CHAVEZ • GRIEVES
CONSULTING ENGINEERS, INC.
THE ENGINEERING FIRM OF CHOICE

5639 JEFFERSON STREET NE • ALBUQUERQUE, NEW MEXICO 87109 • PHONE (505) 344-4080 • FAX (505) 343-8759

GRADING AND DRAINAGE PLAN

FOR

SAGE POINTE SUBDIVISION

Albuquerque, New Mexico

February, 1998

COA Drainage Report No. M10/D11

C-G Project No. A42-101-5197

CITY OF
Albuquerque

March 9, 1998

Joseph L. DeFronzo, P.E.
Chavez-Grieves
5639 Jefferson NE
Albuquerque, New Mexico 87109

DESERT SAGE

M-10/D11A

RE: Drainage Report and Grading and Drainage Plan for Sage Pointe Subdivision (M10/D11) Submitted for Preliminary Plat Approval, Engineer's Stamp Dated 2/17/98.

Dear Mr. DeFronzo:

Based on the information provided with the submittal of February 17, 1998, the above referenced plan is approved for Preliminary Plat action provided that the Infrastructure List includes the inlets needed on 82nd Street. These must be designed prior to DRC approval.

Prior to Final Plat or DRC sign-off, the following must be addressed:

1. Provide the calculations to verify the capacity of the channel between Lots 19 and 20. The final design of the outfall from the two channels to the street may be determined at DRC.

2. Show that the 100-year storm will not impact the homes if the sump inlets should become clogged. The 20' public storm drain easement should not be used as an emergency overflow.

3. Was the runoff from Basin 540 accounted for in the AHYMO calculations?

4. Is the proposed 42" storm drain in Unser designed to accommodate the runoff from the future improved street section?

If you have any questions regarding these comments, please call me at 924-3982.

Sincerely,

Susan Calongne

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

c: Harold Albert, Owner
DRB-97-173
File

DRAINAGE INFORMATION

PROJECT TITLE: ~~Sage Pointe Subdivision~~ Desert Sage ZONE ATLAS/DRNG. FILE #: M-10/11 A

DRB#: 97-173 EPC #: WORK ORDER #:

LEGAL DESCRIPTION: Tracts 486, 487, 488, Town of Atrisco Grant Unit 7

CITY ADDRESS: Sage Road and 82nd Street

ENGINEERING FIRM: Chavez-Grieves CONTACT: Joseph DeFronzo, P.E.

ADDRESS: 5639 Jefferson NE PHONE: 344-4080

OWNER: Harold Albert CONTACT:

ADDRESS: PHONE: 296-1600

ARCHITECT: CONTACT:

ADDRESS: PHONE:

SURVEYOR: CONTACT:

ADDRESS: PHONE:

CONTRACTOR: CONTACT:

ADDRESS: PHONE:

TYPE OF SUBMITTAL:

___ DRAINAGE REPORT
_ DRAINAGE PLAN
___ CONCEPTUAL GRADING & DRAINAGE PLAN
X GRADING PLAN
X EROSION CONTROL PLAN
___ ENGINEER'S CERTIFICATION
___ OTHER

PRE-DESIGN MEETING:

___ YES
X NO
___ COPY PROVIDED

DATE SUBMITTED: 2-17-98

BY: JOSEPH DEFRONZO, P.E.

CHECK TYPE OF APPROVAL SOUGHT:

___ SKETCH PLAT APPROVAL
X PRELIMINARY PLAT APPROVAL
___ S. DEV. PLAN FOR SUB'D. APPROVAL
___ S. DEV. PLAN FOR BLDG. PRMT. 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
___ OTHER

RECEIVED
FEB 17 1998
HYDROLOGY SECTION

CHAVEZ • GRIEVES
CONSULTING ENGINEERS, INC.
THE ENGINEERING FIRM OF CHOICE
5639 JEFFERSON STREET NE • ALBUQUERQUE, NEW MEXICO 87109 • PHONE (505) 344-4080 • FAX (505) 343-8759

February 17, 1998

Ms. Susan Calongne, P.E.
City of Albuquerque
Public Works Department
Hydrology Division
Plaza del Sol Building
600 2nd Street NW
Albuquerque, NM 87102

RE: SAGE POINTE SUBDIVISION (M10/D11)
C-G PROJECT. NO. A42-101-5197

Dear Ms. Calongne:

We are submitting this grading and drainage plan for preliminary plat approval. Thank you for your willingness to meet with Lou Medrano, Joe Kelley, Fred Aguirre and myself on January 16, 1998 and again with Fred and myself on February 13. We have revised this report based on the discussion at those meetings and your written comments of January 12, 1997. Those comments have been addressed as follows:

1. The existing contours have been indicated on the preliminary grading and drainage plan (sheet C2 & C3) to a point 200' beyond the west property boundary per your request. We feel that this information is adequate to show how the basins to the west drain into the site. The full drainage basins with the contours can be found in the Arenal/Unser Master Drainage Plan.

2. The proposed ribbon channels have been deleted on the east, west and south property boundaries. The runoff from the area west of this site will be conveyed through an 11' public right-of-way and the conveyance structures will be built to City standards with 10' bottom widths.

3. The lots on the east side of Artemisa Place will not drain to the back, i.e. to 82nd Street. The plan has been revised such that all the lots drain to the front, i.e. to Artemisa Place.

4. The grading plan has been revised so that the lots drain to the streets and the inlets are located in the streets.

5. Based on information provided by Fred Arfman of Isaacson & Arfman, a 156' roadway and public utility easement was granted by the bulk land plat for this area filed on August 3, 1987. Per our meeting on Friday February 13, Fred

Aguirre stated that this easement should cover storm drain improvements. Therefore, as requested in our meeting we have referenced the easement granted by the plat on Sheet C6. As indicated on page 4 and Figure 3 of this report, the 30" pipe will have the capacity for the street flows in Unser.

6. As shown on Sheet C5 (previously Sheet C6) the new grade over the proposed 30" storm drain will match the existing grade. Therefore, the existing drainage pattern will be maintained in this area.

Should you have any questions prior to preliminary plat approval, please call me or Lou Medrano.

Sincerely,

CHAVEZ-GRIEVES CONSULTING ENGINEERS, INC.

Joseph L. DeFronzo, P.E.
Senior Engineer

Cy: Harold Albert
Project file

CITY OF
Albuquerque

March 9, 1998

Joseph L. DeFronzo, P.E.
Chavez-Grieves
5639 Jefferson NE
Albuquerque, New Mexico 87109

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Sincerely,

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GRADING AND DRAINAGE PLAN

SAGE POINTE SUBDIVISION

Albuquerque, New Mexico

JOSEPH L. DeFRONZO
NEW MEXICO
12663
REGISTERED PROFESSIONAL ENGINEER

Joseph L. DeFronzo
2-17-98

February, 1998

COA Drainage Report No. M10/D11

C-G Project No. A42-101-5197

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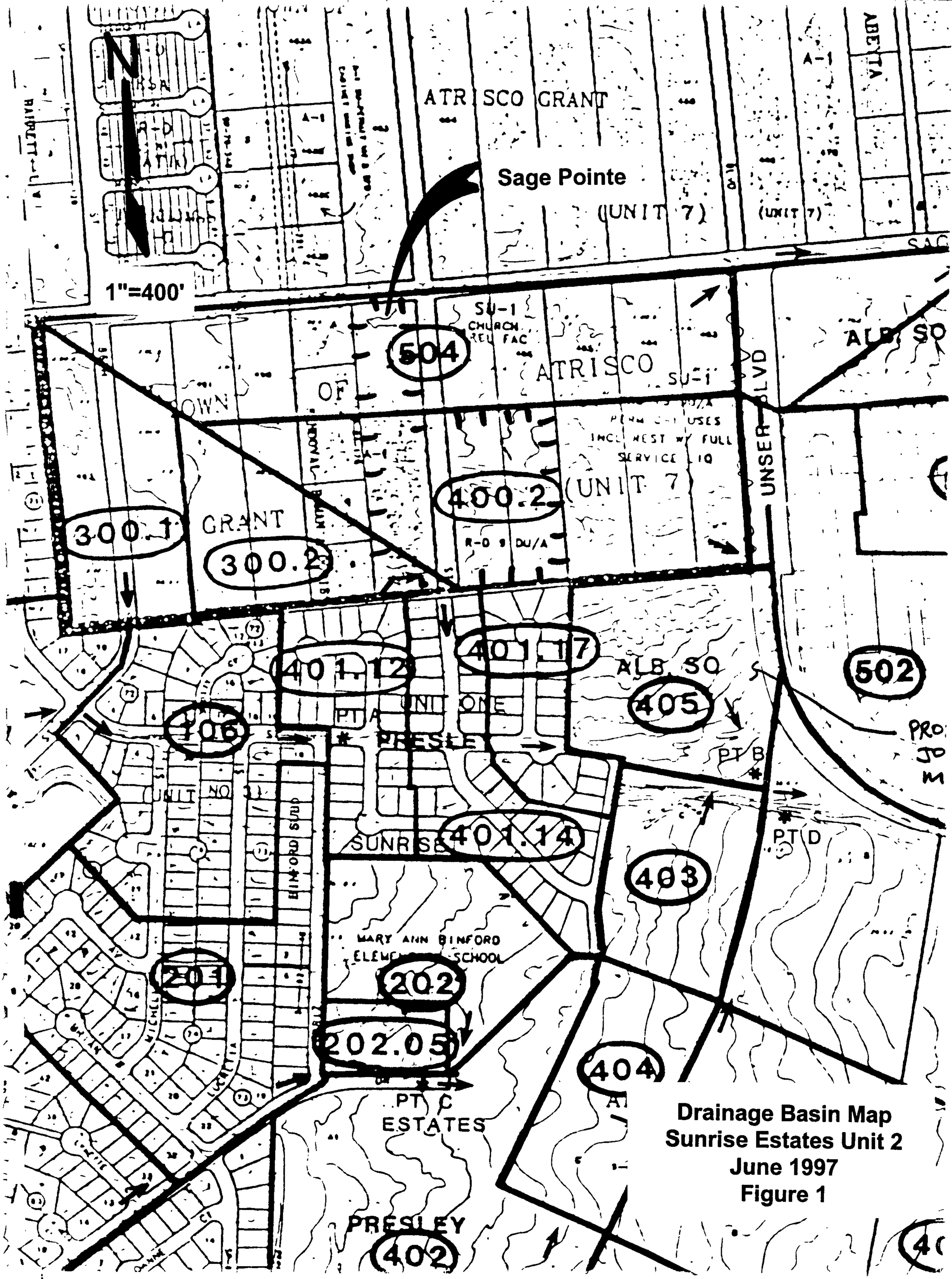
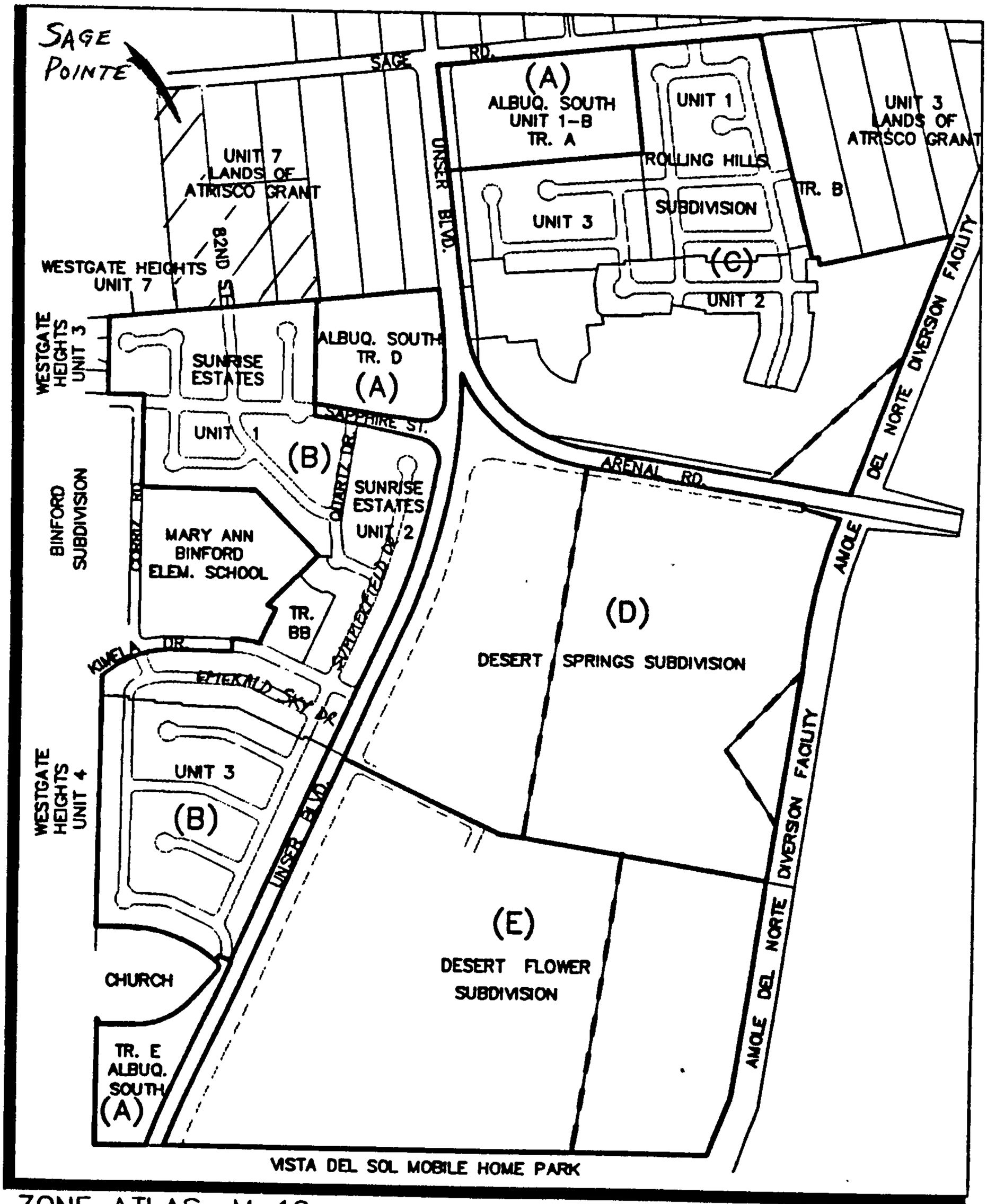


Drainage Basin Map
Sunrise Estates Unit 2
June 1997
Figure 1

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

FROM ARENAL/UNSER DRAINAGE PLAN

FIGURE 2

Analysis Point Summary					
Analysis Point	Exist. Q (cfs)	Dev. Q (cfs)	Conveyance	Capacity (cfs)	Cross Reference
1 west	--	16.87	Concrete Channel	71.58	A-25
1 north	12.99	53.13	82nd Street	66.42	A-27
2	5.56	0	Ground Surface	--	A-34
2 south	--	22.75	Pipe	50.69*	A-38
3	21.2	0	Ground Surface	--	A-34
4	--	22.77	Pipe	42.15*	A-37
5	--	6.27	Red Sage Avenue	88.82	A-35
6	--	16.5	Sageway Drive	108.78	A-36
8	--	42.89	Artemisa Place	54.39	A-20
9	--	47.9	Artemisa Place	74.05	A-23
10		79.15	82nd Street	91.05	A-29
11	71.44	71.44	Sapphire Street	126.28	A-13
11 east	415.66	456.66	Pipe	625.67	A-30
11 east	--	58.49	Sapphire Street	103.11	A-29
13		37.21	Concrete Channel	9.67	A-18
16 north	--	38.06	Fut. From Basin 400.2	--	A-39
16 south	--	59.96	Pipe	91.17	A-39
17 west	--	632.32	Pipe	625.67	A-41
D	--	17.57	Det. Pond Vol. (Ac-ft)	21.31	A-49 - 58

* These storm drains have more than twice the 100-year capacity because they are discharging from an area that is in a sump condition.

FIGURE 3

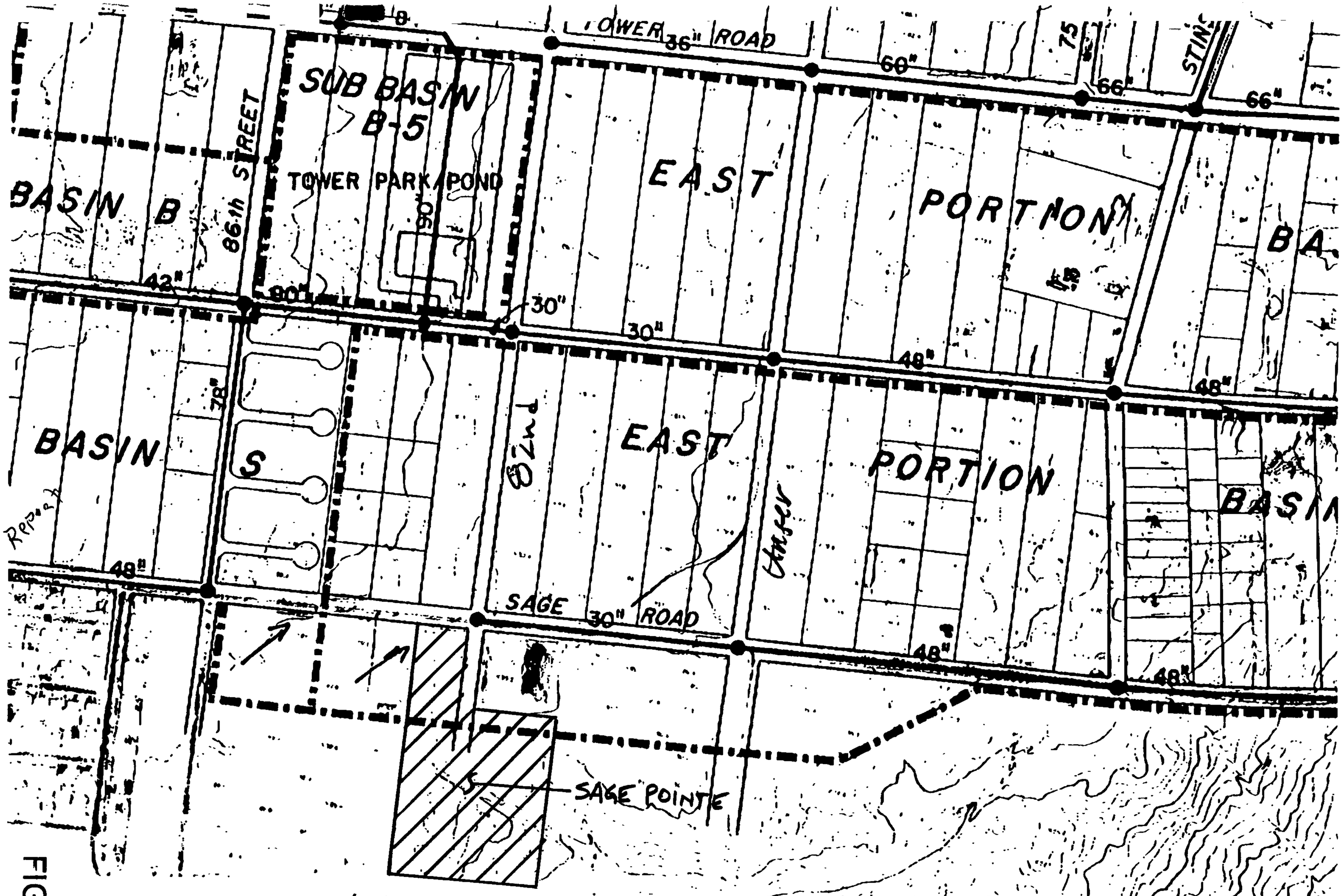
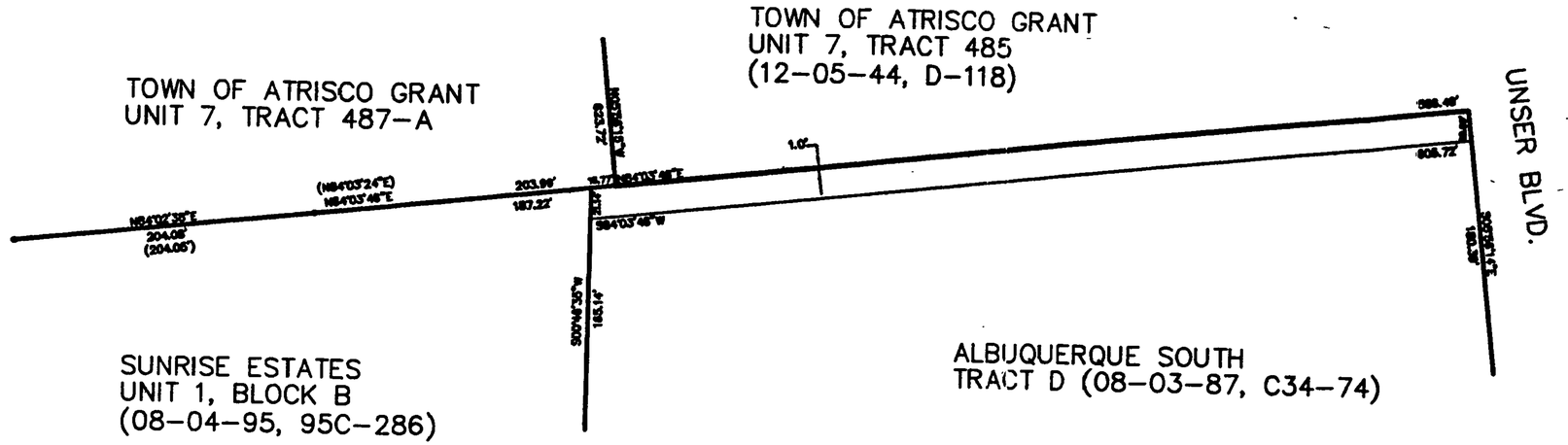


FIGURE 4

Post-it® Fax Note 7671	Date 11/7/97 # of pages ▶
To Joe DeFronzo	From Scott Beeson
Co./Dept. CG	Co. AA&R
Phone #	Phone #
343 8759	Fax # 266 8112

Rev. Oct 97
Tower / Sage Drainage Master Plan
part of A & NO. 3

RELATED DRB NO. 97-173



GRAPHIC SCALE

100 0 50 100 200

(IN FEET)
1 inch = 100 ft.

RICHARD A. BORGEL
NEW MEXICO
7429
REGISTERED PROFESSIONAL LAND SURVEYOR

LEGAL DESCRIPTION

THAT CERTAIN TRACT OF LAND SITUATE WITHIN PROJECTED SECTION 34, T10N, R2E, NMPM, WITHIN THE TOWN OF ATRISCO GRANT, BERNALILLO COUNTY, N.M. BEING A TRACT OF LAND FOR A DRAINAGE EASEMENT WITHIN TRACT "D" AS SUCH TRACT IS SHOWN ON THE PLAT OF TRACTS A THROUGH F, ALBUQUERQUE SOUTH, UNIT 1 FILED IN THE OFFICE OF THE BERNALILLO COUNTY CLERK ON AUGUST 3, 1987, VOL C34, FOLIO 74, AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE NORTHEAST CORNER OF THE TRACT HEREIN DESCRIBED, SAID POINT BEING THE NORTHEAST CORNER OF TRACT "D" FILED AUGUST 3, 1987, VOL. C34, FOLIO 74, RECORDS OF BERNALILLO COUNTY CLERK, WHENCE ACS STATION 1-M10 BEARS N 00°17'00" W, 1032.15' AND RUNNING; THENCE, S 05°56'14" E, 1.00 FOOT TO THE NORTHEAST CORNER AND POINT OF BEGINNING OF THIS EASEMENT SAID POINT BEING ON THE WESTERLY RIGHT OF WAY OF UNSER BOULEVARD, S.W. THENCE, S 05°56'14" E, 20.00 FEET TO THE SOUTHEAST CORNER; THENCE, LEAVING SAID RIGHT OF WAY OF UNSER BOULEVARD, S.W. S 84°03'46" W, 605.72 FEET TO THE SOUTHWEST CORNER; THENCE, N 00°46'35" E, 21.14 FEET TO TO THE NORTHWEST CORNER; THENCE, N 84°03'24: E, 16.77 FEET; THENCE, S 05°[illegible]'17" E, 1.00 FOOT; THENCE, S 84°03'46" E, 586.49' [illegible] THE NORTHEAST CORNE.. AND POINT OF BEGINNING.

SURVEYOR'S CERTIFICATION

I, RICHARD A. BORGEL, A NEW MEXICO REGISTERED PROFESSIONAL SURVEYOR, CERTIFY THAT I CONDUCTED AND AM RESPONSIBLE FOR THIS SURVEY, THAT THIS SURVEY IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF, AND THAT THIS SURVEY AND PLAT MEET THE MINIMUM STANDARDS FOR SURVEYING IN NEW MEXICO, ALONG WITH THE MINIMUM REQUIREMENTS OF MONUMENTATION AND SURVEYS OF THE ALBUQUERQUE SUBDIVISION ORDINANCE.

I FURTHER CERTIFY THAT THIS SURVEY IS NOT A LAND DIVISION OR SUBDIVISION AS DEFINED IN THE NEW MEXICO SUBDIVISION ACT AND THAT THIS IS A BOUNDARY SURVEY PLAT OF ANY EXISTING TRACT OR TRACTS.

Richard A. Borgel
RICHARD A. BORGEL, N.M.R.P.L.S. 7429 11-10-97

Exhibit "A"

FIGURE 5

PERMANENT EASEMENT

Grant of Permanent Easement, between Albuquerque South ("Grantor"), whose address is P.O. Box 27047 Albuq NM 87125 7047 and the City of Albuquerque, a New Mexico municipal corporation ("City"), whose address is P.O. Box 1293, Albuquerque, New Mexico, 87103.

Grantor grants to the City an exclusive, permanent easement ("Easement") in, over, upon and across the real property described on Exhibit "A" attached hereto ("Property") for the construction, installation, maintenance, repair, modification, replacement and operation of STORM DRAIN, together with the right to remove trees, bushes, undergrowth and any other obstacles upon the Property if the City determines they interfere with the appropriate use of this Easement.

Grantor covenants and warrants that Grantor is the owner in fee simple of the Property, that Grantor has a good lawful right to convey the Property or any part thereof and that Grantor will forever warrant and defend the title to the Property against all claims from all persons or entities.

The grant and other provisions of this Easement constitute covenants running with the land for the benefit of the City and its successors and assigns until terminated.

WITNESS my hand and seal this _____ day of _____, 199__.

GRANTOR:

_____
(Individual)

GRANTOR: ALBUQUERQUE SOUTH
BY: ARJAY, INC, CO-MANANGING PARTNER

By: _____
Its: _____
(Corporation or Partnership)

FIGURE 5

INDIVIDUAL

STATE OF _____)
) ss
COUNTY OF _____)

The foregoing instrument was acknowledged before me this _____ day of _____, 199__, by _____.

_____
Notary Public

My Commission Expires:

_____

CORPORATION

STATE OF _____)
) ss
COUNTY OF _____)

The foregoing instrument was acknowledged before me this _____ day of _____, 199__, by _____, _____ of _____, a _____ corporation, on behalf of the corporation.

_____
Notary Public

My Commission Expires:

_____

PARTNERSHIP

STATE OF _____)
) ss
COUNTY OF _____)

The foregoing instrument was acknowledged before me this _____ day of _____, 199__, by _____, partner(s), on behalf of _____, a partnership.

_____
Notary Public

My Commission Expires:

_____

(EXHIBIT "A" ATTACHED)

FIGURE 5

SAGE POINTE SUBDIVISION DRAINAGE REPORT

LOCATION AND ANNEXATION STATUS

This site is located on Albuquerque's west side, south of Sage Road. The ten acre site is split down the middle by 82nd Street, an undeveloped platted road that has recently been annexed into the City.

The five acres east of 82nd Street are within the City's corporate limits, while the five acres west of 82nd Street are in the process of being annexed into the City. The EPC recommended approval of the annexation in their August 21, 1997 hearing. The City Council unanimously approved the annexation request on December 15, 1997.

LEGAL DESCRIPTION

Tract 488 and a portion of tracts 486 and 487 of the town of Atrisco Grant Unit 7.

SURROUNDING DEVELOPMENT

The subdivision is located in a developing residential area. There is a fully-developed residential subdivision adjacent to the site on the south, and residential subdivisions on the north. There is a church to the north of the eastern portion of the subdivision, and one house on one of the large lots just west of the subdivision. The remainder of the nearby area is vacant land and residentially zoned.

FLOOD HAZARD ZONES

As shown on the grading plan, Panel 35001C0336 of the National Flood Insurance Rate Maps for Bernalillo County, dated September 20, 1996, indicates that a designated flood hazard zone AE is adjacent to the site on the north in the Sage Road right-of-way. Zone AE designates 100-year flood plain areas with "base flood elevations determined." In its current platted location, the north property boundary of Sage Pointe is slightly within the flood plain. However, one of the conditions of plat approval, as required by the DRB on October 21, 1997, is that additional right-of-way be dedicated on Sage Road because of its designation as a minor arterial in the City's Long Range Master Street Plan. This dedication will cause the property line to shift 13' to the south, and will remove Sage Pointe property from the flood plain. In addition, the 100-year water surface elevations indicated on the FEMA map all fall within the Sage Road right-of-way. The subdivision is therefore clearly outside of the flood plain.

RELATED REPORTS

The approved Arenal/Unser Drainage Management Plan (A/UDMP), by Isaacson and Arfman, establishes the drainage parameters for the development of the area that drains to the Sapphire Street storm drain, 500' south of Sage Pointe. Sage Pointe is within this Management Plan area, and the design included in this report is consistent with the Management Plan. The approved Drainage Report for Sunrise Estates Unit Two Subdivision (SE2), by Isaacson and Arfman, includes inlet capacity calculations for the storm drain in Sapphire Street, as well as a more detailed drainage basin map for the area south of Sapphire Street. The A/UDMP includes the overall AHYMO analysis for the area, and a copy of the computer analysis was obtained and modified for this report.

According to the SE2 report, there are three drainage basins which cross the Sage Pointe site: Basin 300.2, which discharges to Analysis Point 3--82nd Street to the south; Basin 400.2, which discharges to two points: Analysis Point 2 on the south (the backs of existing residential lots) and Analysis Point 3 on the east (undeveloped subdivision land); and Basin 504, which discharges to Sage Road. It appears that the south boundary line of Basin 504 is depicted further to the south than is true, as indicated by visual observation of the contour map. Basin 504 was redrawn to encompass a smaller area in the current analysis.

Isaacson and Arfman were consulted during the preparation of this report, and they stated that there may be additional capacity in the Sapphire storm drain which could be tapped. The A/UDMP AHYMO analysis did not divide the surface runoff into the storm drain, but merely routed the runoff via the surface into the regional detention pond southeast of Arenal/Unser. The present AHYMO run distributed the runoff into the storm drain in accordance with as-built conditions and the two reports.

The Tower/Sage Drainage Master Plan by Andrews, Asbury, and Robert, dated October, 1997, established preliminary sizing and location of storm drain improvements in Sage Road. Figure 4 is a reprint of the relevant portion of that plan, and shows that no storm drainage infrastructure will be needed in Sage Road along the north frontage.

EXISTING SITE CONDITIONS AND DRAINAGE PATTERN

The existing site is sparsely vegetated by desert shrubs and grass. The western portion of the site is fairly flat, while a 2' to 5' deep minor arroyo bed cuts through the middle of the site. Slopes of 7% exist on the majority of the eastern part of the site. Off-site runoff from the west flows across the site, joins the on-site runoff, and discharges to the east and south property lines of the site.

The adjacent church located on the southeast corner of 82nd Street and Sage Road is served by a paved entrance in the 82nd Street right-of-way, and it is not graded properly for drainage. There is standing water in 82nd adjacent to the church site after storm events. Runoff from the church site discharges to the east and north, with only a very small strip discharging to the south onto Sage Pointe.

As shown by Figure 1, Basin 300.2 is intended to discharge to 82nd Street at Analysis Point 1 along the south property line of Sage Pointe. Under existing conditions, much of this runoff actually discharges to the south through residential lots. However, in accordance with current City Hydrology practice, Sage Pointe must be designed to accommodate all the runoff from Basin 300.2, as well as to correct the erosion problems due to runoff that discharges to the south into the adjacent residential lots.

Similarly, Basin 400.2 is intended to discharge to the east along the south and east property lines of Sage Pointe. Under existing conditions some runoff discharges into the existing residential lots on the south (Analysis Point 2), and the remainder discharges to the undeveloped land on the east (Analysis Point 3). Basin 400.2 was subdivided in the AHYMO analysis to determine the quantity of runoff discharging to these points under existing conditions.

PROPOSED SITE CONDITIONS AND DRAINAGE PATTERN

In general, half of the Sage Pointe runoff and all of the off-site runoff from the west will be conveyed south via 82nd Street to Sapphire Street, where some of the runoff will discharge into the storm drain, and the remainder will discharge to the east in the street. The other half of the Sage Pointe runoff will be captured by a new storm drain system. This system will discharge to the Sapphire storm drain via a new off-site easement running east across Albuquerque South Tract D, and then south in Unser right-of-way, as indicated on the appended profiles. As indicated in Figure 3 and in the hydraulic grade line profile (page B-4 and sheets C5-C6), the streets and the proposed Unser storm drain have sufficient capacity to discharge this runoff. This scenario is in accordance with the A/UDMP.

Runoff from the 5 on-site acres west of 82nd will be conveyed to Analysis Point 1 via the new streets. Off-site runoff from the west was computed based on the approved A/UDMP land treatment factors. This runoff will continue to pond upstream of the existing arroyo that traverses the site. The pond will discharge to Artemisa Place via the new concrete channel within the public storm drain easement. This channel will be constructed per City Standards with a 10' bottom width and it will be maintained by the City.

Eventually the entire basin will collect and discharge from the site at Analysis Point 1. From that point, the runoff will discharge south on 82nd, and join the remainder of the runoff in Sapphire Street. From this point, the runoff will discharge to the east via the storm drain and the street, in accordance with the plans by Isaacson and Arfman. As summarized in Figure 3, there is adequate street and storm drain capacity for this scenario.

The remainder of the on-site runoff will be discharged to the Sapphire Street storm drain via a new storm drain system. Most of the remaining lots will discharge into the new streets and then into this system via an inlet in sump condition at Analysis Point 4. Because it is in a sump, the inlet has been designed to convey twice the 100-year runoff (page B-1). From this point, the runoff will be conveyed to Unser Road via storm drain pipes in a new easement being dedicated across Albuquerque South Tract D.

The contiguous boundary between Sage Pointe and Albuquerque South Tract D is 16' in length. This is less than the standard 20' normally dedicated for drainage easements in the City of Albuquerque. However, as shown on the grading plan, this "pinch point" occurs at a single point, and does not encumber a stretch of line. The storm drain will be 4' deep at this location, and the trench prism will easily fit within the pinched portion of the easement, as it will be between 4' and 12' wide at the top of the trench. Both sides of this "pinch point" will be accessible for maintenance purposes.

Runoff from Sage Pointe will be conveyed east to Unser via a 30" pipe, and then south to Sapphire via a 30" pipe. Runoff from the remainder of Basin 400.2 can be discharged into the new manhole on Unser, and a pipe will be stubbed out to the north for this purpose.

As computed in the AHYMO run and as indicated in Figure 3, the regional detention facility has sufficient capacity to attenuate the developed flows in accordance with the original plan. There is essentially no change in the amount of runoff; the only change has been the routes which the runoff will now take to reach the facility.

The discharge to the Sapphire storm drain system is in accordance with prior City plans. The original AHYMO run was provided by Isaacson and Arfman, and was modified for this development. As shown in the original design on sheet 13 of 22 (attached), the storm drain discharged into the detention pond with a flow of 623 cfs, and a pond elevation of 5025. The new AHYMO run computed a discharge of 632.32 cfs (see Figure 3), and the 100-year pond elevation for the hydraulic grade line calculation is 5024.67 (page A-50). This discharge includes all of the drainage basins which were discharging to the storm drain previously, and the discharge points are in accordance with the original design.

PERIMETER CONDITIONS

Off-site runoff from the west will continue to pond upstream of the existing arroyo that traverses the site. The runoff will discharge to Artemisa Place via the new concrete channel within the public storm drain easement. The channel will be constructed per City Standards with a 10' bottom width.

On-site runoff naturally discharges to the south along the south property line. This pattern has resulted in erosion of the steep slopes in the neighboring residential backyards. There is an existing wood fence along this property line, but it does not deter runoff and erosion. The lots in this area will be graded such that the runoff drains to the street. However, a new retaining wall will be constructed adjacent to the existing wood fence (see section 5/C4) to create backyard ponding. This alternative was discussed with City Hydrology personnel and is acceptable.

On-site runoff naturally discharges to the east along the east property line. The lots in this area (7-16) will be graded such that they discharge to the new street, while lot 17 will have a new retaining wall at the rear per section 5/C4 to create backyard ponding.

A small portion of the church site currently drains across the northeast corner of this site. This runoff is very minor and will be east along the north property line.

On the far north, Sage Road will receive less runoff than it does under existing conditions. All of the runoff from the developed condition will discharge to the new street.

The new lots on the west side of 82nd Street will have the following drainage pattern: the roofs, front yards and back yards will discharge to Artemisa Place.

HYDROLOGY/HYDRAULICS

The runoff calculations and design have been done in accordance with Section 22.2 of the Development Process Manual of the City of Albuquerque, January 1993.

The computerized hydrologic model, AHYMO, was used to calculate storm volumes in accordance with Section 22.2. The 1-hour, 6-hour, and 24-hour precipitation depths were derived from figures C-1, C-2, and C-3 of Section 22.2.

The AHYMO model was also used to do the storm drain routing and to compute street, detention pond, and storm drain capacities. Rating curves for all the applicable conveyance structures can be found in the AHYMO run, as noted in Figure 3. Hydraulic

The AHYMO model was also used to do the storm drain routing and to compute street, detention pond, and storm drain capacities. Rating curves for all the applicable conveyance structures can be found in the AHYMO run, as noted in Figure 3. Hydraulic grade line computations were made in accordance with Section 22.2 of the DPM.

APPENDIX A

HYDROLOGIC COMPUTATIONS

Sage Pointe Subdivision -- 100-Year Design Storm AHYMO Analysis

```
AHYMO PROGRAM (AHYMO_97) -- Version:  1997.02c
RUN DATE (MON/DAY/YR) = 02/16/1998
START TIME (HR:MIN:SEC) = 18:57:40
USER NO.= AHYMO-I3Chavez-Grieves-C
INPUT FILE = C:\KIM\AHYMO2.IN

*S*************************************************************************
*S*************  CHAVEZ-GRIEVES CONSULTING ENGINEERS, INC.  ****************
*S*************            SAGE POINTE SUBDIVISION          ****************
*S*************************************************************************
*S*  FILENAME:  G:\A42\101\DOCUMENT\HYDROLGY\AHYMO2.IN/.OUT
*S*************************************************************************
*S**********  100-YEAR, 6-HOUR STORM
*S*  THIS AHYMO RUN IS A REVISION OF AN AHYMO ANALYSIS PERFORMED BY
*S*  ISAACSON AND ARFMAN ON 08/20/97 FOR THE ARENAL/UNSER DRAINAGE MANAGEMENT
*S*  PLAN (AUDMP).  MANY OF THE BASINS USED IN THAT AHYMO RUN WERE ORIGINALLY
*S*  DELINEATED IN THE SUNRISE ESTATES UNIT 2 (SE2) DRAINAGE REPORT BY
*S*  ISAACSON AND ARFMAN.  AL REVISIONS WHICH HAVE BEEN ADDED TO THE
*S*  08/20/97 DATA FILE WILL BE PRECEDED BY A COMMENT DELINEATED WITH A *S*.
*S                  SUNRISE4.DAT
*S                  REVISED BY: JMN 8/19/97
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        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=5 REACH NO=1 NO VS=1 L=754 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	.1937
.105	.554	.95	.1220
.158	1.246	2.80	.0931
.211	2.215	6.03	.0769
.263	3.461	10.94	.0662
.316	4.920	18.84	.0547
.368	6.394	29.08	.0461
.421	7.869	41.00	.0402
.474	9.344	54.46	.0359
.526	10.821	69.37	.0327
.579	12.298	85.66	.0301
.632	13.776	103.24	.0279
.684	15.261	119.89	.0267
.737	16.869	132.52	.0267
.790	18.644	147.34	.0265
.842	20.586	164.39	.0262
.895	22.695	183.72	.0259
.947	24.971	205.41	.0255
1.000	27.414	229.56	.0250

```
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 =     32.05 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 =    234.45 CFS  AT   1.533 HOURS   BASIN AREA =   .1485 SQ. MI.
```

```
*S ROUTE THE FLOW IN AN EXISTING 28' F-F RESIDENTIAL STREET
*S*  REVISE THE RATING CURVE COMMAND SO THAT THE STREET CAPACITY WILL
*S*  NOT BE EXCEEDED.  THIS REVISION WILL BE DONE BY ADDING A VERTICAL
*S*  LINE AT EACH END OF THE SECTION.  THIS WILL NOT CHANGE THE RESULT
```

```
*S*  OF THE AHYMO RUN, EXCEPT THAT THE RATING CURVE WILL NOW NOT BE
*S*  EXCEEDED.
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEG=1 MIN EL=100.00 MAX EL=102.00
                    CH SLOPE=0.02 FP SLOPE=0.02 N=0.017 DIST=48.0
                    DIST  ELEV  DIST  ELEV  DIST  ELEV  DIST  ELEV
                     0   102.00
                     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
                    48.0 102.00
```

RATING CURVE VALLEY SECTION 1.0

WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH FT
100.00	.00	.00	.00
100.11	.55	.95	10.52
100.21	2.21	6.03	21.04
100.32	4.92	18.83	27.99
100.42	7.87	40.99	28.03
100.53	10.82	69.36	28.06
100.63	13.77	103.23	28.09
100.74	16.87	132.51	32.13
100.84	20.58	164.37	38.48
100.95	24.97	205.38	44.83
101.05	29.94	265.65	48.00
101.16	34.99	344.01	48.00
101.26	40.04	430.12	48.00
101.37	45.09	523.59	48.00
101.47	50.15	624.09	48.00
101.58	55.20	731.33	48.00
101.68	60.25	845.08	48.00
101.79	65.30	965.11	48.00
101.89	70.36	1091.21	48.00
102.00	75.41	1223.20	48.00

```
COMPUTE TRAVEL TIME  ID=7 REACH NO=1 NO VS=1 L=1040 FT SLP=0.02
```

TRAVEL TIME TABLE

REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.105	.554	.95	.1683
.211	2.215	6.03	.1060
.316	4.919	18.83	.0755
.421	7.868	40.99	.0555
.526	10.820	69.36	.0451
.632	13.775	103.23	.0385
.737	16.867	132.51	.0368
.842	20.583	164.37	.0362
.947	24.968	205.38	.0351
1.053	29.937	265.65	.0326
1.158	34.989	344.01	.0294
1.263	40.042	430.12	.0269
1.368	45.094	523.59	.0249
1.474	50.147	624.09	.0232
1.579	55.200	731.33	.0218
1.684	60.252	845.08	.0206
1.789	65.305	965.11	.0195
1.895	70.358	1091.21	.0186
2.000	75.410	1223.20	.0178

```
ROUTE                ID=7 HYD NO=102.4 INFLOW ID=6 DT=0.0
PRINT HYD            ID=7 CODE=1
```

PARTIAL HYDROGRAPH 102.40

RUNOFF VOLUME = .99460 INCHES = 7.8772 ACRE-FEET
PEAK DISCHARGE RATE = 226.34 CFS AT 1.533 HOURS BASIN AREA = .1485 SQ. MI.

```
*S **BASIN 104 IS COMPLETELY DEVELOPED
COMPUTE NM HYD       ID=8 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=8  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 104 TO TOTAL
ADD HYD             ID=9 HYD NO=104.1 ID=7 ID=8
PRINT HYD           ID=9 CODE=1

                                   PARTIAL HYDROGRAPH   104.10


    RUNOFF VOLUME =      .99755 INCHES     =      10.2415 ACRE-FEET
    PEAK DISCHARGE RATE =     297.34 CFS  AT   1.533 HOURS   BASIN AREA =   .1925 SQ. MI.


*S ROUTE THE FLOW IN AN EXISTING 28' F-F' RESIDENTIAL STREET
*S*  REVISE THE RATING CURVE COMMAND SO THAT THE STREET CAPACITY WILL
*S*  NOT BE EXCEEDED.  THIS REVISION WILL BE DONE BY ADDING A VERTICAL
*S*  LINE AT EACH END OF THE SECTION.  THIS WILL NOT CHANGE THE RESULT
*S*  OF THE AHYMO RUN, EXCEPT THAT THE RATING CURVE WILL NOW NOT BE
*S*  EXCEEDED.
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEG=1 MIN EL=100.00 MAX EL=102.00
                    CH SLOPE=0.02 FP SLOPE=0.02 N=0.017 DIST=48.0
                    DIST  ELEV  DIST  ELEV  DIST  ELEV  DIST  ELEV
                     0   102.00
                     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
                    48.0 102.00
```

RATING CURVE VALLEY SECTION 1.0

WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH FT
100.00	.00	.00	.00
100.11	.55	.95	10.52
100.21	2.21	6.03	21.04
100.32	4.92	18.83	27.99
100.42	7.87	40.99	28.03
100.53	10.82	69.36	28.06
100.63	13.77	103.23	28.09
100.74	16.87	132.51	32.13
100.84	20.58	164.37	38.48
100.95	24.97	205.38	44.83
101.05	29.94	265.65	48.00
101.16	34.99	344.01	48.00
101.26	40.04	430.12	48.00
101.37	45.09	523.59	48.00
101.47	50.15	624.09	48.00
101.58	55.20	731.33	48.00
101.68	60.25	845.08	48.00
101.79	65.30	965.11	48.00
101.89	70.36	1091.21	48.00
102.00	75.41	1223.20	48.00

```
COMPUTE TRAVEL TIME  ID=10 REACH NO=1 NO VS=1 L=421 FT SLP=0.02
```

```
TRAVEL TIME TABLE
                    REACH=  1.0

WATER       AVERAGE     FLOW        TRAVEL
DEPTH       AREA        RATE        TIME
FEET        SQ.FT.      CFS         HRS
   .105        .554         .95       .0681
   .211       2.215        6.03       .0429
   .316       4.919       18.83       .0305
   .421       7.868       40.99       .0224
   .526      10.820       69.36       .0182
   .632      13.775      103.23       .0156
   .737      16.867      132.51       .0149
   .842      20.583      164.37       .0146
   .947      24.968      205.38       .0142
  1.053      29.937      265.65       .0132
  1.158      34.989      344.01       .0119
  1.263      40.042      430.12       .0109
  1.368      45.094      523.59       .0101
  1.474      50.147      624.09       .0094
  1.579      55.200      731.33       .0088
  1.684      60.252      845.08       .0083
  1.789      65.305      965.11       .0079
  1.895      70.358     1091.21       .0075
  2.000      75.410     1223.20       .0072
ROUTE                ID=10 HYD NO=104.2 INFLOW ID=9 DT=0.0
PRINT HYD            ID=10 CODE=1

                          PARTIAL HYDROGRAPH   104.20


    RUNOFF VOLUME =      .99756 INCHES     =      10.2415 ACRE-FEET
    PEAK DISCHARGE RATE =     295.22 CFS  AT   1.533 HOURS   BASIN AREA =   .1925 SQ. MI.


*S **AREA 103 IS FULLY DEVELOPED
COMPUTE NM HYD       ID=11 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=11   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 ROUTE THE FLOW IN AN EXISTING RESIDENTIAL STREET (ASSUME 28'F-F)
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=12 REACH NO=1 NO VS=1 L=556 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	.1428
.105	.554	.95	.0900
.158	1.246	2.80	.0687
.211	2.215	6.03	.0567
.263	3.461	10.94	.0489
.316	4.920	18.84	.0403
.368	6.394	29.08	.0340
.421	7.869	41.00	.0296
.474	9.344	54.46	.0265
.526	10.821	69.37	.0241
.579	12.298	85.66	.0222
.632	13.776	103.24	.0206
.684	15.261	119.89	.0197
.737	16.869	132.52	.0197
.790	18.644	147.34	.0195
.842	20.586	164.39	.0193
.895	22.695	183.72	.0191
.947	24.971	205.41	.0188
1.000	27.414	229.56	.0184

```
ROUTE                ID=12 HYD NO=103.1 INFLOW ID=11 DT=0.0
PRINT HYD            ID=12 CODE=1
```

PARTIAL HYDROGRAPH 103.10

RUNOFF VOLUME = 1.00753 INCHES = 2.3643 ACRE-FEET
PEAK DISCHARGE RATE = 72.84 CFS AT 1.533 HOURS BASIN AREA = .0440 SQ. MI.

```
*S AREA 105 IS A PARK & COA WELL SITE
COMPUTE NM HYD       ID=13 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=13   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.


*S ADD BASIN 105 AND HYDROGRAPH NO. 103.1 TOGETHER
ADD HYD              ID=14 HYD NO=105.1 ID=12 ID=13
PRINT HYD            ID=14 CODE=1

                                  PARTIAL HYDROGRAPH   105.10


    RUNOFF VOLUME =      .92698 INCHES     =       3.2135 ACRE-FEET
    PEAK DISCHARGE RATE =     101.80 CFS  AT   1.533 HOURS   BASIN AREA =   .0650 SQ. MI.


*S ADD HYDROGRAPH NOs. 104.2 AND 105.1 TOGETHER
ADD HYD              ID=15 HYD NO=105.2 ID=10 ID=14
PRINT HYD            ID=15 CODE=1

                                  PARTIAL HYDROGRAPH   105.20


    RUNOFF VOLUME =      .97974 INCHES     =      13.4550 ACRE-FEET
    PEAK DISCHARGE RATE =     397.02 CFS  AT   1.533 HOURS   BASIN AREA =   .2575 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 ROUTE THE FLOW IN AN EXISTING RESIDENTIAL STREET-86TH ST. (ASSUME 28'F-F)
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=17 REACH NO=1 NO VS=1 L=357 FT SLP=0.02

                          TRAVEL TIME TABLE
                                     REACH=  1.0

                          WATER      AVERAGE     FLOW       TRAVEL
                          DEPTH      AREA        RATE       TIME
                          FEET       SQ.FT.      CFS        HRS
                             .053       .138        .15      .0917
                             .105       .554        .95      .0578
                             .158      1.246       2.80      .0441
                             .211      2.215       6.03      .0364
                             .263      3.461      10.94      .0314
                             .316      4.920      18.84      .0259
                             .368      6.394      29.08      .0218
                             .421      7.869      41.00      .0190
                             .474      9.344      54.46      .0170
                             .526     10.821      69.37      .0155
                             .579     12.298      85.66      .0142
                             .632     13.776     103.24      .0132
                             .684     15.261     119.89      .0126
                             .737     16.869     132.52      .0126
                             .790     18.644     147.34      .0125
                             .842     20.586     164.39      .0124
                             .895     22.695     183.72      .0122
                             .947     24.971     205.41      .0121
                            1.000     27.414     229.56      .0118
ROUTE                ID=17 HYD NO=300.15 INFLOW ID=16 DT=0.0
PRINT HYD            ID=17 CODE=1

                                   HYDROGRAPH FROM AREA   300.15


    RUNOFF VOLUME =      1.29861 INCHES      =       1.0804 ACRE-FEET
    PEAK DISCHARGE RATE =      32.38 CFS  AT   1.533 HOURS   BASIN AREA =   .0156 SQ. MI.


*S ADD HYDROGRAPH NOs. 105.2 AND 300.15 TOGETHER
ADD HYD              ID=18 HYD NO=105.3 ID=15 ID=17
PRINT HYD            ID=18 CODE=1

                                PARTIAL HYDROGRAPH   105.30


    RUNOFF VOLUME =      .99795 INCHES      =      14.5354 ACRE-FEET
    PEAK DISCHARGE RATE =     429.40 CFS  AT   1.533 HOURS   BASIN AREA =   .2731 SQ. MI.


*S ROUTE THE FLOW IN AN EXISTING 28' F-F STREET-SAPPHIRE ST. TO A.P. A.
*S*  REVISE THE RATING CURVE COMMAND SO THAT THE STREET CAPACITY WILL
*S*  NOT BE EXCEEDED.  THIS REVISION WILL BE DONE BY ADDING A VERTICAL
*S*  LINE AT EACH END OF THE SECTION.  THIS WILL NOT CHANGE THE RESULT
*S*  OF THE AHYMO RUN, EXCEPT THAT THE RATING CURVE WILL NOW NOT BE
*S*  EXCEEDED.
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEG=1 MIN EL=100.00 MAX EL=102.00
                     CH SLOPE=0.02 FP SLOPE=0.02 N=0.017 DIST=48.0
                     DIST  ELEV  DIST  ELEV  DIST  ELEV  DIST  ELEV
                      0   102.00
                      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
```

```
48.0 102.00

                    RATING CURVE VALLEY SECTION  1.0
                      WATER        FLOW        FLOW        TOP
                     SURFACE       AREA        RATE       WIDTH
                      ELEV         SQ FT       CFS        FT
                     100.00         .00         .00        .00
                     100.11         .55         .95      10.52
                     100.21        2.21        6.03      21.04
                     100.32        4.92       18.83      27.99
                     100.42        7.87       40.99      28.03
                     100.53       10.82       69.36      28.06
                     100.63       13.77      103.23      28.09
                     100.74       16.87      132.51      32.13
                     100.84       20.58      164.37      38.48
                     100.95       24.97      205.38      44.83
                     101.05       29.94      265.65      48.00
                     101.16       34.99      344.01      48.00
                     101.26       40.04      430.12      48.00
                     101.37       45.09      523.59      48.00
                     101.47       50.15      624.09      48.00
                     101.58       55.20      731.33      48.00
                     101.68       60.25      845.08      48.00
                     101.79       65.30      965.11      48.00
                     101.89       70.36     1091.21      48.00
                     102.00       75.41     1223.20      48.00
COMPUTE TRAVEL TIME  ID=19 REACH NO=1 NO VS=1 L=881 FT SLP=0.02

                    TRAVEL TIME TABLE
                                  REACH=  1.0

                    WATER       AVERAGE     FLOW        TRAVEL
                    DEPTH       AREA        RATE        TIME
                    FEET        SQ.FT.      CFS         HRS
                      .105        .554        .95       .1426
                      .211       2.215       6.03       .0898
                      .316       4.919      18.83       .0639
                      .421       7.868      40.99       .0470
                      .526      10.820      69.36       .0382
                      .632      13.775     103.23       .0327
                      .737      16.867     132.51       .0312
                      .842      20.583     164.37       .0306
                      .947      24.968     205.38       .0297
                     1.053      29.937     265.65       .0276
                     1.158      34.989     344.01       .0249
                     1.263      40.042     430.12       .0228
                     1.368      45.094     523.59       .0211
                     1.474      50.147     624.09       .0197
                     1.579      55.200     731.33       .0185
                     1.684      60.252     845.08       .0174
                     1.789      65.305     965.11       .0166
                     1.895      70.358    1091.21       .0158
                     2.000      75.410    1223.20       .0151
ROUTE                ID=19 HYD NO=105.4 INFLOW ID=18 DT=0.0
PRINT HYD            ID=19 CODE=1

                                PARTIAL HYDROGRAPH   105.40


    RUNOFF VOLUME =      .99795 INCHES     =      14.5354 ACRE-FEET
    PEAK DISCHARGE RATE =     429.32 CFS  AT   1.567 HOURS   BASIN AREA =   .2731 SQ. MI.


*S AREA 106 IS FULLY DEVELOPED
COMPUTE NM HYD       ID=20 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=20   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 **ADD THE FLOWS FROM BASIN 106 AND HYDROGRAPH NO 105.4 TOGETHER:
*S ANALYSIS PT A
ADD HYD             ID=1  HYD NO=106.1  ID=19 ID=20
PRINT HYD           ID=1  CODE=1

                                PARTIAL HYDROGRAPH   106.10


    RUNOFF VOLUME =      .99866 INCHES     =      15.7052 ACRE-FEET
    PEAK DISCHARGE RATE =     460.76 CFS  AT   1.567 HOURS   BASIN AREA =   .2949 SQ. MI.


*S*  ACCORDING TO THE SE2 CALCULATIONS, 356 CFS IS DISCHARGED INTO A CATTLE
*S*  GRATE INLET AT THIS POINT.  IMMEDIATELY DOWNSTREAM IS ANOTHER SET OF
*S*  SEVEN INLETS THAT WILL COLLECT A TOTAL OF 57.3 CFS.  ADDING THESE
*S*  TOGETHER YIELDS A TOTAL OF 413.3 CFS DISCHARGED INTO THE STORM DRAIN.
DIVIDE HYD          ID=1  Q MAX=413.3  ID I =14  HYD=TO_PIPE
                                       ID II=2   HYD=TO_STREET
PRINT HYD           ID=17  CODE=1

                                  HYDROGRAPH FROM AREA   300.15


    RUNOFF VOLUME =     1.29861 INCHES     =       1.0804 ACRE-FEET
    PEAK DISCHARGE RATE =      32.38 CFS  AT   1.533 HOURS   BASIN AREA =   .0156 SQ. MI.


*S*  ROUTE THE PIPE FLOWS TO THE BATTERY OF INLETS AT 82ND STREET (A.P. 11 VIA
*S*  THE 60" PIPE AT 3% SLOPE.
COMPUTE RATING CURVE CID=1  VS NO=1  CODE=-1  SLP=.03
                    DIA=60 IN  N=.013

                                RATING CURVE PIPE SECTION  1.0
                                    WATER       FLOW        FLOW        MAX
                                   SURFACE      AREA        RATE        WIDTH
                                    ELEV        SQ FT       CFS         FT
                                     .00         .00         .00         .00
                                     .26         .39        2.37        2.22
                                     .52        1.09       10.27        3.06
                                     .78        1.96       23.88        3.63
                                    1.04        2.97       42.95        4.06
                                    1.30        4.07       67.06        4.39
                                    1.56        5.25       95.68        4.64
                                    1.82        6.48      128.19        4.81
                                    2.08        7.75      163.89        4.93
                                    2.35        9.04      202.04        4.99
                                    2.61       10.35      241.80        5.00
                                    2.87       11.64      282.29        5.00
                                    3.13       12.92      322.54        5.00
                                    3.39       14.16      361.51        5.00
                                    3.65       15.35      398.00        5.00
                                    3.91       16.47      430.65        5.00
                                    4.17       17.49      457.82        5.00
                                    4.43       18.39      477.26        5.00
                                    4.69       19.13      485.25        5.00
                                    5.00       19.63      485.25        5.00
COMPUTE TRAVEL TIME ID=15  REACH=1  VS NO=1  L=450  SLP=.03
```

TRAVEL TIME TABLE
REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.261	.390	2.37	.0206
.521	1.086	10.27	.0132
.782	1.961	23.88	.0103
1.042	2.966	42.95	.0086
1.303	4.069	67.06	.0076
1.563	5.246	95.68	.0069
1.824	6.479	128.19	.0063
2.084	7.749	163.89	.0059
2.345	9.043	202.04	.0056
2.606	10.345	241.80	.0053
2.866	11.641	282.29	.0052
3.127	12.918	322.54	.0050
3.387	14.159	361.51	.0049
3.648	15.348	398.00	.0048
3.908	16.467	430.65	.0048
4.169	17.492	457.82	.0048
4.429	18.395	477.26	.0048
4.690	19.130	485.25	.0049
5.000	19.635	485.25	.0051

```
ROUTE          ID=15  HYD=PIPE_TO_AP11  INFLOW ID=14  DT=0.03333
PRINT HYD      ID=15  CODE=1

                          HYDROGRAPH FROM AREA PIPE_TO_AP11

   RUNOFF VOLUME =      .99866 INCHES     =      15.4412 ACRE-FEET
   PEAK DISCHARGE RATE =    415.66 CFS  AT   1.533 HOURS   BASIN AREA =   .2899 SQ. MI.


*S*  ROUTE THE STREET FLOW ON SAPPHIRE ST TO ANALYSIS POINT 11, ON THE
*S*  WEST SIDE OF 82ND STREET.  SAPPHIRE IS 40' F-F IN A 60' R.O.W., AND
*S*  THE 1-1/2 INCH GUTTER DEPTH SHOULD BE REFLECTED IN THE CROSS SECTION,
*S*  AND THE STREET SLOPE IS 3% AT THIS POINT; REVISE ACCORDINGLY.
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEG=1 MIN EL=100.00 MAX EL=101.00
                    CH SLOPE=0.03 FP SLOPE=0.03 N=0.017 DIST=60.0
                    DIST  ELEV  DIST  ELEV  DIST  ELEV  DIST  ELEV
                     0    101    10  100.67  10   100    12  100.13
                     30  100.49  48  100.13  50   100    50  100.67
                     60   101
```

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	.04	.05	1.62
100.11	.17	.35	3.24
100.16	.41	.93	6.79
100.21	.91	2.39	12.05
100.26	1.68	5.26	17.32
100.32	2.73	9.92	22.58
100.37	4.06	16.71	27.84
100.42	5.66	25.96	33.11
100.47	7.54	37.97	38.37
100.53	9.63	55.48	40.00
100.58	11.74	77.00	40.00
100.63	13.84	101.19	40.00
100.68	15.96	126.28	40.86
100.74	18.19	149.67	44.05
100.79	20.59	175.90	47.24
100.84	23.16	205.11	50.43
100.89	25.90	237.44	53.62
100.95	28.81	273.02	56.81
101.00	31.88	311.99	60.00

```
COMPUTE TRAVEL TIME  ID=30 REACH NO=1 NO VS=1 L=278 FT SLP=0.03
```

TRAVEL TIME TABLE
REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.053	.043	.05	.0602
.105	.170	.35	.0379
.158	.411	.93	.0342
.211	.907	2.39	.0293
.263	1.680	5.26	.0247
.316	2.730	9.92	.0213
.368	4.057	16.71	.0188
.421	5.661	25.96	.0168
.474	7.542	37.97	.0153
.526	9.634	55.48	.0134
.579	11.740	77.00	.0118
.632	13.845	101.19	.0106
.684	15.957	126.28	.0098
.737	18.191	149.67	.0094
.790	20.594	175.90	.0090
.842	23.165	205.11	.0087
.895	25.903	237.44	.0084
.947	28.810	273.02	.0081
1.000	31.884	311.99	.0079

```
ROUTE                ID=30 HYD NO=SAPP_TO_82ND INFLOW ID=2 DT=0.03333
PRINT HYD            ID=30 CODE=1

                                HYDROGRAPH FROM AREA SAPP_TO_82ND

    RUNOFF VOLUME =      .99970 INCHES     =        .2644 ACRE-FEET
    PEAK DISCHARGE RATE =      51.43 CFS  AT   1.567 HOURS   BASIN AREA =   .0050 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=3 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=3  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 "SAPP_TO_82ND".
*S*  THIS IS THE TOTAL RUNOFF IN THE STREET FLOWING DOWN TO 82ND AT A.P. 11.
ADD HYD              ID=4 HYD NO=A_P_11_TOTAL ID=30 ID=3
PRINT HYD            ID=4  CODE=1

                                HYDROGRAPH FROM AREA A_P_11_TOTAL

    RUNOFF VOLUME =     1.20717 INCHES     =       1.0442 ACRE-FEET
    PEAK DISCHARGE RATE =      71.44 CFS  AT   1.567 HOURS   BASIN AREA =   .0162 SQ. MI.


*S  **BASIN 300.2 IS CURRENTLY UNDEVELOPED, ASSUME FUTURE DEVELOPMENT WILL BE
*S  @ A DENSITY OF 4 DU/AC
```

```
*S*  FIRST COMPUTE THE EXISTING RUNOFF FROM BASIN 300.2 FOR COMPARISON LATER.
*S*  THE LAND AREA FOR THIS BASIN WILL REMAIN AS WAS ORIGINALLY COMPUTED IN
*S*  THE ARFMAN REPORT.
COMPUTE NM HYD      ID=2 HYD NO=300.2_EXST AREA=0.0118 SQ MI
                    PER A=70 PER B=20 PER C=0 PER D=10
                    TP=-0.1333 HR  MASS RAIN=-1

     K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
     UNIT PEAK =   4.6587    CFS   UNIT VOLUME =    .9969       B =   526.28      P60 = 1.8700
     AREA =      .001180 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


     K =   .156419HR    TP =   .133300HR    K/TP RATIO =  1.173435     SHAPE CONSTANT, N =  3.023022
     UNIT PEAK =   22.602    CFS   UNIT VOLUME =    .9991       B =   283.69      P60 = 1.8700
     AREA =      .010620 SQ MI    IA =    .61667 INCHES    INF =   1.57667 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD           ID=2  CODE=1

                                        HYDROGRAPH FROM AREA 300.2_EXST


    RUNOFF VOLUME =      .63207 INCHES      =        .3978 ACRE-FEET
    PEAK DISCHARGE RATE =      12.99 CFS  AT   1.533 HOURS   BASIN AREA =   .0118 SQ. MI.


*S*****************************************************************************
*S*  PER THE APPROVED SECTOR DEVELOPMENT PLAN, THE DENSITIES FOR BASIN 300.2
*S*  CAN BE UP TO 9 DU/AC.  THEREFORE, THE LAND TREATMENT PERCENTAGES BELOW
*S*  HAVE BEEN REVISED IN ACCORDANCE WITH THIS HIGHER DENSITY.  IN ADDITION,
*S*  BASIN 300.2 WILL BE RECONFIGURED AND EXPANDED CONSIDERABLY TO MAXIMIZE
*S*  THE AMOUNT OF RUNOFF DISCHARGING SOUTH ON 82ND STREET.  THIS CAN BE DONE
*S*  BECAUSE OF EXCESS CAPACITY IN 82ND TO CARRY THE LARGER FLOWS, AND
*S*  BECAUSE OF SUFFICIENT DOWNSTREAM STORM DRAIN CAPACITY.  THE OFF-SITE
*S*  PORTIONS OF BASIN 300.2 WILL BE DESIGNATED BY "300.2-OX", WITH "X" BEING
*S*  THE VARIABLE.
*S*********
*S*  COMPUTE OFF-SITE BASIN 300.2-OA.  USE THE SAME TREATMENT PERCENTAGES
*S*  FOR THE OFF-SITE PORTIONS OF BASIN 300.2 AS PER ARFMAN'S REPORT.
COMPUTE NM HYD      ID=1 HYD NO=300.2-OA AREA=0.01041 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 =   17.262    CFS   UNIT VOLUME =    .9988       B =   526.28      P60 = 1.8700
     AREA =      .004372 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 =   16.065    CFS   UNIT VOLUME =    .9996       B =   354.67      P60 = 1.8700
     AREA =      .006038 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 300.2-OA


    RUNOFF VOLUME =     1.29860 INCHES      =        .7210 ACRE-FEET
    PEAK DISCHARGE RATE =      21.66 CFS  AT   1.500 HOURS   BASIN AREA =   .0104 SQ. MI.


*S*  ROUTE TO ANALYSIS POINT 13.
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEG=1 MIN EL=0 MAX EL=.67
                    CH SLOPE=0.015 FP SLOPE=0.015 N=0.013 DIST=4
                    DIST  ELEV  DIST  ELEV  DIST  ELEV  DIST  ELEV
                     0     .67    0     0     4     0     4    .67

                                  RATING CURVE VALLEY SECTION  1.0
                                      WATER       FLOW        FLOW        TOP
                                     SURFACE      AREA        RATE       WIDTH
```

ELEV	SQ FT	CFS	FT
.00	.00	.00	4.00
.04	.14	.21	4.00
.07	.28	.67	4.00
.11	.42	1.30	4.00
.14	.56	2.09	4.00
.18	.71	3.02	4.00
.21	.85	4.06	4.00
.25	.99	5.23	4.00
.28	1.13	6.49	4.00
.32	1.27	7.86	4.00
.35	1.41	9.32	4.00
.39	1.55	10.86	4.00
.42	1.69	12.49	4.00
.46	1.83	14.20	4.00
.49	1.97	15.98	4.00
.53	2.12	17.83	4.00
.56	2.26	19.76	4.00
.60	2.40	21.75	4.00
.63	2.54	23.80	4.00
.67	2.68	25.91	4.00

```
COMPUTE TRAVEL TIME ID=2 REACH NO=1 NO VS=1 L=100 FT SLP=0.015
```

TRAVEL TIME TABLE
REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.035	.141	.21	.0186
.071	.282	.67	.0118
.106	.423	1.30	.0090
.141	.564	2.09	.0075
.176	.705	3.02	.0065
.212	.846	4.06	.0058
.247	.987	5.23	.0052
.282	1.128	6.49	.0048
.317	1.269	7.86	.0045
.353	1.411	9.32	.0042
.388	1.552	10.86	.0040
.423	1.693	12.49	.0038
.458	1.834	14.20	.0036
.494	1.975	15.98	.0034
.529	2.116	17.83	.0033
.564	2.257	19.76	.0032
.599	2.398	21.75	.0031
.635	2.539	23.80	.0030
.670	2.680	25.91	.0029

```
ROUTE          ID=2 HYD NO=1A_P_13  INFLOW ID=1  DT=0.03333
PRINT HYD      ID=2 CODE=1
```

HYDROGRAPH FROM AREA 1A_P_13

```
RUNOFF VOLUME =     1.29862 INCHES     =        .7210 ACRE-FEET
PEAK DISCHARGE RATE =      21.67 CFS  AT   1.500 HOURS   BASIN AREA =   .0104 SQ. MI.
```

```
*S*  COMPUTE OFF-SITE BASIN 300.2-OB.
COMPUTE NM HYD      ID=1 HYD NO=300.2-OB AREA=0.00373 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 =   6.1850    CFS   UNIT VOLUME =    .9976       B =   526.28      P60 = 1.8700
     AREA =      .001567 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 =   5.7561    CFS   UNIT VOLUME =    .9980       B =   354.67      P60 = 1.8700
     AREA =      .002163 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 300.2-OB


    RUNOFF VOLUME =      1.29860 INCHES     =        .2583 ACRE-FEET
    PEAK DISCHARGE RATE =        7.77 CFS  AT   1.500 HOURS   BASIN AREA =   .0037 SQ. MI.


*S*  ROUTE TO ANALYSIS POINT 13.
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEG=1 MIN EL=0 MAX EL=.67
                    CH SLOPE=0.01 FP SLOPE=0.01 N=0.013 DIST=2
                    DIST  ELEV  DIST  ELEV  DIST  ELEV  DIST  ELEV
                     0     .67   0     0     2     0     2     .67

                                  RATING CURVE VALLEY SECTION  1.0
                                      WATER       FLOW        FLOW        TOP
                                     SURFACE      AREA        RATE        WIDTH
                                      ELEV        SQ FT       CFS         FT
                                        .00         .00         .00        2.00
                                        .04         .07         .09        2.00
                                        .07         .14         .27        2.00
                                        .11         .21         .52        2.00
                                        .14         .28         .83        2.00
                                        .18         .35        1.20        2.00
                                        .21         .42        1.61        2.00
                                        .25         .49        2.05        2.00
                                        .28         .56        2.54        2.00
                                        .32         .63        3.06        2.00
                                        .35         .71        3.61        2.00
                                        .39         .78        4.19        2.00
                                        .42         .85        4.80        2.00
                                        .46         .92        5.43        2.00
                                        .49         .99        6.09        2.00
                                        .53        1.06        6.76        2.00
                                        .56        1.13        7.46        2.00
                                        .60        1.20        8.18        2.00
                                        .63        1.27        8.92        2.00
                                        .67        1.34        9.67        2.00
COMPUTE TRAVEL TIME ID=3 REACH NO=1 NO VS=1 L=100 FT SLP=0.01

                                TRAVEL TIME TABLE
                                              REACH=  1.0

                                WATER       AVERAGE     FLOW        TRAVEL
                                DEPTH       AREA        RATE        TIME
                                FEET        SQ.FT.      CFS         HRS
                                   .035        .071         .09       .0229
                                   .071        .141         .27       .0146
                                   .106        .212         .52       .0112
                                   .141        .282         .83       .0094
                                   .176        .353        1.20       .0082
                                   .212        .423        1.61       .0073
                                   .247        .494        2.05       .0067
                                   .282        .564        2.54       .0062
                                   .317        .635        3.06       .0058
                                   .353        .705        3.61       .0054
                                   .388        .776        4.19       .0051
                                   .423        .846        4.80       .0049
                                   .458        .917        5.43       .0047
                                   .494        .987        6.09       .0045
                                   .529       1.058        6.76       .0043
                                   .564       1.128        7.46       .0042
                                   .599       1.199        8.18       .0041
                                   .635       1.269        8.92       .0040
                                   .670       1.340        9.67       .0038
ROUTE                ID=3 HYD NO=2A_P_13  INFLOW ID=1  DT=0.03333
PRINT HYD            ID=3 CODE=1

                                        HYDROGRAPH FROM AREA 2A_P_13


    RUNOFF VOLUME =      1.29865 INCHES     =        .2583 ACRE-FEET
    PEAK DISCHARGE RATE =        7.77 CFS  AT   1.500 HOURS   BASIN AREA =   .0037 SQ. MI.
```

```
*S*  COMPUTE OFF-SITE BASIN 300.2-OC.
COMPUTE NM HYD       ID=1 HYD NO=300.2-OC AREA=0.00373 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 =   6.1850    CFS   UNIT VOLUME =    .9976       B =   526.28      P60 = 1.8700
     AREA =      .001567 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 =   5.7561    CFS   UNIT VOLUME =    .9980       B =   354.67      P60 = 1.8700
     AREA =      .002163 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 300.2-OC


    RUNOFF VOLUME =      1.29860 INCHES      =        .2583 ACRE-FEET
    PEAK DISCHARGE RATE =       7.77 CFS  AT   1.500 HOURS   BASIN AREA =   .0037 SQ. MI.


*S*  ROUTE TO ANALYSIS POINT 13.
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEG=1 MIN EL=0 MAX EL=.67
                     CH SLOPE=0.01 FP SLOPE=0.01 N=0.013 DIST=2
                     DIST  ELEV  DIST  ELEV  DIST  ELEV  DIST  ELEV
                      0     .67   0     0     2     0     2     .67
```

RATING CURVE VALLEY SECTION 1.0

WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH FT
.00	.00	.00	2.00
.04	.07	.09	2.00
.07	.14	.27	2.00
.11	.21	.52	2.00
.14	.28	.83	2.00
.18	.35	1.20	2.00
.21	.42	1.61	2.00
.25	.49	2.05	2.00
.28	.56	2.54	2.00
.32	.63	3.06	2.00
.35	.71	3.61	2.00
.39	.78	4.19	2.00
.42	.85	4.80	2.00
.46	.92	5.43	2.00
.49	.99	6.09	2.00
.53	1.06	6.76	2.00
.56	1.13	7.46	2.00
.60	1.20	8.18	2.00
.63	1.27	8.92	2.00
.67	1.34	9.67	2.00

```
COMPUTE TRAVEL TIME ID=4 REACH NO=1 NO VS=1 L=100 FT SLP=0.01
```

TRAVEL TIME TABLE

REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.035	.071	.09	.0229
.071	.141	.27	.0146
.106	.212	.52	.0112
.141	.282	.83	.0094
.176	.353	1.20	.0082
.212	.423	1.61	.0073
.247	.494	2.05	.0067
.282	.564	2.54	.0062
.317	.635	3.06	.0058

```
                                .353        .705        3.61        .0054
                                .388        .776        4.19        .0051
                                .423        .846        4.80        .0049
                                .458        .917        5.43        .0047
                                .494        .987        6.09        .0045
                                .529       1.058        6.76        .0043
                                .564       1.128        7.46        .0042
                                .599       1.199        8.18        .0041
                                .635       1.269        8.92        .0040
                                .670       1.340        9.67        .0038
ROUTE              ID=4 HYD NO=A_P_13  INFLOW ID=1  DT=0.03333
PRINT HYD          ID=4 CODE=1

                                    HYDROGRAPH FROM AREA A_P_13


    RUNOFF VOLUME =     1.29865 INCHES     =        .2583 ACRE-FEET
    PEAK DISCHARGE RATE =       7.77 CFS  AT   1.500 HOURS   BASIN AREA =   .0037 SQ. MI.


*S*  ADD FOR SUBTOTAL AT ANALYSIS POINT 13.
ADD HYD            ID=17  HYD=1A_P_13T  ID I=2  ID II=3
PRINT HYD          ID=17  CODE=1

                                    HYDROGRAPH FROM AREA 1A_P_13T


    RUNOFF VOLUME =     1.29856 INCHES     =        .9793 ACRE-FEET
    PEAK DISCHARGE RATE =      29.44 CFS  AT   1.500 HOURS   BASIN AREA =   .0141 SQ. MI.


ADD HYD            ID=18  HYD=A_P_13TOT  ID I=4  ID II=17
PRINT HYD          ID=18  CODE=1

                                    HYDROGRAPH FROM AREA A_P_13TOT


    RUNOFF VOLUME =     1.29855 INCHES     =       1.2376 ACRE-FEET
    PEAK DISCHARGE RATE =      37.21 CFS  AT   1.500 HOURS   BASIN AREA =   .0179 SQ. MI.


*S*  COMPUTE BASIN 300.2-B
COMPUTE NM HYD     ID=1 HYD NO=300.2_B  AREA=0.001109 SQ MI
                   PER A=0  PER B=34  PER C=0  PER D=66
                   TP=-0.1333 HR MASS RAIN=-1

     K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000    SHAPE CONSTANT, N =  7.106420
     UNIT PEAK =   2.8897    CFS   UNIT VOLUME =    .9955       B =   526.28      P60 = 1.8700
     AREA =      .000732 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

     K =   .130992HR    TP =   .133300HR    K/TP RATIO =   .982685    SHAPE CONSTANT, N =  3.593448
     UNIT PEAK =   .92522    CFS   UNIT VOLUME =    .9850       B =   327.09      P60 = 1.8700
     AREA =      .000377 SQ MI    IA =    .50000 INCHES    INF =   1.25000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD          ID=1  CODE=1

                                    HYDROGRAPH FROM AREA 300.2_B


    RUNOFF VOLUME =     1.52413 INCHES     =        .0901 ACRE-FEET
    PEAK DISCHARGE RATE =       2.55 CFS  AT   1.500 HOURS   BASIN AREA =   .0011 SQ. MI.


*S*  COMPUTE BASIN 300.2-C
COMPUTE NM HYD     ID=2 HYD NO=300.2_C  AREA=0.00150 SQ MI
                   PER A=0  PER B=34  PER C=0  PER D=66
                   TP=-0.1333 HR MASS RAIN=-1
```

10' Concrete Channel

```
K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
UNIT PEAK =   3.9086    CFS   UNIT VOLUME =    .9965       B =   526.28      P60 = 1.8700
AREA =      .000990 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


K =   .130992HR    TP =   .133300HR    K/TP RATIO =   .982685     SHAPE CONSTANT, N =  3.593448
UNIT PEAK =   1.2514    CFS   UNIT VOLUME =    .9894       B =   327.09      P60 = 1.8700
AREA =      .000510 SQ MI    IA =    .50000 INCHES    INF =   1.25000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD           ID=2  CODE=1

                                    HYDROGRAPH FROM AREA 300.2_C


   RUNOFF VOLUME =     1.52413 INCHES     =        .1219 ACRE-FEET
   PEAK DISCHARGE RATE =       3.44 CFS  AT   1.500 HOURS   BASIN AREA =   .0015 SQ. MI.


*S*  ADD AND ROUTE 300.2-B & 300.2-C ANALYSIS POINT 8.
ADD HYD             ID=19  HYD=1A_P_8  ID I=1  ID II=2
PRINT HYD           ID=19  CODE=1

                                    HYDROGRAPH FROM AREA 1A_P_8


   RUNOFF VOLUME =     1.52393 INCHES     =        .2120 ACRE-FEET
   PEAK DISCHARGE RATE =       5.99 CFS  AT   1.500 HOURS   BASIN AREA =   .0026 SQ. MI.


*S*  ROUTE VIA STREET SECTION TO ANALYSIS POINT 8.
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEG=1 MIN EL=0  MAX EL=0.67
                     CH SLOPE=0.0075 FP SLOPE=0.0075 N=0.017 DIST=28.0
                     DIST  ELEV  DIST  ELEV  DIST  ELEV  DIST  ELEV
                      0    0.67   0     0     2    0.13   14   0.37
                      26   0.13   28    0     28   0.67

                                 RATING CURVE VALLEY SECTION  1.0
                                    WATER       FLOW        FLOW        TOP
                                   SURFACE      AREA        RATE        WIDTH
                                    ELEV        SQ FT       CFS         FT
                                     .00         .00         .00         .00
                                     .04         .02         .01        1.09
                                     .07         .08         .06        2.17
                                     .11         .17         .18        3.26
                                     .14         .31         .36        5.11
                                     .18         .55         .66        8.63
                                     .21         .92        1.23       12.16
                                     .25        1.41        2.12       15.68
                                     .28        2.03        3.39       19.21
                                     .32        2.76        5.09       22.74
                                     .35        3.63        7.27       26.26
                                     .39        4.60       10.35       28.00
                                     .42        5.59       14.30       28.00
                                     .46        6.58       18.74       28.00
                                     .49        7.56       23.64       28.00
                                     .53        8.55       28.98       28.00
                                     .56        9.54       34.74       28.00
                                     .60       10.53       40.91       28.00
                                     .63       11.51       47.46       28.00
                                     .67       12.50       54.39       28.00
COMPUTE TRAVEL TIME ID=20 REACH NO=1 NO VS=1 L=160 FT SLP=0.0075

                                TRAVEL TIME TABLE
                                            REACH=  1.0

                                WATER       AVERAGE     FLOW        TRAVEL
                                DEPTH       AREA        RATE        TIME
                                FEET        SQ.FT.      CFS         HRS
                                   .035        .019        .01        .0887
                                   .071        .077        .06        .0559
                                   .106        .172        .18        .0426
```

.141	.310	.36	.0387
.176	.553	.66	.0372
.212	.919	1.23	.0332
.247	1.410	2.12	.0296
.282	2.025	3.39	.0266
.317	2.765	5.09	.0242
.353	3.629	7.27	.0222
.388	4.601	10.35	.0198
.423	5.588	14.30	.0174
.458	6.576	18.74	.0156
.494	7.563	23.64	.0142
.529	8.551	28.98	.0131
.564	9.538	34.74	.0122
.599	10.525	40.91	.0114
.635	11.513	47.46	.0108
.670	12.500	54.39	.0102

```
ROUTE              ID=20 HYD NO=TO_A_P_8  INFLOW ID=19 DT=0.03333
PRINT HYD          ID=20 CODE=1

                                HYDROGRAPH FROM AREA TO_A_P_8

    RUNOFF VOLUME =     1.52411 INCHES     =        .2121 ACRE-FEET
    PEAK DISCHARGE RATE =       5.88 CFS  AT   1.533 HOURS   BASIN AREA =   .0026 SQ. MI.

*S*  ADD FOR SUBTOTAL AT ANALYSIS POINT 8.
ADD HYD            ID=20  HYD=A_P_8TOT  ID I=18  ID II=20
PRINT HYD          ID=20  CODE=1

                                HYDROGRAPH FROM AREA A_P_8TOT

    RUNOFF VOLUME =     1.32726 INCHES     =       1.4496 ACRE-FEET
    PEAK DISCHARGE RATE =      42.89 CFS  AT   1.500 HOURS   BASIN AREA =   .0205 SQ. MI.

*S*  ROUTE TOTAL AT ANALYSIS POINT 8 VIA STREET SECTION TO ANALYSIS POINT 9.
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEG=1 MIN EL=0  MAX EL=0.67
                    CH SLOPE=0.0075 FP SLOPE=0.0075 N=0.017 DIST=28.0
                    DIST  ELEV  DIST  ELEV  DIST  ELEV  DIST  ELEV
                     0    0.67   0     0     2    0.13   14   0.37
                     26   0.13   28    0     28   0.67
```

RATING CURVE VALLEY SECTION 1.0

WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH FT
.00	.00	.00	.00
.04	.02	.01	1.09
.07	.08	.06	2.17
.11	.17	.18	3.26
.14	.31	.36	5.11
.18	.55	.66	8.63
.21	.92	1.23	12.16
.25	1.41	2.12	15.68
.28	2.03	3.39	19.21
.32	2.76	5.09	22.74
.35	3.63	7.27	26.26
.39	4.60	10.35	28.00
.42	5.59	14.30	28.00
.46	6.58	18.74	28.00
.49	7.56	23.64	28.00
.53	8.55	28.98	28.00
.56	9.54	34.74	28.00
.60	10.53	40.91	28.00
.63	11.51	47.46	28.00
.67	12.50	54.39	28.00

```
COMPUTE TRAVEL TIME ID=21 REACH NO=1 NO VS=1 L=500 FT SLP=0.0075

                         TRAVEL TIME TABLE
                                        REACH=  1.0
```

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.035	.019	.01	.2771
.071	.077	.06	.1745
.106	.172	.18	.1332
.141	.310	.36	.1210
.176	.553	.66	.1163
.212	.919	1.23	.1039
.247	1.410	2.12	.0924
.282	2.025	3.39	.0830
.317	2.765	5.09	.0755
.353	3.629	7.27	.0693
.388	4.601	10.35	.0617
.423	5.588	14.30	.0543
.458	6.576	18.74	.0487
.494	7.563	23.64	.0444
.529	8.551	28.98	.0410
.564	9.538	34.74	.0381
.599	10.525	40.91	.0357
.635	11.513	47.46	.0337
.670	12.500	54.39	.0319

```
ROUTE              ID=21 HYD NO=TO_A_P_9  INFLOW ID=20 DT=0.03333
PRINT HYD          ID=21 CODE=1

                    HYDROGRAPH FROM AREA TO_A_P_9

    RUNOFF VOLUME =     1.32729 INCHES     =       1.4497 ACRE-FEET
    PEAK DISCHARGE RATE =      42.36 CFS  AT   1.533 HOURS   BASIN AREA =   .0205 SQ. MI.


*S*  COMPUTE BASIN 300.2-D
COMPUTE NM HYD      ID=1 HYD NO=300.2_D  AREA=0.00089 SQ MI
                    PER A=0  PER B=34  PER C=0  PER D=66
                    TP=-0.1333 HR MASS RAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   2.3191    CFS   UNIT VOLUME =    .9941       B =   526.28      P60 = 1.8700
    AREA =      .000587 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

    K =   .130992HR    TP =   .133300HR    K/TP RATIO =   .982685     SHAPE CONSTANT, N =  3.593448
    UNIT PEAK =   .74251    CFS   UNIT VOLUME =    .9821       B =   327.09      P60 = 1.8700
    AREA =      .000303 SQ MI    IA =    .50000 INCHES    INF =   1.25000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD           ID=1  CODE=1

                    HYDROGRAPH FROM AREA 300.2_D

    RUNOFF VOLUME =     1.52413 INCHES     =        .0723 ACRE-FEET
    PEAK DISCHARGE RATE =       2.05 CFS  AT   1.500 HOURS   BASIN AREA =   .0009 SQ. MI.


*S*  COMPUTE BASIN 300.2-A
COMPUTE NM HYD      ID=2 HYD NO=300.2_A  AREA=0.0009421 SQ MI
                    PER A=0  PER B=34  PER C=0  PER D=66
                    TP=-0.1333 HR MASS RAIN=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   2.4548    CFS   UNIT VOLUME =    .9949       B =   526.28      P60 = 1.8700
    AREA =      .000622 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

    K =   .130992HR    TP =   .133300HR    K/TP RATIO =   .982685     SHAPE CONSTANT, N =  3.593448
    UNIT PEAK =   .78598    CFS   UNIT VOLUME =    .9836       B =   327.09      P60 = 1.8700
    AREA =      .000320 SQ MI    IA =    .50000 INCHES    INF =   1.25000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330
```

```
PRINT HYD            ID=2  CODE=1

                                        HYDROGRAPH FROM AREA 300.2_A

    RUNOFF VOLUME =     1.52413 INCHES     =        .0766 ACRE-FEET
    PEAK DISCHARGE RATE =       2.17 CFS  AT   1.500 HOURS   BASIN AREA =   .0009 SQ. MI.


*S*  ADD AND ROUTE 300.2-A & 300.2-D ANALYSIS POINT 9.
ADD HYD              ID=22  HYD=2A_P_9  ID I=1  ID II=2
PRINT HYD            ID=22  CODE=1

                                        HYDROGRAPH FROM AREA 2A_P_9

    RUNOFF VOLUME =     1.52381 INCHES     =        .1489 ACRE-FEET
    PEAK DISCHARGE RATE =       4.22 CFS  AT   1.500 HOURS   BASIN AREA =   .0018 SQ. MI.


*S*  ROUTE VIA STREET SECTION TO ANALYSIS POINT 9.
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEG=1 MIN EL=0  MAX EL=0.67
CH SLOPE=0.0075 FP SLOPE=0.0075 N=0.017 DIST=28.0
DIST  ELEV  DIST  ELEV  DIST  ELEV  DIST  ELEV
 0    0.67   0     0     2    0.13   14   0.37
 26   0.13   28    0     28   0.67
```

RATING CURVE VALLEY SECTION 1.0

WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH FT
.00	.00	.00	.00
.04	.02	.01	1.09
.07	.08	.06	2.17
.11	.17	.18	3.26
.14	.31	.36	5.11
.18	.55	.66	8.63
.21	.92	1.23	12.16
.25	1.41	2.12	15.68
.28	2.03	3.39	19.21
.32	2.76	5.09	22.74
.35	3.63	7.27	26.26
.39	4.60	10.35	28.00
.42	5.59	14.30	28.00
.46	6.58	18.74	28.00
.49	7.56	23.64	28.00
.53	8.55	28.98	28.00
.56	9.54	34.74	28.00
.60	10.53	40.91	28.00
.63	11.51	47.46	28.00
.67	12.50	54.39	28.00

```
COMPUTE TRAVEL TIME ID=23 REACH NO=1 NO VS=1 L=220 FT SLP=0.0075
```

TRAVEL TIME TABLE

REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.035	.019	.01	.1219
.071	.077	.06	.0768
.106	.172	.18	.0586
.141	.310	.36	.0532
.176	.553	.66	.0512
.212	.919	1.23	.0457
.247	1.410	2.12	.0407
.282	2.025	3.39	.0365
.317	2.765	5.09	.0332
.353	3.629	7.27	.0305
.388	4.601	10.35	.0272
.423	5.588	14.30	.0239
.458	6.576	18.74	.0214
.494	7.563	23.64	.0196

```
                                .529       8.551       28.98       .0180
                                .564       9.538       34.74       .0168
                                .599      10.525       40.91       .0157
                                .635      11.513       47.46       .0148
                                .670      12.500       54.39       .0140
ROUTE                ID=23 HYD NO=TO_A_P_9  INFLOW ID=22 DT=0.03333
PRINT HYD            ID=23 CODE=1

                                        HYDROGRAPH FROM AREA TO_A_P_9


    RUNOFF VOLUME =      1.52438 INCHES     =         .1489 ACRE-FEET
    PEAK DISCHARGE RATE =        4.05 CFS  AT    1.533 HOURS   BASIN AREA =   .0018 SQ. MI.


*S*  COMPUTE BASIN 300.2-E
COMPUTE NM HYD       ID=1 HYD NO=300.2_E  AREA=0.00067 SQ MI
                     PER A=0  PER B=34  PER C=0  PER D=66
                     TP=-0.1333 HR MASS RAIN=-1

     K =    .072649HR    TP =    .133300HR    K/TP RATIO =    .545000     SHAPE CONSTANT, N =  7.106420
     UNIT PEAK =    1.7458    CFS   UNIT VOLUME =    .9933       B =   526.28      P60 = 1.8700
     AREA =       .000442 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


     K =    .130992HR    TP =    .133300HR    K/TP RATIO =    .982685     SHAPE CONSTANT, N =  3.593448
     UNIT PEAK =    .55897    CFS   UNIT VOLUME =    .9748       B =   327.09      P60 = 1.8700
     AREA =       .000228 SQ MI    IA =    .50000 INCHES    INF =   1.25000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD            ID=1  CODE=1

                                        HYDROGRAPH FROM AREA 300.2_E


    RUNOFF VOLUME =      1.52413 INCHES     =         .0545 ACRE-FEET
    PEAK DISCHARGE RATE =        1.55 CFS  AT    1.500 HOURS   BASIN AREA =   .0007 SQ. MI.


*S*  ADD FOR SUBTOTAL AT ANALYSIS POINT 9.
ADD HYD              ID=24  HYD=A_P_9T  ID I=21  ID II=23
PRINT HYD            ID=24  CODE=1

                                        HYDROGRAPH FROM AREA A_P_9T


    RUNOFF VOLUME =      1.34343 INCHES     =        1.5986 ACRE-FEET
    PEAK DISCHARGE RATE =       46.41 CFS  AT    1.533 HOURS   BASIN AREA =   .0223 SQ. MI.


ADD HYD              ID=25  HYD=A_P_9TOT  ID I=1  ID II=24
PRINT HYD            ID=25  CODE=1

                                        HYDROGRAPH FROM AREA A_P_9TOT


    RUNOFF VOLUME =      1.34869 INCHES     =        1.6530 ACRE-FEET
    PEAK DISCHARGE RATE =       47.90 CFS  AT    1.533 HOURS   BASIN AREA =   .0230 SQ. MI.


*S*  ROUTE VIA STREET SECTION TO ANALYSIS POINT 1.
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEG=1 MIN EL=0  MAX EL=0.67
                     CH SLOPE=0.01 FP SLOPE=0.01 N=0.017 DIST=32.0
                     DIST  ELEV  DIST  ELEV  DIST  ELEV  DIST  ELEV
                      0    0.67   0     0     2    0.13   16   0.41
                      30   0.13   32    0     32   0.67

                                RATING CURVE VALLEY SECTION  1.0
                                    WATER       FLOW        FLOW        TOP
                                   SURFACE      AREA        RATE        WIDTH
```

ELEV	SQ FT	CFS	FT
.00	.00	.00	.00
.04	.02	.01	1.09
.07	.08	.07	2.17
.11	.17	.21	3.26
.14	.31	.41	5.11
.18	.55	.76	8.63
.21	.92	1.42	12.16
.25	1.41	2.45	15.68
.28	2.03	3.91	19.21
.32	2.76	5.88	22.74
.35	3.63	8.40	26.26
.39	4.62	11.54	29.79
.42	5.72	15.73	32.00
.46	6.85	21.22	32.00
.49	7.98	27.34	32.00
.53	9.11	34.05	32.00
.56	10.23	41.34	32.00
.60	11.36	49.18	32.00
.63	12.49	57.55	32.00
.67	13.62	66.42	32.00

```
COMPUTE TRAVEL TIME ID=26 REACH NO=1 NO VS=1 L=100 FT SLP=0.01
```

TRAVEL TIME TABLE
REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.035	.019	.01	.0480
.071	.077	.07	.0302
.106	.172	.21	.0231
.141	.310	.41	.0210
.176	.553	.76	.0201
.212	.919	1.42	.0180
.247	1.410	2.45	.0160
.282	2.025	3.91	.0144
.317	2.765	5.88	.0131
.353	3.629	8.40	.0120
.388	4.617	11.54	.0111
.423	5.721	15.73	.0101
.458	6.849	21.22	.0090
.494	7.978	27.34	.0081
.529	9.106	34.05	.0074
.564	10.235	41.34	.0069
.599	11.363	49.18	.0064
.635	12.492	57.55	.0060
.670	13.620	66.42	.0057

```
ROUTE          ID=26 HYD NO=TO_A_P_1  INFLOW ID=25 DT=0.03333
PRINT HYD      ID=26 CODE=1
```

HYDROGRAPH FROM AREA TO_A_P_1

```
RUNOFF VOLUME =     1.34871 INCHES     =       1.6530 ACRE-FEET
PEAK DISCHARGE RATE =      48.03 CFS  AT   1.533 HOURS   BASIN AREA =   .0230 SQ. MI.


*S*  COMPUTE OFF-SITE BASIN 300.2-OD.
COMPUTE NM HYD      ID=1 HYD NO=300.2-OD AREA=0.00811 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 =   13.448    CFS   UNIT VOLUME =    .9985       B =   526.28      P60 = 1.8700
AREA =      .003406 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 =   12.515    CFS   UNIT VOLUME =    .9994       B =   354.67      P60 = 1.8700
AREA =      .004704 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330
```

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```
PRINT HYD          ID=1  CODE=1

                                        HYDROGRAPH FROM AREA 300.2-OD


    RUNOFF VOLUME =     1.29860 INCHES     =        .5617 ACRE-FEET
    PEAK DISCHARGE RATE =      16.88 CFS  AT   1.500 HOURS   BASIN AREA =   .0081 SQ. MI.


*S*  ROUTE CONCRETE CHANNEL TO ANALYSIS POINT 1.
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEG=1 MIN EL=0 MAX EL=1
                    CH SLOPE=0.02 FP SLOPE=0.02 N=0.013 DIST=5
                    DIST  ELEV  DIST  ELEV  DIST  ELEV  DIST  ELEV
                     0     1     0     0     5     0     5     1

                                  RATING CURVE VALLEY SECTION  1.0
                                      WATER       FLOW        FLOW        TOP
                                     SURFACE      AREA        RATE        WIDTH
                                      ELEV        SQ FT       CFS         FT
                                        .00         .00         .00        5.00
                                        .05         .26         .59        5.00
                                        .11         .53        1.87        5.00
                                        .16         .79        3.65        5.00
                                        .21        1.05        5.86        5.00
                                        .26        1.32        8.44        5.00
                                        .32        1.58       11.36        5.00
                                        .37        1.84       14.60        5.00
                                        .42        2.11       18.12        5.00
                                        .47        2.37       21.90        5.00
                                        .53        2.63       25.94        5.00
                                        .58        2.89       30.22        5.00
                                        .63        3.16       34.71        5.00
                                        .68        3.42       39.42        5.00
                                        .74        3.68       44.33        5.00
                                        .79        3.95       49.43        5.00
                                        .84        4.21       54.71        5.00
                                        .89        4.47       60.17        5.00
                                        .95        4.74       65.79        5.00
                                       1.00        5.00       71.58        5.00
COMPUTE TRAVEL TIME ID=27 REACH NO=1 NO VS=1 L=200 FT SLP=0.02

                                TRAVEL TIME TABLE
                                              REACH=  1.0

                                WATER       AVERAGE     FLOW        TRAVEL
                                DEPTH       AREA        RATE        TIME
                                FEET        SQ.FT.      CFS         HRS
                                   .053        .263         .59       .0246
                                   .105        .526        1.87       .0156
                                   .158        .789        3.65       .0120
                                   .211       1.053        5.86       .0100
                                   .263       1.316        8.44       .0087
                                   .316       1.579       11.36       .0077
                                   .368       1.842       14.60       .0070
                                   .421       2.105       18.12       .0065
                                   .474       2.368       21.90       .0060
                                   .526       2.632       25.94       .0056
                                   .579       2.895       30.22       .0053
                                   .632       3.158       34.71       .0051
                                   .684       3.421       39.42       .0048
                                   .737       3.684       44.33       .0046
                                   .789       3.947       49.43       .0044
                                   .842       4.211       54.71       .0043
                                   .895       4.474       60.17       .0041
                                   .947       4.737       65.79       .0040
                                  1.000       5.000       71.58       .0039
ROUTE              ID=27 HYD NO=1A_P_1  INFLOW ID=1  DT=0.03333
PRINT HYD          ID=27 CODE=1

                                        HYDROGRAPH FROM AREA 1A_P_1


    RUNOFF VOLUME =     1.29862 INCHES     =        .5617 ACRE-FEET
    PEAK DISCHARGE RATE =      16.87 CFS  AT   1.500 HOURS   BASIN AREA =   .0081 SQ. MI.
```

Conc. Channel

```
*S*  COMPUTE BASIN 300.2-F
COMPUTE NM HYD       ID=1 HYD NO=300.2_F  AREA=0.002713 SQ MI
                     PER A=0  PER B=25  PER C=0  PER D=75
                     TP=-0.1333 HR MASS RAIN=-1

     K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
     UNIT PEAK =   8.0333    CFS   UNIT VOLUME =    .9981       B =   526.28      P60 = 1.8700
     AREA =      .002035 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


     K =   .130992HR    TP =   .133300HR    K/TP RATIO =   .982685     SHAPE CONSTANT, N =  3.593448
     UNIT PEAK =   1.6643    CFS   UNIT VOLUME =    .9918       B =   327.09      P60 = 1.8700
     AREA =      .000678 SQ MI    IA =    .50000 INCHES    INF =   1.25000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD            ID=1  CODE=1

                                        HYDROGRAPH FROM AREA 300.2_F


    RUNOFF VOLUME =      1.64096 INCHES      =         .2374 ACRE-FEET
    PEAK DISCHARGE RATE =       6.58 CFS  AT   1.500 HOURS   BASIN AREA =   .0027 SQ. MI.


*S*  ROUTE 300.2-F VIA STREET SECTION TO ANALYSIS POINT 1.
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEG=1 MIN EL=0  MAX EL=0.67
                     CH SLOPE=0.0075 FP SLOPE=0.0075 N=0.017 DIST=28.0
                     DIST  ELEV  DIST  ELEV  DIST  ELEV  DIST  ELEV
                      0    0.67   0     0     2    0.13   14   0.37
                      26   0.13   28    0     28   0.67
```

RATING CURVE VALLEY SECTION 1.0

WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH FT
.00	.00	.00	.00
.04	.02	.01	1.09
.07	.08	.06	2.17
.11	.17	.18	3.26
.14	.31	.36	5.11
.18	.55	.66	8.63
.21	.92	1.23	12.16
.25	1.41	2.12	15.68
.28	2.03	3.39	19.21
.32	2.76	5.09	22.74
.35	3.63	7.27	26.26
.39	4.60	10.35	28.00
.42	5.59	14.30	28.00
.46	6.58	18.74	28.00
.49	7.56	23.64	28.00
.53	8.55	28.98	28.00
.56	9.54	34.74	28.00
.60	10.53	40.91	28.00
.63	11.51	47.46	28.00
.67	12.50	54.39	28.00

```
COMPUTE TRAVEL TIME ID=28 REACH NO=1 NO VS=1 L=550 FT SLP=0.0075
```

TRAVEL TIME TABLE

REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.035	.019	.01	.3048
.071	.077	.06	.1920
.106	.172	.18	.1465
.141	.310	.36	.1331
.176	.553	.66	.1279
.212	.919	1.23	.1143
.247	1.410	2.12	.1017
.282	2.025	3.39	.0914

.317	2.765	5.09	.0830
.353	3.629	7.27	.0762
.388	4.601	10.35	.0679
.423	5.588	14.30	.0597
.458	6.576	18.74	.0536
.494	7.563	23.64	.0489
.529	8.551	28.98	.0451
.564	9.538	34.74	.0419
.599	10.525	40.91	.0393
.635	11.513	47.46	.0371
.670	12.500	54.39	.0351

```
ROUTE              ID=28 HYD NO=TO_A_P_1  INFLOW ID=1 DT=0.03333
PRINT HYD          ID=28 CODE=1

                                   HYDROGRAPH FROM AREA TO_A_P_1


    RUNOFF VOLUME =     1.64104 INCHES     =        .2374 ACRE-FEET
    PEAK DISCHARGE RATE =      5.56 CFS  AT   1.567 HOURS   BASIN AREA =   .0027 SQ. MI.


*S*  ADD FOR SUBTOTAL AT ANALYSIS POINT 1.
ADD HYD            ID=29  HYD=TOA_P_1  ID I=26  ID II=27
PRINT HYD          ID=29  CODE=1

                                   HYDROGRAPH FROM AREA TOA_P_1


    RUNOFF VOLUME =     1.33561 INCHES     =       2.2147 ACRE-FEET
    PEAK DISCHARGE RATE =     64.60 CFS  AT   1.533 HOURS   BASIN AREA =   .0311 SQ. MI.


ADD HYD            ID=30  HYD=A_P_1TOT  ID I=28  ID II=29
PRINT HYD          ID=30  CODE=1

                                   HYDROGRAPH FROM AREA A_P_1TOT


    RUNOFF VOLUME =     1.36011 INCHES     =       2.4521 ACRE-FEET
    PEAK DISCHARGE RATE =     70.00 CFS  AT   1.533 HOURS   BASIN AREA =   .0338 SQ. MI.


*S*  82ND STREET IS 30' F-F IN A 50' R.O.W., AND THE MINIMUM SLOPE OF THE
*S*  EXISTING STREET (WHICH OCCURS TOWARD THE BOTTOM END NEAR SAPPHIRE) IS
*S*  2.28%.  IN ADDITION, THE 1-1/2 INCH GUTTER WAS NOT REFLECTED IN THE
*S*  ROUTING, SO THESE CHANGES HAVE ALL BEEN MADE IN THE ROUTING BELOW.
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEG=1 MIN EL=0 MAX EL=1
                   CH SLOPE=0.0228 FP SLOPE=0.0228 N=0.017 DIST=30
                   DIST  ELEV  DIST  ELEV  DIST  ELEV  DIST  ELEV
                    0     1     10   .67    10    0     12   .13
                   25   .39     38   .13    40    0     40   .67
                   50    1
```

RATING CURVE VALLEY SECTION 1.0

WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH FT
.00	.00	.00	.00
.05	.02	.02	.81
.11	.09	.15	1.62
.16	.22	.38	4.79
.21	.62	1.24	10.05
.26	1.28	3.20	15.32
.32	2.23	6.61	20.58
.37	3.45	11.77	25.84
.42	4.90	20.03	28.00
.47	6.37	31.00	28.00
.53	7.85	43.80	28.00
.58	9.32	58.27	28.00
.63	10.79	74.34	28.00
.68	12.27	91.05	28.43
.74	13.81	106.99	30.03

```
                                    .79       15.43      124.47      31.62
                                    .84       17.14      143.55      33.22
                                    .89       18.93      164.29      34.81
                                    .95       20.80      186.73      36.41
                                   1.00       22.76      210.93      38.00
COMPUTE TRAVEL TIME  ID=7 REACH NO=1 NO VS=1 L=500 FT SLP=0.0228

                         TRAVEL TIME TABLE
                                   REACH=  1.0

                         WATER      AVERAGE    FLOW       TRAVEL
                         DEPTH      AREA       RATE       TIME
                         FEET       SQ.FT.     CFS        HRS
                            .053       .021        .02       .1242
                            .105       .085        .15       .0782
                            .158       .225        .38       .0827
                            .211       .615       1.24       .0687
                            .263      1.283       3.20       .0556
                            .316      2.227       6.61       .0468
                            .368      3.449      11.77       .0407
                            .421      4.899      20.03       .0340
                            .474      6.373      31.00       .0286
                            .526      7.847      43.80       .0249
                            .579      9.321      58.27       .0222
                            .632     10.794      74.34       .0202
                            .684     12.271      91.05       .0187
                            .737     13.809     106.99       .0179
                            .789     15.432     124.47       .0172
                            .842     17.138     143.55       .0166
                            .895     18.928     164.29       .0160
                            .947     20.802     186.73       .0155
                           1.000     22.760     210.93       .0150
ROUTE                ID=7 HYD NO=STRT_TO_AP10  INFLOW ID=30  DT=0.03333
PRINT HYD            ID=7 CODE=1

                                HYDROGRAPH FROM AREA STRT_TO_AP10

    RUNOFF VOLUME =      1.36012 INCHES     =       2.4521 ACRE-FEET
    PEAK DISCHARGE RATE =      69.39 CFS  AT   1.533 HOURS   BASIN AREA =   .0338 SQ. MI.


*S*  DIVIDE BASIN 401.14 INTO TWO BASINS:  NORTH AND SOUTH OF SAPPHIRE SO
*S*  THAT THE CAPACITY OF THE STREET NORTH OF SAPPHIRE CAN BE ANALYZED TO
*S*  DETERMINE HOW MUCH OF THE FLOWS IT CAN CARRY.
*S ** BASIN 401.14 IS PART OF SUNRISE ESTATES UNIT 1
*S*  COMPUTE BASIN 401.14 NORTH OF SAPPHIRE.
COMPUTE NM HYD       ID=1 HYD NO=401.14NORTH AREA=0.00484 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 =   8.0256    CFS   UNIT VOLUME =    .9981       B =   526.28      P60 = 1.8700
     AREA =      .002033 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 =   7.4691    CFS   UNIT VOLUME =    .9986       B =   354.67      P60 = 1.8700
     AREA =      .002807 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 401.14NORTH


    RUNOFF VOLUME =      1.29860 INCHES     =        .3352 ACRE-FEET
    PEAK DISCHARGE RATE =      10.08 CFS  AT   1.500 HOURS   BASIN AREA =   .0048 SQ. MI.


*S*  ADD THIS TO BASIN 300.2 (ROUTED) TO DETERMINE TOTAL FLOW INTO SAPPHIRE
*S*  FROM 82ND STREET ON THE NORTH AT ANALYSIS POINT 10.
```

```
ADD HYD            ID=1  HYD=A_P_10  ID I=7  ID II=1
PRINT HYD          ID=1  CODE=1

                                   HYDROGRAPH FROM AREA A_P_10


    RUNOFF VOLUME =     1.35240 INCHES     =       2.7873 ACRE-FEET
    PEAK DISCHARGE RATE =      79.15 CFS  AT   1.533 HOURS   BASIN AREA =   .0386 SQ. MI.


*S*  COMPUTE BASIN 401.14 SOUTH OF SAPPHIRE.
COMPUTE NM HYD     ID=8 HYD NO=401.14SOUTH  AREA=0.00633 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 =   10.496    CFS   UNIT VOLUME =    .9982       B =   526.28      P60 = 1.8700
     AREA =      .002659 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 =   9.7684    CFS   UNIT VOLUME =    .9991       B =   354.67      P60 = 1.8700
     AREA =      .003671 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 401.14SOUTH


    RUNOFF VOLUME =     1.29860 INCHES     =        .4384 ACRE-FEET
    PEAK DISCHARGE RATE =      13.18 CFS  AT   1.500 HOURS   BASIN AREA =   .0063 SQ. MI.


*S*  ADD THE RUNOFF FROM THE SOUTH AND THE NORTH
ADD HYD            ID=1 HYD NO=82ND_SAPP ID=1 ID=8
PRINT HYD          ID=1 CODE=1

                                   HYDROGRAPH FROM AREA 82ND_SAPP


    RUNOFF VOLUME =     1.34482 INCHES     =       3.2257 ACRE-FEET
    PEAK DISCHARGE RATE =      91.90 CFS  AT   1.533 HOURS   BASIN AREA =   .0450 SQ. MI.


*S*  ADD THE RUNOFF FROM THE WEST FOR THE TOTAL AT 82ND AND SAPPHIRE
ADD HYD            ID=1 HYD NO=82ND_SAP_TOT ID=1 ID=4
PRINT HYD          ID=1 CODE=1

                                   HYDROGRAPH FROM AREA 82ND_SAP_TOT


    RUNOFF VOLUME =     1.34127 INCHES     =       3.4840 ACRE-FEET
    PEAK DISCHARGE RATE =      99.49 CFS  AT   1.533 HOURS   BASIN AREA =   .0487 SQ. MI.


*S*  ACCORDING TO THE SE2 REPORT, 41 CFS WILL DISCHARGE INTO THE INLETS
*S*  LOCATED AT THIS POINT.
DIVIDE HYD         ID=1  Q MAX=41  ID I =19  HYD=TO_PIPE
                                   ID II=17  HYD=TO_STREET
PRINT HYD          ID=17  CODE=1

                                   HYDROGRAPH FROM AREA TO_STREET


    RUNOFF VOLUME =     1.34127 INCHES     =        .8756 ACRE-FEET
    PEAK DISCHARGE RATE =      58.49 CFS  AT   1.533 HOURS   BASIN AREA =   .0122 SQ. MI.
```

```
*S*  ADD THE PIPE FLOWS FOR THE TOTAL AT THIS POINT
ADD HYD            ID=14  HYD=PIPE_FRM_82ND  ID I=19  ID II=15
PRINT HYD          ID=14  CODE=1

                                   HYDROGRAPH FROM AREA PIPE_FRM_82ND


    RUNOFF VOLUME =     1.03694 INCHES     =      18.0496 ACRE-FEET
    PEAK DISCHARGE RATE =     456.66 CFS  AT   1.533 HOURS   BASIN AREA =   .3264 SQ. MI.


*S*  ROUTE THE PIPE FLOWS TO UNSER (A.P. 17) VIA THE 66" PIPE AT 3%
COMPUTE RATING CURVE CID=1  VS NO=1  CODE=-1  SLP=.03
                   DIA=66 IN  N=.013

                                RATING CURVE PIPE SECTION  1.0
                                   WATER       FLOW        FLOW        MAX
                                  SURFACE      AREA        RATE        WIDTH
                                   ELEV        SQ FT       CFS         FT
                                     .00         .00         .00         .00
                                     .29         .47        3.05        2.44
                                     .57        1.31       13.24        3.36
                                     .86        2.37       30.79        3.99
                                    1.15        3.59       55.38        4.47
                                    1.43        4.92       86.46        4.83
                                    1.72        6.35      123.37        5.10
                                    2.01        7.84      165.28        5.30
                                    2.29        9.38      211.32        5.42
                                    2.58       10.94      260.50        5.49
                                    2.87       12.52      311.77        5.50
                                    3.15       14.09      363.98        5.50
                                    3.44       15.63      415.88        5.50
                                    3.73       17.13      466.12        5.50
                                    4.01       18.57      513.17        5.50
                                    4.30       19.92      555.27        5.50
                                    4.59       21.17      590.30        5.50
                                    4.87       22.26      615.37        5.50
                                    5.16       23.15      625.67        5.50
                                    5.50       23.76      625.67        5.50
COMPUTE TRAVEL TIME ID=15  REACH=1  VS NO=1  L=1100  SLP=.03

                              TRAVEL TIME TABLE
                                          REACH=  1.0

                              WATER       AVERAGE     FLOW        TRAVEL
                              DEPTH       AREA        RATE        TIME
                              FEET        SQ.FT.      CFS         HRS
                                .287         .472        3.05       .0473
                                .573        1.314       13.24       .0303
                                .860        2.373       30.79       .0235
                               1.146        3.589       55.38       .0198
                               1.433        4.923       86.46       .0174
                               1.720        6.348      123.37       .0157
                               2.006        7.839      165.28       .0145
                               2.293        9.377      211.32       .0136
                               2.579       10.942      260.50       .0128
                               2.866       12.518      311.77       .0123
                               3.153       14.086      363.98       .0118
                               3.439       15.630      415.88       .0115
                               3.726       17.132      466.12       .0112
                               4.013       18.571      513.17       .0111
                               4.299       19.925      555.27       .0110
                               4.586       21.166      590.30       .0110
                               4.872       22.258      615.37       .0111
                               5.159       23.147      625.67       .0113
                               5.500       23.758      625.67       .0116
ROUTE              ID=15  HYD=PIP_TO_AP_17  INFLOW ID=14  DT=0.03333
PRINT HYD          ID=15  CODE=1

                                   HYDROGRAPH FROM AREA PIP_TO_AP_17


    RUNOFF VOLUME =     1.03694 INCHES     =      18.0496 ACRE-FEET
    PEAK DISCHARGE RATE =     458.44 CFS  AT   1.567 HOURS   BASIN AREA =   .3264 SQ. MI.
```

```
*S*  ROUTE THE STREET FLOWS ON SAPPHIRE ST. TO QUARTZ VIA A STREET SECTION
*S*  ADJUSTED TO REFLECT AS-BUILT CONDITIONS.
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=60.0
                    DIST  ELEV  DIST  ELEV  DIST  ELEV  DIST  ELEV
                     0    101    10  100.67  10   100    12  100.13
                     30  100.49  48  100.13  50   100    50  100.67
                     60   101
```

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	.04	.04	1.62
100.11	.17	.28	3.24
100.16	.41	.76	6.79
100.21	.91	1.95	12.05
100.26	1.68	4.29	17.32
100.32	2.73	8.10	22.58
100.37	4.06	13.64	27.84
100.42	5.66	21.19	33.11
100.47	7.54	31.00	38.37
100.53	9.63	45.30	40.00
100.58	11.74	62.87	40.00
100.63	13.84	82.62	40.00
100.68	15.96	103.11	40.86
100.74	18.19	122.20	44.05
100.79	20.59	143.62	47.24
100.84	23.16	167.47	50.43
100.89	25.90	193.87	53.62
100.95	28.81	222.92	56.81
101.00	31.88	254.74	60.00

```
COMPUTE TRAVEL TIME ID=5 REACH NO=1 NO VS=1 L=550 FT SLP=0.02
```

TRAVEL TIME TABLE

REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.053	.043	.04	.1459
.105	.170	.28	.0919
.158	.411	.76	.0828
.211	.907	1.95	.0710
.263	1.680	4.29	.0598
.316	2.730	8.10	.0515
.368	4.057	13.64	.0454
.421	5.661	21.19	.0408
.474	7.542	31.00	.0372
.526	9.634	45.30	.0325
.579	11.740	62.87	.0285
.632	13.845	82.62	.0256
.684	15.957	103.11	.0236
.737	18.191	122.20	.0227
.790	20.594	143.62	.0219
.842	23.165	167.47	.0211
.895	25.903	193.87	.0204
.947	28.810	222.92	.0197
1.000	31.884	254.74	.0191

```
ROUTE                ID=5 HYD NO=SAP_TO_QUARZ INFLOW ID=17 DT=0.03333
PRINT HYD            ID=5 CODE=1
```

HYDROGRAPH FROM AREA SAP_TO_QUARZ

```
    RUNOFF VOLUME =     1.34169 INCHES     =        .8759 ACRE-FEET
    PEAK DISCHARGE RATE =      57.16 CFS  AT   1.567 HOURS   BASIN AREA =   .0122 SQ. MI.


*S **BASIN 401.17 IS PART OF SUNRISE ESTATES UNIT 1
COMPUTE NM HYD       ID=12 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=12 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 401.17 AND THE STREET FLOWS TO QUARTZ
ADD HYD             ID=13 HYD NO=401.17 ID=5 ID=12
PRINT HYD           ID=13 CODE=1

                                        HYDROGRAPH FROM AREA   401.17


    RUNOFF VOLUME =     1.32655 INCHES     =       1.3336 ACRE-FEET
    PEAK DISCHARGE RATE =      68.91 CFS  AT   1.567 HOURS   BASIN AREA =   .0189 SQ. MI.


*S*  ROUTE THE STREET FLOW ON SAPPHIRE ST. TO UNSER BLVD./THE POND VIA
*S*  THE 40' STREET SECTION (ADJUSTED TO REFLECT THE UPSTREAM SECTION
*S*  WHICH WILL EVENTUALY BE BUILT TO THE POND).  THIS IS A.P. 17.
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=60.0
                    DIST  ELEV  DIST  ELEV  DIST  ELEV  DIST  ELEV
                     0    101    10  100.67  10   100    12  100.13
                     30  100.49  48  100.13  50   100    50  100.67
                     60   101
```

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	.04	.04	1.62
100.11	.17	.28	3.24
100.16	.41	.76	6.79
100.21	.91	1.95	12.05
100.26	1.68	4.29	17.32
100.32	2.73	8.10	22.58
100.37	4.06	13.64	27.84
100.42	5.66	21.19	33.11
100.47	7.54	31.00	38.37
100.53	9.63	45.30	40.00
100.58	11.74	62.87	40.00
100.63	13.84	82.62	40.00
100.68	15.96	103.11	40.86
100.74	18.19	122.20	44.05
100.79	20.59	143.62	47.24
100.84	23.16	167.47	50.43
100.89	25.90	193.87	53.62
100.95	28.81	222.92	56.81
101.00	31.88	254.74	60.00

```
COMPUTE TRAVEL TIME ID=5 REACH NO=1 NO VS=1 L=450 FT SLP=0.02

                                TRAVEL TIME TABLE
                                              REACH=  1.0
```

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.053	.043	.04	.1193
.105	.170	.28	.0752
.158	.411	.76	.0677
.211	.907	1.95	.0581
.263	1.680	4.29	.0489
.316	2.730	8.10	.0421
.368	4.057	13.64	.0372
.421	5.661	21.19	.0334
.474	7.542	31.00	.0304
.526	9.634	45.30	.0266
.579	11.740	62.87	.0233
.632	13.845	82.62	.0209
.684	15.957	103.11	.0193
.737	18.191	122.20	.0186
.790	20.594	143.62	.0179
.842	23.165	167.47	.0173
.895	25.903	193.87	.0167
.947	28.810	222.92	.0162
1.000	31.884	254.74	.0156

```
ROUTE              ID=5 HYD NO=SAP_TO_AP17 INFLOW ID=13 DT=0.03333
PRINT HYD          ID=5 CODE=1

                                HYDROGRAPH FROM AREA SAP_TO_AP17

    RUNOFF VOLUME =     1.32657 INCHES     =       1.3336 ACRE-FEET
    PEAK DISCHARGE RATE =      68.13 CFS  AT   1.567 HOURS   BASIN AREA =   .0189 SQ. MI.


*S*  COMPUTE BASIN 403.  BASIN 403 WILL DISCHARGE DIRECTLY TO THE PIPE.
COMPUTE NM HYD      ID=31  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=31  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 BASIN 403 TO THE PIPE FLOW FROM THE WEST AT A.P. 17
ADD HYD             ID=15  HYD=AP17_PIPE  ID I=15  ID II=31
PRINT HYD           ID=15  CODE=1

                                HYDROGRAPH FROM AREA AP17_PIPE

    RUNOFF VOLUME =     1.04829 INCHES     =      19.0746 ACRE-FEET
    PEAK DISCHARGE RATE =     484.75 CFS  AT   1.567 HOURS   BASIN AREA =   .3412 SQ. MI.


*S*  BASIN 400.2 IS CURRENTLY UNDEVELOPED, MAKE COMPUTATION OF EXISTING
*S*  RUNOFF TO TWO ANALYSIS POINTS FOR COMPARISON PURPOSES.
*S*  COMPUTE BASIN 400.2-A, DISCHARGE TO ANALYSIS POINT 4.  THIS RUNOFF
*S*  DISCHARGES ACROSS A PROPERTY LINE INTO EXISTING BACK YARDS THAT
```

```
*S*  HAVE NO PROTECTION FROM EROSION.
COMPUTE NM HYD       ID=1  HYD NO=A_P_2_EXST  AREA=0.00669 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 =   13.729    CFS   UNIT VOLUME =    .9986       B =   273.54      P60 = 1.8700
     AREA =      .006690 SQ MI    IA =    .65000 INCHES    INF =   1.67000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD            ID=1  CODE=1

                                        HYDROGRAPH FROM AREA A_P_2_EXST

    RUNOFF VOLUME =      .43925 INCHES     =        .1567 ACRE-FEET
    PEAK DISCHARGE RATE =      5.56 CFS  AT   1.533 HOURS   BASIN AREA =   .0067 SQ. MI.


*S*  COMPUTE BASIN 400.2-B, DISCHARGE TO ANALYSIS POINT 3.  THIS RUNOFF
*S*  DISCHARGES TO THE UNDEVELOPED TRACT ON THE EAST.
COMPUTE NM HYD       ID=1  HYD NO=A_P_3_EXST  AREA=0.02553 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 =   52.390    CFS   UNIT VOLUME =    .9994       B =   273.54      P60 = 1.8700
     AREA =      .025530 SQ MI    IA =    .65000 INCHES    INF =   1.67000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD            ID=1  CODE=1

                                        HYDROGRAPH FROM AREA A_P_3_EXST

    RUNOFF VOLUME =      .43925 INCHES     =        .5981 ACRE-FEET
    PEAK DISCHARGE RATE =     21.20 CFS  AT   1.533 HOURS   BASIN AREA =   .0255 SQ. MI.


*S*  COMPUTE BASIN 400.2-A, DISCHARGE TO RED SAGE AVE. LOW POINT.
COMPUTE NM HYD       ID=1  HYD NO=400.2_A_DEV  AREA=0.00104 SQ MI
                     PER A=0 PER B=34 PER C=0 PER D=66
                     TP=-0.1333 HR MASS RAIN=-1

     K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000    SHAPE CONSTANT, N =  7.106420
     UNIT PEAK =   2.7099    CFS   UNIT VOLUME =    .9949       B =   526.28      P60 = 1.8700
     AREA =      .000686 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


     K =   .130992HR    TP =   .133300HR    K/TP RATIO =   .982685    SHAPE CONSTANT, N =  3.593448
     UNIT PEAK =   .86765    CFS   UNIT VOLUME =    .9850       B =   327.09      P60 = 1.8700
     AREA =      .000354 SQ MI    IA =    .50000 INCHES    INF =   1.25000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD            ID=1  CODE=1

                                        HYDROGRAPH FROM AREA 400.2_A_DEV

    RUNOFF VOLUME =     1.52413 INCHES     =        .0845 ACRE-FEET
    PEAK DISCHARGE RATE =      2.39 CFS  AT   1.500 HOURS   BASIN AREA =   .0010 SQ. MI.


*S*  COMPUTE BASIN 400.2-D, DISCHARGE TO RED SAGE AVE. LOW POINT.
COMPUTE NM HYD       ID=2  HYD NO=400.2_D_DEV  AREA=0.00169 SQ MI
                     PER A=0 PER B=34 PER C=0 PER D=66
                     TP=-0.1333 HR MASS RAIN=-1

     K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000    SHAPE CONSTANT, N =  7.106420
     UNIT PEAK =   4.4037    CFS   UNIT VOLUME =    .9969       B =   526.28      P60 = 1.8700
     AREA =      .001115 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
```

```
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


K =   .130992HR    TP =   .133300HR    K/TP RATIO =   .982685     SHAPE CONSTANT, N =  3.593448
UNIT PEAK =   1.4099    CFS   UNIT VOLUME =    .9903       B =   327.09      P60 = 1.8700
AREA =      .000575 SQ MI    IA =    .50000 INCHES    INF =   1.25000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD           ID=2  CODE=1

                                    HYDROGRAPH FROM AREA 400.2_D_DEV


   RUNOFF VOLUME =     1.52413 INCHES     =        .1374 ACRE-FEET
   PEAK DISCHARGE RATE =       3.88 CFS  AT   1.500 HOURS   BASIN AREA =   .0017 SQ. MI.


*S*  ADD BASIN 400.2-D & 400.2-A FOR TOTAL TO RED SAGE (A.P.-5)
ADD HYD             ID=3  HYD=RED_SAGE_TOT  ID I=1  ID II=2
PRINT HYD           ID=3  CODE=1

                                    HYDROGRAPH FROM AREA RED_SAGE_TOT


   RUNOFF VOLUME =     1.52392 INCHES     =        .2219 ACRE-FEET
   PEAK DISCHARGE RATE =       6.27 CFS  AT   1.500 HOURS   BASIN AREA =   .0027 SQ. MI.


*S*  COMPUTE CAPACITY OF RED SAGE AVE. TO DETERMINE CAPACITY AT A.P.5.
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEG=1 MIN EL=0 MAX EL=0.67
                    CH SLOPE=0.02 FP SLOPE=0.02 N=0.017 DIST=28
                    DIST  ELEV  DIST  ELEV  DIST  ELEV  DIST  ELEV
                     0    0.67   0     0     2    .13    14   .37
                     26   .13    28    0     28   .67
```

RATING CURVE VALLEY SECTION 1.0

WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH FT
.00	.00	.00	.00
.04	.02	.02	1.09
.07	.08	.10	2.17
.11	.17	.29	3.26
.14	.31	.58	5.11
.18	.55	1.08	8.63
.21	.92	2.01	12.16
.25	1.41	3.46	15.68
.28	2.03	5.53	19.21
.32	2.76	8.31	22.74
.35	3.63	11.88	26.26
.39	4.60	16.90	28.00
.42	5.59	23.35	28.00
.46	6.58	30.60	28.00
.49	7.56	38.60	28.00
.53	8.55	47.32	28.00
.56	9.54	56.73	28.00
.60	10.53	66.80	28.00
.63	11.51	77.50	28.00
.67	12.50	88.82	28.00

```
*S*  COMPUTE BASIN 400.2-B, DISCHARGE TO SAGEWAY DRIVE LOW POINT.
COMPUTE NM HYD      ID=1  HYD NO=400.2_B_DEV  AREA=0.00052 SQ MI
                    PER A=0 PER B=34 PER C=0 PER D=66
                    TP=-0.1333 HR MASS RAIN=-1

K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
UNIT PEAK =   1.3550    CFS   UNIT VOLUME =    .9911       B =   526.28      P60 = 1.8700
AREA =      .000343 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


K =   .130992HR    TP =   .133300HR    K/TP RATIO =   .982685     SHAPE CONSTANT, N =  3.593448
UNIT PEAK =   .43383    CFS   UNIT VOLUME =    .9673       B =   327.09      P60 = 1.8700
AREA =      .000177 SQ MI    IA =    .50000 INCHES    INF =   1.25000 INCHES PER HOUR
```

```
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD            ID=1  CODE=1

                                        HYDROGRAPH FROM AREA 400.2_B_DEV


    RUNOFF VOLUME =      1.52413 INCHES      =         .0423 ACRE-FEET
    PEAK DISCHARGE RATE =        1.20 CFS  AT   1.500 HOURS   BASIN AREA =   .0005 SQ. MI.


*S*  COMPUTE BASIN 400.2-C, DISCHARGE TO SAGEWAY DRIVE LOW POINT.
COMPUTE NM HYD       ID=2  HYD NO=400.2_C_DEV  AREA=0.00669 SQ MI
                     PER A=0 PER B=34 PER C=0 PER D=66
                     TP=-0.1333 HR MASS RAIN=-1

     K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
     UNIT PEAK =   17.432    CFS   UNIT VOLUME =    .9988       B =   526.28      P60 = 1.8700
     AREA =      .004415 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


     K =   .130992HR    TP =   .133300HR    K/TP RATIO =   .982685     SHAPE CONSTANT, N =  3.593448
     UNIT PEAK =   5.5813    CFS   UNIT VOLUME =    .9980       B =   327.09      P60 = 1.8700
     AREA =      .002275 SQ MI    IA =    .50000 INCHES    INF =   1.25000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD            ID=2  CODE=1

                                        HYDROGRAPH FROM AREA 400.2_C_DEV


    RUNOFF VOLUME =      1.52413 INCHES      =         .5438 ACRE-FEET
    PEAK DISCHARGE RATE =       15.30 CFS  AT   1.500 HOURS   BASIN AREA =   .0067 SQ. MI.


*S*  ADD BASIN 400.2-B & 400.2-C FOR TOTAL TO SAGEWAY DRIVE (A.P.-6)
ADD HYD              ID=4  HYD=AP_6_TOT  ID I=1  ID II=2
PRINT HYD            ID=4  CODE=1

                                        HYDROGRAPH FROM AREA AP_6_TOT


    RUNOFF VOLUME =      1.52405 INCHES      =         .5860 ACRE-FEET
    PEAK DISCHARGE RATE =       16.50 CFS  AT   1.500 HOURS   BASIN AREA =   .0072 SQ. MI.


*S*  COMPUTE CAPACITY OF SAGEWAY DR. TO DETERMINE CAPACITY AT A.P.6.
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEG=1 MIN EL=0 MAX EL=0.67
                     CH SLOPE=0.03 FP SLOPE=0.03 N=0.017 DIST=28
                     DIST  ELEV  DIST  ELEV  DIST  ELEV  DIST  ELEV
                      0    0.67   0     0     2    .13    14   .37
                      26   .13    28    0     28   .67
```

RATING CURVE VALLEY SECTION 1.0

WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH FT
.00	.00	.00	.00
.04	.02	.02	1.09
.07	.08	.12	2.17
.11	.17	.36	3.26
.14	.31	.71	5.11
.18	.55	1.32	8.63
.21	.92	2.46	12.16
.25	1.41	4.24	15.68
.28	2.03	6.77	19.21
.32	2.76	10.18	22.74
.35	3.63	14.55	26.26
.39	4.60	20.70	28.00
.42	5.59	28.60	28.00
.46	6.58	37.48	28.00

.49	7.56	47.28	28.00
.53	8.55	57.96	28.00
.56	9.54	69.48	28.00
.60	10.53	81.81	28.00
.63	11.51	94.92	28.00
.67	12.50	108.78	28.00

```
*S*  ADD THE RUNOFF AT THE LOW POINT TO DETERMINE THE TOTAL INTO THE
*S*  INLET AT ANALYSIS POINT 4.
ADD HYD            ID=1  HYD=A_P_4_TOTL  ID I=3  ID II=4
PRINT HYD          ID=1  CODE=1
```

HYDROGRAPH FROM AREA A_P_4_TOTL

RUNOFF VOLUME = 1.52401 INCHES = .8079 ACRE-FEET
PEAK DISCHARGE RATE = 22.77 CFS AT 1.500 HOURS BASIN AREA = .0099 SQ. MI.

```
*S*  ROUTE THE FLOW VIA A 24" PIPE TO ANALYSIS POINT 2 AT THE SOUTHEAST
*S*  CORNER OF THE SUBDIVISION.
COMPUTE RATING CURVE CID=1  VS NO=1  CODE=-1  SLP=.03
                    DIA=24 IN  N=.013
```

RATING CURVE PIPE SECTION 1.0

WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	MAX WIDTH FT
.00	.00	.00	.00
.10	.06	.21	.89
.21	.17	.89	1.22
.31	.31	2.07	1.45
.42	.47	3.73	1.62
.52	.65	5.82	1.76
.63	.84	8.31	1.85
.73	1.04	11.13	1.93
.83	1.24	14.24	1.97
.94	1.45	17.55	2.00
1.04	1.66	21.00	2.00
1.15	1.86	24.52	2.00
1.25	2.07	28.02	2.00
1.35	2.27	31.40	2.00
1.46	2.46	34.57	2.00
1.56	2.63	37.41	2.00
1.67	2.80	39.77	2.00
1.77	2.94	41.46	2.00
1.88	3.06	42.15	2.00
2.00	3.14	42.15	2.00

```
COMPUTE TRAVEL TIME ID=3  REACH=1  VS NO=1  L=160  SLP=.03
```

TRAVEL TIME TABLE

REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.104	.062	.21	.0135
.208	.174	.89	.0087
.313	.314	2.07	.0067
.417	.475	3.73	.0057
.521	.651	5.82	.0050
.625	.839	8.31	.0045
.730	1.037	11.13	.0041
.834	1.240	14.24	.0039
.938	1.447	17.55	.0037
1.042	1.655	21.00	.0035
1.146	1.863	24.52	.0034
1.251	2.067	28.02	.0033
1.355	2.265	31.40	.0032
1.459	2.456	34.57	.0032
1.563	2.635	37.41	.0031
1.668	2.799	39.77	.0031
1.772	2.943	41.46	.0032
1.876	3.061	42.15	.0032
2.000	3.142	42.15	.0033

```
ROUTE                ID=3  HYD=PIP_TO_A_P_2  INFLOW ID=1  DT=0.03333
PRINT HYD            ID=3  CODE=1

                                    HYDROGRAPH FROM AREA PIP_TO_A_P_2


    RUNOFF VOLUME =     1.52407 INCHES     =        .8080 ACRE-FEET
    PEAK DISCHARGE RATE =      22.75 CFS  AT   1.500 HOURS   BASIN AREA =   .0099 SQ. MI.


*S*  ROUTE THIS PIPE FLOW TO UNSER BOULEVARD (A.P.16) VIA A 30" STORM DRAIN IN A
*S*  EASEMENT THROUGH THE NORTHERN PART OF ALBUQUERQUE SOUTH TRACT D,
*S*  OWNED BY ALBQ. SOUTH GENERAL PARTNERSHIP.  SIZE THE PIPE SUCH THAT
*S*  IT CAN DISCHARGE TWICE THE 100-YEAR STORM UNDERGROUND, SINCE THIS
*S*  IS A LAND-LOCKED PORTION OF THE SUBDIVISION, AND NO IMPROVEMENTS WILL
*S*  BE CONSTRUCTED ON THE INTERVENING LAND TO CARRY SURFACE RUNOFF IN
*S*  EXCESS OF THE 100-YEAR STORM.  NOTE THAT TWICE THE 100 YEAR STORM
*S*  IS 45.50 CFS, AND THE PIPE BELOW HAS THIS CAPACITY, PER THE RATING
*S*  CURVE.
COMPUTE RATING CURVE CID=1  VS NO=1  CODE=-1  SLP=.0132
                     DIA=30 IN  N=.013

                                    RATING CURVE PIPE SECTION  1.0
                                 WATER      FLOW       FLOW       MAX
                                SURFACE     AREA       RATE       WIDTH
                                 ELEV       SQ FT      CFS        FT
                                  .00        .00        .00        .00
                                  .13        .10        .25       1.11
                                  .26        .27       1.07       1.53
                                  .39        .49       2.49       1.82
                                  .52        .74       4.49       2.03
                                  .65       1.02       7.01       2.19
                                  .78       1.31      10.00       2.32
                                  .91       1.62      13.39       2.41
                                 1.04       1.94      17.12       2.47
                                 1.17       2.26      21.11       2.50
                                 1.30       2.59      25.26       2.50
                                 1.43       2.91      29.49       2.50
                                 1.56       3.23      33.70       2.50
                                 1.69       3.54      37.77       2.50
                                 1.82       3.84      41.58       2.50
                                 1.95       4.12      44.99       2.50
                                 2.08       4.37      47.83       2.50
                                 2.21       4.60      49.86       2.50
                                 2.35       4.78      50.69       2.50
                                 2.50       4.91      50.69       2.50
COMPUTE TRAVEL TIME ID=4  REACH=1  VS NO=1  L=630  SLP=.0132

                                TRAVEL TIME TABLE
                                              REACH=  1.0

                                WATER      AVERAGE     FLOW       TRAVEL
                                DEPTH      AREA        RATE       TIME
                                FEET       SQ.FT.      CFS        HRS
                                  .130       .098        .25       .0691
                                  .261       .271       1.07       .0443
                                  .391       .490       2.49       .0344
                                  .521       .741       4.49       .0289
                                  .651      1.017       7.01       .0254
                                  .782      1.312      10.00       .0230
                                  .912      1.620      13.39       .0212
                                 1.042      1.937      17.12       .0198
                                 1.173      2.261      21.11       .0187
                                 1.303      2.586      25.26       .0179
                                 1.433      2.910      29.49       .0173
                                 1.563      3.229      33.70       .0168
                                 1.694      3.540      37.77       .0164
                                 1.824      3.837      41.58       .0161
                                 1.954      4.117      44.99       .0160
                                 2.084      4.373      47.83       .0160
                                 2.215      4.599      49.86       .0161
                                 2.345      4.783      50.69       .0165
                                 2.500      4.909      50.69       .0169
ROUTE                ID=4  HYD=PIP_TO_AP16  INFLOW ID=3  DT=0.03333
```

```
PRINT HYD            ID=4  CODE=1

                                        HYDROGRAPH FROM AREA PIP_TO_AP16


    RUNOFF VOLUME =      1.52407 INCHES      =         .8080 ACRE-FEET
    PEAK DISCHARGE RATE =      22.57 CFS  AT   1.533 HOURS   BASIN AREA =   .0099 SQ. MI.


*S*  ** THE REMAINDER OF BASIN 400.2 IS CURRENTLY UNDEVELOPED, ASSUME
*S   FUTURE DEVELOPMENT WILL BE @ A DENSITY OF 9 DU/AC
*S*  USE THE SAME LAND TREATMENTS AS IN THE ARFMAN REPORT.
COMPUTE NM HYD       ID=1  HYD NO=400.2  AREA=0.01507 SQ MI
                     PER A=0 PER B=11 PER C=11 PER D=78
                     TP=-0.1333 HR MASS RAIN=-1

     K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
     UNIT PEAK =   46.408    CFS   UNIT VOLUME =    .9991       B =   526.28      P60 = 1.8700
     AREA =      .011755 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 =   8.8212    CFS   UNIT VOLUME =    .9989       B =   354.67      P60 = 1.8700
     AREA =      .003315 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   400.20


    RUNOFF VOLUME =      1.71253 INCHES      =        1.3764 ACRE-FEET
    PEAK DISCHARGE RATE =      38.06 CFS  AT   1.500 HOURS   BASIN AREA =   .0151 SQ. MI.


*S*  ADD BASIN 400.2 DIRECTLY TO THE PIPE FLOW AT ANALYSIS POINT 16.
ADD HYD              ID=17  HYD=A_P_16_PIPE  ID I=4  ID II=1
PRINT HYD            ID=17  CODE=1

                                        HYDROGRAPH FROM AREA A_P_16_PIPE


    RUNOFF VOLUME =      1.63759 INCHES      =        2.1843 ACRE-FEET
    PEAK DISCHARGE RATE =      59.96 CFS  AT   1.500 HOURS   BASIN AREA =   .0250 SQ. MI.


*S*  ROUTE THE PIPE FLOW TO THE EXISTING 42" STUB-OUT AT THE 66" SAPPHIRE
*S*  ROAD STORM DRAIN (A.P. 17) VIA A 30" STORM DRAIN.
COMPUTE RATING CURVE CID=1  VS NO=1  CODE=-1  SLP=.0427
DIA=30 IN  N=.013
```

RATING CURVE PIPE SECTION 1.0

WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	MAX WIDTH FT
.00	.00	.00	.00
.13	.10	.44	1.11
.26	.27	1.93	1.53
.39	.49	4.49	1.82
.52	.74	8.07	2.03
.65	1.02	12.60	2.19
.78	1.31	17.98	2.32
.91	1.62	24.09	2.41
1.04	1.94	30.79	2.47
1.17	2.26	37.96	2.50
1.30	2.59	45.43	2.50
1.43	2.91	53.04	2.50
1.56	3.23	60.60	2.50
1.69	3.54	67.92	2.50
1.82	3.84	74.78	2.50
1.95	4.12	80.92	2.50

```
                                    2.08        4.37        86.02        2.50
                                    2.21        4.60        89.67        2.50
                                    2.35        4.78        91.17        2.50
                                    2.50        4.91        91.17        2.50
COMPUTE TRAVEL TIME ID=4  REACH=1  VS NO=1  L=735  SLP=.0427

                        TRAVEL TIME TABLE
                                     REACH=  1.0

                        WATER       AVERAGE     FLOW        TRAVEL
                        DEPTH       AREA        RATE        TIME
                        FEET        SQ.FT.      CFS         HRS
                           .130        .098         .44       .0448
                           .261        .271        1.93       .0287
                           .391        .490        4.49       .0223
                           .521        .741        8.07       .0188
                           .651       1.017       12.60       .0165
                           .782       1.312       17.98       .0149
                           .912       1.620       24.09       .0137
                          1.042       1.937       30.79       .0128
                          1.173       2.261       37.96       .0122
                          1.303       2.586       45.43       .0116
                          1.433       2.910       53.04       .0112
                          1.563       3.229       60.60       .0109
                          1.694       3.540       67.92       .0106
                          1.824       3.837       74.78       .0105
                          1.954       4.117       80.92       .0104
                          2.084       4.373       86.02       .0104
                          2.215       4.599       89.67       .0105
                          2.345       4.783       91.17       .0107
                          2.500       4.909       91.17       .0110
ROUTE              ID=4  HYD=PIP_TO_AP_17  INFLOW ID=17  DT=0.03333
PRINT HYD          ID=4  CODE=1

                                    HYDROGRAPH FROM AREA PIP_TO_AP_17


    RUNOFF VOLUME =     1.63761 INCHES     =      2.1843 ACRE-FEET
    PEAK DISCHARGE RATE =      59.95 CFS  AT   1.533 HOURS   BASIN AREA =   .0250 SQ. MI.


*S*  ADD THE PIPE RUNOFF AT UNSER/SAPPHIRE--A.P. 17.
ADD HYD            ID=15  HYD=PIPE_A_P_17  ID I=15  ID II=4
PRINT HYD          ID=15  CODE=1

                                    HYDROGRAPH FROM AREA PIPE_A_P_17


    RUNOFF VOLUME =     1.08854 INCHES     =     21.2589 ACRE-FEET
    PEAK DISCHARGE RATE =     540.08 CFS  AT   1.533 HOURS   BASIN AREA =   .3662 SQ. MI.


*S ** BASIN 405 DRAINS TO SAPPHIRE ST.
COMPUTE NM HYD     ID=19  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=19  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 BASIN 405 RUNOFF TO THE EXIST. PIPE RUNOFF AT A.P. 17 (ASSUMING
*S*  INLETS ARE EVENTUALLY BUILT TO DISCHARGE IT INTO THE PIPE).
ADD HYD            ID=19  HYD=A_P_17_PIPE  ID I=19  ID II=15
PRINT HYD          ID=19  CODE=1

                                    HYDROGRAPH FROM AREA A_P_17_PIPE


RUNOFF VOLUME =     1.09708 INCHES     =      22.2410 ACRE-FEET
PEAK DISCHARGE RATE =     568.44 CFS  AT   1.533 HOURS   BASIN AREA =   .3801 SQ. MI.


*S*  ADD STREET FLOWS WITH PIPE FLOWS FOR SUBTOTAL IN PIPE, ASSUMING INLETS
*S*  WILL BE BUILT SO ALL RUNOFF CAN GET INTO PIPE.
ADD HYD            ID=5 HYD=A_P_17_TTL  ID=19 ID=5
PRINT HYD          ID=5 CODE=1

                                    HYDROGRAPH FROM AREA A_P_17_TTL


RUNOFF VOLUME =     1.10792 INCHES     =      23.5746 ACRE-FEET
PEAK DISCHARGE RATE =     632.32 CFS  AT   1.567 HOURS   BASIN AREA =   .3990 SQ. MI.


*S*  ROUTE THIS FLOW INTO THE POND VIA THE EXIST. 66" PIPE AT 3% SLOPE.
COMPUTE RATING CURVE CID=1  VS NO=1  CODE=-1  SLP=.03
                   DIA=66 IN  N=.013
```

RATING CURVE PIPE SECTION 1.0

WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	MAX WIDTH FT
.00	.00	.00	.00
.29	.47	3.05	2.44
.57	1.31	13.24	3.36
.86	2.37	30.79	3.99
1.15	3.59	55.38	4.47
1.43	4.92	86.46	4.83
1.72	6.35	123.37	5.10
2.01	7.84	165.28	5.30
2.29	9.38	211.32	5.42
2.58	10.94	260.50	5.49
2.87	12.52	311.77	5.50
3.15	14.09	363.98	5.50
3.44	15.63	415.88	5.50
3.73	17.13	466.12	5.50
4.01	18.57	513.17	5.50
4.30	19.92	555.27	5.50
4.59	21.17	590.30	5.50
4.87	22.26	615.37	5.50
5.16	23.15	625.67	5.50
5.50	23.76	625.67	5.50

```
COMPUTE TRAVEL TIME ID=19  REACH=1  VS NO=1  L=200  SLP=.03
```

TRAVEL TIME TABLE

REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.287	.472	3.05	.0086
.573	1.314	13.24	.0055
.860	2.373	30.79	.0043
1.146	3.589	55.38	.0036
1.433	4.923	86.46	.0032
1.720	6.348	123.37	.0029
2.006	7.839	165.28	.0026
2.293	9.377	211.32	.0025

```
                                2.579      10.942      260.50       .0023
                                2.866      12.518      311.77       .0022
                                3.153      14.086      363.98       .0022
                                3.439      15.630      415.88       .0021
                                3.726      17.132      466.12       .0020
                                4.013      18.571      513.17       .0020
                                4.299      19.925      555.27       .0020
                                4.586      21.166      590.30       .0020
                                4.872      22.258      615.37       .0020
                                5.159      23.147      625.67       .0021
                                5.500      23.758      625.67       .0021
   ROUTE                ID=19  HYD=PIP_TO_POND  INFLOW ID=5  DT=0.03333
TRAVEL TIME TABLE EXCEEDED
   PRINT HYD            ID=19  CODE=1

                                        HYDROGRAPH FROM AREA PIP_TO_POND


      RUNOFF VOLUME =     1.10792 INCHES     =      23.5746 ACRE-FEET
      PEAK DISCHARGE RATE =     633.74 CFS  AT   1.567 HOURS   BASIN AREA =   .3990 SQ. MI.


   ******************************************************************************
   ******************************************************************************
   *S **BASINS 200,201, & 202 DRAIN TO KIMELA DR
   COMPUTE NM HYD       ID=2 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=2   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 ABOVE ON 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=3 REACH NO=1 NO VS=1 L=595 FT SLP=0.02

                        TRAVEL TIME TABLE
                                    REACH=  1.0

                        WATER      AVERAGE     FLOW       TRAVEL
                        DEPTH      AREA        RATE       TIME
                        FEET       SQ.FT.      CFS        HRS
                          .053       .138        .15      .1529
                          .105       .554        .95      .0963
                          .158      1.246       2.80      .0735
                          .211      2.215       6.03      .0607
                          .263      3.461      10.94      .0523
                          .316      4.920      18.84      .0432
                          .368      6.394      29.08      .0363
                          .421      7.869      41.00      .0317
                          .474      9.344      54.46      .0284
                          .526     10.821      69.37      .0258
                          .579     12.298      85.66      .0237
                          .632     13.776     103.24      .0221
                          .684     15.261     119.89      .0210
                          .737     16.869     132.52      .0210
                          .790     18.644     147.34      .0209
                          .842     20.586     164.39      .0207
                          .895     22.695     183.72      .0204
                          .947     24.971     205.41      .0201
                         1.000     27.414     229.56      .0197
ROUTE                ID=3 HYD NO=200.1 INFLOW ID=2 DT=0.0
PRINT HYD            ID=3 CODE=1

                                PARTIAL HYDROGRAPH   200.10


    RUNOFF VOLUME =     1.00753 INCHES     =       2.8479 ACRE-FEET
    PEAK DISCHARGE RATE =      87.73 CFS  AT   1.533 HOURS   BASIN AREA =   .0530 SQ. MI.


*S COMPUTE DISCHARGE FOR BASIN 201
COMPUTE NM HYD       ID=14 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=14  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.


*S ADD HYDROGRAPHS NO. 201 AND 200.1 TOGETHER
ADD HYD              ID=5 HYD NO=201.1 ID=3 ID=14
PRINT HYD            ID=5 CODE=1
```

PARTIAL HYDROGRAPH 201.10

RUNOFF VOLUME = 1.00752 INCHES = 4.2450 ACRE-FEET
PEAK DISCHARGE RATE = 129.70 CFS AT 1.533 HOURS BASIN AREA = .0790 SQ. MI.

```
*S ROUTE THE ABOVE 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=0.0193 FP SLOPE=0.0193 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	.93	10.52
100.16	1.25	2.75	15.78
100.21	2.22	5.93	21.04
100.26	3.46	10.75	26.30
100.32	4.92	18.50	27.99
100.37	6.39	28.57	28.01
100.42	7.87	40.27	28.03
100.47	9.34	53.50	28.04
100.53	10.82	68.15	28.06
100.58	12.30	84.15	28.07
100.63	13.78	101.42	28.09
100.68	15.26	117.78	28.96
100.74	16.87	130.18	32.13
100.79	18.64	144.74	35.31
100.84	20.59	161.49	38.48
100.89	22.69	180.48	41.66
100.95	24.97	201.79	44.83
101.00	27.41	225.50	48.00

```
COMPUTE TRAVEL TIME  ID=6 REACH NO=1 NO VS=1 L=437 FT SLP=0.0193
```

TRAVEL TIME TABLE
REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.053	.138	.15	.1143
.105	.554	.93	.0720
.158	1.246	2.75	.0549
.211	2.215	5.93	.0454
.263	3.461	10.75	.0391
.316	4.920	18.50	.0323
.368	6.394	28.57	.0272
.421	7.869	40.27	.0237
.474	9.344	53.50	.0212
.526	10.821	68.15	.0193
.579	12.298	84.15	.0177
.632	13.776	101.42	.0165
.684	15.261	117.78	.0157
.737	16.869	130.18	.0157
.790	18.644	144.74	.0156
.842	20.586	161.49	.0155
.895	22.695	180.48	.0153
.947	24.971	201.79	.0150
1.000	27.414	225.50	.0148

```
ROUTE                ID=6 HYD NO=200.2 INFLOW ID=5 DT=0.0
PRINT HYD            ID=6 CODE=1
```

PARTIAL HYDROGRAPH 200.20

RUNOFF VOLUME = 1.00753 INCHES = 4.2450 ACRE-FEET
PEAK DISCHARGE RATE = 129.97 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=7 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=7   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=8  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=8  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=9  HYD NO=202.06 ID I=7  ID II=8
PRINT HYD            ID=9  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=10 HYD NO=202.2 ID=6 ID=9
PRINT HYD            ID=10 CODE=1

                                   PARTIAL HYDROGRAPH   202.20


    RUNOFF VOLUME =      .98938 INCHES     =       4.8545 ACRE-FEET
    PEAK DISCHARGE RATE =     147.62 CFS  AT   1.533 HOURS   BASIN AREA =   .0920 SQ. MI.


*S ROUTE THE ABOVE FLOW ON KIMELA DR. TO UNSER BLVD.
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEG=1 MIN EL=100.00 MAX EL=101.00
                     CH SLOPE=0.0193 FP SLOPE=0.0193 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	.93	10.52
100.16	1.25	2.75	15.78
100.21	2.22	5.93	21.04
100.26	3.46	10.75	26.30
100.32	4.92	18.50	27.99
100.37	6.39	28.57	28.01
100.42	7.87	40.27	28.03
100.47	9.34	53.50	28.04
100.53	10.82	68.15	28.06
100.58	12.30	84.15	28.07
100.63	13.78	101.42	28.09
100.68	15.26	117.78	28.96
100.74	16.87	130.18	32.13
100.79	18.64	144.74	35.31
100.84	20.59	161.49	38.48
100.89	22.69	180.48	41.66
100.95	24.97	201.79	44.83
101.00	27.41	225.50	48.00

```
COMPUTE TRAVEL TIME  ID=11 REACH NO=1 NO VS=1 L=738 FT SLP=0.0193
```

TRAVEL TIME TABLE
REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.053	.138	.15	.1930
.105	.554	.93	.1216
.158	1.246	2.75	.0928
.211	2.215	5.93	.0766
.263	3.461	10.75	.0660
.316	4.920	18.50	.0545
.368	6.394	28.57	.0459
.421	7.869	40.27	.0401
.474	9.344	53.50	.0358
.526	10.821	68.15	.0325
.579	12.298	84.15	.0300
.632	13.776	101.42	.0278
.684	15.261	117.78	.0266
.737	16.869	130.18	.0266
.790	18.644	144.74	.0264
.842	20.586	161.49	.0261
.895	22.695	180.48	.0258
.947	24.971	201.79	.0254
1.000	27.414	225.50	.0249

```
ROUTE                ID=11 HYD NO=202.3 INFLOW ID=10 DT=0.0
PRINT HYD            ID=11 CODE=1
```

PARTIAL HYDROGRAPH 202.30

```
RUNOFF VOLUME =      .98939 INCHES     =       4.8546 ACRE-FEET
PEAK DISCHARGE RATE =     143.37 CFS  AT   1.567 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=12 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=12   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 **BASINS 404 IS UNIT 2 OF SUNRISE ESTATES
COMPUTE NM HYD      ID=13 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=13   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 **COMBINE BASINS 402 AND 404 TOGETHER
ADD HYD             ID=14 HYD NO=404.1 ID=12 ID=13
PRINT HYD           ID=14 CODE=1

                                        HYDROGRAPH FROM AREA   404.10


    RUNOFF VOLUME =     1.29859 INCHES     =       4.3494 ACRE-FEET
    PEAK DISCHARGE RATE =     130.61 CFS  AT   1.500 HOURS   BASIN AREA =   .0628 SQ. MI.


*S **ADD THE FLOW ABOVE TO THE FLOW ON KIMELA DR.
ADD HYD             ID=15 HYD NO=404.2 ID=11 ID=14
PRINT HYD           ID=15 CODE=1

                                        HYDROGRAPH FROM AREA   404.20


    RUNOFF VOLUME =     1.11482 INCHES     =       9.2039 ACRE-FEET
    PEAK DISCHARGE RATE =     268.54 CFS  AT   1.533 HOURS   BASIN AREA =   .1548 SQ. MI.


*S ROUTE THE ABOVE FLOW ON UNSER BLVD. FROM KIMELA DR. TO THE POND
*S*  REVISE THE RATING CURVE COMMAND SO THAT THE STREET CAPACITY WILL
*S*  NOT BE EXCEEDED.  THIS REVISION WILL BE DONE BY ADDING A VERTICAL
*S*  LINE AT EACH END OF THE SECTION.  THIS WILL NOT CHANGE THE RESULT
*S*  OF THE AHYMO RUN, EXCEPT THAT THE RATING CURVE WILL NOW NOT BE
*S*  EXCEEDED.
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEG=1 MIN EL=100.00 MAX EL=102.00
                    CH SLOPE=0.005 FP SLOPE=0.005 N=0.017 DIST=48.0
                    DIST  ELEV  DIST  ELEV  DIST  ELEV  DIST  ELEV
                     0   102.00
```

```
 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
48.0 102.00
```

RATING CURVE VALLEY SECTION 1.0

WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH FT
100.00	.00	.00	.00
100.11	.55	.48	10.52
100.21	2.21	3.02	21.04
100.32	4.92	9.42	27.99
100.42	7.87	20.49	28.03
100.53	10.82	34.68	28.06
100.63	13.77	51.61	28.09
100.74	16.87	66.25	32.13
100.84	20.58	82.18	38.48
100.95	24.97	102.69	44.83
101.05	29.94	132.82	48.00
101.16	34.99	172.01	48.00
101.26	40.04	215.06	48.00
101.37	45.09	261.79	48.00
101.47	50.15	312.04	48.00
101.58	55.20	365.67	48.00
101.68	60.25	422.54	48.00
101.79	65.30	482.55	48.00
101.89	70.36	545.60	48.00
102.00	75.41	611.60	48.00

```
COMPUTE TRAVEL TIME  ID=16 REACH NO=1 NO VS=1 L=1230 FT SLP=0.005
```

TRAVEL TIME TABLE

REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.105	.554	.48	.3982
.211	2.215	3.02	.2508
.316	4.919	9.42	.1785
.421	7.868	20.49	.1312
.526	10.820	34.68	.1066
.632	13.775	51.61	.0912
.737	16.867	66.25	.0870
.842	20.583	82.18	.0856
.947	24.968	102.69	.0831
1.053	29.937	132.82	.0770
1.158	34.989	172.01	.0695
1.263	40.042	215.06	.0636
1.368	45.094	261.79	.0589
1.474	50.147	312.04	.0549
1.579	55.200	365.67	.0516
1.684	60.252	422.54	.0487
1.789	65.305	482.55	.0462
1.895	70.358	545.60	.0441
2.000	75.410	611.60	.0421

```
ROUTE                ID=16 HYD NO=404.3 INFLOW ID=15 DT=0.0
PRINT HYD            ID=16 CODE=1
```

HYDROGRAPH FROM AREA 404.30

RUNOFF VOLUME = 1.11482 INCHES = 9.2039 ACRE-FEET
PEAK DISCHARGE RATE = 244.26 CFS AT 1.567 HOURS BASIN AREA = .1548 SQ. MI.

```
*S*  ADD TO FLOW IN POND FOR TOTAL AT ANALYSIS POINT D (IN POND).
ADD HYD              ID=17 HYD NO=404.4 ID=19 ID=16
PRINT HYD            ID=17 CODE=1
```

HYDROGRAPH FROM AREA 404.40

RUNOFF VOLUME = 1.10985 INCHES = 32.7785 ACRE-FEET
PEAK DISCHARGE RATE = 878.01 CFS AT 1.567 HOURS BASIN AREA = .5538 SQ. MI.

```
*s DIVIDE THE DISCHARGE AT ANALYSIS PT D TO ALLOW 124.0 CFS TO ENTER PIPE
*S AND FLOW TO CHANNEL BEFORE POND FILLS UP
DIVIDE HYD          ID=17  Q=124   ID=18 HYD=404.5
                                    ID=19 HYD=404.6
PRINT HYD           ID=18  CODE=1

                                    HYDROGRAPH FROM AREA   404.50


    RUNOFF VOLUME =     1.10985 INCHES     =      12.8510 ACRE-FEET
    PEAK DISCHARGE RATE =     124.00 CFS , AT   1.400 HOURS   BASIN AREA =   .2171 SQ. MI.


PRINT HYD           ID=19  CODE=1

                                    HYDROGRAPH FROM AREA   404.60


    RUNOFF VOLUME =     1.10985 INCHES     =      19.9275 ACRE-FEET
    PEAK DISCHARGE RATE =     754.01 CFS  AT   1.567 HOURS   BASIN AREA =   .3367 SQ. MI.


*S DESIGN A RETENTION FACILITY TO REDUCE TO FLOW TO THAT WHICH WILL
*S FIT IN A 42" RCP @ S=1.8%
ROUTE RESERVOIR     ID=20 HYD NO=405.7 INFLOW ID=19  CODE=1
                    OUTFLOW(CFS)  STORAGE(AF)  ELEV(FT)
                        0              0         0
                        0.01          0.43       0.5
                        0.01          0.85       1
                        0.02          2.43       2
                        0.02          4.60       3
                        6             7.06       4
                        22            9.65       5
                        36           12.37       6
                        54           15.22       7
                        70           18.20       8
                        84           21.31       9

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

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (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	.00	.00	.000	.00
1.17	.00	.00	.000	.00
1.20	.00	.00	.000	.00
1.23	.00	.00	.000	.00
1.27	.00	.00	.000	.00
1.30	.00	.00	.000	.00
1.33	.00	.00	.000	.00
1.37	.00	.00	.000	.00
1.40	52.82	.08	.073	.00
1.43	197.40	.49	.417	.01
1.47	380.66	1.23	1.213	.01
1.50	570.12	3.00	4.600	.02
1.53	714.57	3.00	4.600	.02
1.57	754.01	3.69	6.309	4.17
1.60	726.92	4.49	8.324	13.81
1.63	665.31	5.20	10.188	24.77
1.67	566.58	5.79	11.805	33.09
1.70	472.75	6.27	13.135	40.83
1.73	397.80	6.65	14.212	47.63
1.77	334.75	6.95	15.082	53.13
1.80	280.63	7.19	15.778	57.00
1.83	233.26	7.37	16.325	59.93

STORM DRAIN PEAK AT 1.567 HOURS
POND HGL = POND BOTTOM ELEV. + DEPTH
= 5021.0 + 3.69
= 5024.69

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
1.87	193.94	7.51	16.745	62.19
1.90	160.97	7.62	17.060	63.88
1.93	132.99	7.69	17.287	65.10
1.97	109.52	7.75	17.441	65.92
2.00	89.64	7.78	17.533	66.42
2.03	72.56	7.79	17.573	66.63
2.07	57.33	7.79	17.568	66.61
2.10	41.57	7.77	17.522	66.36
2.13	23.66	7.74	17.429	65.86
2.17	4.68	7.69	17.288	65.10
2.20	.00	7.64	17.116	64.18
2.23	.00	7.58	16.941	63.24
2.27	.00	7.52	16.768	62.31
2.30	.00	7.46	16.598	61.40
2.33	.00	7.41	16.430	60.49
2.37	.00	7.35	16.264	59.61
2.40	.00	7.30	16.101	58.73
2.43	.00	7.24	15.941	57.87
2.47	.00	7.19	15.782	57.02
2.50	.00	7.14	15.627	56.18
2.53	.00	7.08	15.473	55.36
2.57	.00	7.03	15.322	54.55
2.60	.00	6.98	15.172	53.70
2.63	.00	6.93	15.026	52.77
2.67	.00	6.88	14.882	51.86
2.70	.00	6.83	14.740	50.97
2.73	.00	6.78	14.601	50.09
2.77	.00	6.73	14.464	49.23
2.80	.00	6.69	14.330	48.38
2.83	.00	6.64	14.198	47.54
2.87	.00	6.60	14.068	46.72
2.90	.00	6.55	13.940	45.92
2.93	.00	6.51	13.815	45.12
2.97	.00	6.46	13.692	44.35
3.00	.00	6.42	13.570	43.58
3.03	.00	6.38	13.451	42.83
3.07	.00	6.34	13.334	42.09
3.10	.00	6.30	13.220	41.37
3.13	.00	6.26	13.107	40.65
3.17	.00	6.22	12.996	39.95
3.20	.00	6.18	12.886	39.26
3.23	.00	6.14	12.779	38.58
3.27	.00	6.11	12.674	37.92

3.30	.00	6.07	12.570	37.27
3.33	.00	6.03	12.469	36.62
3.37	.00	6.00	12.369	35.99
3.40	.00	5.96	12.270	35.49
3.43	.00	5.93	12.173	34.99
3.47	.00	5.89	12.077	34.49
3.50	.00	5.86	11.983	34.01
3.53	.00	5.82	11.890	33.53
3.57	.00	5.79	11.798	33.06
3.60	.00	5.76	11.708	32.59
3.63	.00	5.72	11.619	32.13
3.67	.00	5.69	11.531	31.68
3.70	.00	5.66	11.444	31.23

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
3.73	.00	5.63	11.359	30.80
3.77	.00	5.60	11.275	30.36
3.80	.00	5.57	11.191	29.93
3.83	.00	5.54	11.110	29.51
3.87	.00	5.51	11.029	29.10
3.90	.00	5.48	10.949	28.69
3.93	.00	5.45	10.871	28.28
3.97	.00	5.42	10.793	27.89
4.00	.00	5.39	10.717	27.49
4.03	.00	5.36	10.642	27.11
4.07	.00	5.34	10.568	26.72
4.10	.00	5.31	10.495	26.35
4.13	.00	5.28	10.423	25.98
4.17	.00	5.26	10.352	25.61
4.20	.00	5.23	10.282	25.25
4.23	.00	5.21	10.213	24.90
4.27	.00	5.18	10.144	24.54
4.30	.00	5.16	10.077	24.20
4.33	.00	5.13	10.011	23.86
4.37	.00	5.11	9.946	23.52
4.40	.00	5.09	9.882	23.19
4.43	.00	5.06	9.818	22.87
4.47	.00	5.04	9.756	22.54
4.50	.00	5.02	9.694	22.23
4.53	.00	4.99	9.633	21.90
4.57	.00	4.97	9.573	21.53
4.60	.00	4.95	9.515	21.16
4.63	.00	4.93	9.457	20.81
4.67	.00	4.90	9.400	20.45
4.70	.00	4.88	9.344	20.11
4.73	.00	4.86	9.289	19.77
4.77	.00	4.84	9.235	19.44
4.80	.00	4.82	9.182	19.11
4.83	.00	4.80	9.130	18.79
4.87	.00	4.78	9.079	18.47
4.90	.00	4.76	9.028	18.16
4.93	.00	4.74	8.978	17.85
4.97	.00	4.72	8.930	17.55
5.00	.00	4.70	8.882	17.25
5.03	.00	4.69	8.835	16.96
5.07	.00	4.67	8.788	16.68
5.10	.00	4.65	8.743	16.40
5.13	.00	4.63	8.698	16.12
5.17	.00	4.62	8.654	15.85
5.20	.00	4.60	8.611	15.58
5.23	.00	4.58	8.568	15.32
5.27	.00	4.57	8.526	15.06
5.30	.00	4.55	8.485	14.80
5.33	.00	4.53	8.445	14.55
5.37	.00	4.52	8.405	14.31
5.40	.00	4.50	8.366	14.07
5.43	.00	4.49	8.327	13.83
5.47	.00	4.47	8.290	13.60
5.50	.00	4.46	8.253	13.37
5.53	.00	4.45	8.216	13.14
5.57	.00	4.43	8.180	12.92

TIME	INFLOW	ELEV	VOLUME	OUTFLOW

Sage Pointe Subdivision -- 100-Year Design Storm AHYMO Analysis

(HRS)	(CFS)	(FEET)	(AC-FT)	(CFS)
5.60	.00	4.42	8.145	12.70
5.63	.00	4.41	8.110	12.49
5.67	.00	4.39	8.076	12.28
5.70	.00	4.38	8.043	12.07
5.73	.00	4.37	8.010	11.87
5.77	.00	4.35	7.977	11.67
5.80	.00	4.34	7.945	11.47
5.83	.00	4.33	7.914	11.28
5.87	.00	4.32	7.883	11.09
5.90	.00	4.31	7.853	10.90
5.93	.00	4.29	7.823	10.71
5.97	.00	4.28	7.794	10.53
6.00	.00	4.27	7.765	10.36
6.03	.00	4.26	7.737	10.18
6.07	.00	4.25	7.709	10.01
6.10	.00	4.24	7.682	9.84
6.13	.00	4.23	7.655	9.67
6.17	.00	4.22	7.628	9.51
6.20	.00	4.21	7.602	9.35
6.23	.00	4.20	7.577	9.19
6.27	.00	4.19	7.552	9.04
6.30	.00	4.18	7.527	8.89
6.33	.00	4.17	7.503	8.74
6.37	.00	4.16	7.479	8.59
6.40	.00	4.15	7.455	8.44
6.43	.00	4.14	7.432	8.30
6.47	.00	4.14	7.410	8.16
6.50	.00	4.13	7.387	8.02
6.53	.00	4.12	7.366	7.89
6.57	.00	4.11	7.344	7.75
6.60	.00	4.10	7.323	7.62
6.63	.00	4.09	7.302	7.49
6.67	.00	4.09	7.282	7.37
6.70	.00	4.08	7.261	7.24
6.73	.00	4.07	7.242	7.12
6.77	.00	4.06	7.222	7.00
6.80	.00	4.06	7.203	6.88
6.83	.00	4.05	7.184	6.77
6.87	.00	4.04	7.166	6.65
6.90	.00	4.03	7.148	6.54
6.93	.00	4.03	7.130	6.43
6.97	.00	4.02	7.112	6.32
7.00	.00	4.01	7.095	6.22
7.03	.00	4.01	7.078	6.11
7.07	.00	4.00	7.061	6.01
7.10	.00	3.99	7.045	5.96
7.13	.00	3.99	7.028	5.92
7.17	.00	3.98	7.012	5.88
7.20	.00	3.97	6.996	5.84
7.23	.00	3.97	6.980	5.81
7.27	.00	3.96	6.964	5.77
7.30	.00	3.95	6.948	5.73
7.33	.00	3.95	6.932	5.69
7.37	.00	3.94	6.917	5.65
7.40	.00	3.94	6.901	5.61
7.43	.00	3.93	6.886	5.58

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
7.47	.00	3.92	6.871	5.54
7.50	.00	3.92	6.855	5.50
7.53	.00	3.91	6.840	5.47
7.57	.00	3.90	6.825	5.43
7.60	.00	3.90	6.810	5.39
7.63	.00	3.89	6.796	5.36
7.67	.00	3.89	6.781	5.32
7.70	.00	3.88	6.766	5.29
7.73	.00	3.87	6.752	5.25
7.77	.00	3.87	6.737	5.22
7.80	.00	3.86	6.723	5.18
7.83	.00	3.86	6.709	5.15
7.87	.00	3.85	6.695	5.11

7.90	.00	3.85	6.681	5.08
7.93	.00	3.84	6.667	5.04
7.97	.00	3.83	6.653	5.01
8.00	.00	3.83	6.639	4.98
8.03	.00	3.82	6.625	4.94
8.07	.00	3.82	6.612	4.91
8.10	.00	3.81	6.598	4.88
8.13	.00	3.81	6.585	4.85
8.17	.00	3.80	6.572	4.81
8.20	.00	3.80	6.558	4.78
8.23	.00	3.79	6.545	4.75
8.27	.00	3.79	6.532	4.72
8.30	.00	3.78	6.519	4.69
8.33	.00	3.77	6.506	4.65
8.37	.00	3.77	6.494	4.62
8.40	.00	3.76	6.481	4.59
8.43	.00	3.76	6.468	4.56
8.47	.00	3.75	6.456	4.53
8.50	.00	3.75	6.443	4.50
8.53	.00	3.74	6.431	4.47
8.57	.00	3.74	6.419	4.44
8.60	.00	3.73	6.407	4.41
8.63	.00	3.73	6.394	4.38
8.67	.00	3.72	6.382	4.35
8.70	.00	3.72	6.370	4.32
8.73	.00	3.71	6.359	4.29
8.77	.00	3.71	6.347	4.27
8.80	.00	3.71	6.335	4.24
8.83	.00	3.70	6.323	4.21
8.87	.00	3.70	6.312	4.18
8.90	.00	3.69	6.300	4.15
8.93	.00	3.69	6.289	4.13
8.97	.00	3.68	6.278	4.10
9.00	.00	3.68	6.266	4.07
9.03	.00	3.67	6.255	4.04
9.07	.00	3.67	6.244	4.02
9.10	.00	3.66	6.233	3.99
9.13	.00	3.66	6.222	3.96
9.17	.00	3.66	6.211	3.94
9.20	.00	3.65	6.201	3.91
9.23	.00	3.65	6.190	3.88
9.27	.00	3.64	6.179	3.86
9.30	.00	3.64	6.169	3.83

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
9.33	.00	3.63	6.158	3.81
9.37	.00	3.63	6.148	3.78
9.40	.00	3.62	6.137	3.76
9.43	.00	3.62	6.127	3.73
9.47	.00	3.62	6.117	3.71
9.50	.00	3.61	6.106	3.68
9.53	.00	3.61	6.096	3.66
9.57	.00	3.60	6.086	3.63
9.60	.00	3.60	6.076	3.61
9.63	.00	3.60	6.066	3.58
9.67	.00	3.59	6.057	3.56
9.70	.00	3.59	6.047	3.54
9.73	.00	3.58	6.037	3.51
9.77	.00	3.58	6.027	3.49
9.80	.00	3.58	6.018	3.47
9.83	.00	3.57	6.008	3.44
9.87	.00	3.57	5.999	3.42
9.90	.00	3.56	5.989	3.40
9.93	.00	3.56	5.980	3.37
9.97	.00	3.56	5.971	3.35
10.00	.00	3.55	5.962	3.33
10.03	.00	3.55	5.953	3.31
10.07	.00	3.55	5.943	3.29
10.10	.00	3.54	5.934	3.26
10.13	.00	3.54	5.925	3.24
10.17	.00	3.54	5.917	3.22
10.20	.00	3.53	5.908	3.20
10.23	.00	3.53	5.899	3.18

10.27	.00	3.52	5.890	3.16
10.30	.00	3.52	5.882	3.14
10.33	.00	3.52	5.873	3.11
10.37	.00	3.51	5.864	3.09
10.40	.00	3.51	5.856	3.07
10.43	.00	3.51	5.847	3.05
10.47	.00	3.50	5.839	3.03
10.50	.00	3.50	5.831	3.01
10.53	.00	3.50	5.822	2.99
10.57	.00	3.49	5.814	2.97
10.60	.00	3.49	5.806	2.95
10.63	.00	3.49	5.798	2.93
10.67	.00	3.48	5.790	2.91
10.70	.00	3.48	5.782	2.89
10.73	.00	3.48	5.774	2.87
10.77	.00	3.47	5.766	2.85
10.80	.00	3.47	5.758	2.84
10.83	.00	3.47	5.751	2.82
10.87	.00	3.46	5.743	2.80
10.90	.00	3.46	5.735	2.78
10.93	.00	3.46	5.727	2.76
10.97	.00	3.46	5.720	2.74
11.00	.00	3.45	5.712	2.72
11.03	.00	3.45	5.705	2.71
11.07	.00	3.45	5.697	2.69
11.10	.00	3.44	5.690	2.67
11.13	.00	3.44	5.683	2.65
11.17	.00	3.44	5.675	2.63

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
11.20	.00	3.43	5.668	2.62
11.23	.00	3.43	5.661	2.60
11.27	.00	3.43	5.654	2.58
11.30	.00	3.43	5.647	2.56
11.33	.00	3.42	5.640	2.55
11.37	.00	3.42	5.633	2.53
11.40	.00	3.42	5.626	2.51
11.43	.00	3.41	5.619	2.50
11.47	.00	3.41	5.612	2.48
11.50	.00	3.41	5.605	2.46
11.53	.00	3.41	5.599	2.45
11.57	.00	3.40	5.592	2.43
11.60	.00	3.40	5.585	2.41
11.63	.00	3.40	5.578	2.40
11.67	.00	3.40	5.572	2.38
11.70	.00	3.39	5.565	2.37
11.73	.00	3.39	5.559	2.35
11.77	.00	3.39	5.552	2.34
11.80	.00	3.38	5.546	2.32
11.83	.00	3.38	5.540	2.30
11.87	.00	3.38	5.533	2.29
11.90	.00	3.38	5.527	2.27
11.93	.00	3.37	5.521	2.26
11.97	.00	3.37	5.515	2.24
12.00	.00	3.37	5.508	2.23
12.03	.00	3.37	5.502	2.21
12.07	.00	3.36	5.496	2.20
12.10	.00	3.36	5.490	2.18
12.13	.00	3.36	5.484	2.17
12.17	.00	3.36	5.478	2.15
12.20	.00	3.35	5.472	2.14
12.23	.00	3.35	5.466	2.13
12.27	.00	3.35	5.461	2.11
12.30	.00	3.35	5.455	2.10
12.33	.00	3.35	5.449	2.08
12.37	.00	3.34	5.443	2.07
12.40	.00	3.34	5.438	2.06
12.43	.00	3.34	5.432	2.04
12.47	.00	3.34	5.426	2.03
12.50	.00	3.33	5.421	2.02
12.53	.00	3.33	5.415	2.00
12.57	.00	3.33	5.410	1.99
12.60	.00	3.33	5.404	1.98

12.63	.00	3.32	5.399	1.96
12.67	.00	3.32	5.394	1.95
12.70	.00	3.32	5.388	1.94
12.73	.00	3.32	5.383	1.92
12.77	.00	3.32	5.378	1.91
12.80	.00	3.31	5.372	1.90
12.83	.00	3.31	5.367	1.88
12.87	.00	3.31	5.362	1.87
12.90	.00	3.31	5.357	1.86
12.93	.00	3.31	5.352	1.85
12.97	.00	3.30	5.347	1.84
13.00	.00	3.30	5.342	1.82
13.03	.00	3.30	5.337	1.81

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
13.07	.00	3.30	5.332	1.80
13.10	.00	3.30	5.327	1.79
13.13	.00	3.29	5.322	1.77
13.17	.00	3.29	5.317	1.76
13.20	.00	3.29	5.312	1.75
13.23	.00	3.29	5.307	1.74
13.27	.00	3.29	5.302	1.73
13.30	.00	3.28	5.298	1.72
13.33	.00	3.28	5.293	1.70
13.37	.00	3.28	5.288	1.69
13.40	.00	3.28	5.284	1.68
13.43	.00	3.28	5.279	1.67
13.47	.00	3.27	5.275	1.66
13.50	.00	3.27	5.270	1.65
13.53	.00	3.27	5.265	1.64
13.57	.00	3.27	5.261	1.63
13.60	.00	3.27	5.256	1.62
13.63	.00	3.27	5.252	1.61
13.67	.00	3.26	5.248	1.59
13.70	.00	3.26	5.243	1.58
13.73	.00	3.26	5.239	1.57
13.77	.00	3.26	5.235	1.56
13.80	.00	3.26	5.230	1.55
13.83	.00	3.25	5.226	1.54
13.87	.00	3.25	5.222	1.53
13.90	.00	3.25	5.218	1.52
13.93	.00	3.25	5.213	1.51
13.97	.00	3.25	5.209	1.50
14.00	.00	3.25	5.205	1.49
14.03	.00	3.24	5.201	1.48
14.07	.00	3.24	5.197	1.47
14.10	.00	3.24	5.193	1.46
14.13	.00	3.24	5.189	1.45
14.17	.00	3.24	5.185	1.44
14.20	.00	3.24	5.181	1.43
14.23	.00	3.23	5.177	1.42
14.27	.00	3.23	5.173	1.41
14.30	.00	3.23	5.169	1.40
14.33	.00	3.23	5.165	1.39
14.37	.00	3.23	5.162	1.39
14.40	.00	3.23	5.158	1.38
14.43	.00	3.23	5.154	1.37
14.47	.00	3.22	5.150	1.36
14.50	.00	3.22	5.147	1.35
14.53	.00	3.22	5.143	1.34
14.57	.00	3.22	5.139	1.33
14.60	.00	3.22	5.135	1.32
14.63	.00	3.22	5.132	1.31
14.67	.00	3.21	5.128	1.30
14.70	.00	3.21	5.125	1.30
14.73	.00	3.21	5.121	1.29
14.77	.00	3.21	5.118	1.28
14.80	.00	3.21	5.114	1.27
14.83	.00	3.21	5.111	1.26
14.87	.00	3.21	5.107	1.25
14.90	.00	3.20	5.104	1.24

TIME	INFLOW	ELEV	VOLUME	OUTFLOW

Sage Pointe Subdivision -- 100-Year Design Storm AHYMO Analysis

(HRS)	(CFS)	(FEET)	(AC-FT)	(CFS)
14.93	.00	3.20	5.100	1.24
14.97	.00	3.20	5.097	1.23
15.00	.00	3.20	5.094	1.22
15.03	.00	3.20	5.090	1.21
15.07	.00	3.20	5.087	1.20
15.10	.00	3.20	5.084	1.20
15.13	.00	3.20	5.080	1.19
15.17	.00	3.19	5.077	1.18
15.20	.00	3.19	5.074	1.17
15.23	.00	3.19	5.071	1.16
15.27	.00	3.19	5.067	1.16
15.30	.00	3.19	5.064	1.15
15.33	.00	3.19	5.061	1.14
15.37	.00	3.19	5.058	1.13
15.40	.00	3.18	5.055	1.13
15.43	.00	3.18	5.052	1.12
15.47	.00	3.18	5.049	1.11
15.50	.00	3.18	5.046	1.10
15.53	.00	3.18	5.043	1.10
15.57	.00	3.18	5.040	1.09
15.60	.00	3.18	5.037	1.08
15.63	.00	3.18	5.034	1.07
15.67	.00	3.18	5.031	1.07
15.70	.00	3.17	5.028	1.06
15.73	.00	3.17	5.025	1.05
15.77	.00	3.17	5.022	1.05
15.80	.00	3.17	5.019	1.04
15.83	.00	3.17	5.016	1.03
15.87	.00	3.17	5.013	1.02
15.90	.00	3.17	5.011	1.02
15.93	.00	3.17	5.008	1.01
15.97	.00	3.16	5.005	1.00
16.00	.00	3.16	5.002	1.00
16.03	.00	3.16	4.999	.99
16.07	.00	3.16	4.997	.98
16.10	.00	3.16	4.994	.98
16.13	.00	3.16	4.991	.97
16.17	.00	3.16	4.989	.96
16.20	.00	3.16	4.986	.96
16.23	.00	3.16	4.983	.95
16.27	.00	3.15	4.981	.95
16.30	.00	3.15	4.978	.94
16.33	.00	3.15	4.976	.93
16.37	.00	3.15	4.973	.93
16.40	.00	3.15	4.971	.92
16.43	.00	3.15	4.968	.91
16.47	.00	3.15	4.965	.91
16.50	.00	3.15	4.963	.90
16.53	.00	3.15	4.961	.90
16.57	.00	3.15	4.958	.89
16.60	.00	3.14	4.956	.88
16.63	.00	3.14	4.953	.88
16.67	.00	3.14	4.951	.87
16.70	.00	3.14	4.948	.87
16.73	.00	3.14	4.946	.86
16.76	.00	3.14	4.944	.86

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
16.80	.00	3.14	4.941	.85
16.83	.00	3.14	4.939	.84
16.86	.00	3.14	4.937	.84
16.90	.00	3.14	4.934	.83
16.93	.00	3.13	4.932	.83
16.96	.00	3.13	4.930	.82
17.00	.00	3.13	4.928	.82
17.03	.00	3.13	4.925	.81
17.06	.00	3.13	4.923	.81
17.10	.00	3.13	4.921	.80
17.13	.00	3.13	4.919	.79
17.16	.00	3.13	4.916	.79
17.20	.00	3.13	4.914	.78

17.23	.00	3.13	4.912	.78
17.26	.00	3.13	4.910	.77
17.30	.00	3.13	4.908	.77
17.33	.00	3.12	4.906	.76
17.36	.00	3.12	4.904	.76
17.40	.00	3.12	4.902	.75
17.43	.00	3.12	4.900	.75
17.46	.00	3.12	4.897	.74
17.50	.00	3.12	4.895	.74
17.53	.00	3.12	4.893	.73
17.56	.00	3.12	4.891	.73
17.60	.00	3.12	4.889	.72
17.63	.00	3.12	4.887	.72
17.66	.00	3.12	4.885	.71
17.70	.00	3.12	4.883	.71
17.73	.00	3.11	4.882	.70
17.76	.00	3.11	4.880	.70
17.80	.00	3.11	4.878	.69
17.83	.00	3.11	4.876	.69
17.86	.00	3.11	4.874	.69
17.90	.00	3.11	4.872	.68
17.93	.00	3.11	4.870	.68
17.96	.00	3.11	4.868	.67
18.00	.00	3.11	4.866	.67
18.03	.00	3.11	4.865	.66
18.06	.00	3.11	4.863	.66
18.10	.00	3.11	4.861	.65
18.13	.00	3.11	4.859	.65
18.16	.00	3.10	4.857	.65
18.20	.00	3.10	4.856	.64
18.23	.00	3.10	4.854	.64
18.26	.00	3.10	4.852	.63
18.30	.00	3.10	4.850	.63
18.33	.00	3.10	4.849	.62
18.36	.00	3.10	4.847	.62
18.40	.00	3.10	4.845	.62
18.43	.00	3.10	4.844	.61
18.46	.00	3.10	4.842	.61
18.50	.00	3.10	4.840	.60
18.53	.00	3.10	4.839	.60
18.56	.00	3.10	4.837	.60
18.60	.00	3.10	4.835	.59
18.63	.00	3.09	4.834	.59

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
18.66	.00	3.09	4.832	.58
18.70	.00	3.09	4.830	.58
18.73	.00	3.09	4.829	.58
18.76	.00	3.09	4.827	.57
18.80	.00	3.09	4.826	.57
18.83	.00	3.09	4.824	.56
18.86	.00	3.09	4.823	.56
18.90	.00	3.09	4.821	.56
18.93	.00	3.09	4.819	.55
18.96	.00	3.09	4.818	.55
19.00	.00	3.09	4.816	.55
19.03	.00	3.09	4.815	.54
19.06	.00	3.09	4.813	.54
19.10	.00	3.09	4.812	.54
19.13	.00	3.09	4.810	.53
19.16	.00	3.08	4.809	.53
19.20	.00	3.08	4.808	.52
19.23	.00	3.08	4.806	.52
19.26	.00	3.08	4.805	.52
19.30	.00	3.08	4.803	.51
19.33	.00	3.08	4.802	.51
19.36	.00	3.08	4.800	.51
19.40	.00	3.08	4.799	.50
19.43	.00	3.08	4.798	.50
19.46	.00	3.08	4.796	.50
19.50	.00	3.08	4.795	.49
19.53	.00	3.08	4.794	.49
19.56	.00	3.08	4.792	.49

19.60	.00	3.08	4.791	.48
19.63	.00	3.08	4.790	.48
19.66	.00	3.08	4.788	.48
19.70	.00	3.08	4.787	.47
19.73	.00	3.08	4.786	.47
19.76	.00	3.07	4.784	.47
19.80	.00	3.07	4.783	.47
19.83	.00	3.07	4.782	.46
19.86	.00	3.07	4.781	.46
19.90	.00	3.07	4.779	.46
19.93	.00	3.07	4.778	.45
19.96	.00	3.07	4.777	.45

PEAK DISCHARGE = 66.634 CFS - PEAK OCCURS AT HOUR 2.03
MAXIMUM WATER SURFACE ELEVATION = 7.790
MAXIMUM STORAGE = 17.5731 AC-FT INCREMENTAL TIME= .033330HRS

PRINT HYD ID=20 CODE=1

HYDROGRAPH FROM AREA 405.70

RUNOFF VOLUME = .84385 INCHES = 15.1514 ACRE-FEET
PEAK DISCHARGE RATE = 66.63 CFS AT 2.033 HOURS BASIN AREA = .3367 SQ. MI.

*S ROUTE FLOW FROM THE DETENTION POND TO THE AMOLE DEL NORTE CHANNEL
COMPUTE RATING CURVE CID=1 VS NO=1 CODE=-1 SLOPE=0.010
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	.75	1.78
.42	.69	3.27	2.44
.63	1.25	7.60	2.91
.83	1.90	13.68	3.25
1.04	2.60	21.35	3.51
1.25	3.36	30.47	3.71
1.46	4.15	40.82	3.85
1.67	4.96	52.19	3.94
1.88	5.79	64.33	3.99
2.08	6.62	77.00	4.00
2.29	7.45	89.89	4.00
2.50	8.27	102.71	4.00
2.71	9.06	115.11	4.00
2.92	9.82	126.73	4.00
3.13	10.54	137.13	4.00
3.34	11.20	145.78	4.00
3.54	11.77	151.97	4.00
3.75	12.24	154.52	4.00
4.00	12.57	154.52	4.00

COMPUTE TRAVEL TIME ID=1 REACH NO=1 NO VS=1 L=1240 FT SLP=0.010

TRAVEL TIME TABLE
REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.208	.250	.75	.1142
.417	.695	3.27	.0732
.625	1.255	7.60	.0568
.834	1.898	13.68	.0478
1.042	2.604	21.35	.0420
1.251	3.358	30.47	.0380
1.459	4.146	40.82	.0350
1.668	4.960	52.19	.0327
1.876	5.788	64.33	.0310
2.084	6.621	77.00	.0296
2.293	7.451	89.89	.0285
2.501	8.267	102.71	.0277
2.710	9.062	115.11	.0271

```
                                2.918       9.823      126.73       .0267
                                3.127      10.539      137.13       .0265
                                3.335      11.195      145.78       .0265
                                3.544      11.773      151.97       .0267
                                3.752      12.243      154.52       .0273
                                4.000      12.566      154.52       .0280
ROUTE                 ID=1 HYD NO=404.8 INFLOW ID=20 DT=0.0
PRINT HYD             ID=1 CODE=1

                                        HYDROGRAPH FROM AREA   404.80


    RUNOFF VOLUME =       .84360 INCHES     =       15.1470 ACRE-FEET
    PEAK DISCHARGE RATE =      66.59 CFS  AT   2.066 HOURS   BASIN AREA =   .3367 SQ. MI.


*S*************************************************************************
*S*************************************************************************
*S **CALC BASIN 406
COMPUTE NM HYD       ID=2 HYD NO=406.00 AREA=0.057434 SQ MI
                     PER A=4 PER B=27 PER C=27 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 =   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=2   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=3 HYD NO=407.00 AREA=0.0504 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 =   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=3   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=4  HYD NO=408.00  AREA=0.15736 SQ MI
                     PER A=0  PER B=29  PER C=29  PER D=42
                     TP=-0.1333 HR  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=4  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=5 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=5   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=6 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=6   CODE=1

                                 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=7  HYD NO=501.1  ID I=5  ID II=6
PRINT HYD            ID=7  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=8 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=8  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. THE DISCHARGE FROM THIS BASIN DRAINS TO THE AMOLE
*S.DEL NORTE CHANNEL AND DOES NOT AFFECT THE ARENAL/UNSER DRAINAGE MANAGEMENT
*S SITE.
COMPUTE NM HYD       ID=9 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

    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=9  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 9 DU/AC. THE DISCHARGE FROM THIS BASIN TRAVEL ALONG SAGE RD.
*S AND ENTERS THE AMOLE DEL NORTE CHANNEL, DOES NOT AFFECT THE ARENAL/UNSER
*S DRAINAGE MANAGEMENT SITE.
COMPUTE NM HYD       ID=10 HYD NO=504.00_OLD AREA=0.036668 MI
                     PER A=0 PER B=11 PER C=11 PER D=78
```

```
                    TP=-0.1333 HR   MASS RAIN=-1

     K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
     UNIT PEAK =   112.92    CFS   UNIT VOLUME =    .9993       B =   526.28      P60 = 1.8700
     AREA =      .028601 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 =   21.464    CFS   UNIT VOLUME =    .9998       B =   354.67      P60 = 1.8700
     AREA =      .008067 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD           ID=10  CODE=1

                                        HYDROGRAPH FROM AREA 504.00_OLD


    RUNOFF VOLUME =     1.71253 INCHES     =       3.3490 ACRE-FEET
    PEAK DISCHARGE RATE =      92.58 CFS  AT   1.500 HOURS   BASIN AREA =   .0367 SQ. MI.


*S*  THE ABOVE COMPUTATION IS THE COMPUTATION OF WHAT FORMERLY WOULD HAVE
*S*  BEEN DISCHARGED TO SAGE/UNSER FROM BASIN 540.  HOWEVER, IT WILL NOW BE
*S*  LESSENED AS BASIN 504 HAS BEEN REDUCED IN SIZE.  COMPUTE THE NEW RUNOFF
*S*  AMOUNT BELOW.
COMPUTE NM HYD      ID=10 HYD NO=504.00_NEW AREA=0.0197 MI
                    PER A=0 PER B=11 PER C=11 PER D=78
                    TP=-0.1333 HR   MASS RAIN=-1

     K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
     UNIT PEAK =   60.666    CFS   UNIT VOLUME =    .9992       B =   526.28      P60 = 1.8700
     AREA =      .015366 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 =   11.531    CFS   UNIT VOLUME =    .9993       B =   354.67      P60 = 1.8700
     AREA =      .004334 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330

PRINT HYD           ID=10  CODE=1

                                        HYDROGRAPH FROM AREA 504.00_NEW


    RUNOFF VOLUME =     1.71253 INCHES     =       1.7993 ACRE-FEET
    PEAK DISCHARGE RATE =      49.75 CFS  AT   1.500 HOURS   BASIN AREA =   .0197 SQ. MI.


*S **BASIN 505 IS FULLY DEVELOPED AND DRAINS SOUTH TO BLAKE RD..DISCHARGE FROM
*S THIS BASIN DOES NOT AFFECT THE ARENAL/UNSER DRAINAGE MANAGEMENT SITE.
COMPUTE NM HYD      ID=11 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=11   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) = 18:57:46
```

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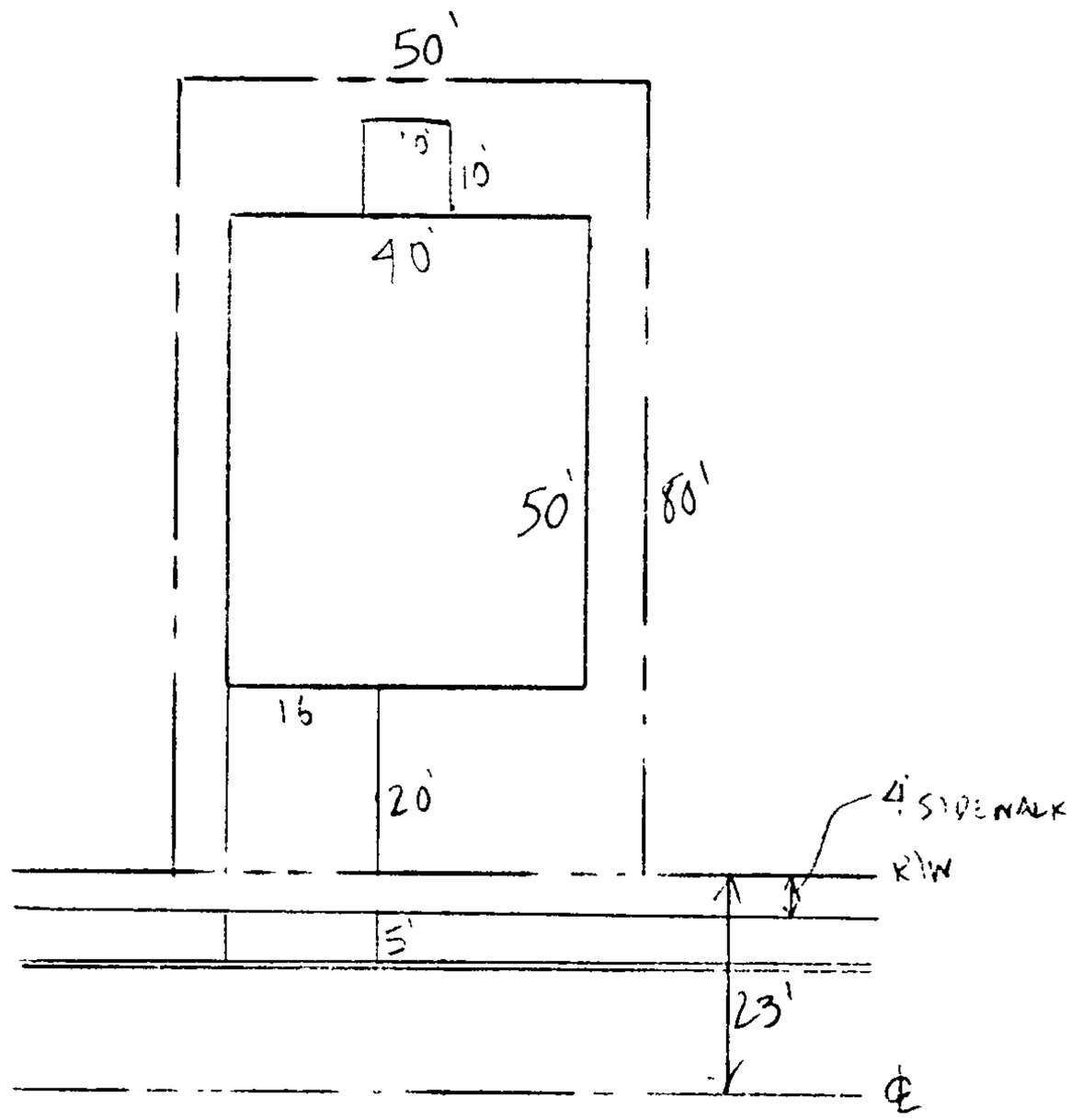
SHEET NO. _____ OF _____
JOB SALE [illegible] SUBDIVISION
SUBJECT _____
CLIENT _____ JOB NO. _____
BY JK DATE 9/11/97
CHECKED BY _____ DATE _____

COMPUTATION OF TYPICAL LAND TREATMENT %'S



"D" AREA = 3400 SF (66%)
"B" AREA = 1750 SF (34%)
TOTAL = 5150 SF

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RUNOFF CALCULATIONS - SIMPLIFIED PROCEDURE

By: James Alarid Date: February 17, 1998
Project: Sage Pointe--Backyard Ponds Zone Atlas: M-10

This procedure is in accordance with the City of Albuquerque Development Process Manual, Volume 2, Section 22.2, "Hydrology", peak discharge rate for small watersheds less than forty acres in size.

Precipitation Zone from Figure A-1: 1
Land treatment descriptions are in Table A-4.

1. RUNOFF RATE COMPUTATION

Use Equation a-10: $Q_P = Q_{PA} A_A + Q_{PB} A_B + Q_{PC} A_C + Q_{PD} A_D$

Values of Q_{pi} are from Table A-9, and are in CFS/acre. Area values are in acres.

BASIN	Q_{PA}	A_A	Q_{PB}	A_B	Q_{PC}	A_C	Q_{PD}	A_D	Q_P
DEVELOPED RATE OF RUNOFF (CFS)									
Lots 19-24	1.29	0.00	2.03	0.017	2.87	0.00	4.37	0.00	0.034
Lot 18	1.29	0.00	2.03	0.037	2.87	0.00	4.37	0.00	0.074

2. RUNOFF VOLUME COMPUTATION

Use Equation a-5 to compute weighted excess precipitation:

Weighted E = "E" = $(E_A A_A + E_B A_B + E_C A_C + E_D A_D)/(A_A + A_B + A_C + A_D)$

$(A_A + A_B + A_C + A_D) = \sum A_i$

Use Equation a-6 to compute the volume:

V_{360} = "E" x $(A_A + A_B + A_C + A_D)$ x 3630 feet^3/acre·inch

Values of E_i are from Table A-8, and are in inches. Area values are in acres.

BASIN	E_A	A_A	E_B	A_B	E_C	A_C	E_D	A_D	$\sum A_i$	"E"	V_{360}
DEVELOPED VOLUME OF RUNOFF (CUBIC FEET)											
Lots 19-24	0.44	0.000	0.67	0.017	0.99	0.000	1.97	0.000	0.017	0.67	41
Lot 18	0.44	0.000	0.67	0.037	0.99	0.000	1.97	0.000	0.037	0.67	90

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RETENTION POND VOLUME CALCULATIONS

By: James Alarid Date: February 16, 1998

Project: Sage Pointe Subdivision Zone Atlas: M-10-Z

This procedure is in accordance with the City of Albuquerque Development Process Manual, Volume 2, Section 22.2, "Hydrology", Equations c-7 and a-9.

BASIN	Q_{360} (CFS)	V_{360} (AC-FT)	A_D (AC)	$V_{10\text{-}DAY}$ (AC-FT)	$V_{10\text{-}DAY}$ (CU-FT)
Lots 19-24	0.03	0.000941	0	0.000941	41.0
Lot 18	0.07	0.002066	0	0.002066	90.0

*Note that Ad = 0, so 10-day Volume is equal to V360 per equation a-9.

BACKYARD RETENTION PONDS 1"=50'

POND VOLUME CALCULATIONS – AVERAGE END AREA METHOD.

POND VOLUME FOR LOTS 19 – 24

ELEVATION	SQARE FT.	VOLUME
1.0	724 SF	
0.5	362 SF	272 CF
0.0	0 SF	91 CF

RUNOFF VOLUME = 41 CF
POND VOLUME = 363 CF

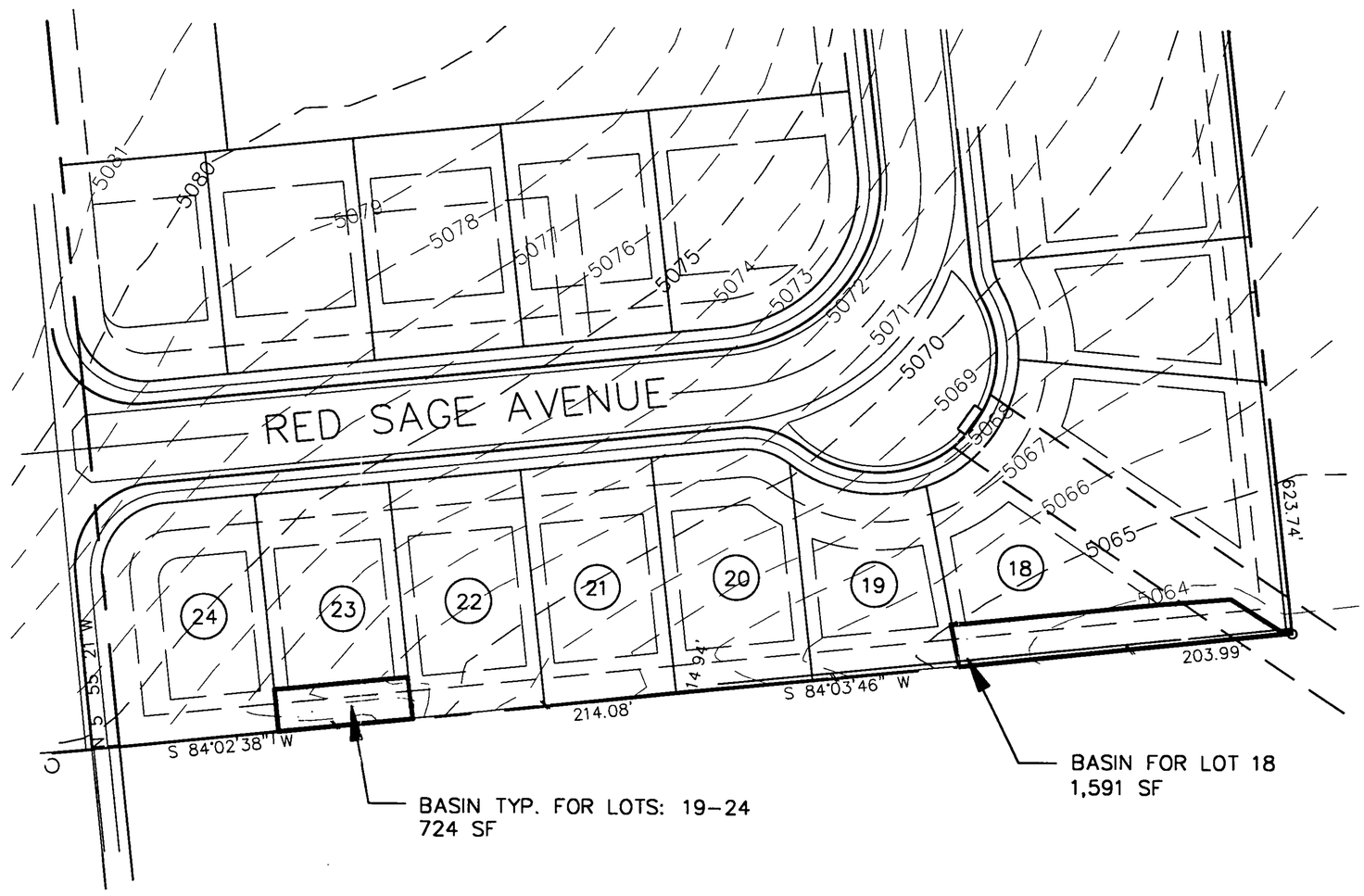
363 CF >> 41 CF --POND HAS SUFFICIENT VOLUME

POND VOLUME FOR LOT 18

ELEVATION	SQARE FT.	VOLUME
1.0	1,591 SF	
0.5	796 SF	597 CF
0.0	0 SF	199 CF

RUNOFF VOLUME = 90 CF
POND VOLUME = 796 CF

796 CF >> 90 CF --POND HAS SUFFICIENT VOLUME



APPENDIX B

HYDRAULIC COMPUTATIONS

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SHEET NO. 1 OF 3
JOB SAGE POINTE
SUBJECT
CLIENT JOB NO.
BY JK DATE 12/10/97
CHECKED BY DATE

STORM INLET DESIGN

ANALYSIS POINT 4

INLET IN SUMP CONDITION – DESIGN IT TO ACCEPT 2x 100-YEAR.

$Q_{100} = 19.18$

$Q_{DESIGN} = 2 \times 19.18$

$= 38.36$ CFS

BECAUSE THIS IS THE ONLY INLET, IT MUST BE A TYPE "A" INLET.

USE A DOUBLE-GRATE "A" INLET WITH TWO 4' WINGS (ONE ON EACH SIDE OF GRATES):

PER FIGURE 1, THE GRATE CAPACITY IS 25.8 CFS.

PER FIGURE 2, THE "WING CAPACITY IS:

8' x 2.2 CFS/FT = 17.6 CFS.

TOTAL CAPACITY 43.4 CFS

43.4 > 38.36 ✓

ANALYSIS POINT 2

INLET IN SUMP CONDITION – DESIGN IT TO ACCEPT 2x 100-YEAR

$Q_{100} = 3.60$ CFS

$Q_{DESIGN} = 2 \times 3.60$

$= 7.20$ CFS

USE A SINGLE-GRATE A:

PER FIGURE 1, THE GRATE CAPACITY IS 17.0 CFS

17.0 >> 7.20 ✓

GRATE OPEN AREA = 4.56 SF/GRATE

NET OPEN AREA FOR WEIR

GRATE @ 10 3/4" (0.90') BELOW TC

EQUATION	SGL C	DBL C	TRPL C	QDPL C
1) ORIFICE	$22.0\,h^{0.5}$	$43.9\,h^{0.5}$	$65.9\,h^{0.5}$	$87.8\,h^{0.5}$
2) 3-SIDED WEIR ($h \le TC$)	$19.9\,h^{1.5}$	$29.7\,h^{1.5}$	$39.5\,h^{1.5}$	$49.2\,h^{1.5}$
3) 4-SIDED WEIR ($h > TC$)	ADD TO 2): $11(h-.90)^{1.5}$	ADD TO 2): $22(h-.90)^{1.5}$	ADD TO 2): $33(h-.90)^{1.5}$	ADD TO 2): $44(h-.90)^{1.5}$

1) $Q = 0.6A\sqrt{2gh}$

2) & 3) $Q = 3.3\,P\,h^{1.5}$

SECTION A-A

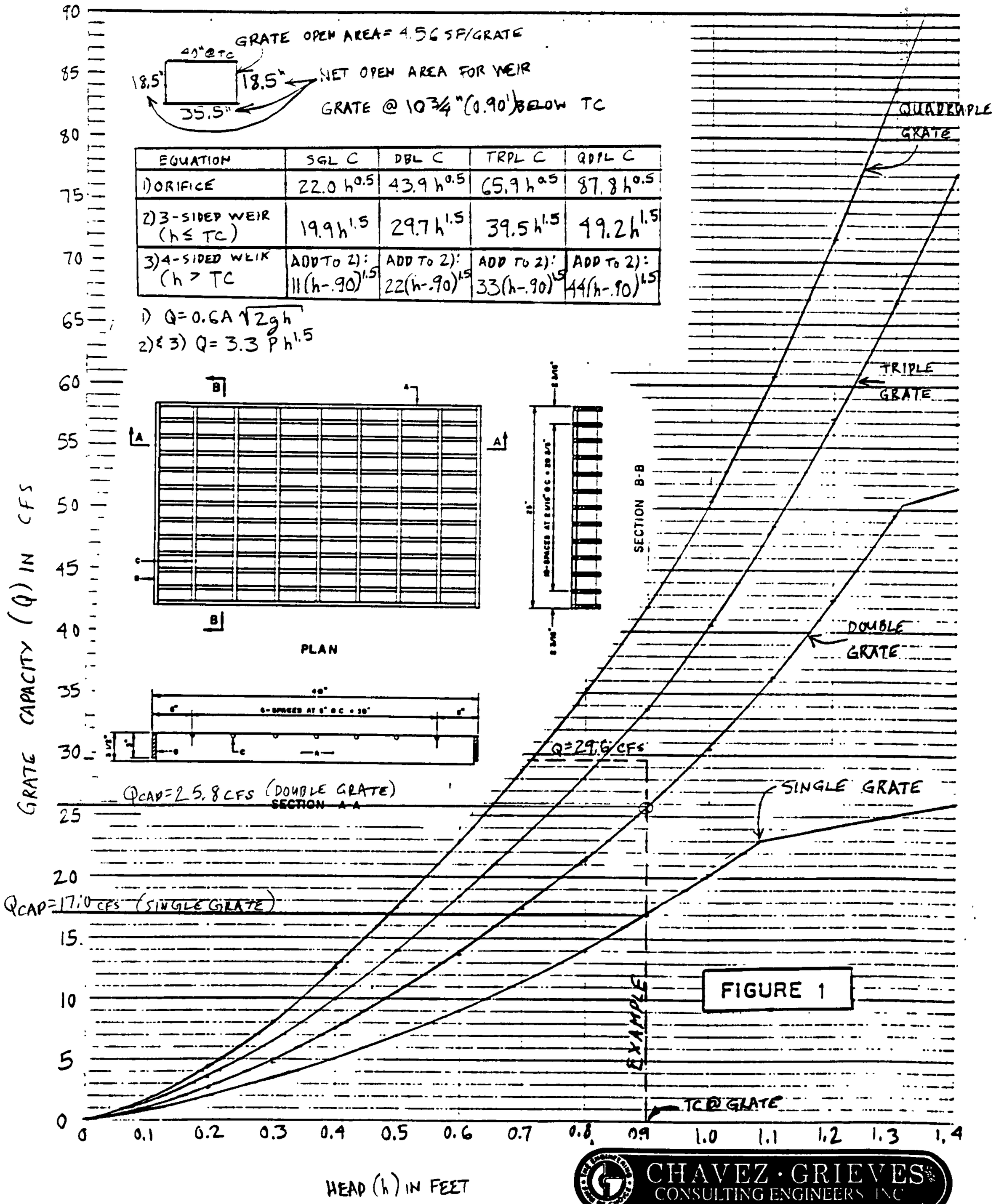


FIGURE 1

CHAVEZ · GRIEVES
CONSULTING ENGINEERS INC

5630 JEFFERSON STREET NE • ALBUQUERQUE NEW MEXICO 87109
PHONE (505) 344-4080 • FAX (505) 343-8759

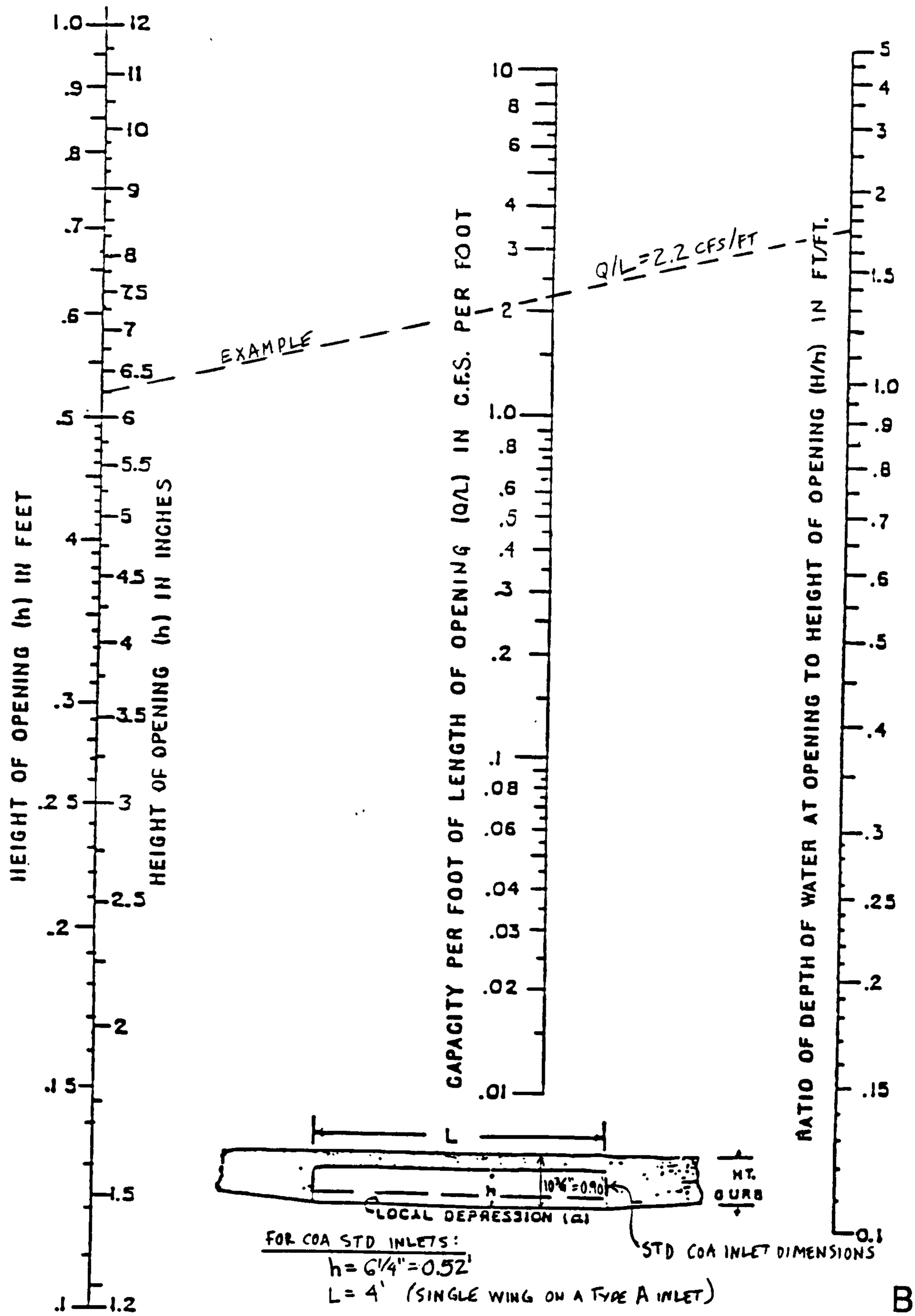
B-2

PROJECT NAME _____

PROJECT NO. _____ BY JPK DATE 8/20/92

SUBJECT RATING CURVE FOR TYPE C INLETS IN SUMP. NO CLOGGING FACTOR CH'D _____ DATE _____

FIGURE 2



FOR COA STD INLETS:
h = 6¼" = 0.52'
L = 4' (SINGLE WING ON A TYPE A INLET)

B-3

FOR CAPACITY OF COMBINATION GRATE & CURB OPENING INLETS IN A SUMP (E.G. TYPE A INLETS), ADD THE GRATE CAPACITY TO THIS CURB OPENING CAPACITY.

NOMOGRAPH FOR CAPACITY OF CURB OPENING INLETS AT LOW POINTS

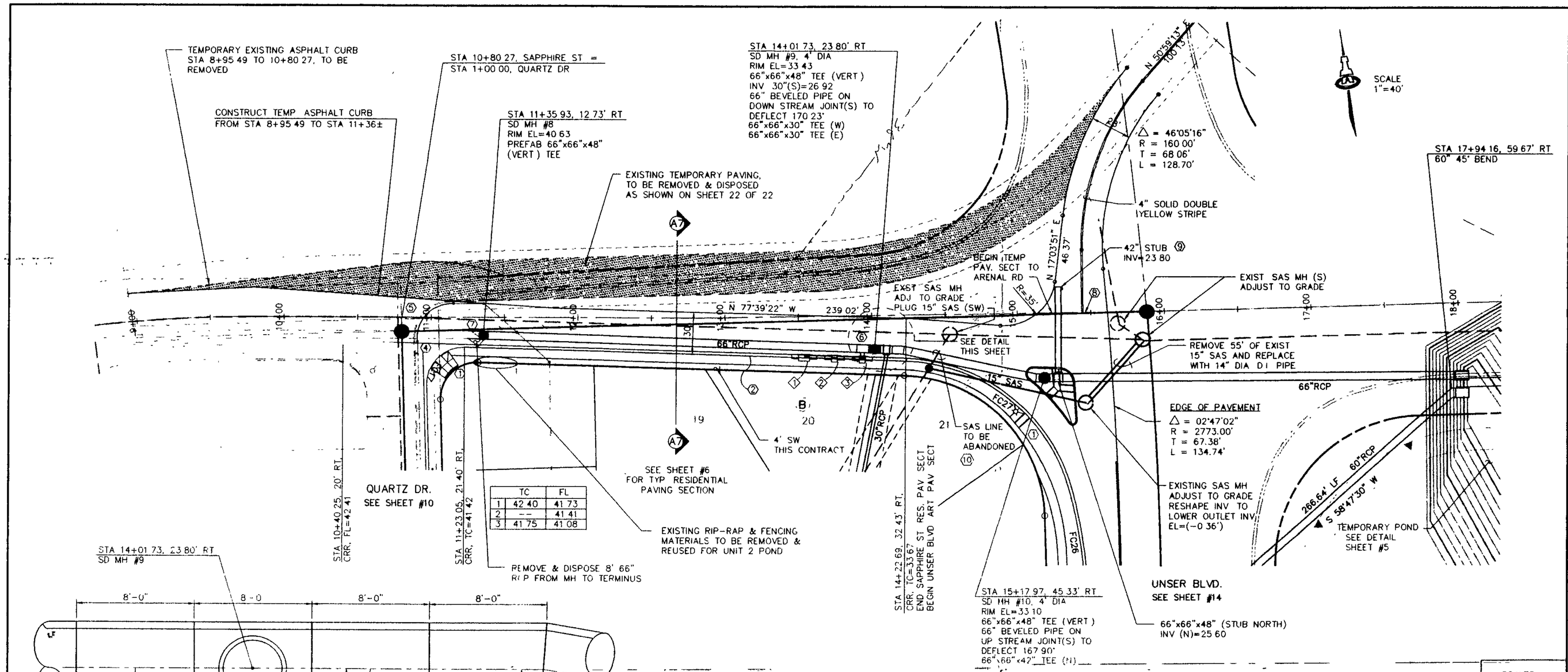
Chavez-Grieves Consulting Engineers, Inc.
Sage Pointe Subdivision
Hydraulic Grade Line Calculations - 100-Year Storm -- Unser Storm Drain
By: Joe Kelley
December 12, 1997

Station	Structure	Pipe Diameter (inches)	Q Flow (cfs)	Pipe Area (s.f.)	Velocity (fps)	Fac	Pipe Invert	Soffit Elevation	Ground Surface Elevation	Velocity Head Hv	Energy Grade Line (downstream)
17+97, Sapp	Outlet										
		66	621 85	23 76	26 17	75	20 20	25 70	30 00		
8+49 94	Junction									10 64	
		42	59 98	9 62	6 23	00	23 15	28 65	33 10		30 60
7+91 25	Transition									0 60	
		30	59 98	4 91	12 22	75	23 80	27 30	33 10		30 20
4+41 96	Manhole									2 32	
		30	59 98	4 91	12 22	24	34 80	37 30	48 89		38 18
1+14 95	Manhole									2 32	
						26	48 70	51 20	57 89		45 15

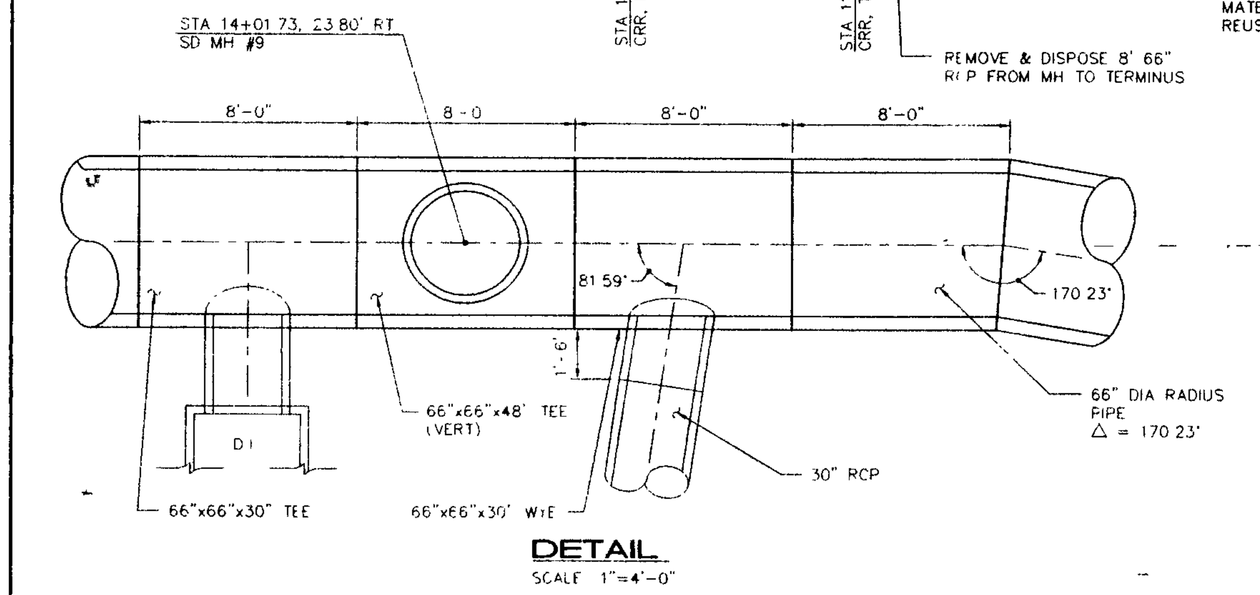
Manning's N = 0 013

Equations
V = Q / A
K = (1 486 / N) * A * ((D / 4)^(2/3))
Sf = Q / K
Hf = Sf * L
Hc = 002 * Hv * (Delta / 360)
Hj = (Hv up - Hv dn) - (2 * (A junct / A main pipe) * Hv junct * cos (delta))
Hmh = 05 * (Hv dn + Hv up) / 2
Ht (expansion)= ((Vup - Vdn)^2) / 2g
Ht (pipe entrance) = 0 5 * (V^2) / 2g
Hb = ((Delta / 90)^ 5) * ((Hv up + Hv dn) / 2)
Hv = (V^2) / 2g

Energy Grade Line (upstream)	Junction (3) Diameter (inches)	Junction (3) Area (s.f.)	Junction (3) Vel. Head (feet)	
				HGL @ pond elev
				Q per W O 5057 9
30 60				HGL per W O 505
30 75				
38 24				
50 26				HGL inside pipe H

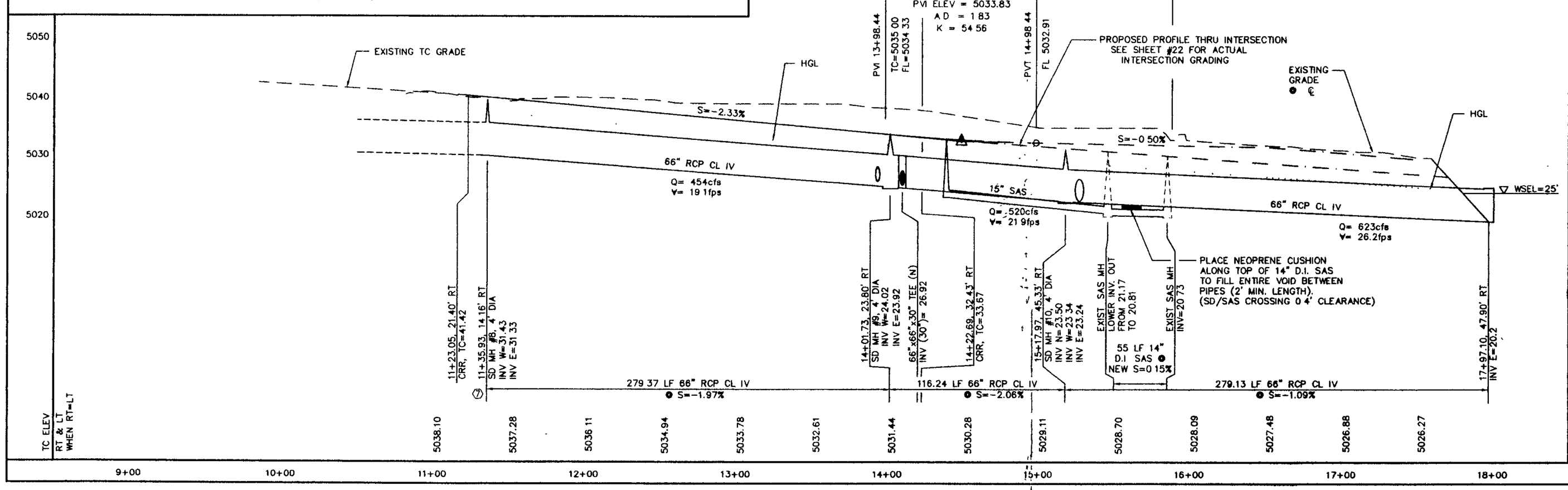


	TC	FL
1	42 40	41 73
2	--	41 41
3	41 75	41 08



DETAIL
SCALE 1"=4'-0"

SCALES:
1"=40' HOR
1"=10' VERT.



KEYED CONSTRUCTION NOTES

1. CONSTRUCT HANDICAP RAMP PER DETAIL ON SHEET #23
2. STANDARD CURB & GUTTER PER COA STD DWG #2415
3. CONSTRUCT PCC VALLEY GUTTER 4' WIDE, 3/4" INVERT PER COA STD DWG #2420
4. COMPLETE PCC VALLEY GUTTER 6' WIDE, 3/4" INVERT PER COA STD DWG #2420
5. REMOVE ALL EXISTING TEMPORARY ASPHALT CURB
6. CONNECT 30" CONNECTOR PIPE DIRECTLY INTO 66" RCP 8-(±) (@ FIRST UPSTREAM JOINT)
7. TEE-TOP PREFABRICATED MANHOLES WITH OUTLET SIZES AS SHOWN SHOP DRAWINGS TO BE PROVIDED TO ENGINEER
8. BEGIN TEMPORARY PAVEMENT SECTION AT SAPPHIRE ST CENTERLINE TO TIE IN WITH EXISTING TEMPORARY SECTIONS TO THE NORTH
9. 60 LF - 42" DIA RCP IV, PROVIDE TEMPORARY PLUG AT END (INCIDENTAL TO PIPE)
10. CONTRACTOR TO PROVIDE BY-PASS PUMPING PLAN TO CITY U D D AND SYSTEM OPERATIONS (JIM FINK) 72 HRS PRIOR TO WORK ON ACTIVE SAS LINES

FACE OF CURB CURVE TABLE

CURVE	RADIUS	LENGTH	DELTA
FC17	25 00'	40 74'	93°22'24"
FC27	407 62'	141 25'	19°51'14"
FC30	25 00'	39 64'	90°51'00"
FC31	25 00'	33 16'	75°59'48"
FC32	90 00'	99 94'	63°37'28"
FC33	60 00'	65 83'	62°51'54"

STORM DRAIN INLET INFORMATION

INLET NO ◇	INLET TYPE	STATION* & OFFSET	TOP GR EL	INV OUT
1	A. SG	13+55 48, 29 33' LT	35 16	30 43
2	A. SG	13+74 43, 30 20' LT	34 72	29 61
3	A. SG	13+93 36, 31 07' LT	34 28	28 79

*STATIONING IS TO MIDPOINT OF GRATE @ FACE OF CURB

CONNECTOR PIPE INFORMATION

FROM INLET NO ◇	Q (CFS)	DIA (IN)	LENGTH (FT)	SLOPE (FT/FT)
1	13	18	16'	0 10
2	11 5	24	16'	0 10
3	10	30	2 93'	0 10

AS-BUILT INFORMATION
CONTRACTOR / WORK STAKED BY / INSPECTOR'S AS-BUILT MARKS / FIELD VERIFICATION BY / DRAWINGS CORRECTED BY — DATE

BENCH MARKS
ACS MONUMENT "1-M10" LOCATED AT THE SOUTHEAST CORNER OF SAGE RD. & UNSER BLVD
ELEV = 5079.88
TBM RIM OF SOUTHWESTERLY MANHOLE AT SAPPHIRE ST & UNSER BLVD
ELEV = 5035.84
RECORDED BY — DATE; NO

SURVEY INFORMATION
FIELD NOTES
ALS 5/96 1

ENGINEER'S SEAL
FRED C. ARFMAN, STATE OF NEW MEXICO, 7262, REGISTERED PROFESSIONAL ENGINEER
04/15/97

NO	DATE	REMARKS	BY

REVISIONS

DESIGN
DESIGNED BY FCA DATE 4/97
DRAWN BY DLV DATE 4/97
CHECKED BY IBA DATE 4/97

ISAACSON & ARFMAN, P.A
Consulting Engineering Associates
128 Monroe Street N E
Albuquerque New Mexico
903PV6 DWGdlv 4/15/97

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
ENGINEERING GROUP

TITLE: SUNRISE ESTATES UNIT TWO
SAPPHIRE ST.
PAVING & STORM DRAIN PLAN & PROFILE

Design Review Committee | City Engineer Approval | Last Design Update | Mo/Day/Yr | Mo/Day/Yr

City Project No 5057.91 | Zone Map No M-10 | Sheet 13 Of 22

[redacted]

MARK GOODWIN & ASSOCIATES
CONSULTING ENGINEERS

DEVELOPMENT & BUILDING SERVICE CENTER
ONE STOP
600 SECOND ST. N.W./2ND FLOOR
ATTENTION: _____
505-924-3900

Records Withdrawal Form

Project No. 1000667 Date: 11/27/01

Project Title: Desert Sage

a. File b. Mylars c. Redlines/Comments
d. Other Pre

Requested By: Bohannan-Huston Phone No.: 798-7933
Company

Comments: Would like copy of "Preliminary Plat & Grading & Drainage Plan"

Anticipated Return Date: 11/27/01

Receipt Acknowledged

I here by accept full responsibility for the security of the above noted records/plans until return receipt acknowledgement is completed. Records/plans will be returned to the Development & Building Services Center on or before the indicated anticipated return date.

Delivery Picked Up By:

Name: PASCUAL ALCANTAR Organization: Repo Graphics
Print

Signed: Pascual Alcantar Date: 11-27-01
Phone No. 262-2046

Office Use Only

Return Acknowledged

Received by: BUH Date: _____
Print

DRAINAGE INFORMATION SHEET

PROJECT TITLE: Desert Sage ZONE ATLAS#: M 10 / D 11 A

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

LEGAL DESCRIPTION: Tracts 487A and 488, Town of Atrisco Grant, Unit 7

CITY ADDRESS: _____

ENGINEERING FIRM:	Mark Goodwin & Associates, PA	CONTACT:	
ADDRESS:	P.O. Box 90606, Albuquerque, NM 87199	PHONE:	828-2200
OWNER:	T.S.McNaney	CONTACT:	Tim McNaney
ADDRESS:	6400 Uptown, Sate 510	PHONE:	975-1154
ARCHITECT:		CONTACT:	
ADDRESS:		PHONE:	
SURVEYOR:	ALS	CONTACT:	TIM ALDRICH
ADDRESS:	4109 MONTGOMERY BLVD.	PHONE:	884-1990
CONTRACTOR:		CONTACT:	
ADDRESS:		PHONE:	

TYPE OF SUBMITTAL:

- ___ DRAINAGE REPORT
- ___ DRAINAGE PLAN
- ___ CONCEPTUAL GRADING & DRAINAGE PLAN
- X GRADING PLAN (revised 7-30-01)
- ___ EROSION CONTROL
- ___ ENGINEER'S CERTIFICATION
- ___ OTHER
- ___ EASEMENT VACATION

PRE-DESIGN MEETING:

- ___ YES
- X NO
- ___ COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:

- ___ SKETCH PLAT APRROVAL
- X PRELIMINARY PLAT APRROVAL
- ___ 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
- ___ CERTIFICATION OF OCCUPANCY APPROVAL
- X GRADING PERMIT APPROVAL
- ___ PAVING PERMIT APPROVAL
- ___ S.A.D. DRAINAGE REPORT
- ___ DRAINAGE REQUIREMENTS
- ___ OTHER
- ___ RELEASE OF FINANCIAL GUARANTY
- ___ TRAFFIC CIRCULATION LAYOUT

RECEIVED
JUL 30 2001
HYDROLOGY SECTION

DATE SUBMITTED: July 30, 2001

BY: Diane Hoelzer

DIANE HOELZER, PE

City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

June 25, 2001

Diane Hoelzer, PE
Mark Goodwin & Associates
P.O. 90606
Albuquerque, NM 87199

Re: Desert Sage Subdivision Drainage Report
Engineer's Stamp dated 6-1-01 (M10/D11A)

Dear Ms. Hoelzer,

Based upon the information provided in your submittal dated 6-4-01, the above referenced plan cannot be approved for Preliminary Plat until the following comments are addressed.

- Please include the Unser basin in your analysis of the stormdrain downstream of the easement.
- The 1-acre lots (still in the county) west of your site must be analyzed and dealt with separately, unless you can obtain cross lot drainage easements.
- A waterblock will be required in South 82nd St.
- Please complete the stormdrain exhibit for the temporary pond.
- Please describe in your executive summary what is happening to the runoff from the basin north of Basin 400.2C, including the church.
- From the masterplan for Sage, is any stormdrain proposed that should be included on your Infrastructure List?

If you have any questions about my comments, you can contact me at 924-3986.

Sincerely,

Bradley L. Bingham

Bradley L. Bingham, PE
Sr. Engineer, Hydrology

C: file

City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

July 30, 2001

Diane Hoelzer, PE
Mark Goodwin & Associates
P.O. 90606
Albuquerque, NM 87199

Re: Desert Sage Subdivision Drainage Report
Engineer's Stamp dated 7-30-01 (M10/D11A)

Dear Ms. Hoelzer,

Based upon the information provided in your submittal dated 7-20-01, the above referenced plan is approved for Preliminary Plat action by the DRB. Conditions of approval include:

- Remove the private common drainage easement on the final plat.
- Add the size of the pond (2.51 ac-ft) to the infrastructure list. The pond itself must be financially guaranteed.

If you have any questions about my comments, you can contact me at 924-3986.

Sincerely,

Bradley L. Bingham, PE
Sr. Engineer, Hydrology

C: file

THE CITY OF ALBUQUERQUE IS AN EQUAL OPPORTUNITY/REASONABLE ACCOMMODATION EMPLOYER

DRAINAGE INFORMATION SHEET

PROJECT TITLE: Desert Sage ZONE ATLAS#: M 10 / D11A

DRB#: EPC# WORK ORDER#:

LEGAL DESCRIPTION: Tracts 487A and 488, Town of Atrisco Grant, Unit 7

CITY ADDRESS:

ENGINEERING FIRM:	Mark Goodwin & Associates, PA	CONTACT:	
ADDRESS:	P.O. Box 90606, Albuquerque, NM 87199	PHONE:	828-2200
OWNER:	T.S.McNaney	CONTACT:	Tim McNaney
ADDRESS:	6400 Uptown, Sate 510	PHONE:	975-1154
ARCHITECT:		CONTACT:	
ADDRESS:		PHONE:	
SURVEYOR:	ALS	CONTACT:	TIM ALDRICH
ADDRESS:	4109 MONTGOMERY BLVD.	PHONE:	884-1990
CONTRACTOR:		CONTACT:	
ADDRESS:		PHONE:	

TYPE OF SUBMITTAL:

- ___ DRAINAGE REPORT
- X DRAINAGE PLAN
- ___ CONCEPTUAL GRADING & DRAINAGE PLAN
- X GRADING PLAN
- ___ EROSION CONTROL
- ___ ENGINEER'S CERTIFICATION
- ___ OTHER
- ___ EASEMENT VACATION

PRE-DESIGN MEETING:

- ___ YES
- X NO
- ___ COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:

- ___ SKETCH PLAT APRROVAL
- ___ PRELIMINARY PLAT APRROVAL
- ___ 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
- ___ CERTIFICATION OF OCCUPANCY APPROVAL
- X GRADING PERMIT APPROVAL
- ___ PAVING PERMIT APPROVAL
- ___ S.A.D. DRAINAGE REPORT
- ___ DRAINAGE REQUIREMENTS
- ___ OTHER
- ___ RELEASE OF FINANCIAL GUARANTY
- ___ TRAFFIC CIRCULATION LAYOUT

RECEIVED
JUN 04 2001
HYDROLOGY SECTION

DATE SUBMITTED: June 4, 2001

BY: Diane Hoelzer

DIANE HOELZER, PE

DRAINAGE REPORT

FOR

Desert Sage Subdivision

(Zone Atlas M-10)

DIANE HOELZER
NEW MEXICO
11967
REGISTERED PROFESSIONAL ENGINEER

7-20-01

Mark Goodwin & Associates, PA

JULY 2001

RECEIVED
JUL 20 2001
HYDROLOGY SECTION

TABLE OF CONTENTS

June 25 Comment Letter and July 20 Resonse Letter

I. PROJECT DESCRIPTION

II. DESIGN CRITERIA AND PREVIOUS REPORTS

III. EXISTING AND PROPOSED DRAINAGE MANAGEMENT PLANS

IV. EXISTING DRAINAGE CONDITIONS

V. DEVELOPED DRAINAGE CONDITIONS

FIGURE 1: VICINITY MAP
FIGURE 2: EL RANCHO GRANDE I MASTER DRAINAGE BASIN MAP
FIGURE 3: DESERT SAGE REVISED MASTER DRAINAGE BASIN MAP
FIGURE 4: DESERT SAGE ONSITE SUBASIN BOUNDARIES & STREET CAPACITY SUMMARY

TABLE 1: SUMMARY OF HYDROLOGY

APPENDIX A - HYDROLOGY

ONSITE RETENTION POND CALCS.
OFFSITE ARENAL/UNSER DETENTION POND CALCS.
ORIGINAL EL RANCHO GRANDE I AHYMO PRINTOUTS
REVISED EL RANCHO GRANDE I AHYMO PRINTOUTS

APPENDIX B - HYDRAULICS

HEC-2 STREET CAPACITY CALCULATIONS

APPENDIX C - ONSITE AND UNSER BLVD. STORM SEWER

INLET & SUMP INLET CALCS.
PRELIMINARY UNSER BLVD. STORM SEWER EXTENSION ANALYSIS

APPENDIX C.1 OFFSITE STORM SEWER

SAGE ROAD STORM SEWER
TOWER SAGE DRAINAGE PLAN
AMOLE DEL NORTE DRAINAGE PLAN

POCKET 1: DESERT SAGE GRADING AND DRAINAGE PLAN
FIGURE 5: PRELIMINARY UNSER BLVD. STORM SEWER EXTENSION DESIGN
POCKET 2: PRELIMINARY PLAT

DRAINAGE INFORMATION SHEET

PROJECT TITLE: Desert Sage ZONE ATLAS#: M 10 / D 11 A

DRB#: 1000667 EPC# WORK ORDER#:

LEGAL DESCRIPTION: Tracts 487A and 488, Town of Atrisco Grant, Unit 7

CITY ADDRESS:

ENGINEERING FIRM:	Mark Goodwin & Associates, PA	CONTACT:	
ADDRESS:	P.O. Box 90606, Albuquerque, NM 87199	PHONE:	828-2200
OWNER:	T.S.McNaney	CONTACT:	Tim McNaney
ADDRESS:	6400 Uptown, Sate 510	PHONE:	975-1154
ARCHITECT:		CONTACT:	
ADDRESS:		PHONE:	
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ADDRESS:	4109 MONTGOMERY BLVD.	PHONE:	884-1990
CONTRACTOR:		CONTACT:	
ADDRESS:		PHONE:	

TYPE OF SUBMITTAL:

X DRAINAGE REPORT(revised)
DRAINAGE PLAN
CONCEPTUAL GRADING & DRAINAGE PLAN
X GRADING PLAN (revised)
EROSION CONTROL
ENGINEER'S CERTIFICATION
OTHER
EASEMENT VACATION

PRE-DESIGN MEETING:

YES
X NO
COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:

SKETCH PLAT APRROVAL
X PRELIMINARY PLAT APRROVAL
S. DEV. PLAN FOR SUB'D APPROVAL
S. DEV. PLAN FOR BLDG PERMIT APPROVAL
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X GRADING PERMIT APPROVAL
PAVING PERMIT APPROVAL
S.A.D. DRAINAGE REPORT
DRAINAGE REQUIREMENTS
OTHER
RELEASE OF FINANCIAL GUARANTY
TRAFFIC CIRCULATION LAYOUT

DATE SUBMITTED: July 20, 2001

BY: Diane Hoelzer

DIANE HOELZER, PE

RECEIVED
JUL 20 2001
HYDROLOGY SECTION

D. Mark Goodwin & Associates, P.A.
Consulting Engineers

P.O. BOX 90606, ALBUQUERQUE, NM 87199
(505) 828-2200 FAX 797-9539
e-mail: dmg@swcp.com

July 20 , 2001

Mr. Brad Bingham, PE
Sr. Engineee Hydrology Dept.
City of Albuquerque
600 2nd Street SW
Albuquerque, NM 87103

Re: Revised Desert Sage Subdivision, Engineer's stamp 7-20-01 (M10/D11A)
DRB #1000667

Dear Mr. Bingham:

In response to you comment letter dated June 25, 2001 I am submitting a revised grading and drainage plan and a drainage report. In response to you comments:

1. *Runoff from the Unser Blvd. R/W basin (SB 400.2D) has been added to the AHYMO and preliminary STORMPLUS storm sewer analysis.*

2. *A 25' public drainage, SAS and WL easement has been revised on the plat and grading & drainage plan which straddles between the adjacent Lots C and D. An additional 10' wide private drainage easement has been added on Lot 16 to allow runoff from the adjacent Lot B.*

3. *There is a 0.5' waterblock at the intersection of "offsite" 82nd street and Feathertop. Runoff from the "onsite" 82nd street is prevented from flowing south to the "offsite" 82nd street by a 2 percent cross slope in Feathertop at this intersection. The Figure 4: Onsite Subasin Boundaries and Street Capacity Summary has been revised and clarified.*

4. *The temporary onsite pond has been added to "Figure 5: Preliminary Unser Blvd. Storm Sewer Extension Design".*

5. *According to the Tower Sage Management Plan this area, identified as Subasin 504 on the Amole del Norte Management Plan exhibit (Appendix C.1), runoff from this site is proposed to discharge north toward Sage Road and then east in Sage until it is intercepted by future Sage storm sewer inlets. Please refer to AHYMO file in Appendix C.1. There is an existing and proposed waterblock within 100 feet of Unser Blvd. that prevents the runoff from being conveyed south into the Unser/Arenal system. Verbage has been added to "Section III Existing and Proposed Drainage Management Plans".*

6. *The Amole del Norte Basin Management Plan prepared as part of the Amole-Hubbell Drainage Management Plan has a conceptual storm sewer design for a 36" RCP in Sage Road beginning east of 86th street and extending to the Amole del Norte channel . During final design it may be possible to reduce this to a 30" RCP. This storm sewer will intercept runoff from subasins located on the north side of Sage Road. Refer to the Amole del Norte Basin Management Plan exhibit and AHYMO printouts in Appendix C.1.*

Please contact me if I can be of further assistance.

Sincerely,

MARK GOODWIN & ASSOCIATES, P.A.

Diane Hoelzer

Diane Hoelzer, PE
Senior Engineer

f\deserts age\hydr_1.ltr

City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

June 25, 2001

Diane Hoelzer, PE
Mark Goodwin & Associates
P.O. 90606
Albuquerque, NM 87199

Re: Desert Sage Subdivision Drainage Report
Engineer's Stamp dated 6-1-01 (M10/D11A)

Dear Ms. Hoelzer,

Based upon the information provided in your submittal dated 6-4-01, the above referenced plan cannot be approved for Preliminary Plat until the following comments are addressed.

- Please include the Unser basin in your analysis of the stormdrain downstream of the easement.
- The 1-acre lots (still in the county) west of your site must be analyzed and dealt with separately, unless you can obtain cross lot drainage easements.
- A waterblock will be required in South 82nd St.
- Please complete the stormdrain exhibit for the temporary pond.
- Please describe in your executive summary what is happening to the runoff from the basin north of Basin 400.2C, including the church.
- From the masterplan for Sage, is any stormdrain proposed that should be included on your Infrastructure List?

If you have any questions about my comments, you can contact me at 924-3986.

Sincerely,

Bradley L. Bingham

Bradley L. Bingham, PE
Sr. Engineer, Hydrology

C: file

I. PROJECT DESCRIPTION

The proposed Desert Sage Subdivision is comprised of approximately 12.3 acres and is proposed to be developed into 82 single family residences at 9 DU/acre. The project site is bounded by Sage Road to the north, developed residential to the south, large acre lot homes to the west and a church and vacant commercial zoned land to the east. This site is part of the Tower Unser Development Sector Plan and the Amole Del Norte Basin (Drainage)Management Plan and Tower Sage (Drainage) Management Plan, refer to exhibit in Appendix C.1.

II. DRAINAGE DESIGN CRITERIA AND PREVIOUS REPORTS

The design criteria used in this report was in accordance with Section 22.2 Hydrology of the Development Process Manual, Volume 2, Design Criteria, January 1993 edition. The 100-year 6-hour storm event was analyzed to determine street capacities using P(1 hr) = 1.87", P(6 hr)=2.20". The onsite Land Treatment values used were Treatment D=60, Treatment C=20 and Treatment B=20 as determined using "Table A-5 Percent Treatment D" in the DPM. AHYMO printouts are provided in Appendix A.

III. EXISTING AND PROPOSED DRAINAGE MANAGEMENT PLANS

Almost 78 percent of the southern half of the project site is part of the Arenal / Unser Detention Pond master drainage plan as detailed in the "Re-Evaluation of Arenal / Unser Detention Pond for El Rancho Grande I, Units 1, 2 and 3" prepared by Mark Goodwin & Associates, May 12, 2001 (refer to Figure 2). The remaining northern 22 percent (northern portion) appears to be part of the future Sage Road storm sewer which is part of the Amole del Norte Basin. The proposed Sage Road storm sewer is designed to intercept flows from subasins located on the north side of Sage between 86th street and Amole del Norte channel, (refer to exhibit in Appendix C.1, Amole Hubbell Drainage Management Plan, LHI, 1999). Subasin 504 which includes the Mormom church and the vacant area that extends eastward to Unser Blvd. is also proposed to drain to the Sage Road storm sewer, refer to excerpt from the Tower / Sage AHYMO file in Appendix C.1 (LHI, 1999). The preliminary design for the Sage Road storm sewer is a 42" RCP.

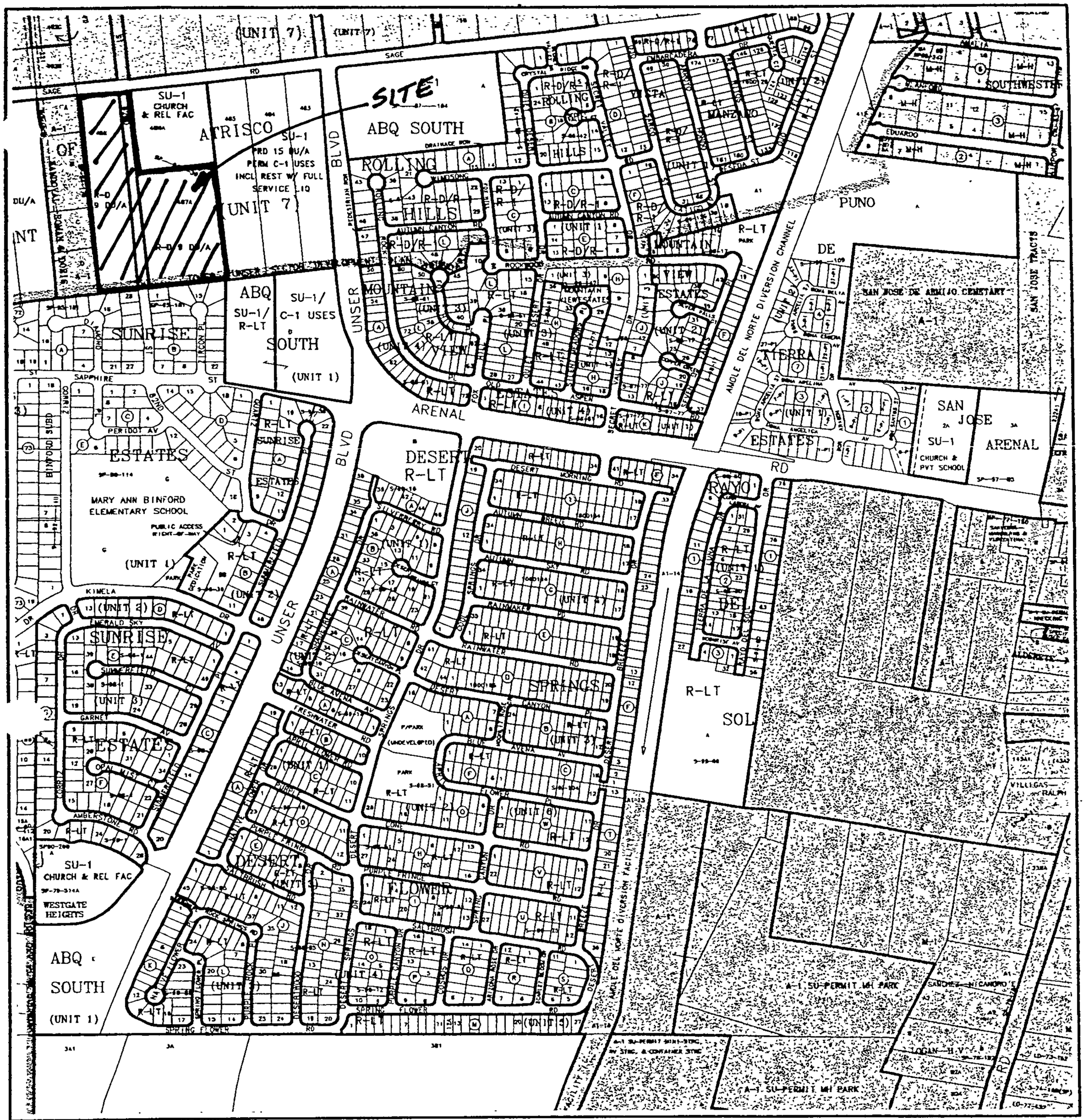
IV. EXISTING DRAINAGE CONDITIONS

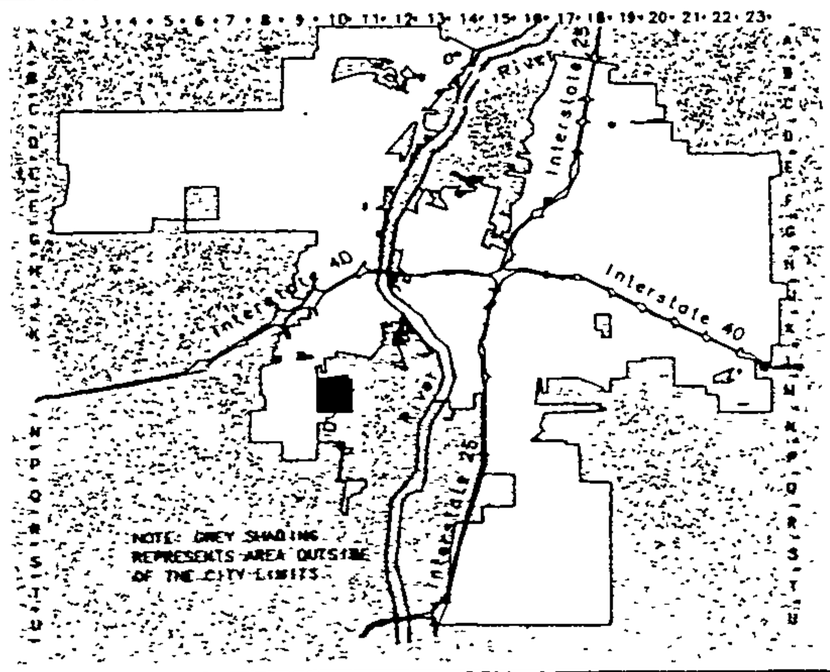
Runoff from the project site is in a general easterly direction. The western half drains at a slope of 1.0 to 2.0 percent. In the southeast corner there is a substantial 9.0 percent drop in grade. Overall there is almost a 25' drop across the site from west to the southeast. There is also remnants of a well defined arroyo that bisects the property. No offsite flows enter the project site from the north, east and south. The area adjacent to the west property boundary is quite flat and there may be some insignificant amounts of runoff entering and exiting at this property boundary.

V. DEVELOPED DRAINAGE CONDITIONS

The proposed drainage plan for this site is to revise the Arenal / Unser Detention Pond master drainage plan to accept runoff from the entire Desert Sage project site as shown in Figure 3. There is excess capacity in the detention pond to accommodate the additional runoff from the north portion of the site that was originally excluded from the site. The revised AHYMO files are in Appendix A. Table 1 is a summary of the changes to the Subasins and results of the revisions associated with the pond.

An offsite drainage easement from the property owners to the southeast is being acquired to allow for the future construction of a storm sewer to Unser Blvd. Ultimately the storm sewer will connect to a future storm sewer in Unser that will connect to the existing storm sewer facilities in Arenal which discharge into the Arenal / Unser Detention Pond. At this time a temporary retention pond will be constructed in the southeast corner of the site until the downstream facilities are in place.





CITY OF Albuquerque

Albuquerque Geographic Information System

PLANNING DEPARTMENT

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GRAPHIC SCALE IN FEET

250 0 750 1000

Zone Atlas Page

M-10-Z

FIGURE 1
VICINITY MAP

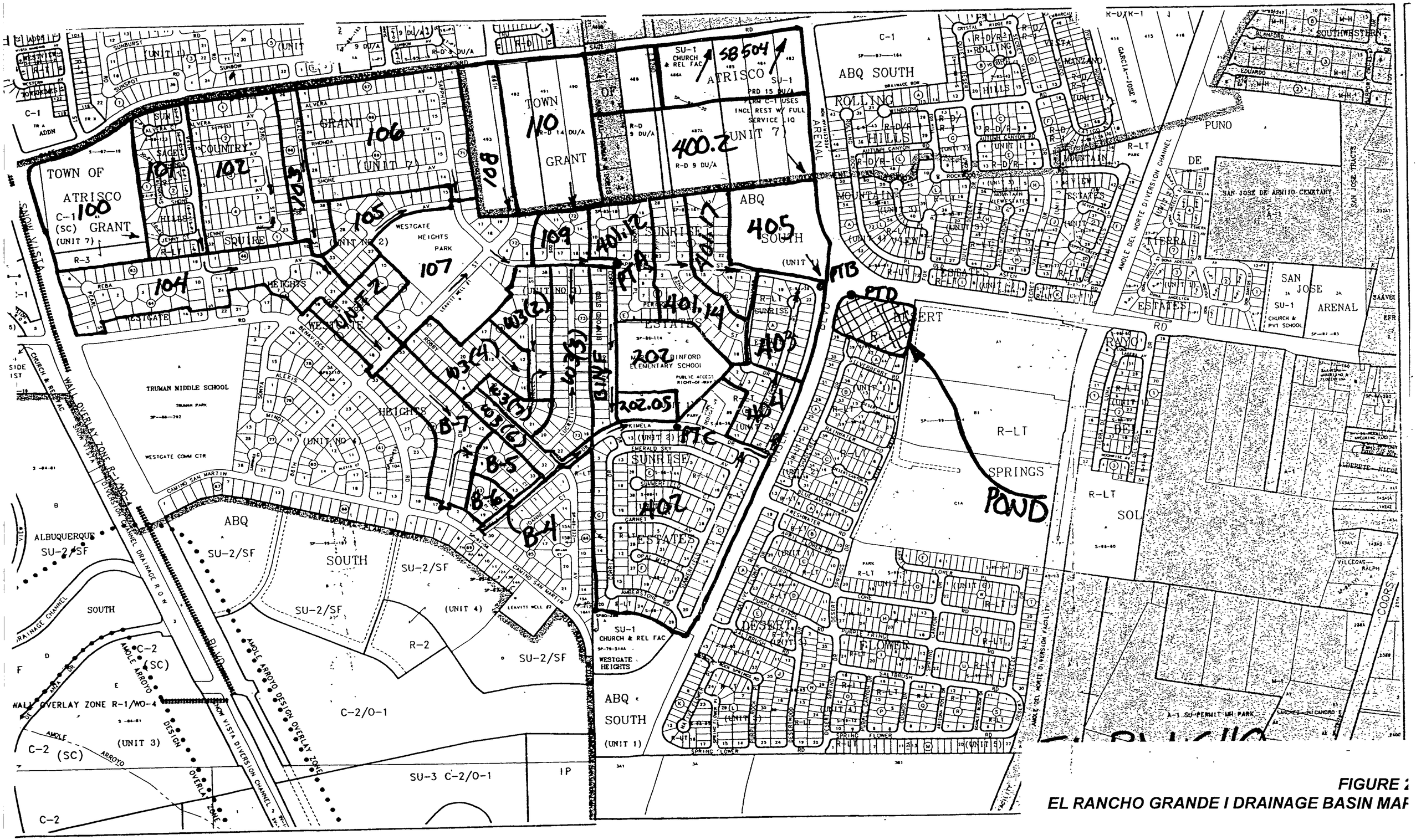


FIGURE 2
EL RANCHO GRANDE I DRAINAGE BASIN MAP

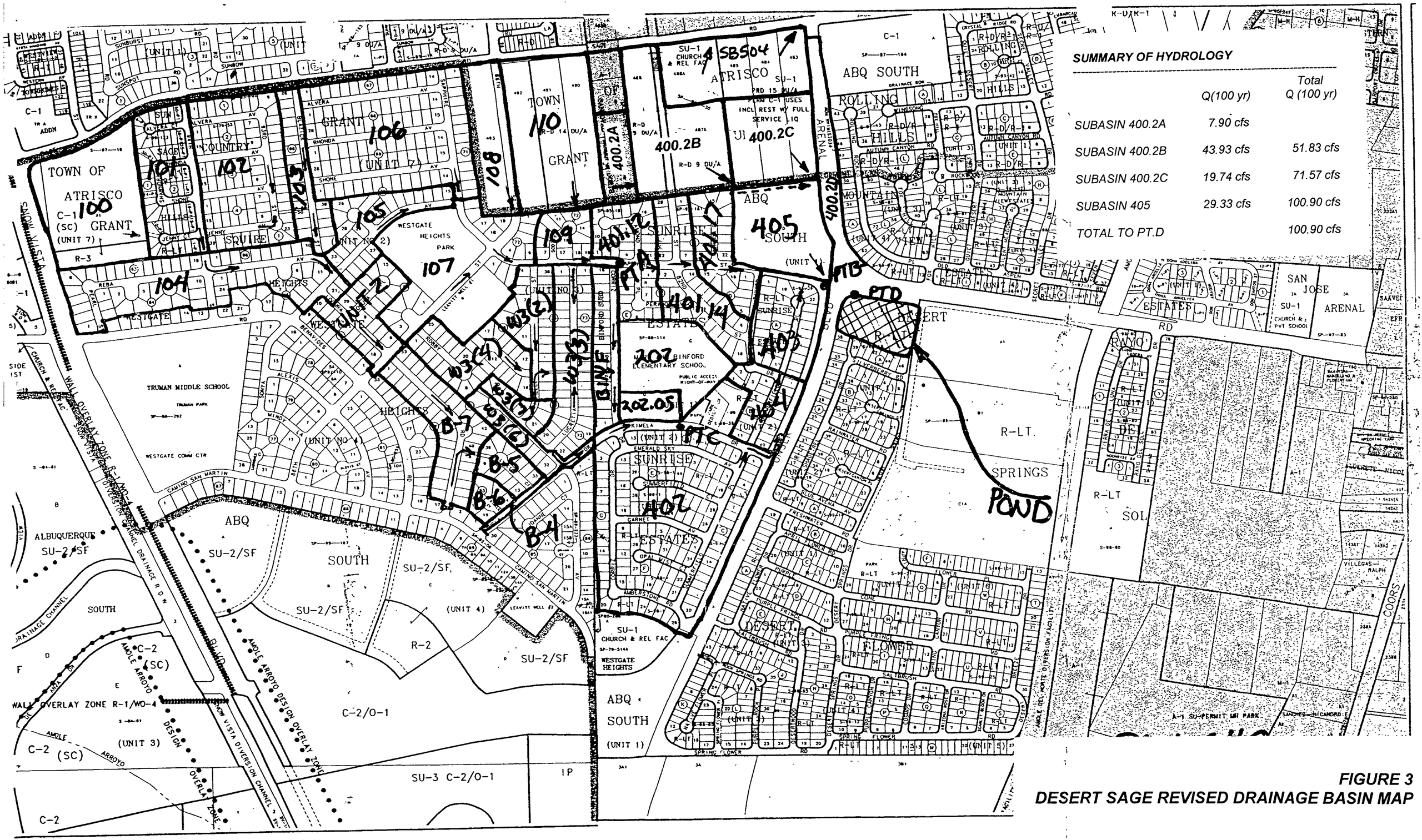
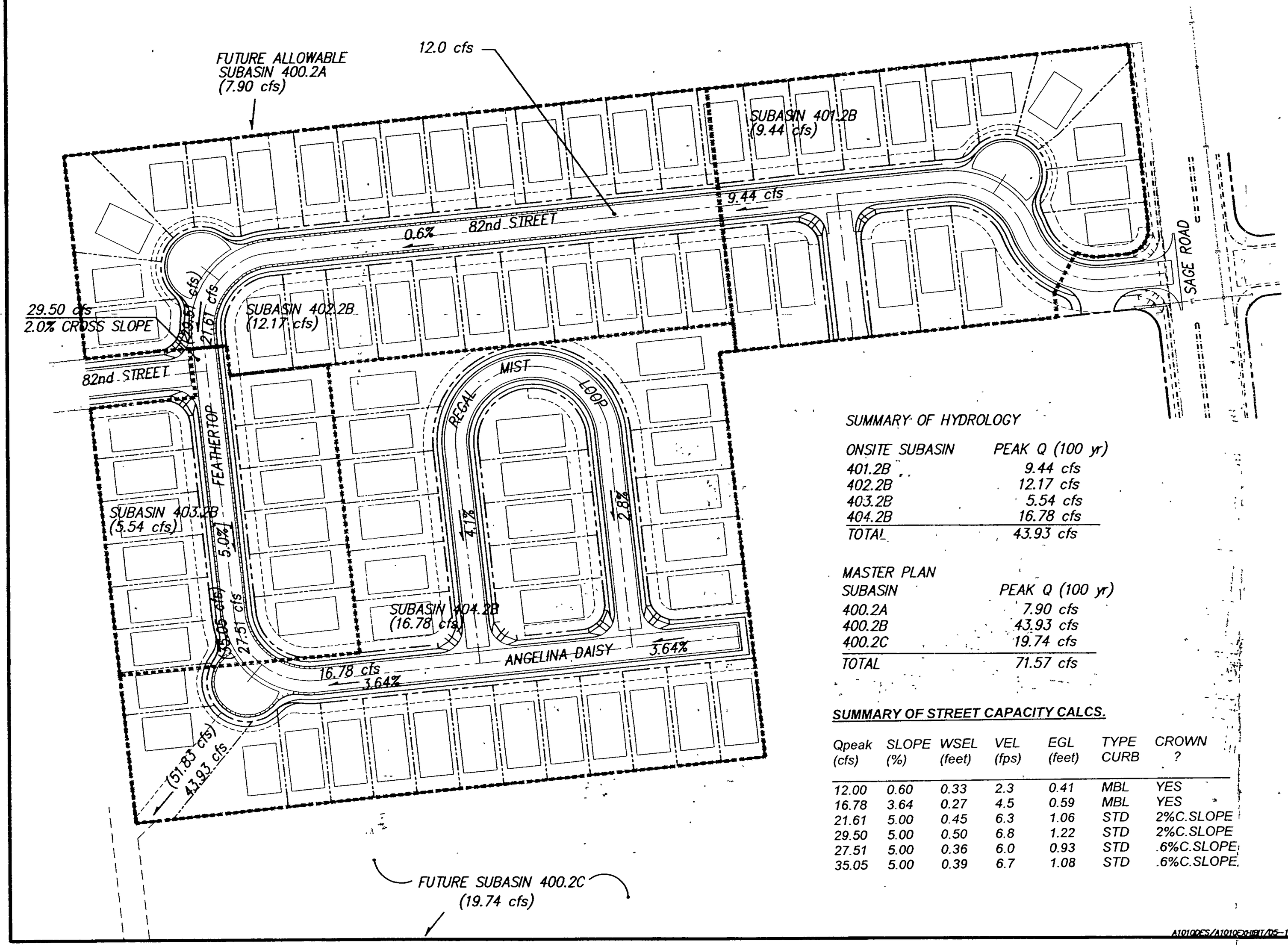


FIGURE 3
DESERT SAGE REVISED DRAINAGE BASIN MAP



SUMMARY OF HYDROLOGY

ONSITE SUBASIN	PEAK Q (100 yr)
401.2B	9.44 cfs
402.2B	12.17 cfs
403.2B	5.54 cfs
404.2B	16.78 cfs
TOTAL	43.93 cfs

MASTER PLAN SUBASIN	PEAK Q (100 yr)
400.2A	7.90 cfs
400.2B	43.93 cfs
400.2C	19.74 cfs
TOTAL	71.57 cfs

SUMMARY OF STREET CAPACITY CALCS.

Qpeak (cfs)	SLOPE (%)	WSEL (feet)	VEL (fps)	EGL (feet)	TYPE CURB	CROWN ?
12.00	0.60	0.33	2.3	0.41	MBL	YES
16.78	3.64	0.27	4.5	0.59	MBL	YES
21.61	5.00	0.45	6.3	1.06	STD	2%C.SLOPE
29.50	5.00	0.50	6.8	1.22	STD	2%C.SLOPE
27.51	5.00	0.36	6.0	0.93	STD	.6%C.SLOPE
35.05	5.00	0.39	6.7	1.08	STD	.6%C.SLOPE

N

50' 25' 0 50' 100'
SCALE: 1" = 50'

FIGURE 4

DESERT SAGE
ONSITE SUBASIN BOUNDARIES
& STREET CAPACITY SUMMARY

dmg
MARK GOODWIN & ASSOCIATES, P.A.
CONSULTING ENGINEERS
P.O. BOX 90606
ALBUQUERQUE, NEW MEXICO 87199
(505)828-2200, FAX (505)797-9539

Designed: DLH	Drawn: KJS	Checked: DMG	Sheet 1 of 1
Scale: 1" = 50'	Date: 02-02-01	Job: A1010	

A10100ES/A1010EXHIBIT/05-19-01/DLH

DESERT SAGE SUBDIVISION

TABLE 1: SUMMARY OF HYDROLOGIC PARAMETERS

LOCATION	SUBASIN ID	AREA (sq.mi.)	L.TR D	L.TR B/C	Q(100) cfs	RUNOFF VOL. (AF)
EL RANCHO GRANDE I (Original drainage)						
	400.2	0.03220	44	28/28	67.78	2.271
	405	0.01393	44	28/28	29.33	0.982
TOTAL					**97.11**	**3.253**
DESERT SAGE (Revised drainage)						
	400.2A	0.00375	44	28/28	7.90	0.264
	400.2B	0.01908	60	20/20	43.93	1.532
	400.2C	0.00938	44	28/28	19.74	0.661
	405	0.01393	44	28/28	29.33	0.982
TOTAL					**100.90**	**3.439**

f\\deserts.age\hydr_sum.tbl

APPENDIX A

HYDROLOGY

D. Mark Goodwin & Associates, P.A.
Consulting Engineers
P.O. BOX 90606, ALBUQUERQUE, NM 87199
(505) 828-2200 FAX 797-9539
e-mail: dmg@swcp.com

PROJECT Desert Sage
SUBJECT Retention Pond Volume Calcs
BY DLH DATE 5-22-01
CHECKED _____ DATE _____
SHEET ____ OF ____

ZONE M-10

P(1) = 1.87"
P(6) = 2.20"
P(24) = 2.66"

$P(10\text{-day}) = 10 - \left[24.9/(2.66)^{1.4} \right] = 3.67"$

$V(10\text{-day}) = 1.532\,AcFt + 12.2(.60)\left(\frac{3.67" - 2.20"}{12}\right) = 2.429$ Ac. Ft. (Req'd Volume)

Pond Design 2:1 s.s. **INCLUDE FENCE**

Top 5065.0 $Area_T = 15298.3$ SF

Bottom 5054.0 $Area_B = 5434$ SF

Depth = 11.0'

Volume Design $= \frac{1}{3}(11)\left(15298 + 5434 + \sqrt{A_T \cdot A_B}\right) = 2.51$ Ac.Ft.

D. Mark Goodwin & Associates, P.A.
Consulting Engineers
P.O. BOX 90606, ALBUQUERQUE, NM 87199
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e-mail: dmg@swcp.com

PROJECT Desert Sage
SUBJECT Hydrology
BY DLH DATE 5-9-01
CHECKED _____ DATE _____
SHEET ____ OF ____

$n = \frac{85 \text{ units}}{12.22 \text{ acres}} = 6.95$ Use D = 60, B/C = 20

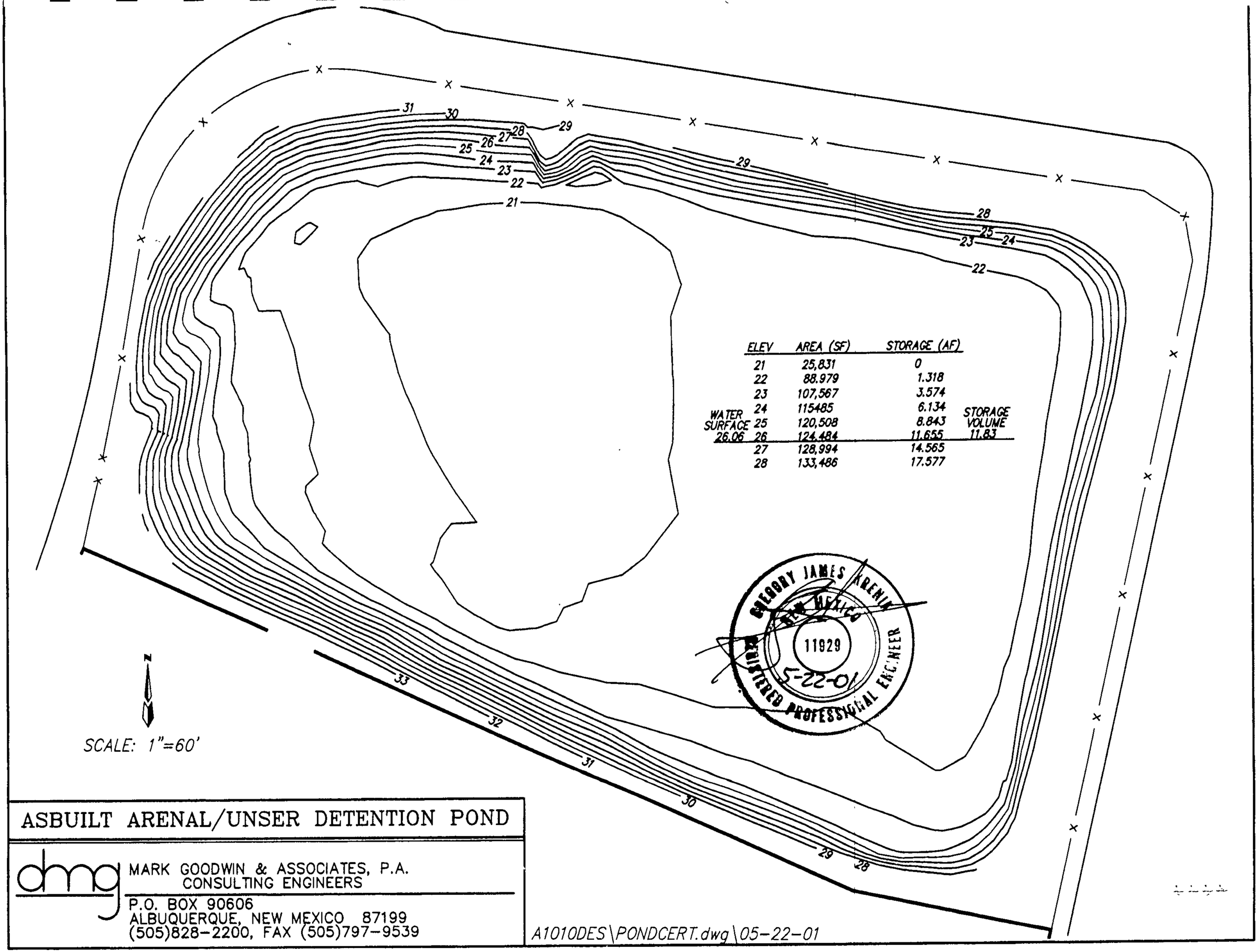
Q(100) = 43.93 cfs

SB 401.2B 430 (264) = 113,520 (.2148) ⇒ 9.44 cfs

SB 402.2B 623(235) = 146405 (.2770) ⇒ 12.17 cfs

SB 403.2B 238(280) = 66.640 (.1261) ⇒ 5.54 cfs

SB 404.2B 385(290) + (.3821) ⇒ 16.78 cfs
145(623) = 201,985



ELEV	AREA (SF)	STORAGE (AF)
21	25,831	0
22	88.979	1.318
23	107,567	3.574
24	115485	6.134
WATER SURFACE 25	120,508	8.843
26.06 26	124.484	11.655
27	128,994	14.565
28	133,486	17.577

STORAGE VOLUME 11.83

ASBUILT ARENAL/UNSER DETENTION POND

dmg
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(505)828-2200, FAX (505)797-9539

A1010DES\PONDCERT.dwg\05-22-01

D. Mark Goodwin & Associates, P.A.
Consulting Engineers
P.O. BOX 90606, ALBUQUERQUE, NM 87199
(505) 828-2200 FAX 797-9539
e-mail: dmg@swcp.com

PROJECT Desert Sage
SUBJECT Revised Arenal/Unser Pond
BY DLH DATE 5-17-01
CHECKED _____ DATE _____
SHEET ____ OF ____

Arenal / Unser Detention Pond
Revised Capacity

Elev.	Area	Volume	Σ Volume	Σ Volume
5021	25,830.6	0		
22	88979.3	57,404.9	57,404.9	1.318
23	107567.1	98,273.2	155,678.1	3.574
24	115,484.5	111,525.8	267,203.9	6.134
25	120,508.4	117,996.5	385,200.4	8.843
26	124,484.4	122,496.4	507696.8	11.655
27	128993.5	126,738.9	634,435.7	14.565
28	133,485.9	131,239.7	765,675.4	17.577
29	138,040.0	135,762.9	901,438.3	20.694
30	142,655.3	140,347.7	1,041,786.0	23.916

ORIGINAL AHYMO OUTPUT FROM EL RANCHO GRANDE I DRAINAGE REPORT (WITH REVISED AS-BUILT POND VOLUMES)

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =05/17/2001
INPUT FILE = ANALPTD.DAT USER NO.= M_GOODWN.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	PAGE = 1 NOTATION
START										TIME= .00
RAINFALL TYPE= 1										RAIN6= 2.200
COMPUTE NM HYD	100.00	-	1	.02190	58.56	2.161	1.85049	1.499	4.178	PER IMP= 90.00
ROUTE RESERVOIR	POND.101	1	2	.02190	1.40	1.642	1.40559	2.597	.100	AC-FT= 1.911
COMPUTE NM HYD	101.00	-	1	.01310	30.61	1.077	1.54209	1.499	3.651	PER IMP= 64.00
ADD HYD	101.00	1& 2	3	.03500	31.34	2.719	1.45667	1.499	1.399	
ROUTE	201.00	3	4	.03500	31.14	2.715	1.45470	1.532	1.390	
COMPUTE NM HYD	104.00	-	1	.01350	27.72	.924	1.28283	1.499	3.208	PER IMP= 42.00
ADD HYD	104.00	1& 4	2	.04850	58.10	3.639	1.40686	1.532	1.872	
ROUTE	204.00	2	3	.04850	56.61	3.632	1.40424	1.532	1.824	
COMPUTE NM HYD	102.00	-	1	.01310	28.19	.961	1.37477	1.499	3.362	PER IMP= 50.00
COMPUTE NM HYD	103.00	-	2	.00398	8.42	.284	1.33869	1.499	3.304	PER IMP= 47.00
ADD HYD	103.00	1& 2	4	.01708	36.61	1.245	1.36633	1.499	3.349	
ADD HYD	104.00	3& 4	2	.06558	92.11	4.877	1.39436	1.532	2.195	
ROUTE	203.00	2	3	.06558	92.38	4.876	1.39402	1.532	2.201	
COMPUTE NM HYD	105.00	-	1	.00526	10.81	.360	1.28283	1.499	3.211	PER IMP= 42.00
ADD HYD	105.00	1& 3	2	.07084	102.90	5.236	1.38576	1.532	2.270	
ROUTE	205.00	2	3	.07084	92.41	5.224	1.38279	1.565	2.038	
COMPUTE NM HYD	106.00	-	1	.01893	39.79	1.342	1.32880	1.499	3.285	PER IMP= 46.00
ADD HYD	106.00	1& 3	2	.08977	126.54	6.566	1.37140	1.565	2.203	
ROUTE	206.00	2	3	.08977	125.13	6.562	1.37058	1.565	2.178	
COMPUTE NM HYD	107.00	-	1	.02670	46.95	1.469	1.03176	1.499	2.748	PER IMP= 23.00
COMPUTE NM HYD	108.00	-	2	.01020	20.89	.696	1.27962	1.499	3.200	PER IMP= 42.00
ADD HYD	108.00	1& 2	4	.03690	67.84	2.165	1.10025	1.499	2.872	
ADD HYD	108.00	3& 4	2	.12667	184.52	8.727	1.29183	1.565	2.276	
ROUTE	208.00	2	3	.12667	185.36	8.723	1.29123	1.565	2.287	
COMPUTE NM HYD	109.00	-	1	.00570	11.48	.379	1.24675	1.499	3.148	PER IMP= 39.00
COMPUTE NM HYD	110.00	-	2	.02320	48.62	1.684	1.36107	1.499	3.275	PER IMP= 53.44
ADD HYD	110.00	1& 2	4	.02890	60.11	2.063	1.33850	1.499	3.250	
ADD HYD	110.00	3& 4	2	.15557	237.13	10.786	1.30001	1.532	2.382	
ROUTE	210.00	2	3	.15557	238.60	10.784	1.29977	1.565	2.396	
COMPUTE NM HYD	401.12	-	19	.01126	23.42	.780	1.29864	1.499	3.250	PER IMP= 42.00
ADD HYD	401.13	19& 3	20	.16683	258.75	11.564	1.29969	1.565	2.423	
COMPUTE NM HYD	300.20	-	1	.01180	24.55	.817	1.29864	1.499	3.250	PER IMP= 42.00
COMPUTE NM HYD	401.14	-	2	.01117	23.24	.774	1.29864	1.499	3.250	PER IMP= 42.00
ADD HYD	401.15	1& 2	3	.02297	47.78	1.591	1.29862	1.499	3.250	
ADD HYD	401.16	3&20	4	.18980	301.16	13.155	1.29956	1.532	2.479	
COMPUTE NM HYD	401.17	-	5	.00661	13.76	.458	1.29864	1.499	3.252	PER IMP= 42.00
ADD HYD	401.18	4& 5	6	.19641	314.53	13.613	1.29953	1.532	2.502	

COMPUTE NM HYD	405.00	-	7	.01393	29.33	.982	1.32163	1.499	3.288	PER IMP= 44.00
ADD HYD	405.10	6& 7	8	.21034	343.00	14.595	1.30099	1.532	2.548	
COMPUTE NM HYD	127.00	-	27	.01080	22.47	.748	1.29864	1.499	3.250	PER IMP= 42.00
COMPUTE NM HYD	403.00	-	9	.01480	30.78	1.025	1.29864	1.499	3.250	PER IMP= 42.00
ADD HYD	405.15	9&27	10	.02560	53.25	1.773	1.29862	1.499	3.250	

PAGE = 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
ADD HYD	112.00	8&10	12	.23594	394.76	16.368	1.30074	1.532	2.614	
COMPUTE NM HYD	400.20	-	11	.03222	67.78	2.271	1.32163	1.499	3.288	PER IMP= 44.00
ADD HYD	405.16	11&12	40	.26816	460.58	18.639	1.30325	1.532	2.684	
COMPUTE NM HYD	101.00	-	1	.00359	7.47	.254	1.32370	1.500	3.249	PER IMP= 50.00
COMPUTE NM HYD	102.00	-	2	.00641	13.31	.452	1.32370	1.500	3.246	PER IMP= 50.00
COMPUTE NM HYD	103.00	-	3	.00531	11.04	.375	1.32370	1.500	3.247	PER IMP= 50.00
COMPUTE NM HYD	104.00	-	4	.00671	13.93	.474	1.32370	1.500	3.246	PER IMP= 50.00
COMPUTE NM HYD	105.00	-	5	.00063	1.31	.044	1.32370	1.500	3.283	PER IMP= 50.00
COMPUTE NM HYD	106.00	-	6	.00325	6.76	.229	1.32370	1.500	3.249	PER IMP= 50.00
COMPUTE NM HYD	107.00	-	7	.00058	1.65	.061	1.96638	1.500	4.458	PER IMP= 100.00
COMPUTE NM HYD	108.00	-	8	.00214	4.49	.153	1.33655	1.500	3.278	PER IMP= 51.00
COMPUTE NM HYD	109.00	-	9	.00117	2.45	.083	1.32370	1.500	3.263	PER IMP= 50.00
COMPUTE NM HYD	110.00	-	10	.00556	11.13	.374	1.25943	1.500	3.127	PER IMP= 45.00
COMPUTE NM HYD	111.00	-	11	.00450	9.35	.318	1.32370	1.500	3.248	PER IMP= 50.00
COMPUTE NM HYD	122.00	-	22	.00925	7.86	.222	.44920	1.533	1.327	PER IMP= .00
COMPUTE NM HYD	123.00	-	23	.00375	10.64	.393	1.96638	1.500	4.438	PER IMP= 100.00
COMPUTE NM HYD	126.00	-	26	.05200	109.73	3.628	1.30833	1.500	3.297	PER IMP= 42.00
ADD HYD	112.00	1& 2	12	.01000	20.78	.706	1.32364	1.500	3.247	
ADD HYD	113.00	3& 4	13	.01202	24.97	.849	1.32365	1.500	3.246	
ADD HYD	114.00	5& 6	14	.00388	8.07	.274	1.32356	1.500	3.255	
ADD HYD	115.00	7& 8	15	.00272	6.14	.213	1.47021	1.500	3.529	
ADD HYD	116.00	9&10	16	.00674	13.58	.456	1.27052	1.500	3.151	
ADD HYD	117.00	12&13	17	.02202	45.75	1.555	1.32364	1.500	3.246	
ADD HYD	118.00	14&17	18	.02590	53.83	1.828	1.32363	1.500	3.248	
ADD HYD	119.00	15&16	19	.00945	19.72	.670	1.32795	1.500	3.260	
ADD HYD	120.00	11&19	20	.01395	29.08	.987	1.32656	1.500	3.256	
ADD HYD	121.00	18&20	21	.03985	82.90	2.815	1.32466	1.500	3.251	
ADD HYD	124.00	22&23	24	.01300	18.31	.615	.88647	1.500	2.201	
ADD HYD	125.00	21&24	25	.05285	101.21	3.430	1.21687	1.500	2.992	
ADD HYD	129.00	25&26	29	.10485	210.94	7.058	1.26223	1.500	3.144	
ADD HYD	404.20	40&29	30	.37301	665.08	25.691	1.29140	1.532	2.786	
ROUTE RESERVOIR	405.40	30	31	.37301	162.63	25.682	1.29097	1.931	.681	AC-FT= 12.347
FINISH										

ORIGINAL AHYMO OUTPUT FROM EL RANCHO GRANDE I DRAINAGE REPORT (WITH REVISED AS-BUILT POND VOLUMES)

```
**ANALYSIS POINT D
ADD HYD              ID=30 HYD NO=404.2 ID=40 ID= 29
PRINT HYD            ID=30 CODE=1
                                        HYDROGRAPH FROM AREA   404.20

    RUNOFF VOLUME =      1.29140 INCHES      =      25.6907 ACRE-FEET
    PEAK DISCHARGE RATE =     665.08 CFS  AT   1.532 HOURS   BASIN AREA =   .3730 SQ. MI.

ROUTE RESERVOIR       ID=31 HYD NO=405.4 INFLOW ID=30 CODE=24
                     OUTFLOW(CFS)    STORAGE(AF)    ELEV(FT)
                         0               0            21
                       104.75            1.318        22
                       120.95            3.574        23
                       135.23            6.134        24
                       148.14            8.843        25
                       160.00           11.655        26
                       171.05           14.565        27
                       181.43           17.577        28
                       191.24           20.694        29
                       200.58           23.916        30

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

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

    .00         .00      21.00       .000        .00
    .80         .00      21.00       .000        .00
   1.60      551.37      24.76      8.198     145.07
   2.40       33.94      25.28      9.625     151.44
   3.20        6.66      22.27      1.926     109.12
   4.00        3.88      21.05       .062       4.95
   4.80        3.70      21.04       .046       3.69
   5.59        4.03      21.04       .050       3.95
   6.39        1.84      21.02       .031       2.49
   7.19        1.27      21.01       .017       1.31
   7.99        1.23      21.01       .016       1.24
   8.79        1.20      21.01       .015       1.20
   9.59        1.16      21.01       .015       1.17
  10.39        1.13      21.01       .014       1.14
  11.19        1.10      21.01       .014       1.10
  11.99        1.06      21.01       .013       1.07
  12.79        1.03      21.01       .013       1.04
  13.59        1.00      21.01       .013       1.01
  14.39         .96      21.01       .012        .97
  15.18         .92      21.01       .012        .93
  15.98         .88      21.01       .011        .89
  16.78         .85      21.01       .011        .85
  17.58         .81      21.01       .010        .82
  18.38         .77      21.01       .010        .78
  19.18         .72      21.01       .009        .73
 PEAK DISCHARGE =      162.629 CFS - PEAK OCCURS AT HOUR    1.93
 MAXIMUM WATER SURFACE ELEVATION =       26.238
 MAXIMUM STORAGE =       12.3473 AC-FT     INCREMENTAL TIME=     .033300HRS

PRINT HYD            ID=31 CODE=1
                                        HYDROGRAPH FROM AREA   405.40

    RUNOFF VOLUME =      1.29097 INCHES      =      25.6822 ACRE-FEET
    PEAK DISCHARGE RATE =     162.63 CFS  AT   1.931 HOURS   BASIN AREA =   .3730 SQ. MI.

FINISH

    NORMAL PROGRAM FINISH          END TIME (HR:MIN:SEC) = 13:33:31
```

REVISED EL RANCHO GRANDE I AHYMO DRAINAGE PLAN
WITH REVISED ARENAL / UNSER DETENTION POND VOLUMES AND
REVISED SUBASIN 400.2 TO SB"s 400.2A, 400.2B, 400.2C,400.2D
AHYMO SUMMARY FILE

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =07/19/2001
INPUT FILE = ARENAL_R.DAT USER NO.= M_GOODWN.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	PAGE = 1 NOTATION
START										TIME= .00
RAINFALL TYPE= 1										RAIN6= 2.200
COMPUTE NM HYD	100.00	-	1	.02190	58.56	2.161	1.85049	1.499	4.178	PER IMP= 90.00
ROUTE RESERVOIR	POND.101	1	2	.02190	1.40	1.642	1.40559	2.597	.100	AC-FT= 1.911
COMPUTE NM HYD	101.00	-	1	.01310	30.61	1.077	1.54209	1.499	3.651	PER IMP= 64.00
ADD HYD	101.00	1& 2	3	.03500	31.34	2.719	1.45667	1.499	1.399	
ROUTE	201.00	3	4	.03500	31.14	2.715	1.45470	1.532	1.390	
COMPUTE NM HYD	104.00	-	1	.01350	27.72	.924	1.28283	1.499	3.208	PER IMP= 42.00
ADD HYD	104.00	1& 4	2	.04850	58.10	3.639	1.40686	1.532	1.872	
ROUTE	204.00	2	3	.04850	56.61	3.632	1.40424	1.532	1.824	
COMPUTE NM HYD	102.00	-	1	.01310	28.19	.961	1.37477	1.499	3.362	PER IMP= 50.00
COMPUTE NM HYD	103.00	-	2	.00398	8.42	.284	1.33869	1.499	3.304	PER IMP= 47.00
ADD HYD	103.00	1& 2	4	.01708	36.61	1.245	1.36633	1.499	3.349	
ADD HYD	104.00	3& 4	2	.06558	92.11	4.877	1.39436	1.532	2.195	
ROUTE	203.00	2	3	.06558	92.38	4.876	1.39402	1.532	2.201	
COMPUTE NM HYD	105.00	-	1	.00526	10.81	.360	1.28283	1.499	3.211	PER IMP= 42.00
ADD HYD	105.00	1& 3	2	.07084	102.90	5.236	1.38576	1.532	2.270	
ROUTE	205.00	2	3	.07084	92.41	5.224	1.38279	1.565	2.038	
COMPUTE NM HYD	106.00	-	1	.01893	39.79	1.342	1.32880	1.499	3.285	PER IMP= 46.00
ADD HYD	106.00	1& 3	2	.08977	126.54	6.566	1.37140	1.565	2.203	
ROUTE	206.00	2	3	.08977	125.13	6.562	1.37058	1.565	2.178	
COMPUTE NM HYD	107.00	-	1	.02670	46.95	1.469	1.03176	1.499	2.748	PER IMP= 23.00
COMPUTE NM HYD	108.00	-	2	.01020	20.89	.696	1.27962	1.499	3.200	PER IMP= 42.00
ADD HYD	108.00	1& 2	4	.03690	67.84	2.165	1.10025	1.499	2.872	
ADD HYD	108.00	3& 4	2	.12667	184.52	8.727	1.29183	1.565	2.276	
ROUTE	208.00	2	3	.12667	185.36	8.723	1.29123	1.565	2.287	
COMPUTE NM HYD	109.00	-	1	.00570	11.48	.379	1.24675	1.499	3.148	PER IMP= 39.00
COMPUTE NM HYD	110.00	-	2	.02320	48.62	1.684	1.36107	1.499	3.275	PER IMP= 53.44
ADD HYD	110.00	1& 2	4	.02890	60.11	2.063	1.33850	1.499	3.250	
ADD HYD	110.00	3& 4	2	.15557	237.13	10.786	1.30001	1.532	2.382	
ROUTE	210.00	2	3	.15557	238.60	10.784	1.29977	1.565	2.396	
COMPUTE NM HYD	401.12	-	19	.01126	23.42	.780	1.29864	1.499	3.250	PER IMP= 42.00
ADD HYD	401.13	19& 3	20	.16683	258.75	11.564	1.29969	1.565	2.423	
COMPUTE NM HYD	300.20	-	1	.01180	24.55	.817	1.29864	1.499	3.250	PER IMP= 42.00
COMPUTE NM HYD	401.14	-	2	.01117	23.24	.774	1.29864	1.499	3.250	PER IMP= 42.00
ADD HYD	401.15	1& 2	3	.02297	47.78	1.591	1.29862	1.499	3.250	
ADD HYD	401.16	3&20	4	.18980	301.16	13.155	1.29956	1.532	2.479	
COMPUTE NM HYD	401.17	-	5	.00661	13.76	.458	1.29864	1.499	3.252	PER IMP= 42.00

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ADD HYD              401.18  4& 5   6        .19641      314.53     13.613     1.29953    1.532    2.502
COMPUTE NM HYD       405.00   -     7        .01393       29.33       .982     1.32163    1.499    3.288 PER IMP=  44.00
ADD HYD              405.10  6& 7   8        .21034      343.00     14.595     1.30099    1.532    2.548
COMPUTE NM HYD       127.00   -    27        .01080       22.47       .748     1.29864    1.499    3.250 PER IMP=  42.00
COMPUTE NM HYD       403.00   -     9        .01480       30.78      1.025     1.29864    1.499    3.250 PER IMP=  42.00
ADD HYD              405.15  9&27  10        .02560       53.25      1.773     1.29862    1.499    3.250
ADD HYD              112.00  8&10  12        .23594      394.76     16.368     1.30074    1.532    2.614
*S BASIN 400.2A AREA WEST OF DESERT SAGE SUBD.
COMPUTE NM HYD       400.2A   -    11        .00375        7.90       .264     1.32163    1.499    3.294 PER IMP=  44.00
*S BASIN 400.2B DESERT SAGE SUBD.
COMPUTE NM HYD       400.2B   -    13        .01908       43.93      1.532     1.50558    1.499    3.598 PER IMP=  60.00
ADD HYD              405.17 11&13  14        .02283       51.84      1.796     1.47534    1.499    3.548
*S BASIN 400.2C AREA EAST OF DESERT SAGE SUBD.
COMPUTE NM HYD       400.2C   -    15        .00938       19.74       .661     1.32163    1.499    3.289 PER IMP=  44.00
ADD HYD              405.16 14&15  16        .03221       71.57      2.457     1.43059    1.499    3.473
*S BASIN 400.2D UNSER BLVD (156' R/W, 1700'LENGTH)
COMPUTE NM HYD       400.2D   -    14        .00951       20.56       .719     1.41637    1.499    3.377 PER IMP=  57.70
ADD HYD              405.16 14&16  15        .04172       92.13      3.176     1.42734    1.499    3.451
ADD HYD              405.17 15&12  40        .27766      483.91     19.544     1.31976    1.532    2.723
RAINFALL  TYPE= 1                                                                                RAIN6=   2.200
COMPUTE NM HYD       101.00   -     1        .00359        7.47       .254     1.32370    1.500    3.249 PER IMP=  50.00
COMPUTE NM HYD       102.00   -     2        .00641       13.31       .452     1.32370    1.500    3.246 PER IMP=  50.00
COMPUTE NM HYD       103.00   -     3        .00531       11.04       .375     1.32370    1.500    3.247 PER IMP=  50.00
COMPUTE NM HYD       104.00   -     4        .00671       13.93       .474     1.32370    1.500    3.246 PER IMP=  50.00
COMPUTE NM HYD       105.00   -     5        .00063        1.31       .044     1.32370    1.500    3.283 PER IMP=  50.00
COMPUTE NM HYD       106.00   -     6        .00325        6.76       .229     1.32370    1.500    3.249 PER IMP=  50.00
COMPUTE NM HYD       107.00   -     7        .00058        1.65       .061     1.96638    1.500    4.458 PER IMP= 100.00
COMPUTE NM HYD       108.00   -     8        .00214        4.49       .153     1.33655    1.500    3.278 PER IMP=  51.00
COMPUTE NM HYD       109.00   -     9        .00117        2.45       .083     1.32370    1.500    3.263 PER IMP=  50.00
COMPUTE NM HYD       110.00   -    10        .00556       11.13       .374     1.25943    1.500    3.127 PER IMP=  45.00
COMPUTE NM HYD       111.00   -    11        .00450        9.35       .318     1.32370    1.500    3.248 PER IMP=  50.00
COMPUTE NM HYD       122.00   -    22        .00925        7.86       .222      .44920    1.533    1.327 PER IMP=    .00
COMPUTE NM HYD       123.00   -    23        .00375       10.64       .393     1.96638    1.500    4.438 PER IMP= 100.00
COMPUTE NM HYD       126.00   -    26        .05200      109.73      3.628     1.30833    1.500    3.297 PER IMP=  42.00
ADD HYD              112.00  1& 2  12        .01000       20.78       .706     1.32364    1.500    3.247
ADD HYD              113.00  3& 4  13        .01202       24.97       .849     1.32365    1.500    3.246
ADD HYD              114.00  5& 6  14        .00388        8.07       .274     1.32356    1.500    3.255
ADD HYD              115.00  7& 8  15        .00272        6.14       .213     1.47021    1.500    3.529
ADD HYD              116.00  9&10  16        .00674       13.58       .456     1.27052    1.500    3.151
ADD HYD              117.00 12&13  17        .02202       45.75      1.555     1.32364    1.500    3.246
ADD HYD              118.00 14&17  18        .02590       53.83      1.828     1.32363    1.500    3.248
ADD HYD              119.00 15&16  19        .00945       19.72       .670     1.32795    1.500    3.260
ADD HYD              120.00 11&19  20        .01395       29.08       .987     1.32656    1.500    3.256
ADD HYD              121.00 18&20  21        .03985       82.90      2.815     1.32466    1.500    3.251
ADD HYD              124.00 22&23  24        .01300       18.31       .615      .88647    1.500    2.201
ADD HYD              125.00 21&24  25        .05285      101.21      3.430     1.21687    1.500    2.992
ADD HYD              129.00 25&26  29        .10485      210.94      7.058     1.26223    1.500    3.144
ADD HYD              404.20 40&29  30        .38251      688.42     26.596     1.30368    1.532    2.812
*S ARENAL UNSER DETENTION POND
ROUTE RESERVOIR      405.40   30   31        .38251      164.93     26.587     1.30326    1.965     .674 AC-FT=   12.953
FINISH
```

REVISED EL RANCHO GRANDE I AHYMO DRAINAGE PLAN
WITH REVISED ARENAL / UNSER DETENTION POND VOLUMES AND
REVISED SB 400.2A, 400.2B, 400.2C, 400.2D
AHYMO OUTPUT FILE

```
**ANALYSIS POINT D
ADD HYD              ID=30 HYD NO=404.2 ID=40 ID= 29
PRINT HYD            ID=30 CODE=1
                                        HYDROGRAPH FROM AREA   404.20

    RUNOFF VOLUME =     1.30368 INCHES     =      26.5957 ACRE-FEET
    PEAK DISCHARGE RATE =     688.42 CFS  AT   1.532 HOURS   BASIN AREA =   .3825 SQ. MI.
*
*S ARENAL UNSER DETENTION POND
*
ROUTE RESERVOIR       ID=31 HYD NO=405.4 INFLOW ID=30 CODE=24
                     OUTFLOW(CFS)    STORAGE(AF)    ELEV(FT)
                         0                0           21
                       104.75            1.318        22
                       120.95            3.574        23
                       135.23            6.134        24
                       148.14            8.843        25
                       160.00           11.655        26
                       171.05           14.565        27
                       181.43           17.577        28
                       191.24           20.694        29
                       200.58           23.916        30

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

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

    .00        .00      21.00       .000        .00
    .80        .00      21.00       .000        .00
   1.60     568.31      24.90      8.575     146.86
   2.40      34.99      25.50     10.254     154.09
   3.20       6.87      22.48      2.390     112.45
   4.00       4.01      21.05       .068       5.43
   4.80       3.83      21.04       .048       3.83
   5.59       4.19      21.04       .052       4.10
   6.39       1.85      21.02       .032       2.54
   7.19       1.27      21.01       .017       1.31
   7.99       1.23      21.01       .016       1.24
   8.79       1.20      21.01       .015       1.20
   9.59       1.16      21.01       .015       1.17
  10.39       1.13      21.01       .014       1.14
  11.19       1.10      21.01       .014       1.10
  11.99       1.06      21.01       .013       1.07
  12.79       1.03      21.01       .013       1.04
  13.59       1.00      21.01       .013       1.01
  14.39        .96      21.01       .012        .97
  15.18        .92      21.01       .012        .93
  15.98        .88      21.01       .011        .89
  16.78        .85      21.01       .011        .85
  17.58        .81      21.01       .010        .82
  18.38        .77      21.01       .010        .78
  19.18        .72      21.01       .009        .73
 PEAK DISCHARGE =      164.930 CFS - PEAK OCCURS AT HOUR    1.96
 MAXIMUM WATER SURFACE ELEVATION =       26.446
 MAXIMUM STORAGE =       12.9533 AC-FT      INCREMENTAL TIME=     .033300HRS
PRINT HYD            ID=31 CODE=1
                                        HYDROGRAPH FROM AREA   405.40
    RUNOFF VOLUME =     1.30326 INCHES     =      26.5872 ACRE-FEET
    PEAK DISCHARGE RATE =     164.93 CFS  AT   1.965 HOURS   BASIN AREA =   .3825 SQ. MI.


FINISH
```

REVISED EL RANCHO GRANDE I AHYMO DRAINAGE PLAN
WITH REVISED ARENAL / UNSER DETENTION POND VOLUMES AND
REVISED SUBASINS 400.2A, 400.2B, 400.2C,400.2D
AHYMO INPUT FILE

```
START                TIME=0.0
***** ******************************************************************************
***** DESERT SAGE SUBDIVISION (REVISED SB 400.2 TO SB 400.2A 400.2B 400.2C)
***** SOURCE FILE:
***** MODIFIED "RE-EVALUATION OF ARENAL/UNSER DETENTION POND FOR EL RANCHO GRANDE I, UNITS 1,2,3"
***** DATED 5-12-00, MARK GOODWIN & ASSOCIATES.
***** FILE ARENAL_R.DAT DLH 7-20-01
***** ******************************************************************************
*****  HYDROGRAPH FOR ANALYSIS POINT D
*****  HYDROGRAPH OF ANALISIS POINTS A & B
*****
RAINFALL             TYPE=1 RAIN QUARTER=0.0 IN
                     RAIN ONE=1.87 IN RAIN SIX=2.20 IN
                     RAIN DAY=2.66 IN DT=0.0333 HR
*****
***** SUB-BASIN 100 (UNDEVELOPED) ASSUME COMMERCIAL DEVELOPED
*****
COMPUTE NM HYD       ID=1 HYD NO=100.0 AREA=0.0219 SQ MI
                     PER A=0 PER B=5 PER C=5 PER D=90
                     TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD            ID=1 CODE=1
*****
***** MAXIMUM FLOW FROM SB 100 IS 1.4 CFS
***** ROUTE THROUGH DETENTION POND (APPROX. DIMENSIONS 181'x181')
***** ORIFICE OPENING
*****
ROUTE RESERVOIR      ID=2  HYD=POND.101  INFLOW=1  CODE=10
                     OUTFLOW(CFS)     STORAGE(AC FT)     ELEV(FT)
                     0                0                  19.0
                     .36              .3104              19.5
                     .77              .6325              20.0
                     .99              .9663              20.5
                     1.15            1.3122              21.0
                     1.45            2.0406              22.0
                     1.70            2.8188              23.0
PRINT HYD            ID=2 CODE=1
*****
***** SUB-BASIN 101 SUN SAGE HILLS TOWNHOMES (6.9 UN/AC)
*****
COMPUTE NM HYD       ID=1 HYD NO=101.0 AREA=0.0131 SQ MI
                     PER A=0 PER B=21 PER C=15 PER D=64
                     TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD            ID=1 CODE=1
*****
*****ADD SB 100 AND SB 101
*****
ADD HYD              ID=3 HYD=101 ID=1  ID=2
PRINT HYD            ID=3 CODE=1
*****
***** ROUTE 250 FT SOUTH ON 94TH STREET 32' FF 50' ROW
***** @ 0.005 FT/FT
*****
COMPUTE RATING CURVE CID=1 VS NO=9  NO SEGS=1
                     MIN ELEV=0.0    MAX ELEV=.87
                     CH SLP=.005     FP SLP=0.005  N=0.017
                     DIST=50
                     DIST  ELEV     DIST  ELEV     DIST  ELEV
                       0   .87      9.0   .67     9.05    0.
                      11  .125       25  .405       39  .125
                      41    0.    41.05   .67       50   .87
COMPUTE TRAVEL TIME ID=4 REACH NO=1  NO VS=1 LENGTH=250 FT SLOPE=0.005
ROUTE                ID=4 HYD NO=201  INFLOW ID=3 DT=0.0
PRINT HYD            ID=4 CODE=1
*****
```

```
***** SUB-BASIN 104 RESIDENTIAL (4.0 UN/AC)
*****
COMPUTE NM HYD       ID=1 HYD NO=104.0 AREA=0.01350 SQ MI
                     PER A=0 PER B=34 PER C=24 PER D=42
                     TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD            ID=1 CODE=1
*****
***** ADD SB 100 AND 101 AND 104
*****
ADD HYD              ID=2 HYD=104 ID=1  ID=4
PRINT HYD            ID=2 CODE=1
*****
***** ROUTE 770 FT EAST ON REBA AVE 32' 50' ROW
***** FF @ 0.0164 FT/FT
*****
COMPUTE RATING CURVE CID=1 VS NO=9  NO SEGS=1
                     MIN ELEV=0.0    MAX ELEV=.87
                     CH SLP=.0164     FP SLP=0.0164  N=0.017
                     DIST=50
                     DIST  ELEV     DIST  ELEV     DIST  ELEV
                        0   .87      9.0   .67     9.05    0.
                       11  .125       25  .405       39  .125
                       41    0.    41.05   .67       50   .87
COMPUTE TRAVEL TIME ID=3 REACH NO=1  NO VS=1 LENGTH=770 FT SLOPE=0.0164
ROUTE                ID=3 HYD NO=204  INFLOW ID=2 DT=0.0
PRINT HYD            ID=3 CODE=1
*****
***** SUB-BASIN 102 RESIDENTIAL (5.1 UN/AC)
*****
COMPUTE NM HYD       ID=1 HYD NO=102.0 AREA=0.01310 SQ MI
                     PER A=0 PER B=30 PER C=20 PER D=50
                     TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD            ID=1 CODE=1
*****
***** SUB-BASIN 103 RESIDENTIAL (4.6 UN/AC)
*****
COMPUTE NM HYD       ID=2 HYD NO=103.0 AREA=0.00398 SQ MI
                     PER A=0 PER B=32 PER C=21 PER D=47
                     TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD            ID=2 CODE=1
*****
***** ADD SB 102 AND 103
*****
ADD HYD              ID=4 HYD=103 ID=1  ID=2
PRINT HYD            ID=4 CODE=1
*****
***** ADD SB 100, 101, 102, 103, 104
*****
ADD HYD              ID=2 HYD=104 ID=3  ID=4
PRINT HYD            ID=2 CODE=1
*****
***** ROUTE 150 FT SOUTHEAST ON BLAZICK AVE 32' FF 50' ROW
***** @ 0.02 FT/FT
*****
COMPUTE RATING CURVE CID=1 VS NO=9  NO SEGS=1
                     MIN ELEV=0.0    MAX ELEV=.87
                     CH SLP=.02       FP SLP=0.02  N=0.017
                     DIST=50
                     DIST  ELEV     DIST  ELEV     DIST  ELEV
                        0   .87      9.0   .67     9.05    0.
                       11  .125       25  .405       39  .125
                       41    0.    41.05   .67       50   .87
COMPUTE TRAVEL TIME ID=3 REACH NO=1  NO VS=1 LENGTH=150 FT SLOPE=0.02
ROUTE                ID=3 HYD NO=203  INFLOW ID=2 DT=0.0
PRINT HYD            ID=3 CODE=1
*****
***** SUB-BASIN 105 RESIDENTIAL (4.0 UN/AC)
*****
COMPUTE NM HYD       ID=1 HYD NO=105.0 AREA=0.00526 SQ MI
                     PER A=0 PER B=34 PER C=24 PER D=42
                     TP=0.1333 HR MASS RAINFALL=-1
```

```
PRINT HYD            ID=1 CODE=1
*****
***** ADD SB 100 THRU 104 AND 105
*****
ADD HYD              ID=2 HYD=105 ID=1  ID=3
PRINT HYD            ID=2 CODE=1
*****
***** ROUTE 1050 FT EAST ON SONYA AVE 32' FF 50' ROW
***** @ 0.0112 FT/FT
*****
COMPUTE RATING CURVE CID=1 VS NO=9  NO SEGS=1
                     MIN ELEV=0.0    MAX ELEV=.87
                     CH SLP=.0112    FP SLP=0.0112  N=0.017
                     DIST=50
                     DIST  ELEV     DIST  ELEV     DIST  ELEV
                        0   .87      9.0   .67     9.05    0.
                       11  .125       25  .405       39  .125
                       41    0.    41.05   .67       50   .87
COMPUTE TRAVEL TIME ID=3 REACH NO=1  NO VS=1 LENGTH=1050 FT SLOPE=0.0112
ROUTE                ID=3 HYD NO=205  INFLOW ID=2 DT=0.0
PRINT HYD            ID=3 CODE=1
*****
***** SUB-BASIN 106 RESIDENTIAL (4.5 UN/AC)
*****
COMPUTE NM HYD       ID=1 HYD NO=106.0 AREA=0.01893 SQ MI
                     PER A=0 PER B=32 PER C=22 PER D=46
                     TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD            ID=1 CODE=1
*****
***** ADD SB 100 THRU 105 AND 106
*****
ADD HYD              ID=2 HYD=106 ID=1  ID=3
PRINT HYD            ID=2 CODE=1
*****
***** ROUTE 400 FT SOUTHEAST ON SAPPHIRE ST. TO 86TH ST.
***** 32' FF 50' ROW @ 0.0135 FT/FT
*****
COMPUTE RATING CURVE CID=1 VS NO=9  NO SEGS=1
                     MIN ELEV=0.0    MAX ELEV=.87
                     CH SLP=.0135    FP SLP=0.0135  N=0.017
                     DIST=50
                     DIST  ELEV     DIST  ELEV     DIST  ELEV
                        0   .87      9.0   .67     9.05    0.
                       11  .125       25  .405       39  .125
                       41    0.    41.05   .67       50   .87
COMPUTE TRAVEL TIME ID=3 REACH NO=1  NO VS=1 LENGTH=400 FT SLOPE=0.0135
ROUTE                ID=3 HYD NO=206  INFLOW ID=2 DT=0.0
PRINT HYD            ID=3 CODE=1
*****
***** SUB-BASIN 107 RESIDENTIAL (PARK/RESIDENTIAL/WATER TNK)
*****
COMPUTE NM HYD       ID=1 HYD NO=107.0 AREA=0.0267 SQ MI
                     PER A=0 PER B=54 PER C=23 PER D=23
                     TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD            ID=1 CODE=1
*****
***** SUB-BASIN 108 UNDEVELOPED ASSUME RESIDENTIAL @ 4.0 UN/AC
*****
COMPUTE NM HYD       ID=2 HYD NO=108.0 AREA=0.0102 SQ MI
                     PER A=0 PER B=35 PER C=23 PER D=42
                     TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD            ID=2 CODE=1
*****
***** ADD SB 107 AND 108
*****
ADD HYD              ID=4 HYD=108 ID=1  ID=2
PRINT HYD            ID=4 CODE=1
*****
***** ADD SB 100 THRU 108
*****
ADD HYD              ID=2 HYD=108 ID=3  ID=4
```

```
PRINT HYD            ID=2 CODE=1
*****
***** ROUTE 300 FT SOUTHEAST ON SAPPHIRE ST. TO MICHELLES
***** 40' FF 60' ROW @ 0.014 FT/FT
***** INCLUDES 8" DIVERSION BERM
COMPUTE RATING CURVE CID=1 VS NO=11  NO SEGS=1
                     MIN ELEV=0.0    MAX ELEV=1.67
                     CH SLP=.014    FP SLP=0.014  N=0.017
                     DIST=60.05
                     DIST  ELEV     DIST  ELEV     DIST  ELEV
                        0  1.67     0.05   1.0       10  0.67
                    10.05    0.       12  .125       30  .485
                       48  .125       50    0.    50.05   0.67
                       60   1.0    60.05  1.67
COMPUTE TRAVEL TIME ID=3 REACH NO=1  NO VS=1 LENGTH=300 FT SLOPE=0.014
ROUTE                ID=3 HYD NO=208  INFLOW ID=2 DT=0.0
PRINT HYD            ID=3 CODE=1
*****
***** SUB-BASIN 109 RESIDENTIAL (3.8 UN/AC)
*****
COMPUTE NM HYD       ID=1 HYD NO=109.0 AREA=0.0057 SQ MI
                     PER A=0 PER B=36 PER C=25 PER D=39
                     TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD            ID=1 CODE=1
*****
***** SUB-BASIN 110 UNDEVELOPED ASSUME RESIDENTIAL @ 4.0 UN/AC
*****
COMPUTE NM HYD       ID=2 HYD NO=110.0 AREA=0.0232 SQ MI
                     PER A=0 PER B=46.56 PER C=0 PER D=53.44
                     TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD            ID=2 CODE=1
*****
***** ADD SB 109 AND 110
*****
ADD HYD              ID=4 HYD=110 ID=1  ID=2
PRINT HYD            ID=4 CODE=1
*****
***** ADD SB 100 thru 110
*****
ADD HYD              ID=2 HYD=110 ID=3  ID=4
PRINT HYD            ID=2 CODE=1
*****
***** ROUTE 200 FT EAST ON SAPPHIRE ST. FROM MICHELLE ST. TO INLETS
***** 40' FF 60' ROW @ 0.014 FT/FT
COMPUTE RATING CURVE CID=1 VS NO=9  NO SEGS=1
                     MIN ELEV=0.0    MAX ELEV=1.0
                     CH SLP=.014    FP SLP=0.014  N=0.017
                     DIST=60
                     DIST  ELEV     DIST  ELEV     DIST  ELEV
                        0   1.0       10  0.67    10.05     0.
                       12  .125       30  .485       48   .125
                       50    0.    50.05  0.67       60   1.0
COMPUTE TRAVEL TIME ID=3 REACH NO=1  NO VS=1 LENGTH=200 FT SLOPE=0.014
ROUTE                ID=3 HYD NO=210  INFLOW ID=2 DT=0.0
PRINT HYD            ID=3 CODE=1
*
**ANALYSIS POINT B
**BASIN401.12
COMPUTE NM HYD       ID=19 HYD NO=401.12 AREA=0.01126 SQ MI
                     PER A=0 B=29 C=29 D=42
                     TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD            ID=19 CODE=1
*
ADD HYD              ID=20 HYD NO=401.13 ID=19 ID=3
PRINT HYD            ID=20 CODE=1
*
**BASIN 300.2
COMPUTE NM HYD       ID=1 HYD NO=300.2 AREA=0.0118 SQ MI
                     PER A=0 B=29 C=29 D=42
                     TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD            ID=1 CODE=1
```

```
*
**BASIN 401.14
COMPUTE NM HYD        ID=2 HYD NO=401.14 AREA=0.01117 SQ MI
                      PER A=0 B=29 C=29 D=42
                      TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD             ID=2 CODE=1
*
ADD HYD               ID=3 HYD NO=401.15  ID=1 ID=2
PRINT HYD             ID=3 CODE=1
*
ADD HYD               ID=4 HYD NO=401.16  ID=3 ID=20
PRINT HYD             ID=4 CODE=1
*
**BASIN 401.17
COMPUTE NM HYD        ID=5 HYD NO=401.17 AREA=0.00661 SQ MI
                      PER A=0 B=29 C=29 D=42
                      TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD             ID=5 CODE=1
*
ADD HYD               ID=6 HYD NO=401.18  ID=4 ID=5
PRINT HYD             ID=6 CODE=1
*
**BASIN 405
COMPUTE NM HYD        ID=7 HYD NO=405 AREA=0.013934 SQ MI
                      PER A=0 B=28 C=28 D=44
                      TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD             ID=7 CODE=1
*
ADD HYD               ID=8 HYD NO=405.1  ID=6 ID=7
PRINT HYD             ID=8 CODE=1
*
**BASIN 404
COMPUTE NM HYD        ID=27 HYD NO=127 AREA=0.0108 SQ MI
                      PER A=0 B=29 C=29 D=42
                      TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD             ID=27 CODE=1
*
**BASIN 403
COMPUTE NM HYD        ID=9 HYD NO=403 AREA=0.0148 SQ MI
                      PER A=0 B=29 C=29 D=42
                      TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD             ID=9 CODE=1
*
ADD HYD               ID=10 HYD NO=405.15  ID=9 ID=27
PRINT HYD             ID=10 CODE=1
*
ADD HYD               ID=12 HYD NO=112  ID=8 ID=10
PRINT HYD             ID=12 CODE=1
*
** REVISED ORIGINAL SB 400.2 (AREA=0.032215)
*
*S BASIN 400.2A AREA WEST OF DESERT SAGE SUBD.
COMPUTE NM HYD        ID=11 HYD NO=400.2A AREA=0.00375 SQ MI
                      PER A=0 B=28 C=28 D=44
                      TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD             ID=11 CODE=1
*
*S BASIN 400.2B DESERT SAGE SUBD.
COMPUTE NM HYD        ID=13 HYD NO=400.2B AREA=0.01908 SQ MI
                      PER A=0 B=20 C=20 D=60
                      TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD             ID=13 CODE=1
*
ADD HYD               ID=14 HYD NO=405.17  ID=11 ID=13
PRINT HYD             ID=14 CODE=1
*S BASIN 400.2C AREA EAST OF DESERT SAGE SUBD.
COMPUTE NM HYD        ID=15 HYD NO=400.2C AREA=0.009375 SQ MI
                      PER A=0 B=28 C=28 D=44
                      TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD             ID=15 CODE=1
*
```

New

```
ADD HYD              ID=16 HYD NO=405.16  ID=14 ID=15
PRINT HYD            ID=16 CODE=1
*
*S BASIN 400.2D UNSER BLVD (156' R/W, 1700'LENGTH)
*
COMPUTE NM HYD       ID=14 HYD NO=400.2D AREA=0.009513 SQ MI
                     PER A=0 B=42.3 C=0 D=57.7
                     TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD            ID=14 CODE=1
*
ADD HYD              ID=15 HYD NO=405.16  ID=14 ID=16
PRINT HYD            ID=15 CODE=1
*
ADD HYD              ID=40 HYD NO=405.17  ID=15 ID=12
PRINT HYD            ID=40 CODE=1
*****
*****   HYDROGRAPH FOR ANALYSIS POINT C
*****
**BASIN W3(2)
RAINFALL              TYPE=1 RAIN QUARTER=0.0 IN
                      RAIN ONE=1.90 IN RAIN SIX=2.20 IN
                      RAIN DAY=2.70 IN DT=0.03333 HR

COMPUTE NM HYD        ID=1 HYD NO=101 AREA=0.003594 SQ MI
                      PER A=0 PER B=50 PER C=0 PER D=50
                      TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD             ID=1 CODE=1
*
**BASIN W3(3)
COMPUTE NM HYD        ID=2 HYD NO=102 AREA=0.006406 SQ MI
                      PER A=0 PER B=50 PER C=0 PER D=50
                      TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD             ID=2 CODE=1
*
**BASIN W3(4)
COMPUTE NM HYD        ID=3 HYD NO=103 AREA=0.005313 SQ MI
                      PER A=0 PER B=50 PER C=0 PER D=50
                      TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD             ID=3 CODE=1
*
**BASIN BINF
COMPUTE NM HYD        ID=4 HYD NO=104 AREA=0.006708 SQ MI
                      PER A=0 PER B=50 PER C=0 PER D=50
                      TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD             ID=4 CODE=1
*
**BASIN W3(6)
COMPUTE NM HYD        ID=5  HYD NO=105  AREA=0.000625 SQ MI
                      PER A=0 B=50 C=0 D=50
                      TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD             ID=5 CODE=1
*
**BASIN W3(7)
COMPUTE NM HYD        ID=6 HYD NO=106 AREA=0.003250 SQ MI
                      PER A=0 PER B=50 PER C=0 PER D=50
                      TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD             ID=6 CODE=1
*
**BASIN B-4
COMPUTE NM HYD        ID=7 HYD NO=107 AREA=0.000578 SQ MI
                      PER A=0 PER B=0 PER C=0 PER D=100
                      TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD             ID=7 CODE=1
*
**BASIN B-5
COMPUTE NM HYD        ID=8 HYD NO=108 AREA=0.002141 SQ MI
                      PER A=0 PER B=49 PER C=0 PER D=51
                      TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD             ID=8 CODE=1
*
**BASIN B-6
```

```
COMPUTE NM HYD        ID=9  HYD NO=109  AREA=0.001172 SQ MI
                      PER A=0 B=50 C=0 D=50
                      TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD             ID=9 CODE=1
*
**BASIN B-7
COMPUTE NM HYD        ID=10 HYD NO=110 AREA=0.005563 SQ MI
                      PER A=0 PER B=55 PER C=0 PER D=45
                      TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD             ID=10 CODE=1
*
**BASIN UNIT 2
COMPUTE NM HYD        ID=11 HYD NO=111 AREA=0.004500 SQ MI
                      PER A=0 PER B=50 PER C=0 PER D=50
                      TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD             ID=11 CODE=1
*
**BASIN 202
COMPUTE NM HYD        ID=22 HYD NO=122 AREA=0.009253 SQ MI
                      PER A=100 B=0 C=0 D=0
                      TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD             ID=22 CODE=1
*
**BASIN 202.05
COMPUTE NM HYD        ID=23 HYD NO=123 AREA=0.003747
                      PER A=0 B=0 C=0 D=100
                      TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD             ID=23 CODE=1
*
**BASIN 402
COMPUTE NM HYD        ID=26 HYD NO=126 AREA=0.052 SQ MI
                      PER A=0 B=29 C=29 D=42
                      TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD             ID=26 CODE=1
*
ADD HYD               ID=12 HYD NO=112  ID=1  ID=2
PRINT HYD             ID=12 CODE=1
*
ADD HYD               ID=13 HYD NO=113  ID=3  ID=4
PRINT HYD             ID=13 CODE=1
*
ADD HYD               ID=14 HYD NO=114  ID=5  ID=6
PRINT HYD             ID=14 CODE=1
*
ADD HYD               ID=15 HYD NO=115  ID=7  ID=8
PRINT HYD             ID=15 CODE=1
*
ADD HYD               ID=16 HYD NO=116  ID=9  ID=10
PRINT HYD             ID=16 CODE=1
*
ADD HYD               ID=17 HYD NO=117  ID=12  ID=13
PRINT HYD             ID=17 CODE=1
*
ADD HYD               ID=18 HYD NO=118  ID=14  ID=17
PRINT HYD             ID=18 CODE=1
*
ADD HYD               ID=19 HYD NO=119  ID=15  ID=16
PRINT HYD             ID=19 CODE=1
*
ADD HYD               ID=20 HYD NO=120  ID=11  ID=19
PRINT HYD             ID=20 CODE=1
*
ADD HYD               ID=21 HYD NO=121  ID=18  ID=20
PRINT HYD             ID=21 CODE=1
*
ADD HYD               ID=24 HYD NO=124  ID=22  ID=23
PRINT HYD             ID=24 CODE=1
*
**ANALYSIS POINT C
ADD HYD               ID=25 HYD NO=125  ID=21  ID=24
PRINT HYD             ID=25 CODE=1
```

```
*
**FLOW IN KIMELA DR. THAT WILL GO TO ANALYSIS POINT D
ADD HYD                ID=29 HYD NO=129  ID=25  ID=26
PRINT HYD              ID=29 CODE=1
*
**ANALYSIS POINT D
ADD HYD                ID=30 HYD NO=404.2 ID=40 ID= 29
PRINT HYD              ID=30 CODE=1
*
*S ARENAL UNSER DETENTION POND
*
ROUTE RESERVOIR         ID=31 HYD NO=405.4 INFLOW ID=30 CODE=24
                       OUTFLOW(CFS)    STORAGE(AF)    ELEV(FT)
                           0                0           21
                         104.75            1.318        22
                         120.95            3.574        23
                         135.23            6.134        24
                         148.14            8.843        25
                         160.00           11.655        26
                         171.05           14.565        27
                         181.43           17.577        28
                         191.24           20.694        29
                         200.58           23.916        30
PRINT HYD              ID=31 CODE=1
FINISH
```

APPENDIX B

HYDRAULICS

```
1*****************************************************
 *  WATER SURFACE PROFILES                           *
 *  VERSION OF SEPTEMBER 1988                        *
 *  ERROR: 01,02                                     *
 *  UPDATED:  4 APRIL    1989                        *
 *  RUN DATE     7/20/ 1   TIME    9:35:50            *
 *****************************************************
```

```
*****************************************
*  U.S. ARMY CORPS OF ENGINEERS         *
*  THE HYDROLOGIC ENGINEERING CENTER    *
*  609 SECOND STREET, SUITE D           *
*  DAVIS, CALIFORNIA 95616-4687         *
*  (916) 756-1104, (916) 551-1748       *
*****************************************
```

```
X     X  XXXXXXX   XXXXX              XXXXX
X     X  X        X     X            X     X
X     X  X        X                        X
XXXXXXX  XXXX     X          XXXXX    XXXXX
X     X  X        X                  X
X     X  X        X     X            X
X     X  XXXXXXX   XXXXX              XXXXXXX
```

```
END OF BANNER
  THIS RUN EXECUTED  7/20/ 1     9:35:50
 ***************************************************
   HEC2 RELEASE DATED SEP 88 UPDATED APR  1989
   ERROR CORR -  01,02
   MODIFICATION -
 ***************************************************

 T1          DESERT SAGE CAPACITY (44' ROW)
 T2          26'FF W/ MOUNTABLE CURB - CROWN
 T3          82nd STREET

 J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

       0         2         0         0      .006         0         0         0         0         0

 J3  VARIABLE CODES FOR SUMMARY PRINTOUT

      38        43         1         2        26         4        68         3

 NC     .017      .017      .017       .1        .3
 QT        2     12.00     16.78
 X1        1         7         0       44         0         0         0         0         0         0
 GR      .51         0       .33      8.9         0         9       .26        22         0        35
 GR      .33      35.1       .51       44

    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA     LEFT/RIGHT
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST

 *PROF 1

 CCHV=      .100 CEHV=      .300
 *SECNO 1.000
 2096 WSEL NOT GIVEN, AVG OF MAX, MIN USED
```

```
     1.00      .33      .33      .00      .00      .41      .08      .00      .00      .51
      12.       0.      12.       0.       0.       5.       0.       0.       0.      .51
      .00      .00     2.27      .00     .000     .017     .000     .000      .00     8.81
  .005915       0.       0.       0.        0        0        6      .00    26.38    35.19

T1
T2 ANGELINA DAISY
T3 3.64 % STREET SLOPE

J1  ICHECK    INQ      NINV     IDIR     STRT     METRIC   HVINS    Q        WSEL     FQ

     0         3        0        1      .0364

J2  NPROF     IPLOT    PRFVS    XSECV    XSECH    FN       ALLDC    IBW      CHNIM    ITRACE

    2         0        -1       0        0        0        0        0        0        0

   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS    BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA    LEFT/RIGHT
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST

*PROF 2

CCHV=      .100 CEHV=      .300
*SECNO 1.000
2096 WSEL NOT GIVEN, AVG OF MAX, MIN USED
     1.00      .27      .27      .37      .00      .59      .32      .00      .00      .51
      17.       0.      17.       0.       0.       4.       0.       0.       0.      .51
      .00      .00     4.50      .00     .000     .017     .000     .000      .00     8.92
  .036485       0.       0.       0.        0       14        6      .00    26.17    35.08

  THIS RUN EXECUTED  7/20/ 1     9:35:50
**************************************************
  HEC2 RELEASE DATED SEP 88 UPDATED APR  1989
  ERROR CORR -  01,02
  MODIFICATION -
**************************************************

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

    82nd STREET

SUMMARY PRINTOUT

      SECNO       Q       CWSEL     CRIWS      VCH      TOPWID     FRCH       EG

      1.000     12.00       .33       .00      2.27     26.38       .89       .41
      1.000     16.78       .27       .37      4.50     26.17      2.10       .59

 SUMMARY OF ERRORS AND SPECIAL NOTES
```

```
1*****************************************************
 *  WATER SURFACE PROFILES                           *
 *  VERSION OF SEPTEMBER 1988                        *
 *  ERROR: 01,02                                     *
 *  UPDATED:  4 APRIL    1989                        *
 *  RUN DATE     7/20/ 1   TIME   10:20:16           *
 *****************************************************
```

```
X     X  XXXXXXX   XXXXX              XXXXX
X     X  X        X     X            X     X
X     X  X        X                        X
XXXXXXX  XXXX     X          XXXXX    XXXXX
X     X  X        X                  X
X     X  X        X     X            X
X     X  XXXXXXX   XXXXX             XXXXXXX
```

```
*****************************************
 *  U.S. ARMY CORPS OF ENGINEERS         *
 *  THE HYDROLOGIC ENGINEERING CENTER    *
 *  609 SECOND STREET, SUITE D           *
 *  DAVIS, CALIFORNIA 95616-4687         *
 *  (916) 756-1104, (916) 551-1748       *
*****************************************
```

```
END OF BANNER

  THIS RUN EXECUTED  7/20/ 1    10:20:16
 ***************************************************
  HEC2 RELEASE DATED SEP 88 UPDATED APR  1989
  ERROR CORR -  01,02
  MODIFICATION -
 ***************************************************
T1          DESERT SAGE STREET CAPACITY CALCULATIONS
T2          26'FF W/ STD CURB, NO CROWN, 2.0 % CROSS SLOPE, 5% SLOPE
T3          FEATHERTOP DRIVE

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

      0         2         0         1       .05         0         0         0         0         0

J3  VARIABLE CODES FOR SUMMARY PRINTOUT

     38        43         1         2        26         4        68         3

NC     .017      .017      .017       .1        .3
QT        2     29.50     21.61
X1        1         7         0        44         0         0         0         0         0         0
GR      .85         0       .67       8.9         0         9      .125        11      .605        35
GR    1.275      35.1     1.455        44

   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA     LEFT/RIGHT
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST

*PROF 1

CCHV=     .100 CEHV=     .300
*SECNO 1.000
2096 WSEL NOT GIVEN, AVG OF MAX, MIN USED
     1.00      .50      .50      .69      .00     1.22      .73      .00      .00      .85
```

```
      30.        0.       29.        0.        0.        4.        0.        0.        0.      1.46
     .00       .00      6.84       .00      .000      .017      .000      .000       .00      8.93
  .050526        0.        0.        0.         0        14         6       .00     20.60     29.52

T1 FEATHERTOP
T2
T3

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

     0         3         0         1        .05

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

    2         0        -1         0         0         0         0         0         0         0

   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS    BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA    LEFT/RIGHT
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST

*PROF 2

CCHV=      .100 CEHV=      .300
*SECNO 1.000
2096 WSEL NOT GIVEN, AVG OF MAX, MIN USED
     1.00       .45       .45       .61       .00      1.06       .61       .00       .00       .85
      22.        0.       22.        0.        0.        3.        0.        0.        0.      1.46
      .00       .00      6.27       .00      .000      .017      .000      .000       .00      8.93
  .049323        0.        0.        0.         0        14         5       .00     18.35     27.29

  THIS RUN EXECUTED  7/20/ 1    10:20:16
**************************************************
  HEC2 RELEASE DATED SEP 88 UPDATED APR  1989
  ERROR CORR -  01,02
  MODIFICATION -
**************************************************

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

    FEATHERTOP DRIVE

SUMMARY PRINTOUT

      SECNO       Q        CWSEL      CRIWS       VCH      TOPWID      FRCH       EG

      1.000     29.50       .50        .69       6.84     20.60       2.63      1.22
      1.000     21.61       .45        .61       6.27     18.35       2.55      1.06
```

```
1*****************************************************
 *  WATER SURFACE PROFILES                           *
 *  VERSION OF SEPTEMBER 1988                        *
 *  ERROR: 01,02                                     *
 *  UPDATED:  4 APRIL    1989                        *
 *  RUN DATE     7/20/ 1   TIME   10: 7:34           *
 *****************************************************
```

```
*****************************************
*  U.S. ARMY CORPS OF ENGINEERS         *
*  THE HYDROLOGIC ENGINEERING CENTER    *
*  609 SECOND STREET, SUITE D           *
*  DAVIS, CALIFORNIA 95616-4687         *
*  (916) 756-1104, (916) 551-1748       *
*****************************************
```

```
X     X  XXXXXXX   XXXXX              XXXXX
X     X  X        X     X            X     X
X     X  X        X                        X
XXXXXXX  XXXX     X          XXXXX    XXXXX
X     X  X        X                  X
X     X  X        X     X            X
X     X  XXXXXXX   XXXXX              XXXXXXX
```

END OF BANNER

THIS RUN EXECUTED 7/20/ 1   10: 7:34

```
 ***************************************************
   HEC2 RELEASE DATED SEP 88 UPDATED APR  1989
   ERROR CORR -  01,02
   MODIFICATION -
 ***************************************************
```

```
T1          DESERT SAGE STREET CAPACITY CALCULATIONS
T2          26'FF W/ STD CURB, NO CROWN, 0.6 % CROSS SLOPE
T3          FEATHERTOP DRIVE

J1  ICHECK    INQ      NINV     IDIR     STRT     METRIC   HVINS    Q        WSEL     FQ

      0        2        0        1       .05       0        0        0        0        0

J3  VARIABLE CODES FOR SUMMARY PRINTOUT

     38       43        1        2       26        4       68        3

NC     .017     .017     .017      .1      .3
QT        2    35.05    27.51
X1        1        7        0      44       0        0        0        0        0        0
GR      .85        0      .67     8.9       0        9     .125       11     .269       35
GR    0.939     35.1    1.119      44

   SECNO    DEPTH    CWSEL    CRIWS    WSELK    EG       HV       HL       OLOSS    BANK ELEV
   Q        QLOB     QCH      QROB     ALOB     ACH      AROB     VOL      TWA    LEFT/RIGHT
   TIME     VLOB     VCH      VROB     XNL      XNCH     XNR      WTN      ELMIN      SSTA
   SLOPE    XLOBL    XLCH     XLOBR    ITRIAL   IDC      ICONT    CORAR    TOPWID     ENDST

*PROF 1

CCHV=      .100 CEHV=      .300
*SECNO 1.000
```

```
2096 WSEL NOT GIVEN, AVG OF MAX, MIN USED
     1.00      .39      .39      .57      .00     1.08      .69      .00      .00      .85
      35.       0.      35.       0.       0.       5.       0.       0.       0.     1.12
      .00      .00     6.65      .00     .000     .017     .000     .000      .00     8.94
  .049910       0.       0.       0.        0       11        5      .00    26.08    35.02

T1 FEATHERTOP
T2
T3

J1  ICHECK    INQ      NINV     IDIR     STRT     METRIC   HVINS    Q        WSEL     FQ

     0         3        0        1       .05

J2  NPROF     IPLOT    PRFVS    XSECV    XSECH    FN       ALLDC    IBW      CHNIM    ITRACE

    2         0       -1        0        0        0        0        0        0        0

   SECNO    DEPTH    CWSEL    CRIWS    WSELK    EG       HV       HL       OLOSS    BANK ELEV
   Q        QLOB     QCH      QROB     ALOB     ACH      AROB     VOL      TWA    LEFT/RIGHT
   TIME     VLOB     VCH      VROB     XNL      XNCH     XNR      WTN      ELMIN      SSTA
   SLOPE    XLOBL    XLCH     XLOBR    ITRIAL   IDC      ICONT    CORAR    TOPWID     ENDST

*PROF 2

CCHV=      .100 CEHV=      .300
*SECNO 1.000
2096 WSEL NOT GIVEN, AVG OF MAX, MIN USED
     1.00      .36      .36      .51      .00      .93      .56      .00      .00      .85
      28.       0.      28.       0.       0.       5.       0.       0.       0.     1.12
      .00      .00     6.03      .00     .000     .017     .000     .000      .00     8.95
  .049557       0.       0.       0.        0       11        5      .00    26.07    35.01

  THIS RUN EXECUTED  7/20/ 1    10: 7:34
**************************************************
  HEC2 RELEASE DATED SEP 88 UPDATED APR  1989
  ERROR CORR -  01,02
  MODIFICATION -
**************************************************

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

    FEATHERTOP DRIVE

SUMMARY PRINTOUT

      SECNO       Q       CWSEL     CRIWS      VCH     TOPWID     FRCH       EG

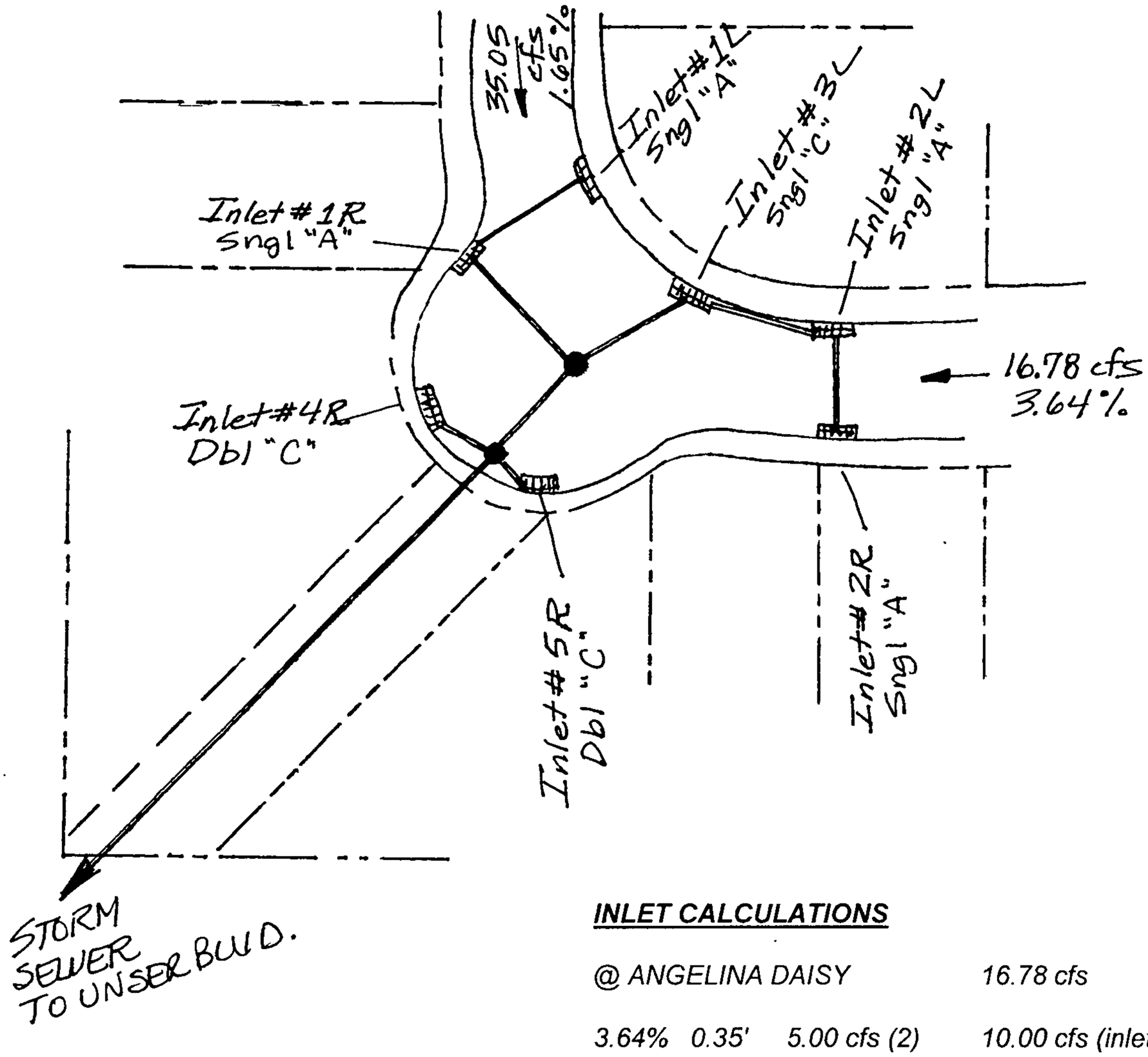
      1.000     35.05      .39       .57      6.65     26.08     2.61      1.08
      1.000     27.51      .36       .51      6.03     26.07     2.54       .93
```

APPENDIX C

ONSITE AND UNSER BLVD. STORM SEWER

D. Mark Goodwin & Associates, P.A.
Consulting Engineers
P.O. BOX 90606, ALBUQUERQUE, NM 87199
(505) 828-2200 FAX 797-9539
e-mail: dmg@swcp.com

PROJECT Desert Sage
SUBJECT Inlet Calcs.
BY DLH DATE 5-22-01
CHECKED _____ DATE _____
SHEET ____ OF ____



INLET CALCULATIONS

@ ANGELINA DAISY			*16.78 cfs*
3.64%	*0.35'*	*5.00 cfs (2)*	*10.00 cfs (inlets #2L & #2R)*
			6.78 cfs

@ FEATHERTOP			*35.05 cfs*
1.65%	*0.49'*	*7.00 cfs (2)*	*14.00 cfs (inlets # 1L & #1R)*
			21.05 cfs

6.78 cfs + 21.05 cfs = 27.83 cfs

8.14 cfs (intercepted by sump inlet #3L)

19.69 cfs (intercepted by sump inlets #4R & #5R)

CALCULATIONS FOR INLETS AT SUMP
for
Desert Sage Subdivision

Angelina Daisy / Feathertop sump inlet along inside of curve

Capacity is measured by the weir equation at the lip of the gutter assuming an allowable ponding elevation equal to the the crown of the road which is at a height of 0.36'. The length of the double grate facing the street is 6.5' and the maximum depth is 0.36' at the lip of the gutter. The sides are each 2' long at an average depth of 0.475' ((0.36 + 1/2(0.23')). From the weir equation:

*Front Q cap = (3.0) x (6.5') x (0.36) **1.5 = 4.21 cfs*

*Sides Q cap = (3.0) x (4.0') x (0.475) **1.5 = 3.93 cfs*

Total Q cap = 4.21 cfs + 3.93 cfs = ***8.14 cfs***

Capacity is measured by the weir equation at the lip of the gutter assuming an allowable ponding elevation equal to the lowest adjacent right of way elevation. The length of the double grate facing the street is 6.5' and the maximum depth is 0.725' at the lip of the gutter. The sides are each 2' long and the average depth is 0.892'. These depths assume an 8" curb with right of way 9' behind the curb for an additional depth of 0.18' above the top of curb. From the weir equation:

Feathertop / Angelina Daisy Knuckle Sump Inlets:

FOR DOUBLE 'C' INLET

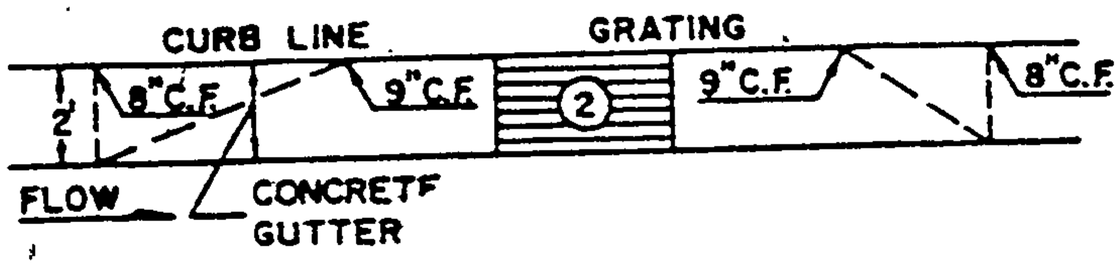
*Front Q cap = (3.0) x (6.5') x (0.725) **1.5 = 12.04 cfs*

*Sides Q cap = (3.0) x (4.0') x (0.892) **1.5 = 10.11 cfs*

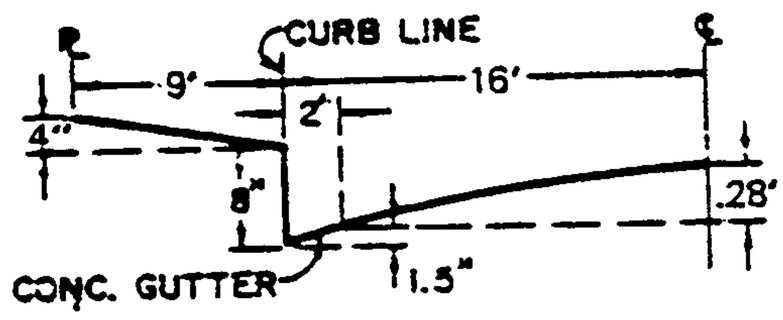
Total Q cap = 12.04 cfs + 10.11 cfs = ***22.15 cfs***

The 100 year developed conditions runoff from the site is 51.83 cfs. 32.14 cfs is intercepted before it reaches the sump inlet at the lowest area in the knuckle. The remaining flow reaching these sump inlets is 19.69 cfs. Two double 'C' inlets will have a combined capacity to intercept 44.30 cfs which is double the actual 100 year flow rate.

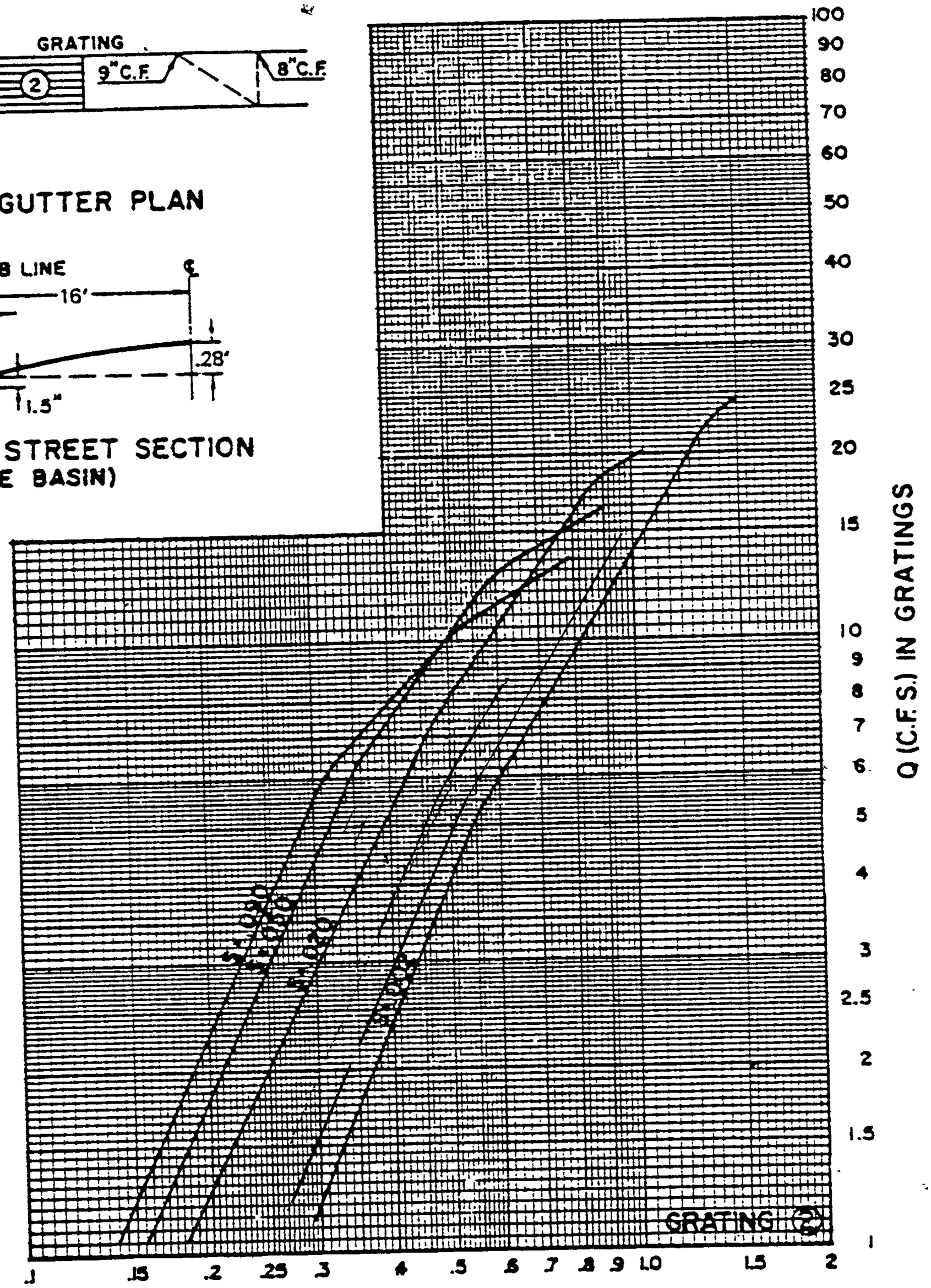
GRATING CAPACITIES FOR TYPE "A", "C" and "D"



GRATING & GUTTER PLAN



TYPICAL HALF STREET SECTION
(ABOVE BASIN)



HYDRAULIC REPORT FOR

DESERT SAGE SUBDIVISION

PRELIMINARY

UNSER BLVD EXTENSION

STORM SEWER ANALYSIS

INTITIAL HGL = 30.0'

MARK GOODWIN & ASSOCIATES

DLH

JULY 2001

LINE 1 / Q = 111.2 / HT = 42 / WID = 42 / N = .013 / L = 60 / JLC = .5

EXIST 66 SD- MH 1 / Outfall

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	30.00	42.00	24.15	11.56	32.08	0.00	4.85	9.62
UPSTRM	30.73	42.00	25.60	11.56	32.81	0.00	5.89	9.62

Drainage area (ac) =	0	Slope of invert (%) =	2.417
Runoff coefficient =	0	Slope energy grade line (%) =	1.222
Time of conc (min) =	8	Critical depth (in) =	38.99
Inlet time (min) =	0	Req'd length curb inlet (ft) =	0.0
Intensity (in/hr) =	0.00	Req'd grate area (sf) =	0.0
Cumulative C*A =	0.0	Depth at inlet opening (in) =	0
Flow contrib (cfs) =	111.1	Confluence angle (deg) =	0
Default Q (cfs) =	111.2	Natural ground elev (ft) =	35
Line capac. (cfs) =	156.4	Line storage (cuft) =	577

LINE 2 / Q = 71.6 / HT = 36 / WID = 36 / N = .013 / L = 350 / JLC = .5

MH 1 - MH 2 / DNLN = 1

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	31.77	36.00	26.10	10.13	33.36	0.00	5.89	7.07
UPSTRM	39.71	32.47	37.00	10.66	41.47	21.40	5	6.71

Drainage area (ac)	= 0	Slope of invert (%)	= 3.114
Runoff coefficient	= 0	Slope energy grade line (%)	= 2.317
Time of conc (min)	= 6	Critical depth (in)	= 32.42
Inlet time (min)	= 0	Req'd length curb inlet (ft)	= 0.0
Intensity (in/hr)	= 0.00	Req'd grate area (sf)	= 0.0
Cumulative C*A	= 0.0	Depth at inlet opening (in)	= 0
Flow contrib (cfs)	= 71.5	Confluence angle (deg)	= 0
Default Q (cfs)	= 71.57	Natural ground elev (ft)	= 45
Line capac. (cfs)	= 117.7	Line storage (cuft)	= 2411

LINE 3 / Q = 71.6 / HT = 36 / WID = 36 / N = .013 / L = 340 / JLC = .5

MH 2 - MH 3 / DNLN = 2

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	40.59	36.00	37.00	10.13	42.18	0.00	5	7.07
UPSTRM	54.71	32.47	52.00	10.66	56.47	21.40	5	6.71

Drainage area (ac)	= 0	Slope of invert (%)	= 4.412
Runoff coefficient	= 0	Slope energy grade line (%)	= 4.203
Time of conc (min)	= 4	Critical depth (in)	= 32.42
Inlet time (min)	= 0	Req'd length curb inlet (ft)	= 0.0
Intensity (in/hr)	= 0.00	Req'd grate area (sf)	= 0.0
Cumulative C*A	= 0.0	Depth at inlet opening (in)	= 0
Flow contrib (cfs)	= 71.5	Confluence angle (deg)	= 15
Default Q (cfs)	= 71.57	Natural ground elev (ft)	= 60
Line capac. (cfs)	= 140.1	Line storage (cuft)	= 2342

LINE 4 / Q = 51.8 / HT = 36 / WID = 36 / N = .013 / L = 290 / JLC = .75

MH 3 - MH 4 / DNLN = 3

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	55.59	36.00	52.00	7.33	56.42	0.00	5	7.07
UPSTRM	57.34	36.00	54.00	7.33	58.18	0.00	5	7.07

Drainage area (ac)	= 0	Slope of invert (%)	= 0.690
Runoff coefficient	= 0	Slope energy grade line (%)	= 0.604
Time of conc (min)	= 3	Critical depth (in)	= 27.53
Inlet time (min)	= 0	Req'd length curb inlet (ft)	= 0.0
Intensity (in/hr)	= 0.00	Req'd grate area (sf)	= 0.0
Cumulative C*A	= 0.0	Depth at inlet opening (in)	= 0
Flow contrib (cfs)	= 51.8	Confluence angle (deg)	= 90
Default Q (cfs)	= 51.83	Natural ground elev (ft)	= 62
Line capac. (cfs)	= 55.4	Line storage (cuft)	= 2050

LINE 5 / Q = 51.8 / HT = 36 / WID = 36 / N = .013 / L = 300 / JLC = .5

MH 4 - MH 5 / DNLN = 4

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	57.97	36.00	54.00	7.33	58.80	0.00	5	7.07
UPSTRM	59.78	36.00	56.00	7.33	60.61	0.00	5	7.07

Drainage area (ac)	= 0	Slope of invert (%)	= 0.667
Runoff coefficient	= 0	Slope energy grade line (%)	= 0.604
Time of conc (min)	= 1	Critical depth (in)	= 27.53
Inlet time (min)	= 0	Req'd length curb inlet (ft)	= 0.0
Intensity (in/hr)	= 0.00	Req'd grate area (sf)	= 0.0
Cumulative C*A	= 0.0	Depth at inlet opening (in)	= 0
Flow contrib (cfs)	= 51.8	Confluence angle (deg)	= 0
Default Q (cfs)	= 51.83	Natural ground elev (ft)	= 64
Line capac. (cfs)	= 54.5	Line storage (cuft)	= 2120

LINE 6 / Q = 51.8 / HT = 36 / WID = 36 / N = .013 / L = 195 / JLC = .75

MH 5 - MH 6 / DNLN = 5

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	60.20	36.00	56.00	7.33	61.03	0.00	5	7.07
UPSTRM	62.00	36.00	57.20	7.33	62.84	0.00	4.49	7.07

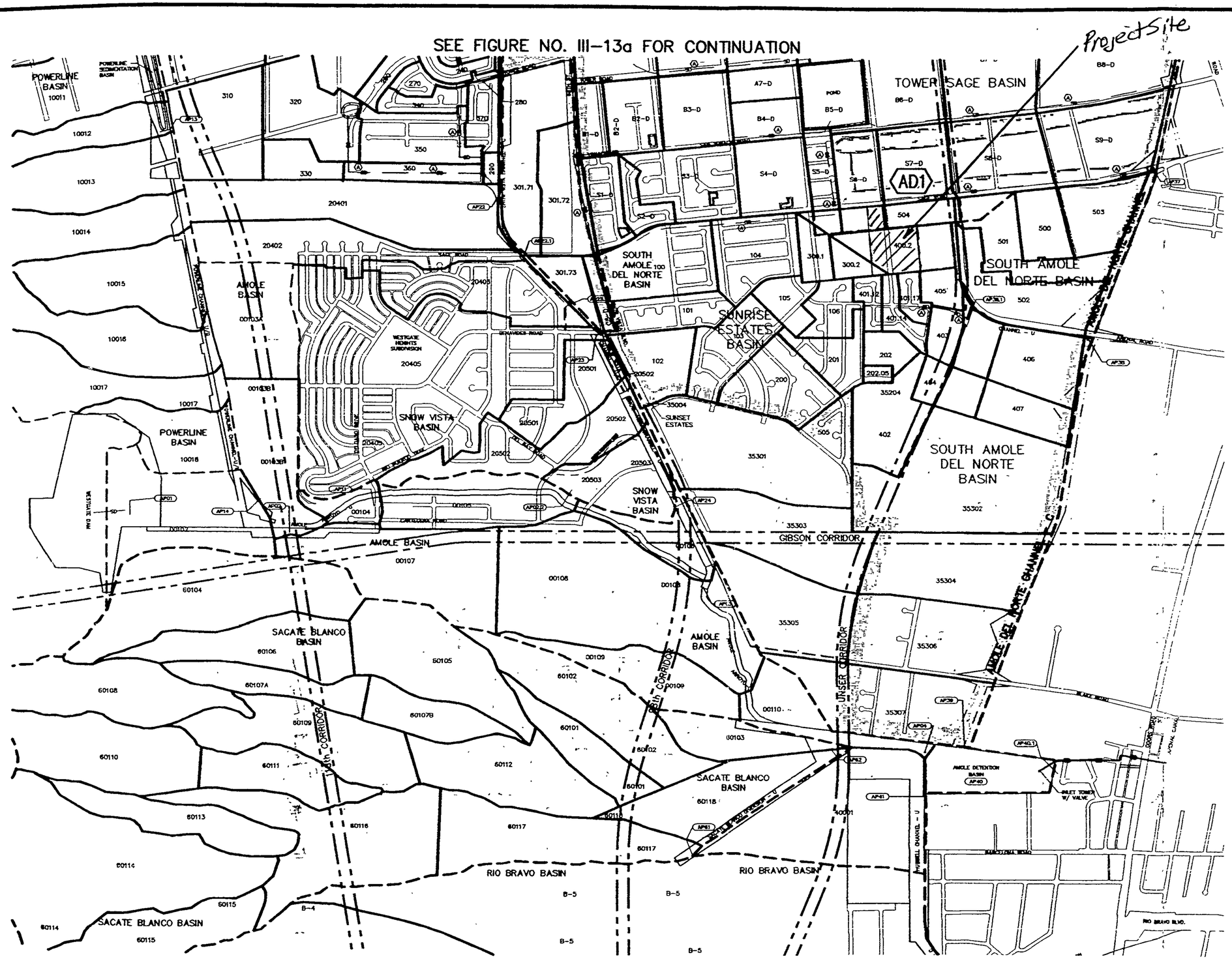
Drainage area (ac)	= 0	Slope of invert (%)	= 0.615
Runoff coefficient	= 0	Slope energy grade line (%)	= 0.604
Time of conc (min)	= 0	Critical depth (in)	= 27.53
Inlet time (min)	= 0	Req'd length curb inlet (ft)	= 0.0
Intensity (in/hr)	= 0.00	Req'd grate area (sf)	= 0.0
Cumulative C*A	= 0.0	Depth at inlet opening (in)	= 0
Flow contrib (cfs)	= 51.8	Confluence angle (deg)	= 45
Default Q (cfs)	= 51.83	Natural ground elev. (ft)	= 64.7
Line capac. (cfs)	= 52.3	Line storage (cuft)	= 1378

APPENDIX C.1

SAGE ROAD STORM SEWER

TOWER SAGE DRAINAGE PLAN

AMOLE DEL NORTE DRAINAGE PLAN



AMOLE DEL NORTE BASIN (ADN) DMP FACILITIES			
AP NO.	DESCRIPTION	VARIABLE	100 YR 24 HR.
36.1	N-S COORS POND	Q cfs (in)	1442
	OUTFALL	TVol AF	379
		DVol AF	68.3
	N-S COORS POND	Q cfs	0
	OVERTOPPING	TVol AF	0
36	ADN CHANNEL	Q cfs	1623
	⊕ HEAD	TVol AF	403
36.2	ADN BELOW	Q cfs	1802
	SAN YGNACIO	TVol AF	483
37	ADN BELOW	Q cfs	1982
	SAGE ROAD	TVol AF	505
38	ADN BELOW	Q cfs	1993
	ARENAL ROAD	TVol AF	508
38.1	OVERLAND FLOW	Q cfs	190
	SUNRISE EST. AREA	TVol AF	36.4
39	ADN ⊕ ENTR. TO	Q cfs	2347
	AMOLE DET. BASIN	TVol AF	601

IDENTIFIED MANAGEMENT PLAN FACILITIES
AD1 SAD 222 TOWER-SAGE DETENTION BASIN AND OUTFALL

LEGEND

- DMP IMPROVEMENTS
- BASIN BOUNDARIES
- PLATTED EASEMENT/ROW
- SUBBASIN BOUNDARIES
- (APXX) HYDROLOGIC ANALYSIS POINT
- BASIN BOUNDARY THIS SHEET
- 60110 SUBBASIN ID NUMBER
- (SVX) PROJECT ID NUMBER

N

0 750' 1500' 3000'
1" = 1500'±

AMOLE-HUBBELL D.M.P.

AMOLE DEL NORTE BASIN MANAGEMENT PLAN

LEEDSHILL-HERKENHOFF, INC.

FIGURE NO. III-13b

P:\95043\95043_32\DWG\C\DN-BASIN.dwg 6-10-99 KHK

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =07/18/2001
INPUT FILE = TS1_DMP.DAT USER NO.= M_GOODWN.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	PAGE = 1 NOTATION
START										TIME= .00
*S										
*S TOWER/SAGE WATERSHED SAD 222										
*S (SAGE STORM SEWER - EAST OF 86th STREET) .										
*S										
*S 100-YR, 24-HR STORM WITH SEDIMENT										
*S FILE NAME: TS1_DMP.DAT										
*S LAST REVISION 7-18-01 DLH										
*S BY: RICHARD STOCKTON PEER REVIEWED BY: DEBORAH DIXON										
*S LAST REVISION: 08-15-96										
RAINFALL TYPE= 2										RAIN24= 2.660
COMPUTE NM HYD	S6-D&AP#35	-	3	.03780	51.00	3.473	1.72289	1.700	2.108	PER IMP= 60.00
ROUTE	AP#35R	3	2	.03780	50.09	3.473	1.72289	1.700	2.070	
COMPUTE NM HYD	S7-D	-	3	.05700	65.54	5.826	1.91658	1.850	1.797	PER IMP= 71.00
ADD HYD	AP#36	2& 3	10	.09480	110.86	9.300	1.83933	1.800	1.827	
ROUTE	AP#36R	10	2	.09480	108.65	9.300	1.83934	1.850	1.791	
COMPUTE NM HYD	S8-D	-	3	.06830	81.37	6.468	1.77571	1.750	1.861	PER IMP= 63.00
ADD HYD	AP#37	2& 3	10	.16310	189.29	15.768	1.81269	1.800	1.813	
ROUTE	AP#37R	10	2	.16310	188.47	15.768	1.81269	1.800	1.806	
COMPUTE NM HYD	S9-D	-	3	.07480	152.95	6.171	1.54680	1.500	3.195	PER IMP= 50.00
ADD HYD	TS3_DMP.HYD	2& 3	20	.23790	235.52	21.939	1.72909	1.750	1.547	
FINISH										

```
START                    0.0 HOURS   PC=0  PL=-1
*S
*S       TOWER/SAGE WATERSHED SAD 222
*S       (SAGE STORM SEWER - EAST OF 86th STREET)
*S
*S 100-YR, 24-HR STORM WITH SEDIMENT
*S FILE NAME: TS1_DMP.DAT
*S LAST REVISION 7-18-01 DLH
*S BY: RICHARD STOCKTON   PEER REVIEWED BY: DEBORAH DIXON
*S LAST REVISION: 08-15-96
*****************************************************************************
*****************************************************************************
**S100 YEAR 24HR STORM DEVELOPED CONDITION
RAINFALL                 TYPE=2  0.0  1.87  2.20  2.66    DT=0.05
** 10 YEAR 24HR STORM DEVELOPED CONDITION
**RAINFALL               TYPE=2  0.0  1.25  1.47  1.77    DT=0.05
**  2 YEAR 24HR STORM DEVELOPED CONDITION
**RAINFALL               TYPE=2  0.0  0.74  0.95  1.15    DT=0.05
*****************************************************************************
*LH**   100 YEAR 24 HOUR STORM.
*LH**
*LH****************************** Set time to start *****************
*LH**
*LH*START                TIME = 0.0
*LH**
*LH****** COMPUTE RAINFALL DISTRIBUTION
*LH**
*LH*RAINFALL             TYPE=2
*LH*                     RAIN QUARTER=0.0        RAIN ONE = 1.90 IN
*LH*                     RAIN SIX=2.21 IN        RAIN DAY = 2.67 IN
*LH*                     DT=0.075
*LH**
*LH****** SEDIMENT BULKING FACTOR = 5%
*LH**
*LH**SEDIMENT BULK        CODE=1   BULK FACTOR=1.05
*
*   THE FOLOWING IS TO DETERMINE THE FLOW INTO THE AMOLE DEL NORTE CHANNEL
*   FROM THE SAGE ROAD STORM DRAIN LINE.
*
***** BASIN S6-D
*
COMPUTE NM HYD       ID=3  HYD NO=S6-D&AP#35 DRAINAGE AREA=.0378  SQ MI
                     PERCENT A=0 PERCENT B=40 PERCENT C=0 PERCENT D=60
                     TP=.31 HRS
                     MASSRAINFALL=-1
*   TOTAL FLOW AT AP#35
PRINT HYD            ID=3  CODE=1
*
***** ROUTE FLOW AT AP#35 TO AP#36 THROUGH PIPE IN SAGE RD.
*
COMPUTE RATING CURVE ID=1  VS NO=1  CODE=-1 SLP=0.0055 DIA=3.5 FT N=0.015
COMPUTE TRAVEL TIME ID=2  REACH=1  NO VS=1
                     L=1100  SLP=0.0055
ROUTE                ID=2    HYD NO=AP#35R
                     INFLOW=3 DT=0.0
PRINT HYD            ID=2  CODE=1
*
***** BASIN S7-D
COMPUTE NM HYD       ID=3  HYD NO=S7-D DRAINAGE AREA=.0570  SQ MI
                     PERCENT A=0 PERCENT B=29 PERCENT C=0 PERCENT D=71
                     TP=.46 HRS
                     MASSRAINFALL=-1
PRINT HYD            ID=3  CODE=1
*
***** ADD HYDROGRAPHS S6-D, S7-D
ADD HYD              ID=10  HYD NO=AP#36  ID I=2  ID II=3
*
*   TOTAL FLOW AT AP#36
PRINT HYD            ID=10  CODE=1
*
***** ROUTE FLOW AT AP#36 TO AP#37 THROUGH PIPE IN SAGE RD.
```

```
COMPUTE RATING CURVE ID=1  VS NO=1  CODE=-1 SLP=0.005 DIA=4.5 FT N=0.015
COMPUTE TRAVEL TIME ID=2  REACH=1  NO VS=1
                    L1500  SLP=0.005
ROUTE               ID=2    HYD NO=AP#36R
                    INFLOW=10 DT=0.0
PRINT HYD           ID=2  CODE=1
*
***** BASIN S8-D
COMPUTE NM HYD      ID=3  HYD NO=S8-D DRAINAGE AREA=.0683  SQ MI
                    PERCENT A=0 PERCENT B=37 PERCENT C=0 PERCENT D=63
                    TP=.39 HRS
                    MASSRAINFALL=-1
PRINT HYD           ID=3  CODE=1
*
***** ADD HYDROGRAPHS S6-D, S7-D, S8-D
ADD HYD             ID=10  HYD NO=AP#37  ID I=2  ID II=3
*
*   TOTAL FLOW AT AP#37
PRINT HYD           ID=10  CODE=1
*
***** ROUTE FLOW AT AP#37 TO AP#38 THROUGH PIPE IN SAGE RD.
COMPUTE RATING CURVE ID=1  VS NO=1  CODE=-1 SLP=0.035 DIA=4.0 FT N=0.015
COMPUTE TRAVEL TIME ID=2  REACH=1  NO VS=1
                    L=1500  SLP=0.035
ROUTE               ID=2    HYD NO=AP#37R
                    INFLOW=10 DT=0.0
PRINT HYD           ID=2  CODE=1
*
***** BASIN S9-D
COMPUTE NM HYD      ID=3  HYD NO=S9-D DRAINAGE AREA=.0748  SQ MI
                    PERCENT A=0 PERCENT B=50 PERCENT C=0 PERCENT D=50
                    TP=.13 HRS
                    MASSRAINFALL=-1
PRINT HYD           ID=3  CODE=1
*
***** ADD HYDROGRAPHS S6-D, S7-D, S8-D, S9-D
ADD HYD             ID=20  HYD=TS3_DMP.HYD  ID I=2  ID II=3
*
*   TOTAL FLOW AT AP#38
PUNCH HYD           ID=20
PRINT HYD           ID=20  CODE=1
*
FINISH
```

```
    AHYMO PROGRAM (AHYMO194) - AMAFCA Hydrologic Model - January, 1994
         RUN DATE (MON/DAY/YR) = 07/18/2001
         START TIME (HR:MIN:SEC) = 11:30:10     USER NO.= M_GOODWN.I01
         INPUT FILE = TS1_DMP.DAT

START                0.0 HOURS   PC=0  PL=-1
*S
*S      TOWER/SAGE WATERSHED SAD 222
*S      (SAGE STORM SEWER - EAST OF 86th STREET)
*S
*S 100-YR, 24-HR STORM WITH SEDIMENT
*S FILE NAME: TS1_DMP.DAT
*S LAST REVISION 7-18-01 DLH
*S BY: RICHARD STOCKTON   PEER REVIEWED BY: DEBORAH DIXON
*S LAST REVISION: 08-15-96
*************************************************************************
**********************************************************************
**S100 YEAR 24HR STORM DEVELOPED CONDITION
RAINFALL              TYPE=2  0.0  1.87  2.20  2.66    DT=0.05

               COMPUTED 24-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2 - PEAK AT 1.40 HR.
               DT =    .050000 HOURS       END TIME =    24.000000 HOURS
                  .0000   .0025   .0050   .0076   .0103   .0131   .0160
                  .0190   .0222   .0254   .0289   .0324   .0362   .0401
                  .0443   .0487   .0534   .0584   .0637   .0695   .0758
                 .0837   .0924   .1176   .1773   .2798   .4384   .6668
                 .9790  1.2253  1.3366  1.4295  1.5109  1.5836  1.6495
                1.7096  1.7648  1.8156  1.8624  1.9057  1.9458  1.9548
                1.9631  1.9708  1.9780  1.9848  1.9912  1.9973  2.0031
                2.0087  2.0140  2.0191  2.0240  2.0287  2.0333  2.0377
                2.0420  2.0462  2.0502  2.0542  2.0580  2.0617  2.0653
                2.0689  2.0724  2.0757  2.0791  2.0823  2.0855  2.0886
                2.0916  2.0946  2.0976  2.1005  2.1033  2.1061  2.1088
                2.1115  2.1142  2.1168  2.1193  2.1219  2.1244  2.1268
                2.1293  2.1316  2.1340  2.1363  2.1386  2.1409  2.1431
                2.1453  2.1475  2.1497  2.1518  2.1539  2.1560  2.1580
                2.1601  2.1621  2.1641  2.1660  2.1680  2.1699  2.1718
                2.1737  2.1756  2.1774  2.1793  2.1811  2.1829  2.1847
                2.1864  2.1882  2.1899  2.1916  2.1933  2.1950  2.1967
                2.1984  2.2000  2.2020  2.2039  2.2059  2.2078  2.2097
                2.2117  2.2136  2.2155  2.2174  2.2193  2.2212  2.2231
                2.2249  2.2268  2.2287  2.2305  2.2324  2.2342  2.2361
                2.2379  2.2398  2.2416  2.2434  2.2452  2.2470  2.2488
                2.2506  2.2524  2.2542  2.2559  2.2577  2.2595  2.2612
                2.2630  2.2647  2.2665  2.2682  2.2700  2.2717  2.2734
                2.2751  2.2768  2.2785  2.2802  2.2819  2.2836  2.2853
                2.2870  2.2887  2.2903  2.2920  2.2937  2.2953  2.2970
                2.2986  2.3002  2.3019  2.3035  2.3051  2.3068  2.3084
                2.3100  2.3116  2.3132  2.3148  2.3164  2.3180  2.3196
                2.3212  2.3227  2.3243  2.3259  2.3274  2.3290  2.3305
                2.3321  2.3336  2.3352  2.3367  2.3383  2.3398  2.3413
```

```
2.3428  2.3444  2.3459  2.3474  2.3489  2.3504  2.3519
2.3534  2.3549  2.3563  2.3578  2.3593  2.3608  2.3622
2.3637  2.3652  2.3666  2.3681  2.3695  2.3710  2.3724
2.3739  2.3753  2.3767  2.3782  2.3796  2.3810  2.3824
2.3839  2.3853  2.3867  2.3881  2.3895  2.3909  2.3923
2.3937  2.3951  2.3965  2.3978  2.3992  2.4006  2.4020
2.4033  2.4047  2.4061  2.4074  2.4088  2.4101  2.4115
2.4128  2.4142  2.4155  2.4168  2.4182  2.4195  2.4208
2.4222  2.4235  2.4248  2.4261  2.4274  2.4287  2.4300
2.4314  2.4327  2.4340  2.4352  2.4365  2.4378  2.4391
2.4404  2.4417  2.4430  2.4442  2.4455  2.4468  2.4480
2.4493  2.4506  2.4518  2.4531  2.4543  2.4556  2.4568
2.4581  2.4593  2.4606  2.4618  2.4630  2.4643  2.4655
2.4667  2.4680  2.4692  2.4704  2.4716  2.4728  2.4740
2.4753  2.4765  2.4777  2.4789  2.4801  2.4813  2.4825
2.4837  2.4849  2.4860  2.4872  2.4884  2.4896  2.4908
2.4919  2.4931  2.4943  2.4955  2.4966  2.4978  2.4990
2.5001  2.5013  2.5024  2.5036  2.5047  2.5059  2.5070
2.5082  2.5093  2.5105  2.5116  2.5127  2.5139  2.5150
2.5161  2.5172  2.5184  2.5195  2.5206  2.5217  2.5229
2.5240  2.5251  2.5262  2.5273  2.5284  2.5295  2.5306
2.5317  2.5328  2.5339  2.5350  2.5361  2.5372  2.5383
2.5394  2.5404  2.5415  2.5426  2.5437  2.5448  2.5458
2.5469  2.5480  2.5490  2.5501  2.5512  2.5522  2.5533
2.5544  2.5554  2.5565  2.5575  2.5586  2.5596  2.5607
2.5617  2.5628  2.5638  2.5649  2.5659  2.5669  2.5680
2.5690  2.5700  2.5711  2.5721  2.5731  2.5741  2.5752
2.5762  2.5772  2.5782  2.5792  2.5803  2.5813  2.5823
2.5833  2.5843  2.5853  2.5863  2.5873  2.5883  2.5893
2.5903  2.5913  2.5923  2.5933  2.5943  2.5953  2.5963
2.5973  2.5982  2.5992  2.6002  2.6012  2.6022  2.6031
2.6041  2.6051  2.6061  2.6070  2.6080  2.6090  2.6099
2.6109  2.6119  2.6128  2.6138  2.6148  2.6157  2.6167
2.6176  2.6186  2.6195  2.6205  2.6214  2.6224  2.6233
2.6243  2.6252  2.6261  2.6271  2.6280  2.6290  2.6299
2.6308  2.6318  2.6327  2.6336  2.6346  2.6355  2.6364
2.6373  2.6383  2.6392  2.6401  2.6410  2.6419  2.6428
2.6438  2.6447  2.6456  2.6465  2.6474  2.6483  2.6492
2.6501  2.6510  2.6519  2.6528  2.6537  2.6546  2.6555
2.6564  2.6573  2.6582  2.6591  2.6600

** 10 YEAR 24HR STORM DEVELOPED CONDITION
**RAINFALL            TYPE=2  0.0  1.25  1.47  1.77    DT=0.05
**  2 YEAR 24HR STORM DEVELOPED CONDITION
**RAINFALL            TYPE=2  0.0  0.74  0.95  1.15    DT=0.05
*****************************************************************************
    *LH****************************** Set time to start ******************
*LH**
*LH*START                TIME = 0.0
*LH**
*LH****** COMPUTE RAINFALL DISTRIBUTION
```

```
*LH**
*LH*RAINFALL              TYPE=2
*LH*                      RAIN QUARTER=0.0        RAIN ONE = 1.90 IN
*LH*                      RAIN SIX=2.21 IN        RAIN DAY = 2.67 IN
*LH*                      DT=0.075
*LH****** SEDIMENT BULKING FACTOR = 5%
*LH**
*LH**SEDIMENT BULK        CODE=1   BULK FACTOR=1.05
*
*   THE FOLOWING IS TO DETERMINE THE FLOW INTO THE AMOLE DEL NORTE CHANNEL
*   FROM THE SAGE ROAD STORM DRAIN LINE.
*
***** BASIN S6-D
*
COMPUTE NM HYD       ID=3  HYD NO=S6-D&AP#35 DRAINAGE AREA=.0378  SQ MI
                     PERCENT A=0 PERCENT B=40 PERCENT C=0 PERCENT D=60
                     TP=.31 HRS
                     MASSRAINFALL=-1

    K =   .168950HR    TP =   .310000HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   38.503    CFS   UNIT VOLUME =    .9997       B =   526.28      P60 = 1.8700
    AREA =      .022680 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .050000

    K =   .304632HR    TP =   .310000HR    K/TP RATIO =   .982685     SHAPE CONSTANT, N =  3.593450
    UNIT PEAK =   15.953    CFS   UNIT VOLUME =    .9992       B =   327.09      P60 = 1.8700
    AREA =      .015120 SQ MI    IA =    .50000 INCHES    INF =   1.25000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .050000

*   TOTAL FLOW AT AP#35
PRINT HYD            ID=3  CODE=1

                                   HYDROGRAPH FROM AREA S6-D&AP#35


    RUNOFF VOLUME =     1.72289 INCHES     =       3.4733 ACRE-FEET
    PEAK DISCHARGE RATE =      51.00 CFS  AT   1.700 HOURS   BASIN AREA =   .0378 SQ. MI.


*
***** ROUTE FLOW AT AP#35 TO AP#36 THROUGH PIPE IN SAGE RD.
*
COMPUTE RATING CURVE ID=1  VS NO=1  CODE=-1 SLP=0.0055 DIA=3.5 FT N=0.015

                                 RATING CURVE PIPE SECTION  1.0
                                     WATER       FLOW        FLOW        MAX
                                    SURFACE      AREA        RATE        WIDTH
                                     ELEV        SQ FT       CFS         FT
                                      .00         .00         .00         .00
```

.18	.19	.34	1.56
.36	.53	1.47	2.14
.55	.96	3.42	2.54
.73	1.45	6.16	2.84
.91	1.99	9.61	3.07
1.09	2.57	13.72	3.25
1.28	3.17	18.38	3.37
1.46	3.80	23.49	3.45
1.64	4.43	28.96	3.49
1.82	5.07	34.66	3.50
2.01	5.70	40.47	3.50
2.19	6.33	46.24	3.50
2.37	6.94	51.82	3.50
2.55	7.52	57.05	3.50
2.74	8.07	61.73	3.50
2.92	8.57	65.63	3.50
3.10	9.01	68.42	3.50
3.28	9.37	69.56	3.50
3.50	9.62	69.56	3.50

```
COMPUTE TRAVEL TIME ID=2  REACH=1  NO VS=1
                    L=1100  SLP=0.0055
```

TRAVEL TIME TABLE

REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.182	.191	.34	.1723
.365	.532	1.47	.1104
.547	.961	3.42	.0858
.730	1.453	6.16	.0721
.912	1.994	9.61	.0634
1.094	2.571	13.72	.0573
1.277	3.175	18.38	.0528
1.459	3.797	23.49	.0494
1.641	4.431	28.96	.0467
1.824	5.069	34.66	.0447
2.006	5.704	40.47	.0431
2.189	6.330	46.24	.0418
2.371	6.938	51.82	.0409
2.553	7.520	57.05	.0403
2.736	8.069	61.73	.0399
2.918	8.571	65.63	.0399
3.101	9.014	68.42	.0403
3.283	9.374	69.56	.0412
3.500	9.621	69.56	.0423

```
ROUTE          ID=2    HYD NO=AP#35R
               INFLOW=3 DT=0.0
PRINT HYD      ID=2  CODE=1
```

```
                                   HYDROGRAPH FROM AREA AP#35R

    RUNOFF VOLUME =      1.72289 INCHES      =        3.4733 ACRE-FEET
    PEAK DISCHARGE RATE =       50.09 CFS  AT   1.700 HOURS   BASIN AREA =   .0378 SQ. MI.


*
***** BASIN S7-D
COMPUTE NM HYD       ID=3  HYD NO=S7-D DRAINAGE AREA=.0570  SQ MI
                     PERCENT A=0 PERCENT B=29 PERCENT C=0 PERCENT D=71
                     TP=.46 HRS
                     MASSRAINFALL=-1

    K =   .250700HR    TP =   .460000HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106437
    UNIT PEAK =   46.301    CFS   UNIT VOLUME =    .9997       B =   526.28      P60 = 1.8700
    AREA =      .040470 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .050000


    K =   .452035HR    TP =   .460000HR    K/TP RATIO =   .982685     SHAPE CONSTANT, N =  3.593454
    UNIT PEAK =   11.754    CFS   UNIT VOLUME =    .9988       B =   327.09      P60 = 1.8700
    AREA =      .016530 SQ MI    IA =    .50000 INCHES    INF =   1.25000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .050000

PRINT HYD            ID=3  CODE=1

                                   HYDROGRAPH FROM AREA S7-D

    RUNOFF VOLUME =      1.91658 INCHES      =        5.8264 ACRE-FEET
    PEAK DISCHARGE RATE =       65.54 CFS  AT   1.850 HOURS   BASIN AREA =   .0570 SQ. MI.


*
***** ADD HYDROGRAPHS S6-D, S7-D
ADD HYD              ID=10  HYD NO=AP#36  ID I=2  ID II=3
*
*   TOTAL FLOW AT AP#36
PRINT HYD            ID=10  CODE=1

                                   HYDROGRAPH FROM AREA AP#36

    RUNOFF VOLUME =      1.83933 INCHES      =        9.2996 ACRE-FEET
    PEAK DISCHARGE RATE =      110.86 CFS  AT   1.800 HOURS   BASIN AREA =   .0948 SQ. MI.
```

```
*
***** ROUTE FLOW AT AP#36 TO AP#37 THROUGH PIPE IN SAGE RD.
COMPUTE RATING CURVE ID=1  VS NO=1  CODE=-1 SLP=0.005 DIA=4.5 FT N=0.015
```

RATING CURVE PIPE SECTION 1.0

WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	MAX WIDTH FT
.00	.00	.00	.00
.23	.32	.63	2.00
.47	.88	2.74	2.75
.70	1.59	6.38	3.27
.94	2.40	11.47	3.66
1.17	3.30	17.91	3.95
1.41	4.25	25.56	4.17
1.64	5.25	34.25	4.33
1.88	6.28	43.78	4.44
2.11	7.32	53.97	4.49
2.35	8.38	64.60	4.50
2.58	9.43	75.41	4.50
2.81	10.46	86.17	4.50
3.05	11.47	96.58	4.50
3.28	12.43	106.32	4.50
3.52	13.34	115.05	4.50
3.75	14.17	122.31	4.50
3.99	14.90	127.50	4.50
4.22	15.50	129.64	4.50
4.50	15.90	129.64	4.50

```
COMPUTE TRAVEL TIME ID=2  REACH=1  NO VS=1
                    L1500  SLP=0.005
```

TRAVEL TIME TABLE

REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.235	.316	.63	.2084
.469	.880	2.74	.1335
.704	1.588	6.38	.1037
.938	2.402	11.47	.0872
1.173	3.296	17.91	.0767
1.407	4.249	25.56	.0693
1.641	5.248	34.25	.0638
1.876	6.277	43.78	.0597
2.111	7.325	53.97	.0565
2.345	8.380	64.60	.0541
2.579	9.430	75.41	.0521
2.814	10.463	86.17	.0506
3.049	11.468	96.58	.0495
3.283	12.432	106.32	.0487

```
                                3.518      13.338      115.05       .0483
                                3.752      14.169      122.31       .0483
                                3.987      14.900      127.50       .0487
                                4.221      15.495      129.64       .0498
                                4.500      15.904      129.64       .0511
ROUTE                  ID=2    HYD NO=AP#36R
                       INFLOW=10 DT=0.0
PRINT HYD              ID=2  CODE=1

                                    HYDROGRAPH FROM AREA AP#36R


    RUNOFF VOLUME =      1.83934 INCHES      =        9.2997 ACRE-FEET
    PEAK DISCHARGE RATE =      108.65 CFS  AT   1.850 HOURS   BASIN AREA =   .0948 SQ. MI.


*
***** BASIN S8-D
COMPUTE NM HYD         ID=3  HYD NO=S8-D DRAINAGE AREA=.0683  SQ MI
                       PERCENT A=0 PERCENT B=37 PERCENT C=0 PERCENT D=63
                       TP=.39 HRS
                       MASSRAINFALL=-1

    K =    .212838HR     TP =    .390000HR     K/TP RATIO =    .545738     SHAPE CONSTANT, N =  7.094126
    UNIT PEAK =    58.001     CFS   UNIT VOLUME =     .9999       B =   525.70      P60 = 1.8700
    AREA =       .043029 SQ MI     IA =     .10000 INCHES     INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .050000


    K =    .382441HR     TP =    .390000HR     K/TP RATIO =    .980618     SHAPE CONSTANT, N =  3.601171
    UNIT PEAK =    21.230     CFS   UNIT VOLUME =     .9993       B =   327.64      P60 = 1.8700
    AREA =       .025271 SQ MI     IA =     .50000 INCHES     INF =   1.25000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .050000

PRINT HYD              ID=3  CODE=1

                                    HYDROGRAPH FROM AREA S8-D


    RUNOFF VOLUME =      1.77571 INCHES      =        6.4683 ACRE-FEET
    PEAK DISCHARGE RATE =       81.37 CFS  AT   1.750 HOURS   BASIN AREA =   .0683 SQ. MI.


*
***** ADD HYDROGRAPHS S6-D, S7-D, S8-D
ADD HYD                ID=10  HYD NO=AP#37  ID I=2  ID II=3
*
*   TOTAL FLOW AT AP#37
PRINT HYD              ID=10  CODE=1
```

HYDROGRAPH FROM AREA AP#37

RUNOFF VOLUME = 1.81269 INCHES = 15.7679 ACRE-FEET
PEAK DISCHARGE RATE = 189.29 CFS AT 1.800 HOURS BASIN AREA = .1631 SQ. MI.

*
***** ROUTE FLOW AT AP#37 TO AP#38 THROUGH PIPE IN SAGE RD.
COMPUTE RATING CURVE ID=1 VS NO=1 CODE=-1 SLP=0.035 DIA=4.0 FT N=0.015

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	1.22	1.78
.42	.69	5.30	2.44
.63	1.25	12.33	2.91
.83	1.90	22.17	3.25
1.04	2.60	34.62	3.51
1.25	3.36	49.40	3.71
1.46	4.15	66.18	3.85
1.67	4.96	84.62	3.94
1.88	5.79	104.31	3.99
2.08	6.62	124.84	4.00
2.29	7.45	145.74	4.00
2.50	8.27	166.53	4.00
2.71	9.06	186.64	4.00
2.92	9.82	205.48	4.00
3.13	10.54	222.34	4.00
3.34	11.20	236.37	4.00
3.54	11.77	246.41	4.00
3.75	12.24	250.53	4.00
4.00	12.57	250.53	4.00

COMPUTE TRAVEL TIME ID=2 REACH=1 NO VS=1
L=1500 SLP=0.035

TRAVEL TIME TABLE
REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.208	.250	1.22	.0852
.417	.695	5.30	.0546
.625	1.255	12.33	.0424
.834	1.898	22.17	.0357
1.042	2.604	34.62	.0313
1.251	3.358	49.40	.0283

```
                    1.459      4.146      66.18      .0261
                    1.668      4.960      84.62      .0244
                    1.876      5.788     104.31      .0231
                    2.084      6.621     124.84      .0221
                    2.293      7.451     145.74      .0213
                    2.501      8.267     166.53      .0207
                    2.710      9.062     186.64      .0202
                    2.918      9.823     205.48      .0199
                    3.127     10.539     222.34      .0197
                    3.335     11.195     236.37      .0197
                    3.544     11.773     246.41      .0199
                    3.752     12.243     250.53      .0204
                    4.000     12.566     250.53      .0209
ROUTE          ID=2    HYD NO=AP#37R
               INFLOW=10 DT=0.0
PRINT HYD      ID=2  CODE=1

                    HYDROGRAPH FROM AREA AP#37R

    RUNOFF VOLUME =     1.81269 INCHES     =      15.7679 ACRE-FEET
    PEAK DISCHARGE RATE =     188.47 CFS  AT   1.800 HOURS   BASIN AREA =   .1631 SQ. MI.


*
***** BASIN S9-D
COMPUTE NM HYD      ID=3  HYD NO=S9-D DRAINAGE AREA=.0748  SQ MI
                    PERCENT A=0 PERCENT B=50 PERCENT C=0 PERCENT D=50
                    TP=.13 HRS
                    MASSRAINFALL=-1

    K =   .071054HR    TP =   .130000HR    K/TP RATIO =   .546565     SHAPE CONSTANT, N =  7.080365
    UNIT PEAK =   151.05    CFS   UNIT VOLUME =    .9993       B =   525.05      P60 = 1.8700
    AREA =      .037400 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .050000


    K =   .127179HR    TP =   .130000HR    K/TP RATIO =   .978302     SHAPE CONSTANT, N =  3.609883
    UNIT PEAK =   94.439    CFS   UNIT VOLUME =    1.001       B =   328.26      P60 = 1.8700
    AREA =      .037400 SQ MI    IA =    .50000 INCHES    INF =   1.25000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .050000

PRINT HYD           ID=3  CODE=1

                    HYDROGRAPH FROM AREA S9-D

    RUNOFF VOLUME =     1.54680 INCHES     =       6.1707 ACRE-FEET
    PEAK DISCHARGE RATE =     152.95 CFS  AT   1.500 HOURS   BASIN AREA =   .0748 SQ. MI.
```

```
*
***** ADD HYDROGRAPHS S6-D, S7-D, S8-D, S9-D
ADD HYD              ID=20  HYD=TS3_DMP.HYD  ID I=2  ID II=3
*
*   TOTAL FLOW AT AP#38
PUNCH HYD            ID=20
PRINT HYD            ID=20  CODE=1

                                        HYDROGRAPH FROM AREA TS3_DMP.HYD


    RUNOFF VOLUME =      1.72909 INCHES      =       21.9385 ACRE-FEET
    PEAK DISCHARGE RATE =     235.52 CFS  AT   1.750 HOURS   BASIN AREA =   .2379 SQ. MI.
*
FINISH

    NORMAL PROGRAM FINISH          END TIME (HR:MIN:SEC) = 11:30:11
```

```
START                 0.0 HOURS   PC=0  PL=-1
*S
*S       SUNRISE ESTATES
*S
*S
*S 100YR 24-HR STORM WITHOUT SEDIMENT
*S FILE NAME: DN_DMP.DAT
*S BY: RICHARD STOCKTON  PEER REVIEWED BY:
*S LAST REVISION: 4-20-98
*************************************************************************
*S THE PURPOSE OF THIS MODEL IS TO CALCULATE THE RUNOFF FROM AREA TRIBUTORY TO
*S THE AMOLE DEL NORTE CHANNEL.  THE OUTFLOW HYDROGRAPH FROM THIS MODEL WILL
*S BE USED IN THE AMOLE DEL NORTE MODEL AN_DMP.DAT.
*********************************************************************
*S ANALYSIS ASSUMPTIONS:
*********************************************************************
*S 1. ALL LAND IN THIS BASIN IS MODELED AS DEVELOPED CONDITION.
*S
**********************************************************************
**S PMP 24HR GENERAL STORM DEVELOPED CONDITION
**RAINFALL                TYPE=4  0.0  5.25  11.08  17.73    DT=0.05
*S100 YEAR 24HR STORM DEVELOPED CONDITION
RAINFALL                  TYPE=2  0.0  1.87  2.20  2.66    DT=0.05
** 10 YEAR 24HR STORM DEVELOPED CONDITION
**RAINFALL                TYPE=2  0.0  1.25  1.47  1.77    DT=0.05
**  2 YEAR 24HR STORM DEVELOPED CONDITION
**RAINFALL                TYPE=2  0.0  0.74  0.95  1.15    DT=0.05
**********************************************************************
* THIS FILE WAS OBTAINED BY LH FROM FRED ARFMAN ON JAN 3, 1996 FOR OUR USE IN
* THE AMOLE DMP.  THIS FILE REFLECTS DEVELOPED CONDITIONS OF THE NORTHLY HALF
* OF THE SOUTH AMOLE DEL NORTE BASIN OF THE AMOLE DEL NORTE WATERSHED.
* THIS FLIE HAS BEEN RENAMED FROM SUNRISE.DAT TO DN_DMP.DAT INDICATING THE
* 100YR, 24HR EVENT UNDER FULLY DEVELOPED CONDITIONS.
* THE PUNCH HYD COMMAND WAS ADDED TO THE END OF THIS FILE SO THE OUTFALL
* HYDROGRAPH COULD BE USED IN THE ANALYSIS OF THE AMOLE DEL NORTE SYSTEM.
*
**********************************************************************
**S                     SUNRISE.DAT
**S                     REVISED BY: JMN 6/04/97
**
**START                 RAINFALL BEGINS AT 0.0 HRS
**RAINFALL              TYPE=2 RAIN QUARTER=0 RAIN ONE=1.87
**                      RAIN SIX=2.20 RAIN DAY=2.66 DT=0.05HR
*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
PRINT HYD            ID=1   CODE=1
*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
PRINT HYD            ID=2   CODE=1
ADD HYD              ID=3 HYD NO=101.01 ID=1 ID=2
PRINT HYD            ID=3 CODE=1
*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
PRINT HYD            ID=4   CODE=1
*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
COMPUTE TRAVEL TIME  ID=5 REACH NO=1 NO VS=1 L=650 FT SLP=0.02
ROUTE                ID=5 HYD NO=102.1 INFLOW ID=4 DT=0.0
```

```
**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
**                     TP=-0.1333 HR   MASS RAIN=-1
**PRINT HYD            ID=13   CODE=1
***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
**                     TP=-0.1333 HR   MASS RAIN=-1
**PRINT HYD            ID=14   CODE=1
***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
**                     TP=-0.1333 HR  MASS RAIN=-1
**PRINT HYD            ID=15  CODE=1
**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
PRINT HYD            ID=16   CODE=1
*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
PRINT HYD            ID=17   CODE=1
*S **COMBINE BASINS 500 AND 501 TOGETHER TO REPRESENT THE NORTHERN PART OF THE
*S **LONGFORD SD
ADD HYD              ID=18  HYD NO=DN2_DMP.HYD ID I=16  ID II=17
PRINT HYD            ID=18  CODE=1
PUNCH HYD            ID=18
*S **BASIN 502 IS THE SOUTHERN PART OF THE LONGFORD SD
COMPUTE NM HYD       ID=19 HYD NO=DN3_DMP.HYD AREA=0.05788 SQ MI
                     PER A=0 PER B=28 PER C=28 PER D=44
                     TP=-0.1333 HR   MASS RAIN=-1
PRINT HYD            ID=19  CODE=1
PUNCH HYD            ID=19
*S **BASIN 503 IS CURRENTLY UNDEVELOPED, ASSUME FUTURE DEVELOPMENT WILL BE @
*S **A DENSITY OF 4 DU/AC. THE DISCHARGE FROM THIS BASIN DRAINS TO THE AMOLE
*S DEL NORTE CHANNEL AND DOES NOT AFFECT THE ARENAL/UNSER DRAINAGE MANAGEMENT
*S SITE.
COMPUTE NM HYD       ID=20 HYD NO=DN1_DMP.HYD AREA=0.03752 SQ MI
                     PER A=0 PER B=29 PER C=29 PER D=42
                     TP=-0.1333 HR   MASS RAIN=-1
PRINT HYD            ID=20  CODE=1
PUNCH HYD            ID=20
*S************************************************************************
*S **BASIN 504 IS CURRENTLY UNDEVELOPED, ASSUME FUTURE DEVELOPMENT WILL BE @
*S **A DENSITY OF 4 DU/AC. THE DISCHARGE FROM THIS BASIN TRAVEL ALONG SAGE RD.
*S AND ENTERS THE AMOLE DEL NORTE CHANNEL, DOES NOT AFFECT THE ARENAL/UNSER
*S DRAINAGE MANAGEMENT SITE.
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
PRINT HYD            ID=1  CODE=1
*S **BASIN 505 IS FULLY DEVELOPED AND DRAINS SOUTH TO BLAKE RD..DISCHARGE FROM
*S THIS BASIN DOES NOT AFFECT THE ARENAL/UNSER DRAINAGE MANAGEMENT SITE.

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
PRINT HYD            ID=2   CODE=1
FINISH
```

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AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994          RUN DATE (MON/DAY/YR) =07/18/2001
INPUT FILE = DN_DMP.DAT                                                                   USER NO.= M_GOODWN.I01
                                FROM  TO                    PEAK        RUNOFF              TIME TO    CFS      PAGE =   1
                   HYDROGRAPH   ID    ID        AREA     DISCHARGE     VOLUME      RUNOFF     PEAK     PER
COMMAND         IDENTIFICATION  NO.   NO.     (SQ MI)     (CFS)       (AC-FT)    (INCHES)   (HOURS)   ACRE     NOTATION
START                                                                                                        TIME=        .00
*S       SUNRISE ESTATES
*S 100YR 24-HR STORM WITHOUT SEDIMENT
*S FILE NAME: DN_DMP.DAT
*S BY: RICHARD STOCKTON  PEER REVIEWED BY:
*S LAST REVISION: 4-20-98
*S THE PURPOSE OF THIS MODEL IS TO CALCULATE THE RUNOFF FROM AREA TRIBUTORY TO
*S THE AMOLE DEL NORTE CHANNEL.  THE OUTFLOW HYDROGRAPH FROM THIS MODEL WILL
*S BE USED IN THE AMOLE DEL NORTE MODEL AN_DMP.DAT.
*S ANALYSIS ASSUMPTIONS:
*S 1. ALL LAND IN THIS BASIN IS MODELED AS DEVELOPED CONDITION.
*S
*S100 YEAR 24HR STORM DEVELOPED CONDITION
RAINFALL  TYPE= 2                                                                                            RAIN24=    2.660
*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       147.19       5.691      1.49238    1.500    3.217 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        60.32       2.249      1.13994    1.500    2.547 PER IMP=  29.00
ADD HYD               101.01  1& 2   3        .10850       207.51       7.940      1.37218    1.500    2.988
*S **AREA 102 IS A MIDDLE SCHOOL (ONSITE DETENTION TO REDUCE RUNOFF)
COMPUTE NM HYD        102.00   -     4        .04000        32.91        .937       .43936    1.500    1.286 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        33.70        .937       .43939    1.550    1.316
*S ADD THE ROUTED FLOW FROM 102 TO THE EARLIER TOTAL
ADD HYD               102.30  3& 5    6        .14850       235.06       8.878      1.12092    1.500    2.473
*S **BASIN 103 IS COMPLETELY DEVELOPED
COMPUTE NM HYD        103.00   -     7        .04400        71.73       2.675      1.13994    1.500    2.547 PER IMP=  29.00
*S ADD 103 TO TOTAL
ADD HYD               103.10  6& 7   8        .19250       306.78      11.553      1.12527    1.500    2.490
*S **ASSUME FLOW IS ROUTED IN 28' STREET AS EARLIER
ROUTE                 103.20    8    9        .19250       289.23      11.553      1.12527    1.550    2.348
*S **AREA 104 IS FULLY DEVELOPED
COMPUTE NM HYD        104.00   -    10        .04400        71.73       2.675      1.13994    1.500    2.547 PER IMP=  29.00
*S ADD THE FLOW TO THE TOTAL
ADD HYD               104.01  9&10   11        .23650       354.76      14.228      1.12800    1.550    2.344
*S AREA 105 IS A PARK & COA WELL SITE
COMPUTE NM HYD        105.00   -    12        .02100        28.93        .884       .78962    1.500    2.153 PER IMP=   7.00
ADD HYD               105.10 11&12  13        .25750       381.87      15.112      1.10040    1.550    2.317
*S ROUTE THE FLOW TO THE EXISTING END OF SAPPHIRE ST.
ROUTE                 105.20   13   14        .25750       349.48      15.112      1.10040    1.600    2.121
*S AREA 106 IS FULLY DEVELOPED
COMPUTE NM HYD        106.00   -    15        .02177        35.50       1.324      1.13994    1.500    2.548 PER IMP=  29.00
*S BASIN 300.1 IS CURRENTLY UNDEVELOPED, ASSUME FUTURE DEVELOPMENT WILL BE @
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*S A DENSITY OF 4 DU/AC
COMPUTE NM HYD        300.10   -    16        .01560        32.12       1.242      1.49238    1.500    3.217 PER IMP=  42.00
*S **ADD THE FLOWS FROM BASINS 106 AND 300.1
ADD HYD               106.10 15&16  17        .03737        67.62       2.565      1.28705    1.500    2.827
*S **TOTAL FLOW IN SAPHIRE ST AT ANALYSIS POINT A
ADD HYD               106.15 14&17  18        .29487       398.10      17.677      1.12406    1.600    2.110
*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        23.19        .896      1.49238    1.500    3.218 PER IMP=  42.00
*S  **ADD THE FLOWS FROM HYDROGRAPH NO 401.12 AND 106.15
ADD HYD               401.13 19&18  20        .30613       414.48      18.574      1.13760    1.600    2.116
*S  **BASIN 300.2 IS CURRENTLY UNDEVELOPED, ASSUME FUTURE DEVELOPMENT WILL BE
*S  @ A DENSITY OF 4 DU/AC
COMPUTE NM HYD        300.20   -     1        .01180        24.30        .939      1.49238    1.500    3.218 PER IMP=  42.00
*S ** BASIN 401.14 IS PART OF SUNRISE ESTATES UNIT 1
COMPUTE NM HYD        401.14   -     2        .01117        23.00        .889      1.49238    1.500    3.218 PER IMP=  42.00
*S  **ADD FLOWS FROM HYDROGRAPH NO 401.14 AND 300.2
ADD HYD               401.15  1& 2   3        .02297        47.30       1.828      1.49235    1.500    3.218
*S **ADD FLOWS FROM HYDROGRAPH NO 401.15 AND 401.13
ADD HYD               401.16  3&20   4        .32910       454.89      20.402      1.16236    1.550    2.160
*S **BASIN 401.17 IS PART OF SUNRISE ESTATES UNIT 1
COMPUTE NM HYD        401.17   -     5        .00661        13.62        .526      1.49238    1.500    3.219 PER IMP=  42.00
*S  **ADD FLOWS FROM HYDROGRAPH NO 401.16 AND 401.17
ADD HYD               401.18  4& 5   6        .33571       467.09      20.928      1.16886    1.550    2.174
*S ** BASIN 405 DRAINS TO SAPPHIRE ST.
COMPUTE NM HYD        405.00   -     7        .01393        29.03       1.133      1.52461    1.500    3.255 PER IMP=  44.00
*S  **ADD FLOWS FROM HYDROGRAPH NO 401.18 AND 405
ADD HYD               405.10  6& 7   8        .34964       493.06      22.061      1.18304    1.550    2.203
*S ** BASIN 403 DRAINS TO SAPPHIRE ST.
COMPUTE NM HYD        403.00   -     9        .01480        30.48       1.178      1.49238    1.500    3.217 PER IMP=  42.00
*S  **ADD FLOWS FROM HYDROGRAPH NO 405.1 AND 403
ADD HYD               405.15  8& 9  10        .36444       520.36      23.239      1.19560    1.550    2.231
*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        67.09       2.619      1.52461    1.500    3.254 PER IMP=  44.00
*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               405.16 10&11  12        .39666       580.37      25.858      1.22232    1.550    2.286
*S*************************************************************************
*S*************************************************************************
*S **BASINS 200,201, & 202 DRAIN TO KIMELA DR
COMPUTE NM HYD        200.00   -    13        .05300        86.39       3.222      1.13994    1.500    2.547 PER IMP=  29.00
*S **ROUTE FLOW TO THE END OF KIMELA DR.
ROUTE                 200.10   13   14        .05300        85.06       3.222      1.13995    1.550    2.508
COMPUTE NM HYD        201.00   -    15        .02600        42.39       1.581      1.13994    1.500    2.547 PER IMP=  29.00
ADD HYD               201.10 15&14  16        .07900       124.93       4.803      1.13993    1.500    2.471
*S **BASIN 202 IS AN ELEMENTARY SCHOOL (ONSITE DETENTION TO REDUCE RUNOFF)
COMPUTE NM HYD        202.00   -    17        .00925         7.62        .217       .43936    1.500    1.286 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        10.31        .485      2.42724    1.500    4.299 PER IMP= 100.00
*S **ADD THE BASINS OF THE ELEMENTARY SCHOOL AND PARKING LOT
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ADD HYD              202.06 17&18  19        .01300        17.93        .702      1.01230    1.500    2.155
*S **ADD THE BASINS TOGETHER TO GET THE FLOW IN KIMELA DR @ ANALYSIS PT C
ADD HYD              202.10 16&19  20        .09200       142.86       5.505      1.12190    1.500    2.426
*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       107.04       4.139      1.49238    1.500    3.216 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       249.90       9.644      1.25568    1.500    2.712
COMPUTE NM HYD       404.00   -     8        .01080        22.24        .860      1.49238    1.500    3.218 PER IMP=  42.00
*S **ADD FLOW TO THAT IN KIMELA DR
ADD HYD              404.10  7& 8   9        .15480       272.15      10.503      1.27219    1.500    2.747
*S **ADD TO FLOW IN SAPPHIRE @ ANALYSIS PT D
ADD HYD              404.20  9&12  10        .55146       836.34      36.362      1.23632    1.550    2.370
*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       190.05      36.362      1.23632    1.950     .538 AC-FT=   18.139
*S ROUTE FLOW FROM THE DETENTION POND TO THE AMOLE DEL NORTE CHANNEL
ROUTE            DN4_DMP.HYD   11   12        .55146       190.05      36.362      1.23632    2.000     .538
*S
*S HYD=DN4_DMP.HYD IS THE FLOW INTO THE AMOLE DEL NORTE AT ARENAL
*S*****************************************************************************
*S*****************************************************************************
*S **BASIN 500 IS UNIT ONE OF THE PROPOSED LONGFORD SD
COMPUTE NM HYD       500.00   -    16        .02491        51.27       1.982      1.49238    1.500    3.217 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        75.41       2.916      1.49238    1.500    3.217 PER IMP=  42.00
*S **COMBINE BASINS 500 AND 501 TOGETHER TO REPRESENT THE NORTHERN PART OF THE
*S **LONGFORD SD
ADD HYD          DN2_DMP.HYD 16&17  18        .06154       126.68       4.898      1.49237    1.500    3.217
*S **BASIN 502 IS THE SOUTHERN PART OF THE LONGFORD SD
COMPUTE NM HYD   DN3_DMP.HYD   -    19        .05788       120.52       4.706      1.52461    1.500    3.254 PER IMP=  44.00
*S **BASIN 503 IS CURRENTLY UNDEVELOPED, ASSUME FUTURE DEVELOPMENT WILL BE @
*S **A DENSITY OF 4 DU/AC. THE DISCHARGE FROM THIS BASIN DRAINS TO THE AMOLE
*S DEL NORTE CHANNEL AND DOES NOT AFFECT THE ARENAL/UNSER DRAINAGE MANAGEMENT
*S SITE.
COMPUTE NM HYD   DN1_DMP.HYD   -    20        .03752        77.24       2.986      1.49238    1.500    3.217 PER IMP=  42.00
*S*****************************************************************************
*S **BASIN 504 IS CURRENTLY UNDEVELOPED, ASSUME FUTURE DEVELOPMENT WILL BE @
*S **A DENSITY OF 4 DU/AC. THE DISCHARGE FROM THIS BASIN TRAVEL ALONG SAGE RD.
*S AND ENTERS THE AMOLE DEL NORTE CHANNEL, DOES NOT AFFECT THE ARENAL/UNSER
*S DRAINAGE MANAGEMENT SITE.
COMPUTE NM HYD       504.00   -     1        .03667        76.36       2.982      1.52461    1.500    3.254 PER IMP=  44.00
*S **BASIN 505 IS FULLY DEVELOPED AND DRAINS SOUTH TO BLAKE RD..DISCHARGE FROM
*S THIS BASIN DOES NOT AFFECT THE ARENAL/UNSER DRAINAGE MANAGEMENT SITE.
COMPUTE NM HYD       505.00   -     2        .02618        42.68       1.592      1.13994    1.500    2.547 PER IMP=  29.00
FINISH
```

City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

November 14, 2002

Diane Hoelzer, P.E.
Mark Goodwin & Assoc.
P.O. Box 90606
Albuquerque, New Mexico 87199

RE: DESERT SAGE SUBDIVISION (M-10/D11A)
Engineers Certification for Release of Financial Guaranty
Engineers Stamp dated 7/30/2001
Engineers Certification dated 10/15/2002

Dear Diane:

Based upon the information provided in your Engineers Certification submittal dated 10/15/2002, the above referenced plan is adequate to satisfy the Grading and Drainage Certification for Release of Financial Guaranty.

If you have any questions, please call me at 924-3981.

Sincerely,

Teresa A. Martin

Teresa A. Martin
Hydrology Plan Checker
Development & Bldg. Ser. Division
3B

c: Arlene Portillo, COA--Project # 670481
File

DRAINAGE AND TRANSPORTATION INFORMATION SHEET

(REV.1/11/2002)

PROJECT TITLE:	Desert Sage Subdivision	ZONE ATLAS#:	M10 / D11A
DRB#:	1000667 EPC#	WORKORDER#:	670481
LEGAL DESCRIPTION	Tract 487-A and 488, Unit 7, Atrisco Grant		
CITY ADDRESS:			

ENGINEERING FIRM:	Mark Goodwin & Associates, PA	CONTACT:	Diane Hoelzer, PE
ADDRESS:	PO Box 90606, ABQ, NM 87199	PHONE:	828-2200
OWNER:	STV Investments	CONTACT:	Tim McNaney
ADDRESS:	400 Gold SW, Ste.700, ABQ, NM 87102	PHONE:	975-1154
ARCHITECT:		CONTACT.	
ADDRESS:		PHONE:	
SURVEYOR:	CSC	CONTACT:	Thomas Patrick
ADDRESS:	4481 Corrales Rd., Corrales, NM 87048	PHONE:	897-0000
CONTRACTOR:	Hydro Systems Inc.	CONTACT:	Lee Smith
ADDRESS:	3809 Atrisco NE Ste. C, ABQ, NM	PHONE:	344-3840

TYPE OF SUBMITTAL:

- ____ DRAINAGE REPORT
- ____ DRAINAGE PLAN
- ____ CONCEPTUAL GRADING & DRAINAGE PLAN
- ____ GRADING PLAN
- ____ EROSION CONTROL PLAN
- X ENGINEER'S CERTIFICATION (HYDROLOGY)
- ____ CLOMR/LOMR
- ____ TRAFFIC CIRCULATION LAYOUT (TCL)
- ____ ENGINEER'S CERTIFICATION (TCL)
- ____ ENGINEER'S CERTIFICATION (DRB APPR. SITE PLAN)
- ____ OTHER

WAS A PRE-DESIGN CONFERENCE ATTENDED:

- ____ YES
- ____ NO
- ____ COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:

- X SIA / FINANCIAL GUARANTY RELEASE
- ____ 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 (PERM)
- ____ CERTIFICATE OF OCCUPANCY (TEMP)
- ____ GRADING PERMIT APPROVAL
- ____ PAVING PERMIT APPROVAL
- ____ WORK ORDER APPROVAL
- ____ OTHER (SPECIFY)

RECEIVED
OCT 15 2002
HYDROLOGY SECTION

DATE SUBMITTED: October 15, 2002

BY: Diane Hoelzer

Diane Hoelzer, PE

Requests for approvals of Site Development Plans and/or Subdivision Plats shall be accompanied by a drainage submittal. The particular nature, location and scope of the proposed development defines the degree of drainage detail. One or more of to the following levels of submittal may be required based on the following:

1. **Conceptual Grading and Drainage Plan:** Required for approval of Site Development Plans greater than five (5).
2. **Drainage Plans:** Required for building permits, grading permits, paving permits and site plans less than five (5)
3. **Drainage Report:** Required for subdivisions containing more than ten (10) lots or constituting five (5) acres or more.

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[redacted]

MARK GOODWIN & ASSOCIATES
CONSULTING ENGINEERS

DRAINAGE REPORT

FOR

Desert Sage Subdivision

(Zone Atlas M-10)

RECEIVED
JUN 04 2001
HYDROLOGY SECTION

DIANE HOELZER
NEW MEXICO
11967
REGISTERED PROFESSIONAL ENGINEER

6-1-01

Mark Goodwin & Associates, PE

JUNE 2001

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I. PROJECT DESCRIPTION

The proposed Desert Sage Subdivision is comprised of approximately 12.3 acres and is proposed to be developed into 85 single family residences. The project site is bounded by Sage Road to the north, developed residential to the south, large acre lot homes to the west and a church and vacant commercial zoned land to the east.

II. DRAINAGE DESIGN CRITERIA AND PREVIOUS REPORTS

The design criteria used in this report was in accordance with Section 22.2 Hydrology of the Development Process Manual, Volume 2, Design Criteria, January 1993 edition. The 100-year 6-hour storm event was analyzed to determine street capacities using P(1 hr) = 1.87", P(6 hr)=2.20". The onsite Land Treatment values used were Treatment D=60, Treatment C=20 and Treatment B=20 as determined using "Table A-5 Percent Treatment D" in the DPM. AHYMO printouts are provided in Appendix A.

III. EXISTING DRAINAGE CONDITIONS

Runoff from the project site is in a general easterly direction. The western half drains at a slope of 1.0 to 2.0 percent. In the southeast corner there is a substantial 9.0 percent drop in grade. There is also remnants of a well defined arroyo that bisects the property. No offsite flows enter the project site from the north, east and south. The area adjacent to the west property boundary is quite flat and there may be some insignificant amounts of runoff entering and exiting at this property boundary.

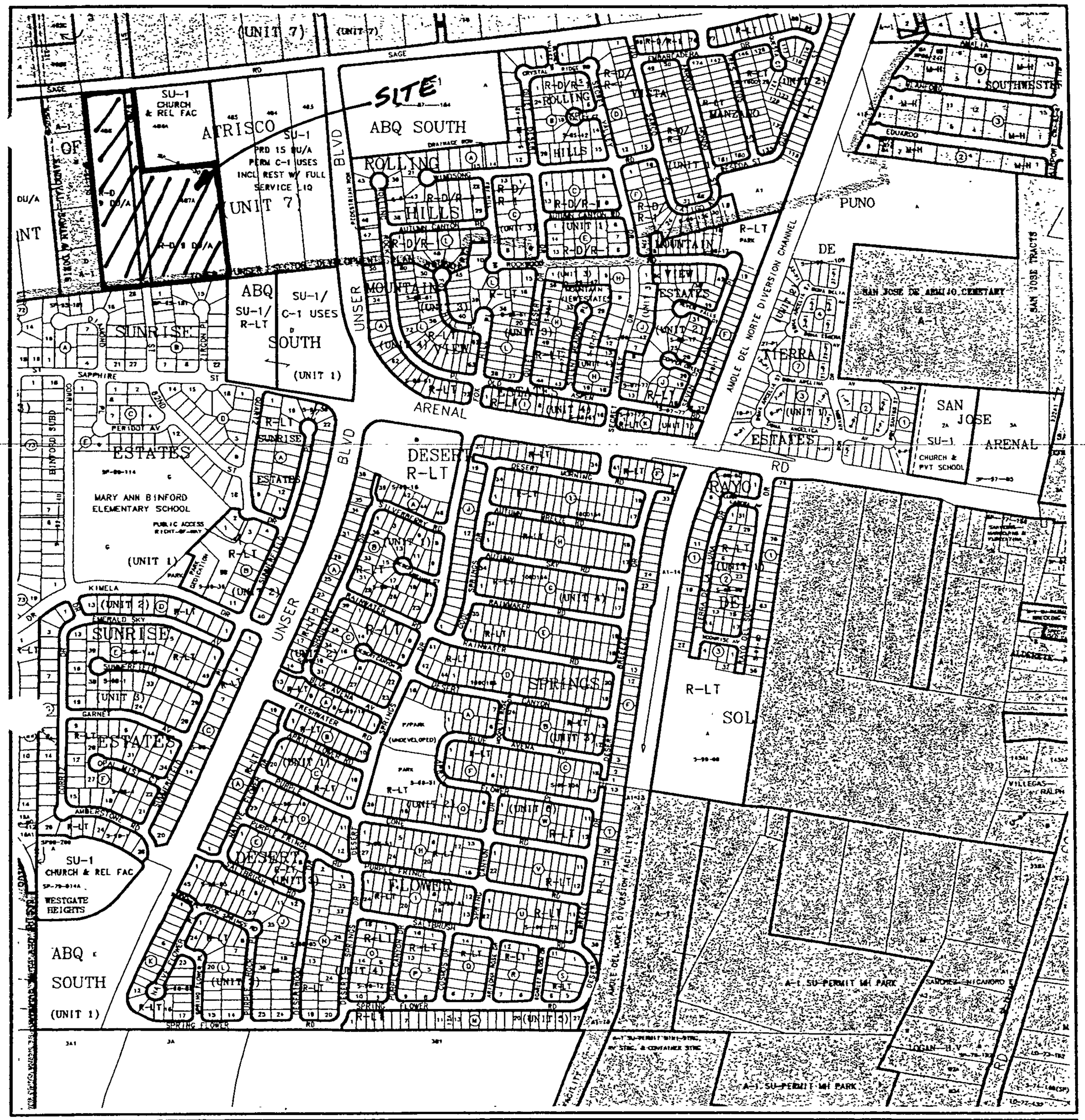
IV. PREVIOUS DRAINAGE REPORTS

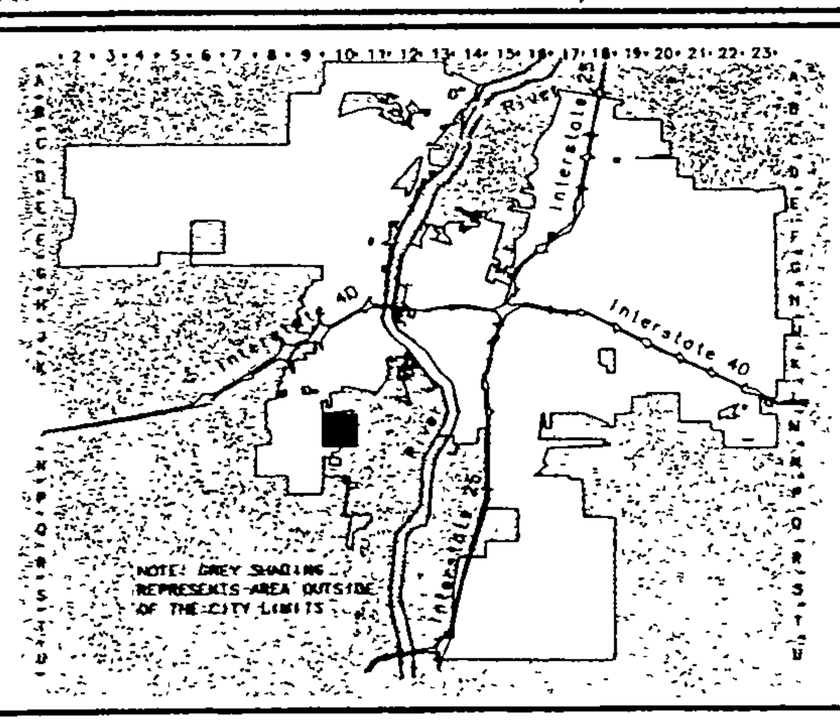
Almost 78 percent of the southern half of the project site is part of the Arenal / Unser Detention Pond master drainage plan as detailed in the "Re-Evaluation of Arenal / Unser Detention Pond for El Rancho Grande I, Units 1, 2 and 3" prepared by Mark Goodwin & Associates, May 12, 2001 (refer to Figure 2). The remaining 22 percent (northern portion) is outside of the Arenal / Unser drainage area as shown.

V. DEVELOPED DRAINAGE CONDITIONS

The proposed drainage plan for this site is to revise the Arenal / Unser Detention Pond master drainage plan to accept runoff from the entire Desert Sage project site as shown in Figure 3. There is excess capacity in the detention pond to accommodate the additional runoff from the north portion of the site that was originally excluded from the site. The revised AHYMO files are in Appendix A. Table 1 is a summary of the changes to the Subasins and results of the revisions associated with the pond.

An offsite drainage easement from the property owners to the southeast is being acquired to allow for the future construction of a storm sewer to Unser Blvd. Ultimately the storm sewer will connect to a future storm sewer in Unser that will connect to the existing storm sewer facilities in Arenal which discharge into the Arenal / Unser Detention Pond. At this time a temporary retention pond will be constructed in the southeast corner of the site until the downstream facilities are in place.





CITY OF Albuquerque

Albuquerque Geographic Information System

PLANNING DEPARTMENT

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GRAPHIC SCALE IN FEET

250 0 750 1000

Zone Atlas Page

M-10-Z

FIGURE 1
VICINITY MAP

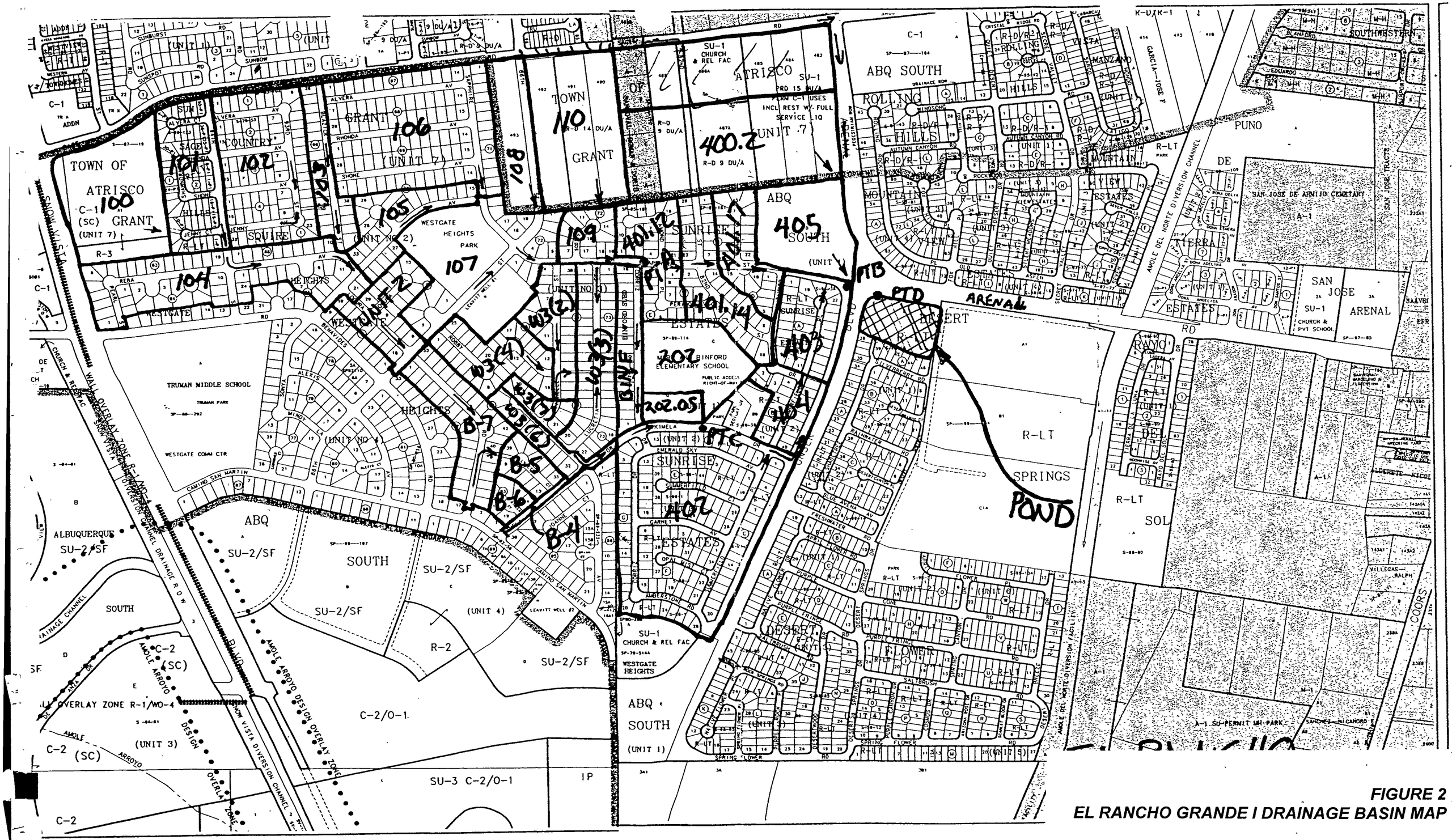


FIGURE 2
EL RANCHO GRANDE I DRAINAGE BASIN MAP

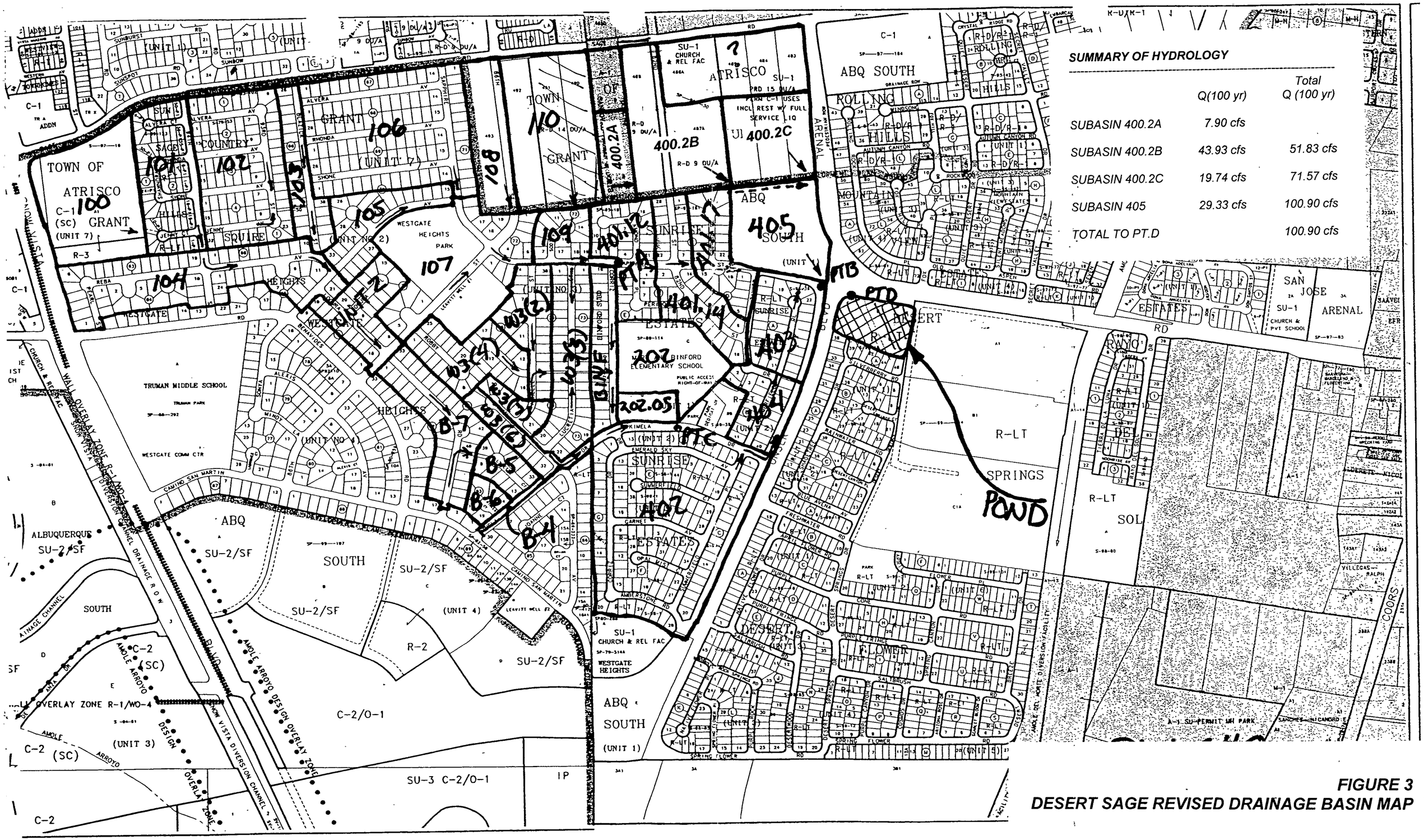
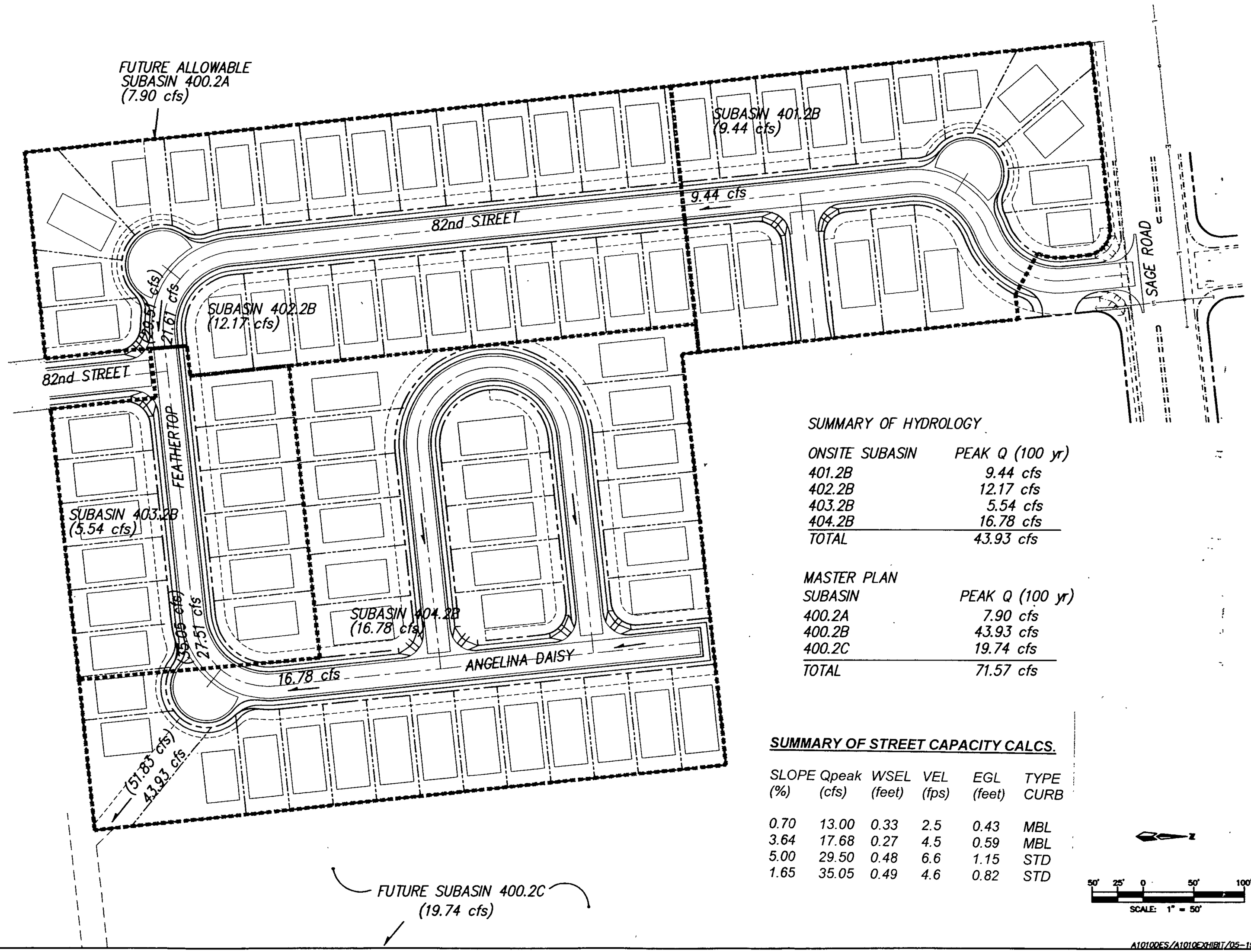


FIGURE 3
DESERT SAGE REVISED DRAINAGE BASIN MAP



SUMMARY OF HYDROLOGY

ONSITE SUBASIN	PEAK Q (100 yr)
401.2B	9.44 cfs
402.2B	12.17 cfs
403.2B	5.54 cfs
404.2B	16.78 cfs
TOTAL	43.93 cfs

MASTER PLAN SUBASIN	PEAK Q (100 yr)
400.2A	7.90 cfs
400.2B	43.93 cfs
400.2C	19.74 cfs
TOTAL	71.57 cfs

SUMMARY OF STREET CAPACITY CALCS.

SLOPE (%)	Qpeak (cfs)	WSEL (feet)	VEL (fps)	EGL (feet)	TYPE CURB
0.70	13.00	0.33	2.5	0.43	MBL
3.64	17.68	0.27	4.5	0.59	MBL
5.00	29.50	0.48	6.6	1.15	STD
1.65	35.05	0.49	4.6	0.82	STD

N

50' 25' 0 50' 100'

SCALE: 1" = 50'

A1010DES/A1010EXHIBIT/05-19-01/DLH

FIGURE 4

DESERT SAGE

ONSITE SUBASIN BOUNDARIES

& STREET CAPACITY SUMMARY

dmg MARK GOODWIN & ASSOCIATES, P.A.
CONSULTING ENGINEERS
P.O. BOX 90606
ALBUQUERQUE, NEW MEXICO 87199
(505)828-2200, FAX (505)797-9539

Designed: DLH	Drawn: KJS	Checked: DMG	Sheet 1 of 1
Scale: 1" = 50'	Date: 02-02-01	Job: A1010	

DESERT SAGE SUBDIVISION

TABLE 1: SUMMARY OF HYDROLOGIC PARAMETERS

LOCATION	SUBASIN ID	AREA (sq.mi.)	L.TR D	L.TR B/C	Q(100) cfs	RUNOFF VOL. (AF)
EL RANCHO GRANDE I (Original drainage)						
	400.2	0.03220	44	28/28	67.78	2.271
	405	0.01393	44	28/28	29.33	0.982
TOTAL					**97.11**	**3.253**
DESERT SAGE (Revised drainage)						
	400.2A	0.00375	44	28/28	7.90	0.264
	400.2B	0.01908	60	20/20	43.93	1.532
	400.2C	0.00938	44	28/28	19.74	0.661
	405	0.01393	44	28/28	29.33	0.982
TOTAL					**100.90**	**3.439**

f\\deserts.age\hydr_sum.tbl

APPENDIX A

HYDROLOGY

D. Mark Goodwin & Associates, P.A.
Consulting Engineers
P.O. BOX 90606, ALBUQUERQUE, NM 87199
(505) 828-2200 FAX 797-9539
e-mail: dmg@swcp.com

PROJECT Desert Sage
SUBJECT Retention Pond Volume Calcs
BY DLH DATE 5-22-01
CHECKED _____ DATE _____
SHEET ____ OF ____

ZONE M-10

$P(1) = 1.87''$

$P(6) = 2.20''$

$P(24) = 2.66''$

$P(10\text{-day}) = 10 - \left[24.9/(2.66)^{1.4} \right] = 3.67''$

$V(10\text{-day}) = 1.532\,AcFt + 12.2(.60)\left(\frac{3.67'' - 2.20''}{12}\right) = 2.429$ Ac. Ft. (Req'd Volume)

Pond Design 2:1 s.s.

Top 5065.0 $Area_T = 15298.3$ SF

Bottom 5054.0 $Area_B = 5434$ SF

Depth = 11.0'

Volume Design $= \frac{1}{3}(11)\left(15298 + 5434 + \sqrt{A_T \cdot A_B}\right) = 2.51$ Ac.Ft.

D. Mark Goodwin & Associates, P.A.
Consulting Engineers
P.O. BOX 90606, ALBUQUERQUE, NM 87199
(505) 828-2200 FAX 797-9539
e-mail: dmg@swcp.com

PROJECT Desert Sage
SUBJECT Hydrology
BY DLH DATE 5-9-01
CHECKED _____ DATE _____
SHEET ____ OF ____

$n = \frac{85 \text{ units}}{12.22 \text{ acres}} = 6.95$ Use D = 60, B/C = 20

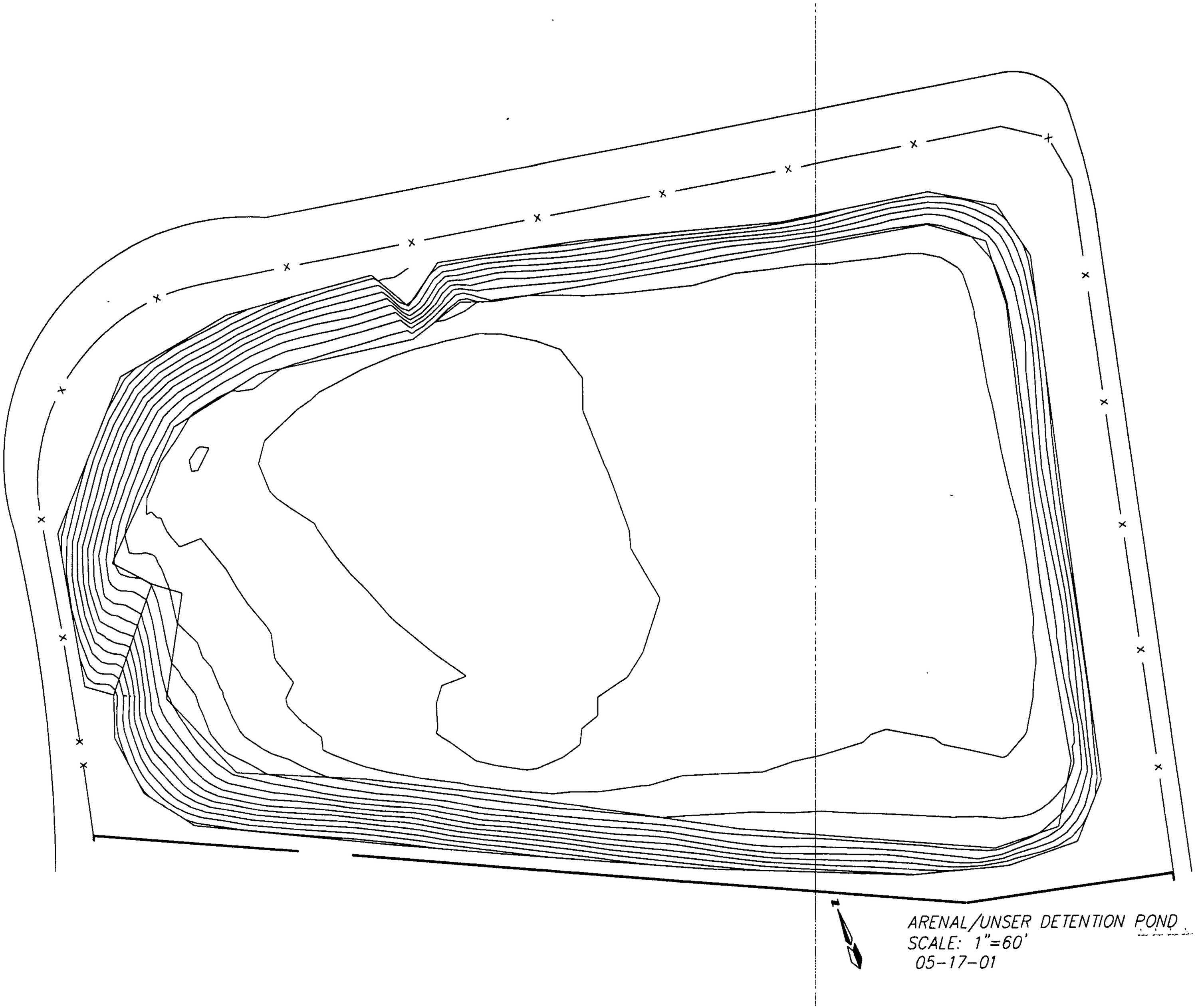
Q(100) = 43.93 cfs

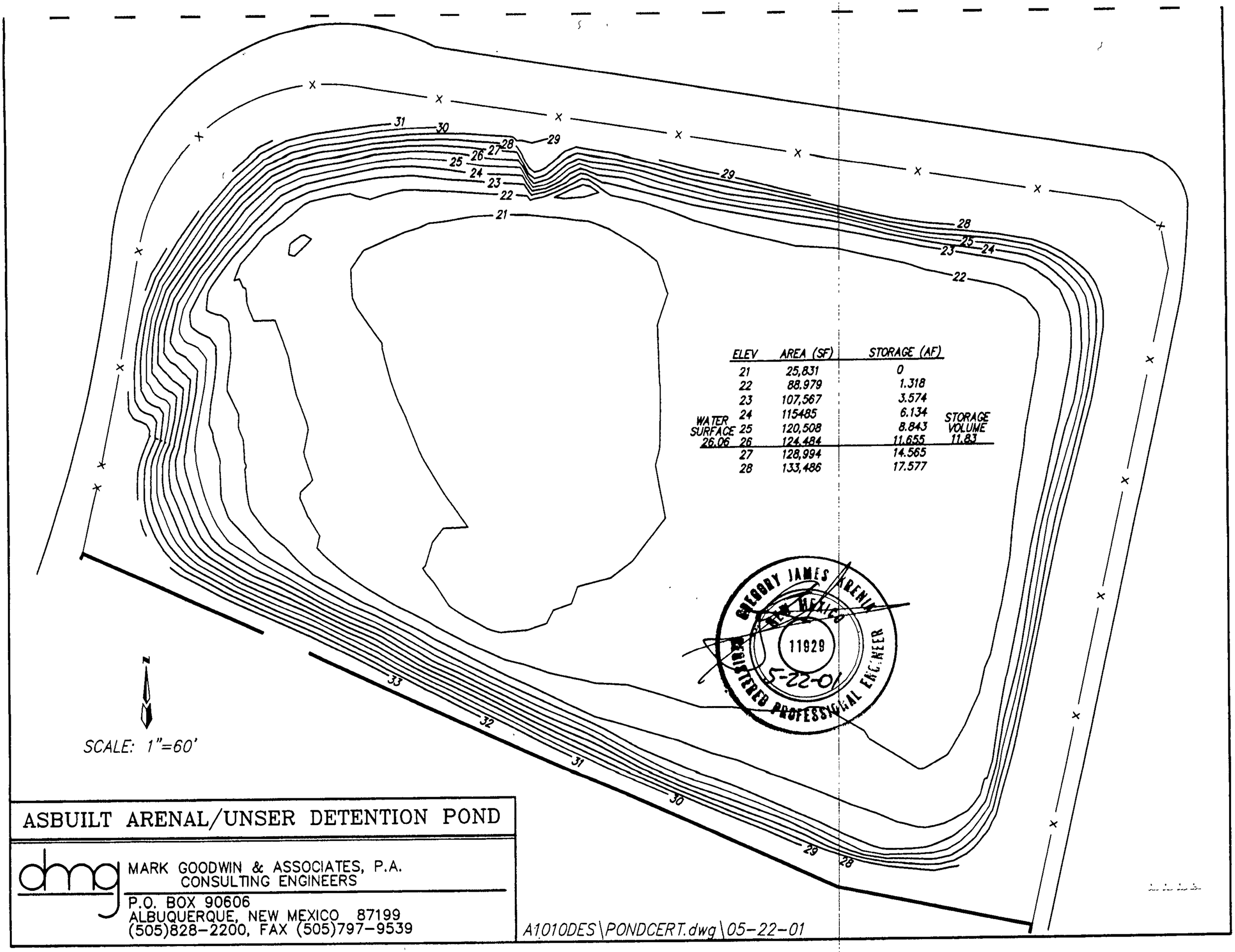
SB 401.2B 430 (264) = 113,520 (.2148) ⇒ 9.44 cfs

SB 402.2B 623(235) = 146405 (.2770) ⇒ 12.17 cfs

SB 403.2B 238(280) = 66.640 (.1261) ⇒ 5.54 cfs

SB 404.2B 385(290) + 145(623) = 201,985 (.3821) ⇒ 16.78 cfs


ARENAL/UNSER DETENTION POND
SCALE: 1"=60'
05-17-01



ELEV	AREA (SF)	STORAGE (AF)
21	25,831	0
22	88.979	1.318
23	107,567	3.574
24	115485	6.134
25	120,508	8.843
26	124.484	11.655
27	128,994	14.565
28	133,486	17.577

WATER SURFACE 26.06

STORAGE VOLUME 11.83

ASBUILT ARENAL/UNSER DETENTION POND

dmg

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CONSULTING ENGINEERS

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ALBUQUERQUE, NEW MEXICO 87199
(505)828-2200, FAX (505)797-9539

A1010DES\PONDCERT.dwg\05-22-01

D. Mark Goodwin & Associates, P.A.
Consulting Engineers
P.O. BOX 90606, ALBUQUERQUE, NM 87199
(505) 828-2200 FAX 797-9539
e-mail: dmg@swcp.com

PROJECT Desert Sage
SUBJECT Revised Arenal/Unser Pond
BY DLH DATE 5-17-01
CHECKED _____ DATE _____
SHEET ____ OF ____

Arenal / Unser Detention Pond
Revised Capacity

Elev.	Area	Volume	Σ Volume	Σ Volume
5021	25,830.6	0		
22	88979.3	57,404.9	57,404.9	1.318
23	107567.1	98,273.2	155,678.1	3.574
24	115,484.5	111,525.8	267,203.9	6.134
25	120,508.4	117,996.5	385,200.4	8.843
26	124,484.4	122,496.4	507696.8	11.655
27	128993.5	126,738.9	634,435.7	14.565
28	133,485.9	131,239.7	765,675.4	17.577
29	138,040.0	135,762.9	901,438.3	20.694
30	142,655.3	140,347.7	1,041,786.0	23.916

ORIGINAL AHYMO OUTPUT FROM EL RANCHO GRANDE I DRAINAGE REPORT (WITH REVISED AS-BUILT POND VOLUMES)

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =05/17/2001
INPUT FILE = ANALPTD.DAT USER NO.= M_GOODWN.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
START										TIME= .00
RAINFALL TYPE= 1										RAIN6= 2.200
COMPUTE NM HYD	100.00	-	1	.02190	58.56	2.161	1.85049	1.499	4.178	PER IMP= 90.00
ROUTE RESERVOIR	POND.101	1	2	.02190	1.40	1.642	1.40559	2.597	.100	AC-FT= 1.911
COMPUTE NM HYD	101.00	-	1	.01310	30.61	1.077	1.54209	1.499	3.651	PER IMP= 64.00
ADD HYD	101.00	1& 2	3	.03500	31.34	2.719	1.45667	1.499	1.399	
ROUTE	201.00	3	4	.03500	31.14	2.715	1.45470	1.532	1.390	
COMPUTE NM HYD	104.00	-	1	.01350	27.72	.924	1.28283	1.499	3.208	PER IMP= 42.00
ADD HYD	104.00	1& 4	2	.04850	58.10	3.639	1.40686	1.532	1.872	
ROUTE	204.00	2	3	.04850	56.61	3.632	1.40424	1.532	1.824	
COMPUTE NM HYD	102.00	-	1	.01310	28.19	.961	1.37477	1.499	3.362	PER IMP= 50.00
COMPUTE NM HYD	103.00	-	2	.00398	8.42	.284	1.33869	1.499	3.304	PER IMP= 47.00
ADD HYD	103.00	1& 2	4	.01708	36.61	1.245	1.36633	1.499	3.349	
ADD HYD	104.00	3& 4	2	.06558	92.11	4.877	1.39436	1.532	2.195	
ROUTE	203.00	2	3	.06558	92.38	4.876	1.39402	1.532	2.201	
COMPUTE NM HYD	105.00	-	1	.00526	10.81	.360	1.28283	1.499	3.211	PER IMP= 42.00
ADD HYD	105.00	1& 3	2	.07084	102.90	5.236	1.38576	1.532	2.270	
ROUTE	205.00	2	3	.07084	92.41	5.224	1.38279	1.565	2.038	
COMPUTE NM HYD	106.00	-	1	.01893	39.79	1.342	1.32880	1.499	3.285	PER IMP= 46.00
ADD HYD	106.00	1& 3	2	.08977	126.54	6.566	1.37140	1.565	2.203	
ROUTE	206.00	2	3	.08977	125.13	6.562	1.37058	1.565	2.178	
COMPUTE NM HYD	107.00	-	1	.02670	46.95	1.469	1.03176	1.499	2.748	PER IMP= 23.00
COMPUTE NM HYD	108.00	-	2	.01020	20.89	.696	1.27962	1.499	3.200	PER IMP= 42.00
ADD HYD	108.00	1& 2	4	.03690	67.84	2.165	1.10025	1.499	2.872	
ADD HYD	108.00	3& 4	2	.12667	184.52	8.727	1.29183	1.565	2.276	
ROUTE	208.00	2	3	.12667	185.36	8.723	1.29123	1.565	2.287	
COMPUTE NM HYD	109.00	-	1	.00570	11.48	.379	1.24675	1.499	3.148	PER IMP= 39.00
COMPUTE NM HYD	110.00	-	2	.02320	48.62	1.684	1.36107	1.499	3.275	PER IMP= 53.44
ADD HYD	110.00	1& 2	4	.02890	60.11	2.063	1.33850	1.499	3.250	
ADD HYD	110.00	3& 4	2	.15557	237.13	10.786	1.30001	1.532	2.382	
ROUTE	210.00	2	3	.15557	238.60	10.784	1.29977	1.565	2.396	
COMPUTE NM HYD	401.12	-	19	.01126	23.42	.780	1.29864	1.499	3.250	PER IMP= 42.00
ADD HYD	401.13	19& 3	20	.16683	258.75	11.564	1.29969	1.565	2.423	
COMPUTE NM HYD	300.20	-	1	.01180	24.55	.817	1.29864	1.499	3.250	PER IMP= 42.00
COMPUTE NM HYD	401.14	-	2	.01117	23.24	.774	1.29864	1.499	3.250	PER IMP= 42.00
ADD HYD	401.15	1& 2	3	.02297	47.78	1.591	1.29862	1.499	3.250	
ADD HYD	401.16	3&20	4	.18980	301.16	13.155	1.29956	1.532	2.479	
COMPUTE NM HYD	401.17	-	5	.00661	13.76	.458	1.29864	1.499	3.252	PER IMP= 42.00
ADD HYD	401.18	4& 5	6	.19641	314.53	13.613	1.29953	1.532	2.502	

COMPUTE NM HYD	405.00	-	7	.01393	29.33	.982	1.32163	1.499	3.288	PER IMP= 44.00
ADD HYD	405.10	6& 7	8	.21034	343.00	14.595	1.30099	1.532	2.548	
COMPUTE NM HYD	127.00	-	27	.01080	22.47	.748	1.29864	1.499	3.250	PER IMP= 42.00
COMPUTE NM HYD	403.00	-	9	.01480	30.78	1.025	1.29864	1.499	3.250	PER IMP= 42.00
ADD HYD	405.15	9&27	10	.02560	53.25	1.773	1.29862	1.499	3.250	

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
ADD HYD	112.00	8&10	12	.23594	394.76	16.368	1.30074	1.532	2.614	
COMPUTE NM HYD	400.20	-	11	.03222	67.78	2.271	1.32163	1.499	3.288	PER IMP= 44.00
ADD HYD	405.16	11&12	40	.26816	460.58	18.639	1.30325	1.532	2.684	
COMPUTE NM HYD	101.00	-	1	.00359	7.47	.254	1.32370	1.500	3.249	PER IMP= 50.00
COMPUTE NM HYD	102.00	-	2	.00641	13.31	.452	1.32370	1.500	3.246	PER IMP= 50.00
COMPUTE NM HYD	103.00	-	3	.00531	11.04	.375	1.32370	1.500	3.247	PER IMP= 50.00
COMPUTE NM HYD	104.00	-	4	.00671	13.93	.474	1.32370	1.500	3.246	PER IMP= 50.00
COMPUTE NM HYD	105.00	-	5	.00063	1.31	.044	1.32370	1.500	3.283	PER IMP= 50.00
COMPUTE NM HYD	106.00	-	6	.00325	6.76	.229	1.32370	1.500	3.249	PER IMP= 50.00
COMPUTE NM HYD	107.00	-	7	.00058	1.65	.061	1.96638	1.500	4.458	PER IMP= 100.00
COMPUTE NM HYD	108.00	-	8	.00214	4.49	.153	1.33655	1.500	3.278	PER IMP= 51.00
COMPUTE NM HYD	109.00	-	9	.00117	2.45	.083	1.32370	1.500	3.263	PER IMP= 50.00
COMPUTE NM HYD	110.00	-	10	.00556	11.13	.374	1.25943	1.500	3.127	PER IMP= 45.00
COMPUTE NM HYD	111.00	-	11	.00450	9.35	.318	1.32370	1.500	3.248	PER IMP= 50.00
COMPUTE NM HYD	122.00	-	22	.00925	7.86	.222	.44920	1.533	1.327	PER IMP= .00
COMPUTE NM HYD	123.00	-	23	.00375	10.64	.393	1.96638	1.500	4.438	PER IMP= 100.00
COMPUTE NM HYD	126.00	-	26	.05200	109.73	3.628	1.30833	1.500	3.297	PER IMP= 42.00
ADD HYD	112.00	1& 2	12	.01000	20.78	.706	1.32364	1.500	3.247	
ADD HYD	113.00	3& 4	13	.01202	24.97	.849	1.32365	1.500	3.246	
ADD HYD	114.00	5& 6	14	.00388	8.07	.274	1.32356	1.500	3.255	
ADD HYD	115.00	7& 8	15	.00272	6.14	.213	1.47021	1.500	3.529	
ADD HYD	116.00	9&10	16	.00674	13.58	.456	1.27052	1.500	3.151	
ADD HYD	117.00	12&13	17	.02202	45.75	1.555	1.32364	1.500	3.246	
ADD HYD	118.00	14&17	18	.02590	53.83	1.828	1.32363	1.500	3.248	
ADD HYD	119.00	15&16	19	.00945	19.72	.670	1.32795	1.500	3.260	
ADD HYD	120.00	11&19	20	.01395	29.08	.987	1.32656	1.500	3.256	
ADD HYD	121.00	18&20	21	.03985	82.90	2.815	1.32466	1.500	3.251	
ADD HYD	124.00	22&23	24	.01300	18.31	.615	.88647	1.500	2.201	
ADD HYD	125.00	21&24	25	.05285	101.21	3.430	1.21687	1.500	2.992	
ADD HYD	129.00	25&26	29	.10485	210.94	7.058	1.26223	1.500	3.144	
ADD HYD	404.20	40&29	30	.37301	665.08	25.691	1.29140	1.532	2.786	
ROUTE RESERVOIR	405.40	30	31	.37301	162.63	25.682	1.29097	1.931	.681	AC-FT= 12.347
FINISH										

ORIGINAL AHYMO OUTPUT FROM EL RANCHO GRANDE I DRAINAGE REPORT (WITH REVISED AS-BUILT POND VOLUMES)

```
**ANALYSIS POINT D
ADD HYD              ID=30 HYD NO=404.2 ID=40 ID= 29
PRINT HYD            ID=30 CODE=1
                                        HYDROGRAPH FROM AREA   404.20

    RUNOFF VOLUME =      1.29140 INCHES      =      25.6907 ACRE-FEET
    PEAK DISCHARGE RATE =      665.08 CFS  AT   1.532 HOURS   BASIN AREA =   .3730 SQ. MI.

ROUTE RESERVOIR       ID=31 HYD NO=405.4 INFLOW ID=30 CODE=24
                     OUTFLOW(CFS)   STORAGE(AF)   ELEV(FT)
                         0              0           21
                       104.75           1.318       22
                       120.95           3.574       23
                       135.23           6.134       24
                       148.14           8.843       25
                       160.00          11.655       26
                       171.05          14.565       27
                       181.43          17.577       28
                       191.24          20.694       29
                       200.58          23.916       30

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

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

   .00         .00      21.00       .000        .00
   .80         .00      21.00       .000        .00
  1.60      551.37      24.76      8.198     145.07
  2.40       33.94      25.28      9.625     151.44
  3.20        6.66      22.27      1.926     109.12
  4.00        3.88      21.05       .062       4.95
  4.80        3.70      21.04       .046       3.69
  5.59        4.03      21.04       .050       3.95
  6.39        1.84      21.02       .031       2.49
  7.19        1.27      21.01       .017       1.31
  7.99        1.23      21.01       .016       1.24
  8.79        1.20      21.01       .015       1.20
  9.59        1.16      21.01       .015       1.17
 10.39        1.13      21.01       .014       1.14
 11.19        1.10      21.01       .014       1.10
 11.99        1.06      21.01       .013       1.07
 12.79        1.03      21.01       .013       1.04
 13.59        1.00      21.01       .013       1.01
 14.39         .96      21.01       .012        .97
 15.18         .92      21.01       .012        .93
 15.98         .88      21.01       .011        .89
 16.78         .85      21.01       .011        .85
 17.58         .81      21.01       .010        .82
 18.38         .77      21.01       .010        .78
 19.18         .72      21.01       .009        .73
 PEAK DISCHARGE =      162.629 CFS - PEAK OCCURS AT HOUR    1.93
 MAXIMUM WATER SURFACE ELEVATION =       26.238
 MAXIMUM STORAGE =       12.3473 AC-FT     INCREMENTAL TIME=     .033300HRS

PRINT HYD            ID=31 CODE=1
                                        HYDROGRAPH FROM AREA   405.40

    RUNOFF VOLUME =      1.29097 INCHES      =      25.6822 ACRE-FEET
    PEAK DISCHARGE RATE =      162.63 CFS  AT   1.931 HOURS   BASIN AREA =   .3730 SQ. MI.

FINISH

    NORMAL PROGRAM FINISH          END TIME (HR:MIN:SEC) = 13:33:31
```

REVISED EL RANCHO GRANDE I AHYMO DRAINAGE PLAN WITH REVISED ARENAL / UNSER DETENTIONPOND VOLUMES AND REVISED SB 400.2 TO SB's 400.2A, 400.2B, 400.2C AHYMO SUMMARY FILE

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =05/17/2001
INPUT FILE = ARENAL_R.DAT USER NO.= M_GOODWN.I01

PAGE = 1

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
START										TIME= .00
RAINFALL TYPE= 1										RAIN6= 2.200
COMPUTE NM HYD	100.00	-	1	.02190	58.56	2.161	1.85049	1.499	4.178	PER IMP= 90.00
ROUTE RESERVOIR	POND.101	1	2	.02190	1.40	1.642	1.40559	2.597	.100	AC-FT= 1.911
COMPUTE NM HYD	101.00	-	1	.01310	30.61	1.077	1.54209	1.499	3.651	PER IMP= 64.00
ADD HYD	101.00	1& 2	3	.03500	31.34	2.719	1.45667	1.499	1.399	
ROUTE	201.00	3	4	.03500	31.14	2.715	1.45470	1.532	1.390	
COMPUTE NM HYD	104.00	-	1	.01350	27.72	.924	1.28283	1.499	3.208	PER IMP= 42.00
ADD HYD	104.00	1& 4	2	.04850	58.10	3.639	1.40686	1.532	1.872	
ROUTE	204.00	2	3	.04850	56.61	3.632	1.40424	1.532	1.824	
COMPUTE NM HYD	102.00	-	1	.01310	28.19	.961	1.37477	1.499	3.362	PER IMP= 50.00
COMPUTE NM HYD	103.00	-	2	.00398	8.42	.284	1.33869	1.499	3.304	PER IMP= 47.00
ADD HYD	103.00	1& 2	4	.01708	36.61	1.245	1.36633	1.499	3.349	
ADD HYD	104.00	3& 4	2	.06558	92.11	4.877	1.39436	1.532	2.195	
ROUTE	203.00	2	3	.06558	92.38	4.876	1.39402	1.532	2.201	
COMPUTE NM HYD	105.00	-	1	.00526	10.81	.360	1.28283	1.499	3.211	PER IMP= 42.00
ADD HYD	105.00	1& 3	2	.07084	102.90	5.236	1.38576	1.532	2.270	
ROUTE	205.00	2	3	.07084	92.41	5.224	1.38279	1.565	2.038	
COMPUTE NM HYD	106.00	-	1	.01893	39.79	1.342	1.32880	1.499	3.285	PER IMP= 46.00
ADD HYD	106.00	1& 3	2	.08977	126.54	6.566	1.37140	1.565	2.203	
ROUTE	206.00	2	3	.08977	125.13	6.562	1.37058	1.565	2.178	
COMPUTE NM HYD	107.00	-	1	.02670	46.95	1.469	1.03176	1.499	2.748	PER IMP= 23.00
COMPUTE NM HYD	108.00	-	2	.01020	20.89	.696	1.27962	1.499	3.200	PER IMP= 42.00
ADD HYD	108.00	1& 2	4	.03690	67.84	2.165	1.10025	1.499	2.872	
ADD HYD	108.00	3& 4	2	.12667	184.52	8.727	1.29183	1.565	2.276	
ROUTE	208.00	2	3	.12667	185.36	8.723	1.29123	1.565	2.287	
COMPUTE NM HYD	109.00	-	1	.00570	11.48	.379	1.24675	1.499	3.148	PER IMP= 39.00
COMPUTE NM HYD	110.00	-	2	.02320	48.62	1.684	1.36107	1.499	3.275	PER IMP= 53.44
ADD HYD	110.00	1& 2	4	.02890	60.11	2.063	1.33850	1.499	3.250	
ADD HYD	110.00	3& 4	2	.15557	237.13	10.786	1.30001	1.532	2.382	
ROUTE	210.00	2	3	.15557	238.60	10.784	1.29977	1.565	2.396	
COMPUTE NM HYD	401.12	-	19	.01126	23.42	.780	1.29864	1.499	3.250	PER IMP= 42.00
ADD HYD	401.13	19& 3	20	.16683	258.75	11.564	1.29969	1.565	2.423	
COMPUTE NM HYD	300.20	-	1	.01180	24.55	.817	1.29864	1.499	3.250	PER IMP= 42.00
COMPUTE NM HYD	401.14	-	2	.01117	23.24	.774	1.29864	1.499	3.250	PER IMP= 42.00
ADD HYD	401.15	1& 2	3	.02297	47.78	1.591	1.29862	1.499	3.250	
ADD HYD	401.16	3&20	4	.18980	301.16	13.155	1.29956	1.532	2.479	

COMPUTE NM HYD	401.17	-	5	.00661	13.76	.458	1.29864	1.499	3.252	PER IMP= 42.00
ADD HYD	401.18	4& 5	6	.19641	314.53	13.613	1.29953	1.532	2.502	
COMPUTE NM HYD	405.00	-	7	.01393	29.33	.982	1.32163	1.499	3.288	PER IMP= 44.00
ADD HYD	405.10	6& 7	8	.21034	343.00	14.595	1.30099	1.532	2.548	
COMPUTE NM HYD	127.00	-	27	.01080	22.47	.748	1.29864	1.499	3.250	PER IMP= 42.00
COMPUTE NM HYD	403.00	-	9	.01480	30.78	1.025	1.29864	1.499	3.250	PER IMP= 42.00
ADD HYD	405.15	9&27	10	.02560	53.25	1.773	1.29862	1.499	3.250	

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	PAGE = 2 NOTATION
ADD HYD	112.00	8&10	12	.23594	394.76	16.368	1.30074	1.532	2.614	
COMPUTE NM HYD	400.2A	-	11	.00375	7.90	.264	1.32163	1.499	3.294	PER IMP= 44.00
COMPUTE NM HYD	400.2B	-	13	.01908	43.93	1.532	1.50558	1.499	3.598	PER IMP= 60.00
ADD HYD	405.17	11&13	14	.02283	51.84	1.796	1.47534	1.499	3.548	
COMPUTE NM HYD	400.2C	-	15	.00938	19.74	.661	1.32163	1.499	3.289	PER IMP= 44.00
ADD HYD	405.16	14&15	16	.03221	71.57	2.457	1.43059	1.499	3.473	
ADD HYD	405.16	16&12	40	.26815	464.01	18.825	1.31633	1.532	2.704	
COMPUTE NM HYD	101.00	-	1	.00359	7.47	.254	1.32370	1.500	3.249	PER IMP= 50.00
COMPUTE NM HYD	102.00	-	2	.00641	13.31	.452	1.32370	1.500	3.246	PER IMP= 50.00
COMPUTE NM HYD	103.00	-	3	.00531	11.04	.375	1.32370	1.500	3.247	PER IMP= 50.00
COMPUTE NM HYD	104.00	-	4	.00671	13.93	.474	1.32370	1.500	3.246	PER IMP= 50.00
COMPUTE NM HYD	105.00	-	5	.00063	1.31	.044	1.32370	1.500	3.283	PER IMP= 50.00
COMPUTE NM HYD	106.00	-	6	.00325	6.76	.229	1.32370	1.500	3.249	PER IMP= 50.00
COMPUTE NM HYD	107.00	-	7	.00058	1.65	.061	1.96638	1.500	4.458	PER IMP= 100.00
COMPUTE NM HYD	108.00	-	8	.00214	4.49	.153	1.33655	1.500	3.278	PER IMP= 51.00
COMPUTE NM HYD	109.00	-	9	.00117	2.45	.083	1.32370	1.500	3.263	PER IMP= 50.00
COMPUTE NM HYD	110.00	-	10	.00556	11.13	.374	1.25943	1.500	3.127	PER IMP= 45.00
COMPUTE NM HYD	111.00	-	11	.00450	9.35	.318	1.32370	1.500	3.248	PER IMP= 50.00
COMPUTE NM HYD	122.00	-	22	.00925	7.86	.222	.44920	1.533	1.327	PER IMP= .00
COMPUTE NM HYD	123.00	-	23	.00375	10.64	.393	1.96638	1.500	4.438	PER IMP= 100.00
COMPUTE NM HYD	126.00	-	26	.05200	109.73	3.628	1.30833	1.500	3.297	PER IMP= 42.00
ADD HYD	112.00	1& 2	12	.01000	20.78	.706	1.32364	1.500	3.247	
ADD HYD	113.00	3& 4	13	.01202	24.97	.849	1.32365	1.500	3.246	
ADD HYD	114.00	5& 6	14	.00388	8.07	.274	1.32356	1.500	3.255	
ADD HYD	115.00	7& 8	15	.00272	6.14	.213	1.47021	1.500	3.529	
ADD HYD	116.00	9&10	16	.00674	13.58	.456	1.27052	1.500	3.151	
ADD HYD	117.00	12&13	17	.02202	45.75	1.555	1.32364	1.500	3.246	
ADD HYD	118.00	14&17	18	.02590	53.83	1.828	1.32363	1.500	3.248	
ADD HYD	119.00	15&16	19	.00945	19.72	.670	1.32795	1.500	3.260	
ADD HYD	120.00	11&19	20	.01395	29.08	.987	1.32656	1.500	3.256	
ADD HYD	121.00	18&20	21	.03985	82.90	2.815	1.32466	1.500	3.251	
ADD HYD	124.00	22&23	24	.01300	18.31	.615	.88647	1.500	2.201	
ADD HYD	125.00	21&24	25	.05285	101.21	3.430	1.21687	1.500	2.992	
ADD HYD	129.00	25&26	29	.10485	210.94	7.058	1.26223	1.500	3.144	
ADD HYD	404.20	40&29	30	.37300	668.51	25.877	1.30080	1.532	2.800	
ROUTE RESERVOIR	405.40	30	31	.37300	163.04	25.869	1.30038	1.965	.683	AC-FT= 12.456
FINISH										

REVISED EL RANCHO GRANDE I AHYMO DRAINAGE PLAN WITH REVISED ARENAL / UNSER DETENTIONPOND VOLUMES AND REVISED SB 400.2 TO SB's 400.2A, 400.2B, 400.2C AHYMO SUMMARY FILE

```
**ANALYSIS POINT D
ADD HYD              ID=30 HYD NO=404.2 ID=40 ID= 29
PRINT HYD            ID=30 CODE=1
                                        HYDROGRAPH FROM AREA   404.20

    RUNOFF VOLUME =      1.30080 INCHES      =      25.8771 ACRE-FEET
    PEAK DISCHARGE RATE =     668.51 CFS  AT   1.532 HOURS   BASIN AREA =   .3730 SQ. MI.

ROUTE RESERVOIR       ID=31 HYD NO=405.4 INFLOW ID=30 CODE=24
                     OUTFLOW(CFS)   STORAGE(AF)   ELEV(FT)
                         0              0           21
                       104.75           1.06        22
                       120.95           3.08        23
                       135.23           5.61        24
                       148.14           8.24        25
                       160.00          10.98        26
                       171.05          13.82        27
                       181.43          16.76        28
                       191.24          19.81        29
                       200.58          22.98        30

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

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

   .00        .00     21.00      .000       .00
   .80        .00     21.00      .000       .00
  1.60     553.54     24.96     8.143    147.66
  2.40      34.17     25.46     9.497    153.58
  3.20       6.71     22.31     1.689    109.80
  4.00       3.92     21.04      .044      4.36
  4.80       3.74     21.04      .038      3.73
  5.59       4.08     21.04      .041      4.02
  6.39       1.84     21.02      .024      2.36
  7.19       1.27     21.01      .013      1.30
  7.99       1.23     21.01      .012      1.23
  8.79       1.20     21.01      .012      1.20
  9.59       1.16     21.01      .012      1.17
 10.39       1.13     21.01      .011      1.14
 11.19       1.10     21.01      .011      1.10
 11.99       1.06     21.01      .011      1.07
 12.79       1.03     21.01      .010      1.04
 13.59       1.00     21.01      .010      1.01
 14.39        .96     21.01      .010       .97
 15.18        .92     21.01      .009       .93
 15.98        .88     21.01      .009       .89
 16.78        .85     21.01      .009       .85
 17.58        .81     21.01      .008       .82
 18.38        .77     21.01      .008       .78
 19.18        .72     21.01      .007       .73
 PEAK DISCHARGE =      165.037 CFS - PEAK OCCURS AT HOUR    1.93
 MAXIMUM WATER SURFACE ELEVATION =       26.456
 MAXIMUM STORAGE =       12.2747 AC-FT      INCREMENTAL TIME=     .033300HRS

PRINT HYD            ID=31 CODE=1
                                        HYDROGRAPH FROM AREA   405.40

    RUNOFF VOLUME =      1.30046 INCHES      =      25.8703 ACRE-FEET
    PEAK DISCHARGE RATE =     165.04 CFS  AT   1.931 HOURS   BASIN AREA =   .3730 SQ. MI.

FINISH

    NORMAL PROGRAM FINISH          END TIME (HR:MIN:SEC) = 17:25:03
```

REVISED EL RANCHO GRANDE I AHYMO DRAINAGE PLAN WITH REVISED ARENAL / UNSER DETENTION POND VOLUMES AND REVISED SB 400.2 TO SB's 400.2A, 400.2B, 400.2C AHYMO INPUT FILE

```
START                   TIME=0.0
***** ******************************************************************************
***** DESERT SAGE SUBDIVISION (REVISED SB 400.2 TO SB 400.2A 400.2B 400.2C)
***** SOURCE FILE:
***** MODIFIED "RE-EVALUATION OF ARENAL/UNSER DETENTION POND FOR EL RANCHO GRANDE I, UNITS 1,2,3"
***** DATED 5-12-00, MARK GOODWIN & ASSOCIATES.
***** FILE ARENAL_R.DAT DLH 5-15-01
***** ******************************************************************************
*****  HYDROGRAPH FOR ANALYSIS POINT D
*****  HYDROGRAPH OF ANALISIS POINTS A & B
*****
RAINFALL                TYPE=1 RAIN QUARTER=0.0 IN
                        RAIN ONE=1.87 IN RAIN SIX=2.20 IN
                        RAIN DAY=2.66 IN DT=0.0333 HR
*****
***** SUB-BASIN 100 (UNDEVELOPED) ASSUME COMMERCIAL DEVELOPED
*****
COMPUTE NM HYD          ID=1 HYD NO=100.0 AREA=0.0219 SQ MI
                        PER A=0 PER B=5 PER C=5 PER D=90
                        TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD               ID=1 CODE=1
*****
***** MAXIMUM FLOW FROM SB 100 IS 1.4 CFS
***** ROUTE THROUGH DETENTION POND (APPROX. DIMENSIONS 181'x181')
***** ORIFICE OPENING
*****
ROUTE RESERVOIR         ID=2  HYD=POND.101  INFLOW=1  CODE=10
                        OUTFLOW(CFS)     STORAGE(AC FT)     ELEV(FT)
                        0                0                  19.0
                        .36              .3104              19.5
                        .77              .6325              20.0
                        .99              .9663              20.5
                        1.15            1.3122              21.0
                        1.45            2.0406              22.0
                        1.70            2.8188              23.0
PRINT HYD               ID=2 CODE=1
*****
***** SUB-BASIN 101 SUN SAGE HILLS TOWNHOMES (6.9 UN/AC)
*****
COMPUTE NM HYD          ID=1 HYD NO=101.0 AREA=0.0131 SQ MI
                        PER A=0 PER B=21 PER C=15 PER D=64
                        TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD               ID=1 CODE=1
*****
*****ADD SB 100 AND SB 101
*****
ADD HYD                 ID=3 HYD=101 ID=1  ID=2
PRINT HYD               ID=3 CODE=1
*****
***** ROUTE 250 FT SOUTH ON 94TH STREET 32' FF 50' ROW
***** @ 0.005 FT/FT
*****
COMPUTE RATING CURVE CID=1 VS NO=9  NO SEGS=1
                        MIN ELEV=0.0     MAX ELEV=.87
                        CH SLP=.005      FP SLP=0.005  N=0.017
                        DIST=50
                        DIST  ELEV      DIST  ELEV      DIST  ELEV
                          0   .87        9.0   .67      9.05   0.
                         11  .125         25  .405        39  .125
                         41    0.     41.05   .67        50   .87
COMPUTE TRAVEL TIME ID=4 REACH NO=1  NO VS=1 LENGTH=250 FT SLOPE=0.005
ROUTE                   ID=4 HYD NO=201  INFLOW ID=3 DT=0.0
```

```
PRINT HYD            ID=4 CODE=1
*****
***** SUB-BASIN 104 RESIDENTIAL (4.0 UN/AC)
*****
COMPUTE NM HYD       ID=1 HYD NO=104.0 AREA=0.01350 SQ MI
                     PER A=0 PER B=34 PER C=24 PER D=42
                     TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD            ID=1 CODE=1
*****
***** ADD SB 100 AND 101 AND 104
*****
ADD HYD              ID=2 HYD=104 ID=1  ID=4
PRINT HYD            ID=2 CODE=1
*****
***** ROUTE 770 FT EAST ON REBA AVE 32' 50' ROW
***** FF @ 0.0164 FT/FT
*****
COMPUTE RATING CURVE CID=1 VS NO=9  NO SEGS=1
                     MIN ELEV=0.0    MAX ELEV=.87
                     CH SLP=.0164     FP SLP=0.0164  N=0.017
                     DIST=50
                     DIST  ELEV     DIST  ELEV     DIST  ELEV
                        0   .87      9.0   .67     9.05    0.
                       11  .125       25  .405       39  .125
                       41    0.    41.05   .67       50   .87
COMPUTE TRAVEL TIME ID=3 REACH NO=1  NO VS=1 LENGTH=770 FT SLOPE=0.0164
ROUTE                ID=3 HYD NO=204  INFLOW ID=2 DT=0.0
PRINT HYD            ID=3 CODE=1
*****
***** SUB-BASIN 102 RESIDENTIAL (5.1 UN/AC)
*****
COMPUTE NM HYD       ID=1 HYD NO=102.0 AREA=0.01310 SQ MI
                     PER A=0 PER B=30 PER C=20 PER D=50
                     TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD            ID=1 CODE=1
*****
***** SUB-BASIN 103 RESIDENTIAL (4.6 UN/AC)
*****
COMPUTE NM HYD       ID=2 HYD NO=103.0 AREA=0.00398 SQ MI
                     PER A=0 PER B=32 PER C=21 PER D=47
                     TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD            ID=2 CODE=1
*****
***** ADD SB 102 AND 103
*****
ADD HYD              ID=4 HYD=103 ID=1  ID=2
PRINT HYD            ID=4 CODE=1
*****
***** ADD SB 100, 101, 102, 103, 104
*****
ADD HYD              ID=2 HYD=104 ID=3  ID=4
PRINT HYD            ID=2 CODE=1
*****
***** ROUTE 150 FT SOUTHEAST ON BLAZICK AVE 32' FF 50' ROW
***** @ 0.02 FT/FT
*****
COMPUTE RATING CURVE CID=1 VS NO=9  NO SEGS=1
                     MIN ELEV=0.0    MAX ELEV=.87
                     CH SLP=.02       FP SLP=0.02  N=0.017
                     DIST=50
                     DIST  ELEV     DIST  ELEV     DIST  ELEV
                        0   .87      9.0   .67     9.05    0.
                       11  .125       25  .405       39  .125
                       41    0.    41.05   .67       50   .87
COMPUTE TRAVEL TIME ID=3 REACH NO=1  NO VS=1 LENGTH=150 FT SLOPE=0.02
ROUTE                ID=3 HYD NO=203  INFLOW ID=2 DT=0.0
PRINT HYD            ID=3 CODE=1
*****
***** SUB-BASIN 105 RESIDENTIAL (4.0 UN/AC)
*****
COMPUTE NM HYD       ID=1 HYD NO=105.0 AREA=0.00526 SQ MI
```

```
                    PER A=0 PER B=34 PER C=24 PER D=42
                    TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD           ID=1 CODE=1
*****
***** ADD SB 100 THRU 104 AND 105
*****
ADD HYD             ID=2 HYD=105 ID=1  ID=3
PRINT HYD           ID=2 CODE=1
*****
***** ROUTE 1050 FT EAST ON SONYA AVE 32' FF 50' ROW
***** @ 0.0112 FT/FT
*****
COMPUTE RATING CURVE CID=1 VS NO=9  NO SEGS=1
                    MIN ELEV=0.0    MAX ELEV=.87
                    CH SLP=.0112    FP SLP=0.0112  N=0.017
                    DIST=50
                    DIST  ELEV     DIST  ELEV     DIST  ELEV
                       0   .87      9.0   .67     9.05    0.
                      11  .125       25  .405       39  .125
                      41    0.    41.05   .67       50   .87
COMPUTE TRAVEL TIME ID=3 REACH NO=1  NO VS=1 LENGTH=1050 FT SLOPE=0.0112
ROUTE               ID=3 HYD NO=205  INFLOW ID=2 DT=0.0
PRINT HYD           ID=3 CODE=1
*****
***** SUB-BASIN 106 RESIDENTIAL (4.5 UN/AC)
*****
COMPUTE NM HYD      ID=1 HYD NO=106.0 AREA=0.01893 SQ MI
                    PER A=0 PER B=32 PER C=22 PER D=46
                    TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD           ID=1 CODE=1
*****
***** ADD SB 100 THRU 105 AND 106
*****
ADD HYD             ID=2 HYD=106 ID=1  ID=3
PRINT HYD           ID=2 CODE=1
*****
***** ROUTE 400 FT SOUTHEAST ON SAPPHIRE ST. TO 86TH ST.
***** 32' FF 50' ROW @ 0.0135 FT/FT
*****
COMPUTE RATING CURVE CID=1 VS NO=9  NO SEGS=1
                    MIN ELEV=0.0    MAX ELEV=.87
                    CH SLP=.0135    FP SLP=0.0135  N=0.017
                    DIST=50
                    DIST  ELEV     DIST  ELEV     DIST  ELEV
                       0   .87      9.0   .67     9.05    0.
                      11  .125       25  .405       39  .125
                      41    0.    41.05   .67       50   .87
COMPUTE TRAVEL TIME ID=3 REACH NO=1  NO VS=1 LENGTH=400 FT SLOPE=0.0135
ROUTE               ID=3 HYD NO=206  INFLOW ID=2 DT=0.0
PRINT HYD           ID=3 CODE=1
*****
***** SUB-BASIN 107 RESIDENTIAL (PARK/RESIDENTIAL/WATER TNK)
*****
COMPUTE NM HYD      ID=1 HYD NO=107.0 AREA=0.0267 SQ MI
                    PER A=0 PER B=54 PER C=23 PER D=23
                    TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD           ID=1 CODE=1
*****
***** SUB-BASIN 108 UNDEVELOPED ASSUME RESIDENTIAL @ 4.0 UN/AC
*****
COMPUTE NM HYD      ID=2 HYD NO=108.0 AREA=0.0102 SQ MI
                    PER A=0 PER B=35 PER C=23 PER D=42
                    TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD           ID=2 CODE=1
*****
***** ADD SB 107 AND 108
*****
ADD HYD             ID=4 HYD=108 ID=1  ID=2
PRINT HYD           ID=4 CODE=1
*****
***** ADD SB 100 THRU 108
```

```
*****
ADD HYD              ID=2 HYD=108 ID=3  ID=4
PRINT HYD            ID=2 CODE=1
*****
***** ROUTE 300 FT SOUTHEAST ON SAPPHIRE ST. TO MICHELLES
***** 40' FF 60' ROW @ 0.014 FT/FT
***** INCLUDES 8" DIVERSION BERM
COMPUTE RATING CURVE CID=1 VS NO=11  NO SEGS=1
                     MIN ELEV=0.0    MAX ELEV=1.67
                     CH SLP=.014    FP SLP=0.014  N=0.017
                     DIST=60.05
                     DIST  ELEV     DIST  ELEV     DIST  ELEV
                        0  1.67     0.05   1.0       10  0.67
                    10.05    0.       12  .125       30  .485
                       48  .125       50    0.    50.05   0.67
                       60   1.0    60.05  1.67
COMPUTE TRAVEL TIME ID=3 REACH NO=1  NO VS=1 LENGTH=300 FT SLOPE=0.014
ROUTE                ID=3 HYD NO=208  INFLOW ID=2 DT=0.0
PRINT HYD            ID=3 CODE=1
*****
***** SUB-BASIN 109 RESIDENTIAL (3.8 UN/AC)
*****
COMPUTE NM HYD       ID=1 HYD NO=109.0 AREA=0.0057 SQ MI
                     PER A=0 PER B=36 PER C=25 PER D=39
                     TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD            ID=1 CODE=1
*****
***** SUB-BASIN 110 UNDEVELOPED ASSUME RESIDENTIAL @ 4.0 UN/AC
*****
COMPUTE NM HYD       ID=2 HYD NO=110.0 AREA=0.0232 SQ MI
                     PER A=0 PER B=46.56 PER C=0 PER D=53.44
                     TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD            ID=2 CODE=1
*****
***** ADD SB 109 AND 110
*****
ADD HYD              ID=4 HYD=110 ID=1  ID=2
PRINT HYD            ID=4 CODE=1
*****
***** ADD SB 100 thru 110
*****
ADD HYD              ID=2 HYD=110 ID=3  ID=4
PRINT HYD            ID=2 CODE=1
*****
***** ROUTE 200 FT EAST ON SAPPHIRE ST. FROM MICHELLE ST. TO INLETS
***** 40' FF 60' ROW @ 0.014 FT/FT
COMPUTE RATING CURVE CID=1 VS NO=9  NO SEGS=1
                     MIN ELEV=0.0    MAX ELEV=1.0
                     CH SLP=.014    FP SLP=0.014  N=0.017
                     DIST=60
                     DIST  ELEV     DIST  ELEV     DIST  ELEV
                        0   1.0       10  0.67    10.05    0.
                       12  .125       30  .485       48  .125
                       50    0.    50.05  0.67       60   1.0
COMPUTE TRAVEL TIME ID=3 REACH NO=1  NO VS=1 LENGTH=200 FT SLOPE=0.014
ROUTE                ID=3 HYD NO=210  INFLOW ID=2 DT=0.0
PRINT HYD            ID=3 CODE=1
*
**ANALYSIS POINT B
**BASIN401.12
COMPUTE NM HYD       ID=19 HYD NO=401.12 AREA=0.01126 SQ MI
                     PER A=0 B=29 C=29 D=42
                     TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD            ID=19 CODE=1
*
ADD HYD              ID=20 HYD NO=401.13 ID=19 ID=3
PRINT HYD            ID=20 CODE=1
*
**BASIN 300.2
COMPUTE NM HYD       ID=1 HYD NO=300.2 AREA=0.0118 SQ MI
                     PER A=0 B=29 C=29 D=42
```

```
                    TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD           ID=1 CODE=1
*
**BASIN 401.14
COMPUTE NM HYD      ID=2 HYD NO=401.14 AREA=0.01117 SQ MI
                    PER A=0 B=29 C=29 D=42
                    TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD           ID=2 CODE=1
*
ADD HYD             ID=3 HYD NO=401.15  ID=1 ID=2
PRINT HYD           ID=3 CODE=1
*
ADD HYD             ID=4 HYD NO=401.16  ID=3 ID=20
PRINT HYD           ID=4 CODE=1
*
**BASIN 401.17
COMPUTE NM HYD      ID=5 HYD NO=401.17 AREA=0.00661 SQ MI
                    PER A=0 B=29 C=29 D=42
                    TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD           ID=5 CODE=1
*
ADD HYD             ID=6 HYD NO=401.18  ID=4 ID=5
PRINT HYD           ID=6 CODE=1
*
**BASIN 405
COMPUTE NM HYD      ID=7 HYD NO=405 AREA=0.013934 SQ MI
                    PER A=0 B=28 C=28 D=44
                    TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD           ID=7 CODE=1
*
ADD HYD             ID=8 HYD NO=405.1  ID=6 ID=7
PRINT HYD           ID=8 CODE=1
*
**BASIN 404
COMPUTE NM HYD      ID=27 HYD NO=127 AREA=0.0108 SQ MI
                    PER A=0 B=29 C=29 D=42
                    TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD           ID=27 CODE=1
*
**BASIN 403
COMPUTE NM HYD      ID=9 HYD NO=403 AREA=0.0148 SQ MI
                    PER A=0 B=29 C=29 D=42
                    TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD           ID=9 CODE=1
*
ADD HYD             ID=10 HYD NO=405.15  ID=9 ID=27
PRINT HYD           ID=10 CODE=1
*
ADD HYD             ID=12 HYD NO=112  ID=8 ID=10
PRINT HYD           ID=12 CODE=1
*
** REVISED ORIGINAL SB 400.2 (AREA=0.032215)
*
**BASIN 400.2A
COMPUTE NM HYD      ID=11 HYD NO=400.2A AREA=0.00375 SQ MI
                    PER A=0 B=28 C=28 D=44
                    TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD           ID=11 CODE=1
*
**BASIN 400.2B
COMPUTE NM HYD      ID=13 HYD NO=400.2B AREA=0.01908 SQ MI
                    PER A=0 B=20 C=20 D=60
                    TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD           ID=13 CODE=1
*
ADD HYD             ID=14 HYD NO=405.17  ID=11 ID=13
PRINT HYD           ID=14 CODE=1
**BASIN 400.2C
COMPUTE NM HYD      ID=15 HYD NO=400.2C AREA=0.009375 SQ MI
                    PER A=0 B=28 C=28 D=44
                    TP=0.1333 HR MASS RAINFALL=-1
```

```
PRINT HYD            ID=15 CODE=1
*
ADD HYD              ID=16 HYD NO=405.16  ID=14 ID=15
PRINT HYD            ID=16 CODE=1
*
ADD HYD              ID=40 HYD NO=405.16  ID=16 ID=12
PRINT HYD            ID=40 CODE=1
*****
*****   HYDROGRAPH FOR ANALYSIS POINT C
*****
**BASIN W3(2)
RAINFALL              TYPE=1 RAIN QUARTER=0.0 IN
                      RAIN ONE=1.90 IN RAIN SIX=2.20 IN
                      RAIN DAY=2.70 IN DT=0.03333 HR

COMPUTE NM HYD        ID=1 HYD NO=101 AREA=0.003594 SQ MI
                      PER A=0 PER B=50 PER C=0 PER D=50
                      TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD             ID=1 CODE=1
*
**BASIN W3(3)
COMPUTE NM HYD        ID=2 HYD NO=102 AREA=0.006406 SQ MI
                      PER A=0 PER B=50 PER C=0 PER D=50
                      TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD             ID=2 CODE=1
*
**BASIN W3(4)
COMPUTE NM HYD        ID=3 HYD NO=103 AREA=0.005313 SQ MI
                      PER A=0 PER B=50 PER C=0 PER D=50
                      TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD             ID=3 CODE=1
*
**BASIN BINF
COMPUTE NM HYD        ID=4 HYD NO=104 AREA=0.006708 SQ MI
                      PER A=0 PER B=50 PER C=0 PER D=50
                      TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD             ID=4 CODE=1
*
**BASIN W3(6)
COMPUTE NM HYD        ID=5  HYD NO=105  AREA=0.000625 SQ MI
                      PER A=0 B=50 C=0 D=50
                      TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD             ID=5 CODE=1
*
**BASIN W3(7)
COMPUTE NM HYD        ID=6 HYD NO=106 AREA=0.003250 SQ MI
                      PER A=0 PER B=50 PER C=0 PER D=50
                      TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD             ID=6 CODE=1
*
**BASIN B-4
COMPUTE NM HYD        ID=7 HYD NO=107 AREA=0.000578 SQ MI
                      PER A=0 PER B=0 PER C=0 PER D=100
                      TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD             ID=7 CODE=1
*
**BASIN B-5
COMPUTE NM HYD        ID=8 HYD NO=108 AREA=0.002141 SQ MI
                      PER A=0 PER B=49 PER C=0 PER D=51
                      TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD             ID=8 CODE=1
*
**BASIN B-6
COMPUTE NM HYD        ID=9  HYD NO=109  AREA=0.001172 SQ MI
                      PER A=0 B=50 C=0 D=50
                      TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD             ID=9 CODE=1
*
**BASIN B-7
COMPUTE NM HYD        ID=10 HYD NO=110 AREA=0.005563 SQ MI
                      PER A=0 PER B=55 PER C=0 PER D=45
```

```
                        TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD               ID=10 CODE=1
*
**BASIN UNIT 2
COMPUTE NM HYD          ID=11 HYD NO=111 AREA=0.004500 SQ MI
                        PER A=0 PER B=50 PER C=0 PER D=50
                        TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD               ID=11 CODE=1
*
**BASIN 202
COMPUTE NM HYD          ID=22 HYD NO=122 AREA=0.009253 SQ MI
                        PER A=100 B=0 C=0 D=0
                        TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD               ID=22 CODE=1
*
**BASIN 202.05
COMPUTE NM HYD          ID=23 HYD NO=123 AREA=0.003747
                        PER A=0 B=0 C=0 D=100
                        TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD               ID=23 CODE=1
*
**BASIN 402
COMPUTE NM HYD          ID=26 HYD NO=126 AREA=0.052 SQ MI
                        PER A=0 B=29 C=29 D=42
                        TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD               ID=26 CODE=1
*
ADD HYD                 ID=12 HYD NO=112  ID=1  ID=2
PRINT HYD               ID=12 CODE=1
*
ADD HYD                 ID=13 HYD NO=113  ID=3  ID=4
PRINT HYD               ID=13 CODE=1
*
ADD HYD                 ID=14 HYD NO=114  ID=5  ID=6
PRINT HYD               ID=14 CODE=1
*
ADD HYD                 ID=15 HYD NO=115  ID=7  ID=8
PRINT HYD               ID=15 CODE=1
*
ADD HYD                 ID=16 HYD NO=116  ID=9  ID=10
PRINT HYD               ID=16 CODE=1
*
ADD HYD                 ID=17 HYD NO=117  ID=12  ID=13
PRINT HYD               ID=17 CODE=1
*
ADD HYD                 ID=18 HYD NO=118  ID=14  ID=17
PRINT HYD               ID=18 CODE=1
*
ADD HYD                 ID=19 HYD NO=119  ID=15  ID=16
PRINT HYD               ID=19 CODE=1
*
ADD HYD                 ID=20 HYD NO=120  ID=11  ID=19
PRINT HYD               ID=20 CODE=1
*
ADD HYD                 ID=21 HYD NO=121  ID=18  ID=20
PRINT HYD               ID=21 CODE=1
*
ADD HYD                 ID=24 HYD NO=124  ID=22  ID=23
PRINT HYD               ID=24 CODE=1
*
**ANALYSIS POINT C
ADD HYD                 ID=25 HYD NO=125  ID=21  ID=24
PRINT HYD               ID=25 CODE=1
*
**FLOW IN KIMELA DR. THAT WILL GO TO ANALYSIS POINT D
ADD HYD                 ID=29 HYD NO=129  ID=25  ID=26
PRINT HYD               ID=29 CODE=1
*
**ANALYSIS POINT D
ADD HYD                 ID=30 HYD NO=404.2 ID=40 ID= 29
PRINT HYD               ID=30 CODE=1
```

```
*
ROUTE RESERVOIR        ID=31 HYD NO=405.4 INFLOW ID=30 CODE=24
                      OUTFLOW(CFS)    STORAGE(AF)    ELEV(FT)
                          0                0           21
                        104.75            1.318        22
                        120.95            3.574        23
                        135.23            6.134        24
                        148.14            8.843        25
                        160.00           11.655        26
                        171.05           14.565        27
                        181.43           17.577        28
                        191.24           20.694        29
                        200.58           23.916        30
PRINT HYD             ID=31 CODE=1
FINISH
```

APPENDIX B

HYDRAULICS

```
1*****************************************************
 *  WATER SURFACE PROFILES                           *
 *  VERSION OF SEPTEMBER 1988                        *
 *  ERROR: 01,02                                     *
 *  UPDATED:  4 APRIL    1989                        *
 *  RUN DATE     5/17/ 1   TIME   17:36:30           *
 *****************************************************

                                        X     X  XXXXXXX   XXXXX              XXXXX
                                        X     X  X        X     X            X     X
                                        X     X  X        X                        X
                                        XXXXXXX  XXXX     X          XXXXX    XXXXX
                                        X     X  X        X                  X
                                        X     X  X        X     X            X
                                        X     X  XXXXXXX   XXXXX             XXXXXXX
 END OF BANNER

   THIS RUN EXECUTED  5/17/ 1    17:36:30
 ************************************************
   HEC2 RELEASE DATED SEP 88 UPDATED APR  1989
   ERROR CORR -  01,02
   MODIFICATION -
 ************************************************

 T1          DESERT SAGE CAPACITY (44' ROW)
 T2          26'FF W/ MOUNTABLE CURB - CROWN
 T3          82nd STREET

 J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

       0         2         0         0      .007         0         0         0         0         0

 J3  VARIABLE CODES FOR SUMMARY PRINTOUT

     38        43         1         2        26         4        68         3

 NC     .017      .017      .017       .1       .3
 QT        2     13.00     16.78
 X1        1         7         0       44        0         0         0         0         0         0
 GR      .51         0       .33      8.9        0         9       .26        22         0        35
 GR      .33      35.1       .51       44

    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA     LEFT/RIGHT
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST

 *PROF 1

 CCHV=     .100 CEHV=     .300
 *SECNO 1.000
```

```
*************************************
*  U.S. ARMY CORPS OF ENGINEERS     *
*  THE HYDROLOGIC ENGINEERING CENTER *
*  609 SECOND STREET, SUITE D       *
*  DAVIS, CALIFORNIA 95616-4687     *
*  (916) 756-1104, (916) 551-1748   *
*************************************
```

```
2096 WSEL NOT GIVEN, AVG OF MAX, MIN USED
     1.00      .33      .33      .00      .00      .43      .09      .00      .00      .51
      13.       0.      13.       0.       0.       5.       0.       0.       0.      .51
      .00      .00     2.46      .00     .000     .017     .000     .000      .00     8.79
  .006904       0.       0.       0.        0        0        6      .00    26.43    35.21

T1
T2 ANGELINA DAISY
T3 3.64 % STREET SLOPE

J1  ICHECK    INQ      NINV     IDIR     STRT     METRIC   HVINS    Q        WSEL     FQ
     0        3        0        1       .0364

J2  NPROF     IPLOT    PRFVS    XSECV    XSECH    FN       ALLDC    IBW      CHNIM    ITRACE
     2        0        -1       0        0        0        0        0        0        0

   SECNO    DEPTH    CWSEL    CRIWS    WSELK    EG       HV       HL       OLOSS    BANK ELEV
   Q        QLOB     QCH      QROB     ALOB     ACH      AROB     VOL      TWA    LEFT/RIGHT
   TIME     VLOB     VCH      VROB     XNL      XNCH     XNR      WTN      ELMIN      SSTA
   SLOPE    XLOBL    XLCH     XLOBR    ITRIAL   IDC      ICONT    CORAR    TOPWID     ENDST

*PROF 2

CCHV=      .100 CEHV=      .300
*SECNO 1.000
2096 WSEL NOT GIVEN, AVG OF MAX, MIN USED
     1.00      .27      .27      .37      .00      .59      .32      .00      .00      .51
      17.       0.      17.       0.       0.       4.       0.       0.       0.      .51
      .00      .00     4.50      .00     .000     .017     .000     .000      .00     8.92
  .036485       0.       0.       0.        0       14        6      .00    26.17    35.08

  THIS RUN EXECUTED  5/17/ 1    17:36:30
**************************************************
  HEC2 RELEASE DATED SEP 88 UPDATED APR  1989
  ERROR CORR -  01,02
  MODIFICATION -
**************************************************

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST
    82nd STREET
SUMMARY PRINTOUT

      SECNO       Q       CWSEL     CRIWS      VCH     TOPWID     FRCH      EG

      1.000     13.00      .33       .00      2.46     26.43      .97      .43
      1.000     16.78      .27       .37      4.50     26.17     2.10      .59

SUMMARY OF ERRORS AND SPECIAL NOTES
```

```
1*****************************************************
 *  WATER SURFACE PROFILES                           *
 *  VERSION OF SEPTEMBER 1988                        *
 *  ERROR: 01,02                                     *
 *  UPDATED:  4 APRIL    1989                        *
 *  RUN DATE     5/22/ 1   TIME    9:18:13            *
 *****************************************************

                                        X     X  XXXXXXX   XXXXX              XXXXX
                                        X     X  X        X     X            X     X
                                        X     X  X        X                        X
                                        XXXXXXX  XXXX     X          XXXXX    XXXXX
                                        X     X  X        X                  X
                                        X     X  X        X     X            X
                                        X     X  XXXXXXX   XXXXX             XXXXXXX
END OF BANNER

  EXECUTED  5/22/ 1     9:18:13
 ************************************************
  HEC2 RELEASE DATED SEP 88 UPDATED APR  1989
  ERROR CORR -  01,02
  MODIFICATION -
 ************************************************

 T1          DESERT SAGE STREET CAPACITY CALCULATIONS
 T2          26'FF W/ STD CURB, NO CROWN, 1.7% CROSS SLOPE, 5% SLOPE
 T3          FEATHERTOP DRIVE

 J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

       0         2         0         1       .05         0         0         0         0         0

 J3  VARIABLE CODES FOR SUMMARY PRINTOUT

     38        43         1         2        26         4        68         3

 NC     .017      .017      .017       .1        .3
 QT        1     29.50
 X1        1         7         0        44         0         0         0         0         0         0
 GR      .85         0       .67       8.9         0         9      .125        11      .533        35
 GR    1.203      35.1     1.403        44

    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     BANK ELEV
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA     LEFT/RIGHT
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST

 *PROF 1

 CCHV=     .100 CEHV=     .300
 *SECNO 1.000
```

```
*****************************************
*  U.S. ARMY CORPS OF ENGINEERS         *
*  THE HYDROLOGIC ENGINEERING CENTER    *
*  609 SECOND STREET, SUITE D           *
*  DAVIS, CALIFORNIA 95616-4687         *
*  (916) 756-1104, (916) 551-1748       *
*****************************************
```

```
2096 WSEL NOT GIVEN, AVG OF MAX, MIN USED
     1.00      .48      .48      .64      .00     1.15      .67      .00      .00      .85
      30.       0.      29.       0.       0.       4.       0.       0.       0.     1.40
      .00      .00     6.56      .00     .000     .017     .000     .000      .00     8.93
  .050226       0.       0.       0.        0       14        6      .00    22.80    31.72

  THIS RUN EXECUTED  5/22/ 1     9:18:13
**************************************************
  HEC2 RELEASE DATED SEP 88 UPDATED APR  1989
  ERROR CORR -  01,02
  MODIFICATION -
**************************************************

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

    FEATHERTOP DRIVE

SUMMARY PRINTOUT

      SECNO        Q       CWSEL     CRIWS      VCH     TOPWID     FRCH       EG

       1.000     29.50       .48       .64      6.56     22.80      2.60      1.15

 SUMMARY OF ERRORS AND SPECIAL NOTES
```

```
1*****************************************************
 *  WATER SURFACE PROFILES                           *
 *  VERSION OF SEPTEMBER 1988                        *
 *  ERROR: 01,02                                     *
 *  UPDATED:  4 APRIL    1989                        *
 *  RUN DATE     5/21/ 1   TIME   16:26:56           *
 *****************************************************
```

```
*****************************************
*  U.S. ARMY CORPS OF ENGINEERS         *
*  THE HYDROLOGIC ENGINEERING CENTER    *
*  609 SECOND STREET, SUITE D           *
*  DAVIS, CALIFORNIA 95616-4687         *
*  (916) 756-1104, (916) 551-1748       *
*****************************************
```

```
X     X  XXXXXXX   XXXXX              XXXXX
X     X  X        X     X            X     X
X     X  X        X                        X
XXXXXXX  XXXX     X          XXXXX    XXXXX
X     X  X        X                  X
X     X  X        X     X            X
X     X  XXXXXXX   XXXXX              XXXXXXX
```

```
END OF BANNER
  THIS RUN EXECUTED  5/21/ 1    16:26:56
**************************************************
  HEC2 RELEASE DATED SEP 88 UPDATED APR  1989
  ERROR CORR -  01,02
  MODIFICATION -
**************************************************

T1          DESERT SAGE STREET CAPACITY CALCULATIONS
T2          28'FF 8" STD CURB
T3          ANGELINA DAISY ROAD

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

      0         2         0         1      .0364        0         0         0         0         0

J3  VARIABLE CODES FOR SUMMARY PRINTOUT

     38        43         1         2        26         4        68         3

NC     .017      .017      .017       .1       .3
QT        3     16.78     27.51    35.05
X1        1         9         0       46        0         0         0         0         0         0
GR      .87         0       .67      8.9        0         9      .125        11      .365        23
GR     .125        35         0       37      .67      37.1       .87        46

   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS     BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA     LEFT/RIGHT
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST

*PROF 1

CCHV=      .100 CEHV=      .300
*SECNO 1.000
2096 WSEL NOT GIVEN, AVG OF MAX, MIN USED
```

```
3265 DIVIDED FLOW

     1.00       .35       .35       .44       .00       .66       .30       .00       .00       .87
      17.        0.       17.        0.        0.        4.        0.        0.        0.       .87
      .00       .00      4.42       .00      .000      .017      .000      .000       .00      8.95
  .035930        0.        0.        0.         0         5         6       .00     26.98     37.05

T1 28' FF
T2 FEATHERTOP
T3

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

      0         3         0         1       .0165

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

     2         0        -1         0         0         0         0         0         0         0

   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS    BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA    LEFT/RIGHT
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST

*PROF 2

CCHV=      .100 CEHV=      .300
*SECNO 1.000
2096 WSEL NOT GIVEN, AVG OF MAX, MIN USED
     1.00       .45       .45       .53       .00       .72       .27       .00       .00       .87
      28.        0.       28.        0.        0.        7.        0.        0.        0.       .87
      .00       .00      4.18       .00      .000      .017      .000      .000       .00      8.93
  .016454        0.        0.        0.         0        11         5       .00     28.14     37.07

T1 28' FF
T2 FEATHERTOP
T3

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

      0         4         0         1       .0165

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

     3         0        -1         0         0         0         0         0         0         0

   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS    BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA    LEFT/RIGHT
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST
```

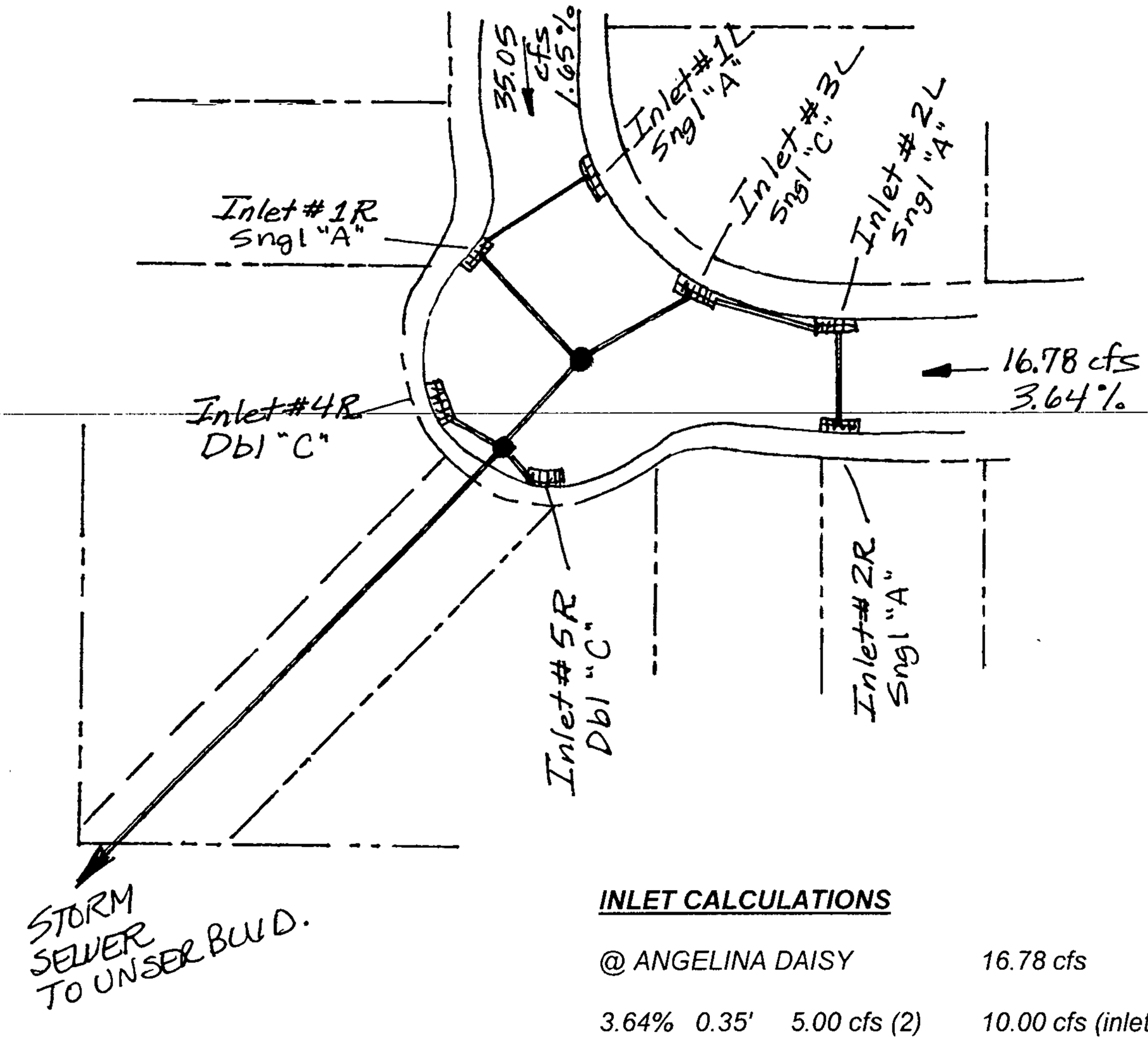
```
*PROF 3

CCHV=      .100 CEHV=      .300
*SECNO 1.000
2096 WSEL NOT GIVEN, AVG OF MAX, MIN USED
     1.00       .49       .49       .58       .00       .82       .33       .00       .00       .87
      35.        0.       35.        0.        0.        8.        0.        0.        0.       .87
      .00       .00      4.60       .00      .000      .017      .000      .000       .00      8.93
  .016513        0.        0.        0.         0        11         6       .00     28.15     37.07

**************************************************
  HEC2 RELEASE DATED SEP 88 UPDATED APR  1989
  ERROR CORR -  01,02
  MODIFICATION -
**************************************************

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

    ANGELINA DAISY ROAD

SUMMARY PRINTOUT

      SECNO        Q       CWSEL      CRIWS       VCH     TOPWID      FRCH       EG

      1.000    16.78        .35        .44      4.42     26.98      2.12      .66
      1.000    27.51        .45        .53      4.18     28.14      1.52      .72
      1.000    35.05        .49        .58      4.60     28.15      1.56      .82

SUMMARY OF ERRORS AND SPECIAL NOTES
```

APPENDIX C

STORM SEWER

D. Mark Goodwin & Associates, P.A.
Consulting Engineers
P.O. BOX 90606, ALBUQUERQUE, NM 87199
(505) 828-2200 FAX 797-9539
e-mail: dmg@swcp.com

PROJECT Desert Sage
SUBJECT Inlet Calcs.
BY DLH DATE 5-22-01
CHECKED _____ DATE _____
SHEET ____ OF ____



INLET CALCULATIONS

@ ANGELINA DAISY			*16.78 cfs*
3.64%	*0.35'*	*5.00 cfs (2)*	*10.00 cfs (inlets #2L & #2R)*
			6.78 cfs

@ FEATHERTOP			*35.05 cfs*
1.65%	*0.49'*	*7.00 cfs (2)*	*14.00 cfs (inlets # 1L & #1R)*
			21.05 cfs

6.78 cfs + 21.05 cfs = 27.83 cfs

8.14 cfs (intercepted by sump inlet #3L)

19.69 cfs (intercepted by sump inlets #4R & #5R)

CALCULATIONS FOR INLETS AT SUMP
for
Desert Sage Subdivision

Angelina Daisy / Feathertop sump inlet along inside of curve

Capacity is measured by the weir equation at the lip of the gutter assuming an allowable ponding elevation equal to the the crown of the road which is at a height of 0.36'. The length of the double grate facing the street is 6.5' and the maximum depth is 0.36' at the lip of the gutter. The sides are each 2' long at an average depth of 0.475' ((0.36 + 1/2(0.23')). From the weir equation:

---

*Front Q cap = (3.0) x (6.5') x (0.36) **1.5 = 4.21 cfs*

*Sides Q cap = (3.0) x (4.0') x (0.475) **1.5 = 3.93 cfs*

Total Q cap = 4.21 cfs + 3.93 cfs = ***8.14 cfs***

Capacity is measured by the weir equation at the lip of the gutter assuming an allowable ponding elevation equal to the lowest adjacent right of way elevation. The length of the double grate facing the street is 6.5' and the maximum depth is 0.725' at the lip of the gutter. The sides are each 2' long and the average depth is 0.892'. These depths assume an 8" curb with right of way 9' behind the curb for an additional depth of 0.18' above the top of curb. From the weir equation:

Feathertop / Angelina Daisy Knuckle Sump Inlets:

FOR DOUBLE 'C' INLET

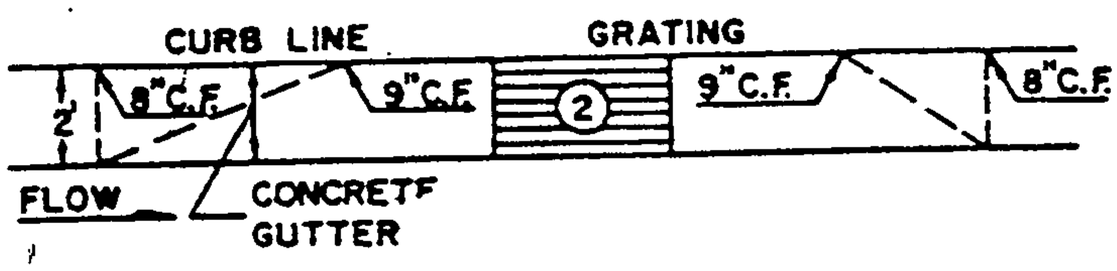
*Front Q cap = (3.0) x (6.5') x (0.725) **1.5 = 12.04 cfs*

*Sides Q cap = (3.0) x (4.0') x (0.892) **1.5 = 10.11 cfs*

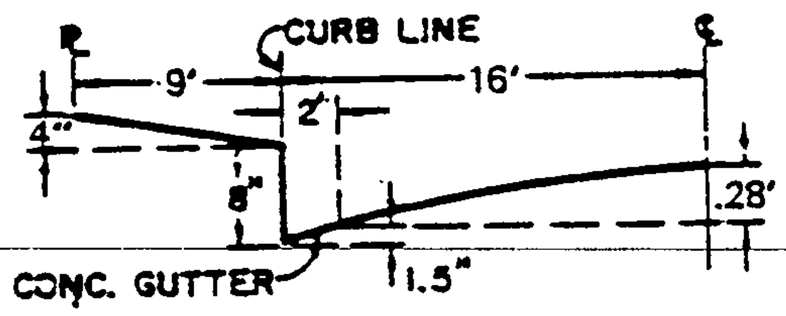
Total Q cap = 12.04 cfs + 10.11 cfs = ***22.15 cfs***

The 100 year developed conditions runoff from the site is 51.83 cfs. 32.14 cfs is intercepted before it reaches the sump inlet at the lowest area in the knuckle. The remaining flow reaching these sump inlets is 19.69 cfs. Two double 'C' inlets will have a combined capacity to intercept 44.30 cfs which is double the actual 100 year flow rate.

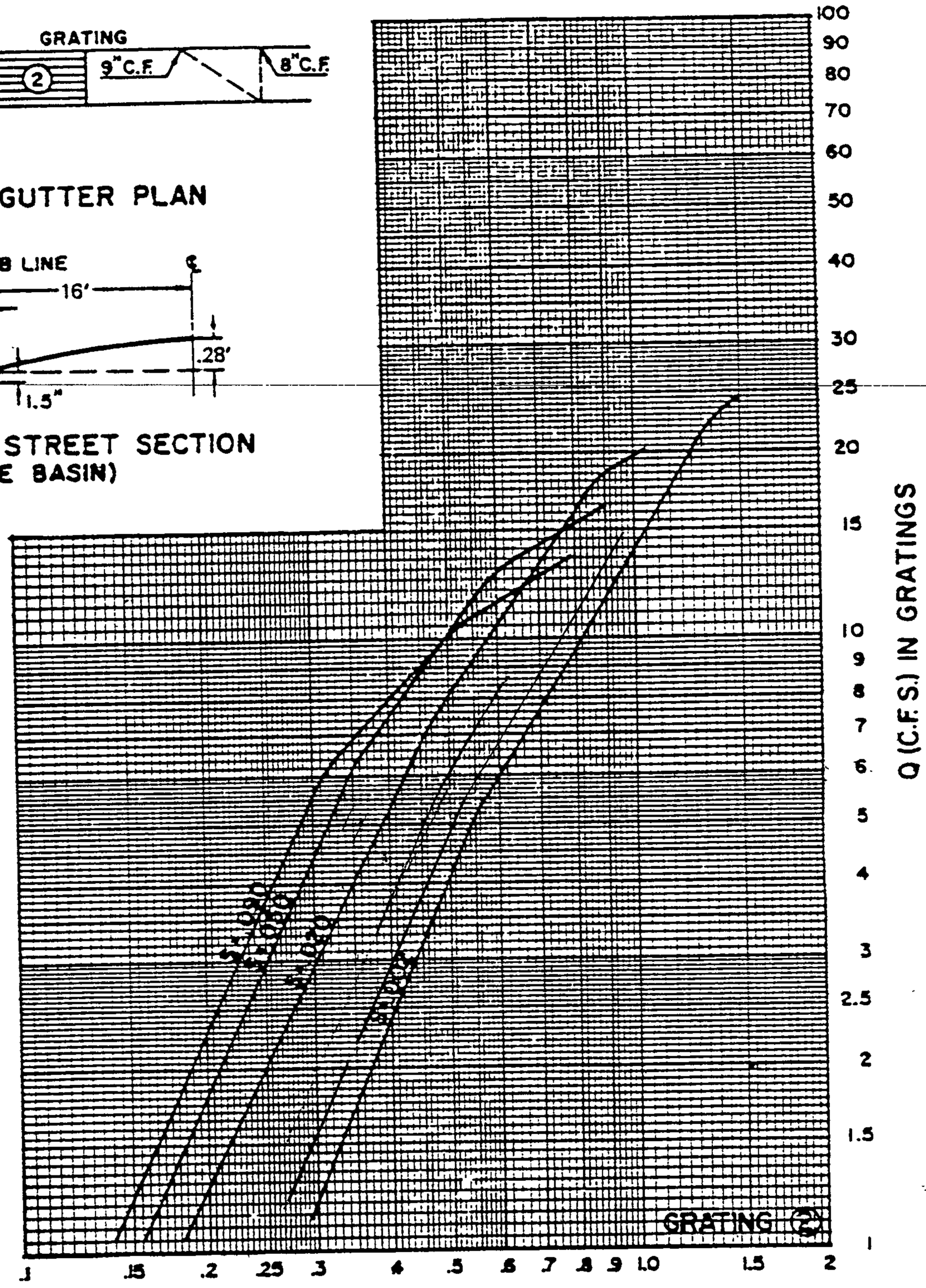
GRATING CAPACITIES FOR TYPE "A", "C" and "D"



GRATING & GUTTER PLAN



TYPICAL HALF STREET SECTION
(ABOVE BASIN)



HYDRAULIC REPORT FOR

DESERT SAGE

PRELIMINARY

UNSER BLVD EXTENSION

STORM SEWER ANALYSIS

MARK GOODWIN & ASSOCIATES

DLH

JUNE 2001

LINE 1 / Q = 100.9 / HT = 42 / WID = 42 / N = .013 / L = 60 / JLC = .5

EXIST 66 SD- MH 1 / Outfall

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	30.00	42.00	24.15	10.49	31.71	0.00	4.85	9.62
UPSTRM	30.60	42.00	25.60	10.49	32.31	0.00	5.89	9.62

Drainage area (ac)	= 0	Slope of invert (%)	= 2.417
Runoff coefficient	= 0	Slope energy grade line (%)	= 1.006
Time of conc (min)	= 8	Critical depth (in)	= 37.82
Inlet time (min)	= 0	Req'd length curb inlet (ft)	= 0.0
Intensity (in/hr)	= 0.00	Req'd grate area (sf)	= 0.0
Cumulative C*A	= 0.0	Depth at inlet opening (in)	= 0
Flow contrib (cfs)	= 100.9	Confluence angle (deg)	= 0
Default Q (cfs)	= 100.9	Natural ground elev (ft)	= 35
Line capac. (cfs)	= 156.4	Line storage (cuft)	= 577

LINE 2 / Q = 71.6 / HT = 36 / WID = 36 / N = .013 / L = 350 / JLC = .5

MH 1 - MH 2 / DNLN = 1

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	31.46	36.00	26.10	10.13	33.05	0.00	5.89	7.07
UPSTRM	39.71	32.47	37.00	10.66	41.47	21.40	5	6.71

Drainage area (ac)	= 0	Slope of invert (%)	= 3.114
Runoff coefficient	= 0	Slope energy grade line (%)	= 2.406
Time of conc (min)	= 6	Critical depth (in)	= 32.42
Inlet time (min)	= 0	Req'd length curb inlet (ft)	= 0.0
Intensity (in/hr)	= 0.00	Req'd grate area (sf)	= 0.0
Cumulative C*A	= 0.0	Depth at inlet opening (in)	= 0
Flow contrib (cfs)	= 71.5	Confluence angle (deg)	= 0
Default Q (cfs)	= 71.57	Natural ground elev (ft)	= 45
Line capac. (cfs)	= 117.7	Line storage (cuft)	= 2411

LINE 3 / Q = 71.6 / HT = 36 / WID = 36 / N = .013 / L = 340 / JLC = .5

MH 2 - MH 3 / DNLN = 2

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	40.59	36.00	37.00	10.13	42.18	0.00	5	7.07
UPSTRM	54.71	32.47	52.00	10.66	56.47	21.40	5	6.71

Drainage area (ac)	= 0	Slope of invert (%)	= 4.412
Runoff coefficient	= 0	Slope energy grade line (%)	= 4.203
Time of conc (min)	= 4	Critical depth (in)	= 32.42
Inlet time (min)	= 0	Req'd length curb inlet (ft)	= 0.0
Intensity (in/hr)	= 0.00	Req'd grate area (sf)	= 0.0
Cumulative C*A	= 0.0	Depth at inlet opening (in)	= 0
Flow contrib (cfs)	= 71.5	Confluence angle (deg)	= 15
Default Q (cfs)	= 71.57	Natural ground elev (ft)	= 60
Line capac. (cfs)	= 140.1	Line storage (cuft)	= 2342

LINE 4 / Q = 51.8 / HT = 36 / WID = 36 / N = .013 / L = 290 / JLC = .75

MH 3 - MH 4 / DNLN = 3

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	55.59	36.00	52.00	7.33	56.42	0.00	5	7.07
UPSTRM	57.34	36.00	54.00	7.33	58.18	0.00	5	7.07

Drainage area (ac)	= 0	Slope of invert (%)	= 0.690
Runoff coefficient	= 0	Slope energy grade line (%)	= 0.604
Time of conc (min)	= 3	Critical depth (in)	= 27.53
Inlet time (min)	= 0	Req'd length curb inlet (ft)	= 0.0
Intensity (in/hr)	= 0.00	Req'd grate area (sf)	= 0.0
Cumulative C*A	= 0.0	Depth at inlet opening (in)	= 0
Flow contrib (cfs)	= 51.8	Confluence angle (deg)	= 90
Default Q (cfs)	= 51.83	Natural ground elev (ft)	= 62
Line capac. (cfs)	= 55.4	Line storage (cuft)	= 2050

LINE 5 / Q = 51.8 / HT = 36 / WID = 36 / N = .013 / L = 300 / JLC = .5

MH 4 - MH 5 / DNLN = 4

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	57.97	36.00	54.00	7.33	58.80	0.00	5	7.07
UPSTRM	59.78	36.00	56.00	7.33	60.61	0.00	5	7.07

Drainage area (ac)	= 0	Slope of invert (%)	= 0.667
Runoff coefficient	= 0	Slope energy grade line (%)	= 0.604
Time of conc (min)	= 1	Critical depth (in)	= 27.53
Inlet time (min)	= 0	Req'd length curb inlet (ft)	= 0.0
Intensity (in/hr)	= 0.00	Req'd grate area (sf)	= 0.0
Cumulative C*A	= 0.0	Depth at inlet opening (in)	= 0
Flow contrib (cfs)	= 51.8	Confluence angle (deg)	= 0
Default Q (cfs)	= 51.83	Natural ground elev (ft)	= 64
Line capac. (cfs)	= 54.5	Line storage (cuft)	= 2120

LINE 6 / Q = 51.8 / HT = 36 / WID = 36 / N = .013 / L = 195 / JLC = .75

MH 5 - MH 6 / DNLN = 5

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	60.20	36.00	56.00	7.33	61.03	0.00	5	7.07
UPSTRM	62.00	36.00	57.20	7.33	62.84	0.00	4.49	7.07

Drainage area (ac)	= 0	Slope of invert (%)	= 0.615
Runoff coefficient	= 0	Slope energy grade line (%)	= 0.604
Time of conc (min)	= 0	Critical depth (in)	= 27.53
Inlet time (min)	= 0	Req'd length curb inlet (ft)	= 0.0
Intensity (in/hr)	= 0.00	Req'd grate area (sf)	= 0.0
Cumulative C*A	= 0.0	Depth at inlet opening (in)	= 0
Flow contrib (cfs)	= 51.8	Confluence angle (deg)	= 45
Default Q (cfs)	= 51.83	Natural ground elev (ft)	= 64.7
Line capac. (cfs)	= 52.3	Line storage (cuft)	= 1378

D. Mark Goodwin and Associates, P.A.
Consulting Engineers

P.O. Box 90606 ❖ Albuquerque, NM 87199
(505) 828-2200 ❖ (505) 797-9539 fax
e-mail: dmg@swcp.com

LETTER OF TRANSMITTAL

TO: **One Stop Hydrology**

DATE: **June 4, 2001**

RE: **Desert Sage**

We are sending:

Copies	Date	Description
1		**Drainage Report and Grading Plan**
1		**Infrastructure List**
1		**Plat**

__X__ For your approval

_____ For your information

_____ As you requested

_____ For your files

_____ Pre-Design Meeting

Project Engineer: Diane Hoelzer

Diane Hoelzer, PE

RECEIVED
JUN 04 2001
HYDROLOGY SECTION

EXHIBIT A (REVISED 5/1/99)
TO SUBDIVISION IMPROVEMENT AGREEMENT
DEVELOPMENT REVIEW BOARD
REQUIRED INFRASTRUCTURE LIST
(Tracts 487-A and 488, Town of Atrisco Grant , Unit 7)

Desert Sage Subdivision
(NAME and UNIT OF SUBDIVISION)

Application No.: _____
D.R.C. Project No.: _____
Prelim. Plat Approved: _____
Prelim. Plat Expires: _____
Site Plan Approved: _____

Date Submitted: 5-24-01

Following is a summary of PUBLIC/PRIVATE Infrastructure required to be constructed or financially guaranteed for the above development. This listing is not necessarily a complete listing. During the SIA process and/or in the review of the construction drawings, if the DRC Chair determines that appurtenant items and/or unforseen items have not been included in the infrastructure listing, the DRC Chair may include those items in the listing and related financial guarantee. Likewise, if the DRC Chair determines that appurtenant or non essential items can be deleted from the listing, those items may be deleted as well as the related portions of the financial guarantees. All such revisions require approval by the DRC Chair, the User Department and agent/owner. If such approvals are obtained, these revisions to the listing will be incorporated administratively. In addition, any unforseen items which arise during construction which are necessary to complete the project and which normally are the Subdivider's responsibility will be required as a condition of the project acceptance and close out by the City.

SIZE	TYPE IMPROVEMENT	LOCATION	FROM	TO
PAVEMENT				
29' F-F	Art Pvmt Std C & G (south side) 6' Sdwk (south side) Extruded Conc Curb (north side)	Sage Road	West Prop. Line	82 nd Street
28'FF 4'	Res Pvmt C & G (both sides) Sidewalk (both sides)*	82 nd Street	Sage Road	South Prop. Line
26'FF 4'	Res Pvmt C & G (both sides) Sidewalk (south side)*	Church Access Esmt.	82 nd Street	Tract 487-A
26'FF 4'	Res Pvmt C & G (both sides) Sidewalk (both sides)*	Feathertop Road	82 nd Street	Angelina Daisy Street
28'FF 4'	Res Pvmt C & G (both sides) Sidewalk (both sides)*	Angelina Daisy Street	Tract 487-A	Feathertop Road
26'FF 4'	Res Pvmt C & G (both sides) Sidewalk (both side)*	Regal Mist Loop	Angelina Daisy Street	Angelina Daisy Street

EXHIBIT A (REVISED 5/1/99)
TO SUBDIVISION IMPROVEMENT AGREEMENT
DEVELOPMENT REVIEW BOARD
REQUIRED INFRASTRUCTURE LIST
(Tracts 487-A and 488, Town of Atrisco Grant , Unit 7)

Desert Sage Subdivision
(NAME and UNIT OF SUBDIVISION)

Application No.: _____
D.R.C. Project No.: _____
Prelim. Plat Approved: _____
Prelim. Plat Expires: _____
Site Plan Approved: _____

Date Submitted: 5-24-01

SIZE	TYPE IMPROVEMENT	LOCATION	FROM	TO
WATER				
6"	Waterline	82 nd Street	Sage Road	South Prop. Line
6"	Waterline	Feathertop Road	82 nd Street	Angelina Daisy Street
6"	Waterline	Angelina Daisy Street	Tract 487-A	Feathertop Road
6"	Waterline	Regal Mist Loop	Angelina Daisy Street	Angelina Daisy Street
6"	Waterline	Esmt. Bet Lots 7 & 8	Feathertop Road	Tract D
SANITARY SEWER				
8"	Sanitary Sewer	82 nd Street	Sage Road	South Prop. Line
8"	Sanitary Sewer	Feathertop Road	82 nd Street	Angelina Daisy Street
8"	Sanitary Sewer	Angelina Daisy Street	Tract 487-A	Feathertop Road
8"	Sanitary Sewer	Regal Mist Loop	Angelina Daisy Street	Angelina Daisy Street
8"	Sanitary Sewer	Esmt. Bet Lots 7 & 8	Feathertop Road	Tract D
8"	Sanitary Sewer	Esmt. N. Side Tract D	Esmt. Bet Lots 7 & 8	Unser Blvd.
STORM DRAIN AND OTHER DRAINAGE IMPROVEMENTS				
36"	Storm Drain	Esmt. Bet Lots 7 & 8	Feathertop Road	Tract D

Pipe in Sage

EXHIBIT A (REVISED 5/1/99)
TO SUBDIVISION IMPROVEMENT AGREEMENT
DEVELOPMENT REVIEW BOARD
REQUIRED INFRASTRUCTURE LIST
(Tracts 487-A and 488, Town of Atrisco Grant , Unit 7)

Desert Sage Subdivision
(NAME and UNIT OF SUBDIVISION)

Application No.: _____
D.R.C. Project No.: _____
Prelim. Plat Approved: _____
Prelim. Plat Expires: _____
Site Plan Approved: _____

Date Submitted: 5-24-01

* Sidewalk to be deferred

1. Stormdrain to include manholes, inlets, riprap and outfall.

2. ~~Grading and Drainage Certification per DPM including Perimeter Walls as shown on the Grading Plan for Release of~~ SIA and Financial Guarantees. Financial Guarantee is not required for this item.

3. Water infrastructure to include valves, fittings, valveboxes and fire hydrants.

4. Sanitary sewer to include manholes and service connections.

5. Street lights per DPM.

Signature: John M. MacKenzie
Agent/Owner Print Name: John M. MacKenzie, P.E.
Firm: Mark Goodwin & Associates, PA

DEVELOPMENT REVIEW BOARD MEMBER APPROVALS

Transportation Dev.	Date	Utility Dev.	Date	Parks & Recreation	Date
Engineer/AMAFCA	Date	DRB Chairman	Date		

DRC REVISIONS

REVISIONS	DATE	DRC CHAIR	USER DEPT	AGENT/OWNER
①				

EXHIBIT A (REVISED 5/1/99)
TO SUBDIVISION IMPROVEMENT AGREEMENT
DEVELOPMENT REVIEW BOARD
REQUIRED INFRASTRUCTURE LIST
(Tracts 487-A and 488, Town of Atrisco Grant , Unit 7)

Desert Sage Subdivision
(NAME and UNIT OF SUBDIVISION)

Application No.: 1000667
D.R.C. Project No.: _____
Prelim. Plat Approved: _____
Prelim. Plat Expires: _____
Site Plan Approved: _____

Date Submitted: 7-20-01

Following is a summary of PUBLIC/PRIVATE Infrastructure required to be constructed or financially guaranteed for the above development. This listing is not necessarily a complete listing. During the SIA process and/or in the review of the construction drawings, if the DRC Chair determines that appurtenant items and/or unforseen items have not been included in the infrastructure listing, the DRC Chair may include those items in the listing and related financial guarantee. Likewise, if the DRC Chair determines that appurtenant or non essential items can be deleted from the listing, those items may be deleted as well as the related portions of the financial guarantees. All such revisions require approval by the DRC Chair, the User Department and agent/owner. If such approvals are obtained, these revisions to the listing will be incorporated administratively. In addition, any unforseen items which arise during construction which are necessary to complete the project and which normally are the Subdivider's responsibility will be required as a condition of the project acceptance and close out by the City.

SIZE	TYPE IMPROVEMENT	LOCATION	FROM	TO
PAVEMENT				
29' FF	Art Pvmt Std C & G (south side) 6' Sdwk (south side)	Sage Road	West Prop. Line	82 nd Street
28' FF 4'	Res Pvmt C & G (both sides) Sidewalk (both sides)*	82 nd Street	Sage Road	South Prop. Line
26' FF 4'	Res Pvmt C & G (both sides) Sidewalk (south side)*	Church Tract A	82 nd Street	Tract 486-A
26' FF 4'	Res Pvmt C & G (both sides) Sidewalk (both sides)*	Feathertop Road	82 nd Street	Angelina Daisy Street
28' FF 4'	Res Pvmt C & G (both sides) Sidewalk (both sides)*	Angelina Daisy Street	Tract 486-A	Feathertop Road
26' FF 4'	Res Pvmt C & G (both sides) Sidewalk (both side)*	Regal Mist Loop	Angelina Daisy Street	Angelina Daisy Street

JUL 2 0 2001
PWD/DESIGN REVIEW

EXHIBIT A (REVISED 5/1/99)
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DEVELOPMENT REVIEW BOARD
REQUIRED INFRASTRUCTURE LIST
(Tracts 487-A and 488, Town of Atrisco Grant , Unit 7)

Desert Sage Subdivision
(NAME and UNIT OF SUBDIVISION)

Application No.: 1000667
D.R.C. Project No.:
Prelim. Plat Approved:
Prelim. Plat Expires:
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Date Submitted: 7-20-01

SIZE	TYPE IMPROVEMENT	LOCATION	FROM	TO
WATER				
10"	Waterline	82nd Street	Sage Road Exist 12" WL	South Prop. Line Exist WL
6"	Waterline	Feathertop Road	82nd Street	Angelina Daisy Street
6"	Waterline	Angelina Daisy Street	Tract 486-A	Feathertop Road
6"	Waterline	Regal Mist Loop	Angelina Daisy Street	Angelina Daisy Street
6"	Waterline	Lot 8, Blk1 Public Easement	Feathertop Road	Tract D
6"	Waterline	Lot 21, Blk 2	82nd Street	Tract C/D
SANITARY SEWER				
8"	Sanitary Sewer	Sage Road	West P.L.	82nd Street
8"	Sanitary Sewer	82nd Street	Sage Road	Feathertop Road
8"	Sanitary Sewer	Feathertop Road	82 nd Street	Angelina Daisy Street
8"	Sanitary Sewer	Angelina Daisy Street	Tract 486-A	Feathertop Road
8"	Sanitary Sewer	Regal Mist Loop	Angelina Daisy Street	Angelina Daisy Street
8"	Sanitary Sewer	Lot 8, Blk1 Public Easement	Feathertop Road	Tract D
8"	Sanitary Sewer	Tract D 30' Public Easement	Lot 8, Blk1 Public Easement	Unser Blvd. (Exist. 15" SAS)
8"	Sanitary Sewer	Lot 21, Blk 2	82nd Street	Tract C/D
STORM DRAIN AND OTHER DRAINAGE IMPROVEMENTS				
36"	Storm Sewer	Lot 8, Blk1 Public Easement	Feathertop Road	Tract D

EXHIBIT A (REVISED 5/1/99)
TO SUBDIVISION IMPROVEMENT AGREEMENT
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Desert Sage Subdivision
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SIZE	TYPE IMPROVEMENT	LOCATION	FROM	TO
36"	Storm Sewer	Tract D 30' Public Easement	Lot 8, Blk1 Public Easement	Unser Blvd. R/W

* Sidewalk to be deferred

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5. Street lights per DPM.

Signature: Diane Hoelzer
Agent/Owner Print Name: Diane Hoelzer, P.E.
Firm: Mark Goodwin & Associates, PA

DEVELOPMENT REVIEW BOARD MEMBER APPROVALS

Transportation Dev.	Date	Utility Dev.	Date	Parks & Recreation	Date
Engineer/AMAFCA	Date	DRB Chairman	Date		

DRC REVISIONS

REVISIONS	DATE	DRC CHAIR	USER DEPT	AGENT/OWNER
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