .         .         .         .
11910 116I          .O        .         .         .         .S        .         .         .         .         .         .
[redacted]920 117I          O         .         .         .         .S        .         .         .         .         .         .
[redacted]930 118I          O         .         .         .         .S        .         .         .         .         .         .
[redacted]940 119I          O         .         .         .         .S        .         .         .         .         .         .
11950 120I         O.         .         .         .         S         .         .         .         .         .         .
12000 121I ........O..................................................S............................................................
[redacted]010 122I         O.         .         .         .         S         .         .         .         .         .         .
[redacted]020 123I         O.         .         .         .         S         .         .         .         .         .         .
[redacted]030 124I        O .         .         .         .         S         .         .         .         .         .         .
12040 125I        O .         .         .         .         S         .         .         .         .         .         .
12050 126I        O .         .         .         .         S         .         .         .         .         .         .
[redacted]100 127I       O  .         .         .         .         S         .         .         .         .         .         .
[redacted]110 128I       O  .         .         .         .         S         .         .         .         .         .         .
[redacted]120 129I     O    .         .         .         .         S         .         .         .         .         .         .
12130 130I          .         .         .         .         S         .         .         .         .         .         .
12140 131I ...........................................................S............................................................
12150 132I          .         .         .         .         S         .         .         .         .         .         .
[redacted]200 133I          .         .         .         .         S         .         .         .         .         .         .
[redacted]210 134I          .         .         .         .         S         .         .         .         .         .         .
12220 135I          .         .         .         .         S         .         .         .         .         .         .
12230 136I          .         .         .         .         S         .         .         .         .         .         .
12240 137I          .         .         .         .         S         .         .         .         .         .         .
[redacted]250 138I          .         .         .         .         S         .         .         .         .         .         .
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12320 141I ...........................................................S............................................................
12330 142I          .         .         .         .         S         .         .         .         .         .         .
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20010 146I          .         .         .         .         S         .         .         .         .         .         .
20020 147I          .         .         .         .         S         .         .         .         .         .         .
[redacted]030 148I          .         .         .         .         S         .         .         .         .         .         .
[redacted]040 149I          .         .         .         .         S         .         .         .         .         .         .
[redacted]050 150I          .         .         .         .         S         .         .         .         .         .         .
20100 151I ...........................................................S............................................................
20110 152I          .         .         .         .         S         .         .         .         .         .         .
[redacted]120 153I          .         .         .         .         S         .         .         .         .         .         .
[redacted]130 154I          .         .         .         .         S         .         .         .         .         .         .
[redacted]140 155I          .         .         .         .         S         .         .         .         .         .         .
20150 156I          .         .         .         .         S         .         .         .         .         .         .
20200 157I          .         .         .         .         S         .         .         .         .         .         .
[redacted]210 158I          .         .         .         .         S         .         .         .         .         .         .
[redacted]220 159I          .         .         .         .         S         .         .         .         .         .         .
[redacted]230 160I          .         .         .         .         S         .         .         .         .         .         .
20240 161I ...........................................................S............................................................
20250 162I          .         .         .         .         S         .         .         .         .         .         .
20300 163I          .         .         .         .         S         .         .         .         .         .         .
[redacted]310 164I          .         .         .         .         S         .         .         .         .         .         .
[redacted]320 165I          .         .         .         .         S         .         .         .         .         .         .
20330 166I          .         .         .         .         S         .         .         .         .         .         .
20340 167I          .         .         .         .         S         .         .         .         .         .         .
20350 168I          .         .         .         .         S         .         .         .         .         .         .
[redacted]400 169I          .         .         .         .         S         .         .         .         .         .         .
[redacted]410 170I          .         .         .         .         S         .         .         .         .         .         .
[redacted]420 171I ...........................................................S............................................................
20430 172I          .         .         .         .         S         .         .         .         .         .         .
20440 173I          .         .         .         .         S         .         .         .         .         .         .
[redacted]450 174I          .         .         .         .         S         .         .         .         .         .         .
[redacted]500 175I          .         .         .         .         S         .         .         .         .         .         .
[redacted]510 176I          .         .         .         .         S         .         .         .         .         .         .
20520 177I          .         .         .         .         S         .         .         .         .         .         .
20530 178I          .         .         .         .         S         .         .         .         .         .         .
[redacted]540 179I          .         .         .         .         S         .         .         .         .         .         .
[redacted]550 180I          .         .         .         .         S         .         .         .         .         .         .
[redacted]600 181I ...........................................................S............................................................
20610 182I          .         .         .         .         S         .         .         .         .         .         .
20620 183I          .         .         .         .         S         .         .         .         .         .         .
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[redacted]650 186I          .         .         .         .         S         .         .         .         .         .         .
20700 187I          .         .         .         .         S         .         .         .         .         .         .
20710 188I          .         .         .         .         S         .         .         .         .         .         .
[redacted]720 189I          .         .         .         .         S         .         .         .         .         .         .
[redacted]730 190I          .         .         .         .         S         .         .         .         .         .         .
[redacted]740 191I ...........................................................S............................................................
20750 192I          .         .         .         .         S         .         .         .         .         .         .
20800 193I          .         .         .         .         S         .         .         .         .         .         .
[redacted]810 194I          .         .         .         .         S         .         .         .         .         .         .
[redacted]820 195I          .         .         .         .         S         .         .         .         .         .         .
[redacted]830 196I          .         .         .         .         S         .         .         .         .         .         .
20840 197I          .         .         .         .         S         .         .         .         .         .         .
20850 198I          .         .         .         .         S         .         .         .         .         .         .
20900 199I          .         .         .         .         S         .         .         .         .         .         .
[redacted]910 200I          .         .         .         .         S         .         .         .         .         .         .
[redacted]920 201I ...........................................................S............................................................
20930 202I          .         .         .         .         S         .         .         .         .         .         .
20940 203I          .         .         .         .         S         .         .         .         .         .         .
20950 204I          .         .         .         .         S         .         .         .         .         .         .
[redacted]
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```
[redacted]1000 205I                                                    S
[redacted]1010 206I                                                    S
[redacted]1020 207I                                                    S
21030 208I                                                             S
21040 209I                                                             S
[redacted]1050 210I                                                    S
[redacted]1100 211I                                                    S
[redacted]1110 212I                                                    S
21120 213I                                                             S
21130 214I                                                             S
[redacted]1140 215I                                                    S
[redacted]1150 216I                                                    S
[redacted]1200 217I                                                    S
21210 218I                                                             S
21220 219I                                                             S
[redacted]1230 220I                                                    S
[redacted]1240 221I                                                    S
[redacted]1250 222I                                                    S
21300 223I                                                             S
21310 224I                                                             S
21320 225I                                                             S
[redacted]1330 226I                                                    S
[redacted]1340 227I                                                    S
[redacted]1350 228I                                                    S
21400 229I                                                             S
21410 230I                                                             S
[redacted]1420 231I                                                    S
[redacted]1430 232I                                                    S
[redacted]1440 233I                                                    S
21450 234I                                                             S
21500 235I                                                             S
[redacted]1510 236I                                                    S
[redacted]1520 237I                                                    S
[redacted]1530 238I                                                    S
21540 239I                                                             S
21550 240I                                                             S
[redacted]1600 241I                                                    S
[redacted]1610 242I                                                    S
[redacted]1620 243I                                                    S
21630 244I                                                             S
21640 245I                                                             S
[redacted]1650 246I                                                    S
[redacted]1700 247I                                                    S
[redacted]1710 248I                                                    S
21720 249I                                                             S
21730 250I                                                             S
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[redacted]1750 252I                                                    S
[redacted]1800 253I                                                    S
21810 254I                                                             S
21820 255I                                                             S
[redacted]1830 256I                                                    S
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[redacted]1850 258I                                                    S
21900 259I                                                             S
21910 260I                                                             S
21920 261I                                                             S
[redacted]1930 262I                                                    S
[redacted]1940 263I                                                    S
[redacted]1950 264I                                                    S
22000 265I                                                             S
22010 266I                                                             S
[redacted]2020 267I                                                    S
[redacted]2030 268I                                                    S
[redacted]2040 269I                                                    S
22050 270I                                                             S
22100 271I                                                             S
[redacted]2110 272I                                                    S
[redacted]2120 273I                                                    S
[redacted]2130 274I                                                    S
22140 275I                                                             S
22150 276I                                                             S
[redacted]2200 277I                                                    S
[redacted]2210 278I                                                    S
[redacted]2220 279I                                                    S
22230 280I                                                             S
22240 281I                                                             S
[redacted]2250 282I                                                    S
[redacted]2300 283I                                                    S
[redacted]2310 284I                                                    S
22320 285I                                                             S
22330 286I                                                             S
[redacted]2340 287I                                                    S
[redacted]2350 288I                                                    S
[redacted]0000 289I                                                    S
30010 290I                                                             S
30020 291I                                                             S
[redacted]0030 292I                                                    S
[redacted]0040 293I                                                    S
[redacted]0050 294I                                                    S
30100 295I                                                             S
30110 296I                                                             S
30120 297I                                                             S
[redacted]
```

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130 298I        .         .         .         .         .         S         .         .         .         .         .         .
140 299I        .         .         .         .         .         S         .         .         .         .         .         .
150 300I---------.---------.---------.---------.---------.---------S---------.---------.---------.---------.---------.---------.
1
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 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+	ROUTED TO		63.	.17	56.	27.	13.	.00		
+									1023.50	.00

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

CBR-PCDA.DAT

Analyzes detention basin for PCD 100-yr, 2-hr conditions where the basin drains as the basin fills.

```
1 ****************************************                    ****************************************
  *                                      *                    *                                      *
  *  FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                    *   U.S. ARMY CORPS OF ENGINEERS       *
  *          SEPTEMBER 1990              *                    *   HYDROLOGIC ENGINEERING CENTER      *
  *           VERSION 4.0                *                    *         609 SECOND STREET            *
  *                                      *                    *      DAVIS, CALIFORNIA 95616         *
  *  RUN DATE  04/30/1996  TIME  14:11:08 *                    *          (916) 756-1104              *
  *                                      *                    *                                      *
  ****************************************                    ****************************************

                                  X     X  XXXXXXX   XXXXX          X
                                  X     X  X        X     X        XX
                                  X     X  X        X              X
                                  XXXXXXX  XXXX     X        XXXXX X
                                  X     X  X        X              X
                                  X     X  X        X     X        X
                                  X     X  XXXXXXX   XXXXX        XXX

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

1                                          HEC-1 INPUT                                                    PAGE  1

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

    1           ID
    2           ID   CBR-PCDA.DAT
    3           ID   MODEL ASSUMES 100-YR, 2-HR EVENT WITH FUTURE (PCD) CONDITIONS
    4           ID   DETENTION POND ANALYSIS FOR CONDITION:
    5           ID   A) BASIN BEGINS TO DRAIN AS STORM EVENT OCCURS
    6           ID   DDM MCUHP1 CAMELBACK RANCH LEVEE DESIGN INTERIOR HYDROLOGY - PCD
    7           IT      10                     300
    8           IO       3
                * DDM   ***** Updated *****

    9           KK     DA1
   10           KM   SUB-BASIN DA1
   11           KM   2-HOUR RAINFALL DISTRIBUTION WAS USED TO FIND TC & R FOR THIS BASIN
   12           KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF 1.000
   13           KM     L = 1.08  Kb = .049  Adj. Slope =   10.0
   14           BA    .302
   15           IN       5
   16           KM   RAINFALL DEPTH OF 2.64 WAS SPACIALLY REDUCED AS SHOWN BY THE PB RECORD
   17           PB   2.640
   18           KM   THE FOLLOWING PC RECORD USED A 2-HOUR RAINFALL DISTRIBUTION
   19           PC    .000    .011    .018    .023    .028    .032    .046    .071    .100    .137
   20           PC    .176    .232    .327    .601    .743    .863    .901    .930    .954    .962
   21           PC    .970    .979    .982    .992   1.000
   22           LG    .300    .250   6.000    .200  11.000
   23           UC   1.038    .811
   24           UA       0       5      16      30      65      77      84      90      94      97
   25           UA     100
                * DDM   ***** Preserved *****

   26           KK   DA1-2
   27           KM   ROUTING SUBBASIN 1 THROUGH 2
   28           RD    3900   .0026    .030            TRAP       0       6     YES
                * DDM   ***** Updated *****

   29           KK     DA2
   30           KM   SUB-BASIN DA2
   31           KM   2-HOUR RAINFALL DISTRIBUTION WAS USED TO FIND TC & R FOR THIS BASIN
   32           KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF 1.000
   33           KM     L = 1.38  Kb = .055  Adj. Slope =   13.0
   34           BA    .438
   35           LG    .220    .250   6.000    .240  28.000
   36           UC   1.150    .895
   37           UA       0       5      16      30      65      77      84      90      94      97
   38           UA     100
                * DDM   ***** Preserved *****

   39           KK   C1-2
   40           KM   COMBINE DA1 WITH DA2
   41           HC
                *
1                                          HEC-1 INPUT                                                    PAGE  2

  LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
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```
 42          KK   ROUTE
 43          KM       1-36" CONCRETE PIPE
 44          RS       1    FLOW      -1
 45          SV       0   .0010    .002    2.59    10.4   18.29   26.26   34.30   42.43   50.63
 46          SV   58.91   67.15
 47          SQ       0     3.0     7.0    12.0    18.0    27.5    37.5    47.5    52.5    57.0
 48          SQ    60.0    63.0
 49          SE  1018.0  1018.5    1019  1019.5  1020.0  1020.5  1021.0  1021.5  1022.0  1022.5
 50          SE  1023.0  1023.5
             *
 51          KO       1       2
             *
             * DDM   ***** Updated *****

 52          KK     DA3
 53          KM   SUB-BASIN DA3
 54          KM   2-HOUR RAINFALL DISTRIBUTION WAS USED TO FIND TC & R FOR THIS BASIN
 55          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF 1.000
 56          KM     L = 1.22  Kb = .091  Adj. Slope =   15.0
 57          BA    .370
 58          LG    .500    .250   5.100    .400    .000
 59          UC   1.500   1.199
 60          UA       0       3       5       8      12      20      43      75      90      96
 61          UA     100
             * DDM   ***** Updated *****

 62          KK     DA4
 63          KM   SUB-BASIN DA4
 64          KM   2-HOUR RAINFALL DISTRIBUTION WAS USED TO FIND TC & R FOR THIS BASIN
 65          KM   THIS BASIN USED RAINFALL REDUCTION FACTOR OF 1.000
 66          KM     L =  .51  Kb = .110  Adj. Slope =   10.0
 67          BA    .061
 68          LG    .500    .250   4.350    .610    .000
 69          UC   1.496   1.662
 70          UA       0       3       5       8      12      20      43      75      90      96
 71          UA     100
             *
             * DDM   ***** Preserved *****

 72          KK   C3-4
 73          KM      COMBINE DA3 WITH DA4
 74          HC
 75          ZZ
1 ****************************************                                    ****************************************
*                                        *                                    *                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)    *                                    *    U.S. ARMY CORPS OF ENGINEERS      *
*          SEPTEMBER 1990                *                                    *    HYDROLOGIC ENGINEERING CENTER     *
*           VERSION 4.0                  *                                    *          609 SECOND STREET           *
*                                        *                                    *       DAVIS, CALIFORNIA 95616        *
* RUN DATE  04/30/1996  TIME  14:11:08   *                                    *           (916) 756-1104             *
*                                        *                                    *                                      *
****************************************                                    ****************************************


                        CBR-PCDA.DAT
                        MODEL ASSUMES 100-YR, 2-HR EVENT WITH FUTURE (PCD) CONDITIONS
                        DETENTION POND ANALYSIS FOR CONDITION:
                        A) BASIN BEGINS TO DRAIN AS STORM EVENT OCCURS
                        DDM MCUHP1 CAMELBACK RANCH LEVEE DESIGN INTERIOR HYDROLOGY - PCD

 8 IO          OUTPUT CONTROL VARIABLES
                     IPRNT           3  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE

  IT           HYDROGRAPH TIME DATA
                      NMIN          10  MINUTES IN COMPUTATION INTERVAL
                     IDATE      1    0  STARTING DATE
                     ITIME        0000  STARTING TIME
                        NQ         300  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE      3    0  ENDING DATE
                    NDTIME        0150  ENDING TIME
                     ICENT          19  CENTURY MARK

                COMPUTATION INTERVAL     .17 HOURS
                     TOTAL TIME BASE   49.83 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


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***
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                **************
                *            *
  9 KK          *     DA1    *
                *            *
                **************
                              SUB-BASIN DA1
                              2-HOUR RAINFALL DISTRIBUTION WAS USED TO FIND TC & R FOR THIS BASIN
                              THIS BASIN USED RAINFALL REDUCTION FACTOR OF 1.000
                                L = 1.08  Kb = .049  Adj. Slope =   10.0
                              RAINFALL DEPTH OF 2.64 WAS SPACIALLY REDUCED AS SHOWN BY THE PB RECORD
                              THE FOLLOWING PC RECORD USED A 2-HOUR RAINFALL DISTRIBUTION

 15 IN          TIME DATA FOR INPUT TIME SERIES
                      JXMIN           5  TIME INTERVAL IN MINUTES
                     JXDATE      1    0  STARTING DATE
                     JXTIME           0  STARTING TIME

            SUBBASIN RUNOFF DATA

 14 BA          SUBBASIN CHARACTERISTICS
                      TAREA         .30  SUBBASIN AREA

                PRECIPITATION DATA

 18 PB                STORM        2.64  BASIN TOTAL PRECIPITATION

 18 PI            INCREMENTAL PRECIPITATION PATTERN
                     .02       .01       .02       .05       .08       .15       .42       .16       .05       .02
                     .01       .02

 22 LG          GREEN AND AMPT LOSS RATE
                      STRTL         .30  STARTING LOSS
                        DTH         .25  MOISTURE DEFICIT
                       PSIF        6.00  WETTING FRONT SUCTION
                      XKSAT         .20  HYDRAULIC CONDUCTIVITY
                      RTIMP       11.00  PERCENT IMPERVIOUS AREA

 23 UC          CLARK UNITGRAPH
                         TC        1.04  TIME OF CONCENTRATION
                          R         .81  STORAGE COEFFICIENT

 24 UA          ACCUMULATED-AREA VS. TIME,  11 ORDINATES
                        .0       5.0      16.0      30.0      65.0      77.0      84.0      90.0      94.0      97.0
                     100.0

                                                          ***

                                                   UNIT HYDROGRAPH PARAMETERS
                                          CLARK   TC=  1.04 HR,       R=   .81 HR
                                         SNYDER   TP=   .64 HR,      CP=   .48

                                                     UNIT HYDROGRAPH
                                                 29 END-OF-PERIOD ORDINATES
                13.       51.      110.      143.      138.      125.      109.       89.       73.       59.
                48.       39.       32.       26.       21.       17.       14.       11.        9.        8.
                 6.        5.        4.        3.        3.        2.        2.        1.        1.

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

                      HYDROGRAPH AT STATION      DA1

  TOTAL RAINFALL =    2.64, TOTAL LOSS =    1.04, TOTAL EXCESS =    1.60

 PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     49.83-HR
+ (CFS)        (HR)
                          (CFS)
+   214.      1.83                   52.         13.          6.          6.
                        (INCHES)    1.590       1.591       1.591       1.591
                        (AC-FT)      26.         26.         26.         26.

                        CUMULATIVE AREA =     .30 SQ MI


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


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                *            *
 26 KK          *    DA1-2   *
                *            *
                **************
                              ROUTING SUBBASIN 1 THROUGH 2

            HYDROGRAPH ROUTING DATA

 28 RD          MUSKINGUM-CUNGE CHANNEL ROUTING
                              L       3900.  CHANNEL LENGTH
                              S       .0026  SLOPE
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                    N        .030  CHANNEL ROUGHNESS COEFFICIENT
                   CA         .00  CONTRIBUTING AREA
                SHAPE        TRAP  CHANNEL SHAPE
                   WD         .00  BOTTOM WIDTH OR DIAMETER
                    Z        6.00  SIDE SLOPE

                                                  ***
                                COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                        COMPUTATION TIME STEP
          ELEMENT    ALPHA       M         DT        DX       PEAK    TIME TO     VOLUME    MAXIMUM
                                                                        PEAK                  CELERITY
                                           (MIN)      (FT)     (CFS)    (MIN)       (IN)      (FPS)

            MAIN       .87      1.33       5.50    780.00    210.88   121.00       1.59       3.87

                                        INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

            MAIN       .87      1.33      10.00              209.50   120.00       1.59

NTINUITY SUMMARY (AC-FT) - INFLOW= .2563E+02 EXCESS= .0000E+00 OUTFLOW= .2561E+02 BASIN STORAGE= .3231E-02 PERCENT ERROR=    .1

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

                   HYDROGRAPH AT STATION    DA1-2

 PEAK FLOW     TIME                        MAXIMUM AVERAGE FLOW
                                   6-HR       24-HR       72-HR     49.83-HR
  (CFS)        (HR)
                          (CFS)
+    209.      2.00                52.         13.          6.           6.
                        (INCHES)  1.591       1.591       1.591        1.591
                         (AC-FT)    26.         26.         26.          26.

                       CUMULATIVE AREA =     .30 SQ MI

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

          **************
          *            *
29 KK     *       DA2  *
          *            *
          **************
                         SUB-BASIN DA2
                         2-HOUR RAINFALL DISTRIBUTION WAS USED TO FIND TC & R FOR THIS BASIN
                         THIS BASIN USED RAINFALL REDUCTION FACTOR OF 1.000
                           L = 1.38  Kb = .055  Adj. Slope =   13.0

             SUBBASIN RUNOFF DATA

34 BA          SUBBASIN CHARACTERISTICS
                     TAREA         .44  SUBBASIN AREA

               PRECIPITATION DATA

18 PB                STORM        2.64  BASIN TOTAL PRECIPITATION

18 PI            INCREMENTAL PRECIPITATION PATTERN
                     .02       .01       .02       .05       .08       .15       .42       .16       .05       .02
                     .01       .02

35 LG          GREEN AND AMPT LOSS RATE
                     STRTL         .22  STARTING LOSS
                       DTH         .25  MOISTURE DEFICIT
                      PSIF        6.00  WETTING FRONT SUCTION
                     XKSAT         .24  HYDRAULIC CONDUCTIVITY
                     RTIMP       28.00  PERCENT IMPERVIOUS AREA

36 UC          CLARK UNITGRAPH
                        TC        1.15  TIME OF CONCENTRATION
                         R         .89  STORAGE COEFFICIENT

37 UA          ACCUMULATED-AREA VS. TIME,  11 ORDINATES
                      .0       5.0      16.0      30.0      65.0      77.0      84.0      90.0      94.0      97.0
                   100.0

                                                  ***

                                          UNIT HYDROGRAPH PARAMETERS
                                    CLARK   TC=  1.15 HR,       R=   .89 HR
                                   SNYDER   TP=   .65 HR,      CP=   .44

                                              UNIT HYDROGRAPH
                                          32 END-OF-PERIOD ORDINATES
             14.       53.      130.      186.      186.      173.      157.      136.      113.       93.
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            78.       64.       53.       44.       37.       30.       25.       21.       17.       14.
            12.       10.        8.        7.        6.        5.        4.        3.        3.        2.
             2.        2.

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

                      HYDROGRAPH AT STATION      DA2

  TOTAL RAINFALL =    2.64, TOTAL LOSS =     .86, TOTAL EXCESS =    1.78

PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     49.83-HR
+  (CFS)       (HR)
                          (CFS)
+    312.      1.83                 83.         21.         10.         10.
                        (INCHES)   1.770       1.771       1.771       1.771
                         (AC-FT)     41.         41.         41.         41.

                        CUMULATIVE AREA =     .44 SQ MI


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


          **************
          *            *
39 KK     *     C1-2   *
          *            *
          **************
                         COMBINE DA1 WITH DA2

41 HC          HYDROGRAPH COMBINATION
                     ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                                ***

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

                      HYDROGRAPH AT STATION    C1-2

EAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     49.83-HR
+  (CFS)       (HR)
                          (CFS)
+    507.      2.00                135.         34.         16.         16.
                        (INCHES)   1.696       1.698       1.698       1.698
                         (AC-FT)     67.         67.         67.         67.

                        CUMULATIVE AREA =     .74 SQ MI


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


          **************
          *            *
42 KK     *     ROUTE  *
          *            *
          **************
                             1-36" CONCRETE PIPE

51 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           1  PRINT CONTROL
                     IPLOT           2  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE

             HYDROGRAPH ROUTING DATA

44 RS          STORAGE ROUTING
                     NSTPS           1  NUMBER OF SUBREACHES
                      ITYP        FLOW  TYPE OF INITIAL CONDITION
                    RSVRIC       -1.00  INITIAL CONDITION
                         X         .00 WORKING R AND D COEFFICIENT

45 SV            STORAGE          .0        .0        .0       2.6      10.4      18.3      26.3      34.3      42.4      50.6
                                 58.9      67.2

47 SQ          DISCHARGE          0.        3.        7.       12.       18.       28.       38.       48.       53.       57.
                                 60.       63.

49 SE          ELEVATION     1018.00   1018.50   1019.00   1019.50   1020.00   1020.50   1021.00   1021.50   1022.00   1022.50
                             1023.00   1023.50

                                                                ***

* WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN        0. TO        7.
             THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
             THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)
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HYDROGRAPH AT STATION ROUTE

A	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	0.	.0	1018.0	1		1640	101	22.	13.7	1020.2	2		0920	201	0.	.0	1018.0
1		0010	2	0.	.0	1018.0	1		1650	102	22.	13.4	1020.2	2		0930	202	0.	.0	1018.0
1		0020	3	1.	.0	1018.1	1		1700	103	21.	13.1	1020.2	2		0940	203	0.	.0	1018.0
1		0030	4	2.	.0	1018.4	1		1710	104	21.	12.8	1020.2	2		0950	204	0.	.0	1018.0
1		0040	5	5.	.0	1018.7	1		1720	105	21.	12.6	1020.1	2		1000	205	0.	.0	1018.0
1		0050	6	7.	.0	1019.0	1		1730	106	20.	12.3	1020.1	2		1010	206	0.	.0	1018.0
1		0100	7	7.	.1	1019.0	1		1740	107	20.	12.0	1020.1	2		1020	207	0.	.0	1018.0
1		0110	8	8.	.5	1019.1	1		1750	108	20.	11.7	1020.1	2		1030	208	0.	.0	1018.0
1		0120	9	10.	1.5	1019.3	1		1800	109	19.	11.5	1020.1	2		1040	209	0.	.0	1018.0
1		0130	10	13.	3.7	1019.6	1		1810	110	19.	11.2	1020.1	2		1050	210	0.	.0	1018.0
1		0140	11	16.	7.9	1019.8	1		1820	111	19.	10.9	1020.0	2		1100	211	0.	.0	1018.0
1		0150	12	22.	13.8	1020.2	1		1830	112	18.	10.7	1020.0	2		1110	212	0.	.0	1018.0
1		0200	13	30.	20.3	1020.6	1		1840	113	18.	10.4	1020.0	2		1120	213	0.	.0	1018.0
1		0210	14	38.	26.6	1021.0	1		1850	114	18.	10.2	1020.0	2		1130	214	0.	.0	1018.0
1		0220	15	45.	32.3	1021.4	1		1900	115	18.	9.9	1020.0	2		1140	215	0.	.0	1018.0
1		0230	16	49.	37.0	1021.7	1		1910	116	17.	9.7	1020.0	2		1150	216	0.	.0	1018.0
1		0240	17	52.	40.9	1021.9	1		1920	117	17.	9.5	1019.9	2		1200	217	0.	.0	1018.0
1		0250	18	53.	44.0	1022.1	1		1930	118	17.	9.2	1019.9	2		1210	218	0.	.0	1018.0
1		0300	19	55.	46.5	1022.2	1		1940	119	17.	9.0	1019.9	2		1220	219	0.	.0	1018.0
1		0310	20	56.	48.3	1022.4	1		1950	120	17.	8.8	1019.9	2		1230	220	0.	.0	1018.0
1		0320	21	57.	49.8	1022.4	1		2000	121	17.	8.5	1019.9	2		1240	221	0.	.0	1018.0
1		0330	22	57.	50.8	1022.5	1		2010	122	16.	8.3	1019.9	2		1250	222	0.	.0	1018.0
1		0340	23	57.	51.5	1022.6	1		2020	123	16.	8.1	1019.9	2		1300	223	0.	.0	1018.0
1		0350	24	57.	52.0	1022.6	1		2030	124	16.	7.8	1019.8	2		1310	224	0.	.0	1018.0
1		0400	25	58.	52.2	1022.6	1		2040	125	16.	7.6	1019.8	2		1320	225	0.	.0	1018.0
1		0410	26	58.	52.3	1022.6	1		2050	126	16.	7.4	1019.8	2		1330	226	0.	.0	1018.0
1		0420	27	58.	52.2	1022.6	1		2100	127	16.	7.2	1019.8	2		1340	227	0.	.0	1018.0
1		0430	28	58.	52.0	1022.6	1		2110	128	15.	7.0	1019.8	2		1350	228	0.	.0	1018.0
1		0440	29	57.	51.7	1022.6	1		2120	129	15.	6.8	1019.8	2		1400	229	0.	.0	1018.0
1		0450	30	57.	51.4	1022.5	1		2130	130	15.	6.6	1019.8	2		1410	230	0.	.0	1018.0
1		0500	31	57.	50.9	1022.5	1		2140	131	15.	6.4	1019.7	2		1420	231	0.	.0	1018.0
1		0510	32	57.	50.4	1022.5	1		2150	132	15.	6.2	1019.7	2		1430	232	0.	.0	1018.0
1		0520	33	57.	49.9	1022.5	1		2200	133	15.	6.0	1019.7	2		1440	233	0.	.0	1018.0
1		0530	34	56.	49.3	1022.4	1		2210	134	14.	5.8	1019.7	2		1450	234	0.	.0	1018.0
1		0540	35	56.	48.7	1022.4	1		2220	135	14.	5.6	1019.7	2		1500	235	0.	.0	1018.0
1		0550	36	56.	48.0	1022.3	1		2230	136	14.	5.4	1019.7	2		1510	236	0.	.0	1018.0
1		0600	37	55.	47.4	1022.3	1		2240	137	14.	5.2	1019.7	2		1520	237	0.	.0	1018.0
1		0610	38	55.	46.7	1022.3	1		2250	138	14.	5.0	1019.7	2		1530	238	0.	.0	1018.0
1		0620	39	54.	46.0	1022.2	1		2300	139	14.	4.8	1019.6	2		1540	239	0.	.0	1018.0
1		0630	40	54.	45.3	1022.2	1		2310	140	14.	4.6	1019.6	2		1550	240	0.	.0	1018.0
1		0640	41	54.	44.6	1022.1	1		2320	141	13.	4.4	1019.6	2		1600	241	0.	.0	1018.0
1		0650	42	53.	43.9	1022.1	1		2330	142	13.	4.2	1019.6	2		1610	242	0.	.0	1018.0
1		0700	43	53.	43.1	1022.0	1		2340	143	13.	4.0	1019.6	2		1620	243	0.	.0	1018.0
1		0710	44	52.	42.4	1022.0	1		2350	144	13.	3.9	1019.6	2		1630	244	0.	.0	1018.0
1		0720	45	52.	41.7	1022.0	2		0000	145	13.	3.7	1019.6	2		1640	245	0.	.0	1018.0
1		0730	46	52.	41.0	1021.9	2		0010	146	13.	3.5	1019.6	2		1650	246	0.	.0	1018.0
1		0740	47	51.	40.3	1021.9	2		0020	147	13.	3.3	1019.5	2		1700	247	0.	.0	1018.0
1		0750	48	51.	39.6	1021.8	2		0030	148	12.	3.2	1019.5	2		1710	248	0.	.0	1018.0
1		0800	49	50.	38.9	1021.8	2		0040	149	12.	3.0	1019.5	2		1720	249	0.	.0	1018.0
1		0810	50	50.	38.2	1021.7	2		0050	150	12.	2.8	1019.5	2		1730	250	0.	.0	1018.0
1		0820	51	49.	37.5	1021.7	2		0100	151	12.	2.7	1019.5	2		1740	251	0.	.0	1018.0
1		0830	52	49.	36.8	1021.7	2		0110	152	12.	2.5	1019.5	2		1750	252	0.	.0	1018.0
1		0840	53	49.	36.2	1021.6	2		0120	153	12.	2.3	1019.5	2		1800	253	0.	.0	1018.0
1		0850	54	48.	35.5	1021.6	2		0130	154	11.	2.2	1019.4	2		1810	254	0.	.0	1018.0
1		0900	55	48.	34.8	1021.5	2		0140	155	11.	2.0	1019.4	2		1820	255	0.	.0	1018.0
1		0910	56	47.	34.2	1021.5	2		0150	156	11.	1.9	1019.4	2		1830	256	0.	.0	1018.0
1		0920	57	47.	33.5	1021.5	2		0200	157	10.	1.7	1019.3	2		1840	257	0.	.0	1018.0
1		0930	58	46.	32.9	1021.4	2		0210	158	10.	1.6	1019.3	2		1850	258	0.	.0	1018.0
1		0940	59	45.	32.3	1021.4	2		0220	159	10.	1.5	1019.3	2		1900	259	0.	.0	1018.0
1		0950	60	44.	31.7	1021.3	2		0230	160	10.	1.3	1019.3	2		1910	260	0.	.0	1018.0
1		1000	61	43.	31.0	1021.3	2		0240	161	9.	1.2	1019.2	2		1920	261	0.	.0	1018.0
1		1010	62	43.	30.5	1021.3	2		0250	162	9.	1.1	1019.2	2		1930	262	0.	.0	1018.0
1		1020	63	42.	29.9	1021.2	2		0300	163	9.	.9	1019.2	2		1940	263	0.	.0	1018.0
1		1030	64	41.	29.3	1021.2	2		0310	164	9.	.8	1019.2	2		1950	264	0.	.0	1018.0
1		1040	65	41.	28.7	1021.2	2		0320	165	8.	.7	1019.1	2		2000	265	0.	.0	1018.0
1		1050	66	40.	28.2	1021.1	2		0330	166	8.	.6	1019.1	2		2010	266	0.	.0	1018.0
1		1100	67	39.	27.6	1021.1	2		0340	167	8.	.5	1019.1	2		2020	267	0.	.0	1018.0
1		1110	68	39.	27.1	1021.1	2		0350	168	8.	.4	1019.1	2		2030	268	0.	.0	1018.0
1		1120	69	38.	26.6	1021.0	2		0400	169	8.	.3	1019.1	2		2040	269	0.	.0	1018.0
1		1130	70	37.	26.1	1021.0	2		0410	170	7.	.2	1019.0	2		2050	270	0.	.0	1018.0
1		1140	71	37.	25.5	1021.0	2		0420	171	7.	.1	1019.0	2		2100	271	0.	.0	1018.0
1		1150	72	36.	25.0	1020.9	2		0430	172	3.	.0	1018.4	2		2110	272	0.	.0	1018.0
1		1200	73	35.	24.6	1020.9	2		0440	173	0.	.0	1018.0	2		2120	273	0.	.0	1018.0
1		1210	74	35.	24.1	1020.9	2		0450	174	0.	.0	1018.0	2		2130	274	0.	.0	1018.0
1		1220	75	34.	23.6	1020.8	2		0500	175	0.	.0	1018.0	2		2140	275	0.	.0	1018.0
1		1230	76	34.	23.1	1020.8	2		0510	176	0.	.0	1018.0	2		2150	276	0.	.0	1018.0
1		1240	77	33.	22.7	1020.8	2		0520	177	0.	.0	1018.0	2		2200	277	0.	.0	1018.0
1		1250	78	32.	22.2	1020.7	2		0530	178	0.	.0	1018.0	2		2210	278	0.	.0	1018.0
1		1300	79	32.	21.8	1020.7	2		0540	179	0.	.0	1018.0	2		2220	279	0.	.0	1018.0
1		1310	80	31.	21.3	1020.7	2		0550	180	0.	.0	1018.0	2		2230	280	0.	.0	1018.0
1		1320	81	31.	20.9	1020.7	2		0600	181	0.	.0	1018.0	2		2240	281	0.	.0	1018.0
1		1330	82	30.	20.5	1020.6	2		0610	182	0.	.0	1018.0	2		2250	282	0.	.0	1018.0
1		1340	83	30.	20.1	1020.6	2		0620	183	0.	.0	1018.0	2		2300	283	0.	.0	1018.0
1		1350	84	29.	19.7	1020.6	2		0630	184	0.	.0	1018.0	2		2310	284	0.	.0	1018.0
1		1400	85	29.	19.3	1020.6	2		0640	185	0.	.0	1018.0	2		2320	285	0.	.0	1018.0

```
1     1410  86     28.     18.9  1020.5 *  2     0650 186      0.      .0  1018.0 *  2     2330 286      0.      .0  1018.0
1     1420  87     28.     18.5  1020.5 *  2     0700 187      0.      .0  1018.0 *  2     2340 287      0.      .0  1018.0
1     1430  88     27.     18.1  1020.5 *  2     0710 188      0.      .0  1018.0 *  2     2350 288      0.      .0  1018.0
1     1440  89     27.     17.7  1020.5 *  2     0720 189      0.      .0  1018.0 *  3     0000 289      0.      .0  1018.0
1     1450  90     26.     17.4  1020.4 *  2     0730 190      0.      .0  1018.0 *  3     0010 290      0.      .0  1018.0
1     1500  91     26.     17.0  1020.4 *  2     0740 191      0.      .0  1018.0 *  3     0020 291      0.      .0  1018.0
1     1510  92     26.     16.7  1020.4 *  2     0750 192      0.      .0  1018.0 *  3     0030 292      0.      .0  1018.0
1     1520  93     25.     16.3  1020.4 *  2     0800 193      0.      .0  1018.0 *  3     0040 293      0.      .0  1018.0
1     1530  94     25.     16.0  1020.4 *  2     0810 194      0.      .0  1018.0 *  3     0050 294      0.      .0  1018.0
1     1540  95     24.     15.6  1020.3 *  2     0820 195      0.      .0  1018.0 *  3     0100 295      0.      .0  1018.0
1     1550  96     24.     15.3  1020.3 *  2     0830 196      0.      .0  1018.0 *  3     0110 296      0.      .0  1018.0
1     1600  97     24.     15.0  1020.3 *  2     0840 197      0.      .0  1018.0 *  3     0120 297      0.      .0  1018.0
1     1610  98     23.     14.7  1020.3 *  2     0850 198      0.      .0  1018.0 *  3     0130 298      0.      .0  1018.0
1     1620  99     23.     14.3  1020.2 *  2     0900 199      0.      .0  1018.0 *  3     0140 299      0.      .0  1018.0
1     1630 100     22.     14.0  1020.2 *  2     0910 200      0.      .0  1018.0 *  3     0150 300      0.      .0  1018.0
                                         *                                          *
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PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR      49.83-HR
+  (CFS)       (HR)
                          (CFS)
+    58.       4.17                55.         32.         16.         16.
                        (INCHES)  .685       1.627       1.698       1.698
                        (AC-FT)    27.         64.         67.         67.

PEAK STORAGE   TIME                          MAXIMUM AVERAGE STORAGE
                                    6-HR       24-HR       72-HR      49.83-HR
+ (AC-FT)      (HR)
    52.        4.17                46.         23.         11.         11.

PEAK STAGE     TIME                          MAXIMUM AVERAGE STAGE
                                    6-HR       24-HR       72-HR      49.83-HR
+  (FEET)      (HR)
  1022.60      4.17             1022.23     1020.80     1019.44     1019.44

                        CUMULATIVE AREA =     .74 SQ MI

1                                                   STATION    ROUTE

                          (I) INFLOW,   (O) OUTFLOW
        0.      100.      200.      300.      400.      500.      600.        0.        0.        0.        0.        0.        0.
                                                                            (S) STORAGE
        0.        0.        0.        0.        0.        0.        0.       20.       40.       60.        0.        0.        0.
DAHRMN PER
 10000   1I---------.---------.---------.---------.---------.---------S---------.---------.---------.---------.---------.---------.
 10010   2I         .         .         .         .         .         S         .         .         .         .         .         .
 10020   3I         .         .         .         .         .         S         .         .         .         .         .         .
 10030   4I         .         .         .         .         .         S         .         .         .         .         .         .
 10040   5I         .         .         .         .         .         S         .         .         .         .         .         .
 10050   6.I        .         .         .         .         .         S         .         .         .         .         .         .
 10100   7.OI       .         .         .         .         .         S         .         .         .         .         .         .
 10110   8.O   I    .         .         .         .         .         S         .         .         .         .         .         .
 10120   9.O        .I        .         .         .         .         .S        .         .         .         .         .         .
 10130  10.O        .         .   I     .         .         .         . S       .         .         .         .         .         .
 10140  11. O . . . . . . . . . . . . . . . . . I . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 10150  12. O       .         .         .         .       I.          .     S   .         .         .         .         .         .
 10200  13.  O      .         .         .         .        .I         .         S         .         .         .         .         .
 10210  14.   O     .         .         .         .       I .         .         .  S      .         .         .         .         .
 10220  15.   O     .         .         .         . I      .         .         .    S    .         .         .         .         .
 10230  16.    O    .         .         .     I   .        .         .         .     S.         .         .         .         .
 10240  17.    O    .         .         I         .        .         .         .      S         .         .         .         .
 10250  18.    O    .         .   I     .         .        .         .         .       . S      .         .         .         .
 10300  19.    O    .         .I        .         .        .         .         .        . S     .         .         .         .
 10310  20.     O   .      I  .         .         .        .         .         .         .  S    .         .         .         .
 10320  21. . . O . . . I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . .
 10330  22.     O   . I       .         .         .        .         .         .         .   S   .         .         .         .
 10340  23.     O  I  .       .         .         .        .         .         .         .    S  .         .         .         .
 10350  24.     O I   .       .         .         .        .         .         .         .    S  .         .         .         .
 10400  25.     OI    .       .         .         .        .         .         .         .    S  .         .         .         .
 10410  26.     I     .       .         .         .        .         .         .         .    S  .         .         .         .
 10420  27.    IO     .       .         .         .        .         .         .         .    S  .         .         .         .
 10430  28.   I O     .       .         .         .        .         .         .         .    S  .         .         .         .
 10440  29.  I  O     .       .         .         .        .         .         .         .    S  .         .         .         .
 10450  30.  I  O     .       .         .         .        .         .         .         .    S  .         .         .         .
 10500  31. I . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . .
 10510  32. I   O     .       .         .         .        .         .         .         .   S   .         .         .         .
 10520  33. I   O     .       .         .         .        .         .         .         .   S   .         .         .         .
 10530  34.I    O     .       .         .         .        .         .         .         .   S   .         .         .         .
 10540  35.I    O     .       .         .         .        .         .         .         .  S    .         .         .         .
 10550  36.I    O     .       .         .         .        .         .         .         .  S    .         .         .         .
 10600  37.I    O     .       .         .         .        .         .         .         .  S    .         .         .         .
 10610  38.I   O      .       .         .         .        .         .         .         . S     .         .         .         .
 10620  39I    O      .       .         .         .        .         .         .         . S     .         .         .         .
 10630  40I    O      .       .         .         .        .         .         .         . S     .         .         .         .
 10640  41I . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . .
 10650  42I    O      .       .         .         .        .         .         .         . S     .         .         .         .
 10700  43I    O      .       .         .         .        .         .         .         . S     .         .         .         .
 10710  44I    O      .       .         .         .        .         .         .         .S      .         .         .         .
 10720  45I    O      .       .         .         .        .         .         .         .S      .         .         .         .
 10730  46I    O      .       .         .         .        .         .         .         S       .         .         .         .
 10740  47I    O      .       .         .         .        .         .         .         S       .         .         .         .
 10750  48I    O      .       .         .         .        .         .         .         S       .         .         .         .
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[redacted]800   49I    O    .         .         .         .         .         .         .        S.         .         .         .         .
[redacted]810   50I    O    .         .         .         .         .         .         .        S.         .         .         .         .
[redacted]820   51I . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . .
10830   52I    O    .         .         .         .         .         .         .       S .         .         .         .         .
10840   53I    O    .         .         .         .         .         .         .       S .         .         .         .         .
[redacted]850   54I    O    .         .         .         .         .         .         .       S .         .         .         .         .
[redacted]900   55I    O    .         .         .         .         .         .         .      S  .         .         .         .         .
[redacted]910   56I    O    .         .         .         .         .         .         .      S  .         .         .         .         .
10920   57I    O    .         .         .         .         .         .         .      S  .         .         .         .         .
10930   58I    O    .         .         .         .         .         .         .     S   .         .         .         .         .
[redacted]940   59I   O     .         .         .         .         .         .         .     S   .         .         .         .         .
[redacted]950   60I   O     .         .         .         .         .         .         .     S   .         .         .         .         .
[redacted]000   61I . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . .
11010   62I   O     .         .         .         .         .         .         .    S    .         .         .         .         .
11020   63I   O     .         .         .         .         .         .         .    S    .         .         .         .         .
[redacted]030   64I   O     .         .         .         .         .         .         .    S    .         .         .         .         .
[redacted]040   65I   O     .         .         .         .         .         .         .   S     .         .         .         .         .
[redacted]050   66I   O     .         .         .         .         .         .         .   S     .         .         .         .         .
[redacted]100   67I   O     .         .         .         .         .         .         .   S     .         .         .         .         .
11110   68I   O     .         .         .         .         .         .         .   S     .         .         .         .         .
[redacted]120   69I   O     .         .         .         .         .         .         .  S      .         .         .         .         .
[redacted]130   70I   O     .         .         .         .         .         .         .  S      .         .         .         .         .
[redacted]140   71I . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . .
[redacted]150   72I   O     .         .         .         .         .         .         .  S      .         .         .         .         .
11200   73I   O     .         .         .         .         .         .         . S       .         .         .         .         .
[redacted]210   74I  O      .         .         .         .         .         .         . S       .         .         .         .         .
[redacted]220   75I  O      .         .         .         .         .         .         . S       .         .         .         .         .
[redacted]230   76I  O      .         .         .         .         .         .         . S       .         .         .         .         .
[redacted]240   77I  O      .         .         .         .         .         .         .S        .         .         .         .         .
11250   78I  O      .         .         .         .         .         .         .S        .         .         .         .         .
11300   79I  O      .         .         .         .         .         .         .S        .         .         .         .         .
[redacted]310   80I  O      .         .         .         .         .         .         .S        .         .         .         .         .
[redacted]320   81I .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . .
[redacted]330   82I  O      .         .         .         .         .         .         S         .         .         .         .         .
11340   83I  O      .         .         .         .         .         .         S         .         .         .         .         .
11350   84I  O      .         .         .         .         .         .         S         .         .         .         .         .
[redacted]400   85I  O      .         .         .         .         .         .         S         .         .         .         .         .
[redacted]410   86I  O      .         .         .         .         .         .        S.         .         .         .         .         .
[redacted]420   87I  O      .         .         .         .         .         .        S.         .         .         .         .         .
11430   88I  O      .         .         .         .         .         .        S.         .         .         .         .         .
11440   89I  O      .         .         .         .         .         .        S.         .         .         .         .         .
[redacted]450   90I  O      .         .         .         .         .         .        S.         .         .         .         .         .
[redacted]500   91I .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . . .
[redacted]510   92I  O      .         .         .         .         .         .       S .         .         .         .         .         .
11520   93I  O      .         .         .         .         .         .       S .         .         .         .         .         .
11530   94I O       .         .         .         .         .         .       S .         .         .         .         .         .
[redacted]540   95I O       .         .         .         .         .         .       S .         .         .         .         .         .
[redacted]550   96I O       .         .         .         .         .         .       S .         .         .         .         .         .
[redacted]600   97I O       .         .         .         .         .         .      S  .         .         .         .         .         .
[redacted]610   98I O       .         .         .         .         .         .      S  .         .         .         .         .         .
11620   99I O       .         .         .         .         .         .      S  .         .         .         .         .         .
[redacted]630  100I O       .         .         .         .         .         .      S  .         .         .         .         .         .
[redacted]640  101I O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . . . .
[redacted]650  102I O       .         .         .         .         .         .      S  .         .         .         .         .         .
[redacted]700  103I O       .         .         .         .         .         .      S  .         .         .         .         .         .
11710  104I O       .         .         .         .         .         .     S   .         .         .         .         .         .
[redacted]720  105I O       .         .         .         .         .         .     S   .         .         .         .         .         .
[redacted]730  106I O       .         .         .         .         .         .     S   .         .         .         .         .         .
[redacted]740  107I O       .         .         .         .         .         .     S   .         .         .         .         .         .
[redacted]750  108I O       .         .         .         .         .         .     S   .         .         .         .         .         .
11800  109I O       .         .         .         .         .         .     S   .         .         .         .         .         .
11810  110I O       .         .         .         .         .         .     S   .         .         .         .         .         .
[redacted]820  111I O . . . . . . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . . . . .
[redacted]830  112I O       .         .         .         .         .         .    S    .         .         .         .         .         .
[redacted]840  113I O       .         .         .         .         .         .    S    .         .         .         .         .         .
11850  114I O       .         .         .         .         .         .    S    .         .         .         .         .         .
11900  115I O       .         .         .         .         .         .    S    .         .         .         .         .         .
[redacted]910  116I O       .         .         .         .         .         .    S    .         .         .         .         .         .
[redacted]920  117I O       .         .         .         .         .         .    S    .         .         .         .         .         .
[redacted]930  118I O       .         .         .         .         .         .    S    .         .         .         .         .         .
11940  119I O       .         .         .         .         .         .   S     .         .         .         .         .         .
11950  120I O       .         .         .         .         .         .   S     .         .         .         .         .         .
[redacted]000  121I O . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . .
[redacted]010  122I O       .         .         .         .         .         .   S     .         .         .         .         .         .
[redacted]020  123I O       .         .         .         .         .         .   S     .         .         .         .         .         .
12030  124I O       .         .         .         .         .         .   S     .         .         .         .         .         .
12040  125I O       .         .         .         .         .         .   S     .         .         .         .         .         .
[redacted]050  126I O       .         .         .         .         .         .   S     .         .         .         .         .         .
[redacted]100  127I O       .         .         .         .         .         .   S     .         .         .         .         .         .
[redacted]110  128I O       .         .         .         .         .         .  S      .         .         .         .         .         .
12120  129I O       .         .         .         .         .         .  S      .         .         .         .         .         .
12130  130I O       .         .         .         .         .         .  S      .         .         .         .         .         .
[redacted]140  131IO. . . . . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . . . . . .
[redacted]150  132IO        .         .         .         .         .         .  S      .         .         .         .         .         .
[redacted]200  133IO        .         .         .         .         .         .  S      .         .         .         .         .         .
12210  134IO        .         .         .         .         .         .  S      .         .         .         .         .         .
12220  135IO        .         .         .         .         .         .  S      .         .         .         .         .         .
[redacted]230  136IO        .         .         .         .         .         .  S      .         .         .         .         .         .
[redacted]240  137IO        .         .         .         .         .         .  S      .         .         .         .         .         .
[redacted]250  138IO        .         .         .         .         .         . S       .         .         .         .         .         .
12300  139IO        .         .         .         .         .         . S       .         .         .         .         .         .
12310  140IO        .         .         .         .         .         . S       .         .         .         .         .         .
[redacted]320  141IO. . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
[redacted]
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[redacted]2330 142IO                                  S
[redacted]2340 143IO                                  S
[redacted]2350 144IO                                  S
20000 145IO                                           S
20010 146IO                                           S
[redacted]0020 147IO                                  S
[redacted]0030 148IO                                  S
[redacted]0040 149IO                                  S
20050 150IO                                           S
20100 151IO                                           S
[redacted]0110 152IO                                  S
[redacted]0120 153IO                                  S
[redacted]0130 154IO                                  S
20140 155IO                                           S
20150 156IO                                           S
[redacted]0200 157IO                                  S
[redacted]0210 158IO                                  S
[redacted]0220 159IO                                  S
20230 160IO                                           S
20240 161IO                                           S
20250 162IO                                           S
[redacted]0300 163IO                                  S
[redacted]0310 164IO                                  S
[redacted]0320 165IO                                  S
20330 166IO                                           S
20340 167IO                                           S
[redacted]0350 168IO                                  S
[redacted]0400 169IO                                  S
[redacted]0410 170IO                                  S
20420 171IO                                           S
20430 172I                                            S
[redacted]0440 173I                                   S
[redacted]0450 174I                                   S
[redacted]0500 175I                                   S
20510 176I                                            S
20520 177I                                            S
[redacted]0530 178I                                   S
[redacted]0540 179I                                   S
[redacted]0550 180I                                   S
20600 181I                                            S
20610 182I                                            S
[redacted]0620 183I                                   S
[redacted]0630 184I                                   S
[redacted]0640 185I                                   S
20650 186I                                            S
20700 187I                                            S
[redacted]0710 188I                                   S
[redacted]0720 189I                                   S
[redacted]0730 190I                                   S
20740 191I                                            S
20750 192I                                            S
[redacted]0800 193I                                   S
[redacted]0810 194I                                   S
[redacted]0820 195I                                   S
[redacted]0830 196I                                   S
20840 197I                                            S
20850 198I                                            S
[redacted]0900 199I                                   S
[redacted]0910 200I                                   S
[redacted]0920 201I                                   S
20930 202I                                            S
20940 203I                                            S
[redacted]0950 204I                                   S
[redacted]1000 205I                                   S
[redacted]1010 206I                                   S
21020 207I                                            S
21030 208I                                            S
[redacted]1040 209I                                   S
[redacted]1050 210I                                   S
[redacted]1100 211I                                   S
21110 212I                                            S
21120 213I                                            S
[redacted]1130 214I                                   S
[redacted]1140 215I                                   S
[redacted]1150 216I                                   S
21200 217I                                            S
21210 218I                                            S
[redacted]1220 219I                                   S
[redacted]1230 220I                                   S
[redacted]1240 221I                                   S
21250 222I                                            S
21300 223I                                            S
[redacted]1310 224I                                   S
[redacted]1320 225I                                   S
[redacted]1330 226I                                   S
21340 227I                                            S
21350 228I                                            S
[redacted]1400 229I                                   S
[redacted]1410 230I                                   S
[redacted]1420 231I                                   S
21430 232I                                            S
21440 233I                                            S
21450 234I                                            S
[redacted]
```

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 21500 235I         .         .         .         .         .         S         .         .         .         .         .         .
 21510 236I         .         .         .         .         .         S         .         .         .         .         .         .
 21520 237I         .         .         .         .         .         S         .         .         .         .         .         .
 21530 238I         .         .         .         .         .         S         .         .         .         .         .         .
 21540 239I         .         .         .         .         .         S         .         .         .         .         .         .
 21550 240I         .         .         .         .         .         S         .         .         .         .         .         .
 21600 241I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 21610 242I         .         .         .         .         .         S         .         .         .         .         .         .
 21620 243I         .         .         .         .         .         S         .         .         .         .         .         .
 21630 244I         .         .         .         .         .         S         .         .         .         .         .         .
 21640 245I         .         .         .         .         .         S         .         .         .         .         .         .
 21650 246I         .         .         .         .         .         S         .         .         .         .         .         .
 21700 247I         .         .         .         .         .         S         .         .         .         .         .         .
 21710 248I         .         .         .         .         .         S         .         .         .         .         .         .
 21720 249I         .         .         .         .         .         S         .         .         .         .         .         .
 21730 250I         .         .         .         .         .         S         .         .         .         .         .         .
 21740 251I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 21750 252I         .         .         .         .         .         S         .         .         .         .         .         .
 21800 253I         .         .         .         .         .         S         .         .         .         .         .         .
 21810 254I         .         .         .         .         .         S         .         .         .         .         .         .
 21820 255I         .         .         .         .         .         S         .         .         .         .         .         .
 21830 256I         .         .         .         .         .         S         .         .         .         .         .         .
 21840 257I         .         .         .         .         .         S         .         .         .         .         .         .
 21850 258I         .         .         .         .         .         S         .         .         .         .         .         .
 21900 259I         .         .         .         .         .         S         .         .         .         .         .         .
 21910 260I         .         .         .         .         .         S         .         .         .         .         .         .
 21920 261I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 21930 262I         .         .         .         .         .         S         .         .         .         .         .         .
 21940 263I         .         .         .         .         .         S         .         .         .         .         .         .
 21950 264I         .         .         .         .         .         S         .         .         .         .         .         .
 22000 265I         .         .         .         .         .         S         .         .         .         .         .         .
 22010 266I         .         .         .         .         .         S         .         .         .         .         .         .
 22020 267I         .         .         .         .         .         S         .         .         .         .         .         .
 22030 268I         .         .         .         .         .         S         .         .         .         .         .         .
 22040 269I         .         .         .         .         .         S         .         .         .         .         .         .
 22050 270I         .         .         .         .         .         S         .         .         .         .         .         .
 22100 271I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 22110 272I         .         .         .         .         .         S         .         .         .         .         .         .
 22120 273I         .         .         .         .         .         S         .         .         .         .         .         .
 22130 274I         .         .         .         .         .         S         .         .         .         .         .         .
 22140 275I         .         .         .         .         .         S         .         .         .         .         .         .
 22150 276I         .         .         .         .         .         S         .         .         .         .         .         .
 22200 277I         .         .         .         .         .         S         .         .         .         .         .         .
 22210 278I         .         .         .         .         .         S         .         .         .         .         .         .
 22220 279I         .         .         .         .         .         S         .         .         .         .         .         .
 22230 280I         .         .         .         .         .         S         .         .         .         .         .         .
 22240 281I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 22250 282I         .         .         .         .         .         S         .         .         .         .         .         .
 22300 283I         .         .         .         .         .         S         .         .         .         .         .         .
 22310 284I         .         .         .         .         .         S         .         .         .         .         .         .
 22320 285I         .         .         .         .         .         S         .         .         .         .         .         .
 22330 286I         .         .         .         .         .         S         .         .         .         .         .         .
 22340 287I         .         .         .         .         .         S         .         .         .         .         .         .
 22350 288I         .         .         .         .         .         S         .         .         .         .         .         .
 30000 289I         .         .         .         .         .         S         .         .         .         .         .         .
 30010 290I         .         .         .         .         .         S         .         .         .         .         .         .
 30020 291I . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
 30030 292I         .         .         .         .         .         S         .         .         .         .         .         .
 30040 293I         .         .         .         .         .         S         .         .         .         .         .         .
 30050 294I         .         .         .         .         .         S         .         .         .         .         .         .
 30100 295I         .         .         .         .         .         S         .         .         .         .         .         .
 30110 296I         .         .         .         .         .         S         .         .         .         .         .         .
 30120 297I         .         .         .         .         .         S         .         .         .         .         .         .
 30130 298I         .         .         .         .         .         S         .         .         .         .         .         .
 30140 299I         .         .         .         .         .         S         .         .         .         .         .         .
 30150 300I---------.---------.---------.---------.---------.---------S---------.---------.---------.---------.---------.---------.
1

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

            **************
            *            *
 52 KK      *       DA3  *
            *            *
            **************
                          SUB-BASIN DA3
                          2-HOUR RAINFALL DISTRIBUTION WAS USED TO FIND TC & R FOR THIS BASIN
                          THIS BASIN USED RAINFALL REDUCTION FACTOR OF 1.000
                            L = 1.22  Kb = .091  Adj. Slope =   15.0

               SUBBASIN RUNOFF DATA

 57 BA           SUBBASIN CHARACTERISTICS
                       TAREA         .37  SUBBASIN AREA

                 PRECIPITATION DATA

 18 PB                 STORM        2.64  BASIN TOTAL PRECIPITATION

 18 PI             INCREMENTAL PRECIPITATION PATTERN
```

```
                .02       .01       .02       .05       .08       .15       .42       .16       .05       .02
                .01       .02

 58 LG        GREEN AND AMPT LOSS RATE
                STRTL        .50  STARTING LOSS
                  DTH        .25  MOISTURE DEFICIT
                 PSIF       5.10  WETTING FRONT SUCTION
                XKSAT        .40  HYDRAULIC CONDUCTIVITY
                RTIMP        .00  PERCENT IMPERVIOUS AREA

 59 UC        CLARK UNITGRAPH
                   TC       1.50  TIME OF CONCENTRATION
                    R       1.20  STORAGE COEFFICIENT

 60 UA        ACCUMULATED-AREA VS. TIME,  11 ORDINATES
                  .0       3.0       5.0       8.0      12.0      20.0      43.0      75.0      90.0      96.0
              100.0

                                                  ***

                                          UNIT HYDROGRAPH PARAMETERS
                                   CLARK   TC=  1.50 HR,       R=  1.20 HR
                                  SNYDER   TP=  1.32 HR,      CP=   .72

                                            UNIT HYDROGRAPH
                                         44 END-OF-PERIOD ORDINATES
          3.        8.       13.       20.       39.       80.      119.      133.      128.      116.
        101.       88.       76.       66.       58.       50.       44.       38.       33.       29.
         25.       22.       19.       16.       14.       12.       11.        9.        8.        7.
          6.        5.        5.        4.        4.        3.        3.        2.        2.        2.
          2.        1.        1.        1.

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

                    HYDROGRAPH AT STATION      DA3

  TOTAL RAINFALL =    2.64, TOTAL LOSS =    1.55, TOTAL EXCESS =    1.09

PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                   6-HR       24-HR       72-HR     49.83-HR
+  (CFS)       (HR)
                         (CFS)
+   141.      2.33                43.         11.          5.          5.
                       (INCHES)   1.072       1.083       1.083       1.083
                        (AC-FT)    21.         21.         21.         21.

                       CUMULATIVE AREA =     .37 SQ MI


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


          **************
          *            *
 62 KK    *       DA4  *
          *            *
          **************
                         SUB-BASIN DA4
                         2-HOUR RAINFALL DISTRIBUTION WAS USED TO FIND TC & R FOR THIS BASIN
                         THIS BASIN USED RAINFALL REDUCTION FACTOR OF 1.000
                           L =  .51  Kb = .110  Adj. Slope =   10.0

            SUBBASIN RUNOFF DATA

 67 BA        SUBBASIN CHARACTERISTICS
                TAREA        .06  SUBBASIN AREA

              PRECIPITATION DATA

 18 PB          STORM       2.64  BASIN TOTAL PRECIPITATION

 18 PI          INCREMENTAL PRECIPITATION PATTERN
                .02       .01       .02       .05       .08       .15       .42       .16       .05       .02
                .01       .02

 68 LG        GREEN AND AMPT LOSS RATE
                STRTL        .50  STARTING LOSS
                  DTH        .25  MOISTURE DEFICIT
                 PSIF       4.35  WETTING FRONT SUCTION
                XKSAT        .61  HYDRAULIC CONDUCTIVITY
                RTIMP        .00  PERCENT IMPERVIOUS AREA

 69 UC        CLARK UNITGRAPH
                   TC       1.50  TIME OF CONCENTRATION
                    R       1.66  STORAGE COEFFICIENT

 70 UA        ACCUMULATED-AREA VS. TIME,  11 ORDINATES
                  .0       3.0       5.0       8.0      12.0      20.0      43.0      75.0      90.0      96.0
              100.0

                                                  ***
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                                   UNIT HYDROGRAPH PARAMETERS
                             CLARK   TC=  1.50 HR,       R=  1.66 HR
                            SNYDER   TP=  1.35 HR,      CP=   .58

                                       UNIT HYDROGRAPH
                                   59 END-OF-PERIOD ORDINATES
              0.       1.       2.       3.       5.      10.      15.      17.      17.      16.
             14.      13.      12.      11.      10.       9.       8.       7.       6.       6.
              5.       5.       4.       4.       4.       3.       3.       3.       2.       2.
              2.       2.       2.       1.       1.       1.       1.       1.       1.       1.
              1.       1.       1.       1.       0.       0.       0.       0.       0.       0.
              0.       0.       0.       0.       0.       0.       0.       0.       0.

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

                    HYDROGRAPH AT STATION      DA4

  TOTAL RAINFALL =    2.64, TOTAL LOSS =    1.68, TOTAL EXCESS =     .96

 PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     49.83-HR
+  (CFS)       (HR)
                          (CFS)
+    16.       2.50                   6.          2.          1.          1.
                        (INCHES)    .917        .955        .955        .955
                         (AC-FT)     3.          3.          3.          3.

                        CUMULATIVE AREA =     .06 SQ MI


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


          **************
          *            *
72 KK     *     C3-4   *
          *            *
          **************
                        COMBINE DA3 WITH DA4

74 HC          HYDROGRAPH COMBINATION
                     ICOMP          2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                          ***

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

                    HYDROGRAPH AT STATION    C3-4

EAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     49.83-HR
+  (CFS)       (HR)
                          (CFS)
+   158.       2.33                  49.         12.          6.          6.
                        (INCHES)   1.050       1.065       1.065       1.065
                         (AC-FT)     24.         24.         24.         24.

                        CUMULATIVE AREA =     .43 SQ MI

1
                                       RUNOFF SUMMARY
                                  FLOW IN CUBIC FEET PER SECOND
                                TIME IN HOURS,  AREA IN SQUARE MILES

                                     PEAK   TIME OF     AVERAGE FLOW FOR MAXIMUM PERIOD      BASIN     MAXIMUM     TIME OF
      OPERATION        STATION      FLOW    PEAK                                           AREA      STAGE     MAX STAGE
+                                                        6-HOUR     24-HOUR     72-HOUR
      HYDROGRAPH AT
+                         DA1       214.    1.83          52.         13.          6.       .30
      ROUTED TO
+                        DA1-2      209.    2.00          52.         13.          6.       .30
      HYDROGRAPH AT
+                         DA2       312.    1.83          83.         21.         10.       .44
      2 COMBINED AT
+                        C1-2       507.    2.00         135.         34.         16.       .74
      ROUTED TO
+                       ROUTE        58.    4.17          55.         32.         16.       .74
+                                                                                          1022.60       4.17
      HYDROGRAPH AT
+                         DA3       141.    2.33          43.         11.          5.       .37
      HYDROGRAPH AT
+                         DA4        16.    2.50           6.          2.          1.       .06
```

```
      2 COMBINED AT
+                C3-4        158.    2.33          49.          12.          6.         .43
1
```

SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
(FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)

ISTAQ	ELEMENT	DT (MIN)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	INTERPOLATED TO COMPUTATION INTERVAL DT (MIN)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)
DA1-2	MANE	5.50	210.88	121.00	1.59	10.00	209.50	120.00	1.59

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2563E+02 EXCESS= .0000E+00 OUTFLOW= .2561E+02 BASIN STORAGE= .3231E-02 PERCENT ERROR= .1

* NORMAL END OF HEC-1 ***

CBR-PCDB.DAT

Analyzes detention basin for PCD 100-yr, 2-hr conditions where the basin drains after the basin reaches the maximum storage capacity.

```
1**************************************                    **************************************
*                                    *                    *                                    *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1) *                    *   U.S. ARMY CORPS OF ENGINEERS     *
*        SEPTEMBER 1990              *                    *   HYDROLOGIC ENGINEERING CENTER    *
*         VERSION 4.0                *                    *         609 SECOND STREET          *
*                                    *                    *      DAVIS, CALIFORNIA 95616       *
* RUN DATE  07/16/1997  TIME  10:43:44 *                  *          (916) 756-1104            *
*                                    *                    *                                    *
**************************************                    **************************************

X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX         XXX

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

1                                                HEC-1 INPUT                                                PAGE  1

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

        1           ID   CBR-PCDB.DAT
        2           ID   DETENTION POND ANALYSIS - CAMELBACK RANCH LEVEE
        3           ID   DETENTION POND STARTS FULL AT 67 AC-FT AND MUST DRAIN
        4           ID   IN 36 HOURS (DRAINS INTO THE AGUA FRIA RIVER)
        5           IT      10                    300
        6           KM   1-36" CONCRETE PIPES
        7           IO       1       2
        8           RS       1    STOR   68.82
        9           SV       0   .0001   2.620   10.62   18.69   26.85   35.08   43.39   51.79   60.26
       10           SV   68.82
       11           SQ       0     5.0     8.0    12.5    20.0    29.0    40.0    49.0    54.0    57.0
       12           SQ    61.0
       13           SE  1018.5  1019.1  1019.5  1020.0  1020.5  1021.0  1021.5  1022.0  1022.5  1023.0
       14           SE  1023.5
                    *
       15           ZZ
1**************************************                    **************************************
*                                    *                    *                                    *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1) *                    *   U.S. ARMY CORPS OF ENGINEERS     *
*        SEPTEMBER 1990              *                    *   HYDROLOGIC ENGINEERING CENTER    *
*         VERSION 4.0                *                    *         609 SECOND STREET          *
*                                    *                    *      DAVIS, CALIFORNIA 95616       *
* RUN DATE  07/16/1997  TIME  10:43:44 *                  *          (916) 756-1104            *
*                                    *                    *                                    *
**************************************                    **************************************

                    CBR-PCDB.DAT
                    DETENTION POND ANALYSIS - CAMELBACK RANCH LEVEE
                    DETENTION POND STARTS FULL AT 67 AC-FT AND MUST DRAIN
                    IN 36 HOURS (DRAINS INTO THE AGUA FRIA RIVER)

 IT          HYDROGRAPH TIME DATA
                  NMIN          10  MINUTES IN COMPUTATION INTERVAL
                 IDATE      1    0  STARTING DATE
                 ITIME        0000  STARTING TIME
                    NQ         300  NUMBER OF HYDROGRAPH ORDINATES
               NDDATE      3    0  ENDING DATE
               NDTIME        0150  ENDING TIME
               ICENT           19  CENTURY MARK

          COMPUTATION INTERVAL     .17 HOURS
               TOTAL TIME BASE   49.83 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
```

1-36" CONCRETE PIPES

```
 7 IO          OUTPUT CONTROL VARIABLES
                     IPRNT          1  PRINT CONTROL
                     IPLOT          2  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE

            HYDROGRAPH ROUTING DATA

 8 RS          STORAGE ROUTING
                     NSTPS          1  NUMBER OF SUBREACHES
                      ITYP       STOR  TYPE OF INITIAL CONDITION
                    RSVRIC      68.82  INITIAL CONDITION
                         X        .00 WORKING R AND D COEFFICIENT

 9 SV            STORAGE        .0       .0       2.6      10.6      18.7      26.9      35.1      43.4      51.8      60.3
                               68.8

11 SQ          DISCHARGE        0.       5.       8.       13.       20.       29.       40.       49.       54.       57.
                                61.

13 SE          ELEVATION     1018.50  1019.10  1019.50  1020.00  1020.50  1021.00  1021.50  1022.00  1022.50  1023.00
                             1023.50
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* WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN        0. TO        5.
            THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
            THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)
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HYDROGRAPH AT STATION

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DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	61.	68.8	1023.5	*	1		1640	101	17.	15.9	1020.3	*	2		0920	201	6.	1.0	1019.3
1		0010	2	61.	68.0	1023.5	*	1		1650	102	17.	15.6	1020.3	*	2		0930	202	6.	.9	1019.2
1		0020	3	60.	67.2	1023.4	*	1		1700	103	17.	15.4	1020.3	*	2		0940	203	6.	.8	1019.2
1		0030	4	60.	66.3	1023.4	*	1		1710	104	17.	15.2	1020.3	*	2		0950	204	6.	.8	1019.2
1		0040	5	59.	65.5	1023.3	*	1		1720	105	17.	14.9	1020.3	*	2		1000	205	6.	.7	1019.2
1		0050	6	59.	64.7	1023.3	*	1		1730	106	16.	14.7	1020.3	*	2		1010	206	6.	.6	1019.2
1		0100	7	59.	63.9	1023.2	*	1		1740	107	16.	14.5	1020.2	*	2		1020	207	6.	.5	1019.2
1		0110	8	58.	63.1	1023.2	*	1		1750	108	16.	14.3	1020.2	*	2		1030	208	6.	.4	1019.2
1		0120	9	58.	62.3	1023.1	*	1		1800	109	16.	14.0	1020.2	*	2		1040	209	5.	.4	1019.2
1		0130	10	58.	61.5	1023.1	*	1		1810	110	15.	13.8	1020.2	*	2		1050	210	5.	.3	1019.1
1		0140	11	57.	60.7	1023.0	*	1		1820	111	15.	13.6	1020.2	*	2		1100	211	5.	.2	1019.1
1		0150	12	57.	59.9	1023.0	*	1		1830	112	15.	13.4	1020.2	*	2		1110	212	5.	.1	1019.1
1		0200	13	57.	59.1	1022.9	*	1		1840	113	15.	13.2	1020.2	*	2		1120	213	5.	.1	1019.1
1		0210	14	56.	58.3	1022.9	*	1		1850	114	15.	13.0	1020.1	*	2		1130	214	5.	.0	1019.1
1		0220	15	56.	57.6	1022.8	*	1		1900	115	15.	12.8	1020.1	*	2		1140	215	0.	.0	1018.5
1		0230	16	56.	56.8	1022.8	*	1		1910	116	14.	12.6	1020.1	*	2		1150	216	0.	.0	1018.5
1		0240	17	56.	56.0	1022.8	*	1		1920	117	14.	12.4	1020.1	*	2		1200	217	0.	.0	1018.5
1		0250	18	55.	55.3	1022.7	*	1		1930	118	14.	12.2	1020.1	*	2		1210	218	0.	.0	1018.5
1		0300	19	55.	54.5	1022.7	*	1		1940	119	14.	12.0	1020.1	*	2		1220	219	0.	.0	1018.5
1		0310	20	55.	53.8	1022.6	*	1		1950	120	14.	11.8	1020.1	*	2		1230	220	0.	.0	1018.5
1		0320	21	54.	53.0	1022.6	*	1		2000	121	13.	11.6	1020.1	*	2		1240	221	0.	.0	1018.5
1		0330	22	54.	52.3	1022.5	*	1		2010	122	13.	11.5	1020.1	*	2		1250	222	0.	.0	1018.5
1		0340	23	54.	51.5	1022.5	*	1		2020	123	13.	11.3	1020.0	*	2		1300	223	0.	.0	1018.5
1		0350	24	53.	50.8	1022.4	*	1		2030	124	13.	11.1	1020.0	*	2		1310	224	0.	.0	1018.5
1		0400	25	53.	50.0	1022.4	*	1		2040	125	13.	10.9	1020.0	*	2		1320	225	0.	.0	1018.5
1		0410	26	53.	49.3	1022.4	*	1		2050	126	13.	10.7	1020.0	*	2		1330	226	0.	.0	1018.5
1		0420	27	52.	48.6	1022.3	*	1		2100	127	12.	10.6	1020.0	*	2		1340	227	0.	.0	1018.5
1		0430	28	52.	47.9	1022.3	*	1		2110	128	12.	10.4	1020.0	*	2		1350	228	0.	.0	1018.5
1		0440	29	51.	47.2	1022.2	*	1		2120	129	12.	10.2	1020.0	*	2		1400	229	0.	.0	1018.5
1		0450	30	51.	46.5	1022.2	*	1		2130	130	12.	10.1	1020.0	*	2		1410	230	0.	.0	1018.5
1		0500	31	50.	45.8	1022.1	*	1		2140	131	12.	9.9	1020.0	*	2		1420	231	0.	.0	1018.5
1		0510	32	50.	45.1	1022.1	*	1		2150	132	12.	9.7	1019.9	*	2		1430	232	0.	.0	1018.5
1		0520	33	50.	44.4	1022.1	*	1		2200	133	12.	9.6	1019.9	*	2		1440	233	0.	.0	1018.5
1		0530	34	49.	43.7	1022.0	*	1		2210	134	12.	9.4	1019.9	*	2		1450	234	0.	.0	1018.5
1		0540	35	49.	43.0	1022.0	*	1		2220	135	12.	9.2	1019.9	*	2		1500	235	0.	.0	1018.5
1		0550	36	48.	42.4	1021.9	*	1		2230	136	12.	9.1	1019.9	*	2		1510	236	0.	.0	1018.5
1		0600	37	47.	41.7	1021.9	*	1		2240	137	12.	8.9	1019.9	*	2		1520	237	0.	.0	1018.5
1		0610	38	46.	41.1	1021.9	*	1		2250	138	11.	8.8	1019.9	*	2		1530	238	0.	.0	1018.5
1		0620	39	46.	40.4	1021.8	*	1		2300	139	11.	8.6	1019.9	*	2		1540	239	0.	.0	1018.5
1		0630	40	45.	39.8	1021.8	*	1		2310	140	11.	8.4	1019.9	*	2		1550	240	0.	.0	1018.5
1		0640	41	44.	39.2	1021.7	*	1		2320	141	11.	8.3	1019.9	*	2		1600	241	0.	.0	1018.5
1		0650	42	44.	38.6	1021.7	*	1		2330	142	11.	8.1	1019.8	*	2		1610	242	0.	.0	1018.5
1		0700	43	43.	38.0	1021.7	*	1		2340	143	11.	8.0	1019.8	*	2		1620	243	0.	.0	1018.5
1		0710	44	43.	37.4	1021.6	*	1		2350	144	11.	7.8	1019.8	*	2		1630	244	0.	.0	1018.5
1		0720	45	42.	36.8	1021.6	*	2		0000	145	11.	7.7	1019.8	*	2		1640	245	0.	.0	1018.5
1		0730	46	41.	36.2	1021.6	*	2		0010	146	11.	7.5	1019.8	*	2		1650	246	0.	.0	1018.5
1		0740	47	41.	35.7	1021.5	*	2		0020	147	11.	7.4	1019.8	*	2		1700	247	0.	.0	1018.5
1		0750	48	40.	35.1	1021.5	*	2		0030	148	11.	7.2	1019.8	*	2		1710	248	0.	.0	1018.5
1		0800	49	39.	34.6	1021.5	*	2		0040	149	11.	7.1	1019.8	*	2		1720	249	0.	.0	1018.5
1		0810	50	39.	34.0	1021.4	*	2		0050	150	10.	7.0	1019.8	*	2		1730	250	0.	.0	1018.5
1		0820	51	38.	33.5	1021.4	*	2		0100	151	10.	6.8	1019.8	*	2		1740	251	0.	.0	1018.5
1		0830	52	37.	33.0	1021.4	*	2		0110	152	10.	6.7	1019.8	*	2		1750	252	0.	.0	1018.5
1		0840	53	37.	32.5	1021.3	*	2		0120	153	10.	6.5	1019.7	*	2		1800	253	0.	.0	1018.5
1		0850	54	36.	32.0	1021.3	*	2		0130	154	10.	6.4	1019.7	*	2		1810	254	0.	.0	1018.5
1		0900	55	35.	31.5	1021.3	*	2		0140	155	10.	6.2	1019.7	*	2		1820	255	0.	.0	1018.5

1	0910	56	35.	31.0	1021.3	*	2	0150	156	10.	6.1	1019.7	*	2	1830	256	0.	.0	1018.5
1	0920	57	34.	30.5	1021.2	*	2	0200	157	10.	6.0	1019.7	*	2	1840	257	0.	.0	1018.5
1	0930	58	33.	30.1	1021.2	*	2	0210	158	10.	5.8	1019.7	*	2	1850	258	0.	.0	1018.5
1	0940	59	33.	29.6	1021.2	*	2	0220	159	10.	5.7	1019.7	*	2	1900	259	0.	.0	1018.5
1	0950	60	32.	29.2	1021.1	*	2	0230	160	10.	5.6	1019.7	*	2	1910	260	0.	.0	1018.5
1	1000	61	32.	28.7	1021.1	*	2	0240	161	10.	5.4	1019.7	*	2	1920	261	0.	.0	1018.5
1	1010	62	31.	28.3	1021.1	*	2	0250	162	10.	5.3	1019.7	*	2	1930	262	0.	.0	1018.5
1	1020	63	30.	27.9	1021.1	*	2	0300	163	9.	5.2	1019.7	*	2	1940	263	0.	.0	1018.5
1	1030	64	30.	27.5	1021.0	*	2	0310	164	9.	5.0	1019.7	*	2	1950	264	0.	.0	1018.5
1	1040	65	29.	27.1	1021.0	*	2	0320	165	9.	4.9	1019.6	*	2	2000	265	0.	.0	1018.5
1	1050	66	29.	26.7	1021.0	*	2	0330	166	9.	4.8	1019.6	*	2	2010	266	0.	.0	1018.5
1	1100	67	28.	26.3	1021.0	*	2	0340	167	9.	4.7	1019.6	*	2	2020	267	0.	.0	1018.5
1	1110	68	28.	25.9	1020.9	*	2	0350	168	9.	4.5	1019.6	*	2	2030	268	0.	.0	1018.5
1	1120	69	28.	25.5	1020.9	*	2	0400	169	9.	4.4	1019.6	*	2	2040	269	0.	.0	1018.5
1	1130	70	27.	25.1	1020.9	*	2	0410	170	9.	4.3	1019.6	*	2	2050	270	0.	.0	1018.5
1	1140	71	27.	24.8	1020.9	*	2	0420	171	9.	4.2	1019.6	*	2	2100	271	0.	.0	1018.5
1	1150	72	26.	24.4	1020.8	*	2	0430	172	9.	4.0	1019.6	*	2	2110	272	0.	.0	1018.5
1	1200	73	26.	24.0	1020.8	*	2	0440	173	9.	3.9	1019.6	*	2	2120	273	0.	.0	1018.5
1	1210	74	26.	23.7	1020.8	*	2	0450	174	9.	3.8	1019.6	*	2	2130	274	0.	.0	1018.5
1	1220	75	25.	23.3	1020.8	*	2	0500	175	9.	3.7	1019.6	*	2	2140	275	0.	.0	1018.5
1	1230	76	25.	23.0	1020.8	*	2	0510	176	9.	3.6	1019.6	*	2	2150	276	0.	.0	1018.5
1	1240	77	24.	22.6	1020.7	*	2	0520	177	8.	3.4	1019.6	*	2	2200	277	0.	.0	1018.5
1	1250	78	24.	22.3	1020.7	*	2	0530	178	8.	3.3	1019.5	*	2	2210	278	0.	.0	1018.5
1	1300	79	24.	22.0	1020.7	*	2	0540	179	8.	3.2	1019.5	*	2	2220	279	0.	.0	1018.5
1	1310	80	23.	21.7	1020.7	*	2	0550	180	8.	3.1	1019.5	*	2	2230	280	0.	.0	1018.5
1	1320	81	23.	21.3	1020.7	*	2	0600	181	8.	3.0	1019.5	*	2	2240	281	0.	.0	1018.5
1	1330	82	23.	21.0	1020.6	*	2	0610	182	8.	2.9	1019.5	*	2	2250	282	0.	.0	1018.5
1	1340	83	22.	20.7	1020.6	*	2	0620	183	8.	2.8	1019.5	*	2	2300	283	0.	.0	1018.5
1	1350	84	22.	20.4	1020.6	*	2	0630	184	8.	2.7	1019.5	*	2	2310	284	0.	.0	1018.5
1	1400	85	22.	20.1	1020.6	*	2	0640	185	8.	2.5	1019.5	*	2	2320	285	0.	.0	1018.5
1	1410	86	21.	19.8	1020.6	*	2	0650	186	8.	2.4	1019.5	*	2	2330	286	0.	.0	1018.5
1	1420	87	21.	19.5	1020.6	*	2	0700	187	8.	2.3	1019.5	*	2	2340	287	0.	.0	1018.5
1	1430	88	21.	19.2	1020.5	*	2	0710	188	8.	2.2	1019.4	*	2	2350	288	0.	.0	1018.5
1	1440	89	20.	19.0	1020.5	*	2	0720	189	7.	2.1	1019.4	*	3	0000	289	0.	.0	1018.5
1	1450	90	20.	18.7	1020.5	*	2	0730	190	7.	2.0	1019.4	*	3	0010	290	0.	.0	1018.5
1	1500	91	20.	18.4	1020.5	*	2	0740	191	7.	1.9	1019.4	*	3	0020	291	0.	.0	1018.5
1	1510	92	19.	18.1	1020.5	*	2	0750	192	7.	1.8	1019.4	*	3	0030	292	0.	.0	1018.5
1	1520	93	19.	17.9	1020.4	*	2	0800	193	7.	1.7	1019.4	*	3	0040	293	0.	.0	1018.5
1	1530	94	19.	17.6	1020.4	*	2	0810	194	7.	1.6	1019.3	*	3	0050	294	0.	.0	1018.5
1	1540	95	19.	17.4	1020.4	*	2	0820	195	7.	1.5	1019.3	*	3	0100	295	0.	.0	1018.5
1	1550	96	19.	17.1	1020.4	*	2	0830	196	7.	1.4	1019.3	*	3	0110	296	0.	.0	1018.5
1	1600	97	18.	16.8	1020.4	*	2	0840	197	7.	1.4	1019.3	*	3	0120	297	0.	.0	1018.5
1	1610	98	18.	16.6	1020.4	*	2	0850	198	6.	1.3	1019.3	*	3	0130	298	0.	.0	1018.5
1	1620	99	18.	16.3	1020.4	*	2	0900	199	6.	1.2	1019.3	*	3	0140	299	0.	.0	1018.5
1	1630	100	18.	16.1	1020.3	*	2	0910	200	6.	1.1	1019.3	*	3	0150	300	0.	.0	1018.5
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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	49.83-HR
+ (CFS)	(HR)					
		(CFS)				
+ 61.	.17		55.	31.	17.	17.
		(INCHES)	.000	.000	.000	.000
		(AC-FT)	27.	61.	69.	69.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	49.83-HR
+ (AC-FT)	(HR)				
69.	.17	55.	29.	15.	15.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	49.83-HR
+ (FEET)	(HR)				
1023.50	.00	1022.67	1021.12	1019.99	1019.99

CUMULATIVE AREA = .00 SQ MI

1 STATION

(I) INFLOW, (O) OUTFLOW

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        0.       10.       20.       30.       40.       50.       60.       70.        0.        0.        0.        0.        0.
                                                                                   (S) STORAGE
        0.        0.        0.        0.        0.        0.        0.       20.       40.       60.       80.        0.        0.
HRMN PER
10000   1I---------.---------.---------.---------.---------.---------.O--------.---------.---------.---S-----.---------.---------.
10010   2I         .         .         .         .         .         .O        .         .         .   S     .         .         .
10020   3I         .         .         .         .         .         O         .         .         .   S     .         .         .
10030   4I         .         .         .         .         .         O         .         .         .  S      .         .         .
10040   5I         .         .         .         .         .        O.         .         .         .  S      .         .         .
10050   6I         .         .         .         .         .        O.         .         .         . S       .         .         .
10100   7I         .         .         .         .         .        O.         .         .         . S       .         .         .
10110   8I         .         .         .         .         .       O .         .         .         . S       .         .         .
10120   9I         .         .         .         .         .       O .         .         .         .S        .         .         .
10130  10I         .         .         .         .         .       O .         .         .         .S        .         .         .
10140  11I . . . . . . . . . . . . . . . . . . . . . . . . . . .O. . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . .
10150  12I         .         .         .         .         .       O .         .         .         S         .         .         .
10200  13I         .         .         .         .         .       O .         .         .         S         .         .         .
10210  14I         .         .         .         .         .      O  .         .         .        S.         .         .         .
10220  15I         .         .         .         .         .      O  .         .         .        S.         .         .         .
10230  16I         .         .         .         .         .      O  .         .         .       S .         .         .         .
10240  17I         .         .         .         .         .      O  .         .         .       S .         .         .         .
10250  18I         .         .         .         .         .     O   .         .         .       S .         .         .         .
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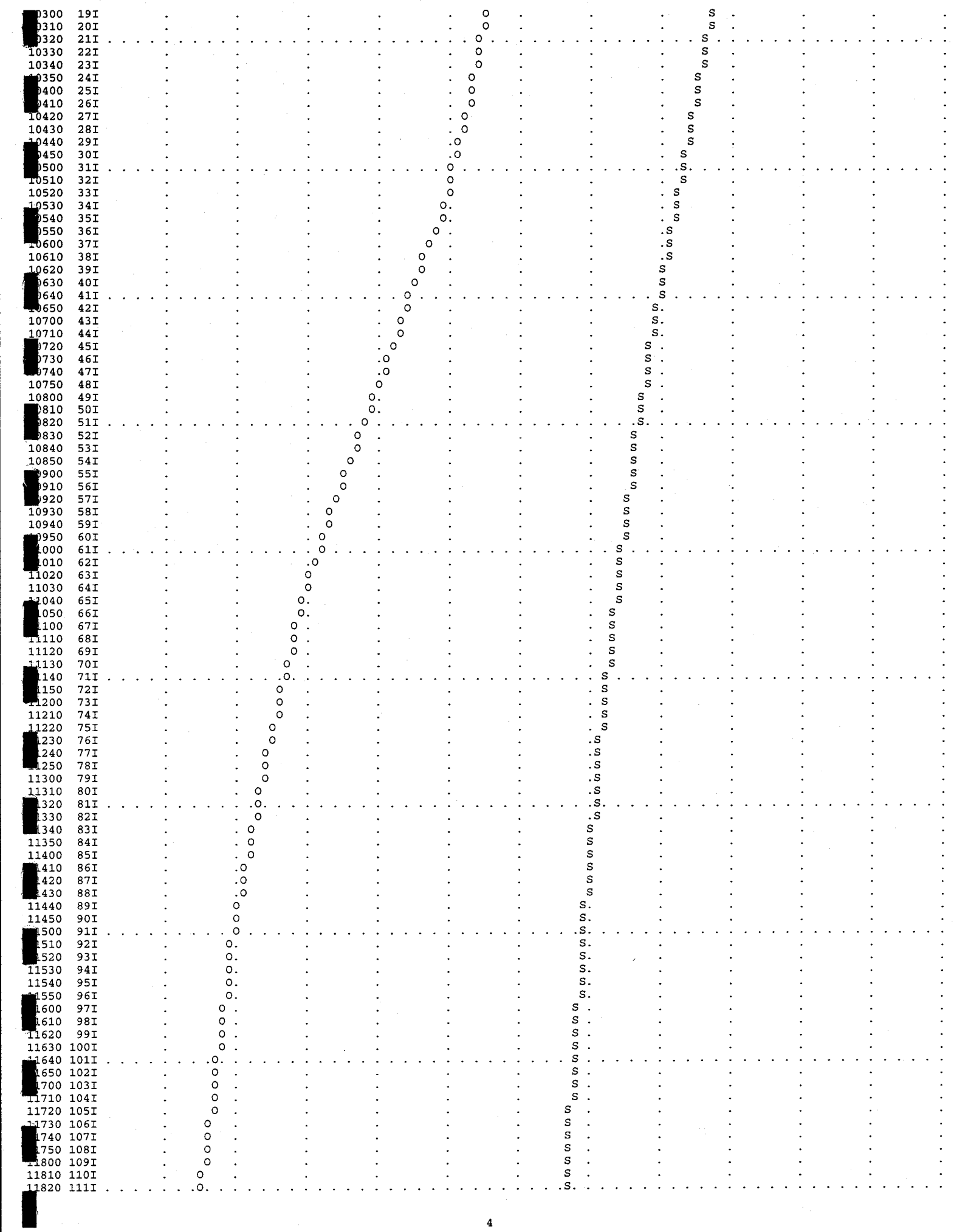

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[redacted]830 112I         .    O    .         .         .         .         .      S  .         .         .         .         .         .
[redacted]840 113I         .    O    .         .         .         .         .      S  .         .         .         .         .         .
[redacted]850 114I         .    O    .         .         .         .         .     S   .         .         .         .         .         .
11900 115I         .    O    .         .         .         .         .     S   .         .         .         .         .         .
11910 116I         .   O     .         .         .         .         .     S   .         .         .         .         .         .
[redacted]920 117I         .   O     .         .         .         .         .     S   .         .         .         .         .         .
[redacted]930 118I         .   O     .         .         .         .         .     S   .         .         .         .         .         .
[redacted]940 119I         .   O     .         .         .         .         .     S   .         .         .         .         .         .
11950 120I         .   O     .         .         .         .         .     S   .         .         .         .         .         .
12000 121I . . . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . .
12010 122I         .  O      .         .         .         .         .     S   .         .         .         .         .         .
[redacted]020 123I         .  O      .         .         .         .         .     S   .         .         .         .         .         .
[redacted]030 124I         .  O      .         .         .         .         .     S   .         .         .         .         .         .
12040 125I         .  O      .         .         .         .         .    S    .         .         .         .         .         .
12050 126I         .  O      .         .         .         .         .    S    .         .         .         .         .         .
12100 127I         . O       .         .         .         .         .    S    .         .         .         .         .         .
[redacted]110 128I         . O       .         .         .         .         .    S    .         .         .         .         .         .
[redacted]120 129I         . O       .         .         .         .         .    S    .         .         .         .         .         .
[redacted]130 130I         . O       .         .         .         .         .    S    .         .         .         .         .         .
12140 131I . . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . . . . .
12150 132I         . O       .         .         .         .         .    S    .         .         .         .         .         .
[redacted]200 133I         . O       .         .         .         .         .    S    .         .         .         .         .         .
[redacted]210 134I         . O       .         .         .         .         .    S    .         .         .         .         .         .
[redacted]220 135I         . O       .         .         .         .         .    S    .         .         .         .         .         .
12230 136I         . O       .         .         .         .         .    S    .         .         .         .         .         .
12240 137I         . O       .         .         .         .         .   S     .         .         .         .         .         .
[redacted]250 138I         .O        .         .         .         .         .   S     .         .         .         .         .         .
[redacted]300 139I         .O        .         .         .         .         .   S     .         .         .         .         .         .
[redacted]310 140I         .O        .         .         .         .         .   S     .         .         .         .         .         .
12320 141I . . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . .
12330 142I         .O        .         .         .         .         .   S     .         .         .         .         .         .
[redacted]340 143I         .O        .         .         .         .         .   S     .         .         .         .         .         .
[redacted]350 144I         .O        .         .         .         .         .   S     .         .         .         .         .         .
[redacted]000 145I         .O        .         .         .         .         .   S     .         .         .         .         .         .
20010 146I         .O        .         .         .         .         .   S     .         .         .         .         .         .
20020 147I         .O        .         .         .         .         .   S     .         .         .         .         .         .
[redacted]030 148I         .O        .         .         .         .         .   S     .         .         .         .         .         .
[redacted]040 149I         .O        .         .         .         .         .   S     .         .         .         .         .         .
[redacted]050 150I         O         .         .         .         .         .  S      .         .         .         .         .         .
20100 151I . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . . . . . .
20110 152I         O         .         .         .         .         .  S      .         .         .         .         .         .
[redacted]120 153I         O         .         .         .         .         .  S      .         .         .         .         .         .
[redacted]130 154I         O         .         .         .         .         .  S      .         .         .         .         .         .
[redacted]140 155I         O         .         .         .         .         .  S      .         .         .         .         .         .
20150 156I         O         .         .         .         .         .  S      .         .         .         .         .         .
20200 157I         O         .         .         .         .         .  S      .         .         .         .         .         .
20210 158I         O         .         .         .         .         .  S      .         .         .         .         .         .
[redacted]220 159I         O         .         .         .         .         .  S      .         .         .         .         .         .
[redacted]230 160I         O         .         .         .         .         .  S      .         .         .         .         .         .
20240 161I . . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . . . . . .
20250 162I         O         .         .         .         .         .  S      .         .         .         .         .         .
20300 163I        O.         .         .         .         .         .  S      .         .         .         .         .         .
[redacted]310 164I        O.         .         .         .         .         .  S      .         .         .         .         .         .
[redacted]320 165I        O.         .         .         .         .         . S       .         .         .         .         .         .
[redacted]330 166I        O.         .         .         .         .         . S       .         .         .         .         .         .
20340 167I        O.         .         .         .         .         . S       .         .         .         .         .         .
20350 168I        O.         .         .         .         .         . S       .         .         .         .         .         .
[redacted]400 169I        O.         .         .         .         .         . S       .         .         .         .         .         .
[redacted]410 170I        O.         .         .         .         .         . S       .         .         .         .         .         .
[redacted]420 171I . . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . S . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
20430 172I        O.         .         .         .         .         . S       .         .         .         .         .         .
20440 173I        O.         .         .         .         .         . S       .         .         .         .         .         .
[redacted]450 174I        O.         .         .         .         .         . S       .         .         .         .         .         .
[redacted]500 175I        O.         .         .         .         .         . S       .         .         .         .         .         .
[redacted]510 176I        O.         .         .         .         .         . S       .         .         .         .         .         .
20520 177I       O .         .         .         .         .         . S       .         .         .         .         .         .
20530 178I       O .         .         .         .         .         . S       .         .         .         .         .         .
[redacted]540 179I       O .         .         .         .         .         . S       .         .         .         .         .         .
[redacted]550 180I       O .         .         .         .         .         . S       .         .         .         .         .         .
[redacted]600 181I . . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
20610 182I       O .         .         .         .         .         .S        .         .         .         .         .         .
20620 183I       O .         .         .         .         .         .S        .         .         .         .         .         .
[redacted]630 184I       O .         .         .         .         .         .S        .         .         .         .         .         .
[redacted]640 185I       O .         .         .         .         .         .S        .         .         .         .         .         .
[redacted]650 186I       O .         .         .         .         .         .S        .         .         .         .         .         .
20700 187I       O .         .         .         .         .         .S        .         .         .         .         .         .
20710 188I       O .         .         .         .         .         .S        .         .         .         .         .         .
[redacted]720 189I      O  .         .         .         .         .         .S        .         .         .         .         .         .
[redacted]730 190I      O  .         .         .         .         .         .S        .         .         .         .         .         .
[redacted]740 191I . . .O. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
20750 192I      O  .         .         .         .         .         .S        .         .         .         .         .         .
20800 193I      O  .         .         .         .         .         .S        .         .         .         .         .         .
[redacted]810 194I      O  .         .         .         .         .         .S        .         .         .         .         .         .
[redacted]820 195I      O  .         .         .         .         .         .S        .         .         .         .         .         .
[redacted]830 196I      O  .         .         .         .         .         .S        .         .         .         .         .         .
20840 197I      O  .         .         .         .         .         .S        .         .         .         .         .         .
20850 198I     O   .         .         .         .         .         .S        .         .         .         .         .         .
20900 199I     O   .         .         .         .         .         .S        .         .         .         .         .         .
[redacted]910 200I     O   .         .         .         .         .         .S        .         .         .         .         .         .
[redacted]920 201I . . O . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .S. . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
20930 202I     O   .         .         .         .         .         S         .         .         .         .         .         .
20940 203I     O   .         .         .         .         .         S         .         .         .         .         .         .
20950 204I     O   .         .         .         .         .         S         .         .         .         .         .         .
[redacted]
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21000	205I	O	S
21010	206I	O	S
21020	207I	O	S
21030	208I	O	S
21040	209I	O	S
21050	210I	O	S
21100	211I	O	S
21110	212I	O	S
21120	213I	O	S
21130	214I	O	S
21140	215I		S
21150	216I		S
21200	217I		S
21210	218I		S
21220	219I		S
21230	220I		S
21240	221I		S
21250	222I		S
21300	223I		S
21310	224I		S
21320	225I		S
21330	226I		S
21340	227I		S
21350	228I		S
21400	229I		S
21410	230I		S
21420	231I		S
21430	232I		S
21440	233I		S
21450	234I		S
21500	235I		S
21510	236I		S
21520	237I		S
21530	238I		S
21540	239I		S
21550	240I		S
21600	241I		S
21610	242I		S
21620	243I		S
21630	244I		S
21640	245I		S
21650	246I		S
21700	247I		S
21710	248I		S
21720	249I		S
21730	250I		S
21740	251I		S
21750	252I		S
21800	253I		S
21810	254I		S
21820	255I		S
21830	256I		S
21840	257I		S
21850	258I		S
21900	259I		S
21910	260I		S
21920	261I		S
21930	262I		S
21940	263I		S
21950	264I		S
22000	265I		S
22010	266I		S
22020	267I		S
22030	268I		S
22040	269I		S
22050	270I		S
22100	271I		S
22110	272I		S
22120	273I		S
22130	274I		S
22140	275I		S
22150	276I		S
22200	277I		S
22210	278I		S
22220	279I		S
22230	280I		S
22240	281I		S
22250	282I		S
22300	283I		S
22310	284I		S
22320	285I		S
22330	286I		S
22340	287I		S
22350	288I		S
30000	289I		S
30010	290I		S
30020	291I		S
30030	292I		S
30040	293I		S
30050	294I		S
30100	295I		S
30110	296I		S
30120	297I		S

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0130 298I        .         .         .         .         .         S         .         .         .         .         .         .
0140 299I        .         .         .         .         .         S         .         .         .         .         .         .
0150 300I---------.---------.---------.---------.---------.---------S---------.---------.---------.---------.---------.---------.
1
1
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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
+	ROUTED TO		61.	.17	55.	31.	17.	.00		
+									1023.50	.00

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

APPENDIX B

HYDRAULIC CALCULATIONS

CURRENT DATE: 10-09-1996
CURRENT TIME: 10:11:38

FILE DATE: 04-22-1996
FILE NAME: 1-36

FHWA CULVERT ANALYSIS
HY-8, VERSION 4.3

CULV	SITE DATA			CULVERT SHAPE, MATERIAL, INLET				
	INLET ELEV. (FT)	OUTLET ELEV. (FT)	CULVERT LENGTH (FT)	BARRELS SHAPE MATERIAL	SPAN (FT)	RISE (FT)	MANNING n	INLET TYPE
1	1018.50	1014.00	730.01	1 RCP	3.00	3.00	.012	CONVENTIONAL
2								
3								
4								
5								
6								

SUMMARY OF CULVERT FLOWS (CFS) FILE: 1-36 DATE: 04-22-1996

ELEV (FT)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
1018.50	0	0	0	0	0	0	0	0	0
1020.04	13	13	0	0	0	0	0	0	0
1020.80	25	25	0	0	0	0	0	0	0
1021.43	38	38	0	0	0	0	0	0	0
1022.12	50	50	0	0	0	0	0	0	0
1023.89	63	63	0	0	0	0	0	0	0
1024.45	65	65	0	0	0	0	0	0	0
1030.50	88	88	0	0	0	0	0	0	0
1034.63	100	100	0	0	0	0	0	0	0
1039.32	113	113	0	0	0	0	0	0	0
1044.55	125	125	0	0	0	0	0	0	0
0.00	0	0	0	0	0	0	0	OVERTOPPING	

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: 1-36 DATE: 04-22-1996

HEAD ELEV(FT)	HEAD ERROR(FT)	TOTAL FLOW(CFS)	FLOW ERROR(CFS)	% FLOW ERROR
1018.50	0.00	0	0	0.00
1020.04	0.00	13	0	0.00
1020.80	0.00	25	0	0.00
1021.43	0.00	38	0	0.00
1022.12	0.00	50	0	0.00
1023.89	0.00	63	0	0.00
1024.45	0.00	65	0	0.00
1030.50	0.00	88	0	0.00
1034.63	0.00	100	0	0.00
1039.32	0.00	113	0	0.00
1044.55	0.00	125	0	0.00

<1> TOLERANCE (FT) = 0.010 <2> TOLERANCE (%) = 1.000

CURRENT DATE: 10-09-1996
CURRENT TIME: 10:11:38

FILE DATE: 04-22-1996
FILE NAME: 1-36

PERFORMANCE CURVE FOR CULVERT # 1 - 1 (3 BY 3) RCP

DIS-CHARGE FLOW (cfs)	HEAD-WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRITICAL DEPTH (ft)	OUTLET VEL. (fps)	OUTLET DEPTH (ft)	TAILWATER VEL. (fps)	TAILWATER DEPTH (ft)
0	1018.50	0.00	0.00	0-NF	0.00	0.00	0.00	0.00	0.00	%-915.00
13	1020.04	1.54	1.54	1-S2n	0.95	1.12	6.54	0.95	1.48	%-914.33
25	1020.80	2.30	2.30	1-S2n	1.39	1.61	7.82	1.39	1.84	%-914.02
38	1021.43	2.93	2.93	1-S2n	1.78	1.99	8.61	1.78	2.07	%-913.78
50	1022.12	3.62	3.62	5-S2n	2.19	2.29	9.08	2.19	2.25	%-913.58
63	1023.89	4.46	5.39	6-FFn	3.00	2.53	8.84	3.00	2.40	%-913.41
65	1024.45	4.65	5.95	6-FFn	3.00	2.57	9.20	3.00	2.42	%-913.37
88	1030.50	6.67	12.00	6-FFn	3.00	2.93	12.38	3.00	2.63	%-913.11
100	1034.63	8.01	16.13	6-FFn	3.00	3.00	14.15	3.00	2.73	%-912.98
113	1039.32	9.49	20.82	6-FFn	3.00	3.00	15.92	3.00	2.82	%-912.86
125	1044.55	11.15	26.05	6-FFn	3.00	3.00	17.68	3.00	2.90	%-912.74

El. inlet face invert 1018.50 ft El. outlet invert 1014.00 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

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**** SITE DATA ***** CULVERT INVERT **************
     INLET STATION (FT)                          0.00
     INLET ELEVATION (FT)                     1018.50
     OUTLET STATION (FT)                       730.00
     OUTLET ELEVATION (FT)                    1014.00
     NUMBER OF BARRELS                           1
     SLOPE (V-FT/H-FT)                           0.0062
     CULVERT LENGTH ALONG SLOPE (FT)           730.01

***** CULVERT DATA SUMMARY ************************
     BARREL SHAPE          CIRCULAR
     BARREL DIAMETER         3.00 FT
     BARREL MATERIAL       CONCRETE
     BARREL MANNING'S N    0.012
     INLET TYPE            CONVENTIONAL
     INLET EDGE AND WALL   GROOVED END IN HEADWALL
     INLET DEPRESSION      NONE
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CURRENT DATE: 10-09-1996
CURRENT TIME: 10:11:38

FILE DATE: 04-22-1996
FILE NAME: 1-36

TAILWATER

****** REGULAR CHANNEL CROSS SECTION **********

BOTTOM WIDTH (FT)	10.00
SIDE SLOPE H/V (X:1)	4.0
CHANNEL SLOPE V/H (FT/FT)	0.002
MANNING'S N (.01-0.1)	0.030
CHANNEL INVERT ELEVATION (FT)	99.00
CULVERT NO.1 OUTLET INVERT ELEVATION	1014.00 FT

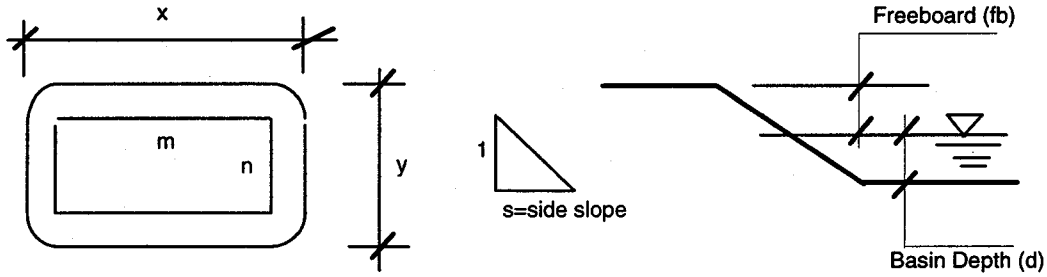
****** UNIFORM FLOW RATING CURVE FOR DOWNSTREAM CHANNEL

FLOW (CFS)	W.S.E. (FT)	FROUDE NUMBER	DEPTH (FT)	VEL. (FPS)	SHEAR (PSF)
0.00	99.00	0.000	0.00	0.00	0.00
12.50	99.67	0.319	0.67	1.48	0.08
25.00	99.98	0.327	0.98	1.84	0.12
37.50	100.22	0.331	1.22	2.07	0.15
50.00	100.42	0.333	1.42	2.25	0.18
62.50	100.59	0.335	1.59	2.40	0.20
65.00	100.63	0.335	1.63	2.42	0.20
87.50	100.89	0.338	1.89	2.63	0.24
100.00	101.02	0.339	2.02	2.73	0.25
112.50	101.14	0.340	2.14	2.82	0.27
125.00	101.26	0.340	2.26	2.90	0.28

ROADWAY OVERTOPPING DATA

ROADWAY SURFACE	GRAVEL
EMBANKMENT TOP WIDTH (FT)	15.00
CREST LENGTH (FT)	50.00
OVERTOPPING CREST ELEVATION (FT)	115.00

Detention Basin Sizing



Formulas:

Vol = (m)(n)(d) + (d2)(s)(m+n) + (pi(d3)(s2))/3

x = m + 2(d + fb)(s) m = x - 2(d + fb)(s)
y = n + 2(d + fb)(s) n = y - 2(d + fb)(s)

Future Condition Storage Volume = 67 ac-ft

Wedge storage.

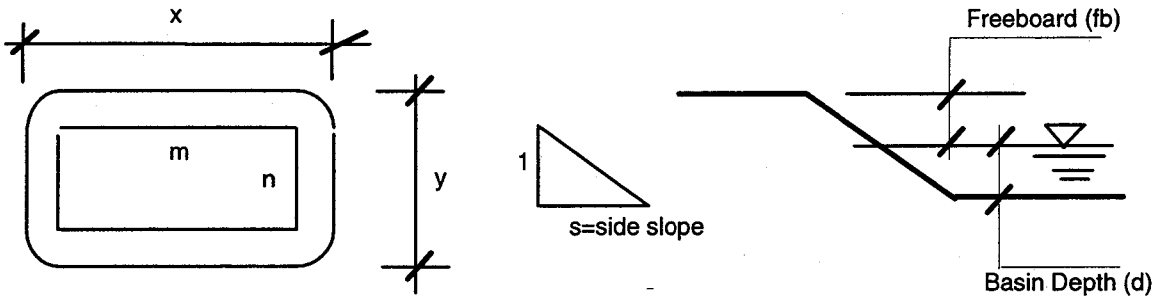
Condition	Basin Slopes ('/ft) =	depth ft.	m	n	Vol. ac-ft
Levee	0.0007	0.5	738.0	738.0	2.08
PCD	0.0005	0.5	738.0	940.0	2.65

Wedge storage assumes that the basin will be graded so that the outlet end is 0.5 foot deeper than the upstream end. The volume of this graded portion was taken to be 1/3 of a rectangular 'cube' with the depth being 0.5 feet.

Square Basin

Detention Basin	Outside Length x (ft)	Outside Width y (ft)	Depth d (ft)	Side Slope s (h:v)	Freeboard fb (ft)	Inside Length m (ft)	Inside Width n (ft)	Vol (ac-ft) of flat basin	Wedge Storage (ac-ft)	Total Storage (ac-ft)
Levee	770	770	4	4	0	738.0	738.0	52.21	2.08	54.29
PCD	770	972	4	4	0	738.0	940.0	66.19	2.65	68.85

Stage Volume Calculations Existing Conditions



Formulas:

Vol = (m)(n)(d) + (d2)(s)(m+n) + pi(d3)(s2)

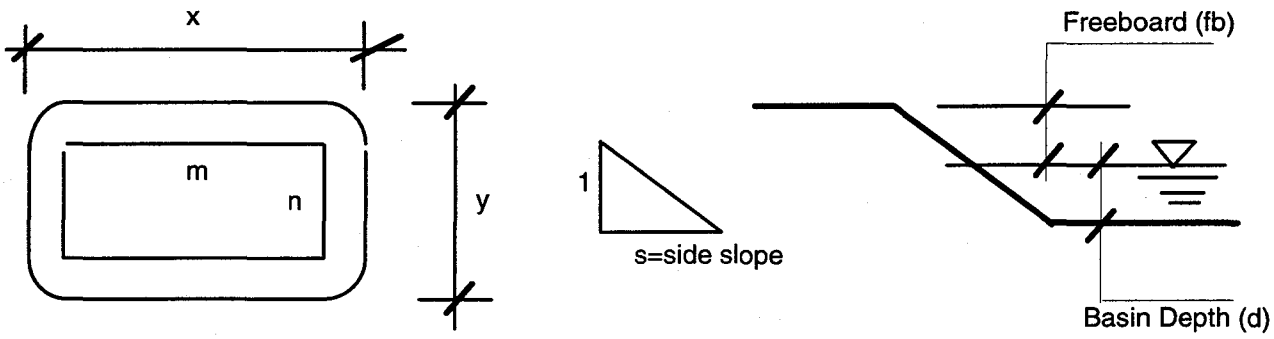
x = m + 2(d + fb)(s) m = x - 2(d + fb)(s)
y = n + 2(d + fb)(s) n = y - 2(d + fb)(s)

Existing Condition Storage Volume = 54 ac-ft

Type of Storage	Outside Length x (ft)	Outside Width y (ft)	Depth at pipe Stage (ft)	Side Slope s (ft)	Freeboard fb (ft)	Inside Length m (ft)	Inside Width n (ft)	Cummulative Storage Vol (ac-ft)
Wedge	0	0	0.0	-	0	-	-	0.00
Wedge	738	738	0.5	4	0	734.0	734.0	2.06
Square	742	742	1.0	4	0	738.0	738.0	8.35
Square	746	746	1.5	4	0	738.0	738.0	14.70
Square	750	750	2.0	4	0	738.0	738.0	21.12
Square	754	754	2.5	4	0	738.0	738.0	27.62
Square	758	758	3.0	4	0	738.0	738.0	34.18
Square	762	762	3.5	4	0	738.0	738.0	40.82
Square	766	766	4.0	4	0	738.0	738.0	47.53
Square	770	770	4.5	4	0	738.0	738.0	54.32

Note: after water surface reaches one half foot deep the square basin begins to account for storage.

Stage Volume Calculations PCD Conditions



Formulas:

$$Vol = (m)(n)(d) + (d2)(s)(m+n) + pi(d3)(s2)$$

$$x = m + 2(d + fb)(s) \qquad m = x - 2(d + fb)(s)$$
$$y = n + 2(d + fb)(s) \qquad n = y - 2(d + fb)(s)$$

Future Condition Storage Volume = 67 ac-ft

Type of Storage	Outside Length x (ft)	Outside Width y (ft)	Depth at pipe Stage (ft)	Side Slope s (ft)	Freeboard fb (ft)	Inside Length m (ft)	Inside Width n (ft)	Cummulative Storage Vol (ac-ft)
Wedge	0	0	0.0	-	0	-	-	0.00
Wedge	823	823	0.5	4	0	819.0	819.0	2.57
Square	827	827	1.0	4	0	823.0	823.0	10.38
Square	831	831	1.5	4	0	823.0	823.0	18.27
Square	835	835	2.0	4	0	823.0	823.0	26.24
Square	839	839	2.5	4	0	823.0	823.0	34.28
Square	843	843	3.0	4	0	823.0	823.0	42.41
Square	847	847	3.5	4	0	823.0	823.0	50.61
Square	851	851	4.0	4	0	823.0	823.0	58.89
Square	855	855	4.5	4	0	823.0	823.0	67.26

Note: After water surface reaches one half foot deep the square basin begins to account for storage.

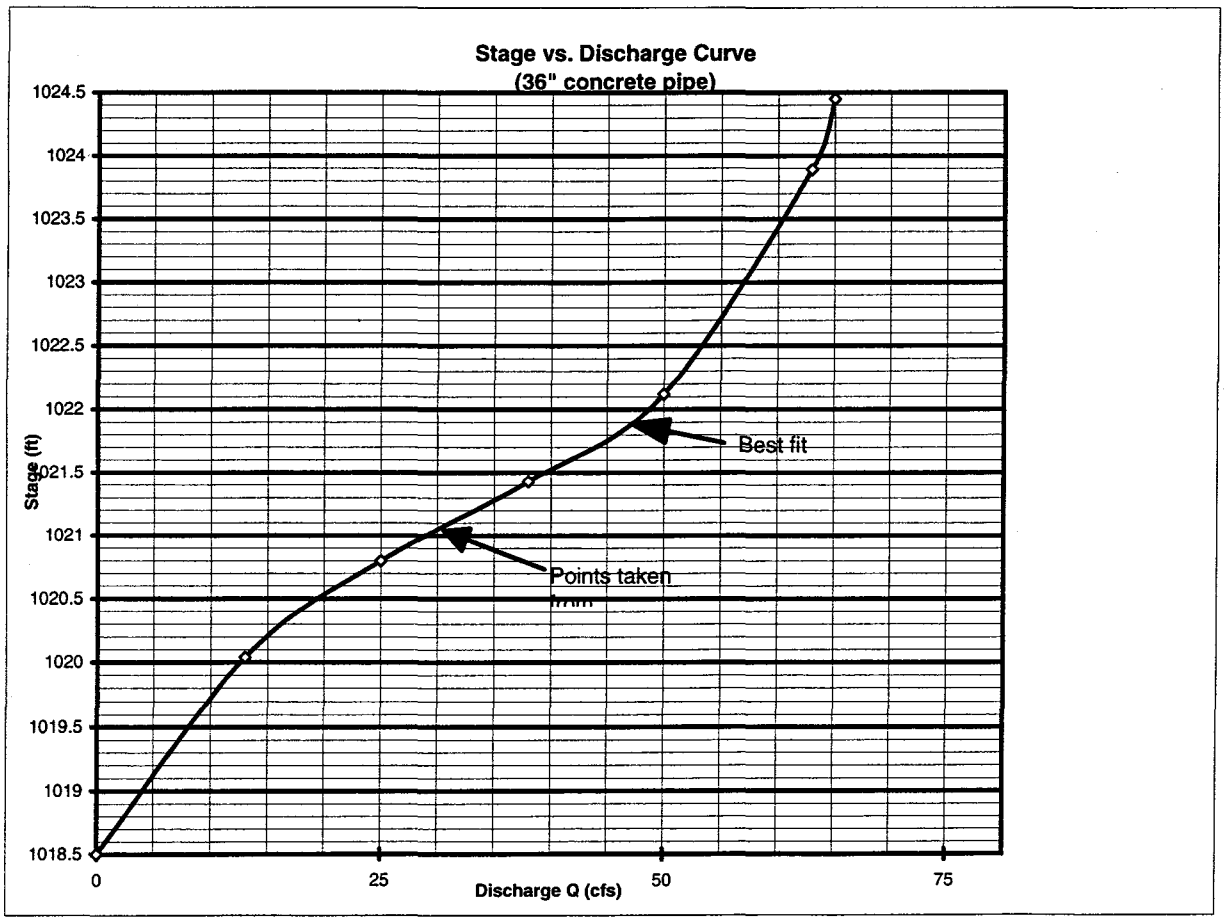
Stage/Storage/Discharge PCD Conditions

Q	Stage
0	1018.50
13	1020.04
25	1020.80
38	1021.43
50	1022.12
63	1023.89
65	1024.45

Note: Taken from FHWA Culvert Analysis, HY8

Stage (ft)	Discharge (cfs) 1	Storage Vol (ac-ft) 2
1018.5	0.0	0.0
1019.1	5.0	.0001*
1019.5	8.0	2.62
1020.0	12.5	10.62
1020.5	20.0	18.69
1021.0	29.0	26.85
1021.5	40.0	35.08
1022.0	49.0	43.39
1022.5	54.0	51.79
1023.0	57.0	60.26
1023.5	61.0	68.82

* Denotes Storage in Drop Structure
1. Extrapolated from Curve below.
2. Taken from Stage Volume Calculations PCD Conditions Curve.



Stage/Storage/Discharge PCD Conditions

Q	Stage
0	1018.50
13	1020.04
25	1020.80
38	1021.43
50	1022.12
63	1023.89
65	1024.45

Note: Taken from FHWA Culvert Analysis, HY8

Stage (ft)	Discharge (cfs) 1	Storage Vol (ac-ft) 2
1018.5	0.0	0.0
1019.1	5.0	.0001*
1019.5	8.0	2.62
1020.0	12.5	10.62
1020.5	20.0	18.69
1021.0	29.0	26.85
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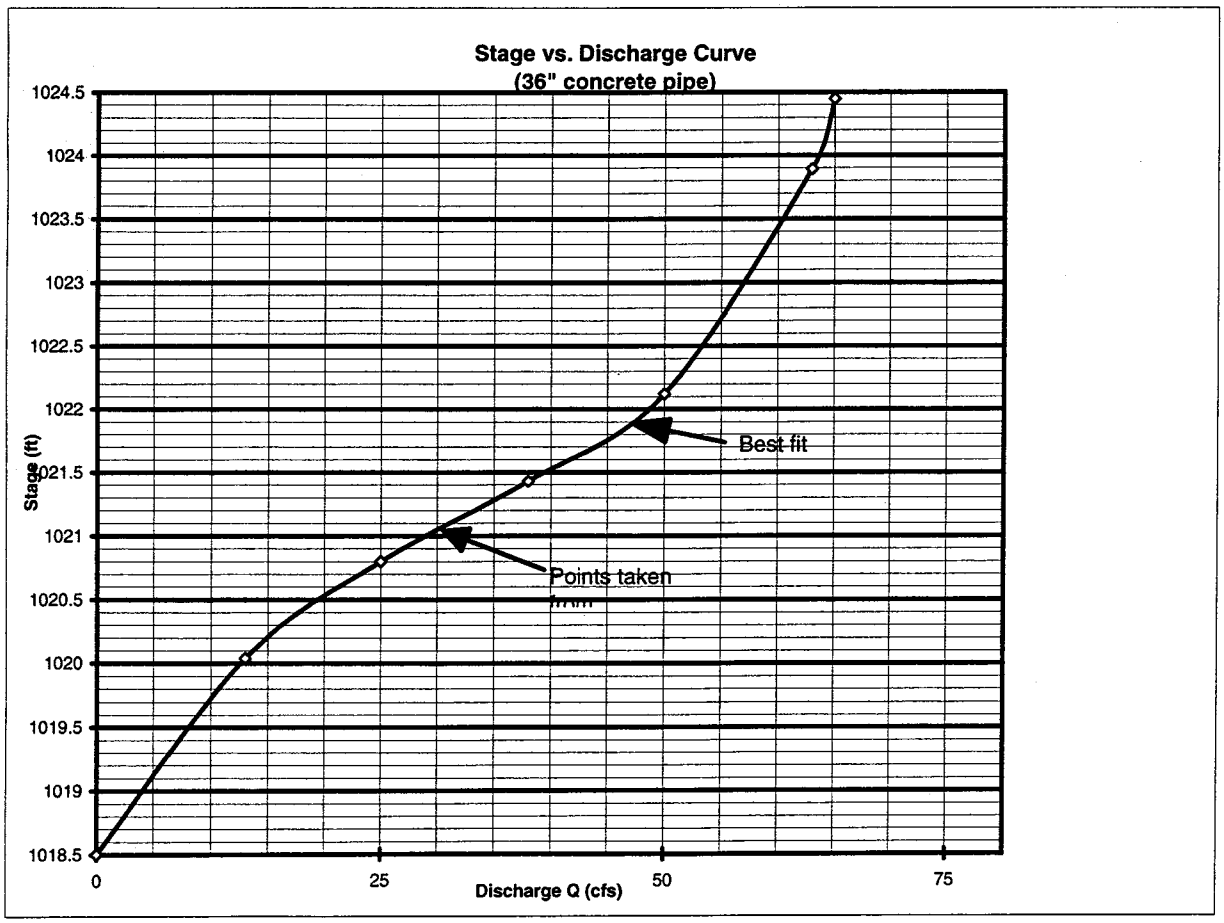
1022.5	54.0	51.79
1023.0	57.0	60.26
1023.5	61.0	68.82

* Denotes Storage in Drop Structure
1. Extrapolated from Curve below.
2. Taken from Stage Volume Calculations PCD Conditions Curve.



Modified Inlet Analysis

$Q = C_w L H^{3/2}$

Assume $\mathbf{C_w}$ = 3.0

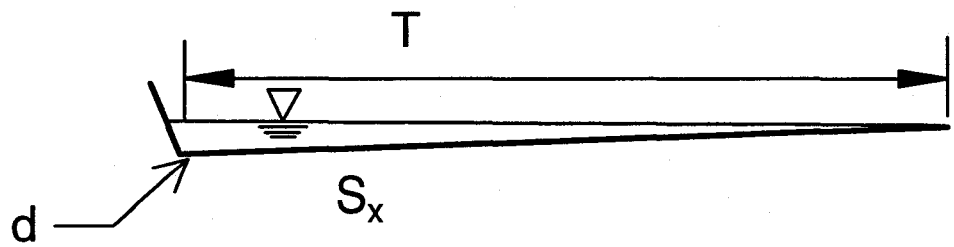
L = 7.75 ft.

DEPTH H (ft)	WEIR Q (cfs)	COMPARISON WITH 36-INCH PIPE Q = (CFS) *
0.00	0.0	0.0
0.50	8.2	12.0
1.00	23.3	18.0
1.50	42.7	27.5
2.00	65.8	37.5
2.50	91.9	47.5
3.00	120.8	52.5
3.50	152.2	57.0
4.00	186.0	60.0

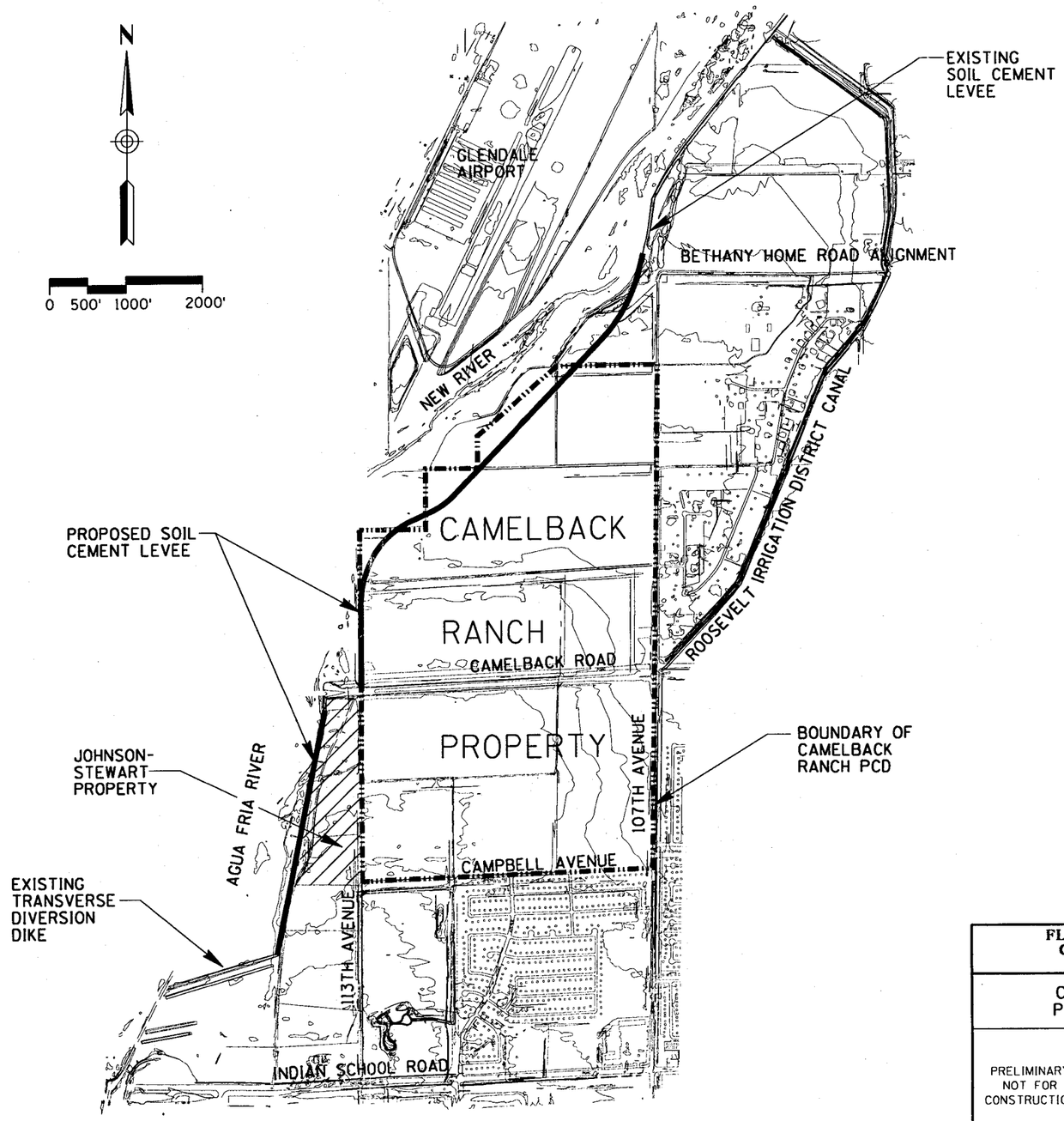
* TAKEN FROM STAGE/DISCHARGE/STORAGE TABLE.
NOTE: Q's for pipe discharge correspond for a depth of one foot deeper than the weir height H.

Depth of Impoundment Behind Levee

$$Q = (0.56/n)(S_x)^{1.67}(S)^{0.5}(T)^{2.67}$$



LEVEE SECTION	Sx ('/ft)	n	S ('/ft)	Q (cfs)	T (ft)	d (ft)
NORTH AREA	0.00012	0.040	0.00200	366	3080	0.37
SOUTH AREA	0.00033	0.040	0.00170	145	1192	0.39



FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

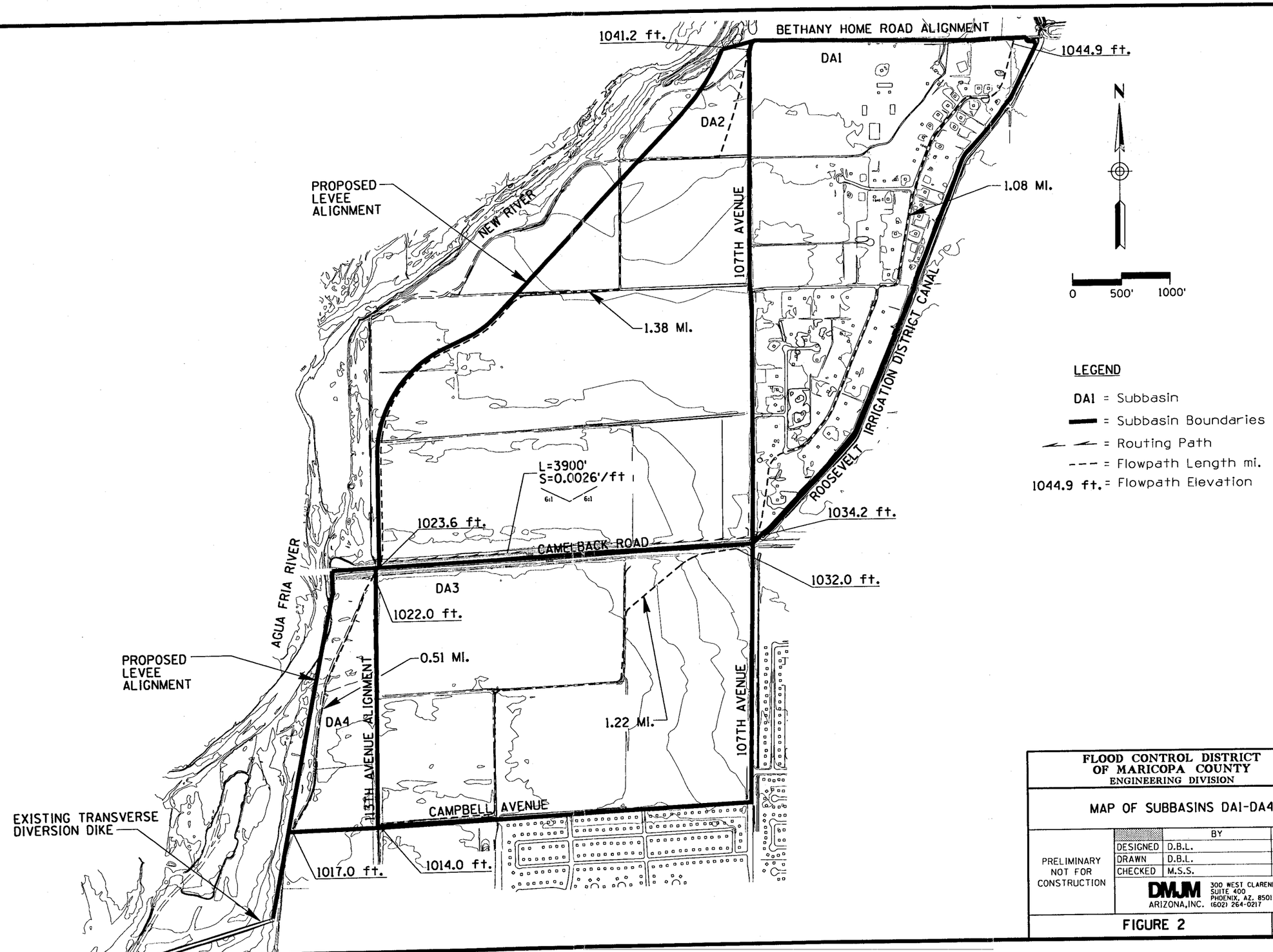
CAMELBACK RANCH PCD AND PROPOSED LEVEE ALIGNMENT

		BY	DATE
PRELIMINARY NOT FOR CONSTRUCTION	DESIGNED	D.B.L.	4/10/98
	DRAWN	D.B.L.	4/10/98
	CHECKED	M.S.S.	4/10/98

DMJM ARIZONA, INC.
300 WEST CLARENDON
SUITE 400
PHOENIX, AZ. 85013-3499
(602) 264-0217

FIGURE 1

PAGE 2



FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

MAP OF SUBBASINS DA1-DA4

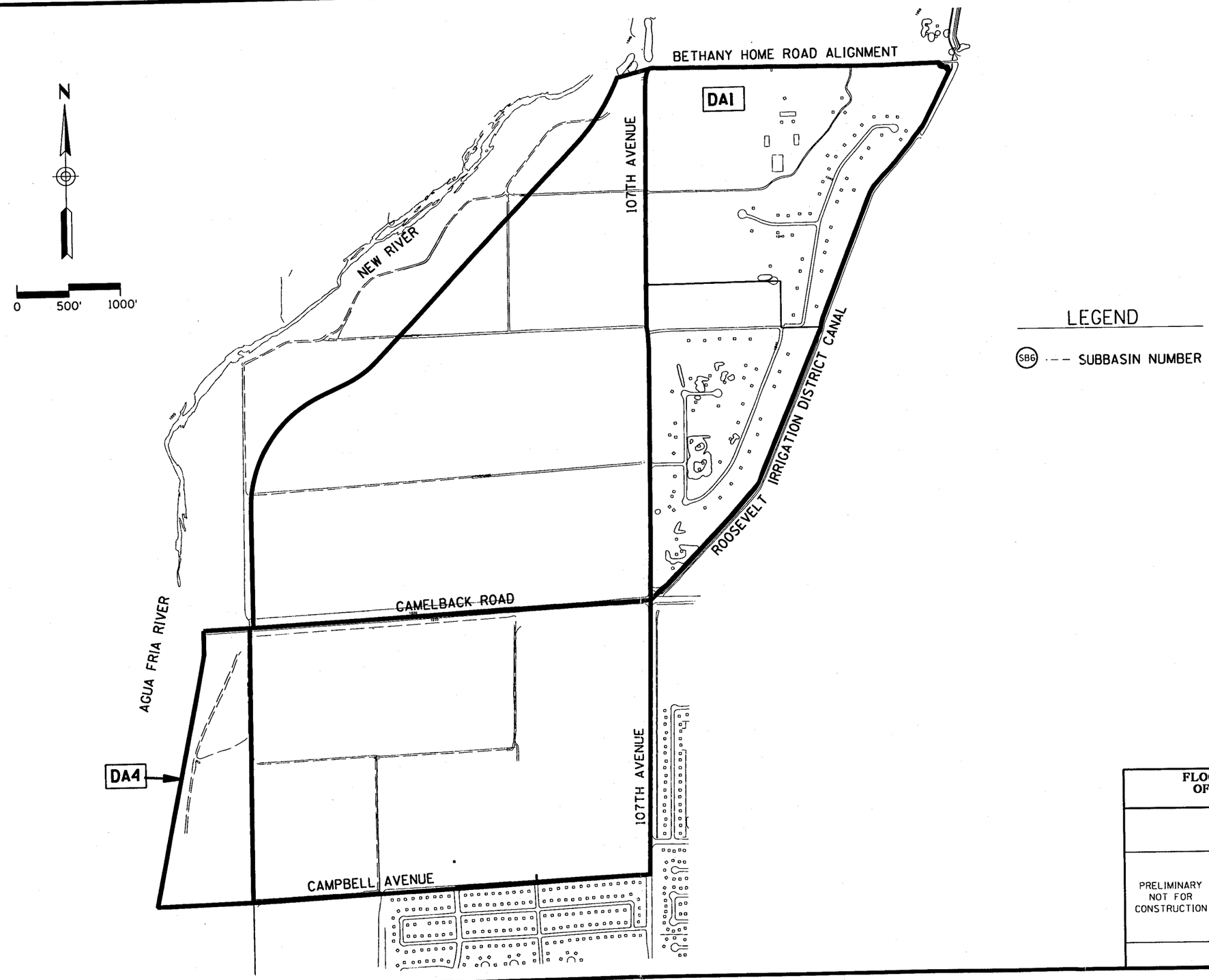
PRELIMINARY NOT FOR CONSTRUCTION

	BY	DATE
DESIGNED	D.B.L.	4/10/98
DRAWN	D.B.L.	4/10/98
CHECKED	M.S.S.	4/10/98

DMJM ARIZONA, INC.
300 WEST CLARENDON
SUITE 400
PHOENIX, AZ. 85013-3499
(602) 264-0217

FIGURE 2

PAGE 7



LEGEND

(SB6) --- SUBBASIN NUMBER

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

MAP OF SUBBASINS

PRELIMINARY NOT FOR CONSTRUCTION		BY	DATE
	DESIGNED	D.B.L.	4/10/98
	DRAWN	D.B.L.	4/10/98
	CHECKED	M.S.S.	4/10/98

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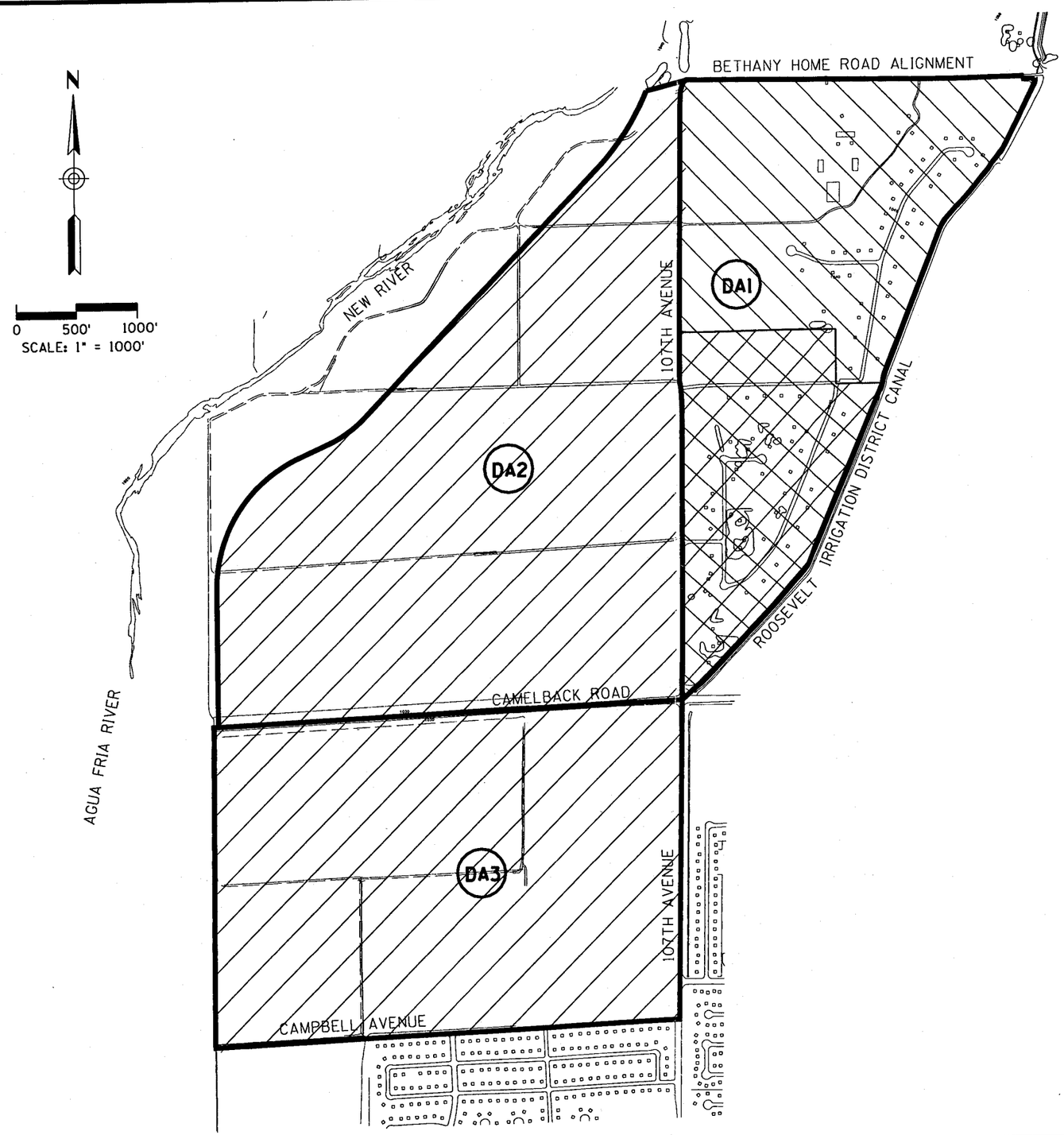
FIGURE 3



LEGEND

- = SUBBASIN BOUNDARY
- = LANDUSE BOUNDARY
- = LIGHT DENSITY RESIDENTIAL (L.D.R.)
- = Agricultural
- = VERY LIGHT DENSITY RESIDENTIAL (V.L.D.R.)

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

EXISTING CONDITIONS
LAND USE MAP

PRELIMINARY NOT FOR CONSTRUCTION

	BY	DATE
DESIGNED	D.B.L.	4/98
DRAWN	D.B.L.	4/98
CHECKED	M.S.S.	4/98

DMJM ARIZONA, INC.
300 WEST CLARENDON
SUITE 400
PHOENIX, AZ. 85013-3499
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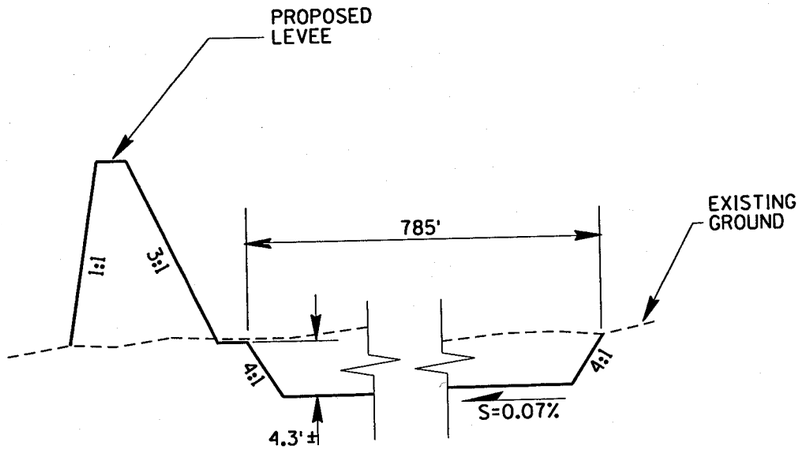
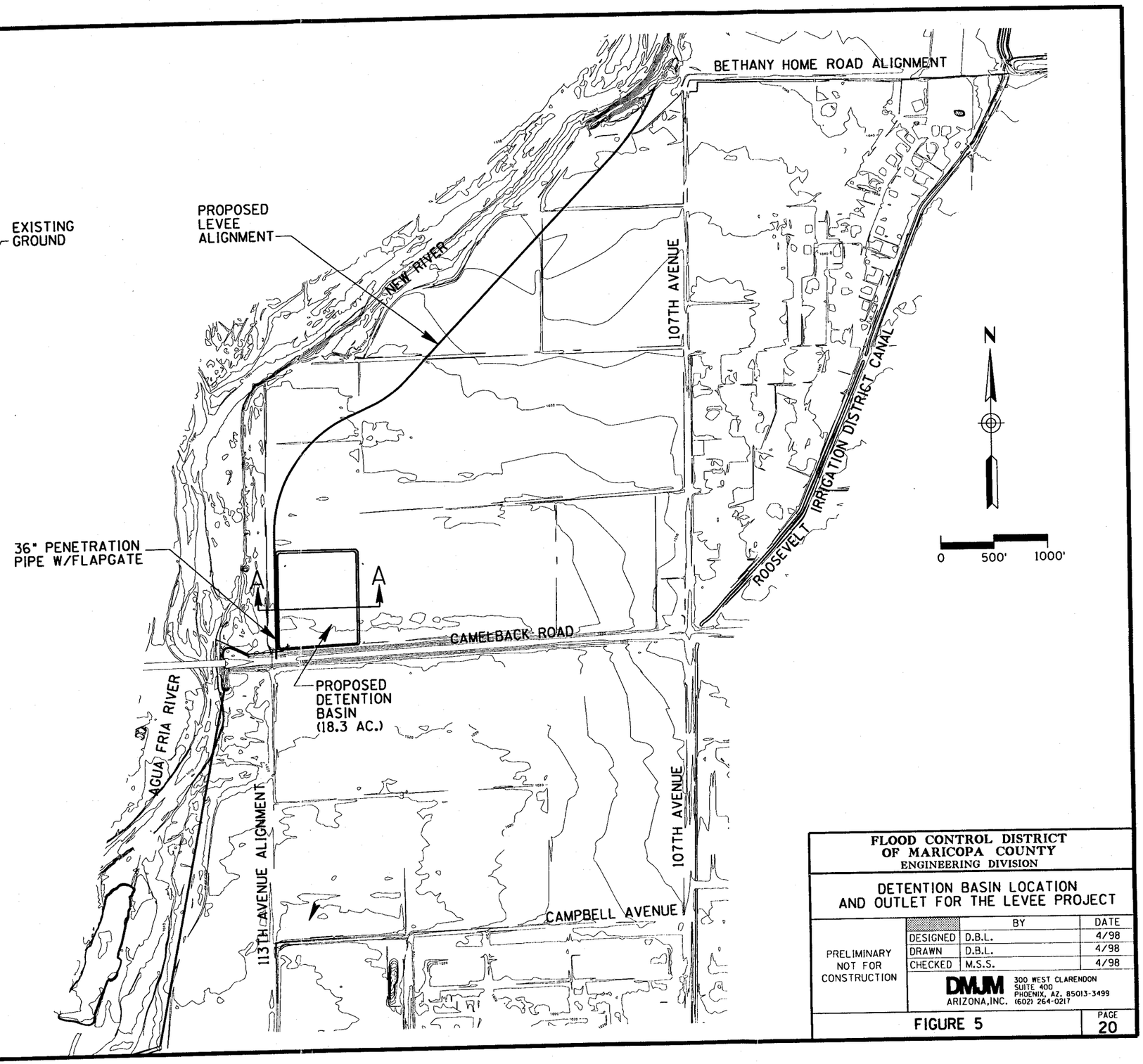
FIGURE 4



SECTION A-A
NTS



FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

DETENTION BASIN LOCATION AND OUTLET FOR THE LEVEE PROJECT

		BY	DATE
PRELIMINARY NOT FOR CONSTRUCTION	DESIGNED	D.B.L.	4/98
	DRAWN	D.B.L.	4/98
	CHECKED	M.S.S.	4/98

DMJM ARIZONA, INC. 300 WEST CLARENDON SUITE 400 PHOENIX, AZ. 85013-3499 (602) 264-0217

FIGURE 5