ARENAL/UNSER
DRAINAGE MANAGEMENT PLAN

ALBUQUERQUE NEW MEXICO
JUNE 1997

Prepared by:
ISAACSON & ARFMAN, P.A.

FRED C. ARFMAN
STATE OF NEW MEXICO
7322
REGISTERED PROFESSIONAL ENGINEER

06-23-97

JUN 23 1997
LIBRARY SECTION

100-yr-24 hrs storm to size
detn pond

exist westgate hts
42% imp Changed to 29%
from 981 cfs to 836 cfs
going to pond
56 or 57% - 4du/ac

net result - reduces flow
to AMOLE ~ 200 cfs

increased land. but may need
larger pond

direct discharge ok (1.5 hrs)
2.25 hrs peak in AMOLE

CITY OF
Albuquerque

July 21, 1997

Martin J. Chávez, Mayor

Fred C. Arfman, P.E.
Isaacson & Arfman
128 Monroe St. NE
Albuquerque, New Mexico

RE: Revised Arenal/Unser Drainage Management Plan (M10/D10), Engineer's Stamp Dated 6/23/97.

Dear Mr. Arfman:

The technical analysis in the above referenced report was reviewed by Richard Stockton of Leedshill-Herkenhoff. Prior to approval of this plan, please address his comments provided in the attached Memo dated July 16, 1997. The issue of land treatments is most critical.

In addition to his comments, it has been brought to my attention that Drainage Basins 400.2, 504 and perhaps 300.2 are to be developed at 9 du/acre. Your analysis accounted for 4 du/acre for these areas. What impact would this more dense development have on the storm drain system?

Although my previous comments were addressed, these issues must be resolved prior to Master Plan approval. If you should have any questions regarding these comments, please call me at 924-3982.

Sincerely,

Susan M. Calongne, P.E.
City/County Floodplain Administrator

c: File

DRAINAGE INFORMATION SHEET

10

PROJECT TITLE: ARENAL/UNSER D.M.P. ZONE ATLAS/DRNG. FILE #: M10/D8

DRB #: _____ EPC #: _____ WORK ORDER #: _____

LEGAL DESCRIPTION: LANDS IN VICINITY OF ZONE MAP M-10

CITY ADDRESS: _____

ENGINEERING FIRM: ISAACSON & ARFMAN, P.A CONTACT: FRED C. ARFMAN

ADDRESS: 128 MONROE ST. NE PHONE: 268-8828

OWNER: PRESLEY HOMES, LONGFORD HOMES, CURB INC, BUILDERS INVESTMENT CO. C/O ISAACSON & ARFMAN CONTACT: "

ADDRESS: 128 MONROE ST. NE PHONE: "

ARCHITECT: N/A. CONTACT: _____

ADDRESS: _____ PHONE: _____

SURVEYOR: ALDRICH LAND SURVEYING CONTACT: TIM ALDRICH

ADDRESS: _____ PHONE: 884-1990

CONTRACTOR: N/A. CONTACT: _____

ADDRESS: _____ PHONE: _____

TYPE OF SUBMITTAL:

____ DRAINAGE REPORT

____ DRAINAGE PLAN

____ CONCEPTUAL GRADING & DRAINAGE PLAN

____ GRADING PLAN

____ EROSION CONTROL PLAN

____ ENGINEER'S CERTIFICATION

X OTHER DRAINAGE MANAGEMENT PLAN (D.M.P.)

PRE-DESIGN MEETING:

X YES

____ NO

____ COPY PROVIDED

RECEIVED JUN 23 1997 HYDROLOGY SECTION

CHECK TYPE OF APPROVAL SOUGHT:

____ SKETCH PLAT APPROVAL

____ PRELIMINARY PLAT APPROVAL

____ S. DEV. PLAN FOR SUB'D. APPROVAL

____ S. DEV. PLAN FOR BLDG. PERMIT APPROVAL

____ SECTOR PLAN APPROVAL

____ FINAL PLAT APPROVAL

____ FOUNDATION PERMIT APPROVAL

____ BUILDING PERMIT APPROVAL

____ CERTIFICATE OF OCCUPANCY APPROVAL

____ GRADING PERMIT APPROVAL

____ PAVING PERMIT APPROVAL

____ S.A.D. DRAINAGE REPORT

____ DRAINAGE REQUIREMENTS

X OTHER D.M.P.

DATE SUBMITTED: JUNE 23, 1997

BY: FRED C. ARFMAN, P.E.

FOR: ISAACSON & ARFMAN, P.A.

RECEIVED ~~JUN 23 19~~ HYDROLOGY SECTION

LEEDSHILL-HERKENHOFF, INC.
an ASCG Company
500 Copper Avenue NW, Suite 500
P.O. Box 1217
Albuquerque, New Mexico 87103
(505) 247-0294 Fax (505) 242-4845

748-95043/0500-97

MEMORANDUM

VIA FAX 884-0214 & U.S. MAIL

TO: KURT BROWNING

ATTN: SUSAN CALONGNE

FROM: RICHARD STOCKTON

DATE: JULY 16, 1997

RE: **AMOLE DRAINAGE MANAGEMENT PLAN REVIEW OF REVISED SUNRISE ESTATES AHYMO MODEL SUBMITTED BY ISAACSON AND ARFMAN**

The revised AHYMO model for the Arenal\Unser Drainage Management Plan, dated June 1997, by Isaacson and Arfman, P.A., was reviewed for the possible impact on the Amole Del Norte Channel. The following procedures were performed and conclusions reached comparing the December 19, 1995 Sunrise Estates (1995 model) and the June 4, 1997 Sunrise Estates (1997 model) AHYMO nodels and the effects on the Amole Del Norte Channel.

The 1997 model submitted was for the 100 year, 6 hour developed conditions. We changed the rainfall to a type 2, to model the 100 year 24 hour event to be consistent with the Amole DMP analysis for comparison purposes. Although the volume is significantly larger, the peak flow rate at the entrance to the Amole del Norte Channel is approximately the same.

The 1995 model submitted to LH for use in the Developed Condition Amole DMP AHYMO model, DID NOT include a detention pond. However, the 1997 model does include a detention pond. There is a common point between the two models HYD NO. 404.20, the flow at the entrance into the detention pond.

The 1995 model had a percent imperviousness of 42 for the existing "Westgate Heights" area. That was changed to 29% in the 1997 model. Based on the 4 du/ac land use, the 29% impervious appears to be low. The result is a reduction from 2.663 cfs/ac (1995) to 2.370 cfs\ac (1997). After review of the basin maps, it has been determined that the 1997 model has revised areas as well. The 1995 model has an area of 0.57580 sq. mi. and the 1997 model).55146 sq. mi at the entrance to the detention basin. Therefore, the flow rates into the etention pond are 981 cfs (1995 model) and 836 cfs (1997 model), respectively.

ISAACSON & ARFMAN, P.A.

Consulting Engineering Associates

Thomas O. Isaacson, PE & LS • Fred C. Arfman, PE
Scott M. McGee, PE

June 20, 1997

Ms. Susan Calongne, P.E.
City/County Floodplain Administrator
Hydrology Division/PWD
City of Albuquerque
P.O. Box 1293
Albuquerque, NM 87103

RE: Arenal/Unser Drainage Management Plan (M10/D8)

Dear Ms. Calongne:

We offer the following response to your twelve (12) comments found in your June 17, 1997 review letter. Please note that this plan has gone through a major overhaul and should be less difficult to follow. Accordingly, we offer the following responses to your questions:

1. *The report states that a portion of the site is within an existing FEMA floodplain. Please provide a copy of the flood map, identifying the subdivisions within the floodplain. Also identify the FIRM panel(s) and the flood zone designation.*

   Maps have been added, see pocket section.

2. *Section II of the report describes the sponsors and participants who are located within the study area. Please provide a map or exhibit showing the location of each area associated with each different participant. The exhibit should also clearly identify the streets mentioned in the report.*

   Maps have been added, see Section II, Plan Sponsors and Participants.

3. *Section II describes existing or proposed storm drain systems, however, these systems are not shown anywhere in the report. Please provide schematics of the storm drain systems or show them on the basin maps to clarify them. I assume that these have been designed, so also indicate the sizes and capacities.*

   The existing and proposed systems are shown on half-sized reduced drawings in the pockets at the end of the document.

128 Monroe St. NE • Albuquerque, NM 87108 • (505) 268-8828 • FAX (505) 268-2632

4. *If the development by Curb, Inc. is part of this master plan, then why does the report state that the developer must produce another master plan? This is unclear.*

   Correction has been made.

5. *This report is unclear on how the proposed release rates into the Amole del Norte compare with those determined in the BEC report. Please summarize the comparison. On the Amole basin map, please indicate the existing release rates at the points identified and indicate the proposed rates. Free discharge from Basins 406-408 has not been justified in this report.*

   See Tables 1 and 2 and the graph, new values and adjusted values have been highlighted for comparison between the two tables.

6. *Where are sub-basins 32-36 and 38 located?*

   The original BEC basin map has been incorporated into the report.

7. *What is the status of the Arenal Road and Unser storm drain systems? It appears that the developments east of Unser depend on having both of these storm drain systems in place. What is the schedule for development?*

   The Unser Blvd. storm drain (60" diameter) is under construction and is expected to be completed 08/01/97.

8. *The Basin Summary tables do not match the AHYMO runs with respect to land treatments and Q's. The AHYMO for the south basins is hard to follow. Please provide flow arrows to indicate the direction of flow for each basin.*

   Flow arrows have been added as well as a flow chart.

9. *The proposed regional detention pond is nearly 12 acre feet in size. This will require approval by the State Engineer's Office.*

   We understand that the Sate Engineer's Office must approve the detention facility. They will be contacted when approval is obtained from the city.

10. *It appears that the basin directly west of Basin 402 was left out.*

    Basin 502 has a historical drainage outfall to the south. Storm waters are accepted by a 48" RCP storm drain through the Vista del Sol Mobile Home Park.

11. *There seems to be an error in the routing of the hydrographs from areas 406.1 and 408.1. Why are you losing more than 100 cfs?*

    Corrected.

12. *Where is the Temporary Surge Pond location in relation to the basins? How does it affect the overall drainage systems?*

    See flood hazard maps and other exhibits.

Please advise our office if any additional information or clarification is needed in your review of this report.

Very truly yours,

ISAACSON & ARFMAN, P.A.

Fred C. Arfman

Fred C. Arfman, P.E.

FCA/rtl

Isaacson & Arfman, P.A.

Consulting Engineering Associates

Letter of Transmittal

To HYDROLOGY DIV. P.W.D. C.O.A.

Date 06-30-97

Job No.

Attn: SUSAN C.

Reference ARENAL / UNSER D.M.P.

Gentlemen:

We transmit to you 1 copy(ies) of the following

- [ ] Plats
- [ ] Plans
- [ ] Specifications
- [ ] Report
- [x] BASIN I.D. MAP.
- [ ]
- [ ] Shop Drawings
- [ ] Submittals
- [ ] Material Specifications
- [ ] Copy of Letter

This information is transmitted:

- [x] As per your request
- [ ] For your review & approval
- [ ] For your information
- [ ] For your attention
- [ ] For your signature
- [ ]
- [ ] For your files
- [x] For your use
- [ ] Please review & return
- [ ] For return to your files
- [ ] Please advise
- [x] FOR INSERTION INTO DRNG. RPT (REPLACEMENT)

Remarks:

By: FRED C. ARFMAN

Copies To

128 Monroe, NE • Albuquerque, NM 87108 • (505) 268-8828

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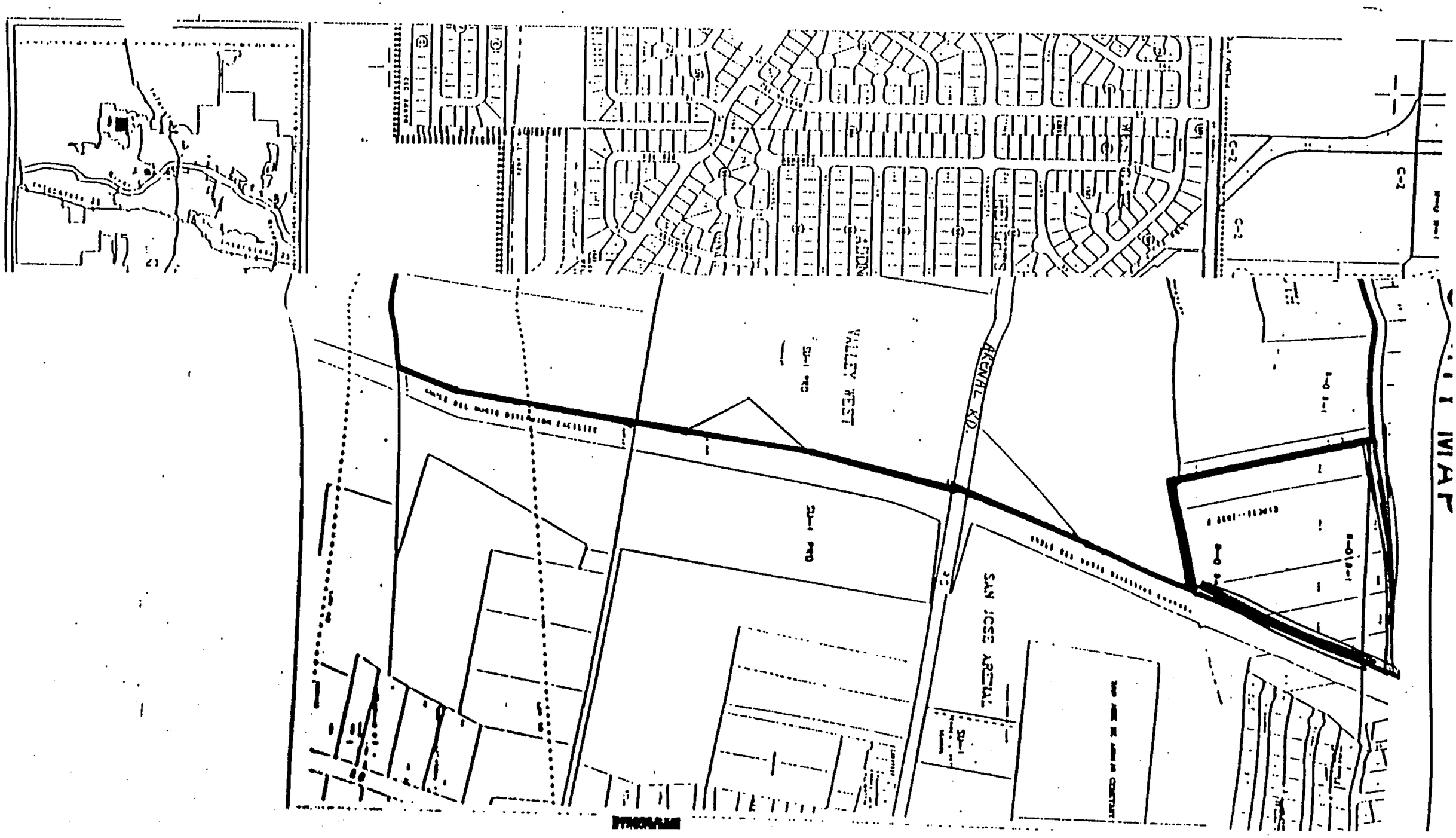
Subbasin Drainage Map
FEMA Flood Map


AKENHL RD.
SAN JOSE ARTERIAL
VALLEY WEST

I. INTRODUCTION

The Arenal/Unser Drainage Management Plan has evolved from the original master drainage study of the area, prepared in July 1994 and updated in July 1996. That plan defined and analyzed the storm water runoff situation for a large portion of land south of Sage Road SW between the Snow Vista Diversion Channel at the westerly boundary unit and the Amole del Norte Diversion Channel defining the easterly boundary of the study.

The previous study defined the existing drainage basins and quantified the storm water runoff characteristics for the 100-year frequency/6-hour duration storm. The storm water rates and volumes calculated in the 1996 study are used as the basis of developing the Drainage Management Plan presented in this report. The AHYMO models have been revised and expanded to reflect the proposed developable areas. The summary files and output files from these models are found in Appendix C of this report.

It is the intent of this plan to present a viable solution to the basin storm water runoff problem currently inhibiting the development potential of the area. Currently, those storm waters generated by the older Westgate Heights residential neighborhood are identified as a floodway by the latest edition of the F.E.M.A. floodway maps. The ultimate solution of providing those storm drainage facilities and eliminating the floodplain is contingent upon the joint efforts of both the public and private sectors. Their role shall be clearly delineated by the following plan.

II. PLAN SPONSORS AND PARTICIPANTS

The following passive land owner and active developers along with the City of Albuquerque are responsible for the funding and construction of the public infrastructure required for the completion of the plan.

A. **Albuquerque South:** A passive land holding general partnership owning most of the undeveloped land in the contributing drainage basins.

B. **Presley Homes, Inc.:** Developers of the Summerfield Subdivision (Sunrise Estates, Units One, Two, and Three). The initial development of Unit One (93 R-1 lots) required the construction of a 60-66" diameter storm drain to convey those storm waters generated for the Westgate Heights development immediately to the west and discharging its storm water via Sapphire Street.

The second unit of Presley's development will construct the Kimela Road and Unser Blvd. storm drains and will be 100% funded by the developer.

C. **Longford Homes of New Mexico:** The Rolling Hills Subdivision will ultimately consist of approximately 336 single family residential lots divided into five phases with the Unit Two project currently under

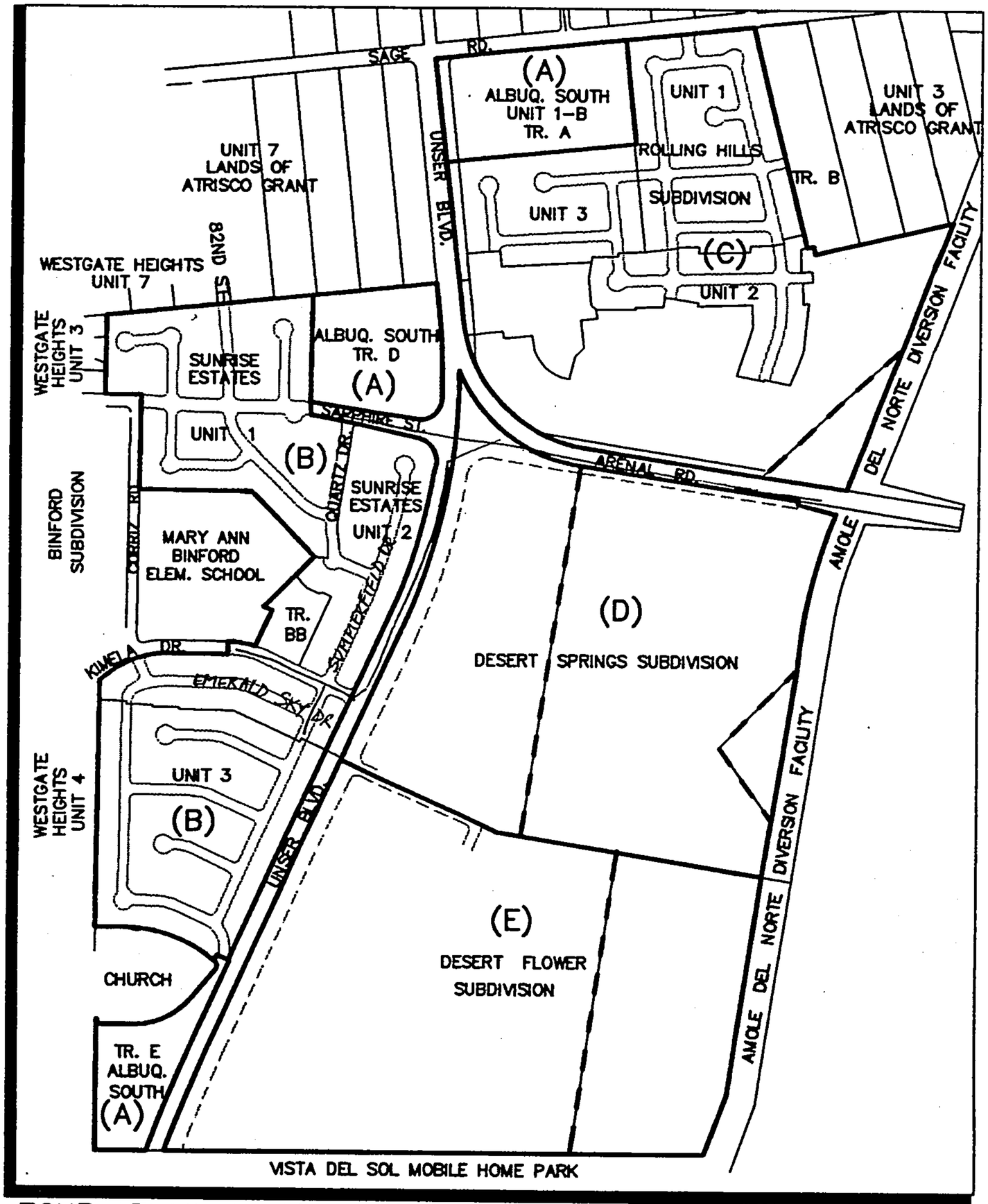
construction. The development is situated between Sage Road and Arenal Road just east of Unser Blvd. SW. Units Three and Four are at various stages in the platting process and are scheduled for construction in early 1997.

The overall development is covered by the Rolling Hills Drainage Management Plan on file at City of Albuquerque Hydrology Division. This plan proposes to discharge the developed storm waters directly to the Amole del Norte Channel at two locations. The project will construct two storm drain lines in the east-west streets and construction of all phases shall be independent of the City funded storm drain situated in Arenal Road.

D. **Builders Investment Co. of NM, Ltd.:** This developer is under contract to purchase 77 acres along the south right-of-way of Arenal Road between Unser Blvd. and the Amole del Norte Diversion Channel. The single family subdivisions (RLT zoning) is projected to be developed in four units with the first phase being a 102 lot subdivision east of Unser Blvd.

The approval and development of Unit One will require the dedication of approximately 3.8 acres at the southeast corner of Unser Blvd. and Arenal Road SW. This area will be utilized as a detention facility for the Unser/Sapphire storm drain system. The phased development

PLAN SPONSORS OWNERSHP MAP



ZONE ATLAS: M-10

SCALE: 1"=750'±

(A) ALBUQUERQUE SOUTH GENERAL PARTNERSHIP
(B) PRESLEY HOMES
(C) LONGFORD HOMES OF NEW MEXICO
(D) BUILDERS INVESTMENT COMPANY OF NEW MEXICO, LTD.
(E) CURB, INC.

9030WNMP.DWGems 06/18/97

of this first, temporary/ultimately, permanent detention pond shall be discussed further in the body of this report.

E. **Curb, Inc.:** Curb, Inc. has purchased a portion of Tract F, Albuquerque South, Unit One, consisting of 60.2 acres. A majority of Tract F is protected from upstream drainage by the proposed improvements to Unser Blvd. bordering on the west. The single family subdivision (proposed R-LT zoning) is projected to be developed in four units. The first phase will have an 84 lot subdivision and lies east of Unser Blvd.

III. PROPOSED DRAINAGE MANAGEMENT PLAN SOLUTION

The plan participants identified above have all purchased their parcels from the Albuquerque South General Partnership. The storm water runoff from each development will ultimately be accepted by the Amole del Norte Diversion Channel. The channel was designed using the older hydrology methods and is now under study by Leedshill-Herkenhoff Engineers under contract to AMAFCA to determine if and how much the channel is undersized with respect to handling the fully developed storm water runoff under current hydrology criteria.

It is the intent of this plan to demonstrate that a single regional detention facility at the southeast quadrant of Unser Blvd. and Arenal Road will provide the necessary detention of storm waters and a reduction in the storm water rate of flow into the Amole del Norte Diversion Channel to the same discharge rate the channel was originally designed by Boyle Engineering Corp (BEC) in 1985. The reduced rate shall apply to the parcels identified as the plan participants and will encompass eight to nine connection points to the channel.

The BEC report titled "Investigation Phase Report for the Re-Evaluation Study of the Amole del Norte Storm Diversion Facility" dated June 1984 was the design basis for the construction of the Amole del Norte Channel. The report was a hydrological analysis for the Amole del Norte Drainage basin using the SCS curve number method which was the accepted rationale at the time. The subbasin boundaries determined in the BEC report correspond with the boundaries used in our analysis. BEC's subbasins 32-36 and 38 were replaced with subbasins 100-505 in this report. It was determined that the best way to derive a discharge rate to the Amole del Norte Channel was to reduce the flow rate/unit area (cfs/ac) from the current analysis to that of the BEC study. The detention pond will then be designed such that it will be sufficiently large enough to detain the discharge from the upstream areas to the cfs/ac that the channel was originally designed for in 1984. The AHYMO model in Appendix C includes a reservoir route to preliminarily design the detention pond. A more complete design of the pond will be performed when construction of the pond becomes necessary for further development to proceed.

Analysis of the side discharges to the channel were needed to determine how much runoff could discharge into the channel. BEC report shows that subbasins 32-35 make a side discharge to the channel at Arenal Road, subbasin 36 makes a side discharge 1700' south of Arenal Road, and subbasin 38 makes a side discharge 3000' south of Arenal Road. Hydrographs for these side discharges into the channel are shown in Table 1 (see Appendix), taken from BEC report. New hydrographs of the subbasins above were needed to represent current developed discharges into the side of the channel. Our study derived nine new hydrographs to replace the hydrographs above. Four new side flows, side flow 980' south of Sage Road, side flow 1000' north of Arenal Road, side flow 200' north of Arenal Road, and side flow 1150' south of Arenal Road were added and are shown in Table 2 (see Appendix). The hydrographs of the side flows in Table 2 were obtained from computations with peak runoffs and times of concentration. Peak runoffs were based from AHYMO runs, combined with times of concentration using SCS Upland Method, to obtain a list of hydrograph data points. The hydrograph results are shown in Table 2. Comparison between the new and the previous hydrographs of the Amole del Norte Channel can be made by referring to Tables 1 and 2 or to the graph. Table 2 shows that the new channel hydrograph peak discharge is slightly lower than that of the previous hydrograph, roughly 1891 cfs vs. 1902 cfs. This is achieved by several factors. First, the temporary surge pond at Arenal Road and Unser Blvd. was enlarged to detain enough runoff so that discharge to the channel via Arenal Road would not exceed previous discharge calculated by BEC report. Second, storm drain pipes from the pond to the channel were sized and placed at certain elevation in the pond to

control the flow to the channel. Third, side discharges north and south of Arenal Road were computed using adjusted areas giving lower times of concentration. The times to peak averaged at 14 minutes vs. 21 minutes computed from BEC report. As a result, the factors pointed out above derive a hydrograph shown on Table 2 with a peak discharge slightly lower than the one from BEC report.

The Appendix contains tables, graph, and computational datas regarding the analysis of the discharges to the Amole del Norte Channel. Basin ID map from Boyle Engineering Corporation report is attached, followed by tables and graph of the hydrograph for the channel. Hydrograph calculations and referencing datas gathered from BEC report make up the last part of the appendix in this section.

IV. THE PLAN

A four acre regional storm water detention facility shall be the backbone of the plan solution. The interim storage of storm water volumes in excess of the downstream storm drain carrying capacity for both the proposed Arenal Road storm drain and the Amole del Norte Diversion Channel shall be analyzed to achieve a balance runoff credit for the combined developing area of the participant's developments.

A. **Existing Conditions:** Presently, 100% of the offsite storm waters being accepted by the Amole del Norte Diversion Channel is from overland flows generated from the Westgate Heights Subdivision, Presley Homes Summerfield Subdivision, Unit One, and the undeveloped property west of the Amole del Norte Channel.

The existing storm drain in Sapphire Street releases its flows to the historical overland drainage route where they are eventually accepted by the channel via a side inlet approximately 800 feet south of Arenal Road.

B. **Proposed Improvements:** The required improvements are proposed for construction in three distinct and coordinated phases as follows:

1. Presley Homes: Sunrise Estates, Unit Two has the Sapphire Street storm drain extension to Unser Blvd.; the Kimela Road storm drain from the east end of the APS property to Unser Blvd.; the Unser Blvd. storm drain from Kimela to Arenal Road; and the temporary storm water detention and surge pond at Unser Blvd. and Arenal Road as found on the Required Infrastructure Listing of the subdivision and will be financially guaranteed and constructed.

2. Longford Homes of New Mexico: The Rolling Hills Subdivision Units Two through Five are allowed to develop independently of the Arenal Road storm drain. This is due to the fact that the Rolling Hills development has two interior backbone storm drains and separate connections to the Amole del Norte Diversion Channel approved per the Rolling Hills D.M.P.

3. Builders Investment Co. of NM, Ltd.: Development of the multi-phase Desert Springs Subdivisions is dependent upon the construction of the Unser Blvd. storm drain and the interim detention pond. These improvements will allow for the development of Unit One along Unser Blvd. The subsequent Units will require the construction of the Arenal Road storm drain and modifying the temporary detention/surge pond into the permanent regional storm water detention facility.

4. City of Albuquerque: The City has designated the Arenal Road storm drain as a masterplan facility and is currently on the City's 1997 C.I.P. funding of storm drainage projects. This improvement is required for the development of those subdivisions east of Desert Springs, Unit One.

5. Curb, Inc.: The development of this 60.2 acre parcel is dependent upon the Kimela Road and Unser Blvd. storm drainage improvements. The individual subdivisions shall be covered by a master drainage plan and will be required to have internal storm drain systems to supplement the street carrying capability to convey 100% of the offsite and onsite storm waters to the Amole del Norte Diversion Channel.

APPENDIX A

BEC Subbasin Maps

Table 1: Previous Hydrograph Datas of the Amole del Norte Channel

Table 2: Revised Hydrograph Datas of the Amole del Norte Channel

Hydrograph of the Amole del Norte Channel

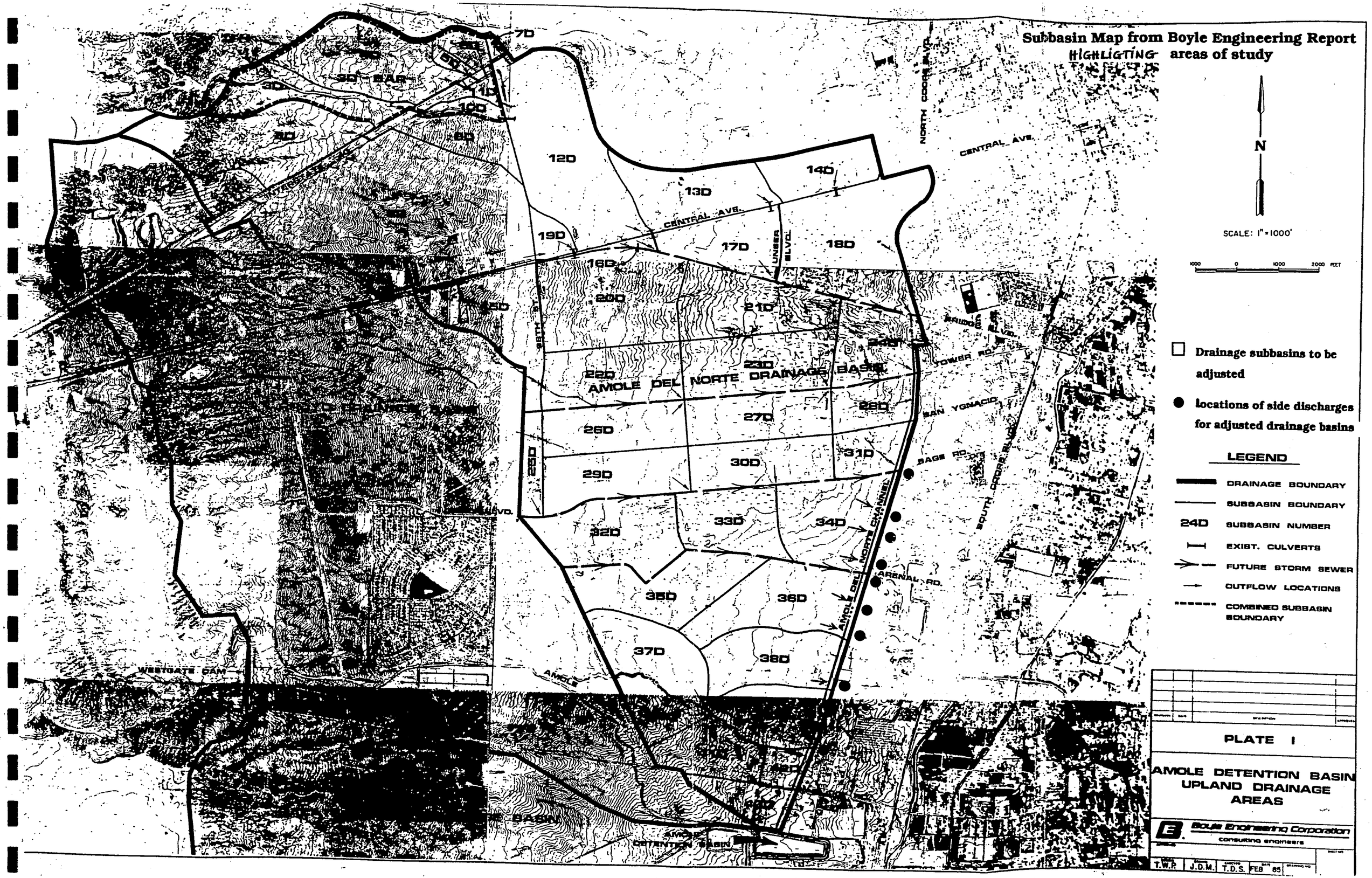

Subbasin Map from Boyle Engineering Report
HIGHLIGTING areas of study
N
SCALE: 1" = 1000'
1000 0 1000 2000 FEET
Drainage subbasins to be adjusted
locations of side discharges for adjusted drainage basins
LEGEND
DRAINAGE BOUNDARY
SUBBASIN BOUNDARY
24D SUBBASIN NUMBER
EXIST. CULVERTS
FUTURE STORM SEWER
OUTFLOW LOCATIONS
COMBINED SUBBASIN BOUNDARY
AMOLE DEL NORTE DRAINAGE BASIN
CENTRAL AVE.
NORTH COORS BLVD.
SOUTH COORS BLVD.
UNSER BLVD.
TOWER RD.
SAN YGNACIO
SAGE RD.
ARENAL RD.
AMOLE DEL NORTE CHANNEL
WESTGATE DAM
AMOLE DETENTION BASIN
7D
8D
9D
10D
11D
12D
13D
14D
16D
17D
18D
19D
20D
21D
22D
23D
24D
25D
26D
27D
28D
29D
30D
31D
32D
33D
34D
35D
36D
37D
38D
PLATE I
AMOLE DETENTION BASIN UPLAND DRAINAGE AREAS
Boyle Engineering Corporation
consulting engineers
T.W.P.
J.D.M.
T.D.S.
FEB 85

TABLE 1

For Reference
From the Amole del Norte Storm Diversion Facility Report February 1995, Boyle Engineering

NOTE:

A = Runoff from the proposed Tierra Bayita storm drain.

B = Sum of flows entering the Amole Channel from Tower so. to the Amole Basin.

C = Discharge from a proposed 35 ac-ft detention basin at the north end of the Amole Channel (inflow = A)

TIME (HR)	DISCHARGE FROM PROPOSED TIERRA BAYITA STORM SEWER (A)	SIDE FLOW AT TOWER ROAD (B)	SIDE FLOW AT SAGE ROAD (B)	SIDE FLOW AT ARENAL ROAD (B)	SIDE FLOW 1700' SO. OF ARENAL (B)	SIDE FLOW 3000' SO. OF ARENAL (B)	SIDE FLOW 1100' NO. OF BLAKE (B)	SIDE FLOW AT BLAKE ROAD (B)	SIDE FLOW SOUTH OF BLAKE (B)	"B"	A & B	DISCHARGE FROM PROPOSED 35 AC-FT DETENTION BASIN NO. OF TOWER ROAD (C)	B & C	HYDROGRAPH PLOTTED (SEE GRAPH)
0.2	138	189	106	117	14	42	44	56	17	585	723	0	585	173
0.4	1323	547	210	317	75	84	135	62	33	1463	2786	210	1673	476
0.5	1368	600	176	280	79	65	109	47	26	1382	2750	520	1902	424
0.6	1178	527	142	242	63	45	83	32	18	1152	2330	690	1842	350
0.8	821	335	90	151	38	27	51	21	11	724	1545	735	1459	216
1.0	614	221	64	103	26	21	37	15	8	495	1109	780	1275	150
1.2	500	158	49	79	20	17	29	12	7	371	871	720	1091	
1.4	411	123	39	64	17	14	24	10	5	296	707	600	896	
1.6	342	102	33	53	14	11	20	8	5	246	588	525	771	
1.8	290	86	28	46	12	10	17	7	4	219	500	465	675	
2.0	249	73	24	40	11	9	15	6	3	181	430	380	561	
2.2	215	64	21	35	9	8	13	6	3	159	374	330	489	
2.4	190	57	18	31	8	7	12	5	3	141	331	280	421	
2.6	168	50	16	28	8	6	10	5	2	125	293	230	355	
2.8	150	45	15	25	7	6	10	4	2	114	264	200	314	
3.0	136	41	14	23	6	5	9	4	2	104	240	175	279	
3.2	125	38	13	21	6	5	8	4	2	97	222	155	252	
3.4	115	35	12	20	5	5	8	4	2	91	206	135	226	
3.6	106	32	11	19	5	4	7	3	2	83	189	120	203	
3.8	98	31	11	18	5	4	7	3	2	81	179	105	186	
4.0	92	29	10	17	4	4	7	3	2	76	168	95	171	
4.2	87	27	10	16	4	4	6	3	1	71	158	87	158	
4.4	82	26	9	15	4	4	6	3	1	68	150	82	150	
4.6	78	25	9	15	4	3	6	3	1	66	144	78	144	
4.8	75	24	8	14	4	3	6	3	1	63	138	75	138	
5.0	71	23	8	13	4	3	5	3	1	60	131	71	131	
5.2	68	22	8	13	3	3	5	2	1	57	125	68	125	
5.4	66	21	7	12	3	3	5	2	1	54	120	66	120	
5.6	63	20	7	12	3	3	5	2	1	53	116	63	116	
5.8	60	20	7	12	3	3	5	2	1	53	113	60	113	
6.0														

Side Flow 1600' N of Arenal

TABLE 2
NEW HYDROGRAPH FOR THE AMOLE DEL NORTE DIVERSION CHANNEL

TIME (HR)	DISCHARGE FROM PROPOSED TIERRA BAYITA STORM SEWER A	SIDE FLOW AT TOWER ROAD	SIDE FLOW AT SAGE ROAD	ADDITIONAL SIDE FLOW AT SAGE ROAD** 504	SIDE FLOW AT 980' S. OF SAGE ROAD** 835 503	SIDE FLOW AT 1000' N. OF ARENAL ROAD** 501	SIDE FLOW AT 200' N. OF ARENAL ROAD** 502	SIDE FLOW AT ARENAL ROAD*	SIDE FLOW 1150' S. OF ARENAL ROAD** B 406	SIDE FLOW 1650' S. OF ARENAL ROAD* 407	SIDE FLOW AT 3000' S. OF ARENAL ROAD* 408	SIDE FLOW 1100' N. OF BLAKE ROAD	ADDITIONAL SIDE FLOW AT 1100' N. OF BLAKE ROAD** 505	SIDE FLOW AT BLAKE ROAD	SIDE FLOW S. OF BLAKE ROAD	B*	A & B*	DISCHARGE FROM PROPOSED 35 AC-FT DETENTION BASIN N. OF TOWER ROAD C	B & C* HYDROGRAPH PLOTTED (SEE GRAPH)	
0.2	138	189	106	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	44	[redacted]	56	17	1248	1386	0	1248	836
0.4	1323	547	210	[redacted]	[redacted]	[redacted]	[redacted]	15[redacted]	[redacted]	[redacted]	[redacted]	135	[redacted]	62	33	1539	2862	210	1749	552
0.5	1368	600	176	[redacted]	[redacted]	[redacted]	[redacted]	18[redacted]	[redacted]	[redacted]	[redacted]	109	[redacted]	47	26	1372	2740	520	1891	417
0.6	1178	527	142	[redacted]	[redacted]	[redacted]	[redacted]	18[redacted]	[redacted]	[redacted]	[redacted]	83	[redacted]	32	18	1133	2311	690	1823	331
0.8	821	335	90	[redacted]				1[redacted]9	[redacted]	[redacted]	[redacted]	51	[redacted]	21	11	697	1518	735	1432	189
1.0	614	221	64	[redacted]				[redacted]	[redacted]	[redacted]	[redacted]	37	[redacted]	15	8	442	1056	780	1222	97
1.2	500	158	49	[redacted]				[redacted]		[redacted]	1	29		12	7	302	802	720	1022	
1.4	411	123	39	[redacted]				2[redacted]				24		10	5	226	637	600	826	
1.6	432	102	33	[redacted]				1[redacted]				20		8	5	182	524	525	707	
1.8	290	86	28	[redacted]				[redacted]				17		7	4	150	440	465	615	
2.0	249	73	24					3[redacted]				15		6	3	124	373	380	504	
2.2	215	64	21					2[redacted]				13		6	3	109	324	330	439	
2.4	190	57	18					1				12		5	3	96	286	280	376	
2.6	168	50	16									10		5	2	83	251	230	313	
2.8	150	45	15									10		4	2	76	226	200	276	
3.0	136	41	14									9		4	2	70	206	175	245	
3.2	125	38	13									8		4	2	65	190	155	220	
3.4	115	35	12									8		4	2	61	176	135	196	
3.6	106	32	11									7		3	2	55	161	120	175	
3.8	98	31	11									7		3	2	54	152	105	159	
4.0	92	29	10									7		3	2	51	143	95	146	
4.2	87	27	10									6		3	1	47	134	87	134	
4.4	82	26	9									6		3	1	45	127	82	127	
4.6	78	25	9									6		3	1	44	122	78	122	
4.8	75	24	8									6		3	1	42	117	75	117	
5.0	71	23	8									5		3	1	40	111	71	111	
5.2	68	22	8									5		2	1	38	106	68	106	
5.4	66	21	7									5		2	1	36	102	66	102	
5.6	63	20	7									5		2	1	35	98	63	98	
5.8	60	20	7									5		2	1	35	95	60	95	
6.0																				

NOTE:

A = Runoff from the proposed Tierra Bayita storm drain.

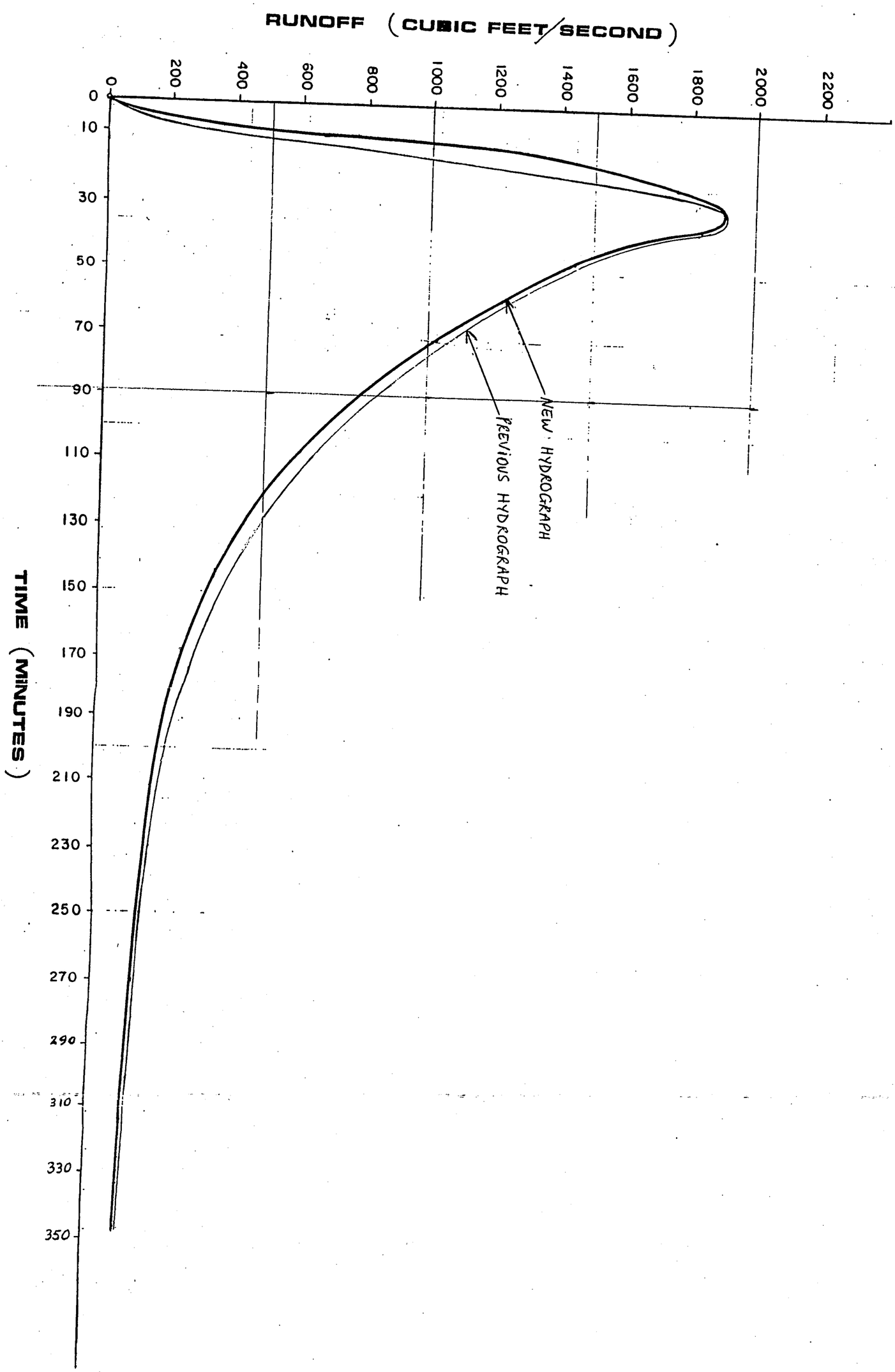
B = Sum of flows entering the Amole Channel from Tower south to the Amole Bain.

C = Discharge from a proposed 35 ac-ft detention basin at the north end of the Amole Channel (inflow = A).

*Values adjusted from Boyle Report, (see calculations section). FOR COMPARISON, SEE TABLE 1

**New side flow

903TABLE,DWGems 06/17/97



Runoff Hydrograph for the Amole del Norte Channel

APPENDIX B

Hydrograph Computational Datas

HYDROGRAPH FOR BASINS DISCHARGING TO CHANNEL AT ARENAL ROAD

FROM BASIN 100 TO SURGE POND

LENGTH (FT)	=	5714
DIFFERENCE IN ELEVATION ACROSS BASIN	=	102
SLOPE OF BASIN (FT/FT)	=	0.015
TIME OF CONCENTRATION (MIN)	=	23
TIME OF PEAK (MIN)	=	15

ROUTING SURGE POND AND TO AMOLE DEL NORTE CHANNEL

[redacted]			
AREA OF BASIN, (ACRES)	=	373.4	352.9
AREA OF BASIN, (SQ MI)	=	0.5834	0.55146
100-YR, 6-HR RAINFALL, (INCHES)	=	2.20	
COMPOSITE CURVE NO.	=	77	
DIRECT RUNOFF (INCHES)	=	.56	
[redacted]			
VOLUME OF RUNOFF (ACRE-FT)	=	32.0	
[redacted]			
AVERAGE RUNOFF PER ACRE (CFS/AC)	=	2.7	

POINT	t/Tp (min/min)	t (min)	y (cfs/cfs)	Q (cfs)
1	.0	0.0	.000	0.0
2	.1	3.3	.030	5.7
3	.2	6.6	.100	19.0
4	.3	9.9	.190	36.1
5	.4	13.2	.310	58.9
6	.5	16.5	.470	89.3
7	.6	19.8	.660	125.4
8	.7	23.1 ,4	.820	155.8
9	.8	26.4	.930	176.7
10	.9	29.7 ,5	.990	188.1
[redacted]				
12	1.1	36.3 ,6	.990	188.1
13	1.2	39.6	.930	176.7
14	1.3	42.9	.860	163.4
15	1.4	46.2 ,8	.780	148.2
16	1.5	49.5	.680	129.2
17	1.6	52.8	.560	106.4
18	1.7	56.1	.460	87.4
19	1.8	59.4	.390	74.1
20	1.9	62.7	.330	62.7
21	2.0	66.0	.280	53.2

POINT	t/Tp (min/min)	t (min)	y (cfs/cfs)	Q (cfs)
22	2.2	72.6	.207	39.3
23	2.4	79.2	.147	27.9
24	2.6	85.8	.107	20.3
25	2.8	92.4	.077	14.6
26	3.0	99.0	.055	10.5
27	3.2	105.6	.040	7.6
28	3.4	112.2	.029	5.5
29	3.6	118.8	.021	4.0
30	3.8	125.4	.015	2.9
31	4.0	132.0	.011	2.1
32	4.5	148.5	.005	1.0
33	5.0	165.0	.000	.00

HYDROGRAPH FOR BASIN 406
(SIDE FLOW 1150' S. OF ARENAL ROAD)

BASIN LENGTH, (FT)	=	2063
DIFFERENCE IN ELEVATION ACROSS BASIN	=	28
SLOPE OF BASIN, (FT/FT)	=	0.0136
AREA OF BASIN, (ACRES)	=	36.2 36.8
AREA OF BASIN, (SQ MI)	=	0.05750
100-YR, 6-HR RAINFALL, (INCHES)	=	2.20
COMPOSITE CURVE NO.	=	77
DIRECT RUNOFF (INCHES)	=	.56
TIME OF CONCENTRATION (SCS UPLAND METHOD) (MIN)	=	20
TIME TO PEAK (MIN)	=	13
VOLUME OF RUNOFF (ACRE-FT) (from AHYMO run)	=	3.9
PEAK RUNOFF (CFS) (from AHYMO run)	=	117.49
RUNOFF PER ACRE (CFS/ACRE)	=	3.25

POINT	t/Tp (min/min)	t (min)	y (cfs/cfs)	Q (cfs)
1	.0	.0	.000	.00
2	.1	1.3	.030	3.52
3	.2	2.3	.100	11.75
4	.3	3.9	.190	22.33
5	.4	5.2	.310	36.43
6	.5	6.5	.470	55.23
7	.6	7.8	.660	77.55
8	.7	9.1	.820	96.35
9	.8	10.4	.930	109.28
10	.9	11.7 .2	.990	116.33
[illegible]	1.0	[illegible]	[illegible]	[illegible]
12	1.1	14.3	.990	116.33
13	1.2	15.6	.930	109.28
14	1.3	16.9	.860	101.05
15	1.4	18.2	.780	91.65
16	1.5	19.5	.680	79.90
17	1.6	20.8	.560	65.8
18	1.7	22.1	.460	54.05
19	1.8	23.4 .4	.390	45.83
20	1.9	24.7	.330	38.78
21	2.0	26.0	.280	32.90
22	2.2	28.6	.207	24.32
23	2.4	31.2	.147	17.27

POINT	t/Tp (min/min)	t (min)	y (cfs/cfs)	Q (cfs)
24	2.6	33.8	.107	12.57
25	2.8	36.4	.077	9.05
26	3.0	39.0	.055	6.46
27	3.2	41.6	.040	4.7
28	3.4	44.2	.029	3.41
29	3.6	46.8	.021	2.47
30	3.8	49.4	.015	1.76
31	4.0	52.0	.011	1.29
32	4.5	58.5	.005	0.59
33	5.0	65.0	.000	.00

HYDROGRAPH FOR BASIN 407
(SIDE FLOW 1650' S. OF ARENAL ROAD)

BASIN LENGTH, (FT)	=	2103
DIFFERENCE IN ELEVATION ACROSS BASIN	=	32
SLOPE OF BASIN, (FT/FT)	=	0.0152
AREA OF BASIN, (ACRES)	=	32.26
AREA OF BASIN, (SQ MI)	=	0.05040
100-YR, 6-HR RAINFALL, (INCHES)	=	2.20
COMPOSITE CURVE NO.	=	77
DIRECT RUNOFF (INCHES)	=	.56
TIME OF CONCENTRATION (SCS UPLAND METHOD) (MIN)	=	19.2
TIME TO PEAK (MIN)	=	13
VOLUME OF RUNOFF (ACRE-FT) (from AHYMO run)	=	3.5
[redacted]		
RUNOFF PER ACRE (CFS/ACRE)	=	3.25

POINT	t/Tp (min/min)	t (min)	Y (cfs/cfs)	Q (cfs)
1	.0	.0	.000	.00
2	.1	1.3	.030	3.14
3	.2	2.3	.100	10.48
4	.3	3.9	.190	19.91
5	.4	5.2	.310	32.49
6	.5	6.5	.470	49.26
7	.6	7.8	.660	69.17
8	.7	9.1	.820	85.94
9	.8	10.4	.930	97.46
10	.9	11.7	.990	103.75
[redacted]				
12	1.1	14.3	.990	103.75
13	1.2	15.6	.930	97.46
14	1.3	16.9	.860	90.13
15	1.4	18.2	.780	81.74
16	1.5	19.5	.680	71.26
17	1.6	20.8	.560	58.69
18	1.7	22.1	.460	48.21
19	1.8	23.4	.390	40.87
20	1.9	24.7	.330	34.58
21	2.0	26.0	.280	29.34
22	2.2	28.6	.207	21.69
23	2.4	31.2	.147	15.41

POINT	t/Tp (min/min)	t (min)	y (cfs/cfs)	Q (cfs)
24	2.6	33.8	.107	11.21
25	2.8	36.4	.077	8.07
26	3.0	39.0	.055	5.76
27	3.2	41.6	.040	4.19
28	3.4	44.2	.029	3.04
29	3.6	46.8	.021	2.20
30	3.8	49.4	.015	1.57
31	4.0	52.0	.011	1.15
32	4.5	58.5	.005	0.52
33	5.0	65.0	.000	.00

HYDROGRAPH FOR BASIN 408
(SIDE FLOW 3000' S. OF ARENAL ROAD)

BASIN LENGTH, (FT)	=	2974
DIFFERENCE IN ELEVATION ACROSS BASIN	=	56
SLOPE OF BASIN, (FT/FT)	=	.0188
AREA OF BASIN, (ACRES)	=	100.7
AREA OF BASIN, (SQ MI)	=	.15736
100-YR, 6-HR RAINFALL, (INCHES)	=	2.20
COMPOSITE CURVE NO.	=	77
DIRECT RUNOFF (INCHES)	=	.56
TIME OF CONCENTRATION (SCS UPLAND METHOD) (MIN)	=	23
TIME TO PEAK (MIN)	=	15
VOLUME OF RUNOFF (ACRE-FT) (from AHYMO run)	=	10.9
PEAK RUNOFF (CFS) (from AHYMO run)	=	327.60
RUNOFF PER ACRE (CFS/ACRE)	=	3.25

POINT	t/Tp (min/min)	t (min)	y (cfs/cfs)	Q (cfs)
1	.0	.0	.000	.00
2	.1	1.5	.030	9.83
3	.2	3.0	.100	32.76
4	.3	4.5	.190	62.24
5	.4	6.0	.310	101.56
6	.5	7.5	.470	153.97
7	.6	9.0	.660	216.22
8	.7	10.5	.820	268.63
9	.8	12.0 ,2	.930	304.67
10	.9	13.5	.990	324.32
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
12	1.1	16.5	.990	324.32
13	1.2	18.0	.930	304.67
14	1.3	19.5	.860	281.74
15	1.4	21.0	.780	255.53
16	1.5	22.5	.680	222.77
17	1.6	24.0 ,4	.560	183.46
18	1.7	25.5	.460	150.70
19	1.8	27.0	.390	127.76
20	1.9	28.5	.330	108.11
21	2.0	30.0	.280	91.73
22	2.2	33.0	.207	67.81
23	2.4	36.0	.147	48.16

POINT	t/Tp (min/min)	t (min)	y (cfs/cfs)	Q (cfs)
24	2.6	39.0	.107	35.05
25	2.8	42.0	.077	25.23
26	3.0	45.0	.055	18.02
27	3.2	48.0	.040	13.10
28	3.4	51.0	.029	9.50
29	3.6	54.0	.021	6.88
30	3.8	57.0	.015	4.91
31	4.0	60.0	.011	3.60
32	4.5	67.5	.005	1.64
33	5.0	75.0	.000	.00

HYDROGRAPH FOR BASINS 500 & 501 OF LONGFORD SUBDIVISION
(SIDE FLOW 1000' N. OF ARENAL ROAD)

BASIN LENGTH, (FT)	=	2325
DIFFERENCE IN ELEVATION ACROSS BASIN	=	57
SLOPE OF BASIN, (FT/FT)	=	0.0245
AREA OF BASIN, (ACRES)	=	32.7
AREA OF BASIN, (SQ MI)	=	0.0511
100-YR, 6-HR RAINFALL, (INCHES)	=	2.20
COMPOSITE CURVE NO.	=	77
DIRECT RUNOFF (SCS UPLAND METHOD) (INCHES)	=	.56
TIME OF CONCENTRATION (MIN)	=	14
TIME TO PEAK (MIN)	=	9
VOLUME OF RUNOFF (ACRE-FT) (from AHYMO run)	=	4.4
PEAK RUNOFF (CFS) (from AHYMO run)	=	128
RUNOFF PER ACRE (CFS/ACRE)	=	3.4

POINT	t/Tp (min/min)	t (min)	y (cfs/cfs)	Q (cfs)
1	.0	.0	.000	.0
2	.1	0.9	.030	3.84
3	.2	1.8	.100	12.80
4	.3	2.7	.190	24.32
5	.4	3.6	.310	39.68
6	.5	4.5	.470	60.16
7	.6	5.4	.660	84.48
8	.7	6.3	.820	104.96
9	.8	7.2	.930	119.04
10	.9	8.1	.990	126.72
11	1.0	9.0	1.000	128.00
12	1.1	9.9	.990	126.72
13	1.2	10.8	.930	119.04
14	1.3	11.7	.860	110.08
15	1.4	12.6 ,2	.780	99.84
16	1.5	13.5	.680	87.04
17	1.6	14.4	.560	71.68
18	1.7	15.3	.460	58.88
19	1.8	16.2	.390	49.92
20	1.9	17.1	.330	42.24
21	2.0	18.0	.280	35.84
22	2.2	19.8	.207	26.50
23	2.4	21.6	.147	18.82

POINT	t/Tp (min/min)	t (min)	y (cfs/cfs)	Q (cfs)
24	2.6	23.4	.107	13.70
25	2.8	25.2	.077	9.86
26	3.0	27.0	.055	7.04
27	3.2	28.8	.040	5.12
28	3.4	30.6	.029	3.71
29	3.6	32.4	.021	2.69
30	3.8	34.2	.015	1.92
31	4.0	36.0	.011	1.41
32	4.5	40.5	.005	0.64
33	5.0	45.0	.000	0.00

HYDROGRAPH FOR BASIN 502 OF LONGFORD SUBDIVISION
(SIDE FLOW 200' N. OF ARENAL ROAD)

BASIN LENGTH, (FT)	=	2714
DIFFERENCE IN ELEVATION ACROSS BASIN	=	72
SLOPE OF BASIN, (FT/FT)	=	0.0265
AREA OF BASIN, (ACRES)	=	36.9
AREA OF BASIN, (SQ MI)	=	0.05788
100-YR, 6-HR RAINFALL, (INCHES)	=	2.20
COMPOSITE CURVE NO.	=	77
DIRECT RUNOFF (INCHES)	=	.56
TIME OF CONCENTRATION (SCS UPLAND METHOD) (MIN)	=	10
TIME TO PEAK (MIN)	=	7
VOLUME OF RUNOFF (ACRE-FT) (from AHYMO run)	=	4.16
PEAK RUNOFF (CFS) (from AHYMO run)	=	121.8
RUNOFF PER ACRE (CFS/ACRE)	=	3.3

POINT	t/Tp (min/min)	t (min)	y (cfs/cfs)	Q (cfs)
1	.0	.0	.000	.00
2	.1	0.7	.030	3.65
3	.2	1.4	.100	12.18
4	.3	2.1	.190	23.14
5	.4	2.8	.310	37.76
6	.5	3.5	.470	57.25
7	.6	4.2	.660	80.39
8	.7	4.9	.820	99.88
9	.8	5.6	.930	113.27
10	.9	6.3	.990	120.58
[illegible]	[illegible]	[illegible]	1.000	121.8
12	1.1	7.7	.990	120.58
13	1.2	8.4	.930	113.27
14	1.3	9.1	.860	104.75
15	1.4	9.8	.780	95.00
16	1.5	10.5	.680	82.82
17	1.6	11.2	.560	68.21
18	1.7	11.9 ,2	.460	56.03
19	1.8	12.6	.390	47.50
20	1.9	13.3	.330	40.19
21	2.0	14.0	.280	34.10
22	2.2	15.4	.207	25.21
23	2.4	16.8	.147	17.90

POINT	t/Tp (min/min)	t (min)	y (cfs/cfs)	Q (cfs)
24	2.6	18.2	.107	13.03
25	2.8	19.6	.077	9.38
26	3.0	21.0	.055	6.70
27	3.2	22.4	.040	4.87
28	3.4	23.8	.029	3.53
29	3.6	25.2	.021	2.56
30	3.8	26.6	.015	1.83
31	4.0	28.0	.011	1.34
32	4.5	31.5	.005	0.61
33	5.0	35.0	.000	0.00

HYDROGRAPH FOR BASIN 503
(SIDE FLOW 980' S. OF SAGE ROAD)

BASIN LENGTH, (FT)	=	1190
DIFFERENCE IN ELEVATION ACROSS BASIN	=	44
SLOPE OF BASIN, (FT/FT)	=	0.037
AREA OF BASIN, (ACRES)	=	24.0
AREA OF BASIN, (SQ MI)	=	0.03752
100-YR, 6-HR RAINFALL, (INCHES)	=	2.20
COMPOSITE CURVE NO.	=	77
DIRECT RUNOFF (INCHES)	=	.56
TIME OF CONCENTRATION (SCS UPLAND METHOD) (MIN)	=	8
TIME TO PEAK (MIN)	=	7
VOLUME OF RUNOFF (ACRE-FT) (from AHYMO run)	=	2.60
PEAK RUNOFF (CFS) (from AHYMO run)	=	78.03
RUNOFF PER ACRE (CFS/ACRE)	=	3.25

POINT	t/Tp (min/min)	t (min)	y (cfs/cfs)	Q (cfs)
1	.0	.0	.000	.00
2	.1	0.7	.030	2.34
3	.2	1.4	.100	7.80
4	.3	2.1	.190	14.82
5	.4	2.8	.310	24.18
6	.5	3.5	.470	36.66
7	.6	4.2	.660	51.48
8	.7	4.9	.820	63.96
9	.8	5.6	.930	72.54
10	.9	6.3	.990	77.22
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
12	1.1	7.7	.990	77.22
13	1.2	8.4	.930	72.54
14	1.3	9.1	.860	67.08
15	1.4	9.8	.780	60.84
16	1.5	10.5	.680	53.04
17	1.6	11.2	.560	43.68
18	1.7	11.9 ,2	.460	35.88
19	1.8	12.6	.390	30.42
20	1.9	13.3	.330	25.74
21	2.0	14.0	.280	21.84
22	2.2	15.4	.207	16.15
23	2.4	16.8	.147	11.47

POINT	t/Tp (min/min)	t (min)	y (cfs/cfs)	Q (cfs)
24	2.6	18.2	.107	8.35
25	2.8	19.6	.077	6.01
26	3.0	21.0	.055	4.29
27	3.2	22.4	.040	3.12
28	3.4	23.8	.029	2.26
29	3.6	25.2	.021	1.64
30	3.8	26.6	.015	1.17
31	4.0	28.0	.011	0.86
32	4.5	31.5	.005	0.39
33	5.0	35.0	.000	.00

HYDROGRAPH FOR BASIN 504
(ADDITIONAL SIDE FLOW AT SAGE ROAD)

BASIN LENGTH, (FT)	=	2897
DIFFERENCE IN ELEVATION ACROSS BASIN	=	24
SLOPE OF BASIN, (FT/FT)	=	0.0083
AREA OF BASIN, (ACRES)	=	23.75
AREA OF BASIN, (SQ MI)	=	0.0366
100-YR, 6-HR RAINFALL, (INCHES)	=	2.20
COMPOSITE CURVE NO.	=	77
DIRECT RUNOFF (INCHES)	=	.56
TIME OF CONCENTRATION (SCS UPLAND METHOD) (MIN)	=	40
TIME TO PEAK (MIN)	=	27
VOLUME OF RUNOFF (ACRE-FT) (from AHYMO run)	=	2.57
PEAK RUNOFF (CFS) (from AHYMO run)	=	77.16
RUNOFF PER ACRE (CFS/ACRE)	=	3.25

POINT	t/Tp (min/min)	t (min)	y (cfs/cfs)	Q (cfs)
1	.0	.0	.000	.00
2	.1	2.7	.030	2.31
3	.2	5.4	.100	7.72
4	.3	8.1	.190	14.66
5	.4	10.8	.310	23.92
6	.5	13.5	.470	36.27
7	.6	16.2	.660	50.93
8	.7	18.9	.820	63.27
9	.8	21.6	.930	71.76
10	.9	24.3	.990	76.39
11	1.0	27.0	1.000	77.16
12	1.1	29.7	.990	76.39
13	1.2	32.4	.930	71.76
14	1.3	35.1	.860	66.36
15	1.4	37.8	.780	60.18
16	1.5	40.5	.680	52.47
17	1.6	43.2	.560	43.21
18	1.7	45.9	.460	35.49
19	1.8	48.6	.390	30.09
20	1.9	51.3	.330	25.47
21	2.0	54.0	.280	21.60
22	2.2	59.4	.207	15.97
23	2.4	64.8	.147	11.34

POINT	t/Tp (min/min)	t (min)	y (cfs/cfs)	Q (cfs)
24	2.6	70.2	.107	8.26
25	2.8	75.6	.077	5.94
26	3.0	81.0	.055	4.29
27	3.2	86.4	.040	3.09
28	3.4	91.8	.029	2.24
29	3.6	97.2	.021	1.62
30	3.8	102.6	.015	1.16
31	4.0	108.0	.011	0.85
32	4.5	121.5	.005	0.39
33	5.0	135.0	.000	.00

HYDROGRAPH FOR BASIN 505
(ADDITIONAL SIDE FLOW 1100' N. OF BLAKE ROAD)

BASIN LENGTH, (FT)	=	1468
DIFFERENCE IN ELEVATION ACROSS BASIN	=	8
SLOPE OF BASIN, (FT/FT)	=	0.00545
AREA OF BASIN, (ACRES)	=	16.8
AREA OF BASIN, (SQ MI)	=	0.02618
100-YR, 6-HR RAINFALL, (INCHES)	=	2.20
COMPOSITE CURVE NO.	=	77
DIRECT RUNOFF (INCHES)	=	.56
TIME OF CONCENTRATION (SCS UPLAND MEDHOD) (MIN)	=	26
TIME TO PEAK (MIN)	=	17
VOLUME OF RUNOFF (ACRE-FT) (from AHYMO run)	=	1.41
PEAK RUNOFF (CFS) (from AHYMO run)	=	43.10
RUNOFF PER ACRE (CFS/ACRE)	=	2.57

POINT	t/Tp (min/min)	t (min)	y (cfs/cfs)	Q (cfs)
1	.0	.0	.000	.00
2	.1	1.7	.030	1.29
3	.2	3.4	.100	4.31
4	.3	5.1	.190	8.19
5	.4	6.8	.310	13.36
6	.5	8.5	.470	20.26
7	.6	10.2	.660	28.45
8	.7	11.9	.820	35.34
9	.8	13.6	.930	40.08
10	.9	15.3	.990	42.67
11	1.0	17.0	1.000	43.10
12	1.1	18.7	.990	42.67
13	1.2	20.4	.930	40.08
14	1.3	22.1	.860	37.07
15	1.4	23.8	.780	33.62
16	1.5	25.5	.680	29.31
17	1.6	27.2	.560	24.14
18	1.7	28.9	.460	19.83
19	1.8	30.6	.390	16.81
20	1.9	32.3	.330	14.22
21	2.0	34.0	.280	12.07
22	2.2	37.4	.207	8.92
23	2.4	40.8	.147	6.34

POINT	t/Tp (min/min)	t (min)	y (cfs/cfs)	Q (cfs)
24	2.6	44.2	.107	4.61
25	2.8	47.6	.077	3.32
26	3.0	51.0	.055	2.37
27	3.2	54.4	.040	1.72
28	3.4	57.8	.029	1.25
29	3.6	61.2	.021	0.91
30	3.8	64.6	.015	0.65
31	4.0	68.0	.011	0.47
32	4.5	76.5	.005	0.22
33	5.0	85.0	.000	.00

APPENDIX C

Time to Peak Calculations

TIME TO PEAK CALCULATIONS

BASINS 100-405 : SIDE FLOW AT ARENAL RD.

$$T_c = \left[(12000 - L)/(120 * K * S^{0.5})\right] + \left[(L - 4000) * K_n * \frac{(L_{ca}/L)^{0.33}}{4.305 * S^{0.165}}\right]$$

$L = 5714$

Based on engineering judgement,

let $K_n = 0.023$, $K = 2.3$

$$T_c = \frac{12000 - 5714}{120 * 2.3 * \sqrt{1.5}} + \frac{(5714 - 4000) * 0.023 \left(\frac{714}{5714}\right)^{0.33}}{4.305 * (1.5)^{0.165}}$$

$= 22.91$ MIN.

$t_p = 2/3 (22.91) = 15.3$ MIN $\quad 0.255$ Hr

BASIN 406 : SIDE FLOW 1150' S. OF ARENAL RD.

$L_1 = 400'$, $K_1 = 0.7$, $S = 0.0136$

$V_1 = 0.7\sqrt{1.36} = 0.82$ fps

$L_2 = 1663'$, $K_2 = 2.0$

$V_2 = 2.0\sqrt{1.36} = 2.33$ fps

$$T_c = \frac{(400/0.82) + (1663/2.33)}{3600} = 0.33\,h$$

$T_p = 2/3 (0.33\,h) = 0.22\,h = 13.2$ min

BASIN 407: SIDE FLOW 1650' S. OF ARENAL RD.

$L_1 = 400'$, $K_1 = 0.7$, $S = 0.0152$

$V_1 = 0.7\sqrt{1.52} = 0.86$

$L_2 = 1703$, $K_2 = 2.0$

$V_2 = 2.0\sqrt{1.52} = 2.47$

$$T_c = \frac{(400/0.86) + (1703/2.47)}{3600} = 0.32h$$

$$T_p = \tfrac{2}{3}(0.32) = 0.21h = 13 \text{ min.}$$

BASIN 408: SIDE FLOW 3000' S. OF ARENAL RD.

$L_1 = 400'$, $K_1 = 0.7$, $S = 0.0188$

$V_1 = 0.7\sqrt{1.88} = 0.96$ fps

$L_2 = 2574'$, $K_2 = 2.0$

$V_2 = 2.0\sqrt{1.88} = 2.74$ fps

$$T_c = \frac{(400/0.96) + (2574/2.74)}{3600} = 0.38h$$

$$T_p = \tfrac{2}{3}(0.38h) = 0.25h = 15 \text{ MIN.}$$

BASINS 500 + 501: SIDE FLOW 1000' N. OF ARENAL RD.

$L_1 = 400'$, $K_1 = 0.7$, $S = 2.45\%$

$V_1 = 0.7\sqrt{2.45} = 1.10$

$L_2 = 400'$, $K_2 = 2.0$

$V_2 = 2.0\sqrt{2.45} = 3.13$

$L_3 = 1525$, $K_3 = 3.0$

$V_3 = 3.0\sqrt{2.45} = 4.70$

$$T_c = \frac{(400/1.10) + (400/3.13) + (1525/4.70)}{3600} = 0.23\,h$$

$$t_p = 2/3\,(0.23h) = 0.15h = 9\text{ MIN.}$$

BASIN 502: SIDE FLOW 200' N. OF ARENAL RD.

$L_1 = 400'$, $K_1 = 2.0$

$V_1 = 2.0\sqrt{2.65} = 3.26$

$L_2 = 2314'$, $K_2 = 3.0$

$V_2 = 3.0\sqrt{2.65} = 4.88$

$$T_c = \frac{(400/3.26) + (2314/4.88)}{3600} = 0.17\,h$$

$$T_p = 2/3\,(0.17h) = 0.11h = 7\text{ MIN.}$$

BASIN 503: SIDE FLOW 980' S. OF SAGE RD.

$L_1 = 400'$, $K_1 = 0.7$, $S = 3.70\%$

$V_1 = 0.7\sqrt{3.70} = 1.35$

$L_2 = 790'$, $K_2 = 2.0$

$V_2 = 2.0\sqrt{3.70} = 3.85$

$$T_c = \frac{(400/1.35) + (790/3.85)}{3600} = 0.14h = 8.4\text{ MIN.}$$

$$T_p = 2/3\,(8.4\text{ min}) = 6.6\text{ MIN.}$$

BASIN 504: : ADDITIONAL SIDE FLOW AT SAGE RD.

$L_1 = 400'$, $K_1 = 0.7'$, $S_1 = 0.83\%$

$V_1 = 0.7\sqrt{0.83} = 0.64$

$L_2 = 2497'$, $K_2 = 2.0$, $S_2 = 0.83\%$

$V_2 = 2.0\sqrt{0.83} = 1.82$

$L_3 = 1984'$, $K_3 = 3.0$, $S_3 = 2.92\%$

$V_3 = 3.0\sqrt{2.92} = 5.13$

$$T_c = \frac{(400/0.64) + (2497/1.82) + (1984/5.13)}{3600} = 0.66\,h = 40\text{ MIN.}$$

$$T_p = 2/3\,(40\text{ min}) = 27\text{ min}.$$

BASIN 505: ADDITIONAL SIDE FLOW 1100' N. OF BLAKE RD.

$L_1 = 400'$, $K_1 = 2.0'$, $S_1 = 0.545\%$

$V_1 = 2.0\sqrt{0.545} = 1.48$

$L_2 = 1068'$, $K_2 = 3.0$, $S_2 = 0.545\%$

$V_2 = 3.0\sqrt{0.545} = 2.21$

$L_3 = 3200'$, $K_3 = 3.0$, $S_3 = 1.88\%$

$V_3 = 3.0\sqrt{1.88} = 4.11$

$$T_c = \frac{(400/1.48) + (1068/2.21) + (3200/4.11)}{3600} = 0.43\,h$$

$$t_p = 2/3\,(0.43h) = 0.29\,h = 17\text{ MIN.}$$

APPENDIX D

Previous Hydrograph Computational Datas by BEC

TABLE 4

DATA SUMMARY

100-YEAR STORM DEVELOPED CONDITIONS

Area No.	Basin Length (Feet)	Elev. Drop (Feet)	Slope	Area (Acres)	CN	T_p (Min.)	Direct Runoff (Inches)	Runoff Volume (Acre-ft.)	Peak Flow (cfs)
21D	4015	52	0.0130	128.8	82	24	0.78	8.33	191
22D	3550	82	0.0231	119.6	83	18	0.84	8.25	252
23D	3910	36	0.0092	137.0	83	28	0.84	9.45	186
24D	2010	57	0.0284	89.0	77	10	0.56	4.11	226
25D	2600	40	0.0154	36.0	77	16	0.56	1.66	57
26D	3450	72	0.0209	90.5	80	18	0.69	5.14	157
27D	3840	23	0.0060	99.2	85	32	0.94	7.74	133
28D	2030	57	0.0281	57.0	79	10	0.64	3.03	166
29D	3630	68	0.0187	98.1	79	20	0.64	5.21	143
30D	2430	26	0.0107	97.1	85	18	0.94	7.58	231
31D	1900	62	0.0326	52.0	77	10	0.56	2.40	132
32D	4140	83	0.0200	126.9	79	22	0.64	6.74	168
33D	3650	74	0.0203	93.9	79	20	0.64	4.99	137
34D	3180	76	0.0239	137.5	82	16	0.78	8.90	306 } 317
35D	5200	100	0.0192	127.3	77	26	0.56	5.88	124
36D	4300	70	0.0163	140.8	77	24	0.56	6.50	149 79
37D	3850	86	0.0223	102.5	77	20	0.56	4.74	130
38D	3100	58	0.0187	131.5	77	18	0.56	6.07	186 84
39D	2670	50	0.0187	52.2	77	16	0.56	2.41	83
40D	2750	50	0.0182	64.5	77	16	0.56	2.98	102

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HYDROGRAPH FOR AREA 32D

BASIN LENGTH, (FT)	=	4140.
DIFFERENCE IN ELEVATION ACROSS BASIN	=	83.
SLOPE OF BASIN, (FT/FT)	=	.0200
AREA OF BASIN, (ACRES)	=	126.9
AREA OF BASIN, (SQ MI)	=	.1982
100-YR, 6-HR RAINFALL, (INCHES)	=	2.20
COMPOSITE CURVE NO.	=	79.00
DIRECT RUNOFF (INCHES)	=	.64
TIME OF CONCENTRATION (KIRPICH EQN.)	=	21.42
TIME TO PEAK (NEAREST EVEN MINUTE)	=	22
VOLUME OF RUNOFF (ACRE-FT)	=	6.739
PEAK RUNOFF (CFS)	=	168.43
PEAK RUNOFF PER ACRE (CFS/ACRE)	=	1.33

POINT	t/Tp (min/min)	t (min)	y (cfs/cfs)	Q (cfs)
1	.0	.0	.000	.00
2	.1	2.2	.030	5.05
3	.2	4.4	.100	16.84
4	.3	6.6	.190	32.00
5	.4	8.8	.310	52.21
6	.5	11.0	.470	79.16
7	.6	13.2	.660	111.16
8	.7	15.4	.820	138.11
9	.8	17.6	.930	156.64
10	.9	19.8	.990	166.75
11	1.0	22.0	1.000	168.43
12	1.1	24.2	.990	166.75
13	1.2	26.4	.930	156.64
14	1.3	28.6	.860	144.85
15	1.4	30.8	.780	131.38
16	1.5	33.0	.680	114.53
17	1.6	35.2	.560	94.32
18	1.7	37.4	.460	77.48
19	1.8	39.6	.390	65.69
20	1.9	41.8	.330	55.58
21	2.0	44.0	.280	47.16
22	2.2	48.4	.207	34.87
23	2.4	52.8	.147	24.76
24	2.6	57.2	.107	18.02
25	2.8	61.6	.077	12.97
26	3.0	66.0	.055	9.26
27	3.2	70.4	.040	6.74
28	3.4	74.8	.029	4.88
29	3.6	79.2	.021	3.54
30	3.8	83.6	.015	2.53
31	4.0	88.0	.011	1.85
32	4.5	99.0	.005	.84
33	5.0	110.0	.000	.00

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HYDROGRAPH FOR AREA 33D

BASIN LENGTH, (FT)	=	3650.
DIFFERENCE IN ELEVATION ACROSS BASIN	=	74.
SLOPE OF BASIN, (FT/FT)	=	.0203
AREA OF BASIN, (ACRES)	=	93.9
AREA OF BASIN, (SQ MI)	=	.1467
100-YR, 6-HR RAINFALL, (INCHES)	=	2.20
COMPOSITE CURVE NO.	=	79.00
DIRECT RUNOFF (INCHES)	=	.64
TIME OF CONCENTRATION (KIRPICH EQN.)	=	19.36
TIME TO PEAK (NEAREST EVEN MINUTE)	=	20
VOLUME OF RUNOFF (ACRE-FT)	=	4.987
PEAK RUNOFF (CFS)	=	137.11
PEAK RUNOFF PER ACRE (CFS/ACRE)	=	1.46

POINT	t/Tp (min/min)	t (min)	Y (cfs/cfs)	Q (cfs)
1	.0	.0	.000	.00
2	.1	2.0	.030	4.11
3	.2	4.0	.100	13.71
4	.3	6.0	.190	26.05
5	.4	8.0	.310	42.50
6	.5	10.0	.470	64.44
7	.6	12.0	.660	90.49
8	.7	14.0	.820	112.43
9	.8	16.0	.930	127.51
10	.9	18.0	.990	135.74
11	1.0	20.0	1.000	137.11
12	1.1	22.0	.990	135.74
13	1.2	24.0	.930	127.51
14	1.3	26.0	.860	117.92
15	1.4	28.0	.780	106.95
16	1.5	30.0	.680	93.24
17	1.6	32.0	.560	76.78
18	1.7	34.0	.460	63.07
19	1.8	36.0	.390	53.47
20	1.9	38.0	.330	45.25
21	2.0	40.0	.280	38.39
22	2.2	44.0	.207	28.38
23	2.4	48.0	.147	20.16
24	2.6	52.0	.107	14.67
25	2.8	56.0	.077	10.56
26	3.0	60.0	.055	7.54
27	3.2	64.0	.040	5.48
28	3.4	68.0	.029	3.98
29	3.6	72.0	.021	2.88
30	3.8	76.0	.015	2.06
31	4.0	80.0	.011	1.51
32	4.5	90.0	.005	.69
33	5.0	100.0	.000	.00

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HYDROGRAPH FOR AREA 34D

BASIN LENGTH, (FT)	=	3180.
DIFFERENCE IN ELEVATION ACROSS BASIN	=	76.
SLOPE OF BASIN, (FT/FT)	=	.0239
AREA OF BASIN, (ACRES)	=	137.5
AREA OF BASIN, (SQ MI)	=	.2149
100-YR, 6-HR RAINFALL, (INCHES)	=	2.20
COMPOSITE CURVE NO.	=	82.00
DIRECT RUNOFF (INCHES)	=	.78
TIME OF CONCENTRATION (KIRPICH EQN.)	=	16.34
TIME TO PEAK (NEAREST EVEN MINUTE)	=	16
VOLUME OF RUNOFF (ACRE-FT)	=	8.900
PEAK RUNOFF (CFS)	=	305.85
PEAK RUNOFF PER ACRE (CFS/ACRE)	=	2.22

POINT	t/Tp (min/min)	t (min)	y (cfs/cfs)	Q (cfs)
1	.0	.0	.000	.00
2	.1	1.6	.030	9.18
3	.2	3.2	.100	30.59
4	.3	4.8	.190	58.11
5	.4	6.4	.310	94.81
6	.5	8.0	.470	143.75
7	.6	9.6	.660	201.86
8	.7	11.2	.820	250.80
9	.8	12.8	.930	284.44
10	.9	14.4	.990	302.79
11	1.0	16.0	1.000	305.85
12	1.1	17.6	.990	302.79
13	1.2	19.2	.930	284.44
14	1.3	20.8	.860	263.03
15	1.4	22.4	.780	238.56
16	1.5	24.0	.680	207.98
17	1.6	25.6	.560	171.28
18	1.7	27.2	.460	140.69
19	1.8	28.8	.390	119.28
20	1.9	30.4	.330	100.93
21	2.0	32.0	.280	85.64
22	2.2	35.2	.207	63.31
23	2.4	38.4	.147	44.96
24	2.6	41.6	.107	32.73
25	2.8	44.8	.077	23.55
26	3.0	48.0	.055	16.82
27	3.2	51.2	.040	12.23
28	3.4	54.4	.029	8.87
29	3.6	57.6	.021	6.42
30	3.8	60.8	.015	4.59
31	4.0	64.0	.011	3.36
32	4.5	72.0	.005	1.53
33	5.0	80.0	.000	.00

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HYDROGRAPH FOR AREA 35D

BASIN LENGTH, (FT)	=	5200.
DIFFERENCE IN ELEVATION ACROSS BASIN	=	100.
SLOPE OF BASIN, (FT/FT)	=	.0192
AREA OF BASIN, (ACRES)	=	127.3
AREA OF BASIN, (SQ MI)	=	.1990
100-YR, 6-HR RAINFALL, (INCHES)	=	2.20
COMPOSITE CURVE NO.	=	77.00
DIRECT RUNOFF (INCHES)	=	.56
TIME OF CONCENTRATION (KIRPICH EQN.)	=	25.95
TIME TO PEAK (NEAREST EVEN MINUTE)	=	26
VOLUME OF RUNOFF (ACRE-FT)	=	5.883
PEAK RUNOFF (CFS)	=	124.43
PEAK RUNOFF PER ACRE (CFS/ACRE)	=	.98

POINT	t/Tp (min/min)	t (min)	y (cfs/cfs)	Q (cfs)
1	.0	.0	.000	.00
2	.1	2.6	.030	3.73
3	.2	5.2	.100	12.44
4	.3	7.8	.190	23.64
5	.4	10.4	.310	38.57
6	.5	13.0	.470	58.48
7	.6	15.6	.660	82.12
8	.7	18.2	.820	102.03
9	.8	20.8	.930	115.72
10	.9	23.4	.990	123.18
11	1.0	26.0	1.000	124.43
12	1.1	28.6	.990	123.18
13	1.2	31.2	.930	115.72
14	1.3	33.8	.860	107.01
15	1.4	36.4	.780	97.05
16	1.5	39.0	.680	84.61
17	1.6	41.6	.560	69.68
18	1.7	44.2	.460	57.24
19	1.8	46.8	.390	48.53
20	1.9	49.4	.330	41.06
21	2.0	52.0	.280	34.84
22	2.2	57.2	.207	25.76
23	2.4	62.4	.147	18.29
24	2.6	67.6	.107	13.31
25	2.8	72.8	.077	9.58
26	3.0	78.0	.055	6.84
27	3.2	83.2	.040	4.98
28	3.4	88.4	.029	3.61
29	3.6	93.6	.021	2.61
30	3.8	98.8	.015	1.87
31	4.0	104.0	.011	1.37
32	4.5	117.0	.005	.62
33	5.0	130.0	.000	.00

BOYLE ENGINEERING CORPORATION
TUE, MAR 13, 1984, 8:52 AM

AMOLE DEL NORTE STORM DIVERSION FACILITY

HYDROGRAPH FOR AREA 36D

BASIN LENGTH, (FT)	=	4300.
DIFFERENCE IN ELEVATION ACROSS BASIN	=	70.
SLOPE OF BASIN, (FT/FT)	=	.0163
AREA OF BASIN, (ACRES)	=	140.8
AREA OF BASIN, (SQ MI)	=	.2200
100-YR, 6-HR RAINFALL, (INCHES)	=	2.20
COMPOSITE CURVE NO.	=	77.00
DIRECT RUNOFF (INCHES)	=	.56
TIME OF CONCENTRATION (KIRPICH EQN.)	=	23.90
TIME TO PEAK (NEAREST EVEN MINUTE)	=	24
VOLUME OF RUNOFF (ACRE-FT)	=	6.504
PEAK RUNOFF (CFS)	=	149.01
PEAK RUNOFF PER ACRE (CFS/ACRE)	=	1.06

POINT	t/Tp (min/min)	t (min)	y (cfs/cfs)	Q (cfs)
1	.0	.0	.000	.00
2	.1	2.4	.030	4.47
3	.2	4.8	.100	14.90
4	.3	7.2	.190	28.31
5	.4	9.6	.310	46.19
6	.5	12.0	.470	70.04
7	.6	14.4	.660	98.35
8	.7	16.8	.820	122.19
9	.8	19.2	.930	138.58
10	.9	21.6	.990	147.52
11	1.0	24.0	1.000	149.01
12	1.1	26.4	.990	147.52
13	1.2	28.8	.930	138.58
14	1.3	31.2	.860	128.15
15	1.4	33.6	.780	116.23
16	1.5	36.0	.680	101.33
17	1.6	38.4	.560	83.45
18	1.7	40.8	.460	68.55
19	1.8	43.2	.390	58.12
20	1.9	45.6	.330	49.17
21	2.0	48.0	.280	41.72
22	2.2	52.8	.207	30.85
23	2.4	57.6	.147	21.91
24	2.6	62.4	.107	15.94
25	2.8	67.2	.077	11.47
26	3.0	72.0	.055	8.20
27	3.2	76.8	.040	5.96
28	3.4	81.6	.029	4.32
29	3.6	86.4	.021	3.13
30	3.8	91.2	.015	2.24
31	4.0	96.0	.011	1.64
32	4.5	108.0	.005	.75
33	5.0	120.0	.000	.00

BOYLE ENGINEERING CORPORATION
TUE, MAR 13, 1984, 8:52 AM

AMOLE DEL NORTE STORM DIVERSION FACILITY

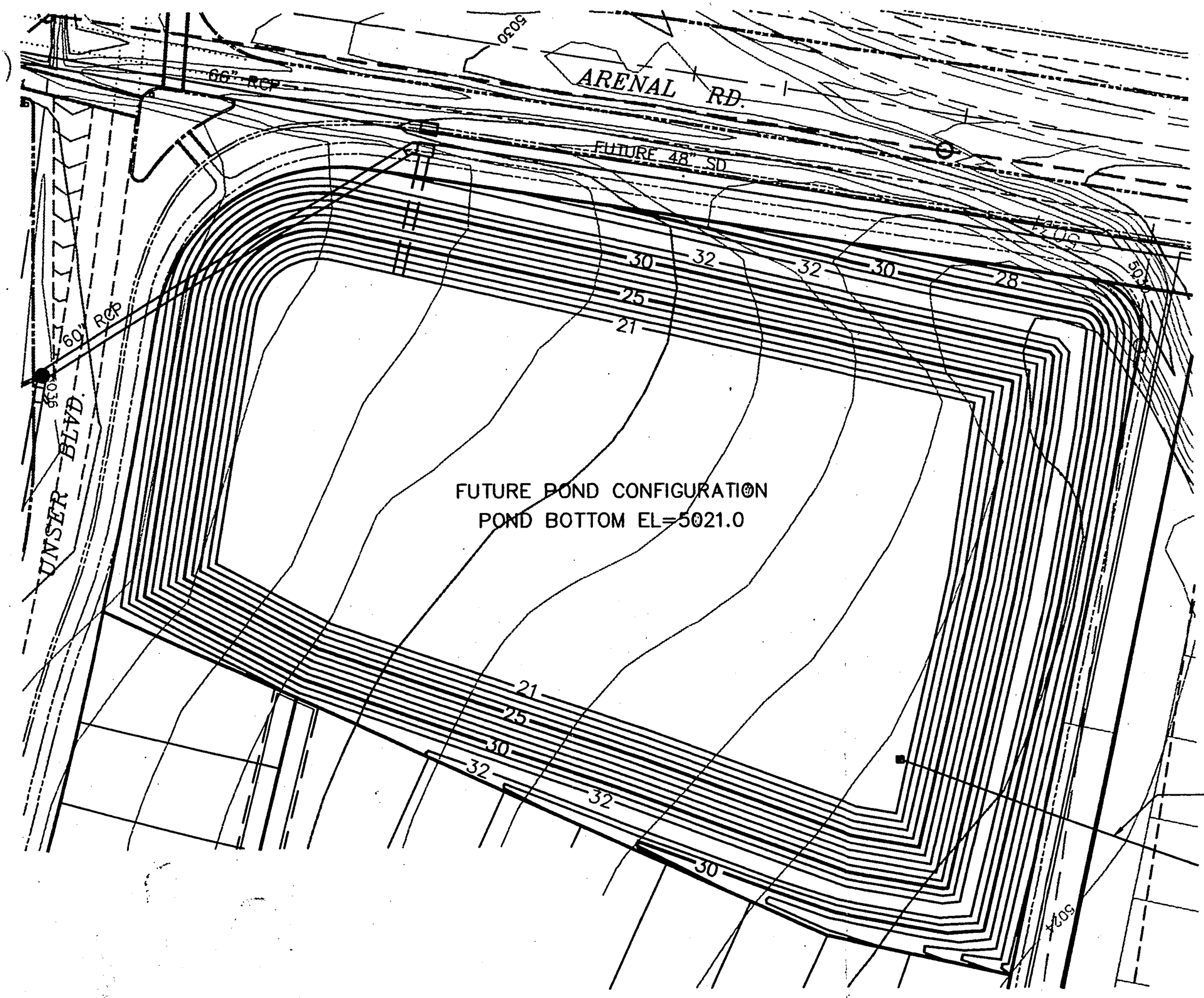
HYDROGRAPH FOR AREA 38D

BASIN LENGTH, (FT)	=	3100.
DIFFERENCE IN ELEVATION ACROSS BASIN	=	58.
SLOPE OF BASIN, (FT/FT)	=	.0187
AREA OF BASIN, (ACRES)	=	131.5
AREA OF BASIN, (SQ MI)	=	.2054
100-YR, 6-HR RAINFALL, (INCHES)	=	2.20
COMPOSITE CURVE NO.	=	77.00
DIRECT RUNOFF (INCHES)	=	.56
TIME OF CONCENTRATION (KIRPICH EQN.)	=	17.61
TIME TO PEAK (NEAREST EVEN MINUTE)	=	18
VOLUME OF RUNOFF (ACRE-FT)	=	6.074
PEAK RUNOFF (CFS)	=	185.56
PEAK RUNOFF PER ACRE (CFS/ACRE)	=	1.41

POINT	t/Tp (min/min)	t (min)	y (cfs/cfs)	Q (cfs)
1	.0	.0	.000	.00
2	.1	1.8	.030	5.57
3	.2	3.6	.100	18.56
4	.3	5.4	.190	35.26
5	.4	7.2	.310	57.52
6	.5	9.0	.470	87.21
7	.6	10.8	.660	122.47
8	.7	12.6	.820	152.16
9	.8	14.4	.930	172.57
10	.9	16.2	.990	183.70
11	1.0	18.0	1.000	185.56
12	1.1	19.8	.990	183.70
13	1.2	21.6	.930	172.57
14	1.3	23.4	.860	159.58
15	1.4	25.2	.780	144.74
16	1.5	27.0	.680	126.18
17	1.6	28.8	.560	103.91
18	1.7	30.6	.460	85.36
19	1.8	32.4	.390	72.37
20	1.9	34.2	.330	61.23
21	2.0	36.0	.280	51.96
22	2.2	39.6	.207	38.41
23	2.4	43.2	.147	27.28
24	2.6	46.8	.107	19.85
25	2.8	50.4	.077	14.29
26	3.0	54.0	.055	10.21
27	3.2	57.6	.040	7.42
28	3.4	61.2	.029	5.38
29	3.6	64.8	.021	3.90
30	3.8	68.4	.015	2.78
31	4.0	72.0	.011	2.04
32	4.5	81.0	.005	.93
33	5.0	90.0	.000	.00

APPENDIX E

Design of the Temporary Detention Pond



SCALE: 1"=60'

TEMPORARY RETENTION POND

EL (ft)	H (ft)	AREA (Ac)	STORAGE (AF)
21	0	1.85	0
22	1	1.96	1.91
23	2	2.07	3.93
24	3	2.18	6.06
25	4	2.30	8.30
26	5	2.42	10.66
27	6	2.54	13.14
28	7	2.66	15.74
29	8	2.79	18.47
30	9	2.92	21.33
31	10	3.05	24.32
32	11	3.18	27.44

PEAK DISCHARGE TO POND: Q_{100}= 880cfs
Q_{10} = 475cfs

PEAK DISCHARGE= 190cfs
MAX. WATER SURFACE ELEV= 26.79'

4" PVC DRAIN LINE. INV= 16.0,
RUN OUT @ S= 0.01 ft/ft TO DAYLIGHT

ISAACSON & ARFMAN, P.A.
Consulting Engineering Associates
128 Monroe Street N.E.
Albuquerque *New Mexico*

903EXH16.DWGdlv 6/12/97

APPENDIX F

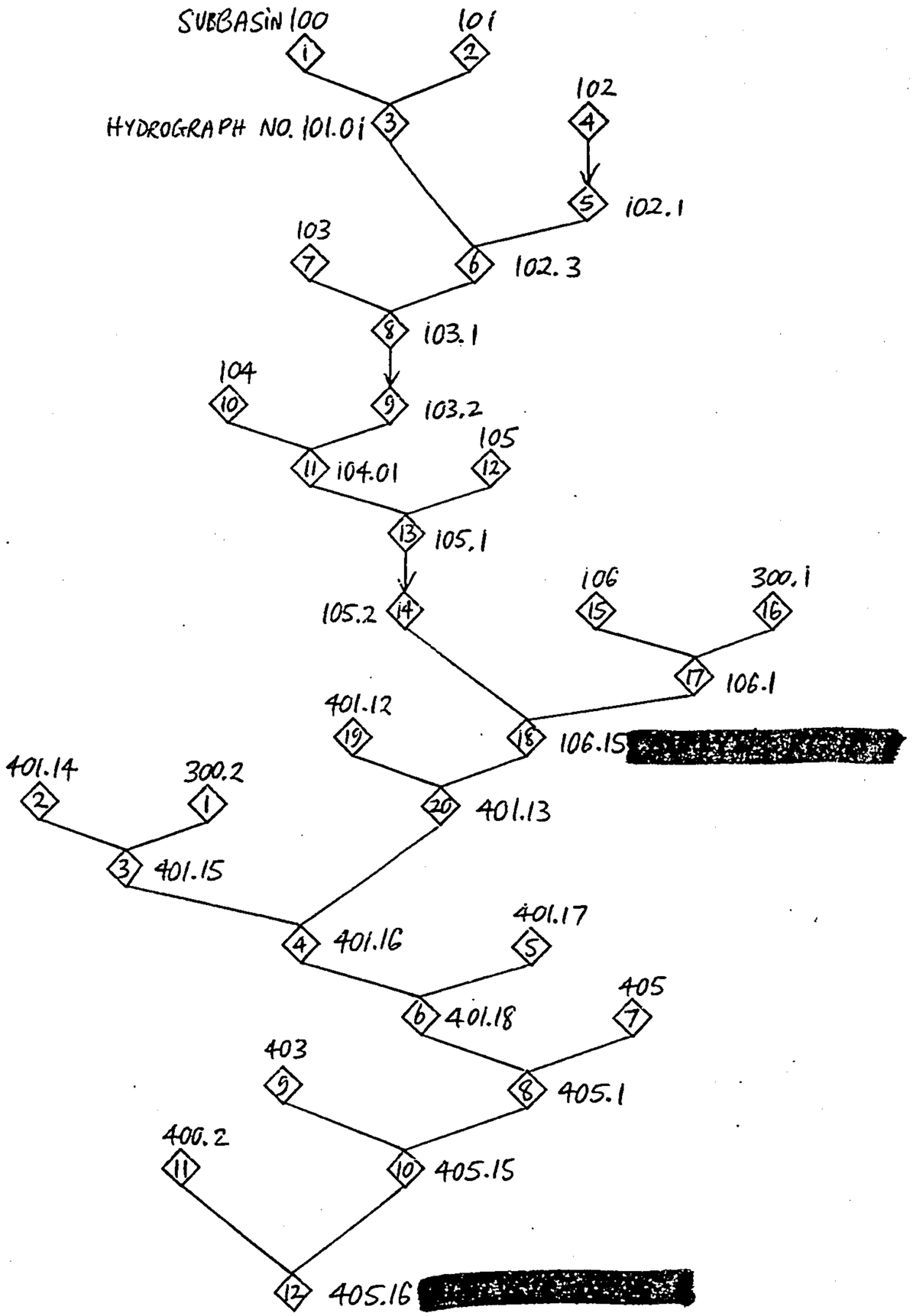
AHYMO Summary & Output

ONSITE/OFFSITE

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/16/1997
INPUT FILE = sunrise.dat USER NO.= ISCARFNM.I01

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION	PAGE = 1
*S	SUNRISE.DAT										
*S	REVISED BY: JMN 6/04/97										
START										TIME=	.00
RAINFALL TYPE= 1										RAIN6=	2.200
*S BASIN 100 IS CURRENTLY UNDEVELOPED, ASSUME FUTURE DEVELOPMENT WILL											
*S BE @ A DENSITY OF 4 DU/AC											
COMPUTE NM HYD	100.00	-	1	.07150	148.70	4.952	1.29860	1.500	3.250	PER IMP=	42.00
*S BASIN 101 IS FULLY DEVELOPED WITH SINGLE FAMILY RESIDENTIAL HOMES											
*S WITH A DENSTIY OF 4 DU/AC											
COMPUTE NM HYD	101.00	-	2	.03700	60.90	1.988	1.00753	1.500	2.572	PER IMP=	29.00
ADD HYD	101.01	1& 2	3	.10850	209.60	6.940	1.19933	1.500	3.018		
*S **AREA 102 IS A MIDDLE SCHOOL (ONSITE DETENTION TO REDUCE RUNOFF)											
COMPUTE NM HYD	102.00	-	4	.04000	33.21	.937	.43925	1.533	1.297	PER IMP=	.00
*S ROUTE THE SCHOOL'S RUNOFF IN A 28' F-F RESIDENTIAL STREET, S=2%											
*S ASSUME SECTION EXTENDS TO THE ROW LINE ON BOTH SIDES											
ROUTE	102.10	4	5	.04000	32.41	.937	.43927	1.567	1.266		
*S ADD THE ROUTED FLOW FROM 102 TO THE EARLIER TOTAL											
ADD HYD	102.30	3& 5	6	.14850	236.14	7.877	.99460	1.500	2.485		
*S **BASIN 103 IS COMPLETELY DEVELOPED											
COMPUTE NM HYD	103.00	-	7	.04400	72.42	2.364	1.00753	1.500	2.572	PER IMP=	29.00
*S ADD 103 TO TOTAL											
ADD HYD	103.10	6& 7	8	.19250	308.56	10.242	.99755	1.500	2.505		
*S **ASSUME FLOW IS ROUTED IN 28' STREET AS EARLIER											
ROUTE	103.20	8	9	.19250	293.93	10.242	.99756	1.533	2.386		
*S **AREA 104 IS FULLY DEVELOPED											
COMPUTE NM HYD	104.00	-	10	.04400	72.42	2.364	1.00753	1.500	2.572	PER IMP=	29.00
*S ADD THE FLOW TO THE TOTAL											
ADD HYD	104.01	9&10	11	.23650	364.94	12.606	.99941	1.533	2.411		
*S AREA 105 IS A PARK & COA WELL SITE											
COMPUTE NM HYD	105.00	-	12	.02100	29.05	.849	.75825	1.500	2.161	PER IMP=	7.00
ADD HYD	105.10	11&12	13	.25750	393.90	13.455	.97974	1.533	2.390		
*S ROUTE THE FLOW TO THE EXISTING END OF SAPPHIRE ST.											
ROUTE	105.20	13	14	.25750	364.47	13.455	.97974	1.567	2.212		
*S AREA 106 IS FULLY DEVELOPED											
COMPUTE NM HYD	106.00	-	15	.02177	35.84	1.170	1.00753	1.500	2.572	PER IMP=	29.00
*S BASIN 300.1 IS CURRENTLY UNDEVELOPED, ASSUME FUTURE DEVELOPMENT WILL BE @											
*S A DENSITY OF 4 DU/AC											
COMPUTE NM HYD	300.10	-	16	.01560	32.45	1.080	1.29860	1.500	3.250	PER IMP=	42.00
*S **ADD THE FLOWS FROM BASINS 106 AND 300.1											
ADD HYD	106.10	15&16	17	.03737	68.29	2.250	1.12902	1.500	2.855		
*S ** [redacted]											
ADD HYD	106.15	14&17	18	.29487	423.63	15.705	.99866	1.567	2.245		
*S **BASIN 401.12, 401.14, 401.17, 300.2 AND 400.2 DRAINS TO SAPPHIRE ST.											
*S **BASIN 401.12 IS PART OF SUNRISE ESTATES UNIT 1											
COMPUTE NM HYD	401.12	-	19	.01126	23.43	.780	1.29860	1.500	3.251	PER IMP=	42.00
*S **ADD THE FLOWS FROM HYDROGRAPH NO 401.12 AND 106.15											
ADD HYD	401.13	19&18	20	.30613	443.65	16.485	1.00969	1.567	2.264		
*S **BASIN 300.2 IS CURRENTLY UNDEVELOPED, ASSUME FUTURE DEVELOPMENT WILL BE											
*S @ A DENSITY OF 4 DU/AC											

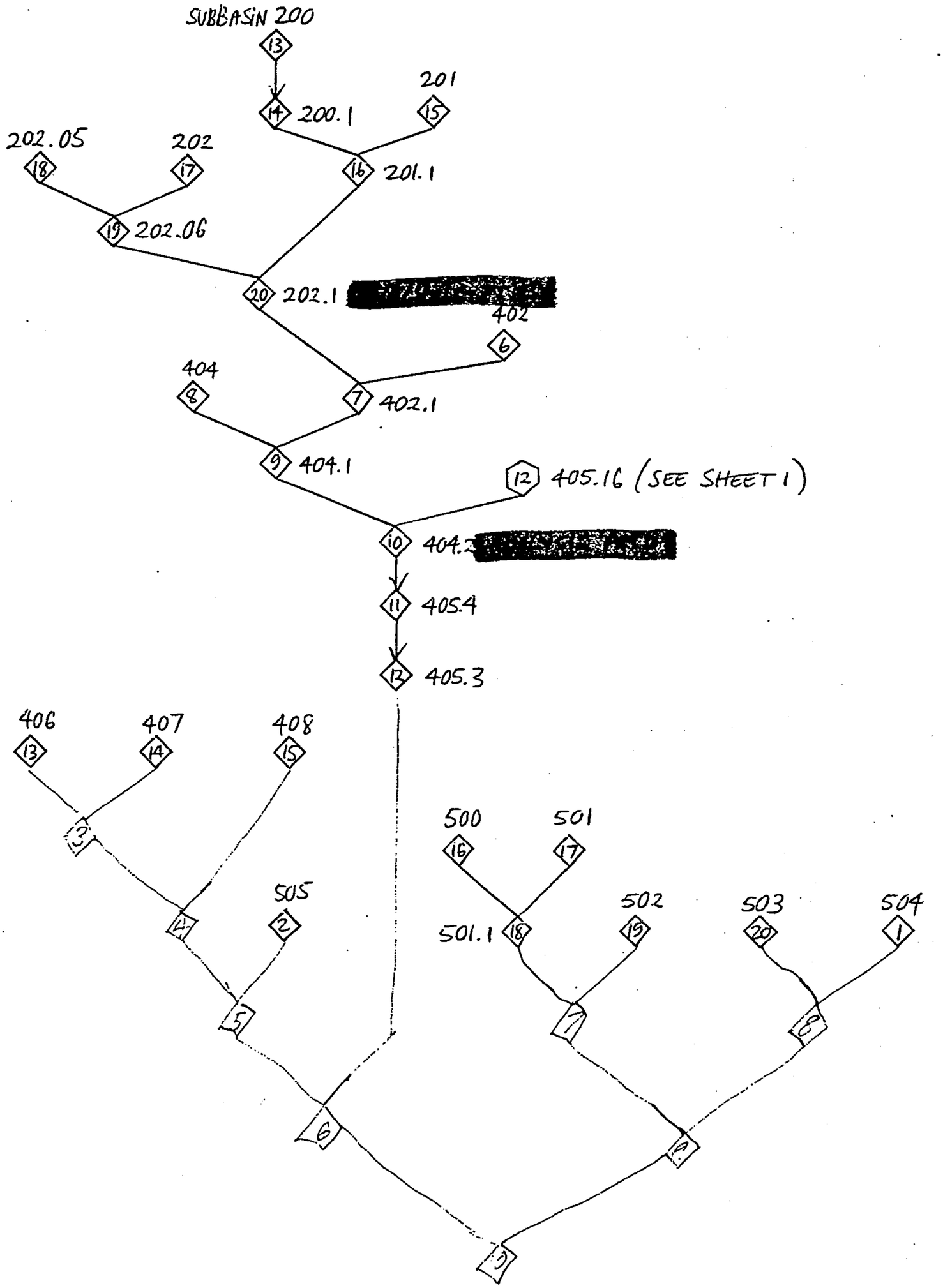
SUBBASINS FLOWCHART



ISAACSON & ARFMAN, P.A.

SUBJECT SUNRISE ESTATES UNIT 2 JOB NO.

BY JMN DATE 6/97 SHEET NO. 1 OF 2



ISAACSON & ARFMAN, P.A.

SUBJECT _____ JOB NO. ____

BY _____ DATE _____ SHEET NO. 2 OF 2

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
COMPUTE NM HYD	300.20	-	1	.01180	24.55	.817	1.29859	1.500	3.251	PER IMP= 42.00
*S ** BASIN 401.14 IS PART OF SUNRISE ESTATES UNIT 1										
COMPUTE NM HYD	401.14	-	2	.01117	23.24	.774	1.29860	1.500	3.251	PER IMP= 42.00
*S **ADD FLOWS FROM HYDROGRAPH NO 401.14 AND 300.2										
ADD HYD	401.15	1& 2	3	.02297	47.79	1.591	1.29857	1.500	3.251	
*S **ADD FLOWS FROM HYDROGRAPH NO 401.15 AND 401.13										
ADD HYD	401.16	3&20	4	.32910	484.48	18.076	1.02985	1.567	2.300	
*S **BASIN 401.17 IS PART OF SUNRISE ESTATES UNIT 1										
COMPUTE NM HYD	401.17	-	5	.00661	13.76	.458	1.29860	1.500	3.252	PER IMP= 42.00
*S **ADD FLOWS FROM HYDROGRAPH NO 401.16 AND 401.17										
ADD HYD	401.18	4& 5	6	.33571	496.23	18.534	1.03514	1.567	2.310	
*S ** BASIN 405 DRAINS TO SAPPHIRE ST.										
COMPUTE NM HYD	405.00	-	7	.01393	29.33	.982	1.32159	1.500	3.289	PER IMP= 44.00
*S **ADD FLOWS FROM HYDROGRAPH NO 401.18 AND 405										
ADD HYD	405.10	6& 7	8	.34964	521.25	19.516	1.04656	1.567	2.329	
*S ** BASIN 403 DRAINS TO SAPPHIRE ST.										
COMPUTE NM HYD	403.00	-	9	.01480	30.79	1.025	1.29860	1.500	3.250	PER IMP= 42.00
*S **ADD FLOWS FROM HYDROGRAPH NO 405.1 AND 403										
ADD HYD	405.15	8& 9	10	.36444	547.55	20.541	1.05679	1.567	2.348	
*S ** BASIN 400.2 IS CURRENTLY UNDEVELOPED, ASSUME FUTURE DEVELOPMENT WILL BE										
*S @ A DENSITY OF 4 DU/AC										
COMPUTE NM HYD	400.20	-	11	.03222	67.80	2.271	1.32159	1.500	3.288	PER IMP= 44.00
*S **ADD FLOWS FROM HYDROGRAPH NO 405.15 AND 400.2 TOGETHER TO GET [redacted]										
*S [redacted]										
ADD HYD	405.16	10&11	12	.39666	607.35	22.812	1.07830	1.533	2.392	
*S**********										
*S**********										
*S **BASINS 200,201, & 202 DRAIN TO KIMELA DR										
COMPUTE NM HYD	200.00	-	13	.05300	87.23	2.848	1.00753	1.500	2.572	PER IMP= 29.00
*S **ROUTE FLOW TO THE END OF KIMELA DR.										
ROUTE	200.10	13	14	.05300	86.94	2.848	1.00753	1.533	2.563	
COMPUTE NM HYD	201.00	-	15	.02600	42.80	1.397	1.00753	1.500	2.572	PER IMP= 29.00
ADD HYD	201.10	15&14	16	.07900	128.91	4.245	1.00752	1.533	2.550	
*S **BASIN 202 IS AN ELEMENTARY SCHOOL (ONSITE DETENTION TO REDUCE RUNOFF)										
COMPUTE NM HYD	202.00	-	17	.00925	7.69	.217	.43925	1.533	1.298	PER IMP= .00
*S **BASIN 202.05 IS THE ELEMENTARY SCHOOL PARKING LOT THAT WILL DRAIN TO KIMELA										
COMPUTE NM HYD	202.05	-	18	.00375	10.49	.393	1.96548	1.500	4.373	PER IMP= 100.00
*S **ADD THE BASINS OF THE ELEMENTARY SCHOOL AND PARKING LOT										
ADD HYD	202.06	17&18	19	.01300	18.01	.610	.87913	1.500	2.164	
*S **ADD THE BASINS TOGETHER TO GET [redacted]										
ADD HYD	202.10	16&19	20	.09200	146.56	4.855	.98938	1.533	2.489	
*S**********										
*S**********										
*S **BASINS 402 THRU 404 ARE CURRENTLY UNDEVELOPED, FOR PURPOSES										
*S OF THIS REPORT, ASSUME ALL BASINS WILL BE BUILT OUT @ THEIR CURRENT										
*S ZONING										
*S **BASIN 402 IS UNIT 2 OF SUNRISE ESTATES										
COMPUTE NM HYD	402.00	-	6	.05200	108.14	3.601	1.29860	1.500	3.249	PER IMP= 42.00
*S **ADD BASIN 402 TO THE TOTAL FLOW @ THE END OF EXTENDED KIMELA										
ADD HYD	402.10	20& 6	7	.14400	251.21	8.456	1.10104	1.533	2.726	
COMPUTE NM HYD	404.00	-	8	.01080	22.47	.748	1.29860	1.500	3.251	PER IMP= 42.00
*S **ADD FLOW TO THAT IN KIMELA DR										

```
                                FROM  TO                    PEAK        RUNOFF                    TIME TO   CFS
                   HYDROGRAPH   ID    ID        AREA      DISCHARGE    VOLUME      RUNOFF         PEAK     PER
COMMAND          IDENTIFICATION NO.  NO.      (SQ MI)      (CFS)      (AC-FT)    (INCHES)      (HOURS)   ACRE      NOTATION

ADD HYD              404.10  7& 8   9         .15480      272.95       9.204      1.11482       1.533    2.755
*S **ADD TO [redacted]
ADD HYD              404.20  9&12   10 352.9  .55146      880.30      32.016      1.08855       1.533    2.494
*S DESIGN A RETENTION FACILITY TO REDUCE TO FLOW TO THAT WHICH WILL
*S FIT IN A 48" RCP @ S=1.8%
ROUTE RESERVOIR      405.40  10     11        .55146      190.04      32.016      1.08855       1.966     .538 AC-FT=   18.136
*S ROUTE FLOW FROM THE DETENTION POND TO THE AMOLE DEL NORTE CHANNEL
ROUTE                405.30  11     12        .55146      190.02      32.016      1.08855       2.000     .538
*S*************************************************************************
*S*************************************************************************
*S **CALC BASIN 406
COMPUTE NM HYD       406.00  -      13 36.8   .05743      117.49       3.920      1.27968       1.500    3.196 PER IMP=   42.00
*S **CALC BASIN 407
COMPUTE NM HYD       407.00  -      14 32.3   .05040      104.81       3.491      1.29860       1.500    3.249 PER IMP=   42.00
*S **CALC BASIN 408
COMPUTE NM HYD       408.00  -      15 190.7  .15736      327.60      10.899      1.29860       1.500    3.253 PER IMP=   42.00
*S*************************************************************************
*S*************************************************************************
*S **BASIN 500 IS UNIT ONE OF THE PROPOSED LONGFORD SD
COMPUTE NM HYD       500.00  -      16        .02491       51.80       1.725      1.29860       1.500    3.250 PER IMP=   42.00
*S **BASIN 501 IS THE AREA PROPOSED AS FUTURE LONGFORD SD DRAINING
*S **DIRECTLY TO THE AMOLE CHANNEL
COMPUTE NM HYD       501.00  -      17        .03663       76.18       2.537      1.29860       1.500    3.249 PER IMP=   42.00
*S **COMBINE BASINS 500 AND 501 TOGETHER TO REPRESENT THE NORTHERN PART OF THE
*S **LONGFORD SD
ADD HYD              501.10 16&17   18        .06154      127.98       4.262      1.29859       1.500    3.250
*S **BASIN 502 IS THE SOUTHERN PART OF THE LONGFORD SD
COMPUTE NM HYD       502.00  -      19        .05788      121.79       4.080      1.32159       1.500    3.288 PER IMP=   44.00
*S **BASIN 503 IS CURRENTLY UNDEVELOPED, ASSUME FUTURE DEVELOPMENT WILL BE @ A DENSITY OF 4 DU/AC THE DISCHARGE FROM THIS BASIN
*S **DRAINS TO THE AMOLE DEL NORTE CHANNEL AND DOES NOT AFFECT THE ARENAL/UNSER DRAINAGE MANAGEMENT SITE.
COMPUTE NM HYD       503.00  -      20        .03752       78.03       2.599      1.29860       1.500    3.249 PER IMP=   42.00
*S*************************************************************************
*S **BASIN 504 IS CURRENTLY UNDEVELOPED, ASSUME FUTURE DEVELOPMENT WILL BE @
*S **A DENSITY OF 4 DU/AC
COMPUTE NM HYD       504.00  -      1         .03667       77.16       2.585      1.32159       1.500    3.288 PER IMP=   44.00
*S **BASIN 505 IS FULLY DEVELOPED AND DRAINS SOUTH TO BLAKE RD.
COMPUTE NM HYD       505.00  -      2         .02618       43.10       1.407      1.00753       1.500    2.572 PER IMP=   29.00
FINISH
```

```
AHYMO PROGRAM (AHYMO194) - AMAFCA Hydrologic Model - January, 1994
     RUN DATE (MON/DAY/YR) = 06/16/1997
     START TIME (HR:MIN:SEC) = 11:10:21     USER NO.= ISCARFNM.I01
     INPUT FILE = sunrise.dat

*S                  SUNRISE.DAT
*S                  REVISED BY: JMN 6/04/97
*
START               RAINFALL BEGINS AT 0.0 HRS
RAINFALL            TYPE=1 RAIN QUARTER=0 RAIN ONE=1.87
                    RAIN SIX=2.20 RAIN DAY=2.66 DT=0.03333HR

               COMPUTED 6-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2 - PEAK AT 1.40 HR.
               DT =     .033330 HOURS       END TIME =     5.999400 HOURS
                  .0000   .0016   .0033   .0050   .0067   .0085   .0103
                  .0122   .0141   .0160   .0180   .0201   .0222   .0243
                  .0266   .0289   .0312   .0337   .0362   .0388   .0415
                  .0443   .0472   .0502   .0534   .0567   .0601   .0637
                  .0675   .0715   .0758   .0809   .0865   .0924   .1050
                  .1334   .1771   .2398   .3254   .4379   .5814   .7600
                  .9780  1.1804  1.2649  1.3363  1.3997  1.4575  1.5106
                 1.5600  1.6061  1.6493  1.6900  1.7284  1.7646  1.7989
                 1.8314  1.8623  1.8915  1.9193  1.9456  1.9518  1.9576
                 1.9630  1.9682  1.9732  1.9780  1.9825  1.9869  1.9912
                 1.9953  1.9993  2.0031  2.0068  2.0104  2.0140  2.0174
                 2.0207  2.0240  2.0272  2.0303  2.0333  2.0363  2.0392
                 2.0420  2.0448  2.0475  2.0502  2.0528  2.0554  2.0580
                 2.0605  2.0629  2.0653  2.0677  2.0700  2.0723  2.0746
                 2.0768  2.0790  2.0812  2.0833  2.0855  2.0875  2.0896
                 2.0916  2.0936  2.0956  2.0976  2.0995  2.1014  2.1033
                 2.1051  2.1070  2.1088  2.1106  2.1124  2.1141  2.1159
                 2.1176  2.1193  2.1210  2.1227  2.1244  2.1260  2.1276
                 2.1292  2.1308  2.1324  2.1340  2.1355  2.1371  2.1386
                 2.1401  2.1416  2.1431  2.1446  2.1460  2.1475  2.1489
                 2.1504  2.1518  2.1532  2.1546  2.1560  2.1573  2.1587
                 2.1600  2.1614  2.1627  2.1640  2.1654  2.1667  2.1680
                 2.1692  2.1705  2.1718  2.1731  2.1743  2.1756  2.1768
                 2.1780  2.1792  2.1804  2.1817  2.1829  2.1840  2.1852
                 2.1864  2.1876  2.1887  2.1899  2.1910  2.1922  2.1933
                 2.1944  2.1956  2.1967  2.1978  2.1989  2.2000

*S BASIN 100 IS CURRENTLY UNDEVELOPED, ASSUME FUTURE DEVELOPMENT WILL
*S BE @ A DENSITY OF 4 DU/AC
COMPUTE NM HYD      ID=1 HYD NO=100.00 AREA=0.07150 SQ MI
                    PER A=0 PER B=29 PER C=29 PER D=42
                    TP=-0.1333 HR   MASS RAIN=-1

    K =   .072801HR    TP =   .133300HR    K/TP RATIO =   .546145     SHAPE CONSTANT, N =  7.087329
    UNIT PEAK =   118.36    CFS   UNIT VOLUME =    .9992       B =   525.38      P60 = 1.8700
    AREA =      .030030 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118190HR    TP =   .133300HR    K/TP RATIO =   .886648     SHAPE CONSTANT, N =  4.001119
    UNIT PEAK =   110.52    CFS   UNIT VOLUME =    1.000       B =   355.24      P60 = 1.8700
    AREA =      .041470 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330
```

```
PRINT HYD            ID=1   CODE=1

                                   PARTIAL HYDROGRAPH   100.00

    RUNOFF VOLUME =      1.29860 INCHES      =        4.9519 ACRE-FEET
    PEAK DISCHARGE RATE =      148.70 CFS  AT   1.500 HOURS   BASIN AREA =   .0715 SQ. MI.


*S BASIN 101 IS FULLY DEVELOPED WITH SINGLE FAMILY RESIDENTIAL HOMES
*S WITH A DENSTIY OF 4 DU/AC
COMPUTE NM HYD       ID=2 HYD NO=101.00 AREA=0.03700 SQ MI
                     PER A=33 PER B=19 PER C=19 PER D=29
                     TP=-0.1333 HR   MASS RAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   42.363    CFS   UNIT VOLUME =    .9991       B =   526.28      P60 = 1.8700
    AREA =      .010730 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .139463HR    TP =   .133300HR    K/TP RATIO =  1.046235     SHAPE CONSTANT, N =  3.374403
    UNIT PEAK =   61.299    CFS   UNIT VOLUME =    .9998       B =   311.05      P60 = 1.8700
    AREA =      .026270 SQ MI    IA =    .52958 INCHES    INF =   1.33282 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330
PRINT HYD            ID=2   CODE=1

                                   PARTIAL HYDROGRAPH   101.00

    RUNOFF VOLUME =      1.00753 INCHES      =        1.9882 ACRE-FEET
    PEAK DISCHARGE RATE =       60.90 CFS  AT   1.500 HOURS   BASIN AREA =   .0370 SQ. MI.


ADD HYD              ID=3 HYD NO=101.01 ID=1 ID=2
PRINT HYD            ID=3 CODE=1

                                   PARTIAL HYDROGRAPH   101.01

    RUNOFF VOLUME =      1.19933 INCHES      =        6.9401 ACRE-FEET
    PEAK DISCHARGE RATE =      209.60 CFS  AT   1.500 HOURS   BASIN AREA =   .1085 SQ. MI.


*S **AREA 102 IS A MIDDLE SCHOOL (ONSITE DETENTION TO REDUCE RUNOFF)
COMPUTE NM HYD       ID=4 HYD NO=102.00 AREA=0.04000 SQ MI
                     PER A=100 PER B=0 PER C=0 PER D=0
                     TP=-0.1333 HR   MASS RAIN=-1

    K =   .163684HR    TP =   .133300HR    K/TP RATIO =  1.227936     SHAPE CONSTANT, N =  2.899764
    UNIT PEAK =   82.084    CFS   UNIT VOLUME =    .9995       B =   273.54      P60 = 1.8700
    AREA =      .040000 SQ MI    IA =    .65000 INCHES    INF =   1.67000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330
```

PRINT HYD ID=4 CODE=1

PARTIAL HYDROGRAPH 102.00

RUNOFF VOLUME = .43925 INCHES = .9371 ACRE-FEET
PEAK DISCHARGE RATE = 33.21 CFS AT 1.533 HOURS BASIN AREA = .0400 SQ. MI.

*S ROUTE THE SCHOOL'S RUNOFF IN A 28' F-F RESIDENTIAL STREET, S=2%
*S ASSUME SECTION EXTENDS TO THE ROW LINE ON BOTH SIDES
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEG=1 MIN EL=100.00 MAX EL=101.00
CH SLOPE=0.02 FP SLOPE=0.02 N=0.017 DIST=48.0
DIST ELEV DIST ELEV DIST ELEV DIST ELEV
0 101.00 10.0 100.67 10.1 100.00 24.0 100.28
38.0 100.00 38.1 100.67 48.0 101.00

RATING CURVE VALLEY SECTION 1.0

WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH FT
100.00	.00	.00	.00
100.05	.14	.15	5.26
100.11	.55	.95	10.52
100.16	1.25	2.80	15.78
100.21	2.22	6.03	21.04
100.26	3.46	10.94	26.30
100.32	4.92	18.84	27.99
100.37	6.39	29.08	28.01
100.42	7.87	41.00	28.03
100.47	9.34	54.46	28.04
100.53	10.82	69.37	28.06
100.58	12.30	85.66	28.07
100.63	13.78	103.24	28.09
100.68	15.26	119.89	28.96
100.74	16.87	132.52	32.13
100.79	18.64	147.34	35.31
100.84	20.59	164.39	38.48
100.89	22.69	183.72	41.66
100.95	24.97	205.41	44.83
101.00	27.41	229.56	48.00

COMPUTE TRAVEL TIME ID=5 REACH NO=1 NO VS=1 L=650 FT SLP=0.02

TRAVEL TIME TABLE
REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.053	.138	.15	.1670
.105	.554	.95	.1052
.158	1.246	2.80	.0803
.211	2.215	6.03	.0663
.263	3.461	10.94	.0571
.316	4.920	18.84	.0472
.368	6.394	29.08	.0397

```
                    .421        7.869        41.00        .0347
                    .474        9.344        54.46        .0310
                    .526       10.821        69.37        .0282
                    .579       12.298        85.66        .0259
                    .632       13.776       103.24        .0241
                    .684       15.261       119.89        .0230
                    .737       16.869       132.52        .0230
                    .790       18.644       147.34        .0228
                    .842       20.586       164.39        .0226
                    .895       22.695       183.72        .0223
                    .947       24.971       205.41        .0219
                   1.000       27.414       229.56        .0216
ROUTE              ID=5 HYD NO=102.1 INFLOW ID=4 DT=0.0
PRINT HYD          ID=5 CODE=1

                          PARTIAL HYDROGRAPH   102.10

    RUNOFF VOLUME =      .43927 INCHES     =        .9371 ACRE-FEET
    PEAK DISCHARGE RATE =      32.41 CFS  AT   1.567 HOURS   BASIN AREA =   .0400 SQ. MI.


*S ADD THE ROUTED FLOW FROM 102 TO THE EARLIER TOTAL
ADD HYD            ID=6 HYD NO=102.3 ID=3 ID=5
PRINT HYD          ID=6 CODE=1

                          PARTIAL HYDROGRAPH   102.30

    RUNOFF VOLUME =      .99460 INCHES     =       7.8772 ACRE-FEET
    PEAK DISCHARGE RATE =     236.14 CFS  AT   1.500 HOURS   BASIN AREA =   .1485 SQ. MI.


*S **BASIN 103 IS COMPLETELY DEVELOPED
COMPUTE NM HYD     ID=7 HYD NO=103.00 AREA=0.04400 SQ MI
                   PER A=33 PER B=19 PER C=19 PER D=29
                   TP=-0.1333 HR   MASS RAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   50.377    CFS   UNIT VOLUME =    .9992       B =   526.28      P60 = 1.8700
    AREA =      .012760 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .139463HR    TP =   .133300HR    K/TP RATIO =  1.046235     SHAPE CONSTANT, N =  3.374403
    UNIT PEAK =   72.896    CFS   UNIT VOLUME =    .9999       B =   311.05      P60 = 1.8700
    AREA =      .031240 SQ MI    IA =    .52958 INCHES    INF =   1.33282 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD          ID=7   CODE=1

                          PARTIAL HYDROGRAPH   103.00
```

```
RUNOFF VOLUME =      1.00753 INCHES      =       2.3643 ACRE-FEET
PEAK DISCHARGE RATE =      72.42 CFS  AT   1.500 HOURS   BASIN AREA =   .0440 SQ. MI.


*S ADD 103 TO TOTAL
ADD HYD              ID=8 HYD NO=103.1 ID=6 ID=7
PRINT HYD            ID=8 CODE=1

                                PARTIAL HYDROGRAPH   103.10

RUNOFF VOLUME =       .99755 INCHES      =      10.2415 ACRE-FEET
PEAK DISCHARGE RATE =     308.56 CFS  AT   1.500 HOURS   BASIN AREA =   .1925 SQ. MI.


*S **ASSUME FLOW IS ROUTED IN 28' STREET AS EARLIER
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEG=1 MIN EL=100.00 MAX EL=101.00
                     CH SLOPE=0.02 FP SLOPE=0.02 N=0.017 DIST=48.0
                     DIST  ELEV  DIST  ELEV  DIST  ELEV  DIST  ELEV
                      0   101.00 10.0 100.67 10.1 100.00 24.0 100.28
                     38.0 100.00 38.1 100.67 48.0 101.00

                                RATING CURVE VALLEY SECTION  1.0
                                    WATER       FLOW        FLOW        TOP
                                   SURFACE      AREA        RATE       WIDTH
                                    ELEV        SQ FT       CFS        FT
                                   100.00         .00         .00        .00
                                   100.05         .14         .15       5.26
                                   100.11         .55         .95      10.52
                                   100.16        1.25        2.80      15.78
                                   100.21        2.22        6.03      21.04
                                   100.26        3.46       10.94      26.30
                                   100.32        4.92       18.84      27.99
                                   100.37        6.39       29.08      28.01
                                   100.42        7.87       41.00      28.03
                                   100.47        9.34       54.46      28.04
                                   100.53       10.82       69.37      28.06
                                   100.58       12.30       85.66      28.07
                                   100.63       13.78      103.24      28.09
                                   100.68       15.26      119.89      28.96
                                   100.74       16.87      132.52      32.13
                                   100.79       18.64      147.34      35.31
                                   100.84       20.59      164.39      38.48
                                   100.89       22.69      183.72      41.66
                                   100.95       24.97      205.41      44.83
                                   101.00       27.41      229.56      48.00
COMPUTE TRAVEL TIME  ID=9 REACH NO=1 NO VS=1 L=900 FT SLP=0.02

                          TRAVEL TIME TABLE
                                       REACH=  1.0
```

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.053	.138	.15	.2312
.105	.554	.95	.1457
.158	1.246	2.80	.1112
.211	2.215	6.03	.0918
.263	3.461	10.94	.0791
.316	4.920	18.84	.0653
.368	6.394	29.08	.0550
.421	7.869	41.00	.0480
.474	9.344	54.46	.0429
.526	10.821	69.37	.0390
.579	12.298	85.66	.0359
.632	13.776	103.24	.0334
.684	15.261	119.89	.0318
.737	16.869	132.52	.0318
.790	18.644	147.34	.0316
.842	20.586	164.39	.0313
.895	22.695	183.72	.0309
.947	24.971	205.41	.0304
1.000	27.414	229.56	.0299

```
    ROUTE                ID=9 HYD NO=103.2 INFLOW ID=8 DT=0.0
TRAVEL TIME TABLE EXCEEDED
    PRINT HYD            ID=9 CODE=1

                                PARTIAL HYDROGRAPH   103.20

    RUNOFF VOLUME =      .99756 INCHES     =      10.2415 ACRE-FEET
    PEAK DISCHARGE RATE =     293.93 CFS  AT   1.533 HOURS   BASIN AREA =   .1925 SQ. MI.


*S **AREA 104 IS FULLY DEVELOPED
COMPUTE NM HYD       ID=10 HYD NO=104.00 AREA=0.04400 SQ MI
                     PER A=33 PER B=19 PER C=19 PER D=29
                     TP=-0.1333 HR   MASS RAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   50.377    CFS   UNIT VOLUME =    .9992       B =   526.28      P60 = 1.8700
    AREA =      .012760 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .139463HR    TP =   .133300HR    K/TP RATIO =  1.046235     SHAPE CONSTANT, N =  3.374403
    UNIT PEAK =   72.896    CFS   UNIT VOLUME =    .9999       B =   311.05      P60 = 1.8700
    AREA =      .031240 SQ MI    IA =    .52958 INCHES    INF =   1.33282 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD            ID=10   CODE=1

                                PARTIAL HYDROGRAPH   104.00


    RUNOFF VOLUME =     1.00753 INCHES     =       2.3643 ACRE-FEET
    PEAK DISCHARGE RATE =      72.42 CFS  AT   1.500 HOURS   BASIN AREA =   .0440 SQ. MI.
```

```
*S ADD THE FLOW TO THE TOTAL
ADD HYD              ID=11 HYD NO=104.01 ID=9 ID=10
PRINT HYD            ID=11 CODE=1

                                PARTIAL HYDROGRAPH   104.01

    RUNOFF VOLUME =      .99941 INCHES     =      12.6058 ACRE-FEET
    PEAK DISCHARGE RATE =     364.94 CFS  AT   1.533 HOURS   BASIN AREA =   .2365 SQ. MI.


*S AREA 105 IS A PARK & COA WELL SITE
COMPUTE NM HYD       ID=12 HYD NO=105.00 AREA=0.021 SQ MI
                     PER A=31 PER B=31 PER C=31 PER D=7
                     TP=-0.1333 HR   MASS RAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   5.8036    CFS   UNIT VOLUME =    .9973       B =   526.28      P60 = 1.8700
    AREA =      .001470 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

    K =   .133514HR    TP =   .133300HR    K/TP RATIO =  1.001607     SHAPE CONSTANT, N =  3.524575
    UNIT PEAK =   47.194    CFS   UNIT VOLUME =    1.000       B =   322.12      P60 = 1.8700
    AREA =      .019530 SQ MI    IA =    .50000 INCHES    INF =   1.25000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330
PRINT HYD            ID=12   CODE=1

                                PARTIAL HYDROGRAPH   105.00

    RUNOFF VOLUME =      .75825 INCHES     =        .8492 ACRE-FEET
    PEAK DISCHARGE RATE =      29.05 CFS  AT   1.500 HOURS   BASIN AREA =   .0210 SQ. MI.


ADD HYD              ID=13 HYD NO=105.1 ID=11 ID=12
PRINT HYD            ID=13 CODE=1

                                PARTIAL HYDROGRAPH   105.10

    RUNOFF VOLUME =      .97974 INCHES     =      13.4550 ACRE-FEET
    PEAK DISCHARGE RATE =     393.90 CFS  AT   1.533 HOURS   BASIN AREA =   .2575 SQ. MI.


*S ROUTE THE FLOW TO THE EXISTING END OF SAPPHIRE ST.
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEG=1 MIN EL=100.00 MAX EL=101.00
                     CH SLOPE=0.02 FP SLOPE=0.02 N=0.017 DIST=48.0
                     DIST  ELEV  DIST  ELEV  DIST  ELEV  DIST  ELEV
                      0   101.00 10.0 100.67 10.1 100.00 24.0 100.28
                     38.0 100.00 38.1 100.67 48.0 101.00
```

RATING CURVE VALLEY SECTION 1.0

WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH FT
100.00	.00	.00	.00
100.05	.14	.15	5.26
100.11	.55	.95	10.52
100.16	1.25	2.80	15.78
100.21	2.22	6.03	21.04
100.26	3.46	10.94	26.30
100.32	4.92	18.84	27.99
100.37	6.39	29.08	28.01
100.42	7.87	41.00	28.03
100.47	9.34	54.46	28.04
100.53	10.82	69.37	28.06
100.58	12.30	85.66	28.07
100.63	13.78	103.24	28.09
100.68	15.26	119.89	28.96
100.74	16.87	132.52	32.13
100.79	18.64	147.34	35.31
100.84	20.59	164.39	38.48
100.89	22.69	183.72	41.66
100.95	24.97	205.41	44.83
101.00	27.41	229.56	48.00

COMPUTE TRAVEL TIME ID=14 REACH NO=1 NO VS=1 L=1200 FT SLP=0.02

TRAVEL TIME TABLE

REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.053	.138	.15	.3083
.105	.554	.95	.1942
.158	1.246	2.80	.1482
.211	2.215	6.03	.1223
.263	3.461	10.94	.1054
.316	4.920	18.84	.0871
.368	6.394	29.08	.0733
.421	7.869	41.00	.0640
.474	9.344	54.46	.0572
.526	10.821	69.37	.0520
.579	12.298	85.66	.0479
.632	13.776	103.24	.0445
.684	15.261	119.89	.0424
.737	16.869	132.52	.0424
.790	18.644	147.34	.0422
.842	20.586	164.39	.0417
.895	22.695	183.72	.0412
.947	24.971	205.41	.0405
1.000	27.414	229.56	.0398

ROUTE ID=14 HYD NO=105.2 INFLOW ID=13 DT=0.0

TRAVEL TIME TABLE EXCEEDED

PRINT HYD ID=14 CODE=1

PARTIAL HYDROGRAPH 105.20

```
    RUNOFF VOLUME =       .97974 INCHES      =      13.4550 ACRE-FEET
    PEAK DISCHARGE RATE =     364.47 CFS  AT   1.567 HOURS   BASIN AREA =   .2575 SQ. MI.


*S AREA 106 IS FULLY DEVELOPED
COMPUTE NM HYD       ID=15 HYD NO=106.00 AREA=0.02177 SQ MI
                     PER A=33 PER B=19 PER C=19 PER D=29
                     TP=-0.1333 HR   MASS RAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   24.925    CFS   UNIT VOLUME =    .9989       B =   526.28      P60 = 1.8700
    AREA =      .006313 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .139463HR    TP =   .133300HR    K/TP RATIO =  1.046235     SHAPE CONSTANT, N =  3.374403
    UNIT PEAK =   36.067    CFS   UNIT VOLUME =    .9997       B =   311.05      P60 = 1.8700
    AREA =      .015457 SQ MI    IA =    .52958 INCHES    INF =   1.33282 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD            ID=15   CODE=1

                                  PARTIAL HYDROGRAPH   106.00


    RUNOFF VOLUME =     1.00753 INCHES      =       1.1698 ACRE-FEET
    PEAK DISCHARGE RATE =      35.84 CFS  AT   1.500 HOURS   BASIN AREA =   .0218 SQ. MI.


*S BASIN 300.1 IS CURRENTLY UNDEVELOPED, ASSUME FUTURE DEVELOPMENT WILL BE @
*S A DENSITY OF 4 DU/AC
COMPUTE NM HYD       ID=16 HYD NO=300.1  AREA=0.0156 SQ MI
                     PER A=0  PER B=29  PER C=29  PER D=42
                     TP=-0.1333 HR  MASS RAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   25.868    CFS   UNIT VOLUME =    .9989       B =   526.28      P60 = 1.8700
    AREA =      .006552 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   24.074    CFS   UNIT VOLUME =    .9999       B =   354.67      P60 = 1.8700
    AREA =      .009048 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD            ID=16  CODE=1

                                 HYDROGRAPH FROM AREA   300.10


    RUNOFF VOLUME =     1.29860 INCHES      =       1.0804 ACRE-FEET
    PEAK DISCHARGE RATE =      32.45 CFS  AT   1.500 HOURS   BASIN AREA =   .0156 SQ. MI.
```

```
*S **ADD THE FLOWS FROM BASINS 106 AND 300.1
ADD HYD              ID=17  HYD NO=106.1  ID=15  ID=16
PRINT HYD            ID=17  CODE=1

                                PARTIAL HYDROGRAPH   106.10

    RUNOFF VOLUME =     1.12902 INCHES     =       2.2502 ACRE-FEET
    PEAK DISCHARGE RATE =      68.29 CFS  AT   1.500 HOURS   BASIN AREA =   .0374 SQ. MI.


*S **TOTAL FLOW IN SAPHIRE ST AT ANALYSIS POINT A
ADD HYD              ID=18 HYD NO=106.15 ID=14 ID=17
PRINT HYD            ID=18 CODE=1

                                PARTIAL HYDROGRAPH   106.15

    RUNOFF VOLUME =      .99866 INCHES     =      15.7052 ACRE-FEET
    PEAK DISCHARGE RATE =     423.63 CFS  AT   1.567 HOURS   BASIN AREA =   .2949 SQ. MI.


*S  **BASIN 401.12, 401.14, 401.17, 300.2 AND 400.2 DRAINS TO SAPPHIRE ST.
*S  **BASIN 401.12 IS PART OF SUNRISE ESTATES UNIT 1
COMPUTE NM HYD       ID=19 HYD NO=401.12 AREA=0.01126 SQ MI
                     PER A=0 PER B=29 PER C=29 PER D=42
                     TP=-0.1333 HR  MASS RAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   18.671    CFS   UNIT VOLUME =    .9988       B =   526.28      P60 = 1.8700
    AREA =      .004729 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   17.376    CFS   UNIT VOLUME =    .9997       B =   354.67      P60 = 1.8700
    AREA =      .006531 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD            ID=19  CODE=1

                                HYDROGRAPH FROM AREA   401.12

    RUNOFF VOLUME =     1.29860 INCHES     =        .7798 ACRE-FEET
    PEAK DISCHARGE RATE =      23.43 CFS  AT   1.500 HOURS   BASIN AREA =   .0113 SQ. MI.


*S  **ADD THE FLOWS FROM HYDROGRAPH NO 401.12 AND 106.15
ADD HYD              ID=20 HYD NO=401.13 ID=19 ID=18
PRINT HYD            ID=20  CODE=1

                                HYDROGRAPH FROM AREA   401.13
```

```
    RUNOFF VOLUME =     1.00969 INCHES     =      16.4850 ACRE-FEET
    PEAK DISCHARGE RATE =     443.65 CFS  AT   1.567 HOURS   BASIN AREA =   .3061 SQ. MI.


*S  **BASIN 300.2 IS CURRENTLY UNDEVELOPED, ASSUME FUTURE DEVELOPMENT WILL BE
*S  @ A DENSITY OF 4 DU/AC
COMPUTE NM HYD       ID=1 HYD NO=300.2 AREA=0.0118 SQ MI
                     PER A=0  PER B=29  PER C=29  PER D=42
                     TP=-0.1333 HR MASS RAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   19.567    CFS   UNIT VOLUME =    .9988       B =   526.28      P60 = 1.8700
    AREA =      .004956 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   18.210    CFS   UNIT VOLUME =    .9997       B =   354.67      P60 = 1.8700
    AREA =      .006844 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD            ID=1  CODE=1

                                   HYDROGRAPH FROM AREA   300.20

    RUNOFF VOLUME =     1.29859 INCHES     =        .8172 ACRE-FEET
    PEAK DISCHARGE RATE =      24.55 CFS  AT   1.500 HOURS   BASIN AREA =   .0118 SQ. MI.


*S ** BASIN 401.14 IS PART OF SUNRISE ESTATES UNIT 1
COMPUTE NM HYD       ID=2 HYD NO=401.14 AREA=0.01117 SQ MI
                     PER A=0 PER B=29 PER C=29 PER D=42
                     TP=-0.1333 HR MASS RAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   18.522    CFS   UNIT VOLUME =    .9988       B =   526.28      P60 = 1.8700
    AREA =      .004691 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   17.237    CFS   UNIT VOLUME =    .9997       B =   354.67      P60 = 1.8700
    AREA =      .006479 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD            ID=2 CODE=1

                                   HYDROGRAPH FROM AREA   401.14

    RUNOFF VOLUME =     1.29860 INCHES     =        .7736 ACRE-FEET
    PEAK DISCHARGE RATE =      23.24 CFS  AT   1.500 HOURS   BASIN AREA =   .0112 SQ. MI.
```

9 du/ac

```
*S  **ADD FLOWS FROM HYDROGRAPH NO 401.14 AND 300.2
ADD HYD              ID=3 HYD NO=401.15 ID=1 ID=2
PRINT HYD            ID=3 CODE=1

                                        HYDROGRAPH FROM AREA   401.15

    RUNOFF VOLUME =     1.29857 INCHES     =       1.5908 ACRE-FEET
    PEAK DISCHARGE RATE =      47.79 CFS  AT   1.500 HOURS   BASIN AREA =   .0230 SQ. MI.


*S **ADD FLOWS FROM HYDROGRAPH NO 401.15 AND 401.13
ADD HYD              ID=4 HYD NO=401.16 ID=3 ID=20
PRINT HYD            ID=4 CODE=1

                                        HYDROGRAPH FROM AREA   401.16

    RUNOFF VOLUME =     1.02985 INCHES     =      18.0759 ACRE-FEET
    PEAK DISCHARGE RATE =     484.48 CFS  AT   1.567 HOURS   BASIN AREA =   .3291 SQ. MI.


*S **BASIN 401.17 IS PART OF SUNRISE ESTATES UNIT 1
COMPUTE NM HYD       ID=5 HYD NO=401.17 AREA=0.00661 SQ MI
                     PER A=0 PER B=29 PER C=29 PER D=42
                     TP=-0.1333 HR MASS RAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   10.961    CFS   UNIT VOLUME =    .9984       B =   526.28      P60 = 1.8700
    AREA =      .002776 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   10.201    CFS   UNIT VOLUME =    .9992       B =   354.67      P60 = 1.8700
    AREA =      .003834 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD            ID=5 CODE=1

                                        HYDROGRAPH FROM AREA   401.17

    RUNOFF VOLUME =     1.29860 INCHES     =        .4578 ACRE-FEET
    PEAK DISCHARGE RATE =      13.76 CFS  AT   1.500 HOURS   BASIN AREA =   .0066 SQ. MI.


*S  **ADD FLOWS FROM HYDROGRAPH NO 401.16 AND 401.17
ADD HYD              ID=6 HYD NO=401.18 ID=4 ID=5
PRINT HYD            ID=6 CODE=1

                                        HYDROGRAPH FROM AREA   401.18
```

```
    RUNOFF VOLUME =      1.03514 INCHES      =      18.5337 ACRE-FEET
    PEAK DISCHARGE RATE =     496.23 CFS  AT   1.567 HOURS   BASIN AREA =   .3357 SQ. MI.


*S ** BASIN 405 DRAINS TO SAPPHIRE ST.
COMPUTE NM HYD       ID=7  HYD NO=405.0  AREA=0.013934 SQ MI
                     PER A=0 PER B=28 PER C=28 PER D=44
                     TP=-0.1333 HR MASS RAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   24.205    CFS   UNIT VOLUME =    .9989       B =   526.28      P60 = 1.8700
    AREA =      .006131 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   20.761    CFS   UNIT VOLUME =    .9998       B =   354.67      P60 = 1.8700
    AREA =      .007803 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD            ID=7 CODE=1

                                    HYDROGRAPH FROM AREA   405.00


    RUNOFF VOLUME =      1.32159 INCHES      =        .9821 ACRE-FEET
    PEAK DISCHARGE RATE =      29.33 CFS  AT   1.500 HOURS   BASIN AREA =   .0139 SQ. MI.


*S  **ADD FLOWS FROM HYDROGRAPH NO 401.18 AND 405
ADD HYD              ID=8 HYD NO=405.1  ID=6 ID=7
PRINT HYD            ID=8 CODE=1

                                    HYDROGRAPH FROM AREA   405.10


    RUNOFF VOLUME =      1.04656 INCHES      =      19.5158 ACRE-FEET
    PEAK DISCHARGE RATE =     521.25 CFS  AT   1.567 HOURS   BASIN AREA =   .3496 SQ. MI.


*S ** BASIN 403 DRAINS TO SAPPHIRE ST.
COMPUTE NM HYD       ID=9  HYD NO=403.0  AREA=0.0148 SQ MI
                     PER A=0 PER B=29 PER C=29 PER D=42
                     TP=-0.1333 HR MASS RAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   24.541    CFS   UNIT VOLUME =    .9989       B =   526.28      P60 = 1.8700
    AREA =      .006216 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330
```

```
    K =    .118429HR    TP =    .133300HR    K/TP RATIO =    .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =    22.839    CFS   UNIT VOLUME =     .9999       B =   354.67      P60 = 1.8700
    AREA =       .008584 SQ MI    IA =     .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .033330

PRINT HYD            ID=9 CODE=1

                                        HYDROGRAPH FROM AREA   403.00

    RUNOFF VOLUME =      1.29860 INCHES      =       1.0250 ACRE-FEET
    PEAK DISCHARGE RATE =       30.79 CFS  AT   1.500 HOURS   BASIN AREA =    .0148 SQ. MI.


*S  **ADD FLOWS FROM HYDROGRAPH NO 405.1 AND 403
ADD HYD              ID=10 HYD NO=405.15  ID=8 ID=9
PRINT HYD            ID=10 CODE=1

                                        HYDROGRAPH FROM AREA   405.15

    RUNOFF VOLUME =      1.05679 INCHES      =      20.5408 ACRE-FEET
    PEAK DISCHARGE RATE =      547.55 CFS  AT   1.567 HOURS   BASIN AREA =    .3644 SQ. MI.


*S ** BASIN 400.2 IS CURRENTLY UNDEVELOPED, ASSUME FUTURE DEVELOPMENT WILL BE
*S @ A DENSITY OF 4 DU/AC
COMPUTE NM HYD       ID=11  HYD NO=400.2  AREA=0.032215 SQ MI
                     PER A=0 PER B=28 PER C=28 PER D=44
                     TP=-0.1333 HR MASS RAIN=-1

    K =    .072649HR    TP =    .133300HR    K/TP RATIO =    .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =    55.962    CFS   UNIT VOLUME =     .9992       B =   526.28      P60 = 1.8700
    AREA =       .014175 SQ MI    IA =     .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .033330


    K =    .118429HR    TP =    .133300HR    K/TP RATIO =    .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =    48.000    CFS   UNIT VOLUME =    1.000        B =   354.67      P60 = 1.8700
    AREA =       .018040 SQ MI    IA =     .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .033330

PRINT HYD            ID=11  CODE=1

                                        HYDROGRAPH FROM AREA   400.20

    RUNOFF VOLUME =      1.32159 INCHES      =       2.2707 ACRE-FEET
    PEAK DISCHARGE RATE =       67.80 CFS  AT   1.500 HOURS   BASIN AREA =    .0322 SQ. MI.
```

9 du/ac

```
*S  **ADD FLOWS FROM HYDROGRAPH NO 405.15 AND 400.2 TOGETHER TO GET THE FLOW
*S IN SAPPHIRE ST. @ ANALYSIS PT B
ADD HYD              ID=12 HYD NO=405.16  ID=10 ID=11
PRINT HYD            ID=12 CODE=1

                                    HYDROGRAPH FROM AREA   405.16

    RUNOFF VOLUME =     1.07830 INCHES     =      22.8114 ACRE-FEET
    PEAK DISCHARGE RATE =     607.35 CFS  AT   1.533 HOURS   BASIN AREA =   .3967 SQ. MI.


*S*************************************************************************
*S*************************************************************************
*S **BASINS 200,201, & 202 DRAIN TO KIMELA DR
COMPUTE NM HYD       ID=13 HYD NO=200.00 AREA=0.053 SQ MI
                     PER A=33 PER B=19 PER C=19 PER D=29
                     TP=-0.1333 HR   MASS RAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   60.682    CFS   UNIT VOLUME =    .9992       B =   526.28      P60 = 1.8700
    AREA =      .015370 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .139463HR    TP =   .133300HR    K/TP RATIO =  1.046235     SHAPE CONSTANT, N =  3.374403
    UNIT PEAK =   87.807    CFS   UNIT VOLUME =    .9999       B =   311.05      P60 = 1.8700
    AREA =      .037630 SQ MI    IA =    .52958 INCHES    INF =   1.33282 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD            ID=13   CODE=1

                                    PARTIAL HYDROGRAPH   200.00


    RUNOFF VOLUME =     1.00753 INCHES     =       2.8479 ACRE-FEET
    PEAK DISCHARGE RATE =      87.23 CFS  AT   1.500 HOURS   BASIN AREA =   .0530 SQ. MI.


*S **ROUTE FLOW TO THE END OF KIMELA DR.
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEG=1 MIN EL=100.00 MAX EL=101.00
                     CH SLOPE=0.02 FP SLOPE=0.02 N=0.017 DIST=48.0
                     DIST  ELEV  DIST  ELEV  DIST  ELEV  DIST  ELEV
                      0   101.00 10.0 100.67 10.1 100.00 24.0 100.28
                     38.0 100.00 38.1 100.67 48.0 101.00

                                    RATING CURVE VALLEY SECTION  1.0
                                       WATER       FLOW        FLOW        TOP
                                      SURFACE      AREA        RATE        WIDTH
                                       ELEV        SQ FT       CFS         FT
                                      100.00        .00         .00         .00
                                      100.05        .14         .15        5.26
                                      100.11        .55         .95       10.52
                                      100.16       1.25        2.80       15.78
                                      100.21       2.22        6.03       21.04
                                      100.26       3.46       10.94       26.30
```

100.32	4.92	18.84	27.99
100.37	6.39	29.08	28.01
100.42	7.87	41.00	28.03
100.47	9.34	54.46	28.04
100.53	10.82	69.37	28.06
100.58	12.30	85.66	28.07
100.63	13.78	103.24	28.09
100.68	15.26	119.89	28.96
100.74	16.87	132.52	32.13
100.79	18.64	147.34	35.31
100.84	20.59	164.39	38.48
100.89	22.69	183.72	41.66
100.95	24.97	205.41	44.83
101.00	27.41	229.56	48.00

COMPUTE TRAVEL TIME ID=14 REACH NO=1 NO VS=1 L=800 FT SLP=0.02

TRAVEL TIME TABLE

REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.053	.138	.15	.2055
.105	.554	.95	.1295
.158	1.246	2.80	.0988
.211	2.215	6.03	.0816
.263	3.461	10.94	.0703
.316	4.920	18.84	.0580
.368	6.394	29.08	.0489
.421	7.869	41.00	.0427
.474	9.344	54.46	.0381
.526	10.821	69.37	.0347
.579	12.298	85.66	.0319
.632	13.776	103.24	.0297
.684	15.261	119.89	.0283
.737	16.869	132.52	.0283
.790	18.644	147.34	.0281
.842	20.586	164.39	.0278
.895	22.695	183.72	.0275
.947	24.971	205.41	.0270
1.000	27.414	229.56	.0265

ROUTE ID=14 HYD NO=200.1 INFLOW ID=13 DT=0.0
PRINT HYD ID=14 CODE=1

PARTIAL HYDROGRAPH 200.10

RUNOFF VOLUME = 1.00753 INCHES = 2.8479 ACRE-FEET
PEAK DISCHARGE RATE = 86.94 CFS AT 1.533 HOURS BASIN AREA = .0530 SQ. MI.

COMPUTE NM HYD ID=15 HYD NO=201.00 AREA=0.026 SQ MI
PER A=33 PER B=19 PER C=19 PER D=29
TP=-0.1333 HR MASS RAIN=-1

```
    K =    .072649HR    TP =    .133300HR    K/TP RATIO =    .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =    29.768    CFS   UNIT VOLUME =    .9990        B =   526.28      P60 = 1.8700
    AREA =       .007540 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

    K =    .139463HR    TP =    .133300HR    K/TP RATIO =  1.046235     SHAPE CONSTANT, N =  3.374403
    UNIT PEAK =    43.075    CFS   UNIT VOLUME =    .9997        B =   311.05      P60 = 1.8700
    AREA =       .018460 SQ MI    IA =    .52958 INCHES    INF =   1.33282 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD           ID=15  CODE=1

                                PARTIAL HYDROGRAPH   201.00

    RUNOFF VOLUME =     1.00753 INCHES     =       1.3971 ACRE-FEET
    PEAK DISCHARGE RATE =      42.80 CFS  AT   1.500 HOURS   BASIN AREA =   .0260 SQ. MI.


ADD HYD             ID=16 HYD NO=201.1 ID=15 ID=14
PRINT HYD           ID=16 CODE=1

                                PARTIAL HYDROGRAPH   201.10

    RUNOFF VOLUME =     1.00752 INCHES     =       4.2450 ACRE-FEET
    PEAK DISCHARGE RATE =     128.91 CFS  AT   1.533 HOURS   BASIN AREA =   .0790 SQ. MI.


*S **BASIN 202 IS AN ELEMENTARY SCHOOL (ONSITE DETENTION TO REDUCE RUNOFF)
COMPUTE NM HYD      ID=17 HYD NO=202.00 AREA=0.009253 SQ MI
                    PER A=100 PER B=0 PER C=0 PER D=0
                    TP=-0.1333 HR   MASS RAIN=-1

    K =    .163684HR    TP =    .133300HR    K/TP RATIO =  1.227936     SHAPE CONSTANT, N =  2.899764
    UNIT PEAK =    18.988    CFS   UNIT VOLUME =    .9989        B =   273.54      P60 = 1.8700
    AREA =       .009253 SQ MI    IA =    .65000 INCHES    INF =   1.67000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD           ID=17   CODE=1

                                PARTIAL HYDROGRAPH   202.00

    RUNOFF VOLUME =      .43925 INCHES     =        .2168 ACRE-FEET
    PEAK DISCHARGE RATE =       7.69 CFS  AT   1.533 HOURS   BASIN AREA =   .0093 SQ. MI.


*S **BASIN 202.05 IS THE ELEMENTARY SCHOOL PARKING LOT THAT WILL DRAIN TO KIMELA
COMPUTE NM HYD      ID=18  HYD NO=202.05 AREA=0.003747 SQ MI
                    PER A=0  PER B=0  PER C=0  PER D=100
                    TP=-0.1333 HR  MASS RAIN=-1
```

```
    K =    .072649HR    TP =    .133300HR    K/TP RATIO =    .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   14.793    CFS   UNIT VOLUME =    .9987       B =   526.28      P60 = 1.8700
    AREA =       .003747 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD           ID=18  CODE=1

                                PARTIAL HYDROGRAPH   202.05

    RUNOFF VOLUME =     1.96548 INCHES     =        .3928 ACRE-FEET
    PEAK DISCHARGE RATE =      10.49 CFS  AT   1.500 HOURS   BASIN AREA =   .0037 SQ. MI.


*S **ADD THE BASINS OF THE ELEMENTARY SCHOOL AND PARKING LOT
ADD HYD             ID=19  HYD NO=202.06 ID I=17  ID II=18
PRINT HYD           ID=19  CODE=1

                                PARTIAL HYDROGRAPH   202.06

    RUNOFF VOLUME =      .87913 INCHES     =        .6095 ACRE-FEET
    PEAK DISCHARGE RATE =      18.01 CFS  AT   1.500 HOURS   BASIN AREA =   .0130 SQ. MI.


*S **ADD THE BASINS TOGETHER TO GET THE FLOW IN KIMELA DR @ ANALYSIS PT C
ADD HYD             ID=20 HYD NO=202.1 ID=16 ID=19
PRINT HYD           ID=20 CODE=1

                                PARTIAL HYDROGRAPH   202.10

    RUNOFF VOLUME =      .98938 INCHES     =       4.8545 ACRE-FEET
    PEAK DISCHARGE RATE =     146.56 CFS  AT   1.533 HOURS   BASIN AREA =   .0920 SQ. MI.


*S*************************************************************************
*S*************************************************************************
*S **BASINS 402 THRU 404 ARE CURRENTLY UNDEVELOPED, FOR PURPOSES
*S OF THIS REPORT, ASSUME ALL BASINS WILL BE BUILT OUT @ THEIR CURRENT
*S ZONING
*S **BASIN 402 IS UNIT 2 OF SUNRISE ESTATES
COMPUTE NM HYD      ID=6 HYD NO=402.00 AREA=0.052 SQ MI
                    PER A=0 PER B=29 PER C=29 PER D=42
                    TP=-0.1333 HR   MASS RAIN=-1

    K =    .072649HR    TP =    .133300HR    K/TP RATIO =    .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   86.225    CFS   UNIT VOLUME =    .9992       B =   526.28      P60 = 1.8700
    AREA =       .021840 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330
```

```
    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   80.246    CFS   UNIT VOLUME =    1.000       B =   354.67      P60 = 1.8700
    AREA =      .030160 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD           ID=6   CODE=1

                                        HYDROGRAPH FROM AREA   402.00

    RUNOFF VOLUME =     1.29860 INCHES     =       3.6014 ACRE-FEET
    PEAK DISCHARGE RATE =     108.14 CFS  AT   1.500 HOURS   BASIN AREA =   .0520 SQ. MI.


*S **ADD BASIN 402 TO THE TOTAL FLOW @ THE END OF EXTENDED KIMELA
ADD HYD             ID=7 HYD NO=402.1 ID=20 ID=6
PRINT HYD           ID=7 CODE=1

                                        HYDROGRAPH FROM AREA   402.10

    RUNOFF VOLUME =     1.10104 INCHES     =       8.4559 ACRE-FEET
    PEAK DISCHARGE RATE =     251.21 CFS  AT   1.533 HOURS   BASIN AREA =   .1440 SQ. MI.


COMPUTE NM HYD      ID=8 HYD NO=404.00 AREA=0.0108 SQ MI
                    PER A=0 PER B=29 PER C=29 PER D=42
                    TP=-0.1333 HR   MASS RAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   17.908    CFS   UNIT VOLUME =    .9988       B =   526.28      P60 = 1.8700
    AREA =      .004536 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   16.666    CFS   UNIT VOLUME =    .9997       B =   354.67      P60 = 1.8700
    AREA =      .006264 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD           ID=8   CODE=1

                                        HYDROGRAPH FROM AREA   404.00

    RUNOFF VOLUME =     1.29860 INCHES     =        .7480 ACRE-FEET
    PEAK DISCHARGE RATE =      22.47 CFS  AT   1.500 HOURS   BASIN AREA =   .0108 SQ. MI.


*S **ADD FLOW TO THAT IN KIMELA DR
ADD HYD             ID=9 HYD NO=404.1 ID=7 ID=8
PRINT HYD           ID=9 CODE=1

                                        HYDROGRAPH FROM AREA   404.10
```

```
    RUNOFF VOLUME =     1.11482 INCHES     =       9.2039 ACRE-FEET
    PEAK DISCHARGE RATE =     272.95 CFS  AT   1.533 HOURS   BASIN AREA =   .1548 SQ. MI.


*S **ADD TO FLOW IN SAPPHIRE @ ANALYSIS PT D
ADD HYD             ID=10 HYD NO=404.2 ID=9 ID=12
PRINT HYD           ID=10 CODE=1

                                    HYDROGRAPH FROM AREA   404.20


    RUNOFF VOLUME =     1.08855 INCHES     =      32.0153 ACRE-FEET
    PEAK DISCHARGE RATE =     880.30 CFS  AT   1.533 HOURS   BASIN AREA =   .5515 SQ. MI.


*S DESIGN A RETENTION FACILITY TO REDUCE TO FLOW TO THAT WHICH WILL
*S FIT IN A 48" RCP @ S=1.8%
ROUTE RESERVOIR     ID=11 HYD NO=405.4 INFLOW ID=10 CODE=1
                    OUTFLOW(CFS)  STORAGE(AF)  ELEV(FT)
                         0             0          0
                        46.2          0.77        0.5
                       104.75         1.91        1
                       120.95         3.93        2
                       135.23         6.06        3
                       148.14         8.30        4
                       160.00        10.66        5
                       171.05        13.14        6
                       181.43        15.74        7
                       191.24        18.47        8
                       200.58        21.33        9
                       209.50        24.32       10
                       218.05        27.44       11

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

  TIME       INFLOW     ELEV       VOLUME     OUTFLOW
  (HRS)      (CFS)      (FEET)     (AC-FT)    (CFS)

    .00        .00        .00        .000       .00
    .03        .00        .00        .000       .00
    .07        .00        .00        .000       .00
    .10        .00        .00        .000       .00
    .13        .00        .00        .000       .00
    .17        .00        .00        .000       .00
    .20        .00        .00        .000       .00
    .23        .00        .00        .000       .00
    .27        .00        .00        .000       .00
    .30        .00        .00        .000       .00
    .33        .00        .00        .000       .00
    .37        .00        .00        .000       .00
    .40        .00        .00        .000       .00
    .43        .00        .00        .000       .00
    .47        .00        .00        .000       .00
    .50        .00        .00        .000       .00
    .53        .00        .00        .000       .00
```

.57	.00	.00	.000	.00
.60	.00	.00	.000	.00
.63	.00	.00	.000	.00
.67	.00	.00	.000	.00
.70	.00	.00	.000	.00
.73	.00	.00	.000	.00
.77	.00	.00	.000	.00
.80	.00	.00	.000	.00
.83	.00	.00	.000	.00
.87	.00	.00	.000	.00
.90	.00	.00	.000	.00
.93	.00	.00	.000	.00
.97	.00	.00	.000	.00
1.00	.00	.00	.000	.00
1.03	.00	.00	.000	.00
1.07	.00	.00	.000	.00
1.10	.00	.00	.000	.00
1.13	.03	.00	.000	.00
1.17	.74	.00	.001	.06
1.20	4.90	.01	.008	.48
1.23	15.78	.02	.033	1.99
1.27	34.67	.06	.092	5.53
1.30	63.45	.13	.203	12.18
1.33	110.17	.26	.393	23.57
1.37	193.52	.47	.719	43.15
1.40	330.78	.72	1.282	72.50
1.43	518.14	1.15	2.204	107.11
1.47	698.75	1.82	3.570	118.06
1.50	831.94	2.66	5.336	130.37
1.53	880.30	3.56	7.318	142.48
1.57	852.46	4.42	9.297	153.15
1.60	780.96	5.18	11.113	162.02
1.63	696.22	5.82	12.692	169.05
1.67	610.62	6.34	14.018	174.56
1.70	541.62	6.76	15.118	178.95
1.73	461.68	7.10	16.002	182.37
1.77	395.56	7.34	16.677	184.80
1.80	343.50	7.53	17.184	186.62
1.83	301.71	7.67	17.557	187.96

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
1.87	267.03	7.76	17.821	188.91
1.90	237.86	7.83	17.995	189.53
1.93	214.21	7.86	18.095	189.89
1.97	195.23	7.88	18.136	190.04
2.00	179.72	7.87	18.129	190.01
2.03	166.54	7.86	18.082	189.85
2.07	152.59	7.83	17.999	189.55
2.10	135.39	7.78	17.874	189.10
2.13	116.39	7.72	17.701	188.48
2.17	98.60	7.64	17.479	187.68
2.20	84.03	7.54	17.215	186.73
2.23	72.59	7.43	16.918	185.66
2.27	63.63	7.31	16.596	184.50
2.30	56.55	7.19	16.255	183.28

2.33	50.88	7.06	15.900	182.00
2.37	46.15	6.92	15.534	180.61
2.40	42.08	6.78	15.160	179.11
2.43	38.50	6.63	14.780	177.60
2.47	35.28	6.48	14.394	176.06
2.50	32.37	6.33	14.004	174.50
2.53	29.81	6.18	13.612	172.93
2.57	27.55	6.03	13.216	171.36
2.60	25.49	5.87	12.820	169.62
2.63	23.61	5.71	12.423	167.85
2.67	21.91	5.55	12.025	166.08
2.70	20.37	5.39	11.629	164.32
2.73	18.94	5.23	11.233	162.55
2.77	17.63	5.07	10.838	160.79
2.80	16.43	4.91	10.444	158.92
2.83	15.33	4.74	10.053	156.95
2.87	14.32	4.58	9.664	155.00
2.90	13.37	4.41	9.278	153.05
2.93	12.50	4.25	8.895	151.13
2.97	11.71	4.09	8.514	149.22
3.00	10.97	3.93	8.137	147.20
3.03	10.29	3.76	7.764	145.05
3.07	9.70	3.60	7.395	142.92
3.10	9.14	3.43	7.030	140.82
3.13	8.61	3.27	6.670	138.74
3.17	8.14	3.11	6.313	136.69
3.20	7.71	2.95	5.962	134.57
3.23	7.33	2.79	5.615	132.25
3.27	6.98	2.63	5.273	129.96
3.30	6.65	2.47	4.937	127.70
3.33	6.35	2.32	4.606	125.49
3.37	6.06	2.16	4.281	123.30
3.40	5.81	2.01	3.961	121.15
3.43	5.58	1.86	3.646	118.67
3.47	5.36	1.71	3.338	116.20
3.50	5.15	1.56	3.035	113.77
3.53	4.96	1.41	2.739	111.40
3.57	4.79	1.27	2.449	109.07
3.60	4.63	1.13	2.164	106.79
3.63	4.50	.99	1.887	103.58
3.67	4.37	.88	1.632	90.48
3.70	4.24	.78	1.411	79.10

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
3.73	4.12	.70	1.218	69.20
3.77	4.01	.62	1.050	60.59
3.80	3.90	.56	.905	53.11
3.83	3.82	.50	.778	46.60
3.87	3.74	.43	.669	40.13
3.90	3.66	.37	.576	34.57
3.93	3.59	.32	.497	29.84
3.97	3.52	.28	.431	25.83
4.00	3.46	.24	.374	22.42
4.03	3.41	.21	.325	19.52
4.07	3.35	.18	.284	17.06

4.10	3.31	.16	.249	14.96
4.13	3.28	.14	.220	13.18
4.17	3.24	.13	.194	11.67
4.20	3.20	.11	.173	10.38
4.23	3.15	.10	.155	9.28
4.27	3.11	.09	.139	8.34
4.30	3.08	.08	.126	7.54
4.33	3.06	.07	.114	6.85
4.37	3.04	.07	.105	6.27
4.40	3.02	.06	.096	5.78
4.43	3.00	.06	.089	5.36
4.47	2.98	.05	.083	4.99
4.50	2.95	.05	.078	4.68
4.53	2.94	.05	.074	4.42
4.57	2.93	.05	.070	4.19
4.60	2.92	.04	.067	4.00
4.63	2.91	.04	.064	3.83
4.67	2.90	.04	.062	3.69
4.70	2.91	.04	.060	3.57
4.73	2.91	.04	.058	3.47
4.77	2.92	.04	.056	3.39
4.80	2.91	.04	.055	3.31
4.83	2.92	.04	.054	3.25
4.87	2.91	.03	.053	3.20
4.90	2.91	.03	.053	3.16
4.93	2.91	.03	.052	3.12
4.97	2.91	.03	.051	3.09
5.00	2.93	.03	.051	3.06
5.03	2.94	.03	.051	3.04
5.07	2.95	.03	.050	3.03
5.10	2.98	.03	.050	3.02
5.13	3.00	.03	.050	3.01
5.17	3.01	.03	.050	3.01
5.20	3.01	.03	.050	3.01
5.23	3.02	.03	.050	3.01
5.27	3.04	.03	.050	3.01
5.30	3.07	.03	.050	3.02
5.33	3.09	.03	.051	3.03
5.37	3.11	.03	.051	3.04
5.40	3.12	.03	.051	3.05
5.43	3.13	.03	.051	3.06
5.47	3.14	.03	.051	3.07
5.50	3.16	.03	.051	3.09
5.53	3.20	.03	.052	3.10
5.57	3.23	.03	.052	3.12

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
5.60	3.24	.03	.052	3.14
5.63	3.25	.03	.053	3.15
5.67	3.28	.03	.053	3.17
5.70	3.31	.03	.053	3.19
5.73	3.33	.03	.053	3.21
5.77	3.35	.03	.054	3.23
5.80	3.37	.04	.054	3.25
5.83	3.40	.04	.054	3.27

5.87	3.42	.04	.055	3.29
5.90	3.45	.04	.055	3.31
5.93	3.49	.04	.056	3.34
5.97	3.52	.04	.056	3.36
6.00	3.54	.04	.056	3.39
6.03	3.56	.04	.057	3.41
6.07	3.45	.04	.057	3.43
6.10	3.12	.04	.057	3.40
6.13	2.66	.04	.055	3.33
6.17	2.22	.03	.053	3.19
6.20	1.85	.03	.050	3.01
6.23	1.57	.03	.047	2.81
6.27	1.36	.03	.043	2.61
6.30	1.19	.03	.040	2.40
6.33	1.06	.02	.037	2.21
6.37	.95	.02	.034	2.03
6.40	.86	.02	.031	1.86
6.43	.78	.02	.028	1.70
6.47	.71	.02	.026	1.55
6.50	.64	.02	.024	1.42
6.53	.58	.01	.022	1.29
6.57	.53	.01	.020	1.18
6.60	.48	.01	.018	1.08
6.63	.44	.01	.016	.98
6.67	.40	.01	.015	.90
6.70	.37	.01	.014	.82
6.73	.34	.01	.012	.75
6.77	.31	.01	.011	.68
6.80	.28	.01	.010	.62
6.83	.26	.01	.009	.57
6.87	.23	.01	.009	.52
6.90	.21	.01	.008	.47
6.93	.19	.00	.007	.43
6.97	.17	.00	.007	.39
7.00	.16	.00	.006	.36
7.03	.15	.00	.005	.33
7.07	.13	.00	.005	.30
7.10	.12	.00	.005	.27
7.13	.11	.00	.004	.25
7.17	.10	.00	.004	.23
7.20	.09	.00	.003	.21
7.23	.08	.00	.003	.19
7.27	.08	.00	.003	.17
7.30	.07	.00	.003	.16
7.33	.06	.00	.002	.14
7.37	.06	.00	.002	.13
7.40	.05	.00	.002	.12
7.43	.05	.00	.002	.11

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
7.47	.04	.00	.002	.10
7.50	.04	.00	.002	.09
7.53	.04	.00	.001	.08
7.57	.03	.00	.001	.08
7.60	.03	.00	.001	.07

7.63	.03	.00	.001	.06
7.67	.02	.00	.001	.06
7.70	.02	.00	.001	.05
7.73	.02	.00	.001	.05
7.77	.02	.00	.001	.04
7.80	.02	.00	.001	.04
7.83	.01	.00	.001	.04
7.87	.01	.00	.001	.03
7.90	.01	.00	.000	.03
7.93	.01	.00	.000	.03
7.97	.01	.00	.000	.02
8.00	.01	.00	.000	.02
8.03	.01	.00	.000	.02
8.07	.01	.00	.000	.02
8.10	.01	.00	.000	.02
8.13	.01	.00	.000	.01
8.17	.01	.00	.000	.01
8.20	.00	.00	.000	.01
8.23	.00	.00	.000	.01
8.27	.00	.00	.000	.01
8.30	.00	.00	.000	.01
8.33	.00	.00	.000	.01
8.37	.00	.00	.000	.01
8.40	.00	.00	.000	.01
8.43	.00	.00	.000	.01
8.47	.00	.00	.000	.01
8.50	.00	.00	.000	.01
8.53	.00	.00	.000	.00

PEAK DISCHARGE = 190.038 CFS - PEAK OCCURS AT HOUR 1.97
MAXIMUM WATER SURFACE ELEVATION = 7.878
MAXIMUM STORAGE = 18.1356 AC-FT INCREMENTAL TIME= .033330HRS

*S ROUTE FLOW FROM THE DETENTION POND TO THE AMOLE DEL NORTE CHANNEL
COMPUTE RATING CURVE CID=1 VS NO=1 CODE=-1 SLOPE=0.0180
DIA=4.0 FT N=0.013

RATING CURVE PIPE SECTION 1.0

WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	MAX WIDTH FT
.00	.00	.00	.00
.21	.25	1.01	1.78
.42	.69	4.39	2.44
.63	1.25	10.20	2.91
.83	1.90	18.35	3.25
1.04	2.60	28.65	3.51
1.25	3.36	40.88	3.71
1.46	4.15	54.76	3.85
1.67	4.96	70.02	3.94
1.88	5.79	86.31	3.99
2.08	6.62	103.30	4.00
2.29	7.45	120.60	4.00
2.50	8.27	137.80	4.00
2.71	9.06	154.44	4.00
2.92	9.82	170.03	4.00
3.13	10.54	183.98	4.00
3.34	11.20	195.59	4.00

3.54	11.77	203.89	4.00
3.75	12.24	207.31	4.00
4.00	12.57	207.31	4.00

```
COMPUTE TRAVEL TIME  ID=12 REACH NO=1 NO VS=1 L=1150 FT SLP=0.018
```

TRAVEL TIME TABLE

REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.208	.250	1.01	.0789
.417	.695	4.39	.0506
.625	1.255	10.20	.0393
.834	1.898	18.35	.0330
1.042	2.604	28.65	.0290
1.251	3.358	40.88	.0262
1.459	4.146	54.76	.0242
1.668	4.960	70.02	.0226
1.876	5.788	86.31	.0214
2.084	6.621	103.30	.0205
2.293	7.451	120.60	.0197
2.501	8.267	137.80	.0192
2.710	9.062	154.44	.0187
2.918	9.823	170.03	.0185
3.127	10.539	183.98	.0183
3.335	11.195	195.59	.0183
3.544	11.773	203.89	.0184
3.752	12.243	207.31	.0189
4.000	12.566	207.31	.0194

880 cfs in

18.14 ac ft

190 cfs out

```
ROUTE                ID=12 HYD NO=405.3 INFLOW ID=11 DT=0.0
PRINT HYD            ID=12 CODE=1
```

HYDROGRAPH FROM AREA 405.30

RUNOFF VOLUME = 1.08855 INCHES = 32.0153 ACRE-FEET
PEAK DISCHARGE RATE = 190.02 CFS AT 2.000 HOURS BASIN AREA = .5515 SQ. MI.

```
*S*************************************************************************
*S*************************************************************************
*S **CALC BASIN 406
COMPUTE NM HYD       ID=13 HYD NO=406.00 AREA=0.057434 SQ MI
                     PER A=4 PER B=27 PER C=27 PER D=42
                     [redacted]  MASS RAIN=-1
```

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 95.236 CFS UNIT VOLUME = .9993 B = 526.28 P60 = 1.8700
AREA = .024122 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

```
    K =    .121550HR    TP =    .133300HR    K/TP RATIO =    .911856     SHAPE CONSTANT, N =  3.883611
    UNIT PEAK =    86.799    CFS    UNIT VOLUME =    1.000        B =    347.33      P60 = 1.8700
    AREA =       .033312 SQ MI    IA =    .44052 INCHES    INF =    1.08345 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .033330

PRINT HYD            ID=13   CODE=1

                                        HYDROGRAPH FROM AREA   406.00


    RUNOFF VOLUME =     1.27968 INCHES      =       3.9198 ACRE-FEET
    PEAK DISCHARGE RATE =     117.49 CFS  AT   1.500 HOURS   BASIN AREA =    .0574 SQ. MI.


*S **CALC BASIN 407
COMPUTE NM HYD       ID=14 HYD NO=407.00 AREA=0.0504 SQ MI
                     PER A=0 PER B=29 PER C=29 PER D=42
                     [redacted]   MASS RAIN=-1

    K =    .072649HR    TP =    .133300HR    K/TP RATIO =    .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =    83.572    CFS    UNIT VOLUME =    .9992        B =    526.28      P60 = 1.8700
    AREA =       .021168 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .033330


    K =    .118429HR    TP =    .133300HR    K/TP RATIO =    .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =    77.777    CFS    UNIT VOLUME =    1.000        B =    354.67      P60 = 1.8700
    AREA =       .029232 SQ MI    IA =    .42500 INCHES    INF =    1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .033330

PRINT HYD            ID=14   CODE=1

                                        HYDROGRAPH FROM AREA   407.00


    RUNOFF VOLUME =     1.29860 INCHES      =       3.4906 ACRE-FEET
    PEAK DISCHARGE RATE =     104.81 CFS  AT   1.500 HOURS   BASIN AREA =    .0504 SQ. MI.


*S **CALC BASIN 408
COMPUTE NM HYD       ID=15  HYD NO=408.00  AREA=0.15736 SQ MI
                     PER A=0  PER B=29  PER C=29  PER D=42
                     [redacted]  MASS RAIN=-1

    K =    .074258HR    TP =    .133300HR    K/TP RATIO =    .557073     SHAPE CONSTANT, N =  6.910316
    UNIT PEAK =    256.33    CFS    UNIT VOLUME =    .9995        B =    516.99      P60 = 1.8700
    AREA =       .066091 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .033330


    K =    .115909HR    TP =    .133300HR    K/TP RATIO =    .869534     SHAPE CONSTANT, N =  4.085829
    UNIT PEAK =    247.07    CFS    UNIT VOLUME =    1.000        B =    360.85      P60 = 1.8700
    AREA =       .091269 SQ MI    IA =    .42500 INCHES    INF =    1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .033330
```

```
PRINT HYD            ID=15  CODE=1

                                        HYDROGRAPH FROM AREA   408.00

    RUNOFF VOLUME =      1.29860 INCHES      =       10.8984 ACRE-FEET
    PEAK DISCHARGE RATE =      327.60 CFS  AT   1.500 HOURS   BASIN AREA =   .1574 SQ. MI.


*S*************************************************************************
*S*************************************************************************
*S **BASIN 500 IS UNIT ONE OF THE PROPOSED LONGFORD SD
COMPUTE NM HYD       ID=16 HYD NO=500.00 AREA=0.024905 SQ MI
                     PER A=0 PER B=29 PER C=29 PER D=42
                     TP=-0.1333 HR   MASS RAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   41.297    CFS   UNIT VOLUME =    .9991       B =   526.28      P60 = 1.8700
    AREA =       .010460 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   38.433    CFS   UNIT VOLUME =    1.000       B =   354.67      P60 = 1.8700
    AREA =       .014445 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD            ID=16   CODE=1

                                   OUTFLOW HYDROGRAPH RESERVOIR   500.00

    RUNOFF VOLUME =      1.29860 INCHES      =        1.7249 ACRE-FEET
    PEAK DISCHARGE RATE =       51.80 CFS  AT   1.500 HOURS   BASIN AREA =   .0249 SQ. MI.


*S **BASIN 501 IS THE AREA PROPOSED AS FUTURE LONGFORD SD DRAINING
*S **DIRECTLY TO THE AMOLE CHANNEL
COMPUTE NM HYD       ID=17 HYD NO=501.00 AREA=0.03663 SQ MI
                     PER A=0 PER B=29 PER C=29 PER D=42
                     TP=-0.1333 HR   MASS RAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   60.739    CFS   UNIT VOLUME =    .9992       B =   526.28      P60 = 1.8700
    AREA =       .015385 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   56.527    CFS   UNIT VOLUME =    1.000       B =   354.67      P60 = 1.8700
    AREA =       .021245 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD            ID=17   CODE=1
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```
                                OUTFLOW HYDROGRAPH RESERVOIR   501.00

    RUNOFF VOLUME =     1.29860 INCHES     =       2.5369 ACRE-FEET
    PEAK DISCHARGE RATE =      76.18 CFS  AT   1.500 HOURS   BASIN AREA =   .0366 SQ. MI.


*S **COMBINE BASINS 500 AND 501 TOGETHER TO REPRESENT THE NORTHERN PART OF THE
*S **LONGFORD SD
ADD HYD             ID=18  HYD NO=501.1  ID I=16  ID II=17
PRINT HYD           ID=18  CODE=1

                                OUTFLOW HYDROGRAPH RESERVOIR   501.10

    RUNOFF VOLUME =     1.29859 INCHES     =       4.2618 ACRE-FEET
    PEAK DISCHARGE RATE =     127.98 CFS  AT   1.500 HOURS   BASIN AREA =   .0615 SQ. MI.


*S **BASIN 502 IS THE SOUTHERN PART OF THE LONGFORD SD
COMPUTE NM HYD      ID=19 HYD NO=502.00 AREA=0.05788 SQ MI
                    PER A=0 PER B=28 PER C=28 PER D=44
                    TP=-0.1333 HR   MASS RAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   100.55    CFS   UNIT VOLUME =    .9993       B =   526.28      P60 = 1.8700
    AREA =      .025467 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   86.240    CFS   UNIT VOLUME =    1.000       B =   354.67      P60 = 1.8700
    AREA =      .032413 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD           ID=19  CODE=1

                                OUTFLOW HYDROGRAPH RESERVOIR   502.00

    RUNOFF VOLUME =     1.32159 INCHES     =       4.0796 ACRE-FEET
    PEAK DISCHARGE RATE =     121.79 CFS  AT   1.500 HOURS   BASIN AREA =   .0579 SQ. MI.


*S **BASIN 503 IS CURRENTLY UNDEVELOPED, ASSUME FUTURE DEVELOPMENT WILL BE @
*S **A DENSITY OF 4 DU/AC
COMPUTE NM HYD      ID=20 HYD NO=503.00 AREA=0.03752 SQ MI
                    PER A=0 PER B=29 PER C=29 PER D=42
                    TP=-0.1333 HR   MASS RAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   62.215    CFS   UNIT VOLUME =    .9992       B =   526.28      P60 = 1.8700
    AREA =      .015758 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330
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```
    K =    .118429HR    TP =    .133300HR    K/TP RATIO =    .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =    57.901    CFS   UNIT VOLUME =    1.000        B =   354.67      P60 = 1.8700
    AREA =       .021762 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD           ID=20  CODE=1

                                OUTFLOW HYDROGRAPH RESERVOIR   503.00


    RUNOFF VOLUME =     1.29860 INCHES     =       2.5986 ACRE-FEET
    PEAK DISCHARGE RATE =      78.03 CFS  AT   1.500 HOURS   BASIN AREA =   .0375 SQ. MI.


*S*************************************************************************
*S **BASIN 504 IS CURRENTLY UNDEVELOPED, ASSUME FUTURE DEVELOPMENT WILL BE @
*S **A DENSITY OF 4 DU/AC
COMPUTE NM HYD      ID=1 HYD NO=504.00 AREA=0.036668 MI
                    PER A=0 PER B=28 PER C=28 PER D=44
                    TP=-0.1333 HR   MASS RAIN=-1

    K =    .072649HR    TP =    .133300HR    K/TP RATIO =    .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =    63.698    CFS   UNIT VOLUME =    .9992        B =   526.28      P60 = 1.8700
    AREA =       .016134 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

    K =    .118429HR    TP =    .133300HR    K/TP RATIO =    .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =    54.635    CFS   UNIT VOLUME =    1.000        B =   354.67      P60 = 1.8700
    AREA =       .020534 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD           ID=1  CODE=1

                                OUTFLOW HYDROGRAPH RESERVOIR   504.00


    RUNOFF VOLUME =     1.32159 INCHES     =       2.5845 ACRE-FEET
    PEAK DISCHARGE RATE =      77.16 CFS  AT   1.500 HOURS   BASIN AREA =   .0367 SQ. MI.


*S **BASIN 505 IS FULLY DEVELOPED AND DRAINS SOUTH TO BLAKE RD.
COMPUTE NM HYD      ID=2 HYD NO=505.00 AREA=0.02618 SQ MI
                    PER A=33 PER B=19 PER C=19 PER D=29
                    TP=-0.1333 HR   MASS RAIN=-1

    K =    .072649HR    TP =    .133300HR    K/TP RATIO =    .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =    29.974    CFS   UNIT VOLUME =    .9990        B =   526.28      P60 = 1.8700
    AREA =       .007592 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330
```

```
K =    .139463HR    TP =    .133300HR    K/TP RATIO =  1.046235     SHAPE CONSTANT, N =  3.374403
UNIT PEAK =    43.373    CFS   UNIT VOLUME =    .9997        B =   311.05      P60 = 1.8700
AREA =       .018588 SQ MI    IA =    .52958 INCHES    INF =   1.33282 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD           ID=2   CODE=1

                              OUTFLOW HYDROGRAPH RESERVOIR   505.00

RUNOFF VOLUME =     1.00753 INCHES     =       1.4068 ACRE-FEET
PEAK DISCHARGE RATE =      43.10 CFS  AT   1.500 HOURS   BASIN AREA =   .0262 SQ. MI.


FINISH

NORMAL PROGRAM FINISH          END TIME (HR:MIN:SEC) = 11:10:28
```