FLOOD CONTROL DISTRICT of MARICOPA COUNTY

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of
Maricopa County

GILA BEND CANAL FLOODPLAIN DELINEATION STUDY

Gillespie Dam to Gila Bend

FCD 90-06

HYDROLOGY REPORT

NOVEMBER, 1991

Donohue ENGINEERS ARCHITECTS SCIENTISTS

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HYDROLOGY REPORT

GILA BEND CANAL
FLOODPLAIN DELINEATION STUDY
Gillespie Dam to Gila Bend

PREPARED FOR

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

November , 1991

Donohue & Associates, Inc.
Phoenix, Arizona
Donohue Project No. 18099

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I. INTRODUCTION

A. Background

The Flood Control District of Maricopa County (FCDMC) contracted with Donohue & Associates, Inc. on July 23, 1990, to conduct a floodplain delineation study of possible flood hazard areas resulting from the Gila Bend Canal System. The location of the study watershed, in southwest Maricopa County, Arizona, is shown in Figure 1. The watershed lies generally on the western slope of the Maricopa Mountains and the southern slopes of the Buckeye Hills. The berm on the east side of the Gila Bend Canal blocks drainage originating in the watershed lying to the east. Various spillway structures and culverts convey flow westerly past the canal and eventually to the Gila River.

This report presents the hydrologic methods and data used to compute present condition basin and subbasin discharge rates to be used in the hydraulic analysis and floodplain delineation portions of the study.

B. Location

The study area is the eastern side of a 23-mile long reach of the Gila Bend Canal beginning at Gillespie Dam on the north, in Section 28 of Township 2 South, Range 4 West, Gila and Salt River Baseline and Meridian, Maricopa County, Arizona. The south end of the study reach is the Town Limits of Gila Bend in Section 32, Township 5 South, Range 4 West.

The Gila Bend Canal lies east of the Gila River between Old United States Highway 80 (US 80) and State Route 85 (SR 85) with both roads parallel to the canal along most of the study reach. The distance from Old US 80 to the canal varies from approximately 75 feet to approximately 1/2 mile.

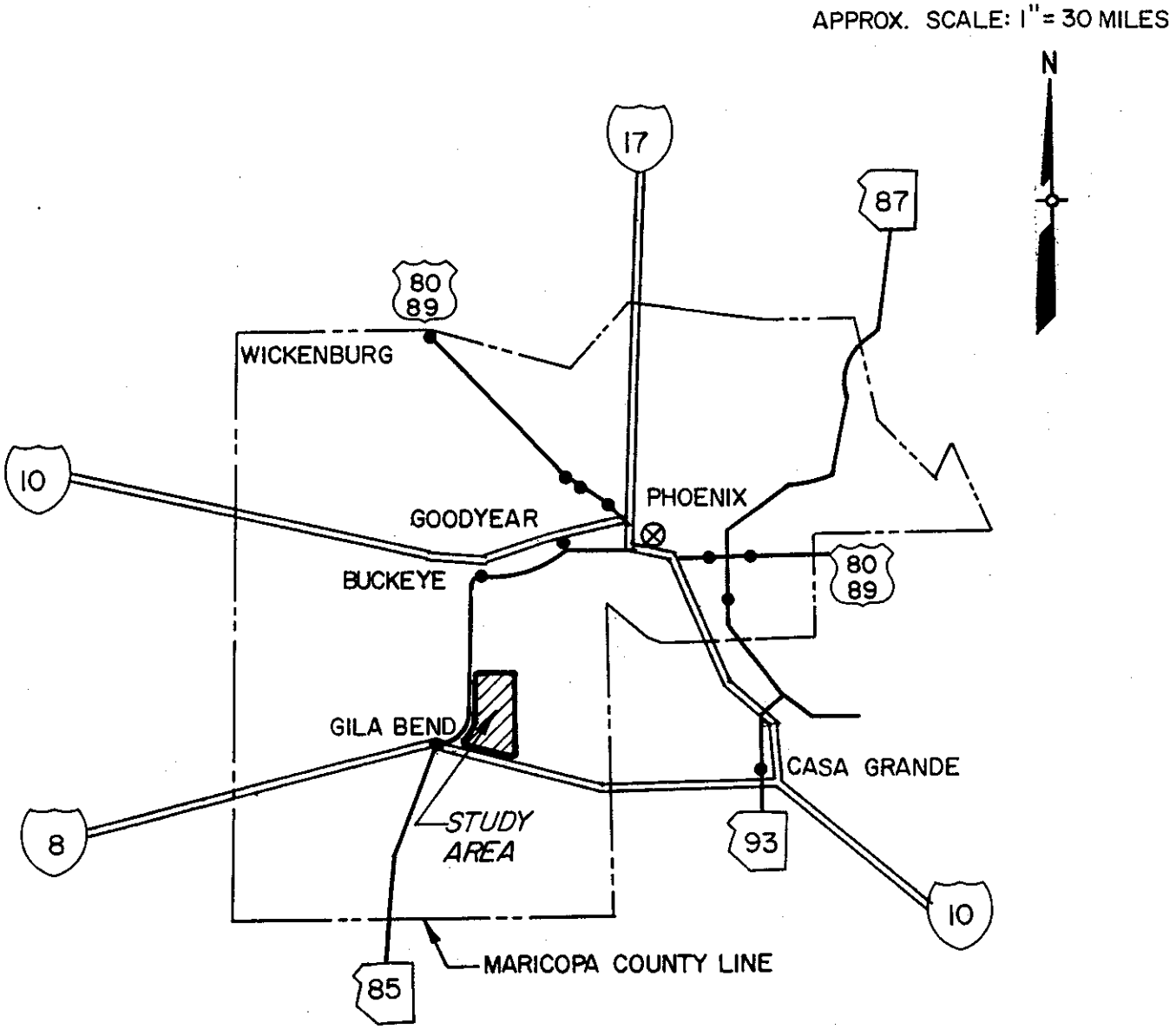

FIGURE 1
STUDY LOCATION MAP

GILA BEND CANAL FLOODPLAIN DELINEATION STUDY
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

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There are eleven inverted siphons located on the 23-mile reach of the canal. At each siphon, a spillway structure provides for cross drainage. Major washes, including Little Rainbow Valley Wash, Margie's Cove Wash, and Butterfield Wash, flow to the Gila River through three of the spillways. Additional cross drainage is provided through culverts, ranging from 24 inches to 60 inches in diameter, which pass under the canal. A lift station, 11.4 miles south of Gillespie Dam, lifts the canal flow 10 feet to provide adequate slope for the downstream reach of the canal.

C. History

1. Gila Bend Canal

The location of the Gillespie Dam at the upstream end of the Gila Bend Canal was known as the "Narrows" during the settlement of the area around Gila Bend and Arlington. The location was thought to be the prime location for a water storage facility at the time the Morman battalion settled Gila Bend.

Plans were drawn for the canal in 1874, although local officials and farmers claim the canal was in existence before that date. It was built to convey water from the Gillespie Dam downstream 46 miles to irrigate crops of the former Theba Ranch, which may have also been known as the Gillespie Ranch and is now called La Paloma Ranch.

The Canal and its right-of-way have been passed on through various owners. Although the dam bears the Gillespie name, the dam and canal are purported to have been built by others at a time earlier than the Gillespie ownership. The current owner of the Canal, dam, and right-of-way is La Paloma Ranch. The original canal was an earthen structure. The concrete lining that now exists was constructed around 1975. A search for records and "as-built" plans of the current canal was unsuccessful.

2. Woolsey Peak Flood Protection District

A history of flooding and damage to property and crops downstream of the canal has resulted in litigation between the canal owners and adjacent property owners due to attempts to control flows. The Woolsey Peak Flood Protection District was formed as a vehicle to control flooding and reduce resulting damages.

The district is a legal subdivision of Arizona State Government whose boundaries are approximately coincident with the watershed boundaries of the study area. Results of analysis conducted in this project are being shared with the District Board of Directors.

D. Authority

The Flood Control District of Maricopa County is obligated under Federal Law and Arizona Revised Statutes to perform floodplain management and oversight of floodplain uses, such as land development, gravel mining, and others, in order to maintain requirements for flood insurance provided by the Federal Emergency Management Agency (FEMA) in Maricopa County and other entities falling within its jurisdiction. It is by this authority that projects such as the Gila Bend Canal Floodplain Delineation Study are conducted; to define floodplains and to insure that activities within flood hazard areas are regulated in accordance with FEMA requirements.

E. Purpose

The purpose of this study is to define areas of flooding upstream of and associated with the Gila Bend Canal east berm. The level of detail and methods of study are appropriate to floodplain management and regulation in Maricopa County. The floodplain delineation will be prepared accordance with guidelines of the Federal Emergency Management Agency (FEMA) and the Arizona Department of Water Resources (ADWR).

This Hydrology Report presents the data collection and hydrologic analysis used to develop basin flows which arrive at the potential flood prone areas adjacent to the east berm of the canal. This report only covers development of subbasin runoff and routing of flows to the point where they reach the canal. The analysis of flow through the canal cross-drainage structures and storage in ponding areas along the canal berm are addressed in a companion report titled Hydraulic Analysis and Floodplain Delineation.

F. Scope of the Hydrologic Study

The hydrologic analysis for the project provides flow hydrographs based on the 100-year rainfall for use in the subsequent hydraulic analysis. The hydrologic analysis primarily consists of collection of relevant data and preparation of a HEC-1 hydrologic model to compute watershed flows arriving at the flood hazard area of interest. In addition, the hydrology of Little Rainbow Valley Wash has been analyzed in sufficient detail for future hydraulic study of areas beyond the study area. The scope of work for activities in the project leading to preparation of this Hydrology Report is provided in the following Technical Scope of Services.

A. <u>PROJECT MANAGEMENT/COORDINATION/QUALITY CONTROL</u>

1. Prepare a project plan that includes the work tasks, schedule, duration and responsible team members.

2. Meet with the District on a regular basis at approximate three week intervals.

3. Conduct quality control reviews throughout the project.

B. DATA COLLECTION

General Data

1. Contact pertinent agencies and collect available data. Contacts will include the District, ADWR, SCS, USGS, COE, FEMA, ADOT, the Woolsley Flood Control District, Gila Bend and the La Paloma Ranch. Data to be collected will include flooding information, soils data, available mapping, and pertinent studies and designs.

2. With the assistance of the District, meet with representatives of the La Paloma ranch to inform them of the project and obtain information regarding the canal including: design plans, problems, sedimentation, flooding and ponding areas, standard operation and maintenance procedures.

3. Conduct an initial field reconnaissance with the assistance of the District to verify the mapping approach, to identify general survey requirements, to determine any necessary modifications to the project plan, and to select critical flow locations (concentration points) in the watershed.

4. Define the mapping limits and coordinate the mapping with the aerial subconsultant. The mapping limits will be defined as a 2500 foot-wide strip extending from I8 to the Gillespie Dam (the "study length"). Ponding areas will be defined at those locations with an overflow culvert or "spill-through" that have significant storage. The overflight coverage will extend over this entire area. Mapping will be obtained to produce 1"=100' scale digital mapping at two foot contour intervals. (See topographic mapping task.) Hard copy maps will be provided at a scale of 1"=400'.

5. Conduct a detailed field reconnaissance of the canal and watershed including the following:

   - Select cross section location
   - Measure sizes of accessible overflow and cross drainage structures.
   - Select roughness coefficients of the canal, channel routing reaches and cross section locations.
   - Photograph structures, cross section locations, accessible routing locations, and ponding areas
   - Sketch structures for field survey.
   - Identify diversion berms.
   - Verify land use and cover.

Field Survey

6. With the assistance of the District, notify property owners and obtain necessary rights-of-entry for the study area.

7. Conduct an initial field survey to set control for the aerial mapping, to establish Elevation Reference Marks (ERM), and define canal overflow elevations. Overflow elevations will consist of spot elevations along the top of the east and west canal berms at appropriate intervals to determine elevations where water could leave or enter the canal. Permanent ERMs will be provided at approximately one mile intervals.

8. Survey the hydrologically-hydraulically significant cross-drainage structures, spill-throughs, bridges, and canal siphons. Since it is unlikely the canal can be dewatered, the structure surveys will be based on available design information and the information that can be obtained by the field survey crew from above the water.

9. Survey up to 6 typical canal cross sections using a boat or rubber raft, if necessary. Canal inverts will be obtained upstream and downstream of the siphons, and at approximately 2500 foot intervals along the canal.

10. Obtain water surface elevations at 2500 foot intervals along the canal, and upstream and downstream of each siphon.

11. In a level of detail consistent with HEC-1 input requirements, survey up to 15 normal depth routing cross sections. These cross sections will be used to prepare the normal depth routing sections to be used in the HEC-1 analysis.

12. Survey work will be conducted to meet or exceed Federal Emergency Management Agency (FEMA) minimum criteria as defined in FEMA Document 37, Flood Insurance Study Guidelines and Specifications for Study Consultants, Appendix 4, September 1985.

13. Surveys will be based on the National Geodetic Vertical Datum (NGVD). ERM's will consist of existing monumentation, such as brass caps or similar survey monuments. Where additional monumentation is needed, survey markers conforming to the Maricopa Association of Governments (MAG) Uniform Standard Detail for Public Works Construction, detail 120-1, Type C, will be placed 2"± above grade. ERM's will be labelled on available maps and described in a manner which allow them to be readily located in the field.

Topographic Mapping

14. Prepare digital topographic mapping to a 2-foot contour interval, at a 1"=100' scale, with spot elevations on section line and mid-section line roads. The mapping will extend along the study length of the canal at a 2500 foot width.

15. Provide stereo photo coverage of the 2500-foot wide mapping area, the area south of Patterson Road between the canal and SR 85, and approximately ten square miles of additional coverage in areas where watershed divides are not readily discernible from the USGS mapping.

16. Ground Control:

   a. Provide survey control for the aerial mapping. Quality control on surveys will be per FEMA 37, Flood Insurance Study Guidelines and Specifications for Study Consultants.
   b. Set panel points and establish horizontal and vertical control throughout the area to be mapped. Where readily available, surveys will tie into the State Plane Coordinate System. Field control will be sufficient to readily allow for compilation of maps by the aerial survey subconsultant at the desired map scale and contour interval and will be based on the National Geodetic Vertical Datum (NGVD).
   c. Locate and mark the horizontal and vertical control points. The controls for the area mapping will be in sufficient numbers and will be in locations compatible with the accuracy of the mapping requirements. The controls will be of at least third order accuracy. Section corners, quarter corners, and mid-section points will be used for control points wherever possible.

17. Develop digital contour and planimetric data for the project in Auto CAD DXF or Intergraph ISIF ASCII format, as specified in Autodesk, Inc., publication TD106-009 (May 7, 1986) or Intergraph publication DIX4110 (May 12, 1985). Layer names and graphics attributes will be documented as appropriate. The delivered DXF or ISIF files will be compatible with the requirements, and subject to the limitations of, the ESRI DXFARC or the ESRI SIF2ARC software translator as detailed in the January 1989 release of the "ARC/INFO Users Guide". File deliveries will be in ASCII format on industry-standard 1/2" magnetic tape, 2400-foot reels, written in a generic unlabeled COPY format, with specified record-lengths and block sizes, or in any other appropriate format acceptable to the Consultant and the District.

18. Provide 1" = 100' scale digital topographic maps that can be used to evaluate the ponding areas.

19. Provide non-erasable topographic mylar base sheets, 24" x 36", with a scale of 1-inch equal to 400 feet, with a contour interval of 2 feet for all mapping with the exception of section line roads which will have spot elevations. Provide a cover sheet with the project title, date of topographic mapping, and a location map showing the geographic range covered by each specific mapping sheet. Each manuscript shall include a minimum of a north arrow, scale, section corners and quarter corners, current and proposed streets and Highway names, State Plane Coordinate System, major drainage features, corporate boundaries, cross section lines, channel station centerline, index map, description and elevation of control points and ERMs, and reference marks used in ground control. The mapping will have an accuracy such that ninety percent (90%) of all contours shall be within one-half contour of the true elevations and the remaining ten percent (10%) of the contours shall not be in error by more than one contour interval.

20. Provide photographic overlay mylar sheets, 24" x 36", with a scale of 1" = 400', that correspond to the 400 scale base sheets.

Hydrologic Data

21. Prepare Hydrologic Work Maps at a scale of 1 inch = 2000 feet including: reproducible mylar overlay maps of: existing drainage patterns; subwatersheds; major flow paths; slopes: land use; and soils.

22. Develop cross sections as located in the field reconnaissance. The aerial subconsultant will provide cross sections in HEC-2 format. Cross sections will extend the width of the mapping at approximately 1000 foot intervals.

23. Characterize slope by defining general slopes across the watershed. Slopes will be characterized by general guidelines such as: steep (greater than 5%) moderate (less than 5% but greater than 1%); and mild (less than 1%).

24. Characterize land use and cover in the watershed based on the field reconnaissance and the aerial photography.

25. Reduce the available soils data and characterize infiltration potential across the watershed.

26. Prepare a technical memorandum that summarizes the data collection phase of the project and incorporates the results of the field reconnaissance. The technical memorandum will document the channel and routing reach photographs, roughness coefficients, and hydraulic structures.

27. Select flow output points (concentration points) based on guidance from the District and necessary flow inputs for the hydraulic analysis.

28. Select channel routing locations to construct and connect subwatershed models.

29. Account for channel infiltration losses based such sources as a comparison to similar gauged watersheds, typical literature values, and similar studies.

30. Delineate the overall watershed limits, subwatersheds and subbasins based on flow locations, routing locations, soils, land use, slope and topography.

C. HYDROLOGY

1. Formulate a hydrologic approach that results in development of the desired flows and volumes. Utilize the U.S. Army Corps of Engineers computer program HEC-1 and the District's Hydrology Manual to develop the hydrologic model. Discuss the specifics of our work plan and approach with the District prior to initiating any major hydrologic work efforts. Summarize the methodology to be used in developing the hydrologic parameters in a technical memorandum.

   The specific hydrologic techniques to be used in the analysis are:

   a. Rainfall: 100-year, 6-hour storm, with the District's distribution(s) for peak discharge and 100-year, 24-hour storm, with the SCS Type II distribution for peak volumes.

   b. Areal reduction: The rainfall will be areally reduced separately for critical flow output points as well as for the entire watershed. The Corps of Engineers Queen Creek areal reduction will be used with the 6-hour rainfall. NOAA HYDRO-40 will be used with the 24-hour rainfall reduction.

   c. Excess: Green - Ampt based on soils maps and guidance in the Hydrology Manual

   d. Unit Hydrograph: Clark & S-Graph. The Clark method will be used for sub-basins of less than 5 square miles or having a time of concentration of less than 1.5 hours. The S-graph will be used with sub-basins having an area of more than 5 square miles. For those sub-basins at the 5 square mile threshold, the time of concentration will be the over-riding factor in the selection of the method, as is appropriate.

   e. Time of Concentration: The Papadakis method will be used with the Clark unit hydrograph. If this method results in unsuitable times of concentration, another method will be used and compared to obtain a reasonable result. The S-graph lag equation will be used for the appropriate S-graph (Phoenix Mountain or Phoenix Valley) hydrograph.

   f. Routing: Normal depth routing. The cross sections will be developed from available mapping and selected survey data. The resulting velocities will be checked and modified if unrealistic.

   g. Transmission loss: Infiltration losses (and methodology) through channel bottoms will be estimated based on existing field data or literature.

2. Meet with the District to obtain approval of the District at each of the following steps.

   a) Soil and watershed boundaries
   b) HEC-1 parameter estimation
   c) HEC-1 schematic (Flow diagram)
   d) HEC-1 results

3. Prepare an interim Hydrology Report which documents the hydrologic model development. Following receipt of District comments and the results of the unsteady flow analysis, final flows and volumes will be incorporated into the report. The report will include the following sections.

   a. Scope of the study
   b. Description of the watershed
   c. Previous studies and reports
   d. Methodology
   e. Assumptions
   f. Results
   g. Comparison of the results with other studies and/or stream gauges.
   h. Conclusions
   i. List of references and agencies contacted

4. Report Tables and Figures

   a. Watershed location (11" x 17") fold-out map
   b. Table showing the peak flows and volumes at flow output points for different rainfall volumes and distributions
   c. Table showing the critical peaks and volumes at flow output points as compared to previous studies (if available).
   d. Spread sheet showing the subbasins and their major parameters (slope, area, friction, total rainfall, time of concentration or lag, major structures, etc.)

5. Appendix Tables and Figures

   a. Hydrologic work maps showing the subwatersheds, routing reaches, to calculation flow paths, major man-made structures, and references (i.e., street names, Township, Range, Section, etc.) at scale of 1:2000.
   b. Soils map at the same scale as the base map
   c. Land use map at the same scale as the base map.
   d. Schematic map for the HEC-1 model showing the sub-basins, the routing reaches and the order of combining the hydrographs.
   e. Pertinent data on hydrologically/hydraulically significant structures in the watershed.

II. WATERSHED DESCRIPTION

A. Boundaries

The study watershed is bounded by the Buckeye Hills to the north, the Maricopa Mountains to the east, and U.S. Interstate Highway 8 on the south as shown in Figure 2. The Gila Bend Canal forms the western boundary of the study area. The combined drainage area is approximately 297 square miles. Within the watershed, 18 basins have been identified and delineated.

Major basins were defined by starting from significant drainage features at the Gila Bend Canal and proceeding upstream. Significant drainage features used to start the delineation were eleven siphon spillways and the lift station spillway. Minor features, including small culverts passing under or into the canal, and significant ponding areas also were considered in forming major basin divides at the downstream boundary of the watershed.

B. Slopes

In general, the downhill slopes are towards the west and south and range up to a maximum 15 percent in the Maricopa Mountains and Buckeye Hills along the eastern and northern boundaries of the watershed. Slopes generally decrease moving west to SR 85. Flatter slopes of one percent or less prevail in the western and southern portions of the watershed. Much of the Little Rainbow Valley has slopes in the range of one to five percent. Agricultural areas have been graded by landowners to slopes that are virtually zero.

C. Soils

The Maricopa Mountains are typically granite. Alluvial soil derived from them are generally coarser grained. Three major soil group associations are found in the watershed all of which are Hyperthermic Arid. The soils are typical of watersheds with mean annual temperatures of more than 72 degrees and rainfall less than 10 inches. The soil groups include the Torrifluvients, the Gunsight-Rillito-Pinal, and the Lithic-Camborthids-Rock Outcrop. Most of the soils have characteristics of silty loam, with moderate runoff potential and high permeability.

D. Land Use

More than 90% of the watershed is undeveloped desert or mountainous landscape. There are two designated wilderness areas, the North and South Maricopa Mountains Wilderness Areas, comprising almost half of the watershed within the study area boundaries. Land use of the remaining area is primarily agriculture with the exception of two other minor land uses. The first is the Ski Lake Development, which was built in 1989 in Basin 7 one mile south of Woods Road abutting the east bank of the canal. The second is the proposed Southwest Regional Landfill, east of SR 85 and north of Little Rainbow Valley Wash. The landfill is being developed by the Maricopa County Landfill Department.

E. Drainageways, Washes and Channels

Much of the watershed is drained by small channels which tend to converge and diverge in a braided network. There are few well-defined channels other than the three major washes: Little Rainbow Valley Wash in basin 4, Margie's Cove Wash in basin 7 and Butterfield Wash in basin 15. These washes, particularly Little Rainbow Valley Wash, form significant channels of large capacity as they approach SR 85 and the

canal. In other basins, channels continue to be braided and distributory even as they pass to the west of SR 85 arriving at the canal berm and cross-drainage structures in many distinct flow paths. In agricultural areas, landowners have constructed a system of drainageways to convey storm flow around crop land and to provide tailwater drainage.

F. Hydraulic Structures

Because the area is largely undeveloped, few significant hydraulic structures are present. The only structures in the watershed are numerous culverts under SR 85 and the cross-drainage structures in the canal. Analysis of the capacity of and ponding area behind typical SR 85 culverts showed these structures would not have significant impact on flows crossing the highway.

The only significance of cross-drainage structures in the canal to watershed hydrology is their use in subbasin delineation. The effects of these structures is considered in detail in the report on hydraulic analysis and floodplain delineation.

III. DATA COLLECTION

A. Previous Reports and Studies

A review was made of available reports and studies which could be readily obtained from FCDMC or through contacts with various Federal, State and local agencies. A brief synopsis of pertinent reports is provided in the following.

An Inventory Report on the Woolsey Peak Flood Protection District, (ADWR, 1990) provided a summary of watershed characteristics and a small sample of recorded flood flows. An approximate watershed delineation and hydrologic analysis is also presented in the report. The focus of

the report however, is the need for regulation of development and improved floodplain management. One conclusion is that detailed hydrologic and hydraulic analysis, such as performed in this study, is needed in the Flood Protection District's watershed.

The Corps of Engineers report, "Gila River and Tributaries - Central Arizona Water Control Study Hydrology Report," (1982), contains general information suitable for system-wide planning. However, little specific information on the Gila Bend Canal is presented in this report

A Flood Insurance Study (FIS) has been prepared for the Gila River between the Gillespie Dam and Gila Bend by Cella Barr Associates (1990) for the FCDMC. According to the study, the floodplain of the Gila River does not impinge or cause backwater on the Gila Bend Canal cross drainage structures. FCDMC has also sponsored a separate hydrology study for the Sand Tanks and Bender Wash area south of and abutting this project. The U.S. Soil Conservation Service (SCS) has prepared a detailed soils inventory of this area which is not yet published but includes the entire watershed. A draft version of this soils inventory was obtain for use in this study.

The "Final Drainage Study for Ski Lake Development" by Steele Engineers, (1989), presents limited analysis for a reservoir recently constructed in basin 7. The analysis is considered inadequate according to ADWR comments (in the Woolsey Peak Inventory Report) hence no results of the study were applied to the present study.

B. Available Mapping

Hydrologic work maps for this study were constructed from USGS 7.5 minute topographic maps. The following quadrangle maps, dated 1973, combine to cover nearly the entire study area:

Bighorn
Bosque
Buckeye
Butterfield Pass
Cotton Center NW
Cotton Center SE
Estrella
Gila Bend
Hassanapa
Margie's Peak
Spring Mountain

A small portion of the watershed, in the extreme southeast, was not covered by 7.5 minute mapping. The Estrella 15 minute quadrangle was used to develop work maps for this area.

Additional maps obtained and used at various points in the hydrologic analysis were the following:

- Maricopa County General Soils Map, SCS, 1973
- Soil Associations Map of Maricopa County, Maricopa County Planning Dept, 1977.
- Paloma Ranch Location and Property Map.
- Geologic Map of Quarternary and Upper Tertiary Alluvium, Phoenix South 30 x 60 minute Quadrangle, Arizona Geological Survey (AGS), 1989.
- Geologic Map of the Maricopa Mountains Central Arizona, AGS, 1987.
- Geologic Map of Maricopa County, Arizona Bureau of Mines, 1957
- Surface Management Status, Phoenix South 30 x 60 minute Quadrangle, Bureau of Land Management, 1981

C. Photogrammetry

An aerial survey was conducted on the portion of the study area where the floodplain delineation was to be performed. The purpose of the aerial survey was to develop topographic maps, according to FEMA standards, to be used as work maps in the floodplain delineation. The area mapped is a strip of land, 23 miles long and 2500 feet wide, along the length of the canal from Gillespie Dam to SR 85. Approximately 2000 feet of the mapped width is east of the canal. Stereophoto coverage of the mapped area was also provided.

Aerial photography was performed on two flight dates using a Wild RC10 first order camera. Nine flight lines were established to produce a photo scale of 1 inch equals 600 feet. Ground control panels were set to match the flight lines. Additional control was generated by computer during the analysis process. Stereo models were bridged on a Wild Aviolyt BC2 first order stereo plotter to establish the additional computer generated control and to check the field control.

Map compilation was based on a target scale of 1 inch equals 400 feet and a contour interval of 2 feet. The area of mapping coverage was 2000 feet to the east (upstream) of the Gila Bend Canal and 300 feet to the west. Mapping was produced to meet National Map Accuracy Standards. Field map checking was performed in accordance with survey and photogrammetry requirements of the State of Arizona.

D. Field Survey

Field surveys were conducted to accomplish several objectives. Initially, the objectives were to provide ground control for the aerial mapping, to establish elevation reference marks as required for FEMA work maps and to establish temporary benchmarks for use in later surveys for collection of hydrologic and hydraulic data.

Horizontal Control for the project is based on the Arizona State Plane Coordinate System, Central Zone, N.A.D., 1983. Field work was performed in meters and adjusted to grid using a combined factor of 0.9999285. Coordinates were converted to Arizona Department of Transportation (ADOT) Modified Grid in feet using the following factors:

- The ADOT modified conversion factor for Maricopa County is 1.00016.
- Arizona Revised Statutes state the International Survey Foot shall be used on all surveys in Arizona. In accordance, one meter is equal to 100 divided by 30.48 feet. Project datum is not on true ground distances because of project elevation and position within the Central Zone. The grid value to project datum conversion factors is as follows: Grid value to project datum equals grid value times 100 divided by 30.48 times 1.00016.

Vertical Control is based on United States Coast and Geodetic Survey benchmark line 361 (A361 through T361). The elevation of T361 was used as published, 751.248 feet. Elevations of benchmarks S361 through A361 were found by computing differences in elevation according to new field work by N.O.S. in 1981.

Ground control for the aerial mapping was established by a system of 114 horizontal control points and an extensive network of spot elevations and cross-sections across the width of the mapped area.

Temporary benchmarks (TBM) were set at intervals of approximately 500 feet beginning at the north end of the project. Spirit level traverses were run through them and adjusted to the benchmarks of line 361. Closures were made to meet Third Order requirements. Elevation Reference Marks (ERM) were set at a minimum of one mile intervals and standard point descriptions were written for inclusion on the work maps.

The primary purpose of the hydrologic field survey was to obtain channel cross-section data for Little Rainbow Wash and Margie's Cove Wash where routing would be required in the hydrologic model. The culverts and road profile of SR 85 were also surveyed so that the significance of the structures could be determined in the analysis.

The field survey for hydraulic analysis was more extensive. This work included survey of the entire lengths of the crest of both canal berms, cross-section surveys of the siphon and pump station spillways and survey of the invert elevations of each cross-drainage culvert. Also, elevation data was collected within the Gila Bend Canal including several typical canal cross-sections, the upstream and downstream canal inverts at each siphon, and bridge opening data at each of three bridge crossings.

E. Field Reconnaissance

Project engineers made several site visits to the study area to collect additional hydrologic data. Data collection on these visits included determination of the Manning 'n' value and verification of channel shape for routing reaches, verification of vegetation density and determination of subbasin divides and flow paths not evident on hydrologic work maps. Photographs of typical land covers and channel reaches were taken during field reconnaissance to document the observations.

IV. HYDROLOGIC ANALYSIS

A. Methodology

The study watershed was modeled using the U.S. Army Corps of Engineers HEC-1 computer program. The models were formulated to compute flows arriving at the canal at 19 flow concentration points. This section of the report describes development of inputs, formulation and calibration of the HEC-1 model.

The primary model inputs are rainfall, subbasin parameters, routing reach parameters and diversion rating curves. The 6-hour and 24-hour, 100-year precipitation events were modeled. The time distribution of rainfall was selected from the Hydrologic Design Manual of Maricopa County (FCDMC, 1990), for the 6-hour storm and the SCS Type II distribution was used for the 24-hour storm. For computation of surface runoff, the study watershed was delineated into 18 basins which were further divided into a total of 100 subbasins. Runoff rates from individual subbasins were determined by application of the Green-Ampt precipitation loss procedure and then flows were generated using unit hydrographs based on either the FCDMC standard procedure (6-hour storm) or the Phoenix Valley S-hydrograph method (24-hour storm). Subbasin flows were combined and routed as appropriate for the flow pattern in each major basin. In all, 87 channel routings are programmed in the HEC-1 models. Transmission losses in channel flow due to infiltration were included in all routings. Flows were assumed to be able to split and jump across basin or subbasin divides at five locations in the watershed. Each of these locations was represented as a diversion in the HEC-1 model.

The final phase in constructing the HEC-1 model is calibration/verification of modeled flows. Thorough calibration of the model is restricted because there are no flow recording gages operating in the watershed and no historical flow records were available. Therefore, the model was calibrated to yield flows that are consistent with 100-year flows estimated for six peakflow gages in or near the study area. Channel transmission losses was used as the calibration parameter in the adjustment of modeled flows.

B. Rainfall

The 100-year storm, 6-hour and 24-hour durations, are the precipitation events modeled in this study. Point precipitation values were derived according to procedures and data presented in Chapter 2 of the

"Hydrologic Design Manual", (FCDMC, 1990). Rainfall depths in the Manual were derived from Precipitation-Frequency Atlas of the Western United States, Volume VIII (NOAA, 1973). Derivation of the point rainfall amounts for this study is provided in Appendix A. The procedure involves constructing a straight line fit of the 2-, 5-, 10-, 25-, 50- and 100-year rainfalls as estimated from County isohyetal maps provided in the Manual. The adjusted 100-year rainfall is the depth indicated by the straight line fit. The 6-hour rainfall depth was determined to be 3.45 inches and the 24-hour depth is 4.20 inches.

Rainfall distribution curves were obtained from the Manual for the 6-hour duration storm. These curves were developed from the Queen Creek flood of 1954 by the Corps of Engineers. The SCS Type II storm distribution curve was used for the 24-hour rainfall event. Each rainfall distribution was implemented in the HEC-1 models using input on PC cards.

Areal reduction factors for the 6-hour storm were taken from Table 2.1 of the Hydrologic Design Manual. Areal reduction factors for the 24-hour storm were taken from NOAA Technical Publication 40, (1961), Figure 15. The depth-area reduction for both the 6-hour and 24-hour events was input on JD cards in the HEC-1 models. Derivation of the areally reduced rainfall is presented in Appendix A.

C. Basin Delineation

Major basin boundaries were delineated using United States Geological Survey (USGS) 7.5 minute topographic maps. Basin boundaries were traced upstream starting from the spillways or ponding areas identified as downstream concentration points. The delineation proceeded eastward of SR 85 and the Southern Pacific Railroad to the watershed divide. Criteria which were considered during the delineation included man-made features (such as roads) and the presence of homogeneous land use and

slopes. Generally, subbasins were delineated to define the drainage area to major flow paths. In some areas, this process created long, narrow basins having large areas. Such basins were broken into subbasins by defining subbasin boundaries at locations where changes land use or average slope occurred. Because of the distributory flow patterns, some boundaries were difficult to distinguish in many areas. Aerial photographs were used to aid in identification of dominant flow paths. Field reconnaissance visits were made to verify boundaries in areas where the boundaries were not obvious on the work maps.

The watershed was delineated into 18 basins which consist of 100 subbasins. Detailed maps of the subbasin boundaries are provided in Exhibit A. Subbasin areas are provided in Table 1. Subbasin sizes range from one-half to nine square miles with an average area of three square miles. In the central and southern parts of the watershed, several long, narrow subbasins were further subdivided into smaller areas so that channel routing effects could be represented in greater detail.

D. Precipitation Losses

Precipitation loss rates were estimated in HEC-1 using the Green-Ampt procedure. The required input parameters and corresponding HEC-1 variable names are initial loss (IA), volumetric moisture deficit (DTHETA), wetted front suction (PSIF), hydraulic conductivity (XKSAT), and percent imperviousness (RTIMP). The primary source of data for calculating these parameters was unpublished soils information obtained from the SCS field office in Buckeye presented in Table B1 of Appendix B. The draft soil survey was also obtained from the SCS field office in Buckeye. Data included soil unit delineations prepared on old aerial mapping and draft descriptions of most of the soil map units. The delineations were transferred to work maps provided as Exhibit B. The descriptions were used to compute Green-Ampt parameters for each soil type. Major and minor textural components of the soil were provided in

TABLE 1

SUBBASIN PARAMETERS

SUBBASIN NO.	DRAINAGE AREA (BA) (sq. mi.)	INITIAL LOSS (IA) (in.)	VOL. MOISTURE DEFICIT (DTHETA) (in.)	WETTING FRONT SUCTION (PSIF) (in.)	HYD. CONDUC. (XKSAT) (in / hr)	IMPERVOUS COVER (RTIMP)	LAG (min.)
1.1	0.868	0.20	0.26	7.40	0.14	7%	41
1.2	0.916	0.32	0.34	4.70	0.35	0%	29
2.1	2.900	0.25	0.23	8.41	0.08	12%	43
2.2	2.616	0.30	0.33	4.22	0.35	0%	81
3.0	3.781	0.28	0.31	4.66	0.30	6%	71
4.1	2.867	0.19	0.32	4.48	0.27	1%	79
4.2	2.041	0.16	0.30	4.06	0.26	1%	78
4.3	5.092	0.29	0.33	4.56	0.30	2%	83
4.4	3.870	0.18	0.31	4.02	0.27	0%	93
4.5	0.534	0.30	0.30	3.88	0.25	0%	49
4.6	1.827	0.28	0.30	5.52	0.25	6%	46
4.7	6.929	0.25	0.33	4.85	0.29	2%	83
4.8	6.467	0.33	0.31	5.44	0.26	4%	202
4.9	1.133	0.25	0.35	4.27	0.39	0%	31
4.10	2.924	0.29	0.28	5.11	0.23	4%	79
4.11	6.033	0.33	0.31	5.10	0.27	4%	98
4.12	2.364	0.32	0.33	4.18	0.34	1%	56
4.13	1.244	0.27	0.33	4.00	0.35	0%	79
4.14	3.628	0.29	0.28	6.18	0.22	8%	113
4.15	3.552	0.38	0.35	4.27	0.39	0%	64
5.0	3.165	0.44	0.35	4.26	0.40	0%	50
6.1	3.676	0.50	0.28	6.37	0.19	7%	69
6.2	0.444	0.39	0.35	3.98	0.34	0%	30
6.3	2.278	0.38	0.32	4.68	0.29	1%	34
6.4	0.599	0.50	0.35	4.03	0.35	0%	42
6.5	1.601	0.44	0.34	4.00	0.34	0%	55
6.6	3.642	0.29	0.26	7.27	0.15	9%	55
6.7	1.128	0.46	0.34	4.17	0.37	0%	51
6.8	0.366	0.35	0.31	3.87	0.29	0%	35
7.1	6.402	0.31	0.28	6.40	0.19	7%	66
7.2	4.324	0.33	0.27	6.71	0.18	9%	48
7.3	2.733	0.30	0.26	7.39	0.15	10%	78
7.4	3.254	0.28	0.27	7.17	0.17	12%	44
7.5	3.705	0.34	0.30	4.48	0.26	2%	69
7.6	2.103	0.35	0.31	3.80	0.30	0%	34
7.7	0.641	0.39	0.34	4.21	0.38	0%	30
8.1	3.377	0.26	0.24	8.16	0.11	12%	67
8.2	1.383	0.26	0.24	8.26	0.09	9%	31
8.3	3.049	0.31	0.26	6.92	0.15	7%	66
8.4	5.639	0.30	0.27	6.52	0.20	10%	61
8.5	1.627	0.28	0.24	8.24	0.10	13%	41
8.6	0.467	0.34	0.31	4.40	0.30	1%	48
8.7	2.538	0.33	0.27	5.72	0.20	5%	60

SUBBASIN NO.	BA (sq. mi.)	IA (in.)	DTHETA (in.)	PSIF (in.)	XKSAT (in / hr)	IMPERVOUS RTIMP	LAG (min.)
8.8	0.306	0.35	0.31	3.81	0.30	0%	22
9.1	2.249	0.35	0.29	3.84	0.25	1%	56
9.2	1.261	0.35	0.30	3.63	0.27	0%	30
10.1	4.633	0.30	0.25	7.64	0.10	6%	76
10.2	4.487	0.32	0.28	5.87	0.17	3%	63
10.3	0.288	0.35	0.31	3.82	0.31	0%	12
11.1	5.202	0.27	0.24	8.17	0.10	12%	69
11.2	5.642	0.34	0.28	4.97	0.21	2%	88
11.3	0.590	0.35	0.30	3.70	0.28	0%	39
12.1	4.063	0.27	0.23	8.41	0.09	14%	47
12.2	4.660	0.33	0.28	6.64	0.18	4%	53
12.3	8.894	0.35	0.32	4.48	0.29	0%	108
12.4	0.613	0.35	0.33	3.95	0.33	0%	31
13.1	5.139	0.31	0.31	5.65	0.30	17%	73
13.2	5.981	0.32	0.31	5.51	0.27	8%	94
13.3	4.433	0.29	0.25	7.43	0.13	9%	103
13.4	1.887	0.26	0.23	8.44	0.09	13%	33
13.5	6.259	0.32	0.31	5.57	0.26	5%	73
13.6	3.326	0.32	0.27	7.10	0.16	9%	59
13.7	9.100	0.35	0.34	4.04	0.33	0%	138
13.8	0.301	0.35	0.35	4.07	0.36	0%	19
14.1	2.378	0.28	0.28	6.80	0.19	13%	52
14.2	7.542	0.35	0.32	4.11	0.30	0%	174
14.3	0.280	0.35	0.35	4.08	0.36	0%	15
15.1	8.786	0.31	0.30	5.68	0.25	5%	95
15.2	1.022	0.35	0.32	4.94	0.23	0%	49
15.3	5.180	0.33	0.31	5.59	0.20	4%	122
15.4	0.801	0.35	0.32	5.11	0.20	0%	64
15.5	3.131	0.28	0.27	6.97	0.19	11%	70
15.6	4.455	0.27	0.26	7.62	0.15	13%	63
15.7	2.486	0.32	0.29	6.41	0.21	4%	29
15.8	5.479	0.35	0.34	4.16	0.33	0%	77
15.9	3.933	0.35	0.34	4.25	0.30	0%	88
15.10	0.709	0.35	0.34	4.32	0.30	0%	61
15.11	0.478	0.35	0.33	4.88	0.25	0%	35
15.12	2.901	0.32	0.30	6.07	0.24	5%	68
15.13	6.667	0.35	0.35	3.97	0.34	0%	122
15.14	2.416	0.30	0.29	6.46	0.23	9%	36
15.15	5.397	0.35	0.35	3.99	0.34	0%	123
15.16	1.893	0.30	0.26	7.33	0.16	11%	40
15.17	1.505	0.35	0.35	4.02	0.34	0%	70
15.18	6.607	0.35	0.35	4.01	0.34	0%	133
15.19	0.944	0.35	0.33	4.71	0.28	0%	75
15.20	1.094	0.35	0.32	5.18	0.19	0%	72
15.21	0.339	0.35	0.35	4.12	0.37	0%	15
15.22	0.271	0.35	0.32	5.14	0.20	0%	20
16.1	3.785	0.33	0.30	5.79	0.19	5%	74
16.2	1.623	0.35	0.32	5.15	0.19	0%	54
16.3	0.559	0.35	0.33	4.80	0.28	0%	36
16.4	0.156	0.35	0.33	4.79	0.28	0%	17
16.5	2.985	0.35	0.32	5.11	0.21	0%	88

SUBBASIN NO.	BA (sq. mi.)	IA (in.)	DTHETA (in.)	PSIF (in.)	XKSAT (in / hr)	IMPERVOUS RTIMP	LAG (min.)
16.6	2.062	0.35	0.33	4.94	0.25	0%	50
16.7	0.356	0.35	0.32	4.98	0.24	0%	19
17.1	7.085	0.35	0.32	4.80	0.25	0%	125
17.2	0.501	0.35	0.34	4.52	0.35	0%	22
18.1	1.635	0.35	0.32	5.09	0.21	0%	59
18.2	0.211	0.35	0.33	4.74	0.29	0%	15

the SCS descriptions and corresponding Green-Ampt values obtained from Table 4.2 of the Hydrologic Design Manual. Weighted averages were calculated for each soil as shown in Table B1. The range of values for each soil series with multiple symbols was checked to insure that a consistent soil type was specified.

Values of volumetric moisture deficit (DTHETA) for both dry and normal conditions were computed; however, for this study, the dry condition values were assumed to be appropriate throughout because the study area is a desert region.

Using the soils work maps, the area of every map symbol within each subbasin was planimetered and tabulated in a spreadsheet. An areally weighted average value for each of the four parameters (XKSAT, PSIF, DTHETA-dry and RTIMP) was calculated. The weighted average computations are shown in Table B2 of Appendix B and the results are summarized in Table 1. The XKSAT values in Table 1 are subject to adjustment for vegetation cover as described below.

Adjustments were made to the hydraulic conductivity parameter for vegetation cover according to the procedure described in Section 4.4.1 of the Hydrologic Design Manual. The value of XKSAT was adjusted for each subbasin based on the percent density of vegetation cover. Percent density was visually estimated using aerial photo maps and field observations by comparison to twelve transects obtained from ADWR. The transects were located on the aerial quads so that areas of similar density could be identified. The transect densities ranged from 10 to 44 percent, and included plants such as creosote, saguaro, bursage, palo verde, ironwood, cholla, ocotillo, and burroweed. Transect data and a transect location map are provided in Appendix B. Photographs of vegetative cover in representative areas are also provided in Appendix B. Adjustment computations for vegetation effects on XKSAT are summarized in Table B3.

The initial loss parameter (IA) was calculated for each basin using slope and land use information shown in Exhibits C and D respectively. The basins were divided into areas of mild (less than 1 percent), moderate (1 percent to 5 percent), and steep slopes (more than 5 percent), and areas of each slope within each subbasin were tabulated. Land use, specifically irrigated agriculture, was also defined for each subbasin and tabulated. Initial loss values were obtained from Table 4.1 of the Hydrologic Design Manual, and a weighted average based on slope and land use was computed. Land is either given a slope designation or was in agriculture. Land area under agriculture, if any, was subtracted from the mild slope area using the assumption that irrigated agriculture was generally on level ground. The data used to perform the weighted average computations is provided in Table B4.

Weighted average computation of the percent impervious area (RTIMP) for each subbasin is included in Table B2. The percent impervious was also developed from the SCS soil description where percent rock and hard pan was identified. With the concurrence of FCDMC staff, the impervious area was assumed to be one half of the percent rock or hard pan based on field observations and past experience.

E. Unit Hydrograph

Unit hydrographs were entered in HEC-1 by way of UI card input. The required UI input was generated using the MCUHP2 computer program provided by FCDMC. This program derives unit hydrographs for a particular duration of rainfall excess using an S-hydrograph subtraction technique. The program is coded with two standard S-hydrographs: the Phoenix Mountain and Phoenix Valley S-graphs. The Phoenix Valley S-graph was used for all subbasins. The required inputs for unit hydrograph computation from an S-hydrograph are the subbasin area, subbasin lag time and the duration of rainfall excess. For HEC-1, the duration of rainfall excess is simply the time step because HEC-1 initiates a new partial runoff hydrograph at each time step whose flows

are added to the coordinates of hydrographs from previous time steps to derive the total runoff flow.

The lag time for each subbasin was calculated using Hydrologic Design Manual Equation 5.11 and is presented in Table 1. Subbasin flow paths on which the lag times are based, are shown in Exhibit A. Physical data for lag time calculations was obtained from the Exhibit A work maps as well. This data included flow path length, slope of the flow path and an approximation of the length along the flow path from the basin centroid to the outlet. Basin roughness, K_n, was estimated to vary between 0.05 and 0.07, with the extremely rugged areas, such as in the Maricopa Mountains, being 0.07 and the agricultural areas assigned a roughness of 0.05. As a check for reasonableness of the computed lag times, average velocities were calculated using the flow path lengths and computed lag times and varied between 2 and 7 feet per second. Data used to perform calculations according to equation 5.11 are provided in Table B5 in Appendix B. Basin lag times compared favorably to values found in the Flood Hydrology Manual, (US Bureau of Reclamation, 1989), Table 4.3 titled Unit Hydrograph Lag Data for the Southwest Desert.

F. Channel Routing

Channel routing introduces time lag and peak attenuation in the subbasin hydrographs. The attenuation is accomplished through channel storage and volume reduction resulting from channel infiltration. The routing procedure was the HEC-1 normal depth storage routing. Transmission losses which occur due to channel infiltration were a primary concern during the development of routing inputs and eventual determination of downstream outflows at the canal berm. The channel routing parameters are intended to represent average conditions in the reaches. They were developed using field information, available topographic maps, and engineering judgement. The stages and flow widths resulting from these routings are not intended to indicate actual flood conditions. Typical flow paths in the study area consist of numerous small, shallow channels

which divide and recombine frequently and randomly. The density of the individual channels is consistent through the routing reach but there is no single continuous flow path. These situations are called "distributed flow" channels.

For well-defined channel flow, such as occurs in Little Rainbow Valley Wash, normal depth routing sections were developed from field measurements and visual inspection. Nine channel cross-sections were obtained along Little Rainbow Wash and two were obtained in Margie's Cove Wash.

For distributed flow channels, an alternate method was developed to estimate the routing parameters. The flow in these reaches tends to move in multiple sand bottom channels uniformly distributed across the width of the basin. During a field review of the area, it was noted that flows are shallow, with little evidence of flow depths greater than 2.0 feet, indicating that flows within the distributed flow channels were typically confined to the individual channels. Three representative sections were obtained in Basins 4, 7, and 13 to verify that flow depths were shallow and that the total channel width was estimated with reasonable accuracy. Using the Exhibit A work maps, a representative section was chosen for each routing reach. The number of channels crossing this section were counted and a typical bottom width was determined by interpolation. The eight point section for the HEC-1 model was then developed using the total sandy bottom width, length, and slope. Thus, each routing reach channel has a bottom width equal to the estimated sum of the bottom widths, and a total width equal to the width of the entire distributed flow channel. Assumed routing reach cross-sections and channel parameters used for each of the HEC-1 routing reaches are provided in Appendix C.

Transmission losses (channel infiltration) were modeled with normal depth channel routing in conjunction with the RL card percrt value in cfs/acre. The RL card takes a PERCRT value and applies it to the wetted

area of the channel. An absence of definitive information makes it a challenge to select a PERCRT value which provides a reasonable and representative loss of runoff volume and reduction in peak flows.

The Gila River Basin FIS, (Cella Barr, 1990), established a value of 1 cfs per wetted acre. Field permeability data obtained from personnel of the ADWR indicate that values of 5 to 10 cfs per wetted acre are common in the project vicinity, particularly in Margie's Cove and Little Rainbow Washes, and that even higher values may be appropriate. The Gila River study notes that loss rates of 1 cfs per wetted acre reflect the influence of return flow (exfiltration) through channel banks which tends to minimize the volumetric decrease by channel percolation. This condition does not appear applicable for this study, since flows lost to percolation will not re-enter the channels under consideration.
Initially, a PERCRT value of 5 cfs per acre was selected for all of the channels. After the models were run, values of the PERCRT within basins were adjusted up to 10 cfs per acre or down to 1 cfs per acre in order to bring the basin flows within calibration limits. Additional information on this procedure is provided in Section I, Calibration.

Values of roughness (Manning n) for both overbank and channels were determined to range from 0.035 to 0.050 when standard methods were applied, as in Chow, (1958). The value 0.050 was used for all channels to account for the effect of braiding. The overbank sections are, in fact, the areas between the braided channels, which generally have less vegetation but coarser bottom material. Field estimates of the Manning n indicated similar values for both channel and overbank.

G. Diversions

Locations where diversions, or flow splits, occurred were identified at four basin and one subbasin boundaries. Interbasin diversions are located in Basins 7, 8, 13, and 16, and a flow split within Basin 7 as

well. The topographic work maps were used to develop conveyance capacity curves for each leg of the split. HEC-1 diversion cards were used to split the hydrograph based on relative capacity. Supporting calculations for the diversion curves are provided in Appendix D along with diagrams indicating the resulting peak flows.

H. HEC-1 Schematic and Input

The HEC-1 model inputs for the 18 basins were input as four separate HEC-1 models which compute system outflows at 19 downstream concentration points. Certain basins had to be combined into a single model due to interbasin diversions that linked them together. Each HEC-1 model is named after a major wash or siphon included in the model. The four HEC-1 models are Rainbow, which covers basins 1 to 6; Paloma, basins 7 to 10; Butterfield, basins 11 to 15; and Getzweiler for basins 16 to 18. Table 2 lists the concentration points and the name of the HEC-1 model that computes the flow at that location. The overall HEC-1 schematic showing the location of all routings, diversions, and concentration points is presented in Figure 3. The HEC-1 output including an input listing, of all four models for both the 6-hour and 24-hour precipitation events is provided in Appendix E.

I. Calibration/Verification

Calibration/verification of the modeled downstream flows is required to insure that model results are reasonable. For this project, there is no available data which would allow calibration of volumes. Consequently, all calibration activities are directed toward peak flows. In addition, the calibration data that is available cannot be correlated with a storm of a specific duration. The larger of the 6- and 24-hour peak flows from the model was assumed to be the better estimate of the modeled 100-year flow and was the modeled flow used in the calibration/verification.

TABLE 2

DOWNSTREAM CONCENTRATION POINTS

CONCENTRATION POINTS	PRIMARY OUTLET	DA (sq.mi.)	HEC-1 MODEL
1C1	Gillespie	7.31	Rainbow
300	Russel Badley	3.78	Rainbow
4C6	Rainbow Wash	50.49	Rainbow
500	Turner Draw	3.17	Rainbow
6C3	Layton	13.74	Rainbow
7C4	Lawsuit	22.51	Paloma
7C5	Ski Lake	0.64	Paloma
8C6	Paloma Lift Stat.	18.39	Paloma
9C2		3.51	Paloma
10C2	Siphon 5	9.41	Paloma
11C2	Stiel #2	11.43	Butterfield
12C3	Tilley #1	18.22	Butterfield
13C3	Tilley #2	36.41	Butterfield
14C2	The Neck	10.2	Butterfield
15C14	Butterfield	65.15	Butterfield
15C15		1.36	Butterfield
16C4	Getzweiller	11.54	Getzweiller
17C2		7.59	Getzweiller
18C1		1.85	Getzweiller

The routing reach transmission loss rate (PERCRT) was selected as the model parameter to be varied in order to adjust the HEC-1 model flows. Transmission loss was selected for two reasons. The first reason is that it is an important physical parameter that is a source of much debate among hydrologists working in desert regions. It is difficult to estimate because, it is affected by many factors including piezometric head, soil porosity, silt load, flow velocity and saturation of lower soil layers. Hydrologists contacted at ADWR expressed the opinion that transmission loss was frequently underestimated in hydrologic studies conducted on desert watersheds in Arizona. The second reason transmission loss was selected is because most of the remaining model parameters were derived from detailed physical and geographic data using state-of-the-art techniques. The assumption is that these parameters are reliable in comparison to the estimated transmission loss rate.

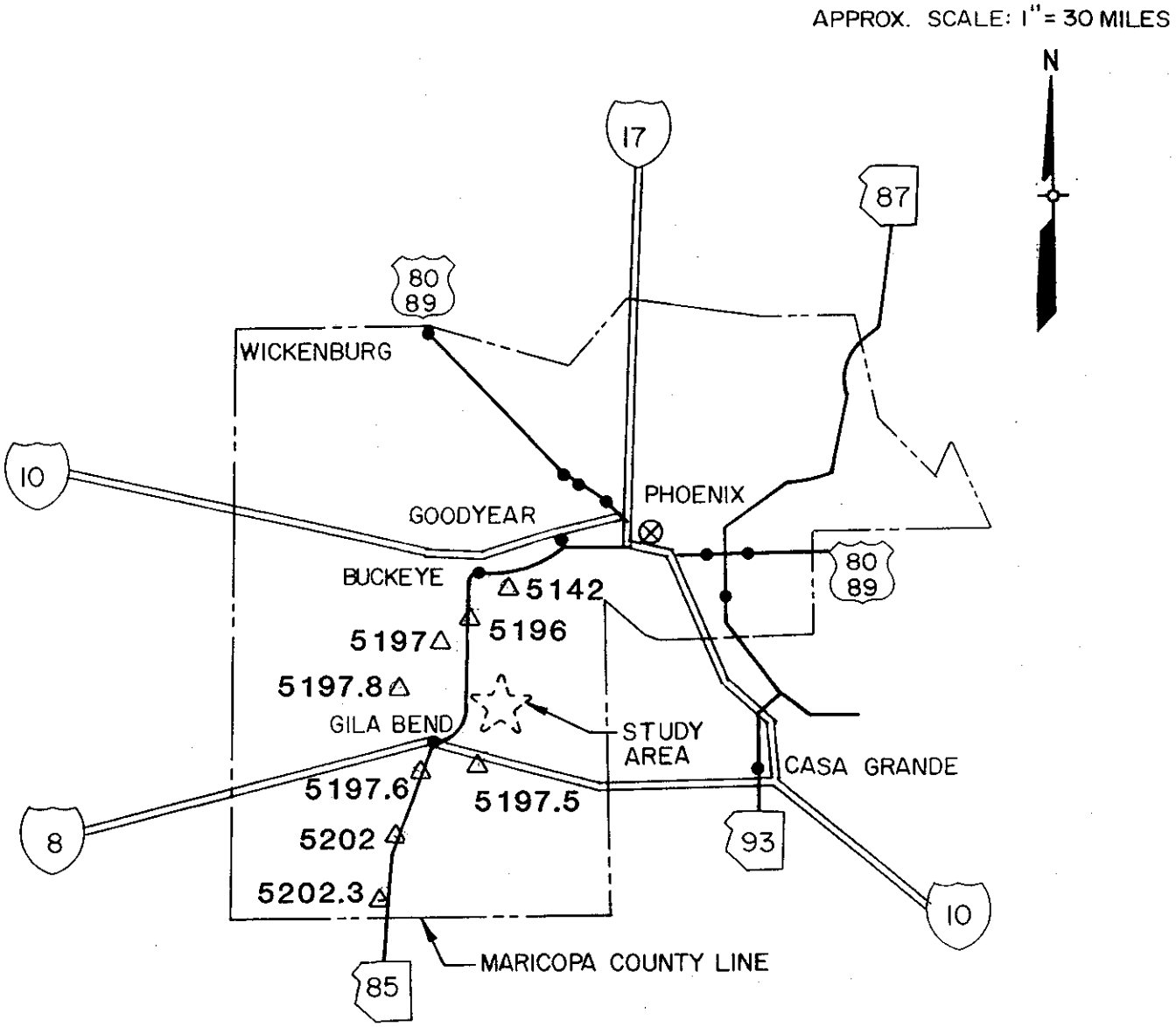
The calibration/verification procedure employed in this study involved the adjustment of transmission loss to bring flows within a reasonable range. Flows were <u>not</u> adjusted to match specific target values as would be done in a normal calibration because no calibration targets are available. The so-called reasonable range was constructed from estimated 100-year flows in nearby watersheds as described in the following.

Historical peak flow data were available at seven nearby gages for watersheds ranging in size from 1.5 square miles to more than 400 square miles. FCDMC provided estimates of the 100-year flow for each gage based on the Log Pearson type III distribution and 17 years of recorded annual floods. A summary of the flow data is provided in Table 3 and a map of gage locations is provided in Figure 4. Peak flows varied from much more than 1000 cfs per square mile to as low as 20 cfs per square mile for the largest watershed (Waterman Wash). The highest value, for Windmill Wash, was a definite outlier since it indicated runoff exceeding 6 inches across a 13 square mile area. With this value discarded, the remaining 6 gages had ratios ranging from 20 csm to 1034 csm. A linear regression was conducted on the log of the flow-area

TABLE 3

GAGE DATA USED FOR VERIFICATION OF HEC-1 MODELS

WASH	GAGE ID	DRAINAGE AREA (sq. mi.)	100-YEAR FLOW (cfs)	RATIO FLOW TO AREA
Crater	95202.3	1.5	1540	1034
Rainbow	95196	3.5	2060	597
Black Gap	95202	12.1	1310	108
Windmill	95197.8	12.9	25300	1961
Bender	95197.5	68.8	7970	116
Sauceda	95197.6	126.0	7910	63
Waterman	95142	403.0	8100	20



△ 5432 GAGE LOCATION NUMBER

FIGURE 4
GAGE LOCATION MAP
GILA BEND CANAL FLOOD PLAIN DELINEATION STUDY
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

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ratio with the log of the area as the predictor. The regression line represents the equation:

$$\frac{Q}{A} = CA^{x} \qquad (1)$$

Where Q is total flow, A is drainage area and C and x are the regression constants.

Equation (1) is equivalent to the common regression formula for flow:

$$Q = CA^{n} \qquad (2)$$

where n=x+1. Equation (1) is used in this analysis to reduce the parameter variance. Hydrologists often use flow per unit area as a check for reasonableness of flow. The division by area is done to reduce variance thus providing values to which it is easier to apply conceptual engineering judgement.

The regression analysis of log(csm) versus log(Area) resulted in the fitted formula:

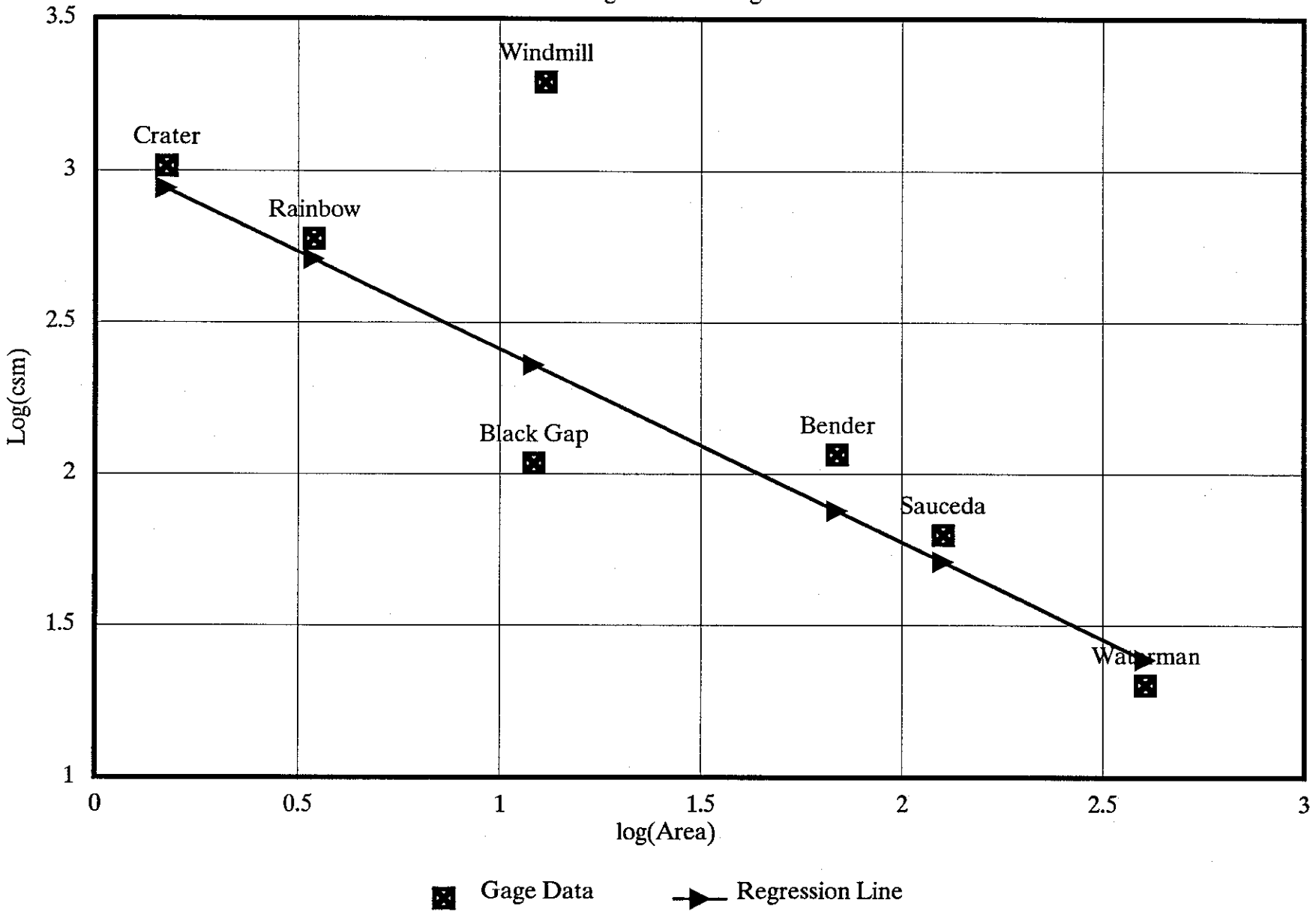
$$\frac{Q}{A} = 1132\ A^{-0.64} \qquad (3)$$

The standard error of the regression is $R^2 = 0.917$. The regression line and the gage data are plotted in Figure 5. The data point for Windmill Wash is plotted but was not used to derive the formula.

A 95% confidence interval envelope was constructed from the regression line using the standard deviation, S_{logA}=0.203, which was calculated in the regression computations. The envelope is based on two standard deviations above or below the regression line. It was presumed that a reasonable watershed flow would fall within this envelope.

FIGURE 5

Regression of Gage Data



The initial HEC-1 watershed outflows were computed using transmission losses of 5 cfs per acre in all channel reaches. In these runs, eight outflows fell outside the regression envelope, four above and four below. The transmission loss rates in the low flow basins were decreased to 1 cfs per acre which brought all flows to a level near the regression line. The transmission rates in the high flow basins were similarly increased to 10 cfs per acre, except in Little Rainbow Valley Wash where field measurements by ADWR personnel indicated 5 cfs per acre is appropriate.

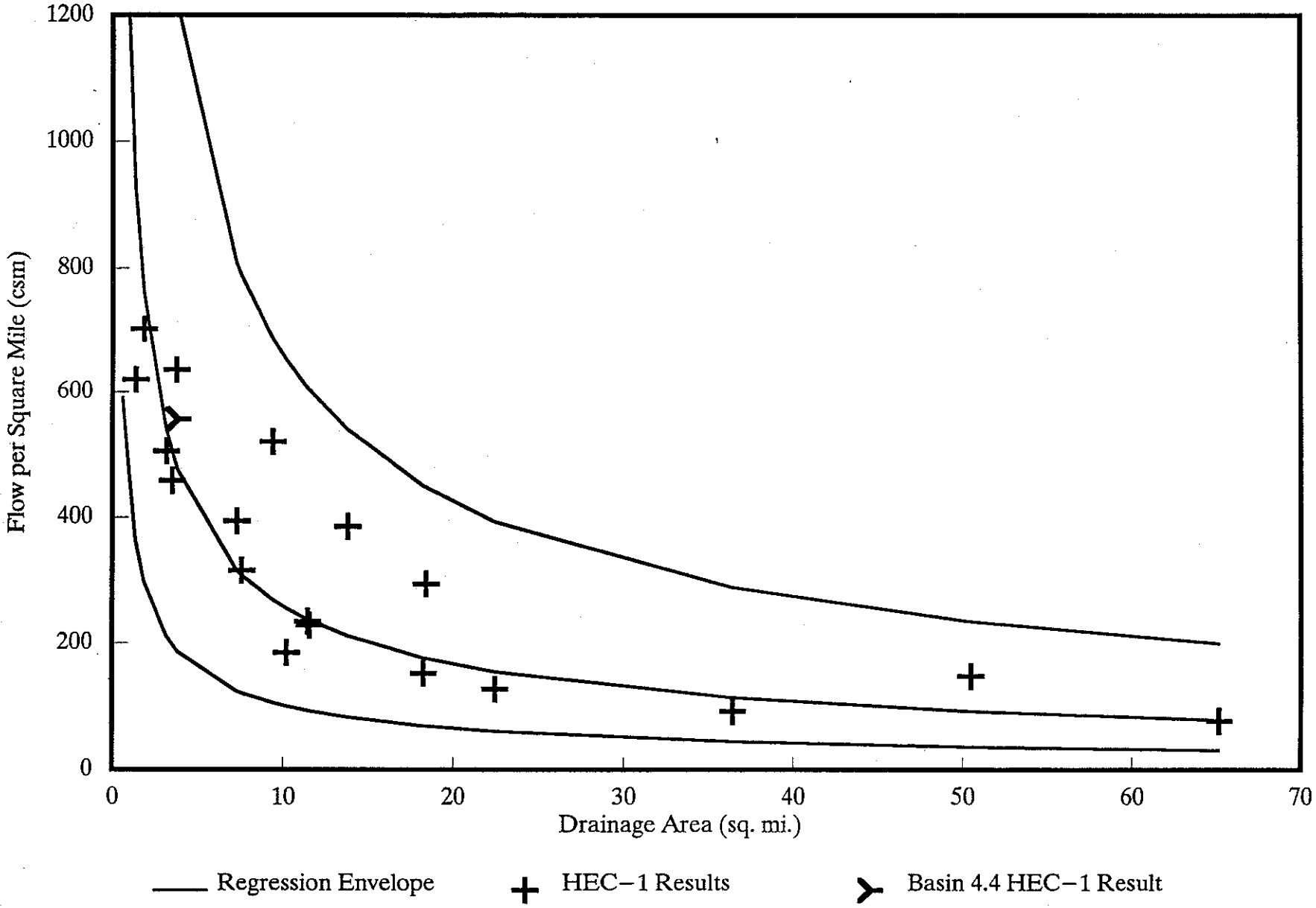
The high flow basins are basins 6, 8, and 10. The adjusted flows in these basins were near the upper limit of the envelope indicating that an even higher infiltration rate might be reasonable. However, it was decided that 10 cfs/acre was the maximum justifiable transmission loss. When transmission losses were adjusted, they were adjusted for every routing reach in the basin. The outflow at concentration point 7C5 was not considered in the verification procedure because this flow contains a substantial diversion from the portion of basin 7 that drains to 7C4. Other basins affected by diversions were not adjusted or had internal flows that were very large compared to the diversion flow.

One of the gages used for verification lies within the study watershed. The Rainbow gage is located in subbasin 4.4 a short distance upstream of the subbasin outlet. The modeled peak flow for subbasin 4.4, 2149 cfs, compares favorably to the estimated 100-year flow at the gage of 2060 cfs. The area of subbasin 4.4, 3.87 square miles, is slightly larger than the gaged area of 3.45 square miles. The plotting position for flow of subbasin 4.4 is also shown in Figure 6.

The adjusted HEC-1 flow results are plotted in Figure 6. The regression line and two standard deviation envelope are also shown. Note how the resulting flows in basins 6, 8, and 10 lie along the upper limit of the envelope despite the high transmission loss rate. These are the only basins in which 10 cfs/acre was used. Overall, the resulting flows per unit area tend to the high side of the envelope giving the impression that the final HEC-1 models provide conservative estimates of peak flow.

FIGURE 6

HEC−1 Verification Results



V. RESULTS AND CONCLUSIONS

The adjusted HEC-1 models were run for 6-hour and 24-hour, 100-year precipitation events. The computed peak flow at each downstream concentration point for each event is presented in Table 4. Maximum flows range from 641 cfs (Point 15C15) to 11565 cfs (Point 4C6 - Little Rainbow Valley Wash). Evaluation of the model results indicate that the higher peak flows result from the 6-hour duration 100-year storm for basins smaller than 10 square miles and peak flows result from the 24-hour duration storm in basins larger than 10 square miles. This results from the smaller basins experiencing less effects of channel losses and of course, having shorter times of concentration. For larger basins, losses in channel routing are more significant and the longer lag times minimize the effect of higher intensities of the 6-hour storm.

Table 4 also provides the computed values of peak flow per square mile and apparent runoff volume in inches. Some of these values are affected by interbasin diversions, particularly at point 7C5 where extremely high values of runoff volume are due to diversion of flow into this small basin. Disregarding point 7C5, the runoff volumes for the 24-hour storm range from 0.48 to 1.59 inches with an average of 0.91 inches. There appears to be little correlation between either drainage area or transmission losses and runoff volume. The runoff volume at point 300 is above the mean volume and point 500 is below and neither basin has a routing reach. The volume at point 10C2 is above the mean and point 6C3 is below the mean and both basins use 10 cfs per acre for routing reach transmission losses. The same can be said for 15C14 and 1C1 which both use 1 cfs per acre. Thus, there is indication that the selected transmission rates may reflect field conditions to some extent.
Without further calibration of flows and volumes, the models and flows should be used with caution due to the following limitations of the calibration procedure:

- No verification of flow volumes could be conducted.

TABLE 4

PEAK FLOWS AND RUNOFF VOLUMES BY CONCENTRATION POINT
6–, AND 24–HOUR EVENTS

CONCENTRATION POINT	DRAINAGE AREA (sq.mi.)	6–HR EVENT Q100 (cfs)	6–HR EVENT q (csm)	6–HR EVENT Vol. (in.)	24–HR EVENT Q100 (cfs)	24–HR EVENT q (csm)	24–HR EVENT Vol. (in.)	CRITICAL DURATION (hr.)
1C1	7.31	2876	393	0.97	2454	336	0.86	6
300	3.78	2403	636	1.43	2187	579	1.30	6
4C6	50.49	8403	166	0.65	11565	229	0.90	24
500	3.17	1510	476	0.73	1599	504	0.77	24
6C3	13.74	4712	343	0.84	5297	386	0.86	24
7C4	22.51	2833	126	0.64	2854	127	0.66	24
7C5	0.64	1717	2683	13.07 (*)	1199	1873	9.35 (*)	6
8C6	18.39	3421	186	0.56	5417	295	1.07	24
9C2	3.51	1607	458	1.21	1459	416	0.97	6
10C2	9.41	4391	467	1.03	4885	519	1.59	24
11C2	11.43	2623	229	0.70	2676	234	0.63	24
12C3	18.22	2369	130	0.45	2757	151	0.48	24
13C3	36.41	2805	77	0.52	3330	91	0.63	24
14C2	10.20	1791	176	0.94	1882	185	0.85	24
15C14	65.15	2960	45	0.38	4971	76	0.59	24
15C15	1.36	843	620	1.64	641	471	1.26	6
16C4	11.54	2630	228	0.87	2609	226	0.85	6
17C2	7.59	2396	316	1.13	2333	307	1.05	6
18C1	1.85	1298	702	1.51	1060	573	1.19	6

NOTE:

(*) – Runoff volume at concentration point 7C5 is exaggerated by inter–basin diversion of flow in upstream areas.

- Only 17 years of gage data are available resulting in relatively unreliable estimates of 100-year flows for these gages.
- The verification analysis was conducted only on the basin outflows. This was done to provide drainage areas well within the range of drainage areas of the gaged watersheds.
- No gage data was available for any of the concetration points

The computed flows are likely reasonable in the areas where the floodplain will be delineated, but are probably less reliable east of SR 85. The subbasin runoff parameters and each of the routing parameters were determined through detailed analysis of physical data. These parameters were intentionally left unchanged in the flow adjustment procedures because the derived subbasin parameters represent application of state-of-the-art hydrologic procedures using fairly detailed sources of data. For example, nearly 1200 soil areas were determined in the Green-Ampt parameter derivation. The procedure used makes the subbasin models developed in this study available to future analysts in an unaltered state, for the purpose of complete calibration.

R/FCDMC/AAO

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R/FCDMC/AA0

AGENCIES CONTACTED

The following agencies were contracted in conjunction with this study. Memoranda of phone calls and meetings are contained in the Technical Documentation Notebook.

1. Flood Control District of Maricopa County (FCDMC).
2. Arizona Department of Water Resources (ADWR).
3. U.S. Soil Conservation Service (SCS).
4. U.S. Geological Survey (USGS).
5. U.S. Army Corps of Engineers (COE).
6. Arizona State University, Climatology Laboratory.
7. Maricopa County Planning Department.
8. Paloma Ranch.
9. Arizona Geological Survey.
10. Cooper Aerial Mapping Company.
11. Arizona Bureau of Mines.
12. Steele Engineering.

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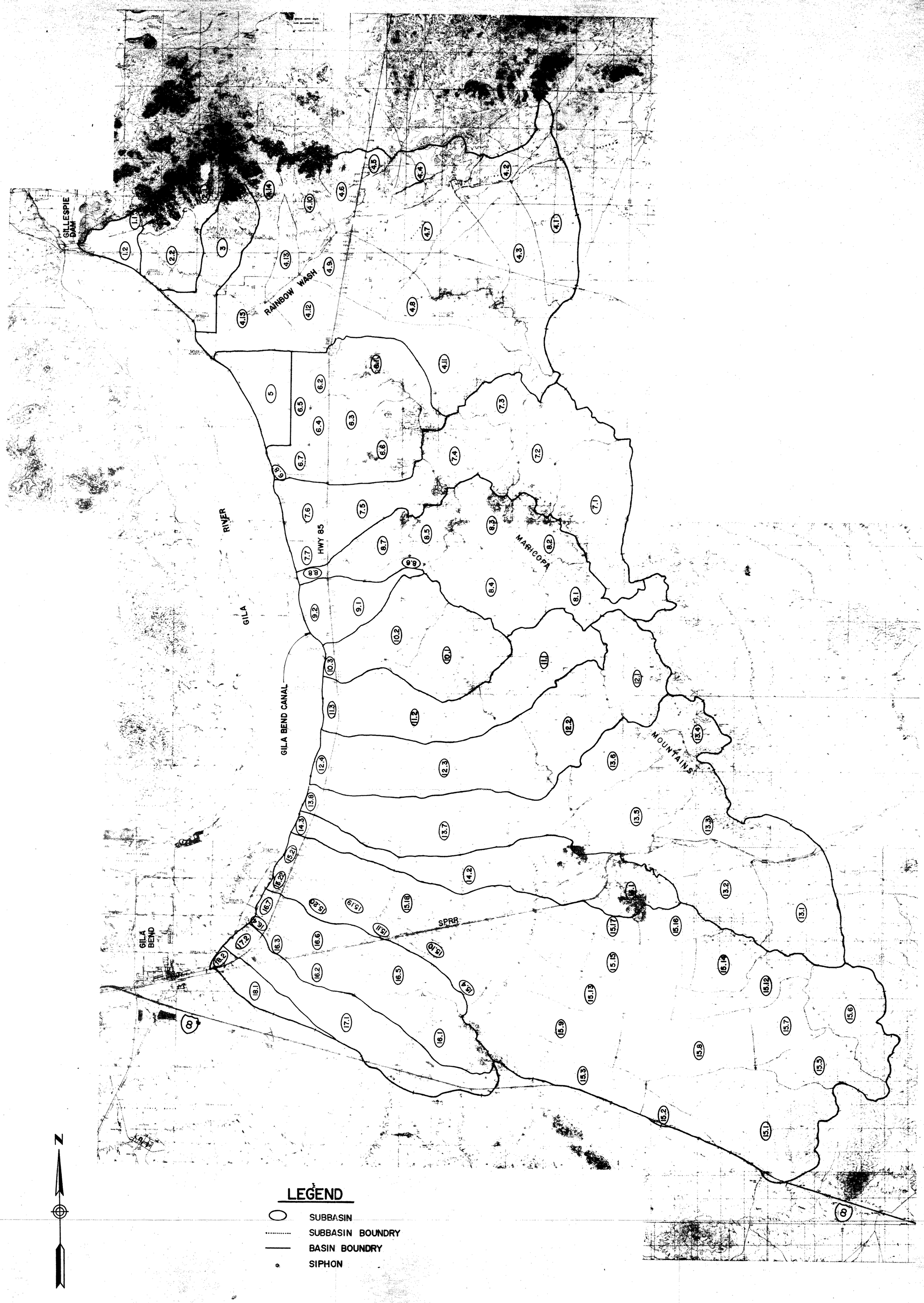

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FIGURE 2

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FIGURE 2
WATERSHED AND SUBBASIN MAP
GILA BEND CANAL FLOODPLAIN DELINEATION STUDY
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

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Designer					
Drafter					
Checker					
Approver		No.	Revisions	By	Date

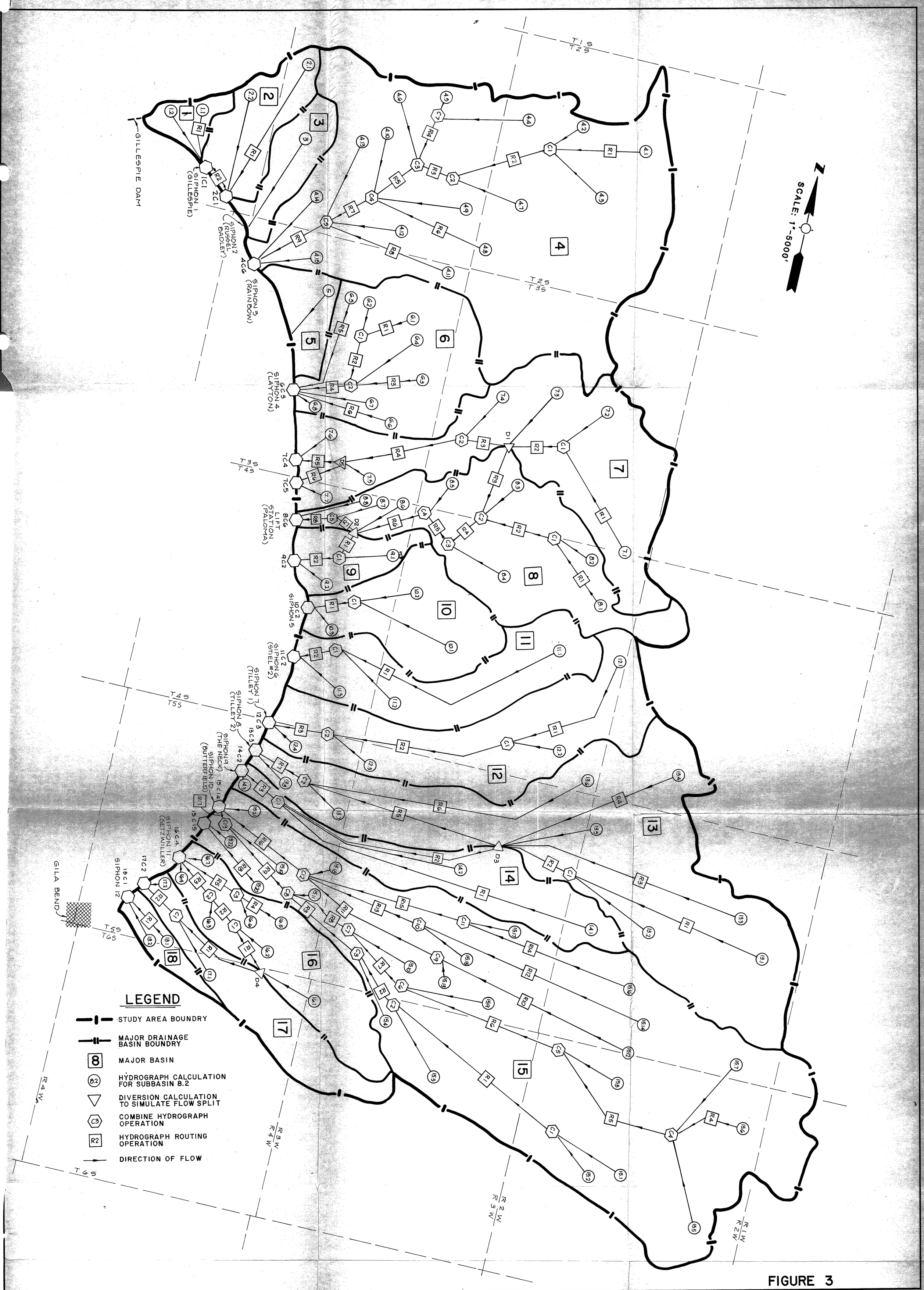

FIGURE 3

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Project No.	
FIGURE 3 Drawing No.	

FIGURE 3
HEC-1 MODEL SCHEMATIC
GILA BEND CANAL FLOODPLAIN DELINEATION STUDY
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

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Date	8/91				
Designer					
Drafter					
Checker					
Approver		No.	Revisions	By	Date

APPENDIX A

RAINFALL DEPTHS AND ADJUSTMENTS

DERIVATION OF THE 6- AND 24-HOUR RAINFALL DEPTHS

Recurrence Interval (years)	Storm Duration (hours)	Isohyetal Map Figure Number	Map Precipitation (inches)	Corrected Precipitation (inches)
2	6	2.2	1.2	1.25
5	6	2.3	1.85	1.8
10	6	2.4	2.25	2.2
25	6	2.5	2.65	2.7
50	6	2.6	3.05	3.1
100	6	2.7	3.45	3.45
2	24	2.8	1.4	1.5
5	24	2.9	2.10	2.15
10	24	2.10	2.6	2.6
25	24	2.11	3.25	3.25
50	24	2.12	3.7	3.7
100	24	2.13	4.2	4.2

Notes:

Map precipitation is estimated from attached Maricopa County isohytal map as indicated by figure number.

Map precipitation values were plotted on a copy of Manual Figure 2.14 - Recurrence interval versus Depth for a Partial Duration Series, Copy is attached.

Corrected precipitation is based on a straight-line fit of the map values as indicated on the attached plot.

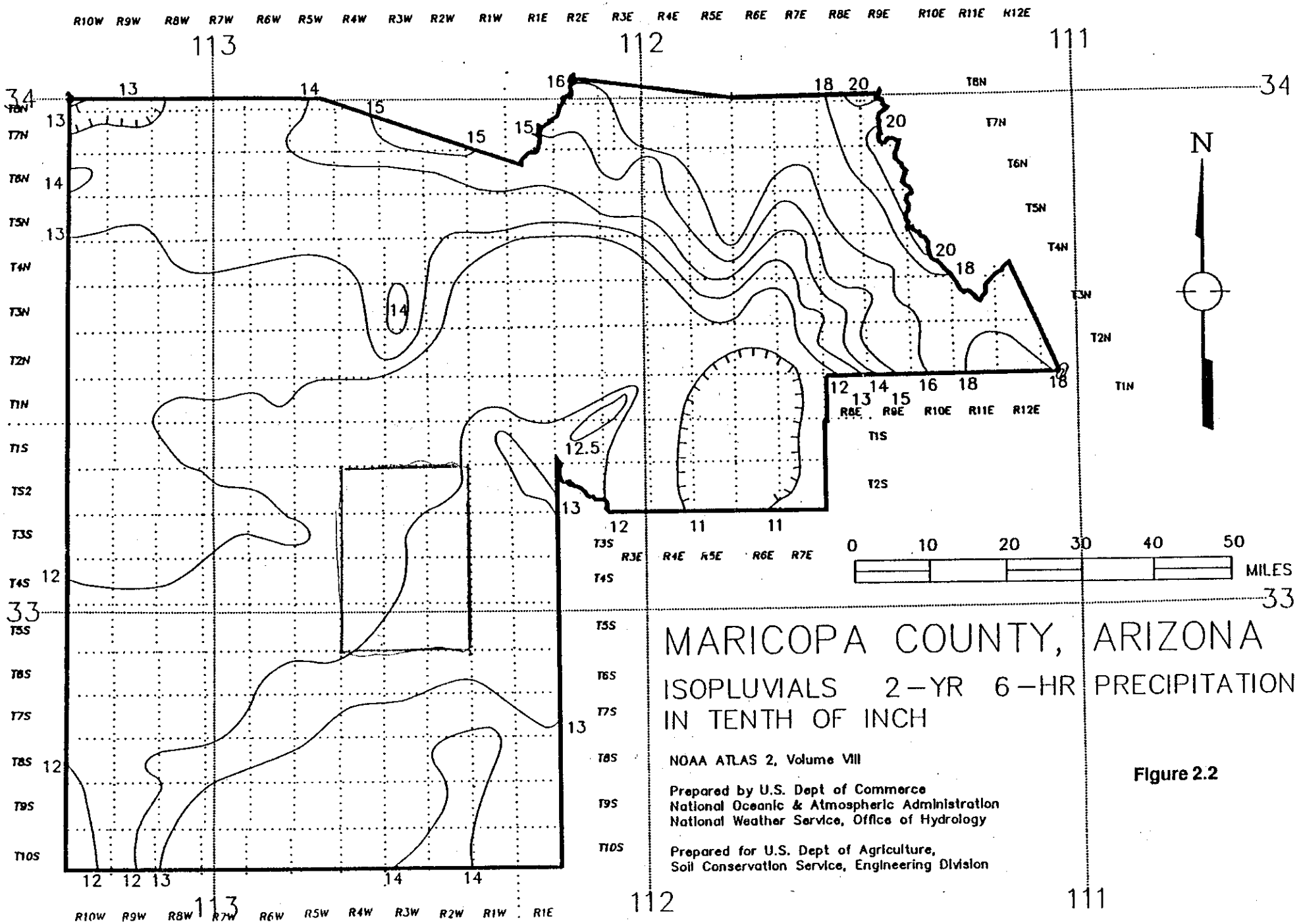
MARICOPA COUNTY, ARIZONA
ISOPLUVIALS 2-YR 6-HR PRECIPITATION
IN TENTH OF INCH
NOAA ATLAS 2, Volume VIII
Prepared by U.S. Dept of Commerce
National Oceanic & Atmospheric Administration
National Weather Service, Office of Hydrology
Prepared for U.S. Dept of Agriculture,
Soil Conservation Service, Engineering Division
N
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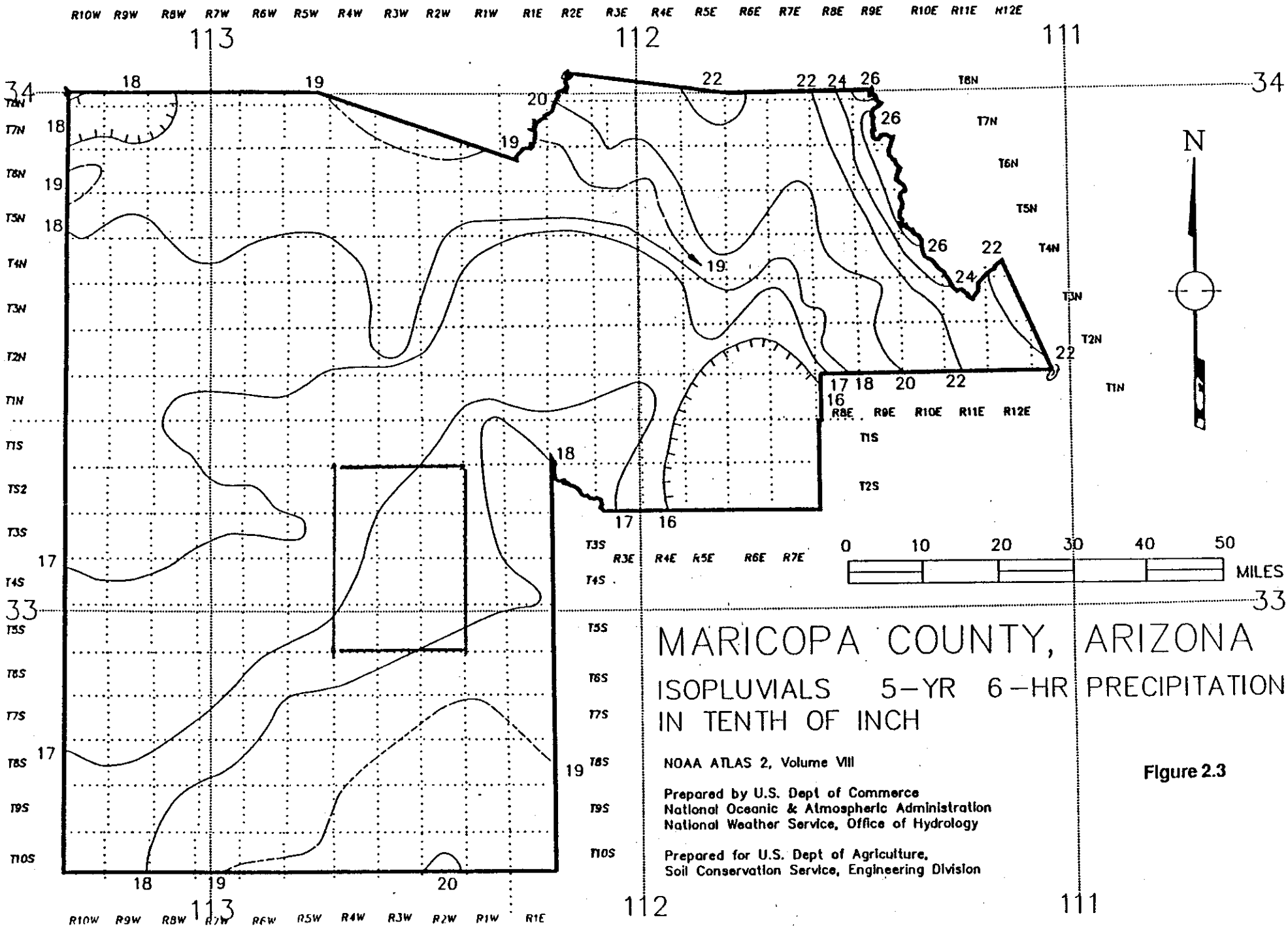
Figure 2.2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ISOPLUVIALS 5-YR 6-HR PRECIPITATION
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Soil Conservation Service, Engineering Division
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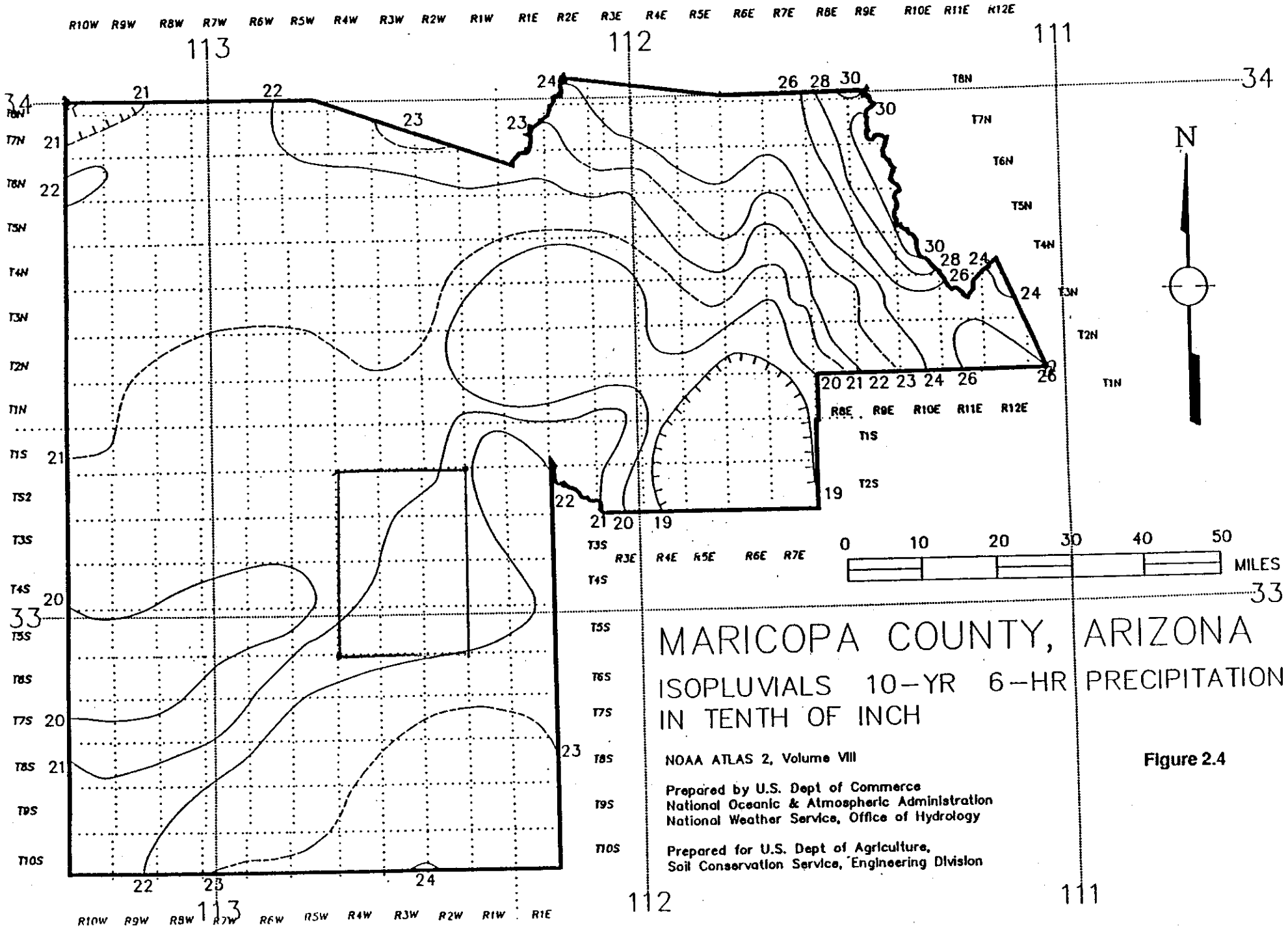

MARICOPA COUNTY, ARIZONA

ISOPLUVIALS 10-YR 6-HR PRECIPITATION IN TENTH OF INCH

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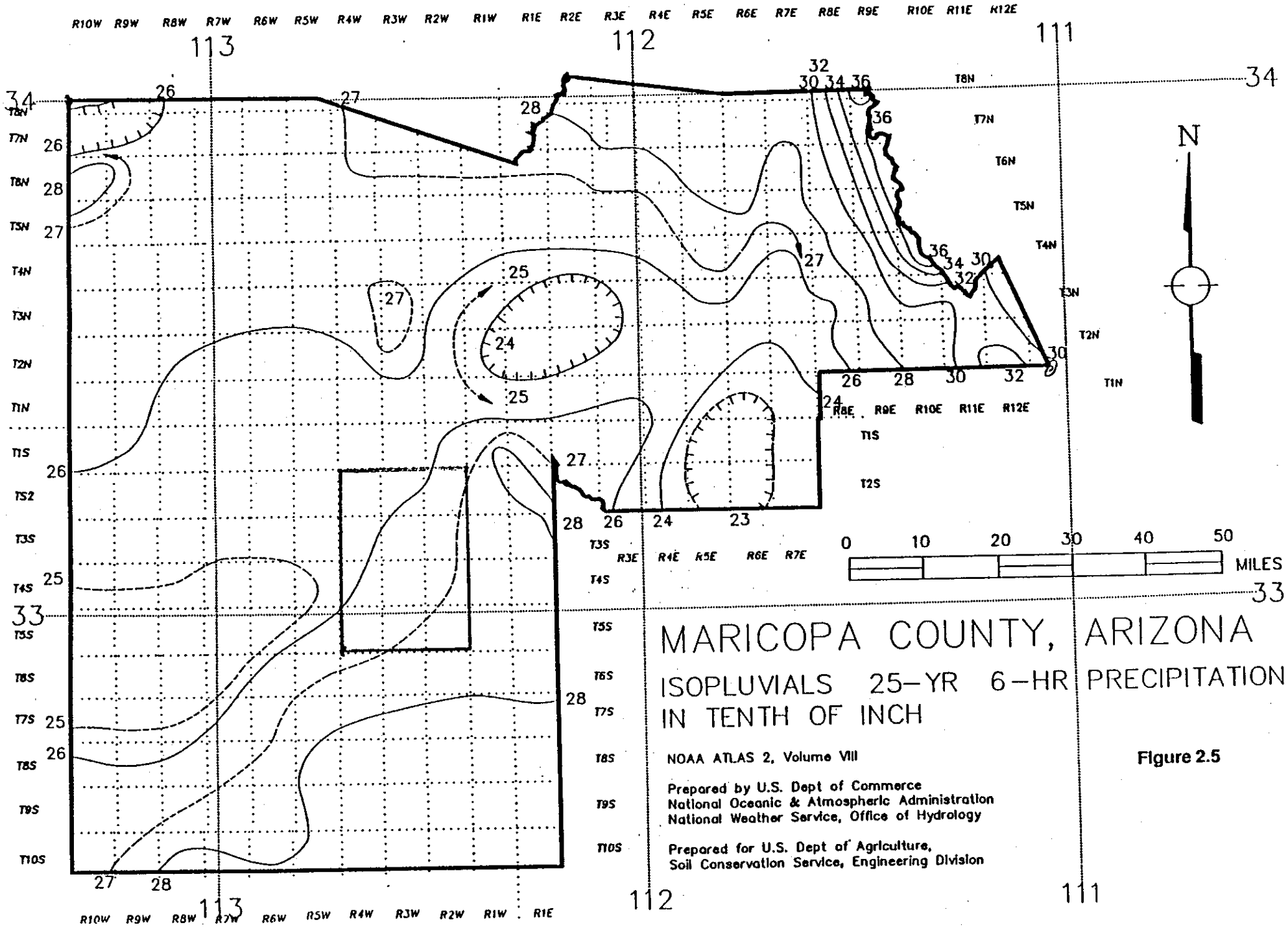
Figure 2.4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IN TENTH OF INCH
NOAA ATLAS 2, Volume VIII
Prepared by U.S. Dept of Commerce
National Oceanic & Atmospheric Administration
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Prepared for U.S. Dept of Agriculture,
Soil Conservation Service, Engineering Division
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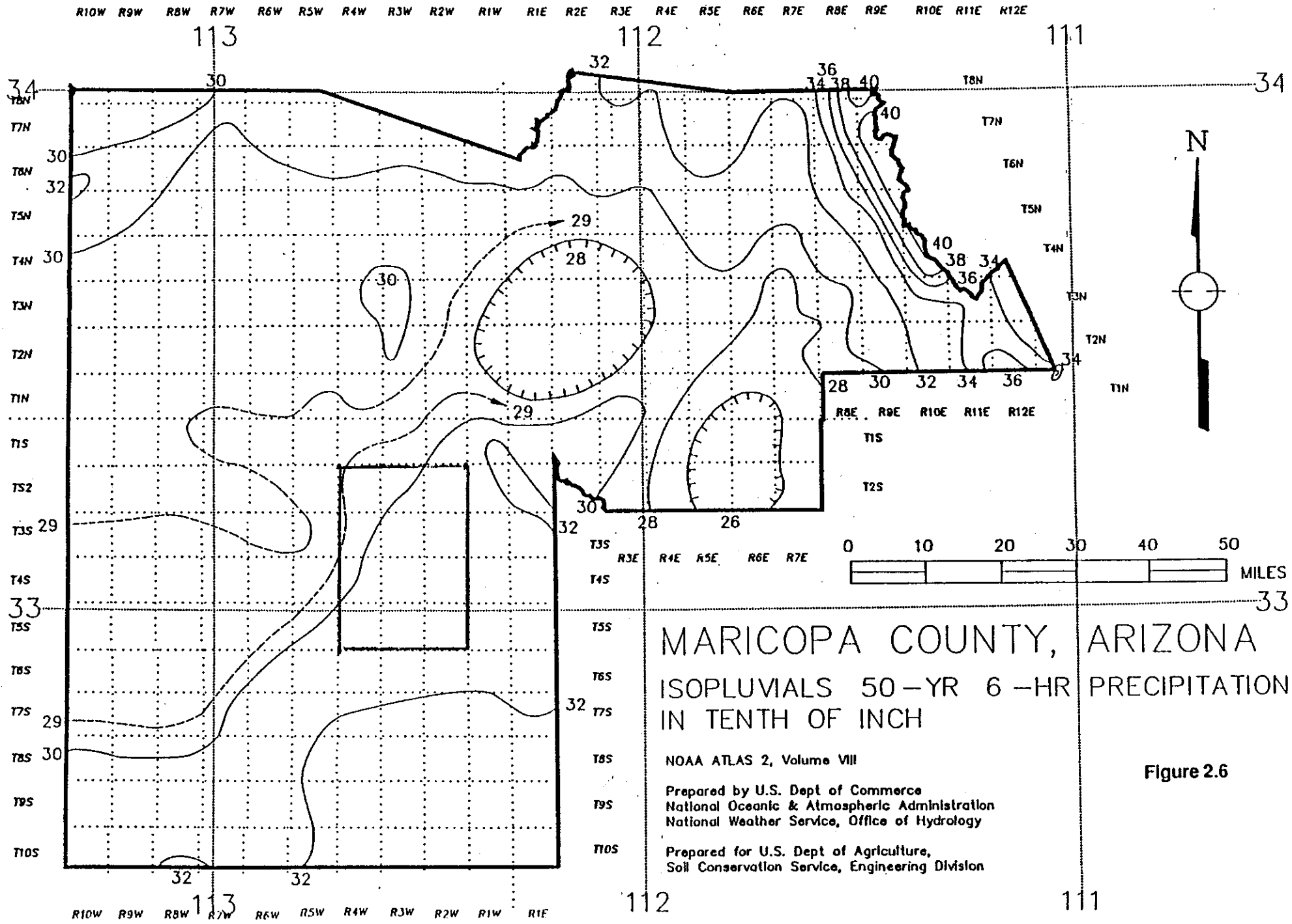
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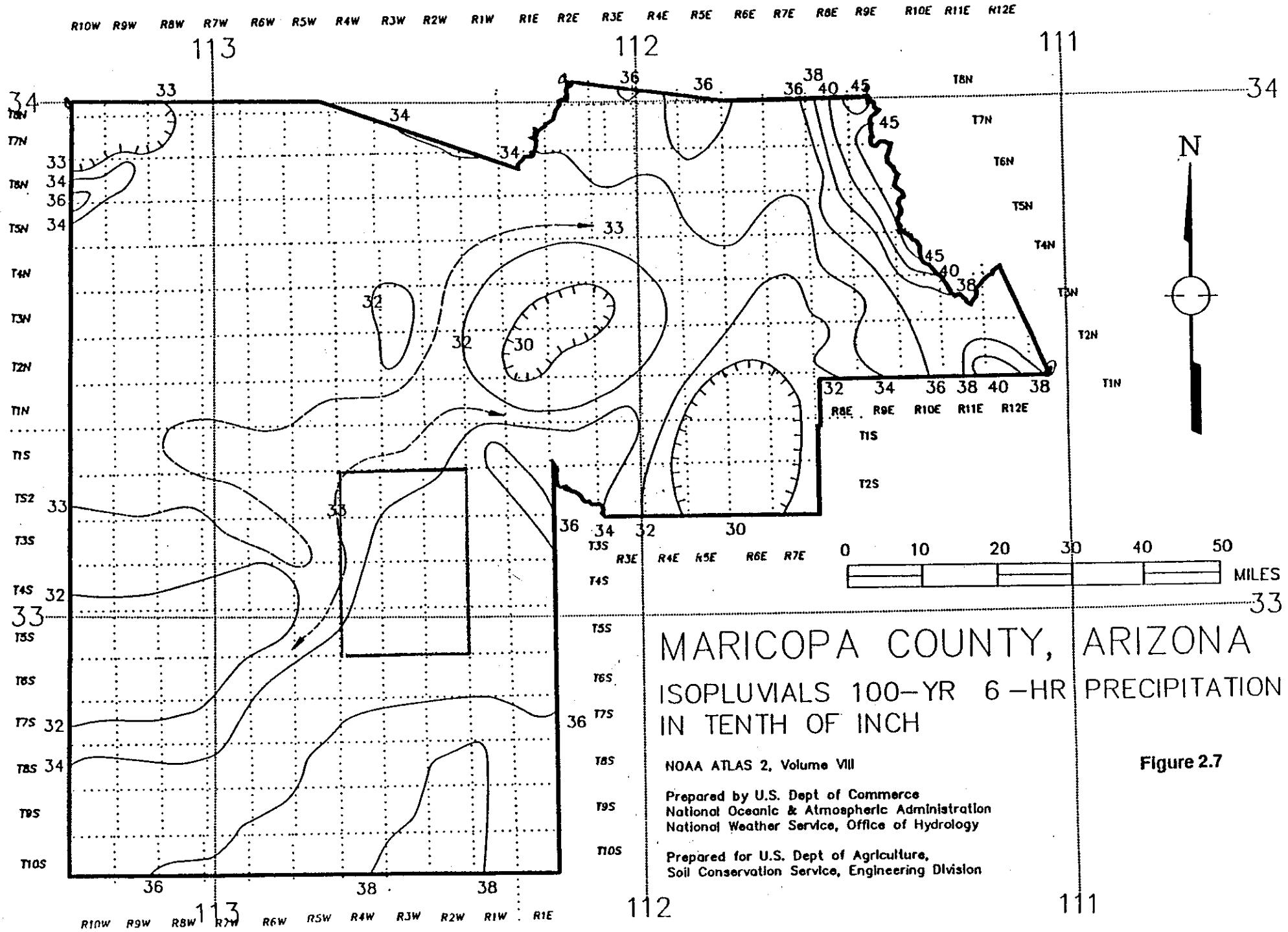
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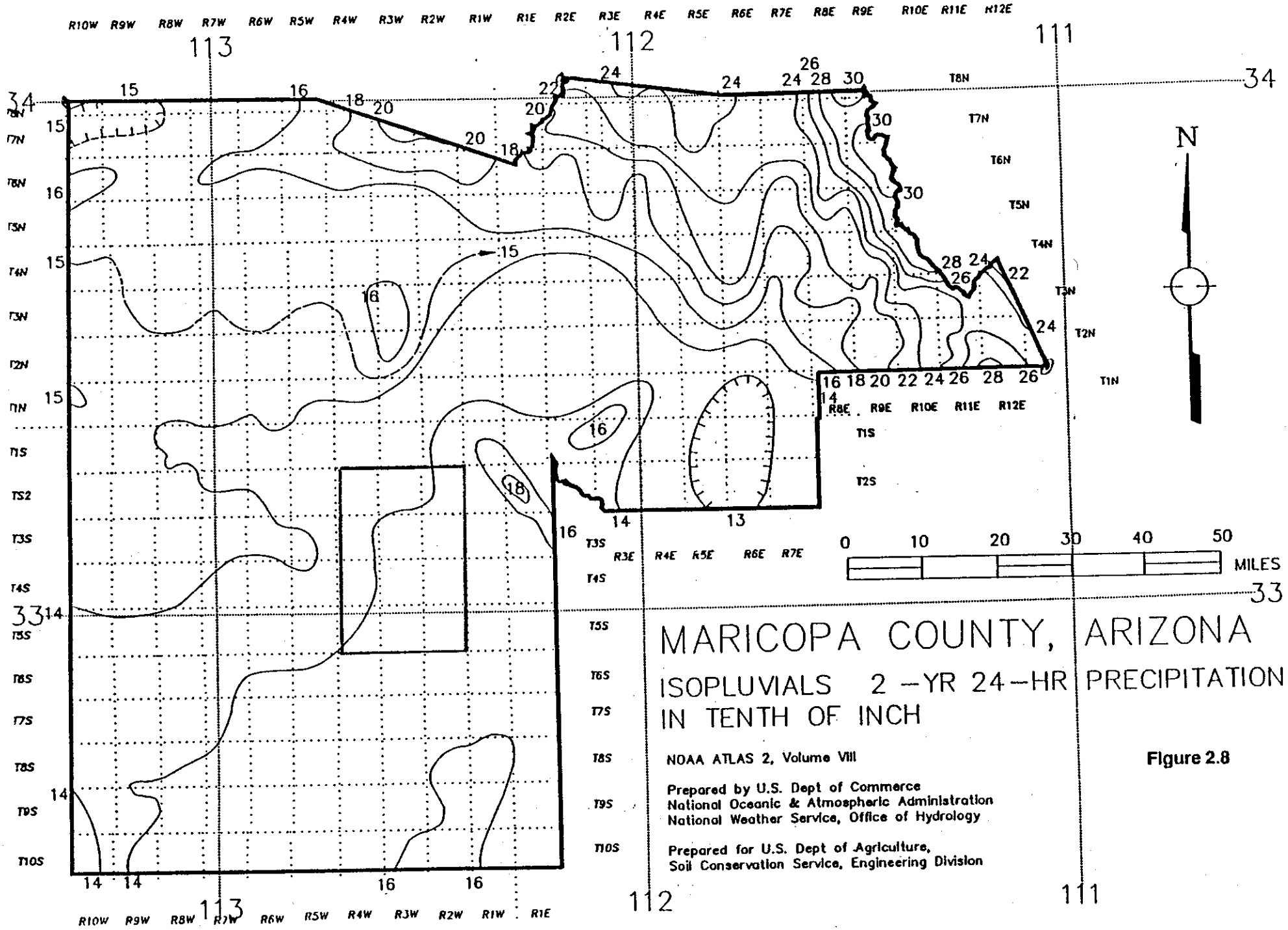
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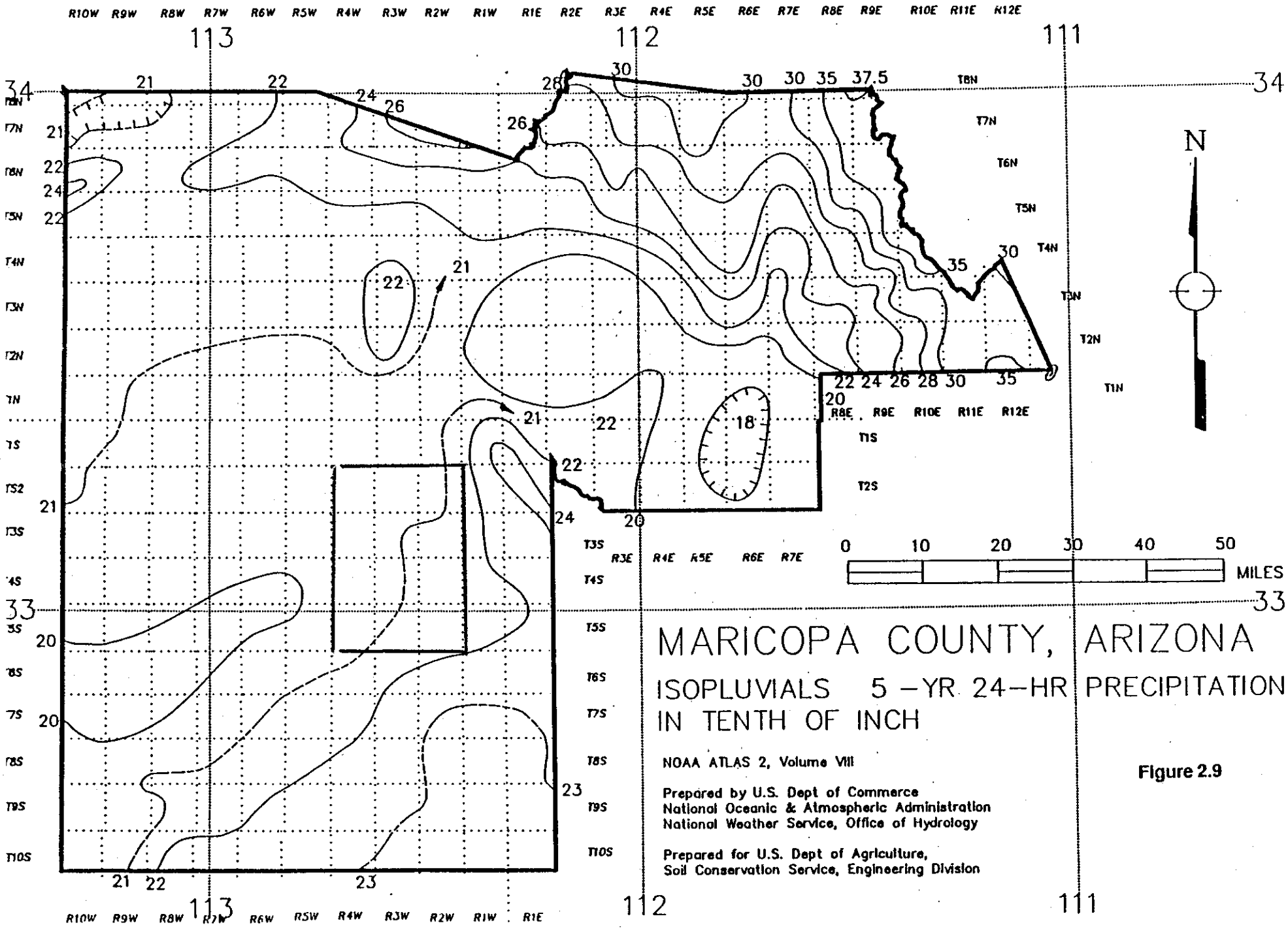
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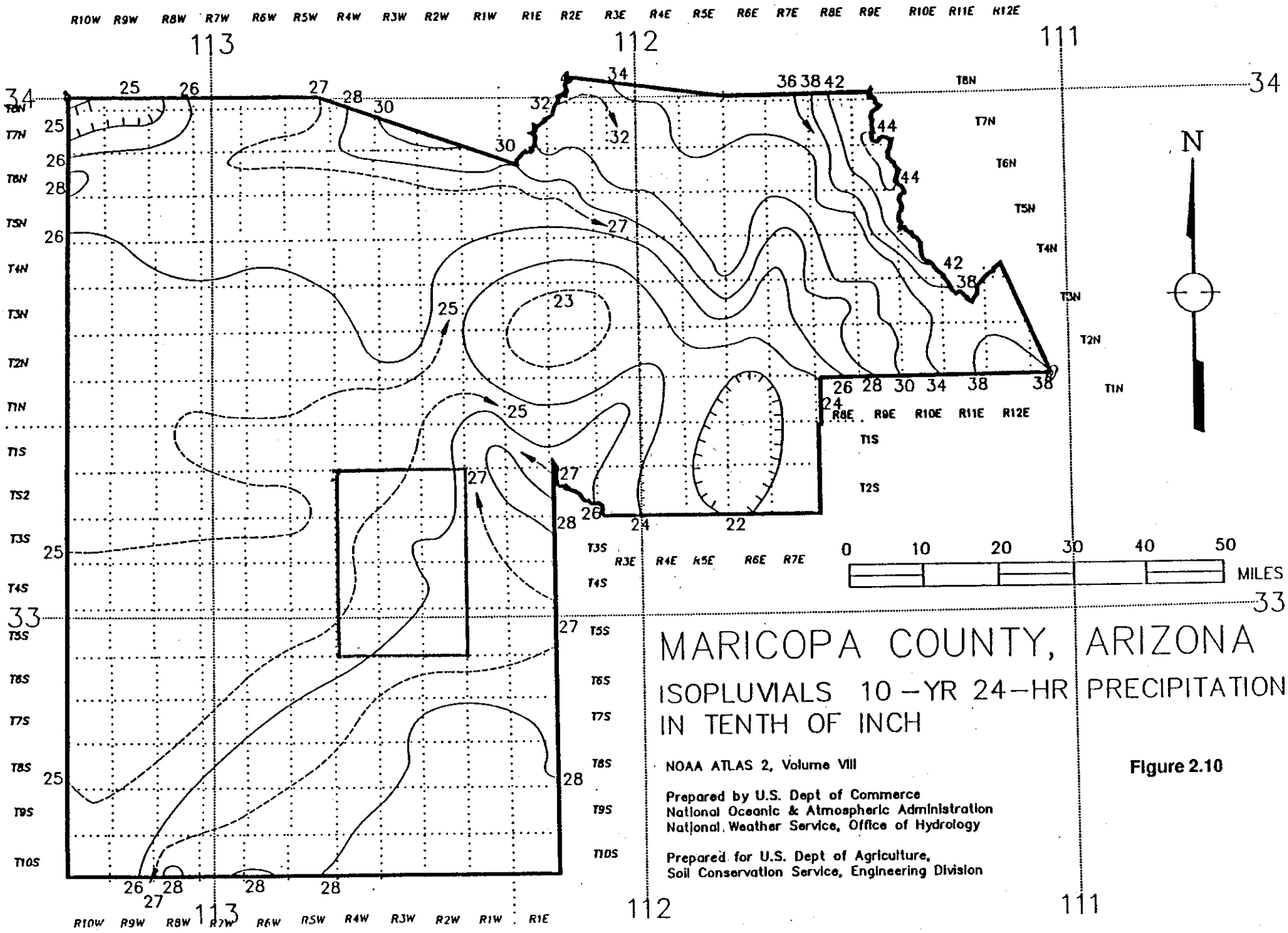
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ISOPLUVIALS 10-YR 24-HR PRECIPITATION
IN TENTH OF INCH
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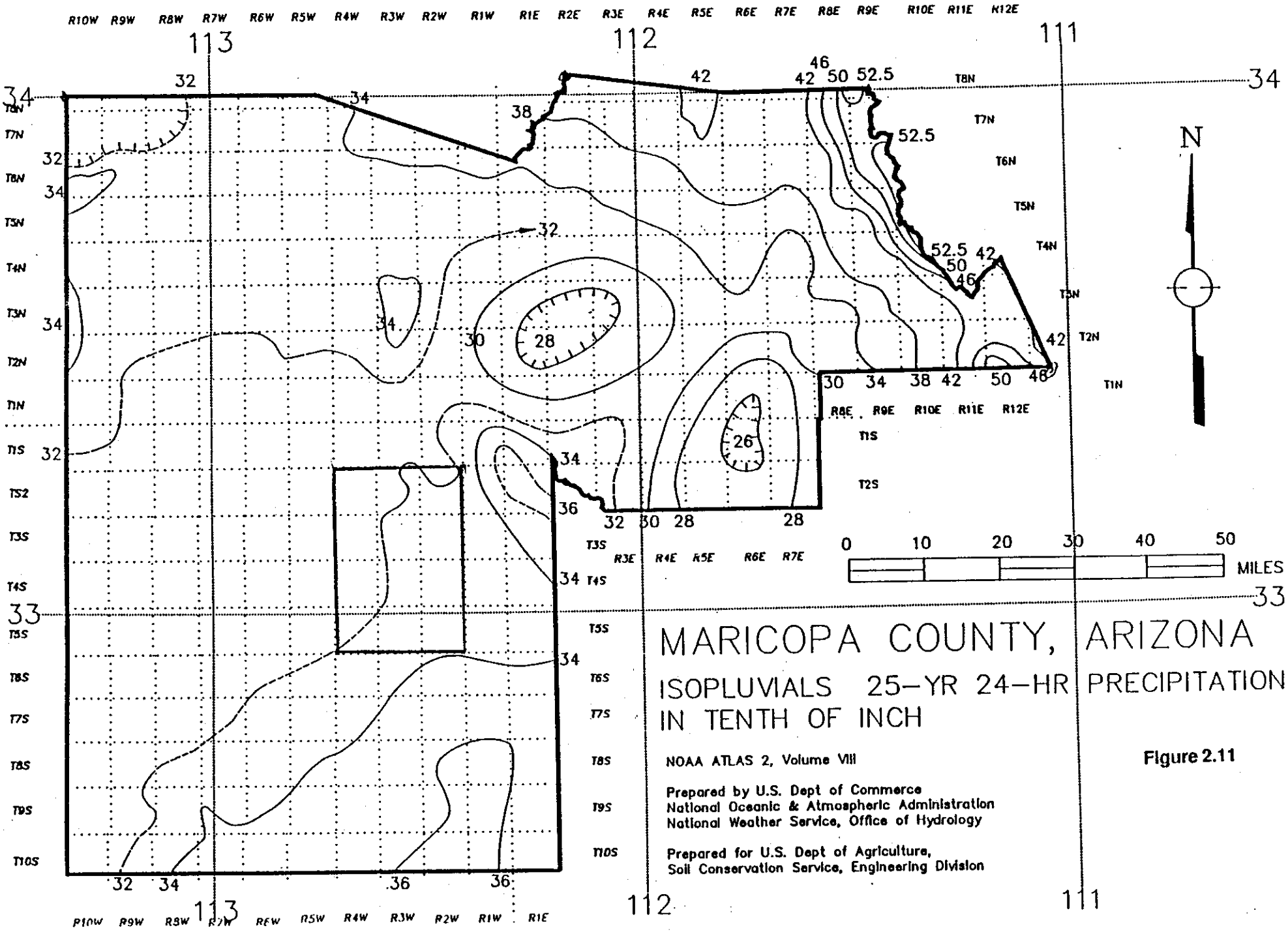
Figure 2.10



MARICOPA COUNTY, ARIZONA

ISOPLUVIALS 25–YR 24–HR PRECIPITATION IN TENTH OF INCH

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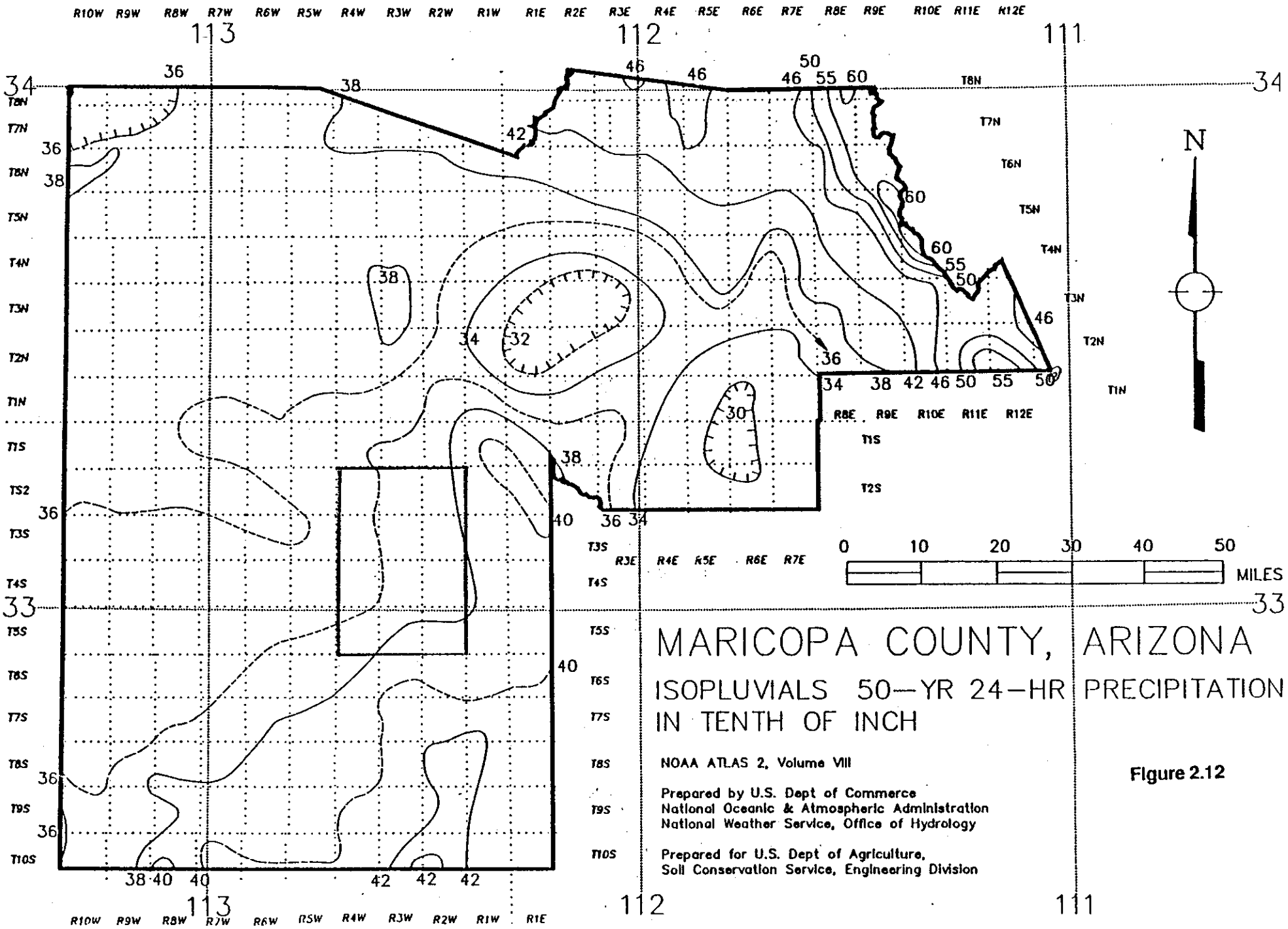
Figure 2.11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MARICOPA COUNTY, ARIZONA
ISOPLUVIALS 50—YR 24—HR PRECIPITATION
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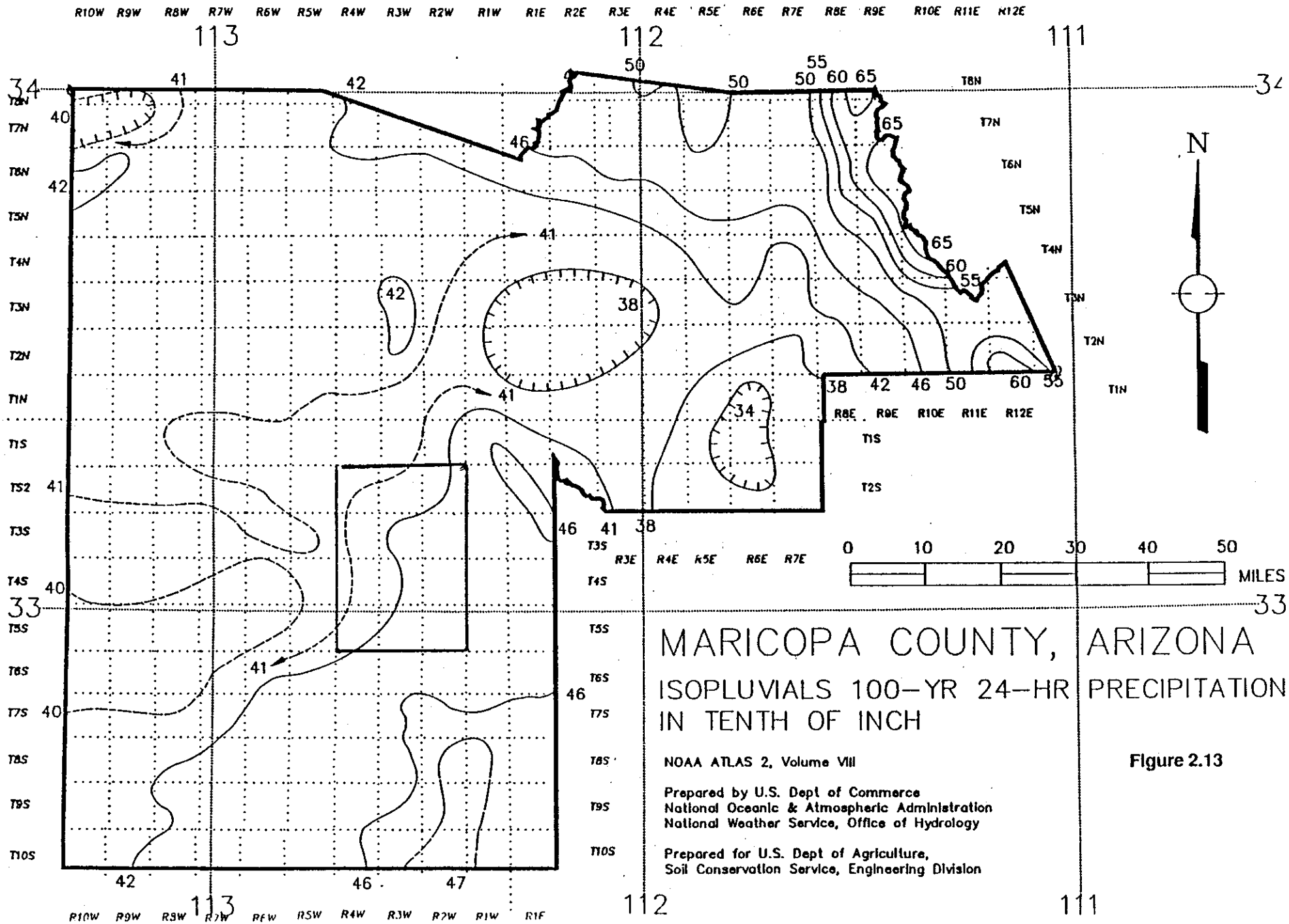
Figure 2.12



MARICOPA COUNTY, ARIZONA

ISOPLUVIALS 100-YR 24-HR PRECIPITATION IN TENTH OF INCH

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Prepared for U.S. Dept of Agriculture,
Soil Conservation Service, Engineering Division

Figure 2.13

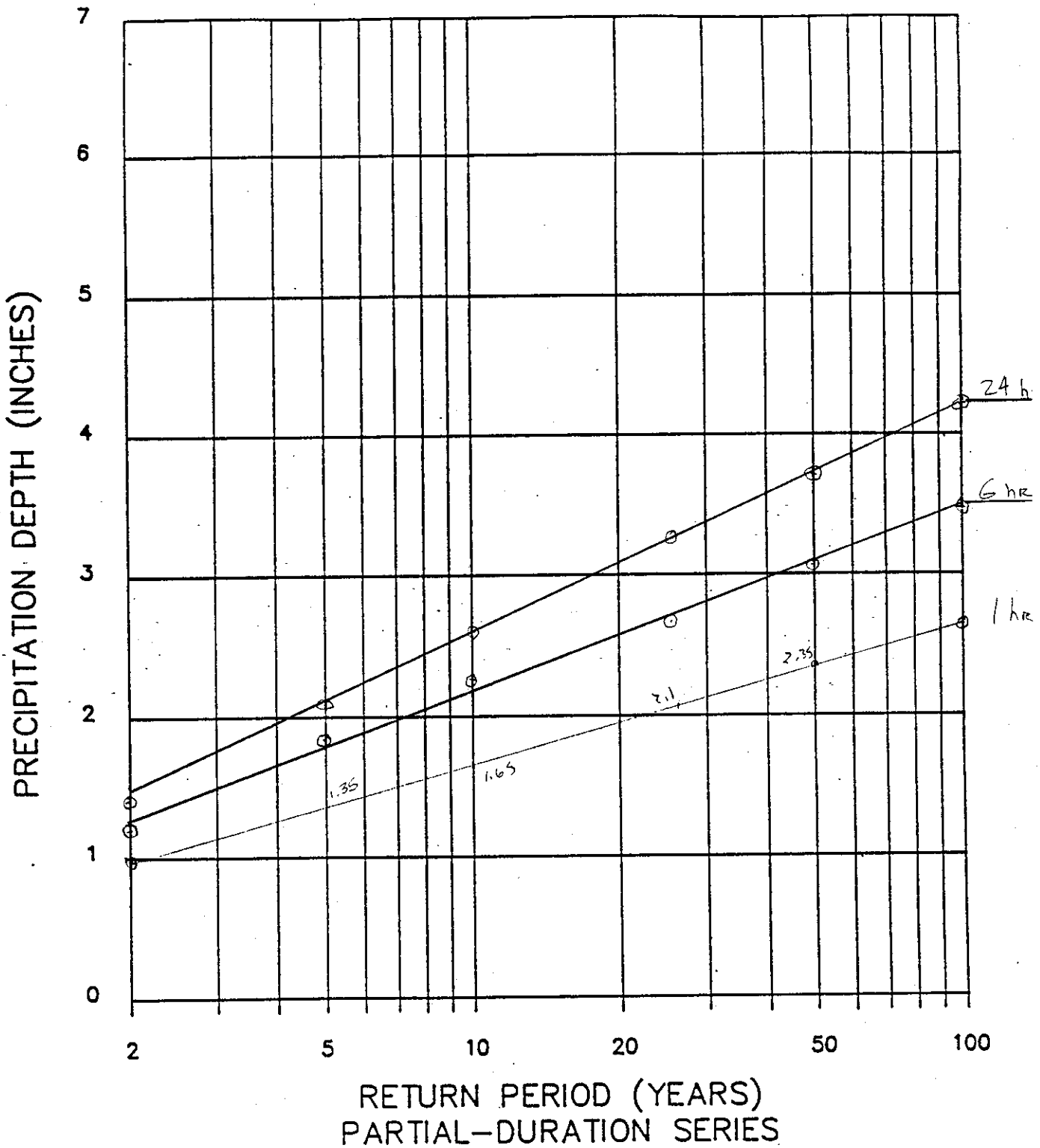


Figure 2.14
Precipitation Depth versus Return Period for Partial-Duration Series

by B.P. Lohr 12/90

AREAL REDUCTION FACTORS AND
CORRESPONDING REDUCED PRECIPITATION

1. 6-hour event reduction factors obtained from Figure 2.1 of the FCDMC Hydrologic Design Manual

Area (sq. mi.)	Reduction Factor	Reduced Precip. Depth (inches)
0.0	1.00	3.45
2.8	0.98	3.38
16.0	0.92	3.18
90.0	0.81	2.79
500.0	0.57	1.97

2. 24-hour event reduction factors obtained from Figure 15 of NOAA Technical Publication 40 (TP-40)

Area (sq. mi.)	Reduction Factor	Reduced Precip. Depth (inches)
0.0	1.00	4.20
10.0	0.95	3.99
20.0	0.92	3.86
30.0	0.90	3.78
50.0	0.88	3.70
100.0	0.85	3.57

APPENDIX B

DATA AND COMPUTATIONS

FOR SUBBASIN LOSS AND HYDROGRAPH PARAMETERS

TABLE B1

SOIL MAP UNITS, DESCRIPTIONS, AND CHARACTERISTICS

MAP #	SOIL SERIES	NAME	COMMENTS	%	Textural Class	XKSAT	PSIF	DTHETA Dry	DTHETA Normal	RTIMP
200	AGUALT	AGUALT–RIPLEY SOILS		100%	SILTY LOAM	0.21	4.74	0.37	0.25	0.0%
		AGUALT		40%	LOAM	0.25	3.50	0.35	0.25	
		RIPLEY		40%	SILTY LOAM	0.15	6.60	0.40	0.25	
		OTHER		20%	LOAM	0.25	3.50	0.35	0.25	
201	AGUALT	AGUALT–RIPLEY SOILS		100%	SANDY LOAM	0.63	3.06	0.35	Q	0.0%
		AGUALT		40%	LOAM	0.25	3.50	0.35	0.25	
		RIPLEY		40%	LOAMY SAND	1.20	2.40	0.35	0.30	
		OTHER		20%	LOAM	0.25	3.50	0.35	0.25	
216	LAGUNITA	LAGUNITA–VINT COMPLEX		100%	LOAMY SAND	1.71	2.33	0.35	0.30	0.0%
		LAGUNITA		50%	LOAMY SAND	1.20	2.40	0.35	0.30	
		VINT		35%	LOAMY SAND	1.20	2.40	0.35	0.30	
		OTHER		15%	SAND	4.60	1.90	0.35	0.30	
226	GILMAN	GILMAN VERY FINE SANDY LOAM		100%	LOAM	0.27	3.62	0.35	0.25	0.0%
		GILMAN		85%	LOAM	0.25	3.50	0.35	0.25	
		OTHER		15%	SANDY LOAM	0.40	4.30	0.35	0.25	
232	GLENBAR	GLENBAR SILTY CLAY		100%	SILTY CLAY LOAM	0.04	10.41	0.29	0.15	0.0%
		GLENBAR		85%	SILTY CLAY LOAM	0.04	10.80	0.30	0.15	
		OTHER		15%	CLAY LOAM	0.04	8.20	0.25	0.15	
233	GLENBAR	GLENBAR SILTY CLAY LOAM		100%	SILTY CLAY LOAM	0.04	10.28	0.29	0.15	0.0%
		GLENBAR		80%	SILTY CLAY LOAM	0.04	10.80	0.30	0.15	
		OTHER		20%	CLAY LOAM	0.04	8.20	0.25	0.15	
234 (VR)	GROWLER	GROWLER–WELTON COMPLEX		100%	SANDY LOAM	0.40	4.30	0.35	0.25	0.0%
		GROWLER		50%	SANDY LOAM	0.40	4.30	0.35	0.25	
		WELTON		32%	SANDY LOAM	0.40	4.30	0.35	0.25	
		OTHER	coarser textured	18%	SANDY LOAM	0.40	4.30	0.35	0.25	
236	INDIO	INDIO SILTY CLAY		100%	SANDY LOAM	0.60	3.83	0.35	0.26	0.0%
		INDIO		75%	SANDY LOAM	0.40	4.30	0.35	0.25	
		OTHER		25%	LOAMY SAND	1.20	2.40	0.35	0.30	
260	VINT	VINT FINE SANDY LOAM		100%	SANDY LOAM	0.60	3.83	0.35	0.26	0.0%

		VINT		75%	SANDY LOAM	0.40	4.30	0.35	0.25	
		OTHER		25%	LOAMY SAND	1.20	2.40	0.35	0.30	
263	DENURE	DENURE		100%	SANDY LOAM	0.40	4.30	0.35	0.25	0.0%
		DENURE		100%	SANDY LOAM	0.40	4.30	0.35	0.25	
266 (VR)	WHY	WHY-CARRIZO COMPLEX		100%	SANDY LOAM	0.40	4.30	0.35	0.25	0.0%
		WHY		50%	SANDY LOAM	0.40	4.30	0.35	0.25	
		CARRIZO		23%	SANDY LOAM	0.40	4.30	0.35	0.25	
		OTHER	more gravel, finer textured	27%	SANDY LOAM	0.40	4.30	0.35	0.25	
267 (VR)	DATELAND	DATELAND-DENURE		100%	SANDY LOAM	0.40	4.30	0.35	0.25	0.0%
		DATELAND		40%	SANDY LOAM	0.40	4.30	0.35	0.25	
		DENURE		37%	SANDY LOAM	0.40	4.30	0.35	0.25	
		OTHER	coarser and/or sand, use loamy s	23%	SANDY LOAM	0.40	4.30	0.35	0.25	
269 (VR)	GROWLER	GROWLER-MOMOLI COMPLEX		100%	SANDY LOAM	0.40	4.30	0.35	0.25	0.0%
		GROWLER		33%	SANDY LOAM	0.40	4.30	0.35	0.25	
		MOMOLI		22%	SANDY LOAM	0.40	4.30	0.35	0.25	
		OTHER	more rock frafments	45%	SANDY LOAM	0.40	4.30	0.35	0.25	
270	INDIO	INDIO SILT LOAM		100%	SAND	4.60	1.90	0.35	0.30	0.0%
		INDIO		77%	SAND	4.60	1.90	0.35	0.30	
		OTHER		23%	SAND	4.60	1.90	0.35	0.30	
275	DATELAND	DATELAND		100%	SANDY LOAM	0.58	3.86	0.35	0.26	0.0%
		DATELAND		77%	SANDY LOAM	0.40	4.30	0.35	0.25	
		OTHER		23%	LOAMY SAND	1.20	2.40	0.35	0.30	
284	MOHALL	MOHALL SANDY LOAM		100%	SANDY LOAM	0.60	3.83	0.35	0.26	0.0%
		MOHALL		75%	SANDY LOAM	0.40	4.30	0.35	0.25	
		OTHER		25%	LOAMY SAND	1.20	2.40	0.35	0.30	
285	MOHALL	MOHALL CLAY LOAM		100%	CLAY LOAM	0.04	8.28	0.25	0.15	0.0%
		MOHALL		80%	CLAY LOAM	0.04	8.20	0.25	0.15	
		OTHER		20%	SANDY CLAY LOAM	0.06	8.60	0.25	0.15	
290	CUERDA	CUERDA-WHY-LAGUNITA COMPLEX		100%	SANDY LOAM	0.54	3.98	0.35	0.26	0.0%
		CUERDA		40%	SANDY LOAM	0.40	4.30	0.35	0.25	
		WHY		25%	SANDY LOAM	0.40	4.30	0.35	0.25	
		LAGUNITA		17%	LOAMY SAND	1.20	2.40	0.35	0.30	
		OTHER		18%	SANDY LOAM	0.40	4.30	0.35	0.25	
291	DENURE	DENURE SANDY LOAM		100%	SANDY LOAM	0.56	3.92	0.35	0.26	0.0%

		DENURE		80%	SANDY LOAM	0.40	4.30	0.35	0.25	
		OTHER		20%	LOAMY SAND	1.20	2.40	0.35	0.30	
301	DENURE	DENURE–COOLIDGE COMPLEX		100%	SANDY LOAM	0.40	4.30	0.35	0.25	0.0%
		DENURE		55%	SANDY LOAM	0.40	4.30	0.35	0.25	
		COOLIDGE		25%	SANDY LOAM	0.40	4.30	0.35	0.25	
		OTHER	more gravelly, coarser	20%	SANDY LOAM	0.40	4.30	0.35	0.25	
303	RIVERWASH	RIVERWASH		100%	SAND	4.60	1.90	0.35	0.30	0.0%
		RIVERWASH		100%	SAND	4.60	1.90	0.35	0.30	
306	CHERIONI	CHERIONI	(10% ROCK OUTCROP)	90%	SANDY CLAY	0.02	9.40	0.20	0.10	5.0%
		CHERIONI	sandy loam w/ hardpan layer	90%	HARDPAN	0.02	9.40	0.20	0.10	
307 (VR)	CHERIONI	CHERIONI–COOLIDGE COMPLEX	(15% ROCK OUTCROP)	85%	SANDY CLAY LOAM	0.13	7.90	0.24	0.14	7.5%
		CHERIONI	w/ hardpan layer	60%	HARDPAN	0.02	9.40	0.20	0.10	
		COOLIDGE		25%	SANDY LOAM	0.40	4.30	0.35	0.25	
310 (VR)	GUNSIGHT	GUNSIGHT–AJO COMPLEX		100%	SILTY LOAM	0.18	5.29	0.32	0.22	0.0%
		GUNSIGHT		55%	LOAM	0.25	3.50	0.35	0.25	
		AJO		35%	SANDY CLAY LOAM	0.06	8.60	0.25	0.15	
		OTHER		10%	LOAM	0.25	3.50	0.35	0.25	
312	GUNSITE	GUNSITE–CIPRIANO COMPLEX		100%	SILTY LOAM	0.19	4.98	0.31	0.21	0.0%
		GUNSIGHT		50%	LOAM	0.25	3.50	0.35	0.25	
		CIPRIANO	(HARDPAN)	25%	HARDPAN	0.02	9.40	0.20	0.10	
		OTHER		25%	LOAM	0.25	3.50	0.35	0.25	
313	GUNSITE	GUNSITE–RILLITO–CARRIZO COMPLEX		100%	LOAM	0.25	3.55	0.29	0.21	0.0%
		GUNSIGHT		45%	LOAM	0.25	3.50	0.35	0.25	
		RILLITO		35%	SANDY LOAM	0.40	4.30	0.35	0.25	
		CARRIZO		15%	SANDY LOAM	0.40	4.30	0.35	0.25	
		OTHER	(5% hardpan)	5%	HARDPAN	0.02	9.40	0.20	0.10	
317	CIPRIANO	CIPRIANO–HYDER–ROCK OUTCROP COMPL	(15% ROCK OUTCROP)	85%	SILT	0.10	7.32	0.25	0.15	7.5%
		CIPRIANO		40%	SANDY CLAY	0.02	9.40	0.20	0.10	
		HYDER		15%	SANDY CLAY	0.02	9.40	0.20	0.10	
		RUBBLE		30%	LOAM	0.25	3.50	0.35	0.25	
321	DENURE	DENURE–RILLITO–WHY COMPLEX		100%	LOAM	0.34	3.97	0.35	0.25	0.0%
		DENURE		42%	SANDY LOAM	0.40	4.30	0.35	0.25	
		RILLITO		25%	LOAM	0.25	3.50	0.35	0.25	
		WHY		16%	LOAM	0.25	3.50	0.35	0.25	
		OTHER	more gravel, coarser	17%	SANDY LOAM	0.40	4.30	0.35	0.25	

322	QUILOTOSA	QUILOTOSA–ROCK OUTCROP COMPLEX	(26% ROCK OUTCROP)	74%	SANDY CLAY	0.03	9.25	0.21	0.11	13.0%
		QUILOTOSA		60%	SANDY CLAY	0.02	9.40	0.20	0.10	
		OTHER		14%	SANDY CLAY LOAM	0.06	8.60	0.25	0.15	
323	CIPRIANO	CIPRIANO–MOMOLI COMPLEX		100%	SILT	0.14	7.04	0.26	0.16	0.0%
		CIPRIANO		58%	SANDY CLAY	0.02	9.40	0.20	0.10	
		MOMOLI		15%	SANDY LOAM	0.40	4.30	0.35	0.25	
		OTHER		27%	LOAM	0.25	3.50	0.35	0.25	
324	GUNSITE	GUNSITE–CHUCKAWALLA COMPLEX		100%	SILTY LOAM	0.19	5.18	0.32	0.22	0.0%
		GUNSIGHT		37%	LOAM	0.25	3.50	0.35	0.25	
		CHUCKAWALLA	desert pavement	33%	SANDY CLAY LOAM	0.06	8.60	0.25	0.15	
		OTHER	coarser w/ hardpan layer	30%	LOAM	0.25	3.50	0.35	0.25	
325	CARRIZO	CARRIZO–MOMOLI COMPLEX		100%	SANDY LOAM	0.40	4.30	0.35	0.25	0.0%
		CARRIZO		65%	SANDY LOAM	0.40	4.30	0.35	0.25	
		MOMOLI		25%	SANDY LOAM	0.40	4.30	0.35	0.25	
		OTHER	less gravelly	10%	SANDY LOAM	0.40	4.30	0.35	0.25	
326	QUILOTOSA	QUILOTOSA–MOMOLI–CARRIZA COMPLEX	(30% ROCK OUTCROP)	70%	SILTY LOAM	0.19	7.07	0.27	0.17	15.0%
		QUILOTOSA	(UNDERLAIN GRANITE BEDROC	38%	SANDY CLAY	0.02	9.40	0.20	0.10	
		MOMOLI		18%	SANDY LOAM	0.40	4.30	0.35	0.25	
		CARRIZO		14%	SANDY LOAM	0.40	4.30	0.35	0.25	
327	MOMOLI	MOMOLI–CARRIZO COMPLEX	(37% ROCK OUTCROP)	63%	SANDY LOAM	0.40	4.30	0.35	0.25	18.5%
		MOMOLI		37%	SANDY LOAM	0.40	4.30	0.35	0.25	
		CARRIZO		26%	SANDY LOAM	0.40	4.30	0.35	0.25	
328	MOMOLI	MOMOLI–COMOBABI ASSOC.	(44% ROCK OUTCROP)	56%	LOAM	0.30	5.67	0.31	0.21	22.0%
		MOMOLI		41%	SANDY LOAM	0.40	4.30	0.35	0.25	
		CAMOBABI	w/ hardpan layer	15%	SANDY CLAY	0.02	9.40	0.20	0.10	
329	DATELAND	DATELAND–CUERDA COMPLEX		100%	SILTY LOAM	0.21	5.06	0.32	0.22	0.0%
		DATELAND		61%	LOAM	0.25	3.50	0.35	0.25	
		CUERDA		29%	SANDY CLAY LOAM	0.06	8.60	0.25	0.15	
		OTHER		10%	SANDY LOAM	0.40	4.30	0.35	0.25	
333	CARRIZO	CARRIZO–DATELAND COMPLEX		100%	SANDY LOAM	0.37	4.13	0.35	0.25	0.0%
		CARRIZO (benches)		47%	SANDY LOAM	0.40	4.30	0.35	0.25	
		DATELAND		21%	LOAM	0.25	3.50	0.35	0.25	
		CARRIZO		18%	SANDY LOAM	0.40	4.30	0.35	0.25	
		OTHER		14%	SANDY LOAM	0.40	4.30	0.35	0.25	
334	GUNSIGHT	GUNSIGHT–PINAMT COMPLEX		100%	SILT	0.13	6.54	0.28	0.18	0.0%

		GUNSIGHT		44%	LOAM	0.25	3.50	0.35	0.25	
		PINAMT		33%	SANDY CLAY LOAM	0.06	8.60	0.25	0.15	
		OTHER	w/ hardpan layer	23%	HARDPAN	0.02	9.40	0.20	0.10	
335	SCHENCO	SCHENCO-LAPOSA-ROCK OUTCROP COM	(19% ROCK OUTCROP)	81%	SANDY CLAY	0.03	9.20	0.21	0.11	9.5%
		SCHENCO		35%	SANDY CLAY	0.02	9.40	0.20	0.10	
		LAPOSA		20%	SANDY CLAY LOAM	0.06	8.60	0.25	0.15	
		OTHER	deeper soils-sandy clay loam	26%	SANDY CLAY	0.02	9.40	0.20	0.10	
336	COOLIDGE	COOLIDGE		100%	LOAMY SAND	1.06	3.49	0.35	0.27	0.0%
		COOLIDGE		60%	SANDY LOAM	0.40	4.30	0.35	0.25	
		COOLIDGE		30%	LOAMY SAND	1.20	2.40	0.35	0.30	
		OTHER		10%	SAND	4.60	1.90	0.35	0.30	
337	ROCK OUTCRC	ROCK OUTCROP HYDER COMPLEX	(36% ROCK OUTCROP)	64%	SANDY CLAY	0.02	9.40	0.20	0.10	18.0%
		HYDER	(UNDERLAIN VOLCANIC ROCK)	34%	SANDY CLAY	0.02	9.40	0.20	0.10	
		OTHER		30%	SANDY CLAY	0.02	9.40	0.20	0.10	
338	HYDER	HYDER-GACHADO-GUNSITE COMPLEX	(21% ROCK OUTCROP)	79%	SANDY CLAY LOAM	0.07	7.84	0.25	0.15	10.5%
		HYDER		35%	SANDY CLAY	0.02	9.40	0.20	0.10	
		GACHADO		29%	CLAY LOAM	0.04	8.20	0.25	0.15	
		GUNSIGHT		15%	LOAM	0.25	3.50	0.35	0.25	
340 (VR)	AJO	AJO-GUNSIGHT-POMPEII		100%	SILTY LOAM	0.15	6.14	0.29	0.19	0.0%
		AJO		24%	SANDY CLAY LOAM	0.06	8.60	0.25	0.15	
		GUNSIGHT		24%	LOAM	0.25	3.50	0.35	0.25	
		POMPEII		24%	SANDY CLAY	0.02	9.40	0.20	0.10	
		OTHER	coarser texture	28%	LOAM	0.25	3.50	0.35	0.25	
342	VAIVA	VAIVA-QUILOTASA COMPLEX	(37% ROCK OUTCROP)	63%	SANDY LOAM	0.40	4.30	0.35	0.25	18.5%
		VAIVA		42%	SANDY LOAM	0.40	4.30	0.35	0.25	
		QUILOTASA		21%	SANDY LOAM	0.40	4.30	0.35	0.25	
345	VAIVA	VAIVA-QUILOTASA COMPLEX	(8% ROCK OUTCROP)	92%	SANDY LOAM	0.40	4.30	0.35	0.25	4.0%
		VAIVA		72%	SANDY LOAM	0.40	4.30	0.35	0.25	
		QUILOTASA		20%	SANDY LOAM	0.40	4.30	0.35	0.25	

TABLE B2

SUBBASIN GREEN–AMPT PARAMETERS
FOR COMPUTATION OF WEIGHTED AVERAGE PRECIPITATION LOSSES

SUBBASIN NO.	SOIL ID. NO.	AREA (acres)	XKSAT (in. / hr.)	PSIF (in.)	DTHETA DRY (in.)	DTHETA NORMAL (in.)	RTIMP
1.1	___	555.6	0.14	7.40	0.26	0.16	7%
	522	123.7	3.41	1143.81	25.90	13.54	
	526	137.3	26.60	970.56	36.88	23.15	
	523	266.3	37.05	1875.54	70.05	43.41	
	266	28.2	11.30	121.43	9.88	7.06	
1.2	___	586.3	0.35	4.70	0.34	0.24	0%
	523	75.2	10.46	529.59	19.78	12.26	
	266	412.7	165.08	1774.60	144.44	103.17	
	310	14.9	2.73	78.51	4.68	3.19	
	310	18.6	3.41	98.14	5.85	3.99	
	513	9.3	2.35	32.96	2.69	1.90	0%
	267	55.7	22.28	239.54	19.50	13.93	
2.1	___	1856.0	0.08	8.41	0.23	0.13	12%
	322	779.1	21.48	7205.17	163.18	85.27	
	328	13.9	4.13	78.50	4.29	2.91	
	328	18.5	5.51	104.66	5.72	3.88	
	522	27.7	0.76	256.26	5.80	3.03	
	522	30.0	0.83	277.61	6.29	3.29	
	528	29.6	8.81	167.46	9.16	6.20	
	522	511.2	14.09	4727.99	107.08	55.96	
	523	143.2	19.91	1008.11	37.65	23.33	
	528	107.1	31.95	607.04	33.19	22.48	
	525	4.6	1.85	19.86	1.62	1.15	
	523	87.7	12.20	617.87	23.08	14.30	
	525	3.7	1.48	15.89	1.29	0.92	
	266	2.3	0.92	9.93	0.81	0.58	
	523	38.3	5.33	269.91	10.08	6.25	
	526	4.6	0.89	32.64	1.24	0.78	
	526	4.6	0.89	32.64	1.24	0.78	
	513	49.9	12.64	177.05	14.46	10.22	
2.2	___	1674.2	0.35	4.22	0.33	0.24	0%
	523	47.9	6.67	337.43	12.60	7.81	
	525	288.0	115.19	1238.32	100.79	72.00	
	523	28.8	4.00	202.46	7.56	4.69	
	513	208.9	52.96	741.66	60.59	42.83	
	521	113.6	38.44	451.07	39.75	28.39	
	521	47.9	16.22	190.33	16.77	11.98	
	525	135.1	54.05	581.04	47.29	33.78	
	513	38.3	9.72	136.08	11.12	7.86	
	513	139.0	35.23	493.31	40.30	28.49	
	513	1.9	0.49	6.80	0.56	0.39	

	513	9.6	2.43	34.02	2.78	1.96	
	266	615.3	246.10	2645.59	215.34	153.81	
3		2419.6	0.30	4.66	0.31	0.21	6%
	322	36.1	0.99	333.48	7.55	3.95	
	522	88.7	2.45	820.53	18.58	9.71	
	528	504.3	150.40	2857.54	156.25	105.82	
	526	66.4	12.87	469.50	17.84	11.20	
	522	8.5	0.24	78.98	1.79	0.93	
	513	563.6	142.88	2000.88	163.45	115.54	
	525	98.2	39.28	422.29	34.37	24.55	
	266	69.7	27.90	299.89	24.41	17.44	
	513	246.2	62.42	874.12	71.41	50.48	
	513	22.3	5.65	79.16	6.47	4.57	
	266	6.6	2.66	28.56	2.32	1.66	
	263	33.2	13.28	142.81	11.62	8.30	
	263	20.9	8.35	89.76	7.31	5.22	
	513	27.0	6.86	96.00	7.84	5.54	
	513	33.2	8.42	117.90	9.63	6.81	
	266	484.4	193.76	2082.91	169.54	121.10	
	267	4.7	1.90	20.40	1.66	1.19	
	310	14.2	2.61	75.22	4.48	3.06	
	267	52.2	20.88	224.41	18.27	13.05	
	266	38.9	15.56	167.29	13.62	9.73	
4.1		1835.2	0.27	4.48	0.32	0.22	1%
	322	92.0	2.54	850.94	19.27	10.07	
	325	33.6	13.43	144.35	11.75	8.39	
	323	114.0	15.85	802.60	29.97	18.58	
	329	16.2	3.39	81.77	5.19	3.57	
	321	768.8	260.24	3053.67	269.08	192.20	
	329	182.8	38.36	924.64	58.67	40.39	
	329	34.4	7.22	174.02	11.04	7.60	
	321	33.2	11.22	131.69	11.60	8.29	
	313	99.5	25.21	353.11	28.85	20.39	
	329	42.3	8.87	213.86	13.57	9.34	
	313	412.0	104.43	1462.46	119.47	84.45	
	321	6.6	2.24	26.34	2.32	1.66	
4.2		1306.0	0.26	4.06	0.30	0.21	1%
	322	8.3	0.23	76.39	1.73	0.90	
	326	13.8	2.67	97.31	3.70	2.32	
	327	42.7	17.07	183.51	14.94	10.67	
	313	129.4	32.80	459.39	37.53	26.53	
	326	46.3	8.98	327.61	12.45	7.81	
	326	9.2	1.78	64.87	2.46	1.55	
	321	173.5	58.72	688.97	60.71	43.36	
	313	130.8	33.15	464.27	37.93	26.81	
	313	391.4	99.23	1389.57	113.51	80.24	
	313	133.1	33.73	472.42	38.59	27.28	
	329	41.8	8.77	211.26	13.40	9.23	
	329	63.3	13.29	320.37	20.33	14.00	
	313	57.8	14.66	205.26	16.77	11.85	
	324	64.7	12.12	335.35	20.51	14.04	

4.3		3258.8	0.30	4.56	0.33	0.23	2%
	322	11.5	0.32	106.62	2.41	1.26	
	326	36.9	7.15	260.76	9.91	6.22	
	322	113.4	3.13	1049.14	23.76	12.42	
	326	30.9	5.98	218.39	8.30	5.21	
	322	16.1	0.44	149.27	3.38	1.77	
	321	713.4	241.47	2833.48	249.68	178.34	
	322	36.4	1.00	336.92	7.63	3.99	
	326	137.4	26.62	971.34	36.91	23.16	
	322	76.5	2.11	707.96	16.03	8.38	
	321	1218.8	412.55	4840.92	426.57	304.69	
	321	624.8	211.50	2481.82	218.69	156.21	
	313	65.9	16.72	234.09	19.12	13.52	
	329	13.8	2.90	69.99	4.44	3.06	
	329	13.8	2.90	69.99	4.44	3.06	
	313	133.3	33.78	473.09	38.65	27.32	
	321	15.7	5.31	62.27	5.49	3.92	
4.4		2476.7	0.27	4.02	0.31	0.22	0%
	313	219.4	55.62	778.95	63.63	44.98	
	324	37.4	7.00	193.83	11.85	8.12	
	329	174.8	36.69	884.40	56.12	38.63	
	313	499.2	126.55	1772.24	144.77	102.34	
	313	221.7	56.20	786.95	64.29	45.44	
	329	223.9	47.00	1132.86	71.88	49.49	
	301	249.6	99.84	1073.33	87.36	62.40	
	313	29.3	7.42	103.97	8.49	6.00	
	329	92.4	19.39	467.28	29.65	20.41	
	313	34.2	8.68	121.56	9.93	7.02	
	313	515.4	130.66	1829.82	149.48	105.67	
	529	54.5	11.44	275.81	17.50	12.05	
	501	124.8	49.92	536.66	43.68	31.20	
4.5		341.5	0.25	3.88	0.30	0.21	0%
	313	70.0	17.75	248.53	20.30	14.35	
	329	69.1	14.51	349.60	22.18	15.27	
	313	179.8	45.57	638.16	52.13	36.85	
	321	22.6	7.64	89.70	7.90	5.65	
4.6		1169.6	0.25	5.52	0.30	0.20	6%
	326	269.5	52.20	1904.84	72.37	45.43	
	322	113.8	3.14	1052.32	23.83	12.45	
	321	193.0	65.33	766.64	67.55	48.25	
	334	35.0	4.71	228.96	9.89	6.39	
	328	90.3	26.92	511.57	27.97	18.94	
	323	46.1	6.41	324.39	12.12	7.51	
	513	178.7	45.31	634.50	51.83	36.64	
	523	12.4	1.73	87.59	3.27	2.03	
	521	59.4	20.11	236.03	20.80	14.86	
	525	101.3	40.54	435.77	35.47	25.34	
	266	9.2	3.69	39.62	3.22	2.30	
	501	28.1	11.24	120.83	9.83	7.02	
	313	13.8	3.50	49.06	4.01	2.83	
	313	18.9	4.79	67.05	5.48	3.87	

4.7		4434.7	0.29	4.85	0.33	0.23	2%
	322	479.3	13.21	4433.11	100.40	52.47	
	326	59.9	11.61	423.52	16.09	10.10	
	322	15.6	0.43	143.82	3.26	1.70	
	326	68.6	13.29	484.94	18.43	11.56	
	323	48.5	6.74	341.41	12.75	7.90	
	326	19.7	3.81	139.02	5.28	3.32	
	323	105.2	14.63	740.79	27.67	17.15	
	321	6.4	2.17	25.43	2.24	1.60	
	322	56.7	1.56	524.53	11.88	6.21	
	321	1386.3	469.26	5506.35	485.20	346.57	
	321	1633.7	553.02	6489.17	571.81	408.43	
	313	16.0	4.06	56.83	4.64	3.28	
	313	90.6	22.96	321.49	26.26	18.56	
	301	64.5	25.80	277.30	22.57	16.12	
	501	220.9	88.36	949.91	77.32	55.23	
	266	30.2	12.07	129.80	10.57	7.55	
	324	6.9	1.28	35.56	2.17	1.49	
	521	125.8	42.58	499.59	44.02	31.44	
4.8		4138.7	0.26	5.44	0.31	0.21	4%
	322	45.2	1.25	418.19	9.47	4.95	
	322	45.2	1.25	418.19	9.47	4.95	
	326	180.0	34.86	1272.07	48.33	30.34	
	322	4.5	0.12	41.82	0.95	0.49	
	321	26.7	9.03	105.96	9.34	6.67	
	322	65.6	1.81	606.38	13.73	7.18	
	321	22.2	7.50	88.00	7.75	5.54	
	326	42.1	8.15	297.24	11.29	7.09	
	322	34.8	0.96	322.01	7.29	3.81	
	325	20.8	8.32	89.44	7.28	5.20	
	322	135.6	3.74	1254.57	28.41	14.85	
	321	372.1	125.97	1478.11	130.25	93.03	
	322	14.9	0.41	138.00	3.13	1.63	
	313	46.6	11.81	165.33	13.51	9.55	
	322	103.5	2.85	957.66	21.69	11.33	
	326	247.3	47.91	1748.30	66.43	41.69	
	322	207.1	5.71	1915.31	43.38	22.67	
	322	112.1	3.09	1037.11	23.49	12.27	
	321	1145.8	387.85	4551.05	401.02	286.45	
	313	18.1	4.58	64.21	5.25	3.71	
	322	31.7	0.87	292.73	6.63	3.46	
	313	45.7	11.58	162.12	13.24	9.36	
	313	36.6	9.28	130.02	10.62	7.51	
	322	37.1	1.02	342.92	7.77	4.06	
	323	36.6	5.09	257.92	9.63	5.97	
	321	18.1	6.12	71.84	6.33	4.52	
	513	35.3	8.94	125.20	10.23	7.23	
	521	553.9	187.50	2200.10	193.87	138.48	
	501	324.7	129.86	1396.01	113.63	81.16	
	501	128.9	51.55	554.13	45.10	32.22	
4.9		724.9	0.39	4.27	0.35	0.25	0%

	525	15.3	6.12	65.76	5.35	3.82	
	266	39.5	15.79	169.76	13.82	9.87	
	525	122.7	49.08	527.63	42.95	30.68	
	501	479.4	191.78	2061.59	167.80	119.86	
	521	67.9	23.00	269.83	23.78	16.98	
4.10		1871.4	0.23	5.11	0.28	0.19	4%
	322	287.1	7.91	2655.34	60.14	31.43	
	328	85.9	25.61	486.55	26.60	18.02	
	323	234.2	32.58	1649.20	61.59	38.17	
	328	47.7	14.23	270.31	14.78	10.01	
	313	65.5	16.60	232.48	18.99	13.43	
	513	862.2	218.56	3060.75	250.03	176.75	
	513	50.7	12.86	180.13	14.72	10.40	
	501	21.3	8.50	91.38	7.44	5.31	
	525	86.3	34.52	371.11	30.21	21.58	
	501	33.8	13.53	145.46	11.84	8.46	
	266	96.7	38.69	415.87	33.85	24.18	
4.11		3861.1	0.27	5.10	0.31	0.21	4%
	322	37.3	1.03	345.33	7.82	4.09	
	325	8.8	3.50	37.66	3.07	2.19	
	326	30.9	5.98	218.31	8.29	5.21	
	323	176.1	24.49	1240.02	46.31	28.70	
	322	541.2	14.92	5005.14	113.35	59.24	
	328	250.3	74.64	1418.25	77.55	52.52	
	321	1955.9	662.07	7768.77	684.56	488.97	
	313	189.0	47.91	670.94	54.81	38.74	
	521	300.6	101.74	1193.79	105.19	75.14	
	513	124.0	31.43	440.20	35.96	25.42	
	522	68.7	1.89	635.24	14.39	7.52	
	513	4.6	1.17	16.36	1.34	0.94	
	513	70.1	17.76	248.74	20.32	14.36	
	501	48.4	19.36	208.13	16.94	12.10	
	501	55.3	22.13	237.86	19.36	13.83	
4.12		1513.1	0.34	4.18	0.33	0.24	1%
	525	26.7	10.66	114.63	9.33	6.66	
	266	6.9	2.76	29.65	2.41	1.72	
	501	624.2	249.67	2684.00	218.46	156.05	
	521	46.0	15.56	182.57	16.09	11.49	
	291	9.7	5.41	37.84	3.38	2.51	
	521	163.2	55.23	648.11	57.11	40.79	
	513	269.8	68.40	957.81	78.24	55.31	
	526	18.8	3.65	133.21	5.06	3.18	
	521	230.3	77.95	914.66	80.60	57.57	
	513	68.5	17.36	243.12	19.86	14.04	
	522	14.7	0.41	136.03	3.08	1.61	
	526	21.1	4.10	149.45	5.68	3.56	
	326	13.3	2.58	94.22	3.58	2.25	
4.13		796.1	0.35	4.00	0.33	0.23	0%
	513	288.0	73.01	1022.45	83.52	59.04	
	521	37.8	12.79	150.03	13.22	9.44	
	291	23.6	13.22	92.54	8.26	6.14	

	263	30.7	12.28	131.97	10.74	7.67	
	263	57.6	23.04	247.69	20.16	14.40	
	501	21.7	8.69	93.39	7.60	5.43	
	263	9.4	3.78	40.61	3.31	2.36	
	266	305.0	122.00	1311.55	106.75	76.25	
	525	22.2	8.88	95.42	7.77	5.55	
4.14		2321.6	0.22	6.18	0.28	0.18	8%
	326	148.1	28.69	1046.92	39.78	24.97	
	322	102.3	2.82	946.02	21.43	11.20	
	322	563.3	15.53	5209.55	117.98	61.66	
	326	9.3	1.79	65.43	2.49	1.56	
	328	258.7	77.16	1465.97	80.16	54.29	
	528	50.0	14.91	283.23	15.49	10.49	
	323	37.0	5.15	260.75	9.74	6.04	
	523	143.5	19.96	1010.39	37.74	23.39	
	513	373.0	94.57	1324.33	108.18	76.48	
	525	57.9	23.14	248.78	20.25	14.46	
	266	13.9	5.55	59.71	4.86	3.47	
	525	67.1	26.84	288.58	23.49	16.78	
	266	75.0	29.99	322.41	26.24	18.75	
	263	113.4	45.36	487.60	39.69	28.35	
	266	84.2	33.69	362.22	29.48	21.06	
	266	30.1	12.03	129.36	10.53	7.52	
	266	46.3	18.51	199.02	16.20	11.57	
	263	68.5	27.40	294.55	23.98	17.13	
	266	12.5	5.00	53.74	4.37	3.12	
	263	32.4	12.96	139.32	11.34	8.10	
	266	21.3	8.52	91.55	7.45	5.32	
	263	13.9	5.55	59.71	4.86	3.47	
4.15		2273.4	0.39	4.27	0.35	0.25	0%
	263	12.5	4.98	53.55	4.36	3.11	
	266	33.2	13.28	142.80	11.62	8.30	
	263	116.7	46.68	501.78	40.84	29.17	
	263	9.2	3.69	39.67	3.23	2.31	
	263	83.0	33.21	356.99	29.06	20.76	
	266	198.3	79.33	852.82	69.42	49.58	
	266	554.9	221.95	2385.91	194.20	138.72	
	266	30.9	12.36	132.88	10.82	7.73	
	263	4.6	1.84	19.83	1.61	1.15	
	513	47.5	12.04	168.65	13.78	9.74	
	291	150.4	84.20	589.42	52.63	39.09	
	310	2.3	0.42	12.19	0.73	0.50	
	263	91.3	36.53	392.69	31.96	22.83	
	521	71.0	24.04	282.13	24.86	17.76	
	526	27.2	5.27	192.36	7.31	4.59	
	310	27.7	5.08	146.26	8.72	5.95	
	521	13.4	4.53	53.13	4.68	3.34	
	266	91.8	36.71	394.68	32.12	22.95	
	310	3.7	0.68	19.50	1.16	0.79	
	310	5.1	0.93	26.81	1.60	1.09	
	267	115.8	46.31	497.81	40.52	28.94	

	275	7.8	4.58	30.29	2.74	2.05	
	310	4.6	0.85	24.38	1.45	0.99	
	263	294.7	117.89	1267.33	103.15	73.68	
	266	86.7	34.68	372.86	30.35	21.68	
	521	184.5	62.45	732.81	64.57	46.12	
	266	4.6	1.84	19.83	1.61	1.15	
5	___	2025.4	0.40	4.26	0.35	0.25	0%
	521	5.0	1.71	20.02	1.76	1.26	
	263	90.7	36.28	390.05	31.75	22.68	
	310	19.1	3.51	101.21	6.03	4.12	
	275	97.3	56.80	375.72	34.04	25.43	
	263	7.6	3.02	32.50	2.65	1.89	
	266	100.8	40.32	433.39	35.28	25.20	
	310	14.6	2.68	77.24	4.60	3.14	
	310	5.0	0.92	26.63	1.59	1.08	
	310	5.0	0.92	26.63	1.59	1.08	
	275	149.7	87.41	578.17	52.38	39.14	
	521	44.3	15.01	176.14	15.52	11.09	
	263	448.5	179.40	1928.57	156.98	112.13	
	521	2.0	0.68	8.01	0.71	0.50	
	263	150.7	60.27	647.91	52.74	37.67	
	266	427.3	170.94	1837.56	149.57	106.83	
	310	3.5	0.65	18.64	1.11	0.76	
	521	85.7	29.00	340.28	29.98	21.42	
	263	23.8	9.52	102.33	8.33	5.95	
	310	29.7	5.46	157.14	9.37	6.39	
	521	37.8	12.79	150.12	13.23	9.45	
	310	8.6	1.57	45.28	2.70	1.84	
	521	50.4	17.06	200.16	17.64	12.60	
	310	5.0	0.92	26.63	1.59	1.08	
	310	7.1	1.29	37.29	2.22	1.52	
	263	200.6	80.23	862.44	70.20	50.14	
	310	5.5	1.02	29.30	1.75	1.19	
6.1	___	2352.4	0.19	6.37	0.28	0.18	7%
	322	262.1	7.22	2423.91	54.90	28.69	
	326	31.8	6.16	224.75	8.54	5.36	
	328	244.4	72.87	1384.60	75.71	51.27	
	321	392.0	132.69	1556.97	137.20	98.00	
	313	25.0	6.33	88.69	7.24	5.12	
	323	63.6	8.85	447.80	16.72	10.37	
	322	539.2	14.86	4986.44	112.93	59.02	
	323	142.2	19.78	1001.16	37.39	23.17	
	513	234.4	59.41	832.03	67.97	48.05	
	521	139.0	47.05	552.07	48.65	34.75	
	513	54.1	13.70	191.88	15.67	11.08	
	522	39.5	1.09	365.48	8.28	4.33	
	323	20.9	2.91	147.13	5.50	3.41	
	521	112.2	37.98	445.62	39.27	28.05	
	323	43.2	6.00	303.87	11.35	7.03	
	266	9.1	3.63	39.06	3.18	2.27	
6.2	___	283.8	0.34	3.98	0.35	0.25	0%

	513	14.4	3.64	51.01	4.17	2.95	
	521	157.4	53.28	625.16	55.09	39.35	
	266	22.5	9.00	96.80	7.88	5.63	
	521	89.6	30.32	355.76	31.35	22.39	
6.3		1457.9	0.29	4.68	0.32	0.23	1%
	322	91.4	2.52	845.54	19.15	10.01	
	323	55.2	7.68	388.83	14.52	9.00	
	323	18.7	2.60	131.63	4.92	3.05	
	321	45.7	15.47	181.57	16.00	11.43	
	323	14.0	1.95	98.80	3.69	2.29	
	521	186.9	63.27	742.44	65.42	46.73	
	323	34.8	4.85	245.41	9.17	5.68	
	323	5.0	0.69	35.06	1.31	0.81	
	513	71.5	18.13	253.86	20.74	14.66	
	266	27.2	10.86	116.77	9.50	6.79	
	266	9.5	3.80	40.87	3.33	2.38	
	323	59.3	8.25	417.51	15.59	9.66	
	521	494.7	167.45	1964.86	173.14	123.67	
	513	56.1	14.23	199.23	16.28	11.50	
	266	9.1	3.62	38.92	3.17	2.26	
	521	182.4	61.74	724.46	63.84	45.60	
	266	63.8	25.53	274.40	22.34	15.95	
	521	32.6	11.03	129.43	11.41	8.15	
6.4		383.4	0.35	4.03	0.35	0.25	0%
	521	27.6	9.36	109.79	9.67	6.91	
	266	40.8	16.31	175.37	14.27	10.20	
	521	61.2	20.71	242.98	21.41	15.29	
	266	13.1	5.26	56.51	4.60	3.29	
	521	208.9	70.71	829.75	73.11	52.22	
	266	13.6	5.44	58.46	4.76	3.40	
	521	18.1	6.14	72.00	6.34	4.53	
6.5		1024.9	0.34	4.00	0.34	0.24	0%
	521	4.9	1.67	19.62	1.73	1.23	
	263	9.9	3.95	42.48	3.46	2.47	
	266	12.3	4.94	53.09	4.32	3.09	
	513	34.6	8.76	122.74	10.03	7.09	
	521	162.5	55.00	645.43	56.87	40.62	
	263	18.8	7.51	80.70	6.57	4.69	
	513	98.8	25.04	350.67	28.65	20.25	
	263	4.9	1.98	21.24	1.73	1.23	
	263	2.0	0.79	8.50	0.69	0.49	
	521	162.5	55.00	645.43	56.87	40.62	
	263	10.4	4.15	44.60	3.63	2.59	
	266	49.4	19.76	212.38	17.29	12.35	
	521	98.8	33.44	392.36	34.57	24.70	
	266	93.8	37.54	403.52	32.84	23.46	
	521	52.8	17.89	209.91	18.50	13.21	
	266	10.9	4.35	46.72	3.80	2.72	
	263	24.7	9.88	106.19	8.64	6.17	
	521	158.0	53.50	627.77	55.32	39.51	
	266	14.8	5.93	63.71	5.19	3.70	

6.6		2330.6	0.15	7.27	0.26	0.16	9%
	326	8.8	1.70	62.14	2.36	1.48	
	322	6.9	0.19	64.19	1.45	0.76	
	328	51.8	15.45	293.62	16.06	10.87	
	323	113.4	15.77	798.28	29.81	18.48	
	323	188.8	26.26	1329.38	49.65	30.77	
	521	56.4	19.11	224.21	19.76	14.11	
	322	693.6	19.12	6414.63	145.28	75.92	
	525	31.9	12.77	137.28	11.17	7.98	
	328	61.5	18.35	348.68	19.07	12.91	
	327	92.5	37.02	397.91	32.39	23.13	
	513	21.7	5.51	77.20	6.31	4.46	
	521	75.4	25.53	299.56	26.40	18.85	
	322	431.2	11.89	3988.28	90.32	47.20	
	323	87.4	12.16	615.81	23.00	14.25	
	521	28.2	9.55	112.11	9.88	7.06	
	323	44.0	6.11	309.54	11.56	7.16	
	326	50.9	9.86	359.76	13.67	8.58	
	266	14.3	5.74	61.68	5.02	3.59	
	521	212.4	71.89	843.56	74.33	53.09	
	513	59.2	15.01	210.25	17.18	12.14	
6.7		722.2	0.37	4.17	0.34	0.25	0%
	266	366.2	146.48	1574.62	128.17	91.55	
	521	81.7	27.67	324.65	28.61	20.43	
	263	63.7	25.49	274.02	22.30	15.93	
	521	51.3	17.35	203.59	17.94	12.81	
	513	23.6	5.97	83.61	6.83	4.83	
	266	88.2	35.28	379.26	30.87	22.05	
	513	47.6	12.06	168.85	13.79	9.75	
6.8		234.2	0.29	3.87	0.31	0.22	0%
	266	63.7	25.49	274.03	22.31	15.93	
	310	14.7	2.69	77.43	4.61	3.15	
	513	4.9	1.24	17.34	1.42	1.00	
	513	15.1	3.84	53.74	4.39	3.10	
	513	130.9	33.18	464.61	37.95	26.83	
	521	4.9	1.65	19.40	1.71	1.22	
7.1		4097.3	0.19	6.40	0.28	0.18	7%
	322	396.8	10.94	3669.71	83.11	43.43	
	323	29.9	4.15	210.21	7.85	4.87	
	326	45.9	8.90	324.62	12.33	7.74	
	326	27.6	5.34	194.77	7.40	4.64	
	313	124.0	31.43	440.18	35.96	25.42	
	313	322.8	81.84	1146.10	93.63	66.18	
	329	35.4	7.42	178.89	11.35	7.81	
	326	16.5	3.20	116.86	4.44	2.79	
	321	1313.9	444.75	5218.75	459.86	328.47	
	323	305.4	42.48	2150.59	80.32	49.78	
	323	10.1	1.41	71.15	2.66	1.65	
	326	429.8	83.27	3038.41	115.44	72.46	
	322	620.9	17.12	5742.41	130.05	67.96	
	328	45.0	13.42	255.00	13.94	9.44	

	322	373.4	10.29	3453.09	78.20	40.87	
7.2	___	2767.2	0.18	6.71	0.27	0.17	9%
	326	380.5	73.71	2689.50	102.19	64.14	
	322	24.1	0.66	222.88	5.05	2.64	
	322	41.7	1.15	385.76	8.74	4.57	
	322	103.8	2.86	960.11	21.74	11.36	
	326	97.3	18.85	687.93	26.14	16.41	
	322	27.3	0.75	252.89	5.73	2.99	
	326	47.7	9.25	337.42	12.82	8.05	
	321	378.6	128.17	1503.93	132.52	94.66	
	321	295.7	100.09	1174.43	103.49	73.92	
	313	207.6	52.63	737.06	60.21	42.56	
	322	258.1	7.12	2387.42	54.07	28.26	
	326	10.2	1.98	72.07	2.74	1.72	
	322	160.4	4.42	1483.03	33.59	17.55	
	327	65.8	26.32	282.98	23.03	16.45	
	323	193.7	26.95	1364.17	50.95	31.58	
	328	102.0	30.41	577.70	31.59	21.39	
	322	372.6	10.27	3446.12	78.05	40.79	
7.3	___	1748.9	0.15	7.39	0.26	0.16	10%
	322	167.7	4.62	1551.27	35.13	18.36	
	326	86.1	16.69	608.91	23.14	14.52	
	322	11.4	0.31	105.39	2.39	1.25	
	323	18.7	2.60	131.60	4.91	3.05	
	322	4.6	0.13	42.15	0.95	0.50	
	325	81.1	32.45	348.86	28.40	20.28	
	322	22.8	0.63	210.77	4.77	2.49	
	322	18.7	0.52	172.83	3.91	2.05	
	326	141.3	27.37	998.75	37.95	23.82	
	322	20.5	0.57	189.69	4.30	2.25	
	321	380.1	128.67	1509.86	133.04	95.03	
	322	643.6	17.74	5952.16	134.80	70.44	
	326	143.1	27.72	1011.63	38.44	24.13	
	322	9.1	0.25	84.31	1.91	1.00	
7.4	___	2082.6	0.17	7.17	0.27	0.17	12%
	322	841.5	23.20	7783.16	176.27	92.12	
	328	48.3	14.41	273.71	14.97	10.14	
	328	325.1	96.94	1841.82	100.71	68.20	
	323	89.4	12.43	629.50	23.51	14.57	
	325	186.5	74.58	801.77	65.26	46.61	
	322	126.0	3.47	1164.97	26.38	13.79	
	321	21.2	7.18	84.28	7.43	5.30	
	325	2.3	0.90	9.71	0.79	0.56	
	321	256.9	86.96	1020.36	89.91	64.22	
	328	74.0	22.08	419.52	22.94	15.54	
	326	13.5	2.62	95.74	3.64	2.28	
	322	53.3	1.47	492.71	11.16	5.83	
	326	44.7	8.66	315.94	12.00	7.53	
7.5	___	2371.0	0.26	4.48	0.30	0.21	2%
	322	54.5	1.50	503.80	11.41	5.96	
	328	4.3	1.29	24.50	1.34	0.91	

	323	10.4	1.44	73.07	2.73	1.69	
	325	113.7	45.48	488.91	39.80	28.43	
	322	247.3	6.82	2287.08	51.80	27.07	
	313	156.1	39.56	554.04	45.26	31.99	
	313	10.8	2.74	38.37	3.13	2.22	
	313	10.8	2.74	38.37	3.13	2.22	
	321	359.7	121.76	1428.70	125.89	89.92	
	521	85.6	28.98	340.00	29.96	21.40	
	513	554.2	140.50	1967.54	160.73	113.62	
	521	379.1	128.34	1505.97	132.70	94.79	
	513	365.0	92.53	1295.78	105.85	74.83	
	266	15.1	6.05	65.06	5.30	3.78	
	263	4.3	1.73	18.59	1.51	1.08	
7.6	___	1345.7	0.30	3.80	0.31	0.22	0%
	513	13.3	3.37	47.14	3.85	2.72	
	513	11.1	2.81	39.29	3.21	2.27	
	513	89.9	22.78	319.01	26.06	18.42	
	266	190.8	76.32	820.41	66.78	47.70	
	266	30.5	12.22	131.34	10.69	7.64	
	513	744.6	188.75	2643.25	215.93	152.64	
	266	118.6	47.45	510.14	41.52	29.66	
	521	103.1	34.91	409.68	36.10	25.79	
	263	8.9	3.54	38.07	3.10	2.21	
	266	35.0	13.99	150.38	12.24	8.74	
7.7	___	410.0	0.38	4.21	0.34	0.24	0%
	521	4.5	1.53	17.92	1.58	1.13	
	266	162.4	64.95	698.23	56.83	40.59	
	263	45.1	18.04	193.95	15.79	11.28	
	513	22.6	5.72	80.06	6.54	4.62	
	266	67.2	26.88	288.99	23.52	16.80	
	263	41.5	16.60	178.44	14.52	10.37	
	263	40.1	16.06	172.62	14.05	10.04	
	513	26.6	6.75	94.47	7.72	5.46	
8.1	___	2161.2	0.11	8.16	0.24	0.14	12%
	322	547.7	15.10	5065.23	114.72	59.95	
	326	153.6	29.76	1086.04	41.26	25.90	
	327	42.0	16.79	180.54	14.70	10.50	
	326	9.2	1.79	65.23	2.48	1.56	
	322	963.4	26.56	8910.02	201.79	105.45	
	327	33.2	13.29	142.85	11.63	8.31	
	327	15.7	6.27	67.46	5.49	3.92	
	327	18.5	7.38	79.36	6.46	4.61	
	322	78.4	2.16	725.43	16.43	8.59	
	325	287.9	115.16	1238.01	100.77	71.98	
	326	11.5	2.23	81.53	3.10	1.94	
8.2	___	885.2	0.09	8.26	0.24	0.14	9%
	322	582.7	16.06	5389.31	122.05	63.78	
	323	204.8	28.49	1442.11	53.86	33.38	
	325	74.5	29.79	320.21	26.06	18.62	
	323	23.3	3.24	163.88	6.12	3.79	
8.3	___	1951.3	0.15	6.92	0.26	0.16	7%

	325	12.6	5.05	54.26	4.42	3.15	
	322	11.7	0.32	108.07	2.45	1.28	
	322	54.7	1.51	505.75	11.45	5.99	
	326	201.0	38.93	1420.61	53.98	33.88	
	322	15.4	0.43	142.65	3.23	1.69	
	322	613.2	16.90	5671.35	128.44	67.12	
	321	262.2	88.76	1041.47	91.77	65.55	
	323	337.5	46.94	2376.34	88.75	55.00	
	322	74.8	2.06	691.63	15.66	8.19	
	313	260.8	66.11	925.84	75.63	53.46	
	325	17.3	6.92	74.36	6.05	4.32	
	322	19.2	0.53	177.23	4.01	2.10	
	325	66.4	26.55	285.39	23.23	16.59	
	323	4.7	0.65	32.91	1.23	0.76	
8.4	___	3609.2	0.20	6.52	0.27	0.18	10%
	325	170.1	68.04	731.43	59.54	42.53	
	322	119.3	3.29	1103.78	25.00	13.06	
	326	18.3	3.54	129.29	4.91	3.08	
	326	14.6	2.83	103.43	3.93	2.47	
	322	32.9	0.91	304.49	6.90	3.60	
	322	47.6	1.31	439.82	9.96	5.21	
	321	206.7	69.96	820.94	72.34	51.67	
	313	504.4	127.85	1790.47	146.26	103.39	
	322	13.7	0.38	126.87	2.87	1.50	
	327	759.5	303.80	3265.89	265.83	189.88	
	325	45.7	18.29	196.62	16.00	11.43	
	323	262.9	36.57	1851.51	69.15	42.86	
	325	82.3	32.92	353.92	28.81	20.58	
	322	1007.3	27.77	9316.56	211.00	110.26	
	322	323.7	8.92	2994.16	67.81	35.44	
8.5	___	1041.3	0.10	8.24	0.24	0.14	13%
	322	778.5	21.46	7199.66	163.05	85.21	
	326	17.1	3.31	120.61	4.58	2.88	
	326	3.2	0.63	22.82	0.87	0.54	
	327	140.7	56.26	604.82	49.23	35.16	
	325	30.9	12.36	132.86	10.81	7.72	
	323	45.7	6.35	321.51	12.01	7.44	
	326	25.4	4.91	179.29	6.81	4.28	
8.6	___	298.9	0.30	4.40	0.31	0.22	1%
	322	18.8	0.52	173.59	3.93	2.05	
	325	115.0	45.98	494.33	40.24	28.74	
	313	119.7	30.33	424.77	34.70	24.53	
	513	23.0	5.83	81.62	6.67	4.71	
	325	13.6	5.44	58.51	4.76	3.40	
	522	8.9	0.25	82.45	1.87	0.98	
8.7	___	1624.4	0.20	5.72	0.27	0.18	5%
	326	39.0	7.55	275.44	10.47	6.57	
	322	373.2	10.29	3451.99	78.18	40.85	
	327	28.2	11.27	121.13	9.86	7.04	
	513	18.8	4.76	66.67	5.45	3.85	
	313	206.1	52.25	731.67	59.77	42.25	

	325	56.8	22.72	244.27	19.88	14.20	
	322	16.4	0.45	151.97	3.44	1.80	
	513	4.7	1.19	16.67	1.36	0.96	
	513	19.2	4.88	68.33	5.58	3.95	
	522	125.4	3.46	1159.35	26.26	13.72	
	313	50.2	12.73	178.33	14.57	10.30	
	521	57.3	19.39	227.51	20.05	14.32	
	522	18.8	0.52	173.68	3.93	2.06	
	525	12.7	5.07	54.51	4.44	3.17	
	526	16.4	3.18	116.15	4.41	2.77	
	525	164.3	65.73	706.58	57.51	41.08	
	526	17.8	3.46	126.11	4.79	3.01	
	513	399.1	101.16	1416.68	115.73	81.81	
8.8	___	196.1	0.30	3.81	0.31	0.22	0%
	513	52.8	13.39	187.45	15.31	10.82	
	266	59.2	23.66	254.38	20.71	14.79	
	513	74.8	18.96	265.55	21.69	15.33	
	266	9.3	3.72	39.94	3.25	2.32	
9.1	___	1439.394	0.25	3.84	0.29	0.20	1%
	322	54.86479	1.51	507.43	11.49	6.01	
	522	12.90936	0.36	119.39	2.70	1.41	
	525	45.18277	18.07	194.29	15.81	11.30	
	513	1326.437	336.25	4708.85	384.67	271.92	
9.2	___	807.1625	0.27	3.63	0.30	0.21	0%
	266	9.214184	3.69	39.62	3.22	2.30	
	266	32.71035	13.08	140.65	11.45	8.18	
	266	18.42837	7.37	79.24	6.45	4.61	
	266	26.72113	10.69	114.90	9.35	6.68	
	513	720.0885	182.54	2556.31	208.83	147.62	
10.1	___	2964.9	0.10	7.64	0.25	0.15	6%
	322	1279.0	35.26	11828.85	267.89	140.00	
	326	70.5	13.65	498.00	18.92	11.88	
	322	27.1	0.75	250.61	5.68	2.97	
	323	1090.7	151.71	7680.40	286.84	177.78	
	328	40.2	11.99	227.74	12.45	8.43	
	313	117.0	29.65	415.24	33.92	23.98	
	324	328.8	61.58	1704.05	104.22	71.34	
	313	6.3	1.60	22.45	1.83	1.30	
	325	4.5	1.81	19.42	1.58	1.13	
	323	0.9	0.13	6.36	0.24	0.15	
10.2	___	2871.4	0.17	5.87	0.28	0.18	3%
	322	575.6	15.87	5323.32	120.56	63.00	
	323	492.2	68.47	3466.31	129.46	80.23	
	322	93.0	2.56	860.25	19.48	10.18	
	324	160.7	30.10	832.91	50.94	34.87	
	313	413.0	104.70	1466.27	119.78	84.67	
	324	368.8	69.08	1911.65	116.92	80.04	
	524	102.2	19.15	529.82	32.40	22.18	
	325	12.4	4.97	53.46	4.35	3.11	
	525	110.5	44.20	475.20	38.68	27.63	
	313	48.8	12.37	173.27	14.15	10.01	

	513	480.3	121.75	1704.93	139.28	98.45	
	266	13.8	5.53	59.40	4.83	3.45	
10.3		184.1	0.31	3.82	0.31	0.22	0%
	513	14.3	3.63	50.89	4.16	2.94	
	266	57.3	22.94	246.56	20.07	14.33	
	266	9.0	3.58	38.53	3.14	2.24	
	513	103.5	26.23	367.35	30.01	21.21	
11.1		3329.4	0.10	8.17	0.24	0.14	12%
	322	623.7	17.19	5768.75	130.65	68.27	
	322	297.7	8.21	2753.75	62.37	32.59	
	328	172.7	51.51	978.65	53.51	36.24	
	328	271.4	80.92	1537.50	84.07	56.94	
	322	446.9	12.32	4132.77	93.60	48.91	
	328	23.2	6.90	131.19	7.17	4.86	
	323	339.0	47.15	2386.95	89.15	55.25	
	322	714.5	19.70	6608.15	149.66	78.21	
	325	21.3	8.52	91.59	7.46	5.33	
	322	13.0	0.36	119.91	2.72	1.42	
	321	11.6	3.92	45.98	4.05	2.89	
	323	132.4	18.42	932.61	34.83	21.59	
	325	27.3	10.93	117.48	9.56	6.83	
	321	9.3	3.13	36.79	3.24	2.32	
	322	58.8	1.62	543.90	12.32	6.44	
	323	110.7	15.39	779.34	29.11	18.04	
	325	56.0	22.41	240.93	19.61	14.01	
11.2		3610.9	0.21	4.97	0.28	0.19	2%
	322	290.2	8.00	2684.41	60.80	31.77	
	323	4.7	0.65	32.76	1.22	0.76	
	325	145.6	58.24	626.04	50.96	36.40	
	322	25.1	0.69	232.30	5.26	2.75	
	322	42.3	1.17	391.48	8.87	4.63	
	322	21.9	0.60	202.19	4.58	2.39	
	322	25.6	0.71	236.61	5.36	2.80	
	322	31.6	0.87	292.53	6.63	3.46	
	323	714.9	99.45	5034.49	188.02	116.53	
	313	1252.2	317.42	4445.18	363.13	256.69	
	513	1056.8	267.90	3751.65	306.47	216.64	
11.3		377.4	0.28	3.70	0.30	0.21	0%
	266	54.2	21.70	233.25	18.99	13.56	
	266	7.8	3.13	33.60	2.74	1.95	
	266	3.7	1.47	15.81	1.29	0.92	
	266	9.2	3.68	39.53	3.22	2.30	
	513	302.5	76.68	1073.80	87.72	62.01	
12.1		2600.0	0.09	8.41	0.23	0.13	14%
	322	287.4	7.92	2658.03	60.20	31.46	
	326	362.1	70.15	2559.86	97.26	61.05	
	322	325.0	8.96	3005.85	68.08	35.57	
	322	1003.8	27.67	9283.77	210.25	109.88	
	327	271.6	108.64	1167.92	95.06	67.90	
	322	340.3	9.38	3147.55	71.28	37.25	
	325	9.8	3.90	41.93	3.41	2.44	

12.2		2982.6	0.18	6.64	0.28	0.18	4%
	322	267.6	7.38	2474.58	56.04	29.29	
	323	95.5	13.28	672.25	25.11	15.56	
	322	8.3	0.23	76.95	1.74	0.91	
	325	224.6	89.86	965.98	78.63	56.16	
	322	161.6	4.45	1494.47	33.85	17.69	
	323	6.1	0.85	43.17	1.61	1.00	
	323	963.0	133.95	6781.14	253.26	156.96	
	321	553.5	187.36	2198.56	193.73	138.38	
	322	151.5	4.18	1401.31	31.74	16.58	
	328	43.8	13.06	248.12	13.57	9.19	
	323	4.4	0.61	30.84	1.15	0.71	
	325	6.1	2.45	26.36	2.15	1.53	
	322	20.6	0.57	190.35	4.31	2.25	
	325	8.8	3.50	37.66	3.07	2.19	
	322	110.4	3.04	1020.61	23.11	12.08	
	327	5.7	2.28	24.48	1.99	1.42	
	322	131.8	3.63	1219.06	27.61	14.43	
	321	186.1	63.00	739.23	65.14	46.53	
	325	11.4	4.55	48.96	3.98	2.85	
	327	17.5	7.01	75.32	6.13	4.38	
	322	4.4	0.12	40.50	0.92	0.48	
12.3		5692.0	0.29	4.48	0.32	0.23	0%
	321	1203.1	407.26	4778.79	421.09	300.78	
	325	36.5	14.59	156.83	12.77	9.12	
	322	97.0	2.67	896.67	20.31	10.61	
	323	47.1	6.55	331.61	12.38	7.68	
	325	17.1	6.83	73.45	5.98	4.27	
	323	683.7	95.11	4814.88	179.82	111.45	
	322	36.0	0.99	333.05	7.54	3.94	
	325	83.6	33.43	359.32	29.25	20.89	
	325	67.9	27.15	291.82	23.75	16.97	
	323	101.1	14.06	711.99	26.59	16.48	
	321	1541.5	521.81	6122.93	539.53	385.38	
	313	533.7	135.29	1894.61	154.77	109.41	
	513	495.4	125.58	1758.58	143.66	101.55	
	521	737.8	249.73	2930.35	258.21	184.44	
	266	3.7	1.48	15.88	1.29	0.92	
	266	6.9	2.77	29.78	2.42	1.73	
12.4		392.1	0.33	3.95	0.33	0.24	0%
	513	7.0	1.77	24.74	2.02	1.43	
	266	37.6	15.05	161.81	13.17	9.41	
	513	92.9	23.55	329.85	26.95	19.05	
	266	18.6	7.43	79.91	6.50	4.65	
	263	4.2	1.67	17.98	1.46	1.05	
	266	7.0	2.79	29.97	2.44	1.74	
	263	22.3	8.92	95.89	7.80	5.57	
	521	190.0	64.32	754.73	66.50	47.50	
	266	12.5	5.02	53.94	4.39	3.14	
13.1		3289.0	0.30	5.65	0.31	0.21	17%
	322	889.6	24.52	8227.61	186.34	97.38	

	327	934.1	373.65	4016.74	326.94	233.53	
	327	1399.0	559.58	6015.54	489.64	349.74	
	329	66.3	13.93	335.62	21.30	14.66	
13.2		3827.9	0.27	5.51	0.31	0.21	8%
	322	821.6	22.65	7598.73	172.09	89.93	
	327	738.3	295.30	3174.52	258.39	184.56	
	321	784.7	265.63	3116.89	274.65	196.18	
	328	281.5	83.94	1594.77	87.20	59.06	
	313	118.4	30.02	420.37	34.34	24.27	
	321	25.0	8.48	99.49	8.77	6.26	
	323	69.2	9.63	487.49	18.21	11.28	
	325	160.3	64.13	689.35	56.11	40.08	
	313	54.7	13.85	194.02	15.85	11.20	
	325	231.8	92.73	996.81	81.14	57.95	
	322	109.3	3.01	1010.92	22.89	11.96	
	321	212.7	71.99	844.80	74.44	53.17	
	321	220.4	74.62	875.55	77.15	55.11	
13.3		2836.9	0.13	7.43	0.25	0.15	9%
	321	70.6	23.90	280.39	24.71	17.65	
	321	67.4	22.82	267.73	23.59	16.85	
	321	43.7	14.80	173.66	15.30	10.93	
	327	77.4	30.97	332.92	27.10	19.36	
	323	34.2	4.75	240.54	8.98	5.57	
	327	18.7	7.47	80.29	6.54	4.67	
	322	777.9	21.44	7194.36	162.93	85.15	
	325	18.2	7.29	78.33	6.38	4.55	
	323	342.9	47.70	2415.00	90.19	55.90	
	322	703.2	19.39	6503.57	147.29	76.97	
	313	220.0	55.76	780.91	63.79	45.09	
	323	195.8	27.24	1379.08	51.51	31.92	
	328	156.2	46.59	885.12	48.40	32.78	
	327	41.0	16.40	176.25	14.35	10.25	
	321	65.1	22.05	258.69	22.79	16.28	
	325	4.6	1.82	19.58	1.59	1.14	
13.4		1207.8	0.09	8.44	0.23	0.13	13%
	322	311.8	8.60	2883.92	65.31	34.13	
	326	92.8	17.98	655.99	24.92	15.64	
	325	31.6	12.62	135.68	11.04	7.89	
	327	124.8	49.93	536.73	43.69	31.21	
	322	646.8	17.83	5982.41	135.49	70.80	
13.5		4005.8	0.26	5.57	0.31	0.21	5%
	321	207.4	70.22	823.92	72.60	51.86	
	325	330.4	132.15	1420.60	115.63	82.59	
	322	29.4	0.81	272.18	6.16	3.22	
	521	29.0	9.80	115.01	10.13	7.24	
	323	15.7	2.18	110.31	4.12	2.55	
	321	161.4	54.63	641.04	56.49	40.35	
	321	1339.1	453.27	5318.71	468.67	334.76	
	322	14.2	0.39	131.70	2.98	1.56	
	325	142.4	56.96	612.33	49.84	35.60	
	321	96.8	32.78	384.62	33.89	24.21	

	327	131.0	52.40	563.34	45.85	32.75	
	322	863.9	23.82	7989.94	180.95	94.56	
	325	61.2	24.49	263.30	21.43	15.31	
	323	165.2	22.98	1163.24	43.44	26.93	
	327	123.4	49.37	530.68	43.20	30.85	
	325	152.8	61.14	657.23	53.50	38.21	
	322	142.4	3.93	1317.02	29.83	15.59	
13.6	___	2128.7	0.16	7.10	0.27	0.17	9%
	322	599.6	16.53	5545.50	125.59	65.63	
	328	139.2	41.52	788.82	43.13	29.21	
	325	57.9	23.16	248.94	20.26	14.47	
	323	184.7	25.69	1300.69	48.58	30.11	
	323	210.9	29.34	1485.12	55.47	34.38	
	328	27.6	8.22	156.20	8.54	5.78	
	325	14.2	5.70	61.25	4.99	3.56	
	322	19.8	0.54	182.73	4.14	2.16	
	323	9.6	1.34	67.95	2.54	1.57	
	321	393.8	133.29	1564.02	137.82	98.44	
	322	152.5	4.21	1410.81	31.95	16.70	
	327	121.3	48.52	521.58	42.45	30.32	
	322	187.5	5.17	1733.77	39.27	20.52	
	327	10.1	4.04	43.47	3.54	2.53	
13.7	___	5824.1	0.33	4.04	0.34	0.25	0%
	322	85.2	2.35	788.29	17.85	9.33	
	325	59.7	23.87	256.55	20.88	14.92	
	325	207.3	82.90	891.18	72.54	51.81	
	313	364.7	92.45	1294.71	105.77	74.77	
	321	2125.0	719.31	8440.48	743.75	531.25	
	321	2920.8	988.69	11601.43	1022.28	730.20	
	521	1.8	0.61	7.13	0.63	0.45	
	266	4.9	1.97	21.22	1.73	1.23	
	266	23.3	9.33	100.31	8.16	5.83	
	266	31.4	12.56	135.03	10.99	7.85	
13.8	___	192.8	0.36	4.07	0.35	0.25	0%
	266	44.9	17.95	192.99	15.71	11.22	
	521	69.0	23.37	274.25	24.17	17.26	
	521	39.9	13.52	158.68	13.98	9.99	
	521	9.4	3.17	37.22	3.28	2.34	
	521	9.9	3.34	39.18	3.45	2.47	
	266	12.8	5.13	55.14	4.49	3.21	
	521	6.9	2.34	27.43	2.42	1.73	
14.1	___	1522.1	0.19	6.80	0.28	0.18	13%
	322	530.5	14.62	4906.39	111.12	58.07	
	328	413.4	123.27	2342.21	128.07	86.74	
	327	101.5	40.60	436.48	35.53	25.38	
	521	322.9	109.30	1282.53	113.01	80.72	
	322	147.0	4.05	1359.35	30.79	16.09	
	521	6.9	2.33	27.37	2.41	1.72	
14.2	___	4826.8	0.30	4.11	0.32	0.23	0%
	521	206.3	69.84	819.55	72.22	51.58	
	513	780.4	197.84	2770.55	226.33	159.99	

	521	169.6	57.41	673.65	59.36	42.40	
	325	123.3	49.34	530.39	43.17	30.84	
	521	91.1	30.85	362.04	31.90	22.79	
	322	144.2	3.98	1333.71	30.21	15.78	
	323	27.2	3.78	191.60	7.16	4.44	
	525	109.3	43.72	469.94	38.25	27.32	
	323	74.4	10.34	523.72	19.56	12.12	
	322	38.1	1.05	352.30	7.98	4.17	
	513	826.2	209.45	2933.14	239.61	169.38	
	521	1092.9	369.94	4340.93	382.51	273.22	
	521	508.3	172.08	2019.16	177.92	127.09	
	521	616.3	208.61	2447.85	215.70	154.07	
	266	13.2	5.26	56.55	4.60	3.29	
	266	5.9	2.36	25.35	2.06	1.47	
14.3	___	179.1	0.36	4.08	0.35	0.25	0%
	521	24.5	8.28	97.16	8.56	6.12	
	521	11.7	3.97	46.64	4.11	2.94	
	521	84.1	28.48	334.24	29.45	21.04	
	266	58.7	23.48	252.45	20.55	14.68	
15.1	___	5623.2	0.25	5.68	0.30	0.20	5%
	322	1155.3	31.85	10685.15	241.99	126.46	
	327	186.2	74.50	800.83	65.18	46.56	
	325	264.3	105.72	1136.47	92.50	66.07	
	323	118.2	16.45	832.54	31.09	19.27	
	313	311.8	79.03	1106.78	90.41	63.91	
	323	32.9	4.57	231.44	8.64	5.36	
	321	54.8	18.54	217.57	19.17	13.69	
	325	54.8	21.91	235.54	19.17	13.69	
	327	41.5	16.62	178.62	14.54	10.38	
	322	515.4	14.21	4766.31	107.95	56.41	
	327	165.7	66.28	712.50	57.99	41.42	
	322	18.3	0.50	168.87	3.82	2.00	
	321	1133.0	383.50	4500.09	396.53	283.24	
	321	1296.4	438.82	5149.18	453.73	324.09	
	325	137.4	54.96	590.81	48.09	34.35	
	325	126.0	50.39	541.74	44.09	31.50	
	324	11.4	2.14	59.15	3.62	2.48	
15.2	___	654.4	0.23	4.94	0.32	0.22	0%
	313	26.8	6.79	95.08	7.77	5.49	
	324	499.5	93.55	2588.81	158.34	108.39	
	325	128.1	51.24	550.86	44.84	32.03	
15.3	___	3315.2	0.20	5.59	0.31	0.21	4%
	324	300.5	56.28	1557.33	95.25	65.20	
	325	123.5	49.38	530.86	43.21	30.86	
	321	165.7	56.08	658.03	57.98	41.42	
	324	991.7	185.75	5140.14	314.38	215.21	
	524	937.7	175.63	4860.20	297.26	203.49	
	322	389.9	10.75	3605.90	81.66	42.68	
	328	310.5	92.58	1759.06	96.19	65.14	
	325	91.2	36.49	392.29	31.93	22.81	
	524	4.5	0.85	23.52	1.44	0.98	

15.4		512.7	0.20	5.11	0.32	0.22	0%
	524	9.0	1.70	46.91	2.87	1.96	
	521	31.2	10.57	124.01	10.93	7.81	
	524	350.7	65.68	1817.57	111.17	76.10	
	524	121.7	22.80	630.87	38.59	26.41	
15.5		2004.0	0.19	6.97	0.27	0.17	11%
	321	10.4	3.52	41.34	3.64	2.60	
	325	132.1	52.85	568.13	46.24	33.03	
	322	46.2	1.27	426.85	9.67	5.05	
	322	27.1	0.75	251.09	5.69	2.97	
	327	323.1	129.23	1389.19	113.07	80.77	
	321	234.4	79.34	930.97	82.03	58.60	
	325	30.3	12.13	130.36	10.61	7.58	
	322	750.7	20.69	6942.58	157.23	82.17	
	335	271.5	8.11	2498.34	57.65	30.50	
	327	93.7	37.47	402.75	32.78	23.42	
	325	80.1	32.04	344.38	28.03	20.02	
	322	4.5	0.12	41.85	0.95	0.50	
15.6		2851.3	0.15	7.62	0.26	0.16	13%
	322	1161.4	32.02	10741.00	243.26	127.12	
	327	237.9	95.16	1023.02	83.27	59.48	
	327	117.4	46.95	504.67	41.08	29.34	
	325	18.2	7.28	78.24	6.37	4.55	
	325	131.5	52.59	565.30	46.01	32.87	
	325	40.9	16.38	176.05	14.33	10.24	
	322	11.4	0.31	105.18	2.38	1.24	
	325	55.0	22.02	236.68	19.26	13.76	
	327	37.8	15.10	162.35	13.21	9.44	
	327	298.9	119.55	1285.14	104.60	74.72	
	335	66.0	1.97	607.00	14.01	7.41	
	322	381.2	10.51	3525.64	79.85	41.73	
	335	164.7	4.92	1515.40	34.97	18.50	
	335	129.2	3.86	1188.88	27.43	14.51	
15.7		1590.8	0.21	6.41	0.29	0.19	4%
	322	313.7	8.65	2901.02	65.70	34.33	
	327	32.6	13.02	140.01	11.40	8.14	
	325	23.4	9.36	100.57	8.19	5.85	
	327	79.8	31.92	343.11	27.93	19.95	
	327	4.1	1.65	17.75	1.44	1.03	
	325	220.6	88.23	948.48	77.20	55.14	
	323	622.8	86.63	4385.43	163.78	101.51	
	322	36.2	1.00	335.06	7.59	3.97	
	325	12.4	4.95	53.24	4.33	3.10	
	321	17.9	6.05	71.04	6.26	4.47	
	325	9.2	3.67	39.44	3.21	2.29	
	321	5.5	1.86	21.86	1.93	1.38	
	325	6.9	2.75	29.58	2.41	1.72	
	321	205.9	69.70	817.85	72.07	51.48	
15.8		3506.4	0.33	4.16	0.34	0.24	0%
	323	210.4	29.27	1481.83	55.34	34.30	
	325	46.5	18.60	199.98	16.28	11.63	

	321	2425.7	821.09	9634.78	848.99	606.42	
	321	823.8	278.84	3271.95	288.31	205.94	
15.9	___	2517.2	0.30	4.25	0.34	0.24	0%
	321	969.9	328.31	3852.48	339.47	242.48	
	521	413.0	139.80	1640.47	144.55	103.25	
	324	102.5	19.19	531.03	32.48	22.23	
	521	554.6	187.74	2202.97	194.12	138.66	
	524	440.8	82.56	2284.59	139.73	95.65	
	524	36.4	6.82	188.81	11.55	7.90	
15.10	___	453.9	0.30	4.32	0.34	0.24	0%
	521	73.3	24.81	291.11	25.65	18.32	
	524	55.9	10.47	289.64	17.72	12.13	
	521	246.9	83.57	980.67	86.41	61.72	
	525	4.6	1.83	19.70	1.60	1.15	
	524	73.3	13.73	379.86	23.23	15.90	
15.11	___	305.8	0.25	4.88	0.33	0.23	0%
	521	18.7	6.33	74.30	6.55	4.68	
	524	28.5	5.34	147.85	9.04	6.19	
	525	80.0	31.99	343.85	27.99	19.99	
	524	178.6	33.46	925.86	56.63	38.76	
15.12	___	1856.6	0.24	6.07	0.30	0.20	5%
	322	599.8	16.54	5547.35	125.63	65.65	
	327	58.1	23.22	249.66	20.32	14.52	
	327	23.3	9.33	100.26	8.16	5.83	
	325	433.4	173.36	1863.59	151.69	108.35	
	323	140.8	19.59	991.56	37.03	22.95	
	322	21.5	0.59	198.72	4.50	2.35	
	321	515.7	174.56	2048.29	180.49	128.92	
	325	64.0	25.60	275.21	22.40	16.00	
15.13	___	4266.6	0.34	3.97	0.35	0.25	0%
	321	3691.0	1249.42	14660.84	1291.87	922.76	
	521	575.6	194.84	2286.22	201.45	143.90	
15.14	___	1546.3	0.23	6.46	0.29	0.19	9%
	322	683.3	18.84	6319.42	143.12	74.79	
	327	155.3	62.11	667.66	54.34	38.82	
	325	14.3	5.71	61.42	5.00	3.57	
	325	93.1	37.23	400.20	32.57	23.27	
	327	102.3	40.91	439.82	35.80	25.57	
	321	70.0	23.71	278.17	24.51	17.51	
	325	376.0	150.39	1616.65	131.59	93.99	
	321	52.1	17.62	206.80	18.22	13.02	
15.15	___	3453.8	0.34	3.99	0.35	0.25	0%
	321	1193.2	403.91	4739.52	417.63	298.31	
	325	119.5	47.80	513.88	41.83	29.88	
	322	4.6	0.13	42.35	0.96	0.50	
	321	2136.5	723.19	8486.03	747.76	534.12	
15.16	___	1211.5	0.16	7.33	0.26	0.16	11%
	322	731.8	20.17	6768.48	153.29	80.11	
	325	8.8	3.53	37.94	3.09	2.21	
	328	52.5	15.65	297.32	16.26	11.01	
	325	65.5	26.19	281.54	22.92	16.37	

	327	137.9	55.17	593.04	48.27	34.48	
	325	56.2	22.48	241.61	19.67	14.05	
	321	144.4	48.88	573.62	50.55	36.10	
	328	14.4	4.29	81.56	4.46	3.02	
15.17		963.5	0.34	4.02	0.35	0.25	0%
	328	4.6	1.37	26.09	1.43	0.97	
	322	4.6	0.13	42.59	0.96	0.50	
	327	12.0	4.79	51.49	4.19	2.99	
	325	18.9	7.55	81.19	6.61	4.72	
	321	180.5	61.11	717.07	63.19	45.13	
	321	742.9	251.46	2950.61	260.00	185.71	
15.18		4228.6	0.34	4.01	0.35	0.25	0%
	325	4.6	1.83	19.64	1.60	1.14	
	521	2300.9	778.86	9139.25	805.32	575.23	
	521	1650.0	558.52	6553.70	577.49	412.49	
	524	65.8	12.32	340.94	20.85	14.27	
	525	138.4	55.36	595.17	48.44	34.60	
	525	46.1	18.45	198.39	16.15	11.53	
	266	22.8	9.14	98.21	7.99	5.71	
15.19		603.9	0.28	4.71	0.33	0.23	0%
	524	6.7	1.26	34.75	2.13	1.45	
	524	67.5	12.64	349.83	21.40	14.65	
	524	248.1	46.47	1285.79	78.64	53.83	
	521	105.5	35.71	419.00	36.92	26.37	
	525	176.1	70.45	757.29	61.64	44.03	
15.20		700.2	0.19	5.18	0.32	0.22	
	524	700.2	131.15	3629.34	221.98	151.95	
15.21		216.7	0.37	4.12	0.35	0.25	0%
	266	33.0	13.18	141.69	11.53	8.24	
	521	4.2	1.43	16.78	1.48	1.06	
	521	76.0	25.74	302.03	26.61	19.01	
	266	62.9	25.18	270.66	22.03	15.74	
	521	23.7	8.01	93.96	8.28	5.91	
	521	16.9	5.72	67.12	5.91	4.22	
15.22		173.2	0.20	5.14	0.32	0.22	
	266	9.3	3.70	39.82	3.24	2.31	
	524	163.9	30.70	849.45	51.95	35.56	
16.1		2422.5	0.19	5.79	0.30	0.20	5%
	521	4.6	1.55	18.14	1.60	1.14	
	322	353.1	9.73	3265.84	73.96	38.65	
	328	385.5	114.98	2184.55	119.45	80.90	
	521	90.4	30.62	359.26	31.66	22.61	
	521	26.0	8.81	103.42	9.11	6.51	
	524	1562.8	292.70	8099.74	495.39	339.12	
16.2		1038.6	0.19	5.15	0.32	0.22	
	524	882.2	165.24	4572.48	279.66	191.44	
	525	21.4	8.55	91.90	7.48	5.34	
	524	121.4	22.74	629.31	38.49	26.35	
	266	13.6	5.46	58.66	4.77	3.41	
16.3		357.8	0.28	4.80	0.33	0.23	
	266	122.3	48.92	525.91	42.81	30.58	

	266	32.1	12.83	137.88	11.22	8.02	
	524	64.1	12.01	332.38	20.33	13.92	
	524	139.3	26.08	721.74	44.14	30.22	
16.4		100.1	0.28	4.79	0.33	0.23	
	524	14.1	2.64	73.13	4.47	3.06	
	266	44.5	17.81	191.50	15.59	11.13	
	524	35.3	6.61	182.83	11.18	7.65	
	524	6.2	1.16	31.99	1.96	1.34	
16.5		1910.7	0.21	5.11	0.32	0.22	0%
	322	39.9	1.10	368.76	8.35	4.36	
	328	13.1	3.92	74.45	4.07	2.76	
	524	33.1	6.20	171.43	10.48	7.18	
	521	157.2	53.22	624.48	55.03	39.31	0%
	524	1514.2	283.61	7848.19	480.01	328.59	
	525	71.6	28.64	307.83	25.06	17.90	
	525	63.4	25.37	272.76	22.20	15.86	
	524	18.1	3.39	93.93	5.75	3.93	
16.6		1319.6	0.25	4.94	0.33	0.23	
	525	101.4	40.55	435.92	35.48	25.34	
	525	46.8	18.73	201.34	16.39	11.71	
	524	3.4	0.64	17.81	1.09	0.75	
	524	8.6	1.61	44.53	2.72	1.86	
	524	10.7	2.01	55.66	3.40	2.33	
	524	236.3	44.25	1224.53	74.89	51.27	
	266	222.1	88.83	954.96	77.73	55.52	
	524	370.7	69.43	1921.39	117.52	80.44	
	524	319.6	59.86	1656.45	101.31	69.35	
16.7		228.1	0.24	4.98	0.32	0.22	
	524	9.5	1.78	49.37	3.02	2.07	
	266	52.2	20.86	224.28	18.26	13.04	
	524	166.5	31.18	862.74	52.77	36.12	
17.1		4534.2	0.25	4.80	0.32	0.22	0%
	322	93.8	2.59	867.66	19.65	10.27	
	328	47.1	14.06	267.06	14.60	9.89	
	524	1640.2	307.20	8501.01	519.93	355.92	
	521	509.4	172.44	2023.38	178.29	127.35	
	524	25.8	4.84	133.89	8.19	5.61	
	524	13.6	2.55	70.47	4.31	2.95	
	524	363.0	67.99	1881.55	115.08	78.78	
	524	198.5	37.18	1028.86	62.93	43.08	
	521	132.8	44.95	527.45	46.48	33.20	
	521	27.6	9.36	109.81	9.68	6.91	
	513	434.6	110.18	1542.94	126.04	89.10	
	524	147.3	27.59	763.42	46.69	31.96	
	524	335.8	62.90	1740.61	106.46	72.88	
	266	96.5	38.61	415.10	33.79	24.13	
	266	83.4	33.36	358.58	29.19	20.85	
	269	165.0	65.99	709.37	57.74	41.24	
	257	219.6	131.78	840.07	76.87	57.65	
17.2		320.7	0.35	4.52	0.34	0.24	
	524	57.8	10.82	299.43	18.31	12.54	

	269	89.6	35.85	385.34	31.36	22.40
	266	27.3	10.92	117.36	9.55	6.82
	269	55.0	22.02	236.68	19.26	13.76
	266	36.8	14.74	158.44	12.90	9.21
	524	20.9	3.92	108.45	6.63	4.54
	269	33.2	13.28	142.79	11.62	8.30
18.1	___	1046.5	0.21	5.09	0.32	0.22
	513	10.5	2.67	37.33	3.05	2.16
	524	943.2	176.66	4888.67	299.00	204.68
	269	92.8	37.12	399.09	32.48	23.20
18.2	___	135.1	0.29	4.74	0.33	0.23
	524	67.5	12.65	350.03	21.41	14.66
	267	4.5	1.81	19.49	1.59	1.13
	266	14.1	5.62	60.42	4.92	3.51
	269	49.0	19.58	210.49	17.13	12.24

Vegetation Cover Adjustment Procedure
(only for soils other than sand, loamy sand)

Factor applies to XKSAT, after weighted average is developed. Ignore soil-vegetation grouping.

Factor = 0.0111 x + .889 (As in Fig. 4.10 of the HDM)

x = Density (%)

For Example: X = 24%

Factor = .0111 (24) + .889 = 1.16

Factor times XKSAT = adjusted XKSAT

R/FCDMC/AAO

TABLE B3

SUBBASIN VEGETATION DENSITY
AND ADJUSTED XKSAT VALUES

SUBBASIN NO.	DENSITY (%)	ADJUSTMENT FACTOR (*)	XKSAT (in./hr.)	ADJUSTED XKSAT (in./hr.)
1.1	15	1.06	0.14	0.15
1.2	60	1.56	0.35	0.55
2.1	10	1.00	0.08	0.08
2.2	20	1.11	0.35	0.39
3.0	20	1.11	0.30	0.33
4.1	14.5	1.05	0.27	0.28
4.2	15	1.06	0.26	0.27
4.3	15	1.06	0.30	0.32
4.4	15	1.06	0.27	0.29
4.5	15	1.06	0.25	0.27
4.6	15	1.06	0.25	0.27
4.7	20	1.11	0.29	0.32
4.8	15	1.06	0.26	0.28
4.9	20	1.11	0.39	0.43
4.10	20	1.11	0.23	0.26
4.11	15	1.06	0.27	0.29
4.12	20	1.11	0.34	0.38
4.13	20	1.11	0.35	0.39
4.14	20	1.11	0.22	0.24
4.15	20	1.11	0.39	0.44
5.0	60	1.56	0.40	0.62
6.1	20	1.11	0.19	0.21
6.2	20	1.11	0.34	0.38
6.3	20	1.11	0.29	0.32
6.4	60	1.56	0.35	0.55
6.5	20	1.11	0.34	0.38
6.6	10	1.00	0.15	0.15
6.7	60	1.56	0.37	0.58
6.8	19.5	1.11	0.29	0.32
7.1	20	1.11	0.19	0.21
7.2	25	1.17	0.18	0.21
7.3	25	1.17	0.15	0.18
7.4	25	1.17	0.17	0.20
7.5	20	1.11	0.26	0.29
7.6	19.5	1.11	0.30	0.33
7.7	20	1.11	0.38	0.42
8.1	15	1.06	0.11	0.12
8.2	15	1.06	0.09	0.10
8.3	17.5	1.08	0.15	0.17
8.4	20	1.11	0.20	0.22
8.5	20	1.11	0.10	0.11
8.6	15	1.06	0.30	0.31

SUBBASIN NO.	DENSITY %	ADJUSTMENT FACTOR (*)	XKSAT (in./hr.)	ADJUSTED XKSAT (in./hr.)
8.7	15	1.06	0.20	0.21
8.8	17	1.08	0.30	0.32
9.1	15	1.06	0.25	0.27
9.2	15	1.06	0.27	0.29
10.1	15	1.06	0.10	0.11
10.2	15	1.06	0.17	0.18
10.3	15	1.06	0.31	0.33
11.1	10	1.00	0.10	0.10
11.2	15	1.06	0.21	0.22
11.3	15	1.06	0.28	0.30
12.1	10	1.00	0.09	0.09
12.2	15	1.06	0.18	0.19
12.3	15	1.06	0.29	0.31
12.4	15	1.06	0.33	0.35
13.1	15	1.06	0.30	0.32
13.2	15	1.06	0.27	0.29
13.3	15	1.06	0.13	0.14
13.4	10	1.00	0.09	0.09
13.5	15	1.06	0.26	0.28
13.6	15	1.06	0.16	0.17
13.7	15	1.06	0.33	0.35
13.8	20	1.11	0.36	0.40
14.1	15	1.06	0.19	0.20
14.2	15	1.06	0.30	0.31
14.3	10	1.00	0.36	0.36
15.01	15	1.06	0.25	0.27
15.02	15	1.06	0.23	0.24
15.03	15	1.06	0.20	0.21
15.04	15	1.06	0.20	0.21
15.05	10	1.00	0.19	0.19
15.06	15	1.06	0.15	0.16
15.07	15	1.06	0.21	0.22
15.08	15	1.06	0.33	0.35
15.09	15	1.06	0.30	0.32
15.10	15	1.06	0.30	0.32
15.11	15	1.06	0.25	0.27
15.12	15	1.06	0.24	0.25
15.13	15	1.06	0.34	0.36
15.14	15	1.06	0.23	0.24
15.15	15	1.06	0.34	0.36
15.16	15	1.06	0.16	0.17
15.17	15	1.06	0.34	0.36
15.18	15	1.06	0.34	0.36
15.19	15	1.06	0.28	0.30
15.20	15	1.06	0.19	0.20
15.21	10.5	1.01	0.37	0.37
15.22	20	1.11	0.20	0.22

SUBBASIN NO.	DENSITY %	ADJUSTMENT FACTOR (*)	XKSAT (in./hr.)	ADJUSTED XKSAT (in./hr.)
16.1	15	1.06	0.19	0.20
16.2	15	1.06	0.19	0.20
16.3	15	1.06	0.28	0.30
16.4	10	1.00	0.28	0.28
16.5	15	1.06	0.21	0.22
16.6	15	1.06	0.25	0.27
16.7	10	1.00	0.24	0.24
17.1	15	1.06	0.25	0.27
17.2	10	1.00	0.35	0.35
18.1	15	1.06	0.21	0.22
18.2	10	1.00	0.29	0.29

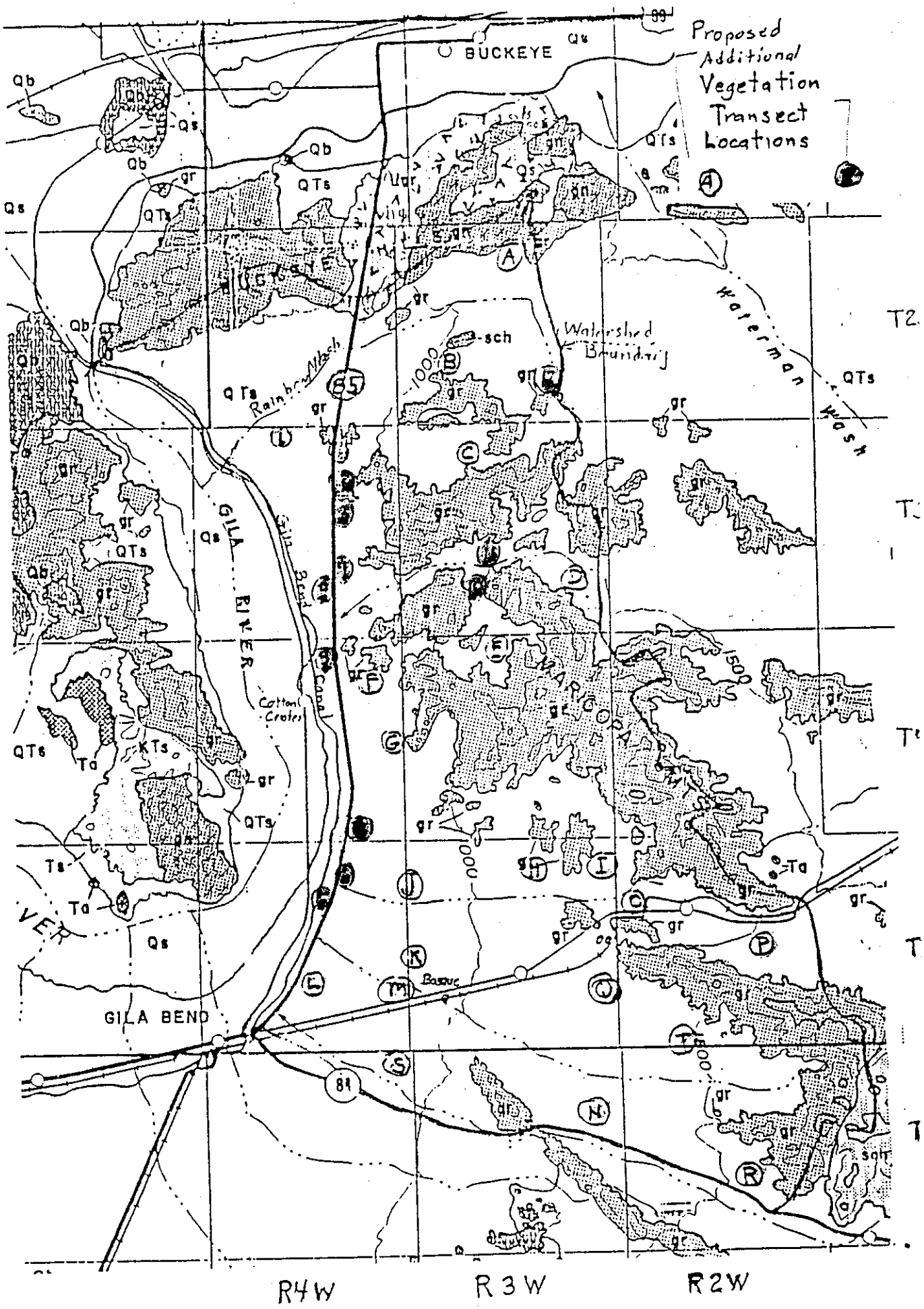
NOTE:

(*) – SEE ATTACHED FOR PROCEDURE TO OBTAIN ADJUSTMENT FACTOR

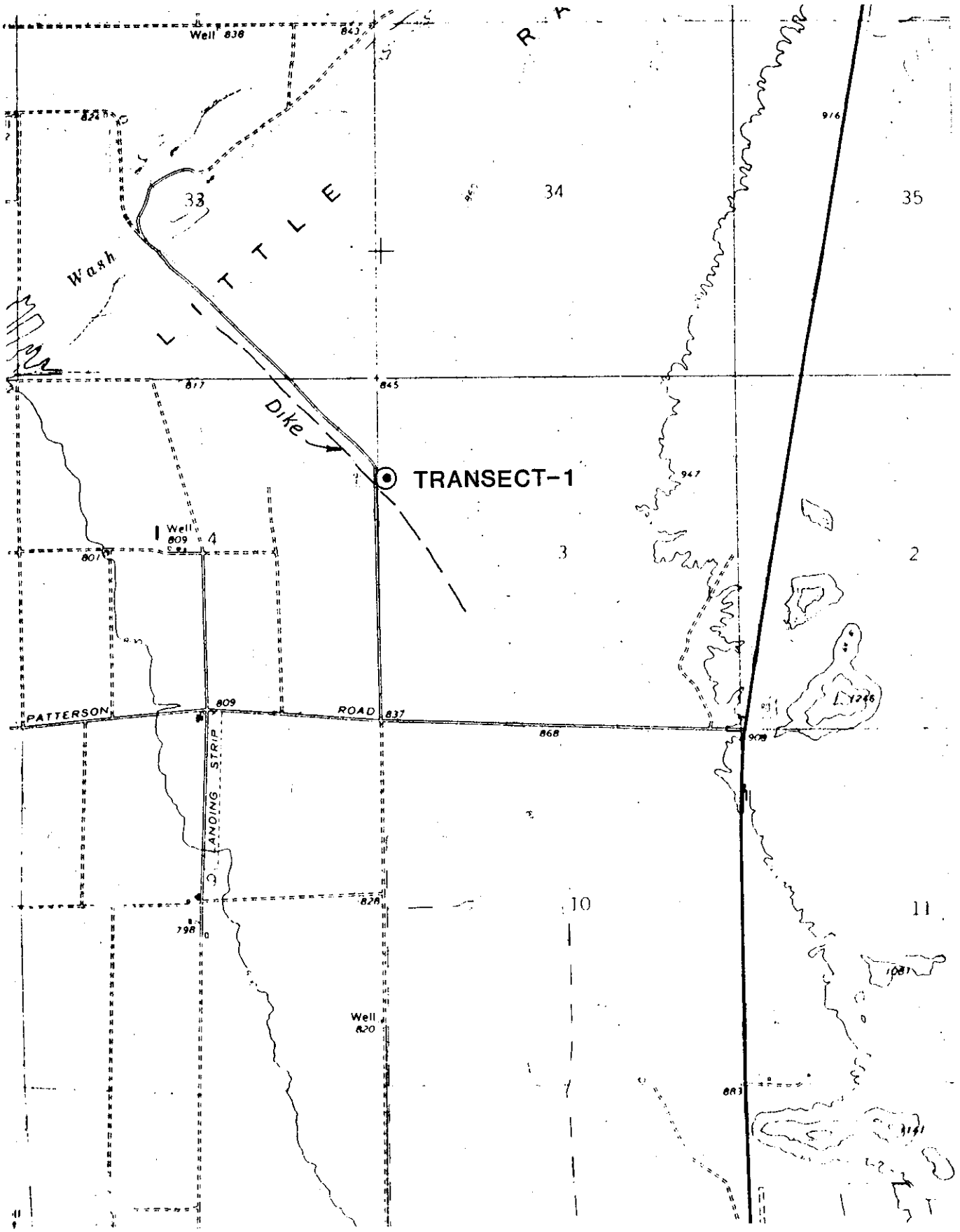
TABLE NO. 1

VEGETATION TRANSECTS

No.	Area Tributary to Siphon No.	Location Sect.	T	R	Elevation	Vegetation	Soil	Transect Length	Density %
1	4	SWNW3	3S	4W	855	Creosote, scattered saguaro & paloverde	sandy loam	100	20
2	5	SWSW11	3S	4W	895	Creosote, ironwood, saguaro, bursage	sandy loam	100	24
3	5	NWNW14	3S	4W	900	Creosote, paloverde, saguaro, bursage	sandy loam next to hill (rock) slope	100	15
4	5	NWNW26	3S	4W	870	Creosote, paloverde, saguaro	sandy loam	100	10
5	10-11	SWSW10	5S	4W	765	Creosote, paloverde, Butterfield Stage rute	sandy loam	100	10.5
6	9	SESE3	4S	4W	770	Creosote, Ironwood, paloverde, saguaro	gravelly sandy loam	100	22.5
7	8	SWSW35	4S	4W	780	Creosote, saguaro, paloverde, bursage paloverde bursage	qravelly sandy loam	100	13
8	Lift Station	SESE3	4S	4W	760	Creosote, bursage, ironwood, paloverde	gravelly sandy loam	100	17
9	Lift Station	SESE27	3S	3W	860	Creosote, cholla, paloverde, saguaro, ironwood, bursage calegarous	sandy gravelly hard calcareous loam	100	19.5
10	Lift Station & 6	SENE29	3S	3W	1185	Creosote, paloverde, ironwood, ocotillo, cholla, bursage	sandy gravelly loam	100	17.5
11	Lift Station	NWNW28	3S	3W	1240	Ironwood, paloverde, saguaro, creosote bursage	sandy gravelly loam	100	43.5
12	4	NWNW35	2S	3W	1170	Creosote, ocotillo, saguaro, burroweed	sandy silt loam	100	14.5


Proposed Additional Vegetation Transect Locations
BUCKEYE
Watershed Boundary
Waterman Wash
Rainbow Wash
GILA RIVER
Gila Bend Canal
Cotton Crates
GILA BEND
Basque
R4W
R3W
R2W
T2
T1

TRANSECT TAKEN ON 06/06/89



TRANSECT LOCATION

Donohue ENGINEERS ARCHITECTS SCIENTISTS

TRANSECT #1

FLOOD MANAGEMENT SECTION ARIZONA DEPARTMENT OF WATER RESOURCES	DATE: 06/ 09/ 89

VEGETATION TRANSECTION FIELD NOTES

PROJECT	WOOLSEY
PERSONNEL	T. CASEY, R. RUSSEL
TRANSECTION LOCATION	NW 1/4 NW 1/4 3 Sec. T 3S R 4W
QUADRANGLE MAP	COTTON CENTER NW
ELEVATION	855
SOIL TYPE AND HYDROLOGIC GROUP	DESERT BRUSH-GROUP "A"
SOIL INFORMATION SOURCE	S.C.S.
VEGETATION COMMUNITY DESCRIPTION	20%-POOR

Waist high creosote bushes, no grasses, very sparce Saguaro. SILTY-SAND, No gravel.

RECORD	MEASUREMENT IS OF 20ft VEGETATION 80ft BARE EARTH/ROCK					
1	1ft.-27ft	27ft-29ft	29ft-32ft	32ft-36ft	36ft-78ft	78ft-83ft
	83ft-90ft	90ft-99ft	99ft-100ft			

% COVER CALCULATIONS

Total Distance	100ft.
Total Measured Cover	20 ft.
Total Measured Non-cover	80 ft.
Total Measured Cover / Total Distance	.20
% Cover	20%

NOTES

Picture #1-General overview of vegetation community.
Picture #2-Close-up of typical cover.

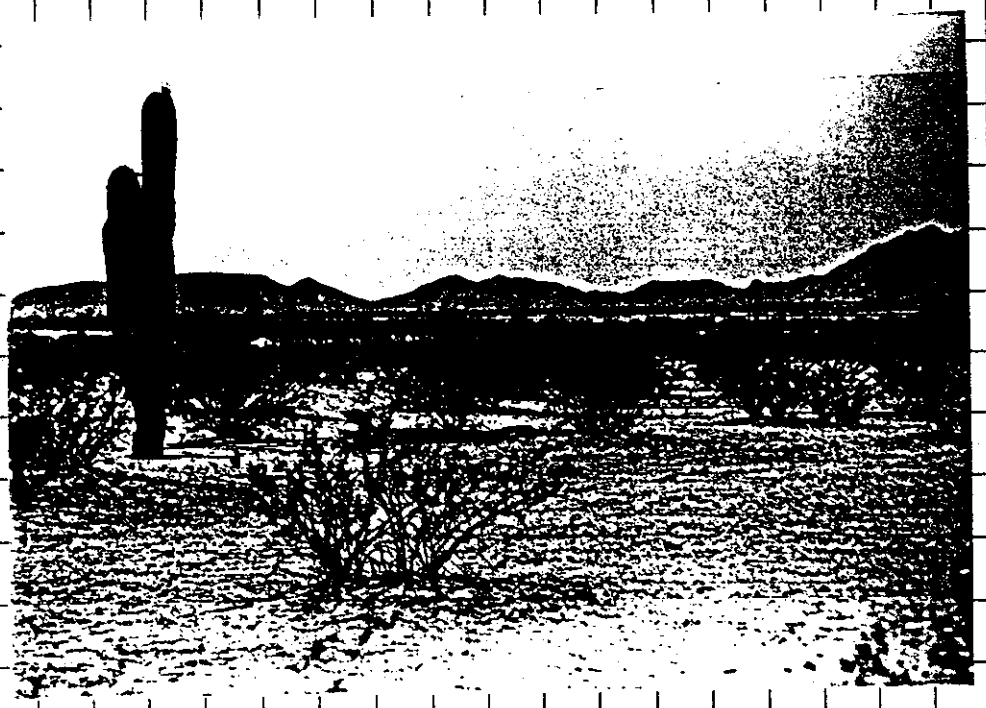
Transect. was taken approx. 100 yds. North of corner where road intersects the dike.

FLOOD MANAGEMENT SECTION
ARIZONA DEPARTMENT OF WATER RESOURCES

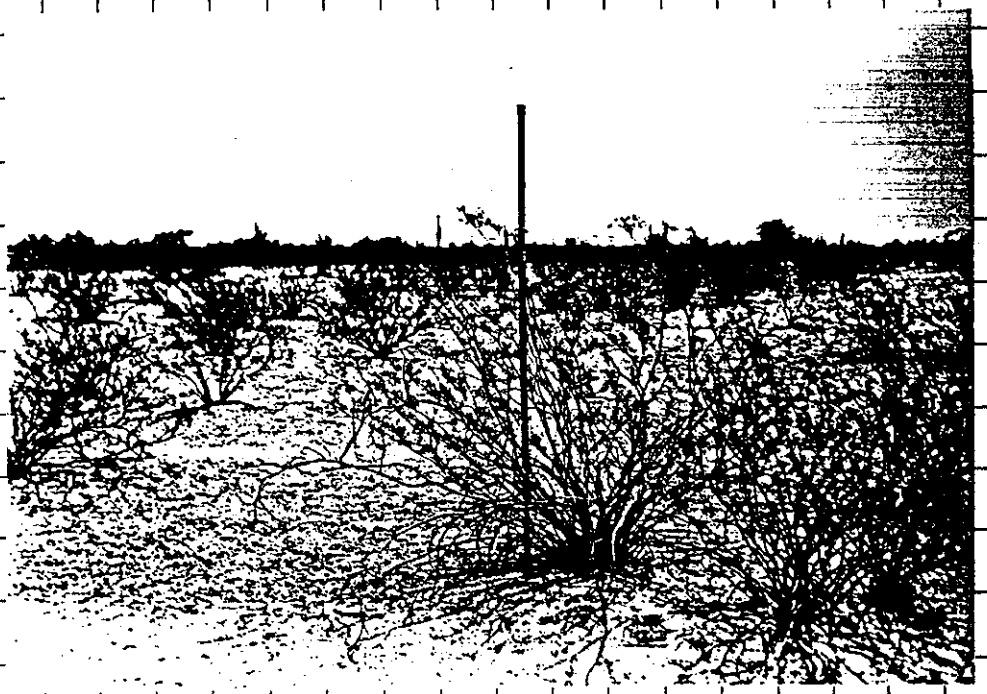
DATE: 06/ 09/ 89

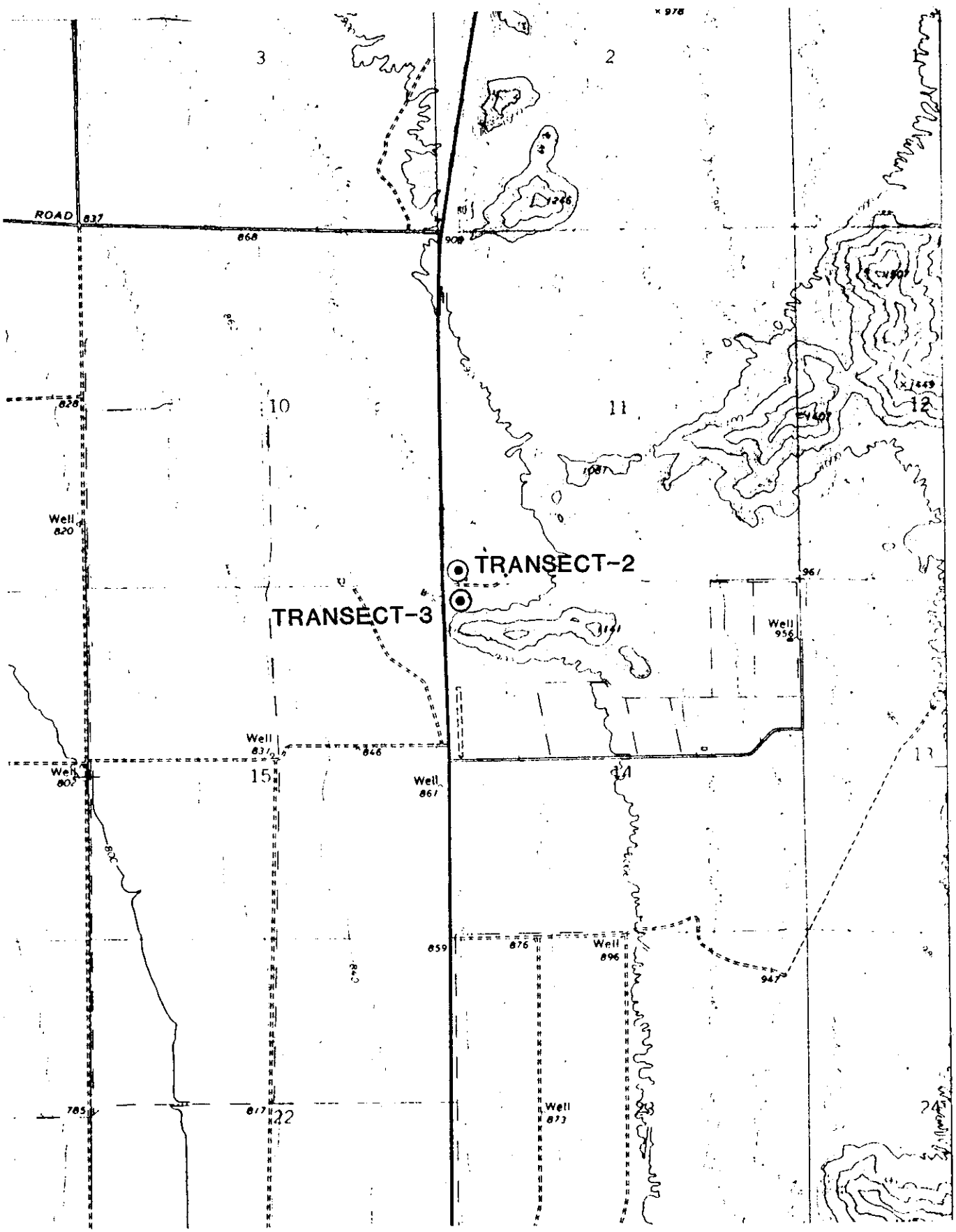
VEGETATION TRANSECTION PHOTOGRAPHIC RECORD

PHOTOGRAPH NUMBER 1: GENERAL OVERVIEW OF VEGETATION COMMUNITY



PHOTOGRAPH NUMBER 2: CLOSE-UP OF TYPICAL COVER DISTRIBUTION





TRANSECT LOCATION

Donohue ENGINEERS ARCHITECTS SCIENTISTS

TRANSECT #2

FLOOD MANAGEMENT SECTION ARIZONA DEPARTMENT OF WATER RESOURCES	DATE: 06/ 09/ 89

VEGETATION TRANSECTION FIELD NOTES

PROJECT	WOOLSEY
PERSONNEL	T. CASEY, R. RUSSEL
TRANSECTION LOCATION	NW 1/4 SW 1/4 11 Sec. T 3S R 4W
QUADRANGLE MAP	COTTON CENTER NW
ELEVATION	895
SOIL TYPE AND HYDROLOGIC GROUP	DESERT BRUSH-GROUP "A"
SOIL INFORMATION SOURCE	S.C.S.

VEGETATION COMMUNITY DESCRIPTION

24%-FAIR

Knee to waist high Creosote, occational ~~Mesquite~~ Ironwood Bush, occasional Saguaro. Silty-Sand, No gravel, occational boulder, numerous shallow gullies approx. 6"-8" in depth running North to South.

RECORD	MEASUREMENT IS OF ____ VEGETATION ____ BARE EARTH/ROCK					
1	1ft-39ft	39ft-41ft	41ft-49ft	49ft-53ft	53ft-58ft	58ft-65ft
	65ft-70ft	70ft-76ft	76ft-83ft	83ft-88ft	88ft-100ft	

% COVER CALCULATIONS

Total Distance	100ft.
Total Measured Cover	24 ft.
Total Measured Non-cover	76 ft.
Total Measured Cover / Total Distance	.24
% Cover	24%

NOTES

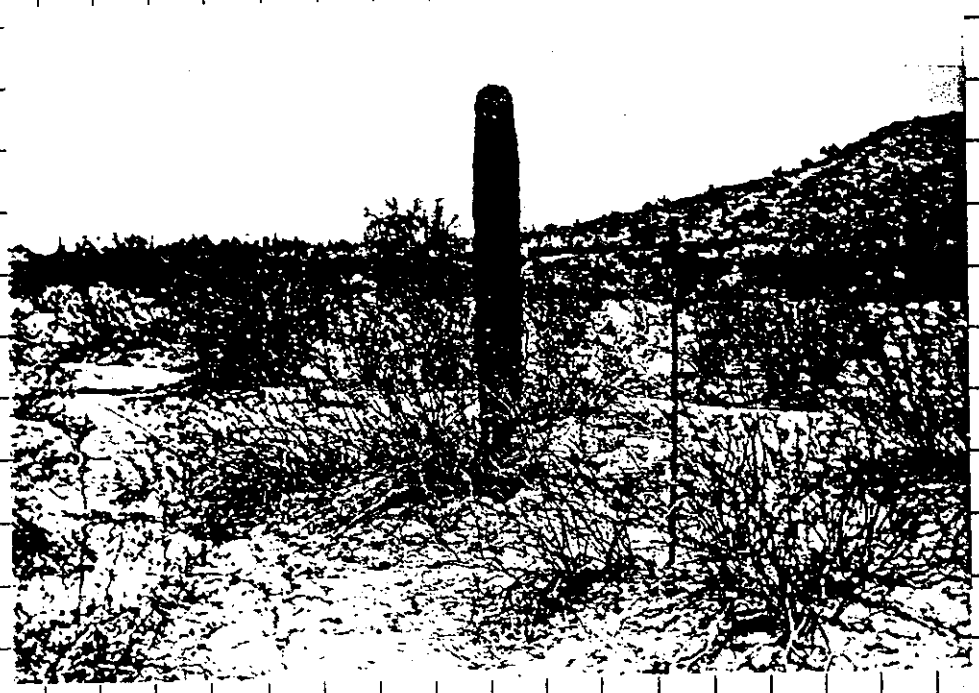
Picture #1-General overview of vegetation community.
Picture #2-Close-up of typical cover.
Picture #3-Depth of typical gully.
Picture #4-Width of typical gully.

Transect, taken approx. 200 yds. East of the Highway.

FLOOD MANAGEMENT SECTION ARIZONA DEPARTMENT OF WATER RESOURCES	DATE: 06/ 09/ 89

VEGETATION TRANSECTION PHOTOGRAPHIC RECORD

PHOTOGRAPH NUMBER 1: GENERAL OVERVIEW OF VEGETATION COMMUNITY



PHOTOGRAPH NUMBER 2: CLOSE-UP OF TYPICAL COVER DISTRIBUTION

FLOOD MANAGEMENT SECTION
ARIZONA DEPARTMENT OF WATER RESOURCES

DATE: 06 / 09 / 89

VEGETATION TRANSECTION PHOTOGRAPHIC RECORD

PHOTOGRAPH NUMBER 3: ADDITIONAL INFORMATION

PHOTOGRAPH NUMBER 4: ADDITIONAL INFORMATION

TRANSECT #3

FLOOD MANAGEMENT SECTION ARIZONA DEPARTMENT OF WATER RESOURCES	DATE: 06 / 09 / 89

VEGETATION TRANSECTION FIELD NOTES

PROJECT	WOOLSEY
PERSONNEL	T. CASEY, R. RUSSEL
TRANSECTION LOCATION	NW 1/4 NW 1/4 14 Sec, T 3S R 4W
QUADRANGLE MAP	COTTEN CENTER NW
ELEVATION	900
SOIL TYPE AND HYDROLOGIC GROUP	DESERT BRUSH-GROUP "A"
SOIL INFORMATION SOURCE	S.C.S.
VEGETATION COMMUNITY DESCRIPTION	15%-POOR

Waist high Creosote, some ~~Mesquite~~ Palverde and Saguaro.
Silty-Sand to Sand, no gravel. Ironwood.

Washes converge from North to South and East to West along the point of the ridge.

RECORD	MEASUREMENT IS OF ____ VEGETATION ____ BARE EARTH/ROCK					
1	0ft-20ft	20ft-25ft	25ft-30ft	30ft-31ft	31ft-52ft	52ft-56ft
	56ft-92ft	92ft-97ft	97ft-100ft			

% COVER CALCULATIONS

Total Distance	100ft.
Total Measured Cover	15 ft.
Total Measured Non-cover	85 ft.
Total Measured Cover / Total Distance	.15
% Cover	15%

NOTES

Picture #1-General overview of vegetation community.
Picture #2-Close-up of typical cover.
Picture #3-Picture of Wash running East to West parallel to the ridge.
Picture #4-Picture of Wash running North to South parallel to the highway.

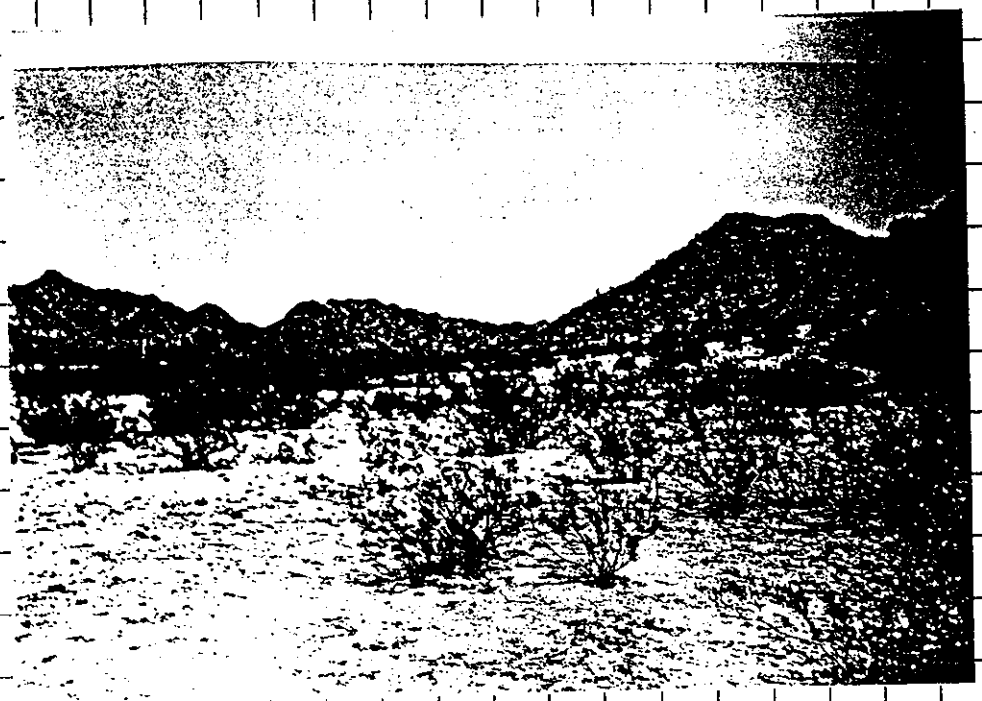
Transect. was taken approx. 200yds. E. of Highway, 100yds. E. of major E/W wash, between major N/S wash and the ridge.

FLOOD MANAGEMENT SECTION
ARIZONA DEPARTMENT OF WATER RESOURCES

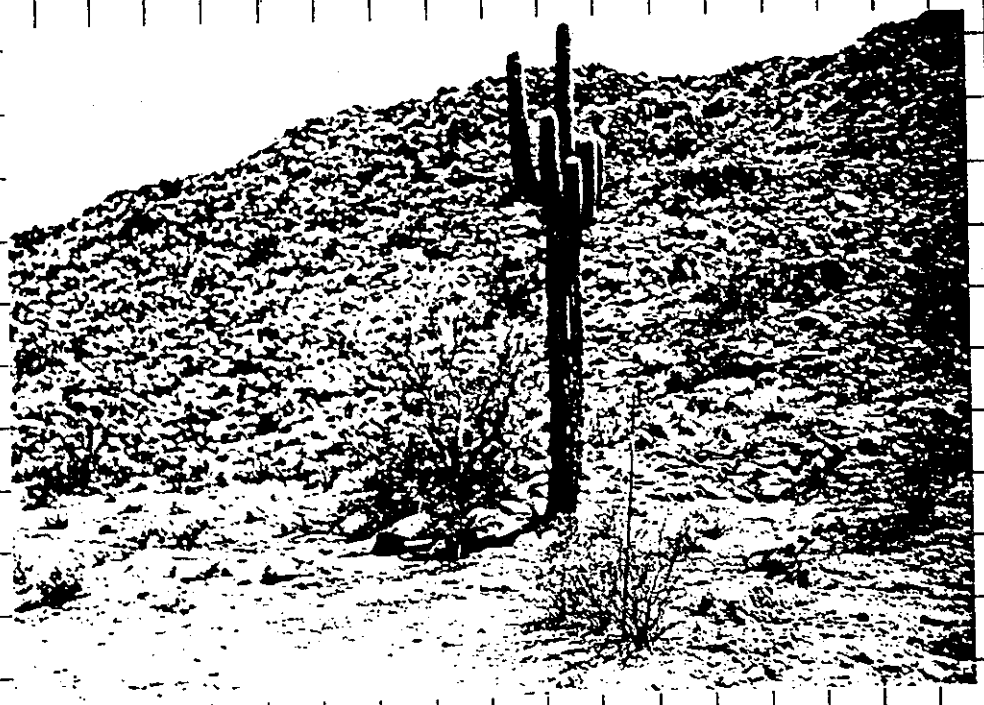
DATE: 06 / 09 / 89

VEGETATION TRANSECTION PHOTOGRAPHIC RECORD

PHOTOGRAPH NUMBER 1: GENERAL OVERVIEW OF VEGETATION COMMUNITY



PHOTOGRAPH NUMBER 2: CLOSE-UP OF TYPICAL COVER DISTRIBUTION



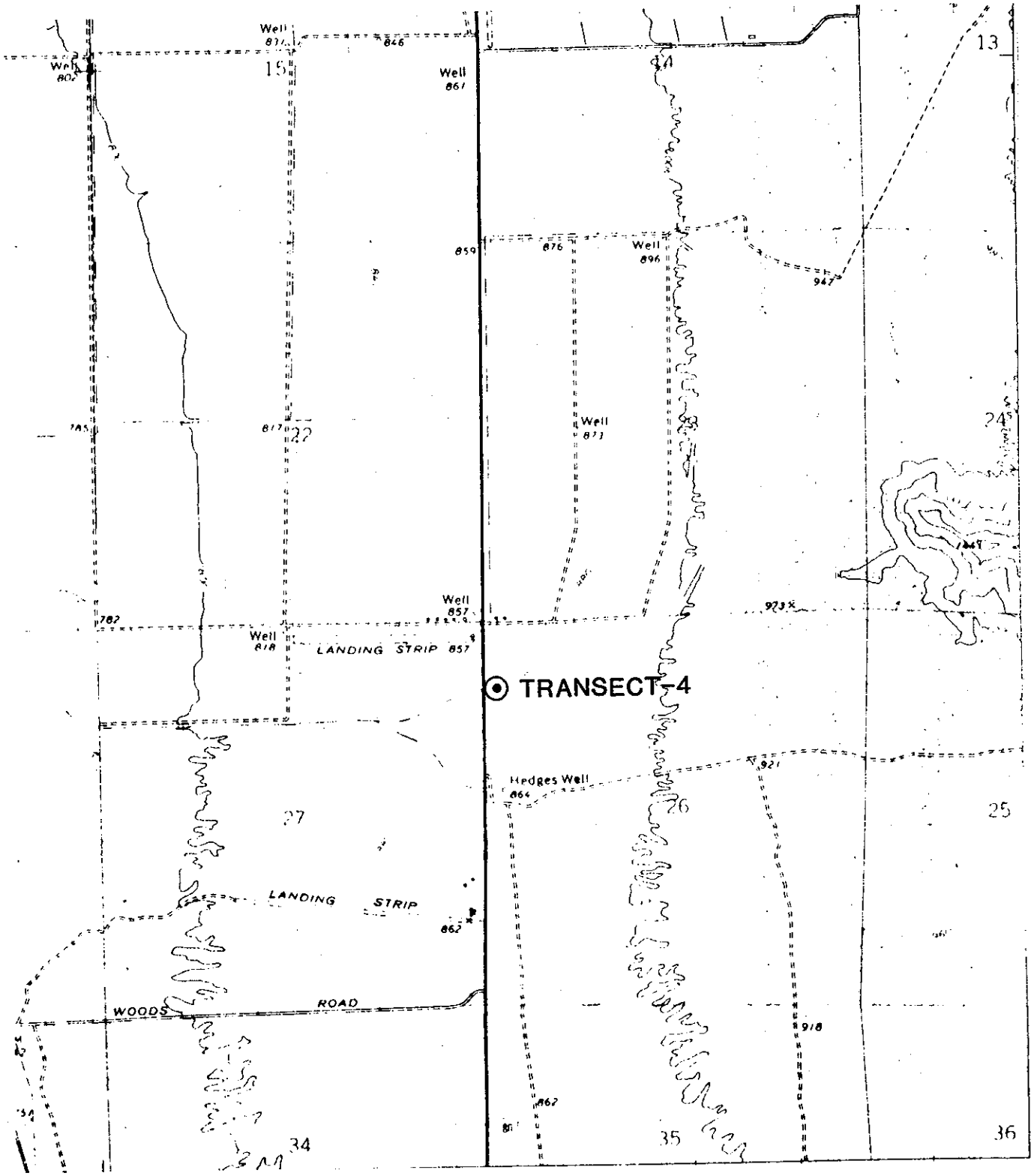
FLOOD MANAGEMENT SECTION
ARIZONA DEPARTMENT OF WATER RESOURCES

DATE: 06 / 09 / 89

VEGETATION TRANSECTION PHOTOGRAPHIC RECORD

PHOTOGRAPH NUMBER 3: ADDITIONAL INFORMATION

PHOTOGRAPH NUMBER 4: ADDITIONAL INFORMATION



TRANSECT LOCATION

Donohue ENGINEERS ARCHITECTS SCIENTISTS

TRANSECT #4

FLOOD MANAGEMENT SECTION ARIZONA DEPARTMENT OF WATER RESOURCES	DATE: 06 / 09 / 89

VEGETATION TRANSECTION FIELD NOTES

PROJECT	WOOLSEY
PERSONNEL	T. CASEY, R. RUSSEL
TRANSECTION LOCATION	NW 1/4 NW 1/4 26 Sec, T 3S, R 4W
QUADRANGLE MAP	COTTEN CENTER NW
ELEVATION	870
SOIL TYPE AND HYDROLOGIC GROUP	DESERT BRUSH-GROUP "A"
SOIL INFORMATION SOURCE	S.C.S.

VEGETATION COMMUNITY DESCRIPTION: 10%-POOR

Waist high Creosote, some Saguaro, few Mesquite.
SILTY-SAND, no gravel.

RECORD	MEASUREMENT IS OF ____ VEGETATION ____ BARE EARTH/ROCK					
1	0ft-6ft	6ft-8ft	8ft-49ft	49ft-55ft	55ft-74ft	74ft-76ft
	76ft-100ft					

% COVER CALCULATIONS

Total Distance	100ft.
Total Measured Cover	10 ft.
Total Measured Non-cover	90 ft.
Total Measured Cover / Total Distance	.10
% Cover	10%

NOTES

Picture #1-General overview of vegetation community.
Picture #2-Close-up of typical cover.
Picture #3-Picture shows height of the Dike.
Picture #4-Wash S. of dike, E. parellel to the Dike.
Picture #5-E.-upstream of bridge, N/W of transect.
Picture #6-Upstream side of bridge on Highowy #85.

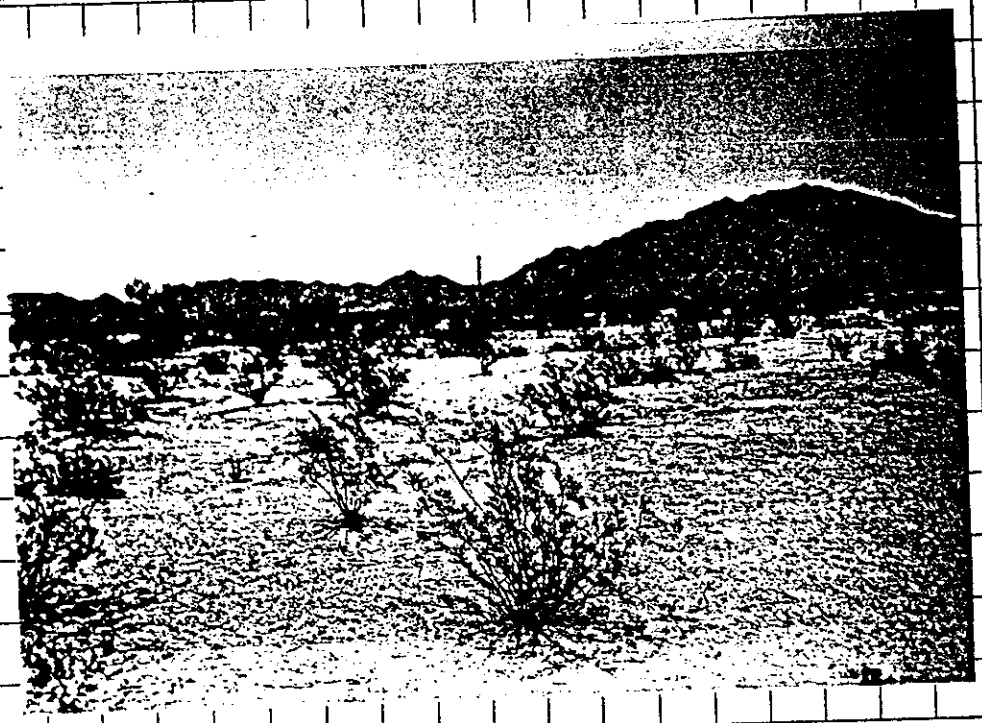
Transect taken approx. 100yds. E. of Highway #85, 200ft. S. of the Dike

FLOOD MANAGEMENT SECTION
ARIZONA DEPARTMENT OF WATER RESOURCES

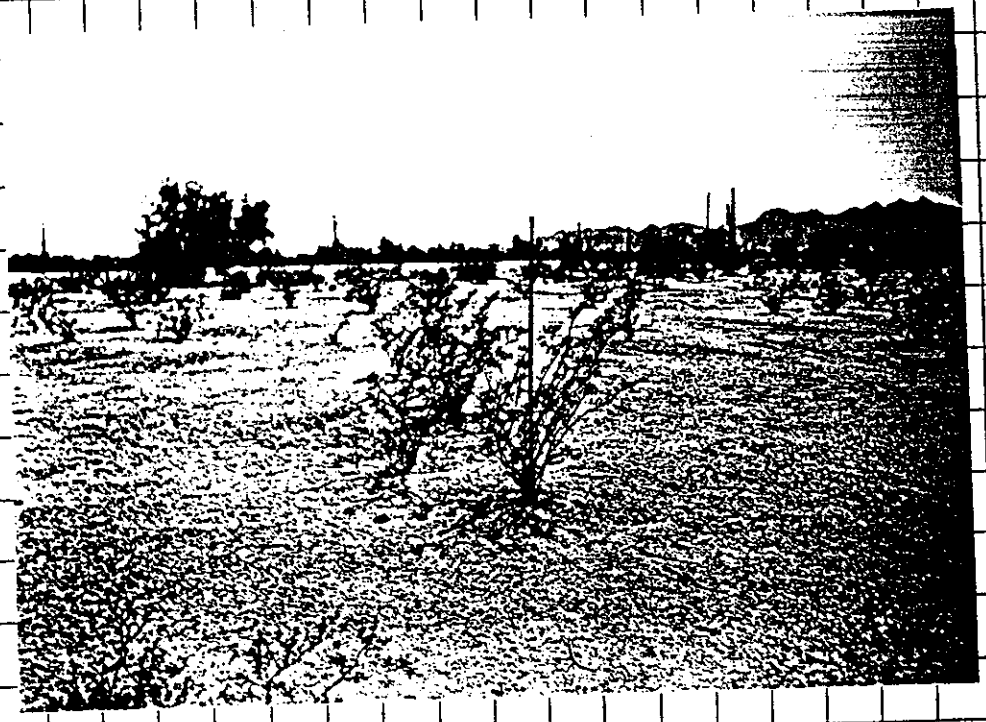
DATE: 06/ 09/ 89

VEGETATION TRANSECTION PHOTOGRAPHIC RECORD

PHOTOGRAPH NUMBER 1: GENERAL OVERVIEW OF VEGETATION COMMUNITY



PHOTOGRAPH NUMBER 2: CLOSE-UP OF TYPICAL COVER DISTRIBUTION

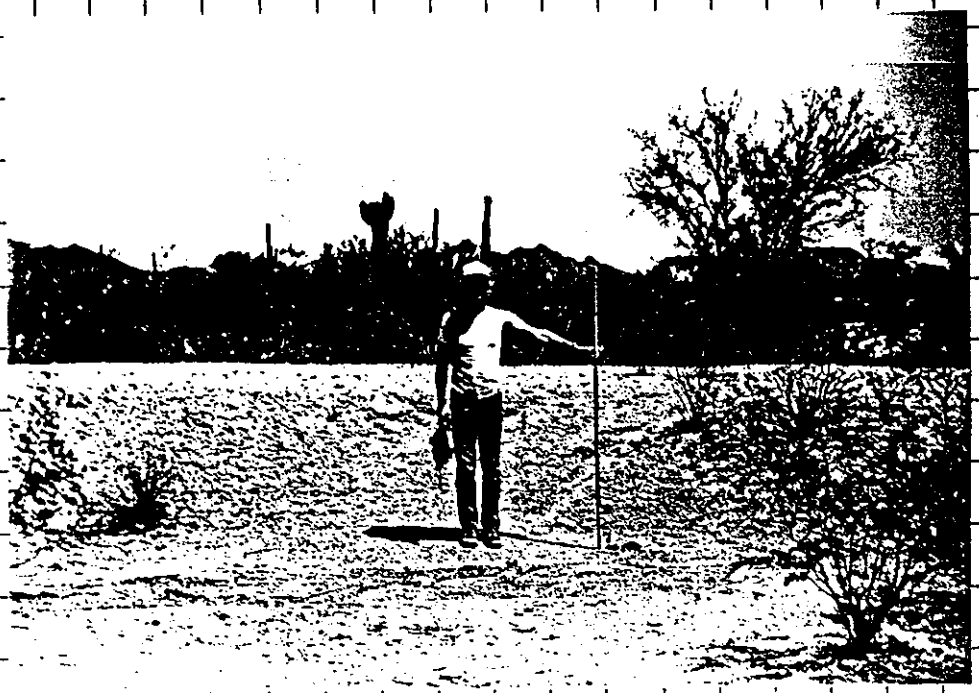


FLOOD MANAGEMENT SECTION
ARIZONA DEPARTMENT OF WATER RESOURCES

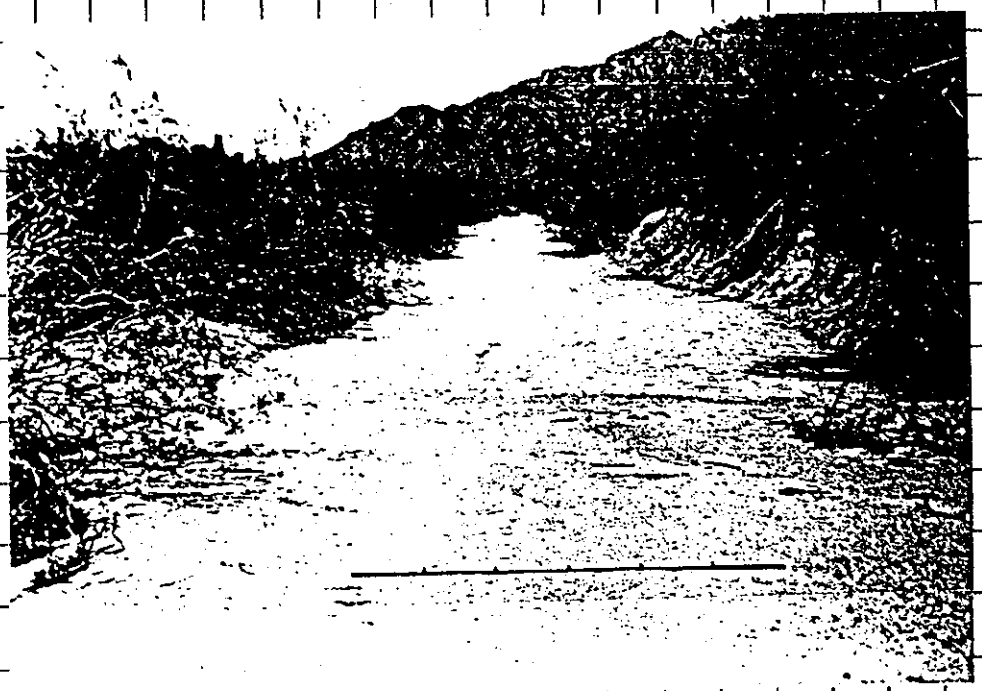
DATE: 06/ 09/ 89

VEGETATION TRANSECTION PHOTOGRAPHIC RECORD

PHOTOGRAPH NUMBER 3: ADDITIONAL INFORMATION



PHOTOGRAPH NUMBER 4: ADDITIONAL INFORMATION



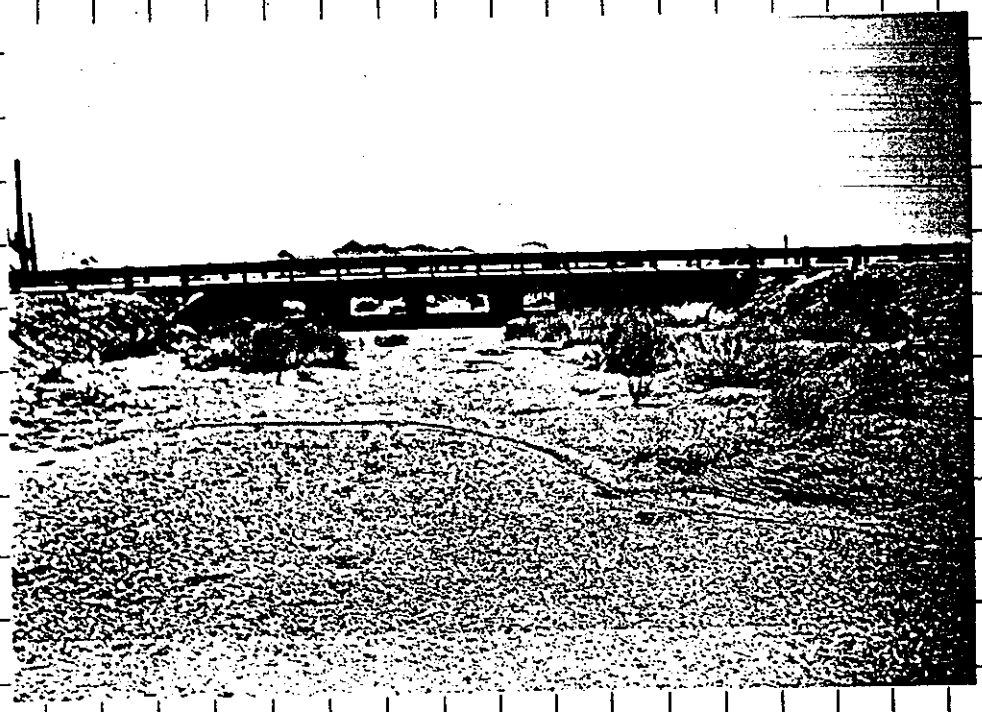
FLOOD MANAGEMENT SECTION
ARIZONA DEPARTMENT OF WATER RESOURCES

DATE: 06 / 09 / 89

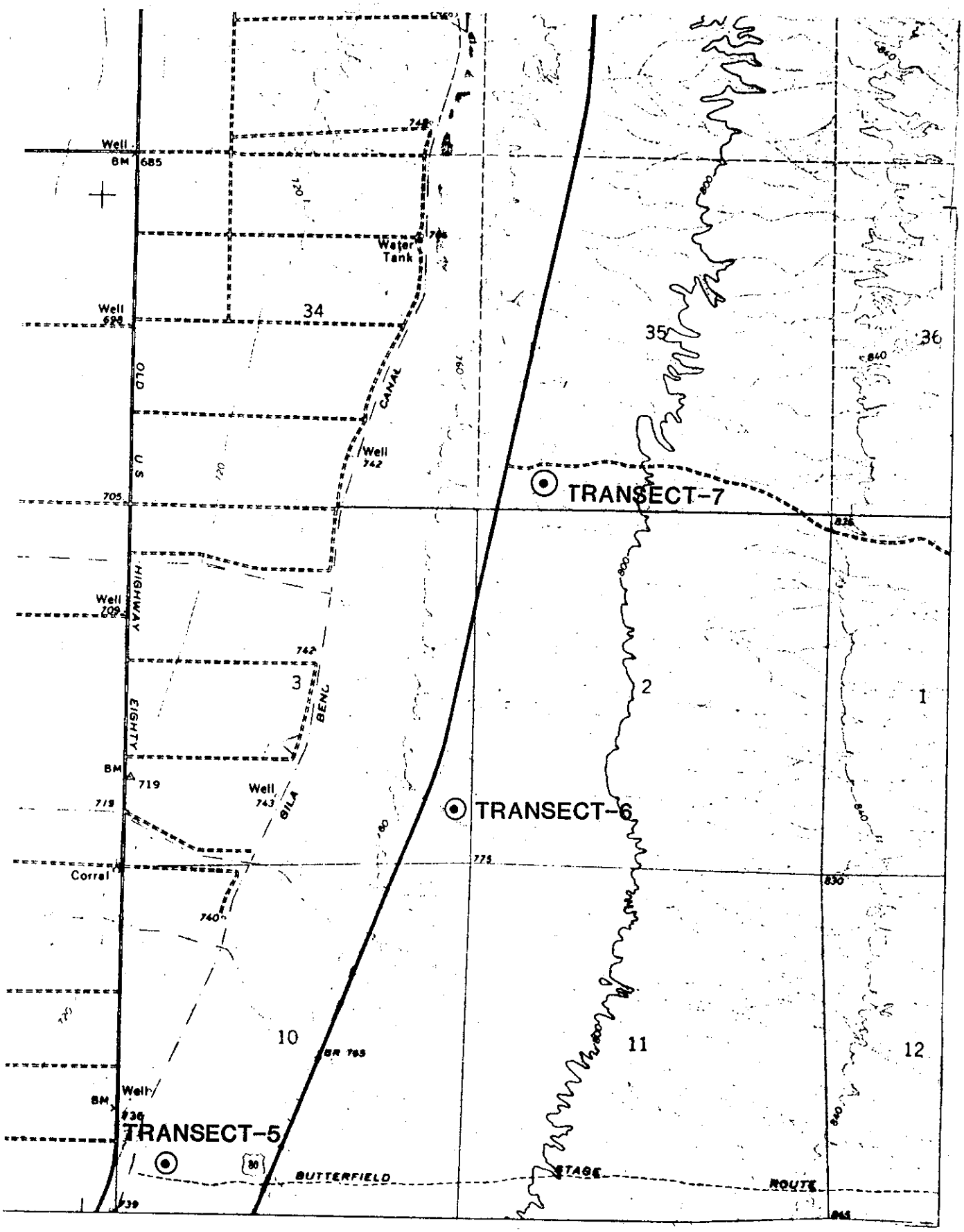
VEGETATION TRANSECTION PHOTOGRAPHIC RECORD

PHOTOGRAPH NUMBER 5. ADDITIONAL INFORMATION

PHOTOGRAPH NUMBER 6: ADDITIONAL INFORMATION



TRANSECTS TAKEN ON 08/25/89 AND 08/28/89



TRANSECT LOCATION

Donohue ENGINEERS ARCHITECTS SCIENTISTS

TRANSECT #5

FLOOD MANAGEMENT SECTION ARIZONA DEPARTMENT OF WATER RESOURCES	DATE: 08 / 25 / 89

VEGETATION TRANSECTION FIELD NOTES

PROJECT	WOOLSEY
PERSONNEL	T. CASEY, R. RUSSEL
TRANSECTION LOCATION	SW 1/4 SE 1/4 10 Sec, T 4S R 4W
QUADRANGLE MAP	COTTON CENTER
ELEVATION	765
SOIL TYPE AND HYDROLOGIC GROUP	DESERT BRUSH-GROUP "A"
SOIL INFORMATION SOURCE	S.C.S.
VEGETATION COMMUNITY DESCRIPTION	10.5 %-POOR

Waist high creosote bushes, scattered 8 ft. to 10 ft. Palo Verde Trees.
SILTY-SAND, sparse cobbles on surface.

RECORD	MEASUREMENT IS OF 10.5ft VEGETATION 89.5ft BARE EARTH/ROCK					
1	3ft.-8.5ft.	8.5ft.-61ft.	61ft.-63ft	63ft.-85ft.	85ft.-88ft	88ft.-100ft.

% COVER CALCULATIONS

Total Distance	100ft.
Total Measured Cover	10.5ft.
Total Measured Non-cover	89.5ft.
Total Measured Cover / Total Distance	.10.5
% Cover	10.5%

NOTES

PICTURE #1-General overview of vegetation community.
PICTURE #2-Close-up of typical cover.

Transect was taken on the Butterfield Stage Route approx.
2 tenths of a mile from the highway.

FLOOD MANAGEMENT SECTION
ARIZONA DEPARTMENT OF WATER RESOURCES

DATE: ____/____/____

VEGETATION TRANSECTION PHOTOGRAPHIC RECORD

PHOTOGRAPH NUMBER 1: GENERAL OVERVIEW OF VEGETATION COMMUNITY

PHOTOGRAPH NUMBER 2: CLOSE-UP OF TYPICAL COVER DISTRIBUTION

TRANSECT #6

FLOOD MANAGEMENT SECTION ARIZONA DEPARTMENT OF WATER RESOURCES	DATE: 08 / 25 / 89

VEGETATION TRANSECTION FIELD NOTES

PROJECT	WOOLSEY
PERSONNEL	T. CASEY, R. RUSSEL
TRANSECTION LOCATION	SW 1/4 SW 1/4 3 Sec, T 4S, R 4W
QUADRANGLE MAP	COTTON CENTER
ELEVATION	770
SOIL TYPE AND HYDROLOGIC GROUP	DESERT BRUSH-GROUP "A"
SOIL INFORMATION SOURCE	S.C.S.

VEGETATION COMMUNITY DESCRIPTION 22.5%-FAIR ?

Scattered waist high Creosote Bush, occasional Palo Verde and Salt Ceder. Ironwood.

SILTY-SAND

RECORD	MEASUREMENT IS OF 22.5ft VEGETATION 77.5ft BARE EARTH/ROCK					
1	0ft.-20ft	20ft-26ft	26ft-54ft	54ft-59.5ft	59.5ft-73ft	73ft-79ft
	79ft-85ft	85ft-90ft	90ft-100ft			

% COVER CALCULATIONS

Total Distance	100ft.
Total Measured Cover	22.5ft.
Total Measured Non-cover	77.5ft.
Total Measured Cover / Total Distance	.225
% Cover	22.5%

NOTES

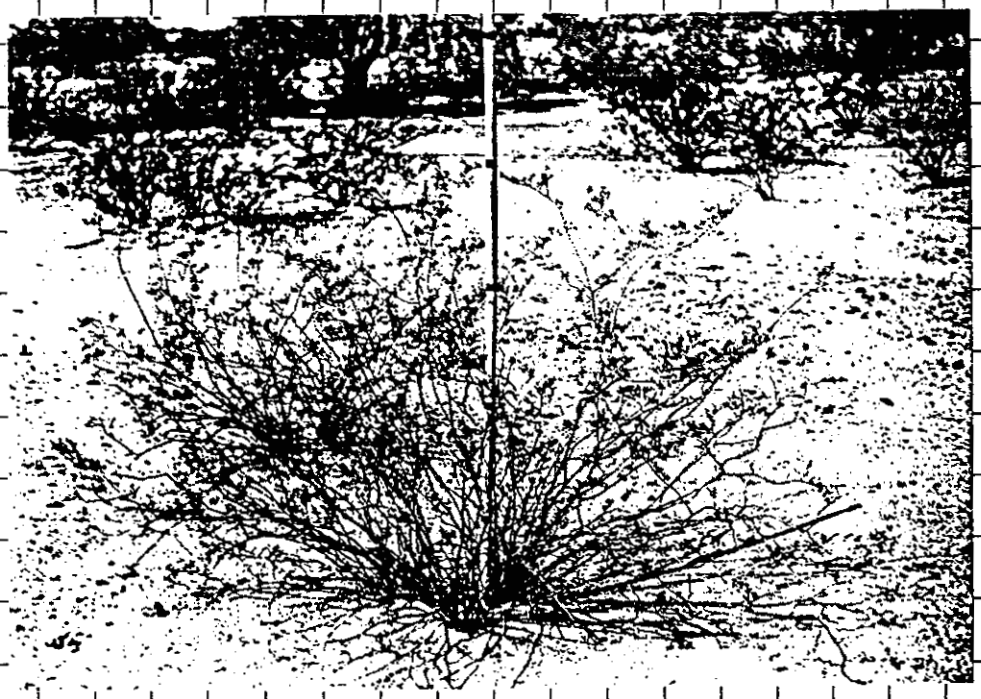
PICTURE #1-General overview of vegetation community.
PICTURE #2&#3-Close-up of typical cover.
PICTURE #4-Drainage structure under highway 85
Transect. was taken approx. 150 yds. east of the highway,
approx. 1.1 miles north of Butterfield Stage Route Rd.

FLOOD MANAGEMENT SECTION ARIZONA DEPARTMENT OF WATER RESOURCES	DATE: ____/____/____

VEGETATION TRANSECTION PHOTOGRAPHIC RECORD

PHOTOGRAPH NUMBER 1: GENERAL OVERVIEW OF VEGETATION COMMUNITY

PHOTOGRAPH NUMBER 2: CLOSE-UP OF TYPICAL COVER DISTRIBUTION



FLOOD MANAGEMENT SECTION
ARIZONA DEPARTMENT OF WATER RESOURCES

DATE: ____/____/____

VEGETATION TRANSECTION PHOTOGRAPHIC RECORD

PHOTOGRAPH NUMBER 3: ADDITIONAL INFORMATION

PHOTOGRAPH NUMBER 4: ADDITIONAL INFORMATION

TRANSECT #7

FLOOD MANAGEMENT SECTION ARIZONA DEPARTMENT OF WATER RESOURCES	DATE: 08 / 25 / 89

VEGETATION TRANSECTION FIELD NOTES

PROJECT	WOOLSEY
PERSONNEL	TN CASEY, R. RUSSEL
TRANSECTION LOCATION	SW 1/4 SW 1/4 35 Sec, T 4S, R 4W
QUADRANGLE MAP	COTTON CENTER
ELEVATION	780
SOIL TYPE AND HYDROLOGIC GROUP	DESERT BRUSH-GROUP "A"
SOIL INFORMATION SOURCE	S.C.S.
VEGETATION COMMUNITY DESCRIPTION	13%-POOR

2-4ft. Creosote, occasional Saguaro, 8-15ft. Palo Verde. Ironwood, burrage

SANDY-SILT

RECORD	MEASUREMENT IS OF 13ft. VEGETATION 87ft. BARE EARTH/ROCK					
1	0ft-6ft	6ft-9ft	9ft-28ft	28ft-31.5ft	31.5ft-41ft	41ft-44.5ft
	44.5ft-63ft	63ft-66ft	66ft-100ft			

% COVER CALCULATIONS

Total Distance	100ft.
Total Measured Cover	13ft.
Total Measured Non-cover	87ft.
Total Measured Cover / Total Distance	.13
% Cover	13%

NOTES

PICTURE #1-General overview of vegetation community.
PICTURES #2&#3-Close-up of typical cover.

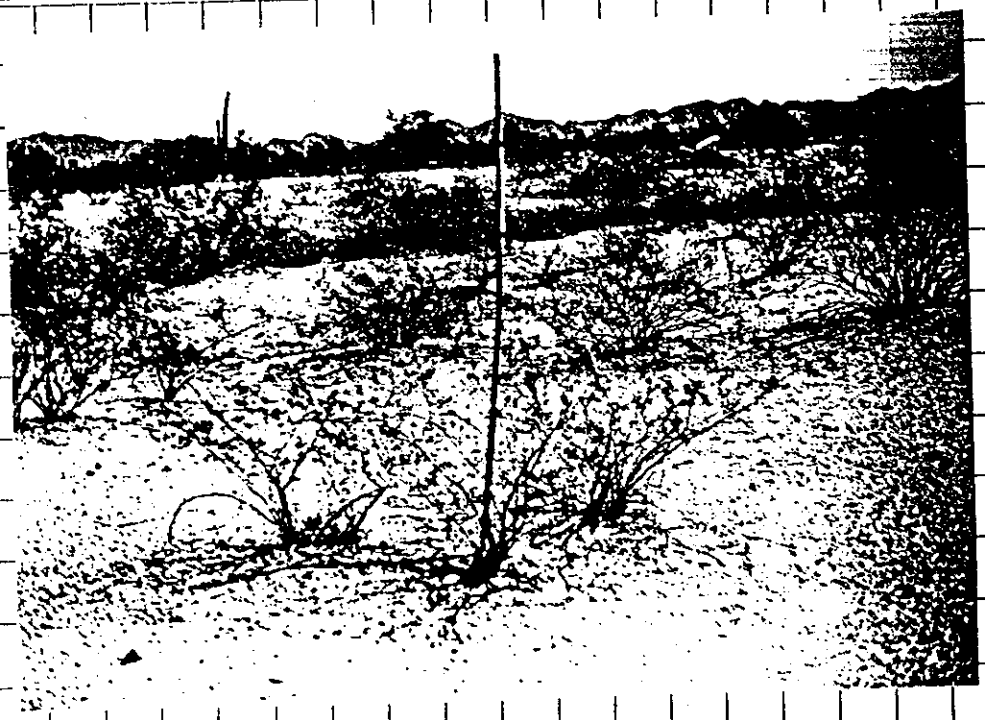
Transect was taken approx. 0.2 miles east of highway 85 and approx. 50 yards south of road.

FLOOD MANAGEMENT SECTION ARIZONA DEPARTMENT OF WATER RESOURCES	DATE: ____/____/____

VEGETATION TRANSECTION PHOTOGRAPHIC RECORD

PHOTOGRAPH NUMBER 1: GENERAL OVERVIEW OF VEGETATION COMMUNITY

PHOTOGRAPH NUMBER 2: CLOSE-UP OF TYPICAL COVER DISTRIBUTION



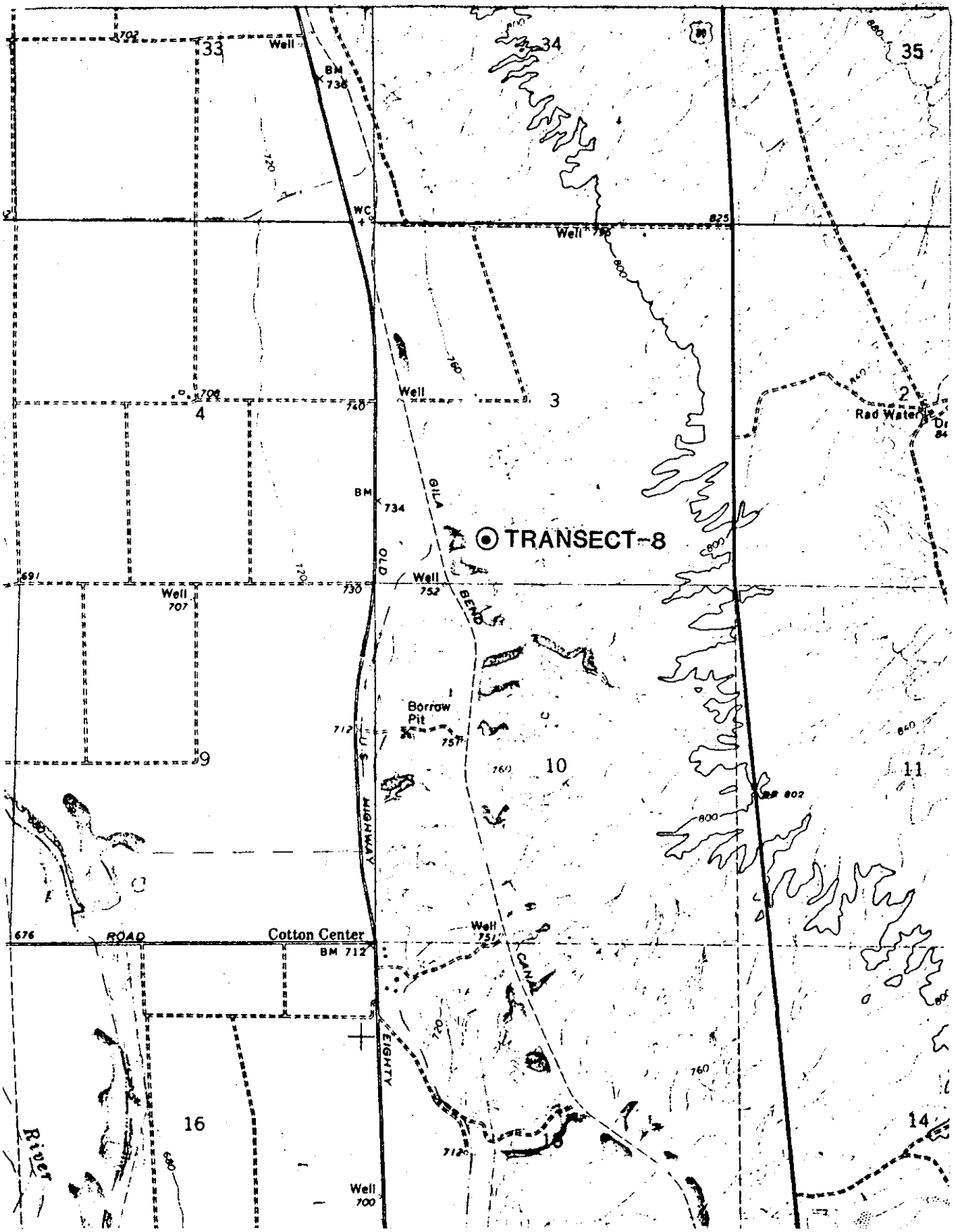
FLOOD MANAGEMENT SECTION
ARIZONA DEPARTMENT OF WATER RESOURCES

DATE: ___/___/___

VEGETATION TRANSECTION PHOTOGRAPHIC RECORD

PHOTOGRAPH NUMBER 3: ADDITIONAL INFORMATION

PHOTOGRAPH NU



TRANSECT LOCATION

Donohue ENGINEERS ARCHITECTS SCIENTISTS

TRANSECT #8

FLOOD MANAGEMENT SECTION ARIZONA DEPARTMENT OF WATER RESOURCES	DATE: 08 / 25 / 89

VEGETATION TRANSECTION FIELD NOTES

PROJECT	WOOLSEY
PERSONNEL	T. CASEY, R. RUSSEL
TRANSECTION LOCATION	SE 1/4 SW 1/4 3 Sec, T 4S, R 4W
QUADRANGLE MAP	COTTON CENTER
ELEVATION	760
SOIL TYPE AND HYDROLOGIC GROUP	DESERT BRUSH-GROUP "A"
SOIL INFORMATION SOURCE	S.C.S.

VEGETATION COMMUNITY DESCRIPTION 17%-POOR

2-4ft Creosote, 1-2ft Burro Weed, occasional Salt Ceder Brisage Ironwood

RECORD	MEASUREMENT IS OF 17ft. VEGETATION 83ft. BARE EARTH/ROCK					
1	0ft-9ft 97ft-100ft	9ft-13ft	13ft-45ft	45ft-52ft	52ft-91ft	91ft-97ft

% COVER CALCULATIONS

Total Distance	100ft.
Total Measured Cover	17ft.
Total Measured Non-cover	83ft.
Total Measured Cover / Total Distance	.17
% Cover	17%

NOTES

PICTURE #1-General overview of vegetation community.
PICTURES #2&#3-Close-up of typical cover.
PICTURES #4&#5-Vegetation type and size of wash running east and west to the siphon at the lift station.

Picture #6-Berm restricting flow across siphon at lift station.

Pano Shot-Retention basin at lift station.

Transect. taken approx. 150 yds. east of lift station.

FLOOD MANAGEMENT SECTION ARIZONA DEPARTMENT OF WATER RESOURCES	DATE: ____/____/____

VEGETATION TRANSECTION PHOTOGRAPHIC RECORD

PHOTOGRAPH NUMBER 1: GENERAL OVERVIEW OF VEGETATION COMMUNITY

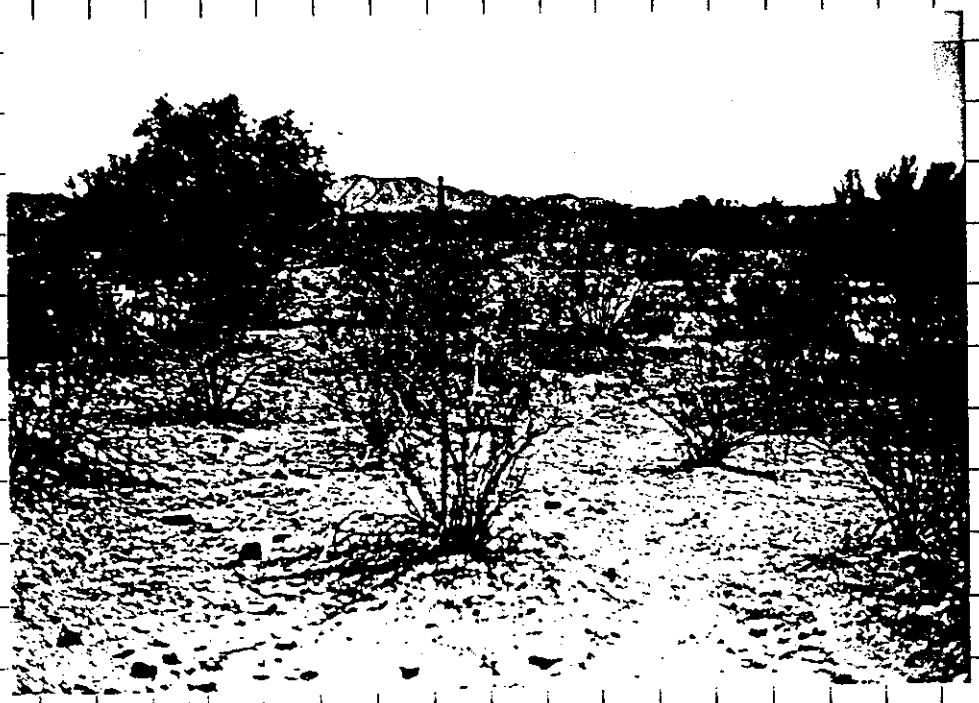
PHOTOGRAPH NUMBER 2: CLOSE-UP OF TYPICAL COVER DISTRIBUTION

FLOOD MANAGEMENT SECTION
ARIZONA DEPARTMENT OF WATER RESOURCES

DATE: ____/____/____

VEGETATION TRANSECTION PHOTOGRAPHIC RECORD

PHOTOGRAPH NUMBER 3 : ADDITIONAL INFORMATION



PHOTOGRAPH NUMBER 4 :

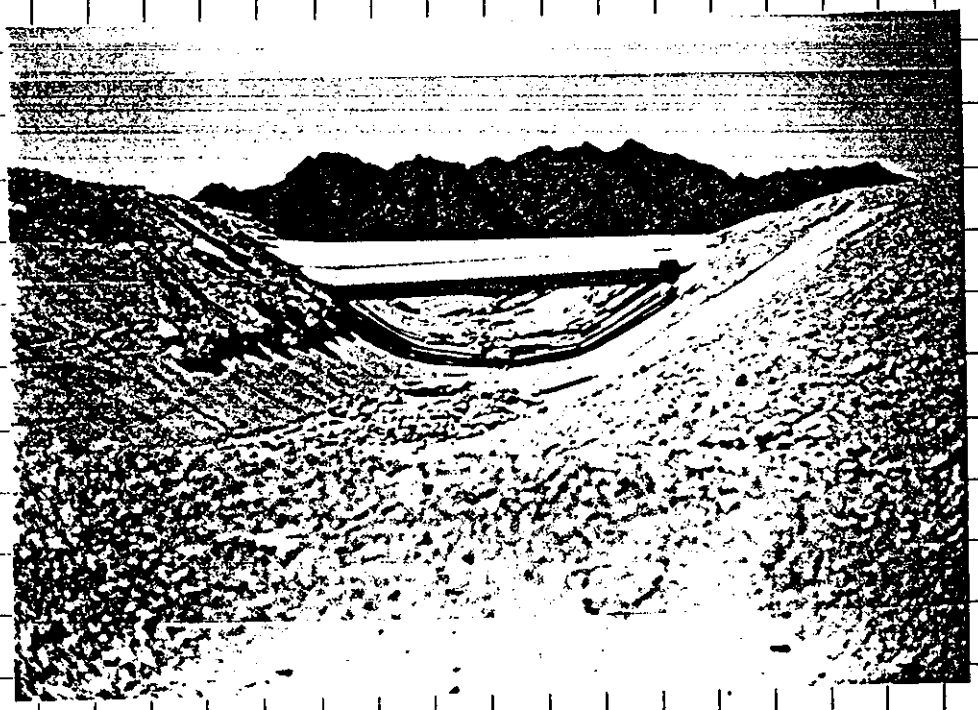
FLOOD MANAGEMENT SECTION
ARIZONA DEPARTMENT OF WATER RESOURCES

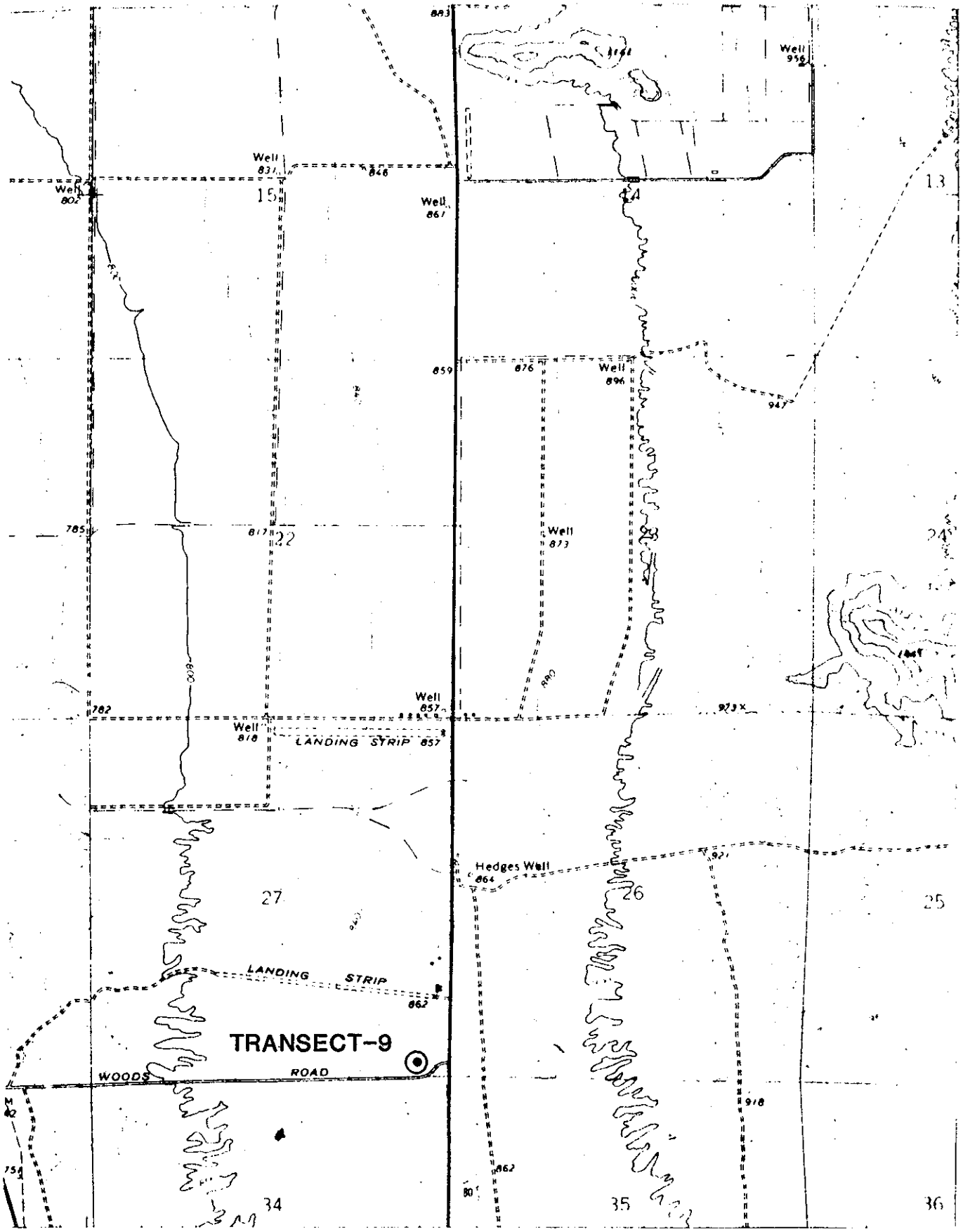
DATE: ____/____/____

VEGETATION TRANSECTION PHOTOGRAPHIC RECORD

PHOTOGRAPH NUMBER 5: ADDITIONAL INFORMATION

PHOTOGRAPH NUMBER 6: ADDITIONAL INFORMATION





TRANSECT LOCATION

Donohue ENGINEERS ARCHITECTS SCIENTISTS

TRANSECT #9

FLOOD MANAGEMENT SECTION ARIZONA DEPARTMENT OF WATER RESOURCES	DATE: 08 / 25 / 89

VEGETATION TRANSECTION FIELD NOTES

PROJECT	WOOLSEY
PERSONNEL	T. CASEY, R. RUSSEL
TRANSECTION LOCATION	SE 1/4 SE 1/4 27 Sec, T 3S R 4W
QUADRANGLE MAP	COTTON CENTER NW
ELEVATION	860
SOIL TYPE AND HYDROLOGIC GROUP	DESERT BRUSH-GROUP "A"
SOIL INFORMATION SOURCE	S.C.S.
VEGETATION COMMUNITY DESCRIPTION	19.5%-POOR

Creosote, Palo Verde, Saguaro, Jumping Cactus

RECORD	MEASUREMENT IS OF 19.5ft VEGETATION 80.5ft BARE EARTH/ROCK					
1	0ft-16.5ft	16.5ft-23ft	23ft-28.5ft	28.5ft-33ft	33ft-70.5ft	70.5ft-75.5ft
	75.5ft-93.5ft		93.5ft-97ft	97ft-100ft		

% COVER CALCULATIONS	
Total Distance	100ft.
Total Measured Cover	19.5ft.
Total Measured Non-cover	80.5ft
Total Measured Cover / Total Distance	.195
% Cover	19.5%

NOTES

PICTURE #1-General overview of vegetation community.
PICTURES #2&3&4-Close-up of typical cover.
PICTURES #5&6-Typical size of washes running through the area.

Transect was taken approx. 100 yards north of Woods Rd. and approx. 0.2 miles west of highway 85.

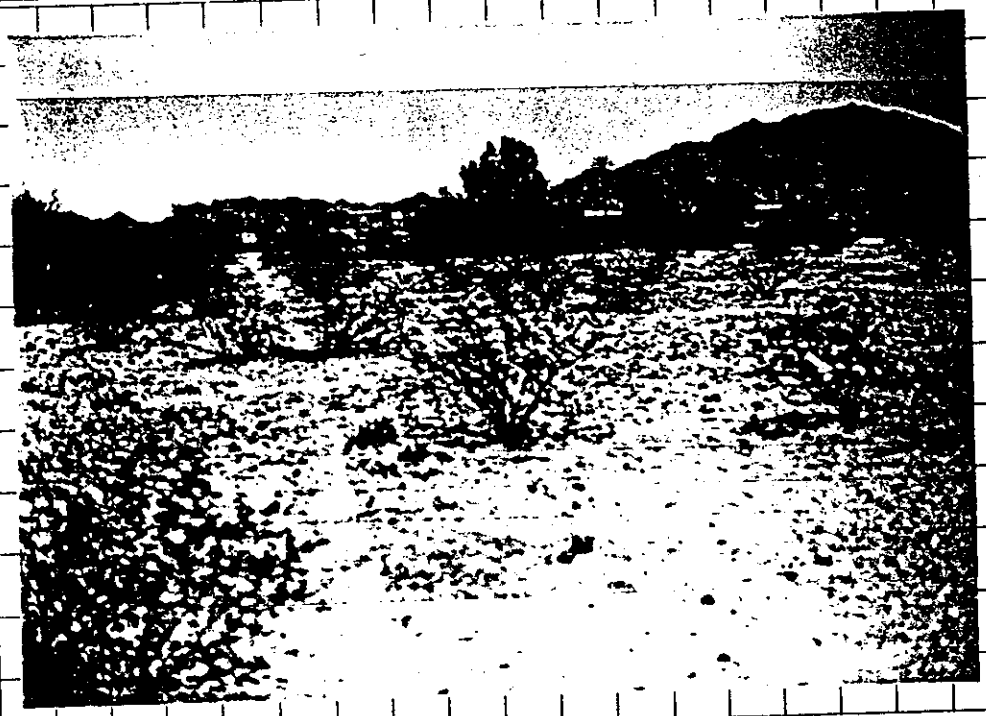
CHEVROLET

FLOOD MANAGEMENT SECTION
ARIZONA DEPARTMENT OF WATER RESOURCES

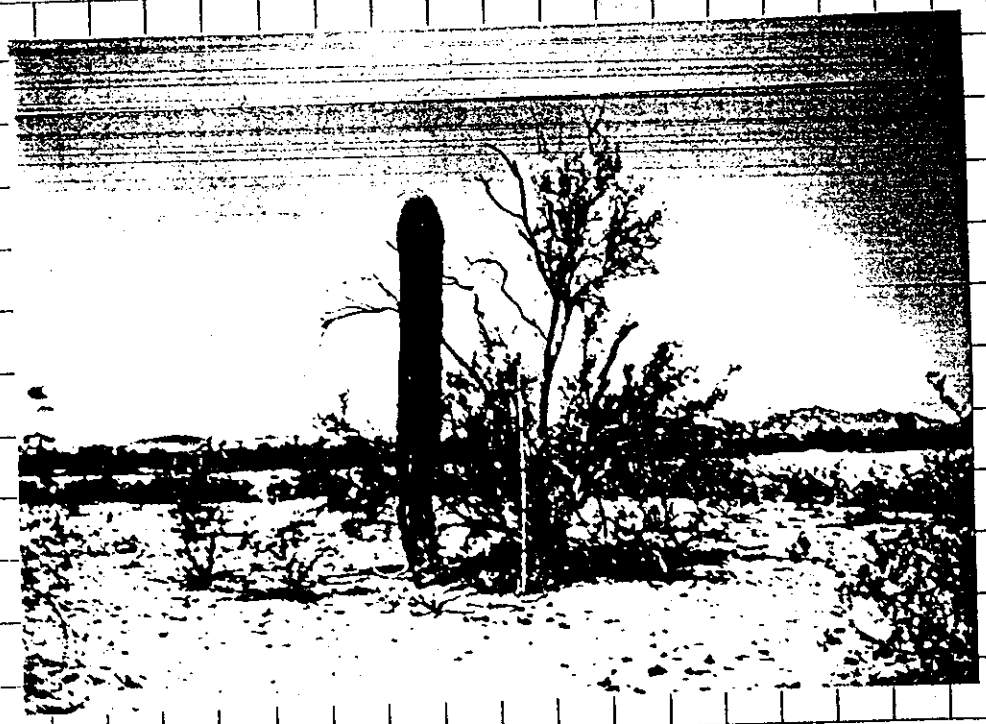
DATE: ____/____/____

VEGETATION TRANSECTION PHOTOGRAPHIC RECORD

PHOTOGRAPH NUMBER 1: GENERAL OVERVIEW OF VEGETATION COMMUNITY



PHOTOGRAPH NUMBER 2: CLOSE-UP OF TYPICAL COVER DISTRIBUTION



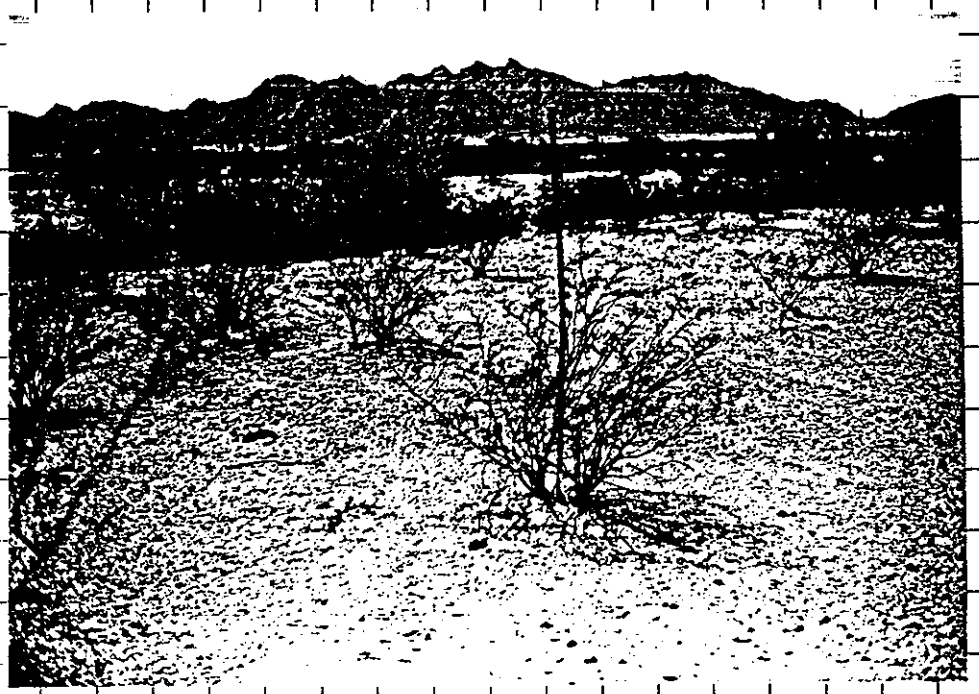
FLOOD MANAGEMENT SECTION
ARIZONA DEPARTMENT OF WATER RESOURCES

DATE: ____/____/____

VEGETATION TRANSECTION PHOTOGRAPHIC RECORD

PHOTOGRAPH NUMBER 3 : ADDITIONAL INFORMATION

PHOTOGRAPH NUMBER 4 : ADDITIONAL INFORMATION



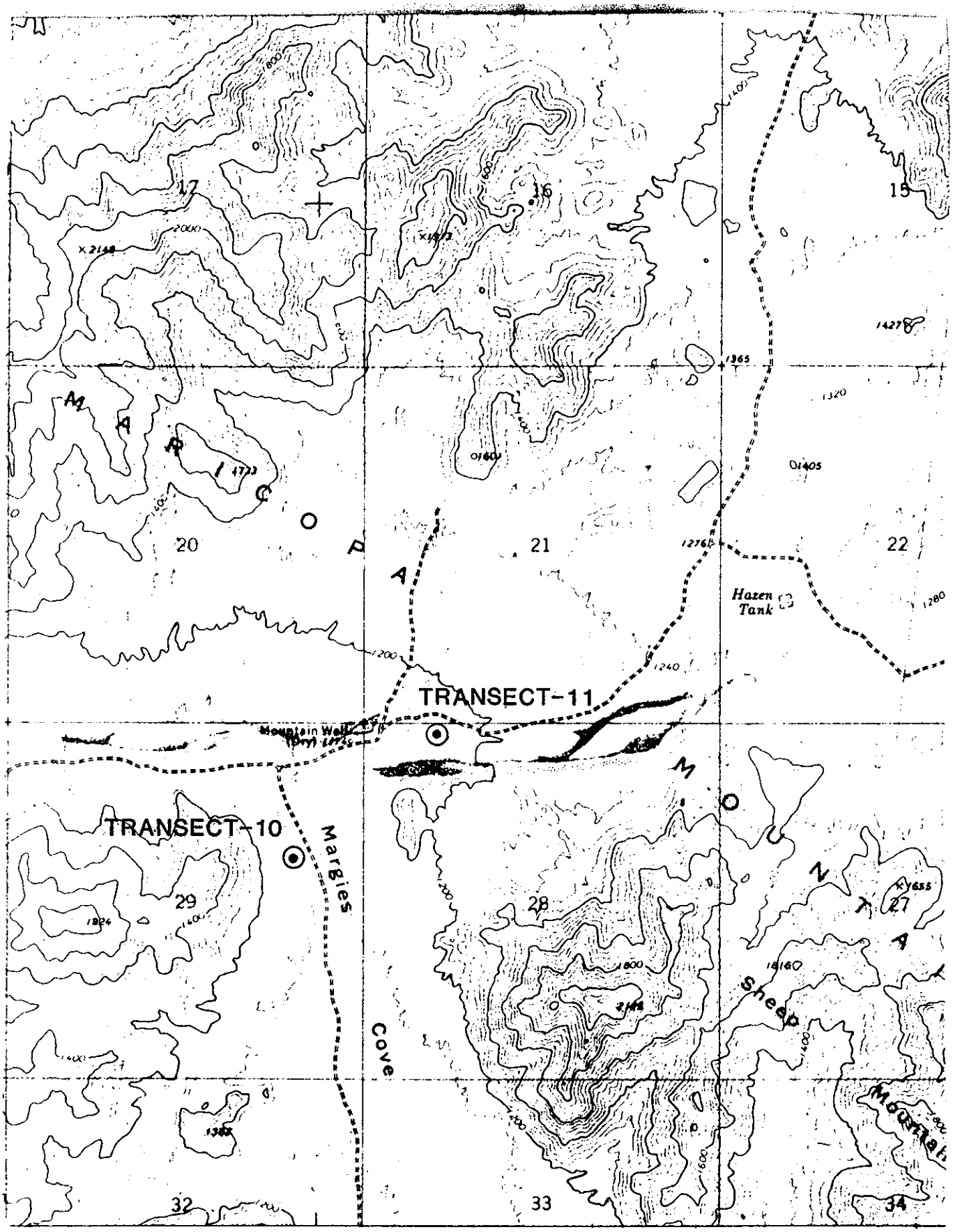
FLOOD MANAGEMENT SECTION
ARIZONA DEPARTMENT OF WATER RESOURCES

DATE: ____/____/____

VEGETATION TRANSECTION PHOTOGRAPHIC RECORD

PHOTOGRAPH NUMBER 5: ADDITIONAL INFORMATION

PHOTOGRAPH NUMBER 6: ADDITIONAL INFORMATION



TRANSECT LOCATION

Donohue ENGINEERS ARCHITECTS SCIENTISTS

TRANSECT #10

FLOOD MANAGEMENT SECTION ARIZONA DEPARTMENT OF WATER RESOURCES	DATE: 08 / 28 / 89

VEGETATION TRANSECTION FIELD NOTES

PROJECT	WOOLSEY
PERSONNEL	T. CASEY, R. RUSSEL
TRANSECTION LOCATION	SE 1/4 NE 1/4 29 Sec, T 3S R 3W
QUADRANGLE MAP	MARGIES PEAK
ELEVATION	1185
SOIL TYPE AND HYDROLOGIC GROUP	DESERT BRUSH-GROUP"A"
SOIL INFORMATION SOURCE	S.C.S.
VEGETATION COMMUNITY DESCRIPTION	17.5-POOR

Creosote, Palo Verde, Saguaro, Jumping Cactus, Ocotillo, Ironwood.

SANDY-SILT

RECORD	MEASUREMENT IS OF ____ VEGETATION ____ BARE EARTH/ROCK					
1	0ft-4.5ft	4.5ft-11ft	11ft-25ft	25ft-30.5ft	30.5ft-50.5ft	
	50.5ft-56ft	56ft-100ft				

% COVER CALCULATIONS

Total Distance	100ft.
Total Measured Cover	17.5ft.
Total Measured Non-cover	82.5ft.
Total Measured Cover / Total Distance	.175
% Cover	17.5%

NOTES

PICTURE #1-General overview of vegetation community.
PICTURES #2,3,4-Close-up of typical cover.
PICTURES#5&#6-#5-This is where the wash splits.
#6-This is upstream of the split.

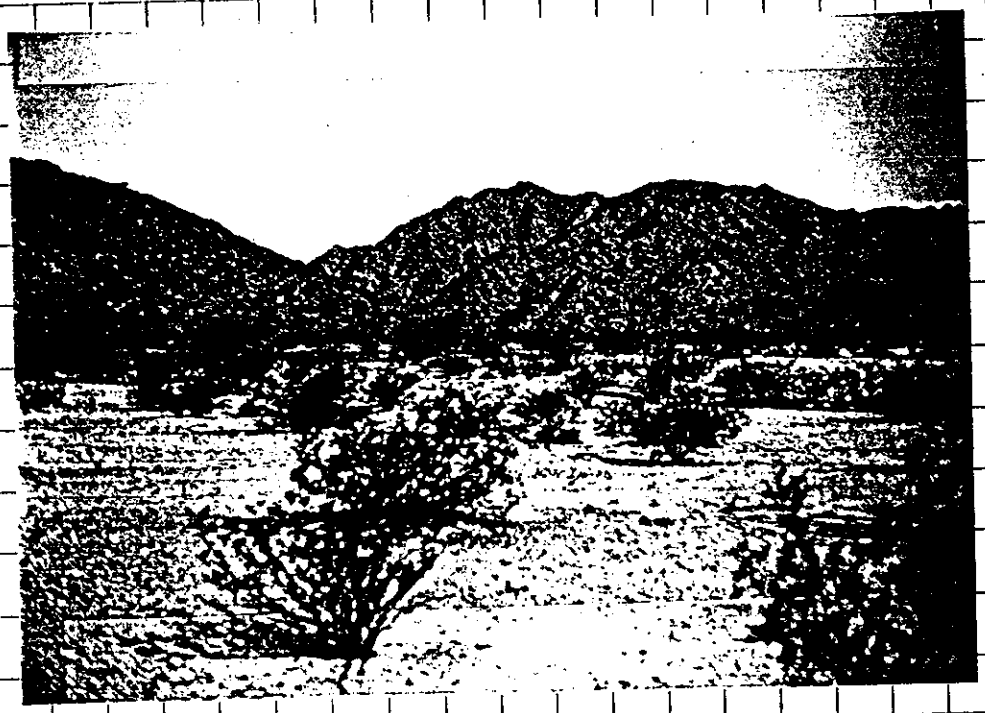
Transect. direction is approx. 3.8 miles east of Highway 85, take a right turn at a "Y", proceed approx. 0.4 miles where wash splits.

FLOOD MANAGEMENT SECTION
ARIZONA DEPARTMENT OF WATER RESOURCES

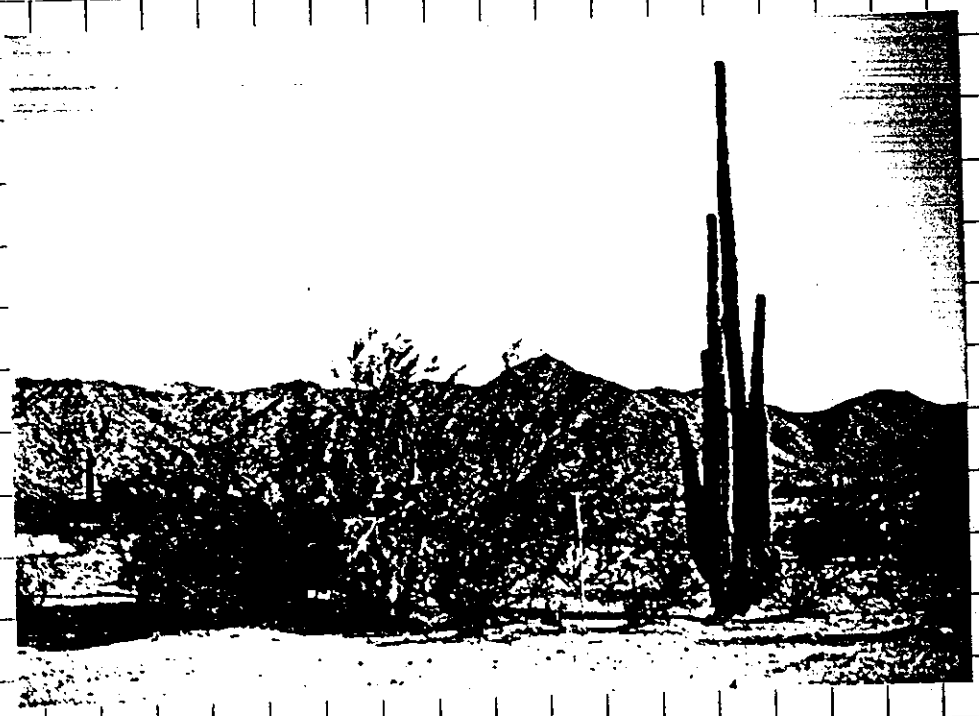
DATE: ____/____/____

VEGETATION TRANSECTION PHOTOGRAPHIC RECORD

PHOTOGRAPH NUMBER 1: GENERAL OVERVIEW OF VEGETATION COMMUNITY



PHOTOGRAPH NUMBER 2: CLOSE-UP OF TYPICAL COVER DISTRIBUTION

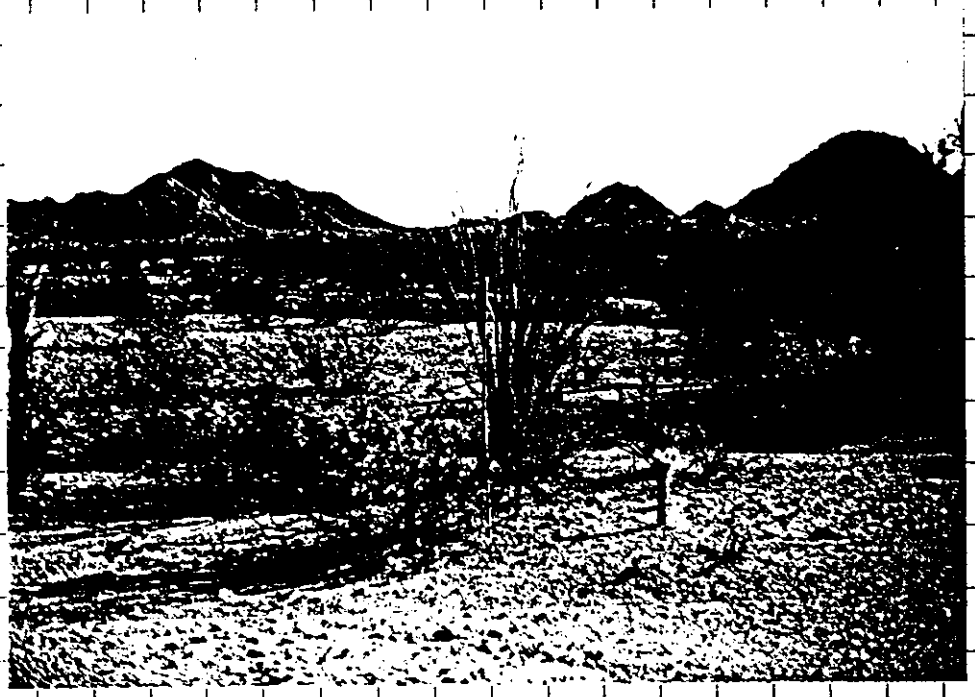


FLOOD MANAGEMENT SECTION
ARIZONA DEPARTMENT OF WATER RESOURCES

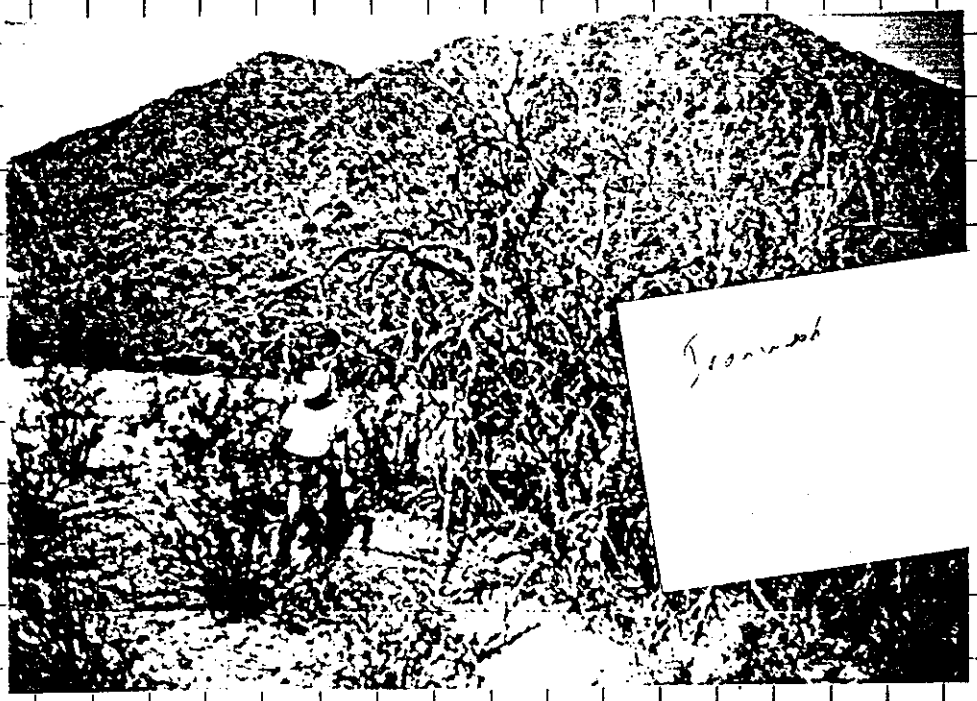
DATE: ____/____/____

VEGETATION TRANSECTION PHOTOGRAPHIC RECORD

PHOTOGRAPH NUMBER 3: ADDITIONAL INFORMATION



PHOTOGRAPH NUMBER 4 : ADDITIONAL INFORMATION



FLOOD MANAGEMENT SECTION
ARIZONA DEPARTMENT OF WATER RESOURCES

DATE: ___/___/___

VEGETATION TRANSECTION PHOTOGRAPHIC RECORD

PHOTOGRAPH NUMBER 5: ADDITIONAL INFORMATION

PHOTOGRAPH NUMBER 6: ADDITIONAL INFORMATION

TRANSECT #11

FLOOD MANAGEMENT SECTION ARIZONA DEPARTMENT OF WATER RESOURCES	DATE: 08 / 28 / 89

VEGETATION TRANSECTION FIELD NOTES

PROJECT	WOOLSEY
PERSONNEL	T. CASEY, R. RUSSEL
TRANSECTION LOCATION	NW 1/4 NW 1/4 28 Sec, T 3S R 3W
QUADRANGLE MAP	MARGIES PEAK
ELEVATION	1240
SOIL TYPE AND HYDROLOGIC GROUP	DESERT BRUSH-GROUP"A"
SOIL INFORMATION SOURCE	S.C.S.

VEGETATION COMMUNITY DESCRIPTION 43.5%-GOOD

Creosote, Mesquite, Palo Verde, Saguaro, Burro Weed. Ironwood
Bursage

SANDE-SILT

RECORD	MEASUREMENT IS OF 43.5ft VEGETATION 56.5ft BARE EARTH/ROCK					
1	0ft-3ft	3ft-18.5ft	18.5ft-21.5ft		21.5ft-26.5ft	
	26.5ft-46ft	46ft-62ft	62ft-80ft	80ft-100ft		

% COVER CALCULATIONS

Total Distance	100ft.
Total Measured Cover	43.5ft.
Total Measured Non-cover	56.5ft.
Total Measured Cover / Total Distance	.
% Cover	%

NOTES

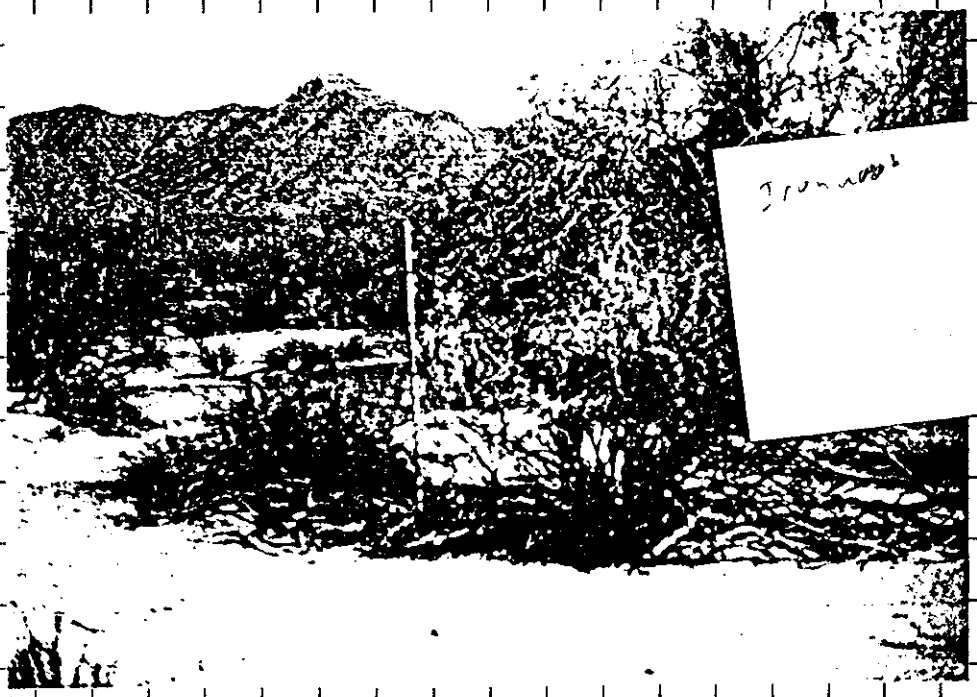
PICTURE #1-General overview of vegetaition community.
PICTURES#2,3&4-Close-up of typical cover.
PICTURES#5&#6-View up and downstream at turnoff from main wash.
PICTURES#7&#8-View up and downstream at point of transect.
southwest of butte, transect is between wash and butte.
TRANSECT. was taken approx. 0.6 miles upstream of wash from road northeast of bu

FLOOD MANAGEMENT SECTION ARIZONA DEPARTMENT OF WATER RESOURCES	DATE: ____/____/____

VEGETATION TRANSECTION PHOTOGRAPHIC RECORD

PHOTOGRAPH NUMBER 1: GENERAL OVERVIEW OF VEGETATION COMMUNITY

PHOTOGRAPH NUMBER 2: CLOSE-UP OF TYPICAL COVER DISTRIBUTION



FLOOD MANAGEMENT SECTION
ARIZONA DEPARTMENT OF WATER RESOURCES

DATE: ____/____/____

VEGETATION TRANSECTION PHOTOGRAPHIC RECORD

PHOTOGRAPH NUMBER 3: ADDITIONAL INFORMATION

↑ Ironwood Tree

PHOTOGRAPH NUMBER 4 :

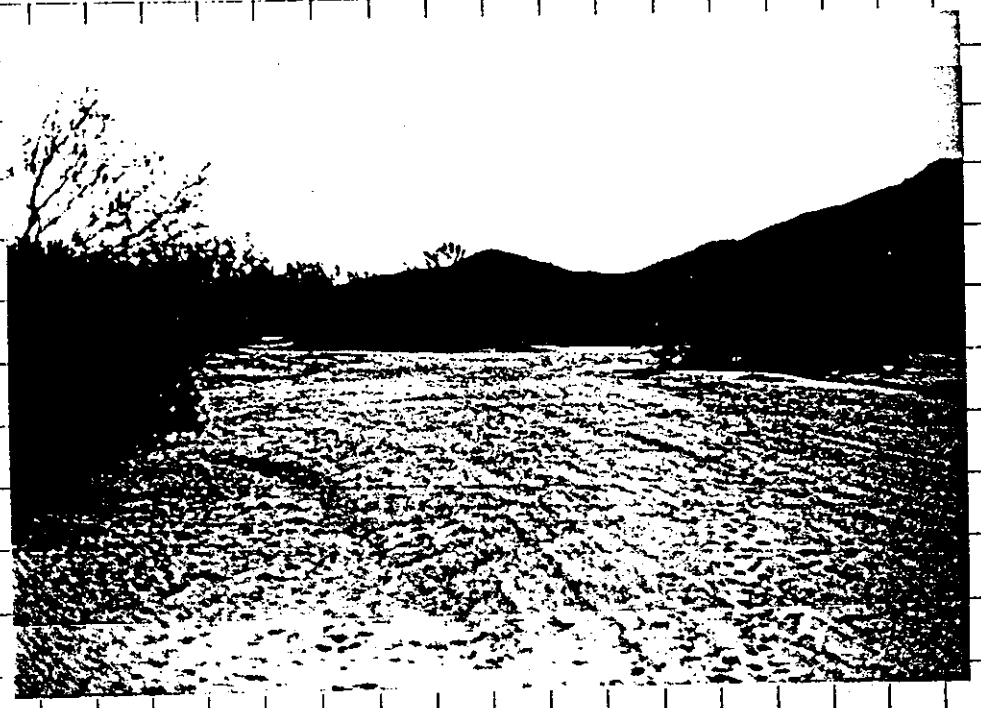
↓ Palo verde
↓ Ironwood

FLOOD MANAGEMENT SECTION
ARIZONA DEPARTMENT OF WATER RESOURCES

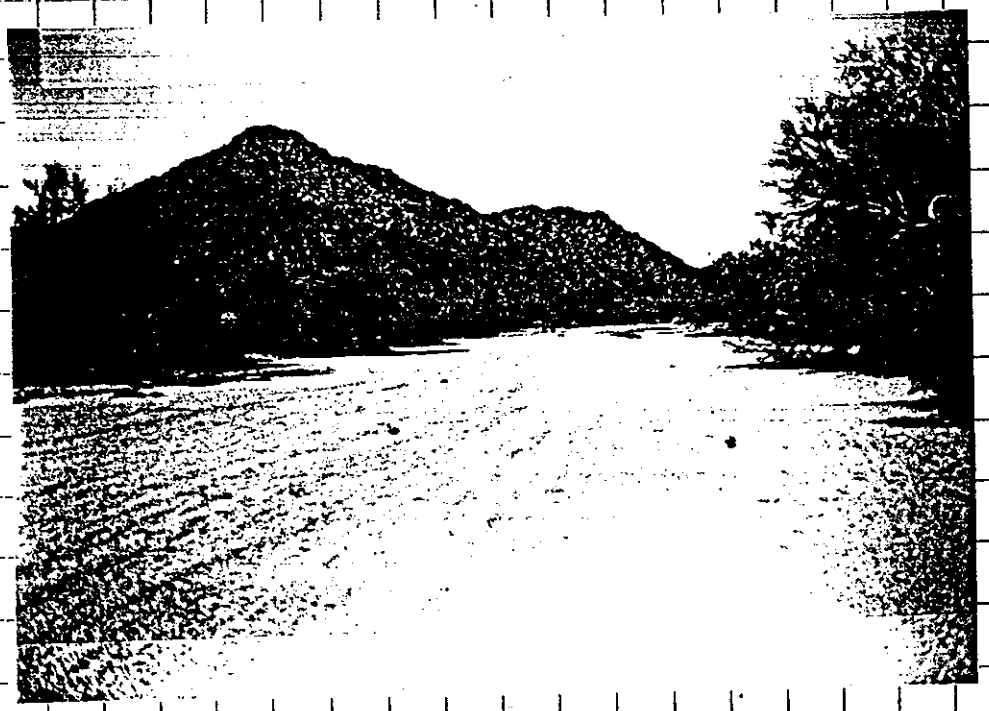
DATE: ____/____/____

VEGETATION TRANSECTION PHOTOGRAPHIC RECORD

PHOTOGRAPH NUMBER 5: ADDITIONAL INFORMATION



PHOTOGRAPH NUMBER 6: ADDITIONAL INFORMATION

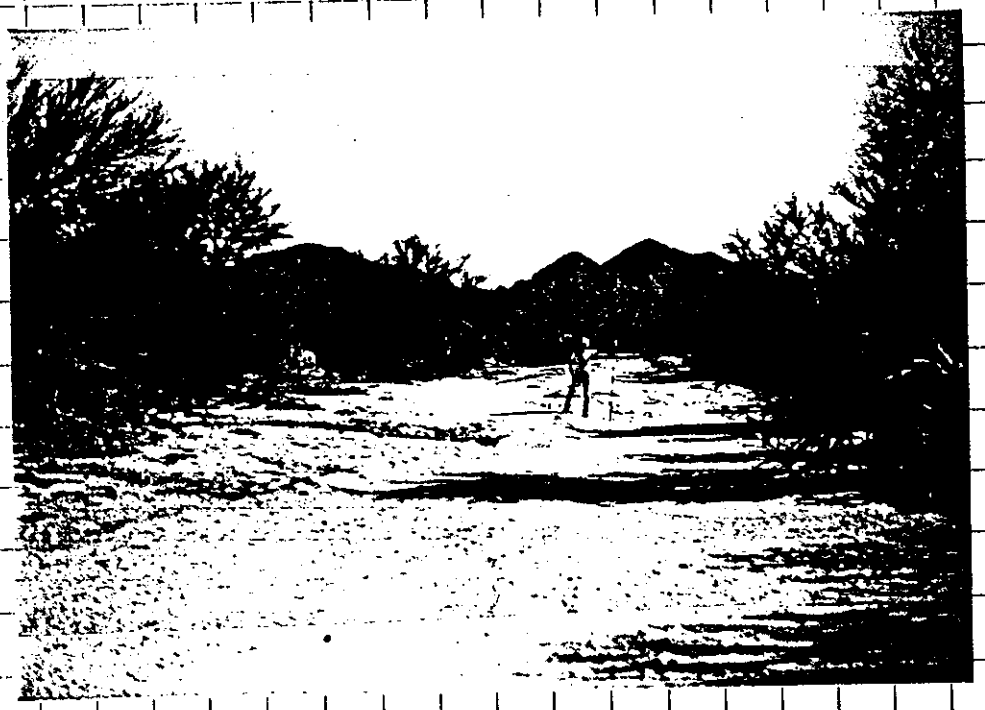


FLOOD MANAGEMENT SECTION
ARIZONA DEPARTMENT OF WATER RESOURCES

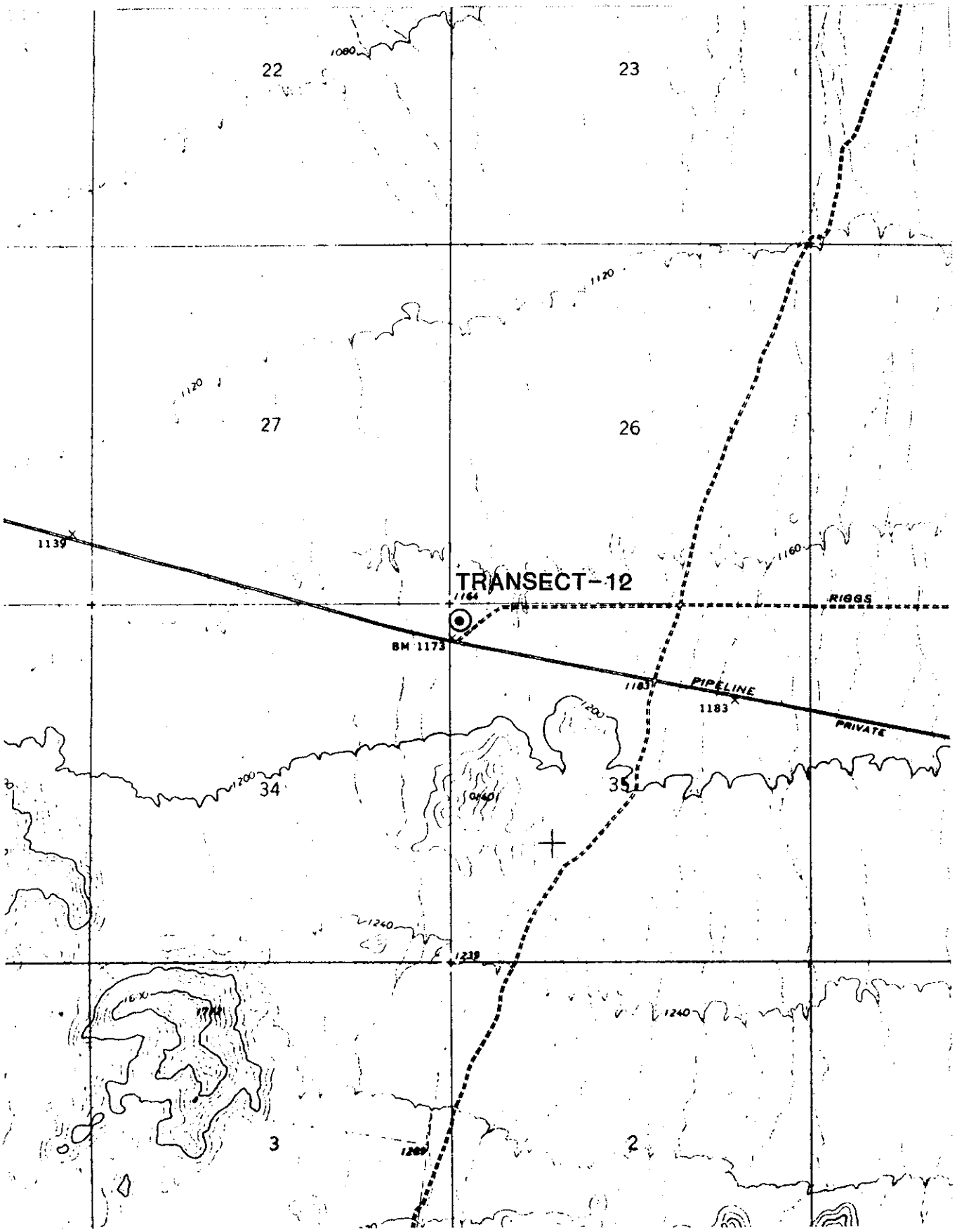
DATE: ____/____/____

VEGETATION TRANSECTION PHOTOGRAPHIC RECORD

PHOTOGRAPH NUMBER 7 : ADDITIONAL INFORMATION



PHOTOGRAPH NUMBER 8 : ADDITIONAL INFORMATION



TRANSECT LOCATION

Donohue ENGINEERS ARCHITECTS SCIENTISTS

TRANSECT #12

FLOOD MANAGEMENT SECTION ARIZONA DEPARTMENT OF WATER RESOURCES	DATE: 08 / 28 / 89

VEGETATION TRANSECTION FIELD NOTES

PROJECT	WOOLSEY
PERSONNEL	T. CASEY, R. RUSSEL
TRANSECTION LOCATION	NW 1/4 NW 1/4 35 Sec, T 2S, R 3W
QUADRANGLE MAP	MARGIES PEAK
ELEVATION	1170
SOIL TYPE AND HYDROLOGIC GROUP	DESERT BRUSH-GROUP "A"
SOIL INFORMATION SOURCE	S.C.S.

VEGETATION COMMUNITY DESCRIPTION 14.5%-POOR

Creosote, ocotillo, Saguaro, Burro Weed.

SANDY-SILT

RECORD	MEASUREMENT IS OF 14.5ft VEGETATION 85.5ft. BARE EARTH/ROCK					
1	0ft-15ft	15ft-19.5ft	19.5ft-45ft	45ft-47.5ft	47.5ft-50ft	50ft-53ft
	53ft-94ft	94ft-98.5ft	98.5ft-100ft			

% COVER CALCULATIONS

Total Distance	100ft.
Total Measured Cover	14.5ft
Total Measured Non-cover	85.5ft.
Total Measured Cover / Total Distance	.145
% Cover	14.5%

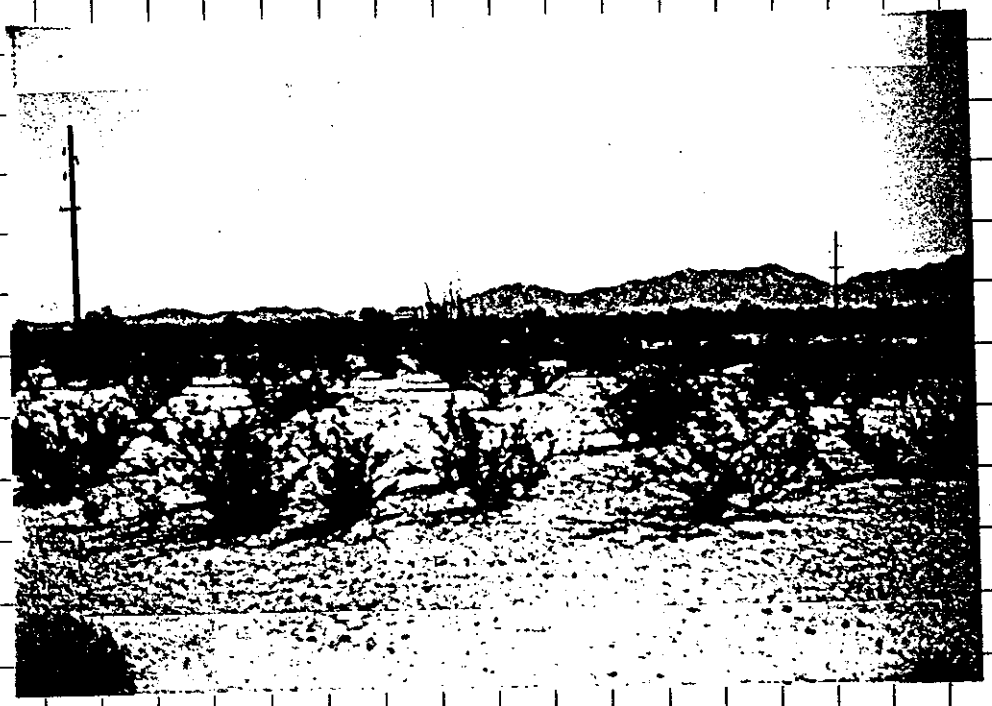
NOTES
PICTURE #1-General overview of vegetation community
PICTURES #2,3,4,5&6-Close-up of typical Cover.

TRANSECT. directions are approx. 10.5 miles across to Riggs Road. take a right on Riggs and proceed approx. 0.5 miles to pipeline.

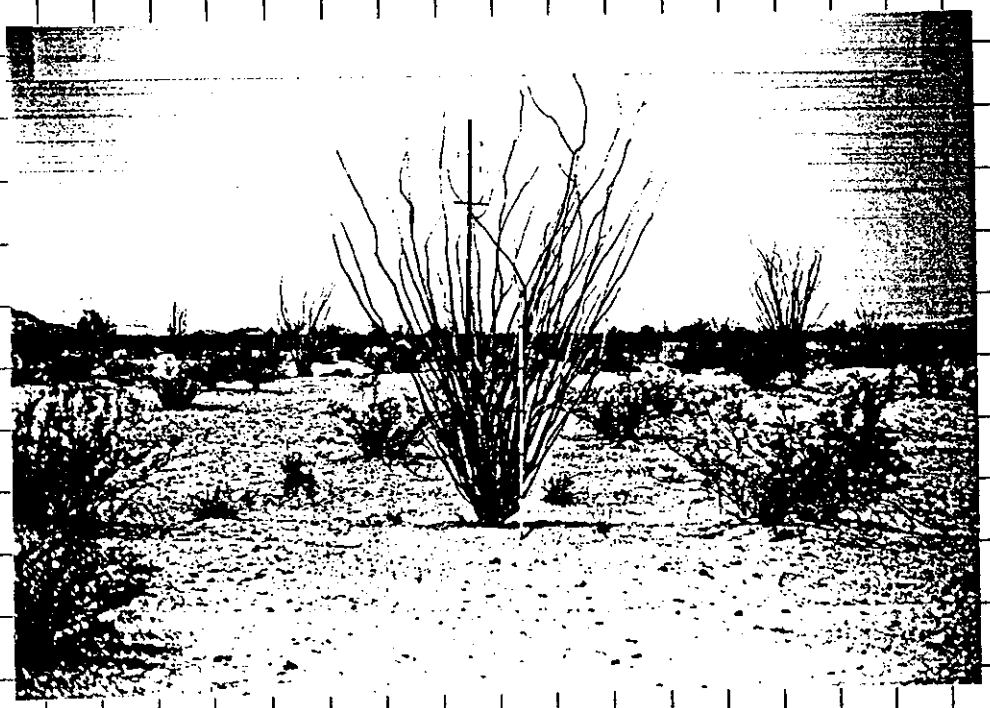
FLOOD MANAGEMENT SECTION ARIZONA DEPARTMENT OF WATER RESOURCES	DATE: ____/____/____

VEGETATION TRANSECTION PHOTOGRAPHIC RECORD

PHOTOGRAPH NUMBER 1: GENERAL OVERVIEW OF VEGETATION COMMUNITY



PHOTOGRAPH NUMBER 2: CLOSE-UP OF TYPICAL COVER DISTRIBUTION

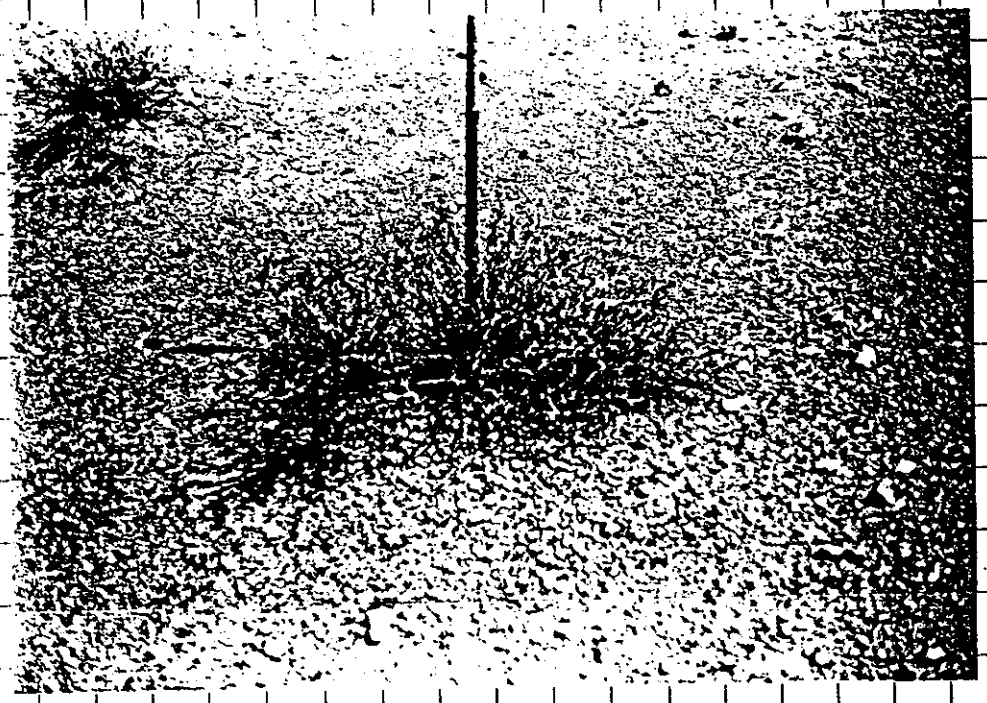


FLOOD MANAGEMENT SECTION
ARIZONA DEPARTMENT OF WATER RESOURCES

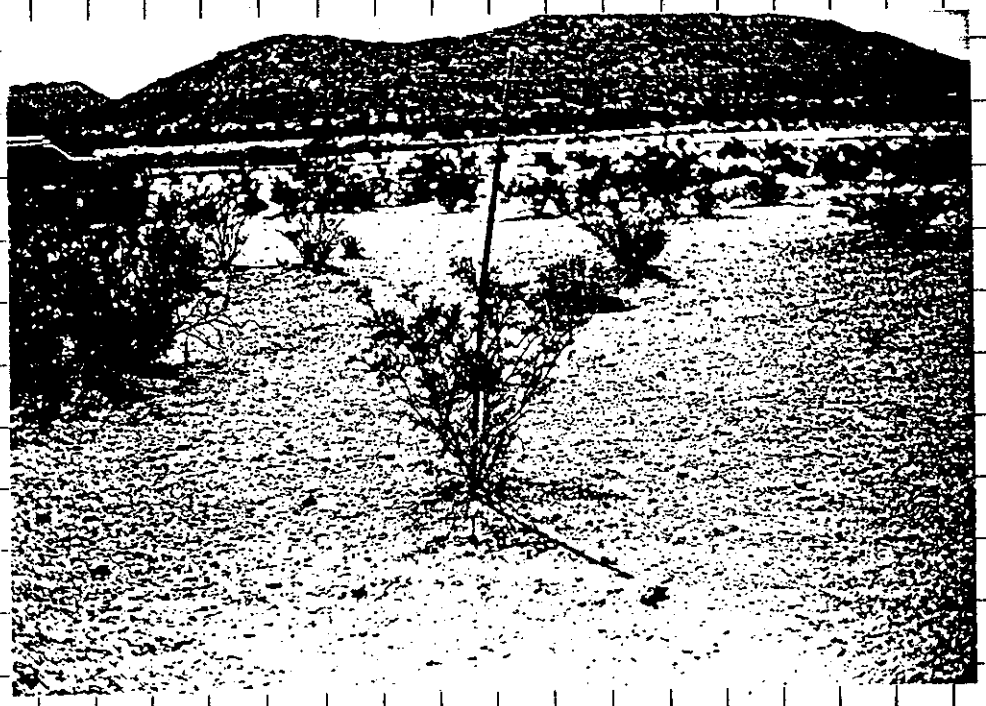
DATE: ____/____/____

VEGETATION TRANSECTION PHOTOGRAPHIC RECORD

PHOTOGRAPH NUMBER 3: ADDITIONAL INFORMATION



PHOTOGRAPH NUMBER 4 : ADDITIONAL INFORMATION

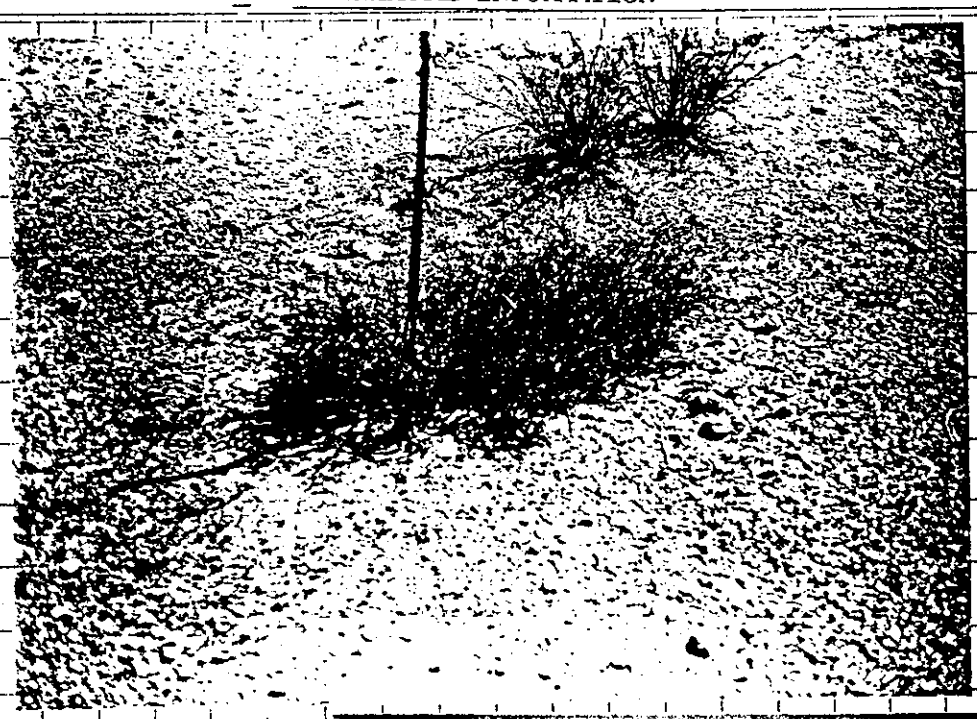


FLOOD MANAGEMENT SECTION
ARIZONA DEPARTMENT OF WATER RESOURCES

DATE: ____/____/____

VEGETATION TRANSECTION PHOTOGRAPHIC RECORD

PHOTOGRAPH NUMBER 5: ADDITIONAL INFORMATION



PHOTOGRAPH NUMBER 6: AD

TABLE B4

SLOPE AND LANDUSE DATA
FOR WEIGHTED INITIAL LOSS VALUES

SUBASIN NO.	SLOPES < 1%	SLOPES 1 TO 5 %	SLOPES > 5 %	CULTIVATED AREAS	WEIGHTED IA
1.1	21%	75%	3%	0%	0.20
1.2	0%	50%	2%	49%	0.32
2.1	0%	0%	100%	0%	0.25
2.2	73%	27%	0%	0%	0.30
3	4%	39%	31%	25%	0.28
4.1	17%	79%	5%	0%	0.19
4.2	1%	93%	6%	0%	0.16
4.3	64%	28%	8%	0%	0.29
4.4	4%	69%	27%	0%	0.18
4.5	46%	0%	54%	0%	0.30
4.6	51%	24%	25%	0%	0.28
4.7	47%	44%	9%	0%	0.25
4.8	71%	4%	20%	4%	0.33
4.9	34%	58%	0%	8%	0.25
4.10	62%	20%	17%	0%	0.29
4.11	78%	0%	22%	0%	0.33
4.12	85%	14%	1%	0%	0.32
4.13	46%	47%	0%	7%	0.27
4.14	50%	10%	40%	0%	0.29
4.15	0%	35%	0%	65%	0.38
5	0%	17%	0%	83%	0.44
6.1	0%	0%	0%	100%	0.50
6.2	71%	0%	0%	29%	0.39
6.3	68%	0%	9%	23%	0.38
6.4	0%	0%	0%	100%	0.50
6.5	29%	0%	6%	65%	0.44
6.6	41%	0%	59%	0%	0.29
6.7	27%	1%	0%	72%	0.46
6.8	100%	0%	0%	0%	0.35
7.1	62%	0%	38%	0%	0.31
7.2	79%	0%	21%	0%	0.33
7.3	48%	0%	52%	0%	0.30
7.4	30%	0%	70%	0%	0.28
7.5	87%	0%	13%	0%	0.34
7.6	100%	0%	0%	0%	0.35
7.7	73%	0%	0%	27%	0.39
8.1	10%	0%	90%	0%	0.26
8.2	15%	0%	85%	0%	0.26
8.3	60%	0%	40%	0%	0.31
8.4	47%	0%	53%	0%	0.30

SUBASIN NO.	SLOPES < 1%	1 TO 5 %	> 5 %	CULTIVATED AREAS	WEIGHTED IA
8.5	29%	0%	71%	0%	0.28
8.6	94%	0%	6%	0%	0.34
8.7	80%	0%	20%	0%	0.33
8.8	100%	0%	0%	0%	0.35
9.1	97%	0%	3%	0%	0.35
9.2	100%	0%	0%	0%	0.35
10.1	46%	0%	54%	0%	0.30
10.2	74%	0%	26%	0%	0.32
10.3	100%	0%	0%	0%	0.35
11.1	22%	0%	78%	0%	0.27
11.2	90%	0%	10%	0%	0.34
11.3	100%	0%	0%	0%	0.35
12.1	15%	0%	85%	0%	0.27
12.2	75%	0%	25%	0%	0.33
12.3	98%	0%	2%	0%	0.35
12.4	100%	0%	0%	0%	0.35
13.1	64%	0%	36%	0%	0.31
13.2	68%	0%	32%	0%	0.32
13.3	38%	0%	62%	0%	0.29
13.4	13%	0%	87%	0%	0.26
13.5	72%	0%	28%	0%	0.32
13.6	67%	0%	33%	0%	0.32
13.7	99%	0%	1%	0%	0.35
13.8	100%	0%	0%	0%	0.35
14.1	30%	0%	70%	0%	0.28
14.2	96%	0%	4%	0%	0.35
14.3	100%	0%	0%	0%	0.35
15.1	65%	0%	35%	0%	0.31
15.2	100%	0%	0%	0%	0.35
15.3	81%	0%	19%	0%	0.33
15.4	100%	0%	0%	0%	0.35
15.5	34%	0%	66%	0%	0.28
15.6	19%	0%	81%	0%	0.27
15.7	75%	0%	25%	0%	0.32
15.8	100%	0%	0%	0%	0.35
15.9	100%	0%	0%	0%	0.35
15.10	100%	0%	0%	0%	0.35
15.11	100%	0%	0%	0%	0.35
15.12	66%	0%	34%	0%	0.32
15.13	100%	0%	0%	0%	0.35
15.14	53%	0%	47%	0%	0.30
15.15	100%	0%	0%	0%	0.35
15.16	55%	0%	45%	0%	0.30
15.17	98%	0%	2%	0%	0.35
15.18	100%	0%	0%	0%	0.35

SUBASIN NO.	SLOPES < 1%	1 TO 5 %	> 5 %	CULTIVATED AREAS	WEIGHTED IA
15.19	100%	0%	0%	0%	0.35
15.20	100%	0%	0%	0%	0.35
15.21	100%	0%	0%	0%	0.35
15.22	100%	0%	0%	0%	0.35
16.1	77%	0%	23%	0%	0.33
16.2	100%	0%	0%	0%	0.35
16.3	100%	0%	0%	0%	0.35
16.4	100%	0%	0%	0%	0.35
16.5	97%	0%	3%	0%	0.35
16.6	100%	0%	0%	0%	0.35
16.7	100%	0%	0%	0%	0.35
17.1	98%	0%	2%	0%	0.35
17.2	100%	0%	0%	0%	0.35
18.1	100%	0%	0%	0%	0.35
18.2	100%	0%	0%	0%	0.35

NOTE:

IA values used for above computations from HDM Table 4.1:

SLOPES < 1%	1 TO 5 %	> 5 %	CULTIVATED AREAS
0.35	0.15	0.25	0.50

TABLE B5

DATA FOR SUBBASIN LAG TIME CALCULATIONS

SUBASIN NO.	AREA (sq. mi.)	LAG (min)	L (mi)	Lca (mi)	SLOPE (ft/mi)	Shape Factor	Kn
1.1	0.9	41	2.4	1.1	363	0.14	0.06
1.2	0.9	29	1.3	0.6	175	0.05	0.06
2.1	2.9	43	2.5	1.2	395	0.16	0.06
2.2	2.6	81	2.5	1.0	3	1.36	0.05
3.	3.8	71	4.4	2.0	224	0.59	0.06
4.1	2.9	79	3.8	1.6	58	0.80	0.06
4.2	2.0	78	4.3	2.0	120	0.77	0.06
4.3	5.1	83	6.5	1.4	99	0.89	0.06
4.4	3.9	93	3.6	1.8	30	1.23	0.06
4.5	0.5	49	1.9	1.5	62	0.35	0.05
4.6	1.8	46	2.3	1.4	294	0.19	0.06
4.7	6.9	83	5.7	3.1	147	1.46	0.05
4.8	6.5	202	7.1	3.4	6	9.39	0.06
4.9	1.1	31	1.7	0.4	33	0.11	0.05
4.10	2.9	79	3.8	2.3	119	0.80	0.06
4.11	6.0	98	5.2	3.3	149	1.39	0.06
4.12	2.4	56	2.0	1.2	55	0.32	0.06
4.13	1.2	79	3.2	1.8	55	0.78	0.06
4.14	3.6	113	6.0	3.8	126	2.04	0.06
4.15	3.6	64	2.7	1.6	35	0.73	0.05
5.	3.2	50	1.8	0.9	48	0.23	0.06
6.1	3.7	69	5.0	1.9	320	0.54	0.06
6.2	0.4	30	1.0	0.7	50	0.10	0.05
6.3	2.3	34	2.4	0.6	287	0.09	0.06
6.4	0.6	42	1.6	0.8	26	0.25	0.05
6.5	1.6	55	3.6	1.4	104	0.48	0.05
6.6	3.6	55	3.7	2.0	229	0.50	0.05
6.7	1.1	51	1.8	1.1	62	0.25	0.06
6.8	0.4	35	1.7	0.7	67	0.15	0.05
7.1	6.4	66	4.9	1.7	295	0.48	0.06
7.2	4.3	48	3.1	1.3	354	0.22	0.06
7.3	2.7	78	4.2	2.8	227	0.77	0.06
7.4	3.3	44	2.7	1.3	395	0.17	0.06
7.5	3.7	69	3.4	1.5	80	0.55	0.06
7.6	2.1	34	1.3	0.6	90	0.09	0.06
7.7	0.6	30	1.2	0.5	79	0.06	0.06
8.1	3.4	67	4.0	1.6	352	0.35	0.07
8.2	1.4	31	1.8	0.7	662	0.05	0.07
8.3	3.0	66	2.4	1.5	49	0.50	0.06
8.4	5.6	61	3.9	1.9	352	0.40	0.06
8.5	1.6	41	2.6	1.0	344	0.14	0.06

SUBASIN NO.	AREA (sq. mi.)	LAG (min)	L (mi)	Lca (mi)	SLOPE (ft/mi)	Shape Factor	Kn
8.6	0.5	48	1.8	0.9	60	0.21	0.06
8.7	2.5	60	3.0	1.7	161	0.39	0.06
8.8	0.3	22	0.8	0.4	60	0.04	0.05
9.1	2.2	56	3.3	1.4	212	0.32	0.06
9.2	1.3	30	0.9	0.5	69	0.06	0.06
10.1	4.6	76	3.8	2.4	364	0.48	0.07
10.2	4.5	63	3.9	1.8	267	0.43	0.06
10.3	0.3	12	0.3	0.1	33	0.01	0.05
11.1	5.2	69	3.6	2.1	415	0.37	0.07
11.2	5.6	88	4.5	2.1	81	1.05	0.06
11.3	0.6	39	0.9	0.7	23	0.12	0.06
12.1	4.1	47	2.9	0.9	346	0.13	0.07
12.2	4.7	53	2.6	1.2	129	0.28	0.06
12.3	8.9	108	5.4	2.9	77	1.79	0.06
12.4	0.6	31	0.9	0.7	34	0.11	0.05
13.1	5.1	73	4.4	2.6	308	0.65	0.06
13.2	6.0	94	5.8	2.9	180	1.26	0.06
13.3	4.4	103	5.9	1.9	110	1.06	0.07
13.4	1.9	33	1.7	0.8	577	0.05	0.07
13.5	6.3	73	4.8	2.5	340	0.64	0.06
13.6	3.3	59	3.3	2.4	482	0.36	0.06
13.7	9.1	138	7.5	3.2	50	3.40	0.06
13.8	0.3	19	0.8	0.2	33	0.03	0.05
14.1	2.4	52	2.7	1.3	395	0.18	0.07
14.2	7.5	174	8.2	5.4	50	6.27	0.06
14.3	0.3	15	0.4	0.3	59	0.02	0.05
15.1	8.8	95	5.6	3.6	251	1.29	0.06
15.2	1.0	49	2.2	0.8	55	0.22	0.06
15.3	5.2	122	5.5	2.6	33	2.45	0.06
15.4	0.8	64	2.7	1.6	87	0.46	0.06
15.5	3.1	70	3.8	1.9	355	0.39	0.07
15.6	4.5	63	3.7	1.3	273	0.30	0.07
15.7	2.5	29	1.9	0.6	465	0.05	0.06
15.8	5.5	77	3.8	1.8	79	0.75	0.06
15.9	3.9	88	4.0	1.9	55	1.04	0.06
15.10	0.7	61	2.6	1.1	54	0.40	0.06
15.11	0.5	35	1.0	0.7	58	0.09	0.06
15.12	2.9	68	4.2	2.3	330	0.53	0.06
15.13	6.7	122	6.4	3.1	63	2.49	0.06
15.14	2.4	36	2.3	0.9	475	0.10	0.06
15.15	5.4	123	5.8	3.6	69	2.53	0.06
15.16	1.9	40	2.3	0.9	596	0.09	0.07
15.17	1.5	70	2.9	1.6	68	0.57	0.06
15.18	6.6	133	6.7	3.3	51	3.11	0.06
15.19	0.9	75	2.9	1.7	51	0.70	0.06

SUBASIN NO.	AREA (sq. mi.)	LAG (min)	L (mi)	Lca (mi)	SLOPE (ft/mi)	Shape Factor	Kn
15.20	1.1	72	3.0	1.4	48	0.62	0.06
15.21	0.3	15	0.5	0.2	42	0.02	0.05
15.22	0.3	20	0.5	0.2	32	0.02	0.06
16.1	3.8	74	4.4	2.5	262	0.68	0.06
16.2	1.6	54	2.5	0.9	56	0.30	0.06
16.3	0.6	36	1.2	0.6	50	0.10	0.06
16.4	0.7	17	0.5	0.3	38	0.02	0.05
16.5	3.0	88	4.4	2.2	89	1.04	0.06
16.6	2.1	50	1.8	0.9	49	0.24	0.06
16.7	0.4	19	0.5	0.2	38	0.02	0.06
17.1	7.1	125	8.2	4.0	155	2.63	0.06
17.2	0.5	22	0.6	0.3	35	0.03	0.06
18.1	1.6	59	3.6	0.7	42	0.36	0.06
18.2	0.2	15	0.4	0.2	28	0.02	0.05

APPENDIX C

ROUTING REACH CROSS-SECTIONS

AND PARAMETERS

TABLE C1

CHANNEL ROUTING PARAMETERS

BASIN NO.	SEGMENT	TYPE	NSTPS	PERCRT	REACH LENGTH (ft)	Energy SLOPE (ft./ft.)	X-SECT. WIDTH (ft.)	CHANNEL WIDTH (ft.)
1.1	1R1	C	3	1	8000	0.0011	700	50
2.1	2R1A	D	3	1	10060	0.0144	6285	1748
2.1	2R1B	C	3	1	3000	0.0011	700	50
4.1	4R1	C	3	10	8045	0.005	4100	100
4.3	4R2	C	6	10	15840	0.0051	4850	150
4.7	4R3	C	1	10	2514	0.004	560	70
4.5	4R4	C	1	10	4022	0.005	1000	55
4.6	4R5	C	3	10	8045	0.005	525	205
4.8	4R6	C	1	5	3268	0.0092	5950	50
4.10	4R7	C	2	10	6537	0.0041	378	223
4.11	4R8	D	4	5	10308	0.0102	7040	988
4.13	4R9	C	4	10	11100	0.0065	156	106
6.1	6R1	D	2	10	5280	0.01	3017	200
6.2	6R2	C	2	10	5280	0.0023	3110	110
6.3	6R3	C	1	10	2700	0.0148	9195	95
6.4	6R4	C	2	10	6537	0.0115	9400	200
6.5	6R5	C	1	10	4022	0.0099	9360	160
6.6	6R6	D	3	10	9051	0.0122	700	200
7.1	7R1	D	2	1	5531	0.0108	3017	500
7.2	7R2	C	2	1	6034	0.0066	2262	400
7.3	7R3	D	2	1	6537	0.0153	3017	400
7.4	7R4	D	6	1	17600	0.0153	5531	1584
7.5	7R5	D	2	1	5280	0.0133	8800	2100
7.6	7R6	D	2	1	6034	0.0149	3520	546
8.1	8R1	D	1	10	4274	0.0269	1000	300
8.2	8R2	D	1	10	4274	0.0246	1000	198
8.3	8R3	C	4	10	10308	0.0116	4700	200
8.3	8R4	D	2	10	7040	0.0114	3771	990
8.4	8R5	D	1	10	2765	0.0145	2514	595
8.5	8R6	D	3	10	8045	0.0099	3268	650
8.6	8R7	D	2	10	6034	0.0133	5531	700
8.7	8R8	D	1	10	4274	0.0112	2011	500
9.1	9R1	D	2	5	6285	0.0127	4525	1050
9.1	9R2	D	2	5	5030	0.0119	4525	900
10.2	10R1	D	3	10	8548	0.0099	4777	891
11.1	11R1	D	8	5	23885	0.0155	7542	1620
11.2	11R2	D	1	5	2300	0.013	6500	1500
12.1	12R1	D	5	5	13577	0.0198	10811	1200
12.2	12R2A	D	3	5	8548	0.0294	11817	1100
12.2	12R2B	D	7	5	20366	0.0133	8045	1150
12.3	12R3	D	1	5	2600	0.01	3050	2860
13.1	13R1	D	7	1	19108	0.011	3520	720
13.2	13R2	D	4	1	11314	0.0106	3520	450
13.3	13R3	D	6	1	15085	0.0113	3520	450
13.4	13R4	D	9	1	24640	0.0187	5028	700
13.5	13R5A	D	7	1	18857	0.0117	8548	1050
13.5	13R5B	D	5	1	14582	0.011	6537	585
13.6	13R6A	D	8	1	22628	0.0124	8548	1050

13.6	13R6B	D	5	1	14080	0.011	6537	585
13.7	13R7	D	1	1	2200	0.0055	1800	350
14.1	14R1A	D	3	5	9051	0.0088	8548	1260
14.1	14R1B	D	6	5	16342	0.0098	3520	490
14.2	14R2A	D	6	5	17850	0.0112	8548	1260
14.2	14R2B	D	6	5	17600	0.0099	3520	490
14.3	14R3	D	1	5	2200	0.01	3000	270
15.2	15R1	D	10	1	27657	0.0101	6285	1100
15.3	15R2A	D	2	1	6537	0.0092	2514	300
15.3	15R2B	D	3	1	8548	0.0094	1005	150
15.4	15R3	D	2	1	5531	0.0108	2514	450
15.6	15R4	D	3	1	8297	0.0241	6537	1600
15.7	15R5	D	7	1	20114	0.0149	8548	2400
15.8	15R6	D	7	1	20617	0.0107	5280	1050
15.9	15R7A	D	2	1	6285	0.0095	1257	240
15.9	15R7B	D	3	1	7542	0.0106	2011	400
15.10	15R8	D	3	1	7291	0.0082	2514	450
15.11	15R9	D	4	1	12571	0.0095	2514	480
15.12	15R10	D	12	1	33691	0.0119	5028	910
15.13	15R11A	D	4	1	12571	0.0095	6537	900
15.13	15R11B	D	4	1	12571	0.0095	5028	1344
15.14	15R12	D	11	1	30422	0.0131	5531	840
15.15	15R13A	D	6	1	16594	0.0096	6537	900
15.15	15R13B	D	4	1	12571	0.0095	5028	1344
15.16	15R14	D	5	1	15588	0.0128	3268	720
15.17	15R15A	D	8	1	22628	0.0097	6537	900
15.17	15R15B	D	4	1	12571	0.0095	5028	1344
15.18	15R16	D	1	1	2514	0.008	2011	399
15.11	15R17	D	1	1	2262	0.0066	3520	500
15.20	15R18	D	1	1	1760	0.0114	3520	750
16.1	16R1	D	3	5	9051	0.0088	4777	1148
16.2	16R2	D	2	5	6537	0.0092	2514	450
16.3	16R3	D	1	5	2765	0.0072	1760	300
16.6	16R5	D	1	5	2514	0.008	1760	300
16.5	16R4	D	3	5	9051	0.0099	5028	648
17.1	17R1	D	6	5	17100	0.0082	5030	600
17.1	17R2	D	1	5	2765	0.0072	2514	500
18.1	18R1	C	1	5	2100	0.0086	570	70

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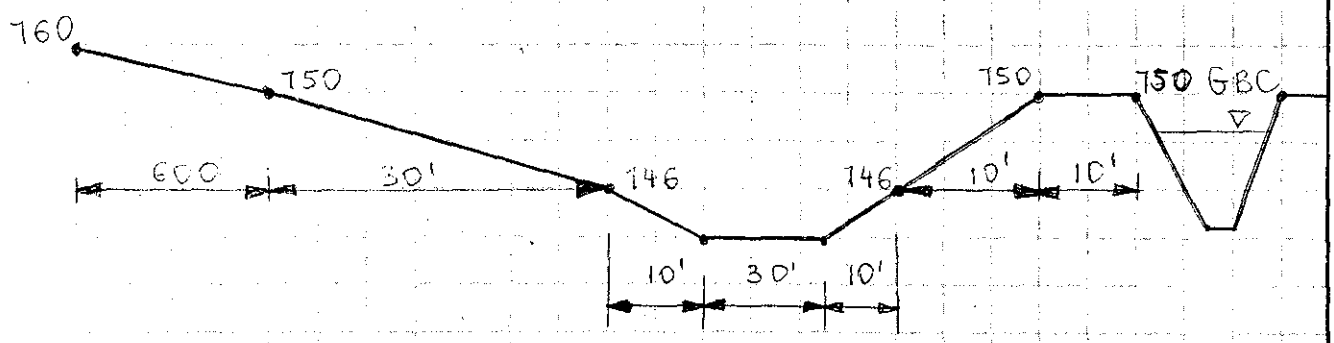
ROUTING REACH: 1R1
SUBBASIN NUMBER: 1.1



HEC-1 REACH PARAMETERS:

RLNTH (Length) =	2000	feet
SEL (Slope) =	0.0011	foot/foot
ANL, ANCH, ANR ('n' value) =	0.05	
PERCRT (Percolation Rate) =	1	cfs/acre

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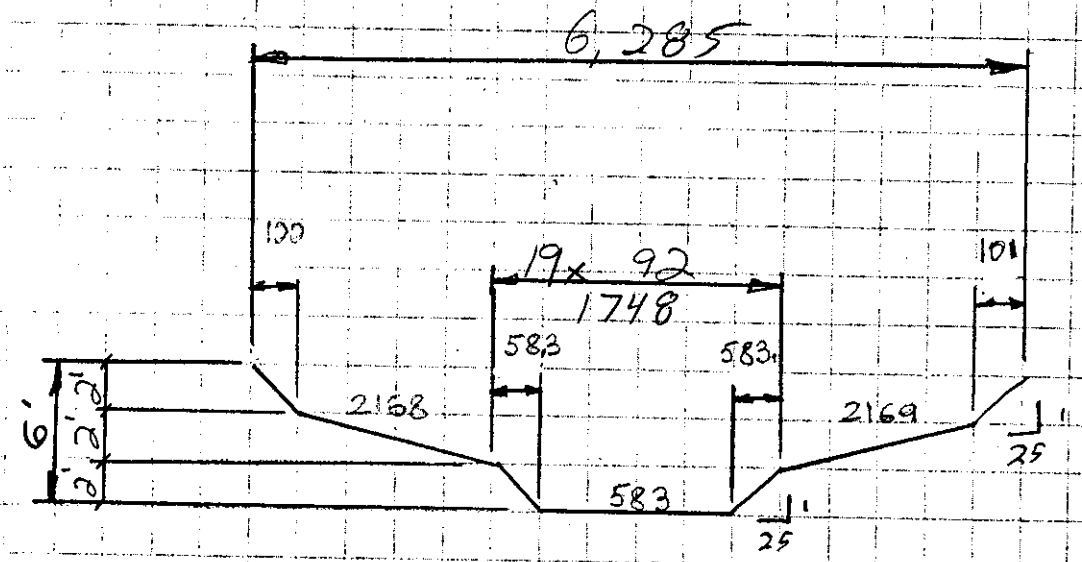
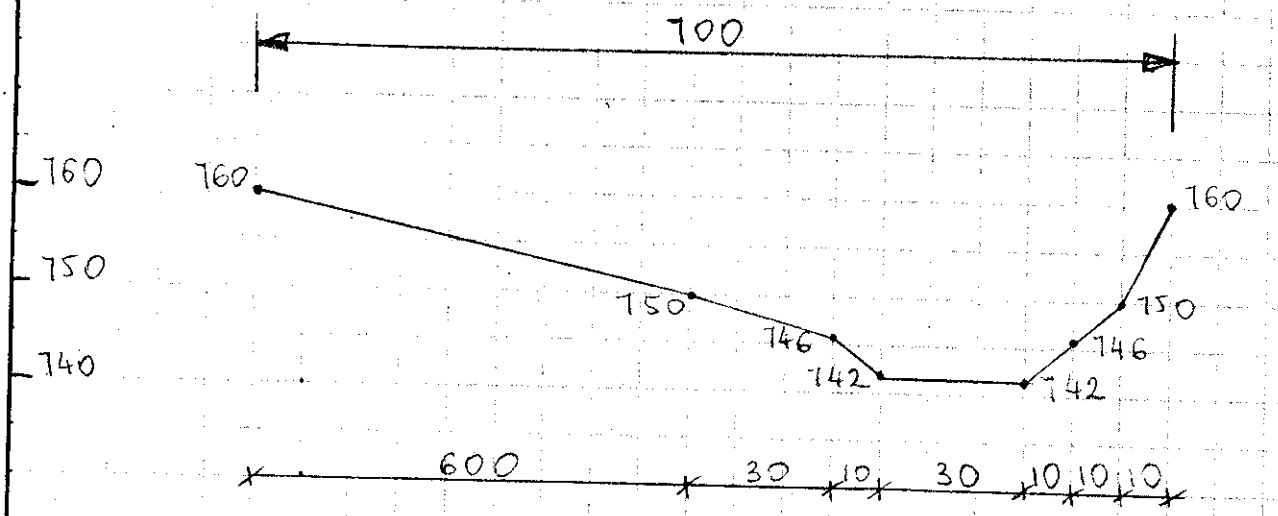
ROUTING REACH: 2R1A
SUBBASIN NUMBER: 2.1



HEC-1 REACH PARAMETERS:

RLNTH (Length) = 10060 feet
SEL (Slope) = 0.0144 foot/foot
ANL, ANCH, ANR ('n' value) = 0.050
PERCRT (Percolation Rate) = 1 cfs/acre

ROUTING REACH: 2R1B
SUBBASIN NUMBER: 2.1



HEC-1 REACH PARAMETERS:

RLNTH (Length) =	3000	feet
SEL (Slope) =	0.0011	foot/foot
ANL, ANCH, ANR ('n' value) =	0.05	
PERCRT (Percolation Rate) =	1	cfs/acre

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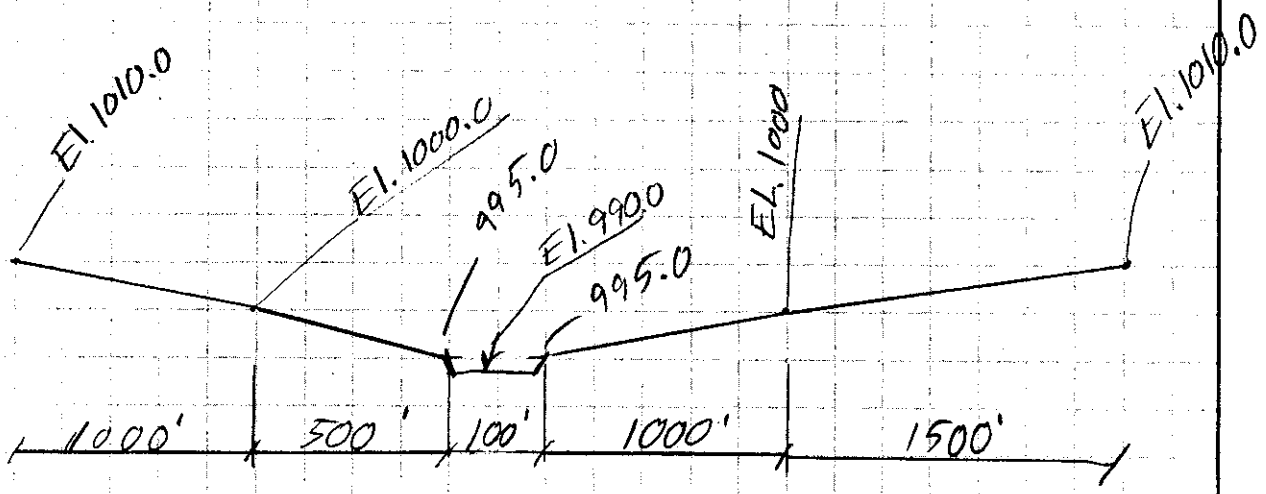
ROUTING REACH: 4R1
SUBBASIN NUMBER: 4.1



HEC-1 REACH PARAMETERS:

RLNTH (Length) = 8045 feet
SEL (Slope) = 0.0050 foot/foot
ANL, ANCH, ANR ('n' value) = 0.05
PERCRT (Percolation Rate) = 10 cfs/acre

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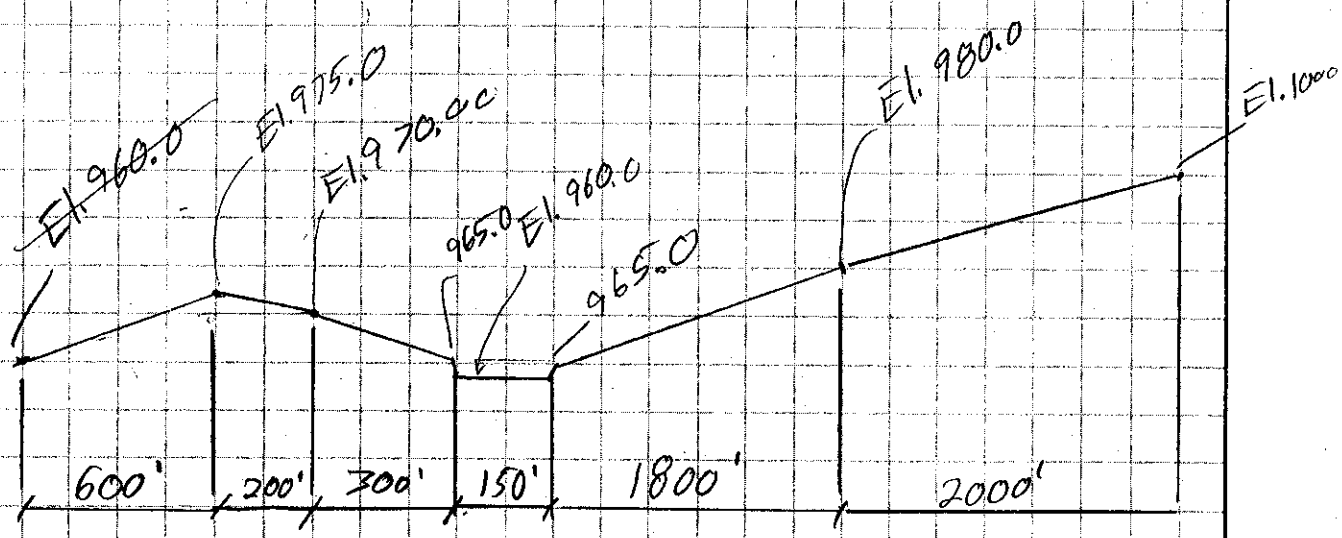
ROUTING REACH: 4R2
SUBBASIN NUMBER: 4.1 & 4.3



HEC-1 REACH PARAMETERS:

RLNTH (Length) =	6600	feet
SEL (Slope) =	0.0051	foot/foot
ANL, ANCH, ANR ('n' value) =	0.05	
PERCRT (Percolation Rate) =	10	cfs/acre

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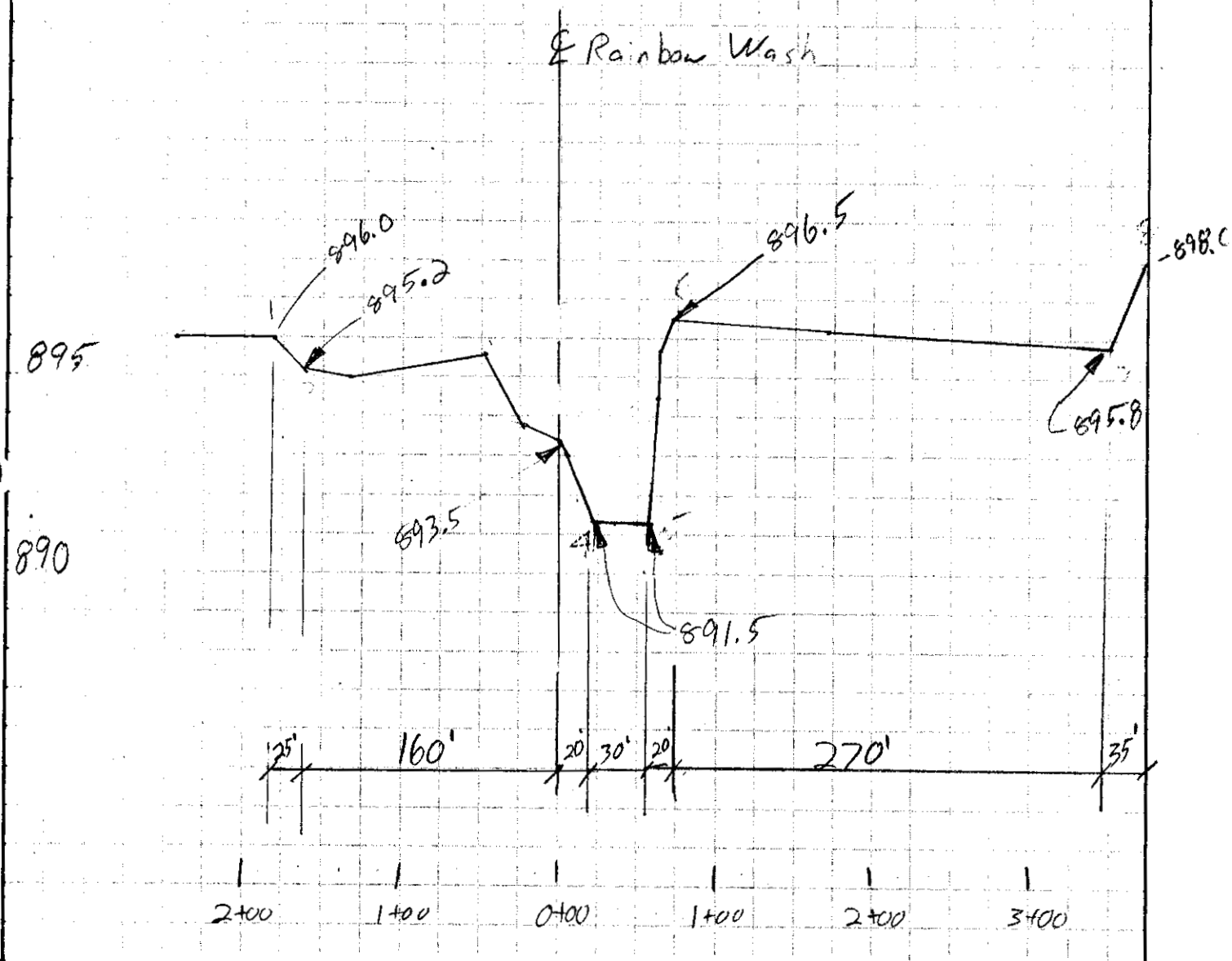
ROUTING REACH: 4R3
SUBBASIN NUMBER: 4.7



HEC-1 REACH PARAMETERS:

RLNTH (Length) = 2,514 feet
SEL (Slope) = 0.0040 foot/foot
ANL, ANCH, ANR ('n' value) = 0.05
PERCRT (Percolation Rate) = 10 cfs/acre

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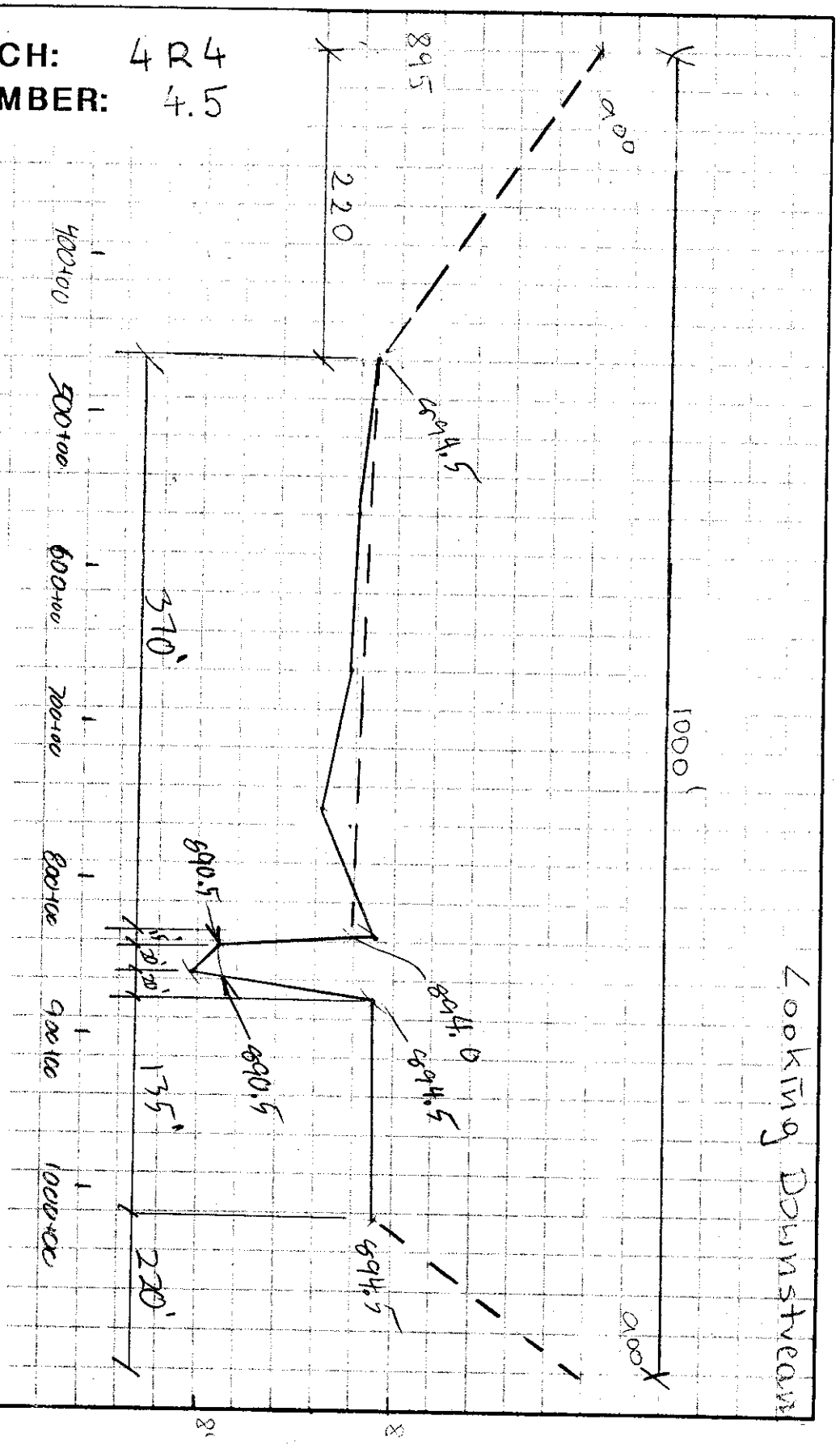
ROUTING REACH: 4R4
SUBBASIN NUMBER: 4.5



HEC-1 REACH PARAMETERS:

RLNTH (Length) =	4022	feet
SEL (Slope) =	0.0050	foot/foot
ANL, ANCH, ANR ('n' value) =	0.05	
PERCRT (Percolation Rate) =	10	cfs/acre

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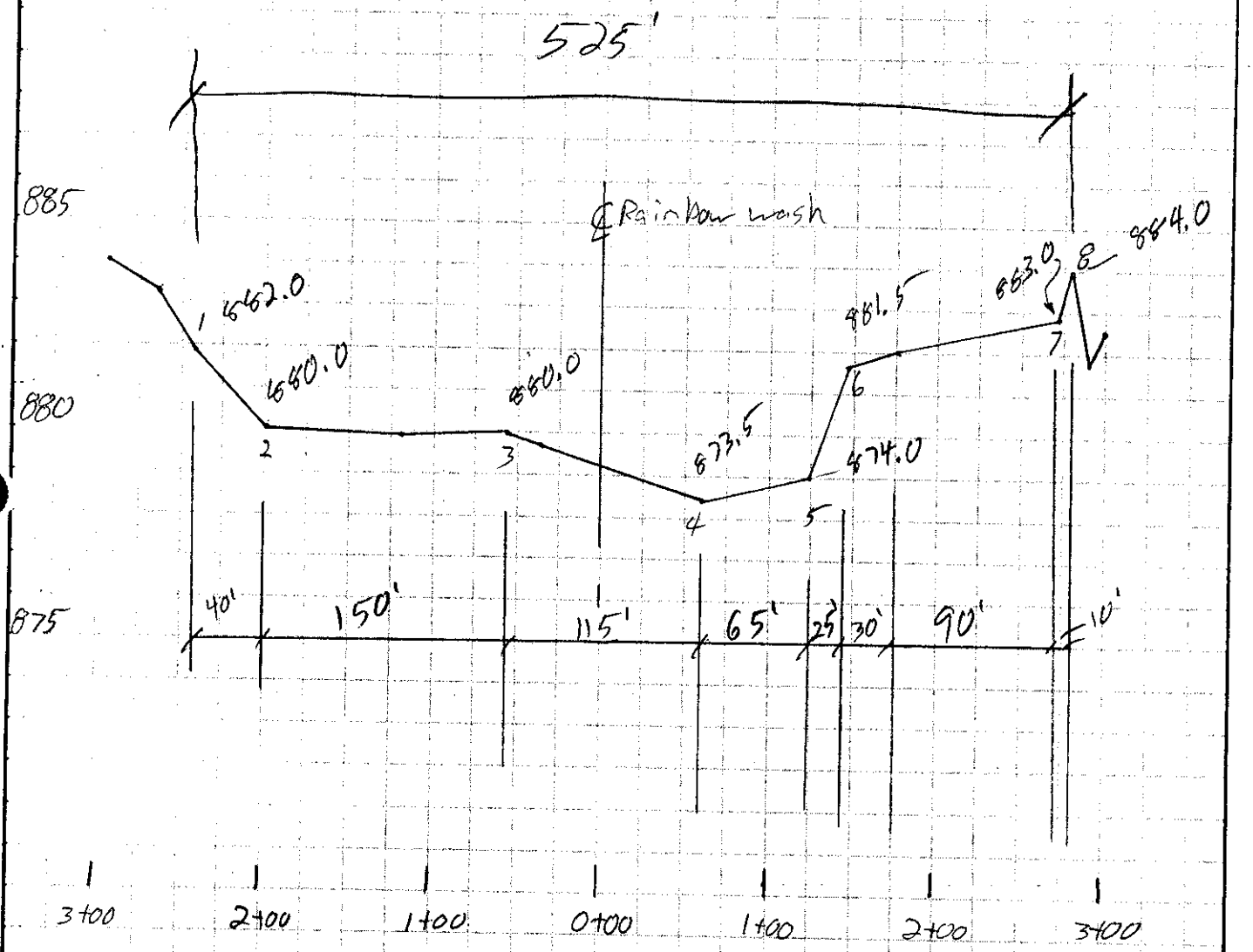
ROUTING REACH: 4R5
SUBBASIN NUMBER: 4.6



HEC-1 REACH PARAMETERS:

RLNTH (Length) = 8045 feet
SEL (Slope) = 0.0050 foot/foot
ANL, ANCH, ANR ('n' value) = 0.05
PERCRT (Percolation Rate) = 10 cfs/acre

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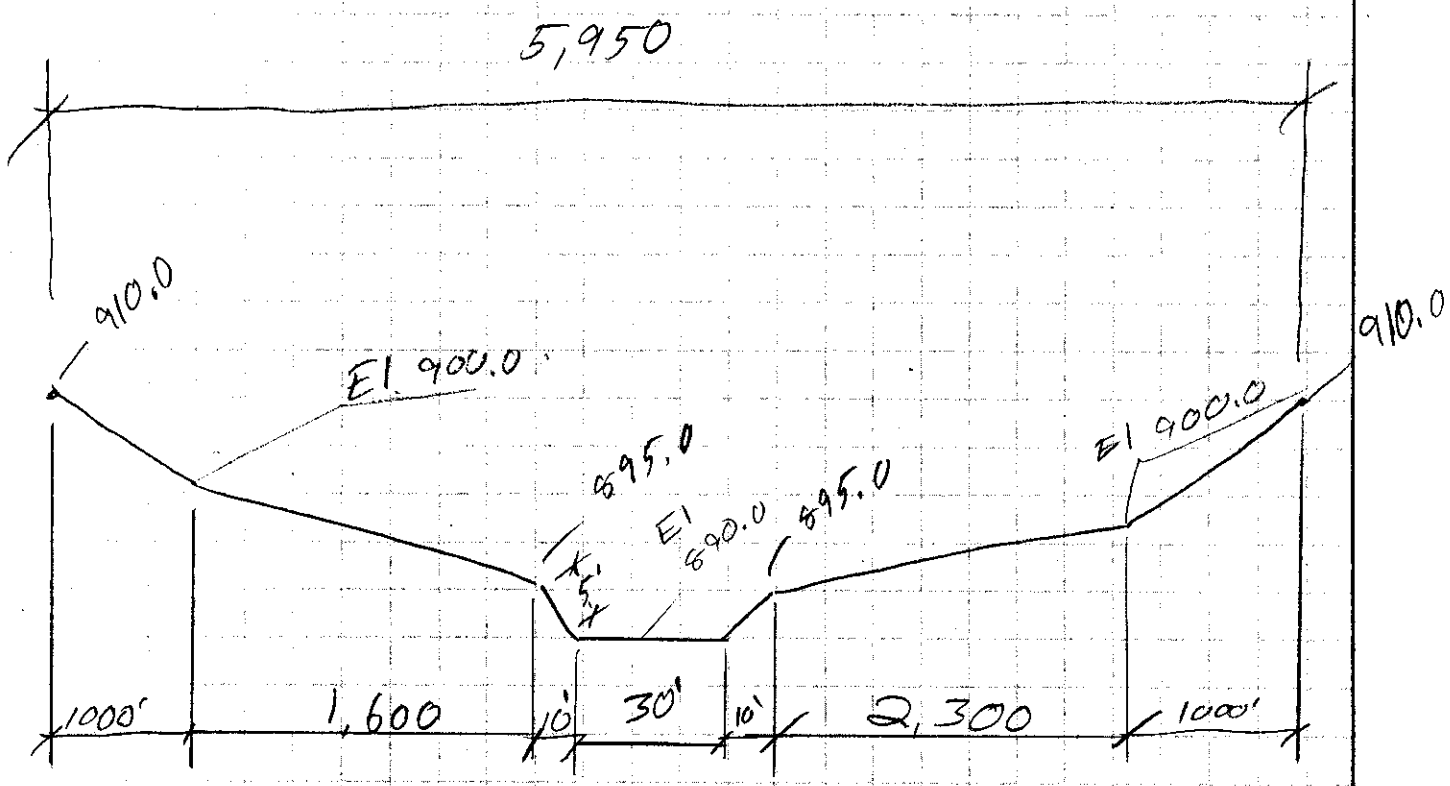
ROUTING REACH: 4R6
SUBBASIN NUMBER: 4.8



HEC-1 REACH PARAMETERS:

RLNTH (Length) =	3268	feet
SEL (Slope) =	0.0092	foot/foot
ANL, ANCH, ANR ('n' value) =	0.05	
PERCRT (Percolation Rate) =	5	cfs/acre

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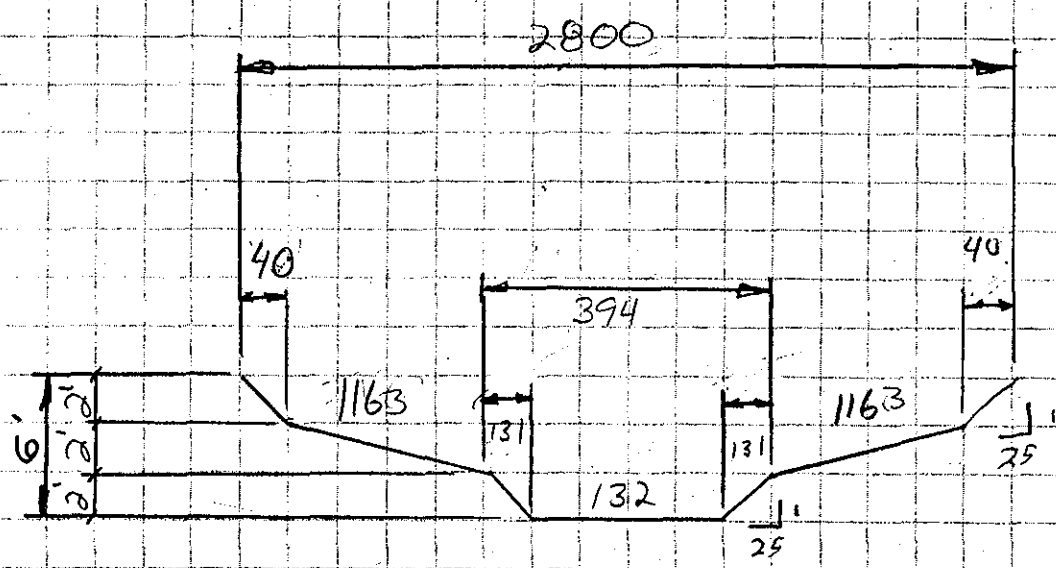
ROUTING REACH: 4R8
SUBBASIN NUMBER: 4.11



HEC-1 REACH PARAMETERS:

RLNTH (Length) =	6500	feet
SEL (Slope) =	0.0102	foot/foot
ANL, ANCH, ANR ('n' value) =	0.05	
PERCRT (Percolation Rate) =	10	cfs/acre

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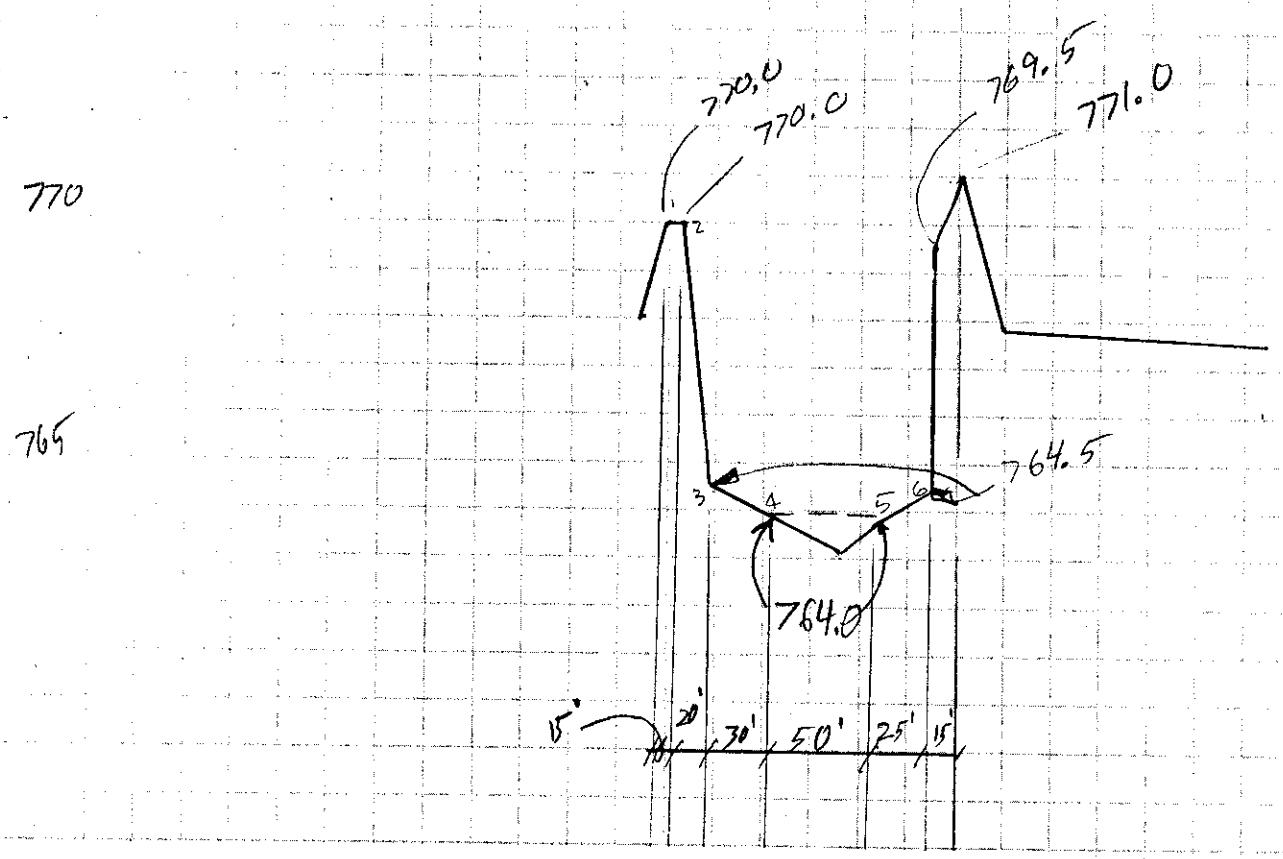
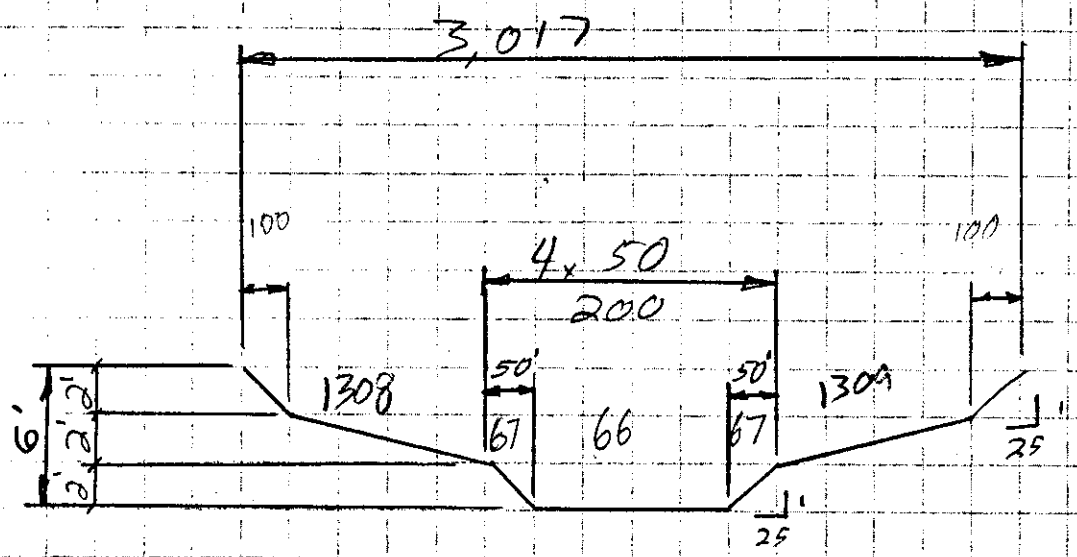
ROUTING REACH: 4R9
SUBBASIN NUMBER: 4.13



HEC-1 REACH PARAMETERS:

RLNTH (Length) =	11100	feet
SEL (Slope) =	0.0065	foot/foot
ANL, ANCH, ANR ('n' value) =	0.05	
PERCRT (Percolation Rate) =	10	cfs/acre

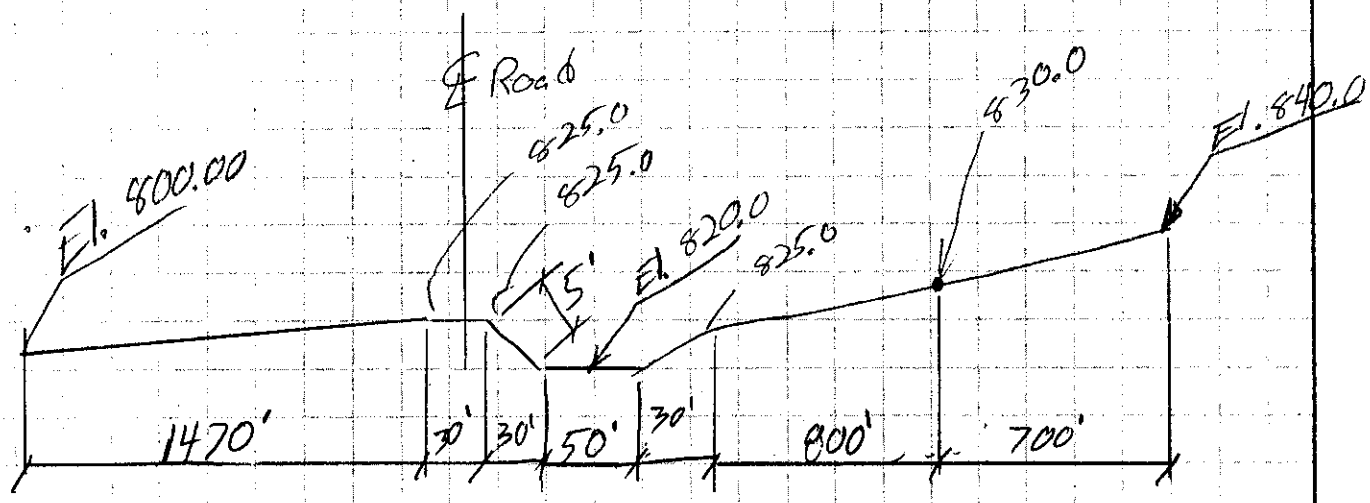
ROUTING REACH: 6R1
SUBBASIN NUMBER: 6.1



HEC-1 REACH PARAMETERS:

RLNTH (Length) = 5280 feet
SEL (Slope) = 0.010 foot/foot
ANL, ANCH, ANR ('n' value) = 0.05
PERCRT (Percolation Rate) = 10 cfs/acre

ROUTING REACH: 6R2
SUBBASIN NUMBER: 6.2



HEC-1 REACH PARAMETERS:

RLNTH (Length) = 5280 feet
SEL (Slope) = 0.0023 foot/foot
ANL, ANCH, ANR ('n' value) = 0.05
PERCRT (Percolation Rate) = 10 cfs/acre

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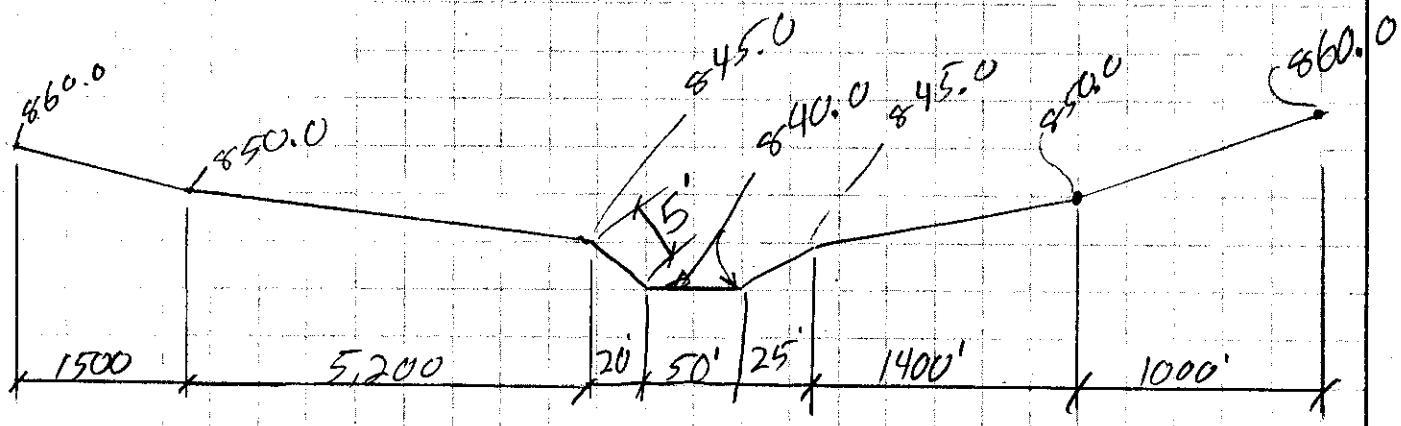
ROUTING REACH: 6R3
SUBBASIN NUMBER: 6.3



HEC-1 REACH PARAMETERS:

RLNTH (Length) =	2700	feet
SEL (Slope) =	0.0148	foot/foot
ANL, ANCH, ANR ('n' value) =	0.05	
PERCRT (Percolation Rate) =	10	cfs/acre

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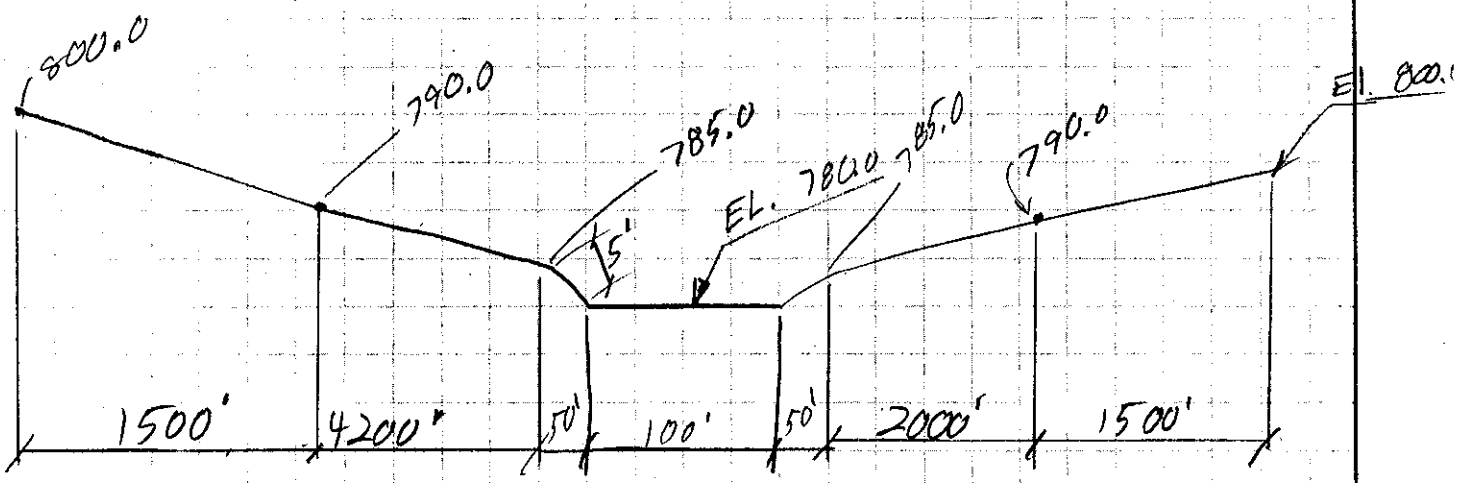
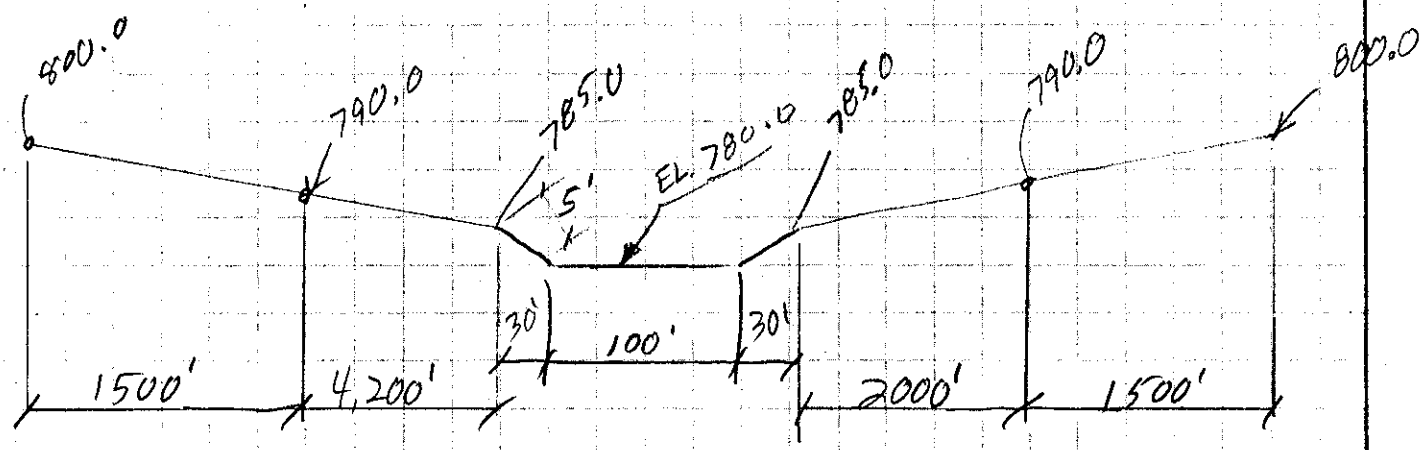
ROUTING REACH: 6 R 4
SUBBASIN NUMBER: 6.4



HEC-1 REACH PARAMETERS:

RLNTH (Length) =	6537	feet
SEL (Slope) =	0.0115	foot/foot
ANL, ANCH, ANR ('n' value) =	0.05	
PERCRT (Percolation Rate) =	10	cfs/acre

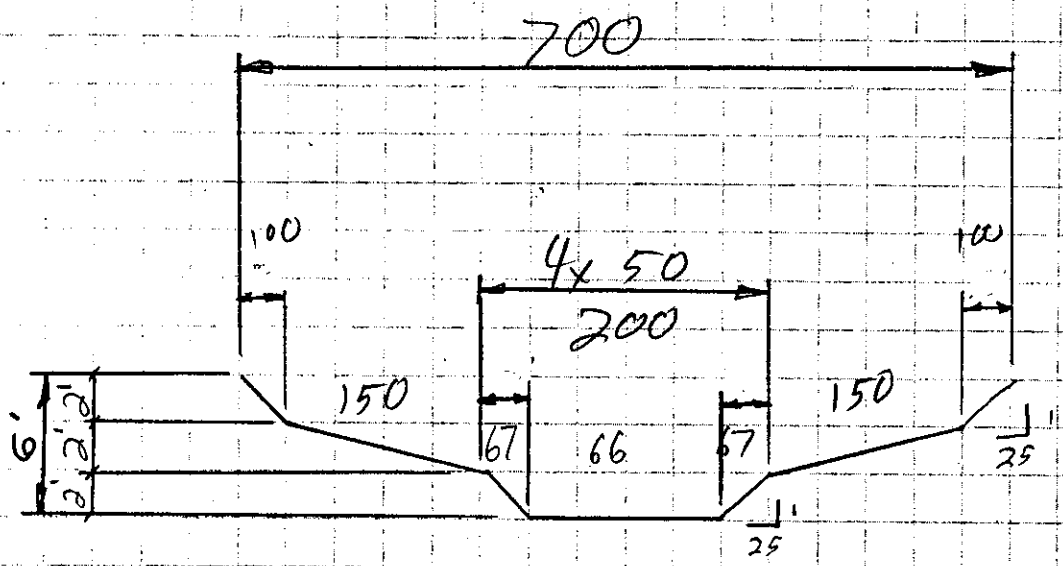
ROUTING REACH: 6R5
SUBBASIN NUMBER: 6.5



HEC-1 REACH PARAMETERS:

RLNTH (Length) =	4022	feet
SEL (Slope) =	0.0099	foot/foot
ANL, ANCH, ANR ('n' value) =	0.05	
PERCRT (Percolation Rate) =	10	cfs/acre

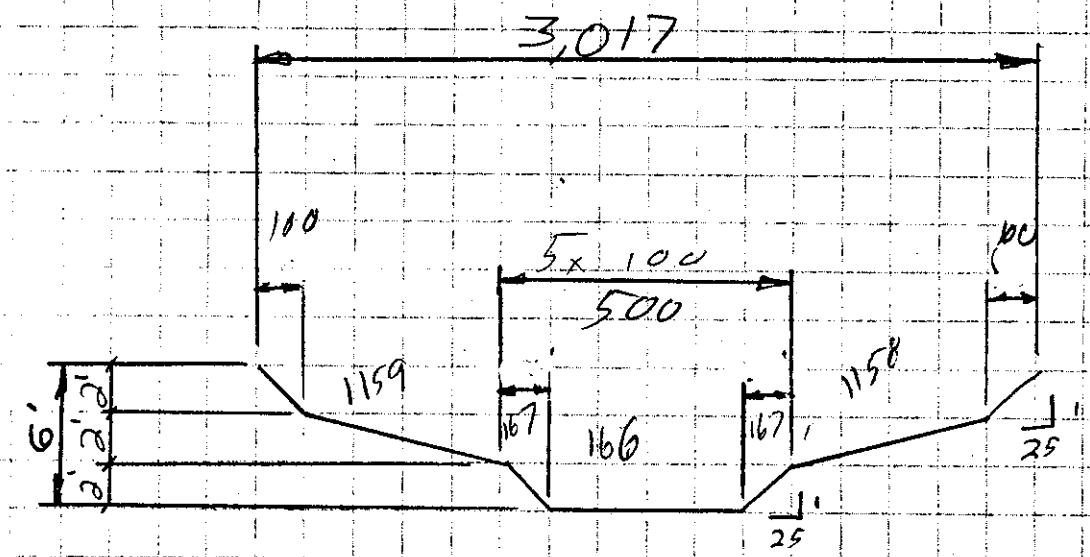
ROUTING REACH: 6R6
SUBBASIN NUMBER: 6.6



HEC-1 REACH PARAMETERS:

RLNTH (Length) = 9051 feet
SEL (Slope) = 0.0122 foot/foot
ANL, ANCH, ANR ('n' value) = 0.05
PERCRT (Percolation Rate) = 10 cfs/acre

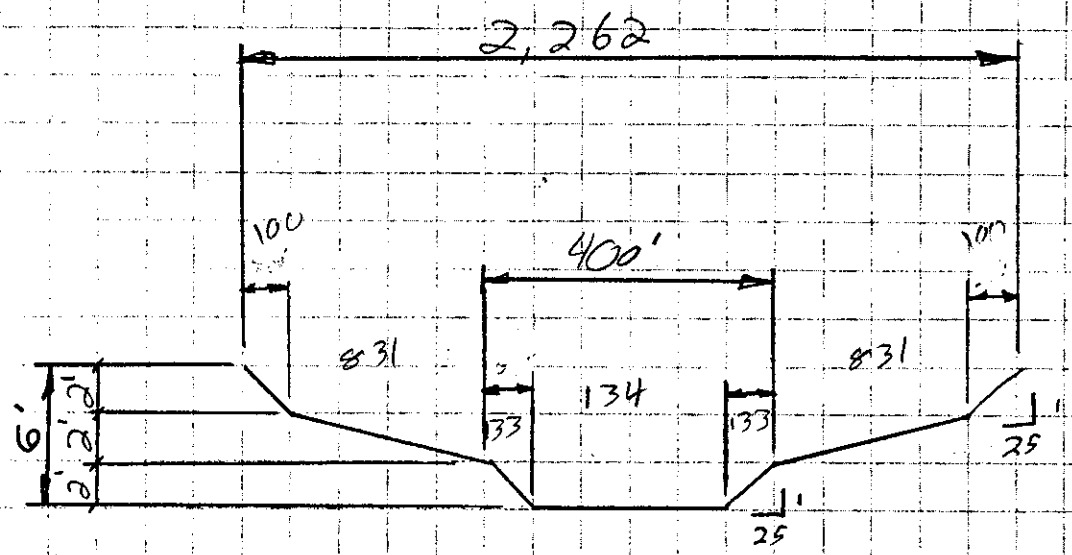
ROUTING REACH: 7R1
SUBBASIN NUMBER: 7.1



HEC-1 REACH PARAMETERS:

RLNTH (Length) =	5531	feet
SEL (Slope) =	0.0108	foot/foot
ANL, ANCH, ANR ('n' value) =	0.05	
PERCRT (Percolation Rate) =	1	cfs/acre

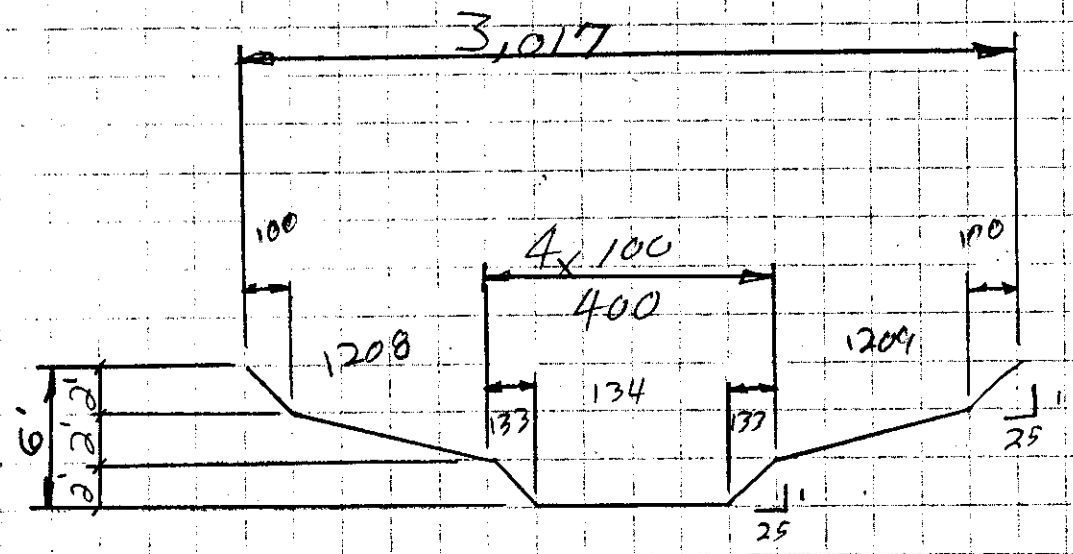
ROUTING REACH: TR2
SUBBASIN NUMBER: T.2



HEC-1 REACH PARAMETERS:

RLNTH (Length) =	6034	feet
SEL (Slope) =	0.0066	foot/foot
ANL, ANCH, ANR ('n' value) =	0.05	
PERCRT (Percolation Rate) =	1	cfs/acre

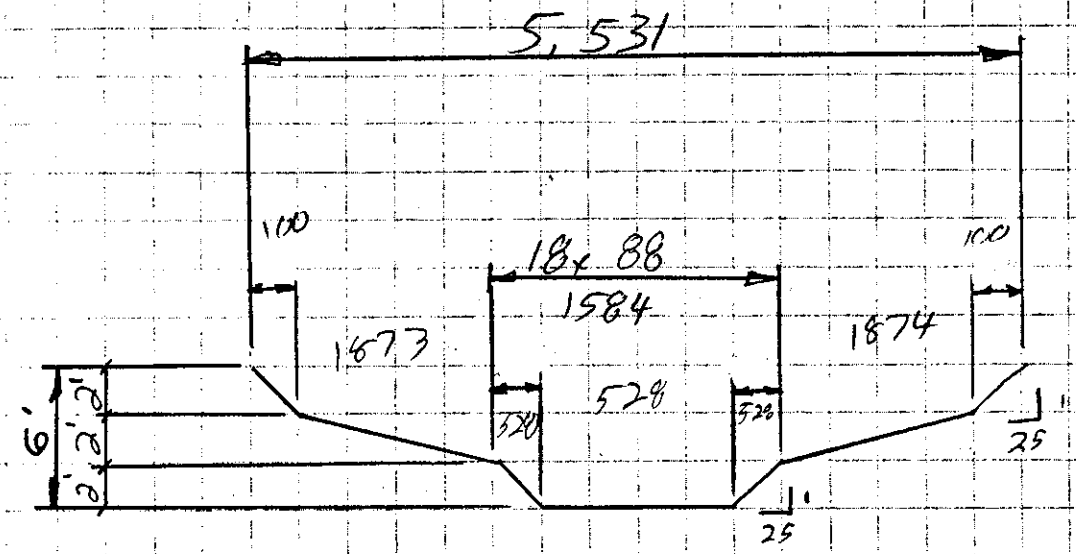
ROUTING REACH: 7R3
SUBBASIN NUMBER: 7.3



HEC-1 REACH PARAMETERS:

RLNTH (Length) = 6537 feet
SEL (Slope) = 0.0153 foot/foot
ANL, ANCH, ANR ('n' value) = 0.05
PERCRT (Percolation Rate) = 1 cfs/acre

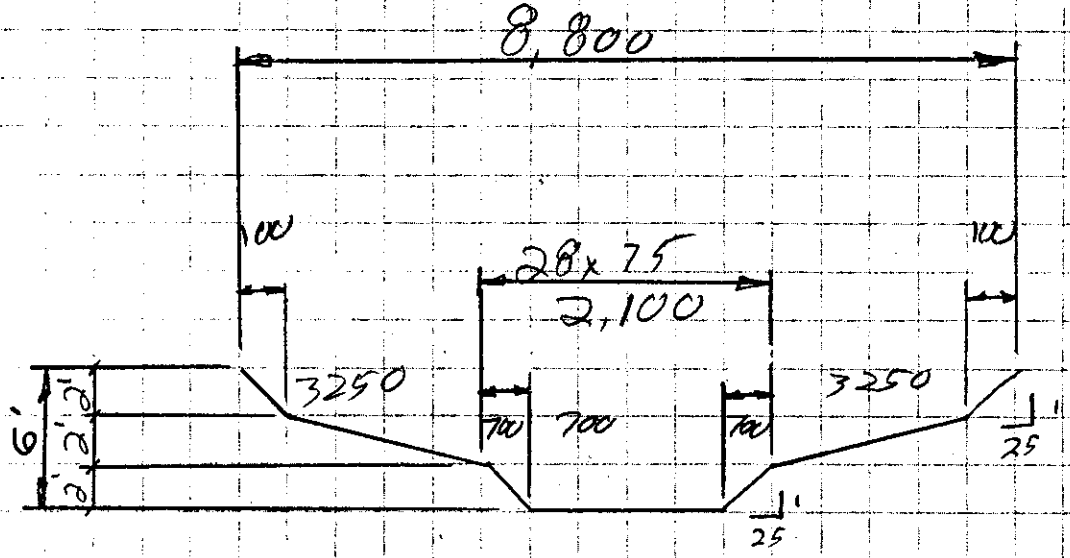
ROUTING REACH: TR4
SUBBASIN NUMBER: 7.4



HEC-1 REACH PARAMETERS:

RLNTH (Length) =	17600	feet
SEL (Slope) =	0.0153	foot/foot
ANL, ANCH, ANR ('n' value) =	0.05	
PERCRT (Percolation Rate) =	1	cfs/acre

ROUTING REACH: TR5
SUBBASIN NUMBER: 7.5



HEC-1 REACH PARAMETERS:

RLNTH (Length) = 5280 feet
SEL (Slope) = 0.0133 foot/foot
ANL, ANCH, ANR ('n' value) = 0.05
PERCRT (Percolation Rate) = 1 cfs/acre

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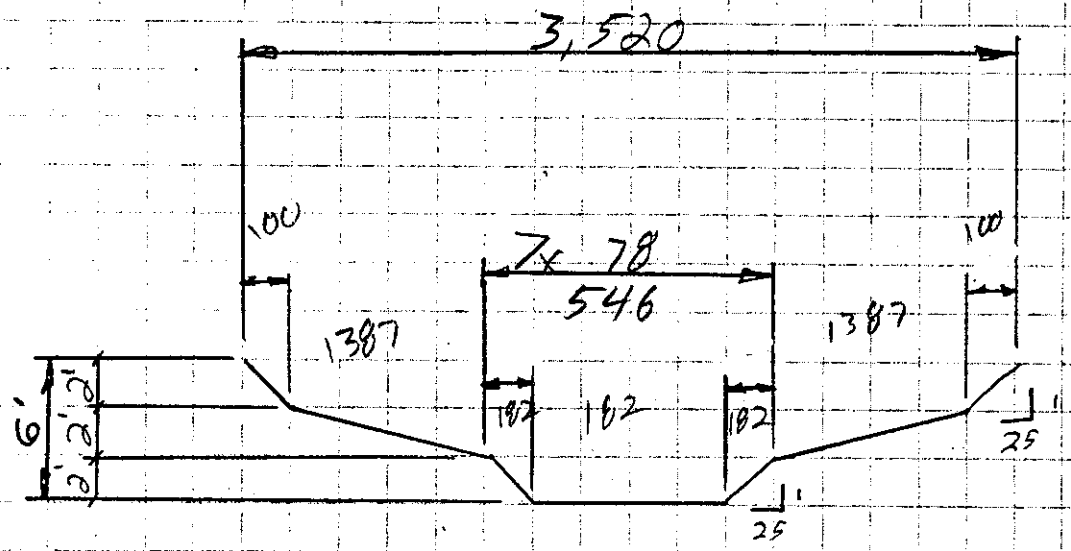
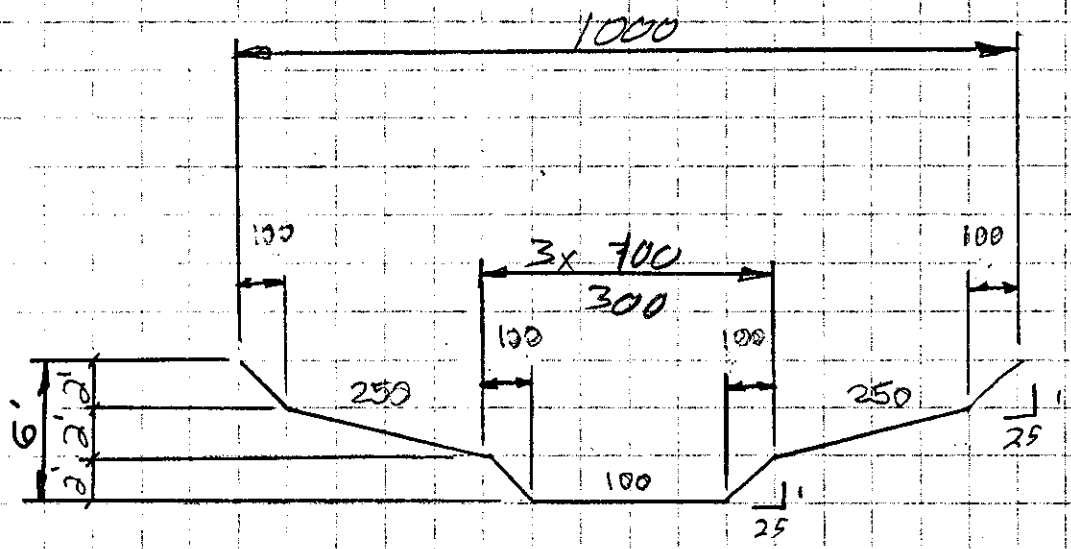
ROUTING REACH: TR6
SUBBASIN NUMBER: 7.6



HEC-1 REACH PARAMETERS:

RLNTH (Length) =	6034	feet
SEL (Slope) =	0.0149	foot/foot
ANL, ANCH, ANR ('n' value) =	0.05	
PERCRT (Percolation Rate) =	1	cfs/acre

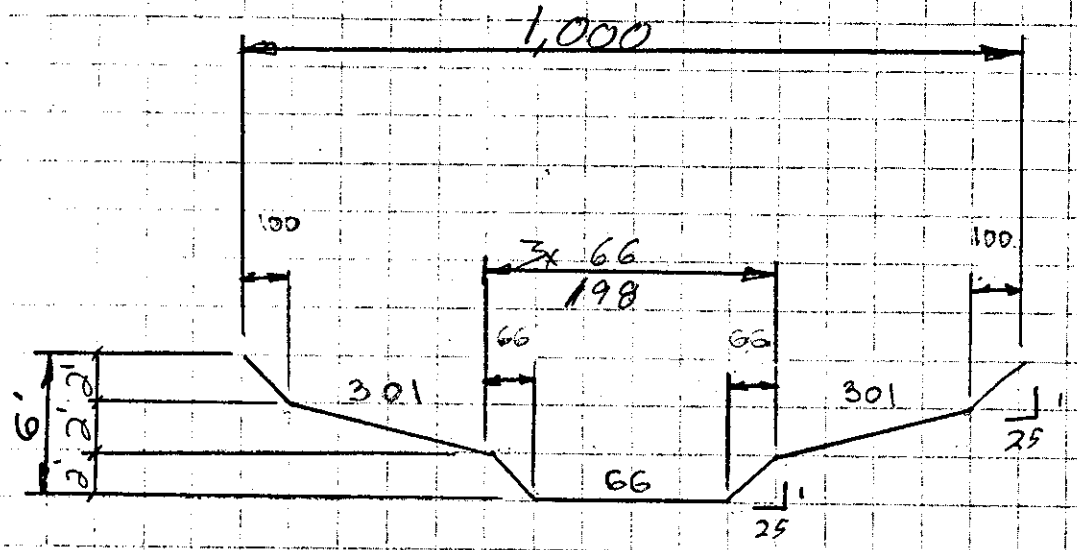
ROUTING REACH: 8R1
SUBBASIN NUMBER: 8.1



HEC-1 REACH PARAMETERS:

RLNTH (Length) = 4247 feet
SEL (Slope) = 0.0269 foot/foot
ANL, ANCH, ANR ('n' value) = 0.05
PERCRT (Percolation Rate) = 10 cfs/acre

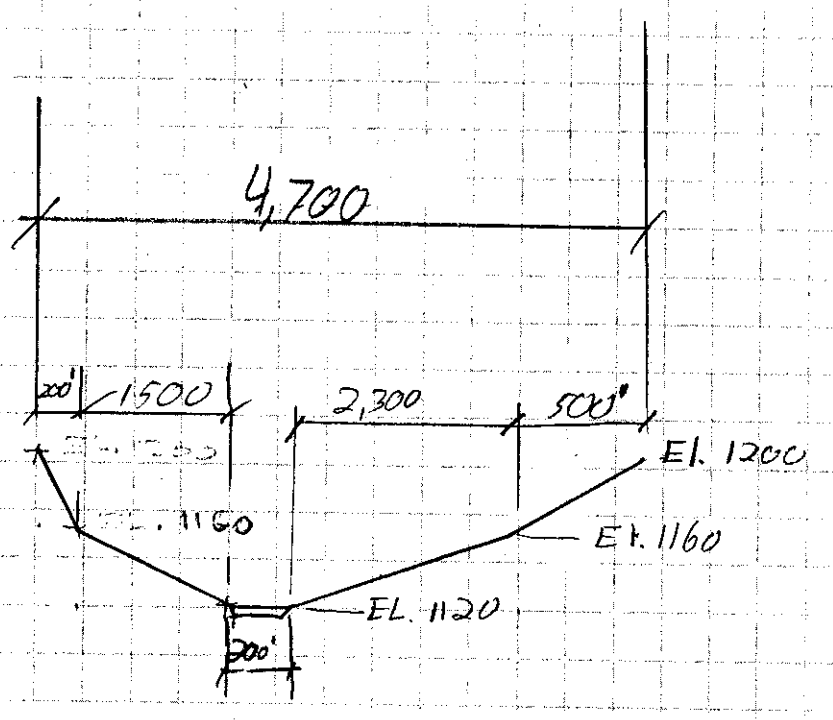
ROUTING REACH: 8R2
SUBBASIN NUMBER: 8.2



HEC-1 REACH PARAMETERS:

RLNTH (Length) = 4274 feet
SEL (Slope) = 0.0246 foot/foot
ANL, ANCH, ANR ('n' value) = 0.05
PERCRT (Percolation Rate) = 10 cfs/acre

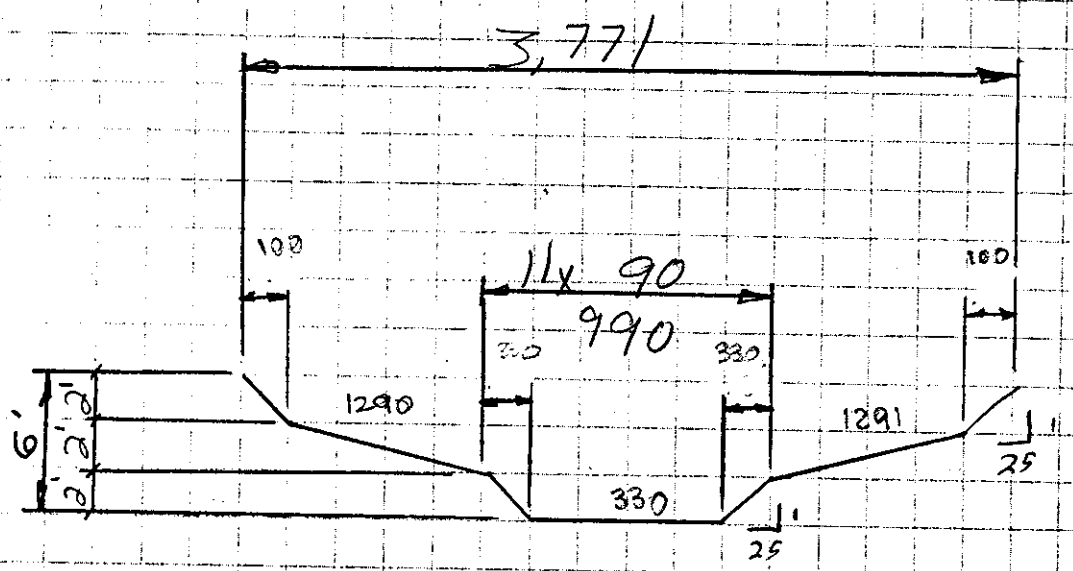
ROUTING REACH: 8R3
SUBBASIN NUMBER: 8.3



HEC-1 REACH PARAMETERS:

RLNTH (Length) =	10308	feet
SEL (Slope) =	0.0116	foot/foot
ANL, ANCH, ANR ('n' value) =	0.05	
PERCRT (Percolation Rate) =	10	cfs/acre

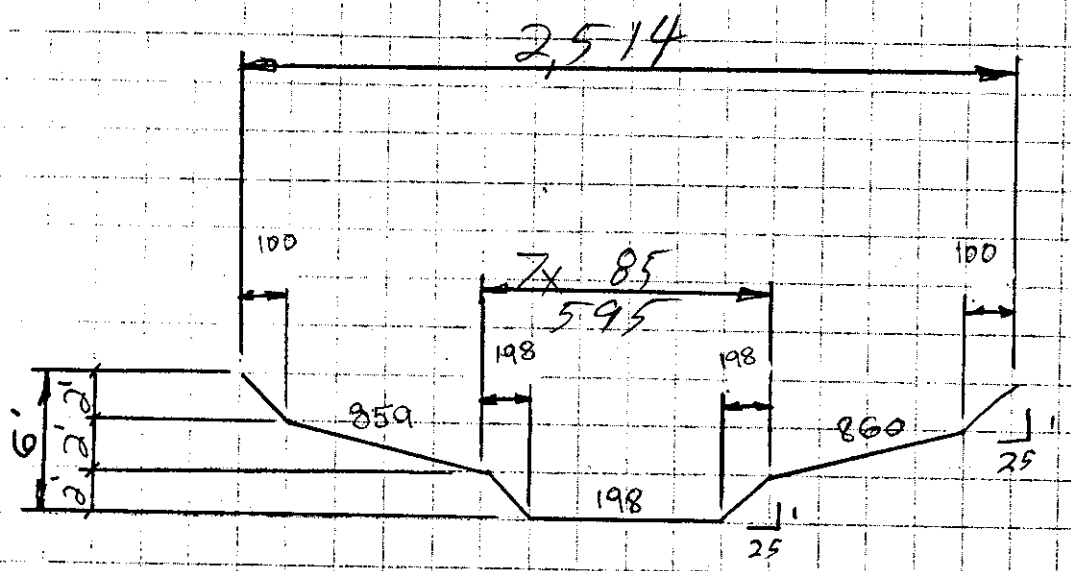
ROUTING REACH: 8R4
SUBBASIN NUMBER: 8.3



HEC-1 REACH PARAMETERS:

RLNTH (Length) = 7040 feet
SEL (Slope) = 0.0114 foot/foot
ANL, ANCH, ANR ('n' value) = 0.05
PERCRT (Percolation Rate) = 10 cfs/acre

ROUTING REACH: 8R5
SUBBASIN NUMBER: 8.4



HEC-1 REACH PARAMETERS:

RLNTH (Length) =	2765	feet
SEL (Slope) =	0.0145	foot/foot
ANL, ANCH, ANR ('n' value) =	0.05	
PERCRT (Percolation Rate) =	10	cfs/acre

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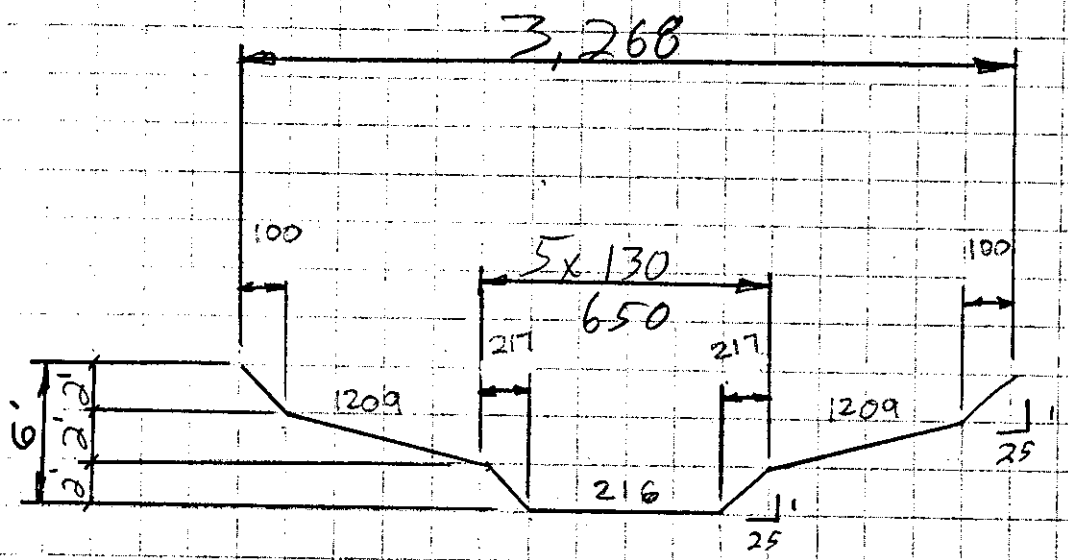
ROUTING REACH: 8R6
SUBBASIN NUMBER: 8.5



HEC-1 REACH PARAMETERS:

RLNTH (Length) =	8045	feet
SEL (Slope) =	0.0099	foot/foot
ANL, ANCH, ANR ('n' value) =	0.05	
PERCRT (Percolation Rate) =	10	cfs/acre

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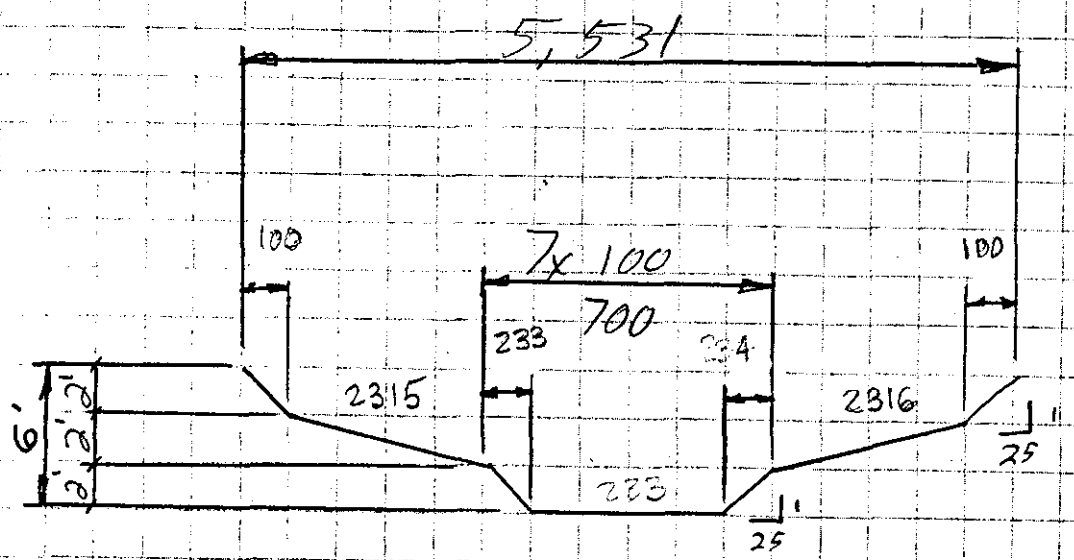
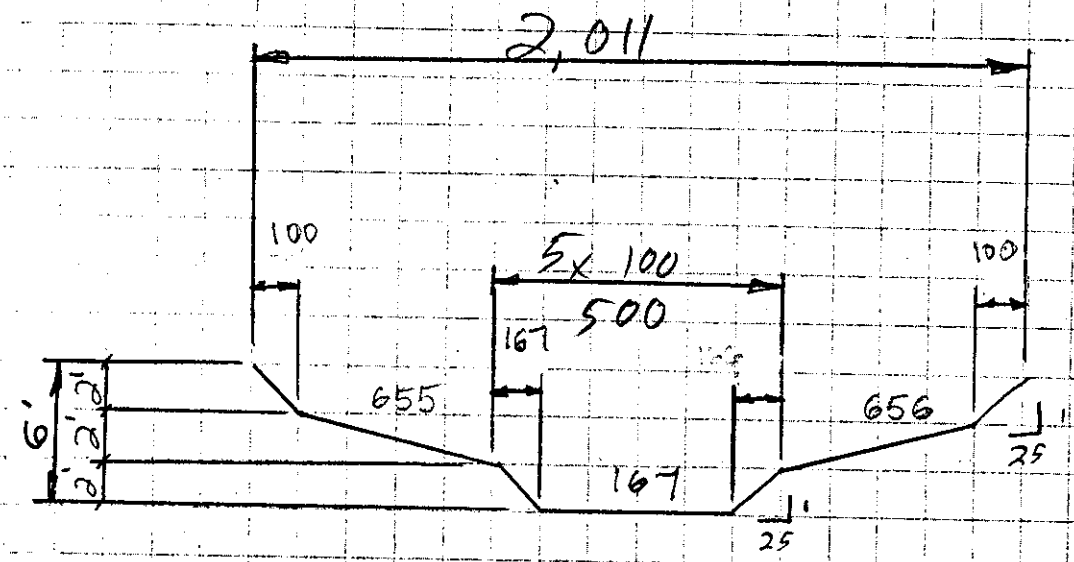
ROUTING REACH: 8R7
SUBBASIN NUMBER: 8.6



HEC-1 REACH PARAMETERS:

RLNTH (Length) =	6034	feet
SEL (Slope) =	0.0133	foot/foot
ANL, ANCH, ANR ('n' value) =	0.05	
PERCRT (Percolation Rate) =	10	cfs/acre

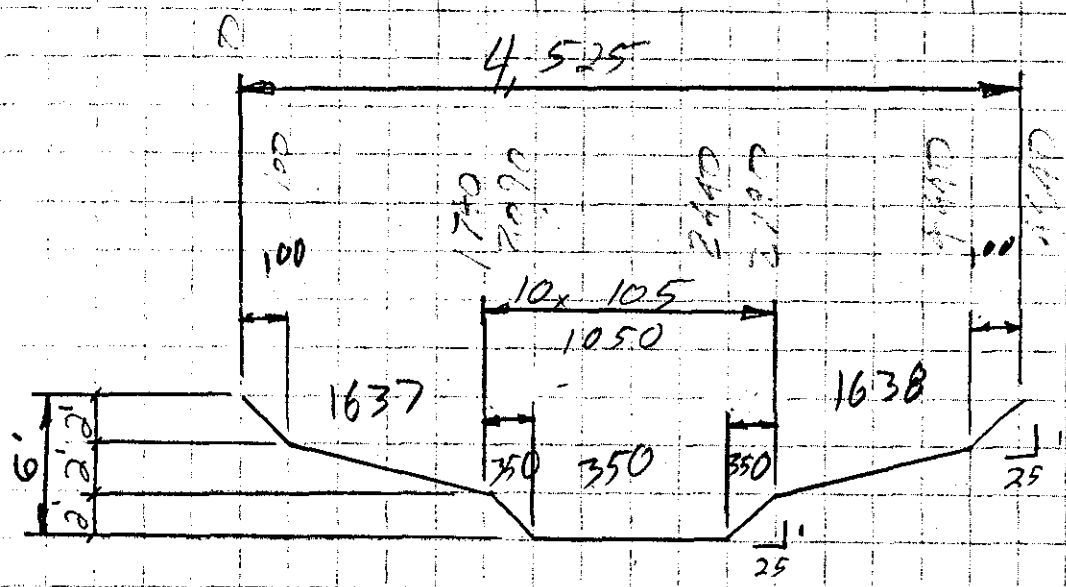
ROUTING REACH: 8R8
SUBBASIN NUMBER: 8.7



HEC-1 REACH PARAMETERS:

RLNTH (Length) =	4274	feet
SEL (Slope) =	0.0112	foot/foot
ANL, ANCH, ANR ('n' value) =	0.05	
PERCRT (Percolation Rate) =	10	cfs/acre

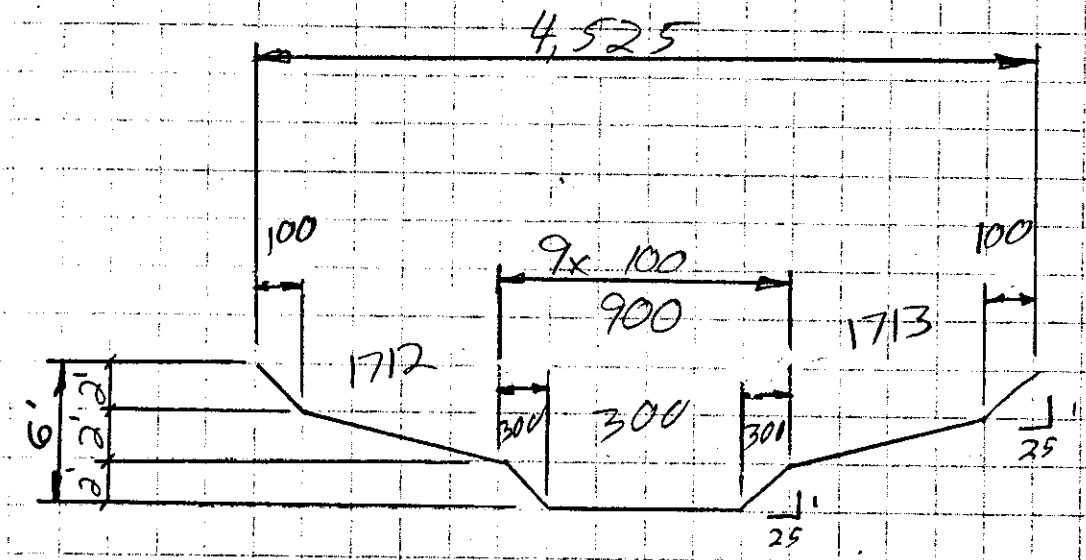
ROUTING REACH: 9R1
SUBBASIN NUMBER: 9.1



HEC-1 REACH PARAMETERS:

RLNTH (Length) =	6285	feet
SEL (Slope) =	0.0127	foot/foot
ANL, ANCH, ANR ('n' value) =	0.05	
PERCRT (Percolation Rate) =	5	cfs/acre

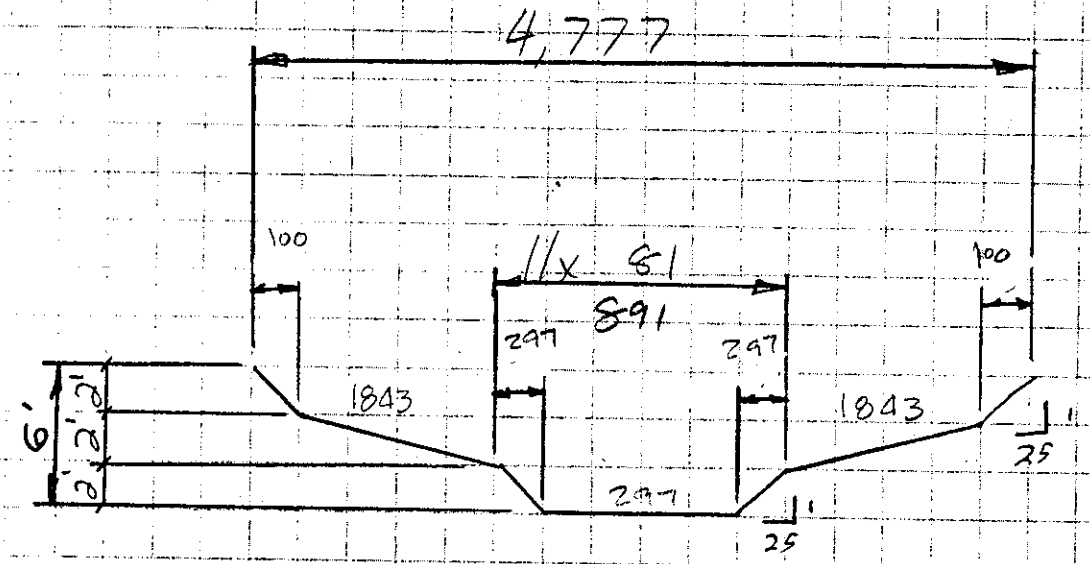
ROUTING REACH: 9R2
SUBBASIN NUMBER: 9.1



HEC-1 REACH PARAMETERS:

RLNTH (Length) = 5030 feet
SEL (Slope) = 0.0119 foot/foot
ANL, ANCH, ANR ('n' value) = 0.05
PERCRT (Percolation Rate) = 5 cfs/acre

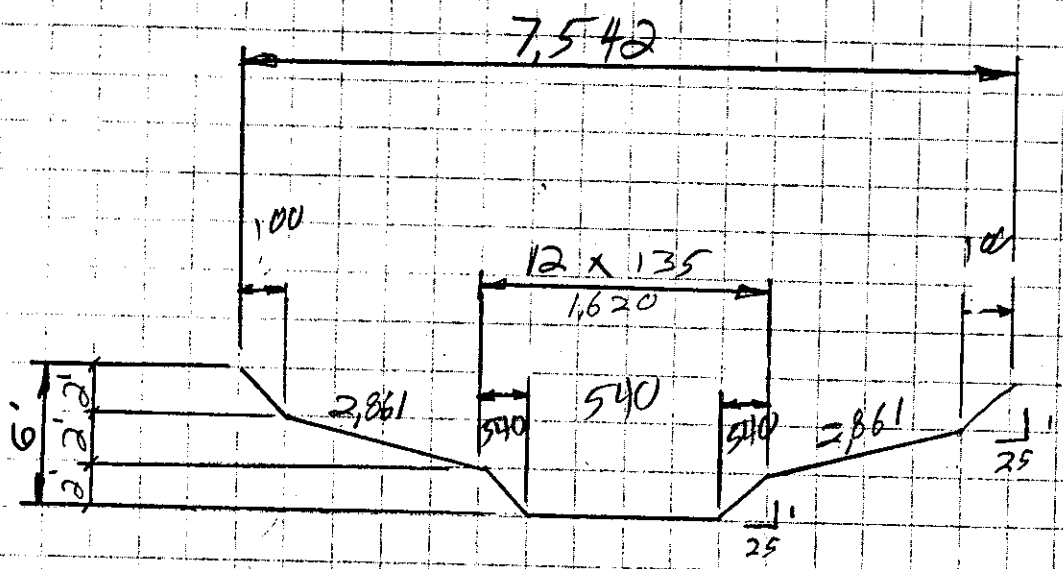
ROUTING REACH: 10R1
SUBBASIN NUMBER: 10.2



HEC-1 REACH PARAMETERS:

RLNTH (Length) =	8548	feet
SEL (Slope) =	0.0099	foot/foot
ANL, ANCH, ANR ('n' value) =	0.05	
PERCRT (Percolation Rate) =	10	cfs/acre

ROUTING REACH: 11R1
SUBBASIN NUMBER: 11.1



HEC-1 REACH PARAMETERS:

RLNTH (Length) = 23 885 feet
SEL (Slope) = 0.0155 foot/foot
ANL, ANCH, ANR ('n' value) = 0.05
PERCRT (Percolation Rate) = 5 cfs/acre

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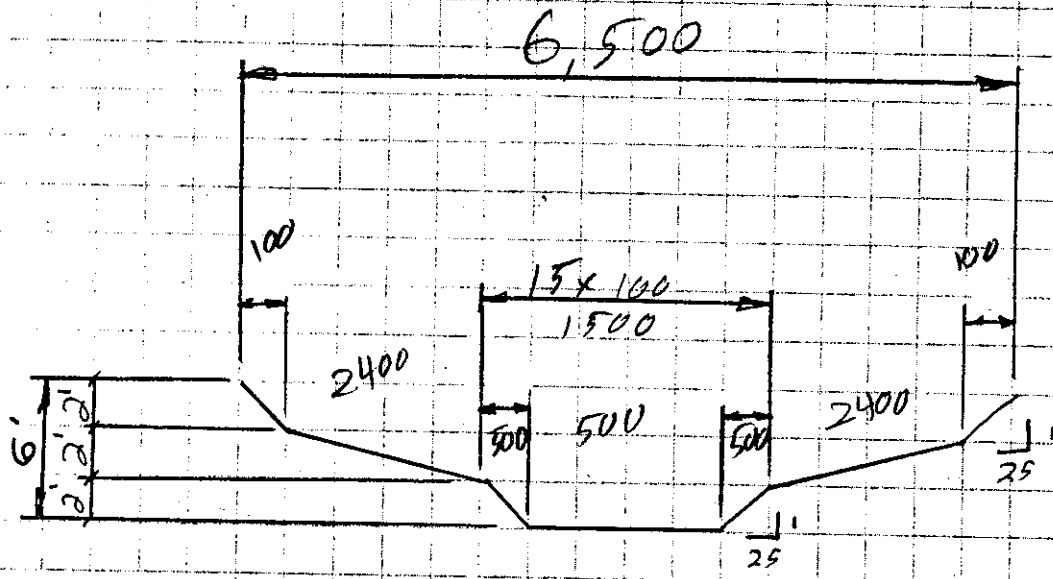
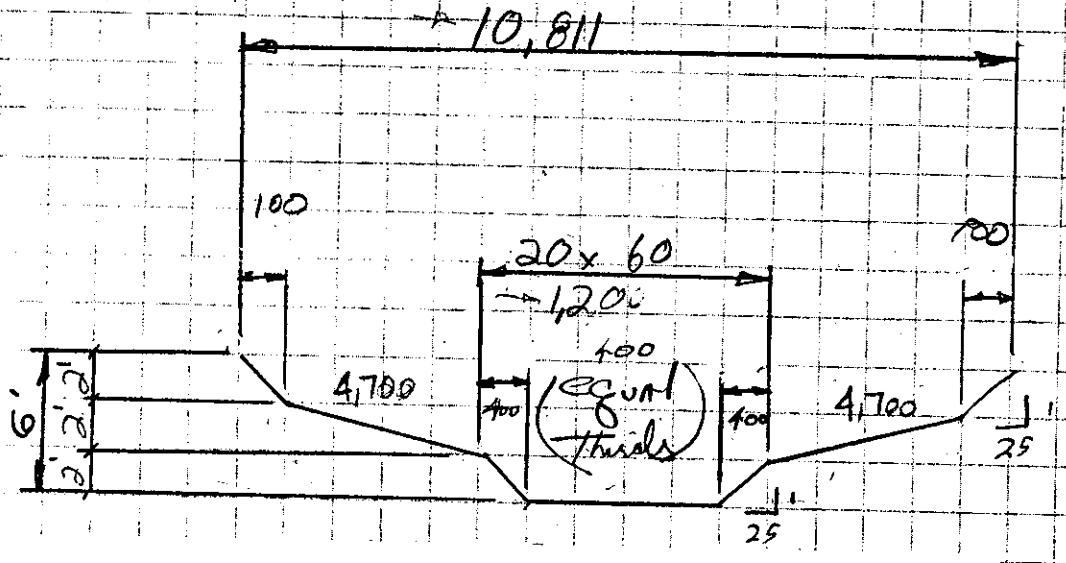
ROUTING REACH: 11R2
SUBBASIN NUMBER: 11.2



HEC-1 REACH PARAMETERS:

RLNTH (Length) =	2300	feet
SEL (Slope) =	0.0130	foot/foot
ANL, ANCH, ANR ('n' value) =	0.05	
PERCRT (Percolation Rate) =	5	cfs/acre

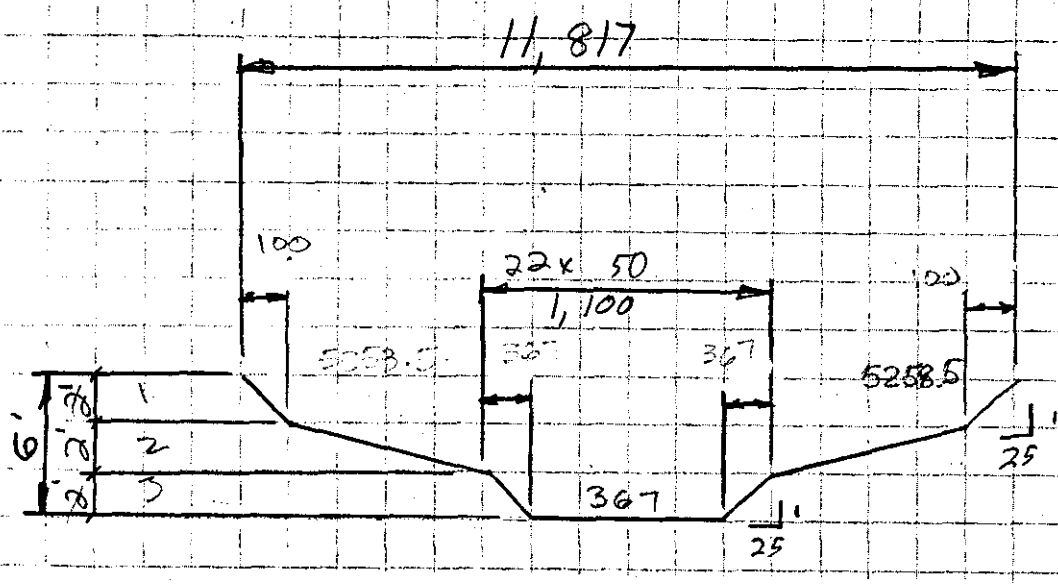
ROUTING REACH: 12 R1
SUBBASIN NUMBER: 12.1



HEC-1 REACH PARAMETERS:

RLNTH (Length) = 13577 feet
SEL (Slope) = 0.0198 foot/foot
ANL, ANCH, ANR ('n' value) = 0.05
PERCRT (Percolation Rate) = 5 cfs/acre

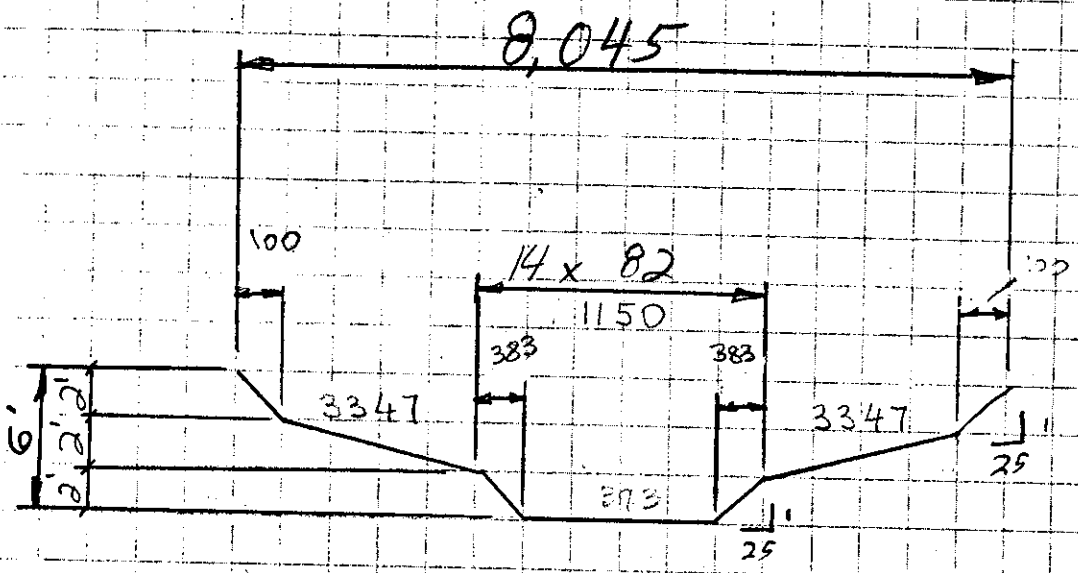
ROUTING REACH: 12R2A
SUBBASIN NUMBER: 12.2



HEC-1 REACH PARAMETERS:

RLNTH (Length) = 8548 feet
SEL (Slope) = 0.0294 foot/foot
ANL, ANCH, ANR ('n' value) = 0.05
PERCRT (Percolation Rate) = 5 cfs/acre

ROUTING REACH: 12R2B
SUBBASIN NUMBER: 12.2



HEC-1 REACH PARAMETERS:

RLNTH (Length) =	20366	feet
SEL (Slope) =	0.0133	foot/foot
ANL, ANCH, ANR ('n' value) =	0.05	
PERCRT (Percolation Rate) =	5	cfs/acre

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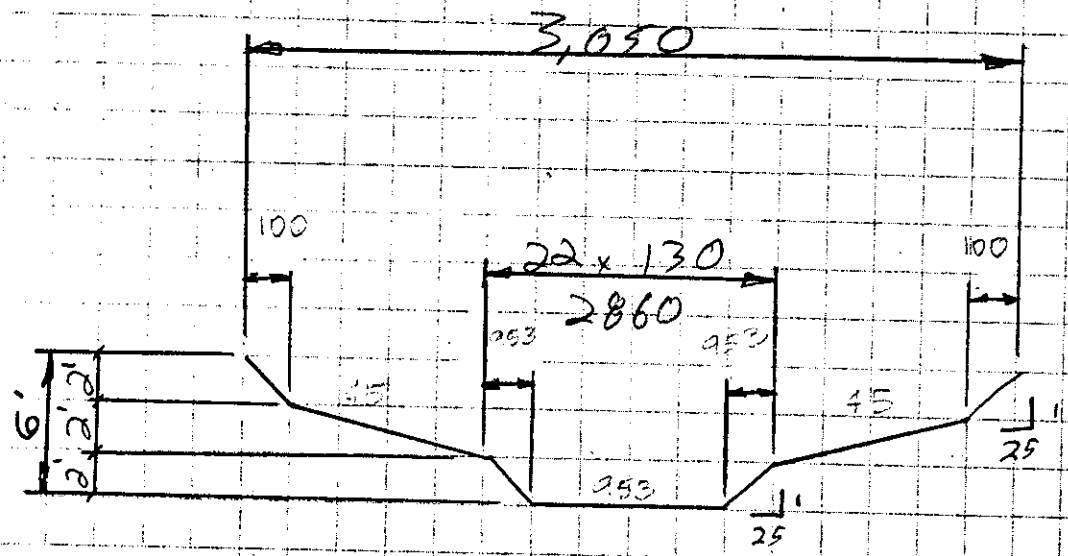
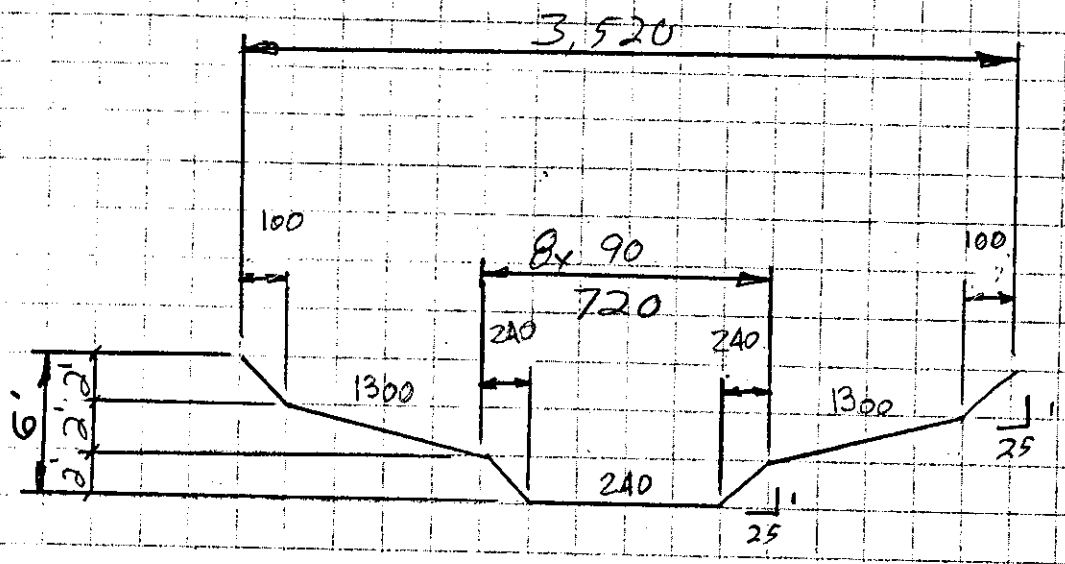
ROUTING REACH: 12R3
SUBBASIN NUMBER: 12.3



HEC-1 REACH PARAMETERS:

RLNTH (Length) = 2600 feet
SEL (Slope) = 0.010 foot/foot
ANL, ANCH, ANR ('n' value) = 0.05
PERCRT (Percolation Rate) = 5 cfs/acre

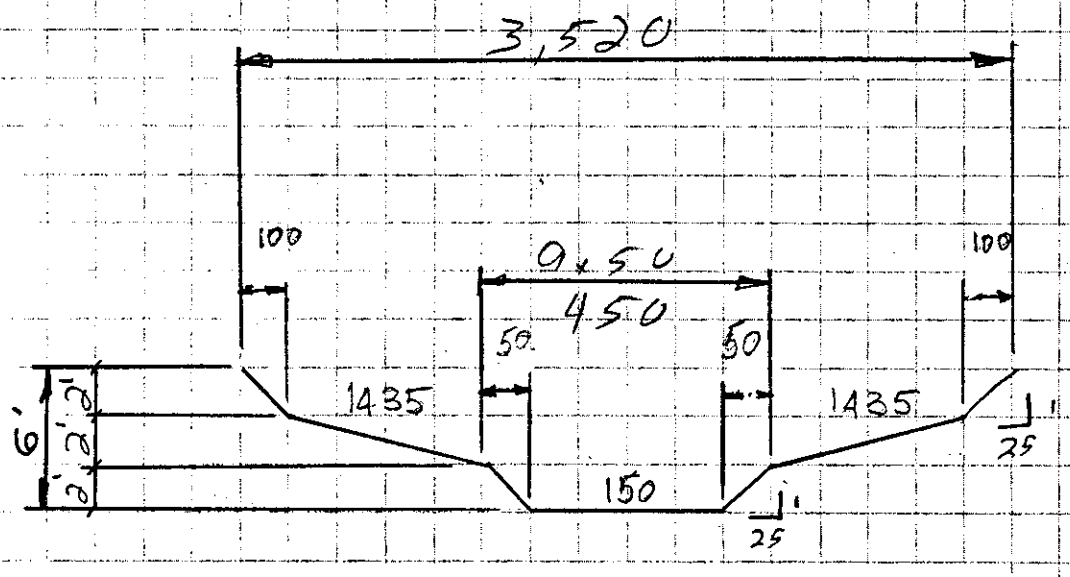
ROUTING REACH: 13R1
SUBBASIN NUMBER: 13.1



HEC-1 REACH PARAMETERS:

RLNTH (Length) =	19108	feet
SEL (Slope) =	0.011	foot/foot
ANL, ANCH, ANR ('n' value) =	0.05	
PERCRT (Percolation Rate) =	1	cfs/acre

ROUTING REACH: 13R2
SUBBASIN NUMBER: 13.2



HEC-1 REACH PARAMETERS:

RLNTH (Length) = 11314 feet
SEL (Slope) = 0.0106 foot/foot
ANL, ANCH, ANR ('n' value) = 0.05
PERCRT (Percolation Rate) = 1 cfs/acre

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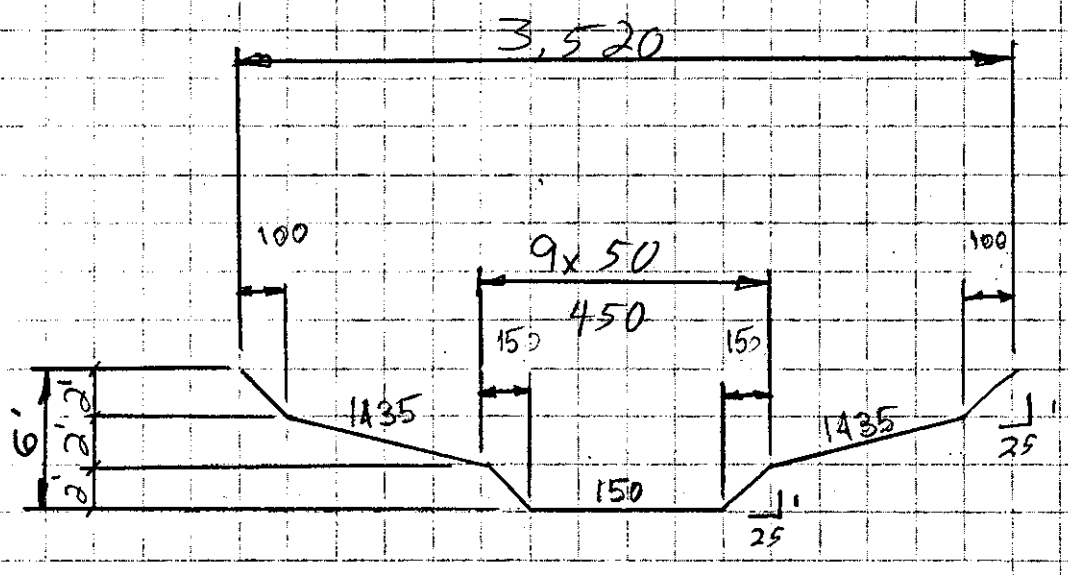
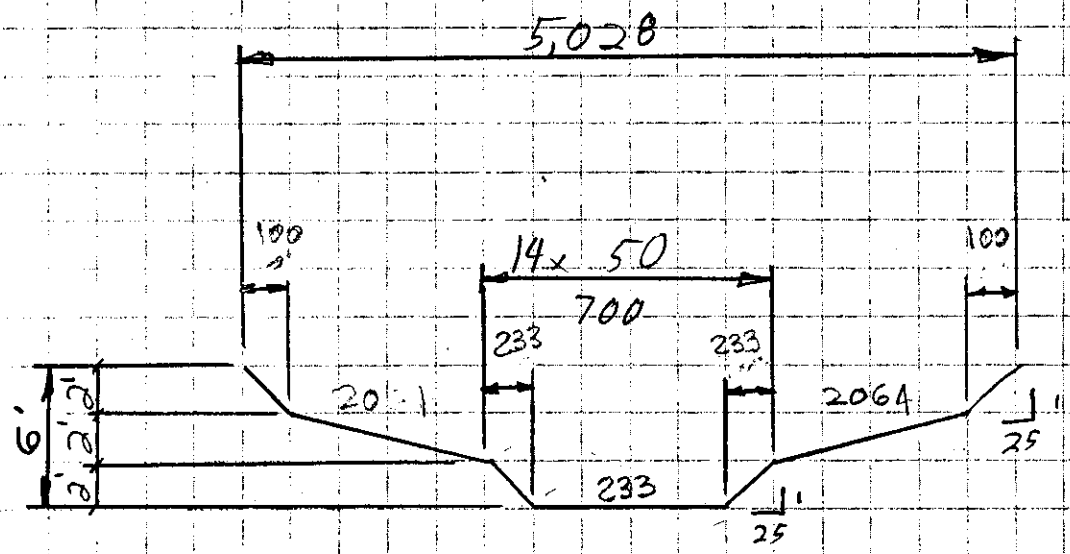
ROUTING REACH: 13R3
SUBBASIN NUMBER: 13.3



HEC-1 REACH PARAMETERS:

RLNTH (Length) =	15085	feet
SEL (Slope) =	0.0113	foot/foot
ANL, ANCH, ANR ('n' value) =	0.05	
PERCRT (Percolation Rate) =	1	cfs/acre

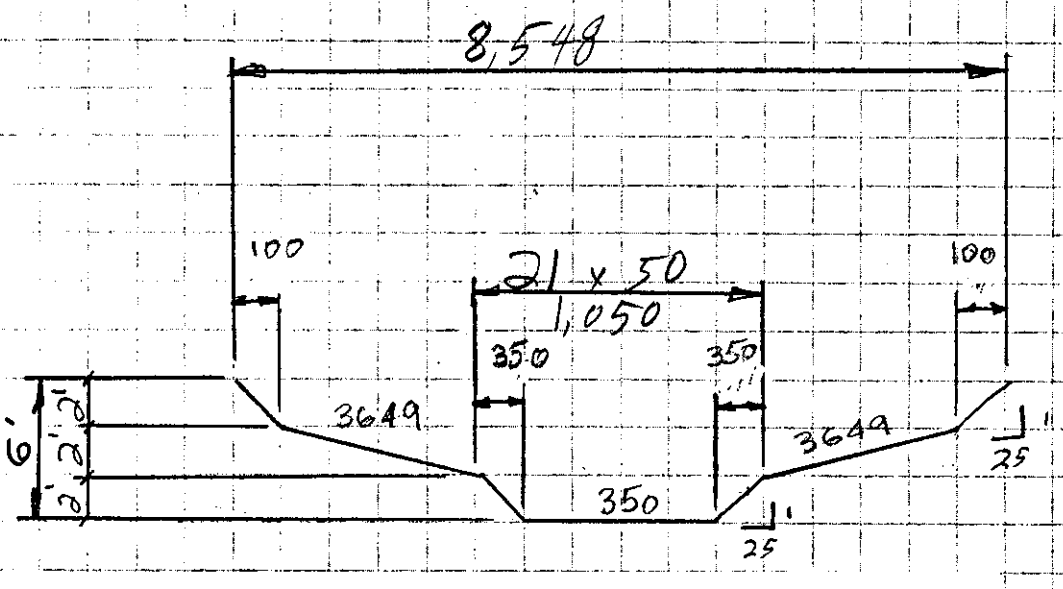
ROUTING REACH: 13R4
SUBBASIN NUMBER: 13.4



HEC-1 REACH PARAMETERS:

RLNTH (Length) = 24640 feet
SEL (Slope) = 0.0187 foot/foot
ANL, ANCH, ANR ('n' value) = 0.05
PERCRT (Percolation Rate) = 1 cfs/acre

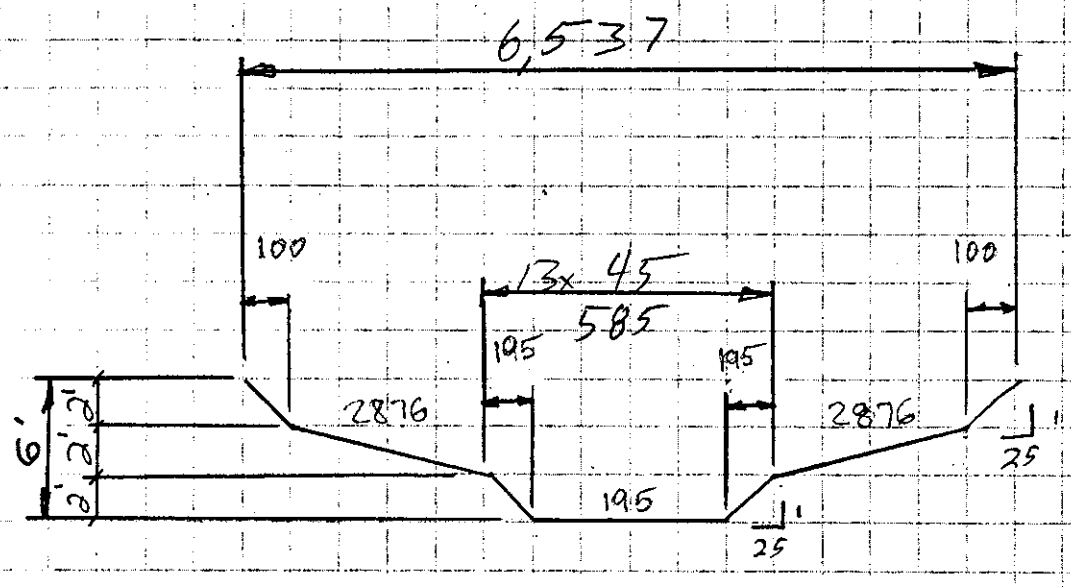
ROUTING REACH: 13R5A
SUBBASIN NUMBER: 13.5



HEC-1 REACH PARAMETERS:

RLNTH (Length) =	18857	feet
SEL (Slope) =	0.0117	foot/foot
ANL, ANCH, ANR ('n' value) =	0.05	
PERCRT (Percolation Rate) =	1	cfs/acre

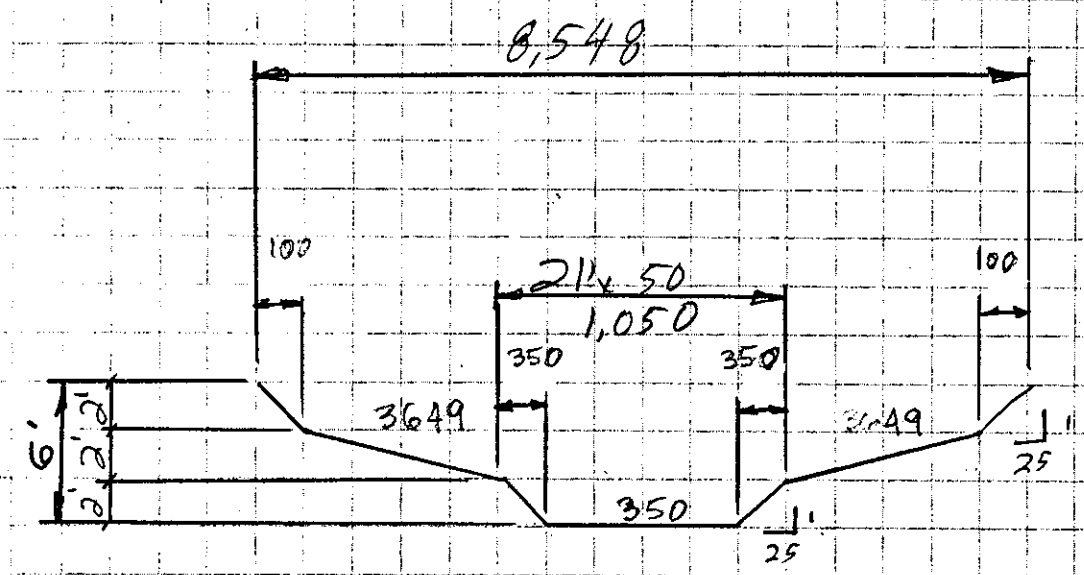
ROUTING REACH: 13R5B
SUBBASIN NUMBER: 13.5



HEC-1 REACH PARAMETERS:

RLNTH (Length) = 14582 feet
SEL (Slope) = 0.0110 foot/foot
ANL, ANCH, ANR ('n' value) = 0.05
PERCRT (Percolation Rate) = 1 cfs/acre

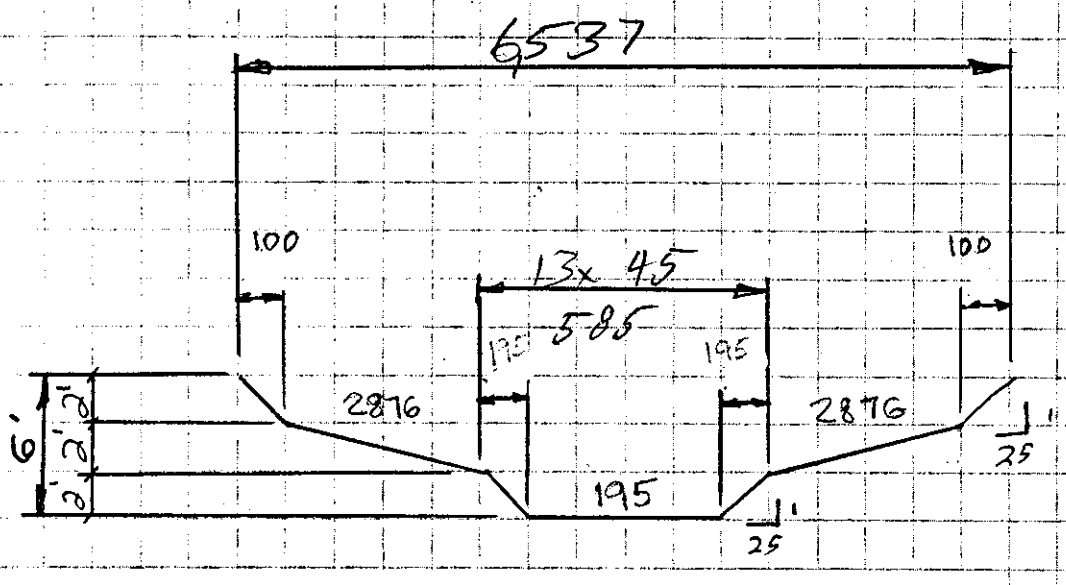
ROUTING REACH: 13R6A
SUBBASIN NUMBER: 13.6



HEC-1 REACH PARAMETERS:

RLNTH (Length) =	22628	feet
SEL (Slope) =	0.0124	foot/foot
ANL, ANCH, ANR ('n' value) =	0.05	
PERCRT (Percolation Rate) =	1	cfs/acre

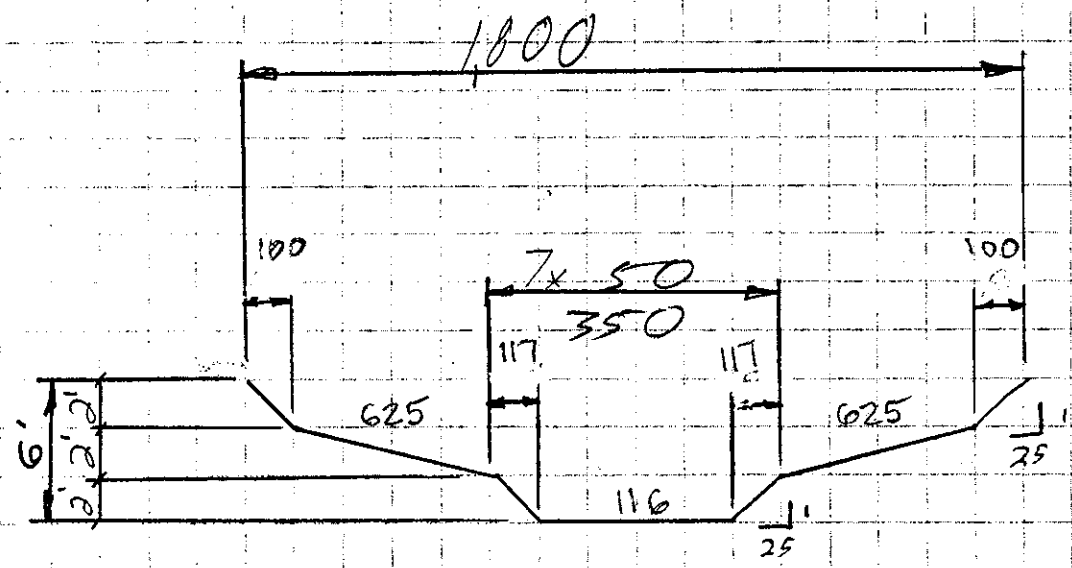
ROUTING REACH: 13R6B
SUBBASIN NUMBER: 13.6



HEC-1 REACH PARAMETERS:

RLNTH (Length) = 14080 feet
SEL (Slope) = 0.011 foot/foot
ANL, ANCH, ANR ('n' value) = 0.05
PERCRT (Percolation Rate) = 1 cfs/acre

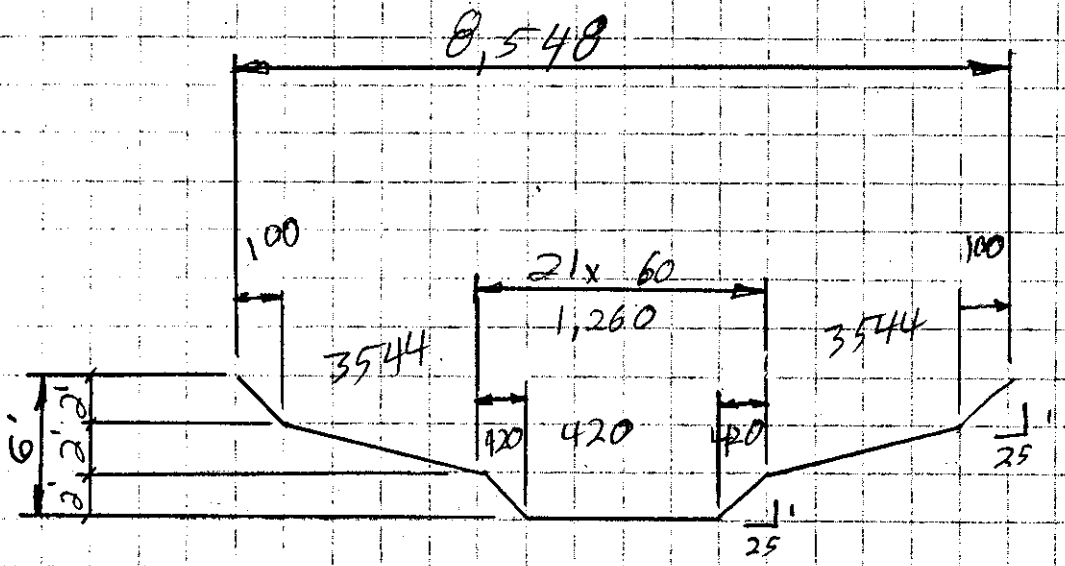
ROUTING REACH: 13R7
SUBBASIN NUMBER: 13.7



HEC-1 REACH PARAMETERS:

RLNTH (Length) =	2200	feet
SEL (Slope) =	0.0055	foot/foot
ANL, ANCH, ANR ('n' value) =	0.05	
PERCRT (Percolation Rate) =	1	cfs/acre

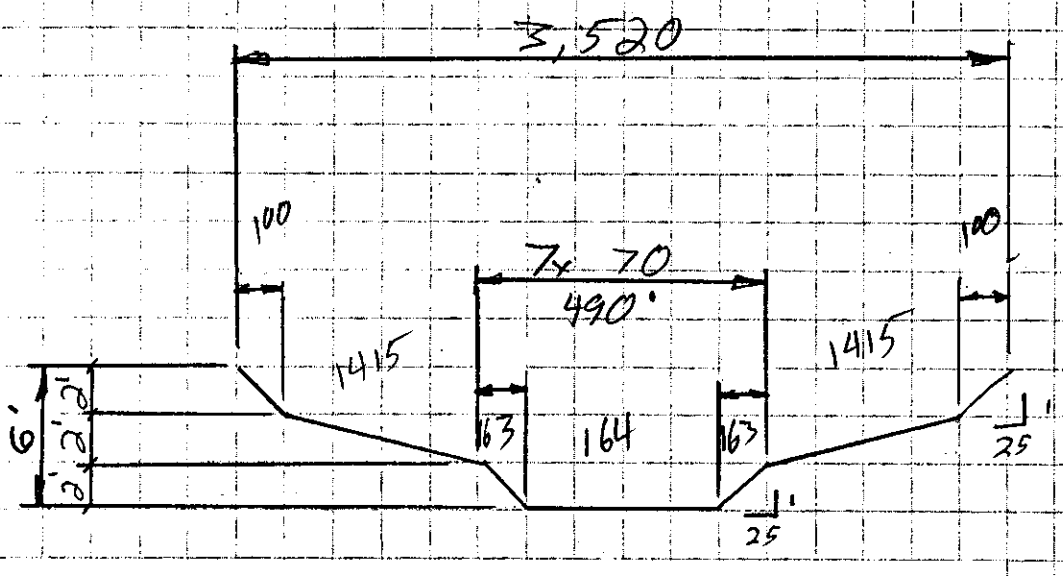
ROUTING REACH: 14R1A
SUBBASIN NUMBER: 14.1



HEC-1 REACH PARAMETERS:

RLNTH (Length) = 9051 feet
SEL (Slope) = 0.0088 foot/foot
ANL, ANCH, ANR ('n' value) = 0.05
PERCRT (Percolation Rate) = 5 cfs/acre

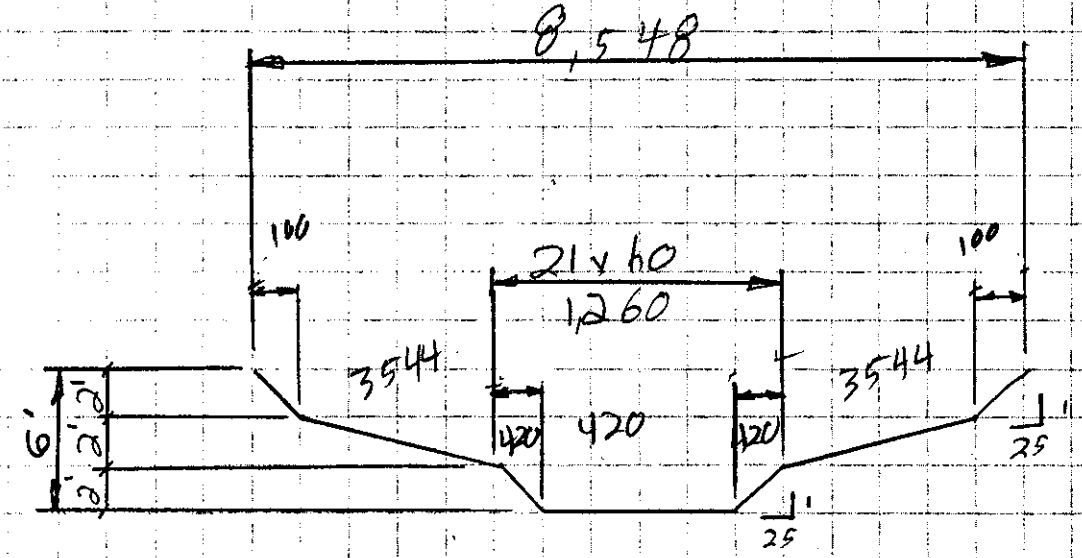
ROUTING REACH: 14R1B
SUBBASIN NUMBER: 14.1



HEC-1 REACH PARAMETERS:

RLNTH (Length) =	16342	feet
SEL (Slope) =	0.0098	foot/foot
ANL, ANCH, ANR ('n' value) =	0.05	
PERCRT (Percolation Rate) =	5	cfs/acre

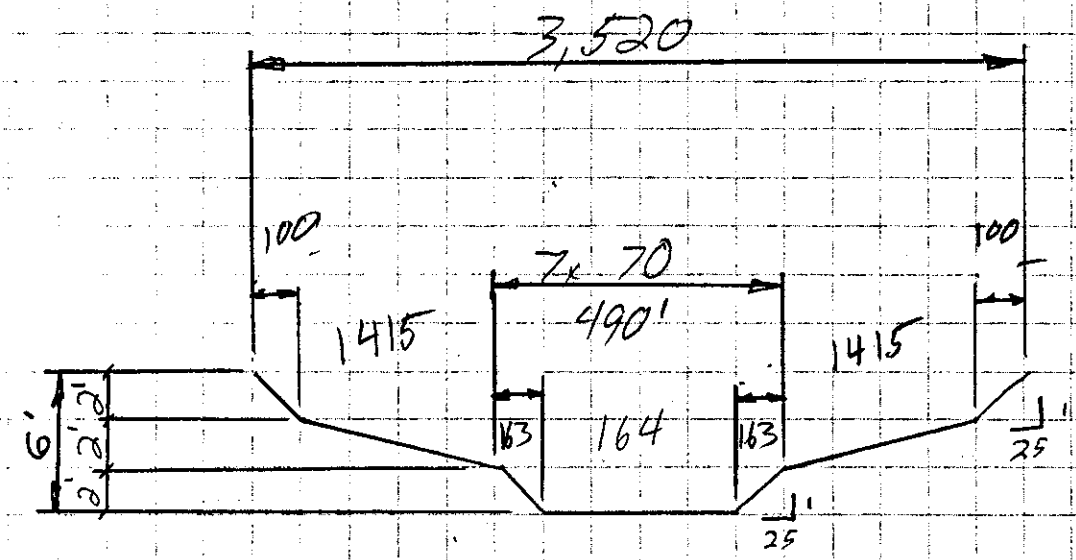
ROUTING REACH: 14R2A
SUBBASIN NUMBER: 14.2



HEC-1 REACH PARAMETERS:

RLNTH (Length) = 17850 feet
SEL (Slope) = 0.0112 foot/foot
ANL, ANCH, ANR ('n' value) = 0.05
PERCRT (Percolation Rate) = 5 cfs/acre

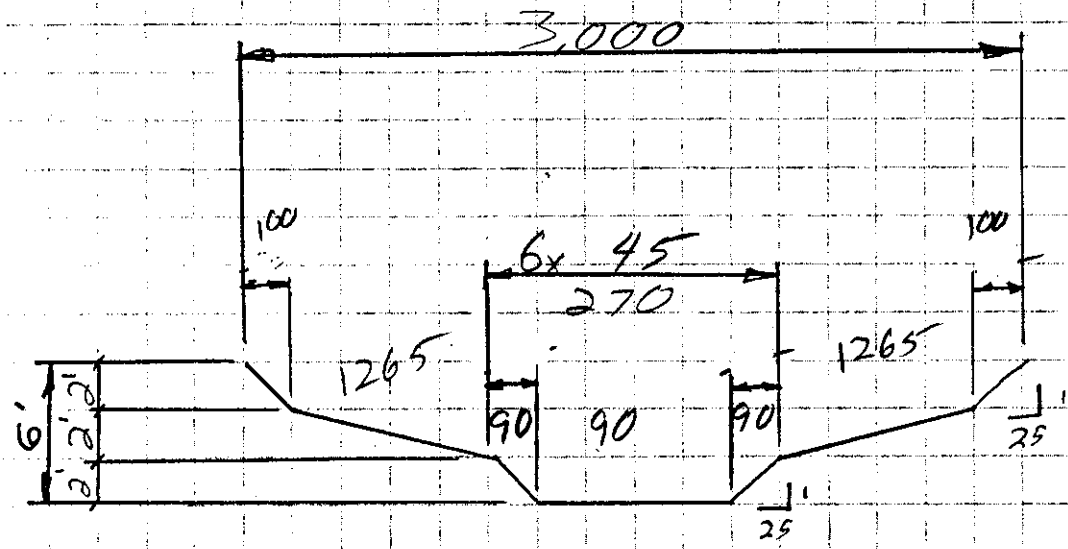
ROUTING REACH: 14R2B
SUBBASIN NUMBER: 14.2



HEC-1 REACH PARAMETERS:

RLNTH (Length) =	17600	feet
SEL (Slope) =	0.0099	foot/foot
ANL, ANCH, ANR ('n' value) =	0.05	
PERCRT (Percolation Rate) =	5	cfs/acre

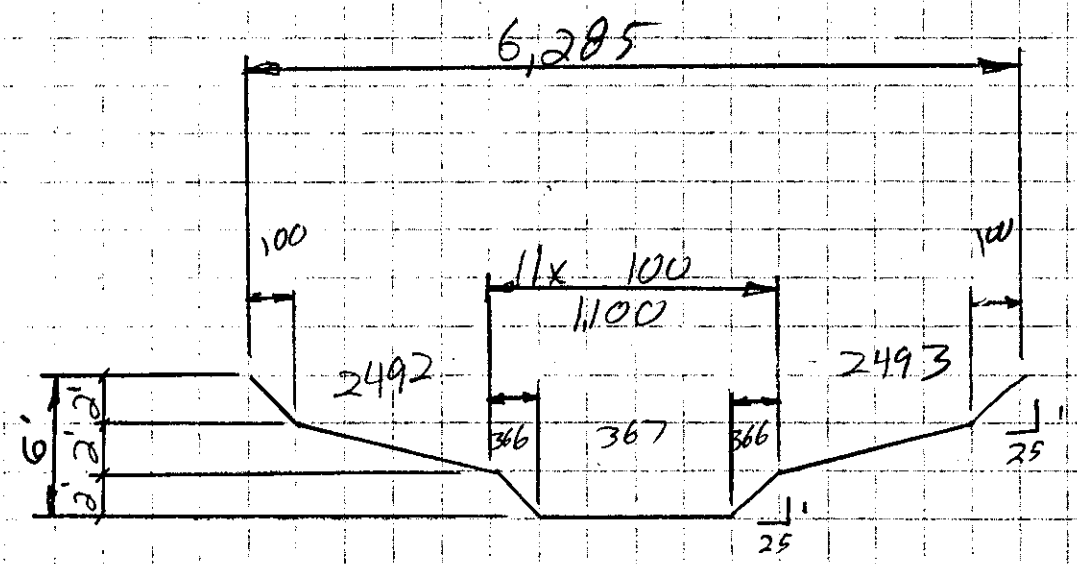
ROUTING REACH: 14 R 3
SUBBASIN NUMBER: 14.3



HEC-1 REACH PARAMETERS:

RLNTH (Length) = 2200 feet
SEL (Slope) = 0.01 foot/foot
ANL, ANCH, ANR ('n' value) = 0.05
PERCRT (Percolation Rate) = 5 cfs/acre

ROUTING REACH: 15R1
SUBBASIN NUMBER: 15.2



HEC-1 REACH PARAMETERS:

RLNTH (Length) =	27657	feet
SEL (Slope) =	0.0101	foot/foot
ANL, ANCH, ANR ('n' value) =	0.05	
PERCRT (Percolation Rate) =	1	cfs/acre

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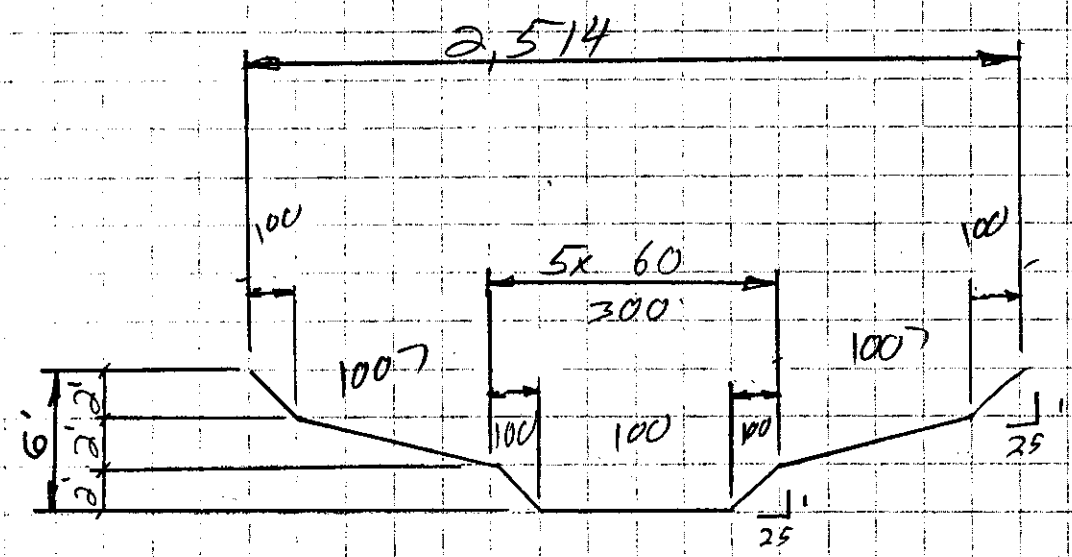
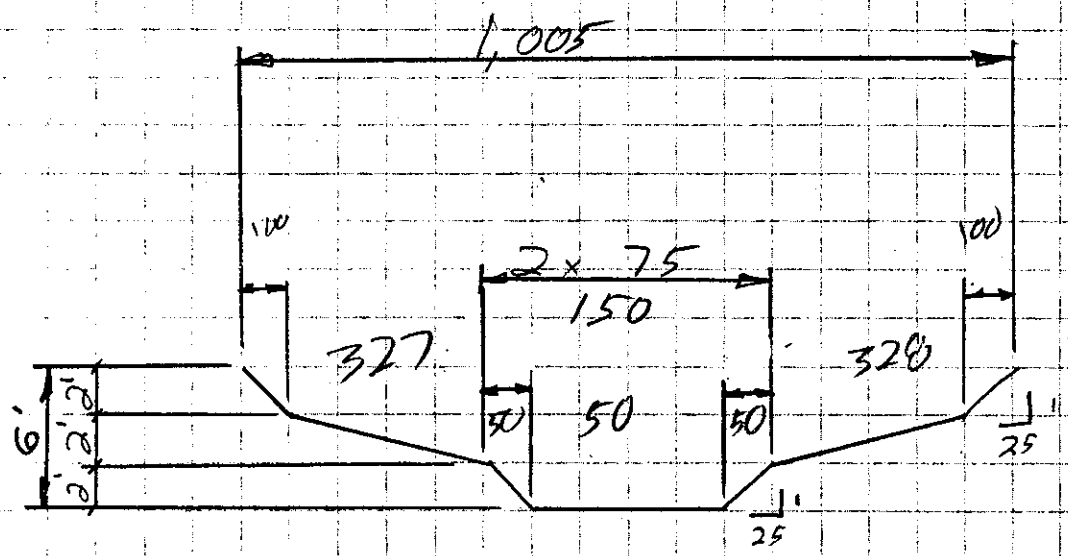
ROUTING REACH: 15R2A
SUBBASIN NUMBER: 15.3



HEC-1 REACH PARAMETERS:

RLNTH (Length) =	6537	feet
SEL (Slope) =	0.0092	foot/foot
ANL, ANCH, ANR ('n' value) =	0.05	
PERCRT (Percolation Rate) =	1	cfs/acre

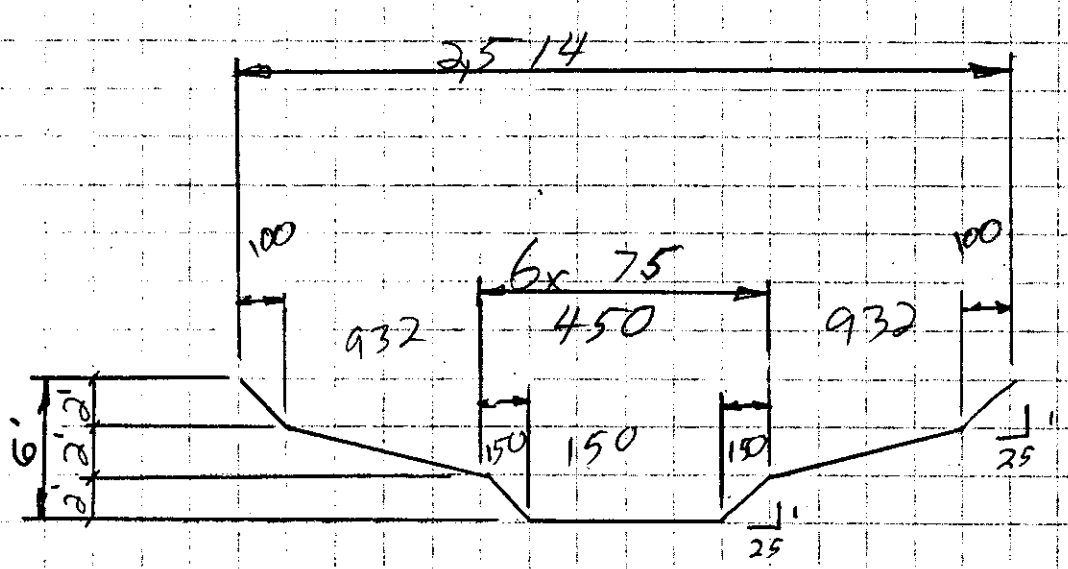
ROUTING REACH: 15R23
SUBBASIN NUMBER: 15.3



HEC-1 REACH PARAMETERS:

RLNTH (Length) =	8548	feet
SEL (Slope) =	0.0094	foot/foot
ANL, ANCH, ANR ('n' value) =	0.05	
PERCRT (Percolation Rate) =	1	cfs/acre

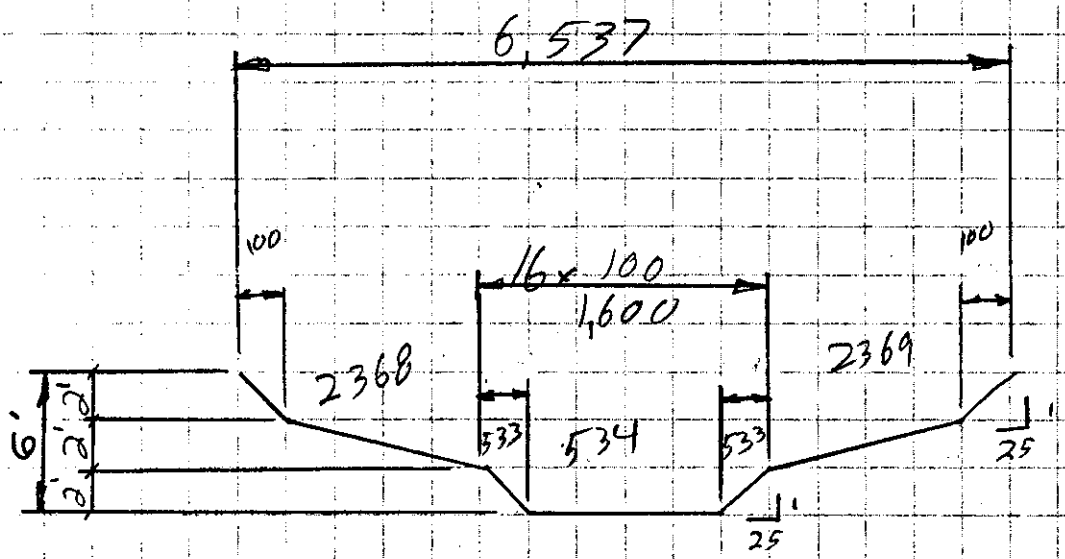
ROUTING REACH: 15 R 3
SUBBASIN NUMBER: 15.4



HEC-1 REACH PARAMETERS:

RLNTH (Length) = 5531 feet
SEL (Slope) = 0.0108 foot/foot
ANL, ANCH, ANR ('n' value) = 0.05
PERCRT (Percolation Rate) = 1 cfs/acre

ROUTING REACH: 15R4
SUBBASIN NUMBER: 15.6



HEC-1 REACH PARAMETERS:

RLNTH (Length) =	8297	feet
SEL (Slope) =	0.0241	foot/foot
ANL, ANCH, ANR ('n' value) =	0.05	
PERCRT (Percolation Rate) =	1	cfs/acre

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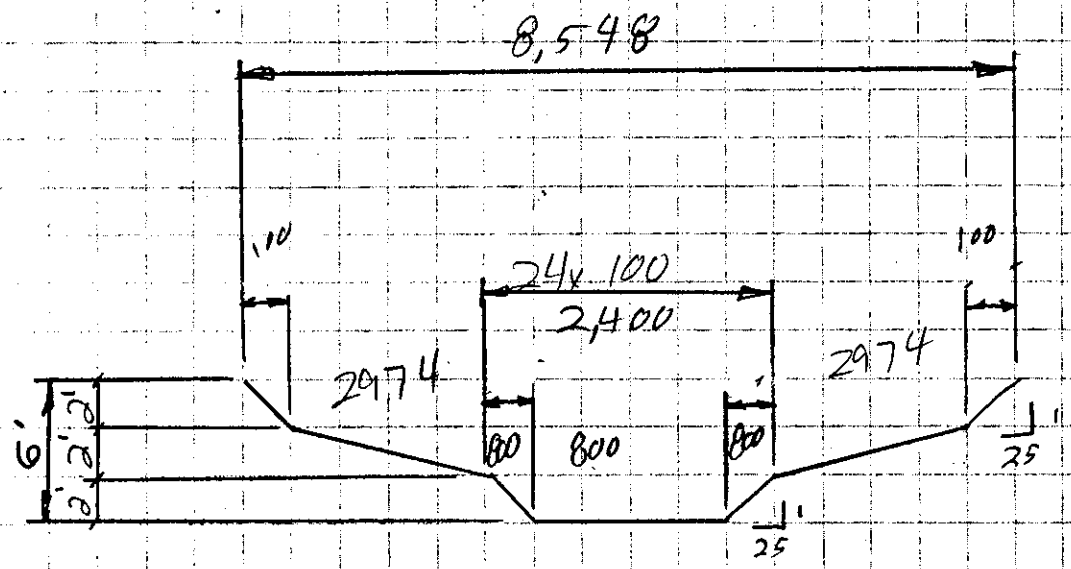
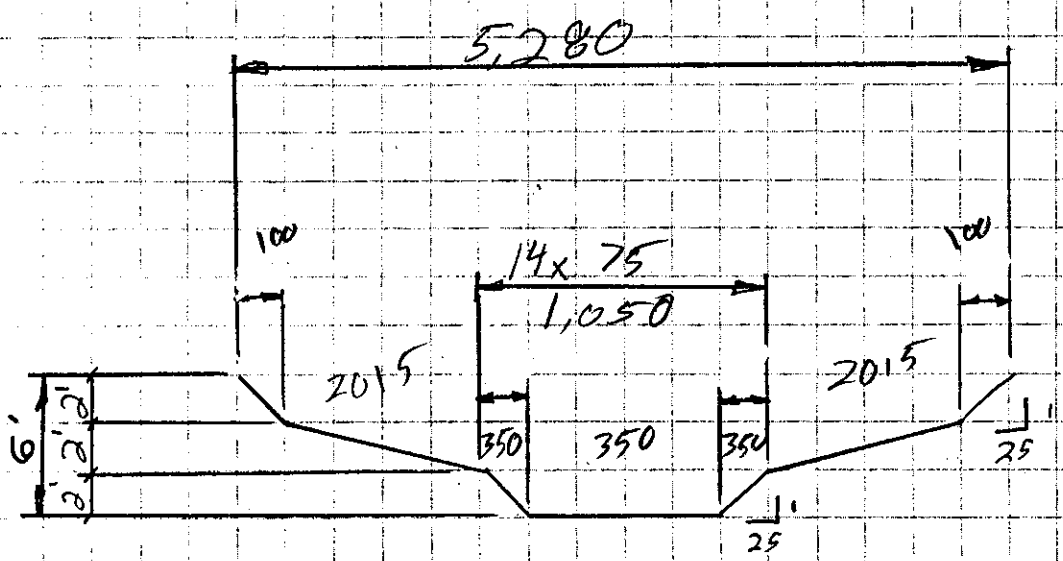
ROUTING REACH: 15R5
SUBBASIN NUMBER: 15.7



HEC-1 REACH PARAMETERS:

RLNTH (Length) = 20114 feet
SEL (Slope) = 0.0149 foot/foot
ANL, ANCH, ANR ('n' value) = 0.05
PERCRT (Percolation Rate) = 1 cfs/acre

ROUTING REACH: 15 R 6
SUBBASIN NUMBER: 15.8



HEC-1 REACH PARAMETERS:

RLNTH (Length) =	20617	feet
SEL (Slope) =	0.0107	foot/foot
ANL, ANCH, ANR ('n' value) =	0.05	
PERCRT (Percolation Rate) =	1	cfs/acre

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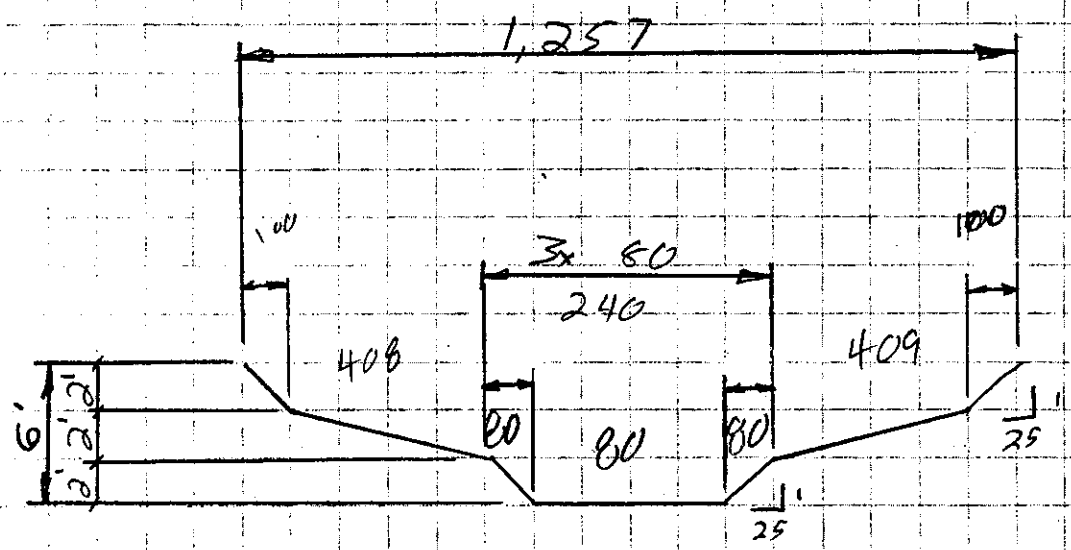
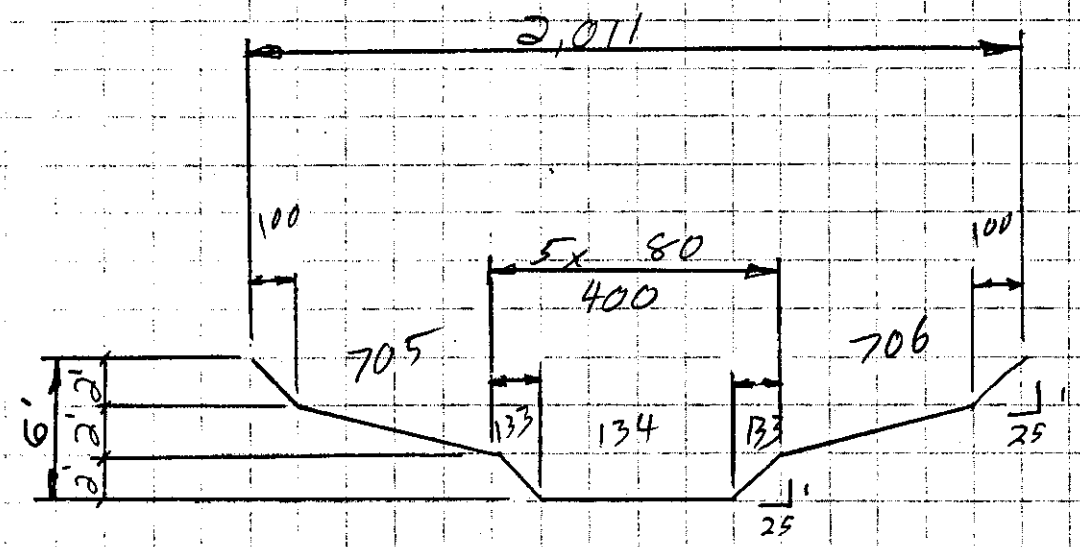
ROUTING REACH: 15R7A
SUBBASIN NUMBER: 15.9



HEC-1 REACH PARAMETERS:

RLNTH (Length) = 6285 feet
SEL (Slope) = 0.0095 foot/foot
ANL, ANCH, ANR ('n' value) = 0.05
PERCRT (Percolation Rate) = 1 cfs/acre

ROUTING REACH: 15R78
SUBBASIN NUMBER: 15.9



HEC-1 REACH PARAMETERS:

RLNTH (Length) =	7542	feet
SEL (Slope) =	0.0106	foot/foot
ANL, ANCH, ANR ('n' value) =	0.05	
PERCRT (Percolation Rate) =	1	cfs/acre

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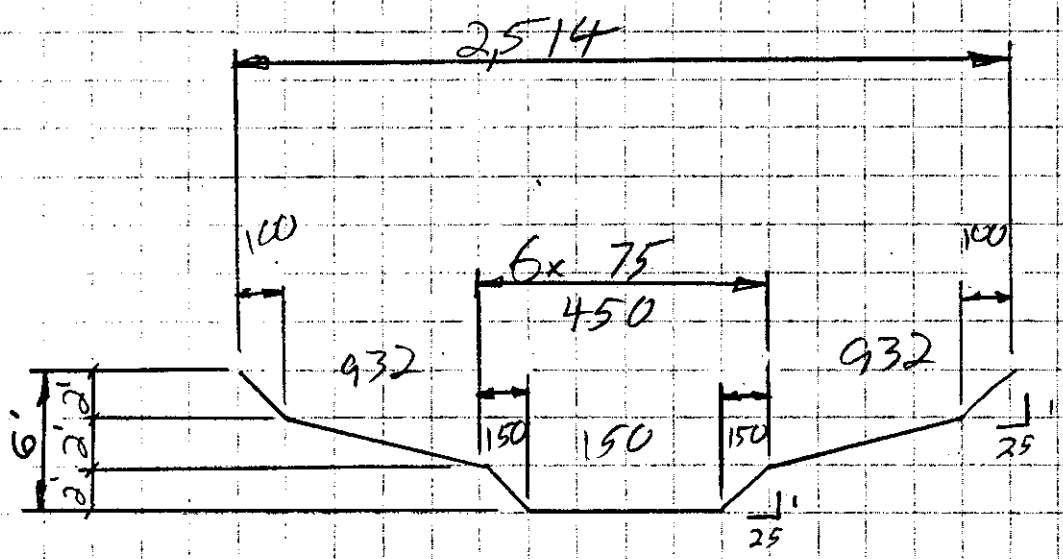
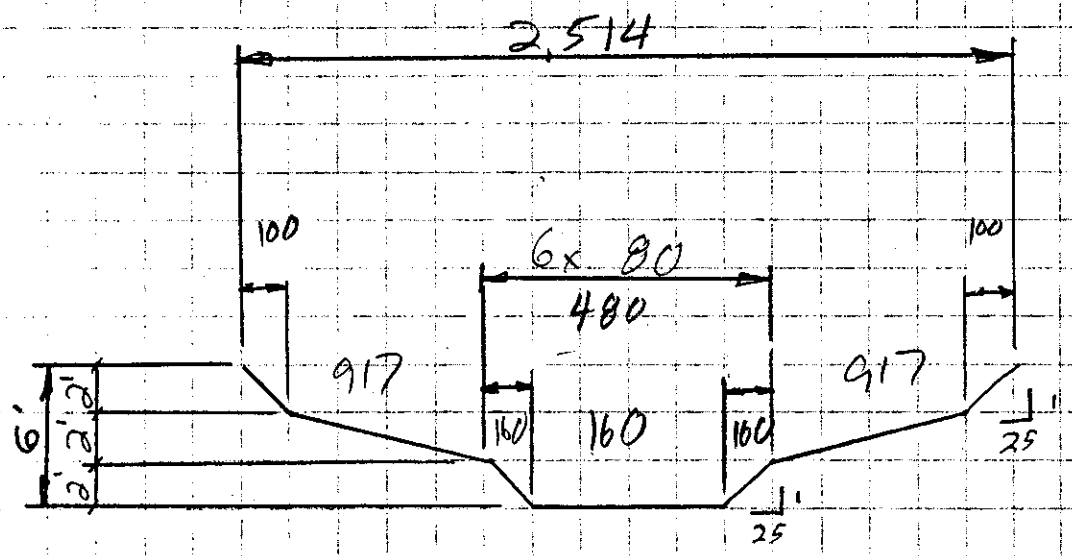
ROUTING REACH: 15 R 8
SUBBASIN NUMBER: 15.10



HEC-1 REACH PARAMETERS:

RLNTH (Length) = 7291 feet
SEL (Slope) = 0.0082 foot/foot
ANL, ANCH, ANR ('n' value) = 0.05
PERCRT (Percolation Rate) = 1 cfs/acre

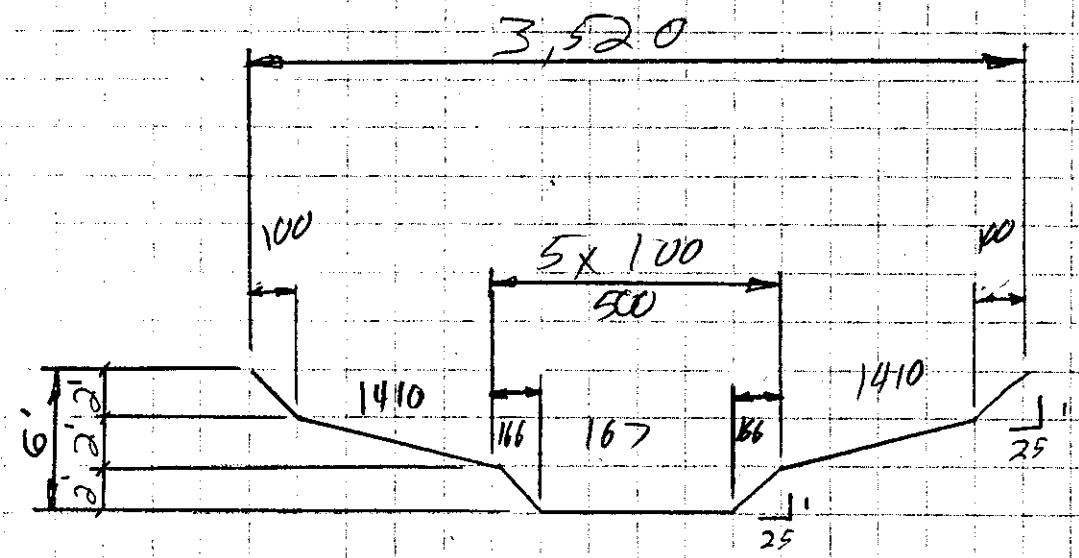
ROUTING REACH: 15R9
SUBBASIN NUMBER: 15.11



HEC-1 REACH PARAMETERS:

RLNTH (Length) =	12571	feet
SEL (Slope) =	0.0095	foot/foot
ANL, ANCH, ANR ('n' value) =	0.05	
PERCRT (Percolation Rate) =	1	cfs/acre

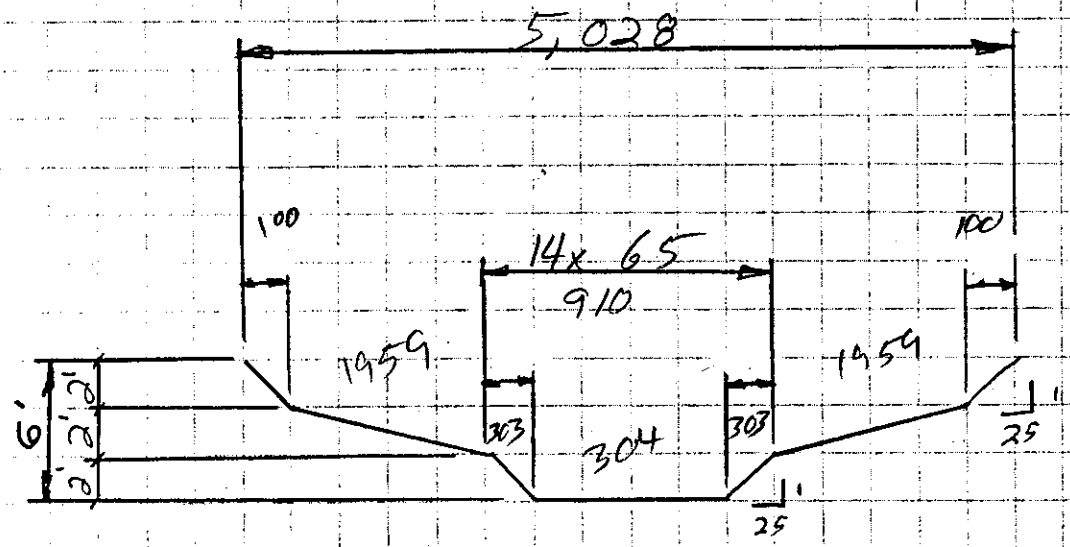
ROUTING REACH: 15 R17
SUBBASIN NUMBER: 15.11



HEC-1 REACH PARAMETERS:

RLNTH (Length) = 2262 feet
SEL (Slope) = 0.0066 foot/foot
ANL, ANCH, ANR ('n' value) = 0.05
PERCRT (Percolation Rate) = 1 cfs/acre

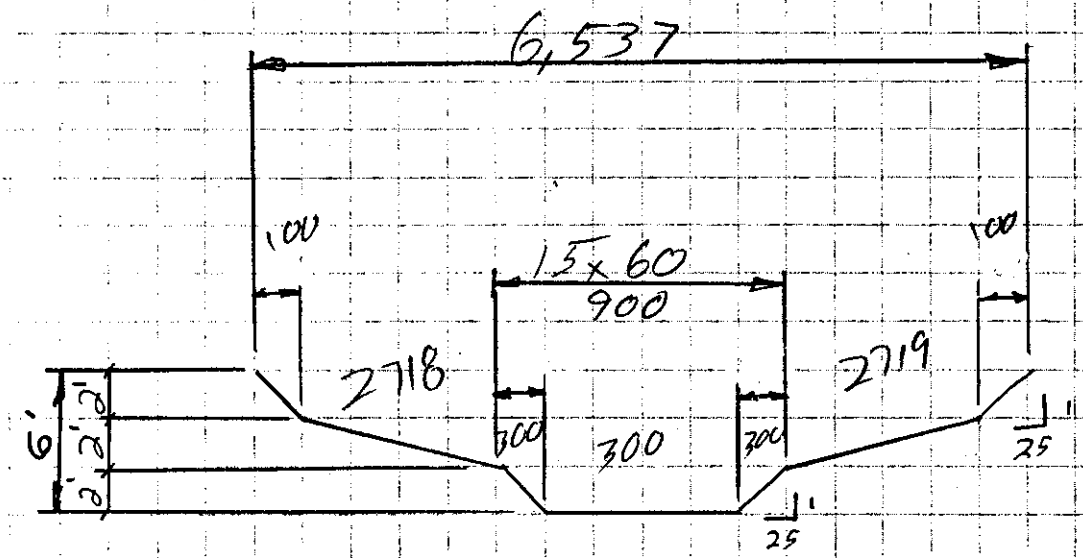
ROUTING REACH: 15R10
SUBBASIN NUMBER: 15.12



HEC-1 REACH PARAMETERS:

RLNTH (Length) =	33691	feet
SEL (Slope) =	0.0119	foot/foot
ANL, ANCH, ANR ('n' value) =	0.05	
PERCRT (Percolation Rate) =	1	cfs/acre

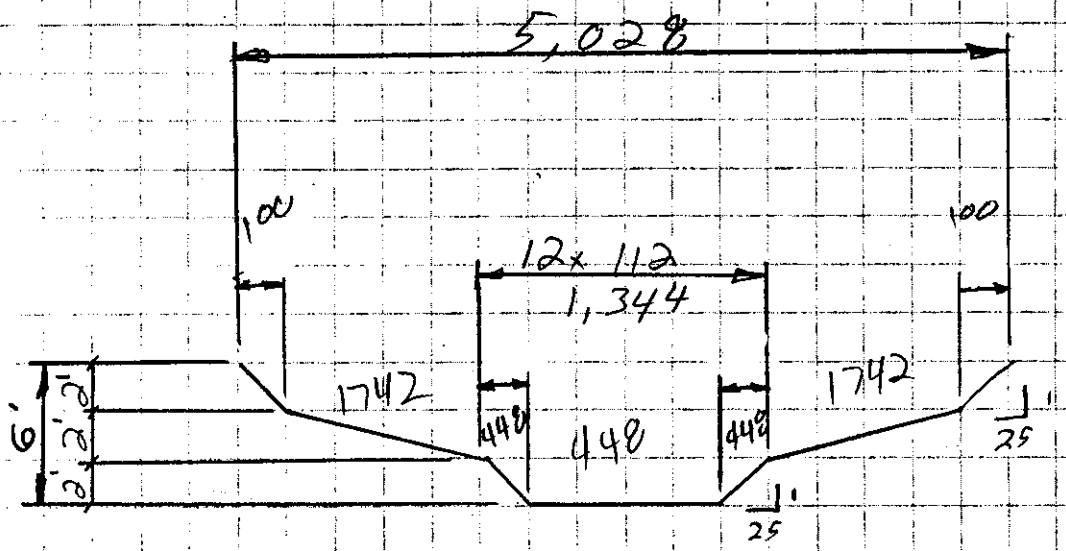
ROUTING REACH: 15R11A
SUBBASIN NUMBER: 15.13



HEC-1 REACH PARAMETERS:

RLNTH (Length) = 12571 feet
SEL (Slope) = 0.0095 foot/foot
ANL, ANCH, ANR ('n' value) = 0.05
PERCRT (Percolation Rate) = 1 cfs/acre

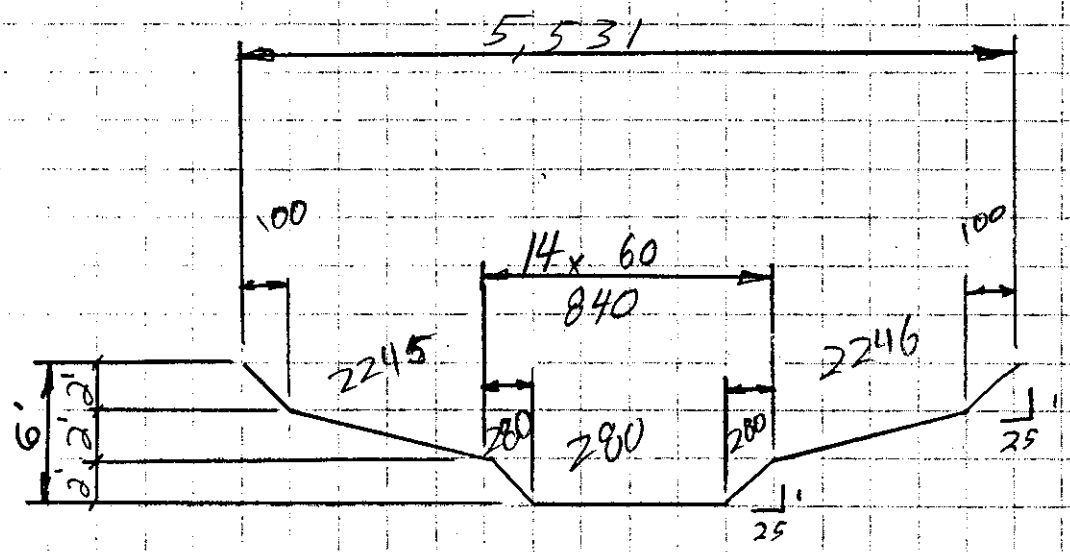
ROUTING REACH: 15 R11B
SUBBASIN NUMBER: 15.13



HEC-1 REACH PARAMETERS:

RLNTH (Length) =	12,571	feet
SEL (Slope) =	0.0095	foot/foot
ANL, ANCH, ANR ('n' value) =	0.05	
PERCRT (Percolation Rate) =	1	cfs/acre

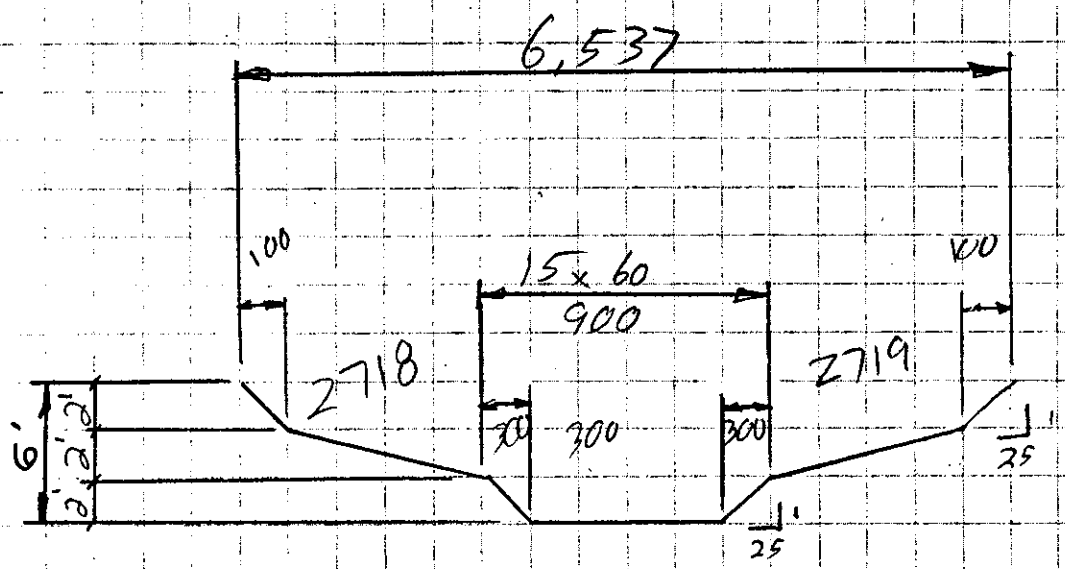
ROUTING REACH: 15 R 12
SUBBASIN NUMBER: 15.14



HEC-1 REACH PARAMETERS:

RLNTH (Length) = 30422 feet
SEL (Slope) = 0.0131 foot/foot
ANL, ANCH, ANR ('n' value) = 0.05
PERCRT (Percolation Rate) = 1 cfs/acre

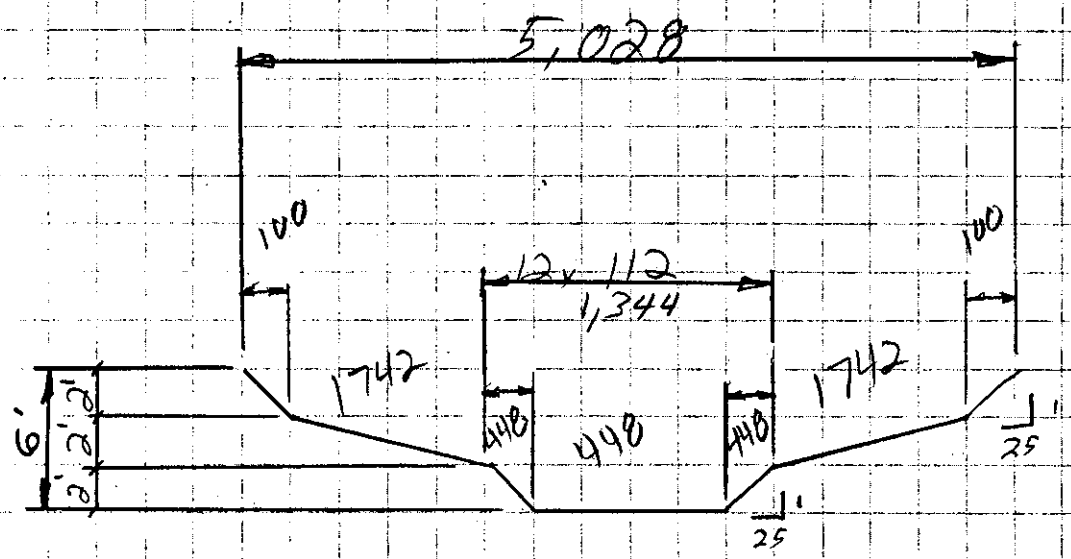
ROUTING REACH: 15R13A
SUBBASIN NUMBER: 15.15



HEC-1 REACH PARAMETERS:

RLNTH (Length) =	16594	feet
SEL (Slope) =	0.0096	foot/foot
ANL, ANCH, ANR ('n' value) =	0.05	
PERCRT (Percolation Rate) =	1	cfs/acre

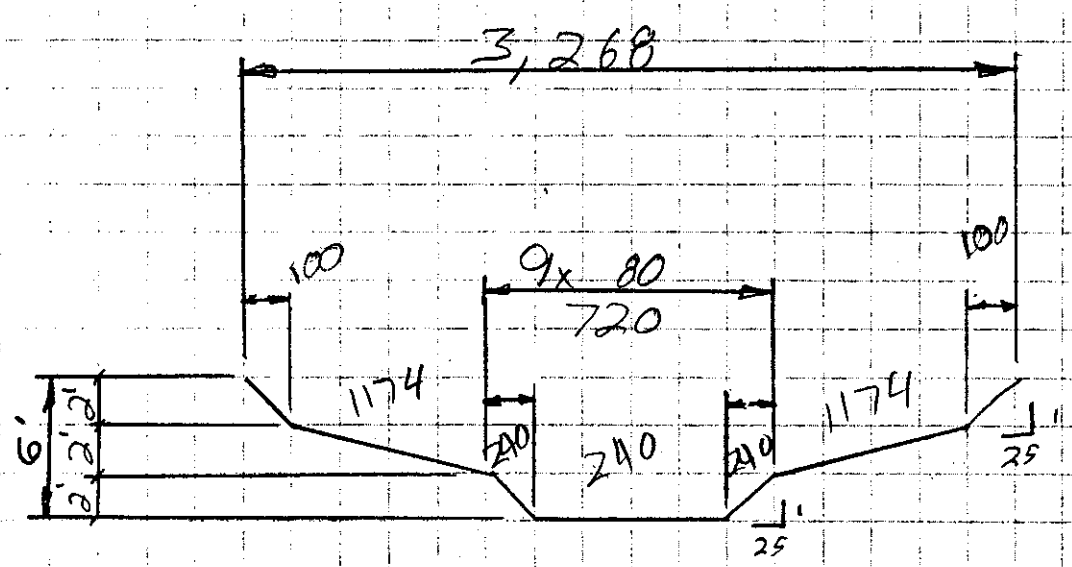
ROUTING REACH: 15R13B
SUBBASIN NUMBER: 15.15



HEC-1 REACH PARAMETERS:

RLNTH (Length) = 12571 feet
SEL (Slope) = 0.0095 foot/foot
ANL, ANCH, ANR ('n' value) = 0.05
PERCRT (Percolation Rate) = 1 cfs/acre

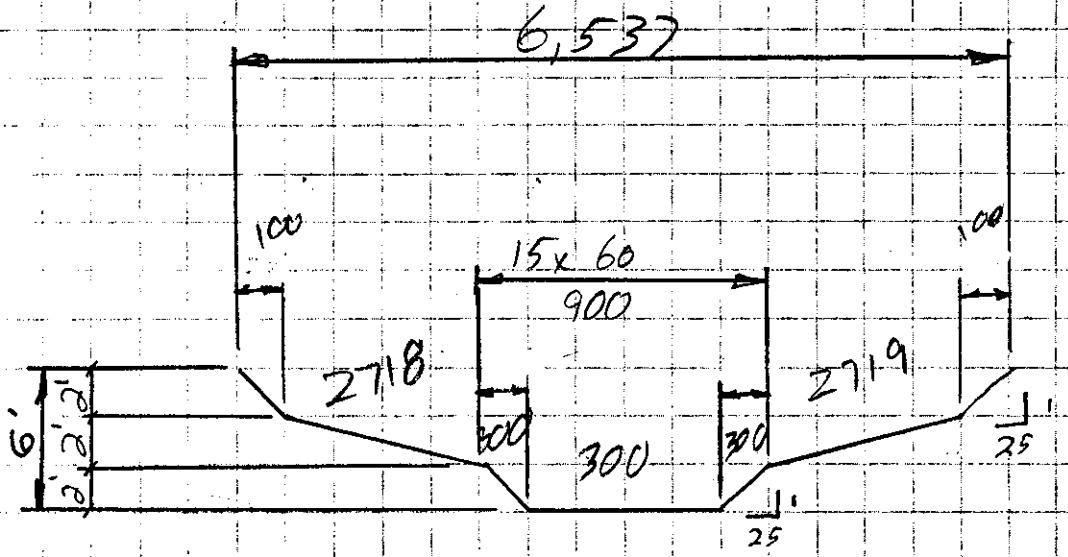
ROUTING REACH: 15R14
SUBBASIN NUMBER: 15.16



HEC-1 REACH PARAMETERS:

RLNTH (Length) =	15588	feet
SEL (Slope) =	0.0122	foot/foot
ANL, ANCH, ANR ('n' value) =	0.05	
PERCRT (Percolation Rate) =	1	cfs/acre

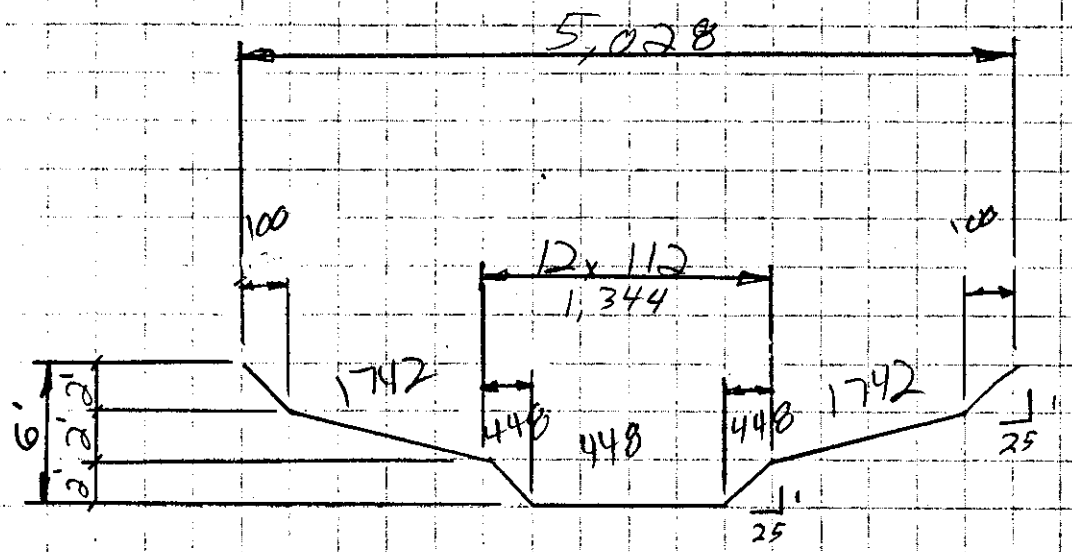
ROUTING REACH: 15R15A
SUBBASIN NUMBER: 15.17



HEC-1 REACH PARAMETERS:

RLNTH (Length) = 22628 feet
SEL (Slope) = 0.0097 foot/foot
ANL, ANCH, ANR ('n' value) = 0.05
PERCRT (Percolation Rate) = 1 cfs/acre

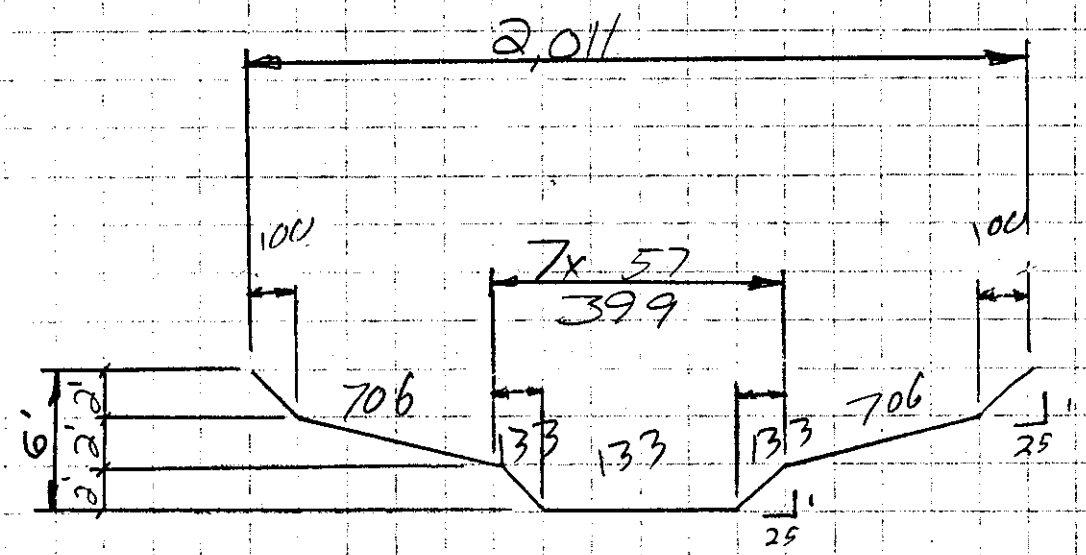
ROUTING REACH: 15R15B
SUBBASIN NUMBER: 15.17



HEC-1 REACH PARAMETERS:

RLNTH (Length) =	12571	feet
SEL (Slope) =	0.0095	foot/foot
ANL, ANCH, ANR ('n' value) =	0.05	
PERCRT (Percolation Rate) =	1	cfs/acre

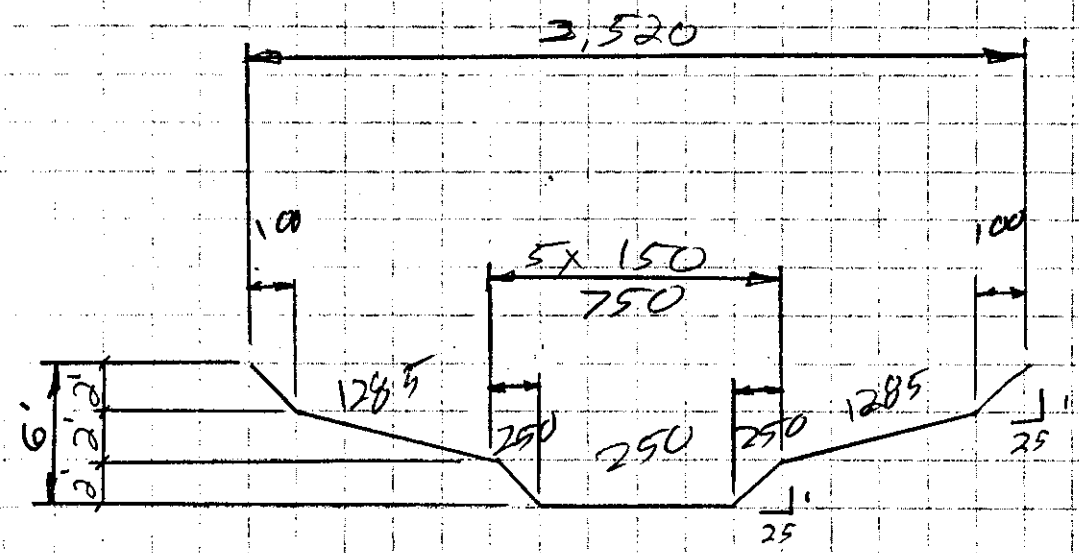
ROUTING REACH: 15R16
SUBBASIN NUMBER: 15.18



HEC-1 REACH PARAMETERS:

RLNTH (Length) = 2514 feet
SEL (Slope) = 0.0080 foot/foot
ANL, ANCH, ANR ('n' value) = 0.05
PERCRT (Percolation Rate) = 1 cfs/acre

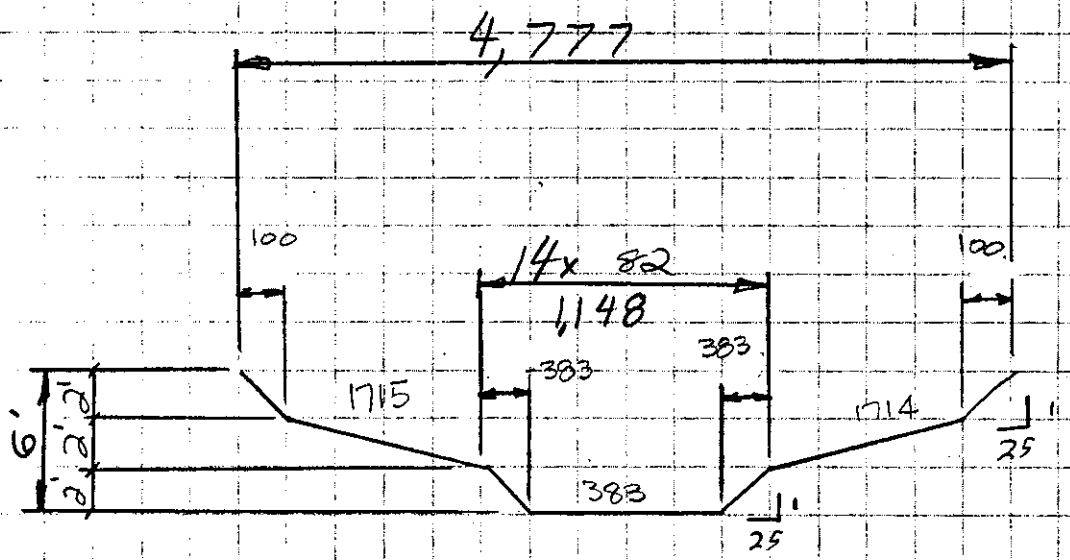
ROUTING REACH: 15R18
SUBBASIN NUMBER: 15.20



HEC-1 REACH PARAMETERS:

RLNTH (Length) =	1760	feet
SEL (Slope) =	0.0114	foot/foot
ANL, ANCH, ANR ('n' value) =	0.05	
PERCRT (Percolation Rate) =	1	cfs/acre

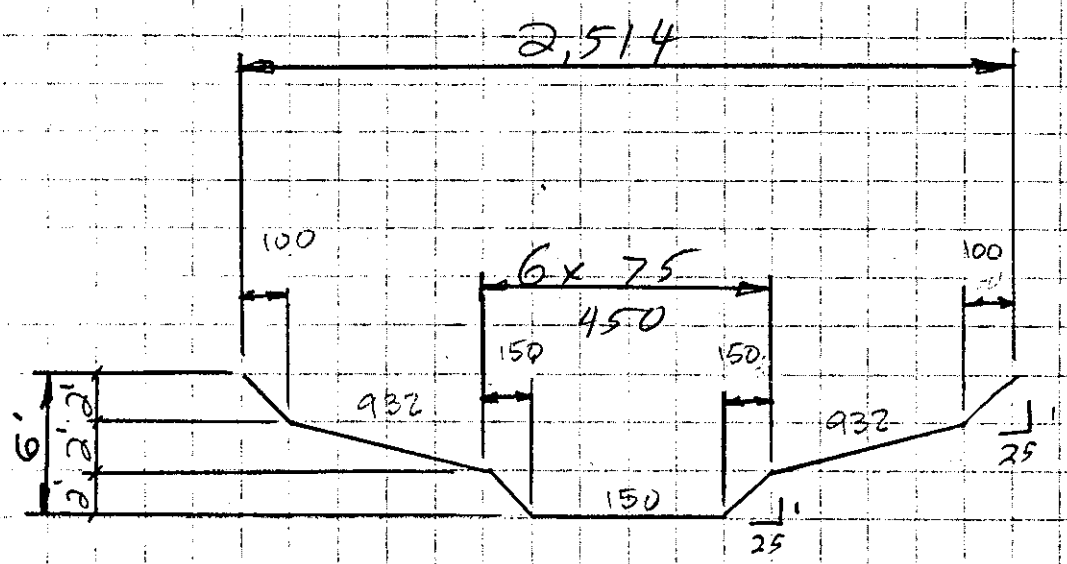
ROUTING REACH: 16R1
SUBBASIN NUMBER: 16.1



HEC-1 REACH PARAMETERS:

RLNTH (Length) = 9051 feet
SEL (Slope) = 0.0088 foot/foot
ANL, ANCH, ANR ('n' value) = 0.05
PERCRT (Percolation Rate) = 5 cfs/acre

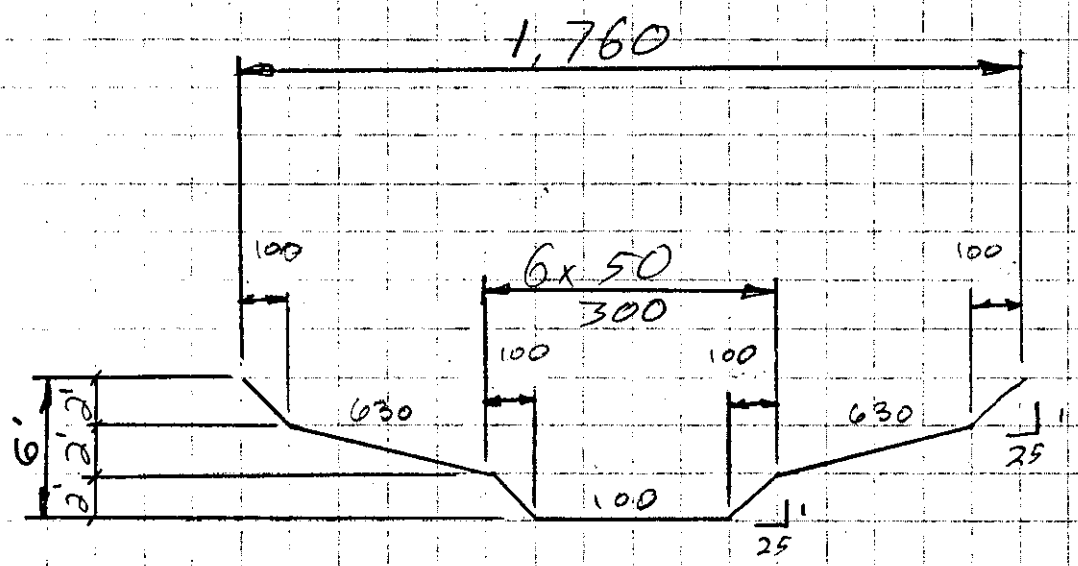
ROUTING REACH: 16R2
SUBBASIN NUMBER: 16.2



HEC-1 REACH PARAMETERS:

RLNTH (Length) =	6537	feet
SEL (Slope) =	0.0092	foot/foot
ANL, ANCH, ANR ('n' value) =	0.05	
PERCRT (Percolation Rate) =	5	cfs/acre

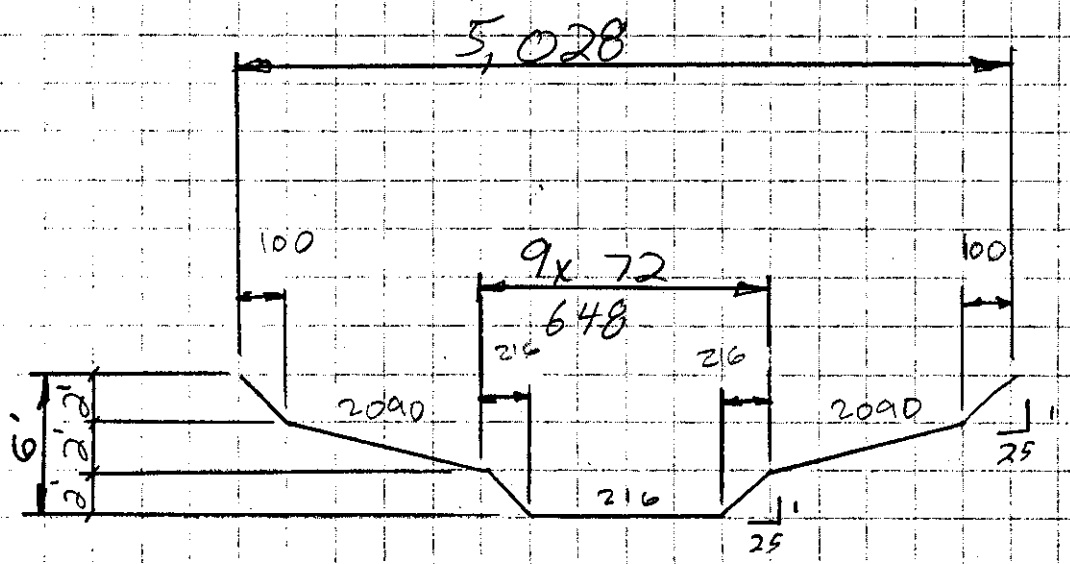
ROUTING REACH: 16R3
SUBBASIN NUMBER: 16.3



HEC-1 REACH PARAMETERS:

RLNTH (Length) = 2765 feet
SEL (Slope) = 0.0072 foot/foot
ANL, ANCH, ANR ('n' value) = 0.05
PERCRT (Percolation Rate) = 5 cfs/acre

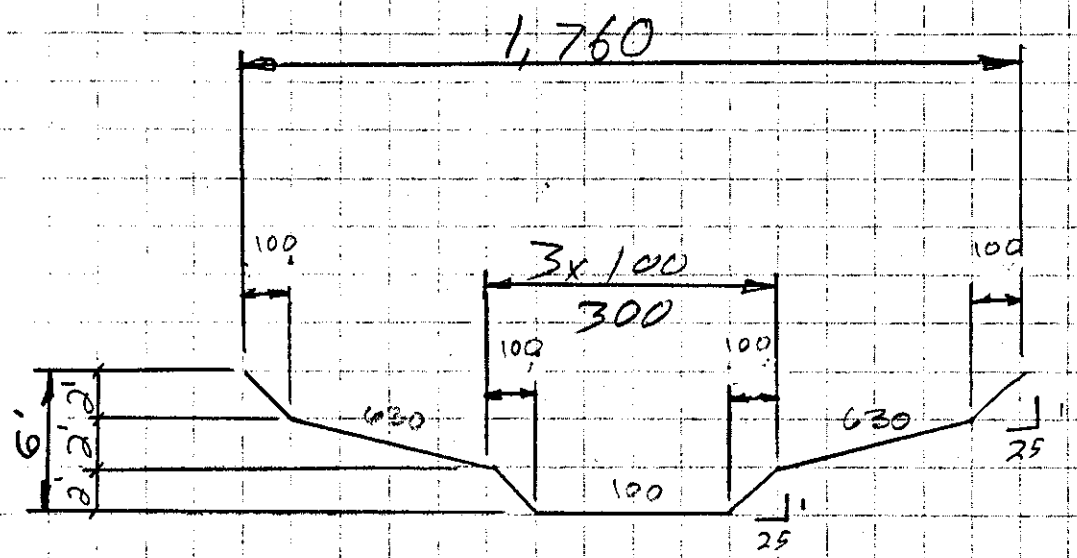
ROUTING REACH: 16R4
SUBBASIN NUMBER: 16.5



HEC-1 REACH PARAMETERS:

RLNTH (Length) =	9051	feet
SEL (Slope) =	0.0099	foot/foot
ANL, ANCH, ANR ('n' value) =	0.05	
PERCRT (Percolation Rate) =	5	cfs/acre

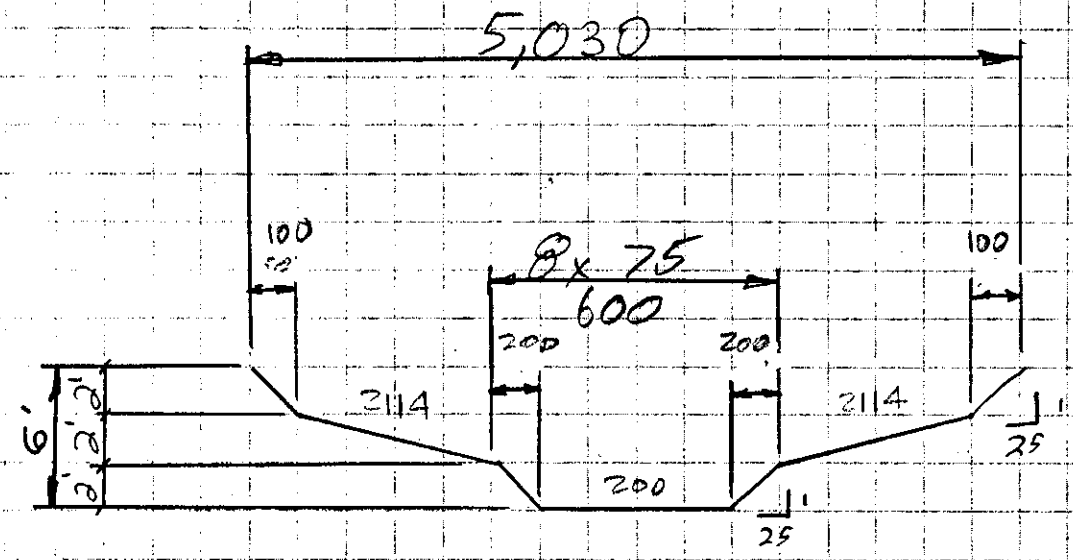
ROUTING REACH: 16R5
SUBBASIN NUMBER: 16.6



HEC-1 REACH PARAMETERS:

RLNTH (Length) = 2514 feet
SEL (Slope) = 0.008 foot/foot
ANL, ANCH, ANR ('n' value) = 0.05
PERCRT (Percolation Rate) = 5 cfs/acre

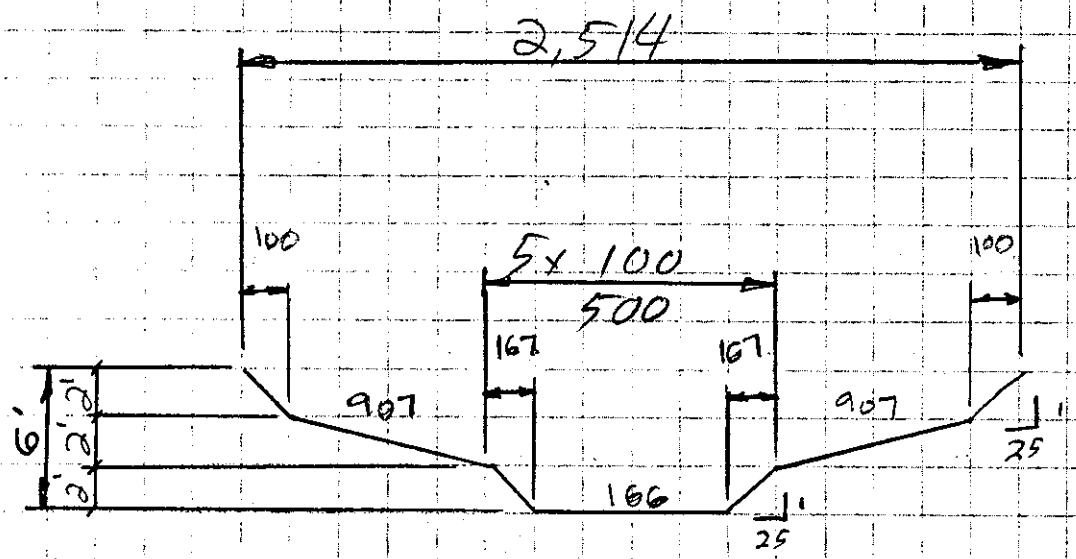
ROUTING REACH: 17R1
SUBBASIN NUMBER: 17.1



HEC-1 REACH PARAMETERS:

RLNTH (Length) =	17100	feet
SEL (Slope) =	0.0032	foot/foot
ANL, ANCH, ANR ('n' value) =	0.05	
PERCRT (Percolation Rate) =	5	cfs/acre

ROUTING REACH: 17R2
SUBBASIN NUMBER: 17.1



HEC-1 REACH PARAMETERS:

RLNTH (Length) = 2765 feet
SEL (Slope) = 0.0072 foot/foot
ANL, ANCH, ANR ('n' value) = 0.05
PERCRT (Percolation Rate) = 5 cfs/acre

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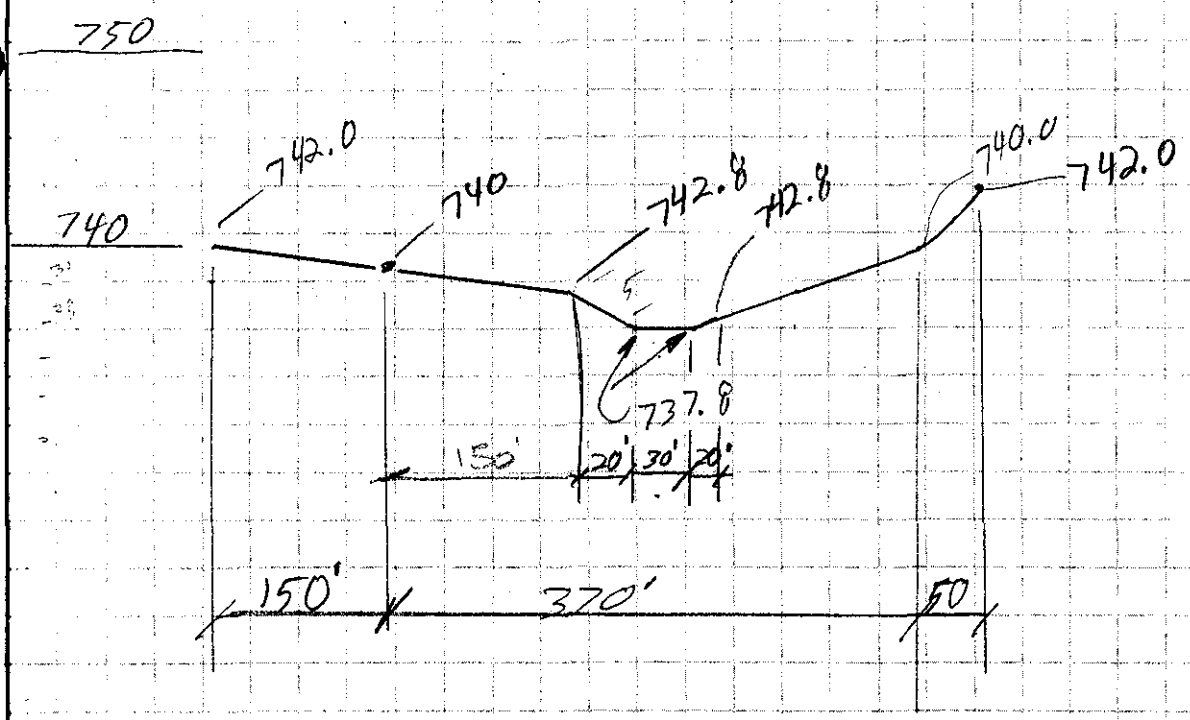
ROUTING REACH: 18R1
SUBBASIN NUMBER: 18.1



HEC-1 REACH PARAMETERS:

RLNTH (Length) =	2100	feet
SEL (Slope) =	0.0086	foot/foot
ANL, ANCH, ANR ('n' value) =	0.05	
PERCRT (Percolation Rate) =	5	cfs/acre

APPENDIX D

CALCULATION OF FLOW DIVERSION

RATING CURVES

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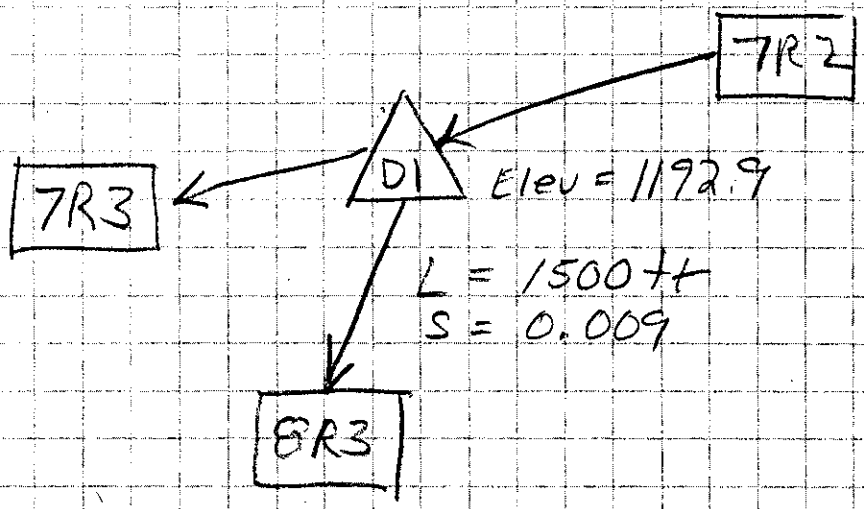
CLIENT FCDMC DATE 8-8-91
PROJECT BY EDL
PROJECT NO. PAGE NO. 1/5

DIVERSION D1
Basin 7
(Top of Margie's Cove)



Attachments

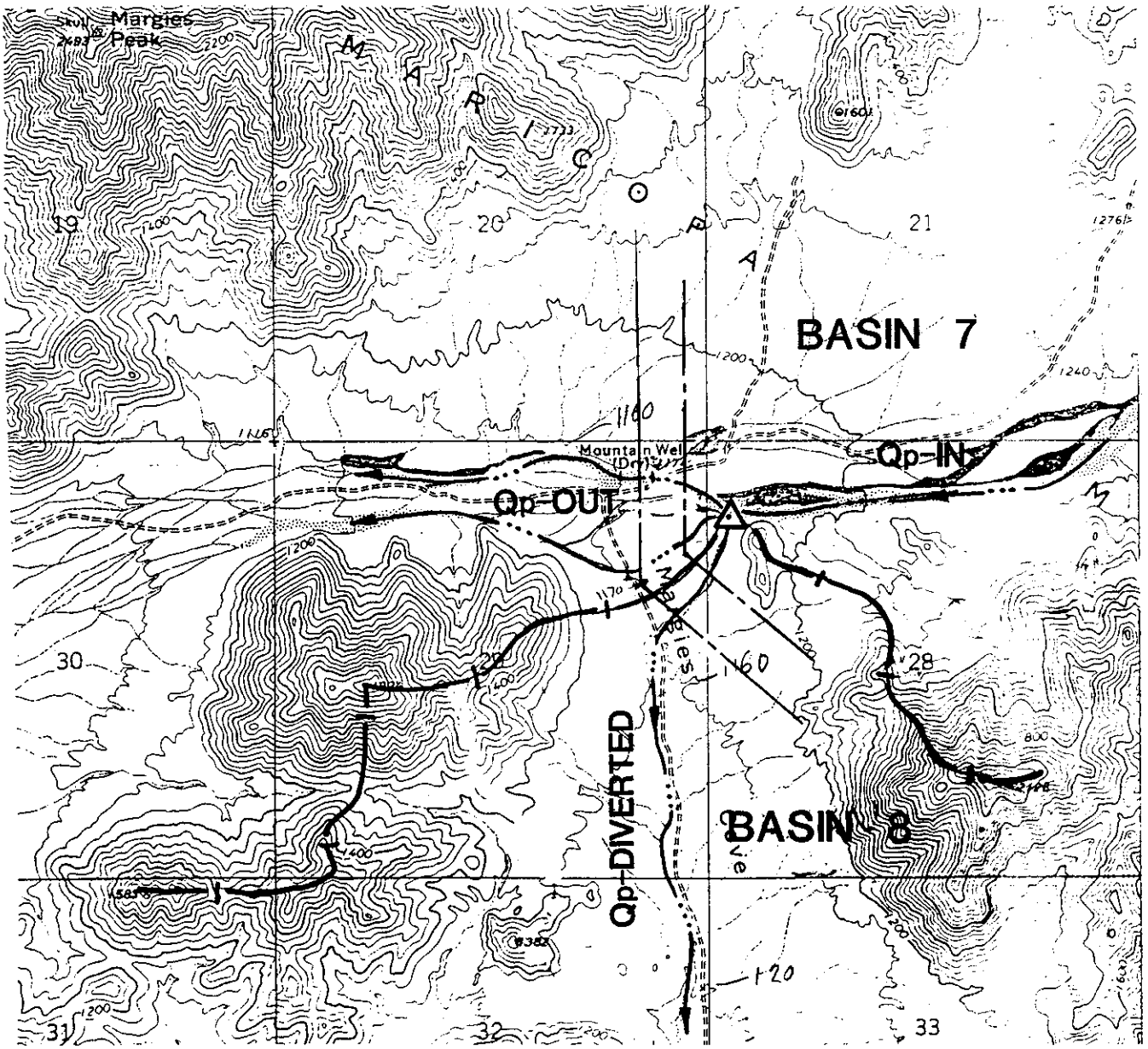
1. Location Map (p. 2/5)
2. Cross-Section Downstream (3/5)
3. Computation of Head vs. Capacity (4/5)
4. Flow vs. Flow Rating Curve. (5/5)

DIVERSION 1	6-HOUR	24-HOUR
IN	6490	6562
OUT	5184	5242
DIVERTED	1306	1320

LEGEND

- FLOW PATHS
- BASIN DELINEATION
- SECTION CUTS
- FLOW SPLIT

N



T3S R3W

DIVERSION MAPPING – D1

Donohue ENGINEERS ARCHITECTS SCIENTISTS

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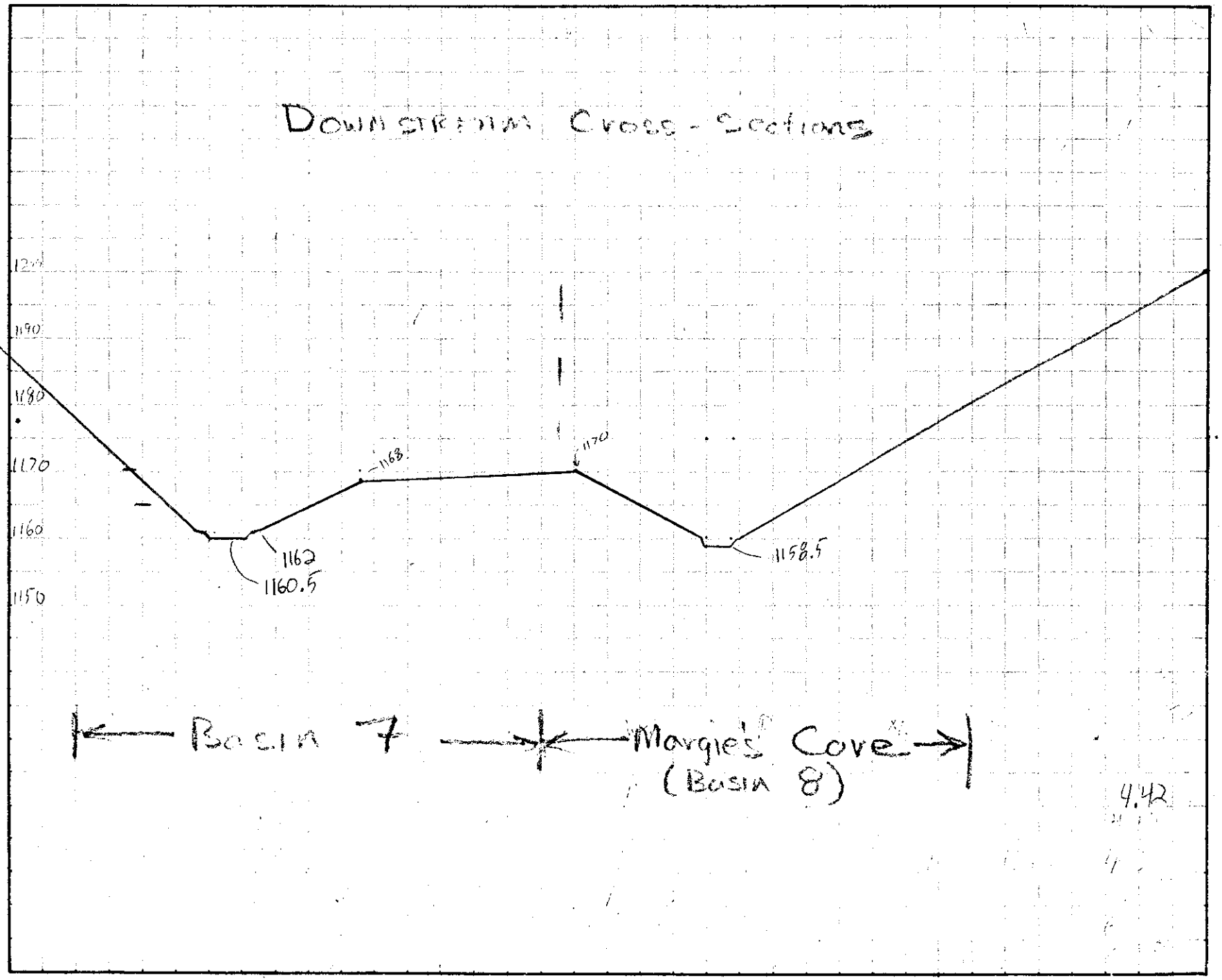

CLIENT FCD DATE 3-17-91
PROJECT J.A. Bend Canal BY B
PROJECT NO. 16299 PAGE NO. 4/5

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COMPUTATION OF HEAD-CAPACITY CURVES

Elev.	Depth	Area	WP	R	N	C	V	Q
1158.5								
1159.5	1	10	12	.83	.035	42.46	3.56	35.6
1160.0	1.5	15	13	1.15	.035	42.46	4.42	66.30
1161.0	2.5	62.5	108	.57	.038	39.11	2.55	159.38
1162.0	3.5	325	203	1.6	.045	33.02	4.29	1394.3
1163.0	4.5	472.5	298	1.6	.046	32.30	4.19	1979.78
1164.0	5.5	815	393	2.1	.047	31.62	4.92	4,009.80
1165.0	6.5	1,252.5	488.0	2.6	.047	31.62	5.67	7,101.66
1166.0	7.5	1,785	583.0	3.1	.048	30.96	6.24	11,138.40
1167.0	8.5	2,412.5	678.0	3.6	.048	30.96	6.90	16,646.25
1168.0	9.5	3,139	773.16	4.1	.048	30.96	7.52	23,605.28
1170.0	11.5	4,865	963.21	5.1	.049	30.33	8.53	41,498.45

Margies Cove

1160.5								
1161.0	.5	65	131	.50	.035	42.46	.58	37.7
1162.0	1.5	195	133	1.47	.035	42.46	1.21	235.95
1163.0	2.5	408	299	1.37	.036	41.29	1.12	456.96
1164.0	3.5	788	466	1.69	.036	41.29	1.29	1,016.52
1165.0	4.5	1335	633	2.11	.040	37.15	1.35	1,802.25
1166.0	5.5	2,048	799	2.56	.042	35.38	1.46	2,990.08
1167.0	6.5	3,028	966	3.14	.043	34.56	1.63	4,935.64
1168.0	7.5	3975	1,133	3.51	.044	33.77	1.72	6,837.0
1170.0	9.5	7,235.0	2,133	3.39	.047	31.62	1.57	11,358.95

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SHEBOYGAN, WISCONSIN

CLIENT FCDMC DATE

PROJECT BY

PROJECT NO. PAGE NO. 5/5

Diversion D1 - Rating Curve

Elevation	TRS Flow	Diversion Flow	Total Flow
1159.5	36	0	36
1161.0	159	35	197
1162.0	1394	236	1630
1163.0	1980	457	2437
1164.0	4001	1017	5018
1165.0	7102	1802	8904

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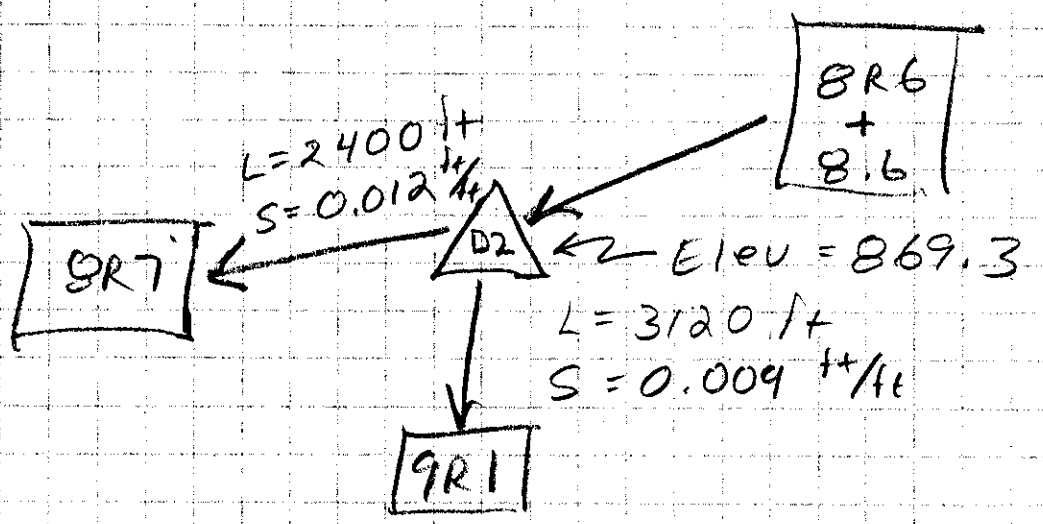
CLIENT FEDMC DATE 8-9
PROJECT BY EDL
PROJECT NO. PAGE NO. 1/5

DIVERSION 2

BASIN 8



Location Map Attached.

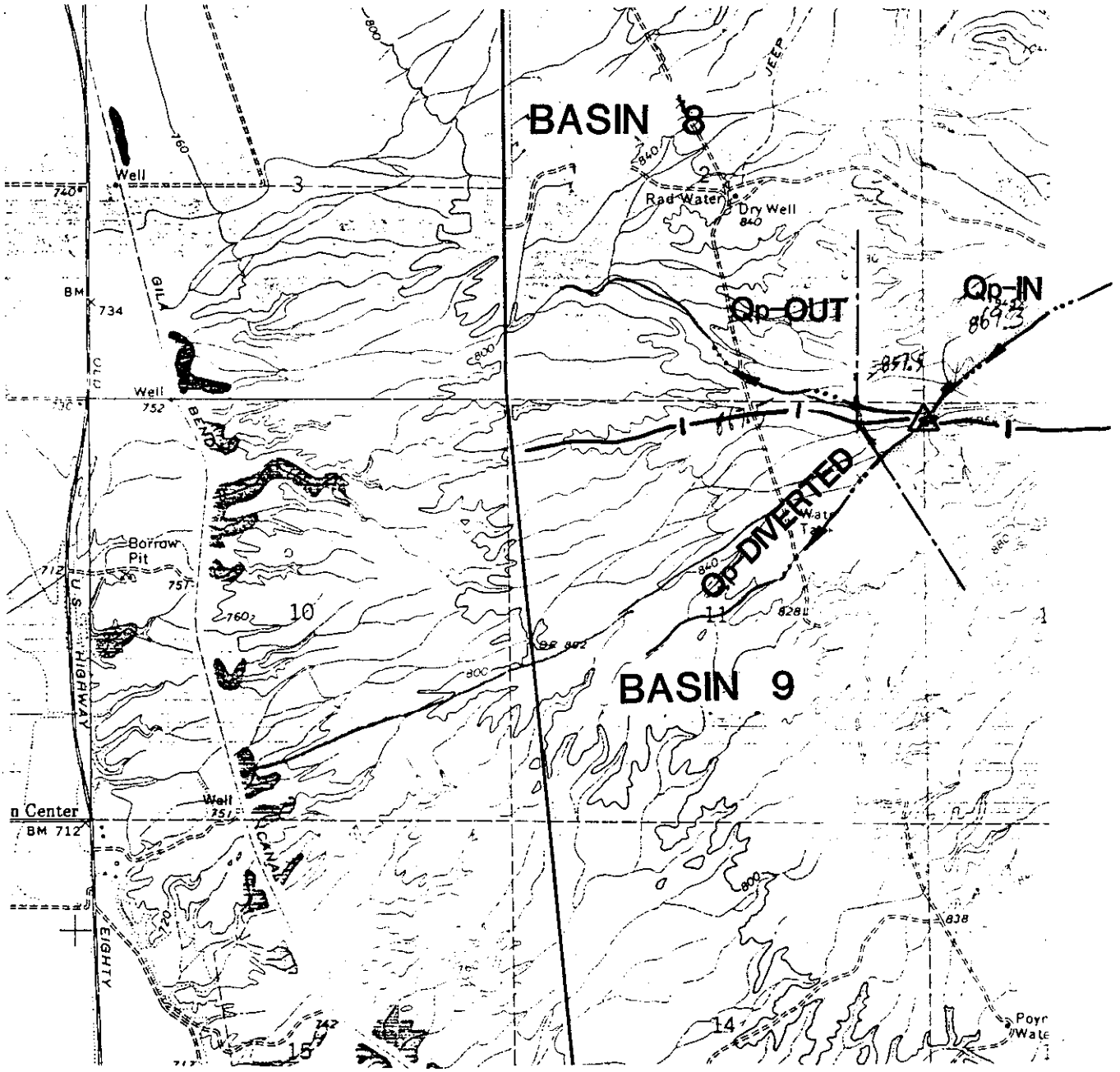
Cross-Section Plots and HEAD-Capacity Computations follow.

DIVERSION 2	6-HOUR	24-HOUR
IN	4623	6434
OUT	4619	6130
DIVERTED	4	304

LEGEND

- FLOW PATHS
- BASIN DELINEATION
- SECTION CUTS
- FLOW SPLIT

N



DIVERSION MAPPING – D2

Donohue ENGINEERS ARCHITECTS SCIENTISTS

CLIENT _____ DATE _____

PROJECT _____ BY _____

PROJECT NO. _____ PAGE NO. 3/5

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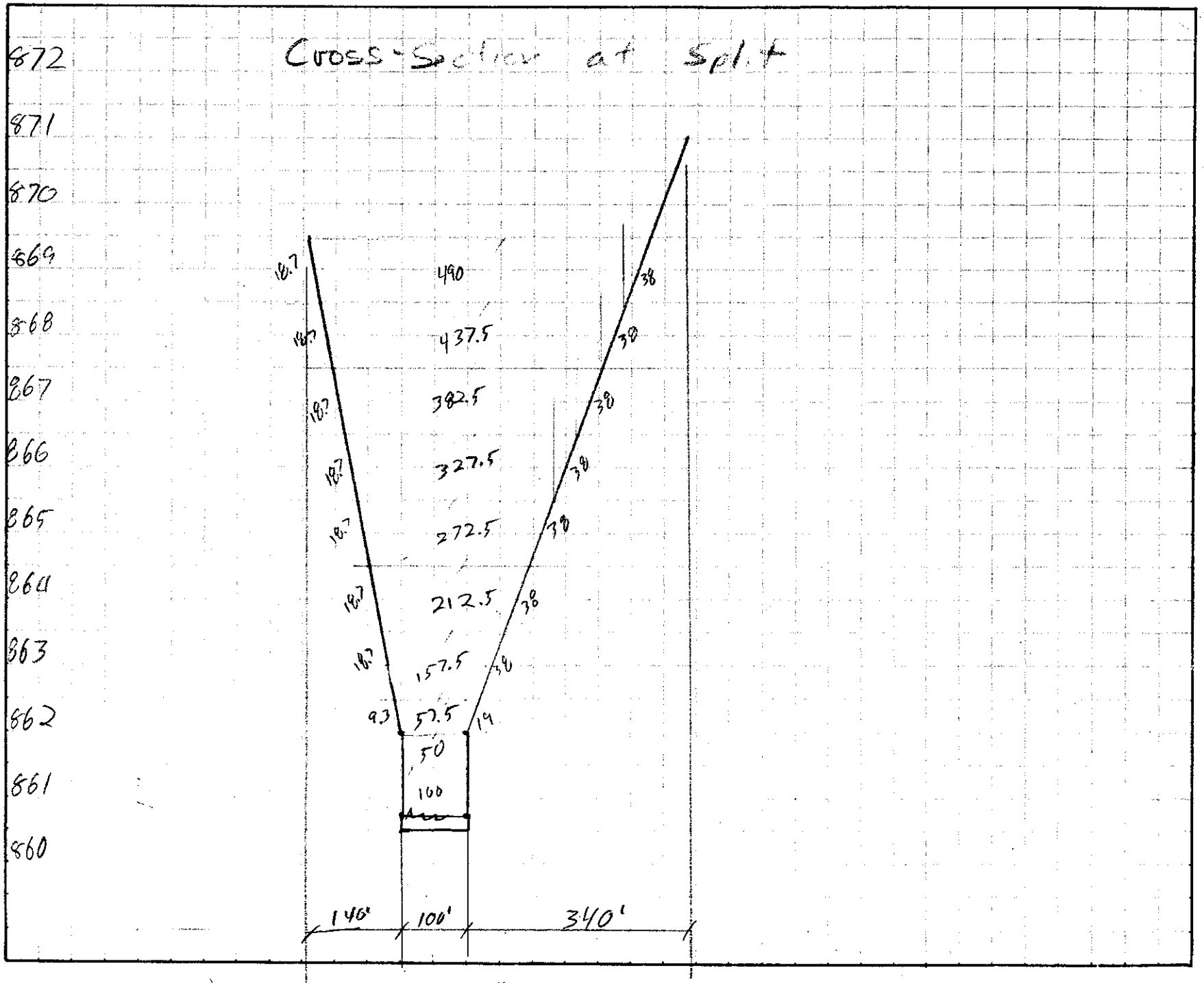

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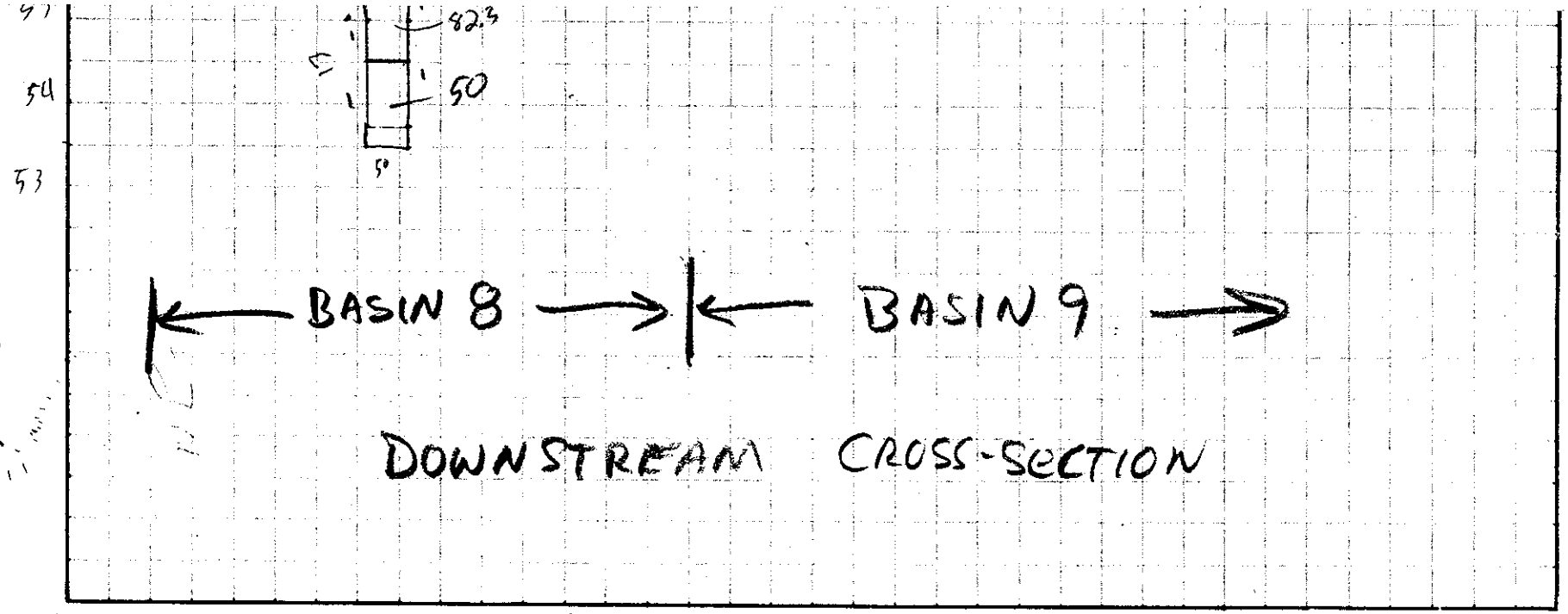

CLIENT [illegible] DATE 3-17-91
PROJECT [illegible] BY [illegible]
PROJECT NO. [illegible] PAGE NO. 4/5

Flow to 9R1

Elev.	Depth	Area	WP	R	N.	C	V.	Q	Q_T.
853.5									
854.5	1	50	52	.96	.035	42.46	4.53	226.5	
855.5	2	132.5	54	2.45	.035	42.46	8.45	1,119.63	
856.5	3	217.5	155	1.40	.043	34.56	4.74	1,030.95	
857.5	4	350	232	1.51	.045	33.02	4.76	1,666.0	
858.5	5	532.5	357	1.49	.047	31.62	4.52	2,406.9	
859.5	6	792.5	482	1.64	.048	30.96	4.72	3,740.6	
860.5	7	1,102.5	617	1.79	.048	30.96	5.0	5,512.5	
861.5	8	1,297.5	752	1.73	.048	30.96	4.88	6,331.8	
862.5	9	1,557.5	927	1.68	.049	30.33	4.69	7,304.7	
863.5	10	2,190	1102	1.99	.049	30.33	5.23	11,453.7	
865.5	12	3,251	1402	2.32	.049	30.33	5.82	18,920.8	
867.5	14	5996.0	1812	3.31	.049	30.33	7.38	44,250.5	
869.5	16	9,063.5	2152	4.21	.049	30.33	8.66	78,489.9	

Flow to 9R1

860.5									
861.5	1	100	102	.98	.035	42.46	3.97	397	
862.0	1.5	150	103	1.46	.035	42.46	5.18	777	
862.5	2.0	207.5	131.3	1.58	.038	39.11	5.03	1,043.7	
863.5	3.0	365	188.0	1.94	.042	35.38	5.22	1,905.3	
864.5	4.0	577.5	244.7	2.36	.044	33.77	5.68	3,280.2	
865.5	5.0	850.0	301.4	2.82	.045	33.02	6.25	5,312.5	
866.5	6.0	1177.0	339.4	3.468	.046	32.30	7.02	8,262.5	
867.5	7.0	1559.5	396.1	3.94	.046	32.30	7.64	11,914.5	
868.5	8.0	1997.0	452.8	4.41	.047	31.61	8.06	16,095.8	
869.5	9.0	2487.0	509.5	4.88	.047	31.61	8.63	21,462.8	

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CLIENT FCDMC DATE 8-9-91
PROJECT _____ BY EDL
PROJECT NO. _____ PAGE NO. 5/5

Diversion D2
Head - Capacity Curves

Elevation	Flow to 8R7	Flow 9R1	Total Flow
860.5	5513	0	5513
861.5	6332	397	6729
862.5	7305	1045	8350
863.5	11454	1905	
864.5	18,920	3280	

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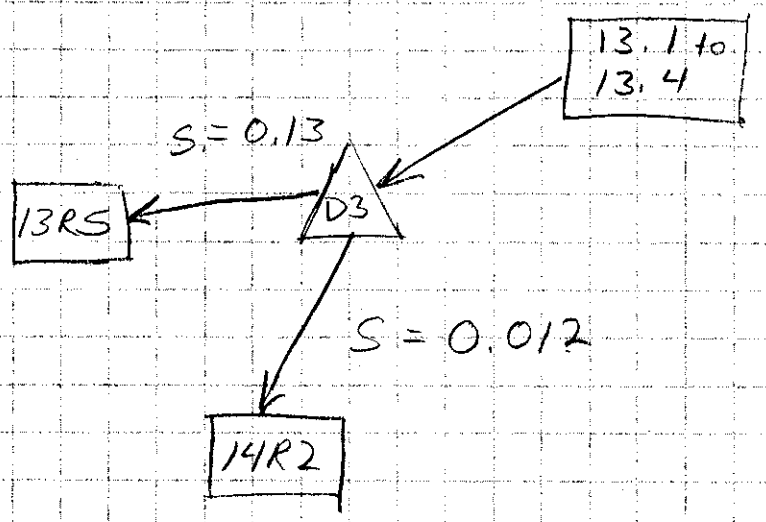
CLIENT FCDMC DATE 8/9/91
PROJECT BY EDL
PROJECT NO. PAGE NO. 1/5

DIVERSION D3

Basin 13

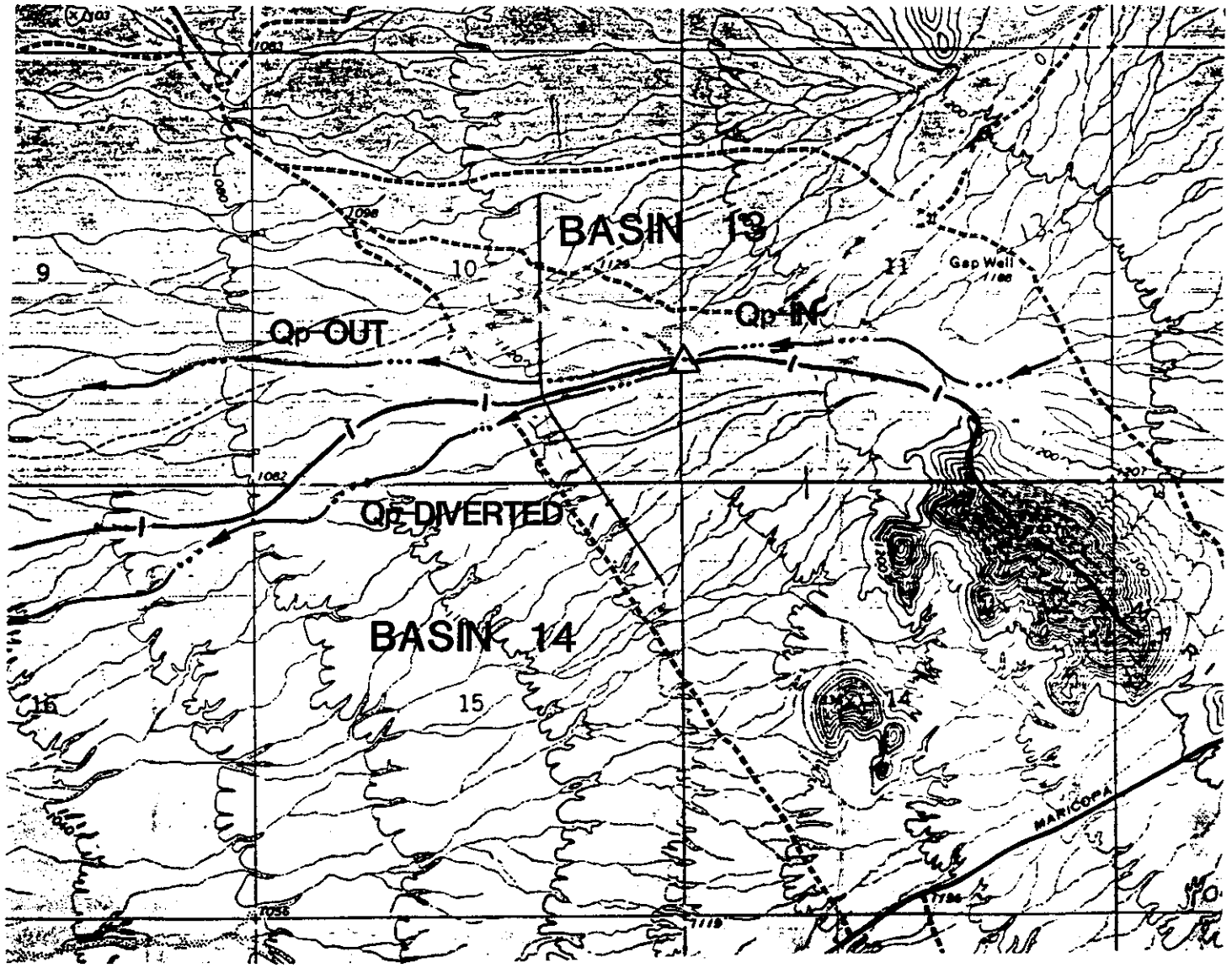


DIVERSION 3	6-HOUR	24-HOUR
IN	5332	5570
OUT	3060	3153
DIVERTED	2276	2417

LEGEND

- FLOW PATHS
- BASIN DELINEATION
- SECTION CUT
- FLOW SPLIT

N



DIVERSION MAPPING – D3

Donohue ENGINEERS ARCHITECTS SCIENTISTS

CLIENT _____ DATE _____

PROJECT _____ BY _____

PROJECT NO. _____ PAGE NO. 3/5

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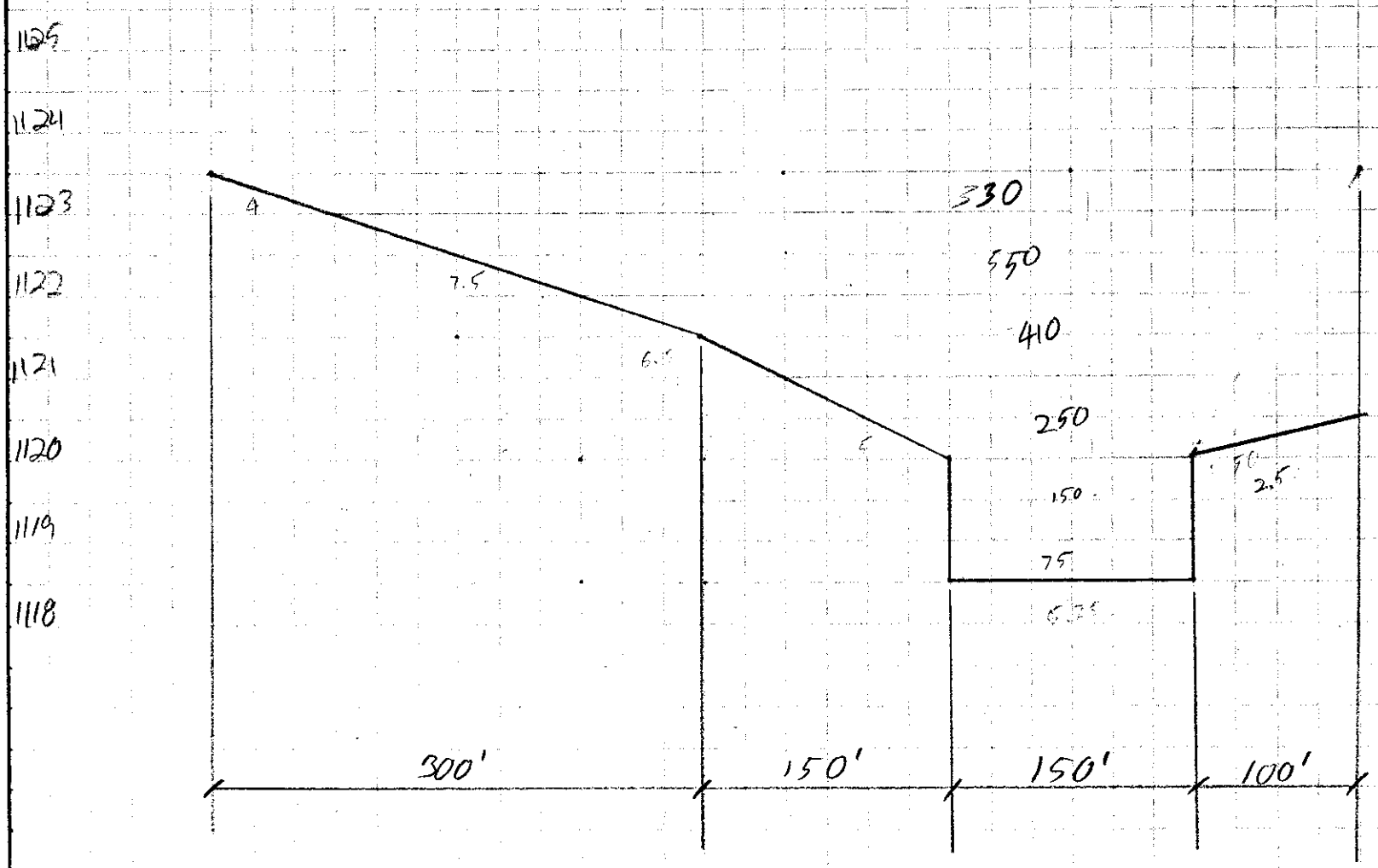
Main Channel
(to 13 RS)

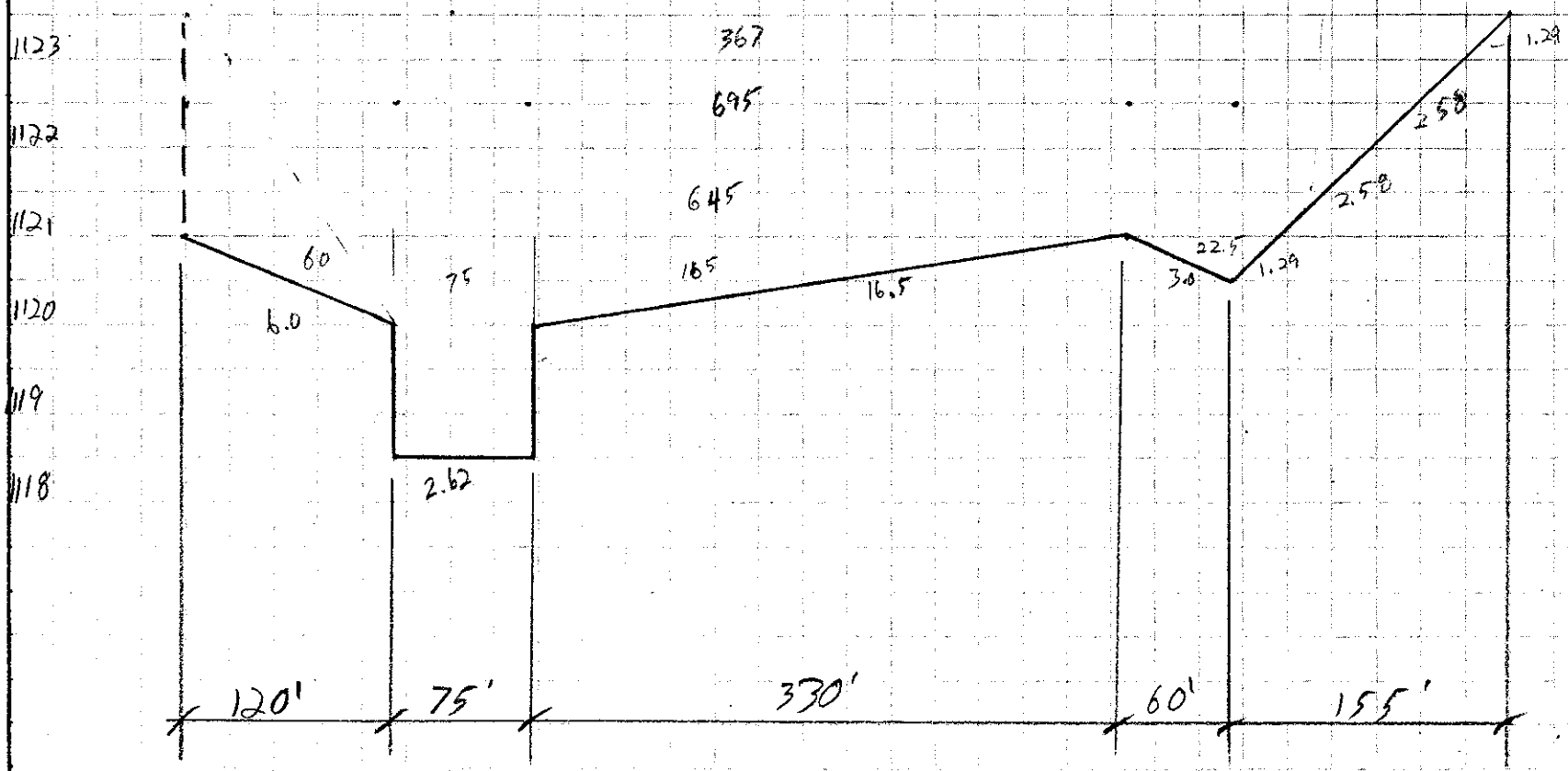


CLIENT _____ DATE _____

PROJECT _____ BY _____

PROJECT NO. _____ PAGE NO. 4/5

Diversion Channel Cross-Section



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CLIENT FCD DATE 3/11/91
PROJECT Gila Bend Canal BY DB
PROJECT NO. 6099 PAGE NO. 5/5

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Pt # 3 Basin B

Flow to 15RS

Elev.	Depth	Area	WP	R	N	C	V	Q
1118.5								
1119.0	.5	75	151	.50	.035	42.46	3.05	228.75
1120.0	1.5	225	153	1.47	.035	42.46	6.26	1,408.5
1121.0	2.5	475	303	1.57	.043	34.56	5.32	2,527.0
1122.0	3.5	885	433	2.04	.045	33.02	6.06	5,363.10
1123.0	4.5	1435	583	2.46	.046	32.30	6.71	9,628.85
1123.5	5	1765	658	2.681	.047	31.61	6.95	12,266.75

Diversion

Diversion to 14RZ

Elev.	Depth	Area	WP	R	N	C	V	Q
1118.5								
1119.0	.5	37.5	76	.49	.035	42.46	2.89	108.38
1120.0	1.5	112.5	78	1.44	.035	42.46	5.93	667.13
1121.0	2.5	435.0	618	.71	.048	30.96	2.69	1170.15
1122.0	3.5	1,080.0	668	1.62	.048	30.96	4.68	5,054.40
1123.0	4.5	1,775.0	718	2.47	.049	30.33	6.07	10,774.25
1123.5	5	2,142.0	743	2.88	.049	30.33	6.73	14,415.66

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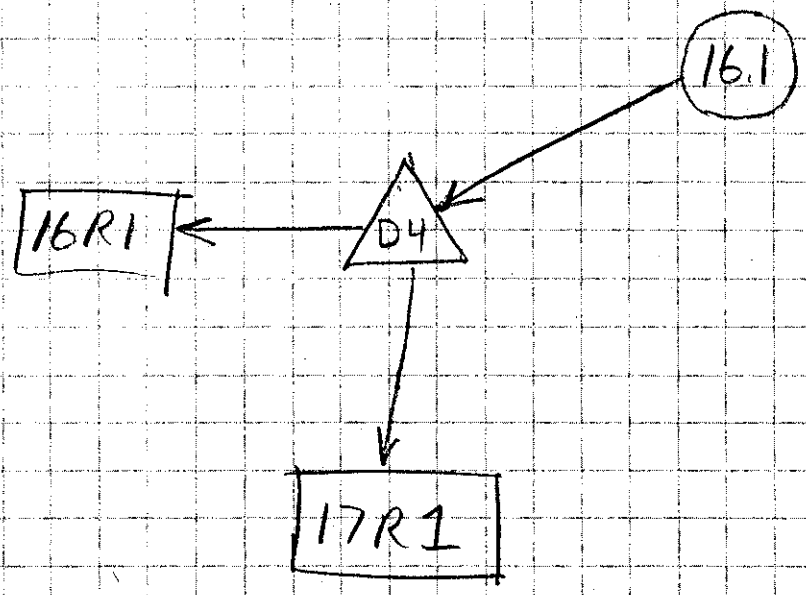
CLIENT FCDMC DATE 8-9-91
PROJECT Gila Bend BY EDL
PROJECT NO. _____ PAGE NO. 1/5

Diversion D-4
Basin 16

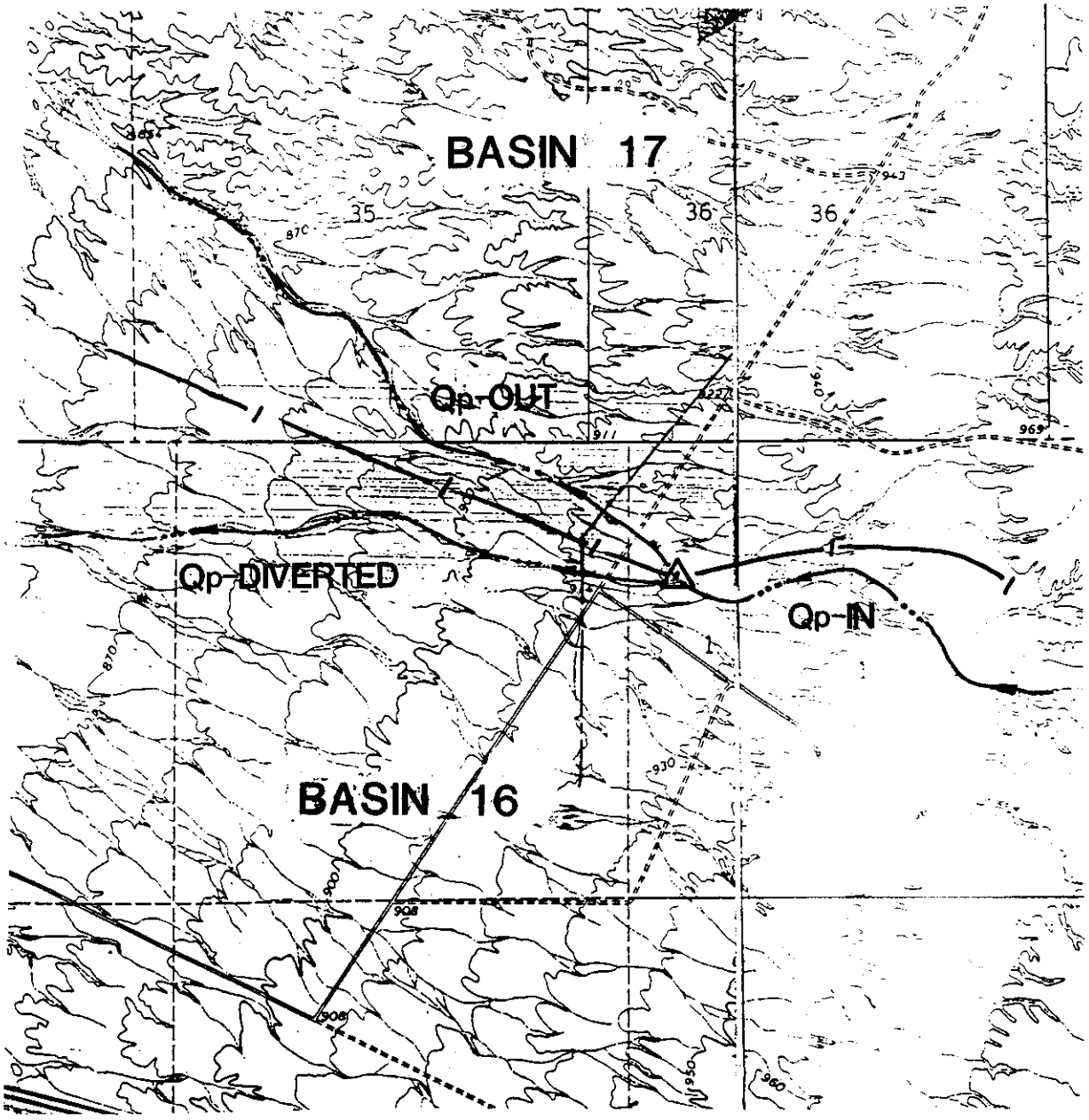


DIVERSION 4	6-HOUR	24-HOUR
IN	2383	2619
OUT	2052	2247
DIVERTED	332	371

LEGEND

- FLOW PATHS
- BASIN DELINEATION
- SECTION CUTS
- FLOW SPLIT

N



DIVERSION MAPPING – D4

Donohue ENGINEERS ARCHITECTS SCIENTISTS

CLIENT _____ DATE _____

PROJECT _____ BY _____

PROJECT NO. _____ PAGE NO. 3/5

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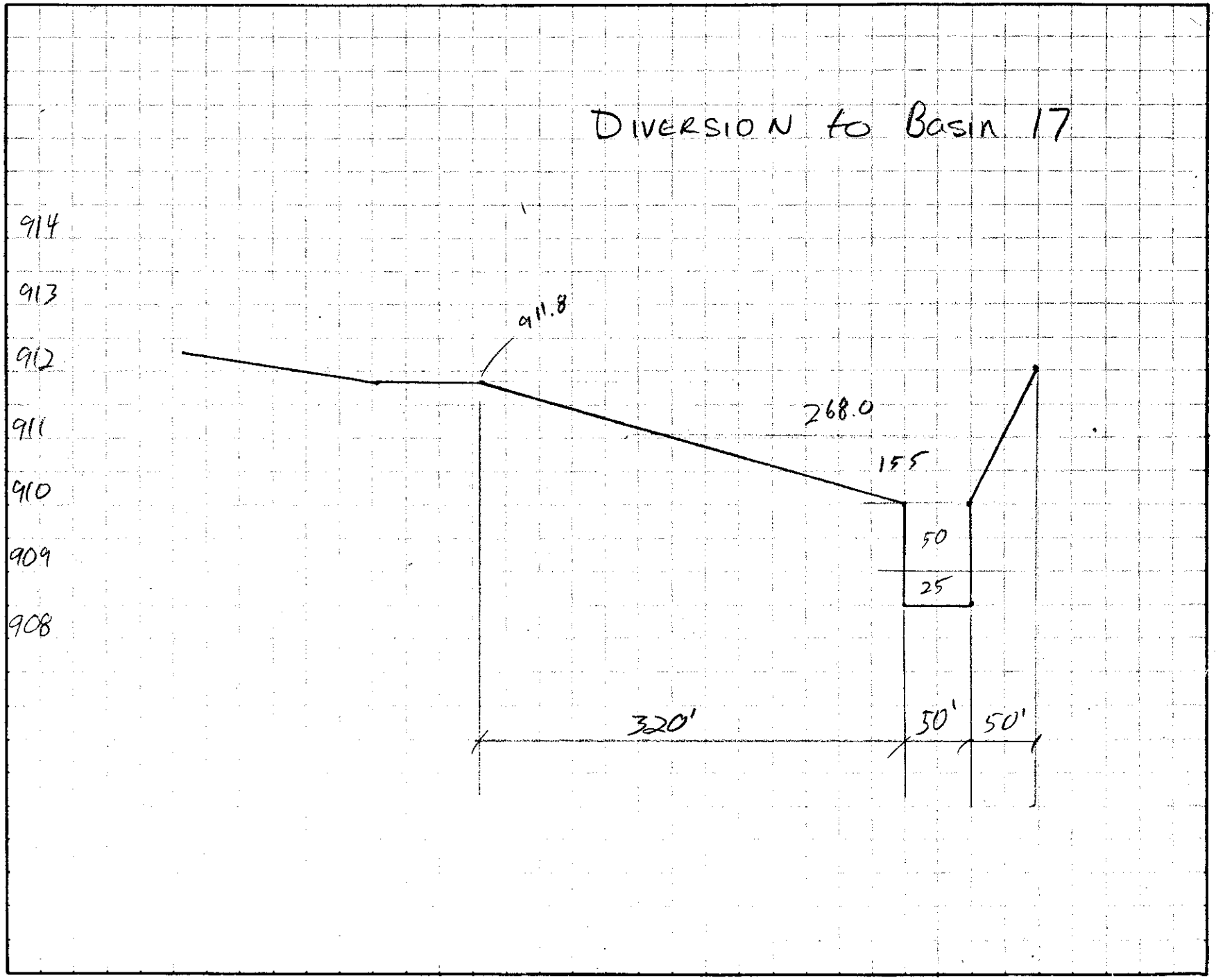
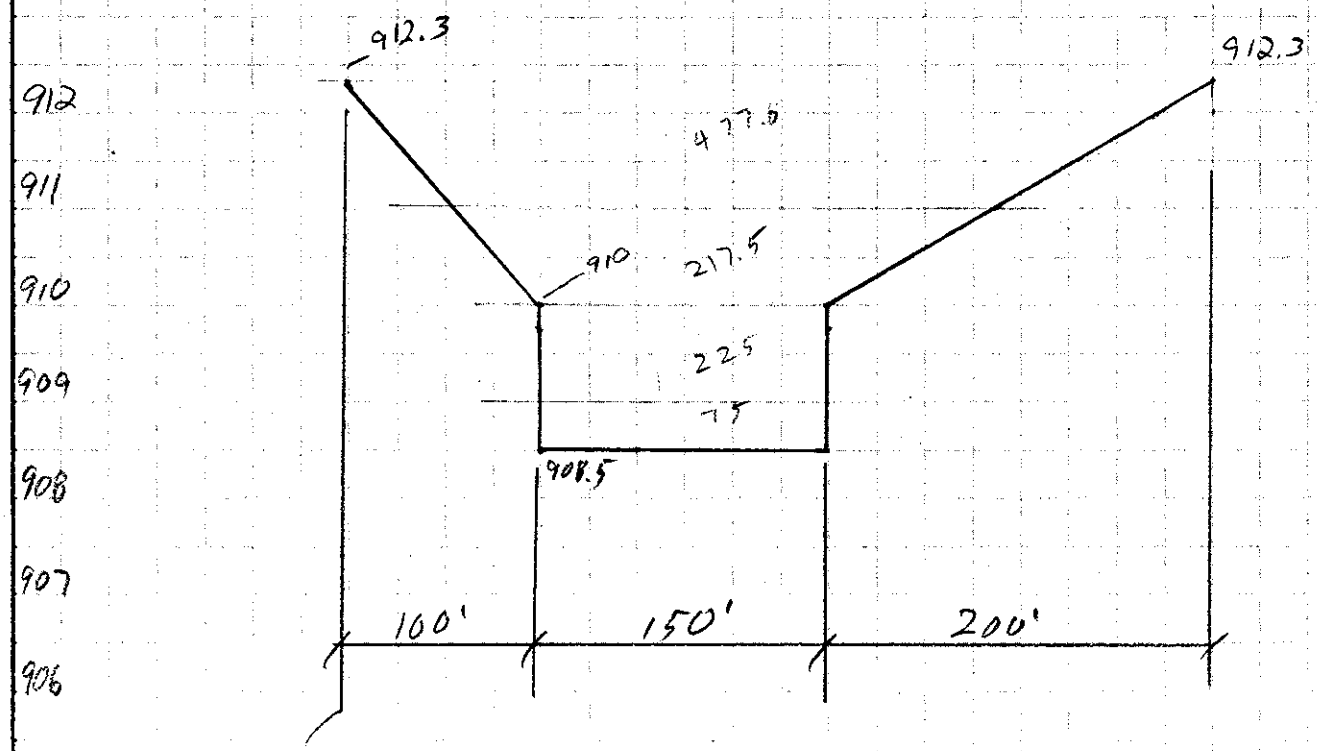


CLIENT _____ DATE _____

PROJECT _____ BY _____

PROJECT NO. _____ PAGE NO. 4/5

Downstream Cross-section
Flow to 16R1



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CLIENT ECD DATE 3/17/92

PROJECT Gila Bend BY [illegible]

PROJECT NO. 18028 PAGE NO. 5/5

Diversion Pit #4 - Basin 16

Elev.	Depth	Area	WP	R	N	C	V	Q
908.5								
909.0	.5	75	151	.50	.035	42.46	3.05	228.8
910.0	1.5	300	153	1.96	.035	42.46	7.58	2,274.0
911.0	2.5	517.5	283	1.83	.041	36.24	6.18	3,198.2
912.3	3.8	995.3	453	2.20	.045	33.02	6.36	6,330.1

DIVERSION FLOW

908.5								
909.0	.5	25	51	.49	.035	42.46	2.36	59.0
910.0	1.5	75	53	1.42	.035	42.46	4.80	360.0
911.0	2.5	230	250	.92	.047	31.62	2.68	616.4
911.8	3.3	498	410	1.19	.048	30.96	3.11	1,520.79

	Q_{Tot}	Q_{SF}
908	0	0
909	290	60
910	2630	360
911	5820	620
912	7850	1520

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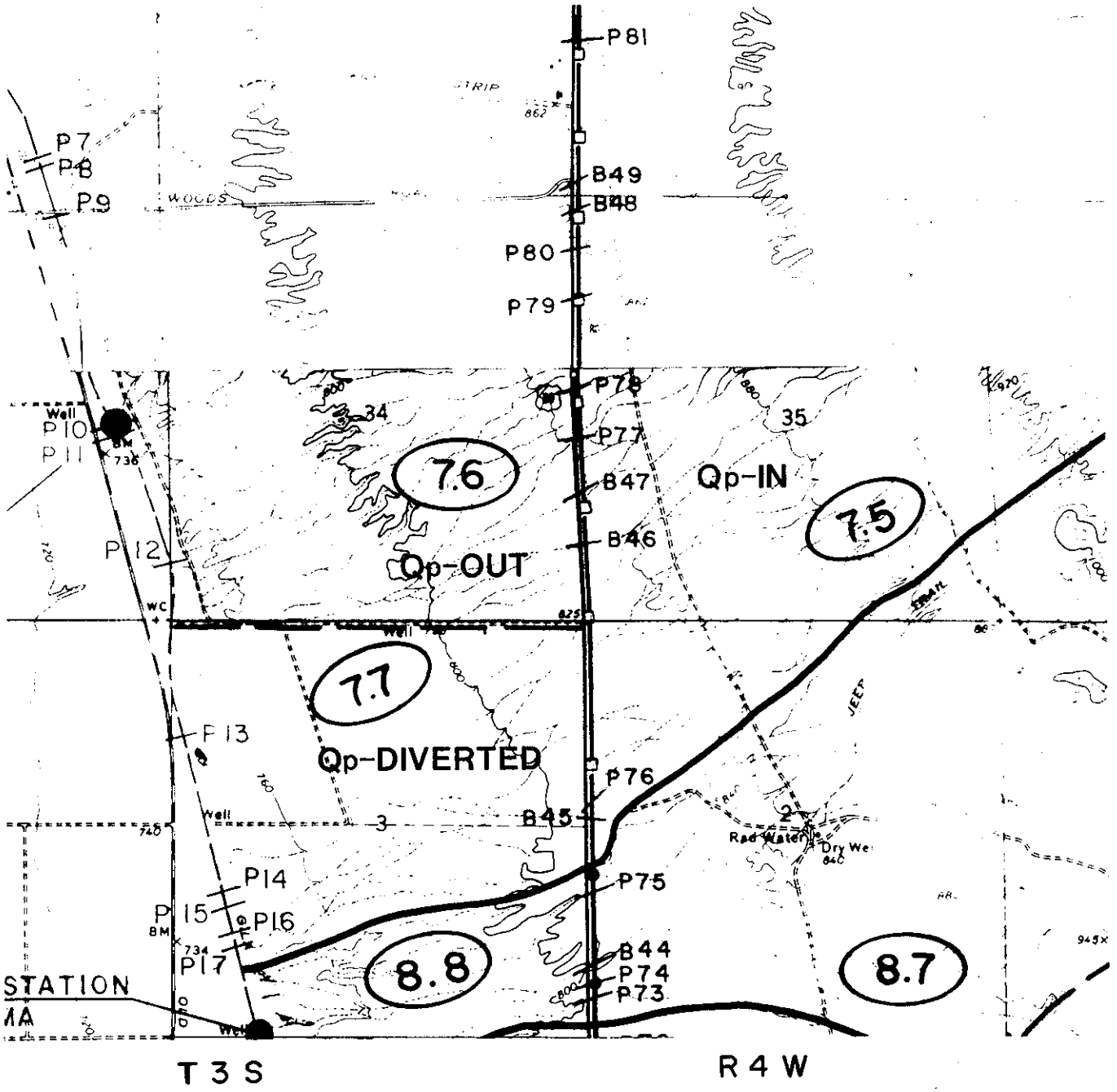
DIVERSION 5	6-HOUR	24-HOUR
IN	4208	4260
OUT	3063	3101
DIVERTED	1145	1159

LEGEND

- FLOW PATHS
- BASIN DELINEATION
- SECTION CUTS
- FLOW SPLIT



DIVERSION MAPPING – D5

Donohue ENGINEERS ARCHITECTS SCIENTISTS

APPENDIX E

HEC-1 MODEL OUTPUT

WITH INPUT ECHO

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****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*           SEPTEMBER 1990             *
*            VERSION 4.0               *
*                                      *
*  RUN DATE  11/25/1991  TIME  16:57:06 *
*                                      *
****************************************
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****************************************
*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*    HYDROLOGIC ENGINEERING CENTER     *
*          609 SECOND STREET           *
*       DAVIS, CALIFORNIA 95616        *
*          (916) 756-1104              *
*                                      *
****************************************
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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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::::::::::::::::::::::::::::::::::::::::
::::::::::::::::::::::::::::::::::::::::
:::                                  :::
:::  Full Microcomputer Implementation :::
:::                by                :::
:::       Haestad Methods, Inc.      :::
:::                                  :::
::::::::::::::::::::::::::::::::::::::::
::::::::::::::::::::::::::::::::::::::::
```

37 Brookside Road * Waterbury, Connecticut 06708 * (203) 755-1666

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

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

  1           ID            GILA BEND CANAL FLOOD STUDY
  2           ID            FCDMC
  3           ID            D&A #18099   9-9-91 REVISED 11-25-91
  4           ID            RAINBOW6.HC1        BASINS 1 - 6
  5           ID                     6-HOUR STORM
  6           IT      10                   145
  7           IO       5
  8           IN      15
  9           JD    3.45    0.01
 10           PC    .000    .008    .016    .025    .033    .041    .050    .058    .066    .074
 11           PC    .087    .099    .118    .138    .216    .377    .834    .911    .931    .950
 12           PC    .962    .972    .983    .991   1.000
 13           JD    3.43    0.50
 14           JD    3.38    2.80
 15           PC    .000    .009    .016    .025    .034    .042    .051    .059    .067    .076
 16           PC    .087    .100    .120    .163    .252    .451    .694    .837    .900    .938
 17           PC    .950    .963    .975    .988   1.000
 18           JD    3.18    16.0
 19           PC    .000    .015    .020    .030    .048    .063    .076    .090    .105    .119
 20           PC    .135    .152    .175    .222    .304    .472    .670    .796    .868    .912
 21           PC    .946    .960    .973    .987   1.000
 22           JD    2.79    90.0
 23           PC    .000    .021    .035    .051    .071    .087    .105    .125    .143    .160
 24           PC    .179    .201    .232    .281    .364    .500    .658    .773    .841    .888
 25           PC    .927    .945    .964    .982   1.000
 26           JD    1.97   500.0
 27           PC    .000    .024    .043    .059    .078    .098    .119    .141    .162    .186
 28           PC    .212    .239    .271    .321    .408    .515    .627    .735    .814    .864
 29           PC    .907    .930    .954    .977   1.000
              *  BASIN NO. 1

 30           KK     101
 31           KM            SUB-BASIN 101
 32           BA     .87
 33           LG     .20     .26    7.40     .15    7.00
 34           UI     81.    304.    459.    753.    702.    476.    300.    133.     82.     30.
 35           UI     22.     22.      0.      0.      0.      0.      0.      0.      0.      0.
 36           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 37           KK     1R1
 38           RS       3    FLOW      -1
 39           RL                      1     742
 40           RC    0.05    0.05    0.05    8000   .0011   760.0
 41           RX       0     600     630     640     670     680     690     700
 42           RY     760     750     746   742.1     742     746     750     750

 43           KK     102
 44           KM            SUB-BASIN 102
 45           BA     .92
 46           LG     .32     .34    4.70     .55     .00
 47           UI    196.    599.   1107.    881.    484.    173.     69.     33.      0.      0.
 48           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
              *  BASIN NO. 2
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  49          KK     201
  50          KM            SUB-BASIN 201
  51          BA    2.90
  52          LG     .25     .23     8.4     .08   12.00
  53          UI    233.    932.   1397.   2170.   2469.   1666.   1134.    545.    319.    166.
  54          UI     70.     70.      0.      0.      0.      0.      0.      0.      0.      0.
  55          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

  56          KK    2R1A
  57          RS       3    FLOW      -1
  58          RL                      5     100
  59          RC     .05    .050    .050   10060   .0144     105
  60          RX       0     100    2268    2851    3434    4017    6186    6285
  61          RY     106     104     102   100.1     100     102     104     106

  62          KK    2R1B
  63          RS       3    FLOW      -1
  64          RL                      5     742
  65          RC    0.05    0.05   0.050    3000   .0011   760.0
  66          RX       0     600     630     640     670     680     690     700
  67          RY     760     750     746   742.1     742     746     750     760

  68          KK     202
  69          KM            SUB-BASIN 202
  70          BA    2.62
  71          LG     .30     .33    4.20     .35     .00
  72          UI    108.    142.    396.    533.    635.    768.    971.   1350.   1146.    925.
  73          UI    772.    630.    513.    354.    199.    179.    125.    108.     42.     33.
  74          UI     33.     33.     33.     33.      0.      0.      0.      0.      0.      0.
  75          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

  76          KK     1C1
  77          KM            SPILLWAY 1 - GILLESPIE
  78          HC       4
              *  BASIN NO. 3

  79          KK     300
  80          KM            SPILLWAY 2 - RUSSEL BADLEY
  81          BA    3.78
  82          LG     .28     .31    4.70     .33    6.00
  83          UI    179.    330.    740.    968.   1184.   1512.   2188.   1877.   1488.   1193.
  84          UI    948.    691.    382.    300.    207.    164.     55.     55.     55.     55.
  85          UI     55.      0.      0.      0.      0.      0.      0.      0.      0.      0.
  86          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
              *  BASIN NO. 4

  87          KK     401
  88          KM            SUB-BASIN 401
  89          BA    2.87
  90          LG     .19     .32    4.50     .28    1.00
  91          UI    122.    173.    459.    613.    733.    891.   1182.   1523.   1229.   1007.
  92          UI    825.    671.    534.    323.    212.    189.    122.     94.     38.     38.
  93          UI     38.     38.     38.      0.      0.      0.      0.      0.      0.      0.
  94          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
```

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

 95           KK     4R1
 96           RS       3    FLOW      -1       0
 97           RL                      5     990
 98           RC     .05     .05     .05    8045   .0050    1010
 99           RX       0    1000    1500    1501    1600    1601    2601    4101
100           RY    1010    1000     995     990     990     995    1000    1010

101           KK     402
102           KM            SUB-BASIN 402
103           BA    2.04
104           LG     .16     .30    4.10     .27    1.00
105           UI     88.    130.    334.    446.    533.    650.    877.   1092.    862.    710.
106           UI    577.    468.    362.    208.    151.    125.     88.     54.     27.     27.
107           UI     27.     27.     27.      0.      0.      0.      0.      0.      0.      0.
108           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

109           KK     403
110           KM            SUB-BASIN 403
111           BA    5.09
112           LG     .29     .33    4.60     .32    2.00
113           UI     206.    249.    738.   1005.   1193.   1428.   1767.   2497.   2318.   1842.
114           UI    1552.   1274.   1039.    780.    459.    352.    293.    206.    143.     63.
115           UI     63.     63.     63.     63.      0.      0.      0.      0.      0.      0.
116           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

117           KK     4C1
118           HC       3

119           KK     4R2
120           RS       6    FLOW      -1       0
121           RL                      5     960
122           RC     .05     .05     .05   6600   .0051    1000
123           RX       0     200     500     501     651     652    2452    4452
124           RY     990     970     965     960     960     965     980     990

125           KK     407
126           KM            SUB-BASIN 407
127           BA    6.93
128           LG     .25     .33    4.90     .32    2.00
129           UI     281.    340.   1005.   1369.   1624.   1945.   2405.   3400.   3156.   2508.
130           UI    2113.   1734.   1414.   1062.    624.    479.    399.    281.    195.     86.
131           UI     86.     86.     86.     86.      0.      0.      0.      0.      0.      0.
132           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

133           KK     4C2
134           HC       2

135           KK     4R3
136           RS       1    FLOW      -1
137           RL                      5   891.5
138           RC     .05     .05     .05    2514   .0040     898
139           RX       0      25     185     205     235     255     525     560
140           RY     896   895.2   893.5   891.6   891.5   896.5   895.8     898
```

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

 141          KK     404
 142          KM            SUB-BASIN 404
 143          BA    3.87
 144          LG     .18     .31    4.00     .29     .00
 145          UI     140.    140.    432.    615.    746.    865.   1027.   1269.   1738.   1579.
 146          UI    1281.   1100.    920.    775.    643.    457.    270.    236.    199.    140.
 147          UI     120.     43.     43.     43.     43.     43.     43.      0.      0.      0.
 148          UI       0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 149          KK     405
 150          KM            SUB-BASIN 405
 151          BA     .53
 152          LG     .30     .30    3.90     .27     .00
 153          UI      36.    126.    201.    275.    429.    340.    248.    175.     89.     56.
 154          UI      35.     11.     11.     11.      0.      0.      0.      0.      0.      0.
 155          UI       0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 156          KK     4C7
 157          HC       2

 158          KK     4R4
 159          RS       1    FLOW      -1
 160          RL                      5   890.5
 161          RC     .05     .05     .05    4022   .0050     900
 162          RX       0     220     590     605     625     645     780    1000
 163          RY     900   894.5     894   890.5   890.5   894.5   894.5     900

 164          KK     406
 165          KM            SUB-BASIN 406
 166          BA    1.83
 167          LG     .28     .30    5.50     .27    6.00
 168          UI     134.    508.    776.   1117.   1580.   1116.    789.    502.    230.    154.
 169          UI      68.     41.     41.      0.      0.      0.      0.      0.      0.      0.
 170          UI       0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 171          KK     4C3
 172          HC       3

 173          KK     4R5
 174          RS       3    FLOW      -1
 175          RL                      5   873.5
 176          RC     .05     .05     .05    8045   .0050     884
 177          RX       0      40     190     305     370     395     515     525
 178          RY     882     880     880   873.5     874   881.5     883     884

 179          KK     408
 180          KM            SUB-BASIN 408
 181          BA    6.47
 182          LG     .33     .31    5.40     .28    4.00
 183          UI     108.    108.    108.    108.    195.    354.    410.    474.    519.    565.
 184          UI     604.    646.    691.    752.    814.    875.   1003.   1211.   1318.   1401.
 185          UI    1230.   1100.   1007.    935.    873.    818.    748.    686.    639.    586.
 186          UI     538.    503.    433.    357.    310.    199.    191.    187.    177.    177.
 187          UI     144.    108.    108.    108.    108.     46.     33.     33.     33.     33.
```

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

 188          UI     33.     33.     33.     33.     33.     33.     33.     33.     33.     33.
 189          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 190          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 191          KK     4R6
 192          RS       1    FLOW      -1
 193          RL                      5     890
 194          RC     .05     .05     .05    3268   .0092     910
 195          RX       0    1000    2600    2610    2640    2650    4950    5950
 196          RY     910     900     895     890     890     895     900     910

 197          KK     409
 198          KM            SUB-BASIN 409
 199          BA    1.13
 200          LG     .25     .35    4.30     .43     .00
 201          UI    208.    650.   1178.   1156.    683.    281.    134.     38.     38.      0.
 202          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 203          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 204          KK     410
 205          KM            SUB-BASIN 410
 206          BA    2.92
 207          LG     .29     .28    5.10     .26    4.00
 208          UI    124.    177.    467.    624.    746.    907.   1202.   1549.   1251.   1025.
 209          UI    839.    683.    543.    328.    216.    192.    124.     95.     38.     38.
 210          UI     38.     38.     38.      0.      0.      0.      0.      0.      0.      0.
 211          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 212          KK     4C4
 213          HC       4

 214          KK     4R7
 215          RS       2    FLOW      -1       0
 216          RL                      5     820
 217          RC     .05     .05     .05    6537   .0041   826.9
 218          RX       0      15      30     212     258     268     289     378
 219          RY   825.3   824.8   822.9     820     820     825   825.9   826.9

 220          KK     411
 221          KM            SUB-BASIN 411
 222          BA    6.03
 223          LG     .33     .31    5.10     .29    4.00
 224          UI    207.    207.    567.    869.   1067.   1225.   1435.   1694.   2258.   2620.
 225          UI   2091.   1772.   1532.   1291.   1090.    905.    641.    369.    348.    295.
 226          UI    207.    195.     64.     64.     64.     64.     64.     64.     64.      0.
 227          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 228          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 229          KK     4R8
 230          RS       4    FLOW      -1
 231          RL                      5     100
 232          RC     .05     .05     .05    6500   .0102     110
 233          RX       0      40    1203    1334    1466    1597    2760    2800
 234          RY     106     104     102     100     100     102     104     106
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 235          KK     412
 236          KM            SUB-BASIN 412
 237          BA    2.36
 238          LG     .32     .33    4.20     .38    1.00
 239          UI    142.    398.    716.    927.   1314.   1687.   1243.    945.    703.    401.
 240          UI    241.    163.     95.     44.     44.     44.      0.      0.      0.      0.
 241          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 242          KK     413
 243          KM            SUB-BASIN 413
 244          BA    1.24
 245          LG     .27     .33    4.00     .39     .00
 246          UI     53.     75.    198.    265.    317.    385.    511.    658.    531.    435.
 247          UI    356.    290.    231.    139.     92.     82.     53.     41.     16.     16.
 248          UI     16.     16.     16.      0.      0.      0.      0.      0.      0.      0.
 249          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 250          KK     4C5
 251          HC       4

 252          KK     4R9
 253          RS       4    FLOW      -1       0
 254          RL                      5     764
 255          RC     .05     .05     .05   12000   .0065     780
 256          RX       0      15      35      65     115     140     141     156
 257          RY     780     770   764.5     764     764   764.5   769.5     780

 258          KK     414
 259          KM            SUB-BASIN 414
 260          BA    3.63
 261          LG     .29     .28    6.20     .24    8.00
 262          UI    108.    108.    207.    392.    504.    580.    651.    751.    859.   1103.
 263          UI   1366.   1229.   1024.    899.    790.    681.    588.    512.    388.    265.
 264          UI    191.    179.    155.    108.    108.     53.     33.     33.     33.     33.
 265          UI     33.     33.     33.      0.      0.      0.      0.      0.      0.      0.
 266          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 267          KK     415
 268          KM            SUB-BASIN 415
 269          BA    3.55
 270          LG     .38     .35    4.30     .43     .00
 271          UI    187.    420.    843.   1087.   1375.   1998.   2151.   1607.   1265.    979.
 272          UI    675.    352.    287.    187.     97.     57.     57.     57.     57.      0.
 273          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 274          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 275          KK     4C6
 276          HC       3
              *  BASIN NO.5
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

277           KK     500
278           KM            SPILL-UNDER @ TURNER DRAW
279           BA    3.17
280           LG     .44     .35    4.30     .62     .00
281           UI    213.    717.   1160.   1563.   2465.   2063.   1511.   1092.    594.    358.
282           UI    217.     92.     65.     65.      0.      0.      0.      0.      0.      0.
283           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
              *  BASIN NO. 6

284           KK     601
285           KM            SUB-BASIN 601
286           BA    3.68
287           LG     .50     .28    6.40     .21    7.00
288           UI    180.    349.    762.    988.   1224.   1596.   2233.   1771.   1419.   1123.
289           UI    885.    587.    315.    277.    180.    108.     55.     55.     55.     55.
290           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
291           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

292           KK     6R1
293           RS       2    FLOW      -1       0
294           RL                     10     100
295           RC     .05    .050     .05    5280   .0100     110
296           RX       0     100    1408    1475    1541    1608    2917    3017
297           RY     106     104     102   100.1     100     102     104     106

298           KK     602
299           KM            SUB-BASIN 602
300           BA     .44
301           LG     .39     .35    4.00     .38     .00
302           UI     87.    269.    496.    435.    251.     96.     40.     15.      0.      0.
303           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

304           KK     6C1
305           HC       2

306           KK     6R2
307           RS       2    FLOW      -1       0
308           RL                     10     820
309           RC     .05    .050     .05    5280   .0023     840
310           RX       0    1470    1500    1530    1580    1610    2410    3110
311           RY     800     825     825   820.1     820     825     830     840

312           KK     603
313           KM            SUB-BASIN 603
314           BA    2.28
315           LG     .38     .32    4.70     .32    1.00
316           UI    338.   1114.   1828.   2471.   1550.    859.    355.    164.     69.     69.
317           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
318           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 319          KK     6R3
 320          RS       1    FLOW      -1       0
 321          RL                      10     840
 322          RC     .05    .050     .05    4700   .0148     860
 323          RX       0    1500    6700    6720    6770    6795    8195    9195
 324          RY     860     850     845   840.1     840     845     850     860

 325          KK     604
 326          KM            SUB-BASIN 604
 327          BA     .60
 328          LG     .50     .35    4.00     .55     .00
 329          UI     52.    201.    302.    485.    498.    337.    223.    100.     61.     28.
 330          UI     15.     15.      0.      0.      0.      0.      0.      0.      0.      0.
 331          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 332          KK     6C2
 333          HC       3

 334          KK     6R4
 335          RS       2    FLOW      -1       0
 336          RL                      10     780
 337          RC     .05    .050     .05    6537   .0115     800
 338          RX       0    1500    5700    5750    5850    5900    7900    9400
 339          RY     800     790     785   780.1     780     785     790     800

 340          KK     605
 341          KM            SUB-BASIN 605
 342          BA    1.60
 343          LG     .44     .34    4.00     .38     .00
 344          UI     98.    283.    501.    652.    933.   1152.    833.    627.    456.    243.
 345          UI    164.    100.     50.     30.     30.     30.      0.      0.      0.      0.
 346          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 347          KK     6R5
 348          RS       1    FLOW      -1       0
 349          RL                      10     780
 350          RC     .05    .050     .05    4022   .0099     800
 351          RX       0    1500    5700    5730    5830    5860    7860    9360
 352          RY     800     790     785   780.1     780     785     790     800

 353          KK     606
 354          KM            SUB-BASIN 606
 355          BA    3.64
 356          LG     .29     .26    7.30     .15    9.00
 357          UI    223.    643.   1139.   1483.   2123.   2620.   1894.   1428.   1038.    552.
 358          UI    373.    228.    114.     68.     68.     68.      0.      0.      0.      0.
 359          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 360          KK     6R6
 361          RS       3    FLOW      -1       0
 362          RL                      10     100
 363          RC     .05    .050     .05    9051   .0122     110
 364          RX       0     100     250     317     383     450     600     700
 365          RY     106     104     102   100.1     100     102     104     106
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 366          KK     607
 367          KM            SUB-BASIN 607
 368          BA    1.13
 369          LG     .46     .34    4.20     .58     .00
 370          UI     75.    244.    401.    536.    842.    753.    552.    400.    242.    127.
 371          UI     86.     44.     23.     23.     23.      0.      0.      0.      0.      0.
 372          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 373          KK     608
 374          KM            SUB-BASIN 608
 375          BA     .37
 376          LG     .35     .31    3.90     .32     .00
 377          UI     51.    171.    273.    400.    259.    154.     64.     32.     11.     11.
 378          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 379          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 380          KK     6C3
 381          HC       5
 382          ZZ
```

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****************************************
*                                      *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*          SEPTEMBER 1990              *
*           VERSION 4.0                *
*                                      *
* RUN DATE  11/25/1991  TIME  16:57:06 *
*                                      *
****************************************
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****************************************
*                                      *
*   U.S. ARMY CORPS OF ENGINEERS       *
*   HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616        *
*          (916) 756-1104              *
*                                      *
****************************************
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                    GILA BEND CANAL FLOOD STUDY
                    FCDMC
                    D&A #18099   9-9-91 REVISED 11-25-91
                    RAINBOW6.HC1        BASINS 1 - 6
                             6-HOUR STORM

 7 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        145  NUMBER OF HYDROGRAPH ORDINATES
                NDDATE     2    0  ENDING DATE
                NDTIME       0000  ENDING TIME
                 ICENT         19  CENTURY MARK

             COMPUTATION INTERVAL     .17 HOURS
                  TOTAL TIME BASE   24.00 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

 9 JD        INDEX STORM NO. 1
                  STRM        3.45  PRECIPITATION DEPTH
                  TRDA         .01  TRANSPOSITION DRAINAGE AREA

10 PI          PRECIPITATION PATTERN
                 .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                 .01       .01       .01       .01       .01       .01       .01       .01       .01       .03
                 .05       .11       .21       .30       .05       .03       .01       .01       .01       .01
                 .01       .01       .01       .01       .01       .01

13 JD        INDEX STORM NO. 2
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                STRM        3.43  PRECIPITATION DEPTH
                TRDA         .50  TRANSPOSITION DRAINAGE AREA

 0 PI         PRECIPITATION PATTERN
                .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                .01       .01       .01       .01       .01       .01       .01       .01       .01       .03
                .05       .11       .21       .30       .05       .03       .01       .01       .01       .01
                .01       .01       .01       .01       .01       .01

14 JD        INDEX STORM NO. 3
                STRM        3.38  PRECIPITATION DEPTH
                TRDA        2.80  TRANSPOSITION DRAINAGE AREA

15 PI         PRECIPITATION PATTERN
                .01       .01       .00       .01       .01       .01       .01       .01       .01       .01
                .01       .01       .01       .01       .01       .01       .01       .01       .03       .04
                .06       .13       .15       .16       .10       .07       .04       .03       .02       .01
                .01       .01       .01       .01       .01       .01

18 JD        INDEX STORM NO. 4
                STRM        3.18  PRECIPITATION DEPTH
                TRDA       16.00  TRANSPOSITION DRAINAGE AREA

19 PI         PRECIPITATION PATTERN
                .01       .01       .00       .01       .01       .01       .01       .01       .01       .01
                .01       .01       .01       .01       .01       .01       .01       .02       .03       .04
                .05       .11       .12       .13       .08       .07       .05       .03       .03       .02
                .01       .01       .01       .01       .01       .01

22 JD        INDEX STORM NO. 5
                STRM        2.79  PRECIPITATION DEPTH
                TRDA       90.00  TRANSPOSITION DRAINAGE AREA

23 PI         PRECIPITATION PATTERN
                .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                .01       .01       .01       .01       .01       .01       .02       .02       .03       .04
                .06       .09       .10       .11       .08       .06       .05       .03       .03       .03
                .01       .01       .01       .01       .01       .01

26 JD        INDEX STORM NO. 6
                STRM        1.97  PRECIPITATION DEPTH
                TRDA      500.00  TRANSPOSITION DRAINAGE AREA

27 PI         PRECIPITATION PATTERN
                .02       .01       .01       .01       .01       .01       .01       .01       .01       .01
                .01       .01       .02       .02       .02       .02       .02       .02       .03       .05
                .06       .07       .07       .07       .07       .06       .05       .03       .03       .03
                .02       .02       .02       .02       .02       .02
WARNING EXCESS AT PONDING LESS THAN ZERO FOR PERIOD. EXCESS SET TO ZERO
```

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

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
HYDROGRAPH AT	101	1245.	4.50	189.	47.	47.	.87		
ROUTED TO	1R1	847.	5.00	181.	45.	45.	.87		
HYDROGRAPH AT	102	1118.	4.33	114.	29.	29.	.92		
HYDROGRAPH AT	201	3575.	4.50	689.	173.	173.	2.90		
ROUTED TO	2R1A	1547.	5.33	275.	69.	69.	2.90		
ROUTED TO	2R1B	1477.	5.50	267.	67.	67.	2.90		
HYDROGRAPH AT	202	1486.	5.17	376.	94.	94.	2.62		
4 COMBINED AT	1C1	2876.	5.33	765.	191.	191.	7.31		
HYDROGRAPH AT	300	2403.	5.00	576.	145.	145.	3.78		
HYDROGRAPH AT	401	1848.	5.17	473.	118.	118.	2.87		
ROUTED TO	4R1	1648.	5.50	403.	101.	101.	2.87		
HYDROGRAPH AT	402	1470.	5.17	369.	92.	92.	2.04		
HYDROGRAPH AT	403	2643.	5.17	699.	175.	175.	5.09		
3 COMBINED AT	4C1	4624.	5.17	1252.	313.	313.	10.00		
ROUTED TO	4R2	4478.	5.50	1162.	290.	290.	10.00		
HYDROGRAPH AT	407	3390.	5.17	899.	225.	225.	6.93		
2 COMBINED AT	4C2	6491.	5.33	1808.	453.	453.	16.93		
ROUTED TO	4R3	6321.	5.50	1776.	444.	444.	16.93		
HYDROGRAPH AT	404	2149.	5.33	621.	155.	155.	3.87		
HYDROGRAPH AT	405	668.	4.67	103.	26.	26.	.53		
2 COMBINED AT	4C7	2263.	5.33	694.	174.	174.	4.40		
ROUTED TO	4R4	1965.	5.50	663.	166.	166.	4.40		
HYDROGRAPH AT	406	1855.	4.67	318.	80.	80.	1.83		
3 COMBINED AT	4C3	7414.	5.50	2343.	587.	587.	23.16		
ROUTED TO	4R5	6994.	5.83	2247.	562.	562.	23.16		
HYDROGRAPH AT	408	1619.	7.00	845.	227.	227.	6.47		

ROUTED TO	4R6	1546.	7.17	829.	220.	220.	6.47
HYDROGRAPH AT	4D9	1406.	4.33	163.	41.	41.	1.13
HYDROGRAPH AT	410	1915.	5.17	497.	125.	125.	2.92
4 COMBINED AT	4C4	7481.	5.83	2985.	762.	762.	33.68
ROUTED TO	4R7	7108.	6.00	2840.	721.	721.	33.68
HYDROGRAPH AT	411	2762.	5.50	850.	214.	214.	6.03
ROUTED TO	4R8	2393.	5.83	708.	177.	177.	6.03
HYDROGRAPH AT	412	1726.	4.83	333.	83.	83.	2.36
HYDROGRAPH AT	413	812.	5.17	191.	48.	48.	1.24
4 COMBINED AT	4C5	8198.	6.00	3292.	838.	838.	43.31
ROUTED TO	4R9	7908.	6.17	3114.	786.	786.	43.31
HYDROGRAPH AT	414	1775.	5.67	615.	155.	155.	3.63
HYDROGRAPH AT	415	1908.	4.83	402.	101.	101.	3.55
3 COMBINED AT	4C6	8403.	6.17	3460.	886.	886.	50.49
HYDROGRAPH AT	500	1510.	4.67	248.	62.	62.	3.17
HYDROGRAPH AT	601	2539.	5.00	603.	151.	151.	3.68
ROUTED TO	6R1	1858.	5.33	481.	120.	120.	3.68
HYDROGRAPH AT	602	698.	4.33	72.	18.	18.	.44
2 COMBINED AT	6C1	1858.	5.33	534.	134.	134.	4.12
ROUTED TO	6R2	1692.	5.83	527.	132.	132.	4.12
HYDROGRAPH AT	603	2356.	4.50	337.	84.	84.	2.28
ROUTED TO	6R3	2182.	4.50	308.	77.	77.	2.28
HYDROGRAPH AT	604	595.	4.50	79.	20.	20.	.60
3 COMBINED AT	6C2	2279.	4.67	787.	197.	197.	7.00
ROUTED TO	6R4	1927.	4.83	644.	161.	161.	7.00
HYDROGRAPH AT	605	1229.	4.83	226.	56.	56.	1.60
ROUTED TO	6R5	1027.	4.83	178.	44.	44.	1.60
HYDROGRAPH AT	606	3345.	4.67	718.	180.	180.	3.64
ROUTED TO	6R6	2685.	5.17	551.	138.	138.	3.64
HYDROGRAPH AT	607	817.	4.67	128.	32.	32.	1.13

HYDROGRAPH AT	608	551.	4.50	67.	17.	17.	.37
5 COMBINED AT	6C3	4712.	5.00	1234.	309.	309.	13.74

*** NORMAL END OF HEC-1 ***
Elapsed Time - 00:00:37.57 (37.57 Seconds)
NORMAL END OF HEC-1

HEC1 S/N: HMVersion: 6.00 Data File: RAINBW24.HC1

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****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*          SEPTEMBER 1990              *
*           VERSION 4.0                *
*                                      *
* RUN DATE  11/25/1991  TIME  16:56:22 *
*                                      *
****************************************
```

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****************************************
*                                      *
*   U.S. ARMY CORPS OF ENGINEERS       *
*   HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET            *
*      DAVIS, CALIFORNIA 95616         *
*          (916) 756-1104              *
*                                      *
****************************************
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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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::::::::::::::::::::::::::::::::::::::::
::::::::::::::::::::::::::::::::::::::::
:::                                  :::
:::  Full Microcomputer Implementation :::
:::                by                :::
:::       Haestad Methods, Inc.      :::
:::                                  :::
::::::::::::::::::::::::::::::::::::::::
::::::::::::::::::::::::::::::::::::::::
```

37 Brookside Road * Waterbury, Connecticut 06708 * (203) 755-1666

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

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

  1           ID            GILA BEND CANAL FLOOD STUDY
  2           ID            FCDMC
  3           ID            D&A #18099   9-9-91 REVISED 11-25-91
  4           ID            RAINBW24.HC1        BASINS 1 - 6
  5           ID                     24-HOUR STORM
  6           IT      10                    145
  7           IO       5
  8           IN      30
  9           JD    4.20     .01
 10           PC    .000    .005    .011    .016    .022    .028    .035    .041    .048    .056
 11           PC    .068    .071    .080    .089    .098    .109    .120    .133    .147    .163
 12           PC    .181    .204    .235    .283    .663    .735    .772    .799    .820    .838
 13           PC    .854    .868    .880    .891    .902    .912    .921    .929    .937    .945
 14           PC    .952    .959    .965    .972    .978    .984    .989    .995   1.000
 15           JD    3.99    10.0
 16           JD    3.86    20.0
 17           JD    3.78    30.0
 18           JD    3.70    50.0
 19           JD    3.57   100.0
              *  BASIN NO. 1

 20           KK     101
 21           KM            SUB-BASIN 101
 22           BA     .87
 23           LG     .20     .26    7.40     .15    7.00
 24           UI     81.    304.    459.    753.    702.    476.    300.    133.     82.     30.
 25           UI     22.     22.      0.      0.      0.      0.      0.      0.      0.      0.
 26           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 27           KK     1R1
 28           RS       3    FLOW      -1
 29           RL                      1     742
 30           RC    0.05    0.05    0.05    8000   .0011   760.0
 31           RX       0     600     630     640     670     680     690     700
 32           RY     760     750     746   742.1     742     746     750     750

 33           KK     102
 34           KM            SUB-BASIN 102
 35           BA     .92
 36           LG     .32     .34    4.70     .55     .00
 37           UI    196.    599.   1107.    881.    484.    173.     69.     33.      0.      0.
 38           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
              *  BASIN NO. 2

 39           KK     201
 40           KM            SUB-BASIN 201
 41           BA    2.90
 42           LG     .25     .23    8.40     .08   12.00
 43           UI    233.    932.   1397.   2170.   2469.   1666.   1134.    545.    319.    166.
 44           UI     70.     70.      0.      0.      0.      0.      0.      0.      0.      0.
 45           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  46          KK    2R1A
  47          RS       3    FLOW      -1
  48          RL                      5     100
  49          RC     .05     .05     .05   10060   .0144     105
  50          RX       0     100    2268    2851    3434    4017    6186    6285
  51          RY     106     104     102     100     100     102     104     106

  52          KK    2R1B
  53          RS       3    FLOW      -1
  54          RL                      5     742
  55          RC    0.05    0.05    0.05    3000   .0011   760.0
  56          RX       0     600     630     640     670     680     690     700
  57          RY     760     750     746   742.1     742     746     750     750

  58          KK     202
  59          KM            SUB-BASIN 202
  60          BA    2.62
  61          LG     .30     .33    4.20     .35     .00
  62          UI    108.    142.    396.    533.    635.    768.    971.   1350.   1146.    925.
  63          UI    772.    630.    513.    354.    199.    179.    125.    108.     42.     33.
  64          UI     33.     33.     33.     33.      0.      0.      0.      0.      0.      0.
  65          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

  66          KK     1C1
  67          KM            SPILLWAY 1 - GILLESPIE
  68          HC       4
              *  BASIN NO. 3

  69          KK     300
  70          KM            SPILLWAY 2 - RUSSEL BADLEY
  71          BA    3.78
  72          LG     .28     .31    4.70     .33    6.00
  73          UI    179.    330.    740.    968.   1184.   1512.   2188.   1877.   1488.   1193.
  74          UI    948.    691.    382.    300.    207.    164.     55.     55.     55.     55.
  75          UI     55.      0.      0.      0.      0.      0.      0.      0.      0.      0.
  76          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
              *  BASIN NO. 4

  77          KK     401
  78          KM            SUB-BASIN 401
  79          BA    2.87
  80          LG     .19     .32    4.50     .28    1.00
  81          UI    122.    173.    459.    613.    733.    891.   1182.   1523.   1229.   1007.
  82          UI    825.    671.    534.    323.    212.    189.    122.     94.     38.     38.
  83          UI     38.     38.     38.      0.      0.      0.      0.      0.      0.      0.
  84          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

  85          KK     4R1
  86          RS       3    FLOW      -1       0
  87          RL                      5     990
  88          RC     .05     .05     .05    8045   .0050    1010
  89          RX       0    1000    1500    1501    1600    1601    2601    4101
  90          RY    1010    1000     995     990     990     995    1000    1010
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  91          KK    402
  92          KM          SUB-BASIN 402
  93          BA   2.04
  94          LG    .16     .30    4.10     .27    1.00
  95          UI    88.    130.    334.    446.    533.    650.    877.   1092.    862.    710.
  96          UI   577.    468.    362.    208.    151.    125.     88.     54.     27.     27.
  97          UI    27.     27.     27.      0.      0.      0.      0.      0.      0.      0.
  98          UI     0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

  99          KK    403
 100          KM          SUB-BASIN 403
 101          BA   5.09
 102          LG    .29     .33    4.60     .32    2.00
 103          UI   206.    249.    738.   1005.   1193.   1428.   1767.   2497.   2318.   1842.
 104          UI  1552.   1274.   1039.    780.    459.    352.    293.    206.    143.     63.
 105          UI    63.     63.     63.     63.      0.      0.      0.      0.      0.      0.
 106          UI     0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 107          KK    4C1
 108          HC      3

 109          KK    4R2
 110          RS      6   FLOW      -1       0
 111          RL                     5     960
 112          RC    .05     .05     .05    6600   .0051    1000
 113          RX      0     200     500     501     651     652    2452    4452
 114          RY    990     970     965     960     960     965     980     990

 115          KK    407
 116          KM          SUB-BASIN 407
 117          BA   6.93
 118          LG    .25     .33    4.90     .32    2.00
 119          UI   281.    340.   1005.   1369.   1624.   1945.   2405.   3400.   3156.   2508.
 120          UI  2113.   1734.   1414.   1062.    624.    479.    399.    281.    195.     86.
 121          UI    86.     86.     86.     86.      0.      0.      0.      0.      0.      0.
 122          UI     0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 123          KK    4C2
 124          HC      2

 125          KK    4R3
 126          RS      1   FLOW      -1
 127          RL                     5   891.5
 128          RC    .05     .05     .05    2514   .0040     898
 129          RX      0      25     185     205     235     255     525     560
 130          RY    896   895.2   893.5   891.6   891.5   896.5   895.8     898

 131          KK    404
 132          KM          SUB-BASIN 404
 133          BA   3.87
 134          LG    .18     .31    4.00     .29     .00
 135          UI   140.    140.    432.    615.    746.    865.   1027.   1269.   1738.   1579.
 136          UI  1281.   1100.    920.    775.    643.    457.    270.    236.    199.    140.
 137          UI   120.     43.     43.     43.     43.     43.     43.      0.      0.      0.
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 138          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 139          KK     405
 140          KM            SUB-BASIN 405
 141          BA     .53
 142          LG     .30     .30    3.90     .27     .00
 143          UI     36.    126.    201.    275.    429.    340.    248.    175.     89.     56.
 144          UI     35.     11.     11.     11.      0.      0.      0.      0.      0.      0.
 145          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 146          KK     4C7
 147          HC       2

 148          KK     4R4
 149          RS       1    FLOW      -1
 150          RL                     5   890.5
 151          RC     .05     .05     .05    4022   .0050     900
 152          RX       0     220     590     605     625     645     780    1000
 153          RY     900   894.5     894   890.5   890.5   894.5   894.5     900

 154          KK     406
 155          KM            SUB-BASIN 406
 156          BA    1.83
 157          LG     .28     .30    5.50     .27    6.00
 158          UI    134.    508.    776.   1117.   1580.   1116.    789.    502.    230.    154.
 159          UI     68.     41.     41.      0.      0.      0.      0.      0.      0.      0.
 160          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 161          KK     4C3
 162          HC       3

 163          KK     4R5
 164          RS       3    FLOW      -1
 165          RL                     5   873.5
 166          RC     .05     .05     .05    8045   .0050     884
 167          RX       0      40     190     305     370     395     515     525
 168          RY     882     880     880   873.5     874   881.5     883     884

 169          KK     408
 170          KM            SUB-BASIN 408
 171          BA    6.47
 172          LG     .33     .31    5.40     .28    4.00
 173          UI    108.    108.    108.    108.    195.    354.    410.    474.    519.    565.
 174          UI    604.    646.    691.    752.    814.    875.   1003.   1211.   1318.   1401.
 175          UI   1230.   1100.   1007.    935.    873.    818.    748.    686.    639.    586.
 176          UI    538.    503.    433.    357.    310.    199.    191.    187.    177.    177.
 177          UI    144.    108.    108.    108.    108.     46.     33.     33.     33.     33.
 178          UI     33.     33.     33.     33.     33.     33.     33.     33.     33.     33.
 179          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 180          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 181          KK     4R6
 182          RS       1    FLOW      -1
 183          RL                      5     890
 184          RC     .05     .05     .05    3268   .0092     910
 185          RX       0    1000    2600    2610    2640    2650    4950    5950
 186          RY     910     900     895     890     890     895     900     910

 187          KK     409
 188          KM            SUB-BASIN 409
 189          BA    1.13
 190          LG     .25     .35    4.30     .43     .00
 191          UI    208.    650.   1178.   1156.    683.    281.    134.     38.     38.      0.
 192          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 193          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 194          KK     410
 195          KM            SUB-BASIN 410
 196          BA    2.92
 197          LG     .29     .28    5.10     .26    4.00
 198          UI    124.    177.    467.    624.    746.    907.   1202.   1549.   1251.   1025.
 199          UI    839.    683.    543.    328.    216.    192.    124.     95.     38.     38.
 200          UI     38.     38.     38.      0.      0.      0.      0.      0.      0.      0.
 201          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 202          KK     4C4
 203          HC       4

 204          KK     4R7
 205          RS       2    FLOW      -1       0
 206          RL                      5     820
 207          RC     .05     .05     .05    6537   .0041   826.9
 208          RX       0      15      30     212     258     268     289     378
 209          RY   825.3   824.8   822.9     820     820     825   825.9   826.9

 210          KK     411
 211          KM            SUB-BASIN 411
 212          BA    6.03
 213          LG     .33     .31    5.10     .29    4.00
 214          UI    207.    207.    567.    869.   1067.   1225.   1435.   1694.   2258.   2620.
 215          UI   2091.   1772.   1532.   1291.   1090.    905.    641.    369.    348.    295.
 216          UI    207.    195.     64.     64.     64.     64.     64.     64.     64.      0.
 217          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 218          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 219          KK     4R8
 220          RS       4    FLOW      -1
 221          RL                      5     100
 222          RC     .05     .05     .05    6500   .0102     110
 223          RX       0      40    1203    1334    1466    1597    2760    2800
 224          RY     106     104     102     100     100     102     104     106
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 225          KK     412
 226          KM            SUB-BASIN 412
 227          BA    2.36
 228          LG     .32     .33    4.20     .38    1.00
 229          UI    142.    398.    716.    927.   1314.   1687.   1243.    945.    703.    401.
 230          UI    241.    163.     95.     44.     44.     44.      0.      0.      0.      0.
 231          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 232          KK     413
 233          KM            SUB-BASIN 413
 234          BA    1.24
 235          LG     .27     .33    4.00     .39     .00
 236          UI     53.     75.    198.    265.    317.    385.    511.    658.    531.    435.
 237          UI    356.    290.    231.    139.     92.     82.     53.     41.     16.     16.
 238          UI     16.     16.     16.      0.      0.      0.      0.      0.      0.      0.
 239          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 240          KK     4C5
 241          HC       4

 242          KK     4R9
 243          RS       4    FLOW      -1       0
 244          RL                      5     764
 245          RC     .05     .05     .05   12000   .0065     780
 246          RX       0      15      35      65     115     140     141     156
 247          RY     780     770   764.5     764     764   764.5   769.5     780

 248          KK     414
 249          KM            SUB-BASIN 414
 250          BA    3.63
 251          LG     .29     .28    6.20     .24    8.00
 252          UI    108.    108.    207.    392.    504.    580.    651.    751.    859.   1103.
 253          UI   1366.   1229.   1024.    899.    790.    681.    588.    512.    388.    265.
 254          UI    191.    179.    155.    108.    108.     53.     33.     33.     33.     33.
 255          UI     33.     33.     33.      0.      0.      0.      0.      0.      0.      0.
 256          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 257          KK     415
 258          KM            SUB-BASIN 415
 259          BA    3.55
 260          LG     .38     .35    4.30     .43     .00
 261          UI    187.    420.    843.   1087.   1375.   1998.   2151.   1607.   1265.    979.
 262          UI    675.    352.    287.    187.     97.     57.     57.     57.     57.      0.
 263          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 264          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 265          KK     4C6
 266          HC       3
              *  BASIN NO.5
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 267          KK     500
 268          KM            SPILL-UNDER @ TURNER DRAW
 269          BA    3.17
 270          LG     .44     .35    4.30     .62     .00
 271          UI    213.    717.   1160.   1563.   2465.   2063.   1511.   1092.    594.    358.
 272          UI    217.     92.     65.     65.      0.      0.      0.      0.      0.      0.
 273          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
              *  BASIN NO. 6

 274          KK     601
 275          KM            SUB-BASIN 601
 276          BA    3.68
 277          LG     .50     .28    6.40     .21    7.00
 278          UI    180.    349.    762.    988.   1224.   1596.   2233.   1771.   1419.   1123.
 279          UI    885.    587.    315.    277.    180.    108.     55.     55.     55.     55.
 280          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 281          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 282          KK     6R1
 283          RS       2    FLOW
 284          RL                     10     100
 285          RC     .05     .05     .05    5280   .0100     110
 286          RX       0     100    1408    1475    1541    1608    2917    3017
 287          RY     106     104     102     100     100     102     104     106

 288          KK     602
 289          KM            SUB-BASIN 602
 290          BA     .44
 291          LG     .39     .35    4.00     .38     .00
 292          UI     87.    269.    496.    435.    251.     96.     40.     15.      0.      0.
 293          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 294          KK     6C1
 295          HC       2

 296          KK     6R2
 297          RS       2    FLOW
 298          RL                     10     820
 299          RC     .05     .05     .05    5280  .0023     840
 300          RX       0    1470    1500    1530    1580    1610    2410    3110
 301          RY     800     825     825     820     820     825     830     840

 302          KK     603
 303          KM            SUB-BASIN 603
 304          BA    2.28
 305          LG     .38     .32    4.70     .32    1.00
 306          UI    338.   1114.   1828.   2471.   1550.    859.    355.    164.     69.     69.
 307          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 308          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
```

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

 309          KK     6R3
 310          RS       1    FLOW      -1
 311          RL                      10     840
 312          RC     .05     .05     .05    4700   .0148     860
 313          RX       0    1500    6700    6720    6770    6795    8195    9195
 314          RY     860     850     845     840     840     845     850     860

 315          KK     604
 316          KM            SUB-BASIN 604
 317          BA     .60
 318          LG     .50     .35    4.00     .55     .00
 319          UI     52.    201.    302.    485.    498.    337.    223.    100.     61.     28.
 320          UI     15.     15.      0.      0.      0.      0.      0.      0.      0.      0.
 321          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 322          KK     6C2
 323          HC       3

 324          KK     6R4
 325          RS       2    FLOW
 326          RL                      10     780
 327          RC     .05     .05     .05    6537   .0115     800
 328          RX       0    1500    5700    5750    5850    5900    7900    9400
 329          RY     800     790     785     780     780     785     790     800

 330          KK     605
 331          KM            SUB-BASIN 605
 332          BA    1.60
 333          LG     .44     .34    4.00     .38     .00
 334          UI     98.    283.    501.    652.    933.   1152.    833.    627.    456.    243.
 335          UI    164.    100.     50.     30.     30.     30.      0.      0.      0.      0.
 336          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 337          KK     6R5
 338          RS       1    FLOW      -1
 339          RL                      10     780
 340          RC     .05     .05     .05    4022   .0099     800
 341          RX       0    1500    5700    5730    5830    5860    7860    9360
 342          RY     800     790     785     780     780     785     790     800

 343          KK     606
 344          KM            SUB-BASIN 606
 345          BA    3.64
 346          LG     .29     .26    7.30     .15    9.00
 347          UI    223.    643.   1139.   1483.   2123.   2620.   1894.   1428.   1038.    552.
 348          UI    373.    228.    114.     68.     68.     68.      0.      0.      0.      0.
 349          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 350          KK     6R6
 351          RS       3    FLOW      -1
 352          RL                      10     100
 353          RC     .05     .05     .05    9051   .0122     110
 354          RX       0     100     250     317     383     450     600     700
 355          RY     106     104     102     100     100     102     104     106
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 356          KK     607
 357          KM            SUB-BASIN 607
 358          BA    1.13
 359          LG     .46     .34    4.20     .58     .00
 360          UI     75.    244.    401.    536.    842.    753.    552.    400.    242.    127.
 361          UI     86.     44.     23.     23.     23.      0.      0.      0.      0.      0.
 362          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 363          KK     608
 364          KM            SUB-BASIN 608
 365          BA     .37
 366          LG     .35     .31    3.90     .32     .00
 367          UI     51.    171.    273.    400.    259.    154.     64.     32.     11.     11.
 368          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 369          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 370          KK     6C3
 371          KM            SPILLWAY 4 - LAYTON
 372          HC       5
 373          ZZ
```

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****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*          SEPTEMBER 1990              *
*           VERSION 4.0                *
*                                      *
* RUN DATE  11/25/1991  TIME  16:56:22 *
*                                      *
****************************************
```

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****************************************
*                                      *
*   U.S. ARMY CORPS OF ENGINEERS       *
*   HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET            *
*      DAVIS, CALIFORNIA 95616         *
*          (916) 756-1104              *
*                                      *
****************************************
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                    GILA BEND CANAL FLOOD STUDY
                    FCDMC
                    D&A #18099   9-9-91 REVISED 11-25-91
                    RAINBW24.HC1        BASINS 1 - 6
                             24-HOUR STORM

 7 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        145  NUMBER OF HYDROGRAPH ORDINATES
                NDDATE      2    0  ENDING DATE
                NDTIME       0000  ENDING TIME
                 ICENT         19  CENTURY MARK

            COMPUTATION INTERVAL     .17 HOURS
                 TOTAL TIME BASE   24.00 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

 9 JD        INDEX STORM NO. 1
                 STRM        4.20  PRECIPITATION DEPTH
                 TRDA         .01  TRANSPOSITION DRAINAGE AREA

10 PI          PRECIPITATION PATTERN
                 .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                 .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                 .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                 .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                 .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                 .00      .00      .00      .00      .01      .01      .01      .01      .01      .01
```

.01	.01	.01	.01	.01	.01	.02	.02	.02	.13
.13	.13	.02	.02	.02	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00						

15 JD INDEX STORM NO. 2

STRM 3.99 PRECIPITATION DEPTH

TRDA 10.00 TRANSPOSITION DRAINAGE AREA

0 PI PRECIPITATION PATTERN

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.02	.02	.02	.13
.13	.13	.02	.02	.02	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00						

16 JD INDEX STORM NO. 3

STRM 3.86 PRECIPITATION DEPTH

TRDA 20.00 TRANSPOSITION DRAINAGE AREA

0 PI PRECIPITATION PATTERN

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.02	.02	.02	.13
.13	.13	.02	.02	.02	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00						

17 JD INDEX STORM NO. 4

STRM 3.78 PRECIPITATION DEPTH

TRDA 30.00 TRANSPOSITION DRAINAGE AREA

0 PI PRECIPITATION PATTERN

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

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.02	.02	.02	.13
.13	.13	.02	.02	.02	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00						

18 JD INDEX STORM NO. 5

STRM 3.70 PRECIPITATION DEPTH

TRDA 50.00 TRANSPOSITION DRAINAGE AREA

0 PI PRECIPITATION PATTERN

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.02	.02	.02	.13
.13	.13	.02	.02	.02	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00						

19 JD INDEX STORM NO. 6

STRM 3.57 PRECIPITATION DEPTH

TRDA 100.00 TRANSPOSITION DRAINAGE AREA

0 PI PRECIPITATION PATTERN

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.02	.02	.02	.13
.13	.13	.02	.02	.02	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00						

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	101	903.	12.50	143.	38.	38.	.87		
ROUTED TO	1R1	606.	13.00	136.	34.	34.	.87		
HYDROGRAPH AT	102	758.	12.17	87.	22.	22.	.92		
HYDROGRAPH AT	201	3193.	12.50	564.	152.	152.	2.90		
ROUTED TO	2R1A	1032.	13.17	159.	40.	40.	2.90		
ROUTED TO	2R1B	975.	13.50	153.	38.	38.	2.90		
HYDROGRAPH AT	202	1297.	13.00	314.	78.	78.	2.62		
4 COMBINED AT	1C1	2454.	13.33	675.	169.	169.	7.31		
HYDROGRAPH AT	300	2187.	13.00	502.	132.	132.	3.78		
HYDROGRAPH AT	401	1600.	13.00	380.	96.	96.	2.87		
ROUTED TO	4R1	1380.	13.33	313.	78.	78.	2.87		
HYDROGRAPH AT	402	1206.	13.00	286.	72.	72.	2.04		
HYDROGRAPH AT	403	2548.	13.17	635.	162.	162.	5.09		
3 COMBINED AT	4C1	4886.	13.17	1218.	308.	308.	10.00		
ROUTED TO	4R2	4605.	13.33	1130.	282.	282.	10.00		
HYDROGRAPH AT	407	3441.	13.17	858.	219.	219.	6.93		
2 COMBINED AT	4C2	7252.	13.33	1903.	480.	480.	16.93		
ROUTED TO	4R3	6988.	13.33	1872.	468.	468.	16.93		
HYDROGRAPH AT	404	1887.	13.33	513.	128.	128.	3.87		
HYDROGRAPH AT	405	441.	12.50	73.	18.	18.	.53		
2 COMBINED AT	4C7	2016.	13.17	584.	146.	146.	4.40		
ROUTED TO	4R4	1702.	13.50	556.	139.	139.	4.40		
HYDROGRAPH AT	406	1549.	12.50	252.	66.	66.	1.83		
3 COMBINED AT	4C3	8520.	13.33	2571.	646.	646.	23.16		
ROUTED TO	4R5	8017.	13.67	2472.	618.	618.	23.16		
HYDROGRAPH AT	408	1565.	15.00	789.	218.	218.	6.47		

ROUTED TO	4R6	1513.	15.00	774.	208.	208.	6.47
HYDROGRAPH AT	409	1055.	12.33	126.	32.	32.	1.13
HYDROGRAPH AT	410	1669.	13.00	406.	105.	105.	2.92
4 COMBINED AT	4C4	9201.	13.67	3551.	909.	909.	33.68
ROUTED TO	4R7	8684.	14.00	3397.	864.	864.	33.68
HYDROGRAPH AT	411	2737.	13.33	785.	204.	204.	6.03
ROUTED TO	4R8	2278.	13.67	645.	161.	161.	6.03
HYDROGRAPH AT	412	1552.	12.67	280.	71.	71.	2.36
HYDROGRAPH AT	413	628.	13.00	148.	37.	37.	1.24
4 COMBINED AT	4C5	10817.	13.83	4251.	1084.	1084.	43.31
ROUTED TO	4R9	10491.	14.00	4065.	1028.	1028.	43.31
HYDROGRAPH AT	414	1568.	13.50	522.	139.	139.	3.63
HYDROGRAPH AT	415	1916.	12.83	379.	95.	95.	3.55
3 COMBINED AT	4C6	11565.	14.00	4747.	1220.	1220.	50.49
HYDROGRAPH AT	500	1599.	12.67	263.	66.	66.	3.17
HYDROGRAPH AT	601	2317.	12.83	521.	138.	138.	3.68
ROUTED TO	6R1	1668.	13.33	406.	101.	101.	3.68
HYDROGRAPH AT	602	435.	12.17	51.	13.	13.	.44
2 COMBINED AT	6C1	1668.	13.33	456.	114.	114.	4.12
ROUTED TO	6R2	1512.	13.67	454.	114.	114.	4.12
HYDROGRAPH AT	603	2204.	12.33	279.	71.	71.	2.28
ROUTED TO	6R3	1943.	12.50	251.	63.	63.	2.28
HYDROGRAPH AT	604	391.	12.50	56.	14.	14.	.60
3 COMBINED AT	6C2	2540.	12.50	752.	188.	188.	7.00
ROUTED TO	6R4	2051.	12.67	611.	153.	153.	7.00
HYDROGRAPH AT	605	1043.	12.67	184.	46.	46.	1.60
ROUTED TO	6R5	843.	12.83	137.	34.	34.	1.60
HYDROGRAPH AT	606	3071.	12.67	596.	159.	159.	3.64
ROUTED TO	6R6	2331.	13.00	436.	109.	109.	3.64
HYDROGRAPH AT	607	614.	12.67	103.	26.	26.	1.13

HYDROGRAPH AT	608	372.	12.33	47.	12.	12.	.37
5 COMBINED AT	6C3	5297.	12.83	1274.	319.	319.	13.74

*** NORMAL END OF HEC-1 ***
Elapsed Time - 00:00:40.37 (40.37 Seconds)
NORMAL END OF HEC-1

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****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*          SEPTEMBER 1990              *
*           VERSION 4.0                *
*                                      *
* RUN DATE  11/25/1991  TIME  16:59:01 *
*                                      *
****************************************
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```
****************************************
*                                      *
*   U.S. ARMY CORPS OF ENGINEERS       *
*   HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET            *
*      DAVIS, CALIFORNIA 95616         *
*          (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
```

```
::::::::::::::::::::::::::::::::::::::::
::::::::::::::::::::::::::::::::::::::::
:::                                  :::
:::  Full Microcomputer Implementation :::
:::              by                  :::
:::       Haestad Methods, Inc.      :::
:::                                  :::
::::::::::::::::::::::::::::::::::::::::
::::::::::::::::::::::::::::::::::::::::
```

37 Brookside Road * Waterbury, Connecticut 06708 * (203) 755-1666

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

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

  1           ID           GILA BEND CANAL FLOOD STUDY
  2           ID           FCDMC
  3           ID           18099     9-9-91
  4           ID           PALOMA06.HC1         BASINS 7 - 10
  5           ID                     6-HOUR STORM
  6           IT     10                   145
  7           IO      5
  8           IN     15
  9           JD   3.45    0.01
 10           PC   .000    .008    .016    .025    .033    .041    .050    .058    .066    .074
 11           PC   .087    .099    .118    .138    .216    .377    .834    .911    .931    .950
 12           PC   .962    .972    .983    .991   1.000
 13           JD   3.43    0.50
 14           JD   3.38    2.80
 15           PC   .000    .009    .016    .025    .034    .042    .051    .059    .067    .076
 16           PC   .087    .100    .120    .163    .252    .451    .694    .837    .900    .938
 17           PC   .950    .963    .975    .988   1.000
 18           JD   3.18    16.0
 19           PC   .000    .015    .020    .030    .048    .063    .076    .090    .105    .119
 20           PC   .135    .152    .175    .222    .304    .472    .670    .796    .868    .912
 21           PC   .946    .960    .973    .987   1.000
 22           JD   2.79    90.0
 23           PC   .000    .021    .035    .051    .071    .087    .105    .125    .143    .160
 24           PC   .179    .201    .232    .281    .364    .500    .658    .773    .841    .888
 25           PC   .927    .945    .964    .982   1.000
 26           JD   1.97   500.0
 27           PC   .000    .024    .043    .059    .078    .098    .119    .141    .162    .186
 28           PC   .212    .239    .271    .321    .408    .515    .627    .735    .814    .864
 29           PC   .907    .930    .954    .977   1.000
              *  BASIN NO. 7

 30           KK    701
 31           KM           SUB-BASIN 701
 32           BA   6.40
 33           LG    .31     .28    6.40     .21    7.00
 34           UI   326.    690.   1436.   1862.   2327.   3226.   3956.   2959.   2363.   1841.
 35           UI  1383.    743.    549.    377.    272.    100.    100.    100.    100.      0.
 36           UI     0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 37           UI     0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 38           KK    7R1
 39           RS      2    FLOW      -1
 40           RL                     1     100
 41           RC    .05     .05     .05    5531   .0108     105
 42           RX      0     100    1259    1426    1592    1759    2917    3017
 43           RY    106     104     102   100.1     100     102     104     106

 44           KK    702
 45           KM           SUB-BASIN 702
 46           BA   4.32
 47           LG    .33     .27    6.70     .21    9.00
 48           UI   303.   1083.   1702.   2357.   3598.   2722.   1977.   1357.    646.    426.
 49           UI   247.     93.     93.     93.      0.      0.      0.      0.      0.      0.
 50           UI     0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  51          KK     7C1
  52          HC       2

  53          KK     7R2
  54          RS       2    FLOW      -1
  55          RL                      1     100
  56          RC     .05     .05     .05    6034   .0066     105
  57          RX       0     100     931    1064    1198    1331    2162    2262
  58          RY     106     104     102   100.1     100     102     104     106

  59          KK     703
  60          KM            SUB-BASIN 703
  61          BA    2.73
  62          LG     .30     .26    7.40     .18   10.00
  63          UI    118.    173.    447.    596.    713.    870.   1174.   1462.   1154.    950.
  64          UI    773.    627.    485.    279.    202.    167.    118.     72.     36.     36.
  65          UI     36.     36.     36.      0.      0.      0.      0.      0.      0.      0.
  66          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

  67          KK     CD1          COMBINE FLOW PRIOR TO DIVERSION
  68          HC       2

  69          KK      D1
  70          KM            DIVERT FLOWS FROM BASIN 7 TO BASIN 8
  71          DT    DIV1
  72          DI       0      36      66     200    1600    2400    5000    8900
  73          DQ       0       0       0      40     240     460    1000    1800

  74          KK     7R3
  75          RS       2    FLOW      -1
  76          RL                      1     100
  77          RC     .05     .05     .05    6537   .0153     105
  78          RX       0     100    1308    1441    1575    1708    2917    3017
  79          RY     106     104     102   100.1     100     102     104     106

  80          KK     704
  81          KM            SUB-BASIN 704
  82          BA    3.25
  83          LG     .28     .27    7.20     .20   12.00
  84          UI    249.    997.   1499.   2266.   2805.   1907.   1326.    688.    387.    221.
  85          UI     76.     76.     76.      0.      0.      0.      0.      0.      0.      0.
  86          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

  87          KK     7C2
  88          HC       2

  89          KK     7R4
  90          RS       6    FLOW      -1
  91          RL                      1     100
  92          RC     .05     .05     .05   17600   .0153     105
  93          RX       0     100    1973    2501    3029    3557    5431    5531
  94          RY     106     104     102   100.1     100     102     104     106
```

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

 95           KK     705
 96           KM            SUB-BASIN 705
 97           BA    3.71
 98           LG     .34     .30    4.50     .29    2.00
 99           UI    181.    351.    766.    993.   1231.   1605.   2245.   1781.   1426.   1129.
100           UI    890.    590.    317.    278.    181.    109.     55.     55.     55.     55.
101           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
102           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

103           KK     CD5          COMBINE FLOWS PRIOR TO DIVERSION
104           HC       2

105           KK      D5          DIVERSION @ SR 85, 705 TO 706 & 707
106           DT    DIV5
107           DI       0     100     200     500    1000    2500    5000
108           DQ       0      27      55     135     270     680    1360

109           KK     7R5
110           RS       2    FLOW      -1
111           RL                      1     100
112           RC     .05     .05     .05    5280   .0133     105
113           RX       0     100    3350    4050    4750    5450    8700    8800
114           RY     106     104     102   100.1     100     102     104     106

115           KK     706
116           KM            SUB-BASIN 706
117           BA    2.10
118           LG     .35     .31    3.80     .33     .00
119           UI    312.   1026.   1684.   2276.   1428.    791.    327.    151.     64.     64.
120           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
121           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

122           KK     7C4
123           KM            COMBINE FLOWS AT CANAL NORTH OF SKI LAKE
124           HC       2

125           KK     RD5
126           KM            RETRIEVE FLOW FROM SUB-BASIN 705
127           DR    DIV5

128           KK     7R6
129           RS       2    FLOW      -1
130           RL                      1     100
131           RC     .05     .05     .05    6034   .0149     105
132           RX       0     100    1490    1670    1850    2030    3420    3520
133           RY     106     104     102   100.1   100.1     102     104     106

134           KK     707
135           KM            SUB-BASIN 707
136           BA     .64
137           LG     .39     .34    4.20     .42     .00
138           UI    127.    391.    721.    633.    365.    140.     58.     22.      0.      0.
139           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
```

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

 140          KK     7C5
 141          KM            COMBINE FLOWS AT CANAL SOUTH OF SKI LAKE
 142          HC       2
              *  BASIN NO. 8

 143          KK     801
 144          KM            SUB-BASIN 801
 145          BA    3.38
 146          LG     .26     .24    8.20     .12   12.00
 147          UI    171.    350.    744.    963.   1198.   1647.   2082.   1591.   1276.    998.
 148          UI    766.    437.    292.    219.    169.     52.     52.     52.     52.     52.
 149          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 150          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 151          KK     8R1
 152          RS       1    FLOW      -1
 153          RL                     10     100
 154          RC     .05     .05     .05    4724   .0269     105
 155          RX       0     100     350     450     550     650     900    1000
 156          RY     106     104     102   100.1     100     102     104     106

 157          KK     802
 158          KM            SUB-BASIN 802
 159          BA    1.38
 160          LG     .26     .24    8.30     .10    9.00
 161          UI    258.    805.   1459.   1433.    846.    349.    166.     47.     47.      0.
 162          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 163          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 164          KK     8C1
 165          HC       2

 166          KK     8R2
 167          RS       1    FLOW      -1
 168          RL                     10     100
 169          RC     .05     .05     .05    4274   .0246     105
 170          RX       0     100     401     467     533     599     900    1000
 171          RY     106     104     102   100.1     100     102     104     106

 172          KK     803
 173          KM            SUB-BASIN 803
 174          BA    3.05
 175          LG     .31     .26    6.90     .17    7.00
 176          UI    153.    323.    673.    873.   1091.   1512.   1854.   1387.   1108.    863.
 177          UI    648.    348.    258.    177.    127.     47.     47.     47.     47.      0.
 178          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 179          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 180          KK     RD1
 181          KM            RETRIEVE DIVERTED FLOW FROM BASIN 7
 182          DR    DIV1
```

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

 183          KK     8R3
 184          RS       4    FLOW      -1
 185          RL                      10    1119
 186          RC     .05     .05     .05   10308   .0116    1200
 187          RX       0     200    1700    1701    1899    1900    4200    4700
 188          RY    1200    1160    1120  1119.1    1119    1120    1160    1200

 189          KK     8C2
 190          HC       3

 191          KK     8R4
 192          RS       2    FLOW      -1
 193          RL                      10     100
 194          RC     .05     .05     .05    7040   .0114     105
 195          RX       0     100    1390    1720    2050    2380    3671    3771
 196          RY     106     104     102   100.1     100     102     104     106

 197          KK     804
 198          KM            SUB-BASIN 804
 199          BA    5.64
 200          LG     .30     .27    6.50     .22   10.00
 201          UI    309.    760.   1451.   1866.   2426.   3656.   3185.   2450.   1879.   1413.
 202          UI    778.    523.    356.    232.     95.     95.     95.     95.      0.      0.
 203          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 204          KK     8C3
 205          HC       2

 206          KK     8R5
 207          RS       1    FLOW      -1
 208          RL                      10     100
 209          RC     .05     .05     .05    2765   .0145     105
 210          RX       0     100     959    1157    1355    1553    2413    2514
 211          RY     106     104     102   100.1     100     102     104     106

 212          KK     805
 213          KM            SUB-BASIN 805
 214          BA    1.62
 215          LG     .28     .24    8.20     .10   13.00
 216          UI    149.    560.    843.   1385.   1291.    876.    551.    244.    150.     56.
 217          UI     40.     40.      0.      0.      0.      0.      0.      0.      0.      0.
 218          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 219          KK     8C4
 220          HC       2

 221          KK     8R6
 222          RS       3    FLOW      -1
 223          RL                      10     100
 224          RC     .05     .05     .05    8045   .0099     105
 225          RX       0     100    1309    1526    1742    1959    3168    3268
 226          RY     106     104     102   100.1     100     102     104     106
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 227          KK     806
 228          KM            SUB-BASIN 806
 229          BA     .47
 230          LG     .34     .31    4.40     .31    1.00
 231          UI     35.    125.    197.    273.    416.    315.    229.    157.     75.     49.
 232          UI     29.     11.     11.     11.      0.      0.      0.      0.      0.      0.
 233          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 234          KK     CD2
 235          HC       2

 236          KK      D2
 237          KM            DIVERT FLOWS FROM BASIN 8 TO BASIN 9
 238          DT    DIV2
 239          DI    5500    6730    8350   13460   24200
 240          DQ       0     400    1050    1900    3300

 241          KK     8R7
 242          RS       2    FLOW      -1
 243          RL                     10     100
 244          RC     .05     .05     .05    6034   .0133     105
 245          RX       0     100    2415    2648    2881    3115    5431    5531
 246          RY     106     104     102   100.1     100     102     104     106

 247          KK     807
 248          KM            SUB-BASIN 807
 249          BA    2.54
 250          LG     .33     .27    5.70     .21    5.00
 251          UI    140.    354.    667.    860.   1129.   1689.   1396.   1077.    822.    602.
 252          UI    313.    234.    144.     83.     43.     43.     43.      0.      0.      0.
 253          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 254          KK     8C5
 255          HC       2

 256          KK     8R8
 257          RS       1    FLOW      -1
 258          RL                     10     100
 259          RC     .05     .05     .05    4274   .0112     105
 260          RX       0     100     755     922    1089    1255    1911    2011
 261          RY     106     104     102   100.1     100     102     104     106

 262          KK     808
 263          KM            SUB-BASIN 808
 264          BA     .31
 265          LG     .35     .31    3.80     .32     .00
 266          UI    115.    348.    435.    186.     56.     14.      0.      0.      0.      0.
 267          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 268          KK     8C6
 269          KM            COMBINE FLOWS AT PUMP STATION SPILLWAY - PALOMA
 270          HC       2
              *  BASIN NO. 9

 271          KK     901
 272          KM            SUB-BASIN 901
 273          BA    2.25
 274          LG     .35     .29    3.80     .27    1.00
 275          UI    135.    379.    683.    884.   1253.   1608.   1185.    901.    670.    383.
 276          UI    230.    156.     90.     41.     41.     41.      0.      0.      0.      0.
 277          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 278          KK     RD2
 279          KM            RETRIEVE FLOW FROM BASIN 8 DIVERSION
 280          DR    DIV2

 281          KK     9R1
 282          RS       2    FLOW      -1
 283          RL                      5     100
 284          RC     .05     .05     .05    6285   .0127     105
 285          RX       0     100    1740    2090    2440    2790    4440    4540
 286          RY     106     104     102   100.1     100     102     104     106

 287          KK     9C1
 288          HC       2
              * ROUTE W/ R2

 289          KK     9R2
 290          RS       2    FLOW      -1
 291          RL                      5     100
 292          RC     .05     .05     .05    5030   .0119     105
 293          RX       0     100    1812    2112    2412    2712    4425    4525
 294          RY     106     104     102   100.1     100     102     104     106

 295          KK     902
 296          KM            SUB-BASIN 902
 297          BA    1.26
 298          LG     .35     .30    3.60     .29     .00
 299          UI    249.    770.   1420.   1246.    718.    276.    114.     43.      0.      0.
 300          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 301          KK     9C2
 302          KM            COMBINE FLOWS AT CANAL FOR PONDING
 303          HC       2
              *  BASIN NO. 10

 304          KK    1001
 305          KM            SUB-BASIN 1001
 306          BA    4.63
 307          LG     .30     .25    7.60     .11    6.00
 308          UI    204.    321.    791.   1050.   1260.   1552.   2145.   2483.   1899.   1567.
 309          UI   1265.   1015.    721.    404.    339.    236.    203.     62.     62.     62.
 310          UI     62.     62.      0.      0.      0.      0.      0.      0.      0.      0.
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 311          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 312          KK    1002
 313          KM            SUB-BASIN 1002
 314          BA    4.49
 315          LG     .32     .28    5.90     .18    3.00
 316          UI    240.    558.   1100.   1417.   1805.   2678.   2673.   2015.   1572.   1215.
 317          UI    784.    418.    339.    240.     88.     74.     74.     74.      0.      0.
 318          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 319          KK    10C1
 320          HC       2

 321          KK    10R1
 322          RS       3    FLOW      -1
 323          RL                     10     100
 324          RC     .05     .05     .05    8548   .0099     105
 325          RX       0     100    1943    2240    2537    2834    4677    4777
 326          RY     106     104     102   100.1     100     102     104     106

 327          KK    1003
 328          KM            SUB-BASIN 1003
 329          BA     .29
 330          LG     .35     .31    3.80     .33     .00
 331          UI    378.    670.     98.      0.      0.      0.      0.      0.      0.      0.
 332          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 333          KK    10C2
 334          KM            COMBINE FLOWS AT CANAL - SPILLWAY 5
 335          HC       2
 336          ZZ
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****************************************
*                                      *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*          SEPTEMBER 1990              *
*           VERSION 4.0                *
*                                      *
* RUN DATE  11/25/1991  TIME  16:59:01 *
*                                      *
****************************************
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****************************************
*                                      *
*   U.S. ARMY CORPS OF ENGINEERS       *
*   HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET            *
*      DAVIS, CALIFORNIA 95616         *
*          (916) 756-1104              *
*                                      *
****************************************
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```
                    GILA BEND CANAL FLOOD STUDY
                    FCDMC
                    18099     9-9-91
                    PALOMA06.HC1        BASINS 7 - 10
                              6-HOUR STORM

  7 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        145  NUMBER OF HYDROGRAPH ORDINATES
                   NDDATE     2    0  ENDING DATE
                   NDTIME       0000  ENDING TIME
                   ICENT         19  CENTURY MARK

                COMPUTATION INTERVAL     .17 HOURS
                     TOTAL TIME BASE   24.00 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

  9 JD        INDEX STORM NO. 1
                     STRM       3.45  PRECIPITATION DEPTH
                     TRDA        .01  TRANSPOSITION DRAINAGE AREA

 10 PI          PRECIPITATION PATTERN
                   .01      .01      .01      .01      .01      .01      .01      .01      .01      .01
                   .01      .01      .01      .01      .01      .01      .01      .01      .01      .03
                   .05      .11      .21      .30      .05      .03      .01      .01      .01      .01
                   .01      .01      .01      .01      .01      .01

 13 JD        INDEX STORM NO. 2
```

```
            STRM        3.43  PRECIPITATION DEPTH
            TRDA         .50  TRANSPOSITION DRAINAGE AREA

 0 PI     PRECIPITATION PATTERN
            .01     .01     .01     .01     .01     .01     .01     .01     .01     .01
            .01     .01     .01     .01     .01     .01     .01     .01     .01     .03
            .05     .11     .21     .30     .05     .03     .01     .01     .01     .01
            .01     .01     .01     .01     .01     .01

14 JD     INDEX STORM NO. 3
            STRM        3.38  PRECIPITATION DEPTH
            TRDA        2.80  TRANSPOSITION DRAINAGE AREA

15 PI     PRECIPITATION PATTERN
            .01     .01     .00     .01     .01     .01     .01     .01     .01     .01
            .01     .01     .01     .01     .01     .01     .01     .01     .03     .04
            .06     .13     .15     .16     .10     .07     .04     .03     .02     .01
            .01     .01     .01     .01     .01     .01

18 JD     INDEX STORM NO. 4
            STRM        3.18  PRECIPITATION DEPTH
            TRDA       16.00  TRANSPOSITION DRAINAGE AREA

19 PI     PRECIPITATION PATTERN
            .01     .01     .00     .01     .01     .01     .01     .01     .01     .01
            .01     .01     .01     .01     .01     .01     .01     .02     .03     .04
            .05     .11     .12     .13     .08     .07     .05     .03     .03     .02
            .01     .01     .01     .01     .01     .01

22 JD     INDEX STORM NO. 5
            STRM        2.79  PRECIPITATION DEPTH
            TRDA       90.00  TRANSPOSITION DRAINAGE AREA

23 PI     PRECIPITATION PATTERN
            .01     .01     .01     .01     .01     .01     .01     .01     .01     .01
            .01     .01     .01     .01     .01     .01     .02     .02     .03     .04
            .06     .09     .10     .11     .08     .06     .05     .03     .03     .03
            .01     .01     .01     .01     .01     .01

26 JD     INDEX STORM NO. 6
            STRM        1.97  PRECIPITATION DEPTH
            TRDA      500.00  TRANSPOSITION DRAINAGE AREA

27 PI     PRECIPITATION PATTERN
            .02     .01     .01     .01     .01     .01     .01     .01     .01     .01
            .01     .01     .02     .02     .02     .02     .02     .02     .03     .05
            .06     .07     .07     .07     .07     .06     .05     .03     .03     .03
            .02     .02     .02     .02     .02     .02
```

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	701	4392.	5.00	1043.	262.	262.	6.40		
ROUTED TO	7R1	3958.	5.17	1008.	252.	252.	6.40		
HYDROGRAPH AT	702	3943.	4.67	750.	188.	188.	4.32		
2 COMBINED AT	7C1	5892.	4.83	1605.	404.	404.	10.72		
ROUTED TO	7R2	5197.	5.33	1564.	392.	392.	10.72		
HYDROGRAPH AT	703	1978.	5.17	526.	132.	132.	2.73		
2 COMBINED AT	CD1	6490.	5.33	1951.	491.	491.	13.45		
DIVERSION TO	DIV1	1306.	5.33	375.	94.	94.	13.45		
HYDROGRAPH AT	D1	5184.	5.33	1576.	397.	397.	13.45		
ROUTED TO	7R3	4793.	5.67	1538.	386.	386.	13.45		
HYDROGRAPH AT	704	3273.	4.50	611.	153.	153.	3.25		
2 COMBINED AT	7C2	4951.	5.50	1973.	500.	500.	16.70		
ROUTED TO	7R4	4263.	6.50	1649.	414.	414.	16.70		
HYDROGRAPH AT	705	2466.	5.00	568.	142.	142.	3.71		
2 COMBINED AT	CD5	4252.	6.33	1988.	507.	507.	20.41		
DIVERSION TO	DIV5	1145.	6.33	535.	136.	136.	20.41		
HYDROGRAPH AT	D5	3063.	6.33	1434.	366.	366.	20.41		
ROUTED TO	7R5	2839.	6.83	1307.	331.	331.	20.41		
HYDROGRAPH AT	706	2318.	4.33	329.	82.	82.	2.10		
2 COMBINED AT	7C4	2833.	6.83	1500.	387.	387.	22.51		
HYDROGRAPH AT	RD5	1145.	6.33	535.	136.	136.	20.41		
ROUTED TO	7R6	1070.	6.83	496.	127.	127.	20.41		
HYDROGRAPH AT	707	928.	4.33	97.	24.	24.	.64		
2 COMBINED AT	7C5	1717.	6.50	875.	225.	225.	.64		
HYDROGRAPH AT	801	2960.	5.00	733.	184.	184.	3.38		
ROUTED TO	8R1	2617.	5.00	611.	153.	153.	3.38		

HYDROGRAPH AT	802	2266.	4.33	322.	80.	80.	1.38
2 COMBINED AT	8C1	3107.	4.83	888.	222.	222.	4.76
ROUTED TO	8R2	2888.	5.00	803.	201.	201.	4.76
HYDROGRAPH AT	803	2424.	5.00	573.	144.	144.	3.05
HYDROGRAPH AT	RD1	1306.	5.33	375.	94.	94.	13.45
ROUTED TO	8R3	494.	5.67	77.	19.	19.	13.45
3 COMBINED AT	8C2	4880.	5.00	1379.	345.	345.	7.81
ROUTED TO	8R4	3506.	5.50	875.	219.	219.	7.81
HYDROGRAPH AT	804	4233.	4.83	953.	239.	239.	5.64
2 COMBINED AT	8C3	5915.	5.17	1639.	411.	411.	13.45
ROUTED TO	8R5	5479.	5.17	1473.	368.	368.	13.45
HYDROGRAPH AT	805	2184.	4.50	373.	93.	93.	1.62
2 COMBINED AT	8C4	6034.	5.17	1759.	440.	440.	15.07
ROUTED TO	8R6	4613.	5.67	1267.	317.	317.	15.07
HYDROGRAPH AT	806	607.	4.67	91.	23.	23.	.47
2 COMBINED AT	CD2	4623.	5.67	1317.	329.	329.	15.54
DIVERSION TO	DIV2	4.	5.67	0.	0.	0.	15.54
HYDROGRAPH AT	D2	4619.	5.67	1316.	329.	329.	15.54
ROUTED TO	8R7	3756.	6.00	983.	246.	246.	15.54
HYDROGRAPH AT	807	2159.	4.83	456.	114.	114.	2.54
2 COMBINED AT	8C5	3946.	5.83	1291.	323.	323.	18.08
ROUTED TO	8R8	3424.	6.00	1067.	267.	267.	18.08
HYDROGRAPH AT	808	601.	4.17	55.	14.	14.	.31
2 COMBINED AT	8C6	3421.	6.00	1100.	275.	275.	18.39
HYDROGRAPH AT	901	1973.	4.83	389.	97.	97.	2.25
HYDROGRAPH AT	RD2	4.	5.67	0.	0.	0.	15.54
ROUTED TO	9R1	0.	.17	0.	0.	0.	15.54
2 COMBINED AT	9C1	1973.	4.83	390.	98.	98.	2.25
ROUTED TO	9R2	1444.	5.17	273.	68.	68.	2.25
HYDROGRAPH AT	902	1844.	4.33	221.	55.	55.	1.26

2 COMBINED AT	9C2	1607.	4.83	454.	114.	114.	3.51
HYDROGRAPH AT	1001	3495.	5.00	936.	235.	235.	4.63
HYDROGRAPH AT	1002	3528.	4.83	790.	198.	198.	4.49
2 COMBINED AT	10C1	6304.	5.00	1609.	404.	404.	9.12
ROUTED TO	10R1	4391.	5.50	1003.	251.	251.	9.12
HYDROGRAPH AT	1003	732.	4.00	54.	13.	13.	.29
2 COMBINED AT	10C2	4391.	5.50	1040.	260.	260.	9.41

*** NORMAL END OF HEC-1 ***
Elapsed Time - 00:00:30.75 (30.75 Seconds)
NORMAL END OF HEC-1

HEC1 S/N: HMVersion: 6.00 Data File: PALOMA24.HC1

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****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*          SEPTEMBER 1990              *
*           VERSION 4.0                *
*                                      *
* RUN DATE  11/25/1991  TIME  16:58:25 *
*                                      *
****************************************
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```
****************************************
*                                      *
*   U.S. ARMY CORPS OF ENGINEERS       *
*   HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET            *
*      DAVIS, CALIFORNIA 95616         *
*          (916) 756-1104              *
*                                      *
****************************************
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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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::::::::::::::::::::::::::::::::::::::::
::::::::::::::::::::::::::::::::::::::::
:::                                  :::
:::  Full Microcomputer Implementation :::
:::                by                :::
:::        Haestad Methods, Inc.     :::
:::                                  :::
::::::::::::::::::::::::::::::::::::::::
::::::::::::::::::::::::::::::::::::::::
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37 Brookside Road * Waterbury, Connecticut 06708 * (203) 755-1666

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

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

  1           ID            GILA BEND CANAL FLOOD STUDY
  2           ID            FCDMC
  3           ID            18099     9-9-91
  4           ID            PALOMA24.HC1     BASINS 7 - 10
  5           ID                      24-HOUR STORM
  6           IT      10                    145
  7           IO       5
  8           IN      30
  9           JD    4.20     .01
 10           PC    .000    .005    .011    .016    .022    .028    .035    .041    .048    .056
 11           PC    .068    .071    .080    .089    .098    .109    .120    .133    .147    .163
 12           PC    .181    .204    .235    .283    .663    .735    .772    .799    .820    .838
 13           PC    .854    .868    .880    .891    .902    .912    .921    .929    .937    .945
 14           PC    .952    .959    .965    .972    .978    .984    .989    .995   1.000
 15           JD    3.99    10.0
 16           JD    3.86    20.0
 17           JD    3.78    30.0
 18           JD    3.70    50.0
 19           JD    3.57   100.0
              *  BASIN NO. 7

 20           KK     701
 21           KM   SUB-BASIN 701
 22           BA    6.40
 23           LG     .31     .28    6.40     .21    7.00
 24           UI    326.    690.   1436.   1862.   2327.   3226.   3956.   2959.   2363.   1841.
 25           UI   1383.    743.    549.    377.    272.    100.    100.    100.    100.      0.
 26           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 27           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 28           KK     7R1
 29           RS       2    FLOW      -1
 30           RL                      1     100
 31           RC     .05     .05     .05    5531   .0108     105
 32           RX       0     100    1259    1426    1592    1759    2917    3017
 33           RY     106     104     102   100.1     100     102     104     106

 34           KK     702
 35           KM   SUB-BASIN 702
 36           BA    4.32
 37           LG     .33     .27    6.70     .21    9.00
 38           UI    303.   1083.   1702.   2357.   3598.   2722.   1977.   1357.    646.    426.
 39           UI    247.     93.     93.     93.      0.      0.      0.      0.      0.      0.
 40           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 41           KK     7C1
 42           HC       2

 43           KK     7R2
 44           RS       2    FLOW      -1
 45           RL                      1     100
 46           RC     .05     .05     .05    6034   .0066     105
 47           RX       0     100     931    1064    1198    1331    2162    2262
 48           RY     106     104     102   100.1     100     102     104     106
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  49          KK     703
  50          KM   SUB-BASIN 703
  51          BA    2.73
  52          LG     .30     .26    7.40     .18   10.00
  53          UI    118.    173.    447.    596.    713.    870.   1174.   1462.   1154.    950.
  54          UI    773.    627.    485.    279.    202.    167.    118.     72.     36.     36.
  55          UI     36.     36.     36.      0.      0.      0.      0.      0.      0.      0.
  56          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

  57          KK     CD1          COMBINE FLOW PRIOR TO DIVERSION
  58          HC       2

  59          KK      D1
  60          KM            DIVERT FLOWS FROM BASIN 7 TO BASIN 8
  61          DT    DIV1
  62          DI       0      36      66     200    1600    2400    5000    8900
  63          DQ       0       0       0      40     240     460    1000    1800

  64          KK     7R3
  65          RS       2    FLOW      -1
  66          RL                      1     100
  67          RC     .05     .05     .05    6537   .0153     105
  68          RX       0     100    1308    1441    1575    1708    2917    3017
  69          RY     106     104     102   100.1     100     102     104     106

  70          KK     704
  71          KM   SUB-BASIN 704
  72          BA    3.25
  73          LG     .28     .27    7.20     .20   12.00
  74          UI    249.    997.   1499.   2266.   2805.   1907.   1326.    688.    387.    221.
  75          UI     76.     76.     76.      0.      0.      0.      0.      0.      0.      0.
  76          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

  77          KK     7C2
  78          HC       2

  79          KK     7R4
  80          RS       6    FLOW      -1
  81          RL                      1     100
  82          RC     .05     .05     .05   17600   .0153     105
  83          RX       0     100    1973    2501    3029    3557    5431    5531
  84          RY     106     104     102   100.1     100     102     104     106

  85          KK     705
  86          KM   SUB-BASIN 705
  87          BA    3.71
  88          LG     .34     .30    4.50     .29    2.00
  89          UI    181.    351.    766.    993.   1231.   1605.   2245.   1781.   1426.   1129.
  90          UI    890.    590.    317.    278.    181.    109.     55.     55.     55.     55.
  91          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
  92          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 93           KK     CD5          COMBINE FLOWS PRIOR TO DIVERSION
 94           HC       2

 95           KK      D5          DIVERSION @ SR 85, 705 TO 706 & 707
 96           DT    DIV5
 97           DI       0     100     200     500    1000    2500    5000
 98           DQ       0      27      55     135     270     680    1360

 99           KK     7R5
100           RS       2    FLOW      -1
101           RL                      1     100
102           RC     .05     .05     .05    5280   .0133     105
103           RX       0     100    3350    4050    4750    5450    8700    8800
104           RY     106     104     102   100.1     100     102     104     106

105           KK     706
106           KM   SUB-BASIN 706
107           BA    2.10
108           LG     .35     .31    3.80     .33     .00
109           UI    312.   1026.   1684.   2276.   1428.    791.    327.    151.     64.     64.
110           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
111           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

112           KK     7C4
113           KM            COMBINE FLOWS AT CANAL NORTH OF SKI LAKE
114           HC       2

115           KK     RD5
116           KM            RETRIEVE FLOW FROM SUB-BASIN 705
117           DR    DIV5

118           KK     7R6
119           RS       2    FLOW      -1
120           RL                      1     100
121           RC     .05     .05     .05    6034   .0149     105
122           RX       0     100    1490    1670    1850    2030    3420    3520
123           RY     106     104     102   100.1   100.1     102     104     106

124           KK     707
125           KM   SUB-BASIN 707
126           BA     .64
127           LG     .39     .34    4.20     .42     .00
128           UI    127.    391.    721.    633.    365.    140.     58.     22.      0.      0.
129           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

130           KK     7C5
131           KM            COMBINE FLOWS AT CANAL SOUTH OF SKI LAKE
132           HC       2
              *  BASIN NO. 8
```

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

 133          KK     801
 134          KM   SUB-BASIN 801
 135          BA    3.38
 136          LG     .26     .24    8.20     .12   12.00
 137          UI    170.    170.    337.    619.    800.    919.   1035.   1192.   1372.   1790.
 138          UI   2160.   1872.   1576.   1384.   1209.   1039.    895.    771.    568.    373.
 139          UI    297.    279.    214.    170.    166.     52.     52.     52.     52.     52.
 140          UI     52.     52.     52.      0.      0.      0.      0.      0.      0.      0.
 141          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 142          KK     8R1
 143          RS       1    FLOW      -1
 144          RL                     10     100
 145          RC     .05     .05     .05    4724   .0269     105
 146          RX       0     100     350     450     550     650     900    1000
 147          RY     106     104     102   100.1     100     102     104     106

 148          KK     802
 149          KM   SUB-BASIN 802
 150          BA    1.38
 151          LG     .26     .24    8.30     .10    9.00
 152          UI    150.    481.    797.   1061.   1655.   1558.   1135.    831.    534.    258.
 153          UI    185.    103.     46.     46.     46.      0.      0.      0.      0.      0.
 154          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 155          KK     8C1
 156          HC       2

 157          KK     8R2
 158          RS       1    FLOW      -1
 159          RL                     10     100
 160          RC     .05     .05     .05    4274   .0246     105
 161          RX       0     100     401     467     533     599     900    1000
 162          RY     106     104     102   100.1     100     102     104     106

 163          KK     803
 164          KM   SUB-BASIN 803
 165          BA    3.05
 166          LG     .31     .26    6.90     .17    7.00
 167          UI    156.    156.    323.    576.    738.    853.    960.   1111.   1288.   1678.
 168          UI   2004.   1655.   1404.   1241.   1065.    929.    787.    663.    480.    292.
 169          UI    266.    256.    162.    156.    112.     48.     48.     48.     48.     48.
 170          UI     48.     48.      0.      0.      0.      0.      0.      0.      0.      0.
 171          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 172          KK     RD1
 173          KM            RETRIEVE DIVERTED FLOW FROM BASIN 7
 174          DR    DIV1
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 175          KK     8R3
 176          RS       4    FLOW      -1
 177          RL                     10    1119
 178          RC     .05     .05     .05   10308   .0116    1200
 179          RX       0     200    1700    1701    1899    1900    4200    4700
 180          RY    1200    1160    1120  1119.1    1119    1120    1160    1200

 181          KK     8C2
 182          HC       3

 183          KK     8R4
 184          RS       2    FLOW      -1
 185          RL                     10     100
 186          RC     .05     .05     .05    7040   .0114     105
 187          RX       0     100    1390    1720    2050    2380    3671    3771
 188          RY     106     104     102   100.1     100     102     104     106

 189          KK     804
 190          KM   SUB-BASIN 804
 191          BA    5.64
 192          LG     .30     .27    6.50     .22   10.00
 193          UI    311.    311.    782.   1266.   1558.   1795.   2067.   2421.   3127.   3932.
 194          UI   3412.   2833.   2475.   2101.   1793.   1523.   1198.    774.    550.    511.
 195          UI    390.    311.    254.     95.     95.     95.     95.     95.     95.     95.
 196          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 197          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 198          KK     8C3
 199          HC       2

 200          KK     8R5
 201          RS       1    FLOW      -1
 202          RL                     10     100
 203          RC     .05     .05     .05    2765   .0145     105
 204          RX       0     100     959    1157    1355    1553    2413    2514
 205          RY     106     104     102   100.1     100     102     104     106

 206          KK     805
 207          KM   SUB-BASIN 805
 208          BA    1.62
 209          LG     .28     .24    8.20     .11   13.00
 210          UI    134.    265.    573.    742.    921.   1223.   1656.   1294.   1038.    819.
 211          UI    639.    405.    233.    195.    134.     67.     41.     41.     41.     41.
 212          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 213          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 214          KK     8C4
 215          HC       2
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 216          KK     8R6
 217          RS       3    FLOW      -1
 218          RL                      10     100
 219          RC     .05     .05     .05    8045   .0099     105
 220          RX       0     100    1309    1526    1742    1959    3168    3268
 221          RY     106     104     102   100.1     100     102     104     106

 222          KK     806
 223          KM   SUB-BASIN 806
 224          BA     .47
 225          LG     .34     .31    4.40     .31    1.00
 226          UI     33.     45.    122.    164.    196.    237.    305.    415.    340.    277.
 227          UI    229.    187.    149.     99.     58.     54.     34.     30.     10.     10.
 228          UI     10.     10.     10.      0.      0.      0.      0.      0.      0.      0.
 229          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 230          KK     CD2
 231          HC       2

 232          KK      D2
 233          KM            DIVERT FLOWS FROM BASIN 8 TO BASIN 9
 234          DT    DIV2
 235          DI    5500    6730    8350   13460   24200
 236          DQ       0     400    1050    1900    3300

 237          KK     8R7
 238          RS       2    FLOW      -1
 239          RL                      10     100
 240          RC     .05     .05     .05    6034   .0133     105
 241          RX       0     100    2415    2648    2881    3115    5431    5531
 242          RY     106     104     102   100.1     100     102     104     106

 243          KK     807
 244          KM   SUB-BASIN 807
 245          BA    2.54
 246          LG     .33     .27    5.70     .21    5.00
 247          UI     143.    143.    371.    590.    721.    833.    965.   1128.   1492.   1811.
 248          UI    1503.   1261.   1099.    926.    792.    671.    486.    309.    246.    234.
 249          UI     148.    143.     79.     44.     44.     44.     44.     44.     44.      0.
 250          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 251          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 252          KK     8C5
 253          HC       2

 254          KK     8R8
 255          RS       1    FLOW      -1
 256          RL                      10     100
 257          RC     .05     .05     .05    4274   .0112     105
 258          RX       0     100     755     922    1089    1255    1911    2011
 259          RY     106     104     102   100.1     100     102     104     106
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 260          KK     808
 261          KM   SUB-BASIN 808
 262          BA     .31
 263          LG     .35     .31    3.80     .32     .00
 264          UI     64.    220.    341.    542.    377.    242.    105.     58.     21.     15.
 265          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 266          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 267          KK     8C6
 268          KM            COMBINE FLOWS AT PUMP STATION SPILLWAY - PALOMA
 269          HC       2
              *  BASIN NO. 9

 270          KK     901
 271          KM   SUB-BASIN 901
 272          BA    2.25
 273          LG     .35     .29    3.80     .27    1.00
 274          UI    135.    379.    683.    884.   1253.   1608.   1185.    901.    670.    383.
 275          UI    230.    156.     90.     41.     41.     41.      0.      0.      0.      0.
 276          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 277          KK     RD2
 278          KM            RETRIEVE FLOW FROM BASIN 8 DIVERSION
 279          DR    DIV2

 280          KK     9R1
 281          RS       2    FLOW      -1
 282          RL                      5     100
 283          RC     .05     .05     .05    6285   .0127     105
 284          RX       0     100    1740    2090    2440    2790    4440    4540
 285          RY     106     104     102   100.1     100     102     104     106

 286          KK     9C1
 287          HC       2
              * ROUTE W/ R2

 288          KK     9R2
 289          RS       2    FLOW      -1
 290          RL                      5     100
 291          RC     .05     .05     .05    5030   .0119     105
 292          RX       0     100    1812    2112    2412    2712    4425    4525
 293          RY     106     104     102   100.1     100     102     104     106

 294          KK     902
 295          KM   SUB-BASIN 902
 296          BA    1.26
 297          LG     .35     .30    3.60     .29     .00
 298          UI    249.    770.   1420.   1246.    718.    276.    114.     43.      0.      0.
 299          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 300          KK     9C2
 301          KM            COMBINE FLOWS AT CANAL FOR PONDING
 302          HC       2
              *  BASIN NO. 10

 303          KK    1001
 304          KM   SUB-BASIN 1001
 305          BA    4.63
 306          LG     .30     .25    7.60     .11    6.00
 307          UI    205.    205.    246.    696.    855.   1012.   1142.   1266.   1438.   1621.
 308          UI   1973.   2536.   2522.   2093.   1827.   1641.   1449.   1267.   1117.    979.
 309          UI    816.    587.    363.    353.    337.    259.    205.    205.    109.     63.
 310          UI     63.     63.     63.     63.     63.     63.     63.      0.      0.      0.
 311          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 312          KK    1002
 313          KM   SUB-BASIN 1002
 314          BA    4.49
 315          LG     .32     .28    5.90     .18    3.00
 316          UI   0240.    240.    561.    941.   1175.   1353.   1544.   1799.   2188.   2927.
 317          UI   2854.   2319.   2005.   1746.   1486.   1268.   1076.    779.    485.    412.
 318          UI    394.    250.    240.    153.     74.     74.     74.     74.     74.     74.
 319          UI     74.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 320          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 321          KK    10C1
 322          HC       2

 323          KK    10R1
 324          RS       3    FLOW      -1
 325          RL                     10     100
 326          RC     .05     .05     .05    8548   .0099     105
 327          RX       0     100    1943    2240    2537    2834    4677    4777
 328          RY     106     104     102   100.1     100     102     104     106

 329          KK    1003
 330          KM   SUB-BASIN 1003
 331          BA     .29
 332          LG     .35     .31    3.80     .33     .00
 333          UI    225.    711.    637.    222.     52.      0.      0.      0.      0.      0.
 334          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 335          KK    10C2
 336          KM            COMBINE FLOWS AT CANAL - SPILLWAY 5
 337          HC       2
 338          ZZ
```

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****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*          SEPTEMBER 1990              *
*           VERSION 4.0                *
*                                      *
* RUN DATE  11/25/1991  TIME  16:58:25 *
*                                      *
****************************************
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****************************************
*                                      *
*   U.S. ARMY CORPS OF ENGINEERS       *
*   HYDROLOGIC ENGINEERING CENTER      *
*        609 SECOND STREET             *
*      DAVIS, CALIFORNIA 95616         *
*         (916) 756-1104               *
*                                      *
****************************************
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                    GILA BEND CANAL FLOOD STUDY
                    FCDMC
                    18099     9-9-91
                    PALOMA24.HC1     BASINS 7 - 10
                              24-HOUR STORM

 7 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        145  NUMBER OF HYDROGRAPH ORDINATES
                NDDATE      2    0  ENDING DATE
                NDTIME       0000  ENDING TIME
                 ICENT         19  CENTURY MARK

            COMPUTATION INTERVAL     .17 HOURS
                 TOTAL TIME BASE   24.00 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

 9 JD        INDEX STORM NO. 1
                  STRM        4.20  PRECIPITATION DEPTH
                  TRDA         .01  TRANSPOSITION DRAINAGE AREA

10 PI          PRECIPITATION PATTERN
                 .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                 .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                 .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                 .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                 .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                 .00      .00      .00      .00      .01      .01      .01      .01      .01      .01
```

```
            .01     .01     .01     .01     .01     .01     .02     .02     .02     .13
            .13     .13     .02     .02     .02     .01     .01     .01     .01     .01
            .01     .01     .01     .01     .01     .01     .01     .01     .01     .01
            .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
            .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
            .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
            .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
            .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
            .00     .00     .00     .00

15 JD     INDEX STORM NO. 2
            STRM        3.99  PRECIPITATION DEPTH
            TRDA       10.00  TRANSPOSITION DRAINAGE AREA

 0 PI       PRECIPITATION PATTERN
            .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
            .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
            .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
            .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
            .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
            .00     .00     .00     .00     .01     .01     .01     .01     .01     .01
            .01     .01     .01     .01     .01     .01     .02     .02     .02     .13
            .13     .13     .02     .02     .02     .01     .01     .01     .01     .01
            .01     .01     .01     .01     .01     .01     .01     .01     .01     .01
            .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
            .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
            .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
            .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
            .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
            .00     .00     .00     .00

16 JD     INDEX STORM NO. 3
            STRM        3.86  PRECIPITATION DEPTH
            TRDA       20.00  TRANSPOSITION DRAINAGE AREA

 0 PI       PRECIPITATION PATTERN
            .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
            .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
            .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
            .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
            .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
            .00     .00     .00     .00     .01     .01     .01     .01     .01     .01
            .01     .01     .01     .01     .01     .01     .02     .02     .02     .13
            .13     .13     .02     .02     .02     .01     .01     .01     .01     .01
            .01     .01     .01     .01     .01     .01     .01     .01     .01     .01
            .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
            .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
            .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
            .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
            .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
            .00     .00     .00     .00

17 JD     INDEX STORM NO. 4
            STRM        3.78  PRECIPITATION DEPTH
            TRDA       30.00  TRANSPOSITION DRAINAGE AREA

 0 PI       PRECIPITATION PATTERN
            .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
            .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
            .00     .00     .00     .00     .00     .00     .00     .00     .00     .00
```

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.02	.02	.02	.13
.13	.13	.02	.02	.02	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00						

18 JD INDEX STORM NO. 5

STRM 3.70 PRECIPITATION DEPTH

TRDA 50.00 TRANSPOSITION DRAINAGE AREA

0 PI PRECIPITATION PATTERN

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.02	.02	.02	.13
.13	.13	.02	.02	.02	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00						

19 JD INDEX STORM NO. 6

STRM 3.57 PRECIPITATION DEPTH

TRDA 100.00 TRANSPOSITION DRAINAGE AREA

0 PI PRECIPITATION PATTERN

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.02	.02	.02	.13
.13	.13	.02	.02	.02	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00						

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	701	4331.	12.83	937.	248.	248.	6.40		
ROUTED TO	7R1	3802.	13.17	906.	229.	229.	6.40		
HYDROGRAPH AT	702	3689.	12.50	647.	174.	174.	4.32		
2 COMBINED AT	7C1	5948.	12.67	1531.	397.	397.	10.72		
ROUTED TO	7R2	5074.	13.17	1493.	378.	378.	10.72		
HYDROGRAPH AT	703	1713.	13.00	432.	116.	116.	2.73		
2 COMBINED AT	CD1	6562.	13.17	1881.	483.	483.	13.45		
DIVERSION TO	DIV1	1320.	13.17	361.	90.	90.	13.45		
HYDROGRAPH AT	D1	5242.	13.17	1520.	393.	393.	13.45		
ROUTED TO	7R3	4761.	13.50	1482.	375.	375.	13.45		
HYDROGRAPH AT	704	3037.	12.50	510.	140.	140.	3.25		
2 COMBINED AT	7C2	4935.	13.50	1934.	502.	502.	16.70		
ROUTED TO	7R4	4193.	14.33	1605.	403.	403.	16.70		
HYDROGRAPH AT	705	2241.	12.83	482.	123.	123.	3.71		
2 COMBINED AT	CD5	4260.	14.33	1998.	511.	511.	20.41		
DIVERSION TO	DIV5	1159.	14.33	543.	139.	139.	20.41		
HYDROGRAPH AT	D5	3101.	14.33	1455.	372.	372.	20.41		
ROUTED TO	7R5	2854.	14.67	1326.	336.	336.	20.41		
HYDROGRAPH AT	706	2102.	12.33	264.	66.	66.	2.10		
2 COMBINED AT	7C4	2854.	14.67	1543.	398.	398.	22.51		
HYDROGRAPH AT	RD5	1159.	14.33	543.	139.	139.	20.41		
ROUTED TO	7R6	1079.	14.67	503.	129.	129.	20.41		
HYDROGRAPH AT	707	602.	12.33	71.	18.	18.	.64		
2 COMBINED AT	7C5	1199.	14.67	618.	161.	161.	.64		
HYDROGRAPH AT	801	2902.	13.50	989.	268.	268.	3.38		
ROUTED TO	8R1	2585.	13.67	825.	206.	206.	3.38		

HYDROGRAPH AT	802	2176.	12.67	416.	110.	110.	1.38
2 COMBINED AT	8C1	3057.	12.67	1230.	314.	314.	4.76
ROUTED TO	8R2	2742.	12.83	1117.	279.	279.	4.76
HYDROGRAPH AT	803	2453.	13.50	798.	210.	210.	3.05
HYDROGRAPH AT	RD1	1320.	13.17	361.	90.	90.	13.45
ROUTED TO	8R3	494.	13.67	72.	18.	18.	13.45
3 COMBINED AT	8C2	5522.	13.50	1978.	505.	505.	7.81
ROUTED TO	8R4	4173.	13.83	1303.	326.	326.	7.81
HYDROGRAPH AT	804	4556.	13.33	1413.	382.	382.	5.64
2 COMBINED AT	8C3	7741.	13.50	2630.	685.	685.	13.45
ROUTED TO	8R5	7250.	13.67	2415.	604.	604.	13.45
HYDROGRAPH AT	805	2084.	12.83	493.	134.	134.	1.62
2 COMBINED AT	8C4	7998.	13.50	2858.	725.	725.	15.07
ROUTED TO	8R6	6355.	14.17	2185.	546.	546.	15.07
HYDROGRAPH AT	806	421.	13.00	101.	25.	25.	.47
2 COMBINED AT	CD2	6434.	14.00	2272.	568.	568.	15.54
DIVERSION TO	DIV2	304.	14.00	35.	9.	9.	15.54
HYDROGRAPH AT	D2	6130.	14.00	2238.	560.	560.	15.54
ROUTED TO	8R7	5188.	14.50	1787.	447.	447.	15.54
HYDROGRAPH AT	807	2117.	13.33	628.	164.	164.	2.54
2 COMBINED AT	8C5	5994.	14.17	2350.	594.	594.	18.08
ROUTED TO	8R8	5417.	14.50	2053.	513.	513.	18.08
HYDROGRAPH AT	808	506.	12.33	67.	17.	17.	.31
2 COMBINED AT	8C6	5417.	14.50	2114.	529.	529.	18.39
HYDROGRAPH AT	901	1699.	12.67	311.	78.	78.	2.25
HYDROGRAPH AT	RD2	304.	14.00	35.	9.	9.	15.54
ROUTED TO	9R1	0.	.17	0.	0.	0.	15.54
2 COMBINED AT	9C1	1699.	12.67	313.	79.	79.	2.25
ROUTED TO	9R2	1158.	13.00	202.	51.	51.	2.25
HYDROGRAPH AT	902	1407.	12.17	168.	42.	42.	1.26

2 COMBINED AT	9C2	1459.	12.33	367.	92.	92.	3.51
HYDROGRAPH AT	1001	3563.	13.83	1304.	341.	341.	4.63
HYDROGRAPH AT	1002	3636.	13.50	1120.	287.	287.	4.49
2 COMBINED AT	10C1	6699.	13.67	2404.	623.	623.	9.12
ROUTED TO	10R1	4885.	14.17	1555.	389.	389.	9.12
HYDROGRAPH AT	1003	629.	12.17	61.	15.	15.	.29
2 COMBINED AT	10C2	4885.	14.17	1614.	403.	403.	9.41

*** NORMAL END OF HEC-1 ***
Elapsed Time - 00:00:32.47 (32.47 Seconds)
NORMAL END OF HEC-1

HEC1 S/N: HMVersion: 6.00 Data File: GTZWLR06.HC1

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****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*            SEPTEMBER 1990            *
*             VERSION 4.0              *
*                                      *
*  RUN DATE  11/25/1991  TIME  16:58:06 *
*                                      *
****************************************
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****************************************
*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*    HYDROLOGIC ENGINEERING CENTER     *
*          609 SECOND STREET           *
*       DAVIS, CALIFORNIA 95616        *
*           (916) 756-1104             *
*                                      *
****************************************
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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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```
::::::::::::::::::::::::::::::::::::::::
::::::::::::::::::::::::::::::::::::::::
:::                                  :::
:::  Full Microcomputer Implementation :::
:::                by                :::
:::       Haestad Methods, Inc.      :::
:::                                  :::
::::::::::::::::::::::::::::::::::::::::
::::::::::::::::::::::::::::::::::::::::
```

37 Brookside Road * Waterbury, Connecticut 06708 * (203) 755-1666

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

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

  1           ID          GILA BEND CANAL FLOOD STUDY
  2           ID          FCDMC     D&A #18099
  3           ID          9-9-91
  4           ID          GTZWLLR6.HC1        BASINS 16 - 18
  5           ID                    6-HOUR STORM
  6           IT     10                   145
  7           IO      5
  8           IN     15
  9           JD   3.45    0.01
 10           PC   .000    .008    .016    .025    .033    .041    .050    .058    .066    .074
 11           PC   .087    .099    .118    .138    .216    .377    .834    .911    .931    .950
 12           PC   .962    .972    .983    .991   1.000
 13           JD   3.43    0.50
 14           JD   3.38    2.80
 15           PC   .000    .009    .016    .025    .034    .042    .051    .059    .067    .076
 16           PC   .087    .100    .120    .163    .252    .451    .694    .837    .900    .938
 17           PC   .950    .963    .975    .988   1.000
 18           JD   3.18    16.0
 19           PC   .000    .015    .020    .030    .048    .063    .076    .090    .105    .119
 20           PC   .135    .152    .175    .222    .304    .472    .670    .796    .868    .912
 21           PC   .946    .960    .973    .987   1.000
 22           JD   2.79    90.0
 23           PC   .000    .021    .035    .051    .071    .087    .105    .125    .143    .160
 24           PC   .179    .201    .232    .281    .364    .500    .658    .773    .841    .888
 25           PC   .927    .945    .964    .982   1.000
 26           JD   1.97   500.0
 27           PC   .000    .024    .043    .059    .078    .098    .119    .141    .162    .186
 28           PC   .212    .239    .271    .321    .408    .515    .627    .735    .814    .864
 29           PC   .907    .930    .954    .977   1.000
              *  BASIN NO. 16

 30           KK   1601
 31           KM          SUB-BASIN 1601
 32           BA   3.79
 33           LG    .33     .30    5.80     .20    5.00
 34           UI   173.    291.    686.    907.   1097.   1364.   1955.   1998.   1536.   1260.
 35           UI  1009.    798.    510.    302.    267.    173.    119.     53.     53.     53.
 36           UI    53.     53.      0.      0.      0.      0.      0.      0.      0.      0.
 37           UI     0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 38           KK     D4          DIVERT FLOW TO BASIN 17
 39           DT   DIV4
 40           DI     0     300    2600    3800    7850
 41           DQ     0      60     360     620    1520

 42           KK   16R1
 43           RS     3    FLOW      -1
 44           RL                     5     100
 45           RC   .05    .050     .05    9051   .0088     105
 46           RX     0     100    1815    2198    2581    2964    4678    4777
 47           RY   106     104     102   100.1     100     102     104     106
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  48          KK    1602
  49          KM          SUB-BASIN 1602
  50          BA    1.62
  51          LG     .35     .32    5.20     .20     .00
  52          UI    100.    298.    516.    675.    992.   1142.    820.    612.    438.    218.
  53          UI    154.    100.     36.     31.     31.     31.      0.      0.      0.      0.
  54          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

  55          KK    16C1
  56          HC       2

  57          KK    16R2
  58          RS       2    FLOW      -1
  59          RL                      5     100
  60          RC     .05    .050     .05    6537   .0092     105
  61          RX       0     100    1032    1182    1332    1482    2414    2514
  62          RY     106     104     102   100.1     100     102     104     106

  63          KK    1603
  64          KM          SUB-BASIN 1603
  65          BA     .56
  66          LG     .35     .33    4.80     .30     .00
  67          UI     78.    264.    414.    640.    431.    270.    113.     64.     19.     17.
  68          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
  69          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

  70          KK    16C2
  71          HC       2

  72          KK    16R3
  73          RS       1    FLOW      -1
  74          RL                      5     100
  75          RC     .05    .050     .05    2765   .0072     105
  76          RX       0     100     730     830     930    1030    1660    1760
  77          RY     106     104     102   100.1     100     102     104     106

  78          KK    1605
  79          KM    SUB-BASIN 1605
  80          BA    2.99
  81          LG     .35     .32    5.10     .22     .00
  82          UI    115.    115.    393.    526.    639.    745.    895.   1197.   1445.   1144.
  83          UI    956.    804.    668.    556.    397.    238.    195.    163.    115.     89.
  84          UI     35.     35.     35.     35.     35.     35.      0.      0.      0.      0.
  85          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

  86          KK    16R4
  87          RS       3    FLOW      -1
  88          RL                      5     100
  89          RC     .05    .050     .05    9051   .0099     105
  90          RX       0     100    2190    2406    2622    2838    4928    5028
  91          RY     106     104     102   100.1     102     104     106
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 92           KK    1606
 93           KM            SUB-BASIN 1606
 94           BA    2.06
 95           LG     .35     .33    4.90     .27     .00
 96           UI    141.    477.    771.   1038.   1638.   1371.   1004.    726.    394.    238.
 97           UI    144.     61.     43.     43.      0.      0.      0.      0.      0.      0.
 98           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 99           KK    16C3
100           HC       2

101           KK    16R5
102           RS       1    FLOW      -1
103           RL                      5    100
104           RC     .05    .050     .05   2514    .008     105
105           RX       0     100     730    830     930    1030    1660    1760
106           RY     106     104     102  100.1     100     102     104     106

107           KK    1604
108           KM            SUB-BASIN 1604
109           BA     .16
110           LG     .35     .33    4.80     .28     .00
111           UI    446.   1320.    740.    159.     43.      0.      0.      0.      0.      0.
112           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

113           KK    1607
114           KM            SUB-BASIN 1607
115           BA     .36
116           LG     .35     .32    5.00     .24     .00
117           UI    206.    647.    500.    148.     34.      0.      0.      0.      0.      0.
118           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

119           KK    16C4
120           KM            SPILLWAY 11 - GETZWILLER
121           HC       4
              *  BASIN NO. 17

122           KK    1701
123           KM            SUB-BASIN 1701
124           BA    7.09
125           LG     .35     .32    4.80     .27     .00
126           UI    191.    191.    246.    655.    806.    954.   1073.   1193.   1361.   1535.
127           UI   1935.   2408.   2270.   1896.   1665.   1500.   1304.   1153.   1002.    891.
128           UI    678.    486.    338.    322.    314.    200.    191.    185.     59.     59.
129           UI     59.     59.     59.     59.     59.     59.     59.      0.      0.      0.
130           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
              * INSERT DIVERSION BLOCK,D4.HC1
              * KK  C1, HC  2, COMBINE D4 AND 1701
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 131          KK    RD4
 132          KM          RETRIEVE FLOW DIVERTED FROM BASIN 16
 133          DR   DIV4

 134          KK   17R1
 135          RS      6   FLOW      -1
 136          RL                     5    100
 137          RC    .05   .050     .05   17100   .0082    105
 138          RX      0    100    2215    2415    2615   2815   4930   5030
 139          RY    106    104     102   100.1     100    102    104    106

 140          KK   17C1
 141          HC      2

 142          KK   17R2
 143          RS      1   FLOW      -1
 144          RL                     5    100
 145          RC    .05   .050     .05    2765   .0072    105
 146          RX      0    100    1007    1174    1340   1507   2414   2514
 147          RY    106    104     102   100.1     100    102    104    106

 148          KK   1702
 149          KM          SUB-BASIN 1702
 150          BA    .50
 151          LG    .35    .34    4.50     .35     .00
 152          UI   192.   579.    725.    310.     94.    23.     0.     0.     0.     0.
 153          UI     0.     0.      0.      0.      0.     0.     0.     0.     0.     0.

 154          KK   17C2
 155          HC      2
              *  BASIN NO. 18

 156          KK   1801
 157          KM          SUB-BASIN 1801
 158          BA   1.64
 159          LG    .35    .32    5.10     .22     .00
 160          UI    91.   237.    441.    567.    756.  1110.   879.   678.   514.   362.
 161          UI   186.   140.     91.     40.     28.    28.    28.     0.     0.     0.
 162          UI     0.     0.      0.      0.      0.     0.     0.     0.     0.     0.

 163          KK   18R1
 164          RS      1   FLOW      -1
 165          RL                     5   737.8
 166          RC    .05   .050     .05    2100   .0086    742
 167          RX      0    150     300     320     360    380    520    570
 168          RY    742    740   742.8   737.8   737.8  742.8    740    742

 169          KK   1802
 170          KM          SUB-BASIN 1802
 171          BA    .21
 172          LG    .35    .33    4.70     .29     .00
 173          UI   162.   423.    158.     25.      0.     0.     0.     0.     0.     0.
 174          UI     0.     0.      0.      0.      0.     0.     0.     0.     0.     0.
```

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

 175          KK    18C1
 176          KM              SPILL-UNDER
 177          HC       2
 178          ZZ
```

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****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*          SEPTEMBER 1990              *
*           VERSION 4.0                *
*                                      *
* RUN DATE  11/25/1991  TIME  16:58:06 *
*                                      *
****************************************
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****************************************
*                                      *
*   U.S. ARMY CORPS OF ENGINEERS       *
*   HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET            *
*      DAVIS, CALIFORNIA 95616         *
*          (916) 756-1104              *
*                                      *
****************************************
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```
                    GILA BEND CANAL FLOOD STUDY
                    FCDMC     D&A #18099
                    9-9-91
                    GTZWLLR6.HC1        BASINS 16 - 18
                              6-HOUR STORM

 7 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        145  NUMBER OF HYDROGRAPH ORDINATES
                NDDATE      2    0  ENDING DATE
                NDTIME       0000  ENDING TIME
                 ICENT         19  CENTURY MARK

            COMPUTATION INTERVAL     .17 HOURS
                 TOTAL TIME BASE   24.00 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

 9 JD        INDEX STORM NO. 1
                  STRM        3.45  PRECIPITATION DEPTH
                  TRDA         .01  TRANSPOSITION DRAINAGE AREA

10 PI          PRECIPITATION PATTERN
                 .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                 .01       .01       .01       .01       .01       .01       .01       .01       .01       .03
                 .05       .11       .21       .30       .05       .03       .01       .01       .01       .01
                 .01       .01       .01       .01       .01       .01

13 JD        INDEX STORM NO. 2
```

```
            STRM        3.43  PRECIPITATION DEPTH
            TRDA         .50  TRANSPOSITION DRAINAGE AREA

0 PI      PRECIPITATION PATTERN
            .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
            .01       .01       .01       .01       .01       .01       .01       .01       .01       .03
            .05       .11       .21       .30       .05       .03       .01       .01       .01       .01
            .01       .01       .01       .01       .01       .01

14 JD     INDEX STORM NO. 3
            STRM        3.38  PRECIPITATION DEPTH
            TRDA        2.80  TRANSPOSITION DRAINAGE AREA

15 PI     PRECIPITATION PATTERN
            .01       .01       .00       .01       .01       .01       .01       .01       .01       .01
            .01       .01       .01       .01       .01       .01       .01       .01       .03       .04
            .06       .13       .15       .16       .10       .07       .04       .03       .02       .01
            .01       .01       .01       .01       .01       .01

18 JD     INDEX STORM NO. 4
            STRM        3.18  PRECIPITATION DEPTH
            TRDA       16.00  TRANSPOSITION DRAINAGE AREA

19 PI     PRECIPITATION PATTERN
            .01       .01       .00       .01       .01       .01       .01       .01       .01       .01
            .01       .01       .01       .01       .01       .01       .01       .02       .03       .04
            .05       .11       .12       .13       .08       .07       .05       .03       .03       .02
            .01       .01       .01       .01       .01       .01

22 JD     INDEX STORM NO. 5
            STRM        2.79  PRECIPITATION DEPTH
            TRDA       90.00  TRANSPOSITION DRAINAGE AREA

23 PI     PRECIPITATION PATTERN
            .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
            .01       .01       .01       .01       .01       .01       .02       .02       .03       .04
            .06       .09       .10       .11       .08       .06       .05       .03       .03       .03
            .01       .01       .01       .01       .01       .01

26 JD     INDEX STORM NO. 6
            STRM        1.97  PRECIPITATION DEPTH
            TRDA      500.00  TRANSPOSITION DRAINAGE AREA

27 PI     PRECIPITATION PATTERN
            .02       .01       .01       .01       .01       .01       .01       .01       .01       .01
            .01       .01       .02       .02       .02       .02       .02       .02       .03       .05
            .06       .07       .07       .07       .07       .06       .05       .03       .03       .03
            .02       .02       .02       .02       .02       .02
```

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	1601	2619.	5.00	659.	165.	165.	3.79		
DIVERSION TO	DIV4	371.	5.00	98.	25.	25.	3.79		
HYDROGRAPH AT	D4	2247.	5.00	561.	141.	141.	3.79		
ROUTED TO	16R1	1125.	5.83	247.	62.	62.	3.79		
HYDROGRAPH AT	1602	1530.	4.67	287.	72.	72.	1.62		
2 COMBINED AT	16C1	1265.	4.67	480.	120.	120.	5.41		
ROUTED TO	16R2	997.	6.00	356.	89.	89.	5.41		
HYDROGRAPH AT	1603	853.	4.50	104.	26.	26.	.56		
2 COMBINED AT	16C2	994.	6.00	433.	108.	108.	5.97		
ROUTED TO	16R3	907.	6.00	384.	96.	96.	5.97		
HYDROGRAPH AT	1605	1772.	5.33	492.	123.	123.	2.99		
ROUTED TO	16R4	1741.	5.50	492.	123.	123.	2.99		
HYDROGRAPH AT	1606	1903.	4.67	329.	82.	82.	2.06		
2 COMBINED AT	16C3	2371.	4.83	752.	188.	188.	5.05		
ROUTED TO	16R5	2215.	5.17	706.	176.	176.	5.05		
HYDROGRAPH AT	1604	1658.	4.17	127.	32.	32.	.16		
HYDROGRAPH AT	1607	922.	4.17	75.	19.	19.	.36		
4 COMBINED AT	16C4	2630.	5.17	1079.	270.	270.	11.54		
HYDROGRAPH AT	1701	2614.	5.83	951.	239.	239.	7.09		
HYDROGRAPH AT	RD4	371.	5.00	98.	25.	25.	3.79		
ROUTED TO	17R1	0.	.17	0.	0.	0.	3.79		
2 COMBINED AT	17C1	2614.	5.83	951.	239.	239.	7.09		
ROUTED TO	17R2	2396.	6.00	865.	216.	216.	7.09		
HYDROGRAPH AT	1702	940.	4.17	84.	21.	21.	.50		
2 COMBINED AT	17C2	2396.	6.00	921.	231.	231.	7.59		
HYDROGRAPH AT	1801	1431.	4.83	277.	69.	69.	1.64		

ROUTED TO	18R1	1298.	5.00	268.	67.	67.	1.64
HYDROGRAPH AT	1802	482.	4.17	36.	9.	9.	.21
2 COMBINED AT	18C1	1298.	5.00	300.	75.	75.	1.85

*** NORMAL END OF HEC-1 ***
Elapsed Time - 00:00:15.87 (15.87 Seconds)
NORMAL END OF HEC-1

HEC1 S/N: HMVersion: 6.00 Data File: GTZWLR24.HC1

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****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*            SEPTEMBER 1990            *
*             VERSION 4.0              *
*                                      *
*  RUN DATE  11/25/1991  TIME  16:57:47 *
*                                      *
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```
****************************************
*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*    HYDROLOGIC ENGINEERING CENTER     *
*          609 SECOND STREET           *
*       DAVIS, CALIFORNIA 95616        *
*           (916) 756-1104             *
*                                      *
****************************************
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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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::::::::::::::::::::::::::::::::::::::::
::::::::::::::::::::::::::::::::::::::::
:::                                  :::
:::  Full Microcomputer Implementation :::
:::                by                :::
:::       Haestad Methods, Inc.      :::
:::                                  :::
::::::::::::::::::::::::::::::::::::::::
::::::::::::::::::::::::::::::::::::::::
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37 Brookside Road * Waterbury, Connecticut 06708 * (203) 755-1666

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

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

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

  1           ID            GILA BEND CANAL FLOOD STUDY
  2           ID            FCDMC     D&A #18099
  3           ID            9-9-91
  4           ID            GTZWLR24.HC1        BASINS 16 - 18
  5           ID                      24-HOUR STORM
  6           IT      10                    145
  7           IO       5
  8           IN      30
  9           JD    4.20     .01
 10           PC    .000    .005    .011    .016    .022    .028    .035    .041    .048    .056
 11           PC    .068    .071    .080    .089    .098    .109    .120    .133    .147    .163
 12           PC    .181    .204    .235    .283    .663    .735    .772    .799    .820    .838
 13           PC    .854    .868    .880    .891    .902    .912    .921    .929    .937    .945
 14           PC    .952    .959    .965    .972    .978    .984    .989    .995   1.000
 15           JD    3.99    10.0
 16           JD    3.86    20.0
 17           JD    3.78    30.0
 18           JD    3.70    50.0
 19           JD    3.57   100.0
              *  BASIN NO. 16

 20           KK    1601
 21           KM            SUB-BASIN 1601
 22           BA    3.79
 23           LG     .33     .30    5.80     .20    5.00
 24           UI    173.    291.    686.    907.   1097.   1364.   1955.   1998.   1536.   1260.
 25           UI   1009.    798.    510.    302.    267.    173.    119.     53.     53.     53.
 26           UI     53.     53.      0.      0.      0.      0.      0.      0.      0.      0.
 27           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 28           KK      D4          DIVERT FLOW TO BASIN 17
 29           DT    DIV4
 30           DI       0     300    2600    3800    7850
 31           DQ       0      60     360     620    1520

 32           KK    16R1
 33           RS       3    FLOW      -1
 34           RL                      5     100
 35           RC     .05     .05     .05    9051   .0088     105
 36           RX       0     100    1815    2198    2581    2964    4678    4777
 37           RY     106     104     102   100.1     100     102     104     106

 38           KK    1602
 39           KM            SUB-BASIN 1602
 40           BA    1.62
 41           LG     .35     .32    5.20     .20     .00
 42           UI    100.    298.    516.    675.    992.   1142.    820.    612.    438.    218.
 43           UI    154.    100.     36.     31.     31.     31.      0.      0.      0.      0.
 44           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  45          KK    16C1
  46          HC       2

  47          KK    16R2
  48          RS       2    FLOW      -1
  49          RL                      5     100
  50          RC     .05     .05     .05    6537   .0092     105
  51          RX       0     100    1032    1182    1332    1482    2414    2514
  52          RY     106     104     102   100.1     100     102     104     106

  53          KK    1603
  54          KM          SUB-BASIN 1603
  55          BA     .56
  56          LG     .35     .33    4.80     .30     .00
  57          UI     78.    264.    414.    640.    431.    270.    113.     64.     19.     17.
  58          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
  59          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

  60          KK    16C2
  61          HC       2

  62          KK    16R3
  63          RS       1    FLOW      -1
  64          RL                      5     100
  65          RC     .05     .05     .05    2765   .0072     105
  66          RX       0     100     730     830     930    1030    1660    1760
  67          RY     106     104     102   100.1     100     102     104     106

  68          KK    1605
  69          KM   SUB-BASIN 1605
  70          BA    2.99
  71          LG     .35     .32    5.10     .22     .00
  72          UI    115.    115.    393.    526.    639.    745.    895.   1197.   1445.   1144.
  73          UI    956.    804.    668.    556.    397.    238.    195.    163.    115.     89.
  74          UI     35.     35.     35.     35.     35.     35.      0.      0.      0.      0.
  75          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

  76          KK    16R4
  77          RS       3    FLOW      -1
  78          RL                      5     100
  79          RC     .05     .05     .05    9051   .0099     105
  80          RX       0     100    2190    2406    2622    2838    4928    5028
  81          RY     106     104     102   100.1     102     104     106

  82          KK    1606
  83          KM          SUB-BASIN 1606
  84          BA    2.06
  85          LG     .35     .33    4.90     .27     .00
  86          UI    141.    477.    771.   1038.   1638.   1371.   1004.    726.    394.    238.
  87          UI    144.     61.     43.     43.      0.      0.      0.      0.      0.      0.
  88          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 89           KK    16C3
 90           HC       2

 91           KK    16R5
 92           RS       1    FLOW      -1
 93           RL                      5     100
 94           RC     .05     .05     .05    2514    .008     105
 95           RX       0     100     730     830     930    1030    1660    1760
 96           RY     106     104     102   100.1     100     102     104     106

 97           KK    1604
 98           KM           SUB-BASIN 1604
 99           BA     .16
100           LG     .35     .33    4.80     .28     .00
101           UI    446.   1320.    740.    159.     43.      0.      0.      0.      0.      0.
102           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

103           KK    1607
104           KM           SUB-BASIN 1607
105           BA     .36
106           LG     .35     .32    5.00     .24     .00
107           UI    206.    647.    500.    148.     34.      0.      0.      0.      0.      0.
108           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

109           KK    16C4
110           KM           SPILLWAY 11 - GETZWILLER
111           HC       4
              *  BASIN NO. 17

112           KK    1701
113           KM           SUB-BASIN 1701
114           BA    7.09
115           LG     .35     .32    4.80     .27     .00
116           UI    191.    191.    246.    655.    806.    954.   1073.   1193.   1361.   1535.
117           UI   1935.   2408.   2270.   1896.   1665.   1500.   1304.   1153.   1002.    891.
118           UI    678.    486.    338.    322.    314.    200.    191.    185.     59.     59.
119           UI     59.     59.     59.     59.     59.     59.     59.      0.      0.      0.
120           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
              * INSERT DIVERSION BLOCK,D4.HC1
              * KK  C1, HC  2, COMBINE D4 AND 1701

121           KK     RD4
122           KM           RETRIEVE FLOW DIVERTED FROM BASIN 16
123           DR    DIV4

124           KK    17R1
125           RS       6    FLOW      -1
126           RL                      5     100
127           RC     .05     .05     .05   17100   .0082     105
128           RX       0     100    2215    2415    2615    2815    4930    5030
129           RY     106     104     102   100.1     100     102     104     106
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 130          KK    17C1
 131          HC       2

 132          KK    17R2
 133          RS       1    FLOW      -1
 134          RL                      5     100
 135          RC     .05     .05     .05    2765   .0072     105
 136          RX       0     100    1007    1174    1340    1507    2414    2514
 137          RY     106     104     102   100.1     100     102     104     106

 138          KK    1702
 139          KM           SUB-BASIN 1702
 140          BA     .50
 141          LG     .35     .34    4.50     .35     .00
 142          UI    192.    579.    725.    310.     94.     23.      0.      0.      0.      0.
 143          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 144          KK    17C2
 145          HC       2
              *  BASIN NO. 18

 146          KK    1801
 147          KM           SUB-BASIN 1801
 148          BA    1.64
 149          LG     .35     .32    5.10     .22     .00
 150          UI     91.    237.    441.    567.    756.   1110.    879.    678.    514.    362.
 151          UI    186.    140.     91.     40.     28.     28.     28.      0.      0.      0.
 152          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 153          KK    18R1
 154          RS       1    FLOW      -1
 155          RL                      5   737.8
 156          RC     .05     .05     .05    2100   .0086     742
 157          RX       0     150     300     320     360     380     520     570
 158          RY     742     740   742.8   737.8   737.8   742.8     740     742

 159          KK    1802
 160          KM           SUB-BASIN 1802
 161          BA     .21
 162          LG     .35     .33    4.70     .29     .00
 163          UI    162.    423.    158.     25.      0.      0.      0.      0.      0.      0.
 164          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 165          KK    18C1
 166          KM           SPILL-UNDER
 167          HC       2
 168          ZZ
```

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****************************************
*                                      *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*          SEPTEMBER 1990              *
*           VERSION 4.0                *
*                                      *
* RUN DATE  11/25/1991  TIME  16:57:47 *
*                                      *
****************************************
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****************************************
*                                      *
*   U.S. ARMY CORPS OF ENGINEERS       *
*   HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET            *
*      DAVIS, CALIFORNIA 95616         *
*          (916) 756-1104              *
*                                      *
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                    GILA BEND CANAL FLOOD STUDY
                    FCDMC     D&A #18099
                    9-9-91
                    GTZWLR24.HC1        BASINS 16 - 18
                              24-HOUR STORM

  7 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        145  NUMBER OF HYDROGRAPH ORDINATES
                  NDDATE      2    0  ENDING DATE
                  NDTIME       0000  ENDING TIME
                   ICENT         19  CENTURY MARK

             COMPUTATION INTERVAL     .17 HOURS
                  TOTAL TIME BASE   24.00 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

  9 JD        INDEX STORM NO. 1
                   STRM       4.20  PRECIPITATION DEPTH
                   TRDA        .01  TRANSPOSITION DRAINAGE AREA

 10 PI          PRECIPITATION PATTERN
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                   .00       .00       .00       .00       .01       .01       .01       .01       .01       .01
```

.01	.01	.01	.01	.01	.01	.02	.02	.02	.13
.13	.13	.02	.02	.02	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
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.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00						

15 JD INDEX STORM NO. 2

STRM 3.99 PRECIPITATION DEPTH

TRDA 10.00 TRANSPOSITION DRAINAGE AREA

0 PI PRECIPITATION PATTERN

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.02	.02	.02	.13
.13	.13	.02	.02	.02	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00						

16 JD INDEX STORM NO. 3

STRM 3.86 PRECIPITATION DEPTH

TRDA 20.00 TRANSPOSITION DRAINAGE AREA

0 PI PRECIPITATION PATTERN

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.02	.02	.02	.13
.13	.13	.02	.02	.02	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
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.00	.00	.00	.00						

17 JD INDEX STORM NO. 4

STRM 3.78 PRECIPITATION DEPTH

TRDA 30.00 TRANSPOSITION DRAINAGE AREA

0 PI PRECIPITATION PATTERN

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
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.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.02	.02	.02	.13
.13	.13	.02	.02	.02	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
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.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

18 JD INDEX STORM NO. 5

STRM 3.70 PRECIPITATION DEPTH

TRDA 50.00 TRANSPOSITION DRAINAGE AREA

0 PI PRECIPITATION PATTERN

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
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.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.02	.02	.02	.13
.13	.13	.02	.02	.02	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

19 JD INDEX STORM NO. 6

STRM 3.57 PRECIPITATION DEPTH

TRDA 100.00 TRANSPOSITION DRAINAGE AREA

0 PI PRECIPITATION PATTERN

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.02	.02	.02	.13
.13	.13	.02	.02	.02	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

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	1601	2383.	13.00	558.	145.	145.	3.79		
DIVERSION TO	DIV4	332.	13.00	84.	22.	22.	3.79		
HYDROGRAPH AT	D4	2052.	13.00	474.	123.	123.	3.79		
ROUTED TO	16R1	867.	13.83	181.	45.	45.	3.79		
HYDROGRAPH AT	1602	1265.	12.67	225.	56.	56.	1.62		
2 COMBINED AT	16C1	1248.	12.67	401.	100.	100.	5.41		
ROUTED TO	16R2	774.	13.83	285.	71.	71.	5.41		
HYDROGRAPH AT	1603	574.	12.33	74.	19.	19.	.56		
2 COMBINED AT	16C2	808.	13.17	356.	89.	89.	5.97		
ROUTED TO	16R3	729.	13.33	316.	79.	79.	5.97		
HYDROGRAPH AT	1605	1575.	13.17	407.	102.	102.	2.99		
ROUTED TO	16R4	1536.	13.33	406.	102.	102.	2.99		
HYDROGRAPH AT	1606	1581.	12.50	264.	66.	66.	2.06		
2 COMBINED AT	16C3	2288.	12.67	665.	166.	166.	5.05		
ROUTED TO	16R5	2048.	12.83	621.	155.	155.	5.05		
HYDROGRAPH AT	1604	1001.	12.00	90.	23.	23.	.16		
HYDROGRAPH AT	1607	555.	12.00	54.	13.	13.	.36		
4 COMBINED AT	16C4	2609.	12.83	1051.	263.	263.	11.54		
HYDROGRAPH AT	1701	2573.	13.67	888.	223.	223.	7.09		
HYDROGRAPH AT	RD4	332.	13.00	84.	22.	22.	3.79		
ROUTED TO	17R1	0.	.17	0.	0.	0.	3.79		
2 COMBINED AT	17C1	2573.	13.67	888.	223.	223.	7.09		
ROUTED TO	17R2	2333.	13.83	803.	201.	201.	7.09		
HYDROGRAPH AT	1702	602.	12.17	59.	15.	15.	.50		
2 COMBINED AT	17C2	2333.	13.83	859.	215.	215.	7.59		
HYDROGRAPH AT	1801	1144.	12.67	218.	54.	54.	1.64		

ROUTED TO	18R1	1060.	12.83	210.	52.	52.	1.64
HYDROGRAPH AT	1802	295.	12.00	25.	6.	6.	.21
2 COMBINED AT	18C1	1060.	12.83	235.	59.	59.	1.85

*** NORMAL END OF HEC-1 ***
Elapsed Time - 00:00:16.26 (16.26 Seconds)
NORMAL END OF HEC-1

HEC1 S/N: HMVersion: 6.00 Data File: BTTRFD06.HC1

```
****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*            SEPTEMBER 1990            *
*             VERSION 4.0              *
*                                      *
*  RUN DATE  11/25/1991  TIME  17:00:55 *
*                                      *
****************************************
```

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

```
::::::::::::::::::::::::::::::::::::::::
::::::::::::::::::::::::::::::::::::::::
:::                                  :::
:::  Full Microcomputer Implementation :::
:::                by                :::
:::       Haestad Methods, Inc.      :::
:::                                  :::
::::::::::::::::::::::::::::::::::::::::
::::::::::::::::::::::::::::::::::::::::
```

37 Brookside Road * Waterbury, Connecticut 06708 * (203) 755-1666

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

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

  1           ID            GILA BEND CANAL FLOOD STUDY
  2           ID            FCDMC
  3           ID            D&A #18099          9-9-91
  4           ID            BTTRFLD6.HC1        BASINS 11 - 15
  5           ID                      6-HOUR STORM
  6           IT      10                    145
  7           IO       5
  8           IN      15
  9           JD    3.45    0.01
 10           PC    .000    .008    .016    .025    .033    .041    .050    .058    .066    .074
 11           PC    .087    .099    .118    .138    .216    .377    .834    .911    .931    .950
 12           PC    .962    .972    .983    .991   1.000
 13           JD    3.43    0.50
 14           JD    3.38    2.80
 15           PC    .000    .009    .016    .025    .034    .042    .051    .059    .067    .076
 16           PC    .087    .100    .120    .163    .252    .451    .694    .837    .900    .938
 17           PC    .950    .963    .975    .988   1.000
 18           JD    3.18    16.0
 19           PC    .000    .015    .020    .030    .048    .063    .076    .090    .105    .119
 20           PC    .135    .152    .175    .222    .304    .472    .670    .796    .868    .912
 21           PC    .946    .960    .973    .987   1.000
 22           JD    2.79    90.0
 23           PC    .000    .021    .035    .051    .071    .087    .105    .125    .143    .160
 24           PC    .179    .201    .232    .281    .364    .500    .658    .773    .841    .888
 25           PC    .927    .945    .964    .982   1.000
 26           JD    1.97   500.0
 27           PC    .000    .024    .043    .059    .078    .098    .119    .141    .162    .186
 28           PC    .212    .239    .271    .321    .408    .515    .627    .735    .814    .864
 29           PC    .907    .930    .954    .977   1.000
              *  BASIN NO. 11

 30           KK    1101
 31           KM            SUB-BASIN 1101
 32           BA    5.20
 33           LG     .27     .24    8.20     .10   12.00
 34           UI    254.    493.   1076.   1395.   1730.   2256.   3155.   2503.   2005.   1586.
 35           UI   1251.    830.    445.    391.    254.    153.     78.     78.     78.     78.
 36           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 37           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 38           KK    11R1
 39           RS       8    FLOW      -1
 40           RL                      5     100
 41           RC     .05     .05     .05   23885   .0155     105
 42           RX       0     100    2961    3501    4041    4581    7442    7542
 43           RY     106     104     102   100.1     100     102     104     106

 44           KK    1102
 45           KM            SUB-BASIN 1102
 46           BA    5.64
 47           LG     .34     .28    5.00     .22    2.00
 48           UI    214.    214.    734.    983.   1192.   1391.   1671.   2234.   2698.   2135.
 49           UI   1784.   1501.   1248.   1037.    741.    445.    363.    304.    214.    166.
 50           UI     66.     66.     66.     66.     66.     66.      0.      0.      0.      0.
 51           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
```

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

  52          KK    11C1
  53          HC       2

  54          KK    11R2
  55          RS       1    FLOW      -1
  56          RL                      5     100
  57          RC     .05     .05     .05    2300   .0130     105
  58          RX       0     100    2500    3000    3500    4000    6400    6500
  59          RY     106     104     102   100.1     100     102     104     106

  60          KK    1103
  61          KM           SUB-BASIN 1103
  62          BA     .59
  63          LG     .35     .30    3.70     .30     .00
  64          UI     64.    229.    348.    579.    462.    308.    168.     81.     42.     16.
  65          UI     16.      0.      0.      0.      0.      0.      0.      0.      0.      0.
  66          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

  67          KK    11C2
  68          KM           SPILLWAY 6 - STIEL #2
  69          HC       2
              *  BASIN NO. 12

  70          KK    1201
  71          KM           SUB-BASIN 1201
  72          BA    4.06
  73          LG     .27     .23    8.40     .09   14.00
  74          UI    291.   1071.   1659.   2339.   3455.   2520.   1802.   1193.    557.    371.
  75          UI    192.     89.     89.     89.      0.      0.      0.      0.      0.      0.
  76          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

  77          KK    12R1
  78          RS       5    FLOW      -1
  79          RL                      5     100
  80          RC     .05     .05     .05   13577   .0198     105
  81          RX       0     100    4800    5200    5600    6000   10700   10800
  82          RY     106     104     102   100.1     100     102     104     106

  83          KK    1202
  84          KM           SUB-BASIN 1202
  85          BA    4.66
  86          LG     .33     .28    6.60     .19    4.00
  87          UI    296.    912.   1550.   2042.   3084.   3261.   2353.   1738.   1192.    585.
  88          UI    416.    265.     91.     91.     91.      0.      0.      0.      0.      0.
  89          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

  90          KK    12C1
  91          HC       2
```

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

 92           KK   12R2A
 93           RS     3    FLOW     -1
 94           RL                   5    100
 95           RC   .05     .05     .05   8548   .0294    105
 96           RX     0     100    5358   5725    6092   6460   11717   11817
 97           RY   106     104     102  100.1     100    102     104     106

 98           KK   12R2B
 99           RS     7    FLOW     -1
100           RL                   5    100
101           RC   .05     .05     .05  20366   .0133    105
102           RX     0     100    3447   3830    4213   4596    7945    8045
103           RY   106     104     102  100.1     100    102     104     106

104           KK   1203
105           KM          SUB-BASIN 1203
106           BA   8.89
107           LG   .35     .32    4.50    .31     .00
108           UI   277.    277.   604.   1050.   1330.  1538.   1733.   2020.   2376.   3135.
109           UI   3509.  2835.  2421.   2137.   1823.  1576.   1349.   1082.    720.    490.
110           UI   461.    396.   277.    277.    114.    85.     85.     85.     85.     85.
111           UI   85.     85.     0.      0.      0.     0.      0.      0.      0.      0.
112           UI    0.      0.     0.      0.      0.     0.      0.      0.      0.      0.

113           KK   12C2
114           HC     2

115           KK   12R3
116           RS     1    FLOW     -1
117           RL                   5    100
118           RC   .05     .05     .05   2600   .0100    105
119           RX     0      50      95   1048    2001   2954    2999    3050
120           RY   106     104     102  100.1     100    102     104     106

121           KK   1204
122           KM          SUB-BASIN 1204
123           BA   .61
124           LG   .35     .33    4.00    .35     .00
125           UI   112.    351.   636.    624.    369.   152.    72.     20.     20.     0.
126           UI    0.      0.     0.      0.      0.     0.      0.      0.      0.      0.
127           UI    0.      0.     0.      0.      0.     0.      0.      0.      0.      0.

128           KK   12C3
129           KM          SPILLWAY 7 - TILLEY #1
130           HC     2
              *  BASIN NO. 13

131           KK   1301
132           KM          SUB-BASIN 1301
133           BA   5.13
134           LG   .31     .31    5.70    .32   17.00
135           UI   235.    408.   945.   1247.   1509.  1895.   2750.   2628.   2042.   1667.
136           UI   1329.  1039.   611.    405.    333.   235.    125.     72.     72.     72.
137           UI   72.      0.     0.      0.      0.     0.      0.      0.      0.      0.
```

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

 138          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 139          KK    13R1
 140          RS       7   FLOW      -1
 141          RL                     1     100
 142          RC     .05     .05     .05   19108    .011     105
 143          RX       0     100    1400    1640    1880    2120    3420    3520
 144          RY     106     104     102   100.1     100     102     104     106

 145          KK    1302
 146          KM          SUB-BASIN 1302
 147          BA    5.98
 148          LG     .32     .31    5.50     .29    8.00
 149          UI    215.    215.    648.    935.   1137.   1315.   1555.   1901.   2614.   2492.
 150          UI   2000.   1723.   1444.   1219.   1029.    735.    456.    368.    333.    215.
 151          UI    215.     69.     66.     66.     66.     66.     66.     66.      0.      0.
 152          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 153          KK    13C1
 154          HC       2

 155          KK    13R2
 156          RS       4   FLOW      -1
 157          RL                     1     100
 158          RC     .05     .05     .05   11314   .0106     105
 159          RX       0     100    1535    1685    1835    1985    3420    3520
 160          RY     106     104     102   100.1     100     102     104     106

 161          KK    1303
 162          KM          SUB-BASIN 1303
 163          BA    4.43
 164          LG     .29     .25    7.40     .14    9.00
 165          UI    136.    136.    289.    509.    648.    751.    844.    981.   1141.   1503.
 166          UI   1738.   1418.   1208.   1066.    914.    789.    675.    562.    386.    240.
 167          UI    229.    212.    136.    136.     77.     42.     42.     42.     42.     42.
 168          UI     42.     42.      0.      0.      0.      0.      0.      0.      0.      0.
 169          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 170          KK    13R3
 171          RS       6   FLOW      -1
 172          RL                     1     100
 173          RC     .05     .05     .05   15085   .0113     105
 174          RX       0     100    1535    1685    1835    1985    3420    3520
 175          RY     106     104     102   100.1     100     102     104     106

 176          KK    1304
 177          KM          SUB-BASIN 1304
 178          BA    1.89
 179          LG     .26     .23    8.40     .09   13.00
 180          UI    302.    979.   1649.   2053.   1248.    631.    275.    110.     59.      0.
 181          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 182          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 183          KK    13R4
 184          RS       9    FLOW      -1
 185          RL                      1     100
 186          RC     .05     .05     .05   24640   .0187     105
 187          RX       0     100    2164    2397    2630    2863    4927    5028
 188          RY     106     104     102   100.1     100     102     104     106

 189          KK    1305
 190          KM          SUB-BASIN 1305
 191          BA    6.26
 192          LG     .32     .31    5.50     .28    5.00
 193          UI    291.    504.   1167.   1541.   1864.   2341.   3397.   3246.   2522.   2059.
 194          UI   1642.   1283.    755.    500.    411.    291.    154.     89.     89.     89.
 195          UI     89.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 196          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 197          KK     CD3          COMBINE PRIOR TO DIVERSION
 198          HC       4

 199          KK      D3
 200          KM          DIVERT FLOW TO BASIN 14
 201          DT    DIV3
 202          DI       0     340    2080    3700   10420   20400
 203          DQ       0     110     670    1170    5650   10770

 204          KK   13R5A
 205          RS       7    FLOW      -1
 206          RL                      1     100
 207          RC     .05     .05     .05   18857   .0117     105
 208          RX       0     100    3749    4099    4449    4799    8448    8548
 209          RY     106     104     102   100.1     100     102     104     106

 210          KK   13R5B
 211          RS       5    FLOW      -1
 212          RL                      1     100
 213          RC     .05     .05     .05   14582   .0110     105
 214          RX       0     100    2976    3171    3366    3561    6437    6537
 215          RY     106     104     102   100.1     100     102     104     106

 216          KK    1306
 217          KM          SUB-BASIN 1306
 218          BA    3.32
 219          LG     .32     .27    7.10     .17    9.00
 220          UI    188.    489.    909.   1170.   1560.   2289.   1813.   1399.   1060.    747.
 221          UI    384.    290.    188.     83.     58.     58.     58.      0.      0.      0.
 222          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 223          KK   13R6A
 224          RS       8    FLOW      -1
 225          RL                      1     100
 226          RC     .05     .05     .05   22628   .0124     105
 227          RX       0     100    3749    4099    4490    4799    8448    8548
 228          RY     106     104     102   100.1     100     102     104     106
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 229          KK   13R6B
 230          RS      5    FLOW     -1
 231          RL                     1     100
 232          RC    .05     .05     .05   14080    .011     105
 233          RX      0     100    2976    3171    3366    3561    6437    6537
 234          RY    106     104     102   100.1     100     102     104     106

 235          KK    1307
 236          KM   SUB-BASIN 1307
 237          BA    9.10
 238          LG    .35     .34    4.00     .35     .00
 239          UI   222.    222.    222.    641.    840.   1044.   1162.   1280.   1418.   1609.
 240          UI  1783.   2164.   2732.   2789.   2336.   2043.   1838.   1670.   1464.   1312.
 241          UI  1146.   1043.    824.    628.    393.    386.    365.    319.    222.    222.
 242          UI   200.     68.     68.     68.     68.     68.     68.     68.     68.     68.
 243          UI    68.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 244          UI     0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 245          KK    13C2
 246          HC       3

 247          KK    13R7
 248          RS       1    FLOW     -1
 249          RL                     1     100
 250          RC    .05     .05     .05    2200   .0055     105
 251          RX      0     100     725     842     958    1075    1700    1800
 252          RY    106     104     102   100.1     100     102     104     106

 253          KK    1308
 254          KM   SUB-BASIN 1308
 255          BA    .30
 256          LG    .35     .35    4.10     .40     .00
 257          UI   154.    485.    375.    111.     25.      0.      0.      0.      0.      0.
 258          UI     0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 259          KK    13C3
 260          KM            SPILLWAY 8 - TILLEY #2
 261          HC       2
              *  BASIN NO. 14

 262          KK    1401
 263          KM            SUB-BASIN 1401
 264          BA    2.38
 265          LG    .28     .28    6.80     .20   13.00
 266          UI   155.    494.    823.   1093.   1694.   1638.   1193.    873.    575.    274.
 267          UI   198.    115.     48.     48.     48.      0.      0.      0.      0.      0.
 268          UI     0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 269          KK    14R1A
 270          RS       3    FLOW     -1
 271          RL                     5     100
 272          RC    .05     .05     .05    9051  .0088     105
 273          RX      0     100    3644    4064    4484    4904    8448    8548
 274          RY    106     104     102   100.1     100     102     104     106
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 275          KK   14R1B
 276          RS      6   FLOW      -1
 277          RL                     5     100
 278          RC    .05     .05     .05   16342   .0098     105
 279          RX      0     100    1515    1678    1842    2005    3420    3520
 280          RY    106     104     102   100.1     100     102     104     106

 281          KK   1402
 282          KM           SUB-BASIN 1402
 283          BA   7.54
 284          LG    .35     .32    4.10     .32     .00
 285          UI   145.    145.    145.    145.    476.    539.    638.    708.    788.    839.
 286          UI   912.    997.   1097.   1199.   1420.   1699.   1919.   1691.   1486.   1340.
 287          UI  1231.   1145.   1040.    943.    862.    783.    710.    642.    531.    417.
 288          UI   290.    257.    247.    238.    230.    145.    145.    145.    136.     45.
 289          UI    45.     45.     45.     45.     45.     45.     45.     45.     45.     45.
 290          UI    45.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 291          UI     0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 292          KK    RD3
 293          KM           RETRIEVE DIVERTED FLOW FROM BASIN 13
 294          DR   DIV3

 295          KK   14R2A
 296          RS      6   FLOW      -1
 297          RL                     5     100
 298          RC    .05     .04     .05   17850   .0112     105
 299          RX      0     200    3645    4065    4485    4905    8450    8550
 300          RY    106     104     102   100.1     100     102     104     106

 301          KK   14R2B
 302          RS      6   FLOW      -1
 303          RL                     5     100
 304          RC    .05     .04     .05   17600   .0099     105
 305          RX      0     100    1515    1678    1842    2005    3420    3520
 306          RY    106     104     102   100.1     100     102     104     106

 307          KK   14C1
 308          HC      3

 309          KK   14R3
 310          RS      1   FLOW      -1
 311          RL                     5     100
 312          RC    .05     .05     .05    2200     .01     105
 313          RX      0     100    1365    1455    1545    1635    2900    3000
 314          RY    106     104     102   100.1     100     102     104     106

 315          KK   1403
 316          KM           SUB-BASIN 1403
 317          BA    .28
 318          LG    .35     .35    4.10     .36     .00
 319          UI   243.    635.    237.     38.      0.      0.      0.      0.      0.      0.
 320          UI     0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 321          KK    14C2
 322          KM            SPILLWAY 9 - THE NECK
 323          HC       2
              *  BASIN NO. 15

 324          KK    1501
 325          KM            SUB-BASIN 1501
 326          BA    8.79
 327          LG     .31     .30    5.70     .27    5.00
 328          UI    312.    312.    917.   1342.   1638.   1889.   2231.   2697.   3692.   3709.
 329          UI   2962.   2535.   2149.   1813.   1521.   1153.    721.    540.    512.    323.
 330          UI    312.    148.     96.     96.     96.     96.     96.     96.      0.      0.
 331          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 332          KK    1502
 333          KM            SUB-BASIN 1502
 334          BA    1.02
 335          LG     .35     .32    4.90     .24     .00
 336          UI     70.    243.    388.    529.    825.    653.    478.    337.    171.    109.
 337          UI     68.     21.     21.     21.      0.      0.      0.      0.      0.      0.
 338          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 339          KK    15C1
 340          HC       2

 341          KK    15R1
 342          RS      10    FLOW      -1
 343          RL                      1     100
 344          RC     .05     .05     .05   27657   .0101     110
 345          RX       0     100    2592    2958    3325    3691    6184    6285
 346          RY     106     104     102   100.1     100     102     104     106

 347          KK    1503
 348          KM            SUB-BASIN 1503
 349          BA    5.18
 350          LG     .33     .31    5.60     .21    4.00
 351          UI    143.    143.    206.    496.    615.    727.    815.    912.   1047.   1197.
 352          UI   1543.   1838.   1594.   1352.   1197.   1069.    923.    815.    707.    600.
 353          UI    439.    281.    249.    235.    186.    143.    143.     72.     44.     44.
 354          UI     44.     44.     44.     44.     44.     44.      0.      0.      0.      0.
 355          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 356          KK    15C2
 357          HC       2

 358          KK    15R2A
 359          RS       2    FLOW      -1
 360          RL                      1     100
 361          RC     .05     .05     .05    6537   .0092     105
 362          RX       0     100    1107    1207    1307    1407    2414    2514
 363          RY     106     104     102   100.1     100     102     104     106
```

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

 364          KK   15R2B
 365          RS       3    FLOW      -1
 366          RL                      1     100
 367          RC     .05     .05     .05    8548   .0094     105
 368          RX       0     100     427     477     527     577     905    1005
 369          RY     106     104     102   100.1     100     102     104     106

 370          KK    1504
 371          KM          SUB-BASIN 1504
 372          BA     .80
 373          LG     .35     .32    5.10     .21     .00
 374          UI     42.     95.    190.    245.    310.    450.    485.    362.    285.    221.
 375          UI    152.     79.     65.     42.     22.     13.     13.     13.     13.      0.
 376          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 377          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 378          KK    15C3
 379          HC       2

 380          KK    15R3
 381          RS       2    FLOW      -1
 382          RL                      1     100
 383          RC     .05     .05     .05    5531   .0108     105
 384          RX       0     100    1032    1182    1332    1482    2414    2514
 385          RY     106     104     102   100.1     100     102     104     106

 386          KK    1505
 387          KM          SUB-BASIN 1505
 388          BA    3.13
 389          LG     .28     .27    7.00     .19   11.00
 390          UI    151.    285.    630.    820.   1009.   1304.   1860.   1528.   1220.    971.
 391          UI    768.    538.    292.    249.    155.    114.     46.     46.     46.     46.
 392          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 393          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 394          KK    1506
 395          KM          SUB-BASIN 1506
 396          BA    4.46
 397          LG     .27     .26    7.60     .16   13.00
 398          UI    238.    553.   1090.   1404.   1789.   2654.   2649.   1998.   1558.   1204.
 399          UI    777.    414.    336.    238.     87.     73.     73.     73.      0.      0.
 400          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 401          KK    15R4
 402          RS       3    FLOW      -1
 403          RL                      1     100
 404          RC     .05     .05     .05    8297   .0241     105
 405          RX       0     100    2468    3001    3535    4068    6437    6537
 406          RY     106     104     102   100.1     100     102     104     106
```

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

 407          KK    1507
 408          KM            SUB-BASIN 1507
 409          BA    2.49
 410          LG     .32     .29    6.40     .22    4.00
 411          UI    530.   1620.   2996.   2385.   1309.    467.    186.     89.      0.      0.
 412          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 413          KK    15C4
 414          HC       3

 415          KK    15R5
 416          RS       7    FLOW      -1
 417          RL                      1     100
 418          RC     .05     .05     .05   20114   .0149     105
 419          RX       0     100    3074    3874    4674    5474    8448    8548
 420          RY     106     104     102   100.1     100     102     104     106

 421          KK    1508
 422          KM            SUB-BASIN 1508
 423          BA    5.48
 424          LG     .35     .34    4.20     .35     .00
 425          UI    240.    365.    920.   1223.   1464.   1796.   2441.   2968.   2286.   1889.
 426          UI   1527.   1235.    915.    521.    405.    308.    240.    110.     73.     73.
 427          UI     73.     73.      0.      0.      0.      0.      0.      0.      0.      0.
 428          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 429          KK    15C5
 430          HC       2

 431          KK    15R6
 432          RS       7    FLOW      -1
 433          RL                      1     100
 434          RC     .05     .05     .05   20617   .0107     105
 435          RX       0     100    2115    2465    2815    3165    5180    5280
 436          RY     106     104     102   100.1     100     102     104     106

 437          KK    1509
 438          KM            SUB-BASIN 1509
 439          BA    3.93
 440          LG     .35     .34    4.30     .32     .00
 441          UI    150.    150.    515.    690.    837.    976.   1173.   1568.   1893.   1498.
 442          UI   1252.   1054.    876.    728.    520.    312.    255.    213.    150.    117.
 443          UI     46.     46.     46.     46.     46.     46.      0.      0.      0.      0.
 444          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 445          KK    15C6
 446          HC       2

 447          KK    15R7A
 448          RS       2    FLOW      -1
 449          RL                      1     100
 450          RC     .05     .05     .05    6285   .0095     105
 451          RX       0     100     508     588     668     748    1157    1257
 452          RY     106     104     102   100.1     100     102     104     106
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 453          KK   15R7B
 454          RS       3   FLOW      -1
 455          RL                     1     100
 456          RC     .05     .05     .05    7542   .0106     105
 457          RX       0     100     805     938    1072    1205    1911    2011
 458          RY     106     104     102   100.1     100     102     104     106

 459          KK    1510
 460          KM          SUB-BASIN 1510
 461          BA     .71
 462          LG     .35     .34    4.30     .32     .00
 463          UI     39.     96.    184.    237.    308.    464.    404.    311.    238.    179.
 464          UI     99.     66.     45.     29.     12.     12.     12.     12.      0.      0.
 465          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 466          KK    15C7
 467          HC       2

 468          KK    15R8
 469          RS       3   FLOW      -1
 470          RL                     1     100
 471          RC     .05     .05     .05    7291   .0082     105
 472          RX       0     100    1032    1182    1332    1482    2414    2514
 473          RY     106     104     102   100.1     100     102     104     106

 474          KK    1511
 475          KM          SUB-BASIN 1511
 476          BA     .48
 477          LG     .35     .33    4.90     .27     .00
 478          UI     67.    222.    355.    520.    336.    200.     83.     41.     14.     14.
 479          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 480          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 481          KK    15C8
 482          HC       3

 483          KK    15R9
 484          RS       4   FLOW      -1
 485          RL                     1     100
 486          RC     .05     .05     .05   12571   .0095     105
 487          RX       0     100    1017    1177    1337    1497    2414    2514
 488          RY     106     104     102   100.1     100     102     104     106

 489          KK    1519
 490          KM          SUB-BASIN 1519
 491          BA     .94
 492          LG     .35     .33    4.70     .30     .00
 493          UI     42.     69.    166.    219.    264.    326.    461.    503.    384.    316.
 494          UI    254.    204.    138.     76.     69.     43.     35.     13.     13.     13.
 495          UI     13.     13.      0.      0.      0.      0.      0.      0.      0.      0.
 496          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

497           KK   15C13
498           HC       2

499           KK   15R17
500           RS       1    FLOW      -1
501           RL                      1     100
502           RC     .05     .05     .05    2262   .0066     105
503           RX       0     100    1510    1676    1843    2009    3420    3520
504           RY     106     104     102   100.1     100     102     104     106

505           KK    1512
506           KM          SUB-BASIN 1512
507           BA    2.90
508           LG     .32     .30    6.10     .25    5.00
509           UI    144.    287.    617.    799.    993.   1332.   1768.   1375.   1103.    869.
510           UI    675.    418.    248.    203.    144.     64.     44.     44.     44.     44.
511           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
512           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

513           KK   15R10
514           RS      12    FLOW      -1
515           RL                      1     100
516           RC     .05     .05     .05   33691   .0119     105
517           RX       0     100    2059    2362    2666    2969    4928    5028
518           RY     106     104     102   100.1     100     102     104     106

519           KK    1513
520           KM          SUB-BASIN 1513
521           BA    6.67
522           LG     .35     .35    4.00     .36     .00
523           UI    184.    184.    266.    639.    791.    936.   1049.   1174.   1348.   1541.
524           UI   1987.   2367.   2053.   1741.   1541.   1377.   1189.   1049.    911.    772.
525           UI    565.    362.    320.    302.    240.    184.    184.     92.     56.     56.
526           UI     56.     56.     56.     56.     56.     56.      0.      0.      0.      0.
527           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

528           KK    15C9
529           HC       2

530           KK  15R11A
531           RS       4    FLOW      -1
532           RL                      1     100
533           RC     .05     .05     .05   12571   .0095     105
534           RX       0     100    2818    3118    3418    3718    6437    6537
535           RY     106     104     102   100.1     100     102     104     106

536           KK  15R11B
537           RS       4    FLOW      -1
538           RL                      1     100
539           RC     .05     .05     .05   12571   .0095     105
540           RX       0     100    1842    2290    2738    3186    4928    5028
541           RY     106     104     102   100.1     100     102     104     106
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

542           KK    1514
543           KM            SUB-BASIN 1514
544           BA    2.42
545           LG     .30     .29    6.50     .24    9.00
546           UI    315.   1066.   1668.   2580.   1737.   1091.    455.    259.     77.     69.
547           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
548           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

549           KK   15R12
550           RS      11    FLOW      -1
551           RL                      1     100
552           RC     .05     .05     .05   30422   .0131     105
553           RX       0     100    2345    2625    2905    3185    5431    5531
554           RY     106     104     102   100.1     100     102     104     106

555           KK    1515
556           KM            SUB-BASIN 1515
557           BA    5.40
558           LG     .35     .35    4.00     .36     .00
559           UI    148.    148.    206.    511.    631.    747.    838.    934.   1074.   1220.
560           UI   1574.   1880.   1682.   1422.   1254.   1123.    973.    860.    745.    639.
561           UI    477.    319.    261.    243.    212.    148.    148.     97.     45.     45.
562           UI     45.     45.     45.     45.     45.     45.      0.      0.      0.      0.
563           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

564           KK   15C10
565           HC       2

566           KK  15R13A
567           RS       6    FLOW      -1
568           RL                      1     100
569           RC     .05     .05     .05   16594   .0096     105
570           RX       0     100    2818    3118    3418    3718    6437    6537
571           RY     106     104     102   100.1     100     102     104     106

572           KK  15R13B
573           RS       4    FLOW      -1
574           RL                      1     100
575           RC     .05     .05     .05   12571   .0095     105
576           RX       0     100    1842    2290    2738    3186    4928    5028
577           RY     106     104     102   100.1     100     102     104     106

578           KK    1516
579           KM            SUB-BASIN 1516
580           BA    1.89
581           LG     .30     .26    7.30     .17   11.00
582           UI    188.    690.   1045.   1736.   1488.   1003.    598.    271.    155.     49.
583           UI     49.      0.      0.      0.      0.      0.      0.      0.      0.      0.
584           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

585           KK   15R14
586           RS       5    FLOW      -1
587           RL                      1     100
588           RC     .05     .05     .05   15588   .0128     105
589           RX       0     100    1274    1514    1754    1994    3168    3268
590           RY     106     104     102   100.1     100     102     104     106

591           KK    1517
592           KM          SUB-BASIN 1517
593           BA    1.51
594           LG     .35     .35    4.00     .36     .00
595           UI     73.    137.    304.    396.    487.    629.    898.    737.    588.    468.
596           UI    371.    260.    141.    120.     75.     55.     22.     22.     22.     22.
597           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
598           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

599           KK   15C11
600           HC       2

601           KK   15R15A
602           RS       8    FLOW      -1
603           RL                      1     100
604           RC     .05     .05     .05   22628   .0097     105
605           RX       0     100    2818    3118    3418    3718    6437    6537
606           RY     106     104     102   100.1     100     102     104     106

607           KK   15R15B
608           RS       4    FLOW      -1
609           RL                      1     100
610           RC     .05     .05     .05   12571   .0095     105
611           RX       0     100    1842    2290    2738    3186    4928    5028
612           RY     106     104     102   100.1     100     102     104     106

613           KK    1518
614           KM          SUB-BASIN 1518
615           BA    6.61
616           LG     .35     .35    4.00     .36     .00
617           UI     167.    167.    167.    528.    669.    797.    904.    993.   1109.   1256.
618           UI    1433.   1833.   2160.   1907.   1630.   1445.   1312.   1149.   1021.    902.
619           UI     797.    671.    485.    312.    292.    275.    240.    167.    167.    137.
620           UI      51.     51.     51.     51.     51.     51.     51.     51.     51.      0.
621           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
622           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

623           KK   15C12
624           HC       4

625           KK   15R16
626           RS       1    FLOW      -1
627           RL                      1     100
628           RC     .05     .05     .05    2514   .0080     105
629           RX       0     100     806     939    1072    1205    1911    2011
630           RY     106     104     102   100.1     100     102     104     106
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 631          KK    1521
 632          KM          SUB-BASIN 1521
 633          BA     .34
 634          LG     .35     .35    4.10     .37     .00
 635          UI    275.    720.    268.     43.      0.      0.      0.      0.      0.      0.
 636          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 637          KK   15C14
 638          KM          SPILWAY 10 - BUTTERFIELD
 639          HC       3

 640          KK    1520
 641          KM          SUB-BASIN 1520
 642          BA    1.09
 643          LG     .35     .32    5.20     .20     .00
 644          UI     51.     91.    208.    273.    332.    420.    611.    551.    432.    350.
 645          UI    279.    213.    118.     87.     65.     51.     19.     16.     16.     16.
 646          UI     16.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 647          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 648          KK   15R18
 649          RS       1    FLOW      -1
 650          RL                      1     100
 651          RC     .05     .05     .05    1760   .0114     105
 652          RX       0     100    1385    1635    1885    2135    3420    3520
 653          RY     106     104     102   100.1     100     102     104     106

 654          KK    1522
 655          KM          SUB-BASIN 1522
 656          BA     .27
 657          LG     .35     .32    5.10     .22     .00
 658          UI    125.    397.    356.    124.     29.      0.      0.      0.      0.      0.
 659          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 660          KK   15C15
 661          HC       2
 662          ZZ
```

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****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*          SEPTEMBER 1990              *
*           VERSION 4.0                *
*                                      *
* RUN DATE  11/25/1991  TIME  17:00:55 *
*                                      *
****************************************
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```
****************************************
*                                      *
*   U.S. ARMY CORPS OF ENGINEERS       *
*   HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET            *
*      DAVIS, CALIFORNIA 95616         *
*          (916) 756-1104              *
*                                      *
****************************************
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                    GILA BEND CANAL FLOOD STUDY
                    FCDMC
                    D&A #18099          9-9-91
                    BTTRFLD6.HC1        BASINS 11 - 15
                            6-HOUR STORM

 7 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        145  NUMBER OF HYDROGRAPH ORDINATES
                NDDATE     2    0  ENDING DATE
                NDTIME       0000  ENDING TIME
                 ICENT         19  CENTURY MARK

            COMPUTATION INTERVAL     .17 HOURS
                 TOTAL TIME BASE   24.00 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

 9 JD        INDEX STORM NO. 1
                  STRM       3.45  PRECIPITATION DEPTH
                  TRDA        .01  TRANSPOSITION DRAINAGE AREA

10 PI          PRECIPITATION PATTERN
                 .01      .01      .01      .01      .01      .01      .01      .01      .01      .01
                 .01      .01      .01      .01      .01      .01      .01      .01      .01      .03
                 .05      .11      .21      .30      .05      .03      .01      .01      .01      .01
                 .01      .01      .01      .01      .01      .01

13 JD        INDEX STORM NO. 2
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                STRM        3.43  PRECIPITATION DEPTH
                TRDA         .50  TRANSPOSITION DRAINAGE AREA

 0 PI         PRECIPITATION PATTERN
                .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                .01       .01       .01       .01       .01       .01       .01       .01       .01       .03
                .05       .11       .21       .30       .05       .03       .01       .01       .01       .01
                .01       .01       .01       .01       .01       .01

14 JD        INDEX STORM NO. 3
                STRM        3.38  PRECIPITATION DEPTH
                TRDA        2.80  TRANSPOSITION DRAINAGE AREA

15 PI         PRECIPITATION PATTERN
                .01       .01       .00       .01       .01       .01       .01       .01       .01       .01
                .01       .01       .01       .01       .01       .01       .01       .01       .03       .04
                .06       .13       .15       .16       .10       .07       .04       .03       .02       .01
                .01       .01       .01       .01       .01       .01

18 JD        INDEX STORM NO. 4
                STRM        3.18  PRECIPITATION DEPTH
                TRDA       16.00  TRANSPOSITION DRAINAGE AREA

19 PI         PRECIPITATION PATTERN
                .01       .01       .00       .01       .01       .01       .01       .01       .01       .01
                .01       .01       .01       .01       .01       .01       .01       .02       .03       .04
                .05       .11       .12       .13       .08       .07       .05       .03       .03       .02
                .01       .01       .01       .01       .01       .01

22 JD        INDEX STORM NO. 5
                STRM        2.79  PRECIPITATION DEPTH
                TRDA       90.00  TRANSPOSITION DRAINAGE AREA

23 PI         PRECIPITATION PATTERN
                .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                .01       .01       .01       .01       .01       .01       .02       .02       .03       .04
                .06       .09       .10       .11       .08       .06       .05       .03       .03       .03
                .01       .01       .01       .01       .01       .01

26 JD        INDEX STORM NO. 6
                STRM        1.97  PRECIPITATION DEPTH
                TRDA      500.00  TRANSPOSITION DRAINAGE AREA

27 PI         PRECIPITATION PATTERN
                .02       .01       .01       .01       .01       .01       .01       .01       .01       .01
                .01       .01       .02       .02       .02       .02       .02       .02       .03       .05
                .06       .07       .07       .07       .07       .06       .05       .03       .03       .03
                .02       .02       .02       .02       .02       .02
     WARNING EXCESS AT PONDING LESS THAN ZERO FOR PERIOD. EXCESS SET TO ZERO
     WARNING EXCESS AT PONDING LESS THAN ZERO FOR PERIOD. EXCESS SET TO ZERO
     WARNING EXCESS AT PONDING LESS THAN ZERO FOR PERIOD. EXCESS SET TO ZERO
     WARNING EXCESS AT PONDING LESS THAN ZERO FOR PERIOD. EXCESS SET TO ZERO
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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	1101	4392.	5.00	1124.	282.	282.	5.20		
ROUTED TO	11R1	740.	6.83	131.	33.	33.	5.20		
HYDROGRAPH AT	1102	3191.	5.33	908.	227.	227.	5.64		
2 COMBINED AT	11C1	2898.	5.33	923.	231.	231.	10.84		
ROUTED TO	11R2	2587.	5.50	788.	197.	197.	10.84		
HYDROGRAPH AT	1103	856.	4.50	111.	28.	28.	.59		
2 COMBINED AT	11C2	2623.	5.33	857.	214.	214.	11.43		
HYDROGRAPH AT	1201	4539.	4.67	933.	234.	234.	4.06		
ROUTED TO	12R1	2637.	5.33	486.	122.	122.	4.06		
HYDROGRAPH AT	1202	3914.	4.67	781.	195.	195.	4.66		
2 COMBINED AT	12C1	4342.	5.17	1156.	289.	289.	8.72		
ROUTED TO	12R2A	3521.	5.50	859.	215.	215.	8.72		
ROUTED TO	12R2B	1065.	7.00	223.	56.	56.	8.72		
HYDROGRAPH AT	1203	3348.	5.67	1094.	274.	274.	8.89		
2 COMBINED AT	12C2	2921.	5.67	1105.	276.	276.	17.61		
ROUTED TO	12R3	2369.	5.83	817.	204.	204.	17.61		
HYDROGRAPH AT	1204	937.	4.33	104.	26.	26.	.61		
2 COMBINED AT	12C3	2369.	5.83	879.	220.	220.	18.22		
HYDROGRAPH AT	1301	3158.	5.00	830.	209.	209.	5.13		
ROUTED TO	13R1	2184.	6.33	677.	169.	169.	5.13		
HYDROGRAPH AT	1302	2915.	5.33	882.	223.	223.	5.98		
2 COMBINED AT	13C1	3400.	6.00	1387.	353.	353.	11.11		
ROUTED TO	13R2	3063.	6.67	1305.	330.	330.	11.11		
HYDROGRAPH AT	1303	2501.	5.67	867.	219.	219.	4.43		
ROUTED TO	13R3	2137.	6.50	777.	195.	195.	4.43		
HYDROGRAPH AT	1304	2820.	4.33	450.	113.	113.	1.89		

ROUTED TO	13R4	1353.	5.83	322.	80.	80.	1.89
HYDROGRAPH AT	1305	3634.	5.00	895.	225.	225.	6.26
4 COMBINED AT	CD3	5332.	6.33	2632.	675.	675.	23.69
DIVERSION TO	DIV3	2276.	6.17	975.	249.	249.	23.69
HYDROGRAPH AT	D3	3060.	6.33	1657.	426.	426.	23.69
ROUTED TO	13R5A	2647.	7.50	1369.	349.	349.	23.69
ROUTED TO	13R5B	2396.	8.33	1218.	313.	313.	23.69
HYDROGRAPH AT	1306	2874.	4.83	626.	157.	157.	3.32
ROUTED TO	13R6A	1404.	6.50	412.	103.	103.	3.32
ROUTED TO	13R6B	956.	7.83	329.	82.	82.	3.32
HYDROGRAPH AT	1307	2675.	6.00	1045.	265.	265.	9.10
3 COMBINED AT	13C2	2859.	8.33	1797.	510.	510.	36.11
ROUTED TO	13R7	2809.	8.50	1779.	505.	505.	36.11
HYDROGRAPH AT	1308	633.	4.17	49.	12.	12.	.30
2 COMBINED AT	13C3	2805.	8.50	1777.	509.	509.	36.41
HYDROGRAPH AT	1401	2353.	4.67	469.	118.	118.	2.38
ROUTED TO	14R1A	941.	5.50	175.	44.	44.	2.38
ROUTED TO	14R1B	90.	7.17	13.	3.	3.	2.38
HYDROGRAPH AT	1402	2001.	6.67	928.	240.	240.	7.54
HYDROGRAPH AT	RD3	2276.	6.17	975.	249.	249.	23.69
ROUTED TO	14R2A	848.	7.50	216.	54.	54.	23.69
ROUTED TO	14R2B	261.	8.83	51.	13.	13.	23.69
3 COMBINED AT	14C1	1999.	6.67	1113.	287.	287.	9.92
ROUTED TO	14R3	1795.	6.83	982.	251.	251.	9.92
HYDROGRAPH AT	1403	702.	4.17	51.	13.	13.	.28
2 COMBINED AT	14C2	1791.	6.83	991.	258.	258.	10.20
HYDROGRAPH AT	1501	3983.	5.33	1208.	304.	304.	8.79
HYDROGRAPH AT	1502	1121.	4.67	181.	45.	45.	1.02
2 COMBINED AT	15C1	4174.	5.33	1325.	334.	334.	9.81
ROUTED TO	15R1	2600.	7.33	972.	244.	244.	9.81

HYDROGRAPH AT	1503	2280.	5.83	832.	210.	210.	5.18
2 COMBINED AT	15C2	3043.	7.17	1544.	405.	405.	14.99
ROUTED TO	15R2A	2766.	7.67	1497.	393.	393.	14.99
ROUTED TO	15R2B	2607.	8.17	1457.	383.	383.	14.99
HYDROGRAPH AT	1504	751.	4.83	150.	38.	38.	.80
2 COMBINED AT	15C3	2605.	8.17	1499.	410.	410.	15.79
ROUTED TO	15R3	2490.	8.50	1444.	392.	392.	15.79
HYDROGRAPH AT	1505	2424.	5.00	596.	150.	150.	3.13
HYDROGRAPH AT	1506	3706.	4.83	874.	220.	220.	4.46
ROUTED TO	15R4	3159.	5.33	768.	192.	192.	4.46
HYDROGRAPH AT	1507	3137.	4.33	424.	106.	106.	2.49
3 COMBINED AT	15C4	4822.	5.17	1569.	395.	395.	10.08
ROUTED TO	15R5	3345.	6.50	1125.	281.	281.	10.08
HYDROGRAPH AT	1508	2769.	5.17	683.	171.	171.	5.48
2 COMBINED AT	15C5	3415.	6.33	1587.	401.	401.	15.56
ROUTED TO	15R6	2677.	7.67	1269.	323.	323.	15.56
HYDROGRAPH AT	1509	1972.	5.33	541.	135.	135.	3.93
2 COMBINED AT	15C6	2672.	7.67	1560.	422.	422.	19.49
ROUTED TO	15R7A	2410.	8.17	1445.	392.	392.	19.49
ROUTED TO	15R7B	2304.	8.50	1384.	375.	375.	19.49
HYDROGRAPH AT	1510	657.	4.83	121.	30.	30.	.71
2 COMBINED AT	15C7	2275.	8.50	1383.	389.	389.	20.20
ROUTED TO	15R8	2154.	9.00	1323.	369.	369.	20.20
HYDROGRAPH AT	1511	712.	4.50	87.	22.	22.	.48
3 COMBINED AT	15C8	3347.	8.83	2156.	613.	613.	36.47
ROUTED TO	15R9	3115.	9.67	2035.	572.	572.	36.47
HYDROGRAPH AT	1519	693.	5.00	156.	39.	39.	.94
2 COMBINED AT	15C13	3100.	9.67	2029.	590.	590.	37.41
ROUTED TO	15R17	3038.	9.83	1992.	578.	578.	37.41
HYDROGRAPH AT	1512	2034.	5.00	473.	118.	118.	2.90

ROUTED TO	15R10	615.	8.00	214.	53.	53.	2.90
HYDROGRAPH AT	1513	2247.	5.83	795.	199.	199.	6.67
2 COMBINED AT	15C9	2097.	5.83	874.	225.	225.	9.57
ROUTED TO	15R11A	1565.	6.83	714.	184.	184.	9.57
ROUTED TO	15R11B	1051.	8.17	512.	131.	131.	9.57
HYDROGRAPH AT	1514	2734.	4.50	426.	107.	107.	2.42
ROUTED TO	15R12	767.	6.83	229.	57.	57.	2.42
HYDROGRAPH AT	1515	1877.	5.83	667.	167.	167.	5.40
2 COMBINED AT	15C10	1754.	5.83	798.	201.	201.	7.82
ROUTED TO	15R13A	1304.	7.50	610.	154.	154.	7.82
ROUTED TO	15R13B	916.	8.83	426.	107.	107.	7.82
HYDROGRAPH AT	1516	2339.	4.50	383.	96.	96.	1.89
ROUTED TO	15R14	1188.	5.50	293.	73.	73.	1.89
HYDROGRAPH AT	1517	1054.	5.00	226.	56.	56.	1.51
2 COMBINED AT	15C11	1643.	5.50	479.	120.	120.	3.40
ROUTED TO	15R15A	779.	7.50	283.	71.	71.	3.40
ROUTED TO	15R15B	352.	9.33	143.	36.	36.	3.40
HYDROGRAPH AT	1518	2079.	6.00	784.	198.	198.	6.61
4 COMBINED AT	15C12	1487.	6.00	1026.	297.	297.	27.40
ROUTED TO	15R16	1420.	6.17	1010.	292.	292.	27.40
HYDROGRAPH AT	1521	791.	4.17	57.	14.	14.	.34
3 COMBINED AT	15C14	2960.	9.83	2096.	662.	662.	65.15
HYDROGRAPH AT	1520	914.	5.00	201.	50.	50.	1.09
ROUTED TO	15R18	843.	5.17	193.	48.	48.	1.09
HYDROGRAPH AT	1522	607.	4.17	51.	13.	13.	.27
2 COMBINED AT	15C15	843.	5.17	241.	60.	60.	1.36

*** NORMAL END OF HEC-1 ***
Elapsed Time - 00:01:14.59 (74.59 Seconds)
NORMAL END OF HEC-1

HEC1 S/N: HMVersion: 6.00 Data File: BTTRFD24.HC1

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****************************************
*                                      *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*          SEPTEMBER 1990              *
*           VERSION 4.0                *
*                                      *
*  RUN DATE  11/25/1991  TIME  16:59:35 *
*                                      *
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****************************************
*                                      *
*   U.S. ARMY CORPS OF ENGINEERS       *
*   HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET            *
*      DAVIS, CALIFORNIA 95616         *
*          (916) 756-1104              *
*                                      *
****************************************
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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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::::::::::::::::::::::::::::::::::::::::
::::::::::::::::::::::::::::::::::::::::
:::                                  :::
:::  Full Microcomputer Implementation :::
:::                by                :::
:::       Haestad Methods, Inc.      :::
:::                                  :::
::::::::::::::::::::::::::::::::::::::::
::::::::::::::::::::::::::::::::::::::::
```

37 Brookside Road * Waterbury, Connecticut 06708 * (203) 755-1666

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

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

  1           ID           GILA BEND CANAL FLOOD STUDY
  2           ID           FCDMC
  3           ID           D&A #18099          9-9-91
  4           ID           BTTRFD24.HC1        BASINS 11 - 15
  5           ID                     24-HOUR STORM
  6           IT     10                   145
  7           IO      5
  8           IN     30
  9           JD   4.20     .01
 10           PC   .000    .005    .011    .016    .022    .028    .035    .041    .048    .056
 11           PC   .068    .071    .080    .089    .098    .109    .120    .133    .147    .163
 12           PC   .181    .204    .235    .283    .663    .735    .772    .799    .820    .838
 13           PC   .854    .868    .880    .891    .902    .912    .921    .929    .937    .945
 14           PC   .952    .959    .965    .972    .978    .984    .989    .995   1.000
 15           JD   3.99    10.0
 16           JD   3.86    20.0
 17           JD   3.78    30.0
 18           JD   3.70    50.0
 19           JD   3.57   100.0
              *  BASIN NO. 11

 20           KK   1101
 21           KM           SUB-BASIN 1101
 22           BA   5.20
 23           LG    .27     .24    8.20     .10   12.00
 24           UI   254.    493.   1076.   1395.   1730.   2256.   3155.   2503.   2005.   1586.
 25           UI  1251.    830.    445.    391.    254.    153.     78.     78.     78.     78.
 26           UI     0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 27           UI     0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 28           KK   11R1
 29           RS      8   FLOW      -1
 30           RL                     5     100
 31           RC    .05     .05     .05   23885   .0155     105
 32           RX      0     100    2961    3501    4041    4581    7442    7542
 33           RY    106     104     102   100.1     100     102     104     106

 34           KK   1102
 35           KM           SUB-BASIN 1102
 36           BA   5.64
 37           LG    .34     .28    5.00     .22    2.00
 38           UI   214.    214.    734.    983.   1192.   1391.   1671.   2234.   2698.   2135.
 39           UI  1784.   1501.   1248.   1037.    741.    445.    363.    304.    214.    166.
 40           UI    66.     66.     66.     66.     66.     66.      0.      0.      0.      0.
 41           UI     0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 42           KK   11C1
 43           HC      2

 44           KK   11R2
 45           RS      1   FLOW      -1
 46           RL                     5     100
 47           RC    .05     .05     .05    2300   .0130     105
 48           RX      0     100    2500    3000    3500    4000    6400    6500
 49           RY    106     104     102   100.1     100     102     104     106
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  50          KK    1103
  51          KM            SUB-BASIN 1103
  52          BA     .59
  53          LG     .35     .30    3.70     .30     .00
  54          UI     64.    229.    348.    579.    462.    308.    168.     81.     42.     16.
  55          UI     16.      0.      0.      0.      0.      0.      0.      0.      0.      0.
  56          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

  57          KK    11C2
  58          KM            SPILLWAY 6 - STIEL #2
  59          HC       2
              *  BASIN NO. 12

  60          KK    1201
  61          KM            SUB-BASIN 1201
  62          BA    4.06
  63          LG     .27     .23    8.40     .09   14.00
  64          UI    291.   1071.   1659.   2339.   3455.   2520.   1802.   1193.    557.    371.
  65          UI    192.     89.     89.     89.      0.      0.      0.      0.      0.      0.
  66          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

  67          KK    12R1
  68          RS       5    FLOW      -1
  69          RL                      5     100
  70          RC     .05     .05     .05   13577   .0198     105
  71          RX       0     100    4800    5200    5600    6000   10700   10800
  72          RY     106     104     102   100.1     100     102     104     106

  73          KK    1202
  74          KM            SUB-BASIN 1202
  75          BA    4.66
  76          LG     .33     .28    6.60     .19    4.00
  77          UI    296.    912.   1550.   2042.   3084.   3261.   2353.   1738.   1192.    585.
  78          UI    416.    265.     91.     91.     91.      0.      0.      0.      0.      0.
  79          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

  80          KK    12C1
  81          HC       2

  82          KK   12R2A
  83          RS       3    FLOW      -1
  84          RL                      5     100
  85          RC     .05     .05     .05    8548   .0294     105
  86          RX       0     100    5358    5725    6092    6460   11717   11817
  87          RY     106     104     102   100.1     100     102     104     106

  88          KK   12R2B
  89          RS       7    FLOW      -1
  90          RL                      5     100
  91          RC     .05     .05     .05   20366   .0133     105
  92          RX       0     100    3447    3830    4213    4596    7945    8045
  93          RY     106     104     102   100.1     100     102     104     106
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 94           KK    1203
 95           KM            SUB-BASIN 1203
 96           BA    8.89
 97           LG     .35     .32    4.50     .31     .00
 98           UI    277.    277.    604.   1050.   1330.   1538.   1733.   2020.   2376.   3135.
 99           UI   3509.   2835.   2421.   2137.   1823.   1576.   1349.   1082.    720.    490.
100           UI    461.    396.    277.    277.    114.     85.     85.     85.     85.     85.
101           UI     85.     85.      0.      0.      0.      0.      0.      0.      0.      0.
102           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

103           KK    12C2
104           HC       2

105           KK    12R3
106           RS       1    FLOW      -1
107           RL                      5     100
108           RC     .05     .05     .05    2600   .0100     105
109           RX       0      50      95    1048    2001    2954    2999    3050
110           RY     106     104     102   100.1     100     102     104     106

111           KK    1204
112           KM            SUB-BASIN 1204
113           BA     .61
114           LG     .35     .33    4.00     .35     .00
115           UI    112.    351.    636.    624.    369.    152.     72.     20.     20.      0.
116           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
117           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

118           KK    12C3
119           KM            SPILLWAY 7 - TILLEY #1
120           HC       2
              *  BASIN NO. 13

121           KK    1301
122           KM            SUB-BASIN 1301
123           BA    5.13
124           LG     .31     .31    5.70     .32   17.00
125           UI    235.    408.    945.   1247.   1509.   1895.   2750.   2628.   2042.   1667.
126           UI   1329.   1039.    611.    405.    333.    235.    125.     72.     72.     72.
127           UI     72.      0.      0.      0.      0.      0.      0.      0.      0.      0.
128           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

129           KK    13R1
130           RS       7    FLOW      -1
131           RL                      1     100
132           RC     .05     .05     .05   19108    .011     105
133           RX       0     100    1400    1640    1880    2120    3420    3520
134           RY     106     104     102   100.1     100     102     104     106
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 135          KK    1302
 136          KM          SUB-BASIN 1302
 137          BA    5.98
 138          LG     .32     .31    5.50     .29    8.00
 139          UI    215.    215.    648.    935.   1137.   1315.   1555.   1901.   2614.   2492.
 140          UI   2000.   1723.   1444.   1219.   1029.    735.    456.    368.    333.    215.
 141          UI    215.     69.     66.     66.     66.     66.     66.     66.      0.      0.
 142          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 143          KK    13C1
 144          HC       2

 145          KK    13R2
 146          RS       4    FLOW      -1
 147          RL                      1     100
 148          RC     .05     .05     .05   11314   .0106     105
 149          RX       0     100    1535    1685    1835    1985    3420    3520
 150          RY     106     104     102   100.1     100     102     104     106

 151          KK    1303
 152          KM          SUB-BASIN 1303
 153          BA    4.43
 154          LG     .29     .25    7.40     .14    9.00
 155          UI    136.    136.    289.    509.    648.    751.    844.    981.   1141.   1503.
 156          UI   1738.   1418.   1208.   1066.    914.    789.    675.    562.    386.    240.
 157          UI    229.    212.    136.    136.     77.     42.     42.     42.     42.     42.
 158          UI     42.     42.      0.      0.      0.      0.      0.      0.      0.      0.
 159          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 160          KK    13R3
 161          RS       6    FLOW      -1
 162          RL                      1     100
 163          RC     .05     .05     .05   15085   .0113     105
 164          RX       0     100    1535    1685    1835    1985    3420    3520
 165          RY     106     104     102   100.1     100     102     104     106

 166          KK    1304
 167          KM          SUB-BASIN 1304
 168          BA    1.89
 169          LG     .26     .23    8.40     .09   13.00
 170          UI    302.    979.   1649.   2053.   1248.    631.    275.    110.     59.      0.
 171          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 172          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 173          KK    13R4
 174          RS       9    FLOW      -1
 175          RL                      1     100
 176          RC     .05     .05     .05   24640   .0187     105
 177          RX       0     100    2164    2397    2630    2863    4927    5028
 178          RY     106     104     102   100.1     100     102     104     106
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 179          KK    1305
 180          KM          SUB-BASIN 1305
 181          BA    6.26
 182          LG     .32     .31    5.50     .28    5.00
 183          UI    291.    504.   1167.   1541.   1864.   2341.   3397.   3246.   2522.   2059.
 184          UI   1642.   1283.    755.    500.    411.    291.    154.     89.     89.     89.
 185          UI     89.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 186          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 187          KK     CD3         COMBINE PRIOR TO DIVERSION
 188          HC       4

 189          KK      D3
 190          KM          DIVERT FLOW TO BASIN 14
 191          DT    DIV3
 192          DI       0     340    2080    3700   10420   20400
 193          DQ       0     110     670    1170    5650   10770

 194          KK   13R5A
 195          RS       7    FLOW      -1
 196          RL                      1     100
 197          RC     .05     .05     .05   18857   .0117     105
 198          RX       0     100    3749    4099    4449    4799    8448    8548
 199          RY     106     104     102   100.1     100     102     104     106

 200          KK   13R5B
 201          RS       5    FLOW      -1
 202          RL                      1     100
 203          RC     .05     .05     .05   14582   .0110     105
 204          RX       0     100    2976    3171    3366    3561    6437    6537
 205          RY     106     104     102   100.1     100     102     104     106

 206          KK    1306
 207          KM          SUB-BASIN 1306
 208          BA    3.32
 209          LG     .32     .27    7.10     .17    9.00
 210          UI    188.    489.    909.   1170.   1560.   2289.   1813.   1399.   1060.    747.
 211          UI    384.    290.    188.     83.     58.     58.     58.      0.      0.      0.
 212          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 213          KK   13R6A
 214          RS       8    FLOW      -1
 215          RL                      1     100
 216          RC     .05     .05     .05   22628   .0124     105
 217          RX       0     100    3749    4099    4490    4799    8448    8548
 218          RY     106     104     102   100.1     100     102     104     106

 219          KK   13R6B
 220          RS       5    FLOW      -1
 221          RL                      1     100
 222          RC     .05     .05     .05   14080    .011     105
 223          RX       0     100    2976    3171    3366    3561    6437    6537
 224          RY     106     104     102   100.1     100     102     104     106
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 225          KK    1307
 226          KM   SUB-BASIN 1307
 227          BA    9.10
 228          LG     .35     .34    4.00     .35     .00
 229          UI    222.    222.    222.    641.    840.   1044.   1162.   1280.   1418.   1609.
 230          UI   1783.   2164.   2732.   2789.   2336.   2043.   1838.   1670.   1464.   1312.
 231          UI   1146.   1043.    824.    628.    393.    386.    365.    319.    222.    222.
 232          UI    200.     68.     68.     68.     68.     68.     68.     68.     68.     68.
 233          UI     68.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 234          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 235          KK    13C2
 236          HC       3

 237          KK    13R7
 238          RS       1    FLOW      -1
 239          RL                      1     100
 240          RC     .05     .05     .05    2200   .0055     105
 241          RX       0     100     725     842     958    1075    1700    1800
 242          RY     106     104     102   100.1     100     102     104     106

 243          KK    1308
 244          KM   SUB-BASIN 1308
 245          BA     .30
 246          LG     .35     .35    4.10     .40     .00
 247          UI    154.    485.    375.    111.     25.      0.      0.      0.      0.      0.
 248          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 249          KK    13C3
 250          KM           SPILLWAY 8 - TILLEY #2
 251          HC       2
              *  BASIN NO. 14

 252          KK    1401
 253          KM           SUB-BASIN 1401
 254          BA    2.38
 255          LG     .28     .28    6.80     .20   13.00
 256          UI    155.    494.    823.   1093.   1694.   1638.   1193.    873.    575.    274.
 257          UI    198.    115.     48.     48.     48.      0.      0.      0.      0.      0.
 258          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 259          KK   14R1A
 260          RS       3    FLOW      -1
 261          RL                      5     100
 262          RC     .05     .05     .05    9051   .0088     105
 263          RX       0     100    3644    4064    4484    4904    8448    8548
 264          RY     106     104     102   100.1     100     102     104     106

 265          KK   14R1B
 266          RS       6    FLOW      -1
 267          RL                      5     100
 268          RC     .05     .05     .05   16342   .0098     105
 269          RX       0     100    1515    1678    1842    2005    3420    3520
 270          RY     106     104     102   100.1     100     102     104     106
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 271          KK    1402
 272          KM            SUB-BASIN 1402
 273          BA    7.54
 274          LG     .35     .32    4.10     .32     .00
 275          UI    145.    145.    145.    145.    476.    539.    638.    708.    788.    839.
 276          UI    912.    997.   1097.   1199.   1420.   1699.   1919.   1691.   1486.   1340.
 277          UI   1231.   1145.   1040.    943.    862.    783.    710.    642.    531.    417.
 278          UI    290.    257.    247.    238.    230.    145.    145.    145.    136.     45.
 279          UI     45.     45.     45.     45.     45.     45.     45.     45.     45.     45.
 280          UI     45.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 281          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 282          KK     RD3
 283          KM            RETRIEVE DIVERTED FLOW FROM BASIN 13
 284          DR    DIV3

 285          KK   14R2A
 286          RS       6    FLOW      -1
 287          RL                      5     100
 288          RC     .05     .05     .05   17850   .0112     105
 289          RX       0     200    3645    4065    4485    4905    8450    8550
 290          RY     106     104     102   100.1     100     102     104     106

 291          KK   14R2B
 292          RS       6    FLOW      -1
 293          RL                      5     100
 294          RC     .05     .05     .05   17600   .0099     105
 295          RX       0     100    1515    1678    1842    2005    3420    3520
 296          RY     106     104     102   100.1     100     102     104     106

 297          KK    14C1
 298          HC       3

 299          KK    14R3
 300          RS       1    FLOW      -1
 301          RL                      5     100
 302          RC     .05     .05     .05    2200     .01     105
 303          RX       0     100    1365    1455    1545    1635    2900    3000
 304          RY     106     104     102   100.1     100     102     104     106

 305          KK    1403
 306          KM            SUB-BASIN 1403
 307          BA     .28
 308          LG     .35     .35    4.10     .36     .00
 309          UI    243.    635.    237.     38.      0.      0.      0.      0.      0.      0.
 310          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 311          KK    14C2
 312          KM            SPILLWAY 9 - THE NECK
 313          HC       2
              *  BASIN NO. 15
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  314         KK    1501
  315         KM            SUB-BASIN 1501
  316         BA    8.79
  317         LG     .31     .30    5.70     .27    5.00
  318         UI    312.    312.    917.   1342.   1638.   1889.   2231.   2697.   3692.   3709.
  319         UI   2962.   2535.   2149.   1813.   1521.   1153.    721.    540.    512.    323.
  320         UI    312.    148.     96.     96.     96.     96.     96.     96.      0.      0.
  321         UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

  322         KK    1502
  323         KM            SUB-BASIN 1502
  324         BA    1.02
  325         LG     .35     .32    4.90     .24     .00
  326         UI     70.    243.    388.    529.    825.    653.    478.    337.    171.    109.
  327         UI     68.     21.     21.     21.      0.      0.      0.      0.      0.      0.
  328         UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

  329         KK    15C1
  330         HC       2

  331         KK    15R1
  332         RS      10    FLOW      -1
  333         RL                      1     100
  334         RC     .05     .05     .05   27657   .0101     110
  335         RX       0     100    2592    2958    3325    3691    6184    6285
  336         RY     106     104     102   100.1     100     102     104     106

  337         KK    1503
  338         KM            SUB-BASIN 1503
  339         BA    5.18
  340         LG     .33     .31    5.60     .21    4.00
  341         UI    143.    143.    206.    496.    615.    727.    815.    912.   1047.   1197.
  342         UI   1543.   1838.   1594.   1352.   1197.   1069.    923.    815.    707.    600.
  343         UI    439.    281.    249.    235.    186.    143.    143.     72.     44.     44.
  344         UI     44.     44.     44.     44.     44.     44.      0.      0.      0.      0.
  345         UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

  346         KK    15C2
  347         HC       2

  348         KK    15R2A
  349         RS       2    FLOW      -1
  350         RL                      1     100
  351         RC     .05     .05     .05    6537   .0092     105
  352         RX       0     100    1107    1207    1307    1407    2414    2514
  353         RY     106     104     102   100.1     100     102     104     106

  354         KK    15R2B
  355         RS       3    FLOW      -1
  356         RL                      1     100
  357         RC     .05     .05     .05    8548   .0094     105
  358         RX       0     100     427     477     527     577     905    1005
  359         RY     106     104     102   100.1     100     102     104     106
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 360          KK    1504
 361          KM          SUB-BASIN 1504
 362          BA     .80
 363          LG     .35     .32    5.10     .21     .00
 364          UI     42.     95.    190.    245.    310.    450.    485.    362.    285.    221.
 365          UI    152.     79.     65.     42.     22.     13.     13.     13.     13.      0.
 366          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 367          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 368          KK    15C3
 369          HC       2

 370          KK    15R3
 371          RS       2   FLOW      -1
 372          RL                     1     100
 373          RC     .05     .05     .05    5531   .0108     105
 374          RX       0     100    1032    1182    1332    1482    2414    2514
 375          RY     106     104     102   100.1     100     102     104     106

 376          KK    1505
 377          KM          SUB-BASIN 1505
 378          BA    3.13
 379          LG     .28     .27    7.00     .19   11.00
 380          UI     151.    285.    630.    820.   1009.   1304.   1860.   1528.   1220.    971.
 381          UI     768.    538.    292.    249.    155.    114.     46.     46.     46.     46.
 382          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 383          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 384          KK    1506
 385          KM          SUB-BASIN 1506
 386          BA    4.46
 387          LG     .27     .26    7.60     .16   13.00
 388          UI     238.    553.   1090.   1404.   1789.   2654.   2649.   1998.   1558.   1204.
 389          UI     777.    414.    336.    238.     87.     73.     73.     73.      0.      0.
 390          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 391          KK    15R4
 392          RS       3   FLOW      -1
 393          RL                     1     100
 394          RC     .05     .05     .05    8297   .0241     105
 395          RX       0     100    2468    3001    3535    4068    6437    6537
 396          RY     106     104     102   100.1     100     102     104     106

 397          KK    1507
 398          KM          SUB-BASIN 1507
 399          BA    2.49
 400          LG     .32     .29    6.40     .22    4.00
 401          UI     530.   1620.   2996.   2385.   1309.    467.    186.     89.      0.      0.
 402          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 403          KK    15C4
 404          HC       3

 405          KK    15R5
 406          RS       7    FLOW      -1
 407          RL                      1     100
 408          RC     .05     .05     .05   20114    .0149     105
 409          RX       0     100    3074    3874    4674    5474    8448    8548
 410          RY     106     104     102   100.1     100     102     104     106

 411          KK    1508
 412          KM           SUB-BASIN 1508
 413          BA    5.48
 414          LG     .35     .34    4.20     .35     .00
 415          UI    240.    365.    920.   1223.   1464.   1796.   2441.   2968.   2286.   1889.
 416          UI   1527.   1235.    915.    521.    405.    308.    240.    110.     73.     73.
 417          UI     73.     73.      0.      0.      0.      0.      0.      0.      0.      0.
 418          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 419          KK    15C5
 420          HC       2

 421          KK    15R6
 422          RS       7    FLOW      -1
 423          RL                      1     100
 424          RC     .05     .05     .05   20617    .0107     105
 425          RX       0     100    2115    2465    2815    3165    5180    5280
 426          RY     106     104     102   100.1     100     102     104     106

 427          KK    1509
 428          KM           SUB-BASIN 1509
 429          BA    3.93
 430          LG     .35     .34    4.30     .32     .00
 431          UI    150.    150.    515.    690.    837.    976.   1173.   1568.   1893.   1498.
 432          UI   1252.   1054.    876.    728.    520.    312.    255.    213.    150.    117.
 433          UI     46.     46.     46.     46.     46.     46.      0.      0.      0.      0.
 434          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 435          KK    15C6
 436          HC       2

 437          KK    15R7A
 438          RS       2    FLOW      -1
 439          RL                      1     100
 440          RC     .05     .05     .05    6285    .0095     105
 441          RX       0     100     508     588     668     748    1157    1257
 442          RY     106     104     102   100.1     100     102     104     106

 443          KK    15R7B
 444          RS       3    FLOW      -1
 445          RL                      1     100
 446          RC     .05     .05     .05    7542    .0106     105
 447          RX       0     100     805     938    1072    1205    1911    2011
 448          RY     106     104     102   100.1     100     102     104     106
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

449           KK    1510
450           KM          SUB-BASIN 1510
451           BA     .71
452           LG     .35     .34    4.30     .32     .00
453           UI     39.     96.    184.    237.    308.    464.    404.    311.    238.    179.
454           UI     99.     66.     45.     29.     12.     12.     12.     12.      0.      0.
455           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

456           KK    15C7
457           HC       2

458           KK    15R8
459           RS       3    FLOW      -1
460           RL                      1     100
461           RC     .05     .05     .05    7291   .0082     105
462           RX       0     100    1032    1182    1332    1482    2414    2514
463           RY     106     104     102   100.1     100     102     104     106

464           KK    1511
465           KM          SUB-BASIN 1511
466           BA     .48
467           LG     .35     .33    4.90     .27     .00
468           UI     67.    222.    355.    520.    336.    200.     83.     41.     14.     14.
469           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
470           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

471           KK    15C8
472           HC       3

473           KK    15R9
474           RS       4    FLOW      -1
475           RL                      1     100
476           RC     .05     .05     .05   12571   .0095     105
477           RX       0     100    1017    1177    1337    1497    2414    2514
478           RY     106     104     102   100.1     100     102     104     106

479           KK    1519
480           KM          SUB-BASIN 1519
481           BA     .94
482           LG     .35     .33    4.70     .30     .00
483           UI     42.     69.    166.    219.    264.    326.    461.    503.    384.    316.
484           UI    254.    204.    138.     76.     69.     43.     35.     13.     13.     13.
485           UI     13.     13.      0.      0.      0.      0.      0.      0.      0.      0.
486           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

487           KK    15C13
488           HC       2

489           KK    15R17
490           RS       1    FLOW      -1
491           RL                      1     100
492           RC     .05     .05     .05    2262   .0066     105
493           RX       0     100    1510    1676    1843    2009    3420    3520
494           RY     106     104     102   100.1     100     102     104     106
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

495           KK    1512
496           KM            SUB-BASIN 1512
497           BA    2.90
498           LG     .32     .30    6.10     .25    5.00
499           UI    144.    287.    617.    799.    993.   1332.   1768.   1375.   1103.    869.
500           UI    675.    418.    248.    203.    144.     64.     44.     44.     44.     44.
501           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
502           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

503           KK   15R10
504           RS      12    FLOW      -1
505           RL                      1     100
506           RC     .05     .05     .05   33691   .0119     105
507           RX       0     100    2059    2362    2666    2969    4928    5028
508           RY     106     104     102   100.1     100     102     104     106

509           KK    1513
510           KM            SUB-BASIN 1513
511           BA    6.67
512           LG     .35     .35    4.00     .36     .00
513           UI    184.    184.    266.    639.    791.    936.   1049.   1174.   1348.   1541.
514           UI   1987.   2367.   2053.   1741.   1541.   1377.   1189.   1049.    911.    772.
515           UI    565.    362.    320.    302.    240.    184.    184.     92.     56.     56.
516           UI     56.     56.     56.     56.     56.     56.      0.      0.      0.      0.
517           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

518           KK    15C9
519           HC       2

520           KK  15R11A
521           RS       4    FLOW      -1
522           RL                      1     100
523           RC     .05     .05     .05   12571   .0095     105
524           RX       0     100    2818    3118    3418    3718    6437    6537
525           RY     106     104     102   100.1     100     102     104     106

526           KK  15R11B
527           RS       4    FLOW      -1
528           RL                      1     100
529           RC     .05     .05     .05   12571   .0095     105
530           RX       0     100    1842    2290    2738    3186    4928    5028
531           RY     106     104     102   100.1     100     102     104     106

532           KK    1514
533           KM            SUB-BASIN 1514
534           BA    2.42
535           LG     .30     .29    6.50     .24    9.00
536           UI    315.   1066.   1668.   2580.   1737.   1091.    455.    259.     77.     69.
537           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
538           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

539           KK   15R12
540           RS      11    FLOW      -1
541           RL                      1     100
542           RC     .05     .05     .05   30422   .0131     105
543           RX       0     100    2345    2625    2905    3185    5431    5531
544           RY     106     104     102   100.1     100     102     104     106

545           KK    1515
546           KM          SUB-BASIN 1515
547           BA    5.40
548           LG     .35     .35    4.00     .36     .00
549           UI    148.    148.    206.    511.    631.    747.    838.    934.   1074.   1220.
550           UI   1574.   1880.   1682.   1422.   1254.   1123.    973.    860.    745.    639.
551           UI    477.    319.    261.    243.    212.    148.    148.     97.     45.     45.
552           UI     45.     45.     45.     45.     45.     45.      0.      0.      0.      0.
553           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

554           KK   15C10
555           HC       2

556           KK  15R13A
557           RS       6    FLOW      -1
558           RL                      1     100
559           RC     .05     .05     .05   16594   .0096     105
560           RX       0     100    2818    3118    3418    3718    6437    6537
561           RY     106     104     102   100.1     100     102     104     106

562           KK  15R13B
563           RS       4    FLOW      -1
564           RL                      1     100
565           RC     .05     .05     .05   12571   .0095     105
566           RX       0     100    1842    2290    2738    3186    4928    5028
567           RY     106     104     102   100.1     100     102     104     106

568           KK    1516
569           KM          SUB-BASIN 1516
570           BA    1.89
571           LG     .30     .26    7.30     .17   11.00
572           UI    188.    690.   1045.   1736.   1488.   1003.    598.    271.    155.     49.
573           UI     49.      0.      0.      0.      0.      0.      0.      0.      0.      0.
574           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

575           KK   15R14
576           RS       5    FLOW      -1
577           RL                      1     100
578           RC     .05     .05     .05   15588   .0128     105
579           RX       0     100    1274    1514    1754    1994    3168    3268
580           RY     106     104     102   100.1     100     102     104     106
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 581          KK    1517
 582          KM            SUB-BASIN 1517
 583          BA    1.51
 584          LG     .35     .35    4.00     .36     .00
 585          UI     73.    137.    304.    396.    487.    629.    898.    737.    588.    468.
 586          UI    371.    260.    141.    120.     75.     55.     22.     22.     22.     22.
 587          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 588          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 589          KK   15C11
 590          HC       2

 591          KK  15R15A
 592          RS       8    FLOW      -1
 593          RL                      1     100
 594          RC     .05     .05     .05   22628   .0097     105
 595          RX       0     100    2818    3118    3418    3718    6437    6537
 596          RY     106     104     102   100.1     100     102     104     106

 597          KK  15R15B
 598          RS       4    FLOW      -1
 599          RL                      1     100
 600          RC     .05     .05     .05   12571   .0095     105
 601          RX       0     100    1842    2290    2738    3186    4928    5028
 602          RY     106     104     102   100.1     100     102     104     106

 603          KK    1518
 604          KM            SUB-BASIN 1518
 605          BA    6.61
 606          LG     .35     .35    4.00     .36     .00
 607          UI     167.    167.    167.    528.    669.    797.    904.    993.   1109.   1256.
 608          UI    1433.   1833.   2160.   1907.   1630.   1445.   1312.   1149.   1021.    902.
 609          UI     797.    671.    485.    312.    292.    275.    240.    167.    167.    137.
 610          UI      51.     51.     51.     51.     51.     51.     51.     51.     51.      0.
 611          UI       0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 612          UI       0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 613          KK   15C12
 614          HC       4

 615          KK   15R16
 616          RS       1    FLOW      -1
 617          RL                      1     100
 618          RC     .05     .05     .05    2514   .0080     105
 619          RX       0     100     806     939    1072    1205    1911    2011
 620          RY     106     104     102   100.1     100     102     104     106

 621          KK    1521
 622          KM            SUB-BASIN 1521
 623          BA     .34
 624          LG     .35     .35    4.10     .37     .00
 625          UI     275.    720.    268.     43.      0.      0.      0.      0.      0.      0.
 626          UI       0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 627          KK   15C14
 628          KM            SPILLWAY 10 - BUTTERFIELD
 629          HC       3

 630          KK    1520
 631          KM            SUB-BASIN 1520
 632          BA    1.09
 633          LG     .35     .32    5.20     .20     .00
 634          UI     51.     91.    208.    273.    332.    420.    611.    551.    432.    350.
 635          UI    279.    213.    118.     87.     65.     51.     19.     16.     16.     16.
 636          UI     16.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 637          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 638          KK   15R18
 639          RS       1    FLOW      -1
 640          RL                      1     100
 641          RC     .05     .05     .05    1760   .0114     105
 642          RX       0     100    1385    1635    1885    2135    3420    3520
 643          RY     106     104     102   100.1     100     102     104     106

 644          KK    1522
 645          KM            SUB-BASIN 1522
 646          BA     .27
 647          LG     .35     .32    5.10     .22     .00
 648          UI    125.    397.    356.    124.     29.      0.      0.      0.      0.      0.
 649          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

 650          KK   15C15
 651          HC       2
 652          ZZ
```

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****************************************
*                                      *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*          SEPTEMBER 1990              *
*           VERSION 4.0                *
*                                      *
* RUN DATE  11/25/1991  TIME  16:59:35 *
*                                      *
****************************************
```

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****************************************
*                                      *
*   U.S. ARMY CORPS OF ENGINEERS       *
*   HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET            *
*      DAVIS, CALIFORNIA 95616         *
*          (916) 756-1104              *
*                                      *
****************************************
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                    GILA BEND CANAL FLOOD STUDY
                    FCDMC
                    D&A #18099          9-9-91
                    BTTRFD24.HC1        BASINS 11 - 15
                              24-HOUR STORM

  7 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        145  NUMBER OF HYDROGRAPH ORDINATES
               NDDATE      2    0  ENDING DATE
               NDTIME       0000  ENDING TIME
               ICENT          19  CENTURY MARK

            COMPUTATION INTERVAL     .17 HOURS
                 TOTAL TIME BASE   24.00 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

  9 JD        INDEX STORM NO. 1
                 STRM        4.20  PRECIPITATION DEPTH
                 TRDA         .01  TRANSPOSITION DRAINAGE AREA

 10 PI          PRECIPITATION PATTERN
                 .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                 .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                 .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                 .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                 .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
                 .00      .00      .00      .00      .01      .01      .01      .01      .01      .01
```

.01	.01	.01	.01	.01	.01	.02	.02	.02	.13
.13	.13	.02	.02	.02	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00						

15 JD INDEX STORM NO. 2

STRM 3.99 PRECIPITATION DEPTH

TRDA 10.00 TRANSPOSITION DRAINAGE AREA

0 PI PRECIPITATION PATTERN

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.02	.02	.02	.13
.13	.13	.02	.02	.02	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00						

16 JD INDEX STORM NO. 3

STRM 3.86 PRECIPITATION DEPTH

TRDA 20.00 TRANSPOSITION DRAINAGE AREA

0 PI PRECIPITATION PATTERN

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.02	.02	.02	.13
.13	.13	.02	.02	.02	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00						

17 JD INDEX STORM NO. 4

STRM 3.78 PRECIPITATION DEPTH

TRDA 30.00 TRANSPOSITION DRAINAGE AREA

PI PRECIPITATION PATTERN

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

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.02	.02	.02	.13
.13	.13	.02	.02	.02	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00						

18 JD INDEX STORM NO. 5

STRM 3.70 PRECIPITATION DEPTH

TRDA 50.00 TRANSPOSITION DRAINAGE AREA

0 PI PRECIPITATION PATTERN

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.02	.02	.02	.13
.13	.13	.02	.02	.02	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00						

19 JD INDEX STORM NO. 6

STRM 3.57 PRECIPITATION DEPTH

TRDA 100.00 TRANSPOSITION DRAINAGE AREA

0 PI PRECIPITATION PATTERN

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.02	.02	.02	.13
.13	.13	.02	.02	.02	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00						

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	1101	3964.	12.83	948.	256.	256.	5.20		
ROUTED TO	11R1	343.	14.83	48.	12.	12.	5.20		
HYDROGRAPH AT	1102	3037.	13.17	798.	203.	203.	5.64		
2 COMBINED AT	11C1	3000.	13.17	831.	211.	211.	10.84		
ROUTED TO	11R2	2656.	13.33	701.	175.	175.	10.84		
HYDROGRAPH AT	1103	567.	12.33	80.	20.	20.	.59		
2 COMBINED AT	11C2	2676.	13.33	773.	193.	193.	11.43		
HYDROGRAPH AT	1201	4145.	12.50	777.	212.	212.	4.06		
ROUTED TO	12R1	2112.	13.33	358.	90.	90.	4.06		
HYDROGRAPH AT	1202	3738.	12.67	676.	175.	175.	4.66		
2 COMBINED AT	12C1	3720.	12.67	1024.	262.	262.	8.72		
ROUTED TO	12R2A	3024.	13.17	742.	185.	185.	8.72		
ROUTED TO	12R2B	755.	15.00	145.	36.	36.	8.72		
HYDROGRAPH AT	1203	3580.	13.50	1082.	270.	270.	8.89		
2 COMBINED AT	12C2	3427.	13.50	1150.	287.	287.	17.61		
ROUTED TO	12R3	2757.	13.67	862.	215.	215.	17.61		
HYDROGRAPH AT	1204	623.	12.33	75.	19.	19.	.61		
2 COMBINED AT	12C3	2757.	13.67	931.	233.	233.	18.22		
HYDROGRAPH AT	1301	3034.	13.00	758.	216.	216.	5.13		
ROUTED TO	13R1	1985.	14.17	609.	153.	153.	5.13		
HYDROGRAPH AT	1302	2841.	13.33	816.	219.	219.	5.98		
2 COMBINED AT	13C1	3358.	14.00	1392.	366.	366.	11.11		
ROUTED TO	13R2	3058.	14.50	1308.	333.	333.	11.11		
HYDROGRAPH AT	1303	2238.	13.50	732.	195.	195.	4.43		
ROUTED TO	13R3	1796.	14.33	645.	162.	162.	4.43		
HYDROGRAPH AT	1304	2430.	12.33	362.	98.	98.	1.89		

ROUTED TO	13R4	958.	14.00	237.	59.	59.	1.89
HYDROGRAPH AT	1305	3610.	13.00	829.	217.	217.	6.26
4 COMBINED AT	CD3	5570.	14.17	2775.	719.	719.	23.69
DIVERSION TO	DIV3	2417.	14.17	1027.	265.	265.	23.69
HYDROGRAPH AT	D3	3153.	14.17	1748.	454.	454.	23.69
ROUTED TO	13R5A	2766.	15.33	1451.	371.	371.	23.69
ROUTED TO	13R5B	2542.	16.17	1296.	334.	334.	23.69
HYDROGRAPH AT	1306	2539.	12.67	522.	139.	139.	3.32
ROUTED TO	13R6A	1076.	14.50	315.	79.	79.	3.32
ROUTED TO	13R6B	682.	15.83	237.	59.	59.	3.32
HYDROGRAPH AT	1307	2886.	14.00	1064.	269.	269.	9.10
3 COMBINED AT	13C2	3383.	16.17	2185.	616.	616.	36.11
ROUTED TO	13R7	3330.	16.17	2165.	609.	609.	36.11
HYDROGRAPH AT	1308	363.	12.00	35.	9.	9.	.30
2 COMBINED AT	13C3	3330.	16.17	2165.	617.	617.	36.41
HYDROGRAPH AT	1401	2010.	12.67	383.	105.	105.	2.38
ROUTED TO	14R1A	627.	13.50	110.	27.	27.	2.38
ROUTED TO	14R1B	0.	.17	0.	0.	0.	2.38
HYDROGRAPH AT	1402	2021.	14.50	889.	230.	230.	7.54
HYDROGRAPH AT	RD3	2417.	14.17	1027.	265.	265.	23.69
ROUTED TO	14R2A	768.	15.67	190.	48.	48.	23.69
ROUTED TO	14R2B	42.	17.50	6.	2.	2.	23.69
3 COMBINED AT	14C1	2021.	14.50	929.	241.	241.	9.92
ROUTED TO	14R3	1882.	14.67	880.	226.	226.	9.92
HYDROGRAPH AT	1403	418.	12.00	36.	9.	9.	.28
2 COMBINED AT	14C2	1882.	14.67	893.	234.	234.	10.20
HYDROGRAPH AT	1501	4123.	13.33	1166.	305.	305.	8.79
HYDROGRAPH AT	1502	823.	12.50	136.	34.	34.	1.02
2 COMBINED AT	15C1	4266.	13.33	1297.	337.	337.	9.81
ROUTED TO	15R1	2580.	15.17	945.	237.	237.	9.81

HYDROGRAPH AT	1503	2123.	13.67	734.	190.	190.	5.18
2 COMBINED AT	15C2	3140.	15.00	1553.	411.	411.	14.99
ROUTED TO	15R2A	2822.	15.50	1506.	396.	396.	14.99
ROUTED TO	15R2B	2653.	16.00	1465.	386.	386.	14.99
HYDROGRAPH AT	1504	556.	12.83	112.	28.	28.	.80
2 COMBINED AT	15C3	2653.	16.00	1505.	412.	412.	15.79
ROUTED TO	15R3	2551.	16.33	1456.	396.	396.	15.79
HYDROGRAPH AT	1505	2100.	12.83	494.	134.	134.	3.13
HYDROGRAPH AT	1506	3397.	12.83	743.	203.	203.	4.46
ROUTED TO	15R4	2727.	13.17	639.	160.	160.	4.46
HYDROGRAPH AT	1507	2865.	12.17	345.	89.	89.	2.49
3 COMBINED AT	15C4	4605.	13.00	1459.	378.	378.	10.08
ROUTED TO	15R5	3050.	14.33	1019.	255.	255.	10.08
HYDROGRAPH AT	1508	2814.	13.00	644.	161.	161.	5.48
2 COMBINED AT	15C5	3251.	14.33	1578.	398.	398.	15.56
ROUTED TO	15R6	2561.	15.50	1259.	320.	320.	15.56
HYDROGRAPH AT	1509	1867.	13.17	477.	119.	119.	3.93
2 COMBINED AT	15C6	2561.	15.50	1588.	427.	427.	19.49
ROUTED TO	15R7A	2443.	16.00	1535.	414.	414.	19.49
ROUTED TO	15R7B	2354.	16.33	1473.	397.	397.	19.49
HYDROGRAPH AT	1510	454.	12.83	88.	22.	22.	.71
2 COMBINED AT	15C7	2354.	16.33	1488.	418.	418.	20.20
ROUTED TO	15R8	2239.	16.83	1425.	396.	396.	20.20
HYDROGRAPH AT	1511	482.	12.33	62.	15.	15.	.48
3 COMBINED AT	15C8	4342.	16.50	2663.	750.	750.	36.47
ROUTED TO	15R9	4032.	17.33	2535.	704.	704.	36.47
HYDROGRAPH AT	1519	521.	13.00	117.	29.	29.	.94
2 COMBINED AT	15C13	4032.	17.33	2538.	730.	730.	37.41
ROUTED TO	15R17	3957.	17.50	2507.	718.	718.	37.41
HYDROGRAPH AT	1512	1804.	12.83	393.	103.	103.	2.90

ROUTED TO	15R10	431.	16.17	148.	37.	37.	2.90
HYDROGRAPH AT	1513	2321.	13.67	777.	195.	195.	6.67
2 COMBINED AT	15C9	2311.	13.67	896.	230.	230.	9.57
ROUTED TO	15R11A	1669.	14.67	736.	189.	189.	9.57
ROUTED TO	15R11B	1139.	16.00	532.	136.	136.	9.57
HYDROGRAPH AT	1514	2457.	12.33	348.	94.	94.	2.42
ROUTED TO	15R12	529.	15.00	160.	40.	40.	2.42
HYDROGRAPH AT	1515	1865.	13.67	630.	158.	158.	5.40
2 COMBINED AT	15C10	1856.	13.67	780.	196.	196.	7.82
ROUTED TO	15R13A	1283.	15.17	593.	150.	150.	7.82
ROUTED TO	15R13B	887.	16.83	411.	103.	103.	7.82
HYDROGRAPH AT	1516	1918.	12.50	307.	83.	83.	1.89
ROUTED TO	15R14	875.	13.50	220.	55.	55.	1.89
HYDROGRAPH AT	1517	834.	12.83	179.	45.	45.	1.51
2 COMBINED AT	15C11	1292.	13.33	396.	99.	99.	3.40
ROUTED TO	15R15A	565.	15.67	209.	52.	52.	3.40
ROUTED TO	15R15B	216.	17.67	81.	20.	20.	3.40
HYDROGRAPH AT	1518	2138.	13.83	765.	193.	193.	6.61
4 COMBINED AT	15C12	1957.	13.83	1374.	395.	395.	27.40
ROUTED TO	15R16	1866.	14.00	1355.	389.	389.	27.40
HYDROGRAPH AT	1521	468.	12.00	40.	10.	10.	.34
3 COMBINED AT	15C14	4971.	17.33	3411.	1033.	1033.	65.15
HYDROGRAPH AT	1520	690.	13.00	154.	39.	39.	1.09
ROUTED TO	15R18	640.	13.00	146.	37.	37.	1.09
HYDROGRAPH AT	1522	371.	12.17	37.	9.	9.	.27
2 COMBINED AT	15C15	641.	13.00	182.	46.	46.	1.36

*** NORMAL END OF HEC-1 ***
[illegible]ed Time - 00:01:16.62 (76.62 Seconds)
[illegible]END OF HEC-1