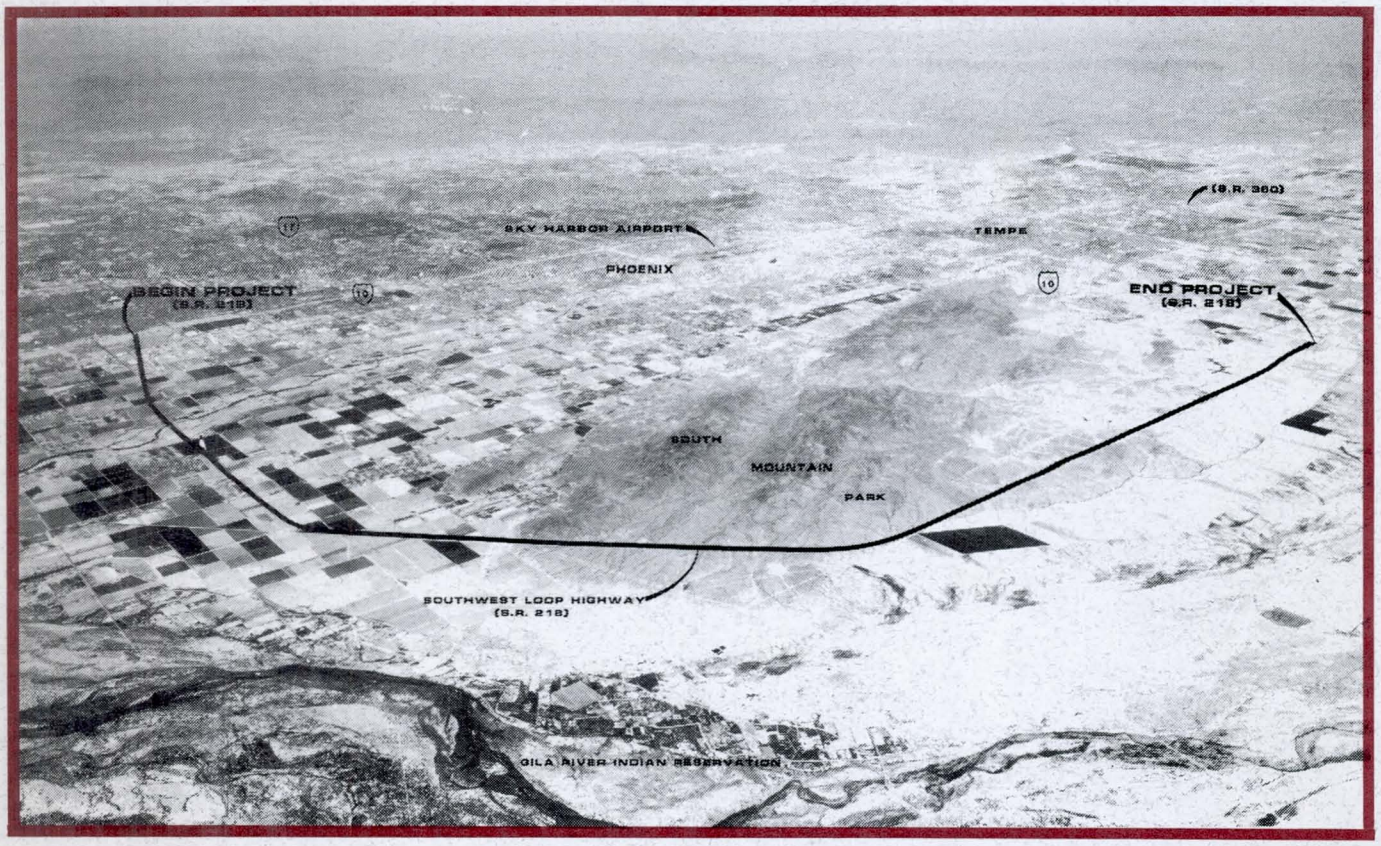
SOUTHWEST LOOP HIGHWAY
(S.R. 218)

Phoenix, Maricopa County, Arizona



DRAINAGE DESIGN CONCEPT REPORT

SEPTEMBER 1988

Prepared By:

HDR Infrastructure, Inc.
Phoenix, Arizona

For:

Arizona Department of Transportation
Urban Highway Section
and
Environmental Planning Services

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ENVIRONMENTAL PLANNING SERVICES
205 SOUTH 17TH AVENUE
PHOENIX, ARIZONA 85007

DRAINAGE DESIGN CONCEPT REPORT

FOR

STATE ROUTE 218

SOUTHWEST LOOP HIGHWAY

I-10 AT 59TH AVENUE - 1-10 AT PECOS ROAD

PHOENIX, MARICOPA COUNTY, ARIZONA

PROJECT RAM-600-6-201

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1.0 INTRODUCTION

HDR Engineering, Inc. was contracted by the Arizona Department of Transportation (ADOT), to evaluate alignments and develop a preliminary design for the Southwest Loop Highway (SR-218). As part of this study, this preliminary drainage design concept was developed.

This Drainage Design Concept Report addresses the surface water drainage conditions and requirements affecting the Southwest Loop highway (SR-218) between I-10 at 59th Avenue and I-10 at Pecos Road (Plate No. 1). It's purpose is to document the conceptual design of the project drainage system including the procedures, methodology and judgements used in its derivation.

The Scope of the Study is to provide a conceptual design identifying project requirements and to mitigate major concerns relating to surface water drainage. The emphasis of this effort is to provide a cost effective, practical, workable system by either quantitative or qualitative means. Efforts were made to prepare a uniform conservative design. Where drainage options were found to be of public concern, input was solicited from the public and was considered in the selection of the drainage design.

The level of study in this work was varied depending on the complexity of the drainage problems encountered or the differences in drainage systems as they relate to local concerns.

The SR-218 corridor bisects tributary flows to both the Salt River and the Gila River and is subject to extremely high peak flows from the South Mountain range. The majority of the route passes through non-residential property, however, considerable residential development is planned for the southern flank of the South Mountains.

By virtue of its presence perpendicular to the local runoff, the highway traditionally becomes a source of collecting runoff and discharging it at concentrated locations. A major part of the complexity of this project was the need to avoid concentrating flows. Flows were maintained in as natural a state as possible. In some areas, the highway was seen as a way of preventing downstream flooding. This has been accomplished with the extensive use of retention/detention cells and level spreaders.

SOUTHWEST LOOP STUDY MAP

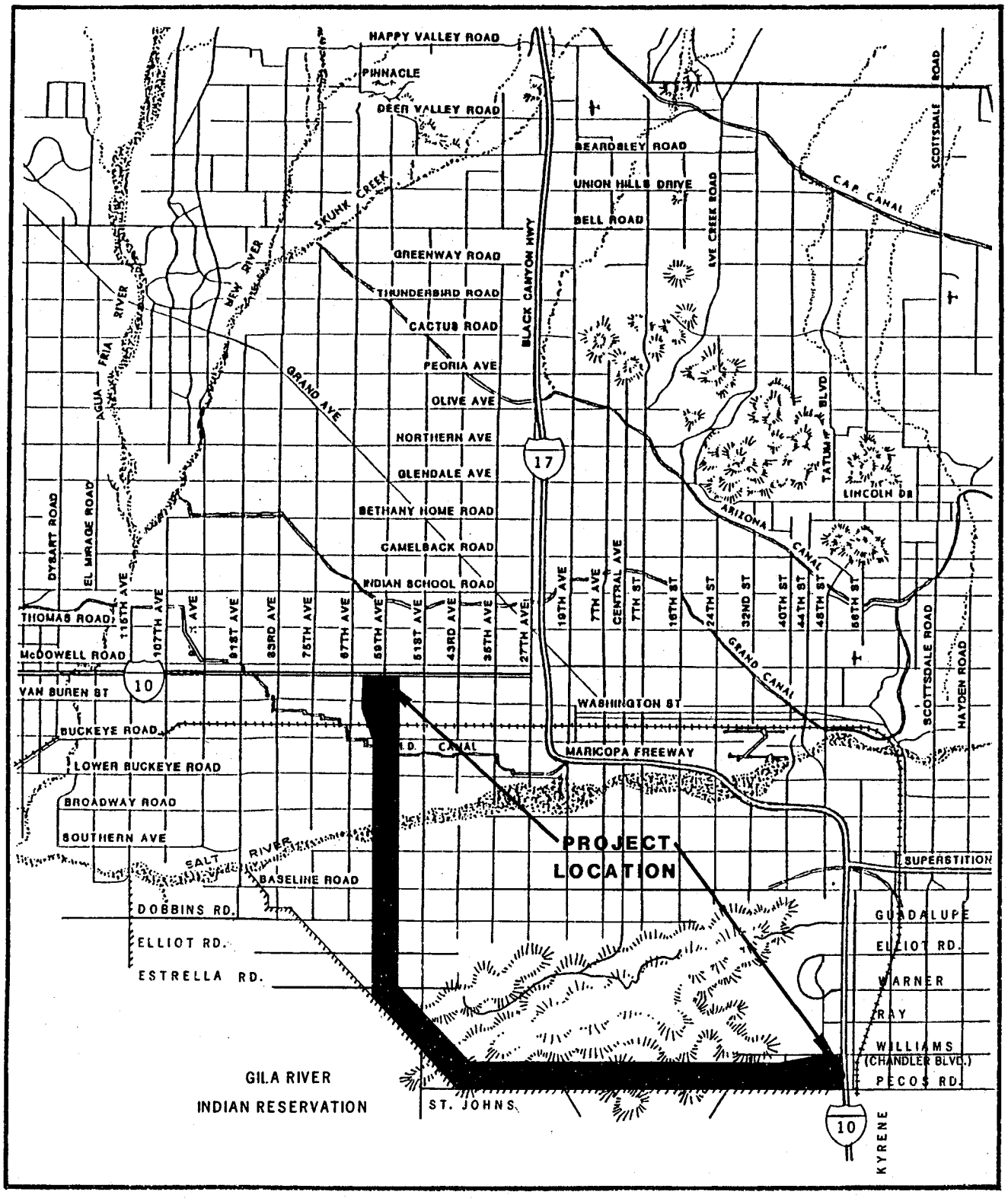

PLATE 1

Where planned development was encountered, the previously approved drainage plans were reviewed, utilized as they were designed and supplemented with on-site improvements to the point of meeting the above stated flow objectives.

To facilitate a better understanding of this report, six Plates and five Tables are included as follows:

- Plate 1, page 2 and plate No. 2, page 7, are plan view maps of the entire project showing the general layout, location and the limits of each of the four drainage segments.

- Plates 3 and 4, (foldouts in pocket at page 52 & 53,) identify the proposed alignment, all of the drainage areas tributary to it, and the recommended drainage facilities to be constructed.

- Plate 5, (foldout in pocket at page 54), shows all of the drainage changes and improvements to the I-10 (Papago Freeway) Interchange with SR-218.

- Plate 6, (foldout in pocket at page 55), shows all recommended new facilities for the I-10 (Maricopa Freeway) Interchange with SR-218.

- Table 1, (page 28 to 41), Summarizes all recommended culverts/pipes.
    - Location
    - Structure Type
    - Design Capacity
    - Length

- Table 2, (page 42 to 43), Quantifies recommended changes needed within the I-10 (Papago Freeway) Interchange.

- Table 3, (page 44 to 46), Summarizes all recommended detention/retention cells.
    - Location
    - Type
    - Volume (Ac-ft)
    - Average Depth
    - Bottom Elevation
    - Remarks

- Table 4, (page 47), Summarizes all recommended level spreaders.
    - Location

- Volume (Ac-ft)
- Average Depth
- Bottom Elevation

- Table 5, (page 48 to 51), Summarizes all recommended drainage ditches/channels.
  - Location
  - Design Flow
  - Average Slope
  - Bottom Width
  - Average Velocity
  - Normal Flow Depth

The detailed drainage conceptual design including plan and profile sheets and the construction cost estimate is included in The Design Concept Report under separate cover.

2.0 METHODOLOGY/HYDROLOGY

The computer program used to compute peak flows for both 10-year events and 100-year events was the U.S. Corps of Engineers HEC-1 program utilizing SCS methods. HDR's internal program, STMSIM, a Stormwater Simulation program developed by HDR, was used to size detention and level spreader cells by the Modified Puls method. Based on a study comparison prepared by Boyle Engineering, completed in May 1986, a 24-hour design storm is used.

The method of study varied dependent on the status of the adjacent land. Drainage plans prepared by developers' engineers, which predate this study, were reviewed for appropriateness with respect to hydrologic and hydraulic accuracy. It was found that the previously planned developments utilized a 2-hour design storm and they provided calculations for the 10-year, 50-year and 100-year storms. Because of the discrepancies between the 24-hour project design storm and the 2-hour developer design storm, a sensitivity analysis was performed between the 100-year, 2-hour storm and the 100-year, 24-hour storm. For two sample basins, HDR developed a HEC-1 program and compared the results with the previously approved drainage studies. No major methodology or computational problems for flow rate were found. Results of the analysis indicated some variations between the two peak flows, however, no general trend was observed. That is, in some cases the 2-hour storm peak was greater while in other cases the 24-hour storm provided higher peak flows. The peak discharges presented in the developers' drainage plans were used as

the basis for preliminary design in their areas and the model analysis results of the sample basins were utilized to define HEC-1 input in adjacent basins.

However, with respect to storm VOLUME, it was determined a 24-hour storm usually generated about 75% more runoff volume than was generated by the 2-hour storm. For this reason, a 24-hour storm was used to size all new facilities and a 2-hour storm was utilized whenever it was necessary to match previously approved master drainage plans and designs.

For previously unstudied areas, HEC-1 was utilized to develop hydrographs. The basin areas were taken from USGS quadrangle maps. The Soils Conservation Service (SCS) provided the basin lagtimes and the runoff curve numbers (CN), and the 1985 City of Phoenix Storm Drain Design Manual was utilized for depth-duration data.

For design of the freeway drainage systems and for drainage areas adjacent to the freeway, which would be drained by freeway facilities less than 200 acres, the rational method was utilized to analyze design flows. The initial time of concentration was assumed to be 10 minutes and the rainfall intensity was taken from the Phoenix Rainfall Intensity Ratio Curve (Page 66). Runoff coefficients "C" were assumed to be 0.9 for paved areas and 0.5 for all other areas.

The on-site storm drainage system was designed to intercept all storm runoff generated within the freeway right-of-way including the depressed sections. For depressed sections, catch basin inlets are located in the gutterline and in the medians. Where necessary, slotted drains could be added to improve the interception capacity of inlets and to decrease spread of flooding on the pavement. The intercepted stormwater was conveyed via interconnected pipes to appropriate outfalls.

The specific design parameters are detailed in the Drainage Design Criteria Section, page 56 to page 65.

3.0 HYDRAULICS

The hydraulic analysis performed for this study was limited to normal flow computations utilizing Manning's equation for pipes and open channels. Preliminary culvert sizing was done utilizing HEC-5 (Hydraulic Charts for the Selection of Highway Culverts) and

assuming inlet control. No backwater profiles were computed. More specific information with respect to design criteria can be found in Drainage Design Criteria Section, page 56 to page 65.

4.0 DESIGN CONCEPTS

The Southwest Loop Alignment is divided into four geographical segments (Plate 2, page 7.)

Segment I consists of the region south of the I-10 Papago Freeway at 55th Avenue to the Salt River. Segment II lies between the Salt River and the interchange at 51st Avenue. Segment III continues from the 51st Avenue Interchange to 19th Avenue. Segment IV encompasses the region east of 19th Avenue to I-10 Maricopa Freeway at Pecos Road. Each of these segments have their own peculiar characteristics in terms of land use, drainage patterns and general requirements. The hydrology analysis was subdivided in each segment based upon topographic features, flow characteristics and land use. (Since much of the tributary area will be developed prior to construction, the final plans should be prepared taking into account the drainage systems existing at that time.)

All segments were analyzed to conform to the drainage design criteria and are shown in detail on Plate 3 and 4. Individual drainage facilities, culverts/pipes; detention/retention cells; level spreaders; ditches/ channels are summarized in Tables 1, 3, 4 and 5 respectively.

The following text describes the drainage analyses by segment:

4.1 Segment I - I-10 to the Salt River

The area of influence, which lies primarily within the City of Phoenix, ranges from the existing Papago Freeway (I-10) south to the Salt River. This area is predominantly zoned industrial; thus development currently taking place is primarily industrial with pockets of residential. Historical agricultural land use has largely been eliminated. There is however, still extensive open area in a state of transition at this time.

The general fall of the land is northeast to southwest at a gentle slope of 0.2 to 0.4%.

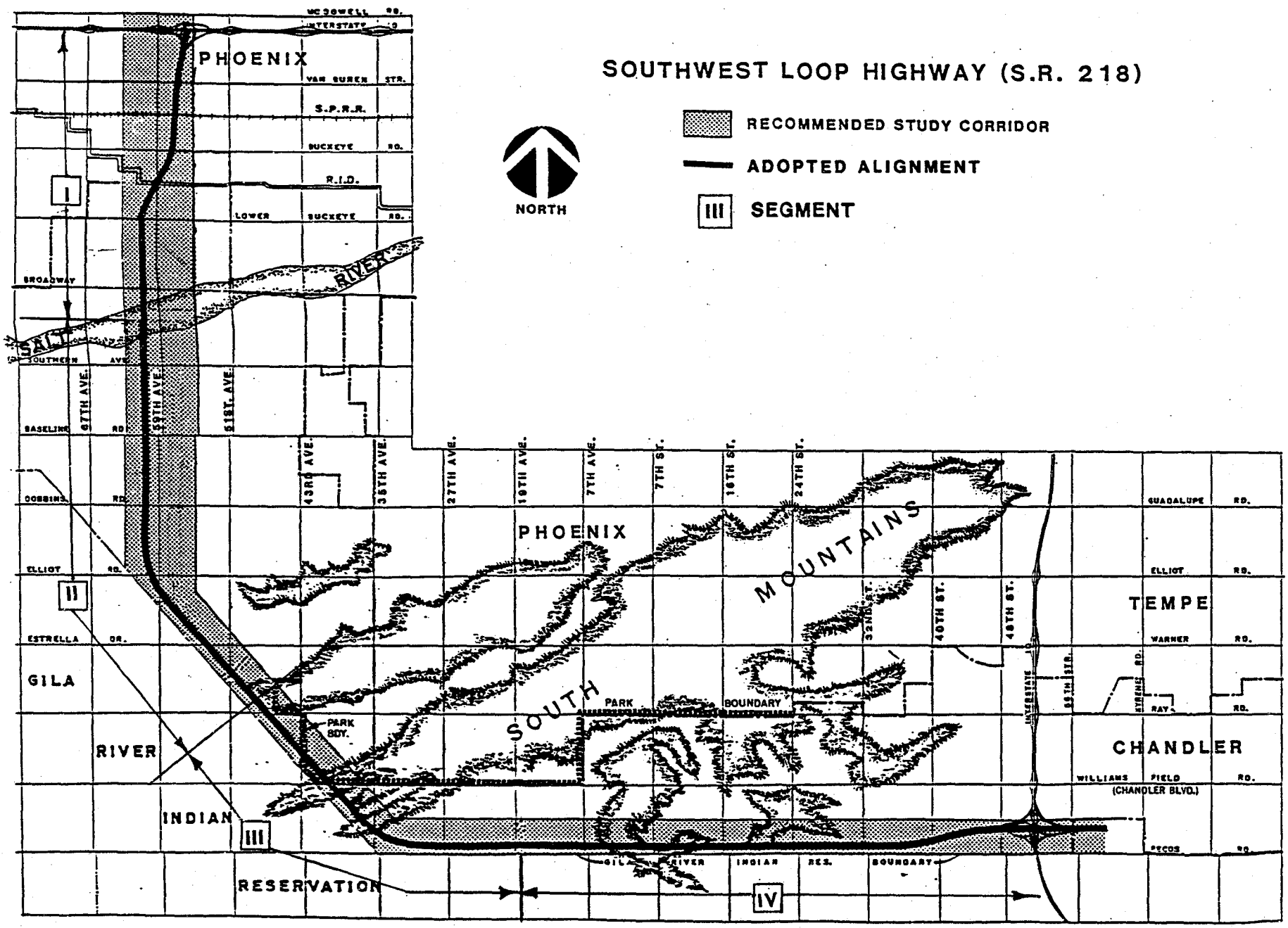
SOUTHWEST LOOP HIGHWAY (S.R. 218)
RECOMMENDED STUDY CORRIDOR
ADOPTED ALIGNMENT
SEGMENT
NORTH
PHOENIX
PHOENIX
TEMPE
CHANDLER
GILA
RIVER
INDIAN
RESERVATION
SOUTH
MOUNTAINS
PARK
BOUNDARY
PARK BDY.
SALT
RIVER
I
II
III
IV
MCDOWELL RD.
INTERSTATE 10
VAN BUREN STR.
S.P.R.R.
BUCKEYE RD.
R.I.D.
LOWER BUCKEYE RD.
BROADWAY
SOUTHERN AVE.
BASELINE RD
DOBBINS RD.
ELLIOT RD.
ESTRELLA DR.
67TH AVE.
59TH AVE.
51ST. AVE.
43RD AVE.
35TH AVE.
27TH AVE.
19TH AVE.
7TH AVE.
7TH ST.
16TH ST.
24TH ST.
32ND ST.
40TH ST.
48TH ST.
INTERSTATE 10
GUADALUPE RD.
ELLIOT RD.
WARNER RD.
RAY RD.
WILLIAMS FIELD RD.
(CHANDLER BLVD.)
PECOS RD.
GILA RIVER INDIAN RES. BOUNDARY

PLATE 2

Stormwater runoff from higher frequency events tends to pond in open areas, is retained in industrial retention areas or is conveyed in the streets. The predominant roadway drainage pattern is north to south, to the Salt River. Natural overland drainage is interrupted by the streets and presumably they shall remain the primary conveyors of stormwater runoff. Since the surface drainage is controlled and conveyed largely by the major north-south streets, the impact of a north-south freeway corridor upon surface drainage is relatively minimal.

Plate 5 details the drainage facilities required within the SR-218/I-10 Papago Freeway Interchange at 59th Avenue.

The highway drainage system on this segment needs only to carry on-site runoffs and drainage intercepted by the proposed highway. Local runoff will be intercepted by the streets and main storm sewers on 51st and 59th Avenues or the I-10 Papago Freeway drainage channel which prohibits any north to south conveyance from north of I-10.

For the proposed SR-218/I-10 Papago Freeway Interchange, two of the ramps connecting to I-10 are depressed and their drainage is to be connected to existing I-10 facilities. The hydrologic and hydraulic capacities of the stormdrain/pumping station systems at 59th Avenue and 51st Avenue, respectively, are not adversely impacted. In general, the impacts resulting from the proposed SR-218/I-10 Papago Freeway Interchange (Table 2) are the following:

1) Realignment of approximately 2700 L.F. of existing concrete channel north of I-10 between 51st Avenue and 55th Avenue (detailed hydraulic analysis regarding this impact will not be done at this time);

2) The drainage junction structure up stream of the 51st Avenue pump station wet well will have to be adjusted and the drainage junction structure up stream of the 59th Avenue pump station wet well will have to be moved from beneath pavement widening;

3) Existing catch basins or manholes, will have to be moved due to the widening of I-10 to accommodate new exit and entrance ramps; and

4) New catch basins or manholes will be connected by lateral pipes and then connected to existing trunk lines.

The runoffs between I-10 and Van Buren Street will be conveyed partially north and partially south. Between I-10 and Roosevelt Street, runoffs will be conveyed by a trapezoidal channel into two interconnected retention cells (No. 1 & No. 2 totaling 13.8 ac-ft) within the SR-218/I-10 Papago Freeway Interchange. Between Roosevelt Street and Van Buren Street the runoff on both the west side and the east side is conveyed south and is handled by a combination of trapezoidal channels and detention cells on each side. The peak storage required on the west side is 9.4 ac-ft. in No. 4 and on the east side is 5.0 ac-ft. in No. 3. A 24-inch RCP equalizer pipe will be installed to distribute the runoffs between the two detention cells and a 24-inch RCP outlet pipe will discharge 10 cfs from the east side detention cell into the existing 48-inch RCP storm drain at Van Buren Street.

While the connection between the SR-218 drainage system and the City of Phoenix 48 inch storm drain pipe at Van Buren Street has not been reviewed or approved by the City of Phoenix, we believe it is the best technical and most cost effective solution. This particular 48 inch drain was installed between 51st Avenue and 59th Avenue to pick up the runoff contributed between I-10 and Van Buren Street. This preliminary design will do exactly the same thing with the additional benefit that there will be no discharge into the 48 inch drain for any rainfall up to a 10 year event, and a controlled discharge, maximized at 10 cfs, for up to a 100-year event. It may be possible to outfall this water to the I-10 pumping station.

It is our understanding the City of Phoenix has allowed a connection to their system under these circumstances. If for some reason the City were to not allow this intertie, the flat terrain between Van Buren Street and the Salt River would mandate an extremely expensive, wide and deep trapezoidal channel and several deep crossings under the streets and the Roosevelt Canal.

South of Van Buren Street to the R.I.D. Canal, the recommended drainage plan utilizes a closed conduit system to a detention cell located north of the canal. The system on the east side of SR-218 begins with a 60-inch pipe (Q = 124 cfs) south of Van Buren Street and increases to a 72-inch pipe (Q = 195 cfs) north of the Southern Pacific Railroad. At the railroad, a junction structure is used to convey the flow into three 48-inch pipes which must be jacked in casing beneath the railroad right-of-way. South of the railroad, the three pipe system continues across Buckeye Road and outlets as 72-inch pipes with a design flow of 629 cfs into the 59 ac-ft detention cell (No. 5) north of the R.I.D. canal. The system on the west side of SR-218 begins with a 42-inch pipe (Q = 55 cfs) south of Van Buren Street and is increased to a 48-inch pipe (Q = 72 cfs) south to the Southern Pacific Railroad. This pipe increases in size to 54-inch pipes (Q = 184 cfs) just north of the R.I.D. canal where the pipes cross beneath SR-218 and outlets into the detention cell(No. 5) on the east side of SR-218. This eliminates one crossing at the R.I.D. canal. Plus, the 59 ac-ft detention cell on the east at Station 190, having a maximum depth of 10 feet, will reduce the 10-year peak discharge from 630 cfs to 300 cfs.

Full commercial and industrial development is assumed for the region north of the R.I.D. Canal, therefore, the volume of runoff is substantial for these impervious areas. Options to convey flow under the R.I.D. canal consist of an inverted siphon, a splitter box and a multiple box structure, a drop structure, or a combination of these. For the preliminary assessment performed here, closed conduit system with a single inverted siphon structure (two 60-inch RCP) crossing beneath the R.I.D. was used.

After crossing the R.I.D. canal the flow is carried along the freeway's east side by enclosed pipeline to station 221+00 and then carried by trapezoidal channel to the Salt River.

The runoff from the west side of the freeway, south of the R.I.D. canal, is picked up by trapezoidal channel and also conveyed to Salt River.

4.2 Salt River Crossing

An initial bridge study for the Salt River structures was conducted concurrently with the various corridor studies. The results of that study are presented in the following text.

4.2.1 Hydraulic Considerations

The Salt River reach which traverses the Southwest Loop Highway has been studied under the Federal Flood Insurance Program. The U.S. Army Corps of Engineers performed the hydraulic analysis and produced the 100-year flood plain and floodway maps used in determining the lengths of the bridges. While the study's results and mapping have not received final federal (F.E.M.A.) approval, the hydraulics and mapping are considered the best and most reliable information available.

Since the bridge crossing design, as related to the flood plain, would be subject to the flood insurance program criteria, the effects of the structures on the hydraulics of the waterway were investigated. This hydraulic investigation was based on a criteria of bridging the entire designated floodway and based upon the established 100-year design flow of 190,000 cubic feet per second with a water surface elevation of 1002.30 at the 59th Avenue alignment. The computer program HY-4, "Hydraulics of Bridge Waterways", developed by the Federal Highway Administration was used to determine the backwater produced by a constricted flood plain and bridge substructure. It was determined that bridges 3100 feet in length with 24 piers would cause an increase in the water surface elevation of 0.38 feet for the 100-year flood. This is below the one foot allowed for encroachment into the flood plain. In order to meet the minimum freeboard criteria of three feet above the 100-year flood water surface elevation, as established by the Maricopa

County Highway Department, a minimum low superstructure elevation of approximately 1005.8 would be required.

Further study of possible encroachment into the floodway is suggested. This would require FEMA approval, but the possible savings in bridge construction costs by a reduction in overall length are significant enough to warrant further study. One possible method of maintaining flow through a narrower channel would be to construct a channelization project within the Salt River bed for a given distance on either side of the crossing. The material from this channelization project could then be used for construction of the embankment sections.

Effects of scour on pier footings should also be studied further. This study should include whether or not the piers need to be skewed so that pier centerlines are parallel to flow. The use of drilled shaft pier foundations could also be considered which may eliminate the need for deep footings as a means of scour protections.

4.2.2 Bridge Types

<u>Assumptions</u>

The following basic assumptions were made in determining various alternate bridge types:

- Twin structures - 57'-0" wide separated by a 27' clear median

- Steel H-pile foundations similar to those employed at the 51st Avenue bridge or large diameter drilled shafts.

- Prestressed concrete girder superstructures to be simply supported for both dead and live loadings. Steel girders to be continuous for both dead and live loadings.

- Scour protection, including grouted riprap at the abutments, similar to that used on the 51st Avenue bridge.

- Berm elevations at the abutments set one foot minimum above the 100-year flood elevation.

- Structure bottom of girder set three feet above 100-year flood elevation.

Substructure Types

Two types of substructure were considered, a two-column bent similar to that used on the 51st Avenue bridge and a "hammerhead" or "tee type" pier. The hammerhead pier is commonly used for river crossings because of its solid shaft design. For north-south alignments, a skew angle of 20 degrees should be considered for the substructure so that piers will be parallel to flow. More detailed hydraulic and scour studies may show that the use of the skew is not warranted.

1. Deep Foundation Types

Two alternative foundation types were considered for the hammer-head piers and two-column bents. Large diameter drilled shafts and driven steel H-piles were evaluated for vertical and lateral capacity, as well as for their relative cost of construction.

The determinations of the required length of embedment for the shafts and piles were based on the recommendations presented in the "Preliminary Geotechnical Investigation Report" prepared by Sergent, Hauskins, and Beckwith (SH&B). The following foundation design data were obtained from this report:

- 35′ of scour can be expected for bridge piers and bents

located in the Salt River flood plain.

- below this depth, a dense alluvial deposit of sands, gravels and cobbles (SGC) will be encountered, with an assumed angle of internal friction of 41 degrees and a submerged unit weight of 70 pcf.

It should be noted that the recommendations for scour depth and soil parameters were based on the engineering judgment of SH&B and their experience in the area of the Salt River. Soil borings in the vicinity of the bridge, advanced with a 6-1/2" hollow stem auger, met refusal at depths of 4 to 15 feet.

Superstructure Schemes

Two basic types of superstructure were considered, precast prestressed concrete girders and welded steel plate girders. Girder type bridges are considered to be the most cost effective solution of river crossings where moderate span lengths can be maintained. The precast concrete girders studied were standard AASHTO Type IV girders and a modified AASHTO Type VI girders used by the Arizona Department of Transportation. Inquiries were made at the Arizona Department of Transportation and with a Phoenix area precaster to determine the sections most commonly used and current prices.

Summary of Alternates

Alternate No. 1: 3100′ x 57′ twin structure using modified AASHTO Type VI concrete girders. These structures each have 25 spans of 124′ with hammerhead type piers perpendicular to roadway centerline. The foundation is driven steel H-piles.

Alternate No. 2: Same as Alternate No. 1 except piers skewed 20 degrees.

Alternate No. 3: 3100′ x 57′ twin structure using standard AASHTO Type IV concrete girders. These structures each have 31 spans of 100′ with hammerhead type piers perpendicular to the roadway centerline. The foundation is driven steel H-piles.

Alternate No. 4: 3100′ x 57′ twin structures using welded steel plate girders. These girders have a web depth of approximately 57" and spans ranging from 110′ end span to 140′ interior spans. There are a total of 24 spans and hammerhead type piers perpendicular to the roadway centerline are used. The foundation is driven steel H-piles.

Alternate No. 5: 3100′ x 57′ twin structures using standard AASHTO Type-VI concrete girders. These structures each have 25 spans of 124′ with two column piers, utilizing 6′0" diameter drilled shafts.

Alternate No. 6: Same as No. 5 except piers are Hammerhead type with 8′0" diameter drilled shafts.

Further Study

Prior to completion of the preliminary bridge design (TS&L drawings) the following items should be studied more thoroughly:

- Possible encroachment into the floodway with the intention of shortening the bridge length. Should this prove to be feasible, FEMA approval should be sought.

- Scour effects and protection methods for both skewed and zero-skewed piers.

Recommendation

Each of the alternates studied are considered technically sound concepts, with each having its own advantages. Thus the deciding factor is one of economics. These comparative estimates show that Alternate No. 5 is the least costly and is therefore recommended. The following is a complete breakdown of Alternate No. 5:

- 3100' x 57' Twin Structures*
- 25 Spans of approximately 124'
- Modified AASHTO Type VI Prestressed Concrete Girders
- 7-1/2" Cast-In-Place Concrete Deck (with contractor's option for the use of prestressed concrete stay-in-place forms)
- Two-column type piers *
- 6'0" diameter drilled shafts extending approximately 70' below existing river bed.

(* These items are subject to further study)

It is strongly recommended that the above mentioned study be undertaken as the possible cost savings may be significant.

4.2.3 Permits

Crossing the Salt River will require several permits and approvals. A 404 permit as specified by the Clean Water Act must be obtained from the Corp of Engineers. In addition to this permit, the Maricopa Flood Control District must approve the plans for this crossing prior to construction.

4.3 Segment II - Salt River To 51st Avenue

The area of influence is currently in agricultural use with residential developments at 67th Avenue and Baseline Road, and at the unincorporated community of Laveen. The natural east to west fall of the land drains 26.4 square miles toward Baseline Road. The Champion Drain, located in the natural low point along Baseline Road, collects runoff and irrigation tailwater and outfalls into the Salt River at 79th Avenue.

Natural waterways have been obscured by cultivation of the land. Under current conditions the irrigation network and roadways tend to interrupt and direct flow patterns. Stormwater begins in the western part of the South Mountains and flows northeasterly in sheet flow. It is gradually collected in canals and roadways, being eventually conveyed to the Champion Drain. Imminent development, most probably residential, is projected for this watershed. Essentially, the drainage conditions along this portion of the corridor are capable of producing high peak discharges under existing and future conditions.

From Southern Avenue north, trapezoidal channels will intercept and convey runoff northerly to the Salt River on both the east and west side of SR-218. Between Southern Avenue and Baseline Road trapezoidal channels will again intercept and convey the runoff on both the east and west sides, this time in a southerly direction under Baseline Road and into the Champion Drain.

At the southeast end of Segment II the flows intercepted on the east side of the freeway, north of 51st Avenue, are conveyed by trapezoidal channel to a 88 ac-ft detention cell (No. 7) at Estrella Drive. The peak discharge of 1677 cfs is reduced to 673 cfs and is released through four 54-inch pipes. It is carried by trapezoidal channel northerly to a 195 ac-ft detention cell, (No. 6) at Elliot Road. At this point the 1831 cfs peak is reduced to 699 cfs and is outlet under the freeway to the west side by four 48-inch pipes. From Elliot Road the flow on both the east and west side is carried by trapezoidal channel and discharged into the Champion Drain at Baseline Road.

The drainage system on the west side of the freeway, between 51st Avenue and Baseline Road consists entirely of trapezoidal channel carrying the runoff directly to the Champion Drain.

Detention was considered at the Champion Drain to regulate the flows without disrupting the existing system. However, the characteristics of the basin are such that the basin peak would occur at approximately the same time the detention occurred. The basin's flow patterns are sheet flow in the lower reaches and the time to peak is thus delayed. Therefore, detention at Champion Drain would not be advantageous because such detention may actually increase peak runoff.

The existing capacity of the Champion Drain ranges from 46 cfs to a maximum of 666 cfs near its outfall. The Peak 10-year discharge from the drainage basin tributary to the Champion Drain is 3700 cfs requiring a trapezoidal channel with a 30' bottom width and a normal depth of 10.4 feet. Because of impending development in the basin, improvements to the Champion Drain will have to be constructed. When the agency responsible for the Drain plans these improvements, ADOT should consider participating in this improvement in proportion to the increased flow caused by the Southwest Loop. The cost estimate for the Southwest Loop included a proportional cost for an additional 1777 cfs for the Champion Drain improvements.

4.4 Segment III - 51st Avenue To 19th Avenue

This segment contains the west end of the South Mountain area. The topographical character of the land transitions from rugged mountains where the alignment crosses the South Mountain ranges to the foothills on their southern flank. The majority of the terrain is mountainous and full development is prohibited by its physical features and access considerations. Unincorporated Maricopa County, park land and state land provide the right-of-way for this section while the southwesterly project boundary is the Gila River Indian Reservation.

The alignment is subject to substantial runoff volumes particularly between 51st Avenue and Station 750. At the base of the mountains, flows are collected in many braided, interconnected

washes and conveyed through washes, across reservation land, to the Gila River. Tributary drainage basins vary in size from 4 acres to 523 acres. In numerous locations, the braided streams leave a main channel and the flow is split into multiple channels. The analysis accounted for these split channel flows by directing a percentage of the main channel flow to the smaller channels. The percentage was determined by a review of the topography from aerial photographs and field observations. A reach-by-reach study included analysis of downstream flood impacts should accomplished in the final design.

The primary consideration for the drainage design in this segment is to avoid concentrating discharge flows, thereby maintaining flow in as close to the existing state as possible. To accommodate this, downstream detention cells and level spreaders have been designed to retain up to a 10-year, 24-hour event before releasing a controlled sheet flow into natural paths across the Gila River Indian Reservation.

Progressing sequentially ahead on stationing, the design is as follows:

- 51st Avenue to Station 650, runoff is intercepted by trapezoidal channel and conveyed northerly into a 12.4 ac-ft detention cell (No. 8) located in the Southeast quadrant of the 51st Avenue Interchange. The control release of 35 cfs from detention cell No. 8 is piped under 51st Avenue and into a trapezoidal ditch east of SR-218 which conveys the water northerly into the Champion Drain.

- At Station 660, the natural flows (Q=2946 cfs) is passed under the freeway via 5 box culverts and an equipment crossing structure. These structures should be located to match the existing washes as closely as possible.

- Between Stations 665 and 710, the runoff is collected in a trapezoidal channel, carried under the freeway and dispensed uniformly downstream by 37.8 ac-ft of level spreaders (No.s 1, 2, 3, 4, 4A & 5).

- Between Station 725 and 737, the runoff is collected in a trapezoidal channel and outlet into a 16′ x 14′ box culvert/equipment crossing under the freeway. An open throated ford allows the flow to enter the 57 ac-ft retention cell No. 9. This retention cell is designed to retain up to a 100-year event at which point it would over top into sheet flow.

- Between Station 738 and 753, the runoff is collected in a trapezoidal channel which outlets into 4-10′ x 6′ box culverts at Station 742. It is carried under the freeway into 52 ac-ft of retention cell (No. 10). As with retention cell No. 9, retention cell No. 10 will not overtop until the 100-year event is exceeded.

- Between Station 753 and 801 are equalizing flow trapezoidal channel intercepts flow on the freeways north side and conveys it under the freeway at Stations 778, 783, 790, 795 and 801 into stepped interconnected level spreaders No. 6, 7, 8, 9 and 10.

- Between Stations 802 and 824, flow is intercepted by a trapezoidal channel and converges at 3-10′x6" box culverts crossing under the freeway at Station 808 with no additional downstream handling.

- Between Stations 824 and 880, flow is intercepted by 22.1 ac-ft of equalizing detention cell (No.11) and dispersed into culverts under the freeway with no outfall handling at Stations 826, 846, 860 and 870.

- East of 19th Avenue, the runoff is intercepted by trapezoidal channel and carried eastward into Segment IV.

Although not a part of the actual freeway drainage system for Segment III, it should be noted that 14 culverts under 51st Avenue between SR-218 and St. John's Road were surveyed. Their combined capacities will carry 800 cfs of the 3870 cfs 10-year discharge or 6700 cfs 100-year discharge tributary from above the freeway to this section of 51st Avenue. Hence, modifications to the pipe system and channelization along 51st Avenue may need to

occur to reduce the limits of flooding which currently exist for the higher frequency storms. This flooding is a result of existing undersized drainage facilities and is neither increased by or decreased by SR-218 drainage features. This area was studied to determine if the SR-218 project could offer some relief of downstream flooding. Under the basic philosophy that downstream protection would be included if it did not require a substantial increase in project costs, no downstream improvement within the scope of the SR-218 project was feasible for this reach. Similarly, the Bureau of Indian Affairs (BIA) proposed a 51st Avenue Floodway to intercept the flow upstream of the freeway and channelize it to the Gila River. One interception channel from Station 655 to Station 670 would have a bottom width of 30-feet, 3:1 side slopes and a normal flow depth of 6.1 feet to carry the 2760 cfs generated by a 100-year, 24 hour storm. The second interception channel from Station 670 to Station 750 would also have a bottom width of 30-feet, 3:1 side slopes but would flow 6.9-feet deep to carry the 3930 cfs from the same storm. The floodway from freeway Station 670 to the mid-point of Section 28 would carry the combined 6920 cfs with a 30-foot bottom, 3:1 side slopes and a normal depth of 8.0 feet. From the mid-point of Section 28 to the Gila River the floodway would expand to a 40-foot bottom, 3:1 side slopes and a normal flow depth of 8.5-feet. It is recommended this option be further reviewed prior to final construction design.

If the floodways necessary to protect the 51st Avenue area are to be constructed by BIA or others, then the Southwest Loop Drainage facilities should be coordinated with the floodway concepts.

4.5 Segment IV - 19th Avenue To I-10 Maricopa Freeway

Topographically, Segment IV transitions from South Mountain range foothills to a flat alluvial plain. The general runoff pattern is north to south, off the southern mountain slopes. As in segment III this southern project boundary is the Gila River Indian Reservation. Under natural conditions, runoff would cross the reservation boundary in numerous washes, characteristic of foothill terrain, where it would be collected in the Gila Drain and then carried westward to the Gila River.

Agricultural activities on the Reservation have eliminated most of the natural drainage features south of the alignment.

Although currently sparsely developed, the northern (upstream) side of this section of freeway is planned for substantial residential development. Master drainage plans have already been approved for four (Foothills, Mountain Park Ranch, Lakewood and Pecos Road P.C.D.) developments encompassing most of the length of Segment IV. At the time of this study, some of the approved drainage facilities were in place while others were under construction. Systems previously approved were accommodated as much as possible.

Because of flooding of downstream agricultural lands a number of drainage modifications have been made upstream of the SR-218 right-of-way beginning in the mid 1940's. These modifications have extensively changed the natural flow patterns from South Mountain to eliminate frequent flooding of the agricultural ground. Upstream development unrelated to SR-218 has sought to re-establish the natural drainage patterns. In order to protect and maintain the previously developed flood prevention measures, extensive detention has been proposed by the developers on the upstream drainage facilities. Drainage proposals analyzed and recommended for this segment are intended to minimize impacts to either upstream drainage improvements or downstream flooding. Generally, it was the intention of this study to avoid modifying either drainage facilities in place or the proposed drainage systems of the upstream developers. However, because of space considerations, a number of facilities must be relocated from where they were shown on the preliminary master plans.

Foothills

The Foothills Development (19th Avenue to 24th Street) is located north of the Gila River Indian Community Reservation and south of the Phoenix South Mountain Preserve. With the extensive upstream storage which is planned, the construction of SR-218 will require minimal drainage facilities provided these improvements are in place prior to freeway construction. However, since the timing of their construction is unknown, the structure design

for this segment should be the based on 100-year storm. It is recommended to downsize these drainage structures if the upstream drainage facilities are in place and operating before SR-218 is constructed.

The approved master drainage plan for this development presented the pre-development and post-development discharges at various concentrated points. The post-development discharges have been reduced substantially with proposed channelization and retention. A total retention volume of 773 ac-ft was proposed with individual cells ranging in size from 0.7 ac-ft to 84.2 ac-ft. The capacity of several retention/detention cells proposed in the development master plan are reduced by the encroachment of SR-218. Those cells must be relocated or enlarged to preserve the design volume.

All drainage channels running parallel to SR-218 were sized for the 10-year event utilizing the Rational Equation ($Q = CxIxA$). The runoff coefficients represent a weighted average of commercial and residential development. Areas within approximately 200 feet of the channel centerline were assumed to be commercial. All other areas were assumed residential unless the terrain prohibited such development.

The typical channel section was trapezoidal with a 10-foot bottom width, side slopes of 3:1, a minimum velocity of 4 fps and a normal flow depth of 2 feet. The Continuity Equation ($Q = VxA$) was used to size the channel. Frequent drop structures or extensive erosion protection are anticipated.

The Foothills developer has agreed to build additional channels to convey local drainage not intercepted by the highway system. However, at the date of this study no results of these changes were available. These channels will be designed separate from the SR-218 drainage system. The SR-218 drainage will intercept flows from the roadway and adjacent areas only.

Specifically, a series of trapezoidal channels along the north side of the freeway between 19th Avenue and 24th Street will intercept runoff and convey it under the freeway as follows:

- Box culverts at Station 890 will carry 452 cfs into an existing wash at the downstream right-of-way.

- At Station 906 a box culvert will carry 141 cfs under the freeway.

- At Station 923, a series of 8 box culverts are needed to convey 5291 cfs under the freeway into a natural wash.

- At Station 932, 6 box culverts will carry 1232 cfs under the freeway into a natural wash.

- At Station 941, 2 box culverts will carry 728 cfs under the freeway into a natural wash.

- At Station 958, 2 pipes will carry 203 cfs under the freeway into a natural retention area on the south side of the freeway.

- At Station 967, 2 box culverts will carry 461 cfs under the freeway into the same natural retention area.

- At Station 975, a single pipe will carry 86 cfs under the freeway into a natural retention area.

- At Station 996, a series of 8 box culverts will intercept a natural wash and carry the 5314 cfs under the freeway and back into the natural wash.

- At Station 1006, an existing pipe will be extended to carry 151 cfs under the freeway.

- At Station 1028, 2 box culverts will carry 363 cfs under the freeway and connect to existing box culverts.

- At Station 1048, a box culvert will carry 438 cfs under the freeway and connect to an existing box culvert.

- At Station 1081, 2 box culverts will carry 482 cfs under the freeway and connect to existing box culverts.

Goldman Dairy Property

The Goldman Dairy Property is approximately 200 acres located between 24th Street and 28th Street. A portion of the stormwater runoff in this section, (approximately 600 cfs) is diverted from the Lakewood property and flows in a natural drainage channel through the Goldman Dairy property. The system needed to facilitate the on-site and offsite flow is:

- A culvert under the freeway at Station 1090 carrying 91 cfs into a 2.4 ac-ft level spreader (No. 11).

- 2 box culverts at Station 1093 carrying the 783 cfs from Foothills under the freeway into a natural channel.

- A 12.7 ac-ft detention ditch (No. 12) intercepting flow on the north side of the freeway, equalizing through a culvert at Station 1102 into a 20.6 ac-ft level spreader (No. 12) on the south side of the freeway.

Overflows from the two south side level spreaders will sheet flow naturally across the Indian Reservation.

Lakewood Property

The Lakewood Development encompasses the eastern portion of Segment IV between 28th Street and 40th Street. Drainage facilities for future subdivisions are essentially in place. Drainage systems in this area incorporate extensive upstream storage coupled with downstream storage facilities and a level spreader. The intent of this concept is to store all minor flows up to a 10-year storm with no overflow onto downstream agricultural grounds. For floods in excess of the 10-year flood, water is distributed in level spreaders along the entire length of the south line of the subdivisions. These spreaders were sized such that the 100-year natural discharge flow is not exceeded under the full development condition.

The master drainage plan has two major outfall locations, 28th Street and the Central Spine system at Station 1164. Three proposed developer

constructed retention basins lie near the Gila River Indian Community Reservation boundary and two developer constructed lakes regulate the Central Spine system. The proposed retention volume for the Lakewood basin was not affected by the location of SR-218. However, structures are needed to convey the 100-year pre-development discharges of 2700 cfs and 1218 cfs under the freeway at 28th Street and the Central Spine channel.

Trapezoidal channels intercept uncontrolled overland flow along the north side of the freeway and convey it to these same structures at 28th Street and Station 1164 plus an additional structure to carry 150 cfs at 32nd Street. The SR-218 drainage design is intended to bridge over the existing drainage facilities with minimum impact. It should be noted that preliminary comparison studies were made between the original drainage master plan and the post SR-218 condition. It was found that the net impact of SR-218 provided a slight increase in paved area due to the wider roadway section for the interchange but a substantial decrease in development densities because of a larger right-of-way requirement. Therefore, the net result of SR-218 on the proposed drainage plan is a net reduction in surface runoff.

Pecos Road, P.C.D.

The Pecos Road P.C.D. Development is 640 acres between 40th Street and to 48th Street. The master drainage plan proposes to allow all of the runoff to flow to the southwest corner and into two retention basins. At the time of this report, construction of these facilities had not started.

Since the freeway alignment bisects the southern portion of the property, provisions will need to be made to intercept the runoff along the northern right-of-way and provide detention or level spreading. It is proposed to accomplish this with 14.2 ac-ft of new detention ditches (No. 13 & 15) between Stations 1193 and 1244, connected by 24 inch equalizing pipes at Station 1214 and 1230 to 11.7 ac-ft of level spreader (No. 13) on the south side of freeway.

The developer has proposed a 41.5 ac-ft retention basin on the north side of the freeway at Stations

1195. If this is constructed prior to the freeway, it will have to be relocated to the north side of the freeway between Stations 1205 and 1219. If the freeway is constructed first, this same area north of the freeway should be reserved for the developer to construct the 41.5 ac-ft retention cell in.

In addition, to the retention and level spreaders described above, the natural drainage channel at Station 1197 will need a series of 4 box culverts under Ramp C, Ramp D and the mainline to carry 1238 cfs under the freeway.

SR-218/I-10 Maricopa Freeway Interchange

The runoff tributary to SR-218 at the SR-218/I-10 Maricopa Freeway Interchange is bisected by the north-south alignment of I-10. Along the west side of I-10, the runoff will be collected by a drainage ditch and carried under Ramp 700 by 3 box culverts into 30.0 ac-ft of detention cell (No. 16). Runoff collected between Ramp 100 and the mainline will be piped under the mainline into detention cell No. 16 as will the runoff collected between Ramp D, Ramp 700 and Ramp 600. The discharge from detention cell No. 17 will be piped under SR-218 by 3 box culverts into a 36.0 ac-ft detention cell (No. 17) located between Ramp 400 and I-10 mainline. Discharge from detention cell No. 17 is piped under Ramp 200 into a 90.0 ac-ft retention cell (No. 18).

The runoff tributary to SR-218 east of I-10 will be intercepted by a ditch along Ramp 500 and carried into a 3.0 ac-ft detention cell (No. 19). Discharge from detention cell No. 19 is piped into a 4.0 ac-ft detention cell (No. 20). Discharge from detention cell No. 20 is piped under Ramp 300 into a 17.2 ac-ft detention cell (No. 21). From detention cell No. 21, the discharge is piped under SR-218 into a 12.5 ac-ft detention cell (No. 22) and then under Ramp 800 into 12.5 ac-ft detention cell (No. 23). Discharge from detention cell No. 23 is piped westerly under Ramp 600 from there it is ditched south and then piped back easterly under Ramp 600 to a drainage ditch along the easterly I-10 right-of-way. From there it flows southerly into an existing drainage ditch along the section line.

TABLE 1

SUMMARY OF PRELIMINARY CULVERT/PIPE SIZING
SEGMENT I

PIPE CULVERT/ STRUCTURE NUMBER	LOCATION (STATION)	STRUCTURE TYPE	Q10 (CFS)	TOTAL LENGTH (FT)	REMARKS
100	*624+00, 110'RT. SOUTH COLLECTOR RD.	18" RCP	5	100	RESTRICTED OUTLET (SEE PLATE 5)
101	*436+00, RAMP 400 AND 225+50, RAMP 200	24" RCP	-	290	EQUALIZER PIPE
102	*524+00, RAMP 500	30" RCP	44	110	TO RETENTION CELL 2
103	*326+00, RAMP 200	36" RCP	96	100	TO RETENTION CELL 1
104	*542+00, RAMP 500	24" RCP	12	76	C-15.70
105	*250+15, RAMP 200	24" RCP	12	86	SUMP W/C-15.70
106	125+27	24" RCP	--	170	EQUALIZER PIPE
107	125+50 TO 127+90, 100' LT.	24" RCP	10	240	RESTRICTED OUTLET TO EXST. 48" S.D. C.O.P.
108	52+07, RAMP 'C'	24" RCP	12	110	VAN BUREN ST. T.F.
109	71+57, RAMP 'D'	24" RCP	12	150	VAN BUREN ST. T.F.

(100) STRUCTURE/CULVERT NUMBER [ ] PIPE SYSTEM NUMBER

* SR-218/I-10 PAPAGO FREEWAY INTERCHANGE AT 59TH AVE. VICINITY
(*)JACKED/BORED WITH CASING UNDER THE RAILROAD

TABLE 1 Continued

SUMMARY OF PRELIMINARY CULVERT/PIPE SIZING
SEGMENT I

PIPE CULVERT/ STRUCTURE NUMBER	LOCATION (STATION)	STRUCTURE TYPE	Q10 (CFS)	TOTAL LENGTH (FT)	REMARKS
110	129+60 TO 135+00, LT.	60" RCP	124	540	
111	135+00 TO 153+00, LT.	72" RCP	195	1,800	
112	153+00 TO 155+00, LT.	*3-48" RCP CLASS IV	195	600	S.P.R.R.- MAINLINE
113	155+00 TO 163+00, LT.	3-48" RCP	195	2,400	
114	163+00 TO 165+00, RT.	*3-48" RCP, CLASS IV	195	600	S.P.R.R. - SPUR
115	165+00 TO 179+50, LT.	3-60" RCP	340	4,350	
116	179+50 TO 181+00, 320'LT.	2-8' X 4' RCBC	340	150	BUCKEYE RD. CROSSING
117	180+00 C/L MEDIAN	24" RCP	12	140	SUMP W/C-15.70
118	23+73, RAMP 'A'	24" RCP	12	100	BUCKEYE RD. T.I.
119	48+56, RAMP 'B'	24" RCP	12	120	BUCKEYE RD. T.I.
120	52+27, RAMP 'C'	24" RCP	12	110	BUCKEYE RD. T.I.
121	71+95, RAMP 'D'	24" RCP	12	90	BUCKEYE RD. T.I.

(○) STRUCTURE/CULVERT NUMBER [ ] PIPE SYSTEM NUMBER

(*) JACKED/BORED WITH CASING NUMBER THE RAILROAD

TABLE 1 - Continued

SUMMARY OF PRELIMINARY CULVERT/PIPE SIZING
SEGMENT I

PIPE CULVERT/ STRUCTURE NUMBER	LOCATION (STATION)	STRUCTURE TYPE	Q10 (CFS)	TOTAL LENGTH (FT)	REMARKS
122	181+00 TO 189+50, LT.	3-72" RCP	629	2,550	
123	129+65 TO 139+00, RT.	42" RCP	52	935	
124	139+00 TO 153+40, RT.	48" RCP	55	1,440	
125	153+40 TO 155+00, RT.	*48" RCP CLASS IV	55	160	S.P.R.R. - SPUR
126	155+00 TO 157+50, RT.	48" RCP	72	250	
127	157+50 TO 158+30, RT.	*48" RCP CLASS IV	72	80	
128	158+30 TO 161+00, RT.	48" RCP	72	270	* L=70'
129	161+00 TO 180+50, RT.	2-48" RCP	121	3,960	
130	180+50 TO 182+50, 300' RT.	8' X 3' RCBC	121	200	BUCKEYE ROAD
131	182+50 TO 200+00, RT.	2-54" RCP	184	3,500	
132	199+91 C/L	2-54" RCP	184	440	TO DETENTION CELL 5
133	200+90 TO 206+50, LT.	2-60" RCP	328	1,120	

(oval) STRUCTURE/CULVERT NUMBER [ ] PIPE SYSTEM NUMBER

* JACKED/BORED WITH CASING UNDER THE RAILROAD

TABLE 1 - Continued

SUMMARY OF PRELIMINARY CULVERT/PIPE SIZING
SEGMENT I

PIPE CULVERT/ STRUCTURE NUMBER	LOCATION (STATION)	STRUCTURE TYPE	Q10 (CFS)	TOTAL LENGTH (FT)	REMARKS
134	206+50 TO 209+50, LT.	**2-60" RCP	328	620	R.I.D. SIPHON (OPTION)
135	209+50 TO 221+00, LT.	2-60" RCP	328	2,340	
136	235+00 C/L MEDIAN	24" RCP	12	130	C-15.90
137	234+30 TO 235+90, 330' LT.	2-8'X4' RCBC	403	160	LOWER BUCKEYE RD. (EAST)
138	237+20 TO 238+80, 365' RT.	36" RCP	35	160	LOWER BUCKEYE RD. (WEST)
139	25+09, RAMP 'A'	24" RCP	12	110	LOWER BUCKEYE RD.T.I.
140	49+94, RAMP 'B'	24" RCP	12	140	LOWER BUCKEYE RD.T.I.
141	53+96, RAMP 'C'	24" RCP	12	100	LOWER BUCKEYE RD.T.I.
142	72+07, RAMP 'D'	24" RCP	12	140	LOWER BUCKEYE RD. T.I.
143	267+70 C/L MEDIAN	24" RCP	12	120	SUMP W/C-15.70
144	289+50 TO 290+80,165' LT.	2-12' X 3' RCBC	563	130	BROADWAY RD. (EAST)
145	289+50 TO 290+80,160'RT.	54" RCP	80	130	BROADWAY RD. (WEST)

(oval) STRUCTURE/CULVERT NUMBER [ ] PIPE SYSTEM NUMBER

** SIPHON OPTION UNDER R.I.D. CANAL

TABLE 1 - Continued

SUMMARY OF PRELIMINARY CULVERT/PIPE SIZING
SEGMENT II

PIPE CULVERT/ STRUCTURE NUMBER	LOCATION (STATION)	STRUCTURE TYPE	Q10 (CFS)	TOTAL LENGTH (FT)	REMARKS
204	238+50 TO 240+00,190'LT.	24" RCP	12	150	TO SALT RIVER
205	22+95, RAMP 'A'	24" RCP	12	90	SOUTHERN AVE. T.I.
206	48+32, RAMP 'B'	24" RCP	12	120	SOUTHERN AVE. T.I.
207	52+80, RAMP 'C'	24" RCP	12	100	SOUTHERN AVE. T.I.
208	72+71, RAMP 'D'	24" RCP	12	100	SOTHERN AVE. T.I.
209	382+10 C/L MEDIAN	24" RCP	12	110	SUMP W/C-15.70
210	401+70 TO 402+60, 340'LT.	54" RCP	98	90	BASELINE RD. (EAST)
210A	402+00, 340' LT.	36" RCP	35	25	
211	401+70 TO 402+60,340'RT.	30" RCP	22	90	BASELINE RD. (WEST)
212	22+44, RAMP 'A'	24" RCP	12	120	BASELINE RD. T.I.
213	46+77, RAMP 'B'	24" RCP	12	130	BASELINE RD. T.I.
214	403+00, 270' LT.	*4-8' X 7' RCBC	3700	130	RAMP 'C'
215	403+00, 290' RT.	*4-8' X 7' RCBC	3700	120	RAMP 'D'

( ) STRUCTURE/CULVERT NUMBER

* BASELINE RD. T.I. RAMP STRUCTURE AT CHAMPION DRAIN

TABLE 1 - Continued

SUMMARY OF PRELIMINARY CULVERT/PIPE SIZING
SEGMENT II

PIPE CULVERT/ STRUCTURE NUMBER	LOCATION (STATION)	STRUCTURE TYPE	Q10 (CFS)	TOTAL LENGTH (FT)	REMARKS
216	403+00, 1.9 Miles RT.	5-10'X8' RCBC	3700	90	BASELINE RD. AT CHAMPION DRAIN
217	422+60, C/L MEDIAN	24" RCP	12	120	SUMP W/C-15.70
218	13+60, RAMP 'A'	24" RCP	12	70	DOBBINS RD. T.I.
219	37+00, RAMP 'B'	24" RCP	12	70	DOBBINS RD. T.I.
220	454+70 TO 455+70, 350'LT.	8' X 4' RCBC	178	100	DOBBINS RD. (EAST)
221	454+70 TO 455+70,390' RT	2-10' X 5' RCBC	699	100	DOBBINS RD. (WEST)
222	456+00, C/L MEDIAN	24" RCP	12	100	C-15-90
223	57+70, 70' LT. RAMP 'C'	18" RCP	12	40	DOBBINS RD. T.I. W/C-15.70
224	63+31, RAMP 'C'	24" RCP	12	60	DOBBINS RD. T.I.
225	76+50, 60' RT. RAMP 'D'	24" RCP	12	40	DOBBINS RD. T.I.
225-A	81+44, RAMP 'D'	24" RCP	12	80	DOBBINS RD. T.I.
226	485+00	2-10' X 5' RCBC	699	260	OUTLET FROM DETENTION CELL 6

STRUCTURE/CULVERT NUMBER

TABLE 1 - Continued

SUMMARY OF PRELIMINARY CULVERT/PIPE SIZING
SEGMENT II

PIPE CULVERT/ STRUCTURE NUMBER	LOCATION (STATION)	STRUCTURE TYPE	Q10 (CFS)	TOTAL LENGTH (FT)	REMARKS
227	507+70 TO 508+30,160'LT.	2-10' X 5' RCBC	673	60	ELLIOT RD. (EAST)
228	NOT USED				
229	530+90 & MEDIAN	24" RCP	12	100	SUMP W/C-15.70
230	543+70 TO 544+00, 130'LT.	4-54" RCP	673	120	OUTLET FROM DETENTION CELL 7
231	575+80 TO 576+90,160'LT.	4-10' X 6' RCBC	1,677	110	ESTRELLA DR. (EAST)
232	572+90 TO 573+90,150' RT.	36" RCP	35	100	ESTRELLA DR. (WEST)
233	593+68 C/L MEDIAN	24" RCP	12	130	SUMP W/C-15.70
234	602+00 C/L MEDIAN	24" RCP	12	320	C-15.70
235	602+00, 200' LT.	36" RCP	35	120	C-15.70
236	602+00 TO 607+30, 230'LT.	36" RCP	35	530	OUTLET FROM DETENTION CELL 8
237	55+00, RAMP 'C'	2-48" RCP	129	220	51ST AVE. T.I.
238	610+00 C/L MEDIAN	24" RCP	12	110	C-15.90
239	611+00, 170' LT. TO 140' RT.	24" RCP	12	310	TO DETENTION CELL 8

STRUCTURE/CULVERT NUMBER

TABLE 1 - Continued

SUMMARY OF PRELIMINARY CULVERT/PIPE SIZING
SEGMENT III

PIPE CULVERT/ STRUCTURE NUMBER	LOCATION (STATION)	STRUCTURE TYPE	Q10 (CFS)	TOTAL LENGTH (FT)	REMARKS
305	657+50	5 - 12′ x 7′ RCBC	2946	672	
306	661+92	*16′X14′ RCBC EQUIPMENT CROSSING	--	390	IVANHOE ST.
307	669+00	66" RCP	145	356	W/C-15.70 AT MEDIAN
308	673+00	66" RCP	147	356	
309	678+00	10′ X 5′ RCBC	309	360	
310	691+70	5-10′ X 8′ RCBC	3455	377	
311	707+30	8′ X 6′ RCBC	355	290	
312	707+90 TO 708+30	10′ X 3′ RCBC	15	42	SRP ACCESS RD. NO. 1 TURNOUT
313	737+20	*16′ X 14′ RCBC EQUIPMENT CROSSING	646	160	ACCESS RD.
314	742+00	4-10′ X 6′ RCBC	1514	315	
315	777+80	54" RCP	74	290	
316	783+60	48" RCP	56	280	

(○) STRUCTURE/CULVERT NUMBER

(*) Combination Equipment Crossing and Drain Structure

TABLE 1 - Continued

SUMMARY OF PRELIMINARY CULVERT/PIPE SIZING
SEGMENT III

PIPE CULVERT/ STRUCTURE NUMBER	LOCATION (STATION)	STRUCTURE TYPE	Q10 (CFS)	TOTAL LENGTH (FT)	REMARKS
317	790+50	72" RCP	198	265	
318	795+50	8' X 5' RCBC	223	260	
319	798+40	66" RCP	136	260	
320	801+40	72" RCP	205	260	
321	807+70	3-10' X 6' RCBC	942	280	
322	826+00	3-8' X 8' RCBC	1695	260	
323	846+00	2-6' X 6' RCBC	460	230	
324	860+00	2-6' X 6' RCBC	525	230	
325	869+80	2-8' X 6' RCBC	660	330	
326	22+45, RAMP 'A'	24" RCP	Q_{10}=12	110	19TH AVENUE T.I. W/C-15.70
327	47+60, RAMP 'B'	24" RCP	Q_{10}=12	80	19TH AVENUE T.I. W/C-15.70
328	881+65, 145' LT.	24" RCP	Q_{10}=12	120	19TH AVENUE
329	881+65, 150' RT.	24" RCP	Q_{10}=12	130	19TH AVENUE

( ) STRUCTURE/CULVERT NUMBER

TABLE 1 - Continued

SUMMARY OF PRELIMINARY CULVERT/PIPE SIZING
SEGMENT IV

PIPE CULVERT/ STRUCTURE NUMBER	LOCATION (STATION)	STRUCTURE TYPE	DESIGN DISCHARGE Q10	Q100	TOTAL LENGTH (FT)	CULVERT NO. BY OTHERS (PLATE 4)	REMARKS
405	889+90	* 2 - 10' x 4' RCBC	--	452	490	C-1	
406	901+20 C/L MEDIAN	24" RCP	12	--	120	--	SUMP W/C-15.70
407	906+00	* 8' - 4' RCBC	--	141	280	C-2	
408	923+00	* 8' - 10' x 8' RCBC	--	5291	370	C-3	
409	932+50	* 6' - 10' X 3' RCBC	--	1232	515	C-5	
410	934+00 TO 936+30,140' LT.	24" RCP	12	--	230	--	7TH AVE.
411	933+40 TO 936+40, 150' RT.	24" RCP	12	--	300	--	7TH AVE.
412	941+50	* 2-10'X6' RCBC	--	728	440	C-6	
413	958+05	* 2-54" RCP	--	203	490	C-8	
414	968+05	* 10' X 5' RCBC	--	461	315	C-9	
415	975+50	* 54" RCP	--	86	320	C-10	
416	14+00, RAMP 'A'	24" RCP	12	--	90		7TH ST. T.I.
417	37+00, RAMP 'B'	24" RCP	12	--	60	--	7TH ST. T.I.
418	997+13	# 8-10' X 8' RCBC	--	5314	420	C-16	

STRUCTURE/CULVERT NUMBER

* DOWNSIZE STRUCTURE IF UPSTREAM DRAINAGE FACILITIES OF FOOTHILLS MASTER DRAINAGE PLAN ARE IN-PLACE AND OPERATING BEFORE SR-218 IS CONSTRUCTED.

TABLE 1 - Continued

SUMMARY OF PRELIMINARY CULVERT/PIPE SIZING
SEGMENT IV

PIPE CULVERT/ STRUCTURE NUMBER	LOCATION (STATION)	STRUCTURE TYPE	DESIGN DISCHARGE Q10	DESIGN DISCHARGE Q100	TOTAL LENGTH (FT)	CULVERT NO. BY OTHERS (PLATE 4)	REMARKS
419	1006+20	66" RCP	--	151	270	C-19	
420	1028+60	2-6' X 6' RCBC	--	363	200	C-20	
421	1049+05	10'X6' RCBC EXTENSION	--	438	185	C-21	
422	1068+32 C/L MEDIAN	24" RCP	12	--	90	--	SUMP W/C-15.70
423	1081+27	2-6'X6' RCBC EXTENSION	--	483	480	C-22	
424	25+00, RAMP 'A'	24" RCP	12	--	150	--	24TH ST. T.I.
425	71+60, RAMP 'D'	24" RCP	12	--	130	--	24TH ST. T.I.
426	1085+61, 140',LT.	24" RCP	12	--	110	--	24TH ST. T.I.
427	1084+00 TO 1087+20, 140',RT.	24" RCP	12	--	320	--	24TH ST. T.I.
428	1090+56	54" RCP	--	*91	480	--	TO LEVEL SPREADER NO. 11
429	1093+05	2-8' X 7' RCBC	--	(*)783	380	--	TO NATURAL DRAINAGE CHANNEL
430	1101+80	54" R.C.P.	--	* 92	290		TO LEVEL SPREADER NO. 12

(○) STRUCTURE/CULVERT NUMBER

* TOTAL LOCAL RUNOFF Q_{110}=183 CVS IN SPLIT 50% AND DRAIN TO LEVEL SPREADER.

(*) AS PER COE & VAN LOO CONSULTING ENGINEERS' MASTER DRAINAGE REPORT, SEPT. 1985 LAKEWOOD PHASE II UPDATE PAGE 5, Q_{100}=600 CFS WILL BY-PASS THE LAKEWOOD PROPERTY. HENCE, CULVERT IS DESINGED FOR Q_{100}=600+183=783 CFS.

\# DOWN SIZE STRUCTURE TO 2-8' X 8' RCBC FOR Q = 1431 CFS IF UPSTREAM FACILITIES ARE IN PLACE AND OPERATING BEFORE SR-218 IS CONSTRUCTED.

TABLE 1 - Continued

SUMMARY OF PRELIMINARY CULVERT/PIPE SIZING
SEGMENT IV

PIPE CULVERT/ STRUCTURE NUMBER	LOCATION (STATION)	STRUCTURE TYPE	DESIGN DISCHARGE Q10	Q100	TOTAL LENGTH (FT)	CULVERT NO. BY OTHERS (PLATE 4)	REMARKS
431	1105+41 C/L MEDIAN	24" RCP	12	--	150	--	SUMP W/C-15.70
432	1114+85	6 - 12' X 6' RCBC	--	2700	210	--	TO EXISTING RETENTION CELL
433	1138+17	10' X 3' RCBC	--	150	150	--	EXTENSION OF EXISTING BOX CULVERT
434	1169+32 C/L MEDIAN	24" RCP	12	--	110	--	SUMP W/C-15.70
435	1164+55	(*)4-10' X 5' RCBC	--	1218	160	--	CENTRAL SPINE CHANNEL
436	1182+05	24" RCP	12	--	210	--	EXTENSION OF EXISTING PIPE CLV.
437	55+70, RAMP 'C' (WEST CHANNEL)	**4-8' X 4' RCBC	--	1238	55	--	40TH ST. T.I.
438	1197+42 (WEST CHANNEL)	**4-8' X 4' RCBC	--	1238	160	--	40TH ST. T.I.

( ) STRUCTURE/CULVERT NUMBER.

* TOTAL LOCAL RUNOOF Q_{100}=183 CFS IS SPLIT 50% AND DRAIN TO LEVEL SPREADER.

(*) AS PER COE & VAN LOO CONSULTING ENGINEERS' MASTER DRAINAGE REPORT, SEPT. 1985 LAKEWOOD PHASE II UPDATE PAGE 5, Q_{100}=600 CFS WILL BY-PASS THE LAKEWOOD PROPERTY. HENCE, CULVERT IS DESIGNED FOR Q_{100}=600+183=783 CFS.

** PECOS ROAD P.C.D. MASTER DRAINAGE PLAN

TABLE 1 - Continued

SUMMARY OF PRELIMINARY CULVERT/PIPE SIZING
SEGMENT IV

PIPE CULVERT/ STRUCTURE NUMBER	LOCATION (STATION)	STRUCTURE TYPE	DESIGN DISCHARGE Q10	DESIGN DISCHARGE Q100	TOTAL LENGTH (FT)	CULVERT NO. BY OTHERS (PLATE 4)	REMARKS
439	75+90, RAMP 'D'	** 4-8' X 4' RCBC	--	1238	55	--	40 ST. T.I.
440	1213+40	24" RCP	12	--	280	--	EQUALIZER PIPE
441	1225+00	24" RCP	12	--	310	--	EQUALIZER PIPE
442	1244+70 (EAST CHANNEL)	**2-10' X 4' RCBC	--	530	360	--	48TH ST.
443	#227+80, RAMP 200	24" RCP	12	--	300	--	SEE PLATE 6
444	#235+00, RAMP 200	2-6' X 6' RCBC	--	435	330	--	SEE PLATE 6
445	#1255+30	24" RCP	12	--	260	--	
446	#648+00, RAMP 600	3-8' X 5' RCBC	--	728	260	--	SEE PLATE 6
447	#637+00, RAMP 600	24" RCP	12	--	330	--	SEE PLATE 6
448	#1266+00	3-8' X 5' RCBC	--	600	470	--	SEE PLATE 6
449	#73+65 RAMP "C"	24" RCP	12	--	110	--	SEE PLATE 6

( ) STRUCTURE/CULVERT NUMBER

** PECOS ROAD P.C.D. MASTER DRAINAGE PLAN
# SR-218/I-10 MARICOPA FREEWAY INTERCHANGE AT PECOS RD. VICINITY

TABLE 1 - Continued

SUMMARY OF PRELIMINARY CULVERT/PIPE SIZING
SEGMENT IV

PIPE CULVERT/ STRUCTURE NUMBER	LOCATION (STATION)	STRUCTURE TYPE	DESIGN DISCHARGE Q10	Q100	TOTAL LENGTH (FT)	CULVERT NO. BY OTHERS (PLATE 4)	REMARKS
450	#339+80, RAMP 300	24" RCP	12	--	180'	--	SEE PLATE 6
451	#91+80, RAMP 'D'	24" RCP	12	--	100	--	SEE PLATE 6
452	#838+58, 148' LT. I-10 MARICOPA	24" X 38" RCP-ARCH	--	--	80	--	EXTENT EXISTING PIPE CULVERT
453	#325+50, 190' RT.	18" RCP	10	--	85'	--	RESTRICTED OUT-LET, SEE PLATE 6
454	#320+00, RAMP 300	24" RCP	12	--	280	--	SEE PLATE 6
455	#1287+50 C/L	24" RCP	12	--	260	--	SEE PLATE 6
456	#864+00, 120' RT.	24" RCP	12	--	80	--	SEE PLATE 6
457	#846+00, RAMP 800	24" RCP	12	--	290	--	SEE PLATE 6
458	#513+00, RAMP 500	24" RCP	12	--	220	--	SEE PLATE 6
459	#504+90, RAMP 500	24" RCP	12	--	190	--	SEE PLATE 6
460	#878+03 I-10, (MARICOPA FREEWAY)	16' X 14' RCBC	--	--	115	--	(EXTEND EXIST-ING BOX) 45'LT & 70' RT. SEE SEE PLATE 6

( ) STRUCTURE/CULVERT NUMBER
SR-218/I-10 MARICOPA FREEWAY INTERCHANGE AT PECOS ROAD VICINITY.

TABLE 2
STORM DRAIN STRUCTURES *
SR-218/I-10 PAPAGO FREEWAY INTERCHANGE AT 59TH AVENUE VICINITY

	Exst. Structure to be Removed/ Plugged/Capped		Exst. Structure to be Relocated		Exst. Structure to be Adjusted		New Drainage Structure	
	C.B.	M.H.	C.B.	M.H.	C.B.	M.H.	C.B.	M.H.
I-10 Mainline	21	14	14	13	0	3	20	5
Ramp 67-C	5	2	5	2	0	1	0	0
Ramp 67-D	2	0	2	0	4	0	0	0
Ramp 59-A	8	3	8	3	0	0	0	0
Ramp 59-B	1	0	1	0	3	0	0	0
Ramp 59-C	7	2	0	1	0	0	0	0
Ramp 59-D	6	0	1	0	0	0	0	0
Ramp 51-A	0	0	0	0	0	0	0	0
Ramp 51-B	14	1	14	1	0	0	0	0
Ramp 51-C	8	1	0	0	0	0	0	0
Ramp 51-D	10	1	1	0	0	0	0	0
North Collector Road	0	0	0	0	0	0	13	1
South Collector Road	0	0	0	0	0	0	15	0
Ramp 100	0	0	0	0	0	0	0	2

* SEE PLATE 5

TABLE 2 - Continued
STORM DRAIN STRUCTURES *
SR-218/I-10 PAPAGO FREEWAY INTERCHANGE AT 59TH AVENUE VICINITY

	Exst. Structure to be Removed/ Plugged/Capped		Exst. Structure to be Relocated		Exst. Structure to be Adjusted		New Drainage Structure	
	C.B.	M.H.	C.B.	M.H.	C.B.	M.H.	C.B.	M.H.
Ramp 200	0	0	0	0	0	0	4	0
Ramp 300	0	0	0	0	0	0	0	2
Ramp 400	0	0	0	0	0	0	8	0
Ramp 500	0	0	0	0	0	0	6	2
Ramp 700	0	0	0	0	0	0	6	1
GRAND TOTAL	82	24	46	20	7	4	72	13

NOTES

1. Junction Structure South of 59th Avenue Pump Station wet well @ STA. 7311+96, LT. to be reloacted.

2. Junction Structure South of 51st Avenue Pump Station wet well @ STA. 7365+00 LT. to be reconstructed and/or adjusted.

3. Existing concrete channel north of I-10 to be realigned approximately 2700 L.F.

* See Plate 5

TABLE 3
DETENTION/RETENTION CELL SUMMARY

STRUCTURE NO.	LOCATION (FROM STA. TO STA)	STRUCTURE TYPE	VOLUME (AC-FT)	AVE. DEPTH (FT.)	BOTTOM ELEV.	REMARKS
1	*7342+00 TO 7347+00, 400' RT, I-10 PAPAGO	RETENTION CELL	10.4	6	1160.00	24" RCP EQUALIZER PIPE
2	*7336+00 TO 7340+00, 400' RT, I-10 PAPAGO	RETENTION CELL	3.4	6	1160.00	18" RCP OUTLET
3	*115+00 TO 125+50 LT. SR-218	DETENTION CELL	5.0	6	1046.00	24" RCP RESTRICTED OUTLET
4	*534+50 TO 547+44, RAMP 500,LT AND 114+25 TO 125+80, LT SR-218	DETENTION CELL	9.4	6	1046.00	24" RCP EQUALIZER PIPE
5	189+50 TO 201+00, LT., SR-218 (R.I.D. VICINITY)	DETENTION CELL	59.0	10	1024.00	2-60" RCP OUTLET PIPE
6	470+00 TO 505+00, LT., SR-218	DETENTION CELL	195.0	10	1013.00	2-10'X5' RCBC OUTLET BOX CIV
7	544+00 TO 566+00, LT., SR-218	DETENTION CELL	88.0	10	1018.00	4-54" RCP OUTLET PIPE
8	607+00 TO 612+00, LT., SR-218	DETENTION CELL	12.4	6	1040.00	36" RCP OUTLET PIPE
9	726+00 TO 737+00, RT., SR-218	RETENTION CELL	57.0	8.6	1163.00	18" RCP RESTRICTED PIPE
10	739+00 TO 747+00, RT., SR-218	DETENTION CELL	52.0	12	1163.00	18" RCP RESTRICTED OUTLET PIPE

[ ] DETENTION/RETENTION CELL NUMBER

* SR-218/I-10 PAPAGO FREEWAY INTERCHANGE AT 59TH AVENUE VICINITY.

TABLE 3 - Continued
DETENTION/RETENTION CELL SUMMARY

STRUCTURE NO.	LOCATION (FROM STA. TO STA)	STRUCTURE TYPE	VOLUME (AC-FT)	AVE DEPTH (FT.)	BOTTOM ELEV.	REMARKS
11	824+00 TO 881+00, LT., SR-218	DETENTION CELL	22.1	VARIES	VARIES 1098.00 TO MIN. 1144.00 MAX.	WEIR FLOW TO NEXT CELL
12	1094+00 TO 1100+00, LT., SR-218	DETENTION DITCH	12.7	12	1170.00	54" RCP OUTLET TO LEVEL SPREADER 12
13	1192+70 TO 1196+70, LT., SR-218	DETENTION DITCH	1.0	5	1168.00	18" RCP RESTRICTED OUTLET
14	1205+00 TO 1219+30, RT., SR-218	RETENTION CELL	41.5	5	1162.00	RELOCATED RETENTION CELL
15	1198+00 TO 1244+30, LT., SR-218	DETENTION DITCH	13.2	5	1167.00	2 - 24" RCP OUTLET TO LEVEL SPREADER 13
16	1254+00 TO 1267+00, LT., SR-218	DETENTION CELL	30.0	6	1163.00	3-8'X5' RCBC OUTLET TO DETENTION CELL 17
17	857+50 TO 872+40, RT., I-10 MARICOPA	DETENTION CELL	36.0	6	1156.00	2-6'X6' RCBC OUTLET TO DETENTION CELL 18
18	227+00 TO 245+10, RT., RAMP 200 I-10 MARICOPA	RETENTION CELL	90.0	15	1145.00	NO OUTLET, SHEET FLOW Q100 TO GRIC
19	326+00 TO 338+00, RT., RAMP 300 I-10 MARICOPA	DETENTION DITCH	3.0	6	1156.00	18" RCP RESTRICTED OUTLET PIPE TO DETENTION DITCH 20

DETENTION/RETENTION CELL NUMBER

TABLE 3
DETENTION/RETENTION CELL SUMMARY

STRUCTURE NO.	LOCATION (FROM STA. TO STA)	STRUCTURE TYPE	VOLUME (AC-FT)	AVE DEPTH (FT.)	BOTTOM ELEV.	REMARKS
20	311+00 TO 325+50, RT., RAMP 300 I-10 MARICOPA	DETENTION DITCH	4.0	6	1156.00	24" RCP OUTLET TO DETENTION CELL 21
21	1279+00 TO 1292+00, LT., SR-218	DETENTION CELL	17.2	5	1163.00	24" RCP OUTLET TO DETENTION CELL 22
22	1280+50 TO 1294+50, RT., SR-218	DETENTION CELL	12.5	5	1160.00	24" RCP OUTLET TO DETENTION CELL 23
23	1276+50 TO 1282+00, RT., SR-218	DETENTION CELL	12.5	6	1160.00	24" RCP RESTRICTED OUTLET TO DITCH

DENTENTION/RETENTION CELL NUMBER

TABLE 4
LEVEL SPREADER SUMMARY

LEVEL SPREADER NO.	LOCATION (STATION)	APPROX. VOLUME (AC-FT)	AVE. DEPTH (FT.)	BOTTOM ELEV. (FT.)	REMARKS
1	665+00 TO 669+30, RT.	1.8	6	1120.00	18" RCP RESTRICTED OUTLET
2	670+00 TO 673+40, RT.	1.4	6	1120.00	18" RCP RESTRICTED OUTLET
3	673+60 TO 679+80, RT.	4.3	6	1122.00	18" RCP RESTRICTED OUTLET
4	680+20 TO 691+70, RT.	7.0	6	1125.00	18" RCP RESTRICTED OUTLET SPLIT Q100 FROM 310
4A	682+50 TO 691+70, RT.	6.9	6	1130.00	18" RCP RESTRICTED OUTLET SPLIT Q100 FROM 310
5	700+50 TO 707+30, RT.	16.4	6	1145.00	18" RCP RESTRICTED FLOW
6	777+00 TO 783+00, RT.	25.6	6	1179.00	18" RCP RESTRICTED FLOW
7	783+50 TO 790+00, RT.	26.5	5	1181.00	18" RCP RESTRICTED FLOW
8	790+20 TO 795+00, RT.	11.4	5	1182.00	18" RCP RESTRICTED FLOW
9	795+20 TO 798+20, RT.	6.7	5	1183.00	18" RCP RESTRICTED FLOW
10	798+50 TO 802+00, RT.	7.6	5	1183.00	18" RCP RESTRICTED FLOW
11	1087+00 TO 1091+00. RT.	2.4	5	1163.00	PROVIDED WITH OVERFLOW WEIR STRUCTURES
12	1093+50 TO 1109+50, RT.	20.6	7	1163.00	18" RCP RESTRICTED FLOW
13	1200+00 TO 1243+00, RT.	11.7	5	1160.00	18" RCP RESTRICTED FLOW

◯ LEVEL SPREADER NUMBER

TABLE 5
DRAINAGE DITCH/CHANNEL SUMMARY

NOTE: LOCATION AT SR-218 UNLESS SPECIFIED.

LOCATION (FROM STA. TO STA.)	DESIGN Q10 (CFS)	AVERAGE SLOPE FT/FT	BOTTOM WIDTH FT	AVERAGE VELOCITY (FPS)	NORMAL DEPTH (FT)
*520+70 TO 533+00, RT 533+00, RT., RAMP 500	44	0.0020	10	2.0	1.5
*318+25 TO 334+00, RAMP 300, RT AND 637+15 TO 650+80, SOUTH COLLECTOR RD. RT.	96	0.0020	10	2.4	2.0
*7336+00 TO 7362+50, LT. I-10 W.B.	RELOCATED	CONCRETE CHANNEL	--	--	--
*236+50 TO 251+00, LT., RAMP 200	34	0.0012	10	2.0	2.0
200+00 TO 207+50, RT.	14	0.0009	10	1.1	1.0
211+30 TO 237+30, RT.	44	0.0020	10	2.0	1.5
221+00 TO 234+40, LT.	340	0.0020	15	3.5	3.7
236+20 TO 289+60, LT.	405	0.0021	15	3.7	4.0
239+00 TO 289+60, RT.	84	0.0020	10	2.5	2.1
290+80 TO 306+30, LT.	563	0.0020	15	4.0	4.8
290+80 TO 307+00, RT.	84	0.0020	10	2.5	2.1
340+00 TO 348+25, LT.	47	0.0100	10	3.6	1.0

* SR-218/I-10 PAPAGO FREEWAY INTERCHANGE AT 59TH AVENUE VICINITY.

TABLE 5 - Continued
DRAINAGE DITCH/CHANNEL SUMMARY

NOTE: LOCATION AT SR-218 UNLESS SPECIFIED.

LOCATION (FROM STA. TO STA.)	DESIGN Q10 (CFS)	AVERAGE SLOPE FT/FT	BOTTOM WIDTH FT	AVERAGE VELOCITY (FPS)	NORMAL DEPTH (FT)
350+00 TO 401+80, LT.	98	0.0153	10	2.3	2.4
350+00 TO 401+80, RT.	25	0.0020	10	1.7	1.1
403+20 TO 454+90, LT.	1771	0.0018	30	5.1	6.9
403+20 TO 454+80, RT.	715	0.0005	20	2.6	6.9
455+90 TO 469+80, LT.	178	0.0073	15	4.7	1.9
455+80 TO 485+50, RT.	699	0.0068	20	6.5	3.5
504+44 TO 544+00, LT.	673	0.0040	20	5.3	4.0
566+00 TO 576+00, LT.	1677	0.0055	30	7.5	5.0
576+80 TO 602+80, LT.	1677	0.0055	VARIES 30 TO 20	7.5	5.0
604+70 TO 663+50, LT.	VARIES 262 TO 66	VARIES 0.035 TO 0.0015	VARIES 20 TO 1020	VARIES 2 TO 9.4	VARIES 2 TO 3
664+30 TO 725+50, LT.	VARIES	VARIES	10	VARIES	VARIES
707+30 TO 707+95, RT.	BENCHED-CUT SECTION	0.0077	17	-	-
708+30 TO 723+50, RT.	150	0.0077	10	4.7	2.0
725+60 TO 737+20, LT.	768	0.0050	20	6.0	4.0

* SR-218/I10 PAPAGO FREEWAY INTERCHANGE AT 59TH AVENUE VICINITY

TABLE 5 - Continued
DRAINAGE DITCH/CHANNEL SUMMARY

NOTE: LOCATION AT SR-218 UNLESS SPECIFIED.

LOCATION (FROM STA. TO STA.)	DESIGN Q10 (CFS)	AVERAGE SLOPE FT/FT	BOTTOM WIDTH FT	AVERAGE VELOCITY (FPS)	NORMAL DEPTH (FT)
738+00 TO 753+40, LT.	687	0.0040	20	5.4	4.0
748+00 TO 751+00, RT.	26	0.0030	10	2.0	1.0
751+00 TO 778+00, RT.	BENCHED-CUT SECTION	0.0294	17	-	-
753+50 TO 807+75, LT.	225	0.0035	10	3.9	3.0
807+75 TO 824+00, LT.	294	0.0060	10	5.2	3.0
883+30 TO 1084+00, LT.	# VARIES AT THE FOOTHILLS		--	--	--
1115+50 TO 1164+00, LT.	170	0.0020	10	2.9	3.0
1165+00 TO 1176+00, LT.	170	0.0020	10	2.9	3.0
1176+00 TO 1191+00, LT.	118	0.0020	10	2.7	2.5
*212+00 TO 227+00, RT., RAMP 200	118	0.0020	10	2.7	2.5
*71+50, RAMP 'D' RT. TO 658+00 RAMP 600, RT.	329	0.0040	10	4.2	3.5
*337+50 TO 353+00, RT. RAMP 300	329	0.0040	10	4.6	3.5
*605+00, RAMP 600, RT. TO 518+50, RAMP 500, RT.	118	0.0020	10	2.7	2.5

* SR-218/I-10 MARICOPA FREEWAY INTERCHANGE AT PECOS ROAD VICINITY.
# THE FOOTHILLS MASTER DRAINAGE PLAN PREPARED BY COLLAR, WILLIAMS & WHITE ENGINEERING.

TABLE 5 - Continued
DRAINAGE DITCH/CHANNEL SUMMARY

NOTE: LOCATION AT SR-218 UNLESS SPECIFIED.

LOCATION (FROM STA. TO STA.)	DESIGN Q10 (CFS)	AVERAGE SLOPE FT/FT	BOTTOM WIDTH FT	AVERAGE VELOCITY (FPS)	NORMAL DEPTH (FT)
*518+50, RAMP 500, RT. TO 863+50, RAMP 800 RT.	118	0.0020	10	2.7	2.5

* SR-218/I-10 MARICOPA FREEWAY INTERCHANGE AT PECOS ROAD VICINITY

Transmittal

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Phoenix, Arizona
85016-3226
Telephone:
(602) 264-0731

HDR

Attention Tom Granillo, PE Date 6-4-92 Job No. 00173-042-044

To Flood Control District of Maricopa County
2801 W. Durango
Phx Az 85009

Regarding South Mt. Freeway

We are sending you: [X] **Attached** [ ] **Under separate cover via** _____ **the following items:**

[ ] Shop drawings [ ] Prints [ ] Plans [ ] Samples [ ] Specifications

[ ] Copy of letter [ ] Change order [ ] Other

Copies	Date	No.	Description
1	9/88		Drainage Design Concept Report

FLOOD CONTROL DISTRICT
RECEIVED
JUN 04 1992
CH ENG | P & PM
HYDRO
MAINT
FINANCE | FILE
ENG MGR | 1 | TEG
REMARKS

These are transmitted as checked below:

[ ] For approval [ ] Approved as submitted [ ] Resubmit _____ copies for approval

[X] For your use [ ] Approved as noted [ ] Submit _____ copies for distribution

[X] As requested [ ] Returned for corrections [ ] Return _____ corrected prints

[ ] For review/comment [ ] Other

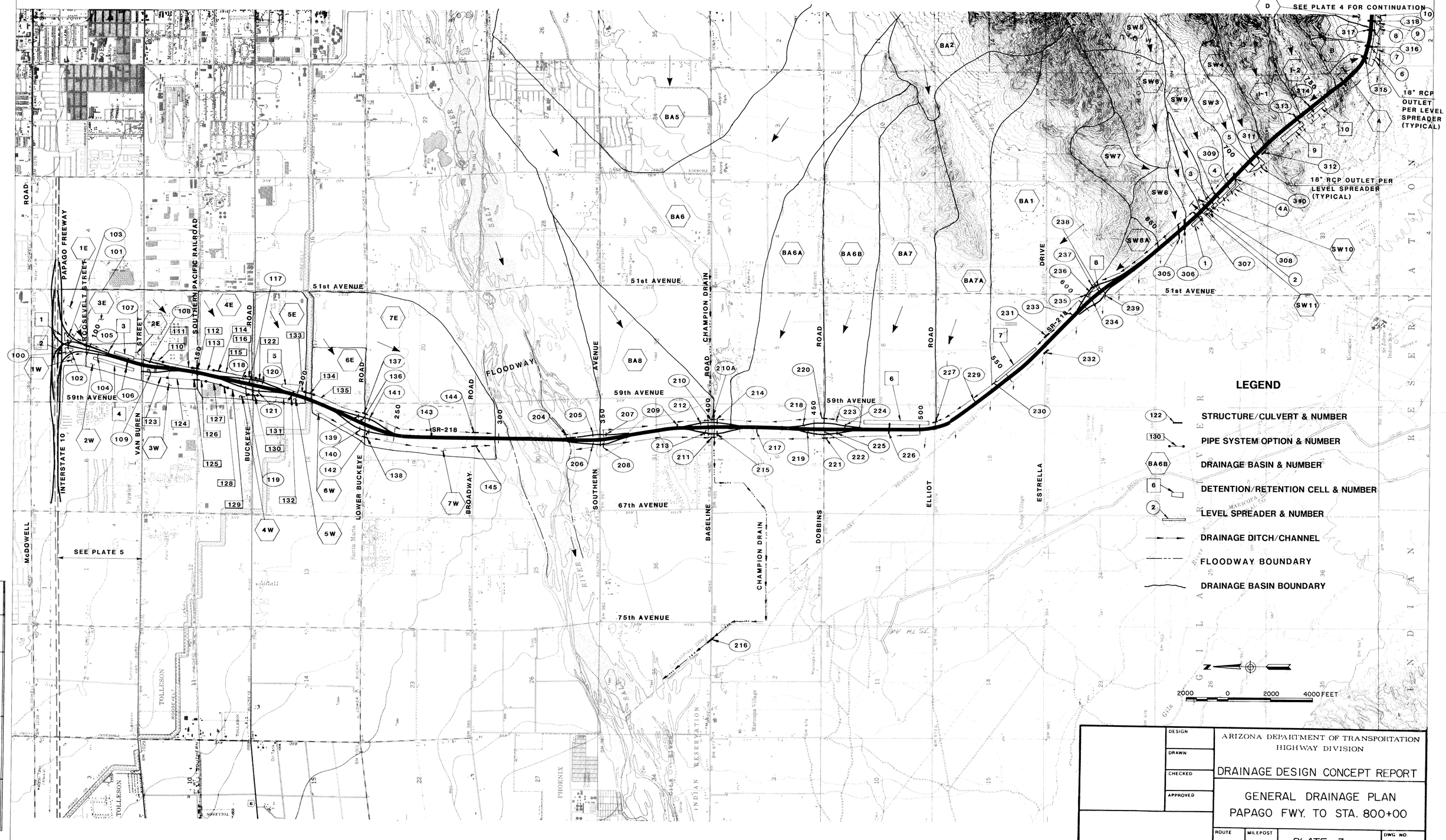
[ ] **For bids due** _____ **19** ____ [ ] **Prints returned after loan to us**

Remarks Tom,
We found an extra copy of this & thought it might be of use to you

Copy to File Signed [signature]

If enclosures are not as noted please notify us at once.

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.				



SURVEY NOS.	FINISHED PLANS	REVISIONS	LOCATION	DATE

DESIGN	ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAY DIVISION
DRAWN	DRAINAGE DESIGN CONCEPT REPORT
CHECKED	GENERAL DRAINAGE PLAN
APPROVED	PAPAGO FWY. TO STA. 800+00
ROUTE / MILEPOST	PLATE 3 — DWG. NO.

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.				

SEE PLATE 3 FOR CONTINUATION

SEGMENT III — FOOTHILLS MASTER DRAINAGE PLAN — GOLDMAN DAIRY PROPERTY — LAKEWOOD MASTER DRAINAGE PLAN — PECOS ROAD P.C.D. MASTER DRAINAGE PLAN — SR-218/I-10 MARICOPA FREEWAY INTERCHANGE AT PECOS ROAD SEE PLATE 6 — SEGMENT IV

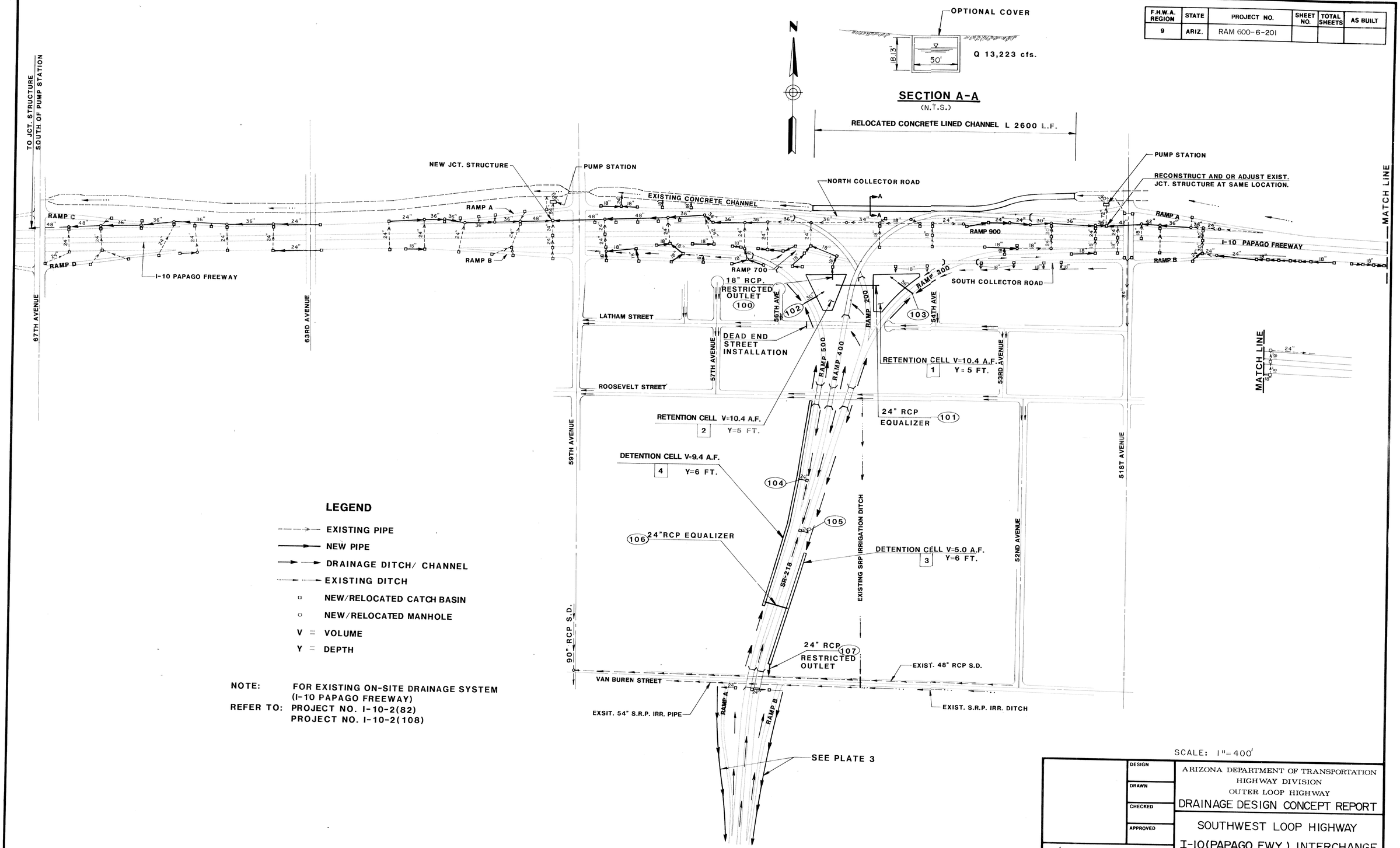
LEGEND

- DRAINAGE DITCH/CHANNEL
- FLOW DIRECTION
- DRAINAGE BASIN BOUNDARY
- R-6 FLOOD RETENTION LAKE
- DEVELOPER IMPROVEMENTS — DR-5 DRY RETENTION AREA
- C-22 CULVERT NUMBER
- 122 STRUCTURE/CULVERT & NUMBER
- 130 PIPE SYSTEM OPTION & NUMBER
- BA6B DRAINAGE BASIN & NUMBER
- 6 DETENTION/RETENTION CELL & NUMBER
- 2 LEVEL SPREADER & NUMBER

SURVEY NOS.	FINISHED PLANS	REVISIONS	LOCATION	DATE

DESIGN	ARIZONA DEPARTMENT OF TRANSPORTATION HIGHWAY DIVISION
DRAWN	DRAINAGE DESIGN CONCEPT REPORT
CHECKED	GENERAL DRAINGE PLAN
APPROVED	STA. 800+00 TO MARICOPA FWY.
ROUTE / MILEPOST	PLATE 4 — DWG NO

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	RAM 600-6-201			



LEGEND

- EXISTING PIPE
- NEW PIPE
- DRAINAGE DITCH/ CHANNEL
- EXISTING DITCH
- NEW/RELOCATED CATCH BASIN
- NEW/RELOCATED MANHOLE
- V = VOLUME
- Y = DEPTH

NOTE: FOR EXISTING ON-SITE DRAINAGE SYSTEM (I-10 PAPAGO FREEWAY)
REFER TO: PROJECT NO. I-10-2(82)
PROJECT NO. I-10-2(108)

SCALE: 1"=400'

DESIGN	
DRAWN	
CHECKED	
APPROVED	

HDR Infrastructure, Inc.
A Centerra Company

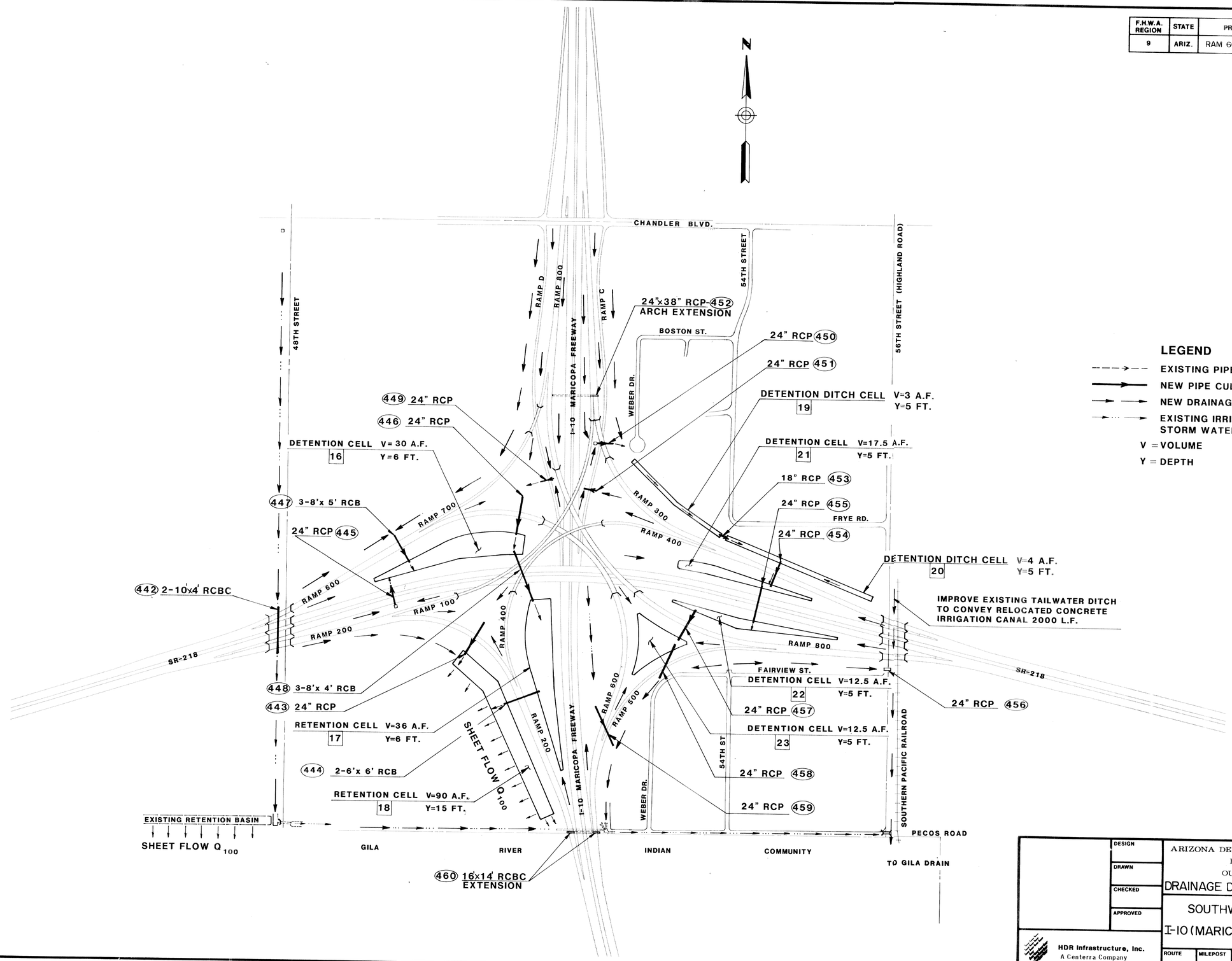
ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAY DIVISION
OUTER LOOP HIGHWAY

DRAINAGE DESIGN CONCEPT REPORT

SOUTHWEST LOOP HIGHWAY
I-10(PAPAGO FWY.) INTERCHANGE

ROUTE	MILEPOST		DWG. NO.
		PLATE 5	

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	RAM 600-6-201			



LEGEND

- EXISTING PIPE CULVERT
- NEW PIPE CULVERT
- NEW DRAINAGE DITCH/CHANNEL
- EXISTING IRRIGATION AND STORM WATER DITCH

V = VOLUME

Y = DEPTH

SCALE: 1"=400'

DESIGN
DRAWN
CHECKED
APPROVED

HDR Infrastructure, Inc.
A Centerra Company

ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAY DIVISION
OUTER LOOP HIGHWAY
DRAINAGE DESIGN CONCEPT REPORT

SOUTHWEST LOOP HIGHWAY
I-10 (MARICOPA FWY.) INTERCHANGE

ROUTE	MILEPOST	PLATE 6	DWG. NO.

7.0 DRAINAGE DESIGN CRITERIA

A. General

These criteria have been developed to provide a summary of standards to be used for the design of the SR-218 Southwest Loop Freeway stormwater drainage within SR-218.

The drainage system for SR-218 shall include all inlets, manholes, sewers, ditches, culverts, or other hydraulic and erosion control appurtenances required to:

1. Properly dispose of storm runoff disrupted or generated by the freeway and its associated construction.

2. Protect adjacent properties from adverse effects that would result from highway impacts on the existing drainage patterns.

3. Protect the roadway and slopes from damage by erosion.

4. Maintain clear traffic lanes for the design storm.

B. Development Assumptions:

1. For areas with an approved master drainage plan with existing (in-place) facilities -- ultimate development is used.

2. For areas with an approved master drainage plan with proposed facilities (not in place) -- either the existing or the ultimate development is used, whichever result in the largest runoff.

3. For drainage areas less than 200 acres, the Rational Method is used. Otherwise, the HEC-1 computer program and/or SCS TR-20 rainfall runoff model is used.

C. Rational Method Parameters

1. Storm Frequency

a. 10-year storm - pavement, storm sewers flowing full, and ditches.

b. 50-year storm - depressed roadways. Hydraulic Grade Line (HGL) is 6-inches below the low steel of catch basin grate.

c. 100-year storm (24-hr.) - culverts, major ditches, stormwater reservoir and F.I.S. designated floodways. Use a freeboard equal to the elevation of the principal spillway plus 3-feet or maximum one (1) foot rise in 100-year flood plain elevation. No increase in flooding outside the right-of-way.

2. Time of Concentration

a. Pavement

- 10 minutes minimum or the sum of overland and gutter flow time if more than 10 minutes.

b. Storm Sewers

- Time to first pavement inlet is 10 minutes minimum.
- If more than 10 minutes, time of concentration is the sum of overland flow and gutter flow time.

c. Ditches

- Time to ditch inlet is 10 minutes minimum.
- Overland flow time, if more than 10 minutes.

3. Rainfall Intensity

Use the Phoenix, Arizona Rainfall Intensity-Duration-Frequency Curves (based on data from NOAA Atlas 2, Vol VIII, Arizona). Refer to page 56.

4. Runoff Coefficients

a. Paved Surfaces.....0.90
b. Highway Slopes and Ditches....0.50
c. Landscaped Areas.....0.60
d. Urban Residential Districts...0.40 - 0.60
e. Parks and Recreation.....0.2 - 0.40
f. Cultivated Areas.....0.2 - 0.40

D. General Design Equations

1. Manning's General Equation

$$Q = Ax\ (1.486/n)\ x\ (A/W.P.)^{2/3}\ x\ (S)^{1/2}$$

where:

Q = design flow in cfs

A = area in sq. ft.

n = Manning's coefficient of roughness

W.P. = wetter perimeter

S = slope in ft. per ft.

2. Manning's Equation for Triangular Channels
use FHWA HEC-12 with Figure 13. The basic equation is:

$$Q = (0.56/nS_C)\ x\ (S_O)^{1/2}\ x\ (S_C)^{5/3}\ x\ (T)^{8/3}$$

where:

Q = design flow in cfs
S_C = cross slope in ft. per ft.
n = Manning's coefficient of roughness
S_O = longitudinal slope in ft. per ft.
T = width of flooding (spread) in ft.

3. For Circular Sections Flowing Full or Partially Full or For Trapezoidal Channel.

Use Manning's General Equation or the FHWA HDS No. 3 or similar procedure.

4. Manning's Coefficient or Roughness (n)

a. Pavement.....0.016
b. Concrete Pipe.....0.012
c. Corrugated Metal Pipe.....0.024
d. Cast Iron Steel Pipe.....0.011
e. Box Culverts.....0.015
f. Steel Pipe.....0.011
g. Ditches - Concrete Lining.....0.015
Aggregate Lining D50 (2"-4")...0.03
Aggregate Lining D50 (4"-6")...0.035

E. Pavement Drainage Design

1. Allowable Pavement Flooding Width

a. Elevated Sections

Roadway Type	Max. Water Surface Width	Storm Frequency
Rural 4-lane	Left -- shoulder width. Right -- shoulder width plus 1/2 adj. traffic lane width.	10-year, 10-minute
Urban 4-or 6-lane Divided	Left -- gutter width plus any shoulder width. Right -- shoulder, parking or distress lane width plus 1/2 adj. traffic lane width.	10-year, 10-minute
4 or 6-lane undivided	shoulder, parking or distress lane width plus 1/2 adj. traffic lane width.	10-year, 10-minute
2-lane undivided	gutter and/or shoulder parking or distress lane width.	10-year, 10-minute
22' or 24' ramps (including accel. & decel. lane.	Left -- 2 ft. Right -- 8 ft.	10-year, 10-minute

2. Pipe Size -- 18" laterals, 24" mainline
The pipe size selection will be based on a 10-year storm flowing just full. A 50-year storm will be checked such that the HGL does not come within one foot of the inlet or catch basin grate elevation.

Use ADOT standard calculation sheets where applicable.

3. Manhole Spacing

Manholes will be placed at all changes in grade or alignment and at intermediate points such that the following maximum spacing is not exceeded:

a. Under 36".....330 ft.
b. 36" to 60" .....440 ft.
c. Over 60".....660 ft.

4. Minimum Cover Below Subgrade

a. Freeway Crossing ..... 3 ft.
b. Ramp Crossing.....2 ft.
c. Crossroads.....1.5 ft.

G. Ditches

1. Minimum Velocity

The ditches will be placed on a minimum slope such that a minimum velocity of 2 fps is achieved when flowing 2 ft. deep.

2. Ditch Lining

The maximum allowable velocity will follow the guidelines as per Technical Release No. 25.

3. Freeboard

A minimum freeboard of one-foot should be added for the design flow conditions.

H. Culverts

1. Capacity Calculations

a. For drainage area less than one square mile, use the Rational Method -- or use procedures given in FHWA's HEC No. 5.

b. For drainage area greater than one square mile -- use HEC-1, a computer program for Flood Hydrograph Program developed by the Corps of Engineers.

c. Design Frequency - 100-year storm
Use Figure 13 for Standard Calculation Sheet.

2. Maximum Allowable Headwater

a. One foot below the lowest shoulder elevation.

b. Prevent flooding around buildings and outside of ADOT right-of-way.

c. Maximum depth: Hw/D = 1.5

3. Minimum Size

a. Pipe Culvert.....24"
b. Box Culvert.....Height - 3 ft. minimum
- 4 ft. desirable
Width - 6 ft.

4. Minimum and Maximum Cover

ADOT Drawings Nos. C-13.10 and C-13.15

5. Culvert Outlet Protection

a. 7 fps.....none
b. 7 to 15 fps.....riprap
c. 15 to 20 fps.....rock lining
d. Over 20 fps.....energy dissipator

I. Pipe Design Criteria

1. The ADOT pipe design criteria is used unless directed otherwise.

2. Pipe Charts. Use Pipe Charts for trench and non-trench conditions. The charts cover a range of embankment fill heights from 1 to 35 ft. for pipe diameters of 12 to 120 inches.

3. The following table gives acceptable D-loads for reinforced concrete pipes.

AASHTO Class	*D-load to Produce 0.01-Inch Crack
I	800
II	1000
III	1350
IV	2000
V	3000

* Pounds per foot of inside diameter as measured by three edge bearing plate.

4. Resistivity:

Corrugated metal pipe is to be specified in accordance with the values as determined during the geotechnical field investigations and given in the Subsurface Investigation Report.

METAL PIPE RESISTIVITY
ALLOWABLE TYPES OF CULVERT PIPES
For pH Range 5.0 to 9.0(1)

Resistivity (Ohm-cm)	Allowable Pipe	Types of Culvert Pipe
2000 or Greater	A(2)-B-C-D	A - Galvanized coated Steel AASHTO M-36
1000 - 1999	B-C-D	
500 - 999	C-D	B - Aluminum Coated Steel AASHTO M-26
Less than 500	D	C - Aluminum Alloy AASHTO M-196
		D - Bituminous Coated AASHTO M-190

Notes: (1) If pH is outside the range of 5.0 to 9.0, a special

study of the situation should be made.

(2) Not allowable when pH is less than 6.0.

J. Pipe Alternatives.

Corrugated metal pipe (CMP) versus concrete pipe alternatives should be given for culvert cross-drainage. Where CMP without bituminous coating can be used, the option should be listed in the Summary Sheet. Bituminous coating will not be used on closed storm drains. Where resistivity dictate CMP with bituminous coating, CMP is not to be used in storm drains.

K. Drains at Mainline Overpasses.

Stormwater runoff must be intercepted as it leaves mainline overpass bridges at both ends of crest bridges, or at the downstream end of bridges on uniform grade. The runoff is to be directed to the ramp medians. It is required that curbs be continuous from the end of the bridge to a point where the roadway sideslope becomes 6:1, as shown on ADOT Urban Highway Detail No. UC-49.

L. Design for Depressed Roadway Sections.

The following steps and criteria were used in the study of the on-site storm drainage system within the depressed section:

1. Outline the outer limits of on-site drainage area.

2. Arbitrarily establish location of first catch basin. Delineate and measure drainage area. Using the Rational Equation (Q = CAI) compute Q_{50} using 10-minute minimum Time of Concentration and Intensity (I) from Phoenix Rainfall Intensity Duration Frequency Curve, (page 56), and using the appropriate "C" factor for the paved (0.9) and unpaved (0.5) portions of the area. Data is compiled on ADOT "Runoff Calculation Sheet".

3. Compute the width and depth of flow at the inlet of for Q_{50} using the Nomograph for Flow in Triangular Channels or other applicable

methods as described in FHWA HEC-12, Reference 7.

4. Check the spread of gutter flow to ensure that there is compliance with the design criteria and that no encroachment onto the roadway or overtopping of curb occurs.

5. If the depth or spread are excessive, repeat the previous four (4) steps, reducing the drainage area size by moving the inlet locations up gradient.

6. If depth and spread of gutter flow criteria have been met, the catch basin inlets are sized. If spread is excessive or 100% interception desirable (such as within the low point of a vertical curve), slotted drains are also considered in the design, as outlined in ADOT Hydraulic Design Procedures for Slotted Drains, Reference 12, with a clogging factor of 1.20 for on grade and 2.00 in sumps applied. Inlets on grade have no clogging factors applied. Catch basin inlets capacities in sumps have been calculated as per FHWA, HEC-12 with a clogging factor of 2.00 applied.

   Inlet and slotted drain design calculations are compiled using ADOT Calculation Sheets. Flanking inlets are added for sump conditions as per FHWA, HEC-12.

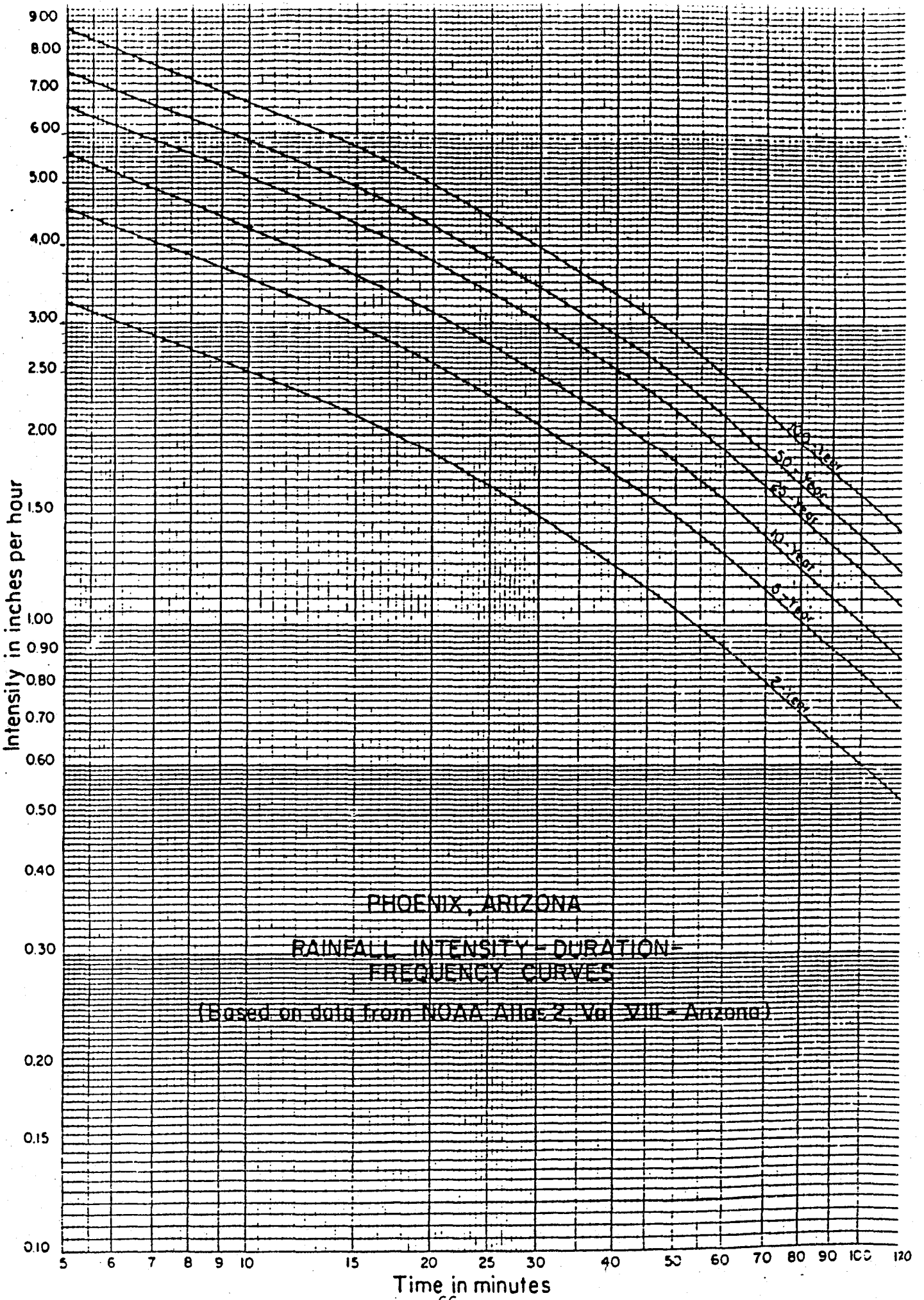
7. The above procedures are followed through for locating downstream catch basin inlets, with any by-pass flow from the upstream inlet added.

8. The Q_{10} for pipe design is computed by recalculating the Time of Concentration for flow time to the first inlet (assumed at 10 minutes) together with pipe flow time. Sewer design is compiled using ADOT Sewer Calculations Sheet. The hydraulic Grade Line (H.G.L.) for the Q_{10} must be within the pipe as per the design criteria.

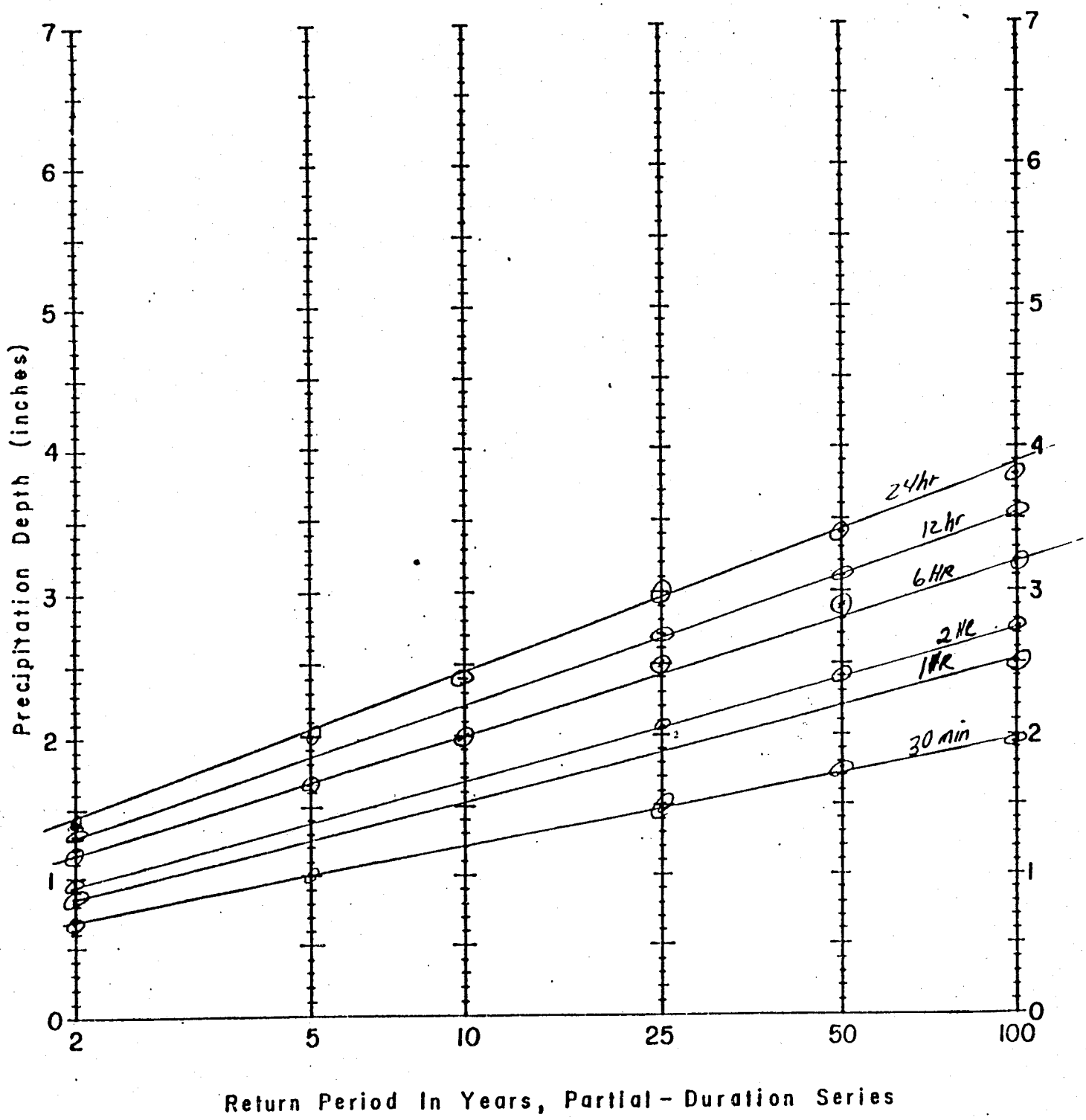
9. A hydraulic line (H.G.L.) analysis is performed for the Q_{50}. Pipe sizes are adjusted, if necessary, to satisfy the downstream H.G.L.

control requirement set at top of pipe, and the upstream controls set at 6 inches below bottom steel of inlet grates at each catch basin location.

10. For pipes with surcharge and velocities below the minimum scour velocity of 2.5 fps, a normal depth flow analysis is made to determine whether the low velocity conditions are due to temporary backwater, or whether the pipe slope requires adjustment to increase velocities. Pipe slopes are adjusted as necessary to achieve the minimum velocity.


PHOENIX, ARIZONA
RAINFALL INTENSITY-DURATION-FREQUENCY CURVES
(Based on data from NOAA Atlas 2, Vol VIII - Arizona)
100-Year
50-Year
25-Year
10-Year
5-Year
2-Year
Intensity in inches per hour
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.50
2.00
1.50
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.15
0.10
5
6
7
8
9
10
15
20
25
30
40
50
60
70
80
90
100
120
Time in minutes

Project No. SR 218 Station



Precipitation Depth Versus Return Period for Partial-Duration Series

8.0 DESIGN SPECIFICATIONS AND REFERENCES

1. A Policy on Geometric Design of Highways and Streets, A.A.S.H.T.O., 1984,

2. Division of Highways - Standard Drawings, Urban Highway Section, A.D.O.T., 1986.

3. Division of Highways - Standard Drawings, A.D.O.T., 1974 and current revisions.

4. Standard Specifications for Road and Bridge Construction, A.D.O.T. 1982, and A.D.O.T.'s current supplemental specifications.

5. Drafting Guides for Use in Office and Field, A.D.O.T., 1982.

6. Reinforced Concrete Box Culvert Manual, A.D.O.T., March, 1981.

7. Drainage of Highway Pavements, Hydraulic Engineering Circular No. 12, U.S. Department of Transportation, FHA, 1984.

8. A.D.O.T. Drainage Design Services - Hydraulic Design Notes, distributed in 1969 and 1972.

9. Design of Urban Highway Drainage, The State of the Art, U.S. Department of Transportation, August 1979.

10. A.D.O.T. Drainage Design Services, Hydrologic and Hydraulic Design Methods and Criteria, distributed in 1969 and 1972.

11. Handbook of Hydraulics King and Brater, Fifth Edition.

12. A.D.O.T. Drainage Design Services, Hydraulic Design Procedures for Slotted Drains, April, 1982.

13. Urban Hydrology for Small Watersheds, Technical Release No. 55 - Eng. Division Soil Conservation, U.S. Department of Agriculture, January, 1975.

14. Design Charts for Open Channel Flow, U.S. Department of Commerce, Bureau of Public Roads, Washington, 1961.

15. Storm Drain Design Manual, City of Phoenix Engineering Department, August 1975 (Revised 1984).

16. City of Phoenix, 100 Scale Quarter Sections 1452, Revised Mapping for Water, Sewer, and Right-of-way, 1982.

17. City of Phoenix, 100 Scale A.P., Contour Mapping, 1982.

18. City of Phoenix, Storm Drain Maps, 1983.

19. UEC-1 User's Manual.

20. National Engineering Handbooks 4, Soil Conservation Service Hydrograph Procedures.

21. FHWA HEC-5, "Hydraulic Charts for the Selection of Highway Culverts".

22. "The Foothills, Master Drainage Plan for the Adams Group, Inc., "June 25, 1985 Prepared by Collar, Williams & White Engineering, Inc.

23. "Master Drainage Report" Lakewood, January 11, 1985 Revised March 20, 1985. Prepared by Coo & Van Loo Consulting Engineers, Inc. for Continental Homes, Inc.

24. "Supplement to Conceptual Master Drainage Plan," Lakewood Phase II Update. Prepared by Coo & Van Loo Consulting Engineers, Inc. for Amcor Investments Corporation, September, 1985.

25. "Supplement to Conceptual Master Drainage Plan," Lakewood Phase I Pecos Road Realignment Update, September, 1985. Revised December, 1985, for Amcor Investments Corporation.

26. Drainage Report for "Fallbrook" Pecos Road Development, July 22, 1985. Prepared by Coo and Van Loo Consulting Engineers, Inc. for Coventry Homes, Inc.

27. "Master Drainage Report for Pecos Road P.C.D., "July 26, 1985. Prepared by Ramesh I. Patel for Dunlap & Magee Homes and Conventry Homes.

28. Williams Field Road Transition Mountain Park Ranch, May, 1985. Prepared by Coo and Van Loo Consulting Engineers, Inc. for Genstar Southwest Development.

9.0 APPENDIX

HEC - 1
COMPUTER SHEETS

1

****
FLOOD HYDROGRAPH PACKAGE (HEC-1 (IBM XT 512K VERSION) -FEB 1,1985
U.S. ARMY CORPS OF ENGINEERS, THE HYDROLOGIC ENGINEERING CENTER, 609 SECOND STREET, DAVIS, CA. 95616
****

SEGMENT 1 - I-10 PAPAGO TO SALT RIVER
10 yr - 24 hr event

THIS HEC-1 VERSION CONTAINS ALL OPTIONS EXCEPT ECONOMICS, AND THE NUMBER OF PLANS ARE REDUCED TO 3

1

HEC-1 INPUT PAGE 1

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

  1           ID        NORTH OF THE SALT HYDROLOGY
  2           ID        SOUTH WEST LOOP ADOT     10 YR 24 HR ANALYSIS
  3           ID        FUTURE CONDITIONS 11/19/87
              *DIAGRAM
  4           IT       5 19NOV87    1200      150
  5           ID       3        0

  6           KK      1E
  7           BA    0.13
  8           PH   10.00        0      .47    0.92    1.61    1.72    1.82    2.07    2.30    2.53
  9           LS            92.00
 10           UD    0.62

 11           KK      1W
 12           BA    0.04
 13           LS            92.00
 14           UD    0.32

 15           KK      2E
 16           BA    0.05
 17           LS            92.00
 18           UD    0.71

 19           KK      2W
 20           BA    0.07
 21           LS            92.00
 22           UD    0.85

 23           KK    COMB
 24           IO       1        0
 25           HC       2

 26           KK      3E
 27           IO       3        0
 28           BA    0.59
 29           LS            92.00
 30           UD    1.70

 31           KK      4E
 32           BA    0.37
 33           LS            92.00
 34           UD    1.25
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  35          KK   COMB1
  36          HC       2

  37          KK      5E
  38          BA    0.44
  39          LS           92.00
  40          UD    1.21
1                                          HEC-1 INPUT                                                          PAGE  2

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


  41          KK   COMB2
  42          HC       2

  43          KK      3W
  44          BA    0.09
  45          LS           92.00
  46          UD    0.81

  47          KK      4W
  48          BA    0.10
  49          LS           92.00
  50          UD    0.72

  51          KK   COMB5
  52          HC       2

  53          KK      5W
  54          BA    0.09
  55          LS           92.00
  56          UD    0.64

  57          KK   COMB6
  58          HC       2

  59          KK   COMB7
  60          IO       1        0
  61          HC       2

  62          KK     RID
  63          RS       1     ELEV  1020.0      0.
  64          SL  1022.5     39.3     0.6     0.5
  65          SV             10.2    20.6    31.1    41.9    52.8    63.9    75.3    86.8    98.5
  66          SE   1020.    1021.   1022.   1023.   1024.   1025.   1026.   1027.   1028.   1029.
  67          SS    1050        0     3.0     1.5

  68          KK      6E
  69          IO       3        0
  70          BA    0.29
  71          LS           90.00
  72          UD     1.6

  73          KK   COMB3
  74          HC       2

  75          KK      7E
  76          BA    0.85
  77          LS           89.00
  78          UD    2.51
1                                          HEC-1 INPUT                                                          PAGE  3

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


  79          KK   COMB4
```

```
80          HC       2

81          KK      4W
82          BA    0.08
83          LS            90.00
84          UD    1.07

85          KK      7W
86          BA    0.15
87          LS            89.00
88          UD    1.44

89          KK   COMB8
90          HC       2
91          ZZ
```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

```
INPUT
 LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

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

    6          1E
                .
                .
   11           .          1W
                .           .
                .           .
   15           .           .          2E
                .           .           .
                .           .           .
   19           .           .           .          2W
                .           .           .           .
                .           .           .           .
   23           .           .        COMB.............
                .           .           .
                .           .           .
   26           .           .           .          3E
                .           .           .           .
                .           .           .           .
   31           .           .           .           .          4E
                .           .           .           .           .
                .           .           .           .           .
   35           .           .           .       COMB1............
                .           .           .           .
                .           .           .           .
   37           .           .           .           .          5E
                .           .           .           .           .
                .           .           .           .           .
   41           .           .           .       COMB2............
                .           .           .           .
                .           .           .           .
   43           .           .           .           .          3W
                .           .           .           .           .
                .           .           .           .           .
   47           .           .           .           .           .          4W
                .           .           .           .           .           .
                .           .           .           .           .           .
   51           .           .           .           .       COMB5............
                .           .           .           .           .
                .           .           .           .           .
   53           .           .           .           .           .          5W
                .           .           .           .           .           .
                .           .           .           .           .           .
   57           .           .           .           .       COMB6............
                .           .           .           .           .
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 59                          COMB7............
                                 V
                                 V
 62                            RID
                                 .
                                 .
 68                                          6E
                                              .
                                              .
 73                          COMB3............
                                 .
                                 .
 75                                          7E
                                              .
                                              .
 79                          COMB4............
                                 .
                                 .
 81                                          6W
                                              .
                                              .
 85                                                       7W
                                                           .
                                                           .
 89                                       COMB8............
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1                                                    ****
                    FLOOD HYDROGRAPH PACKAGE HEC-1 (IBM XT 512K VERSION) -FEB 1,1985
          U.S. ARMY CORPS OF ENGINEERS, THE HYDROLOGIC ENGINEERING CENTER, 609 SECOND STREET, DAVIS, CA. 95616
                                                     ****
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```
                    NORTH OF THE SALT HYDROLOGY
                    SOUTH WEST LOOP ADOT     10 YR 24 HR ANALYSIS
                    FUTURE CONDITIONS 11/19/87

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

    IT        HYDROGRAPH TIME DATA
                   NMIN          5  MINUTES IN COMPUTATION INTERVAL
                  IDATE    19NOV87  STARTING DATE
                  ITIME       1200  STARTING TIME
                     NQ        150  NUMBER OF HYDROGRAPH ORDINATES
                 NDDATE    20NOV87  ENDING DATE
                 NDTIME       0025  ENDING TIME

            COMPUTATION INTERVAL     .08 HOURS
                 TOTAL TIME BASE   12.42 HOURS

        ENGLISH UNITS
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            **************
            *            *
  6 KK      *        1E  *
```

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

   SUBBASIN RUNOFF DATA

 7 BA          SUBBASIN CHARACTERISTICS
                    TAREA          .13  SUBBASIN AREA

               PRECIPITATION DATA

 8 PH                                   DEPTHS FOR  10-PERCENT HYPOTHETICAL STORM
               ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
               5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                 .47     .92    1.61    1.72    1.82    2.07    2.30    2.53     .00     .00     .00     .00

                                                STORM AREA =     .13

 9 LS          SCS LOSS RATE
                    STRTL          .17  INITIAL ABSTRACTION
                   CRVNBR        92.00  CURVE NUMBER
                    RTIMP          .00  PERCENT IMPERVIOUS AREA

10 UD          SCS DIMENSIONLESS UNITGRAPH
                     TLAG          .62  LAG

                                                        ***

                                                   UNIT HYDROGRAPH
                                             39 END-OF-PERIOD ORDINATES
                 5.      14.      27.      45.      67.      84.      93.      95.      92.      84.
                75.      63.      50.      39.      32.      26.      22.      18.      14.      12.
                10.       8.       6.       5.       4.       3.       3.       2.       2.       1.
                 1.       1.       1.       1.       1.       0.       0.       0.       0.

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

                     HYDROGRAPH AT STATION       1E

   TOTAL RAINFALL =    2.29, TOTAL LOSS =     .79, TOTAL EXCESS =    1.50

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     12.42-HR
+   (CFS)       (HR)
                          (CFS)
+     96.       6.83                20.         10.         10.         10.
                        (INCHES)   1.446       1.475       1.475       1.475
                         (AC-FT)     10.         10.         10.         10.

                     CUMULATIVE AREA =     .13 SQ MI


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


            ***************
            *             *
 11 KK      *        1W   *
            *             *
            ***************

   SUBBASIN RUNOFF DATA

 12 BA          SUBBASIN CHARACTERISTICS
                    TAREA          .04  SUBBASIN AREA
```

PRECIPITATION DATA

8 PH

DEPTHS FOR 10-PERCENT HYPOTHETICAL STORM

HYDRO-35			TP-40					TP-49			
5-MIN	15-MIN	60-MIN	2-HR	3-HR	6-HR	12-HR	24-HR	2-DAY	4-DAY	7-DAY	10-DAY
.47	.92	1.61	1.72	1.82	2.07	2.30	2.53	.00	.00	.00	.00

STORM AREA = .04

13 LS SCS LOSS RATE

STRTL	.17	INITIAL ABSTRACTION
CRVNBR	92.00	CURVE NUMBER
RTIMP	.00	PERCENT IMPERVIOUS AREA

14 UD SCS DIMENSIONLESS UNITGRAPH

TLAG	.32	LAG

***

UNIT HYDROGRAPH
21 END-OF-PERIOD ORDINATES

7.	22.	43.	53.	51.	42.	29.	19.	14.	9.
6.	4.	3.	2.	1.	1.	1.	0.	0.	0.
0.									

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

HYDROGRAPH AT STATION 1W

TOTAL RAINFALL = 2.29, TOTAL LOSS = .79, TOTAL EXCESS = 1.50

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	12.42-HR
+	(CFS)	(HR)				
			(CFS)			
+	44.	6.58	6.	3.	3.	3.
			(INCHES) 1.450	1.487	1.487	1.487
			(AC-FT) 3.	3.	3.	3.

CUMULATIVE AREA = .04 SQ MI

*** ***

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**************
*            *
*        2E  *
*            *
**************
```

15 KK

SUBBASIN RUNOFF DATA

16 BA SUBBASIN CHARACTERISTICS

TAREA	.05	SUBBASIN AREA

PRECIPITATION DATA

8 PH

DEPTHS FOR 10-PERCENT HYPOTHETICAL STORM

HYDRO-35			TP-40					TP-49			
5-MIN	15-MIN	60-MIN	2-HR	3-HR	6-HR	12-HR	24-HR	2-DAY	4-DAY	7-DAY	10-DAY
.47	.92	1.61	1.72	1.82	2.07	2.30	2.53	.00	.00	.00	.00

STORM AREA = .05

17 LS SCS LOSS RATE

STRTL	.17	INITIAL ABSTRACTION
CRVNBR	92.00	CURVE NUMBER
RTIMP	.00	PERCENT IMPERVIOUS AREA

18 UD SCS DIMENSIONLESS UNITGRAPH

TLAG	.71	LAG

***

UNIT HYDROGRAPH
45 END-OF-PERIOD ORDINATES

1.	4.	7.	12.	18.	25.	29.	32.	32.	32.
29.	27.	24.	20.	16.	13.	11.	9.	8.	6.
5.	4.	4.	3.	3.	2.	2.	2.	1.	1.
1.	1.	1.	1.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.					

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

HYDROGRAPH AT STATION 2E

TOTAL RAINFALL = 2.29, TOTAL LOSS = .79, TOTAL EXCESS = 1.50

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	12.42-HR
+	(CFS)	(HR)				
			(CFS)			
+	34.	7.00	8.	4.	4.	4.
			(INCHES) 1.445	1.472	1.472	1.472
			(AC-FT) 4.	4.	4.	4.

CUMULATIVE AREA = .05 SQ MI

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**************
*            *
*        2W  *
*            *
**************
```

19 KK

SUBBASIN RUNOFF DATA

20 BA SUBBASIN CHARACTERISTICS

TAREA	.07	SUBBASIN AREA

PRECIPITATION DATA

8 PH DEPTHS FOR 10-PERCENT HYPOTHETICAL STORM

..... HYDRO-35			..... TP-40					..... TP-49			
5-MIN	15-MIN	60-MIN	2-HR	3-HR	6-HR	12-HR	24-HR	2-DAY	4-DAY	7-DAY	10-DAY
.47	.92	1.61	1.72	1.82	2.07	2.30	2.53	.00	.00	.00	.00

STORM AREA = .07

21 LS SCS LOSS RATE

STRTL	.17	INITIAL ABSTRACTION
CRVNBR	92.00	CURVE NUMBER
RTIMP	.00	PERCENT IMPERVIOUS AREA

22 UD SCS DIMENSIONLESS UNITGRAPH
TLAG .95 LAG

***

UNIT HYDROGRAPH
53 END-OF-PERIOD ORDINATES

1.	3.	7.	11.	16.	22.	28.	33.	36.	38.
38.	37.	35.	32.	30.	26.	22.	18.	15.	13.
11.	10.	9.	7.	6.	5.	5.	4.	3.	3.
3.	2.	2.	2.	1.	1.	1.	1.	1.	1.
1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.							

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

HYDROGRAPH AT STATION 2W

TOTAL RAINFALL = 2.29, TOTAL LOSS = .79, TOTAL EXCESS = 1.50

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	12.42-HR
+	(CFS)	(HR)					
			(CFS)				
+	41.	7.08		11.	5.	5.	5.
			(INCHES)	1.441	1.466	1.466	1.466
			(AC-FT)	5.	5.	5.	5.

CUMULATIVE AREA = .07 SQ MI

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            **************
            *            *
23 KK       *    COMB    *
            *            *
            **************
```

24 IO OUTPUT CONTROL VARIABLES

IPRNT	1	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

25 HC HYDROGRAPH COMBINATION

ICOMP	2	NUMBER OF HYDROGRAPHS TO COMBINE

***

****

HYDROGRAPH AT STATION COMB
SUM OF 2 HYDROGRAPHS

****

DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
19	NOV	1200	1	0.	*	19	NOV	1510	39	0.	*	19	NOV	1820	77	14.	*	19	NOV	2130	115	6.
19	NOV	1205	2	0.	*	19	NOV	1515	40	0.	*	19	NOV	1825	78	21.	*	19	NOV	2135	116	6.
19	NOV	1210	3	0.	*	19	NOV	1520	41	0.	*	19	NOV	1830	79	29.	*	19	NOV	2140	117	6.
19	NOV	1215	4	0.	*	19	NOV	1525	42	0.	*	19	NOV	1835	80	40.	*	19	NOV	2145	118	6.

19	NOV	1220	5	0.	*	19	NOV	1530	43	0.	*	19	NOV	1840	81	50.	*	19	NOV	2150	119	5.	
19	NOV	1225	6	0.	*	19	NOV	1535	44	0.	*	19	NOV	1845	82	59.	*	19	NOV	2155	120	5.	
19	NOV	1230	7	0.	*	19	NOV	1540	45	0.	*	19	NOV	1850	83	67.	*	19	NOV	2200	121	5.	
19	NOV	1235	8	0.	*	19	NOV	1545	46	0.	*	19	NOV	1855	84	72.	*	19	NOV	2205	122	5.	
19	NOV	1240	9	0.	*	19	NOV	1550	47	0.	*	19	NOV	1900	85	74.	*	19	NOV	2210	123	4.	
19	NOV	1245	10	0.	*	19	NOV	1555	48	0.	*	19	NOV	1905	86	74.	*	19	NOV	2215	124	4.	
19	NOV	1250	11	0.	*	19	NOV	1600	49	0.	*	19	NOV	1910	87	71.	*	19	NOV	2220	125	4.	
19	NOV	1255	12	0.	*	19	NOV	1605	50	0.	*	19	NOV	1915	88	67.	*	19	NOV	2225	126	4.	
19	NOV	1300	13	0.	*	19	NOV	1610	51	0.	*	19	NOV	1920	89	62.	*	19	NOV	2230	127	4.	
19	NOV	1305	14	0.	*	19	NOV	1615	52	0.	*	19	NOV	1925	90	56.	*	19	NOV	2235	128	4.	
19	NOV	1310	15	0.	*	19	NOV	1620	53	0.	*	19	NOV	1930	91	50.	*	19	NOV	2240	129	4.	
19	NOV	1315	16	0.	*	19	NOV	1625	54	0.	*	19	NOV	1935	92	44.	*	19	NOV	2245	130	3.	
19	NOV	1320	17	0.	*	19	NOV	1630	55	0.	*	19	NOV	1940	93	39.	*	19	NOV	2250	131	3.	
19	NOV	1325	18	0.	*	19	NOV	1635	56	0.	*	19	NOV	1945	94	34.	*	19	NOV	2255	132	3.	
19	NOV	1330	19	0.	*	19	NOV	1640	57	0.	*	19	NOV	1950	95	30.	*	19	NOV	2300	133	3.	
19	NOV	1335	20	0.	*	19	NOV	1645	58	0.	*	19	NOV	1955	96	27.	*	19	NOV	2305	134	3.	
19	NOV	1340	21	0.	*	19	NOV	1650	59	0.	*	19	NOV	2000	97	24.	*	19	NOV	2310	135	3.	
19	NOV	1345	22	0.	*	19	NOV	1655	60	0.	*	19	NOV	2005	98	21.	*	19	NOV	2315	136	3.	
19	NOV	1350	23	0.	*	19	NOV	1700	61	0.	*	19	NOV	2010	99	19.	*	19	NOV	2320	137	3.	
19	NOV	1355	24	0.	*	19	NOV	1705	62	0.	*	19	NOV	2015	100	17.	*	19	NOV	2325	138	3.	
19	NOV	1400	25	0.	*	19	NOV	1710	63	0.	*	19	NOV	2020	101	16.	*	19	NOV	2330	139	3.	
19	NOV	1405	26	0.	*	19	NOV	1715	64	1.	*	19	NOV	2025	102	14.	*	19	NOV	2335	140	3.	
19	NOV	1410	27	0.	*	19	NOV	1720	65	1.	*	19	NOV	2030	103	13.	*	19	NOV	2340	141	3.	
19	NOV	1415	28	0.	*	19	NOV	1725	66	1.	*	19	NOV	2035	104	12.	*	19	NOV	2345	142	3.	
19	NOV	1420	29	0.	*	19	NOV	1730	67	1.	*	19	NOV	2040	105	11.	*	19	NOV	2350	143	3.	
19	NOV	1425	30	0.	*	19	NOV	1735	68	1.	*	19	NOV	2045	106	11.	*	19	NOV	2355	144	3.	
19	NOV	1430	31	0.	*	19	NOV	1740	69	1.	*	19	NOV	2050	107	10.	*	20	NOV	0000	145	3.	
19	NOV	1435	32	0.	*	19	NOV	1745	70	1.	*	19	NOV	2055	108	9.	*	20	NOV	0005	146	2.	
19	NOV	1440	33	0.	*	19	NOV	1750	71	1.	*	19	NOV	2100	109	9.	*	20	NOV	0010	147	2.	
19	NOV	1445	34	0.	*	19	NOV	1755	72	2.	*	19	NOV	2105	110	8.	*	20	NOV	0015	148	2.	
19	NOV	1450	35	0.	*	19	NOV	1800	73	2.	*	19	NOV	2110	111	8.	*	20	NOV	0020	149	2.	
19	NOV	1455	36	0.	*	19	NOV	1805	74	3.	*	19	NOV	2115	112	7.	*	20	NOV	0025	150	2.	
19	NOV	1500	37	0.	*	19	NOV	1810	75	5.	*	19	NOV	2120	113	7.	*						
19	NOV	1505	38	0.	*	19	NOV	1815	76	9.	*	19	NOV	2125	114	7.	*						
					*						*						*						

****

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	12.42-HR
+ (CFS)	(HR)					
		(CFS)				
+ 74.	7.00		19.	9.	9.	9.
		(INCHES)	1.443	1.469	1.469	1.469
		(AC-FT)	9.	9.	9.	9.

CUMULATIVE AREA = .12 SQ MI

*** ***

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            **************
            *            *
26 KK       *        3E  *
            *            *
            **************
```

27 IO OUTPUT CONTROL VARIABLES

IPRNT	3	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

SUBBASIN RUNOFF DATA

```
28 BA          SUBBASIN CHARACTERISTICS
                     TAREA          .59  SUBBASIN AREA

               PRECIPITATION DATA

 8 PH                                   DEPTHS FOR  10-PERCENT HYPOTHETICAL STORM
               ..... HYDRO-35 ......   ................ TP-40 ................   ........... TP-49 ...........
               5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                 .47     .92    1.61    1.72    1.82    2.07    2.30    2.53     .00     .00     .00     .00

                                                STORM AREA =      .59

29 LS          SCS LOSS RATE
                     STRTL          .17  INITIAL ABSTRACTION
                    CRVNBR        92.00  CURVE NUMBER
                     RTIMP          .00  PERCENT IMPERVIOUS AREA

30 UD          SCS DIMENSIONLESS UNITGRAPH
                      TLAG         1.70  LAG

                                                      ***

                                                UNIT HYDROGRAPH
                                          104 END-OF-PERIOD ORDINATES
                 2.      5.     10.     15.     22.     29.     38.     47.     59.     71.
                85.    100.    114.    126.    137.    146.    153.    158.    162.    163.
               164.    163.    162.    157.    153.    147.    142.    136.    129.    122.
               114.    105.     96.     87.     79.     73.     67.     62.     57.     53.
                49.     45.     42.     40.     37.     34.     31.     29.     27.     24.
                23.     21.     20.     18.     17.     16.     14.     13.     12.     11.
                10.     10.      9.      8.      8.      7.      6.      6.      6.      5.
                 5.      4.      4.      4.      4.      3.      3.      3.      3.      2.
                 2.      2.      2.      2.      2.      2.      1.      1.      1.      1.
                 1.      1.      1.      1.      1.      1.      1.      1.      0.      0.
                 0.      0.      0.      0.

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

                         HYDROGRAPH AT STATION       3E

    TOTAL RAINFALL =    2.29, TOTAL LOSS =     .79, TOTAL EXCESS =    1.50

  PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                                 6-HR       24-HR       72-HR     12.42-HR
+   (CFS)        (HR)
                                   (CFS)
+     195.       8.00                 89.         43.         43.         43.
                                (INCHES)      1.399       1.410       1.410       1.410
                                 (AC-FT)        44.         44.         44.         44.

                         CUMULATIVE AREA =     .59 SQ MI

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

               **************
               *            *
31 KK          *        4E  *
               *            *
               **************

                  SUBBASIN RUNOFF DATA
```

```
 32 BA          SUBBASIN CHARACTERISTICS
                      TAREA          .37  SUBBASIN AREA

                PRECIPITATION DATA

  8 PH                                   DEPTHS FOR  10-PERCENT HYPOTHETICAL STORM
                ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                  .47     .92    1.61    1.72    1.82    2.07    2.30    2.53     .00     .00     .00     .00

                                                   STORM AREA =      .37

 33 LS          SCS LOSS RATE
                      STRTL          .17  INITIAL ABSTRACTION
                     CRVNBR        92.00  CURVE NUMBER
                      RTIMP          .00  PERCENT IMPERVIOUS AREA

 34 UD          SCS DIMENSIONLESS UNITGRAPH
                       TLAG         1.25  LAG

                                                          ***

                                                     UNIT HYDROGRAPH
                                                 77 END-OF-PERIOD ORDINATES
                    3.      7.     13.     21.     30.     41.     54.     69.     86.    101.
                  115.    125.    132.    137.    138.    138.    137.    132.    126.    120.
                  113.    105.     96.     86.     76.     67.     60.     53.     48.     43.
                   39.     35.     32.     29.     26.     24.     21.     19.     17.     15.
                   14.     13.     11.     10.      9.      8.      7.      7.      6.      5.
                    5.      4.      4.      4.      3.      3.      3.      2.      2.      2.
                    2.      2.      1.      1.      1.      1.      1.      1.      1.      1.
                    1.      0.      0.      0.      0.      0.      0.

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

                          HYDROGRAPH AT STATION       4E

      TOTAL RAINFALL =    2.29, TOTAL LOSS =     .79, TOTAL EXCESS =    1.50

   PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                        6-HR       24-HR       72-HR     12.42-HR
+    (CFS)       (HR)
                            (CFS)
+     159.       7.50                    57.         28.         28.         28.
                         (INCHES)     1.428       1.446       1.446       1.446
                          (AC-FT)       28.         29.         29.         29.

                         CUMULATIVE AREA =     .37 SQ MI


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

                 **************
                 *            *
 35 KK           *    COMB1   *
                 *            *
                 **************

 36 HC          HYDROGRAPH COMBINATION
                      ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                          ***
```

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

HYDROGRAPH AT STATION COM31

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	12.42-HR
+ (CFS)	(HR)					
		(CFS)				
+ 340.	7.75		145.	71.	71.	71.
		(INCHES)	1.409	1.424	1.424	1.424
		(AC-FT)	72.	73.	73.	73.

CUMULATIVE AREA = .96 SQ MI

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            **************
            *            *
 37 KK      *        5E  *
            *            *
            **************
```

SUBBASIN RUNOFF DATA

38 BA SUBBASIN CHARACTERISTICS

TAREA .44 SUBBASIN AREA

PRECIPITATION DATA

8 PH DEPTHS FOR 10-PERCENT HYPOTHETICAL STORM

..... HYDRO-35			..... TP-40					..... TP-49			
5-MIN	15-MIN	60-MIN	2-HR	3-HR	6-HR	12-HR	24-HR	2-DAY	4-DAY	7-DAY	10-DAY
.47	.92	1.61	1.72	1.82	2.07	2.30	2.53	.00	.00	.00	.00

STORM AREA = .44

39 LS SCS LOSS RATE

STRTL .17 INITIAL ABSTRACTION

CRVNBR 92.00 CURVE NUMBER

RTIMP .00 PERCENT IMPERVIOUS AREA

40 UD SCS DIMENSIONLESS UNITGRAPH

TLAG 1.21 LAG

***

UNIT HYDROGRAPH
75 END-OF-PERIOD ORDINATES

3.	9.	17.	27.	39.	53.	71.	90.	112.	130.
145.	158.	165.	169.	170.	169.	165.	158.	150.	142.
133.	121.	109.	96.	84.	74.	67.	60.	53.	48.
44.	39.	35.	32.	29.	25.	23.	21.	18.	17.
15.	13.	12.	11.	9.	9.	8.	7.	6.	6.
5.	5.	4.	4.	3.	3.	3.	2.	2.	2.
2.	2.	1.	1.	1.	1.	1.	1.	1.	1.
0.	0.	0.	0.	0.					

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

HYDROGRAPH AT STATION 5E

TOTAL RAINFALL = 2.29, TOTAL LOSS = .79, TOTAL EXCESS = 1.50

```
  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     12.42-HR
+   (CFS)       (HR)
                           (CFS)
+     194.      7.50                 68.         33.         33.         33.
                         (INCHES)   1.429       1.448       1.448       1.448
                          (AC-FT)    34.         34.         34.         34.

                         CUMULATIVE AREA =     .44 SQ MI


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

            **************
            *            *
   41 KK    *     COMB2  *
            *            *
            **************

   42 HC          HYDROGRAPH COMBINATION
                       ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                                  ***

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

                          HYDROGRAPH AT STATION    COMB2

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     12.42-HR
+   (CFS)       (HR)
                           (CFS)
+     527.      7.58                213.        104.        104.        104.
                         (INCHES)   1.415       1.432       1.432       1.432
                          (AC-FT)   106.        107.        107.        107.

                         CUMULATIVE AREA =    1.40 SQ MI


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

            **************
            *            *
   43 KK    *        3W  *
            *            *
            **************

               SUBBASIN RUNOFF DATA

   44 BA          SUBBASIN CHARACTERISTICS
                       TAREA          .09  SUBBASIN AREA

                  PRECIPITATION DATA

    8 PH                                DEPTHS FOR  10-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 ......  ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .47     .92    1.61    1.72    1.82    2.07    2.30    2.53     .00     .00     .00     .00
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                                                STORM AREA =      .09

 45 LS          SCS LOSS RATE
                     STRTL          .17  INITIAL ABSTRACTION
                    CRVNBR        92.00  CURVE NUMBER
                     RTIMP          .00  PERCENT IMPERVIOUS AREA

 46 UD          SCS DIMENSIONLESS UNITGRAPH
                      TLAG          .81  LAG

                                                   ***

                                                UNIT HYDROGRAPH
                                          51 END-OF-PERIOD ORDINATES
                 1.       5.       9.      15.      23.      32.      41.      47.      50.      51.
                51.      48.      45.      41.      36.      31.      25.      21.      18.      15.
                13.      11.      10.       8.       7.       6.       5.       4.       4.       3.
                 3.       2.       2.       2.       1.       1.       1.       1.       1.       1.
                 1.       0.       0.       0.       0.       0.       0.       0.       0.       0.
                 0.

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

                      HYDROGRAPH AT STATION       3W

    TOTAL RAINFALL =    2.29, TOTAL LOSS =     .79, TOTAL EXCESS =    1.50

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                        6-HR       24-HR       72-HR     12.42-HR
+   (CFS)       (HR)
                          (CFS)
+     55.       7.08                    14.          7.          7.          7.
                        (INCHES)     1.442       1.468       1.468       1.468
                         (AC-FT)        7.          7.          7.          7.

                      CUMULATIVE AREA =     .09 SQ MI


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

            **************
            *            *
 47 KK      *        4W  *
            *            *
            **************

              SUBBASIN RUNOFF DATA

 48 BA          SUBBASIN CHARACTERISTICS
                      TAREA          .10  SUBBASIN AREA

                PRECIPITATION DATA

  8 PH                                DEPTHS FOR  10-PERCENT HYPOTHETICAL STORM
                ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                5-MIN  15-MIN  60-MIN    2-HR     3-HR     6-HR    12-HR    24-HR    2-DAY    4-DAY    7-DAY   10-DAY
                  .47     .92    1.61    1.72     1.82     2.07     2.30     2.53      .00      .00      .00      .00

                                                STORM AREA =      .10

 49 LS          SCS LOSS RATE
                     STRTL          .17  INITIAL ABSTRACTION
                    CRVNBR        92.00  CURVE NUMBER
```

RTIMP .00 PERCENT IMPERVIOUS AREA

50 UD SCS DIMENSIONLESS UNITGRAPH
TLAG .72 LAG

***

UNIT HYDROGRAPH
45 END-OF-PERIOD ORDINATES

2.	7.	14.	23.	35.	48.	57.	62.	63.	63.
59.	54.	48.	41.	33.	27.	22.	19.	16.	13.
11.	9.	8.	7.	5.	5.	4.	3.	3.	2.
2.	2.	1.	1.	1.	1.	1.	1.	0.	0.
0.	0.	0.	0.	0.					

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

HYDROGRAPH AT STATION 4W

TOTAL RAINFALL = 2.29, TOTAL LOSS = .79, TOTAL EXCESS = 1.50

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	12.42-HR
+	(CFS)	(HR)					
			(CFS)				
+	67.	7.00		16.	8.	8.	8.
			(INCHES)	1.444	1.471	1.471	1.471
			(AC-FT)	8.	8.	8.	8.

CUMULATIVE AREA = .10 SQ MI

*** ***

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**************
*            *
*     COMB5  *
*            *
**************
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51 KK

52 HC HYDROGRAPH COMBINATION
ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

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

HYDROGRAPH AT STATION COMB5

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	12.42-HR
+	(CFS)	(HR)					
			(CFS)				
+	121.	7.00		29.	15.	15.	15.
			(INCHES)	1.443	1.470	1.470	1.470
			(AC-FT)	15.	15.	15.	15.

CUMULATIVE AREA = .19 SQ MI

*** ***

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              **************
              *            *
 53 KK        *     5W     *
              *            *
              **************

                SUBBASIN RUNOFF DATA

 54 BA            SUBBASIN CHARACTERISTICS
                        TAREA          .09  SUBBASIN AREA

                  PRECIPITATION DATA

  8 PH                                  DEPTHS FOR  10-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .47     .92    1.61    1.72    1.82    2.07    2.30    2.53     .00     .00     .00     .00

                                                   STORM AREA =      .09

 55 LS            SCS LOSS RATE
                       STRTL          .17  INITIAL ABSTRACTION
                      CRVNBR        92.00  CURVE NUMBER
                       RTIMP          .00  PERCENT IMPERVIOUS AREA

 56 UD            SCS DIMENSIONLESS UNITGRAPH
                        TLAG          .64  LAG

                                                          ***

                                                     UNIT HYDROGRAPH
                                                 40 END-OF-PERIOD ORDINATES
                 3.       9.      17.      29.      43.      55.      61.      64.      63.      58.
                53.      45.      37.      29.      24.      19.      16.      13.      11.       9.
                 7.       6.       5.       4.       3.       3.       2.       2.       1.       1.
                 1.       1.       1.       1.       0.       0.       0.       0.       0.       0.

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

                        HYDROGRAPH AT STATION       5W

    TOTAL RAINFALL =    2.29, TOTAL LOSS =     .79, TOTAL EXCESS =    1.50

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     12.42-HR
+   (CFS)       (HR)
                                    (CFS)
+     65.       6.92                  14.          7.          7.          7.
                                 (INCHES)      1.446       1.475       1.475       1.475
                                  (AC-FT)        7.          7.          7.          7.

                        CUMULATIVE AREA =     .09 SQ MI


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


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              *            *
 57 KK        *    COMB6   *
              *            *
              **************
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 58 HC          HYDROGRAPH COMBINATION
                     ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                                  ***

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

                        HYDROGRAPH AT STATION    COMB6

 PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR        24-HR        72-HR      12.42-HR
+  (CFS)        (HR)
                              (CFS)
+    184.       7.00                 43.          21.          21.          21.
                            (INCHES)   1.444       1.471        1.471        1.471
                             (AC-FT)     22.          22.          22.          22.

                        CUMULATIVE AREA =      .28 SQ MI


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


            **************
            *            *
 59 KK      *     COMB7  *
            *            *
            **************

 60 IO          OUTPUT CONTROL VARIABLES
                     IPRNT           1  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE

 61 HC          HYDROGRAPH COMBINATION
                     ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE
                                                                  ***
*****************************************************************************************************************************
                                        HYDROGRAPH AT STATION    COMB7
                                            SUM OF  2 HYDROGRAPHS
*****************************************************************************************************************************
```

DA MON HRMN	ORD	FLOW	*	DA MON HRMN	ORD	FLOW	*	DA MON HRMN	ORD	FLOW	*	DA MON HRMN	ORD	FLOW
19 NOV 1200	1	0.	*	19 NOV 1510	39	0.	*	19 NOV 1820	77	86.	*	19 NOV 2130	115	179.
19 NOV 1205	2	0.	*	19 NOV 1515	40	0.	*	19 NOV 1825	78	127.	*	19 NOV 2135	116	170.
19 NOV 1210	3	0.	*	19 NOV 1520	41	0.	*	19 NOV 1830	79	177.	*	19 NOV 2140	117	161.
19 NOV 1215	4	0.	*	19 NOV 1525	42	0.	*	19 NOV 1835	80	236.	*	19 NOV 2145	118	153.
19 NOV 1220	5	0.	*	19 NOV 1530	43	0.	*	19 NOV 1840	81	299.	*	19 NOV 2150	119	145.
19 NOV 1225	6	0.	*	19 NOV 1535	44	0.	*	19 NOV 1845	82	363.	*	19 NOV 2155	120	138.
19 NOV 1230	7	0.	*	19 NOV 1540	45	0.	*	19 NOV 1850	83	424.	*	19 NOV 2200	121	131.
19 NOV 1235	8	0.	*	19 NOV 1545	46	0.	*	19 NOV 1855	84	480.	*	19 NOV 2205	122	125.
19 NOV 1240	9	0.	*	19 NOV 1550	47	0.	*	19 NOV 1900	85	528.	*	19 NOV 2210	123	119.
19 NOV 1245	10	0.	*	19 NOV 1555	48	0.	*	19 NOV 1905	86	567.	*	19 NOV 2215	124	113.
19 NOV 1250	11	0.	*	19 NOV 1600	49	0.	*	19 NOV 1910	87	596.	*	19 NOV 2220	125	108.
19 NOV 1255	12	0.	*	19 NOV 1605	50	0.	*	19 NOV 1915	88	615.	*	19 NOV 2225	126	103.
19 NOV 1300	13	0.	*	19 NOV 1610	51	0.	*	19 NOV 1920	89	626.	*	19 NOV 2230	127	98.
19 NOV 1305	14	0.	*	19 NOV 1615	52	0.	*	19 NOV 1925	90	629.	*	19 NOV 2235	128	94.
19 NOV 1310	15	0.	*	19 NOV 1620	53	0.	*	19 NOV 1930	91	626.	*	19 NOV 2240	129	90.

19 NOV	1315	16	0.	*	19 NOV	1625	54	0.	*	19 NOV	1935	92	619.	*	19 NOV	2245	130	86.					
19 NOV	1320	17	0.	*	19 NOV	1630	55	0.	*	19 NOV	1940	93	606.	*	19 NOV	2250	131	82.					
19 NOV	1325	18	0.	*	19 NOV	1635	56	0.	*	19 NOV	1945	94	590.	*	19 NOV	2255	132	79.					
19 NOV	1330	19	0.	*	19 NOV	1640	57	1.	*	19 NOV	1950	95	571.	*	19 NOV	2300	133	76.					
19 NOV	1335	20	0.	*	19 NOV	1645	58	1.	*	19 NOV	1955	96	550.	*	19 NOV	2305	134	73.					
19 NOV	1340	21	0.	*	19 NOV	1650	59	1.	*	19 NOV	2000	97	527.	*	19 NOV	2310	135	70.					
19 NOV	1345	22	0.	*	19 NOV	1655	60	1.	*	19 NOV	2005	98	501.	*	19 NOV	2315	136	67.					
19 NOV	1350	23	0.	*	19 NOV	1700	61	2.	*	19 NOV	2010	99	473.	*	19 NOV	2320	137	65.					
19 NOV	1355	24	0.	*	19 NOV	1705	62	2.	*	19 NOV	2015	100	445.	*	19 NOV	2325	138	63.					
19 NOV	1400	25	0.	*	19 NOV	1710	63	3.	*	19 NOV	2020	101	419.	*	19 NOV	2330	139	61.					
19 NOV	1405	26	0.	*	19 NOV	1715	64	4.	*	19 NOV	2025	102	395.	*	19 NOV	2335	140	59.					
19 NOV	1410	27	0.	*	19 NOV	1720	65	4.	*	19 NOV	2030	103	372.	*	19 NOV	2340	141	57.					
19 NOV	1415	28	0.	*	19 NOV	1725	66	5.	*	19 NOV	2035	104	350.	*	19 NOV	2345	142	55.					
19 NOV	1420	29	0.	*	19 NOV	1730	67	6.	*	19 NOV	2040	105	330.	*	19 NOV	2350	143	53.					
19 NOV	1425	30	0.	*	19 NOV	1735	68	7.	*	19 NOV	2045	106	310.	*	19 NOV	2355	144	51.					
19 NOV	1430	31	0.	*	19 NOV	1740	69	8.	*	19 NOV	2050	107	291.	*	20 NOV	0000	145	50.					
19 NOV	1435	32	0.	*	19 NOV	1745	70	9.	*	19 NOV	2055	108	273.	*	20 NOV	0005	146	48.					
19 NOV	1440	33	0.	*	19 NOV	1750	71	11.	*	19 NOV	2100	109	256.	*	20 NOV	0010	147	47.					
19 NOV	1445	34	0.	*	19 NOV	1755	72	13.	*	19 NOV	2105	110	240.	*	20 NOV	0015	148	46.					
19 NOV	1450	35	0.	*	19 NOV	1800	73	17.	*	19 NOV	2110	111	226.	*	20 NOV	0020	149	44.					
19 NOV	1455	36	0.	*	19 NOV	1805	74	24.	*	19 NOV	2115	112	213.	*	20 NOV	0025	150	43.					
19 NOV	1500	37	0.	*	19 NOV	1810	75	35.	*	19 NOV	2120	113	201.	*									
19 NOV	1505	38	0.	*	19 NOV	1815	76	55.	*	19 NOV	2125	114	189.	*									
				*					*					*									

****

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	12.42-HR
+ (CFS)	(HR)					
		(CFS)				
+ 629.	7.42		256.	126.	126.	126.
		(INCHES)	1.418	1.438	1.438	1.438
		(AC-FT)	127.	129.	129.	129.

CUMULATIVE AREA = 1.68 SQ MI

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            **************
            *            *
  62 KK     *      RID   *
            *            *
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HYDROGRAPH ROUTING DATA

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  63 RS        STORAGE ROUTING
                    NSTPS          1  NUMBER OF SUBREACHES
                     ITYP       ELEV  TYPE OF INITIAL CONDITION
                   RSVRIC    1020.00  INITIAL CONDITION
                        X        .00  WORKING R AND D COEFFICIENT

  65 SV          STORAGE        .0     10.2     20.6     31.1     41.9     52.8     63.9     75.3     86.8     98.5

  66 SE        ELEVATION    1020.00  1021.00  1022.00  1023.00  1024.00  1025.00  1026.00  1027.00  1028.00  1029.00

  64 SL        LOW-LEVEL OUTLET
                    ELEVL    1022.50  ELEVATION AT CENTER OF OUTLET
                    CAREA      39.30  CROSS-SECTIONAL AREA
                     COQL        .60  COEFFICIENT
```

EXPL	.50	EXPONENT OF HEAD

67 SS SPILLWAY

CREL	1050.00	SPILLWAY CREST ELEVATION
SPWID	.00	SPILLWAY WIDTH
COQW	.00	WEIR COEFFICIENT
EXPW	1.50	EXPONENT OF HEAD

***

COMPUTED OUTFLOW-ELEVATION DATA

OUTFLOW	.00	.00	356.92.	392.85	436.81	491.85	562.76	657.57	790.79	991.71
ELEVATION	1020.00	1022.50	1026.06	1026.82	1027.84	1029.26	1031.36	1034.59	1039.99	1050.00

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	10.20	20.60	25.85	31.10	41.90	52.80	63.90	64.61	73.19
OUTFLOW	.00	.00	.00	.00	133.72	231.61	299.01	353.80	356.92	392.85
ELEVATION	1020.00	1021.00	1022.00	1022.50	1023.00	1024.00	1025.00	1026.00	1026.06	1026.82
STORAGE	75.30	84.90	86.80	98.50	101.59	126.06	163.91	227.04	344.20	
OUTFLOW	401.17	436.81	443.51	482.14	491.85	562.76	657.57	790.79	991.71	
ELEVATION	1027.00	1027.84	1028.00	1029.00	1029.26	1031.36	1034.59	1039.99	1050.00	

****

HYDROGRAPH AT STATION RID

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DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
19	NOV	1200	1	0.	.0	1020.0	*	19	NOV	1610	51	0.	.0	1020.0	*	19	NOV	2020	101	321.	57.3	1025.4
19	NOV	1205	2	0.	.0	1020.0	*	19	NOV	1615	52	0.	.0	1020.0	*	19	NOV	2025	102	324.	57.9	1025.5
19	NOV	1210	3	0.	.0	1020.0	*	19	NOV	1620	53	0.	.0	1020.0	*	19	NOV	2030	103	326.	58.3	1025.5
19	NOV	1215	4	0.	.0	1020.0	*	19	NOV	1625	54	0.	.0	1020.0	*	19	NOV	2035	104	327.	58.5	1025.5
19	NOV	1220	5	0.	.0	1020.0	*	19	NOV	1630	55	0.	.0	1020.0	*	19	NOV	2040	105	328.	58.6	1025.5
19	NOV	1225	6	0.	.0	1020.0	*	19	NOV	1635	56	0.	.0	1020.0	*	19	NOV	2045	106	327.	58.5	1025.5
19	NOV	1230	7	0.	.0	1020.0	*	19	NOV	1640	57	0.	.0	1020.0	*	19	NOV	2050	107	326.	58.3	1025.5
19	NOV	1235	8	0.	.0	1020.0	*	19	NOV	1645	58	0.	.0	1020.0	*	19	NOV	2055	108	325.	58.0	1025.5
19	NOV	1240	9	0.	.0	1020.0	*	19	NOV	1650	59	0.	.0	1020.0	*	19	NOV	2100	109	323.	57.6	1025.4
19	NOV	1245	10	0.	.0	1020.0	*	19	NOV	1655	60	0.	.0	1020.0	*	19	NOV	2105	110	320.	57.1	1025.4
19	NOV	1250	11	0.	.0	1020.0	*	19	NOV	1700	61	0.	.0	1020.0	*	19	NOV	2110	111	318.	56.5	1025.3
19	NOV	1255	12	0.	.0	1020.0	*	19	NOV	1705	62	0.	.1	1020.0	*	19	NOV	2115	112	314.	55.9	1025.3
19	NOV	1300	13	0.	.0	1020.0	*	19	NOV	1710	63	0.	.1	1020.0	*	19	NOV	2120	113	311.	55.2	1025.2
19	NOV	1305	14	0.	.0	1020.0	*	19	NOV	1715	64	0.	.1	1020.0	*	19	NOV	2125	114	307.	54.4	1025.1
19	NOV	1310	15	0.	.0	1020.0	*	19	NOV	1720	65	0.	.1	1020.0	*	19	NOV	2130	115	303.	53.5	1025.1
19	NOV	1315	16	0.	.0	1020.0	*	19	NOV	1725	66	0.	.2	1020.0	*	19	NOV	2135	116	298.	52.7	1025.0
19	NOV	1320	17	0.	.0	1020.0	*	19	NOV	1730	67	0.	.2	1020.0	*	19	NOV	2140	117	293.	51.8	1024.9
19	NOV	1325	18	0.	.0	1020.0	*	19	NOV	1735	68	0.	.2	1020.0	*	19	NOV	2145	118	287.	50.9	1024.8
19	NOV	1330	19	0.	.0	1020.0	*	19	NOV	1740	69	0.	.3	1020.0	*	19	NOV	2150	119	281.	49.9	1024.7
19	NOV	1335	20	0.	.0	1020.0	*	19	NOV	1745	70	0.	.3	1020.0	*	19	NOV	2155	120	275.	49.0	1024.7
19	NOV	1340	21	0.	.0	1020.0	*	19	NOV	1750	71	0.	.4	1020.0	*	19	NOV	2200	121	270.	48.0	1024.6
19	NOV	1345	22	0.	.0	1020.0	*	19	NOV	1755	72	0.	.5	1020.0	*	19	NOV	2205	122	264.	47.1	1024.5
19	NOV	1350	23	0.	.0	1020.0	*	19	NOV	1800	73	0.	.6	1020.1	*	19	NOV	2210	123	258.	46.1	1024.4
19	NOV	1355	24	0.	.0	1020.0	*	19	NOV	1805	74	0.	.7	1020.1	*	19	NOV	2215	124	252.	45.2	1024.3
19	NOV	1400	25	0.	.0	1020.0	*	19	NOV	1810	75	0.	.9	1020.1	*	19	NOV	2220	125	246.	44.2	1024.2
19	NOV	1405	26	0.	.0	1020.0	*	19	NOV	1815	76	0.	1.2	1020.1	*	19	NOV	2225	126	240.	43.3	1024.1
19	NOV	1410	27	0.	.0	1020.0	*	19	NOV	1820	77	0.	1.7	1020.2	*	19	NOV	2230	127	234.	42.3	1024.0
19	NOV	1415	29	0.	.0	1020.0	*	19	NOV	1825	78	0.	2.5	1020.2	*	19	NOV	2235	128	227.	41.4	1024.0
19	NOV	1420	29	0.	.0	1020.0	*	19	NOV	1830	79	0.	3.5	1020.3	*	19	NOV	2240	129	219.	40.5	1023.9
19	NOV	1425	30	0.	.0	1020.0	*	19	NOV	1835	80	0.	4.9	1020.5	*	19	NOV	2245	130	211.	39.6	1023.8
19	NOV	1430	31	0.	.0	1020.0	*	19	NOV	1840	81	0.	6.8	1020.7	*	19	NOV	2250	131	203.	38.8	1023.7
19	NOV	1435	32	0.	.0	1020.0	*	19	NOV	1845	82	0.	9.1	1020.9	*	19	NOV	2255	132	196.	38.0	1023.6

19	NOV	1440	33	0.	.0	1020.0	*	19	NOV	1850	83	0.	11.8	1021.2	*	19	NOV	2300	133	189.	37.2	1023.6
19	NOV	1445	34	0.	.0	1020.0	*	19	NOV	1855	84	0.	14.9	1021.4	*	19	NOV	2305	134	182.	36.4	1023.5
19	NOV	1450	35	0.	.0	1020.0	*	19	NOV	1900	85	0.	18.3	1021.8	*	19	NOV	2310	135	175.	35.7	1023.4
19	NOV	1455	36	0.	.0	1020.0	*	19	NOV	1905	86	0.	22.1	1022.1	*	19	NOV	2315	136	169.	35.0	1023.4
19	NOV	1500	37	0.	.0	1020.0	*	19	NOV	1910	87	6.	26.1	1022.5	*	19	NOV	2320	137	162.	34.3	1023.3
19	NOV	1505	38	0.	.0	1020.0	*	19	NOV	1915	88	103.	29.9	1022.9	*	19	NOV	2325	138	156.	33.6	1023.2
19	NOV	1510	39	0.	.0	1020.0	*	19	NOV	1920	89	154.	33.3	1023.2	*	19	NOV	2330	139	151.	33.0	1023.2
19	NOV	1515	40	0.	.0	1020.0	*	19	NOV	1925	90	182.	36.4	1023.5	*	19	NOV	2335	140	145.	32.4	1023.1
19	NOV	1520	41	0.	.0	1020.0	*	19	NOV	1930	91	209.	39.4	1023.8	*	19	NOV	2340	141	140.	31.8	1023.1
19	NOV	1525	42	0.	.0	1020.0	*	19	NOV	1935	92	233.	42.2	1024.0	*	19	NOV	2345	142	135.	31.2	1023.0
19	NOV	1530	43	0.	.0	1020.0	*	19	NOV	1940	93	249.	44.7	1024.3	*	19	NOV	2350	143	124.	30.7	1023.0
19	NOV	1535	44	0.	.0	1020.0	*	19	NOV	1945	94	264.	47.1	1024.5	*	19	NOV	2355	144	112.	30.2	1022.9
19	NOV	1540	45	0.	.0	1020.0	*	19	NOV	1950	95	277.	49.2	1024.7	*	20	NOV	0000	145	102.	29.9	1022.9
19	NOV	1545	46	0.	.0	1020.0	*	19	NOV	1955	96	289.	51.1	1024.8	*	20	NOV	0005	146	94.	29.5	1022.8
19	NOV	1550	47	0.	.0	1020.0	*	19	NOV	2000	97	299.	52.8	1025.0	*	20	NOV	0010	147	86.	29.2	1022.8
19	NOV	1555	48	0.	.0	1020.0	*	19	NOV	2005	98	306.	54.3	1025.1	*	20	NOV	0015	148	80.	29.0	1022.8
19	NOV	1600	49	0.	.0	1020.0	*	19	NOV	2010	99	312.	55.5	1025.2	*	20	NOV	0020	149	74.	28.8	1022.8
19	NOV	1605	50	0.	.0	1020.0	*	19	NOV	2015	100	317.	56.5	1025.3	*	20	NOV	0025	150	69.	28.6	1022.8
							*								*							

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	12.42-HR
+ (CFS)	(HR)					
		(CFS)				
+ 328.	8.67		202.	98.	98.	98.
		(INCHES)	1.120	1.120	1.120	1.120
		(AC-FT)	100.	100.	100.	100.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	12.42-HR
+ (AC-FT)	(HR)				
59.	8.67	40.	20.	20.	20.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	12.42-HR
+ (FEET)	(HR)				
1025.52	8.67	1023.83	1021.86	1021.86	1021.86

CUMULATIVE AREA = 1.68 SQ MI

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              **************
              *            *
   68 KK      *        6E  *
              *            *
              **************

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

                  SUBBASIN RUNOFF DATA

   70 BA          SUBBASIN CHARACTERISTICS
                        TAREA        .29  SUBBASIN AREA

                  PRECIPITATION DATA

    8 PH                          DEPTHS FOR  10-PERCENT HYPOTHETICAL STORM
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HYDRO-35			TP-40					TP-49			
5-MIN	15-MIN	60-MIN	2-HR	3-HR	6-HR	12-HR	24-HR	2-DAY	4-DAY	7-DAY	10-DAY
.47	.92	1.61	1.72	1.82	2.07	2.30	2.53	.00	.00	.00	.00

STORM AREA = .29

71 LS SCS LOSS RATE

STRTL	.22	INITIAL ABSTRACTION
CRVNBR	90.00	CURVE NUMBER
RTIMP	.00	PERCENT IMPERVIOUS AREA

72 UD SCS DIMENSIONLESS UNITGRAPH

TLAG 1.60 . LAG

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UNIT HYDROGRAPH
98 END-OF-PERIOD ORDINATES

1.	3.	6.	9.	13.	17.	22.	27.	34.	41.
50.	58.	65.	71.	76.	80.	83.	85.	85.	85.
85.	84.	81.	78.	75.	72.	69.	65.	60.	56.
50.	46.	41.	38.	35.	32.	29.	27.	25.	23.
21.	20.	18.	17.	16.	14.	13.	12.	11.	10.
9.	9.	8.	7.	7.	6.	6.	5.	5.	4.
4.	4.	3.	3.	3.	3.	2.	2.	2.	2.
2.	2.	2.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.		

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

HYDROGRAPH AT STATION 6E

TOTAL RAINFALL = 2.29, TOTAL LOSS = .94, TOTAL EXCESS = 1.34

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	12.42-HR
+	(CFS)	(HR)				
			(CFS)			
+	90.	7.92	39.	19.	19.	19.
			(INCHES) 1.263	1.270	1.270	1.270
			(AC-FT) 20.	20.	20.	20.

CUMULATIVE AREA = .29 SQ MI

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**************
*            *
*     COMB3  *
*            *
**************
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73 KK

74 HC HYDROGRAPH COMBINATION

ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

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

HYDROGRAPH AT STATION COMB3

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	12.42-HR
		(CFS)				
403.	8.33		242.	117.	117.	117.
		(INCHES)	1.141	1.142	1.142	1.142
		(AC-FT)	120.	120.	120.	120.

CUMULATIVE AREA = 1.97 SQ MI

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              **************
              *            *
   75 KK      *        7E  *
              *            *
              **************
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SUBBASIN RUNOFF DATA

76 BA SUBBASIN CHARACTERISTICS

TAREA .85 SUBBASIN AREA

PRECIPITATION DATA

8 PH DEPTHS FOR 10-PERCENT HYPOTHETICAL STORM

..... HYDRO-35			..... TP-40					..... TP-49			
5-MIN	15-MIN	60-MIN	2-HR	3-HR	6-HR	12-HR	24-HR	2-DAY	4-DAY	7-DAY	10-DAY
.47	.92	1.61	1.72	1.82	2.07	2.30	2.53	.00	.00	.00	.00

STORM AREA = .85

77 LS SCS LOSS RATE

STRTL .25 INITIAL ABSTRACTION
CRVNBR 89.00 CURVE NUMBER
RTIMP .00 PERCENT IMPERVIOUS AREA

78 UD SCS DIMENSIONLESS UNITGRAPH

TLAG 2.51 LAG

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UNIT HYDROGRAPH TRUNCATED FROM 153 TO 150 INT ERVALS

UNIT HYDROGRAPH
150 END-OF-PERIOD ORDINATES
VOLUME = 1.00

2.	3.	5.	8.	12.	16.	20.	25.	30.	36.
42.	48.	56.	65.	73.	83.	93.	103.	111.	120.
128.	135.	141.	147.	151.	154.	158.	160.	160.	161.
161.	160.	160.	158.	155.	152.	149.	145.	141.	138.
133.	129.	125.	120.	114.	109.	103.	96.	90.	85.
80.	74.	71.	67.	63.	60.	57.	54.	51.	48.
46.	44.	42.	40.	38.	36.	34.	32.	31.	29.
28.	26.	24.	23.	22.	21.	20.	19.	18.	17.
16.	15.	15.	14.	13.	12.	12.	11.	11.	10.
9.	9.	8.	8.	8.	7.	7.	6.	6.	6.
6.	5.	5.	5.	4.	4.	4.	4.	4.	3.
3.	3.	3.	3.	3.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.

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                1.        1.        1.        0.        0.        0.        0.        0.        0.        0.

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

                        HYDROGRAPH AT STATION       7E

     TOTAL RAINFALL =    2.28, TOTAL LOSS =    1.02, TOTAL EXCESS =    1.27

  PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                        6-HR       24-HR       72-HR     12.42-HR
+   (CFS)        (HR)
                                     (CFS)
+     168.       8.92                 99.         48.         48.         48.
                                  (INCHES)     1.088       1.090       1.090       1.090
                                   (AC-FT)      49.         49.         49.         49.

                        CUMULATIVE AREA =     .85 SQ MI


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


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            *            *
   79 KK    *     COMB4  *
            *            *
            **************

   80 HC          HYDROGRAPH COMBINATION
                       ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE
                                                                  ***

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

                        HYDROGRAPH AT STATION    COMB4

  PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                        6-HR       24-HR       72-HR     12.42-HR
+   (CFS)        (HR)
                                     (CFS)
+     563.       8.50                341.        165.        165.        165.
                                  (INCHES)     1.125       1.126       1.126       1.126
                                   (AC-FT)     169.        169.        169.        169.

                        CUMULATIVE AREA =    2.82 SQ MI


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


            **************
            *            *
   81 KK    *        6W  *
            *            *
            **************

                SUBBASIN RUNOFF DATA

   82 BA          SUBBASIN CHARACTERISTICS
                       TAREA          .08  SUBBASIN AREA
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PRECIPITATION DATA

8 PH

DEPTHS FOR 10-PERCENT HYPOTHETICAL STORM

HYDRO-35			TP-40					TP-49			
5-MIN	15-MIN	60-MIN	2-HR	3-HR	6-HR	12-HR	24-HR	2-DAY	4-DAY	7-DAY	10-DAY
.47	.92	1.61	1.72	1.82	2.07	2.30	2.53	.00	.00	.00	.00

STORM AREA = .08

83 LS

SCS LOSS RATE

STRTL	.22	INITIAL ABSTRACTION
CRVNBR	90.00	CURVE NUMBER
RTIMP	.00	PERCENT IMPERVIOUS AREA

84 UD

SCS DIMENSIONLESS UNITGRAPH

TLAG	1.07	LAG

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UNIT HYDROGRAPH
66 END-OF-PERIOD ORDINATES

1.	2.	4.	7.	10.	14.	18.	23.	27.	30.
33.	34.	35.	35.	34.	32.	31.	29.	26.	24.
21.	18.	15.	14.	12.	11.	9.	8.	8.	7.
6.	5.	5.	4.	4.	3.	3.	2.	2.	2.
2.	2.	1.	1.	1.	1.	1.	1.	1.	1.
1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.				

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

HYDROGRAPH AT STATION 6W

TOTAL RAINFALL = 2.29, TOTAL LOSS = .94, TOTAL EXCESS = 1.34

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	12.42-HR
+	(CFS)	(HR)				
			(CFS)			
+	35.	7.33	11.	5.	5.	5.
			(INCHES) 1.291	1.303	1.303	1.303
			(AC-FT) 6.	6.	6.	6.

CUMULATIVE AREA = .08 SQ MI

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85 KK

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*            *
*        7W  *
*            *
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SUBBASIN RUNOFF DATA

86 BA

SUBBASIN CHARACTERISTICS

TAREA	.15	SUBBASIN AREA

PRECIPITATION DATA

8 PH

DEPTHS FOR 10-PERCENT HYPOTHETICAL STORM

HYDRO-35 TP-40 TP-49

5-MIN	15-MIN	60-MIN	2-HR	3-HR	6-HR	12-HR	24-HR	2-DAY	4-DAY	7-DAY	10-DAY
.47	.92	1.61	1.72	1.82	2.07	2.30	2.53	.00	.00	.00	.00

STORM AREA = .15

87 LS SCS LOSS RATE
STRTL .25 INITIAL ABSTRACTION
CRVNBR 89.00 CURVE NUMBER
RTIMP .00 PERCENT IMPERVIOUS AREA

88 UD SCS DIMENSIONLESS UNITGRAPH
TLAG 1.44 LAG

***

UNIT HYDROGRAPH
88 END-OF-PERIOD ORDINATES

1.	2.	4.	6.	8.	11.	15.	19.	24.	29.
34.	38.	42.	45.	47.	48.	49.	49.	49.	48.
46.	44.	42.	40.	38.	35.	32.	29.	26.	23.
21.	19.	17.	16.	14.	13.	12.	11.	10.	9.
9.	8.	7.	6.	6.	5.	5.	5.	4.	4.
3.	3.	3.	3.	2.	2.	2.	2.	2.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.		

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HYDROGRAPH AT STATION 7W

TOTAL RAINFALL = 2.29, TOTAL LOSS = 1.02, TOTAL EXCESS = 1.27

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	12.42-HR
+	(CFS)	(HR)	(CFS)				
+	48.	7.75		19.	9.	9.	9.
			(INCHES)	1.205	1.212	1.212	1.212
			(AC-FT)	10.	10.	10.	10.

CUMULATIVE AREA = .15 SQ MI

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*            *
*     COMB8  *
*            *
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89 KK

90 HC HYDROGRAPH COMBINATION
ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

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

HYDROGRAPH AT STATION COMB8

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	12.42-HR

	(CFS)	(HR)					
+	80.	7.50	(CFS)	31.	15.	15.	15.
			(INCHES)	1.234	1.244	1.244	1.244
			(AC-FT)	15.	15.	15.	15.

CUMULATIVE AREA = .23 SQ MI

1

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

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+	HYDROGRAPH AT	1E	96.	6.83	20.	10.	10.	.13	Roosevelt St	
+	HYDROGRAPH AT	1W	44.	6.58	6.	3.	3.	.04	Roosevelt St	
+	HYDROGRAPH AT	2E	34.	7.00	8.	4.	4.	.05	Van Buren	
+	HYDROGRAPH AT	2W	41.	7.08	11.	5.	5.	.07		
+	2 COMBINED AT	COMB	74.	7.00	19.	9.	9.	.12	Van Buren	
+	HYDROGRAPH AT	3E	195.	8.00	89.	43.	43.	.59	SP RR	
+	HYDROGRAPH AT	4E	159.	7.50	57.	28.	28.	.37		
+	2 COMBINED AT	COMB1	340.	7.75	145.	71.	71.	.96	Buckeye Rd	
+	HYDROGRAPH AT	5E	194.	7.50	68.	33.	33.	.44		
+	2 COMBINED AT	COMB2	527.	7.58	213.	104.	104.	1.40	RID	
+	HYDROGRAPH AT	3W	55.	7.08	14.	7.	7.	.09	SPRR	
+	HYDROGRAPH AT	4W	67.	7.00	16.	8.	8.	.10		
+	2 COMBINED AT	COMB5	121.	7.00	29.	15.	15.	.19	Buckeye Rd	
+	HYDROGRAPH AT	5W	65.	6.92	14.	7.	7.	.09		
+	2 COMBINED AT	COMB6	184.	7.00	43.	21.	21.	.28		
+	2 COMBINED AT	COMB7	629.	7.42	256.	126.	126.	1.68	RID	
	ROUTED TO									

+		RID	329.	8.67	202.	98.	98.	1.68	1025.52 8.67
+	HYDROGRAPH AT	6E	90.	7.92	39.	19.	19.	.29	Lower Buckeye
+	2 COMBINED AT	COMB3	403.	8.33	242.	117.	117.	1.97	
+	HYDROGRAPH AT	7E	168.	8.92	99.	48.	48.	.85	
+	2 COMBINED AT	COMB4	563.	8.50	341.	165.	165.	2.82	Broadway
+	HYDROGRAPH AT	6W	35.	7.33	11.	5.	5.	.08	Lower Buckeye
+	HYDROGRAPH AT	7W	48.	7.75	19.	9.	9.	.15	
+	2 COMBINED AT	COMB8	80.	7.50	31.	15.	15.	.23	Broadway

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

1 ****
FLOOD HYDROGRAPH PACKAGE HEC-1 (IBM XT 512K VERSION) -FEB 1.1985
U.S. ARMY CORPS OF ENGINEERS, THE HYDROLOGIC ENGINEERING CENTER, 609 SECOND STREET, DAVIS, CA. 95616
****

SEGMENT 1 - I-10 PAPAGO TO SALT RIVER
100 yr - 24 hr event

THIS HEC-1 VERSION CONTAINS ALL OPTIONS EXCEPT ECONOMICS, AND THE NUMBER OF PLANS ARE REDUCED TO 3

1 HEC-1 INPUT PAGE 1

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

  1           ID        NORTH OF THE SALT HYDROLOGY
  2           ID        SOUTH WEST LOOP ADOT     100 YR 24 HR ANALYSIS
  3           ID        FUTURE CONDITIONS 11/19/87
              *DIAGRAM
  4           IT       5 19NOV87    1200     150
  5           IO       3       0

  6           KK      1E
  7           BA    0.13
  8           PH              0    0.77    1.52    2.66    2.82    2.97    3.35    3.69    4.04
  9           LS          92.00
 10           UD    0.62

 11           KK      1W
 12           BA    0.04
 13           LS          92.00
 14           UD    0.32

 15           KK      2E
 16           BA    0.05
 17           LS          92.00
 18           UD    0.71

 19           KK      2W
 20           BA    0.07
 21           LS          92.00
 22           UD    0.85

 23           KK    COMB
 24           HC       2

 25           KK      3E
 26           BA    0.59
 27           LS          92.00
 28           UD    1.70

 29           KK      4E
 30           BA    0.37
 31           LS          92.00
 32           UD    1.25

 33           KK   COMB1
 34           HC       2
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 35          KK      5E
 36          BA    0.44
 37          LS           92.00
 38          UD    1.21

 39          KK   COMB2
 40          HC       2
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 41          KK      3W
 42          BA    0.09
 43          LS           92.00
 44          UD    0.81

 45          KK      4W
 46          BA    0.10
 47          LS           92.00
 48          UD    0.72

 49          KK   COMB5
 50          HC       2

 51          KK      5W
 52          BA    0.09
 53          LS           92.00
 54          UD    0.64

 55          KK   COMB6
 56          HC       2

 57          KK   COMB7
 58          IO       1       0
 59          HC       2

 60          KK     RIB
 61          RS       1    ELEV  1020.0      0.
 62          SL  1022.5    39.3     0.6     0.5
 63          SV            10.2    20.6    31.1    41.9    52.8    63.9    75.3    86.8    98.5
 64          SE   1020.   1021.   1022.   1023.   1024.   1025.   1026.   1027.   1028.   1029.
 65          SS    1050       0     3.0     1.5

 66          KK      6E
 67          IO       3       0
 68          BA    0.29
 69          LS           90.00
 70          UD     1.6

 71          KK   COMB3
 72          HC       2

 73          KK      7E
 74          BA    0.85
 75          LS           89.00
 76          UD    2.51

 77          KK   COMB4
 78          HC       2
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
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```
79          KK      6W
80          BA    0.08
81          LS            90.00
82          UD    1.07

83          KK      7W
84          BA    0.15
85          LS            89.00
86          UD    1.44

87          KK   COMB8
88          HC       2
89          ZZ
```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

```
INPUT
 LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

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

   6          1E
               .
               .
  11          .          1W
              .           .
              .           .
  15          .           .          2E
              .           .           .
              .           .           .
  19          .           .           .          2W
              .           .           .           .
              .           .           .           .
  23          .           .        COMB.........
              .           .           .
              .           .           .
  25          .           .           .          3E
              .           .           .           .
              .           .           .           .
  29          .           .           .           .          4E
              .           .           .           .           .
              .           .           .           .           .
  33          .           .           .       COMB1........
              .           .           .           .
              .           .           .           .
  35          .           .           .           .          5E
              .           .           .           .           .
              .           .           .           .           .
  39          .           .           .       COMB2........
              .           .           .           .
              .           .           .           .
  41          .           .           .           .          3W
              .           .           .           .           .
              .           .           .           .           .
  45          .           .           .           .           .          4W
              .           .           .           .           .           .
              .           .           .           .           .           .
  49          .           .           .           .       COMB5........
              .           .           .           .           .
              .           .           .           .           .
  51          .           .           .           .           .          5W
              .           .           .           .           .           .
              .           .           .           .           .           .
  55          .           .           .           .       COMB6........
              .           .           .           .           .
              .           .           .           .           .
  57          .           .           .       COMB7........
```

```
                 .          .          .          V
                 .          .          .          V
   60            .          .          .        RID
                 .          .          .          .
                 .          .          .          .
   66            .          .          .          .          6E
                 .          .          .          .           .
                 .          .          .          .           .
   71            .          .          .     COMB3.............
                 .          .          .          .
                 .          .          .          .
   73            .          .          .          .          7E
                 .          .          .          .           .
                 .          .          .          .           .
   77            .          .          .     COMB4.............
                 .          .          .          .
                 .          .          .          .
   79            .          .          .          .          6W
                 .          .          .          .           .
                 .          .          .          .           .
   83            .          .          .          .           .          7W
                 .          .          .          .           .           .
                 .          .          .          .           .           .
   87            .          .          .          .      COMB8............
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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1                                                          ****
                    FLOOD HYDROGRAPH PACKAGE HEC-1 (IBM XT 512K VERSION) -FEB 1,1985
          U.S. ARMY CORPS OF ENGINEERS, THE HYDROLOGIC ENGINEERING CENTER, 609 SECOND STREET, DAVIS, CA. 95616
                                                           ****
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                         NORTH OF THE SALT HYDROLOGY
                         SOUTH WEST LOOP ADOT     100 YR 24 HR ANALYSIS
                         FUTURE CONDITIONS 11/19/87

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

     IT        HYDROGRAPH TIME DATA
                      NMIN          5  MINUTES IN COMPUTATION INTERVAL
                     IDATE    19NOV87  STARTING DATE
                     ITIME       1200  STARTING TIME
                        NQ        150  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE    20NOV87  ENDING DATE
                    NDTIME       0025  ENDING TIME

                 COMPUTATION INTERVAL     .08 HOURS
                      TOTAL TIME BASE   12.42 HOURS

          ENGLISH UNITS
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            **************
            *            *
   6 KK     *        1E  *
            *            *
            **************
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                SUBBASIN RUNOFF DATA

  7 BA            SUBBASIN CHARACTERISTICS
                        TAREA          .13  SUBBASIN AREA

                  PRECIPITATION DATA

  8 PH                                 DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .77    1.52    2.66    2.82    2.97    3.35    3.69    4.04     .00     .00     .00     .00

                                                  STORM AREA =      .13

  9 LS            SCS LOSS RATE
                       STRTL          .17  INITIAL ABSTRACTION
                      CRVNBR        92.00  CURVE NUMBER
                       RTIMP          .00  PERCENT IMPERVIOUS AREA

 10 UD            SCS DIMENSIONLESS UNITGRAPH
                        TLAG          .62  LAG

                                                     ***

                                                UNIT HYDROGRAPH
                                            39 END-OF-PERIOD ORDINATES
                    5.      14.      27.      45.      67.      84.      93.      95.      92.      84.
                   75.      63.      50.      39.      32.      26.      22.      18.      14.      12.
                   10.       8.       6.       5.       4.       3.       3.       2.       2.       1.
                    1.       1.       1.       1.       1.       0.       0.       0.       0.

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

                         HYDROGRAPH AT STATION       1E

     TOTAL RAINFALL =    3.71, TOTAL LOSS =     .87, TOTAL EXCESS =    2.83

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                        6-HR       24-HR       72-HR     12.42-HR
+   (CFS)       (HR)
                                      (CFS)
+     185.      6.83                    38.         19.         19.         19.
                                   (INCHES)      2.717       2.799       2.799       2.799
                                    (AC-FT)        19.         19.         19.         19.

                         CUMULATIVE AREA =     .13 SQ MI


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


            **************
            *            *
 11 KK      *        1W  *
            *            *
            **************

                SUBBASIN RUNOFF DATA

 12 BA            SUBBASIN CHARACTERISTICS
                        TAREA          .04  SUBBASIN AREA

                  PRECIPITATION DATA
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```
  8 PH                                  DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                   .77    1.52    2.66    2.82    2.97    3.35    3.69    4.04     .00     .00     .00     .00

                                                STORM AREA =      .04

 13 LS            SCS LOSS RATE
                       STRTL        .17  INITIAL ABSTRACTION
                      CRVNBR      92.00  CURVE NUMBER
                       RTIMP        .00  PERCENT IMPERVIOUS AREA

 14 UD            SCS DIMENSIONLESS UNITGRAPH
                        TLAG        .32  LAG

                                                      ***

                                                UNIT HYDROGRAPH
                                            21 END-OF-PERIOD ORDINATES
                  7.      22.      43.      53.      51.      42.      29.      19.      14.       9.
                  6.       4.       3.       2.       1.       1.       1.       0.       0.       0.
                  0.

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

                          HYDROGRAPH AT STATION       1W

    TOTAL RAINFALL =    3.71, TOTAL LOSS =     .87, TOTAL EXCESS =    2.83

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                        6-HR       24-HR       72-HR     12.42-HR
+   (CFS)       (HR)
                                     (CFS)
+     85.       6.58                    12.          6.          6.          6.
                                  (INCHES)     2.721       2.817       2.817       2.817
                                   (AC-FT)       6.          6.          6.          6.

                          CUMULATIVE AREA =     .04 SQ MI


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


                 **************
                 *            *
 15 KK           *        2E  *
                 *            *
                 **************

                 SUBBASIN RUNOFF DATA

 16 BA             SUBBASIN CHARACTERISTICS
                        TAREA        .05  SUBBASIN AREA

                   PRECIPITATION DATA

  8 PH                                  DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                   .77    1.52    2.66    2.82    2.97    3.35    3.69    4.04     .00     .00     .00     .00

                                                STORM AREA =      .05
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17 LS          SCS LOSS RATE
                    STRTL        .17  INITIAL ABSTRACTION
                   CRVNBR      92.00  CURVE NUMBER
                    RTIMP        .00  PERCENT IMPERVIOUS AREA

18 UD          SCS DIMENSIONLESS UNITGRAPH
                     TLAG        .71  LAG

                                                    ***

                                              UNIT HYDROGRAPH
                                         45 END-OF-PERIOD ORDINATES
                 1.      4.      7.     12.     18.     25.     29.     32.     32.     32.
                29.     27.     24.     20.     16.     13.     11.      9.      8.      6.
                 5.      4.      4.      3.      3.      2.      2.      2.      1.      1.
                 1.      1.      1.      1.      0.      0.      0.      0.      0.      0.
                 0.      0.      0.      0.      0.

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

                        HYDROGRAPH AT STATION      2E

    TOTAL RAINFALL =    3.71, TOTAL LOSS =     .87, TOTAL EXCESS =    2.83

  PEAK FLOW     TIME                        MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     12.42-HR
+   (CFS)       (HR)
                              (CFS)
+     65.       6.92                15.          7.          7.          7.
                           (INCHES)     2.717       2.794       2.794       2.794
                            (AC-FT)       7.          7.          7.          7.

                        CUMULATIVE AREA =     .05 SQ MI


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

            **************
            *            *
19 KK       *        2W  *
            *            *
            **************

               SUBBASIN RUNOFF DATA

20 BA          SUBBASIN CHARACTERISTICS
                     TAREA        .07  SUBBASIN AREA

               PRECIPITATION DATA

 8 PH                                 DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
               ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
               5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                 .77    1.52    2.66    2.82    2.97    3.35    3.69    4.04     .00     .00     .00     .00

                                                STORM AREA =     .07

21 LS          SCS LOSS RATE
                    STRTL        .17  INITIAL ABSTRACTION
                   CRVNBR      92.00  CURVE NUMBER
                    RTIMP        .00  PERCENT IMPERVIOUS AREA

22 UD          SCS DIMENSIONLESS UNITGRAPH
```

TLAG .85 LAG

***

UNIT HYDROGRAPH
53 END-OF-PERIOD ORDINATES

1.	3.	7.	11.	16.	22.	28.	33.	36.	38.
38.	37.	35.	32.	30.	26.	22.	18.	15.	13.
11.	10.	9.	7.	6.	5.	5.	4.	3.	3.
3.	2.	2.	2.	1.	1.	1.	1.	1.	1.
1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.							

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

HYDROGRAPH AT STATION 2W

TOTAL RAINFALL = 3.71, TOTAL LOSS = .87, TOTAL EXCESS = 2.83

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	12.42-HR
+ (CFS)	(HR)					
		(CFS)				
+ 79.	7.08		20.	10.	10.	10.
		(INCHES)	2.714	2.785	2.785	2.785
		(AC-FT)	10.	10.	10.	10.

CUMULATIVE AREA = .07 SQ MI

*** ***

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              **************
              *            *
  23 KK       *     COMB   *
              *            *
              **************
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24 HC HYDROGRAPH COMBINATION
ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

***

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

HYDROGRAPH AT STATION COMB

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	12.42-HR
+ (CFS)	(HR)					
		(CFS)				
+ 143.	7.00		35.	17.	17.	17.
		(INCHES)	2.715	2.789	2.789	2.789
		(AC-FT)	17.	18.	18.	18.

CUMULATIVE AREA = .12 SQ MI

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                **************
                *            *
25 KK           *     3E     *
                *            *
                **************

            SUBBASIN RUNOFF DATA

26 BA          SUBBASIN CHARACTERISTICS
                     TAREA          .59  SUBBASIN AREA

               PRECIPITATION DATA

 8 PH                                   DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
               ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
               5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                 .77    1.52    2.66    2.82    2.97    3.35    3.69    4.04     .00     .00     .00     .00

                                                   STORM AREA =      .59

27 LS          SCS LOSS RATE
                     STRTL          .17  INITIAL ABSTRACTION
                    CRVNBR        92.00  CURVE NUMBER
                     RTIMP          .00  PERCENT IMPERVIOUS AREA

28 UD          SCS DIMENSIONLESS UNITGRAPH
                     TLAG          1.70  LAG

                                                   ***

                                                UNIT HYDROGRAPH
                                          104 END-OF-PERIOD ORDINATES
                 2.      5.     10.     15.     22.     29.     38.     47.     59.     71.
                85.    100.    114.    126.    137.    146.    153.    158.    162.    163.
               164.    163.    162.    157.    153.    147.    142.    136.    129.    122.
               114.    105.     96.     87.     79.     73.     67.     62.     57.     53.
                49.     45.     42.     40.     37.     34.     31.     29.     27.     24.
                23.     21.     20.     18.     17.     16.     14.     13.     12.     11.
                10.     10.      9.      8.      8.      7.      6.      6.      6.      5.
                 5.      4.      4.      4.      4.      3.      3.      3.      3.      2.
                 2.      2.      2.      2.      2.      2.      1.      1.      1.      1.
                 1.      1.      1.      1.      1.      1.      1.      1.      0.      0.
                 0.      0.      0.      0.

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

                        HYDROGRAPH AT STATION       3E

   TOTAL RAINFALL =    3.70, TOTAL LOSS =     .87, TOTAL EXCESS =    2.83

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     12.42-HR
+   (CFS)       (HR)
                                    (CFS)
+     376.      8.00                  168.        83.         83.         83.
                                 (INCHES)       2.650       2.693       2.693       2.693
                                  (AC-FT)        83.         85.         85.         85.

                        CUMULATIVE AREA =     .59 SQ MI

*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***
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                **************
                *            *
 29 KK          *     4E     *
                *            *
                **************

                  SUBBASIN RUNOFF DATA

 30 BA              SUBBASIN CHARACTERISTICS
                          TAREA          .37  SUBBASIN AREA

                    PRECIPITATION DATA

  8 PH                                  DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                    ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                    5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                      .77    1.52    2.66    2.82    2.97    3.35    3.69    4.04     .00     .00     .00     .00

                                                        STORM AREA =      .37

 31 LS              SCS LOSS RATE
                          STRTL          .17  INITIAL ABSTRACTION
                         CRVNBR        92.00  CURVE NUMBER
                          RTIMP          .00  PERCENT IMPERVIOUS AREA

 32 UD              SCS DIMENSIONLESS UNITGRAPH
                          TLAG         1.25  LAG

                                                          ***

                                                    UNIT HYDROGRAPH
                                              77 END-OF-PERIOD ORDINATES
                      3.      7.     13.     21.     30.     41.     54.     69.     86.    101.
                    115.    125.    132.    137.    138.    138.    137.    132.    126.    120.
                    113.    105.     96.     86.     76.     67.     60.     53.     48.     43.
                     39.     35.     32.     29.     26.     24.     21.     19.     17.     15.
                     14.     13.     11.     10.      9.      8.      7.      7.      6.      5.
                      5.      4.      4.      4.      3.      3.      3.      2.      2.      2.
                      2.      2.      1.      1.      1.      1.      1.      1.      1.      1.
                      1.      0.      0.      0.      0.      0.      0.

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

                        HYDROGRAPH AT STATION       4E

    TOTAL RAINFALL =    3.70, TOTAL LOSS =     .87, TOTAL EXCESS =    2.83

  PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     12.42-HR
+   (CFS)        (HR)
                                    (CFS)
+     307.       7.50                107.         53.         53.         53.
                                 (INCHES)      2.697       2.754       2.754       2.754
                                  (AC-FT)        53.         54.         54.         54.

                        CUMULATIVE AREA =      .37 SQ MI


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

                **************
                *            *
 33 KK          *    COMB1   *
```

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

 34 HC            HYDROGRAPH COMBINATION
                       ICOMP          2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                                  ***

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

                          HYDROGRAPH AT STATION    COMB1

  PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR        24-HR        72-HR      12.42-HR
+   (CFS)        (HR)
                             (CFS)
+     657.       7.67                275.         136.         136.         136.
                          (INCHES)  2.666        2.716        2.716        2.716
                           (AC-FT)   137.         139.         139.         139.

                          CUMULATIVE AREA =      .96 SQ MI


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


                **************
                *            *
 35 KK          *        5E  *
                *            *
                **************

                   SUBBASIN RUNOFF DATA

 36 BA               SUBBASIN CHARACTERISTICS
                          TAREA          .44  SUBBASIN AREA

                     PRECIPITATION DATA

  8 PH                                   DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                     ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                     5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                       .77    1.52    2.66    2.82    2.97    3.35    3.69    4.04     .00     .00     .00     .00

                                                   STORM AREA =      .44

 37 LS               SCS LOSS RATE
                          STRTL          .17  INITIAL ABSTRACTION
                         CRVNBR        92.00  CURVE NUMBER
                          RTIMP          .00  PERCENT IMPERVIOUS AREA

 38 UD               SCS DIMENSIONLESS UNITGRAPH
                          TLAG         1.21  LAG

                                                                  ***

                                                   UNIT HYDROGRAPH
                                              75 END-OF-PERIOD ORDINATES
                      3.       9.      17.      27.      39.      53.      71.      90.     112.     130.
                    145.     158.     165.     169.     170.     169.     165.     158.     150.     142.
                    133.     121.     109.      96.      84.      74.      67.      60.      53.      48.
                     44.      39.      35.      32.      29.      25.      23.      21.      18.      17.
                     15.      13.      12.      11.       9.       9.       8.       7.       6.       6.
                      5.       5.       4.       4.       3.       3.       3.       2.       2.       2.
```

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                2.        2.        1.        1.        1.        1.        1.        1.        1.        1.
                0.        0.        0.        0.        0.

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

                        HYDROGRAPH AT STATION       CE

   TOTAL RAINFALL =    3.70, TOTAL LOSS =     .87, TOTAL EXCESS =    2.83

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                        6-HR       24-HR       72-HR     12.42-HR
+   (CFS)       (HR)
                                    (CFS)
+     374.      7.42                 128.         63.         63.         63.
                                 (INCHES)      2.699       2.757       2.757       2.757
                                  (AC-FT)       63.         65.         65.         65.

                        CUMULATIVE AREA =     .44 SQ MI


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


            **************
            *            *
   39 KK    *     COMB2  *
            *            *
            **************

   40 HC          HYDROGRAPH COMBINATION
                       ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE
                                                                  ***

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

                        HYDROGRAPH AT STATION    COMB2

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                        6-HR       24-HR       72-HR     12.42-HR
+   (CFS)       (HR)
                                    (CFS)
+    1020.      7.58                 403.        199.        199.        199.
                                 (INCHES)      2.675       2.729       2.729       2.729
                                  (AC-FT)       200.        204.        204.        204.

                        CUMULATIVE AREA =    1.40 SQ MI


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


            **************
            *            *
   41 KK    *        3W  *
            *            *
            **************

               SUBBASIN RUNOFF DATA

   42 BA          SUBBASIN CHARACTERISTICS
                       TAREA         .09  SUBBASIN AREA
```

PRECIPITATION DATA

8 PH

DEPTHS FOR 0-PERCENT HYPOTHETICAL STORM

HYDRO-35			TP-40					TP-49			
5-MIN	15-MIN	60-MIN	2-HR	3-HR	6-HR	12-HR	24-HR	2-DAY	4-DAY	7-DAY	10-DAY
.77	1.52	2.66	2.82	2.97	3.35	3.69	4.04	.00	.00	.00	.00

STORM AREA = .09

43 LS

SCS LOSS RATE

STRTL	.17	INITIAL ABSTRACTION
CRVNBR	92.00	CURVE NUMBER
RTIMP	.00	PERCENT IMPERVIOUS AREA

44 UD

SCS DIMENSIONLESS UNITGRAPH

TLAG	.81	LAG

***

UNIT HYDROGRAPH
51 END-OF-PERIOD ORDINATES

1.	5.	9.	15.	23.	32.	41.	47.	50.	51.
51.	48.	45.	41.	36.	31.	25.	21.	18.	15.
13.	11.	10.	8.	7.	6.	5.	4.	4.	3.
3.	2.	2.	2.	1.	1.	1.	1.	1.	1.
1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.									

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

HYDROGRAPH AT STATION 3W

TOTAL RAINFALL = 3.71, TOTAL LOSS = .87, TOTAL EXCESS = 2.83

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	12.42-HR
+	(CFS)	(HR)				
			(CFS)			
+	106.	7.08	26.	13.	13.	13.
			(INCHES) 2.715	2.788	2.788	2.788
			(AC-FT) 13.	13.	13.	13.

CUMULATIVE AREA = .09 SQ MI

*** ***

45 KK

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**************
*            *
*        4W  *
*            *
**************
```

SUBBASIN RUNOFF DATA

46 BA

SUBBASIN CHARACTERISTICS

TAREA	.10	SUBBASIN AREA

PRECIPITATION DATA

8 PH

DEPTHS FOR 0-PERCENT HYPOTHETICAL STORM

HYDRO-35 ..... TP-40 ..... TP-49 .....

5-MIN	15-MIN	60-MIN	2-HR	3-HR	6-HR	12-HR	24-HR	2-DAY	4-DAY	7-DAY	10-DAY
.77	1.52	2.66	2.82	2.97	3.35	3.69	4.04	.00	.00	.00	.00

STORM AREA = .10

```
47 LS          SCS LOSS RATE
                  STRTL         .17  INITIAL ABSTRACTION
                 CRVNBR       92.00  CURVE NUMBER
                  RTIMP         .00  PERCENT IMPERVIOUS AREA

48 UD          SCS DIMENSIONLESS UNITGRAPH
                   TLAG         .72  LAG
```

***

UNIT HYDROGRAPH
45 END-OF-PERIOD ORDINATES

2.	7.	14.	23.	35.	48.	57.	62.	63.	63.
59.	54.	48.	41.	33.	27.	22.	19.	16.	13.
11.	9.	8.	7.	5.	5.	4.	3.	3.	2.
2.	2.	1.	1.	1.	1.	1.	1.	0.	0.
0.	0.	0.	0.	0.					

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

HYDROGRAPH AT STATION 4W

TOTAL RAINFALL = 3.71, TOTAL LOSS = .87, TOTAL EXCESS = 2.83

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	12.42-HR
+ (CFS)	(HR)					
		(CFS)				
+ 128.	7.00		29.	15.	15.	15.
		(INCHES)	2.716	2.793	2.793	2.793
		(AC-FT)	14.	15.	15.	15.

CUMULATIVE AREA = .10 SQ MI

*** ***

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            **************
            *            *
49 KK       *    COMB5   *
            *            *
            **************

50 HC          HYDROGRAPH COMBINATION
                  ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE
```

***

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

HYDROGRAPH AT STATION COMB5

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	12.42-HR
+ (CFS)	(HR)					
		(CFS)				
+ 233.	7.00		55.	28.	28.	28.
		(INCHES)	2.715	2.791	2.791	2.791

(AC-FT) 28. 28. 28. 28.

CUMULATIVE AREA = .19 SQ MI

*** ***

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**************
*            *
*        5W  *
*            *
**************
```

51 KK

SUBBASIN RUNOFF DATA

52 BA SUBBASIN CHARACTERISTICS

TAREA .09 SUBBASIN AREA

PRECIPITATION DATA

8 PH DEPTHS FOR 0-PERCENT HYPOTHETICAL STORM

..... HYDRO-35			..... TP-40					..... TP-49			
5-MIN	15-MIN	60-MIN	2-HR	3-HR	6-HR	12-HR	24-HR	2-DAY	4-DAY	7-DAY	10-DAY
.77	1.52	2.66	2.82	2.97	3.35	3.69	4.04	.00	.00	.00	.00

STORM AREA = .09

53 LS SCS LOSS RATE

STRTL .17 INITIAL ABSTRACTION
CRVNBR 92.00 CURVE NUMBER
RTIMP .00 PERCENT IMPERVIOUS AREA

54 UD SCS DIMENSIONLESS UNITGRAPH

TLAG .64 LAG

***

UNIT HYDROGRAPH
40 END-OF-PERIOD ORDINATES

3.	9.	17.	29.	43.	55.	61.	64.	63.	58.
53.	45.	37.	29.	24.	19.	16.	13.	11.	9.
7.	6.	5.	4.	3.	3.	2.	2.	1.	1.
1.	1.	1.	1.	0.	0.	0.	0.	0.	0.

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

HYDROGRAPH AT STATION 5W

TOTAL RAINFALL = 3.71, TOTAL LOSS = .87, TOTAL EXCESS = 2.83

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	12.42-HR
+	(CFS)	(HR)	(CFS)				
+	125.	6.92		26.	13.	13.	13.
			(INCHES)	2.717	2.798	2.798	2.798
			(AC-FT)	13.	13.	13.	13.

CUMULATIVE AREA = .09 SQ MI

*** ***

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              **************
              *            *
  55 KK       *     COMB6  *
              *            *
              **************

  56 HC            HYDROGRAPH COMBINATION
                        ICOMP            2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                                  ***

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

                            HYDROGRAPH AT STATION     COMB6

  PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR        24-HR        72-HR      12.42-HR
+   (CFS)        (HR)
                          (CFS)
+     355.       6.92                 82.          41.          41.          41.
                          (INCHES)  2.716        2.793        2.793        2.793
                          (AC-FT)     41.          42.          42.          42.

                            CUMULATIVE AREA =      .28 SQ MI
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              **************
              *            *
  57 KK       *     COMB7  *
              *            *
              **************

  58 IO            OUTPUT CONTROL VARIABLES
                        IPRNT            1  PRINT CONTROL
                        IPLOT            0  PLOT CONTROL
                        QSCAL           0.  HYDROGRAPH PLOT SCALE

  59 HC            HYDROGRAPH COMBINATION
                        ICOMP            2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                                  ***
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HYDROGRAPH AT STATION COMB7
SUM OF 2 HYDROGRAPHS

****

DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLOW	DA MON HRMN	ORD	FLOW
19 NOV 1200	1	0.	19 NOV 1510	39	0.	19 NOV 1820	77	198.	19 NOV 2130	115	320.
19 NOV 1205	2	0.	19 NOV 1515	40	0.	19 NOV 1825	78	280.	19 NOV 2135	116	303.
19 NOV 1210	3	0.	19 NOV 1520	41	0.	19 NOV 1830	79	380.	19 NOV 2140	117	286.
19 NOV 1215	4	0.	19 NOV 1525	42	0.	19 NOV 1835	80	494.	19 NOV 2145	118	271.
19 NOV 1220	5	0.	19 NOV 1530	43	0.	19 NOV 1840	81	615.	19 NOV 2150	119	256.
19 NOV 1225	6	0.	19 NOV 1535	44	0.	19 NOV 1845	82	736.	19 NOV 2155	120	243.
19 NOV 1230	7	0.	19 NOV 1540	45	0.	19 NOV 1850	83	850.	19 NOV 2200	121	230.

19	NOV	1235	8	0.	*	19	NOV	1545	46	0.	*	19	NOV	1855	84	955.	*	19	NOV	2205	122	219.	
19	NOV	1240	9	0.	*	19	NOV	1550	47	1.	*	19	NOV	1900	85	1043.	*	19	NOV	2210	123	207.	
19	NOV	1245	10	0.	*	19	NOV	1555	48	1.	*	19	NOV	1905	86	1114.	*	19	NOV	2215	124	196.	
19	NOV	1250	11	0.	*	19	NOV	1600	49	1.	*	19	NOV	1910	87	1166.	*	19	NOV	2220	125	186.	
19	NOV	1255	12	0.	*	19	NOV	1605	50	2.	*	19	NOV	1915	88	1198.	*	19	NOV	2225	126	177.	
19	NOV	1300	13	0.	*	19	NOV	1610	51	2.	*	19	NOV	1920	89	1214.	*	19	NOV	2230	127	169.	
19	NOV	1305	14	0.	*	19	NOV	1615	52	3.	*	19	NOV	1925	90	1216.	*	19	NOV	2235	128	161.	
19	NOV	1310	15	0.	*	19	NOV	1620	53	4.	*	19	NOV	1930	91	1208.	*	19	NOV	2240	129	153.	
19	NOV	1315	16	0.	*	19	NOV	1625	54	5.	*	19	NOV	1935	92	1190.	*	19	NOV	2245	130	146.	
19	NOV	1320	17	0.	*	19	NOV	1630	55	6.	*	19	NOV	1940	93	1162.	*	19	NOV	2250	131	140.	
19	NOV	1325	18	0.	*	19	NOV	1635	56	7.	*	19	NOV	1945	94	1128.	*	19	NOV	2255	132	133.	
19	NOV	1330	19	0.	*	19	NOV	1640	57	8.	*	19	NOV	1950	95	1089.	*	19	NOV	2300	133	128.	
19	NOV	1335	20	0.	*	19	NOV	1645	58	10.	*	19	NOV	1955	96	1046.	*	19	NOV	2305	134	122.	
19	NOV	1340	21	0.	*	19	NOV	1650	59	11.	*	19	NOV	2000	97	998.	*	19	NOV	2310	135	117.	
19	NOV	1345	22	0.	*	19	NOV	1655	60	13.	*	19	NOV	2005	98	946.	*	19	NOV	2315	136	113.	
19	NOV	1350	23	0.	*	19	NOV	1700	61	15.	*	19	NOV	2010	99	890.	*	19	NOV	2320	137	108.	
19	NOV	1355	24	0.	*	19	NOV	1705	62	17.	*	19	NOV	2015	100	836.	*	19	NOV	2325	138	104.	
19	NOV	1400	25	0.	*	19	NOV	1710	63	19.	*	19	NOV	2020	101	785.	*	19	NOV	2330	139	100.	
19	NOV	1405	26	0.	*	19	NOV	1715	64	21.	*	19	NOV	2025	102	737.	*	19	NOV	2335	140	97.	
19	NOV	1410	27	0.	*	19	NOV	1720	65	23.	*	19	NOV	2030	103	692.	*	19	NOV	2340	141	93.	
19	NOV	1415	28	0.	*	19	NOV	1725	66	25.	*	19	NOV	2035	104	650.	*	19	NOV	2345	142	90.	
19	NOV	1420	29	0.	*	19	NOV	1730	67	27.	*	19	NOV	2040	105	610.	*	19	NOV	2350	143	87.	
19	NOV	1425	30	0.	*	19	NOV	1735	68	30.	*	19	NOV	2045	106	572.	*	19	NOV	2355	144	84.	
19	NOV	1430	31	0.	*	19	NOV	1740	69	32.	*	19	NOV	2050	107	536.	*	20	NOV	0000	145	81.	
19	NOV	1435	32	0.	*	19	NOV	1745	70	35.	*	19	NOV	2055	108	501.	*	20	NOV	0005	146	79.	
19	NOV	1440	33	0.	*	19	NOV	1750	71	39.	*	19	NOV	2100	109	468.	*	20	NOV	0010	147	76.	
19	NOV	1445	34	0.	*	19	NOV	1755	72	45.	*	19	NOV	2105	110	437.	*	20	NOV	0015	148	74.	
19	NOV	1450	35	0.	*	19	NOV	1800	73	54.	*	19	NOV	2110	111	409.	*	20	NOV	0020	149	72.	
19	NOV	1455	36	0.	*	19	NOV	1805	74	69.	*	19	NOV	2115	112	384.	*	20	NOV	0025	150	70.	
19	NOV	1500	37	0.	*	19	NOV	1810	75	93.	*	19	NOV	2120	113	361.	*						
19	NOV	1505	38	0.	*	19	NOV	1815	76	136.	*	19	NOV	2125	114	340.	*						
					*						*						*						

****

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	12.42-HR
+ (CFS)	(HR)					
		(CFS)				
+ 1216.	7.42		484.	239.	239.	239.
		(INCHES)	2.679	2.740	2.740	2.740
		(AC-FT)	240.	245.	245.	245.

CUMULATIVE AREA = 1.68 SQ MI

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              **************
              *            *
   60 KK      *      RID   *
              *            *
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HYDROGRAPH ROUTING DATA

61 RS STORAGE ROUTING

NSTPS	1	NUMBER OF SUBREACHES
ITYP	ELEV	TYPE OF INITIAL CONDITION
RSVRIC	1020.00	INITIAL CONDITION
X	.00	WORKING R AND D COEFFICIENT

63 SV	STORAGE	.0	10.2	20.6	31.1	41.9	52.8	63.9	75.3	86.8	98.5

64 SE	ELEVATION	1020.00	1021.00	1022.00	1023.00	1024.00	1025.00	1026.00	1027.00	1028.00	1029.00

62 SL LOW-LEVEL OUTLET

ELEVL	1022.50	ELEVATION AT CENTER OF OUTLET
CAREA	39.30	CROSS-SECTIONAL AREA
COQL	.60	COEFFICIENT
EXPL	.50	EXPONENT OF HEAD

65 SS SPILLWAY

CREL	1050.00	SPILLWAY CREST ELEVATION
SPWID	.00	SPILLWAY WIDTH
COQW	.00	WEIR COEFFICIENT
EXPW	1.50	EXPONENT OF HEAD

***

COMPUTED OUTFLOW-ELEVATION DATA

OUTFLOW	.00	.00	356.92	392.85	436.81	491.85	562.76	657.57	790.79	991.71
ELEVATION	1020.00	1022.50	1026.06	1026.82	1027.84	1029.26	1031.36	1034.59	1039.99	1050.00

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	10.20	20.60	25.85	31.10	41.90	52.80	63.90	64.61	73.19
OUTFLOW	.00	.00	.00	.00	133.72	231.61	299.01	353.80	356.92	392.85
ELEVATION	1020.00	1021.00	1022.00	1022.50	1023.00	1024.00	1025.00	1026.00	1026.06	1026.82
STORAGE	75.30	84.90	86.80	98.50	101.59	126.06	163.91	227.04	344.20	
OUTFLOW	401.17	436.81	443.51	482.14	491.85	562.76	657.57	790.79	991.71	
ELEVATION	1027.00	1027.84	1028.00	1029.00	1029.26	1031.36	1034.59	1039.99	1050.00	

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HYDROGRAPH AT STATION RID

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DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
19	NOV	1200	1	0.	.0	1020.0	*	19	NOV	1610	51	0.	.0	1020.0	*	19	NOV	2020	101	522.	112.0	1030.2
19	NOV	1205	2	0.	.0	1020.0	*	19	NOV	1615	52	0.	.1	1020.0	*	19	NOV	2025	102	527.	113.6	1030.3
19	NOV	1210	3	0.	.0	1020.0	*	19	NOV	1620	53	0.	.1	1020.0	*	19	NOV	2030	103	530.	114.9	1030.4
19	NOV	1215	4	0.	.0	1020.0	*	19	NOV	1625	54	0.	.1	1020.0	*	19	NOV	2035	104	533.	115.8	1030.5
19	NOV	1220	5	0.	.0	1020.0	*	19	NOV	1630	55	0.	.2	1020.0	*	19	NOV	2040	105	535.	116.5	1030.5
19	NOV	1225	6	0.	.0	1020.0	*	19	NOV	1635	56	0.	.2	1020.0	*	19	NOV	2045	106	536.	116.9	1030.6
19	NOV	1230	7	0.	.0	1020.0	*	19	NOV	1640	57	0.	.2	1020.0	*	19	NOV	2050	107	537.	117.0	1030.6
19	NOV	1235	8	0.	.0	1020.0	*	19	NOV	1645	58	0.	.3	1020.0	*	19	NOV	2055	108	536.	116.9	1030.6
19	NOV	1240	9	0.	.0	1020.0	*	19	NOV	1650	59	0.	.4	1020.0	*	19	NOV	2100	109	535.	116.5	1030.5
19	NOV	1245	10	0.	.0	1020.0	*	19	NOV	1655	60	0.	.5	1020.0	*	19	NOV	2105	110	533.	116.0	1030.5
19	NOV	1250	11	0.	.0	1020.0	*	19	NOV	1700	61	0.	.6	1020.1	*	19	NOV	2110	111	531.	115.2	1030.4
19	NOV	1255	12	0.	.0	1020.0	*	19	NOV	1705	62	0.	.7	1020.1	*	19	NOV	2115	112	529.	114.3	1030.3
19	NOV	1300	13	0.	.0	1020.0	*	19	NOV	1710	63	0.	.8	1020.1	*	19	NOV	2120	113	526.	113.2	1030.3
19	NOV	1305	14	0.	.0	1020.0	*	19	NOV	1715	64	0.	.9	1020.1	*	19	NOV	2125	114	522.	112.0	1030.2
19	NOV	1310	15	0.	.0	1020.0	*	19	NOV	1720	65	0.	1.1	1020.1	*	19	NOV	2130	115	518.	110.7	1030.0
19	NOV	1315	16	0.	.0	1020.0	*	19	NOV	1725	66	0.	1.2	1020.1	*	19	NOV	2135	116	514.	109.3	1029.9
19	NOV	1320	17	0.	.0	1020.0	*	19	NOV	1730	67	0.	1.4	1020.1	*	19	NOV	2140	117	510.	107.8	1029.8
19	NOV	1325	18	0.	.0	1020.0	*	19	NOV	1735	68	0.	1.6	1020.2	*	19	NOV	2145	118	505.	106.2	1029.7
19	NOV	1330	19	0.	.0	1020.0	*	19	NOV	1740	69	0.	1.8	1020.2	*	19	NOV	2150	119	501.	104.6	1029.5
19	NOV	1335	20	0.	.0	1020.0	*	19	NOV	1745	70	0.	2.1	1020.2	*	19	NOV	2155	120	496.	102.9	1029.4
19	NOV	1340	21	0.	.0	1020.0	*	19	NOV	1750	71	0.	2.3	1020.2	*	19	NOV	2200	121	490.	101.1	1029.2
19	NOV	1345	22	0.	.0	1020.0	*	19	NOV	1755	72	0.	2.6	1020.3	*	19	NOV	2205	122	485.	99.3	1029.1
19	NOV	1350	23	0.	.0	1020.0	*	19	NOV	1800	73	0.	3.0	1020.3	*	19	NOV	2210	123	479.	97.4	1028.9
19	NOV	1355	24	0.	.0	1020.0	*	19	NOV	1805	74	0.	3.4	1020.3	*	19	NOV	2215	124	472.	95.6	1028.7

19	NOV	1400	25	0.	.0	1020.0	*	19	NOV	1810	75	0.	3.9	1020.4	*	19	NOV	2220	125	466.	93.6	1028.6
19	NOV	1405	26	0.	.0	1020.0	*	19	NOV	1815	76	0.	4.7	1020.5	*	19	NOV	2225	126	460.	91.7	1028.4
19	NOV	1410	27	0.	.0	1020.0	*	19	NOV	1820	77	0.	5.9	1020.6	*	19	NOV	2230	127	453.	89.8	1028.3
19	NOV	1415	28	0.	.0	1020.0	*	19	NOV	1825	78	0.	7.5	1020.7	*	19	NOV	2235	128	447.	87.8	1028.1
19	NOV	1420	29	0.	.0	1020.0	*	19	NOV	1830	79	0.	9.8	1021.0	*	19	NOV	2240	129	440.	85.8	1027.9
19	NOV	1425	30	0.	.0	1020.0	*	19	NOV	1835	80	0.	12.8	1021.3	*	19	NOV	2245	130	433.	83.8	1027.7
19	NOV	1430	31	0.	.0	1020.0	*	19	NOV	1840	81	0.	16.6	1021.6	*	19	NOV	2250	131	426.	81.9	1027.6
19	NOV	1435	32	0.	.0	1020.0	*	19	NOV	1845	82	0.	21.3	1022.1	*	19	NOV	2255	132	418.	79.9	1027.4
19	NOV	1440	33	0.	.0	1020.0	*	19	NOV	1850	83	21.	26.7	1022.6	*	19	NOV	2300	133	411.	77.9	1027.2
19	NOV	1445	34	0.	.0	1020.0	*	19	NOV	1855	84	145.	32.3	1023.1	*	19	NOV	2305	134	404.	76.0	1027.1
19	NOV	1450	35	0.	.0	1020.0	*	19	NOV	1900	85	196.	38.0	1023.6	*	19	NOV	2310	135	396.	74.1	1026.9
19	NOV	1455	36	0.	.0	1020.0	*	19	NOV	1905	86	244.	43.9	1024.2	*	19	NOV	2315	136	389.	72.2	1026.7
19	NOV	1500	37	0.	.0	1020.0	*	19	NOV	1910	87	281.	50.0	1024.7	*	19	NOV	2320	137	381.	70.3	1026.6
19	NOV	1505	38	0.	.0	1020.0	*	19	NOV	1915	88	315.	56.0	1025.3	*	19	NOV	2325	138	373.	68.4	1026.4
19	NOV	1510	39	0.	.0	1020.0	*	19	NOV	1920	89	345.	62.1	1025.8	*	19	NOV	2330	139	365.	66.6	1026.2
19	NOV	1515	40	0.	.0	1020.0	*	19	NOV	1925	90	371.	68.0	1026.4	*	19	NOV	2335	140	358.	64.8	1026.1
19	NOV	1520	41	0.	.0	1020.0	*	19	NOV	1930	91	395.	73.7	1026.9	*	19	NOV	2340	141	349.	63.0	1025.9
19	NOV	1525	42	0.	.0	1020.0	*	19	NOV	1935	92	416.	79.2	1027.3	*	19	NOV	2345	142	341.	61.2	1025.8
19	NOV	1530	43	0.	.0	1020.0	*	19	NOV	1940	93	435.	84.3	1027.8	*	19	NOV	2350	143	332.	59.5	1025.6
19	NOV	1535	44	0.	.0	1020.0	*	19	NOV	1945	94	451.	89.2	1028.2	*	19	NOV	2355	144	324.	57.9	1025.5
19	NOV	1540	45	0.	.0	1020.0	*	19	NOV	1950	95	466.	93.6	1028.6	*	20	NOV	0000	145	316.	56.2	1025.3
19	NOV	1545	46	0.	.0	1020.0	*	19	NOV	1955	96	480.	97.7	1028.9	*	20	NOV	0005	146	308.	54.6	1025.2
19	NOV	1550	47	0.	.0	1020.0	*	19	NOV	2000	97	491.	101.4	1029.3	*	20	NOV	0010	147	300.	53.1	1025.0
19	NOV	1555	48	0.	.0	1020.0	*	19	NOV	2005	98	501.	104.7	1029.5	*	20	NOV	0015	148	291.	51.6	1024.9
19	NOV	1600	49	0.	.0	1020.0	*	19	NOV	2010	99	509.	107.5	1029.8	*	20	NOV	0020	149	282.	50.1	1024.8
19	NOV	1605	50	0.	.0	1020.0	*	19	NOV	2015	100	516.	110.0	1030.0	*	20	NOV	0025	150	273.	48.7	1024.6

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	12.42-HR
+ (CFS)	(HR)					
		(CFS)				
+ 537.	8.83		397.	192.	192.	192.
		(INCHES)	2.197	2.197	2.197	2.197
		(AC-FT)	197.	197.	197.	197.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	12.42-HR
+ (AC-FT)	(HR)				
117.	8.83	81.	39.	39.	39.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	12.42-HR
+ (FEET)	(HR)				
1030.58	8.83	1027.44	1023.62	1023.62	1023.62

CUMULATIVE AREA = 1.68 SQ MI

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            **************
            *            *
  66 KK     *        6E  *
            *            *
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67 IO OUTPUT CONTROL VARIABLES

IPRNT	3	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

SUBBASIN RUNOFF DATA

68 BA SUBBASIN CHARACTERISTICS
TAREA .29 SUBBASIN AREA

PRECIPITATION DATA

8 PH DEPTHS FOR 0-PERCENT HYPOTHETICAL STORM

..... HYDRO-35			..... TP-40					..... TP-49			
5-MIN	15-MIN	60-MIN	2-HR	3-HR	6-HR	12-HR	24-HR	2-DAY	4-DAY	7-DAY	10-DAY
.77	1.52	2.66	2.82	2.97	3.35	3.69	4.04	.00	.00	.00	.00

STORM AREA = .29

69 LS SCS LOSS RATE
STRTL .22 INITIAL ABSTRACTION
CRVNBR 90.00 CURVE NUMBER
RTIMP .00 PERCENT IMPERVIOUS AREA

70 UD SCS DIMENSIONLESS UNITGRAPH
TLAG 1.60 LAG

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UNIT HYDROGRAPH
98 END-OF-PERIOD ORDINATES

1.	3.	6.	9.	13.	17.	22.	27.	34.	41.
50.	58.	65.	71.	76.	80.	83.	85.	85.	85.
85.	84.	81.	78.	75.	72.	69.	65.	60.	56.
50.	46.	41.	38.	35.	32.	29.	27.	25.	23.
21.	20.	18.	17.	16.	14.	13.	12.	11.	10.
9.	9.	8.	7.	7.	6.	6.	5.	5.	4.
4.	4.	3.	3.	3.	3.	2.	2.	2.	2.
2.	2.	2.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.		

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HYDROGRAPH AT STATION 6E

TOTAL RAINFALL = 3.70, TOTAL LOSS = 1.06, TOTAL EXCESS = 2.64

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	12.42-HR
+	(CFS)	(HR)					
			(CFS)				
+	182.	7.83		78.	38.	38.	38.
			(INCHES)	2.491	2.521	2.521	2.521
			(AC-FT)	39.	39.	39.	39.

CUMULATIVE AREA = .29 SQ MI

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**************
*            *
*     COMB3  *
*            *
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71 KK

72 HC HYDROGRAPH COMBINATION

ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

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HYDROGRAPH AT STATION COMB3

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	12.42-HR
+ 684.	8.33	(CFS)	475.	230.	230.	230.
		(INCHES)	2.240	2.244	2.244	2.244
		(AC-FT)	235.	236.	236.	236.

CUMULATIVE AREA = 1.97 SQ MI

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*            *
*        7E  *
*            *
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73 KK

SUBBASIN RUNOFF DATA

74 BA

SUBBASIN CHARACTERISTICS

TAREA .85 SUBBASIN AREA

PRECIPITATION DATA

8 PH

DEPTHS FOR 0-PERCENT HYPOTHETICAL STORM

..... HYDRO-35			..... TP-40					..... TP-49			
5-MIN	15-MIN	60-MIN	2-HR	3-HR	6-HR	12-HR	24-HR	2-DAY	4-DAY	7-DAY	10-DAY
.77	1.52	2.66	2.82	2.97	3.35	3.69	4.04	.00	.00	.00	.00

STORM AREA = .85

75 LS

SCS LOSS RATE

STRTL .25 INITIAL ABSTRACTION

CRVNBR 89.00 CURVE NUMBER

RTIMP .00 PERCENT IMPERVIOUS AREA

76 UD

SCS DIMENSIONLESS UNITGRAPH

TLAG 2.51 LAG

***

UNIT HYDROGRAPH TRUNCATED FROM 153 TO 150 INT ERVALS

UNIT HYDROGRAPH
150 END-OF-PERIOD ORDINATES
VOLUME = 1.00

2.	3.	5.	8.	12.	16.	20.	25.	30.	36.
42.	48.	56.	65.	73.	83.	93.	103.	111.	120.
128.	135.	141.	147.	151.	154.	158.	160.	160.	161.
161.	160.	160.	158.	155.	152.	149.	145.	141.	138.
133.	129.	125.	120.	114.	109.	103.	96.	90.	85.
80.	74.	71.	67.	63.	60.	57.	54.	51.	48.

46.	44.	42.	40.	38.	36.	34.	32.	31.	29.
28.	26.	24.	23.	22.	21.	20.	19.	18.	17.
16.	15.	15.	14.	13.	12.	12.	11.	11	10.
9.	9.	8.	8.	8.	7.	7.	6.	6.	5.
6.	5.	5.	5.	4.	4.	4.	4.	4.	3.
3.	3.	3.	3.	3. .	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	0.	0.	0.	0.	0.	0.	0.

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HYDROGRAPH AT STATION 7E

TOTAL RAINFALL = 3.70, TOTAL LOSS = 1.16, TOTAL EXCESS = 2.54

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	12.42-HR
+ (CFS)	(HR)					
		(CFS)				
+ 346.	8.83		203.	98.	98.	98.
		(INCHES)	2.216	2.224	2.224	2.224
		(AC-FT)	100.	101.	101.	101.

CUMULATIVE AREA = .85 SQ MI

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              **************
              *            *
   77 KK      *     COMB4  *
              *            *
              **************
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78 HC HYDROGRAPH COMBINATION
ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

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HYDROGRAPH AT STATION COMB4

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	12.42-HR
+ (CFS)	(HR)					
		(CFS)				
+ 1015.	8.50		677.	328.	328.	328.
		(INCHES)	2.233	2.238	2.238	2.238
		(AC-FT)	336.	337.	337.	337.

CUMULATIVE AREA = 2.82 SQ MI

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              *            *
   79 KK      *        6W  *
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*             *
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  SUBBASIN RUNOFF DATA

80 BA        SUBBASIN CHARACTERISTICS
                TAREA          .08  SUBBASIN AREA

             PRECIPITATION DATA

 8 PH                              DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
             ..... HYDRO-35 ......  ............... TP-40 ...............   ........... TP-49 ...........
             5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
               .77    1.52    2.66    2.82    2.97    3.35    3.69    4.04     .00     .00     .00     .00

                                                STORM AREA =     .08

81 LS        SCS LOSS RATE
                STRTL          .22  INITIAL ABSTRACTION
               CRVNBR        90.00  CURVE NUMBER
                RTIMP          .00  PERCENT IMPERVIOUS AREA

82 UD        SCS DIMENSIONLESS UNITGRAPH
                TLAG         1.07  LAG

                                                  ***

                                              UNIT HYDROGRAPH
                                         66 END-OF-PERIOD ORDINATES
             1.      2.      4.      7.     10.     14.     18.     23.     27.     30.
            33.     34.     35.     35.     34.     32.     31.     29.     26.     24.
            21.     18.     15.     14.     12.     11.      9.      8.      8.      7.
             6.      5.      5.      4.      4.      3.      3.      2.      2.      2.
             2.      2.      1.      1.      1.      1.      1.      1.      1.      1.
             1.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             0.      0.      0.      0.      0.      0.

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

                  HYDROGRAPH AT STATION      6W

  TOTAL RAINFALL =    3.71, TOTAL LOSS =    1.06, TOTAL EXCESS =    2.64

 PEAK FLOW     TIME                        MAXIMUM AVERAGE FLOW
+  (CFS)       (HR)                 6-HR       24-HR       72-HR     12.42-HR
                              (CFS)
+     71.      7.33                 22.         11.         11.         11.
                          (INCHES)  2.535      2.578       2.578       2.578
                          (AC-FT)    11.         11.         11.         11.

                  CUMULATIVE AREA =     .08 SQ MI


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             *            *
 93 KK       *      7W    *
             *            *
             **************

  SUBBASIN RUNOFF DATA
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 84 BA          SUBBASIN CHARACTERISTICS
                     TAREA          .15  SUBBASIN AREA

                PRECIPITATION DATA

  3 PM                                  DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                  .77    1.52    2.66    2.82    2.97    3.35    3.69    4.04     .00     .00     .00     .00

                                                STORM AREA =      .15

 85 LS          SCS LOSS RATE
                     STRTL          .25  INITIAL ABSTRACTION
                    CRVNBR        89.00  CURVE NUMBER
                     RTIMP          .00  PERCENT IMPERVIOUS AREA

 86 UD          SCS DIMENSIONLESS UNITGRAPH
                      TLAG         1.44  LAG

                                                        ***

                                                   UNIT HYDROGRAPH
                                              88 END-OF-PERIOD ORDINATES
                     1.      2.      4.      6.      8.     11.     15.     19.     24.     29.
                    34.     38.     42.     45.     47.     48.     49.     49.     49.     48.
                    46.     44.     42.     40.     38.     35.     32.     29.     26.     23.
                    21.     19.     17.     16.     14.     13.     12.     11.     10.      9.
                     9.      8.      7.      6.      6.      5.      5.      5.      4.      4.
                     3.      3.      3.      3.      2.      2.      2.      2.      2.      1.
                     1.      1.      1.      1.      1.      1.      1.      1.      1.      1.
                     1.      1.      0.      0.      0.      0.      0.      0.      0.      0.
                     0.      0.      0.      0.      0.      0.      0.      0.

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

                          HYDROGRAPH AT STATION       7W

    TOTAL RAINFALL =    3.71, TOTAL LOSS =    1.16; TOTAL EXCESS =    2.55

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                        6-HR       24-HR       72-HR     12.42-HR
+   (CFS)       (HR)
                                     (CFS)
+     99.       7.67                   39.         19.         19.         19.
                                 (INCHES)        2.423       2.452       2.452       2.452
                                  (AC-FT)         19.         20.         20.         20.

                          CUMULATIVE AREA =     .15 SQ MI


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                 *            *
 87 KK           *     COMB8  *
                 *            *
                 **************

 88 HC          HYDROGRAPH COMBINATION
                      ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE
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HYDROGRAPH AT STATION COMB8

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	12.42-HR
164.	7.50	(CFS)	61.	30.	30.	30.
		(INCHES)	2.461	2.496	2.496	2.496
		(AC-FT)	30.	31.	31.	31.

CUMULATIVE AREA = .23 SQ MI

1

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

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
HYDROGRAPH AT	1E	185.	6.83	38.	19.	19.	.13		
HYDROGRAPH AT	1W	85.	6.58	12.	6.	6.	.04		
HYDROGRAPH AT	2E	65.	6.92	15.	7.	7.	.05		
HYDROGRAPH AT	2W	79.	7.08	20.	10.	10.	.07		
2 COMBINED AT	COMB	143.	7.00	35.	17.	17.	.12		
HYDROGRAPH AT	3E	376.	8.00	168.	83.	83.	.59		
HYDROGRAPH AT	4E	307.	7.50	107.	53.	53.	.37		
2 COMBINED AT	COMB1	657.	7.67	275.	136.	136.	.96		
HYDROGRAPH AT	5E	374.	7.42	128.	63.	63.	.44		
2 COMBINED AT	COMB2	1020.	7.58	403.	199.	199.	1.40		
HYDROGRAPH AT	3W	106.	7.08	26.	13.	13.	.09		
HYDROGRAPH AT	4W	128.	7.00	29.	15.	15.	.10		
2 COMBINED AT	COMB5	233.	7.00	55.	28.	28.	.19		
HYDROGRAPH AT	5W	125.	6.92	26.	13.	13.	.09		

+	2 COMBINED AT	COMB6	355.	6.92	22.	41.	41.	.23	
+	2 COMBINED AT	COM67	1216.	7.42	484.	239.	239.	1.68	
+	ROUTED TO	RID	537.	8.83	397.	192.	192.	1.68	1030.58 8.83
+	HYDROGRAPH AT	6E	182.	7.83	78.	38.	38.	.29	
+	2 COMBINED AT	COMB3	684.	8.33	475.	230.	230.	1.97	
+	HYDROGRAPH AT	7E	346.	8.83	203.	98.	98.	.85	
+	2 COMBINED AT	COMB4	1015.	8.50	677.	328.	328.	2.82	
+	HYDROGRAPH AT	6W	71.	7.33	22.	11.	11.	.08	
+	HYDROGRAPH AT	7W	99.	7.67	39.	19.	19.	.15	
+	2 COMBINED AT	COMB8	164.	7.50	61.	30.	30.	.23	

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

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FLOOD HYDROGRAPH PACKAGE HEC-1 (IBM XT 512K VERSION) -FEB 1,1985
U.S. ARMY CORPS OF ENGINEERS, THE HYDROLOGIC ENGINEERING CENTER, 609 SECOND STREET, DAVIS, CA. 95616
****

SEGMENT 2 - ELLIOT ROAD TO CHAMPION DRAIN
10 yr - 24 hr event

THIS HEC-1 VERSION CONTAINS ALL OPTIONS EXCEPT ECONOMICS, AND THE NUMBER OF PLANS ARE REDUCED TO 3

1

HEC-1 INPUT


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

  1           ID        SOUTHWEST LOOP HYDROLOGY     ESTRELLA & ELLIOT RES MODELED
  2           ID        SOUTH OF THE SALT RIVER   DISCHARGE INTO CHAMPION DRAIN
  3           ID        FUTURE CONDITIONS 11/18/87 10 YEAR 24 HOUR ANALYSIS
              *DIAGRAM
  4           IT       5 18NOV87 1200.0  150.00
  5           IO       3

  6           KK     BA4
  7           BA    2.15
  8           PH      10          0.47    0.92    1.61    1.72    1.82    2.07    2.30    2.53
  9           LS            89.00
 10           UD     .41

 11           KK     BA5
 12           BA     9.5
 13           LS            84.00
 14           UD    4.28

 15           KK   COMB1
 16           HC       2

 17           KK     BA3
 18           BA     .30
 19           LS            96.00
 20           UD     .25

 21           KK     BA6
 22           BA    4.69
 23           LS            85.00
 24           UD    4.39

 25           KK    COMB
 26           HC       2

 27           KK     BA8
 28           BA    1.03
 29           LS            83.00
 30           UD    3.91

 31           KK   COMB3
 32           HC       3

 33           KK    BA6B
 34           BA    1.30
 35           LS            85.00
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 35          LS          [illegible]
 36          UD     2.9

 37          KK     BA2
 38          BA    1.13
 39          LS          97.00
 40          UD    0.25
```



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

 41          KK    BA6A
 42          BA    1.62
 43          LS          85.00
 44          UD    3.32

 45          KK   COMB5
 46          HC       2

 47          KK    COMB
 48          HC       2

 49          KK    B38A
 50          BA    0.20
 51          LS          90.0
 52          UD    0.65

 53          KK     BA1
 54          BA    2.44
 55          LS          90.00
 56          UD    0.65

 57          KK    COMB
 58          KO       1
 59          HC       2

 60          KK   ESTER
 61          RS       1    ELEV    1015       0
 62          SL  1017.2    63.6     0.6     0.5
 63          SV       0     8.9    27.2    45.8    65.0    84.6   104.7   125.3   146.4   168.0
 64          SV   190.1
 65          SE    1015  1015.8  1017.3  1018.8  1020.3  1021.8  1023.3  1024.8  1026.3  1027.8
 66          SE  1029.3
 67          SS    1050       0     3.0     1.5

 68          KK    BA7A
 69          BA    1.72
 70          LS          89.00
 71          UD    1.32

 72          KK    COMB
 73          HC       2

 74          KK     BA7
 75          BA    1.65
 76          LS          89.00
 77          UD    1.31

 78          KK    COMB
 79          HC       2
```



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

 80          KK   FLITT
```

81	RS	1	ELEV	1016	0						
82	SL	1018	50.3	0.6	0.5						
83	SV	0	12.8	25.8	38.9	52.1	65.4	78.8	92.4	106.1	110.7
84	SV	119.9									
85	SE	1016	1016.7	1017.4	1018.1	1018.8	1019.5	1020.2	1020.9	1021.6	1021.8
86	SE	1022.3									
87	SS	1050	0	3.0	1.5						
88	ZZ										

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

```
INPUT
 LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW
  NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

   6        BA4
              :
              :
  11          :          BA5
              :           :
              :           :
  15       COMB1............
              :
              :
  17          :          BA3
              :           :
              :           :
  21          :           :          BA6
              :           :           :
              :           :           :
  25          :        COMB............
              :           :
              :           :
  27          :           :          BA8
              :           :           :
              :           :           :
  31       COMB3........................
              :
              :
  33          :        BA6B
              :           :
              :           :
  37          :           :          BA2
              :           :           :
              :           :           :
  41          :           :           :          BA6A
              :           :           :           :
              :           :           :           :
  45          :           :        COMB5............
              :           :           :
              :           :           :
  47          :        COMB............
              :           :
              :           :
  49          :           :        B38A
              :           :           :
              :           :           :
  53          :           :           :          BA1
              :           :           :           :
              :           :           :           :
  57          :           :        COMB............
              :           :           V
              :           :           V
  60          :           :        ESTER
              :           :           :
```

```
68          .          .          .           BA7A
            .          .          .              .
            .          .          .              .
72          .          .       COMB.............
            .          .          .
            .          .          .
74          .          .          .           BA7
            .          .          .              .
            .          .          .              .
78          .          .       COMB.............
            .          .          V
            .          .          V
80          .          .       ELLIT
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

1

```
                                              ****
              FLOOD HYDROGRAPH PACKAGE HEC-1 (IBM XT 512K VERSION) -FEB 1,1985
  U.S. ARMY CORPS OF ENGINEERS, THE HYDROLOGIC ENGINEERING CENTER, 609 SECOND STREET, DAVIS, CA. 95616
                                              ****
```

```
                 SOUTHWEST LOOP HYDROLOGY      ESTRELLA & ELLIOT RES MODELED
                 SOUTH OF THE SALT RIVER    DISCHARGE INTO CHAMPION DRAIN
                 FUTURE CONDITIONS 11/18/87 10 YEAR 24 HOUR ANALYSIS

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

  IT         HYDROGRAPH TIME DATA
                   NMIN          5  MINUTES IN COMPUTATION INTERVAL
                  IDATE    18NOV87  STARTING DATE
                  ITIME       1200  STARTING TIME
                     NQ        150  NUMBER OF HYDROGRAPH ORDINATES
                 NDDATE    19NOV87  ENDING DATE
                 NDTIME       0025  ENDING TIME

             COMPUTATION INTERVAL      .08 HOURS
                  TOTAL TIME BASE    12.42 HOURS

        ENGLISH UNITS
```

*** ***

```
          **************
          *            *
6 KK      *     BA4    *
          *            *
          **************

         SUBBASIN RUNOFF DATA

7 BA      SUBBASIN CHARACTERISTICS
               TAREA       2.15  SUBBASIN AREA

          PRECIPITATION DATA

8 PH                      DEPTHS FOR  10-PERCENT HYPOTHETICAL STORM
     ..... HYDRO-35 ......  ............... TP-40 ...............  ........... TP-49 ...........
     5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
```

```
.47     .92     1.61    1.72    1.82    2.07    2.30    2.53    .00     .00     .00     .00

                                STORM AREA =    2.15

 9 LS        SCS LOSS RATE
                 STRTL        .25  INITIAL ABSTRACTION
                CRVNBR      89.00  CURVE NUMBER
                 RTIMP        .00  PERCENT IMPERVIOUS AREA

10 UD        SCS DIMENSIONLESS UNITGRAPH
                 TLAG        .41  LAG

                                        ***

                                   UNIT HYDROGRAPH
                              27 END-OF-PERIOD ORDINATES
        205.    627.    1314.   1981.   2281.   2266.   1991.   1618.   1148.   834.
        619.    466.    339.    254.    188.    139.    103.    77.     57.     42.
         31.     24.     19.     13.      9.      5.      0.

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

                HYDROGRAPH AT STATION      BA4

  TOTAL RAINFALL =    2.28, TOTAL LOSS =    1.02, TOTAL EXCESS =    1.26

 PEAK FLOW    TIME                    MAXIMUM AVERAGE FLOW
                              6-HR      24-HR      72-HR     12.42-HR
+  (CFS)      (HR)
                     (CFS)
+   1750.     6.67            285.       140.       140.       140.
                  (INCHES)   1.231      1.250      1.250      1.250
                   (AC-FT)   141.       143.       143.       143.

                CUMULATIVE AREA =    2.15 SQ MI


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

          **************
          *            *
11 KK     *     BA5    *
          *            *
          **************

          SUBBASIN RUNOFF DATA

12 BA       SUBBASIN CHARACTERISTICS
                TAREA       9.50  SUBBASIN AREA

            PRECIPITATION DATA

8 PH                          DEPTHS FOR  10-PERCENT HYPOTHETICAL STORM
            ..... HYDRO-35 .....  ............... TP-40 ...............  ........... TP-49 ...........
            5-MIN  15-MIN  60-MIN   2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
              .47     .92    1.61    1.72    1.82    2.07    2.30    2.53     .00     .00     .00     .00

                                STORM AREA =    9.50

13 LS       SCS LOSS RATE
                 STRTL        .38  INITIAL ABSTRACTION
                CRVNBR      84.00  CURVE NUMBER
                 RTIMP         00  PERCENT IMPERVIOUS AREA
```

14 UD SCS DIMENSIONLESS UNITGRAPH
TLAG 4.28 LAG

***

UNIT HYDROGRAPH TRUNCATED FROM 259 TO 150 INT ERVALS

UNIT HYDROGRAPH
150 END-OF-PERIOD ORDINATES
VOLUME = 1.00

6.	13.	19.	25.	32.	45.	60.	74.	89.	104.
121.	140.	159.	178.	197.	219.	244.	270.	295.	320.
348.	381.	415.	449.	483.	517.	557.	597.	637.	677.
717.	752.	785.	819.	853.	887.	913.	936.	959.	983.
1006.	1024.	1036.	1049.	1061.	1074.	1083.	1085.	1088.	1090.
1092.	1093.	1091.	1089.	1087.	1085.	1083.	1071.	1058.	1045.
1033.	1020.	1006.	991.	976.	961.	947.	931.	914.	897.
880.	863.	845.	824.	802.	781.	760.	738.	713.	688.
662.	637.	612.	591.	570.	549.	528.	506.	491.	476.
461.	446.	432.	418.	406.	393.	380.	368.	356.	345.
335.	324.	314.	304.	296.	289.	281.	273.	266.	258.
250.	242.	235.	227.	221.	214.	208.	202.	195.	189.
183.	176.	170.	164.	158.	154.	150.	146.	142.	137.
133.	129.	125.	121.	116.	113.	110.	107.	104.	101.
98.	94.	91.	88.	85.	82.	80.	78.	75.	73.

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

HYDROGRAPH AT STATION BA5

TOTAL RAINFALL = 2.25, TOTAL LOSS = 1.32, TOTAL EXCESS = .93

	PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	12.42-HR
+	874.	10.92	(CFS)	549.	265.	265.	265.
			(INCHES)	.537	.537	.537	.537
			(AC-FT)	272.	272.	272.	272.

CUMULATIVE AREA = 9.50 SQ MI

*** ***

```
**************
*            *
*    COMB1   *
*            *
**************
```

15 KK

16 HC HYDROGRAPH COMBINATION
ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

***

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

HYDROGRAPH AT STATION COMB1

PEAK FLOW TIME MAXIMUM AVERAGE FLOW

```
 PEAK FLOW      TIME                          6-HR        24-HR       72-HR      12.42-HR
+   (CFS)       (HR)
                                   (CFS)
+    1776.      6.67                          810.        405.        405.        405.
                                (INCHES)       .646        .669        .669        .669
                                 (AC-FT)       402.        416.        416.        416.

                          CUMULATIVE AREA =   11.65 SQ MI


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


                 **************
                 *            *
  17 KK          *     BA3    *
                 *            *
                 **************

                    SUBBASIN RUNOFF DATA

  18 BA               SUBBASIN CHARACTERISTICS
                            TAREA          .30  SUBBASIN AREA

                      PRECIPITATION DATA

   8 PH                                  DEPTHS FOR  10-PERCENT HYPOTHETICAL STORM
                      ..... HYDRO-35 ......  ............... TP-40 ...............  ........... TP-49 ...........
                      5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                        .47     .92    1.61    1.72    1.82    2.07    2.30    2.53     .00     .00     .00     .00

                                                     STORM AREA =      .30

  19 LS               SCS LOSS RATE
                            STRTL          .08  INITIAL ABSTRACTION
                           CRVNBR        96.00  CURVE NUMBER
                            RTIMP          .00  PERCENT IMPERVIOUS AREA

  20 UD               SCS DIMENSIONLESS UNITGRAPH
                             TLAG          .25  LAG

                                                                  ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                        UNIT HYDROGRAPH
                                                  17 END-OF-PERIOD ORDINATES
                      88.     301.     480.     480.     374.     224.     139.      90.      56.      35.
                      22.      14.       9.       5.       4.       2.       1.

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

                          HYDROGRAPH AT STATION      BA3

    TOTAL RAINFALL =    2.29, TOTAL LOSS =     .43, TOTAL EXCESS =    1.85

 PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                                6-HR        24-HR       72-HR      12.42-HR
+   (CFS)       (HR)
                                   (CFS)
+     455.      6.50                           57.         29.         29.         29.
                                (INCHES)      1.757       1.844       1.844       1.844
                                 (AC-FT)       28.         30.         30.         30.
```

CUMULATIVE AREA = .30 SQ MI

*** ***

```
**************
*            *
*     BA6    *
*            *
**************
```

21 KK

SUBBASIN RUNOFF DATA

22 BA

SUBBASIN CHARACTERISTICS

TAREA 4.69 SUBBASIN AREA

PRECIPITATION DATA

8 PH

DEPTHS FOR 10-PERCENT HYPOTHETICAL STORM

..... HYDRO-35			..... TP-40					..... TP-49			
5-MIN	15-MIN	60-MIN	2-HR	3-HR	6-HR	12-HR	24-HR	2-DAY	4-DAY	7-DAY	10-DAY
.47	.92	1.61	1.72	1.82	2.07	2.30	2.53	.00	.00	.00	.00

STORM AREA = 4.69

23 LS

SCS LOSS RATE

STRTL .35 INITIAL ABSTRACTION

CRVNBR 85.00 CURVE NUMBER

RTIMP .00 PERCENT IMPERVIOUS AREA

24 UD

SCS DIMENSIONLESS UNITGRAPH

TLAG 4.39 LAG

***

UNIT HYDROGRAPH TRUNCATED FROM 265 TO 150 INTERVALS

UNIT HYDROGRAPH
150 END-OF-PERIOD ORDINATES
VOLUME = 1.00

3.	6.	9.	12.	15.	21.	28.	35.	41.	48.
56.	65.	74.	83.	92.	101.	113.	125.	137.	149.
161.	175.	191.	207.	223.	239.	256.	275.	294.	313.
332.	350.	366.	382.	398.	414.	430.	442.	453.	464.
475.	486.	494.	500.	506.	512.	518.	523.	524.	525.
526.	527.	528.	528.	527.	526.	525.	524.	520.	514.
508.	502.	496.	490.	483.	476.	469.	462.	455.	448.
440.	432.	424.	416.	407.	397.	387.	377.	367.	357.
345.	333.	321.	309.	297.	287.	277.	267.	257.	247.
239.	232.	225.	218.	211.	204.	199.	193.	187.	181.
175.	170.	165.	160.	155.	150.	146.	142.	138.	135.
131.	128.	124.	120.	117.	113.	109.	106.	103.	100.
97.	94.	92.	89.	86.	83.	80.	77.	75.	73.
71.	69.	67.	65.	63.	61.	59.	57.	55.	54.
52.	51.	49.	48.	47.	45.	44.	42.	41.	39.

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

HYDROGRAPH AT STATION BA6

TOTAL RAINFALL = 2.27, TOTAL LOSS = 1.27, TOTAL EXCESS = 1.00

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	12.42-HR
+		(CFS)				
+ 460.	11.08		287.	139.	139.	139.
		(INCHES)	.568	.568	.568	.568
		(AC-FT)	142.	142.	142.	142.

CUMULATIVE AREA = 4.69 SQ MI

*** ***

```
              **************
              *            *
  25 KK       *      COMB  *
              *            *
              **************
```

26 HC HYDROGRAPH COMBINATION
ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

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

HYDROGRAPH AT STATION COMB

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	12.42-HR
+		(CFS)				
+ 467.	11.08		327.	167.	167.	167.
		(INCHES)	.610	.645	.645	.645
		(AC-FT)	162.	172.	172.	172.

CUMULATIVE AREA = 4.99 SQ MI

*** ***

```
              **************
              *            *
  27 KK       *      BA8   *
              *            *
              **************
```

SUBBASIN RUNOFF DATA

28 BA SUBBASIN CHARACTERISTICS
TAREA 1.03 SUBBASIN AREA

PRECIPITATION DATA

8 PH DEPTHS FOR 10-PERCENT HYPOTHETICAL STORM

..... HYDRO-35			..... TP-40					..... TP-49			
5-MIN	15-MIN	60-MIN	2-HR	3-HR	6-HR	12-HR	24-HR	2-DAY	4-DAY	7-DAY	10-DAY
.47	.92	1.61	1.72	1.82	2.07	2.30	2.53	.00	.00	.00	.00

STORM AREA = 1.03

STORM AREA = 1.00

```
29 LS          SCS LOSS RATE
                    STRTL          .41  INITIAL ABSTRACTION
                   CRVNBR        83.00  CURVE NUMBER
                    RTIMP          .00  PERCENT IMPERVIOUS AREA

30 UD          SCS DIMENSIONLESS UNITGRAPH
                    TLAG         3.91  LAG

                                                    ***
```

UNIT HYDROGRAPH TRUNCATED FROM 237 TO 150 INTERVALS

UNIT HYDROGRAPH
150 END-OF-PERIOD ORDINATES
VOLUME = 1.00

1.	2.	2.	3.	4.	6.	8.	10.	12.	14.
17.	19.	21.	24.	27.	30.	33.	37.	40.	44.
49.	53.	57.	62.	67.	72.	77.	82.	87.	91.
96.	100.	104.	108.	111.	114.	116.	119.	121.	123.
124.	126.	127.	127.	128.	128.	128.	128.	128.	128.
127.	127.	126.	124.	122.	121.	119.	117.	115.	113.
112.	110.	107.	105.	103.	101.	98.	96.	93.	90.
88.	84.	81.	78.	75.	71.	69.	66.	63.	61.
58.	56.	54.	53.	51.	49.	47.	46.	44.	42.
41.	40.	38.	37.	36.	35.	34.	33.	32.	31.
30.	29.	28.	27.	26.	25.	24.	24.	23.	22.
21.	20.	20.	19.	18.	18.	17.	17.	16.	16.
15.	14.	14.	13.	13.	13.	12.	12.	11.	11.
11.	10.	10.	10.	9.	9.	9.	8.	8.	8.
7.	7.	7.	7.	6.	6.	6.	6.	6.	5.

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

HYDROGRAPH AT STATION BA8

TOTAL RAINFALL = 2.28, TOTAL LOSS = 1.39, TOTAL EXCESS = .90

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW	6-HR	24-HR	72-HR	12.42-HR
+	(CFS)	(HR)	(CFS)	63.	31.	31.	31.
+	98.	10.50	(INCHES)	.573	.573	.573	.573
			(AC-FT)	31.	32.	32.	32.

CUMULATIVE AREA = 1.03 SQ MI

*** ***

```
              **************
              *            *
31 KK         *     COMB3  *
              *            *
              **************

32 HC          HYDROGRAPH COMBINATION
                    ICOMP            3  NUMBER OF HYDROGRAPHS TO COMBINE
                                                    ***
```

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

HYDROGRAPH AT STATION COMB3

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	12.42-HR
+		(CFS)				
+ 2108.	6.67		1200.	603.	603.	603.
		(INCHES)	.631	.657	.657	.657
		(AC-FT)	595.	619.	619.	619.

CUMULATIVE AREA = 17.67 SQ MI

*** ***

```
              **************
              *            *
  33 KK       *     BA6B   *
              *            *
              **************
```

SUBBASIN RUNOFF DATA

34 BA SUBBASIN CHARACTERISTICS

TAREA 1.30 SUBBASIN AREA

PRECIPITATION DATA

8 PH DEPTHS FOR 10-PERCENT HYPOTHETICAL STORM

..... HYDRO-35			..... TP-40					..... TP-49			
5-MIN	15-MIN	60-MIN	2-HR	3-HR	6-HR	12-HR	24-HR	2-DAY	4-DAY	7-DAY	10-DAY
.47	.92	1.61	1.72	1.82	2.07	2.30	2.53	.00	.00	.00	.00

STORM AREA = 1.30

35 LS SCS LOSS RATE

STRTL	.35	INITIAL ABSTRACTION
CRVNBR	85.00	CURVE NUMBER
RTIMP	.00	PERCENT IMPERVIOUS AREA

36 UD SCS DIMENSIONLESS UNITGRAPH

TLAG 2.90 LAG

***

UNIT HYDROGRAPH TRUNCATED FROM 176 TO 150 INT ERVALS

UNIT HYDROGRAPH
150 END-OF-PERIOD ORDINATES
VOLUME = 1.00

2.	4.	5.	8.	13.	17.	21.	27.	32.	37.
44.	51.	58.	65.	75.	85.	94.	105.	116.	128.
139.	149.	159.	169.	177.	184.	191.	197.	202.	205.
209.	212.	213.	213.	214.	213.	213.	212.	211.	208.
204.	200.	196.	192.	188.	183.	179.	174.	169.	163.
157.	151.	145.	138.	131.	123.	117.	111.	105.	98.
94.	90.	86.	82.	78.	74.	71.	68.	65.	62.
59.	57.	55.	52.	50.	48.	46.	44.	42.	40.
38.	36.	35.	33.	31.	30.	29.	27.	26.	25.
24.	23.	22.	21.	20.	19.	18.	17.	16.	16.

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

                    HYDROGRAPH AT STATION      BA2

   TOTAL RAINFALL =    3.70, TOTAL LOSS =     .35, TOTAL EXCESS =    3.35

 PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     12.42-HR
+   (CFS)       (HR)
                                   (CFS)
+   3042.       6.50                383.        196.        196.        196.
                              (INCHES)       3.148       3.338       3.338       3.338
                               (AC-FT)        190.        201.        201.        201.

                    CUMULATIVE AREA =    1.13 SQ MI


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


            **************
            *            *
   41 KK    *     BA6A   *
            *            *
            **************

              SUBBASIN RUNOFF DATA

   42 BA        SUBBASIN CHARACTERISTICS
                      TAREA         1.62  SUBBASIN AREA

                PRECIPITATION DATA

    8 PH                          DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                  .77    1.52    2.66    2.82    2.97    3.35    3.69    4.04     .00     .00     .00     .00

                                                STORM AREA =    1.62

   43 LS        SCS LOSS RATE
                      STRTL          .35  INITIAL ABSTRACTION
                     CRVNBR        85.00  CURVE NUMBER
                      RTIMP          .00  PERCENT IMPERVIOUS AREA

   44 UD        SCS DIMENSIONLESS UNITGRAPH
                      TLAG         3.32  LAG

                                                          ***

    UNIT HYDROGRAPH TRUNCATED FROM 201 TO 150 INT   ERVALS

                                          UNIT HYDROGRAPH
                                   150 END-OF-PERIOD ORDINATES
                                          VOLUME = 1.00
              2.       3.       5.       7.      11.      15.      19.      23.      28.      34.
             39.      44.      51.      58.      65.      72.      81.      90.      99.     109.
            119.     130.     141.     152.     162.     171.     181.     190.     197.     203.
            210.     216.     221.     224.     227.     231.     232.     233.     234.     234.
            234.     233.     233.     232.     230.     226.     223.     219.     216.     211.
            207.     203.     199.     194.     190.     185.     180.     174.     168.     162.
            156.     149.     142.     135.     129.     123.     117.     111.     106.     102.
             98.      94.      90.      87.      83.      80.      76      73       71       68
```

65.	63.	61.	59.	56.	54.	52.	50.	48.	46.
45.	43.	41.	39.	38.	36.	34.	33.	32.	31.
30.	28.	27.	26.	25.	24.	23.	22.	21.	21.
20.	19.	18.	17.	17.	16.	15.	15.	14.	14.
13.	12.	12.	12.	11.	11.	10.	10.	9.	9.
9.	8.	8.	8.	7.	7.	7.	7.	6.	6.
6.	6.	5.	5.	5.	5.	5.	4.	4.	4.

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

HYDROGRAPH AT STATION BA6A

TOTAL RAINFALL = 3.70, TOTAL LOSS = 1.51, TOTAL EXCESS = 2.19

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	12.42-HR
+		(CFS)	289.	140.	140.	140.
+ 444.	9.83	(INCHES)	1.658	1.660	1.660	1.660
		(AC-FT)	143.	143.	143.	143.

CUMULATIVE AREA = 1.62 SQ MI

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              **************
              *            *
45 KK         *     COMB5  *
              *            *
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46 HC HYDROGRAPH COMBINATION
ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

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HYDROGRAPH AT STATION COMB5

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	12.42-HR
+		(CFS)	637.	336.	336.	336.
+ 3057.	6.50	(INCHES)	2.155	2.350	2.350	2.350
		(AC-FT)	316.	345.	345.	345.

CUMULATIVE AREA = 2.75 SQ MI

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              **************
              *            *
47 KK         *      COMB  *
              *            *
              **************
```

15.	14.	14.	13.	12.	12.	11.	11.	10.	10.
9.	9.	9.	8.	8.	8.	7.	7.	7.	6.
6.	6.	5.	5.	5.	5.	5.	4.	4.	4.
4.	4.	3.	3.	3.	3.	3.	3.	3.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.

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

HYDROGRAPH AT STATION BA6B

TOTAL RAINFALL = 2.28, TOTAL LOSS = 1.27, TOTAL EXCESS = 1.01

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	12.42-HR
+ (CFS)	(HR)	(CFS)				
+ 178.	9.42		112.	54.	54.	54.
		(INCHES)	.802	.803	.803	.803
		(AC-FT)	56.	56.	56.	56.

CUMULATIVE AREA = 1.30 SQ MI

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              **************
              *            *
37 KK         *     BA2    *
              *            *
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SUBBASIN RUNOFF DATA

38 BA SUBBASIN CHARACTERISTICS

TAREA 1.13 SUBBASIN AREA

PRECIPITATION DATA

8 PH DEPTHS FOR 10-PERCENT HYPOTHETICAL STORM

..... HYDRO-35			..... TP-40					..... TP-49			
5-MIN	15-MIN	60-MIN	2-HR	3-HR	6-HR	12-HR	24-HR	2-DAY	4-DAY	7-DAY	10-DAY
.47	.92	1.61	1.72	1.82	2.07	2.30	2.53	.00	.00	.00	.00

STORM AREA = 1.13

39 LS SCS LOSS RATE

STRTL .06 INITIAL ABSTRACTION

CRVNBR 97.00 CURVE NUMBER

RTIMP .00 PERCENT IMPERVIOUS AREA

40 UD SCS DIMENSIONLESS UNITGRAPH

TLAG .25 LAG

***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

UNIT HYDROGRAPH
17 END-OF-PERIOD ORDINATES

332.	1135.	1806.	1806.	1408.	843.	524.	340.	211.	132.
83.	52.	33.	21.	14.	8.	3.			

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

HYDROGRAPH AT STATION BA2

TOTAL RAINFALL = 2.28, TOTAL LOSS = .33, TOTAL EXCESS = 1.95

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	12.42-HR
+ (CFS)	(HR)	(CFS)				
+ 1766.	6.50		223.	114.	114.	114.
		(INCHES)	1.836	1.941	1.941	1.941
		(AC-FT)	111.	117.	117.	117.

CUMULATIVE AREA = 1.13 SQ MI

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            *            *
 41 KK      *     BA6A   *
            *            *
            **************
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SUBBASIN RUNOFF DATA

42 BA SUBBASIN CHARACTERISTICS
TAREA 1.62 SUBBASIN AREA

PRECIPITATION DATA

8 PH DEPTHS FOR 10-PERCENT HYPOTHETICAL STORM

..... HYDRO-35			..... TP-40					..... TP-49			
5-MIN	15-MIN	60-MIN	2-HR	3-HR	6-HR	12-HR	24-HR	2-DAY	4-DAY	7-DAY	10-DAY
.47	.92	1.61	1.72	1.82	2.07	2.30	2.53	.00	.00	.00	.00

STORM AREA = 1.62

43 LS SCS LOSS RATE
STRTL .35 INITIAL ABSTRACTION
CRVNBR 85.00 CURVE NUMBER
RTIMP .00 PERCENT IMPERVIOUS AREA

44 UD SCS DIMENSIONLESS UNITGRAPH
TLAG 3.32 LAG

***

UNIT HYDROGRAPH TRUNCATED FROM 201 TO 150 INT ERVALS

UNIT HYDROGRAPH
150 END-OF-PERIOD ORDINATES
VOLUME = 1.00

2.	3.	5.	7.	11.	15.	19.	23.	28.	34.
39.	44.	51.	58.	65.	72.	81.	90.	99.	109.
119.	130.	141.	152.	162.	171.	181.	190.	197.	203.
210.	216.	221.	224.	227.	231.	232.	233.	234.	234.
234.	233.	233.	232.	230.	226.	223.	219.	216.	211.
207.	203.	199.	194.	190.	185.	180.	174.	168.	162.
156.	149.	142.	135.	129.	123.	117.	111.	106.	102.
98.	94.	90.	87.	83.	80.	76.	73.	71.	68.
[illegible]	[illegible]	[illegible]	[illegible]	56.	54.	52.	50.	48.	46.

65.	63.	61.	57.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
45.	43.	41.	39.	38.	36.	34.	33.	32.	31.	
30.	28.	27.	26.	25.	24.	23.	22.	21.	21.	
20.	19.	18.	17.	17.	16.	15.	15.	14.	14.	
13.	12.	12.	12.	11.	11.	10.	10.	9.	9.	
9.	8.	8.	8.	7.	7.	7.	7.	6.	6.	
6.	6.	5.	5.	5.	5.	5.	4.	4.	4.	

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

HYDROGRAPH AT STATION BA6A

TOTAL RAINFALL = 2.28, TOTAL LOSS = 1.27, TOTAL EXCESS = 1.01

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	12.42-HR
+ (CFS)	(HR)	(CFS)	129.	62.	62.	62.
+ 198.	9.83	(INCHES)	.741	.741	.741	.741
		(AC-FT)	64.	64.	64.	64.

CUMULATIVE AREA = 1.62 SQ MI

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*            *
*     COMB5  *
*            *
**************
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45 KK

46 HC HYDROGRAPH COMBINATION
ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

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

HYDROGRAPH AT STATION COMB5

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	12.42-HR
+ (CFS)	(HR)	(CFS)	337.	176.	176.	176.
+ 1771.	6.50	(INCHES)	1.138	1.234	1.234	1.234
		(AC-FT)	167.	181.	181.	181.

CUMULATIVE AREA = 2.75 SQ MI

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**************
*            *
*      COMB  *
*            *
**************
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47 KK

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48 HC          HYDROGRAPH COMBINATION
                    ICOMP          2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                          ***

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

                        HYDROGRAPH AT STATION     COMB

 PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     12.42-HR
+   (CFS)       (HR)
                              (CFS)
+    1777.      6.50                443.        231.        231.        231.
                          (INCHES)  1.016       1.096       1.096       1.096
                           (AC-FT)  219.        237.        237.        237.

                        CUMULATIVE AREA =    4.05 SQ MI


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


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            *            *
49 KK       *     B38A   *
            *            *
            **************

               SUBBASIN RUNOFF DATA

50 BA            SUBBASIN CHARACTERISTICS
                      TAREA          .20  SUBBASIN AREA

                 PRECIPITATION DATA

 8 PH                                  DEPTHS FOR  10-PERCENT HYPOTHETICAL STORM
                 ..... HYDRO-35 .....  ............... TP-40 ...............  ........... TP-49 ...........
                 5-MIN  15-MIN  60-MIN   2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                  .47     .92    1.61   1.72    1.82    2.07    2.30    2.53     .00     .00     .00     .00

                                                STORM AREA =      .20

51 LS            SCS LOSS RATE
                      STRTL          .22  INITIAL ABSTRACTION
                     CRVNBR        90.00  CURVE NUMBER
                      RTIMP          .00  PERCENT IMPERVIOUS AREA

52 UD            SCS DIMENSIONLESS UNITGRAPH
                      TLAG          .65  LAG

                                                          ***

                                                   UNIT HYDROGRAPH
                                              41 END-OF-PERIOD ORDINATES
                  6.      19.     37.     62.     93.    118.    134.    139.    139.    129.
                117.     103.     84.     66.     54.     44.     37.     31.     25.     20.
                 17.      14.     11.      9.      8.      6.      5.      4.      4.      3.
                  2.       2.      2.      1.      1.      1.      1.      1.      0.      0.
                  0.

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

                        HYDROGRAPH AT STATION     B38A
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HYDROGRAPH AT STATION

TOTAL RAINFALL = 2.29, TOTAL LOSS = .94, TOTAL EXCESS = 1.34

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	12.42-HR
+		(CFS)				
+ 129.	6.92		28.	14.	14.	14.
		(INCHES)	1.302	1.320	1.320	1.320
		(AC-FT)	14.	14.	14.	14.

CUMULATIVE AREA = .20 SQ MI

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              **************
              *            *
53 KK         *     BA1    *
              *            *
              **************
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SUBBASIN RUNOFF DATA

54 BA SUBBASIN CHARACTERISTICS

TAREA 2.44 SUBBASIN AREA

PRECIPITATION DATA

8 PH DEPTHS FOR 10-PERCENT HYPOTHETICAL STORM

..... HYDRO-35			..... TP-40					..... TP-49			
5-MIN	15-MIN	60-MIN	2-HR	3-HR	6-HR	12-HR	24-HR	2-DAY	4-DAY	7-DAY	10-DAY
.47	.92	1.61	1.72	1.82	2.07	2.30	2.53	.00	.00	.00	.00

STORM AREA = 2.44

55 LS SCS LOSS RATE

STRTL .22 INITIAL ABSTRACTION

CRVNBR 90.00 CURVE NUMBER

RTIMP .00 PERCENT IMPERVIOUS AREA

56 UD SCS DIMENSIONLESS UNITGRAPH

TLAG .65 LAG

***

UNIT HYDROGRAPH

41 END-OF-PERIOD ORDINATES

76.	233.	450.	752.	1132.	1441.	1630.	1698.	1690.	1579.
1431.	1252.	1024.	807.	657.	539.	447.	372.	307.	247.
206.	169.	139.	114.	92.	77.	63.	52.	43.	35.
29.	24.	20.	17.	14.	12.	9.	7.	5.	3.
1.									

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

HYDROGRAPH AT STATION BA1

TOTAL RAINFALL = 2.28, TOTAL LOSS = .94, TOTAL EXCESS = 1.33

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	12.42-HR
+					

			(CFS)				
+	1548.	6.92		339.	166.	166.	166.
			(INCHES)	1.293	1.312	1.312	1.312
			(AC-FT)	168.	171.	171.	171.

CUMULATIVE AREA = 2.44 SQ MI

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              **************
              *            *
  57 KK       *     COMB   *
              *            *
              **************
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58 KO OUTPUT CONTROL VARIABLES

IPRNT	1	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

59 HC HYDROGRAPH COMBINATION

ICOMP	2	NUMBER OF HYDROGRAPHS TO COMBINE

***

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HYDROGRAPH AT STATION COMB
SUM OF 2 HYDROGRAPHS

****

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
18	NOV	1200	1	0.	18	NOV	1510	39	0.	18	NOV	1820	77	566.	18	NOV	2130	115	115.
18	NOV	1205	2	0.	18	NOV	1515	40	0.	18	NOV	1825	78	567.	18	NOV	2135	116	109.
18	NOV	1210	3	0.	18	NOV	1520	41	0.	18	NOV	1830	79	818.	18	NOV	2140	117	104.
18	NOV	1215	4	0.	18	NOV	1525	42	0.	18	NOV	1835	80	1096.	18	NOV	2145	118	100.
18	NOV	1220	5	0.	18	NOV	1530	43	0.	18	NOV	1840	81	1346.	18	NOV	2150	119	96.
18	NOV	1225	6	0.	18	NOV	1535	44	0.	18	NOV	1845	82	1532.	18	NOV	2155	120	92.
18	NOV	1230	7	0.	18	NOV	1540	45	0.	18	NOV	1850	83	1641.	18	NOV	2200	121	88.
18	NOV	1235	8	0.	18	NOV	1545	46	0.	18	NOV	1855	84	1677.	18	NOV	2205	122	85.
18	NOV	1240	9	0.	18	NOV	1550	47	0.	18	NOV	1900	85	1641.	18	NOV	2210	123	82.
18	NOV	1245	10	0.	18	NOV	1555	48	0.	18	NOV	1905	86	1548.	18	NOV	2215	124	79.
18	NOV	1250	11	0.	18	NOV	1600	49	0.	18	NOV	1910	87	1412.	18	NOV	2220	125	77.
18	NOV	1255	12	0.	18	NOV	1605	50	0.	18	NOV	1915	88	1243.	18	NOV	2225	126	74.
18	NOV	1300	13	0.	18	NOV	1610	51	0.	18	NOV	1920	89	1072.	18	NOV	2230	127	72.
18	NOV	1305	14	0.	18	NOV	1615	52	0.	18	NOV	1925	90	920.	18	NOV	2235	128	70.
18	NOV	1310	15	0.	18	NOV	1620	53	0.	18	NOV	1930	91	789.	18	NOV	2240	129	69.
18	NOV	1315	16	0.	18	NOV	1625	54	0.	18	NOV	1935	92	679.	18	NOV	2245	130	67.
18	NOV	1320	17	0.	18	NOV	1630	55	0.	18	NOV	1940	93	586.	18	NOV	2250	131	66.
18	NOV	1325	18	0.	18	NOV	1635	56	0.	18	NOV	1945	94	507.	18	NOV	2255	132	64.
18	NOV	1330	19	0.	18	NOV	1640	57	0.	18	NOV	1950	95	442.	18	NOV	2300	133	63.
18	NOV	1335	20	0.	18	NOV	1645	58	0.	18	NOV	1955	96	390.	18	NOV	2305	134	62.
18	NOV	1340	21	0.	18	NOV	1650	59	0.	18	NOV	2000	97	347.	18	NOV	2310	135	61.
18	NOV	1345	22	0.	18	NOV	1655	60	1.	18	NOV	2005	98	312.	18	NOV	2315	136	59.
18	NOV	1350	23	0.	18	NOV	1700	61	1.	18	NOV	2010	99	282.	18	NOV	2320	137	58.
18	NOV	1355	24	0.	18	NOV	1705	62	2.	18	NOV	2015	100	257.	18	NOV	2325	138	57.
18	NOV	1400	25	0.	18	NOV	1710	63	3.	18	NOV	2020	101	237.	18	NOV	2330	139	56.
18	NOV	1405	26	0.	18	NOV	1715	64	4.	18	NOV	2025	102	220.	18	NOV	2335	140	56.
18	NOV	1410	27	0.	18	NOV	1720	65	5.	18	NOV	2030	103	206.	18	NOV	2340	141	55.
18	NOV	1415	28	0.	18	NOV	1725	66	6.	18	NOV	2035	104	193.	18	NOV	2345	142	54.

18 NOV 1420	29	0.	*	18 NOV 1730	67	8.	*	18 NOV 2040	105	192.	*	18 NOV 2350	143	53.
18 NOV 1425	30	0.	*	18 NOV 1735	68	10.	*	18 NOV 2045	106	172.	*	18 NOV 2355	144	52.
18 NOV 1430	31	0.	*	18 NOV 1740	69	12.	*	18 NOV 2050	107	164.	*	19 NOV 0000	145	51.
18 NOV 1435	32	0.	*	18 NOV 1745	70	15.	*	18 NOV 2055	108	156.	*	19 NOV 0005	146	51.
18 NOV 1440	33	0.	*	18 NOV 1750	71	19.	*	18 NOV 2100	109	149.	*	19 NOV 0010	147	50.
18 NOV 1445	34	0.	*	18 NOV 1755	72	28.	*	18 NOV 2105	110	143.	*	19 NOV 0015	148	49.
18 NOV 1450	35	0.	*	18 NOV 1800	73	43.	*	18 NOV 2110	111	137.	*	19 NOV 0020	149	49.
18 NOV 1455	36	0.	*	18 NOV 1805	74	70.	*	18 NOV 2115	112	131.	*	19 NOV 0025	150	48.
18 NOV 1500	37	0.	*	18 NOV 1810	75	119.	*	18 NOV 2120	113	125.	*			
18 NOV 1505	38	0.	*	18 NOV 1815	76	215.	*	18 NOV 2125	114	120.	*			
			*				*				*			

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	12.42-HR
+ (CFS)	(HR)	(CFS)				
+ 1677.	6.92		367.	180.	180.	180.
		(INCHES)	1.294	1.313	1.313	1.313
		(AC-FT)	182.	185.	185.	185.

CUMULATIVE AREA = 2.64 SQ MI

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              **************
              *            *
60 KK         *     ESTER  *
              *            *
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HYDROGRAPH ROUTING DATA

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61 RS          STORAGE ROUTING
                    NSTPS          1  NUMBER OF SUBREACHES
                     ITYP       ELEV  TYPE OF INITIAL CONDITION
                   RSVRIC    1015.00  INITIAL CONDITION
                        X        .00 WORKING R AND D COEFFICIENT

63 SV            STORAGE         .0      8.9     27.2     45.8     65.0     84.6    104.7    125.3    146.4    168.0
                               190.1

65 SE          ELEVATION    1015.00  1015.80  1017.30  1018.80  1020.30  1021.80  1023.30  1024.80  1026.30  1027.80
                            1029.30

62 SL          LOW-LEVEL OUTLET
                    ELEVL    1017.20  ELEVATION AT CENTER OF OUTLET
                    CAREA      63.60  CROSS-SECTIONAL AREA
                     COQL        .60  COEFFICIENT
                     EXPL        .50  EXPONENT OF HEAD

67 SS          SPILLWAY
                     CREL    1050.00  SPILLWAY CREST ELEVATION
                    SPWID        .00  SPILLWAY WIDTH
                     COQW        .00  WEIR COEFFICIENT
                     EXPW       1.50  EXPONENT OF HEAD
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COMPUTED OUTFLOW-ELEVATION DATA

OUTFLOW	.00	.00	650.53	714.74	793.01	890.53	1015.41	1181.02	1411.18	1752.75

ELEVATION	1015.00	1017.20	1021.72	1022.65	1023.91	1025.67	1028.21	1032.09	1038.46	1050.00

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	8.90	25.98	27.20	45.80	65.00	83.53	84.60	96.05	104.70
OUTFLOW	.00	.00	.00	96.77	387.11	538.84	650.53	656.39	714.74	755.87
ELEVATION	1015.00	1015.80	1017.20	1017.30	1018.80	1020.30	1021.72	1021.80	1022.65	1023.30
STORAGE	113.13	125.30	137.50	146.40	168.00	174.01	190.10	231.23	325.08	495.08
OUTFLOW	793.01	843.70	890.53	923.22	996.41	1015.41	1064.57	1181.02	1411.18	1752.75
ELEVATION	1023.91	1024.80	1025.67	1026.30	1027.80	1028.21	1029.30	1032.09	1038.46	1050.00

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HYDROGRAPH AT STATION ESTER

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	12.42-HR
+ (CFS)	(HR)	(CFS)				
+ 673.	7.58		319.	154.	154.	154.
		(INCHES)	1.124	1.124	1.124	1.124
		(AC-FT)	158.	158.	158.	158.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE 6-HR	24-HR	72-HR	12.42-HR
+ (AC-FT)	(HR)				
88.	7.58	47.	23.	23.	23.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE 6-HR	24-HR	72-HR	12.42-HR
+ (FEET)	(HR)				
1022.04	7.58	1018.87	1016.88	1016.88	1016.88

CUMULATIVE AREA = 2.64 SQ MI

*** ***

```
                 **************
                 *            *
68 KK            *     BA7A   *
                 *            *
                 **************
```

SUBBASIN RUNOFF DATA

69 BA. SUBBASIN CHARACTERISTICS

TAREA 1.72 SUBBASIN AREA

PRECIPITATION DATA

8 PH DEPTHS FOR 10-PERCENT HYPOTHETICAL STORM

..... HYDRO-35			..... TP-40					..... TP-49			
5-MIN	15-MIN	60-MIN	2-HR	3-HR	6-HR	12-HR	24-HR	2-DAY	4-DAY	7-DAY	10-DAY
.47	.92	1.61	1.72	1.82	2.07	2.30	2.53	.00	.00	.00	.00

STORM AREA = 1.72

70 LS SCS LOSS RATE

STRTL = 25. INITIAL ABSTRACTION

STRTL .20 INITIAL ABSTRACTION
CRVNBR 89.00 CURVE NUMBER
RTIMP .00 PERCENT IMPERVIOUS AREA

71 UD SCS DIMENSIONLESS UNITGRAPH
TLAG 1.32 LAG

***

UNIT HYDROGRAPH
81 END-OF-PERIOD ORDINATES

11.	28.	54.	86.	120.	165.	217.	277.	346.	414.
474.	523.	564.	588.	605.	609.	608.	603.	581.	557.
531.	502.	471.	434.	393.	348.	310.	275.	249.	225.
202.	184.	166.	153.	139.	126.	115.	103.	92.	84.
76.	69.	62.	57.	51.	46.	42.	38.	34.	31.
28.	25.	23.	21.	19.	17.	16.	14.	13.	11.
10.	9.	8.	8.	7.	6.	6.	6.	5.	5.
4.	4.	3.	3.	3.	2.	2.	1.	1.	1.
0.									

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

HYDROGRAPH AT STATION BA7A

TOTAL RAINFALL = 2.28, TOTAL LOSS = 1.02, TOTAL EXCESS = 1.26

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	12.42-HR
+	(CFS)	(HR)	(CFS)				
+	589.	7.58		223.	109.	109.	109.
			(INCHES)	1.205	1.214	1.214	1.214
			(AC-FT)	111.	111.	111.	111.

CUMULATIVE AREA = 1.72 SQ MI

*** ***

```
**************
*            *
*     COMB   *
*            *
**************
```

72 KK

73 HC HYDROGRAPH COMBINATION
ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

***

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

HYDROGRAPH AT STATION COMB

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	12.42-HR
+	(CFS)	(HR)	(CFS)				
+	1262.	7.58		542.	263.	263.	263.
			(INCHES)	1.155	1.159	1.159	1.159
			(AC-FT)	269.	270.	270.	270.

CUMULATIVE AREA = 4.36 SQ MI

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

              **************
              *            *
 74 KK        *     BA7    *
              *            *
              **************

          SUBBASIN RUNOFF DATA

 75 BA          SUBBASIN CHARACTERISTICS
                     TAREA          1.65  SUBBASIN AREA

                PRECIPITATION DATA

  8 PH                                  DEPTHS FOR  10-PERCENT HYPOTHETICAL STORM
                ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                  .47     .92    1.61    1.72    1.82    2.07    2.30    2.53     .00     .00     .00     .00

                                                STORM AREA =     1.65

 76 LS          SCS LOSS RATE
                     STRTL           .25  INITIAL ABSTRACTION
                    CRVNBR         89.00  CURVE NUMBER
                     RTIMP           .00  PERCENT IMPERVIOUS AREA

 77 UD          SCS DIMENSIONLESS UNITGRAPH
                      TLAG          1.31  LAG

                                                    ***

                                                UNIT HYDROGRAPH
                                          81 END-OF-PERIOD ORDINATES
                  11.     27.     53.     84.    118.    162.    213.    271.    339.    405.
                 463.    509.    549.    571.    585.    589.    587.    580.    559.    535.
                 509.    481.    449.    413.    372.    328.    292.    260.    235.    212.
                 191.    173.    158.    144.    131.    119.    108.     97.     86.     79.
                  72.     64.     59.     53.     48.     43.     39.     35.     32.     29.
                  26.     23.     21.     19.     17.     16.     14.     13.     12.     11.
                  10.      9.      8.      7.      6.      6.      6.      5.      5.      4.
                   4.      3.      3.      3.      2.      2.      1.      1.      1.      0.
                   0.

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

                      HYDROGRAPH AT STATION      BA7

    TOTAL RAINFALL =    2.28, TOTAL LOSS =    1.02, TOTAL EXCESS =    1.26

  PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                        6-HR       24-HR       72-HR     12.42-HR
+   (CFS)        (HR)
                                   (CFS)
+     569.       7.58                214.        104.        104.        104.
                              (INCHES)  1.206       1.215       1.215       1.215
                               (AC-FT)    106.        107.        107.        107.

                      CUMULATIVE AREA =    1.65 SQ MI
```

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

              **************
              *            *
  78 KK       *     COMB   *
              *            *
              **************

  79 HC            HYDROGRAPH COMBINATION
                        ICOMP          2  NUMBER OF HYDROGRAPHS TO COMBINE
                                                                  ***

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

                          HYDROGRAPH AT STATION     COMB

                                                MAXIMUM AVERAGE FLOW
  PEAK FLOW      TIME                     6-HR       24-HR       72-HR      12.42-HR
+   (CFS)        (HR)          (CFS)
+    1831.       7.58                     756.        367.        367.        367.
                              (INCHES)    1.169       1.174       1.174       1.174
                               (AC-FT)     375.        376.        376.        376.

                          CUMULATIVE AREA =     6.01 SQ MI


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

              **************
              *            *
  80 KK       *     ELLIT  *
              *            *
              **************

                 HYDROGRAPH ROUTING DATA

  81 RS            STORAGE ROUTING
                        NSTPS            1  NUMBER OF SUBREACHES
                         ITYP         ELEV  TYPE OF INITIAL CONDITION
                       RSVRIC      1016.00  INITIAL CONDITION
                            X          .00 WORKING R AND D COEFFICIENT

  83 SV              STORAGE           .0      12.8      25.8      38.9      52.1      65.4      78.8      92.4     106.1     110.7
                                     119.9

  85 SE            ELEVATION      1016.00   1016.70   1017.40   1018.10   1018.80   1019.50   1020.20   1020.90   1021.60   1021.80
                                  1022.30

  82 SL            LOW-LEVEL OUTLET
                        ELEVL      1018.00  ELEVATION AT CENTER OF OUTLET
                        CAREA        50.30  CROSS-SECTIONAL AREA
                         COQL          .60  COEFFICIENT
                         EXPL          .50  EXPONENT OF HEAD

  87 SS            SPILLWAY
                         CREL      1050.00  SPILLWAY CREST ELEVATION
                        SPWID          .00  SPILLWAY WIDTH
                         COOW          .00  WEIR COEFFICIENT
```

EXPW 1.50 EXPONENT OF HEAD

***

COMPUTED OUTFLOW-ELEVATION DATA

OUTFLOW	.00	.00	486.20	535.54	596.02	671.91	769.94	901.45	1087.15	1369.21
ELEVATION	1016.00	1018.00	1022.04	1022.90	1024.06	1025.71	1028.12	1031.87	1038.17	1050.00

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	12.80	25.80	37.03	38.90	52.10	65.40	78.80	92.40	106.10
OUTFLOW	.00	.00	.00	.00	76.53	216.49	296.44	359.01	412.19	459.24
ELEVATION	1016.00	1016.70	1017.40	1018.00	1018.10	1018.80	1019.50	1020.20	1020.90	1021.60
STORAGE	110.70	115.02	119.90	130.86	152.35	182.57	226.96	296.00	411.98	629.58
OUTFLOW	471.83	486.20	501.91	535.54	596.02	671.91	769.94	901.45	1087.15	1369.21
ELEVATION	1021.80	1022.04	1022.30	1022.90	1024.06	1025.71	1028.12	1031.87	1038.17	1050.00

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

HYDROGRAPH AT STATION ELLIT

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	12.42-HR
+ (CFS)	(HR)	(CFS)	524.	253.	253.	253.
+ 699.	9.42	(INCHES)	.811	.811	.811	.811
		(AC-FT)	260.	260.	260.	260.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE 6-HR	24-HR	72-HR	12.42-HR
+ (AC-FT)	(HR)				
195.	9.42	139.	67.	67.	67.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE 6-HR	24-HR	72-HR	12.42-HR
+ (FEET)	(HR)				
1026.38	9.42	1023.36	1019.56	1019.56	1019.56

CUMULATIVE AREA = 6.01 SQ MI

1

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

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+	HYDROGRAPH AT	BA4	1750.	6.67	285.	140.	140.	2.15		
+	HYDROGRAPH AT	BA5	874.	10.92	549.	265.	265.	9.50		
+	2 COMBINED AT	COMB1	1776.	6.67	810.	405.	405.	11.65		
+	HYDROGRAPH AT	BA3	455.	6.50	57.	29.	29.	.30		

+	HYDROGRAPH AT	BA6	460.	11.08	287.	139.	139.	4.69	
+	2 COMBINED AT	COMB	467.	11.08	327.	167.	167.	4.99	
+	HYDROGRAPH AT	BA8	98.	10.50	63.	31.	31.	1.03	
+	3 COMBINED AT	COMB3	2108.	6.67	1200.	603.	603.	17.67	
+	HYDROGRAPH AT	BA6B	178.	9.42	112.	54.	54.	1.30	
+	HYDROGRAPH AT	BA2	1766.	6.50	223.	114.	114.	1.13	
+	HYDROGRAPH AT	BA6A	198.	9.83	129.	62.	62.	1.62	
+	2 COMBINED AT	COMB5	1771.	6.50	337.	176.	176.	2.75	
+	2 COMBINED AT	COMB	1777.	6.50	443.	231.	231.	4.05	
+	HYDROGRAPH AT	B3BA	129.	6.92	28.	14.	14.	.20	
+	HYDROGRAPH AT	BA1	1548.	6.92	339.	166.	166.	2.44	
+	2 COMBINED AT	COMB	1677.	6.92	367.	180.	180.	2.64	
+	ROUTED TO	ESTER	673.	7.58	319.	154.	154.	2.64	1022.04 7.58
+	HYDROGRAPH AT	BA7A	589.	7.58	223.	109.	109.	1.72	
+	2 COMBINED AT	COMB	1262.	7.58	542.	263.	263.	4.36	
+	HYDROGRAPH AT	BA7	569.	7.58	214.	104.	104.	1.65	
+	2 COMBINED AT	COMB	1831.	7.58	756.	367.	367.	6.01	
+	ROUTED TO	ELLIT	699.	9.42	524.	253.	253.	6.01	1026.38 9.42

HEC-1 INPUT

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

  1
  2
  3
  4
*** WARNING *** ZZ-CARD MISSING
  5
  6           ZZ
```

SW008

****
FLOOD HYDROGRAPH PACKAGE HEC-1 (IBM XT 512K VERSION) -FEB 1,1985
U.S. ARMY CORPS OF ENGINEERS, THE HYDROLOGIC ENGINEERING CENTER, 609 SECOND STREET, DAVIS, CA. 95616
****

SEGMENT 2 - 51ST AVENUE TO STATION 720
10 yr - 24 hr event

THIS HEC-1 VERSION CONTAINS ALL OPTIONS EXCEPT ECONOMICS, AND THE NUMBER OF PLANS ARE REDUCED TO 3

1 HEC-1 INPUT PAGE 1

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

  1           ID        SOUTH WEST MOUNTAIN BASIN
  2           ID        HYDROLOGY ANALYSIS  EXISTING CONDITIONS
  3           ID        10 YEAR 24 HR STORM     5/21/87
              *DIAGRAM
  4           IT       5 05MAY87  1200.0  150.00
  5           IO       3

  6           KK     SW1
  7           BA    1.45
  8           PH      10       0     .47    0.92    1.61    1.72    1.82    2.07    2.30    2.53
  9           LS            94.00
 10           UD     .52

 11           KK     CHANNEL SECTION X-32
 12           RK    5700   0.025   0.035         TRAP      30.00    0.00

 13           KK     SW2
 14           BA     .54
 15           LS            94.00
 16           UD     .33

 17           KK    COMB1
 18           HC       2

 19           KK     CHANNEL SECTION X-33
 20           RK    3300   0.023   0.035         TRAP      30.00    0.00

 21           KK     CHANNEL SECTION 33-A
 22           RK    3300   0.023   0.035         TRAP      50.00    0.00

 23           KK     SW3
 24           BA     .27
 25           LS            82.00
 26           UD     .94

 27           KK    COMB1
 28           HC       2

 29           KK     SW5
 30           BA     .47
 31           LS            94.00
 32           UD     .28

 33           KK     CHANNEL SECTION X-36
 34           RK    1700   0.022    0.04         TRAP      30.00    0.00
```

```
 35          KK    CHANNEL SECTION X-38
 36          RK    3000     .02   0.035         TRAP      40.00    0.00

 37          KK     SW6
 38          BA     .48
 39          LS           94.00
 40          UD     .46
```



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

 41          KK     SW7
 42          BA     .34
 43          LS           94.00
 44          UD     .42

 45          KK    COMB1
 46          HC       3

 47          KK    CHANNEL THRU SECTION X-38
 48          RK    3200   0.016   0.035         TRAP      40.00    0.00

 49          KK     SW8
 50          BA     .20
 51          LS           94.00
 52          UD     .45

 53          KK    COMB1
 54          HC       2

 55          KK    SW8A
 56          BA     .14
 57          LS           94.00
 58          UD     .14
 59          KO       1

 60          KK     SW4
 61          BA     .25
 62          LS           94.00
 63          UD     .68

 64          KK     SW9
 65          BA     .35
 66          LS           88.00
 67          UD     .99

 68          KK    SW10
 69          BA     .13
 70          LS           88.00
 71          UD     .71

 72          KK    SW11
 73          BA     .10
 74          LS           88.00
 75          UD     .50
 76          ZZ
```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

```
INPUT
 LINE     (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

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

   6        SW1
             V
```

```
                 V
11             CHA
                 .
                 .
13               .          SW2
                 .            .
                 .            .
17          COMB1.............
                 V
                 V
19             CHAN
                 V
                 V
21             CHAN
                 .
                 .
23               .          SW3
                 .            .
                 .            .
27          COMB1.............
                 .
                 .
29               .          SW5
                 .            V
                 .            V
33               .         CHAN
                 .            V
                 .            V
35               .         CHAN
                 .            .
                 .            .
37               .            .         SW6
                 .            .           .
                 .            .           .
41               .            .           .         SW7
                 .            .           .           .
                 .            .           .           .
45               .       COMB1.........................
                 .            V
                 .            V
47               .        CHAN
                 .            .
                 .            .
49               .            .         SW8
                 .            .           .
                 .            .           .
53               .       COMB1.............
                 .            .
                 .            .
55               .            .        SW8A
                 .            .           .
                 .            .           .
60               .            .           .         SW4
                 .            .           .           .
                 .            .           .           .
64               .            .           .           .         SW9
                 .            .           .           .           .
                 .            .           .           .           .
68               .            .           .           .           .        SW10
                 .            .           .           .           .          .
                 .            .           .           .           .          .
72               .            .           .           .           .          .        SW11
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

1 ****

FLOOD HYDROGRAPH PACKAGE HEC-1 (IBM XT 512K VERSION) -FEB 1.1985

U.S. ARMY CORPS OF ENGINEERS, THE HYDROLOGIC ENGINEERING CENTER, 609 SECOND STREET, DAVIS, CA. 95616
****

SOUTH WEST MOUNTAIN BASIN
HYDROLOGY ANALYSIS EXISTING CONDITIONS
10 YEAR 24 HR STORM 5/21/87

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

   IT          HYDROGRAPH TIME DATA
                      NMIN          5  MINUTES IN COMPUTATION INTERVAL
                     IDATE     5MAY87  STARTING DATE
                     ITIME       1200  STARTING TIME
                        NQ        150  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE     6MAY87  ENDING DATE
                    NDTIME       0025  ENDING TIME

                 COMPUTATION INTERVAL     .08 HOURS
                      TOTAL TIME BASE   12.42 HOURS

        ENGLISH UNITS


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


           **************
           *            *
 6 KK      *       SW1  *
           *            *
           **************

              SUBBASIN RUNOFF DATA

 7 BA          SUBBASIN CHARACTERISTICS
                     TAREA        1.45  SUBBASIN AREA

               PRECIPITATION DATA

 8 PH                                  DEPTHS FOR  10-PERCENT HYPOTHETICAL STORM
               ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
               5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                 .47     .92    1.61    1.72    1.82    2.07    2.30    2.53     .00     .00     .00     .00

                                                STORM AREA =    1.45

 9 LS          SCS LOSS RATE
                     STRTL         .13  INITIAL ABSTRACTION
                    CRVNBR       94.00  CURVE NUMBER
                     RTIMP         .00  PERCENT IMPERVIOUS AREA

10 UD          SCS DIMENSIONLESS UNITGRAPH
                      TLAG         .52  LAG

                                                   ***

                                              UNIT HYDROGRAPH
                                          33 END-OF-PERIOD ORDINATES
               80.      233.      477.      808.     1080.     1227.     1242.     1149.     1037.      848.
```

658.	503.	394.	314.	249.	193.	153.	120.	93.	73.
58.	45.	36.	28.	22.	17.	14.	11.	9.	7.
5.	3.	1.							

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

HYDROGRAPH AT STATION SW1

TOTAL RAINFALL = 2.28, TOTAL LOSS = .62, TOTAL EXCESS = 1.66

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	12.42-HR
+	(CFS)	(HR)	(CFS)				
+	1331.	6.75		248.	124.	124.	124.
			(INCHES)	1.592	1.643	1.643	1.643
			(AC-FT)	123.	127.	127.	127.

CUMULATIVE AREA = 1.45 SQ MI

*** ***

```
            **************
            *            *
  11 KK     *     CHA    *     NNEL SECTION X-32
            *            *
            **************
```

HYDROGRAPH ROUTING DATA

12 RK KINEMATIC WAVE STREAM ROUTING

L	5700.	CHANNEL LENGTH
S	.0250	SLOPE
N	.035	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	30.00	BOTTOM WIDTH OR DIAMETER
Z	.00	SIDE SLOPE

***

KINEMATIC STREAM ROUTING USED FOR THIS REACH

COMPUTED KINEMATIC PARAMETERS

ALPHA	M	DT (MIN)	DX (FT)
.6972	1.667	1.67	2850.00

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

HYDROGRAPH AT STATION CHA

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	12.42-HR
+	(CFS)	(HR)	(CFS)				
+	1315.	6.83		248.	123.	123.	123.
			(INCHES)	1.590	1.627	1.627	1.627
			(AC-FT)	123.	126.	126.	126.

CUMULATIVE AREA = 1.45 SQ MI

*** ***

```
**************
*            *
*     SW2    *
*            *
**************
```

13 KK

SUBBASIN RUNOFF DATA

14 BA

SUBBASIN CHARACTERISTICS

TAREA .54 SUBBASIN AREA

PRECIPITATION DATA

8 PH

DEPTHS FOR 10-PERCENT HYPOTHETICAL STORM

..... HYDRO-35			..... TP-40					..... TP-49			
5-MIN	15-MIN	60-MIN	2-HR	3-HR	6-HR	12-HR	24-HR	2-DAY	4-DAY	7-DAY	10-DAY
.47	.92	1.61	1.72	1.82	2.07	2.30	2.53	.00	.00	.00	.00

STORM AREA = .54

15 LS

SCS LOSS RATE

STRTL .13 INITIAL ABSTRACTION

CRVNBR 94.00 CURVE NUMBER

RTIMP .00 PERCENT IMPERVIOUS AREA

16 UD

SCS DIMENSIONLESS UNITGRAPH

TLAG .33 LAG

***

UNIT HYDROGRAPH
22 END-OF-PERIOD ORDINATES

85.	272.	544.	693.	685.	578.	418.	277.	192.	136.
94.	65.	45.	31.	22.	15.	10.	7.	6.	4.
2.	0.								

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

HYDROGRAPH AT STATION SW2

TOTAL RAINFALL = 2.29, TOTAL LOSS = .62, TOTAL EXCESS = 1.67

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	12.42-HR
+	(CFS)	(HR)				
			(CFS)			
+	652.	6.58	93.	46.	46.	46.
			(INCHES) 1.597	1.654	1.654	1.654
			(AC-FT) 46.	48.	48.	48.

CUMULATIVE AREA = .54 SQ MI

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              **************
              *            *
   17 KK      *     COMB1  *
              *            *
              **************

   18 HC          HYDROGRAPH COMBINATION
                       ICOMP          2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                                  ***

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

                          HYDROGRAPH AT STATION    COMB1

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     12.42-HR
+   (CFS)       (HR)
                            (CFS)
+    1817.      6.75                341.        169.        169.        169.
                          (INCHES)  1.591       1.634       1.634       1.634
                           (AC-FT)   169.        173.        173.        173.

                          CUMULATIVE AREA =    1.99 SQ MI


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

              **************
              *            *
   19 KK      *      CHAN  *     NEL SECTION X-33
              *            *
              **************

                 HYDROGRAPH ROUTING DATA

   20 RK           KINEMATIC WAVE STREAM ROUTING
                             L       3300.  CHANNEL LENGTH
                             S      .0230  SLOPE
                             N       .035  CHANNEL ROUGHNESS COEFFICIENT
                            CA        .00  CONTRIBUTING AREA
                         SHAPE       TRAP  CHANNEL SHAPE
                            WD      30.00  BOTTOM WIDTH OR DIAMETER
                             Z        .00  SIDE SLOPE
                                                                  ***

          KINEMATIC STREAM ROUTING USED FOR THIS REACH


           COMPUTED KINEMATIC PARAMETERS
              ALPHA        M       DT (MIN)    DX (FT)
              .6687    1.667        1.25      1650.00

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

                          HYDROGRAPH AT STATION     CHAN

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     12.42-HR
+   (CFS)       (HR)
```

```
                          (CFS)
+    1816.      6.75                  340.        168.        168.        168.
                          (INCHES)   1.589       1.625       1.625       1.625
                          (AC-FT)     169.        172.        172.        172.

                          CUMULATIVE AREA =    1.99 SQ MI


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

            **************
            *            *
  21 KK     *      CHAN  *     NEL SECTION 33-A
            *            *
            **************

               HYDROGRAPH ROUTING DATA

  22 RK          KINEMATIC WAVE STREAM ROUTING
                            L       3300.  CHANNEL LENGTH
                            S       .0230  SLOPE
                            N        .035  CHANNEL ROUGHNESS COEFFICIENT
                           CA         .00  CONTRIBUTING AREA
                        SHAPE        TRAP  CHANNEL SHAPE
                           WD       50.00  BOTTOM WIDTH OR DIAMETER
                            Z         .00  SIDE SLOPE
                                                                  ***

          KINEMATIC STREAM ROUTING USED FOR THIS REACH


           COMPUTED KINEMATIC PARAMETERS
               ALPHA        M       DT (MIN)    DX (FT)
               .4757    1.667        1.25      1650.00

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

                          HYDROGRAPH AT STATION     CHAN

  PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR        24-HR       72-HR      12.42-HR
+   (CFS)        (HR)
                          (CFS)
+    1800.      6.75                  340.        167.        167.        167.
                          (INCHES)   1.588       1.615       1.615       1.615
                          (AC-FT)     169.        171.        171.        171.

                          CUMULATIVE AREA =    1.99 SQ MI


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

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            *            *
  23 KK     *       SW3  *
            *            *
            **************
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SUBBASIN RUNOFF DATA

24 BA SUBBASIN CHARACTERISTICS
TAREA .27 SUBBASIN AREA

PRECIPITATION DATA

8 PH DEPTHS FOR 10-PERCENT HYPOTHETICAL STORM

..... HYDRO-35			..... TP-40					..... TP-49			
5-MIN	15-MIN	60-MIN	2-HR	3-HR	6-HR	12-HR	24-HR	2-DAY	4-DAY	7-DAY	10-DAY
.47	.92	1.61	1.72	1.82	2.07	2.30	2.53	.00	.00	.00	.00

STORM AREA = .27

25 LS SCS LOSS RATE
STRTL .44 INITIAL ABSTRACTION
CRVNBR 82.00 CURVE NUMBER
RTIMP .00 PERCENT IMPERVIOUS AREA

26 UD SCS DIMENSIONLESS UNITGRAPH
TLAG .94 LAG

***

UNIT HYDROGRAPH
58 END-OF-PERIOD ORDINATES

3.	10.	20.	32.	46.	65.	86.	105.	118.	127.
132.	133.	131.	125.	117.	108.	98.	86.	73.	61.
53.	46.	40.	35.	31.	27.	24.	20.	18.	16.
14.	12.	10.	9.	8.	7.	6.	5.	5.	4.
3.	3.	3.	2.	2.	2.	1.	1.	1.	1.
1.	1.	1.	1.	0.	0.	0.	0.		

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

HYDROGRAPH AT STATION SW3

TOTAL RAINFALL = 2.29, TOTAL LOSS = 1.44, TOTAL EXCESS = .84

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	12.42-HR
+	(CFS)	(HR)				
			(CFS)			
+	79.	7.25	24.	11.	11.	11.
			(INCHES) .812	.817	.817	.817
			(AC-FT) 12.	12.	12.	12.

CUMULATIVE AREA = .27 SQ MI

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*            *
*   COMB1    *
*            *
**************
```

27 KK

28 HC HYDROGRAPH COMBINATION
ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

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

                    HYDROGRAPH AT STATION    COMB1

 PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                   6-HR        24-HR       72-HR      12.42-HR
+   (CFS)       (HR)
                              (CFS)
+    1843.      6.75                 363.        178.        178.        178.
                          (INCHES)  1.495       1.520       1.520       1.520
                           (AC-FT)   180.        183.        183.        183.

                    CUMULATIVE AREA =    2.26 SQ MI


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


          **************
          *            *
 29 KK    *      SW5   *
          *            *
          **************

             SUBBASIN RUNOFF DATA

 30 BA          SUBBASIN CHARACTERISTICS
                     TAREA          .47  SUBBASIN AREA

                PRECIPITATION DATA

  8 PH                                DEPTHS FOR  10-PERCENT HYPOTHETICAL STORM
                ..... HYDRO-35 .....   ............. TP-40 .............   ........... TP-49 ...........
                5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                  .47     .92    1.61    1.72    1.82    2.07    2.30    2.53     .00     .00     .00     .00

                                                STORM AREA =     .47

 31 LS          SCS LOSS RATE
                     STRTL          .13  INITIAL ABSTRACTION
                    CRVNBR        94.00  CURVE NUMBER
                     RTIMP          .00  PERCENT IMPERVIOUS AREA

 32 UD          SCS DIMENSIONLESS UNITGRAPH
                      TLAG          .28  LAG

                                                                  ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                   UNIT HYDROGRAPH
                                              19 END-OF-PERIOD ORDINATES
              108.      356.      639.      704.      610.      434.      270.      179.      118.       77.
               51.       33.       22.       14.        9.        7.        4.        2.        1.

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

                    HYDROGRAPH AT STATION      SW5

   TOTAL RAINFALL =    2.29, TOTAL LOSS =     .62, TOTAL EXCESS =    1.67

 PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                   6-HR        24-HR       72-HR      12.42-HR
```

```
+   (CFS)        (HR)
                              (CFS)
+     623.       6.50                    81.        40.        40.        40.
                            (INCHES)    1.597      1.656      1.656      1.656
                             (AC-FT)     40.        42.        42.        42.

                            CUMULATIVE AREA =     .47 SQ MI


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

            **************
            *            *
  33 KK     *      CHAN  *     NEL SECTION X-36
            *            *
            **************

               HYDROGRAPH ROUTING DATA

  34 RK          KINEMATIC WAVE STREAM ROUTING
                            L       1700.  CHANNEL LENGTH
                            S       .0220  SLOPE
                            N        .040  CHANNEL ROUGHNESS COEFFICIENT
                           CA         .00  CONTRIBUTING AREA
                        SHAPE        TRAP  CHANNEL SHAPE
                           WD       30.00  BOTTOM WIDTH OR DIAMETER
                            Z         .00  SIDE SLOPE
                                                                  ***

          KINEMATIC STREAM ROUTING USED FOR THIS REACH


           COMPUTED KINEMATIC PARAMETERS
               ALPHA        M       DT (MIN)    DX (FT)
               .5723    1.667        1.67       850.00

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

                          HYDROGRAPH AT STATION     CHAN

  PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR      12.42-HR
+   (CFS)        (HR)
                              (CFS)
+     604.       6.50                    81.        40.        40.        40.
                            (INCHES)    1.601      1.652      1.652      1.652
                             (AC-FT)     40.        41.        41.        41.

                            CUMULATIVE AREA =     .47 SQ MI


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

            **************
            *            *
  35 KK     *      CHAN  *     NEL SECTION X-38
            *            *
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   HYDROGRAPH ROUTING DATA

36 RK        KINEMATIC WAVE STREAM ROUTING
                      L       3000.  CHANNEL LENGTH
                      S       .0200  SLOPE
                      N        .035  CHANNEL ROUGHNESS COEFFICIENT
                     CA         .00  CONTRIBUTING AREA
                  SHAPE        TRAP  CHANNEL SHAPE
                     WD       40.00  BOTTOM WIDTH OR DIAMETER
                      Z         .00  SIDE SLOPE
                                                        ***

     KINEMATIC STREAM ROUTING USED FOR THIS REACH


      COMPUTED KINEMATIC PARAMETERS
          ALPHA        M      DT (MIN)   DX (FT)
          .5147    1.667        2.50     1500.00

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

                 HYDROGRAPH AT STATION     CHAN

 PEAK FLOW     TIME                        MAXIMUM AVERAGE FLOW
                                   6-HR       24-HR       72-HR     12.42-HR
+  (CFS)       (HR)
                          (CFS)
+    603.      6.58                 82.         41.         41.         41.
                        (INCHES)  1.622      1.660       1.660       1.660
                         (AC-FT)    41.         42.         42.         42.

                       CUMULATIVE AREA =     .47 SQ MI


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

          **************
          *            *
37 KK     *       SW6  *
          *            *
          **************

   SUBBASIN RUNOFF DATA

38 BA        SUBBASIN CHARACTERISTICS
                TAREA          .48  SUBBASIN AREA

             PRECIPITATION DATA

8 PH                                 DEPTHS FOR  10-PERCENT HYPOTHETICAL STORM
             ..... HYDRO-35 ......  ............... TP-40 ...............  ........... TP-49 ...........
             5-MIN  15-MIN  60-MIN   2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
               .47     .92    1.61   1.72    1.82    2.07    2.30    2.53     .00     .00     .00     .00

                                          STORM AREA =     .48

39 LS        SCS LOSS RATE
                STRTL          .13  INITIAL ABSTRACTION
```

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                    CRVNBR        94.00  CURVE NUMBER
                    RTIMP          .00  PERCENT IMPERVIOUS AREA

 40 UD          SCS DIMENSIONLESS UNITGRAPH
                      TLAG          .46  LAG

                                                    ***

                                                UNIT HYDROGRAPH
                                          30 END-OF-PERIOD ORDINATES
              35.      106.      216.      353.      439.      462.      440.      387.      317.      231.
             173.      131.      103.       78.       60.       45.       34.       26.       20.       15.
              12.        9.        7.        5.        4.        3.        2.        2.        1.        0.

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

                         HYDROGRAPH AT STATION      SW6

    TOTAL RAINFALL =    2.29, TOTAL LOSS =     .62, TOTAL EXCESS =    1.67

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     12.42-HR
+   (CFS)       (HR)
                           (CFS)
+     477.      6.67                  82.         41.         41.         41.
                         (INCHES)   1.596       1.649       1.649       1.649
                          (AC-FT)    41.         42.         42.         42.

                         CUMULATIVE AREA =     .48 SQ MI


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

            **************
            *            *
 41 KK      *      SW7   *
            *            *
            **************

               SUBBASIN RUNOFF DATA

 42 BA            SUBBASIN CHARACTERISTICS
                       TAREA          .34  SUBBASIN AREA

                  PRECIPITATION DATA

  8 PH                                   DEPTHS FOR  10-PERCENT HYPOTHETICAL STORM
                 ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                 5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                   .47     .92    1.61    1.72    1.82    2.07    2.30    2.53     .00     .00     .00     .00

                                                STORM AREA =      .34

 43 LS            SCS LOSS RATE
                       STRTL          .13  INITIAL ABSTRACTION
                      CRVNBR        94.00  CURVE NUMBER
                       RTIMP          .00  PERCENT IMPERVIOUS AREA

 44 UD            SCS DIMENSIONLESS UNITGRAPH
                       TLAG          .42  LAG

                                                    ***
```

UNIT HYDROGRAPH
27 END-OF-PERIOD ORDINATES

31.	94.	195.	300.	352.	353.	315.	262.	190.	138.
102.	78.	58.	43.	32.	24.	18.	13.	10.	7.
5.	4.	3.	2.	2.	1.	0.			

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

HYDROGRAPH AT STATION SW7

TOTAL RAINFALL = 2.29, TOTAL LOSS = .62, TOTAL EXCESS = 1.67

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	12.42-HR
+	(CFS)	(HR)					
			(CFS)				
+	359.	6.67		58.	29.	29.	29.
			(INCHES)	1.597	1.651	1.651	1.651
			(AC-FT)	29.	30.	30.	30.

CUMULATIVE AREA = .34 SQ MI

*** ***

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              **************
              *            *
   45 KK      *     COMB1  *
              *            *
              **************
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46 HC HYDROGRAPH COMBINATION
ICOMP 3 NUMBER OF HYDROGRAPHS TO COMBINE

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

HYDROGRAPH AT STATION COMB1

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	12.42-HR
+	(CFS)	(HR)					
			(CFS)				
+	1416.	6.67		223.	111.	111.	111.
			(INCHES)	1.606	1.654	1.654	1.654
			(AC-FT)	110.	114.	114.	114.

CUMULATIVE AREA = 1.29 SQ MI

*** ***

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              **************
              *            *
   47 KK      *     CHAN   *     NEL THRU SECTION X-38
              *            *
              **************
```

HYDROGRAPH ROUTING DATA

```
 48 RK          KINEMATIC WAVE STREAM ROUTING
                          L       3200.  CHANNEL LENGTH
                          S       .0160  SLOPE
                          N        .035  CHANNEL ROUGHNESS COEFFICIENT
                         CA         .00  CONTRIBUTING AREA
                      SHAPE        TRAP  CHANNEL SHAPE
                         WD       40.00  BOTTOM WIDTH OR DIAMETER
                          Z         .00  SIDE SLOPE

                                                        ***

        KINEMATIC STREAM ROUTING USED FOR THIS REACH


         COMPUTED KINEMATIC PARAMETERS
             ALPHA        M       DT (MIN)   DX (FT)
             .4604    1.667        1.67     1600.00

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

                        HYDROGRAPH AT STATION     CHAN

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     12.42-HR
+   (CFS)       (HR)
                             (CFS)
+    1406.      6.67                 223.        110.        110.        110.
                          (INCHES)  1.608       1.645       1.645       1.645
                           (AC-FT)   111.        113.        113.        113.

                          CUMULATIVE AREA =    1.29 SQ MI


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


            **************
            *            *
 49 KK      *       SW8  *
            *            *
            **************

               SUBBASIN RUNOFF DATA

 50 BA           SUBBASIN CHARACTERISTICS
                      TAREA          .20  SUBBASIN AREA

                 PRECIPITATION DATA

  8 PH                                DEPTHS FOR  10-PERCENT HYPOTHETICAL STORM
                 ..... HYDRO-35 ......  ............... TP-40 ...............  ........... TP-49 ...........
                 5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                   .47     .92    1.61    1.72    1.82    2.07    2.30    2.53     .00     .00     .00     .00

                                                STORM AREA =     .20

 51 LS           SCS LOSS RATE
                      STRTL          .13  INITIAL ABSTRACTION
                     CRVNBR        94.00  CURVE NUMBER
                      RTIMP          .00  PERCENT IMPERVIOUS AREA
```

52 UD SCS DIMENSIONLESS UNITGRAPH
TLAG .45 LAG

***

UNIT HYDROGRAPH
29 END-OF-PERIOD ORDINATES

15.	47.	96.	154.	189.	196.	185.	160.	128.	91.
69.	53.	41.	31.	23.	18.	13.	10.	8.	6.
4.	3.	3.	2.	2.	1.	1.	1.	0.	

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

HYDROGRAPH AT STATION SW8

TOTAL RAINFALL = 2.29, TOTAL LOSS = .62, TOTAL EXCESS = 1.67

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	12.42-HR
+	(CFS)	(HR)	(CFS)				
+	202.	6.67		34.	17.	17.	17.
			(INCHES)	1.598	1.651	1.651	1.651
			(AC-FT)	17.	18.	18.	18.

CUMULATIVE AREA = .20 SQ MI

*** ***

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**************
*            *
*     COMB1  *
*            *
**************
```

53 KK

54 HC HYDROGRAPH COMBINATION
ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

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

HYDROGRAPH AT STATION COMB1

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	12.42-HR
+	(CFS)	(HR)	(CFS)				
+	1609.	6.67		257.	127.	127.	127.
			(INCHES)	1.606	1.646	1.646	1.646
			(AC-FT)	128.	131.	131.	131.

CUMULATIVE AREA = 1.49 SQ MI

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*            *
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5 MAY 1335	20	.00	.00	.00	0.	*	5 MAY 1950	95	.01	.00	.01	8.
5 MAY 1340	21	.00	.00	.00	0.	*	5 MAY 1955	96	.01	.00	.01	9.
5 MAY 1345	22	.00	.00	.00	0.	*	5 MAY 2000	97	.01	.00	.01	9.
5 MAY 1350	23	.00	.00	.00	0.	*	5 MAY 2005	98	.01	.00	.01	8.
5 MAY 1355	24	.00	.00	.00	0.	*	5 MAY 2010	99	.01	.00	.01	8.
5 MAY 1400	25	.00	.00	.00	0.	*	5 MAY 2015	100	.01	.00	.01	8.
5 MAY 1405	26	.00	.00	.00	0.	*	5 MAY 2020	101	.01	.00	.01	8.
5 MAY 1410	27	.00	.00	.00	0.	*	5 MAY 2025	102	.01	.00	.01	7.
5 MAY 1415	28	.00	.00	.00	0.	*	5 MAY 2030	103	.01	.00	.01	7.
5 MAY 1420	29	.00	.00	.00	0.	*	5 MAY 2035	104	.01	.00	.01	7.
5 MAY 1425	30	.00	.00	.00	0.	*	5 MAY 2040	105	.01	.00	.01	7.
5 MAY 1430	31	.00	.00	.00	0.	*	5 MAY 2045	106	.01	.00	.01	7.
5 MAY 1435	32	.00	.00	.00	0.	*	5 MAY 2050	107	.01	.00	.01	6.
5 MAY 1440	33	.00	.00	.00	0.	*	5 MAY 2055	108	.01	.00	.01	6.
5 MAY 1445	34	.00	.00	.00	0.	*	5 MAY 2100	109	.01	.00	.01	6.
5 MAY 1450	35	.00	.00	.00	0.	*	5 MAY 2105	110	.01	.00	.01	6.
5 MAY 1455	36	.00	.00	.00	0.	*	5 MAY 2110	111	.01	.00	.01	6.
5 MAY 1500	37	.00	.00	.00	0.	*	5 MAY 2115	112	.00	.00	.00	5.
5 MAY 1505	38	.00	.00	.00	0.	*	5 MAY 2120	113	.00	.00	.00	5.
5 MAY 1510	39	.00	.00	.00	0.	*	5 MAY 2125	114	.00	.00	.00	5.
5 MAY 1515	40	.01	.01	.00	0.	*	5 MAY 2130	115	.00	.00	.00	4.
5 MAY 1520	41	.01	.01	.00	0.	*	5 MAY 2135	116	.00	.00	.00	4.
5 MAY 1525	42	.01	.01	.00	0.	*	5 MAY 2140	117	.00	.00	.00	4.
5 MAY 1530	43	.01	.01	.00	0.	*	5 MAY 2145	118	.00	.00	.00	4.
5 MAY 1535	44	.01	.01	.00	0.	*	5 MAY 2150	119	.00	.00	.00	4.
5 MAY 1540	45	.01	.01	.00	0.	*	5 MAY 2155	120	.00	.00	.00	4.
5 MAY 1545	46	.01	.01	.00	0.	*	5 MAY 2200	121	.00	.00	.00	4.
5 MAY 1550	47	.01	.01	.00	0.	*	5 MAY 2205	122	.00	.00	.00	4.
5 MAY 1555	48	.01	.01	.00	1.	*	5 MAY 2210	123	.00	.00	.00	4.
5 MAY 1600	49	.01	.01	.00	1.	*	5 MAY 2215	124	.00	.00	.00	4.
5 MAY 1605	50	.01	.01	.00	1.	*	5 MAY 2220	125	.00	.00	.00	4.
5 MAY 1610	51	.01	.01	.00	1.	*	5 MAY 2225	126	.00	.00	.00	3.
5 MAY 1615	52	.01	.01	.00	1.	*	5 MAY 2230	127	.00	.00	.00	3.
5 MAY 1620	53	.01	.01	.00	1.	*	5 MAY 2235	128	.00	.00	.00	3.
5 MAY 1625	54	.01	.01	.00	2.	*	5 MAY 2240	129	.00	.00	.00	3.
5 MAY 1630	55	.01	.01	.00	2.	*	5 MAY 2245	130	.00	.00	.00	3.
5 MAY 1635	56	.01	.01	.00	2.	*	5 MAY 2250	131	.00	.00	.00	3.
5 MAY 1640	57	.01	.01	.00	2.	*	5 MAY 2255	132	.00	.00	.00	3.
5 MAY 1645	58	.01	.01	.00	2.	*	5 MAY 2300	133	.00	.00	.00	3.
5 MAY 1650	59	.01	.01	.00	2.	*	5 MAY 2305	134	.00	.00	.00	3.
5 MAY 1655	60	.01	.01	.00	2.	*	5 MAY 2310	135	.00	.00	.00	3.
5 MAY 1700	61	.01	.01	.00	3.	*	5 MAY 2315	136	.00	.00	.00	3.
5 MAY 1705	62	.01	.01	.00	3.	*	5 MAY 2320	137	.00	.00	.00	3.
5 MAY 1710	63	.01	.01	.00	3.	*	5 MAY 2325	138	.00	.00	.00	3.
5 MAY 1715	64	.01	.00	.00	3.	*	5 MAY 2330	139	.00	.00	.00	3.
5 MAY 1720	65	.01	.00	.00	3.	*	5 MAY 2335	140	.00	.00	.00	3.
5 MAY 1725	66	.01	.00	.00	3.	*	5 MAY 2340	141	.00	.00	.00	3.
5 MAY 1730	67	.01	.01	.00	3.	*	5 MAY 2345	142	.00	.00	.00	3.
5 MAY 1735	68	.01	.01	.00	4.	*	5 MAY 2350	143	.00	.00	.00	3.
5 MAY 1740	69	.01	.01	.00	4.	*	5 MAY 2355	144	.00	.00	.00	3.
5 MAY 1745	70	.05	.03	.02	7.	*	6 MAY 0000	145	.00	.00	.00	3.
5 MAY 1750	71	.05	.03	.03	15.	*	6 MAY 0005	146	.00	.00	.00	3.
5 MAY 1755	72	.06	.03	.04	24.	*	6 MAY 0010	147	.00	.00	.00	3.
5 MAY 1800	73	.10	.04	.06	36.	*	6 MAY 0015	148	.00	.00	.00	2.
5 MAY 1805	74	.13	.04	.09	54.	*	6 MAY 0020	149	.00	.00	.00	2.
5 MAY 1810	75	.26	.06	.21	91.	*	6 MAY 0025	150	.00	.00	.00	2.
						*						

****

TOTAL RAINFALL = 2.29, TOTAL LOSS = .62, TOTAL EXCESS = 1.67

	PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW (CFS) 6-HR	24-HR	72-HR	12.42-HR
+	254.	6.33	24.	12.	12.	12.

```
55 KK      *      SW8A  *
           *            *
           **************

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

             SUBBASIN RUNOFF DATA

56 BA          SUBBASIN CHARACTERISTICS
                    TAREA          .14  SUBBASIN AREA

               PRECIPITATION DATA

 8 PH                                 DEPTHS FOR  10-PERCENT HYPOTHETICAL STORM
               ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
               5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                 .47     .92    1.61    1.72    1.82    2.07    2.30    2.53     .00     .00     .00     .00

                                                STORM AREA =      .14

57 LS          SCS LOSS RATE
                    STRTL          .13  INITIAL ABSTRACTION
                   CRVNBR        94.00  CURVE NUMBER
                    RTIMP          .00  PERCENT IMPERVIOUS AREA

58 UD          SCS DIMENSIONLESS UNITGRAPH
                     TLAG          .14  LAG

                                                          ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                   UNIT HYDROGRAPH
                                             10 END-OF-PERIOD ORDINATES
             151.      371.      299.      138.       67.       31.       15.        7.        4.        2.
```

****

HYDROGRAPH AT STATION SW8A

****

DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	*	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
5	MAY	1200	1	.00	.00	.00	0.	*	5	MAY	1815	76	.46	.06	.40	176.
5	MAY	1205	2	.00	.00	.00	0.	*	5	MAY	1820	77	.18	.02	.16	254.
5	MAY	1210	3	.00	.00	.00	0.	*	5	MAY	1825	78	.11	.01	.10	233.
5	MAY	1215	4	.00	.00	.00	0.	*	5	MAY	1830	79	.07	.01	.06	170.
5	MAY	1220	5	.00	.00	.00	0.	*	5	MAY	1835	80	.06	.00	.05	120.
5	MAY	1225	6	.00	.00	.00	0.	*	5	MAY	1840	81	.05	.00	.05	88.
5	MAY	1230	7	.00	.00	.00	0.	*	5	MAY	1845	82	.01	.00	.01	65.
5	MAY	1235	8	.00	.00	.00	0.	*	5	MAY	1850	83	.01	.00	.01	41.
5	MAY	1240	9	.00	.00	.00	0.	*	5	MAY	1855	84	.01	.00	.01	25.
5	MAY	1245	10	.00	.00	.00	0.	*	5	MAY	1900	85	.01	.00	.01	17.
5	MAY	1250	11	.00	.00	.00	0.	*	5	MAY	1905	86	.01	.00	.01	12.
5	MAY	1255	12	.00	.00	.00	0.	*	5	MAY	1910	87	.01	.00	.01	10.
5	MAY	1300	13	.00	.00	.00	0.	*	5	MAY	1915	88	.01	.00	.01	9.
5	MAY	1305	14	.00	.00	.00	0.	*	5	MAY	1920	89	.01	.00	.01	9.
5	MAY	1310	15	.00	.00	.00	0.	*	5	MAY	1925	90	.01	.00	.01	9.
5	MAY	1315	16	.00	.00	.00	0.	*	5	MAY	1930	91	.01	.00	.01	9.
5	MAY	1320	17	.00	.00	.00	0.	*	5	MAY	1935	92	.01	.00	.01	8.
5	MAY	1325	18	.00	.00	.00	0.	*	5	MAY	1940	93	.01	.00	.01	8.
5	MAY	1330	19	.00	.00	.00	0.	*	5	MAY	1945	94	.01	.00	.01	8.

```
                    (INCHES)      1.599       1.662       1.662       1.662
                    (AC-FT)        12.         12.         12.         12.

                    CUMULATIVE AREA =     .14 SQ MI


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

            **************
            *            *
 60 KK      *     SW4    *
            *            *
            **************

               SUBBASIN RUNOFF DATA

 61 BA           SUBBASIN CHARACTERISTICS
                      TAREA          .25  SUBBASIN AREA

                 PRECIPITATION DATA

  8 PH                                   DEPTHS FOR  10-PERCENT HYPOTHETICAL STORM
                 ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                 5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                   .47     .92    1.61    1.72    1.82    2.07    2.30    2.53     .00     .00     .00     .00

                                                STORM AREA =     .25

 62 LS           SCS LOSS RATE
                      STRTL          .13  INITIAL ABSTRACTION
                     CRVNBR        94.00  CURVE NUMBER
                      RTIMP          .00  PERCENT IMPERVIOUS AREA

 63 UD           SCS DIMENSIONLESS UNITGRAPH
                       TLAG          .68  LAG

                                                      ***

                                                UNIT HYDROGRAPH
                                           43 END-OF-PERIOD ORDINATES
                  7.      21.      41.      68.     103.     135.     156.     166.     167.     160.
                147.     132.     113.      91.      73.      60.      50.      42.      35.      29.
                 24.      20.      16.      14.      11.       9.       8.       6.       5.       4.
                  4.       3.       2.       2.       2.       2.       1.       1.       1.       1.
                  0.       0.       0.

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

                       HYDROGRAPH AT STATION      SW4

    TOTAL RAINFALL =    2.29, TOTAL LOSS =     .62, TOTAL EXCESS =    1.67

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     12.42-HR
+   (CFS)       (HR)
                                    (CFS)
+    192.       6.92                  43.         21.         21.         21.
                                (INCHES)      1.595       1.641       1.641       1.641
                                 (AC-FT)       21.         22.         22.         22.

                       CUMULATIVE AREA =     .25 SQ MI
```

*** ***

```
              **************
              *            *
 64 KK        *     SW9    *
              *            *
              **************
```

SUBBASIN RUNOFF DATA

65 BA — SUBBASIN CHARACTERISTICS

TAREA	.35	SUBBASIN AREA

PRECIPITATION DATA

8 PH — DEPTHS FOR 10-PERCENT HYPOTHETICAL STORM

..... HYDRO-35			..... TP-40					..... TP-49			
5-MIN	15-MIN	60-MIN	2-HR	3-HR	6-HR	12-HR	24-HR	2-DAY	4-DAY	7-DAY	10-DAY
.47	.92	1.61	1.72	1.82	2.07	2.30	2.53	.00	.00	.00	.00

STORM AREA = .35

66 LS — SCS LOSS RATE

STRTL	.27	INITIAL ABSTRACTION
CRVNBR	88.00	CURVE NUMBER
RTIMP	.00	PERCENT IMPERVIOUS AREA

67 UD — SCS DIMENSIONLESS UNITGRAPH

TLAG	.99	LAG

***

UNIT HYDROGRAPH
61 END-OF-PERIOD ORDINATES

4.	12.	23.	36.	52.	73.	97.	120.	139.	153.
161.	163.	163.	159.	151.	142.	131.	119.	105.	89.
76.	67.	58.	51.	45.	40.	35.	31.	27.	23.
21.	18.	16.	14.	12.	11.	9.	8.	7.	6.
6.	5.	4.	4.	3.	3.	2.	2.	2.	2.
2.	1.	1.	1.	1.	1.	1.	1.	0.	0.
0.									

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

HYDROGRAPH AT STATION SW9

TOTAL RAINFALL = 2.29, TOTAL LOSS = 1.09, TOTAL EXCESS = 1.20

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW	6-HR	24-HR	72-HR	12.42-HR
+	(CFS)	(HR)	(CFS)	44.	21.	21.	21.
+	144.	7.25	(INCHES)	1.157	1.166	1.166	1.166
			(AC-FT)	22.	22.	22.	22.

CUMULATIVE AREA = .35 SQ MI

*** ***

```
              **************
              *            *
68 KK         *     SW10   *
              *            *
              **************

                SUBBASIN RUNOFF DATA

69 BA             SUBBASIN CHARACTERISTICS
                       TAREA          .13  SUBBASIN AREA

                  PRECIPITATION DATA

 8 PH                                   DEPTHS FOR  10-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .47     .92    1.61    1.72    1.82    2.07    2.30    2.53     .00     .00     .00     .00

                                                STORM AREA =     .13

70 LS             SCS LOSS RATE
                       STRTL          .27  INITIAL ABSTRACTION
                      CRVNBR        88.00  CURVE NUMBER
                       RTIMP          .00  PERCENT IMPERVIOUS AREA

71 UD             SCS DIMENSIONLESS UNITGRAPH
                       TLAG          .71  LAG

                                                     ***

                                                UNIT HYDROGRAPH
                                           45 END-OF-PERIOD ORDINATES
                   3.      10.      19.      32.      48.      64.      75.      82.      84.      82.
                  77.      70.      62.      52.      42.      34.      28.      24.      20.      17.
                  14.      12.      10.       8.       7.       6.       5.       4.       3.       3.
                   2.       2.       2.       1.       1.       1.       1.       1.       1.       0.
                   0.       0.       0.       0.       0.

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

                      HYDROGRAPH AT STATION     SW10

   TOTAL RAINFALL =    2.29, TOTAL LOSS =    1.09, TOTAL EXCESS =    1.20

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     12.42-HR
+   (CFS)       (HR)
                          (CFS)
+     70.       7.00                  16.          8.          8.          8.
                         (INCHES)   1.166       1.178       1.178       1.178
                          (AC-FT)     8.          8.          8.          8.

                      CUMULATIVE AREA =     .13 SQ MI


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

              **************
              *            *
72 KK         *     SW11   *
              *            *
              **************
```

SUBBASIN RUNOFF DATA

73 BA SUBBASIN CHARACTERISTICS

TAREA .10 SUBBASIN AREA

PRECIPITATION DATA

8 PH DEPTHS FOR 10-PERCENT HYPOTHETICAL STORM

..... HYDRO-35			..... TP-40					..... TP-49			
5-MIN	15-MIN	60-MIN	2-HR	3-HR	6-HR	12-HR	24-HR	2-DAY	4-DAY	7-DAY	10-DAY
.47	.92	1.61	1.72	1.82	2.07	2.30	2.53	.00	.00	.00	.00

STORM AREA = .10

74 LS SCS LOSS RATE

STRTL .27 INITIAL ABSTRACTION

CRVNBR 88.00 CURVE NUMBER

RTIMP .00 PERCENT IMPERVIOUS AREA

75 UD SCS DIMENSIONLESS UNITGRAPH

TLAG .50 LAG

***

UNIT HYDROGRAPH
32 END-OF-PERIOD ORDINATES

6.	18.	36.	61.	80.	89.	89.	81.	71.	57.
42.	32.	25.	20.	16.	12.	9.	7.	6.	4.
3.	3.	2.	2.	1.	1.	1.	1.	0.	0.
0.	0.								

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

HYDROGRAPH AT STATION SW11

TOTAL RAINFALL = 2.29, TOTAL LOSS = 1.09, TOTAL EXCESS = 1.20

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	12.42-HR
+	(CFS)	(HR)					
			(CFS)				
+	69.	6.75		13.	6.	6.	6.
			(INCHES)	1.171	1.186	1.186	1.186
			(AC-FT)	6.	6.	6.	6.

CUMULATIVE AREA = .10 SQ MI

1

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

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+	HYDROGRAPH AT	SW1	1331.	6.75	248.	124.	124.	1.45		
+	ROUTED TO	CHA	1315.	6.83	248.	123.	123.	1.45		
+	HYDROGRAPH AT	SW2	652.	6.58	93.	46.	46.	.54		

+	2 COMBINED AT	COMB1	1817.	6.75	341.	169.	169.	1.99
+	ROUTED TO	CHAN	1816.	6.75	340.	168.	168.	1.99
+	ROUTED TO	CHAN	1800.	6.75	340.	167.	167.	1.99
+	HYDROGRAPH AT	SW3	79.	7.25	24.	11.	11.	.27
+	2 COMBINED AT	COMB1	1843.	6.75	363.	178.	178.	2.26
+	HYDROGRAPH AT	SW5	623.	6.50	81.	40.	40.	.47
+	ROUTED TO	CHAN	604.	6.50	81.	40.	40.	.47
+	ROUTED TO	CHAN	603.	6.58	82.	41.	41.	.47
+	HYDROGRAPH AT	SW6	477.	6.67	82.	41.	41.	.48
+	HYDROGRAPH AT	SW7	359.	6.67	58.	29.	29.	.34
+	3 COMBINED AT	COMB1	1416.	6.67	223.	111.	111.	1.29
+	ROUTED TO	CHAN	1406.	6.67	223.	110.	110.	1.29
+	HYDROGRAPH AT	SW8	202.	6.67	34.	17.	17.	.20
+	2 COMBINED AT	COMB1	1609.	6.67	257.	127.	127.	1.49
+	HYDROGRAPH AT	SW8A	254.	6.33	24.	12.	12.	.14
+	HYDROGRAPH AT	SW4	192.	6.92	43.	21.	21.	.25
+	HYDROGRAPH AT	SW9	144.	7.25	44.	21.	21.	.35
+	HYDROGRAPH AT	SW10	70.	7.00	16.	8.	8.	.13
+	HYDROGRAPH AT	SW11	69.	6.75	13.	6.	6.	.10

1 HEC-1 INPUT PAGE 1

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

*** WARNING *** ZZ-CARD MISSING

1
2 ZZ

1 ****

FLOOD HYDROGRAPH PACKAGE HEC-1 (IBM XT 512K VERSION) -FEB 1,1985
U.S. ARMY CORPS OF ENGINEERS, THE HYDROLOGIC ENGINEERING CENTER, 609 SECOND STREET, DAVIS, CA. 95616

****

ERROR 1 CARD NO. 1

IT HYDROGRAPH TIME DATA

NMIN	5	MINUTES IN COMPUTATION INTERVAL
IDATE	5MAY87	STARTING DATE
ITIME	1200	STARTING TIME
NQ	150	NUMBER OF HYDROGRAPH ORDINATES
NDDATE	6MAY87	ENDING DATE
NDTIME	0025	ENDING TIME

COMPUTATION INTERVAL .08 HOURS
TOTAL TIME BASE 12.42 HOURS

ENGLISH UNITS

SUBBASIN RUNOFF DATA

0 BA SUBBASIN CHARACTERISTICS

TAREA .00 SUBBASIN AREA

PRECIPITATION DATA

0 PH DEPTHS FOR 10-PERCENT HYPOTHETICAL STORM

..... HYDRO-35			..... TP-40					..... TP-49			
5-MIN	15-MIN	60-MIN	2-HR	3-HR	6-HR	12-HR	24-HR	2-DAY	4-DAY	7-DAY	10-DAY
.47	.92	1.61	1.72	1.82	2.07	2.30	2.53	.00	.00	.00	.00

STORM AREA = .00

0 UD SCS DIMENSIONLESS UNITGRAPH

TLAG .50 LAG

***

1

****
FLOOD HYDROGRAPH PACKAGE HEC-1 (IBM XT 512K VERSION) -FEB 1,1985
U.S. ARMY CORPS OF ENGINEERS, THE HYDROLOGIC ENGINEERING CENTER, 609 SECOND STREET, DAVIS, CA. 95616
****

51st Ave

SEGMENT 2 - ~~ELLIOT ROAD~~ TO CHAMPION DRAIN
100 yr - 24 hr event

THIS HEC-1 VERSION CONTAINS ALL OPTIONS EXCEPT ECONOMICS, AND THE NUMBER OF PLANS ARE REDUCED TO 3

1 HEC-1 INPUT PAGE 1

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

  1           ID        SOUTHWEST LOOP HYDROLOGY     ESTRELLA & ELLIOT RES MODELED
  2           ID        SOUTH OF THE SALT RIVER   DISCHARGE INTO CHAMPION DRAIN
  3           ID        FUTURE CONDITIONS 11/20/87 100 YEAR 24 HOUR ANALYSIS
              *DIAGRAM
  4           IT       5 20NOV87 1200.0  150.00
  5           IO       3

  6           KK     BA4
  7           BA    2.15
  8           PH                  0.77    1.52    2.66    2.82    2.97    3.35    3.69    4.04
  9           LS            89.00
 10           UD     .41

 11           KK     BA5
 12           BA     9.5
 13           LS            84.00
 14           UD    4.28

 15           KK   COMB1
 16           HC       2

 17           KK     BA3
 18           BA     .30
 19           LS            96.00
 20           UD     .25

 21           KK     BA6
 22           BA    4.69
 23           LS            85.00
 24           UD    4.39

 25           KK    COMB
 26           HC       2

 27           KK     BA8
 28           BA    1.03
 29           LS            83.00
 30           UD    3.91

 31           KK   COMB3
 32           HC       3

 33           KK    BA6B
 34           BA    1.30
```

```
 35          LS          85.00
 36          UD     2.9

 37          KK     BA2
 38          BA    1.13
 39          LS          97.00
 40          UD    0.25
```



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

 41          KK    BA6A
 42          BA    1.62
 43          LS          85.00
 44          UD    3.32

 45          KK   COMB5
 46          HC       2

 47          KK    COMB
 48          HC       2

 49          KK    B38A
 50          BA    0.20
 51          LS           90.0
 52          UD    0.65

 53          KK     BA1
 54          BA    2.44
 55          LS          90.00
 56          UD    0.65

 57          KK    COMB
 58          KO       1
 59          HC       2

 60          KK   ESTER
 61          RS       1    ELEV    1015       0
 62          SL  1017.2    63.6     0.6     0.5
 63          SV       0     8.9    27.2    45.8    65.0    84.6   104.7   125.3   146.4   168.0
 64          SV   190.1
 65          SE    1015  1015.8  1017.3  1018.8  1020.3  1021.8  1023.3  1024.8  1026.3  1027.8
 66          SE  1029.3
 67          SS    1050       0     3.0     1.5

 68          KK    BA7A
 69          BA    1.72
 70          LS          89.00
 71          UD    1.32

 72          KK    COMB
 73          HC       2

 74          KK     BA7
 75          BA    1.65
 76          LS          89.00
 77          UD    1.31

 78          KK    COMB
 79          HC       2
```



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

```
80          KK   ELLIT
81          RS       1    ELEV    1016       0
82          SL    1018    50.3     0.6     0.5
83          SV       0    12.8    25.8    38.9    52.1    65.4    78.8    92.4   106.1   110.7
84          SV   119.9
85          SE    1016  1016.7  1017.4  1018.1  1018.8  1019.5  1020.2  1020.9  1021.6  1021.8
86          SE  1022.3
87          SS    1050       0     3.0     1.5
88          ZZ
```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

```
INPUT
 LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW
  NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

   6         BA4
                .
                .
  11            .          BA5
                .            .
                .            .
  15       COMB1............
                .
                .
  17            .          BA3
                .            .
                .            .
  21            .            .          BA6
                .            .            .
                .            .            .
  25            .        COMB............
                .            .
                .            .
  27            .            .          BA8
                .            .            .
                .            .            .
  31       COMB3........................
                .
                .
  33            .        BA6B
                .            .
                .            .
  37            .            .          BA2
                .            .            .
                .            .            .
  41            .            .            .          BA6A
                .            .            .            .
                .            .            .            .
  45            .            .       COMB5............
                .            .            .
                .            .            .
  47            .        COMB............
                .            .
                .            .
  49            .            .        B38A
                .            .            .
                .            .            .
  53            .            .            .          BA1
                .            .            .            .
                .            .            .            .
  57            .            .        COMB............
                .            .            V
                .            .            V
  60            .            .       ESTER
                .            .            .
```

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                 .          .          .
68               .          .          .        BA7A
                 .          .          .          .
                 .          .          .          .
72               .          .       COMB...........
                 .          .          .
                 .          .          .
74               .          .          .         BA7
                 .          .          .          .
                 .          .          .          .
78               .          .       COMB...........
                 .          .          V
                 .          .          V
80               .          .       ELLIT
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1                                                                    ****
                          FLOOD HYDROGRAPH PACKAGE HEC-1 (IBM XT 512K VERSION) -FEB 1,1985
              U.S. ARMY CORPS OF ENGINEERS, THE HYDROLOGIC ENGINEERING CENTER, 609 SECOND STREET, DAVIS, CA. 95616
                                                                    ****


                          SOUTHWEST LOOP HYDROLOGY     ESTRELLA & ELLIOT RES MODELED
                          SOUTH OF THE SALT RIVER   DISCHARGE INTO CHAMPION DRAIN
                          FUTURE CONDITIONS 11/20/87 100 YEAR 24 HOUR ANALYSIS

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

    IT          HYDROGRAPH TIME DATA
                       NMIN           5  MINUTES IN COMPUTATION INTERVAL
                      IDATE    20NOV87  STARTING DATE
                      ITIME        1200  STARTING TIME
                         NQ         150  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE    21NOV87  ENDING DATE
                     NDTIME        0025  ENDING TIME

                  COMPUTATION INTERVAL     .08 HOURS
                       TOTAL TIME BASE   12.42 HOURS

          ENGLISH UNITS


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


              **************
              *            *
  6 KK        *       BA4  *
              *            *
              **************

                 SUBBASIN RUNOFF DATA

  7 BA            SUBBASIN CHARACTERISTICS
                       TAREA        2.15  SUBBASIN AREA

                  PRECIPITATION DATA

  8 PH                                 DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
```

```
                5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                  .77    1.52    2.66    2.82    2.97    3.35    3.69    4.04     .00     .00     .00     .00

                                                STORM AREA =     2.15

  9 LS          SCS LOSS RATE
                      STRTL          .25  INITIAL ABSTRACTION
                     CRVNBR        89.00  CURVE NUMBER
                      RTIMP          .00  PERCENT IMPERVIOUS AREA

 10 UD          SCS DIMENSIONLESS UNITGRAPH
                       TLAG          .41  LAG

                                                        ***

                                                   UNIT HYDROGRAPH
                                             27 END-OF-PERIOD ORDINATES
              205.     627.    1314.    1981.    2281.    2266.    1991.    1618.    1148.     834.
              619.     466.     339.     254.     188.     139.     103.      77.      57.      42.
               31.      24.      19.      13.       9.       5.       0.

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

                     HYDROGRAPH AT STATION      BA4

    TOTAL RAINFALL =    3.69, TOTAL LOSS =    1.16, TOTAL EXCESS =    2.54

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     12.42-HR
+   (CFS)       (HR)
                              (CFS)
+   3591.       6.67                 568.        281.        281.        281.
                            (INCHES)  2.455       2.514       2.514       2.514
                             (AC-FT)   281.        288.        288.        288.

                     CUMULATIVE AREA =    2.15 SQ MI


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


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            *            *
 11 KK      *     BA5    *
            *            *
            **************

               SUBBASIN RUNOFF DATA

 12 BA          SUBBASIN CHARACTERISTICS
                      TAREA        9.50  SUBBASIN AREA

                PRECIPITATION DATA

  8 PH                                 DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                  .77    1.52    2.66    2.82    2.97    3.35    3.69    4.04     .00     .00     .00     .00

                                                STORM AREA =     9.50

 13 LS          SCS LOSS RATE
                      STRTL          .38  INITIAL ABSTRACTION
                     CRVNBR        84.00  CURVE NUMBER
```

RTIMP .00 PERCENT IMPERVIOUS AREA

14 UD SCS DIMENSIONLESS UNITGRAPH
TLAG 4.28 LAG

***

UNIT HYDROGRAPH TRUNCATED FROM 259 TO 150 INT ERVALS

UNIT HYDROGRAPH
150 END-OF-PERIOD ORDINATES
VOLUME = 1.00

6.	13.	19.	25.	32.	45.	60.	74.	89.	104.
121.	140.	159.	178.	197.	219.	244.	270.	295.	320.
348.	381.	415.	449.	483.	517.	557.	597.	637.	677.
717.	752.	785.	819.	853.	887.	913.	936.	959.	983.
1006.	1024.	1036.	1049.	1061.	1074.	1083.	1085.	1088.	1090.
1092.	1093.	1091.	1089.	1087.	1085.	1083.	1071.	1058.	1045.
1033.	1020.	1006.	991.	976.	961.	947.	931.	914.	897.
880.	863.	845.	824.	802.	781.	760.	738.	713.	688.
662.	637.	612.	591.	570.	549.	528.	506.	491.	476.
461.	446.	432.	418.	406.	393.	380.	368.	356.	345.
335.	324.	314.	304.	296.	289.	281.	273.	266.	258.
250.	242.	235.	227.	221.	214.	208.	202.	195.	189.
183.	176.	170.	164.	158.	154.	150.	146.	142.	137.
133.	129.	125.	121.	116.	113.	110.	107.	104.	101.
98.	94.	91.	88.	85.	82.	80.	78.	75.	73.

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

HYDROGRAPH AT STATION BA5

TOTAL RAINFALL = 3.65, TOTAL LOSS = 1.58, TOTAL EXCESS = 2.06

	PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	12.42-HR
+	1997.	10.92	(CFS)	1275.	617.	617.	617.
			(INCHES)	1.248	1.249	1.249	1.249
			(AC-FT)	632.	633.	633.	633.

CUMULATIVE AREA = 9.50 SQ MI

*** ***

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**************
*            *
*     COMB1  *
*            *
**************
```

15 KK

16 HC HYDROGRAPH COMBINATION
ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

***

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

HYDROGRAPH AT STATION COMB1

```
 PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR        24-HR        72-HR      12.42-HR
+  (CFS)        (HR)
                          (CFS)
+   3665.       6.67                 1782.        897.         897.         897.
                        (INCHES)     1.422       1.482        1.482        1.482
                         (AC-FT)      884.        921.         921.         921.

                       CUMULATIVE AREA =   11.65 SQ MI


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


              **************
              *            *
   17 KK      *      BA3   *
              *            *
              **************

                 SUBBASIN RUNOFF DATA

   18 BA           SUBBASIN CHARACTERISTICS
                        TAREA          .30  SUBBASIN AREA

                   PRECIPITATION DATA

    8 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                   ..... HYDRO-35 ......  ............... TP-40 ...............  ........... TP-49 ...........
                   5-MIN  15-MIN  60-MIN   2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                     .77    1.52    2.66   2.82    2.97    3.35    3.69    4.04     .00     .00     .00     .00

                                                   STORM AREA =      .30

   19 LS           SCS LOSS RATE
                        STRTL          .08  INITIAL ABSTRACTION
                       CRVNBR        96.00  CURVE NUMBER
                        RTIMP          .00  PERCENT IMPERVIOUS AREA

   20 UD           SCS DIMENSIONLESS UNITGRAPH
                        TLAG          .25  LAG

                                                          ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                     UNIT HYDROGRAPH
                                                 17 END-OF-PERIOD ORDINATES
                 88.      301.      480.      480.      374.      224.      139.       90.       56.       35.
                 22.       14.        9.        5.        4.        2.        1.

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

                        HYDROGRAPH AT STATION      BA3

    TOTAL RAINFALL =    3.70, TOTAL LOSS =     .46, TOTAL EXCESS =    3.25

 PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR        24-HR        72-HR      12.42-HR
+  (CFS)        (HR)
                          (CFS)
+    798.       6.50                   99.         50.          50.          50.
                        (INCHES)     3.069       3.234        3.234        3.234
                         (AC-FT)       49.         52.          52.          52.
```

CUMULATIVE AREA = .30 SQ MI

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*            *
*      BA6   *
*            *
**************
```

21 KK

SUBBASIN RUNOFF DATA

22 BA

SUBBASIN CHARACTERISTICS
TAREA 4.69 SUBBASIN AREA

PRECIPITATION DATA

8 PH

DEPTHS FOR 0-PERCENT HYPOTHETICAL STORM

..... HYDRO-35			..... TP-40					..... TP-49			
5-MIN	15-MIN	60-MIN	2-HR	3-HR	6-HR	12-HR	24-HR	2-DAY	4-DAY	7-DAY	10-DAY
.77	1.52	2.66	2.82	2.97	3.35	3.69	4.04	.00	.00	.00	.00

STORM AREA = 4.69

23 LS

SCS LOSS RATE
STRTL .35 INITIAL ABSTRACTION
CRVNBR 85.00 CURVE NUMBER
RTIMP .00 PERCENT IMPERVIOUS AREA

24 UD

SCS DIMENSIONLESS UNITGRAPH
TLAG 4.39 LAG

***

UNIT HYDROGRAPH TRUNCATED FROM 265 TO 150 INT ERVALS

UNIT HYDROGRAPH
150 END-OF-PERIOD ORDINATES
VOLUME = 1.00

3.	6.	9.	12.	15.	21.	28.	35.	41.	48.
56.	65.	74.	83.	92.	101.	113.	125.	137.	149.
161.	175.	191.	207.	223.	239.	256.	275.	294.	313.
332.	350.	366.	382.	398.	414.	430.	442.	453.	464.
475.	486.	494.	500.	506.	512.	518.	523.	524.	525.
526.	527.	528.	528.	527.	526.	525.	524.	520.	514.
508.	502.	496.	490.	483.	476.	469.	462.	455.	448.
440.	432.	424.	416.	407.	397.	387.	377.	367.	357.
345.	333.	321.	309.	297.	287.	277.	267.	257.	247.
239.	232.	225.	218.	211.	204.	199.	193.	187.	181.
175.	170.	165.	160.	155.	150.	146.	142.	138.	135.
131.	128.	124.	120.	117.	113.	109.	106.	103.	100.
97.	94.	92.	89.	86.	83.	80.	77.	75.	73.
71.	69.	67.	65.	63.	61.	59.	57.	55.	54.
52.	51.	49.	48.	47.	45.	44.	42.	41.	39.

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

HYDROGRAPH AT STATION BA6

TOTAL RAINFALL = 3.68, TOTAL LOSS = 1.51, TOTAL EXCESS = 2.17

```
 PEAK FLOW      TIME                                MAXIMUM AVERAGE FLOW
                                          6-HR        24-HR        72-HR       12.42-HR
+  (CFS)        (HR)
                                  (CFS)
+   1024.       11.00                   649.         314.         314.         314.
                                 (INCHES)        1.287        1.288        1.288        1.288
                                  (AC-FT)         322.         322.         322.         322.

                                 CUMULATIVE AREA =     4.69 SQ MI


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


                 **************
                 *            *
   25 KK         *      COMB  *
                 *            *
                 **************

   26 HC              HYDROGRAPH COMBINATION
                            ICOMP            2  NUMBER OF HYDROGRAPHS TO COMBINE
                                                                   ***

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

                                HYDROGRAPH AT STATION      COMB

 PEAK FLOW      TIME                                MAXIMUM AVERAGE FLOW
                                          6-HR        24-HR        72-HR       12.42-HR
+  (CFS)        (HR)
                                  (CFS)
+   1035.       11.00                   718.         364.         364.         364.
                                 (INCHES)        1.337        1.405        1.405        1.405
                                  (AC-FT)         356.         374.         374.         374.

                                 CUMULATIVE AREA =     4.99 SQ MI


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


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                 *            *
   27 KK         *      BA8   *
                 *            *
                 **************

                   SUBBASIN RUNOFF DATA

   28 BA             SUBBASIN CHARACTERISTICS
                           TAREA          1.03  SUBBASIN AREA

                     PRECIPITATION DATA

    8 PH                                 DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                     ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                     5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                       .77    1.52    2.66    2.82    2.97    3.35    3.69    4.04     .00     .00     .00     .00
```

STORM AREA = 1.03

29 LS SCS LOSS RATE

STRTL	.41	INITIAL ABSTRACTION
CRVNBR	83.00	CURVE NUMBER
RTIMP	.00	PERCENT IMPERVIOUS AREA

30 UD SCS DIMENSIONLESS UNITGRAPH

TLAG	3.91	LAG

***

UNIT HYDROGRAPH TRUNCATED FROM 237 TO 150 INT ERVALS

UNIT HYDROGRAPH
150 END-OF-PERIOD ORDINATES
VOLUME = 1.00

1.	2.	2.	3.	4.	6.	8.	10.	12.	14.
17.	19.	21.	24.	27.	30.	33.	37.	40.	44.
49.	53.	57.	62.	67.	72.	77.	82.	87.	91.
96.	100.	104.	108.	111.	114.	116.	119.	121.	123.
124.	126.	127.	127.	128.	128.	128.	128.	128.	128.
127.	127.	126.	124.	122.	121.	119.	117.	115.	113.
112.	110.	107.	105.	103.	101.	98.	96.	93.	90.
88.	84.	81.	78.	75.	71.	69.	66.	63.	61.
58.	56.	54.	53.	51.	49.	47.	46.	44.	42.
41.	40.	38.	37.	36.	35.	34.	33.	32.	31.
30.	29.	28.	27.	26.	25.	24.	24.	23.	22.
21.	20.	20.	19.	18.	18.	17.	17.	16.	16.
15.	14.	14.	13.	13.	13.	12.	12.	11.	11.
11.	10.	10.	10.	9.	9.	9.	8.	8.	8.
7.	7.	7.	7.	6.	6.	6.	6.	6.	5.

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

HYDROGRAPH AT STATION BA8

TOTAL RAINFALL = 3.70, TOTAL LOSS = 1.67, TOTAL EXCESS = 2.03

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	12.42-HR
+ (CFS)	(HR)	(CFS)				
+ 229.	10.50		149.	72.	72.	72.
		(INCHES)	1.349	1.350	1.350	1.350
		(AC-FT)	74.	74.	74.	74.

CUMULATIVE AREA = 1.03 SQ MI

*** ***

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              **************
              *            *
31 KK         *     COMB3  *
              *            *
              **************
```

32 HC HYDROGRAPH COMBINATION

ICOMP	3	NUMBER OF HYDROGRAPHS TO COMBINE

***

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

                    HYDROGRAPH AT STATION    COMB3

                                   MAXIMUM AVERAGE FLOW
 PEAK FLOW     TIME                 6-HR       24-HR      72-HR     12.42-HR
+  (CFS)       (HR)
                          (CFS)
+   4284.      6.58                2646.      1334.      1334.       1334.
                        (INCHES)   1.392      1.453      1.453       1.453
                         (AC-FT)   1312.      1369.      1369.       1369.

                     CUMULATIVE AREA =   17.67 SQ MI


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


            **************
            *            *
 33 KK      *     BA6B   *
            *            *
            **************

              SUBBASIN RUNOFF DATA

 34 BA          SUBBASIN CHARACTERISTICS
                      TAREA          1.30  SUBBASIN AREA

                PRECIPITATION DATA

 8 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                 ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                 5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                   .77    1.52    2.66    2.82    2.97    3.35    3.69    4.04     .00     .00     .00     .00

                                                  STORM AREA =     1.30

 35 LS          SCS LOSS RATE
                      STRTL          .35  INITIAL ABSTRACTION
                     CRVNBR        85.00  CURVE NUMBER
                      RTIMP          .00  PERCENT IMPERVIOUS AREA

 36 UD          SCS DIMENSIONLESS UNITGRAPH
                       TLAG         2.90  LAG

                                                  ***

    UNIT HYDROGRAPH TRUNCATED FROM 176 TO 150 INT   ERVALS

                                          UNIT HYDROGRAPH
                                     150 END-OF-PERIOD ORDINATES
                                          VOLUME = 1.00
          2.      4.      5.      8.     13.     17.     21.     27.     32.     37.
         44.     51.     58.     65.     75.     85.     94.    105.    116.    128.
        139.    149.    159.    169.    177.    184.    191.    197.    202.    205.
        209.    212.    213.    213.    214.    213.    213.    212.    211.    208.
        204.    200.    196.    192.    188.    183.    179.    174.    169.    163.
        157.    151.    145.    138.    131.    123.    117.    111.    105.     98.
         94.     90.     86.     82.     78.     74.     71.     68.     65.     62.
         59.     57.     55.     52.     50.     48.     46.     44.     42.     40.
         38.     36.     35.     33.     31.     30.     28.     27.     26.     25.
```

24.	23.	22.	21.	20.	19.	18.	17.	16.	16.
15.	14.	14.	13.	12.	12.	11.	11.	10.	10.
9.	9.	9.	8.	8.	8.	7.	7.	7.	6.
6.	6.	5.	5.	5.	5.	5.	4.	4.	4.
4.	4.	3.	3.	3.	3.	3.	3.	3.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.

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

HYDROGRAPH AT STATION BA6B

TOTAL RAINFALL = 3.70, TOTAL LOSS = 1.51, TOTAL EXCESS = 2.19

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	12.42-HR
+ (CFS)	(HR)				
		(CFS)			
+ 399.	9.33	250.	121.	121.	121.
		(INCHES) 1.788	1.790	1.790	1.790
		(AC-FT) 124.	124.	124.	124.

CUMULATIVE AREA = 1.30 SQ MI

*** ***

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              **************
              *            *
37 KK         *     BA2    *
              *            *
              **************
```

SUBBASIN RUNOFF DATA

38 BA SUBBASIN CHARACTERISTICS
TAREA 1.13 SUBBASIN AREA

PRECIPITATION DATA

8 PH DEPTHS FOR 0-PERCENT HYPOTHETICAL STORM

..... HYDRO-35			..... TP-40				..... TP-49			
5-MIN	15-MIN	60-MIN	2-HR	3-HR	6-HR	12-HR	24-HR	2-DAY	4-DAY	7-DAY	10-DAY
.77	1.52	2.66	2.82	2.97	3.35	3.69	4.04	.00	.00	.00	.00

STORM AREA = 1.13

39 LS SCS LOSS RATE
STRTL .06 INITIAL ABSTRACTION
CRVNBR 97.00 CURVE NUMBER
RTIMP .00 PERCENT IMPERVIOUS AREA

40 UD SCS DIMENSIONLESS UNITGRAPH
TLAG .25 LAG

***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

UNIT HYDROGRAPH
17 END-OF-PERIOD ORDINATES

332.	1135.	1806.	1806.	1408.	843.	524.	340.	211.	132.
83.	52.	33.	21.	14.	8.	3.			

```
48 HC          HYDROGRAPH COMBINATION
                    ICOMP          2  NUMBER OF HYDROGRAPHS TO COMBINE
                                                                  ***

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

                      HYDROGRAPH AT STATION     COMB

 PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR      12.42-HR
+   (CFS)       (HR)
                          (CFS)
+   3073.       6.50                 875.        457.        457.        457.
                        (INCHES)    2.009       2.170       2.170       2.170
                         (AC-FT)     434.        469.        469.        469.

                      CUMULATIVE AREA =    4.05 SQ MI


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


            **************
            *            *
49 KK       *     B38A   *
            *            *
            **************

              SUBBASIN RUNOFF DATA

50 BA           SUBBASIN CHARACTERISTICS
                      TAREA          .20  SUBBASIN AREA

                PRECIPITATION DATA

 8 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                 ..... HYDRO-35 ......  ............... TP-40 ...............  ........... TP-49 ...........
                 5-MIN  15-MIN  60-MIN   2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                   .77    1.52    2.66   2.82    2.97    3.35    3.69    4.04     .00     .00     .00     .00

                                                STORM AREA =      .20

51 LS           SCS LOSS RATE
                      STRTL          .22  INITIAL ABSTRACTION
                     CRVNBR        90.00  CURVE NUMBER
                      RTIMP          .00  PERCENT IMPERVIOUS AREA

52 UD           SCS DIMENSIONLESS UNITGRAPH
                       TLAG          .65  LAG
                                                                  ***

                                                     UNIT HYDROGRAPH
                                                 41 END-OF-PERIOD ORDINATES
                   6.      19.     37.     62.     93.    118.    134.    139.    139.    129.
                 117.     103.     84.     66.     54.     44.     37.     31.     25.     20.
                  17.      14.     11.      9.      8.      6.      5.      4.      4.      3.
                   2.       2.      2.      1.      1.      1.      1.      1.      0.      0.
                   0.

   ***            ***            ***            ***            ***
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                    HYDROGRAPH AT STATION      B38A

   TOTAL RAINFALL =     3.71, TOTAL LOSS =     1.06, TOTAL EXCESS =     2.64

 PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR        24-HR        72-HR      12.42-HR
+   (CFS)       (HR)
                                   (CFS)
+    259.       6.92                 55.          27.          27.          27.
                                (INCHES)       2.547        2.605        2.605        2.605
                                 (AC-FT)         27.          28.          28.          28.

                          CUMULATIVE AREA =     .20 SQ MI

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

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            *            *
 53 KK      *     BA1    *
            *            *
            **************

              SUBBASIN RUNOFF DATA

 54 BA          SUBBASIN CHARACTERISTICS
                      TAREA          2.44  SUBBASIN AREA

                PRECIPITATION DATA

 8 PH                                  DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                 5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                   .77    1.52    2.66    2.82    2.97    3.35    3.69    4.04     .00     .00     .00     .00

                                                STORM AREA =     2.44

 55 LS          SCS LOSS RATE
                      STRTL           .22  INITIAL ABSTRACTION
                     CRVNBR         90.00  CURVE NUMBER
                      RTIMP           .00  PERCENT IMPERVIOUS AREA

 56 UD          SCS DIMENSIONLESS UNITGRAPH
                       TLAG           .65  LAG

                                                    ***

                                                UNIT HYDROGRAPH
                                           41 END-OF-PERIOD ORDINATES
                 76.      233.      450.      752.     1132.     1441.     1630.     1698.     1690.     1579.
               1431.     1252.     1024.      807.      657.      539.      447.      372.      307.      247.
                206.      169.      139.      114.       92.       77.       63.       52.       43.       35.
                 29.       24.       20.       17.       14.       12.        9.        7.        5.        3.
                  1.

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

                    HYDROGRAPH AT STATION      BA1

   TOTAL RAINFALL =     3.69, TOTAL LOSS =     1.06, TOTAL EXCESS =     2.63

 PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR        24-HR        72-HR      12.42-HR
```

```
+   (CFS)        (HR)
                          (CFS)
+   3116.        6.92                664.        329.        329.        329.
                          (INCHES)   2.531       2.590       2.590       2.590
                          (AC-FT)    329.        337.        337.        337.

                          CUMULATIVE AREA =    2.44 SQ MI
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            *            *
 57 KK      *     COMB   *
            *            *
            **************

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

 59 HC          HYDROGRAPH COMBINATION
                     ICOMP          2  NUMBER OF HYDROGRAPHS TO COMBINE
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HYDROGRAPH AT STATION COMB
SUM OF 2 HYDROGRAPHS

****

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
20	NOV	1200	1	0.	20	NOV	1510	39	0.	20	NOV	1820	77	863.	20	NOV	2130	115	191.
20	NOV	1205	2	0.	20	NOV	1515	40	0.	20	NOV	1825	78	1280.	20	NOV	2135	116	182.
20	NOV	1210	3	0.	20	NOV	1520	41	0.	20	NOV	1830	79	1786.	20	NOV	2140	117	173.
20	NOV	1215	4	0.	20	NOV	1525	42	0.	20	NOV	1835	80	2331.	20	NOV	2145	118	165.
20	NOV	1220	5	0.	20	NOV	1530	43	0.	20	NOV	1840	81	2809.	20	NOV	2150	119	157.
20	NOV	1225	6	0.	20	NOV	1535	44	0.	20	NOV	1845	82	3150.	20	NOV	2155	120	151.
20	NOV	1230	7	0.	20	NOV	1540	45	0.	20	NOV	1850	83	3335.	20	NOV	2200	121	144.
20	NOV	1235	8	0.	20	NOV	1545	46	0.	20	NOV	1855	84	3375.	20	NOV	2205	122	139.
20	NOV	1240	9	0.	20	NOV	1550	47	0.	20	NOV	1900	85	3273.	20	NOV	2210	123	133.
20	NOV	1245	10	0.	20	NOV	1555	48	0.	20	NOV	1905	86	3065.	20	NOV	2215	124	129.
20	NOV	1250	11	0.	20	NOV	1600	49	1.	20	NOV	1910	87	2775.	20	NOV	2220	125	125.
20	NOV	1255	12	0.	20	NOV	1605	50	1.	20	NOV	1915	88	2427.	20	NOV	2225	126	121.
20	NOV	1300	13	0.	20	NOV	1610	51	2.	20	NOV	1920	89	2080.	20	NOV	2230	127	118.
20	NOV	1305	14	0.	20	NOV	1615	52	3.	20	NOV	1925	90	1775.	20	NOV	2235	128	114.
20	NOV	1310	15	0.	20	NOV	1620	53	5.	20	NOV	1930	91	1515.	20	NOV	2240	129	111.
20	NOV	1315	16	0.	20	NOV	1625	54	7.	20	NOV	1935	92	1295.	20	NOV	2245	130	109.
20	NOV	1320	17	0.	20	NOV	1630	55	9.	20	NOV	1940	93	1110.	20	NOV	2250	131	106.
20	NOV	1325	18	0.	20	NOV	1635	56	12.	20	NOV	1945	94	954.	20	NOV	2255	132	104.
20	NOV	1330	19	0.	20	NOV	1640	57	15.	20	NOV	1950	95	826.	20	NOV	2300	133	102.
20	NOV	1335	20	0.	20	NOV	1645	58	18.	20	NOV	1955	96	724.	20	NOV	2305	134	100.
20	NOV	1340	21	0.	20	NOV	1650	59	22.	20	NOV	2000	97	638.	20	NOV	2310	135	98.
20	NOV	1345	22	0.	20	NOV	1655	60	26.	20	NOV	2005	98	568.	20	NOV	2315	136	96.
20	NOV	1350	23	0.	20	NOV	1700	61	30.	20	NOV	2010	99	510.	20	NOV	2320	137	94.
20	NOV	1355	24	0.	20	NOV	1705	62	34.	20	NOV	2015	100	462.	20	NOV	2325	138	92.
20	NOV	1400	25	0.	20	NOV	1710	63	38.	20	NOV	2020	101	423.	20	NOV	2330	139	91.
20	NOV	1405	26	0.	20	NOV	1715	64	42.	20	NOV	2025	102	389.	20	NOV	2335	140	89.
20	NOV	1410	27	0.	20	NOV	1720	65	46.	20	NOV	2030	103	361.	20	NOV	2340	141	88.

20 NOV 1415	28	0.	*	20 NOV 1725	66	50.	*	20 NOV 2035	104	337.	*	20 NOV 2345	142	86.
20 NOV 1420	29	0.	*	20 NOV 1730	67	53.	*	20 NOV 2040	105	316.	*	20 NOV 2350	143	85.
20 NOV 1425	30	0.	*	20 NOV 1735	68	57.	*	20 NOV 2045	106	298.	*	20 NOV 2355	144	84.
20 NOV 1430	31	0.	*	20 NOV 1740	69	61.	*	20 NOV 2050	107	281.	*	21 NOV 0000	145	83.
20 NOV 1435	32	0.	*	20 NOV 1745	70	68.	*	20 NOV 2055	108	267.	*	21 NOV 0005	146	81.
20 NOV 1440	33	0.	*	20 NOV 1750	71	81.	*	20 NOV 2100	109	254.	*	21 NOV 0010	147	80.
20 NOV 1445	34	0.	*	20 NOV 1755	72	103.	*	20 NOV 2105	110	242.	*	21 NOV 0015	148	79.
20 NOV 1450	35	0.	*	20 NOV 1800	73	143.	*	20 NOV 2110	111	231.	*	21 NOV 0020	149	78.
20 NOV 1455	36	0.	*	20 NOV 1805	74	211.	*	20 NOV 2115	112	221.	*	21 NOV 0025	150	77.
20 NOV 1500	37	0.	*	20 NOV 1810	75	330.	*	20 NOV 2120	113	211.	*			
20 NOV 1505	38	0.	*	20 NOV 1815	76	543.	*	20 NOV 2125	114	201.	*			

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	12.42-HR
+ (CFS)	(HR)	(CFS)				
+ 3375.	6.92		719.	356.	356.	356.
		(INCHES)	2.533	2.592	2.592	2.592
		(AC-FT)	357.	365.	365.	365.

CUMULATIVE AREA = 2.64 SQ MI

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                 **************
                 *            *
60 KK            *   ESTER    *
                 *            *
                 **************

                HYDROGRAPH ROUTING DATA

61 RS             STORAGE ROUTING
                      NSTPS          1  NUMBER OF SUBREACHES
                       ITYP       ELEV  TYPE OF INITIAL CONDITION
                     RSVRIC    1015.00  INITIAL CONDITION
                          X        .00 WORKING R AND D COEFFICIENT

63 SV               STORAGE        .0      8.9     27.2     45.8     65.0     84.6    104.7    125.3    146.4    168.0
                                 190.1

65 SE             ELEVATION    1015.00  1015.80  1017.30  1018.80  1020.30  1021.80  1023.30  1024.80  1026.30  1027.80
                               1029.30

62 SL             LOW-LEVEL OUTLET
                       ELEVL    1017.20  ELEVATION AT CENTER OF OUTLET
                       CAREA      63.60  CROSS-SECTIONAL AREA
                        COQL        .60  COEFFICIENT
                        EXPL        .50  EXPONENT OF HEAD

67 SS             SPILLWAY
                        CREL    1050.00  SPILLWAY CREST ELEVATION
                       SPWID        .00  SPILLWAY WIDTH
                        COQW        .00  WEIR COEFFICIENT
                        EXPW       1.50  EXPONENT OF HEAD

                                      ***

                    COMPUTED OUTFLOW-ELEVATION DATA
```

OUTFLOW	.00	.00	650.53	714.74	793.01	890.53	1015.41	1181.02	1411.18	1752.75
ELEVATION	1015.00	1017.20	1021.72	1022.65	1023.91	1025.67	1028.21	1032.09	1038.46	1050.00

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	8.90	25.98	27.20	45.80	65.00	83.53	84.60	96.05	104.70
OUTFLOW	.00	.00	.00	96.77	387.11	538.84	650.53	656.39	714.74	755.87
ELEVATION	1015.00	1015.80	1017.20	1017.30	1018.80	1020.30	1021.72	1021.80	1022.65	1023.30
STORAGE	113.13	125.30	137.50	146.40	168.00	174.01	190.10	231.23	325.08	495.08
OUTFLOW	793.01	843.70	890.53	923.22	996.41	1015.41	1064.57	1181.02	1411.18	1752.75
ELEVATION	1023.91	1024.80	1025.67	1026.30	1027.80	1028.21	1029.30	1032.09	1038.46	1050.00

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HYDROGRAPH AT STATION ESTER

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	12.42-HR
+ (CFS)	(HR)					
		(CFS)				
+ 1072.	7.67		674.	326.	326.	326.
		(INCHES)	2.374	2.374	2.374	2.374
		(AC-FT)	334.	334.	334.	334.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE 6-HR	24-HR	72-HR	12.42-HR
+ (AC-FT)	(HR)				
193.	7.67	103.	51.	51.	51.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE 6-HR	24-HR	72-HR	12.42-HR
+ (FEET)	(HR)				
1029.47	7.67	1023.07	1018.96	1018.96	1018.96

CUMULATIVE AREA = 2.64 SQ MI

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              **************
              *            *
68 KK         *     BA7A   *
              *            *
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SUBBASIN RUNOFF DATA

69 BA SUBBASIN CHARACTERISTICS

TAREA 1.72 SUBBASIN AREA

PRECIPITATION DATA

8 PH DEPTHS FOR 0-PERCENT HYPOTHETICAL STORM

..... HYDRO-35			..... TP-40					..... TP-49			
5-MIN	15-MIN	60-MIN	2-HR	3-HR	6-HR	12-HR	24-HR	2-DAY	4-DAY	7-DAY	10-DAY
.77	1.52	2.66	2.92	2.97	3.35	3.69	4.04	.00	.00	.00	.00

STORM AREA = 1.72

70 LS SCS LOSS RATE

```
                    STRTL        .25  INITIAL ABSTRACTION
                   CRVNBR      89.00  CURVE NUMBER
                    RTIMP        .00  PERCENT IMPERVIOUS AREA

 71 UD          SCS DIMENSIONLESS UNITGRAPH
                     TLAG       1.32  LAG

                                                    ***

                                              UNIT HYDROGRAPH
                                         81 END-OF-PERIOD ORDINATES
                 11.     28.     54.     86.    120.    165.    217.    277.    346.    414.
                474.    523.    564.    588.    605.    609.    608.    603.    581.    557.
                531.    502.    471.    434.    393.    348.    310.    275.    249.    225.
                202.    184.    166.    153.    139.    126.    115.    103.     92.     84.
                 76.     69.     62.     57.     51.     46.     42.     38.     34.     31.
                 28.     25.     23.     21.     19.     17.     16.     14.     13.     11.
                 10.      9.      8.      8.      7.      6.      6.      6.      5.      5.
                  4.      4.      3.      3.      3.      2.      2.      1.      1.      1.
                  0.

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

                    HYDROGRAPH AT STATION     BA7A

   TOTAL RAINFALL =    3.69, TOTAL LOSS =    1.16, TOTAL EXCESS =    2.54

                                          MAXIMUM AVERAGE FLOW
  PEAK FLOW     TIME                 6-HR      24-HR      72-HR     12.42-HR
+   (CFS)       (HR)
                                  (CFS)
+   1219.       7.58                448.       219.       219.        219.
                              (INCHES)      2.423      2.455      2.455       2.455
                                (AC-FT)       222.       225.       225.        225.

                    CUMULATIVE AREA =    1.72 SQ MI


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

                 **************
                 *            *
 72 KK           *     COMB   *
                 *            *
                 **************

 73 HC                HYDROGRAPH COMBINATION
                          ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                    ***

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

                    HYDROGRAPH AT STATION     COMB

                                          MAXIMUM AVERAGE FLOW
  PEAK FLOW     TIME                 6-HR      24-HR      72-HR     12.42-HR
+   (CFS)       (HR)
                                  (CFS)
+   2288.       7.58               1121.       545.       545.        545.
                              (INCHES)      2.391      2.406      2.406       2.406
                                (AC-FT)       556.       559.       559.        559.
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CUMULATIVE AREA = 4.36 SQ MI

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              *            *
74 KK         *     BA7    *
              *            *
              **************
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SUBBASIN RUNOFF DATA

75 BA SUBBASIN CHARACTERISTICS

TAREA 1.65 SUBBASIN AREA

PRECIPITATION DATA

8 PH DEPTHS FOR 0-PERCENT HYPOTHETICAL STORM

..... HYDRO-35			..... TP-40					..... TP-49			
5-MIN	15-MIN	60-MIN	2-HR	3-HR	6-HR	12-HR	24-HR	2-DAY	4-DAY	7-DAY	10-DAY
.77	1.52	2.66	2.82	2.97	3.35	3.69	4.04	.00	.00	.00	.00

STORM AREA = 1.65

76 LS SCS LOSS RATE

STRTL .25 INITIAL ABSTRACTION

CRVNBR 89.00 CURVE NUMBER

RTIMP .00 PERCENT IMPERVIOUS AREA

77 UD SCS DIMENSIONLESS UNITGRAPH

TLAG 1.31 LAG

***

UNIT HYDROGRAPH

81 END-OF-PERIOD ORDINATES

11.	27.	53.	84.	118.	162.	213.	271.	339.	405.
463.	509.	549.	571.	585.	589.	587.	580.	559.	535.
509.	481.	449.	413.	372.	328.	292.	260.	235.	212.
191.	173.	158.	144.	131.	119.	108.	97.	86.	79.
72.	64.	59.	53.	48.	43.	39.	35.	32.	29.
26.	23.	21.	19.	17.	16.	14.	13.	12.	11.
10.	9.	8.	7.	6.	6.	6.	5.	5.	4.
4.	3.	3.	3.	2.	2.	1.	1.	1.	0.
0.									

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HYDROGRAPH AT STATION BA7

TOTAL RAINFALL = 3.70, TOTAL LOSS = 1.16, TOTAL EXCESS = 2.54

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW	6-HR	24-HR	72-HR	12.42-HR
+	(CFS)	(HR)	(CFS)				
+	1177.	7.58		430.	211.	211.	211.
			(INCHES)	2.425	2.456	2.456	2.456
			(AC-FT)	213.	216.	216.	216.

CUMULATIVE AREA = 1.65 SQ MI

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

              **************
              *            *
   78 KK      *     COMB   *
              *            *
              **************

   79 HC          HYDROGRAPH COMBINATION
                       ICOMP            2  NUMBER OF HYDROGRAPHS TO COMBINE
                                                                  ***

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

                          HYDROGRAPH AT STATION     COMB

  PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR        24-HR        72-HR      12.42-HR
+   (CFS)        (HR)
                                  (CFS)
+    3465.       7.58                1550.        756.         756.         756.
                                (INCHES)        2.398        2.420        2.420        2.420
                                 (AC-FT)         769.         776.         776.         776.

                          CUMULATIVE AREA =     6.01 SQ MI


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

              **************
              *            *
   80 KK      *    ELLIT   *
              *            *
              **************

              HYDROGRAPH ROUTING DATA

   81 RS          STORAGE ROUTING
                       NSTPS            1  NUMBER OF SUBREACHES
                        ITYP         ELEV  TYPE OF INITIAL CONDITION
                       RSVRIC      1016.00  INITIAL CONDITION
                            X          .00 WORKING R AND D COEFFICIENT

   83 SV            STORAGE           .0      12.8      25.8      38.9      52.1      65.4      78.8      92.4     106.1     110.7
                                    119.9

   85 SE          ELEVATION      1016.00   1016.70   1017.40   1018.10   1018.80   1019.50   1020.20   1020.90   1021.60   1021.80
                                 1022.30

   82 SL          LOW-LEVEL OUTLET
                       ELEVL      1018.00  ELEVATION AT CENTER OF OUTLET
                       CAREA        50.30  CROSS-SECTIONAL AREA
                        COQL          .60  COEFFICIENT
                        EXPL          .50  EXPONENT OF HEAD

   87 SS          SPILLWAY
                        CREL      1050.00  SPILLWAY CREST ELEVATION
                       SPWID          .00  SPILLWAY WIDTH
```

COQW	.00	WEIR COEFFICIENT
EXPW	1.50	EXPONENT OF HEAD

***

COMPUTED OUTFLOW-ELEVATION DATA

OUTFLOW	.00	.00	486.20	535.54	596.02	671.91	769.94	901.45	1087.15	1369.21
ELEVATION	1016.00	1018.00	1022.04	1022.90	1024.06	1025.71	1028.12	1031.87	1038.17	1050.00

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	12.80	25.80	37.03	38.90	52.10	65.40	78.80	92.40	106.10
OUTFLOW	.00	.00	.00	.00	76.53	216.49	296.44	359.01	412.19	459.24
ELEVATION	1016.00	1016.70	1017.40	1018.00	1018.10	1018.80	1019.50	1020.20	1020.90	1021.60
STORAGE	110.70	115.02	119.90	130.86	152.35	182.57	226.96	296.00	411.98	629.58
OUTFLOW	471.83	486.20	501.91	535.54	596.02	671.91	769.94	901.45	1087.15	1369.21
ELEVATION	1021.80	1022.04	1022.30	1022.90	1024.06	1025.71	1028.12	1031.87	1038.17	1050.00

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HYDROGRAPH AT STATION ELLIT

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	12.42-HR
+ (CFS)	(HR)	(CFS)				
+ 1102.	10.00		886.	428.	428.	428.
		(INCHES)	1.370	1.370	1.370	1.370
		(AC-FT)	439.	439.	439.	439.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE 6-HR	24-HR	72-HR	12.42-HR
+ (AC-FT)	(HR)				
423.	10.00	318.	154.	154.	154.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE 6-HR	24-HR	72-HR	12.42-HR
+ (FEET)	(HR)				
1038.79	10.00	1033.11	1024.28	1024.28	1024.28

CUMULATIVE AREA = 6.01 SQ MI

1

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

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+	HYDROGRAPH AT	BA4	3591.	6.67	568.	281.	281.	2.15		
+	HYDROGRAPH AT	BA5	1997.	10.92	1275.	617.	617.	9.50		
+	2 COMBINED AT	COMB1	3665.	6.67	1782.	897.	897.	11.65		
+	HYDROGRAPH AT	BA3	798.	6.50	99.	50.	50.	30		

+	HYDROGRAPH AT	BA6	1024.	11.00	649.	314.	314.	4.69	
+	2 COMBINED AT	COMB	1035.	11.00	718.	364.	364.	4.99	
+	HYDROGRAPH AT	BA8	229.	10.50	149.	72.	72.	1.03	
+	3 COMBINED AT	COMB3	4284.	6.58	2646.	1334.	1334.	17.67	
+	HYDROGRAPH AT	BA6B	399.	9.33	250.	121.	121.	1.30	
+	HYDROGRAPH AT	BA2	3042.	6.50	383.	196.	196.	1.13	
+	HYDROGRAPH AT	BA6A	444.	9.83	289.	140.	140.	1.62	
+	2 COMBINED AT	COMB5	3057.	6.50	637.	336.	336.	2.75	
+	2 COMBINED AT	COMB	3073.	6.50	875.	457.	457.	4.05	
+	HYDROGRAPH AT	B3BA	259.	6.92	55.	27.	27.	.20	
+	HYDROGRAPH AT	BA1	3116.	6.92	664.	329.	329.	2.44	
+	2 COMBINED AT	COMB	3375.	6.92	719.	356.	356.	2.64	
+	ROUTED TO	ESTER	1072.	7.67	674.	326.	326.	2.64	1029.47 7.67
+									
+	HYDROGRAPH AT	BA7A	1219.	7.58	448.	219.	219.	1.72	
+	2 COMBINED AT	COMB	2288.	7.58	1121.	545.	545.	4.36	
+	HYDROGRAPH AT	BA7	1177.	7.58	430.	211.	211.	1.65	
+	2 COMBINED AT	COMB	3465.	7.58	1550.	756.	756.	6.01	
+	ROUTED TO	ELLIT	1102.	10.00	886.	428.	428.	6.01	1038.79 10.00
+									
1									


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

  1
  2
  3
  4
*** WARNING *** ZZ-CARD MISSING
  5
```

SW009

1

****
FLOOD HYDROGRAPH PACKAGE HEC-1 (IBM XT 512K VERSION) -FEB 1,1985
U.S. ARMY CORPS OF ENGINEERS, THE HYDROLOGIC ENGINEERING CENTER, 609 SECOND STREET, DAVIS, CA. 95616
****

SEGMENT 2 - 51ST AVENUE TO STATION 720
100 yr - 24 hr event

THIS HEC-1 VERSION CONTAINS ALL OPTIONS EXCEPT ECONOMICS, AND THE NUMBER OF PLANS ARE REDUCED TO 3

1 HEC-1 INPUT PAGE 1

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

  1           ID        SOUTH MOUNTAIN BASIN
  2           ID        HYDROLOGY ANALYSIS  EXISTING CONDITIONS
  3           ID        100 YEAR 24 HR STORM
              *DIAGRAM
  4           IT       5 21MAY87  1200.0  150.00
  5           IO       3

  6           KK     SW1
  7           BA    1.45
  8           PH              0     .77    1.52    2.66    2.82    2.97    3.35    3.69    4.04
  9           LS          94.00
 10           UD     .52

 11           KK     CHANNEL SECTION X-32
 12           RK    5700   0.025   0.035        TRAP      30.00     0.00

 13           KK     SW2
 14           BA     .54
 15           LS          94.00
 16           UD     .33

 17           KK    COMB1
 18           HC       2

 19           KK     CHANNEL SECTION X-33
 20           RK    3300   0.023   0.035        TRAP      30.00     0.00

 21           KK     CHANNEL SECTION 33-A
 22           RK    3300   0.023   0.035        TRAP      50.00     0.00

 23           KK     SW3
 24           BA     .27
 25           LS          82.00
 26           UD     .94

 27           KK    COMB1
 28           HC       2

 29           KK     SW5
 30           BA     .47
 31           LS          94.00
 32           UD     .28

 33           KK     CHANNEL SECTION X-36
 34           RK    1700   0.022    0.04        TRAP      30.00     0.00
```

```
35          KK    CHANNEL SECTION X-38
36          RK    3000     .02   0.035         TRAP      40.00     0.00

37          KK     SW6
38          BA     .48
39          LS            94.00
40          UD     .46
```



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

41          KK     SW7
42          BA     .34
43          LS            94.00
44          UD     .42

45          KK    COMB1
46          HC        3

47          KK    CHANNEL THRU SECTION X-38
48          RK    3200   0.016   0.035         TRAP      40.00     0.00

49          KK     SW8
50          BA     .20
51          LS            94.00
52          UD     .45

53          KK    COMB1
54          HC        2

55          KK    SW8A
56          BA    0.14
57          LS            94.00
58          UD    0.14

59          KK     SW4
60          BA     .25
61          LS            94.00
62          UD     .68

63          KK     SW9
64          BA     .35
65          LS            88.00
66          UD     .99

67          KK    SW10
68          BA     .13
69          LS            88.00
70          UD     .71

71          KK    SW11
72          BA     .10
73          LS            88.00
74          UD     .50

75          KK    COMB2
76          HC        7
77          ZZ
```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

```
INPUT
 LINE     (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

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

```
 6        SW1
           V
           V
11        CHA
           .
           .
13         .        SW2
           .         .
           .         .
17      COMB1............
           V
           V
19       CHAN
           V
           V
21       CHAN
           .
           .
23         .        SW3
           .         .
           .         .
27      COMB1............
           .
           .
29         .        SW5
           .         V
           .         V
33         .       CHAN
           .         V
           .         V
35         .       CHAN
           .         .
           .         .
37         .         .        SW6
           .         .         .
           .         .         .
41         .         .         .        SW7
           .         .         .         .
           .         .         .         .
45         .      COMB1......................
           .         V
           .         V
47         .       CHAN
           .         .
           .         .
49         .         .        SW8
           .         .         .
           .         .         .
53         .      COMB1............
           .         .
           .         .
55         .         .        SW8A
           .         .         .
           .         .         .
59         .         .         .        SW4
           .         .         .         .
           .         .         .         .
63         .         .         .         .        SW9
           .         .         .         .         .
           .         .         .         .         .
67         .         .         .         .         .        SW10
           .         .         .         .         .         .
           .         .         .         .         .         .
71         .         .         .         .         .         .        SW11
           .         .         .         .         .         .
```

```
  75       COMB2.....................................................................

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1                                                                    ****
                          FLOOD HYDROGRAPH PACKAGE HEC-1 (IBM XT 512K VERSION) -FEB 1,1985
              U.S. ARMY CORPS OF ENGINEERS, THE HYDROLOGIC ENGINEERING CENTER, 609 SECOND STREET, DAVIS, CA. 95616
                                                                    ****


                                SOUTH MOUNTAIN BASIN
                                HYDROLOGY ANALYSIS  EXISTING CONDITIONS
                                100 YEAR 24 HR STORM

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

     IT          HYDROGRAPH TIME DATA
                        NMIN           5  MINUTES IN COMPUTATION INTERVAL
                       IDATE     21MAY87  STARTING DATE
                       ITIME        1200  STARTING TIME
                          NQ         150  NUMBER OF HYDROGRAPH ORDINATES
                      NDDATE     22MAY87  ENDING DATE
                      NDTIME        0025  ENDING TIME

                  COMPUTATION INTERVAL     .08 HOURS
                       TOTAL TIME BASE   12.42 HOURS

          ENGLISH UNITS


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


            **************
            *            *
   6 KK     *       SW1  *
            *            *
            **************

               SUBBASIN RUNOFF DATA

   7 BA          SUBBASIN CHARACTERISTICS
                       TAREA        1.45  SUBBASIN AREA

                 PRECIPITATION DATA

   8 PH                                 DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                 ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                 5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                   .77    1.52    2.66    2.82    2.97    3.35    3.69    4.04     .00     .00     .00     .00

                                                STORM AREA =    1.45

   9 LS          SCS LOSS RATE
                       STRTL         .13  INITIAL ABSTRACTION
                      CRVNBR       94.00  CURVE NUMBER
                       RTIMP         .00  PERCENT IMPERVIOUS AREA

  10 UD          SCS DIMENSIONLESS UNITGRAPH
                        TLAG         .52  LAG
```

***

UNIT HYDROGRAPH
33 END-OF-PERIOD ORDINATES

80.	233.	477.	808.	1080.	1227.	1242.	1169.	1037.	868.
658.	503.	394.	314.	249.	193.	153.	120.	93.	73.
58.	45.	36.	28.	22.	17.	14.	11.	9.	7.
5.	3.	1.							

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

HYDROGRAPH AT STATION SW1

TOTAL RAINFALL = 3.70, TOTAL LOSS = .67, TOTAL EXCESS = 3.03

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	12.42-HR
+	(CFS)	(HR)					
			(CFS)				
+	2450.	6.75		449.	226.	226.	226.
			(INCHES)	2.881	2.998	2.998	2.998
			(AC-FT)	223.	232.	232.	232.

CUMULATIVE AREA = 1.45 SQ MI

*** ***

```
            **************
            *            *
 11 KK      *     CHA    *     NNEL SECTION X-32
            *            *
            **************
```

HYDROGRAPH ROUTING DATA

12 RK KINEMATIC WAVE STREAM ROUTING

L	5700.	CHANNEL LENGTH
S	.0250	SLOPE
N	.035	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	30.00	BOTTOM WIDTH OR DIAMETER
Z	.00	SIDE SLOPE

***

KINEMATIC STREAM ROUTING USED FOR THIS REACH

COMPUTED KINEMATIC PARAMETERS

ALPHA	M	DT (MIN)	DX (FT)
.6972	1.667	1.25	2850.00

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

HYDROGRAPH AT STATION CHA

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	12.42-HR

```
+   (CFS)        (HR)
                              (CFS)
+    2424.       6.75                    449.        224.        224.        224.
                            (INCHES)     2.880       2.978       2.978       2.978
                             (AC-FT)      223.        230.        230.        230.

                            CUMULATIVE AREA =     1.45 SQ MI


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

            **************
            *            *
  13 KK     *     SW2    *
            *            *
            **************

              SUBBASIN RUNOFF DATA

  14 BA         SUBBASIN CHARACTERISTICS
                      TAREA          .54  SUBBASIN AREA

                PRECIPITATION DATA

   8 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                  .77    1.52    2.66    2.82    2.97    3.35    3.69    4.04     .00     .00     .00     .00

                                                STORM AREA =      .54

  15 LS         SCS LOSS RATE
                      STRTL          .13  INITIAL ABSTRACTION
                     CRVNBR        94.00  CURVE NUMBER
                      RTIMP          .00  PERCENT IMPERVIOUS AREA

  16 UD         SCS DIMENSIONLESS UNITGRAPH
                       TLAG          .33  LAG

                                                          ***

                                                     UNIT HYDROGRAPH
                                                 22 END-OF-PERIOD ORDINATES
                85.      272.      544.      693.      685.      578.      418.      277.      192.      136.
                94.       65.       45.       31.       22.       15.       10.        7.        6.        4.
                 2.        0.

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

                         HYDROGRAPH AT STATION      SW2

    TOTAL RAINFALL =    3.70, TOTAL LOSS =     .67, TOTAL EXCESS =    3.03

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     12.42-HR
+   (CFS)       (HR)
                              (CFS)
+    1193.       6.58                    168.         85.         85.         85.
                            (INCHES)     2.890       3.016       3.016       3.016
                             (AC-FT)       83.         87.         87.         87.

                            CUMULATIVE AREA =      .54 SQ MI
```

*** ***

```
            **************
            *            *
  17 KK     *     COMB1  *
            *            *
            **************

  18 HC          HYDROGRAPH COMBINATION
                      ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE
                                                                  ***

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

                        HYDROGRAPH AT STATION    COMB1

 PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR        24-HR        72-HR      12.42-HR
+   (CFS)       (HR)
                                   (CFS)
+    3380.      6.67                 617.         309.         309.         309.
                                (INCHES)        2.881        2.988        2.988        2.988
                                 (AC-FT)         306.         317.         317.         317.

                        CUMULATIVE AREA =    1.99 SQ MI
```

*** ***

```
            **************
            *            *
  19 KK     *     CHAN   *     NEL SECTION X-33
            *            *
            **************

               HYDROGRAPH ROUTING DATA

  20 RK          KINEMATIC WAVE STREAM ROUTING
                            L       3300.  CHANNEL LENGTH
                            S      .0230  SLOPE
                            N       .035  CHANNEL ROUGHNESS COEFFICIENT
                           CA        .00  CONTRIBUTING AREA
                        SHAPE       TRAP  CHANNEL SHAPE
                           WD      30.00  BOTTOM WIDTH OR DIAMETER
                            Z        .00  SIDE SLOPE
                                                                  ***

        KINEMATIC STREAM ROUTING USED FOR THIS REACH


         COMPUTED KINEMATIC PARAMETERS
             ALPHA         M       DT (MIN)    DX (FT)
             .6687     1.667         1.25      1650.00

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

HYDROGRAPH AT STATION CHAN

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	12.42-HR
+		(CFS)				
+ 3354.	6.75		618.	309.	309.	309.
		(INCHES)	2.887	2.984	2.984	2.984
		(AC-FT)	306.	317.	317.	317.

CUMULATIVE AREA = 1.99 SQ MI

*** ***

```
            **************
            *            *
 21 KK      *      CHAN  *     NEL SECTION 33-A
            *            *
            **************
```

HYDROGRAPH ROUTING DATA

22 RK KINEMATIC WAVE STREAM ROUTING

L	3300.	CHANNEL LENGTH
S	.0230	SLOPE
N	.035	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	50.00	BOTTOM WIDTH OR DIAMETER
Z	.00	SIDE SLOPE

***

KINEMATIC STREAM ROUTING USED FOR THIS REACH

COMPUTED KINEMATIC PARAMETERS

ALPHA	M	DT (MIN)	DX (FT)
.4757	1.667	1.25	1650.00

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

HYDROGRAPH AT STATION CHAN

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	12.42-HR
+		(CFS)				
+ 3339.	6.75		618.	307.	307.	307.
		(INCHES)	2.886	2.971	2.971	2.971
		(AC-FT)	306.	315.	315.	315.

CUMULATIVE AREA = 1.99 SQ MI

*** ***

```
              **************
              *            *
 23 KK        *     SW3    *
              *            *
              **************

                 SUBBASIN RUNOFF DATA

 24 BA             SUBBASIN CHARACTERISTICS
                        TAREA          .27  SUBBASIN AREA

                   PRECIPITATION DATA

  8 PH                                   DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .77    1.52    2.66    2.82    2.97    3.35    3.69    4.04     .00     .00     .00     .00

                                                  STORM AREA =      .27

 25 LS             SCS LOSS RATE
                        STRTL          .44  INITIAL ABSTRACTION
                       CRVNBR        82.00  CURVE NUMBER
                        RTIMP          .00  PERCENT IMPERVIOUS AREA

 26 UD             SCS DIMENSIONLESS UNITGRAPH
                         TLAG          .94  LAG

                                                      ***

                                                UNIT HYDROGRAPH
                                            58 END-OF-PERIOD ORDINATES
                   3.      10.      20.      32.      46.      65.      86.     105.     118.     127.
                 132.     133.     131.     125.     117.     108.      98.      86.      73.      61.
                  53.      46.      40.      35.      31.      27.      24.      20.      18.      16.
                  14.      12.      10.       9.       8.       7.       6.       5.       5.       4.
                   3.       3.       3.       2.       2.       2.       1.       1.       1.       1.
                   1.       1.       1.       1.       0.       0.       0.       0.

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

                        HYDROGRAPH AT STATION      SW3

     TOTAL RAINFALL =    3.70, TOTAL LOSS =    1.75, TOTAL EXCESS =    1.95

   PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                        6-HR       24-HR       72-HR     12.42-HR
 +   (CFS)        (HR)
                                     (CFS)
 +     193.       7.25                  55.         27.         27.         27.
                                  (INCHES)       1.891       1.905       1.905       1.905
                                   (AC-FT)         27.         27.         27.         27.

                        CUMULATIVE AREA =      .27 SQ MI


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

              **************
              *            *
 27 KK        *     COMB1  *
              *            *
```

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

 28 HC          HYDROGRAPH COMBINATION
                     ICOMP          2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                          ***

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

                      HYDROGRAPH AT STATION    COMB1

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     12.42-HR
+   (CFS)       (HR)
                                   (CFS)
+    3455.      6.75                672.        334.        334.        334.
                                (INCHES)      2.763       2.844       2.844       2.844
                                 (AC-FT)       333.        343.        343.        343.

                          CUMULATIVE AREA =    2.26 SQ MI


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


              **************
              *            *
 29 KK        *     SW5    *
              *            *
              **************

            SUBBASIN RUNOFF DATA

 30 BA        SUBBASIN CHARACTERISTICS
                   TAREA          .47  SUBBASIN AREA

              PRECIPITATION DATA

  8 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
              ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
              5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                .77    1.52    2.66    2.82    2.97    3.35    3.69    4.04     .00     .00     .00     .00

                                                STORM AREA =      .47

 31 LS        SCS LOSS RATE
                   STRTL          .13  INITIAL ABSTRACTION
                  CRVNBR        94.00  CURVE NUMBER
                   RTIMP          .00  PERCENT IMPERVIOUS AREA

 32 UD        SCS DIMENSIONLESS UNITGRAPH
                   TLAG          .28  LAG

                                                          ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                UNIT HYDROGRAPH
                                            19 END-OF-PERIOD ORDINATES
          108.      356.      639.      704.      610.      434.      270.      179.      118.       77.
           51.       33.       22.       14.        9.        7.        4.        2.        1.

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

HYDROGRAPH AT STATION SW5

TOTAL RAINFALL = 3.70, TOTAL LOSS = .67, TOTAL EXCESS = 3.03

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	12.42-HR
+		(CFS)				
+ 1143.	6.50		146.	74.	74.	74.
		(INCHES)	2.891	3.019	3.019	3.019
		(AC-FT)	72.	76.	76.	76.

CUMULATIVE AREA = .47 SQ MI

*** ***

```
            **************
            *            *
  33 KK     *      CHAN  *     NEL SECTION X-36
            *            *
            **************
```

HYDROGRAPH ROUTING DATA

34 RK KINEMATIC WAVE STREAM ROUTING

L	1700.	CHANNEL LENGTH
S	.0220	SLOPE
N	.040	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	30.00	BOTTOM WIDTH OR DIAMETER
Z	.00	SIDE SLOPE

***

KINEMATIC STREAM ROUTING USED FOR THIS REACH

COMPUTED KINEMATIC PARAMETERS

ALPHA	M	DT (MIN)	DX (FT)
.5723	1.667	1.25	850.00

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

HYDROGRAPH AT STATION CHAN

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	12.42-HR
+		(CFS)				
+ 1119.	6.50		147.	74.	74.	74.
		(INCHES)	2.902	3.020	3.020	3.020
		(AC-FT)	73.	76.	76.	76.

CUMULATIVE AREA = .47 SQ MI

*** ***

```
              **************
              *            *
 35 KK        *      CHAN  *      NEL SECTION X-38
              *            *
              **************

                 HYDROGRAPH ROUTING DATA

 36 RK             KINEMATIC WAVE STREAM ROUTING
                            L        3000.  CHANNEL LENGTH
                            S        .0200  SLOPE
                            N         .035  CHANNEL ROUGHNESS COEFFICIENT
                           CA          .00  CONTRIBUTING AREA
                        SHAPE         TRAP  CHANNEL SHAPE
                           WD        40.00  BOTTOM WIDTH OR DIAMETER
                            Z          .00  SIDE SLOPE

                                                                  ***

          KINEMATIC STREAM ROUTING USED FOR THIS REACH


            COMPUTED KINEMATIC PARAMETERS
                ALPHA        M       DT (MIN)    DX (FT)
                .5147    1.667        1.67      1500.00

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

                          HYDROGRAPH AT STATION     CHAN

  PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR        24-HR        72-HR      12.42-HR
+   (CFS)        (HR)
                             (CFS)
+    1105.       6.58                147.         74.          74.          74.
                          (INCHES)  2.909       3.010        3.010        3.010
                           (AC-FT)   73.         75.          75.          75.

                          CUMULATIVE AREA =      .47 SQ MI


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

              **************
              *            *
 37 KK        *       SW6  *
              *            *
              **************

                 SUBBASIN RUNOFF DATA

 38 BA             SUBBASIN CHARACTERISTICS
                        TAREA .        .48  SUBBASIN AREA

                   PRECIPITATION DATA

  8 PH                                 DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
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                .77    1.52    2.66    2.82    2.97    3.35    3.69    4.04     .00     .00     .00     .00

                                                STORM AREA =      .48

 39 LS          SCS LOSS RATE
                     STRTL          .13  INITIAL ABSTRACTION
                    CRVNBR        94.00  CURVE NUMBER
                     RTIMP          .00  PERCENT IMPERVIOUS AREA

 40 UD          SCS DIMENSIONLESS UNITGRAPH
                      TLAG          .46  LAG

                                                        ***

                                                   UNIT HYDROGRAPH
                                             30 END-OF-PERIOD ORDINATES
              35.      106.      216.      353.      439.      462.      440.      387.      317.      231.
             173.      131.      103.       78.       60.       45.       34.       26.       20.       15.
              12.        9.        7.        5.        4.        3.        2.        2.        1.        0.

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

                        HYDROGRAPH AT STATION      SW6

   TOTAL RAINFALL =    3.70, TOTAL LOSS =     .67, TOTAL EXCESS =    3.03

  PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     12.42-HR
+   (CFS)        (HR)
                                    (CFS)
+     880.       6.67                149.         75.         75.         75.
                                 (INCHES)      2.889       3.008       3.008       3.008
                                  (AC-FT)        74.         77.         77.         77.

                        CUMULATIVE AREA =     .48 SQ MI


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


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            *            *
 41 KK      *       SW7  *
            *            *
            **************

               SUBBASIN RUNOFF DATA

 42 BA            SUBBASIN CHARACTERISTICS
                      TAREA          .34  SUBBASIN AREA

                  PRECIPITATION DATA

  8 PH                                  DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                 ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                 5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                   .77    1.52    2.66    2.82    2.97    3.35    3.69    4.04     .00     .00     .00     .00

                                                STORM AREA =      .34

 43 LS            SCS LOSS RATE
                      STRTL          .13  INITIAL ABSTRACTION
                     CRVNBR        94.00  CURVE NUMBER
                      RTIMP          .00  PERCENT IMPERVIOUS AREA
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44 UD          SCS DIMENSIONLESS UNITGRAPH
                     TLAG          .42  LAG

                                                  .   ***

                                                UNIT HYDROGRAPH
                                          27 END-OF-PERIOD ORDINATES
              31.      94.     195.     300.     352.     353.     315.     262.     190.     138.
             102.      78.      58.      43.      32.      24.      18.      13.      10.       7.
               5.       4.       3.       2.       2.       1.       0.

     ***            ***            ***            ***            ***                .

                         HYDROGRAPH AT STATION      SW7

     TOTAL RAINFALL =    3.70, TOTAL LOSS =     .67, TOTAL EXCESS =    3.03

  PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                        6-HR       24-HR       72-HR     12.42-HR
+   (CFS)        (HR)
                                  (CFS)
+     659.       6.67                 106.        53.         53.         53.
                                (INCHES)       2.891       3.012       3.012       3.012
                                 (AC-FT)        52.         55.         55.         55.

                         CUMULATIVE AREA =     .34 SQ MI


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

            **************
            *            *
  45 KK     *     COMB1  *
            *            *
            **************

  46 HC          HYDROGRAPH COMBINATION
                      ICOMP           3  NUMBER OF HYDROGRAPHS TO COMBINE

                                                                  ***

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

                         HYDROGRAPH AT STATION    COMB1

  PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                        6-HR       24-HR       72-HR     12.42-HR
+   (CFS)        (HR)
                                  (CFS)
+    2584.       6.58                 402.       202.        202.        202.
                                (INCHES)       2.897       3.010       3.010       3.010
                                 (AC-FT)       199.        207.        207.        207.

                         CUMULATIVE AREA =    1.29 SQ MI


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

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                *            *
 47 KK          *     CHAN   *      NEL THRU SECTION X-38
                *            *
                **************

                  HYDROGRAPH ROUTING DATA

 48 RK              KINEMATIC WAVE STREAM ROUTING
                              L       3200.  CHANNEL LENGTH
                              S       .0160  SLOPE
                              N        .035  CHANNEL ROUGHNESS COEFFICIENT
                             CA         .00  CONTRIBUTING AREA
                          SHAPE        TRAP  CHANNEL SHAPE
                             WD       40.00  BOTTOM WIDTH OR DIAMETER
                              Z         .00  SIDE SLOPE

                                                                  ***

          KINEMATIC STREAM ROUTING USED FOR THIS REACH


           COMPUTED KINEMATIC PARAMETERS
               ALPHA        M       DT (MIN)   DX (FT)
               .4604    1.667        1.25     1600.00

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

                          HYDROGRAPH AT STATION     CHAN

  PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR        24-HR        72-HR      12.42-HR
+   (CFS)        (HR)
                             (CFS)
+    2573.       6.67                402.         201.         201.         201.
                            (INCHES)   2.900        3.000        3.000        3.000
                             (AC-FT)    200.         206.         206.         206.

                            CUMULATIVE AREA =    1.29 SQ MI


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


                **************
                *            *
 49 KK          *     SW8    *
                *            *
                **************

                 SUBBASIN RUNOFF DATA

 50 BA             SUBBASIN CHARACTERISTICS
                        TAREA          .20  SUBBASIN AREA

                   PRECIPITATION DATA

  8 PH                                 DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                 ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                 5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                   .77    1.52    2.66    2.82    2.97    3.35    3.69    4.04     .00     .00     .00     .00

                                                STORM AREA =      .20
```

```
51 LS          SCS LOSS RATE
                    STRTL          .13  INITIAL ABSTRACTION
                   CRVNBR        94.00  CURVE NUMBER
                    RTIMP          .00  PERCENT IMPERVIOUS AREA

52 UD          SCS DIMENSIONLESS UNITGRAPH
                     TLAG          .45  LAG

                                                    ***

                                              UNIT HYDROGRAPH
                                        29 END-OF-PERIOD ORDINATES
              15.      47.      96.     154.     189.     196.     185.     160.     128.      91.
              69.      53.      41.      31.      23.      18.      13.      10.       8.       6.
               4.       3.       3.       2.       2.       1.       1.       1.       0.

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

                        HYDROGRAPH AT STATION      SW8

   TOTAL RAINFALL =    3.71, TOTAL LOSS =     .67, TOTAL EXCESS =    3.04

  PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     12.42-HR
+   (CFS)        (HR)
                                    (CFS)
+     373.       6.67                  62.         31.         31.         31.
                                 (INCHES)       2.892       3.011       3.011       3.011
                                  (AC-FT)          31.         32.         32.         32.

                        CUMULATIVE AREA =     .20 SQ MI


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

            **************
            *            *
  53 KK     *     COMB1  *
            *            *
            **************

  54 HC          HYDROGRAPH COMBINATION
                      ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                    ***

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

                        HYDROGRAPH AT STATION    COMB1

  PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     12.42-HR
+   (CFS)        (HR)
                                    (CFS)
+    2946.       6.67                 465.        232.        232.        232.
                                 (INCHES)       2.899       3.001       3.001       3.001
                                  (AC-FT)         230.        238.        238.        238.

                        CUMULATIVE AREA =    1.49 SQ MI
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*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

            **************
            *            *
 55 KK      *     SW8A   *
            *            *
            **************

              SUBBASIN RUNOFF DATA

 56 BA          SUBBASIN CHARACTERISTICS
                      TAREA          .14  SUBBASIN AREA

                PRECIPITATION DATA

  8 PH                                  DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                  .77    1.52    2.66    2.82    2.97    3.35    3.69    4.04     .00     .00     .00     .00

                                                  STORM AREA =      .14

 57 LS          SCS LOSS RATE
                      STRTL          .13  INITIAL ABSTRACTION
                     CRVNBR        94.00  CURVE NUMBER
                      RTIMP          .00  PERCENT IMPERVIOUS AREA

 58 UD          SCS DIMENSIONLESS UNITGRAPH
                       TLAG          .14  LAG

                                                                  ***

WARNING *** TIME INTERVAL IS GREATER THAN .29*LAG

                                                      UNIT HYDROGRAPH
                                                 10 END-OF-PERIOD ORDINATES
            151.      371.      299.      138.       67.       31.       15.        7.        4.        2.

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

                        HYDROGRAPH AT STATION     SW8A

    TOTAL RAINFALL =    3.71, TOTAL LOSS =     .67, TOTAL EXCESS =    3.04

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     12.42-HR
+   (CFS)       (HR)
                                   (CFS)
+     465.      6.33                44.         22.         22.         22.
                                (INCHES)       2.895       3.029       3.029       3.029
                                 (AC-FT)        22.         23.         23.         23.

                        CUMULATIVE AREA =     .14 SQ MI


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

            **************
            *            *
 59 KK      *     SW4    *
            *            *
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SUBBASIN RUNOFF DATA

60 BA        SUBBASIN CHARACTERISTICS
                TAREA          .25  SUBBASIN AREA

             PRECIPITATION DATA

8 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
             ..... HYDRO-35 ......  ............... TP-40 ...............  ........... TP-49 ...........
             5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
              .77    1.52    2.66    2.82    2.97    3.35    3.69    4.04     .00     .00     .00     .00

                                          STORM AREA =     .25

61 LS        SCS LOSS RATE
                STRTL          .13  INITIAL ABSTRACTION
               CRVNBR        94.00  CURVE NUMBER
                RTIMP          .00  PERCENT IMPERVIOUS AREA

62 UD        SCS DIMENSIONLESS UNITGRAPH
                TLAG          .68  LAG

                                                  ***

                                              UNIT HYDROGRAPH
                                         43 END-OF-PERIOD ORDINATES
              7.      21.     41.     68.    103.    135.    156.    166.    167.    160.
            147.     132.    113.     91.     73.     60.     50.     42.     35.     29.
             24.      20.     16.     14.     11.      9.      8.      6.      5.      4.
              4.       3.      2.      2.      2.      2.      1.      1.      1.      1.
              0.       0.      0.

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

                    HYDROGRAPH AT STATION      SW4

  TOTAL RAINFALL =    3.70, TOTAL LOSS =     .67, TOTAL EXCESS =    3.04

 PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     12.42-HR
+  (CFS)       (HR)
                                   (CFS)
+    355.      6.92                  78.         39.         39.         39.
                                (INCHES)       2.888       2.997       2.997       2.997
                                 (AC-FT)        39.         40.         40.         40.

                    CUMULATIVE AREA =     .25 SQ MI


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

            **************
            *            *
63 KK       *      SW9   *
            *            *
            **************

             SUBBASIN RUNOFF DATA

64 BA          SUBBASIN CHARACTERISTICS
                  TAREA          .35  SUBBASIN AREA
```

PRECIPITATION DATA

8 PH DEPTHS FOR 0-PERCENT HYPOTHETICAL STORM

HYDRO-35			TP-40					TP-49			
5-MIN	15-MIN	60-MIN	2-HR	3-HR	6-HR	12-HR	24-HR	2-DAY	4-DAY	7-DAY	10-DAY
.77	1.52	2.66	2.82	2.97	3.35	3.69	4.04	.00	.00	.00	.00

STORM AREA = .35

65 LS SCS LOSS RATE

STRTL	.27	INITIAL ABSTRACTION
CRVNBR	88.00	CURVE NUMBER
RTIMP	.00	PERCENT IMPERVIOUS AREA

66 UD SCS DIMENSIONLESS UNITGRAPH

TLAG	.99	LAG

***

UNIT HYDROGRAPH
61 END-OF-PERIOD ORDINATES

4.	12.	23.	36.	52.	73.	97.	120.	139.	153.
161.	163.	163.	159.	151.	142.	131.	119.	105.	89.
76.	67.	58.	51.	45.	40.	35.	31.	27.	23.
21.	18.	16.	14.	12.	11.	9.	8.	7.	6.
6.	5.	4.	4.	3.	3.	2.	2.	2.	2.
2.	1.	1.	1.	1.	1.	1.	1.	0.	0.
0.									

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

HYDROGRAPH AT STATION SW9

TOTAL RAINFALL = 3.70, TOTAL LOSS = 1.25, TOTAL EXCESS = 2.46

	PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	12.42-HR
+	(CFS)	(HR)				
			(CFS)			
+	306.	7.25	89.	44.	44.	44.
			(INCHES) 2.367	2.399	2.399	2.399
			(AC-FT) 44.	45.	45.	45.

CUMULATIVE AREA = .35 SQ MI

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*            *
*     SW10   *
*            *
**************
```

67 KK

SUBBASIN RUNOFF DATA

68 BA SUBBASIN CHARACTERISTICS

TAREA	.13	SUBBASIN AREA

PRECIPITATION DATA

8 PM DEPTHS FOR 0-PERCENT HYPOTHETICAL STORM

```
                  ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .77    1.52    2.66    2.82    2.97    3.35    3.69    4.04     .00     .00     .00     .00

                                                STORM AREA =      .13

 69 LS            SCS LOSS RATE
                       STRTL          .27  INITIAL ABSTRACTION
                      CRVNBR        88.00  CURVE NUMBER
                       RTIMP          .00  PERCENT IMPERVIOUS AREA

 70 UD            SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .71  LAG

                                                     ***

                                                UNIT HYDROGRAPH
                                            45 END-OF-PERIOD ORDINATES
                     3.      10.      19.      32.      48.      64.      75.      82.      84.      82.
                    77.      70.      62.      52.      42.      34.      28.      24.      20.      17.
                    14.      12.      10.       8.       7.       6.       5.       4.       3.       3.
                     2.       2.       2.       1.       1.       1.       1.       1.       1.       0.
                     0.       0.       0.       0.       0.

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

                         HYDROGRAPH AT STATION     SW10

      TOTAL RAINFALL =    3.71, TOTAL LOSS =    1.25, TOTAL EXCESS =    2.46

    PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                          6-HR       24-HR       72-HR     12.42-HR
  +   (CFS)        (HR)
                                        (CFS)
  +    147.        7.00                   33.         16.         16.         16.
                                     (INCHES)      2.379       2.419       2.419       2.419
                                      (AC-FT)        16.         17.         17.         17.

                         CUMULATIVE AREA =     .13 SQ MI


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


                 **************
                 *            *
 71 KK           *     SW11   *
                 *            *
                 **************

                   SUBBASIN RUNOFF DATA

 72 BA               SUBBASIN CHARACTERISTICS
                         TAREA         .10  SUBBASIN AREA

                     PRECIPITATION DATA

  8 PH                                  DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .77    1.52    2.66    2.82    2.97    3.35    3.69    4.04     .00     .00     .00     .00

                                                STORM AREA =      .10
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73 LS          SCS LOSS RATE
                    STRTL        .27  INITIAL ABSTRACTION
                   CRVNBR      88.00  CURVE NUMBER
                    RTIMP        .00  PERCENT IMPERVIOUS AREA

74 UD          SCS DIMENSIONLESS UNITGRAPH
                    TLAG        .50  LAG

                                                    ***

                                              UNIT HYDROGRAPH
                                         32 END-OF-PERIOD ORDINATES
              6.      18.      36.      61.      80.      89.      89.      81.      71.      57.
             42.      32.      25.      20.      16.      12.       9.       7.       6.       4.
              3.       3.       2.       2.       1.       1.       1.       1.       0.       0.
              0.       0.

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

                        HYDROGRAPH AT STATION     SW11

   TOTAL RAINFALL =    3.71, TOTAL LOSS =    1.25, TOTAL EXCESS =    2.46

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     12.42-HR
+   (CFS)       (HR)
                                    (CFS)
+     145.      6.75                   26.         13.         13.         13.
                                 (INCHES)        2.385       2.431       2.431       2.431
                                  (AC-FT)           13.         13.         13.         13.

                        CUMULATIVE AREA =     .10 SQ MI


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

            **************
            *            *
  75 KK     *     COMB2  *
            *            *
            **************

  76 HC          HYDROGRAPH COMBINATION
                      ICOMP           7  NUMBER OF HYDROGRAPHS TO COMBINE
                                                    ***

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

                        HYDROGRAPH AT STATION    COMB2

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     12.42-HR
+   (CFS)       (HR)
                                    (CFS)
+    7169.      6.75                 1404.        700.        700.        700.
                                 (INCHES)        2.765       2.854       2.854       2.854
                                  (AC-FT)          696.        718.        718.        718.

                        CUMULATIVE AREA =    4.72 SQ MI

1
                                                   RUNOFF SUMMARY
```

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

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+	HYDROGRAPH AT	SW1	2450.	6.75	449.	226.	226.	1.45		
+	ROUTED TO	CHA	2424.	6.75	449.	224.	224.	1.45		
+	HYDROGRAPH AT	SW2	1193.	6.58	168.	85.	85.	.54		
+	2 COMBINED AT	COMB1	3380.	6.67	617.	309.	309.	1.99		
+	ROUTED TO	CHAN	3354.	6.75	618.	309.	309.	1.99		
+	ROUTED TO	CHAN	3339.	6.75	618.	307.	307.	1.99		
+	HYDROGRAPH AT	SW3	193.	7.25	55.	27.	27.	.27		
+	2 COMBINED AT	COMB1	3455.	6.75	672.	334.	334.	2.26		
+	HYDROGRAPH AT	SW5	1143.	6.50	146.	74.	74.	.47		
+	ROUTED TO	CHAN	1119.	6.50	147.	74.	74.	.47		
+	ROUTED TO	CHAN	1105.	6.58	147.	74.	74.	.47		
+	HYDROGRAPH AT	SW6	880.	6.67	149.	75.	75.	.48		
+	HYDROGRAPH AT	SW7	659.	6.67	106.	53.	53.	.34		
+	3 COMBINED AT	COMB1	2584.	6.58	402.	202.	202.	1.29		
+	ROUTED TO	CHAN	2573.	6.67	402.	201.	201.	1.29		
+	HYDROGRAPH AT	SW8	373.	6.67	62.	31.	31.	.20		
+	2 COMBINED AT	COMB1	2946.	6.67	465.	232.	232.	1.49		
+	HYDROGRAPH AT	SW8A	465.	6.33	44.	22.	22.	.14		
+	HYDROGRAPH AT	SW4	355.	6.92	78.	39.	39.	.25		
+	HYDROGRAPH AT	SW9	306.	7.25	89.	44.	44.	.35		

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          HYDROGRAPH AT
+                          SW10       147.    7.00          33.         16.         16.        .13

          HYDROGRAPH AT
+                          SW11       145.    6.75          28.         13.         13.        .10

          7 COMBINED AT
+                          COMB2      7169.   6.75        1404.        700.        700.       4.72
1                                                   HEC-1 INPUT                                                    PAGE  1

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

 *** WARNING *** ZZ-CARD MISSING
                1
                2           ZZ
1                                                                  ****
                                   FLOOD HYDROGRAPH PACKAGE HEC-1 (IBM XT 512K VERSION) -FEB 1,1985
                     U.S. ARMY CORPS OF ENGINEERS, THE HYDROLOGIC ENGINEERING CENTER, 609 SECOND STREET, DAVIS, CA. 95616
                                                                   ****



 ERROR 1      CARD NO.    1

      IT          HYDROGRAPH TIME DATA
                        NMIN           5  MINUTES IN COMPUTATION INTERVAL
                       IDATE     21MAY87  STARTING DATE
                       ITIME        1200  STARTING TIME
                          NQ         150  NUMBER OF HYDROGRAPH ORDINATES
                      NDDATE     22MAY87  ENDING DATE
                      NDTIME        0025  ENDING TIME

                   COMPUTATION INTERVAL      .08 HOURS
                        TOTAL TIME BASE   12.42 HOURS

           ENGLISH UNITS

                SUBBASIN RUNOFF DATA

    0 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .00  SUBBASIN AREA

                  PRECIPITATION DATA

    0 PH                                  DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .77    1.52    2.66    2.82    2.97    3.35    3.69    4.04     .00     .00     .00     .00

                                                   STORM AREA =      .00

    0 UD          SCS DIMENSIONLESS UNITGRAPH
                        TLAG         .50  LAG

                                                                   ***
```

GOLD02

```
1                                                    ****
                    FLOOD HYDROGRAPH PACKAGE HEC-1 (IBM XT 512K VERSION) -FEB 1,1985
          U.S. ARMY CORPS OF ENGINEERS, THE HYDROLOGIC ENGINEERING CENTER, 609 SECOND STREET, DAVIS, CA. 95616
                                                    ****
```

SEGMENT 4 - GOLDMAN DAIRY PROPERTY
10 yr - 24 hr event

```
          THIS HEC-1 VERSION CONTAINS ALL OPTIONS EXCEPT ECONOMICS, AND THE NUMBER OF PLANS ARE REDUCED TO 3

1                                                HEC-1 INPUT                                                PAGE  1

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

          1           ID        GOLDMAN PROPERTY
          2           ID        HYDROLOGY ANALYSIS    10 YR 24 HR
          3           ID        EXISTING CONDITIONS 8/05/86 INPUT=GOLDX  OUTPUT=GOLD02
                      *DIAGRAM
          4           IT      10 05AUG86 1200.0   150.00
          5           IO       3

          6           KK     AA1
          7           BA     .39
          8           PH    10.0       0    0.47    0.92    1.61    1.72    1.82    2.07    2.30    2.53
          9           LS           73.00
         10           UD    1.01
         11           ZZ
1
              SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

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

     6         AA1

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1                                                    ****
                    FLOOD HYDROGRAPH PACKAGE HEC-1 (IBM XT 512K VERSION) -FEB 1,1985
          U.S. ARMY CORPS OF ENGINEERS, THE HYDROLOGIC ENGINEERING CENTER, 609 SECOND STREET, DAVIS, CA. 95616
                                                    ****


                                GOLDMAN PROPERTY
                                HYDROLOGY ANALYSIS    10 YR 24 HR
                                EXISTING CONDITIONS 8/05/86 INPUT=GOLDX  OUTPUT=GOLD02

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

      IT          HYDROGRAPH TIME DATA
                         NMIN         10  MINUTES IN COMPUTATION INTERVAL
                        IDATE     5AUG86  STARTING DATE
```

```
                ITIME        1200  STARTING TIME
                   NQ         150  NUMBER OF HYDROGRAPH ORDINATES
               NDDATE      6AUG86  ENDING DATE
               NDTIME        1250  ENDING TIME

          COMPUTATION INTERVAL      .17 HOURS
               TOTAL TIME BASE    24.83 HOURS

     ENGLISH UNITS


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


        **************
        *            *
  6 KK  *       AA1  *
        *            *
        **************

           SUBBASIN RUNOFF DATA

  7 BA       SUBBASIN CHARACTERISTICS
                  TAREA          .39  SUBBASIN AREA

             PRECIPITATION DATA

  8 PH                                DEPTHS FOR  10-PERCENT HYPOTHETICAL STORM
             ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
             5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
               .47     .92    1.61    1.72    1.82    2.07    2.30    2.53     .00     .00     .00     .00

                                                STORM AREA =     .39

  9 LS       SCS LOSS RATE
                  STRTL          .74  INITIAL ABSTRACTION
                 CRVNBR        73.00  CURVE NUMBER
                  RTIMP          .00  PERCENT IMPERVIOUS AREA

 10 UD       SCS DIMENSIONLESS UNITGRAPH
                  TLAG         1.01  LAG

                                                    ***

                                              UNIT HYDROGRAPH
                                         32 END-OF-PERIOD ORDINATES
             11.     34.     69.    116.    153.    171.    171.    158.    138.    112.
             83.     64.     50.     40.     31.     24.     19.     15.     11.      9.
              7.      5.      4.      3.      3.      2.      2.      1.      1.      1.
              0.      0.

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

                     HYDROGRAPH AT STATION      AA1

    TOTAL RAINFALL =    2.50, TOTAL LOSS =    1.93, TOTAL EXCESS =     .57

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.83-HR
+   (CFS)       (HR)
                                    (CFS)
+     59.      13.17                  20.         6.          6.          6.
                                (INCHES)         .487        .565        .565        .565
                                  (AC-FT)         10.         12.         12.         12.
```

```
                    CUMULATIVE AREA =      .39 SQ MI

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

                                     PEAK    TIME OF     AVERAGE FLOW FOR MAXIMUM PERIOD      BASIN     MAXIMUM     TIME OF
        OPERATION        STATION     FLOW     PEAK                                           AREA      STAGE     MAX STAGE
+                                                          6-HOUR      24-HOUR      72-HOUR

        HYDROGRAPH AT
+                          AA1        59.    13.17          20.          6.           6.        .39
1                                                       HEC-1 INPUT                                                PAGE  1

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

            1
 *** WARNING *** ZZ-CARD MISSING
            2
            3            ZZ
1                                                          ****
                          FLOOD HYDROGRAPH PACKAGE HEC-1 (IBM XT 512K VERSION) -FEB 1,1985
                U.S. ARMY CORPS OF ENGINEERS, THE HYDROLOGIC ENGINEERING CENTER, 609 SECOND STREET, DAVIS, CA. 95616
                                                           ****



 ERROR 1       CARD NO.    1

      IT           HYDROGRAPH TIME DATA
                        NMIN          10  MINUTES IN COMPUTATION INTERVAL
                       IDATE      5AUG86  STARTING DATE
                       ITIME        1200  STARTING TIME
                          NQ         150  NUMBER OF HYDROGRAPH ORDINATES
                      NDDATE      6AUG86  ENDING DATE
                      NDTIME        1250  ENDING TIME

                  COMPUTATION INTERVAL     .17 HOURS
                       TOTAL TIME BASE   24.83 HOURS

          ENGLISH UNITS

 ERROR 1       CARD NO.    2

                SUBBASIN RUNOFF DATA

    O BA          SUBBASIN CHARACTERISTICS
                       TAREA         .00  SUBBASIN AREA

                  PRECIPITATION DATA

    O PH                                 DEPTHS FOR  10-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ................   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .47     .92    1.61    1.72    1.82    2.07    2.30    2.53     .00     .00     .00     .00

                                                   STORM AREA =      .00

    O UD          SCS DIMENSIONLESS UNITGRAPH
                       TLAG        1.01  LAG

                                                           ***
```

GOLD 92

```
1                                                    ****
                    FLOOD HYDROGRAPH PACKAGE HEC-1 (IBM XT 512K VERSION) -FEB 1,1985
          U.S. ARMY CORPS OF ENGINEERS, THE HYDROLOGIC ENGINEERING CENTER, 609 SECOND STREET, DAVIS, CA. 95616
                                                    ****
```

SEGMENT 4 - GOLDMAN DAIRY PROPERTY
100 yr - 24 hr event

THIS HEC-1 VERSION CONTAINS ALL OPTIONS EXCEPT ECONOMICS, AND THE NUMBER OF PLANS ARE REDUCED TO 3

```
1                                                HEC-1 INPUT                                                    PAGE  1

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

          1           ID        GOLDMAN PROPERTY
          2           ID        HYDROLOGY ANALYSIS    100 YR 24 HR
          3           ID        EXISTING CONDITIONS 8/05/86 INPUT=GOLD OUTPUT=GOLD01
                      *DIAGRAM
          4           IT      10 05AUG86 1200.0   150.00
          5           IO       3

          6           KK     AA1
          7           BA     .39
          8           PH                0   0.77    1.52    2.66    2.82    2.97    3.35    3.69    4.04
          9           LS            73.00
         10           UD    1.01
         11           ZZ
1
              SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

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

    6         AA1

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
                                                    ****
1                   FLOOD HYDROGRAPH PACKAGE HEC-1 (IBM XT 512K VERSION) -FEB 1,1985
          U.S. ARMY CORPS OF ENGINEERS, THE HYDROLOGIC ENGINEERING CENTER, 609 SECOND STREET, DAVIS, CA. 95616
                                                    ****


                            GOLDMAN PROPERTY
                            HYDROLOGY ANALYSIS    100 YR 24 HR
                            EXISTING CONDITIONS 8/05/86 INPUT=GOLD OUTPUT=GOLD01

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

      IT          HYDROGRAPH TIME DATA
                        NMIN         10  MINUTES IN COMPUTATION INTERVAL
                       IDATE     5AUG86  STARTING DATE
```

```
                ITIME        1200  STARTING TIME
                   NQ         150  NUMBER OF HYDROGRAPH ORDINATES
              NDDATE      6AUG86  ENDING DATE
              NDTIME        1250  ENDING TIME

          COMPUTATION INTERVAL      .17 HOURS
               TOTAL TIME BASE   24.83 HOURS

     ENGLISH UNITS


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


        **************
        *            *
  6 KK  *       AA1  *
        *            *
        **************

           SUBBASIN RUNOFF DATA

  7 BA        SUBBASIN CHARACTERISTICS
                 TAREA          .39  SUBBASIN AREA

              PRECIPITATION DATA

  8 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
              ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
              5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                .77    1.52    2.66    2.82    2.97    3.35    3.69    4.04     .00     .00     .00     .00

                                                STORM AREA =      .39

  9 LS        SCS LOSS RATE
                 STRTL          .74  INITIAL ABSTRACTION
                CRVNBR        73.00  CURVE NUMBER
                 RTIMP          .00  PERCENT IMPERVIOUS AREA

 10 UD        SCS DIMENSIONLESS UNITGRAPH
                 TLAG         1.01  LAG

                                                  ***

                                              UNIT HYDROGRAPH
                                         32 END-OF-PERIOD ORDINATES
              11.      34.      69.     116.     153.     171.     171.     158.     138.     112.
              83.      64.      50.      40.      31.      24.      19.      15.      11.       9.
               7.       5.       4.       3.       3.       2.       2.       1.       1.       1.
               0.       0.

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

                 HYDROGRAPH AT STATION      AA1

   TOTAL RAINFALL =    4.04, TOTAL LOSS =    2.48, TOTAL EXCESS =    1.55

  PEAK FLOW     TIME                      MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR      72-HR     24.83-HR
+   (CFS)       (HR)
                                   (CFS)
+    183.      13.17                 58.        16.        16.        16.
                                (INCHES)      1.382      1.545      1.545      1.545
                                  (AC-FT)       29.        32.        32.        32.
```

```
                    CUMULATIVE AREA =      .39 SQ MI

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

                                        PEAK    TIME OF     AVERAGE FLOW FOR MAXIMUM PERIOD      BASIN     MAXIMUM     TIME OF
        OPERATION        STATION        FLOW     PEAK                                           AREA      STAGE     MAX STAGE
+                                                                 6-HOUR      24-HOUR      72-HOUR

        HYDROGRAPH AT
+                            AA1        183.    13.17          58.          16.          16.        .39
1                                                          HEC-1 INPUT                                                PAGE  1

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

            1
 *** WARNING *** ZZ-CARD MISSING
            2
            3            ZZ
1                                                          ****
                          FLOOD HYDROGRAPH PACKAGE HEC-1 (IBM XT 512K VERSION) -FEB 1,1985
               U.S. ARMY CORPS OF ENGINEERS, THE HYDROLOGIC ENGINEERING CENTER, 609 SECOND STREET, DAVIS, CA. 95616
                                                           ****



 ERROR 1       CARD NO.     1

      IT           HYDROGRAPH TIME DATA
                         NMIN          10  MINUTES IN COMPUTATION INTERVAL
                        IDATE      5AUG86  STARTING DATE
                        ITIME        1200  STARTING TIME
                           NQ         150  NUMBER OF HYDROGRAPH ORDINATES
                       NDDATE      6AUG86  ENDING DATE
                       NDTIME        1250  ENDING TIME

                   COMPUTATION INTERVAL      .17 HOURS
                        TOTAL TIME BASE    24.83 HOURS

          ENGLISH UNITS

 ERROR 1       CARD NO.     2

                SUBBASIN RUNOFF DATA

    0 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .00  SUBBASIN AREA

                  PRECIPITATION DATA

    0 PH                                  DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .77    1.52    2.66    2.82    2.97    3.35    3.69    4.04     .00     .00     .00     .00

                                                   STORM AREA =      .00

    0 UD          SCS DIMENSIONLESS UNITGRAPH
                        TLAG        1.01  LAG

                                                           ***
```