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

January 13, 2003

Gregory J Krenik, PE
Mark Goodwin & Associates
P.O. 90606
Albuquerque, NM 87199

Re: Sage Pointe Subdivision Drainage Report
Engineer's Stamp dated 12-2-02 (M10/D11)

Dear Mr. Krenik,

Based upon the information provided in your submittal dated 11-27-02, the above referenced report is approved for Preliminary Plat action by the DRB.

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

Sincerely,

Bradley L. Bingham, PE
Sr. Engineer, Planning Dept.
Development and Building Services

C: file

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

DRAINAGE AND TRANSPORTATION INFORMATION SHEET

M-10 / D 11

(REV.1/11/2002)

PROJECT TITLE: Sage Pointe Subdivision

ZONE MAP/DRB.FILE#: ~~M-9~~

DRB#. 1000408 EPC# _____

WORK ORDER#: _____

LEGAL DESCRIPTION: Tract 490 and 491, Town on Atrisco Grant, Unit 7

CITY ADDRESS: _____

ENGINEERING FIRM: Mark Goodwin & Associates, PA — CONTACT: Gregory J. Krenik, PE

ADDRESS: P.O. Box 90606 — PHONE: 828-2200

CITY, STATE: Albuquerque NM — ZIP CODE: 87119

OWNER: C & W Land Development — CONTACT: Rex Wilson

ADDRESS: 4619 Inspiration Dr. SE — PHONE: (505) 450-2305

CITY, STATE: Albuquerque NM — ZIP CODE: 87122

ARCHITECT: _____ — CONTACT: _____

ADDRESS: _____ — PHONE: _____

CITY, STATE: _____ — ZIP CODE: _____

SURVEYOR: _____ — CONTACT: _____

ADDRESS: _____ — PHONE: _____

CITY, STATE: _____ — ZIP CODE: _____

CONTRACTOR: _____ — CONTACT: _____

ADDRESS: _____ — PHONE: _____

CITY, STATE: _____ — ZIP CODE: _____

TYPE OF SUBMITTAL:

- ____ DRAINAGE REPORT
- X DRAINAGE PLAN – REVISED TO MATCH PLAT
- ____ CONCEPTUAL GRADING & DRAINAGE PLAN
- X GRADING PLAN – REVISED TO MATCH PLAT
- ____ EROSION CONTROL PLAN
- ____ 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:

- ____ SIA / FINANCIAL GUARANTY RELEASE
- ✔ 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
- ____ CERTIFICATE OF OCCUPANCY (PERM)
- ____ CERTIFICATE OF OCCUPANCY (TEMP)
- ✔ GRADING PERMIT APPROVAL
- ____ PAVING PERMIT APPROVAL
- ____ WORK ORDER APPROVAL
- ✓ OTHER (SPECIFY) Rough Grading Approval

RECEIVED
NOV 27 2002
HYDROLOGY SECTION

DATE SUBMITTED: 12-2-02 BY: _____

Gregory Krenik, 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.

f \\forms\drainf.tbl

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

July 25, 2002

Gregory Krenik
Mark Goodwin & Associates
P.O. Box 90606
Albuquerque New Mexico 87119

RE: Revised Grading and Drainage Plan for Sage Pointe Subdivision (M10-D11) Dated May 22, 2002

Dear Mr. Krenik:

The above referenced drainage plan is approved for Amended Preliminary Plat action at DRB. Please submit the grading and drainage plan mylar so I can sign for rough grading.

If you have any questions please call me at 924-3982.

Sincerely,

Carlos A. Montoya
City Floodplain Administrator

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

DRAINAGE AND TRANSPORTATION INFORMATION SHEET

M-10 / D11

(REV.1/11/2002)

PROJECT TITLE: Sage Pointe Subdivision ZONE MAP/DRB.FILE#: ~~M-9~~

DRB#: 1000408 EPC# WORK ORDER#:

LEGAL DESCRIPTION: Tract 490 and 491, Town on Atrisco Grant, Unit 7

CITY ADDRESS:

ENGINEERING FIRM: Mark Goodwin & Associates, PA CONTACT: Gregory J. Krenik, PE

ADDRESS: P.O. Box 90606 PHONE: 828-2200

CITY, STATE: Albuquerque NM ZIP CODE: 87119

OWNER: C & W Land Development CONTACT: Rex Wilson

ADDRESS: 4619 Inspiration Dr. SE PHONE: (505) 450-2305

CITY, STATE: Albuquerque NM ZIP CODE: 87122

ARCHITECT: CONTACT:

ADDRESS: PHONE:

CITY, STATE: ZIP CODE:

SURVEYOR: CONTACT:

ADDRESS: PHONE:

CITY, STATE: ZIP CODE:

CONTRACTOR: CONTACT:

ADDRESS: PHONE:

CITY, STATE: ZIP CODE:

RECEIVED MAY 23 2002 HYDROLOGY SECTION

TYPE OF SUBMITTAL:

- ___ DRAINAGE REPORT
- X DRAINAGE PLAN (REVISED TO MATCH PLAT)
- ___ CONCEPTUAL GRADING & DRAINAGE PLAN
- X GRADING PLAN (REVISED TO MATCH PLAT)
- ___ EROSION CONTROL PLAN
- ___ 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:

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

CALL WHEN APPROVED AND I WILL BRING MYLAR FOR YOU TO SIGN.

DATE SUBMITTED: 5-22-02 BY: Gregory Krenik, 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.

f:\\forms\drainmf tbl

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

January 15, 2004

Gregory Krenik, P.E.
Mark Goodwin & Associates, PA
P.O. Box 90606
Albuquerque, NM 87199

Re: Sage Pointe Subdivision, SIA/Financial Guarantee Release
Engineer's Stamp dated 12-06-02 (M10/D11)
Certification dated 1-13-04

Dear Mr. Krenik,

Based upon the information provided in your submittal received 1-13-04, the above referenced certification is approved for release of SIA and Financial Guarantee.

If you have any questions, you can contact me at 924-3981.

Sincerely,

Kristal D. Metro
Engineering Associate, Planning Dept.
Development and Building Services

C: Arlene Portillo, COA# 617783
file

DRAINAGE AND TRANSPORTATION INFORMATION SHEET

(REV. 1/28/2003rd)

M-10 | D11

PROJECT TITLE: SAGE POINTE SUBDIVISION ZONE MAP/DRG. FILE #: M-9
DRB #: 1000408 EPC#: WORK ORDER#:

LEGAL DESCRIPTION: TRACT 490 + 491, TOWN OF ATRISCO GRANT, UNIT 7
CITY ADDRESS:

ENGINEERING FIRM: MARK GOODWIN & ASSOCIATES CONTACT: GREGORY J. KRENIK, PE
ADDRESS: P.O. Box 90606 PHONE: 828-2200
CITY, STATE: Albuquerque NM ZIP CODE: 87119

OWNER: C+W LAND DEVELOPMENT CONTACT: REX WILSON
ADDRESS: 4619 INSPIRATION DRSE PHONE: 450-2305
CITY, STATE: Albuquerque NM ZIP CODE: 87122

ARCHITECT: CONTACT:
ADDRESS: PHONE:
CITY, STATE: ZIP CODE:

SURVEYOR: CONTACT:
ADDRESS PHONE:
CITY, STATE: ZIP CODE:

CONTRACTOR: CONTACT:
ADDRESS: PHONE:
CITY, STATE: ZIP CODE:

CHECK TYPE OF SUBMITTAL:

- ____ DRAINAGE REPORT
- ____ DRAINAGE PLAN 1st SUBMITTAL, *REQUIRES TCL or equal*
- ____ DRAINAGE PLAN RESUBMITTAL
- ____ CONCEPTUAL GRADING & DRAINAGE PLAN
- ____ GRADING PLAN
- ____ EROSION CONTROL PLAN
- X ENGINEER'S CERTIFICATION (HYDROLOGY)
- ____ CLOMR/LOMR
- ____ TRAFFIC CIRCULATION LAYOUT (TCL)
- ____ ENGINEERS CERTIFICATION (TCL)
- ____ ENGINEERS CERTIFICATION (DRB APPR. SITE PLAN)
- ____ OTHER

CHECK TYPE OF APPROVAL SOUGHT:

- X SIA / FINANCIAL GUARANTEE 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)

WAS A PRE-DESIGN CONFERENCE ATTENDED:

- ____ YES
- X NO
- ____ COPY PROVIDED

RECEIVED
JAN 13 2004
HYDROLOGY SECTION

DATE SUBMITTED: 1-13-04 BY: GREGORY J. KRENIK 617783

Requests for approvals of Site Development Plans and/or Subdivision Plats shall be accompanied by a drainage submittal. The particular nature , location and scope ot the proposed development defines the degree of drainage detail. One or more of 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) acres and Sector Plans.
2. **Drainage Plans:** Required for building permits, grading permits, paving permits and site plans less than five (5) acres.
3. **Drainage Report:** Required for subdivisions containing more than ten (10) lots or constituting five (5) acres or more

[redacted]

DRAINAGE REPORT

for

SAGE POINTE SUBDIVISION

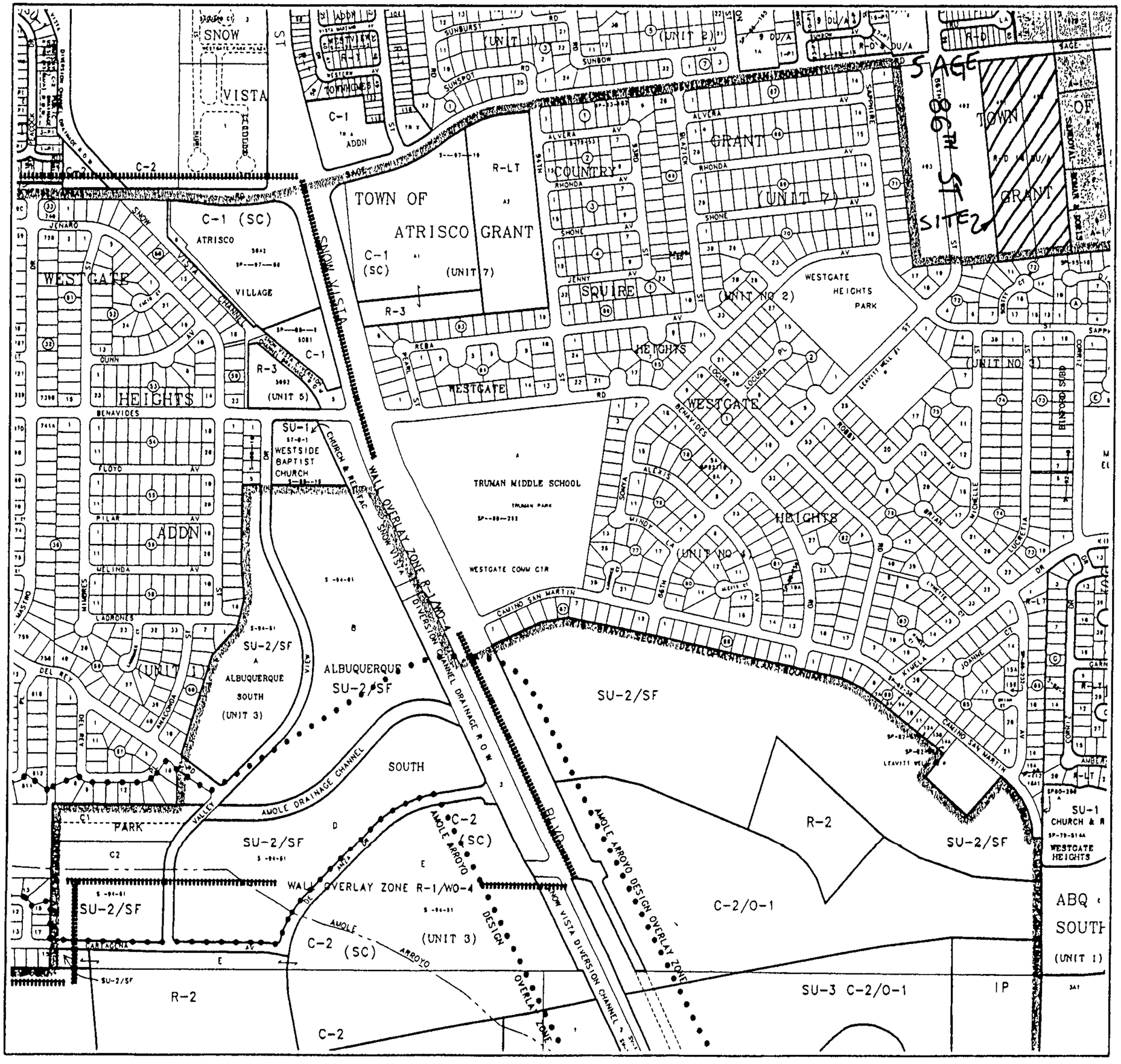
RECEIVED
NOV 27 2002
HYDROLOGY SECTION

GREGORY JAMES BRENN
11926
REGISTERED PROFESSIONAL ENGINEER
2-4-99

3-16-99
3-30-99
4-20-99
4-1-02
12-2-02

February 1999

D. MARK GOODWIN & ASSOCIATES



CITY OF
Albuquerque

Albuquerque Geographic Information System
PLANNING DEPARTMENT

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GRAPHIC SCALE IN FEET

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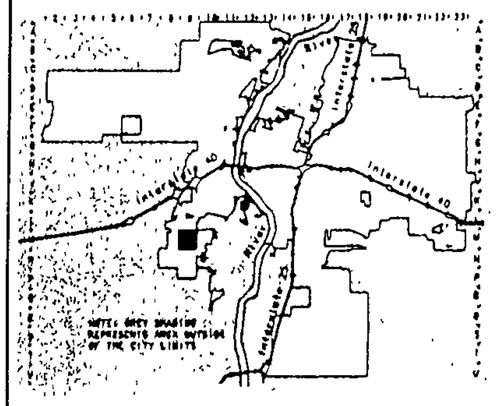

Zone Atlas Page
M-9-Z

Map Amended through
December 10, 1998

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 SAGE POINTE
SUBJECT DRAINAGE CALCS
BY GJK DATE 1-27-99
CHECKED _____ DATE _____
SHEET 1 OF ____
REVISED 4-20-99, 4-1-02
12-2-02

- SITE DOES NOT LIE IN A 100YR FLOOD PLAIN.
- OFFSITE FLOWS FROM THE WEST IMPACT THE SITE AND WILL BE ALLOWED TO FLOW ACCROSS THIS PROPERTY IN ONE LOCATION.
- RUNOFF WILL BE ALLOWED DIRECT DISCHARGE THROUGH AN EXISTING CONCRETE CHANNEL AT THE SOUTH END OF THE PROPERTY.
- THIS PROPERTY IS PART OF BASINS 108 & 110 OF THE SUN SAGE HILLS REPORT PREPARED BY MARK GOODWIN AND ASSOCIATES.

- TOTAL SITE = 9.8546 AC
  86 LOTS
  DRIVE PADS = 20 x 20 x 86 = 34,400 SF = 0.7897 AC TYPE "D"
  PADS = 33 x 44.6 x 86 = 126,575 = 2.9058 AC TYPE "D"
  ROW = 2.6047 AC 80% "D" = 2.0838 AC
  20% "B" = 0.5209 AC

	TOTAL	
"B"	= 4.0753 AC	41.35%
"D"	= 5.7793 AC	58.65%
	9.8546	

$P_1 = 1.87$ in
$P_6 = 2.20$ in
$P_{24} = 2.66$ in

FROM AHYMO OUTPUT SHEETS 8-10
Q = 33.50 CFS = 0.3995 CFS / LOT
FLOW WILL BE SPLIT 50% ON ALEXANDRA & 50% CASSANDRA
Q = 16.75 CFS

- FIND STREET CAPACITY
  S = 0.533 n = 0.017 32' F-F
  MOUNTABLE CURB
  d = 0.33
  wp = 15.375
  A = 2.3864
  $V_{1/2}$ = 1.84 F/s
  $Q_{1/2}$ = 4.40 CFS

  $d + \frac{V^2}{2g} = 0.38 < 0.53$

  No of LOTS PER SIDE OF STREET = 4.40 / 0.3995 = 11.01

  TRANSITION FROM MOUNTABLE TO STD C+G AFTER 11 LOTS EACH SIDE

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PROJECT SAGE POINTE
SUBJECT DRAINAGE CALCS
BY GJK DATE 1-27-99
CHECKED _____ DATE _____
SHEET 2 OF ____
REVISED 4-1-02, 4-16-02, 12-2-02

- FIND STREET CAPACITY OF STD C+G

S = 0.533 %
32' F-F

d = 0.67
WP = 33.34
A = 13.77
V = 3.54 F/s
Q = 48.74 CFS > 16.75 OK

$d + \frac{V^2}{2g} = 0.86 \approx 0.85$ OK

- FIND STREET CAPACITY OF 25' F-F STREET W/ STD C+G
S = 0.533 % NO CROWN

d = 0.56
WP = 26.12
A = 14.00
V = 4.21 F/s
Q = 58.95 CFS > 16.75 OK

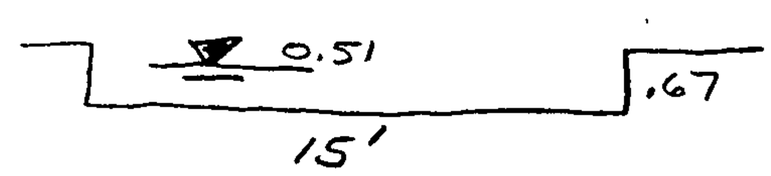
$d + \frac{V^2}{2g} = 0.84 < 0.85$ OK

- SIZE CURB OPENING TO CHANNEL AT SOUTH END OF PROPERTY, EAST AND WEST SIDES.

$Q = 2.95\ L\ H^{1.5}$

USE 0.67 FOR H
16.75 = Q

L = 10.35'



- USE 15 OPENING

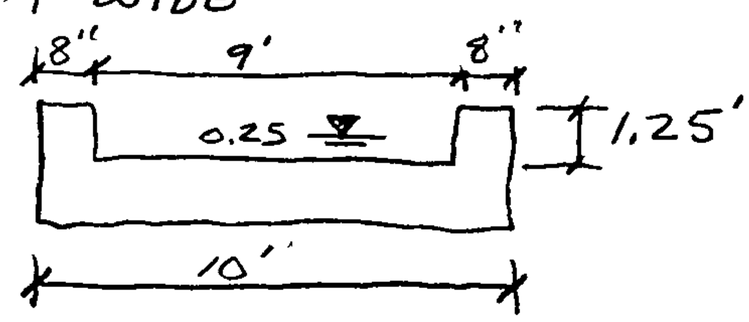
WATER SURFACE = 0.51'

- SIZE CHANNEL AT SOUTH END ON EAST SIDE

S = 2.87 % n = 0.013 9' WIDE

d = 0.25
WP = 9.5
A = 2.25
V = 7.41 F/s
Q = 16.68 CFS ≈ 16.75 OK

$d + \frac{V^2}{2g} = 1.10'$ say 1.25'



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PROJECT SAGE POINTE
SUBJECT DRAINAGE CALCS
BY GJK DATE 1-27-99
CHECKED _____ DATE _____
REVISED 4-1-02 4-16.02 12-2-02 SHEET 3 OF ____

• SIZE CHANNEL AT SOUTH END ON WEST SIDE

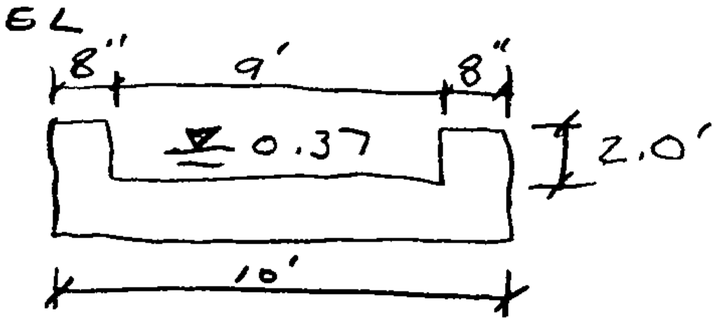
$S = 3.11\%$ $n = 0.013$

• OFFSITE FLOWS FROM THE WEST WILL ALSO FLOW THROUGH THIS CHANNEL.

• AREA IS APPROX. 5 ACRES.
• ASSUME SAME LAND TREATMENTS
• Q = ½ OF OUR SITE = 16.75 CFS

TOTAL FLOW IN CHANNEL
Q = 16.75 + 16.75
= 33.50 CFS

USE A 9' WIDE CHANNEL



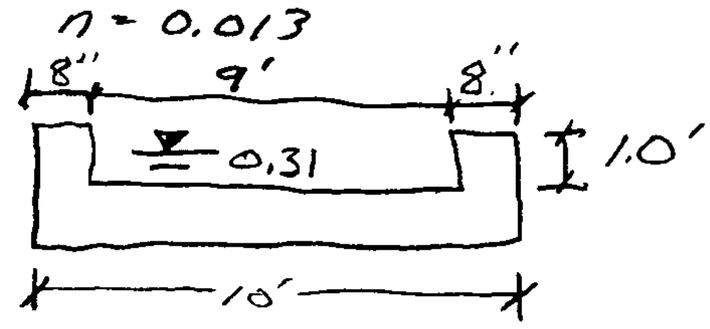
d = 0.38
wp = 9.76 $d + V^2/2g = 1.94'$ SAY 2.0'
A = 3.42
V = 10.02 F/s
Q = 34.27 CFS > 33.50 OK

• OPENING FROM OUR SITE TO CHANNEL WILL BE THE WIDTH OF THE STREET = 25'

• SIZE CHANNEL FROM PROPERTY TO WEST TO STREET

Q = 16.75 CFS $S = 1.43\%$ $n = 0.013$

USE 9' WIDE



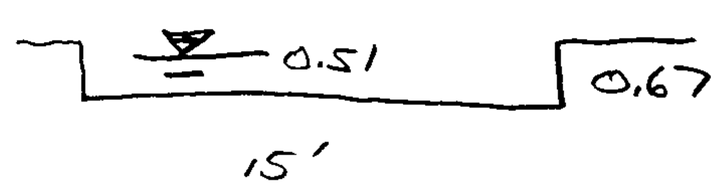
d = 0.31
wp = 9.62 $d + V^2/2g = 0.87'$ SAY 1.0'
A = 2.79
V = 5.99 F/s
Q = 16.71 CFS ≈ 16.75 OK

• SIZE OPENING FROM WEST

USE 15' OPENING

$Q = 2.95 L H^{1.5}$ Q = 16.75 CFS

H = 0.51'



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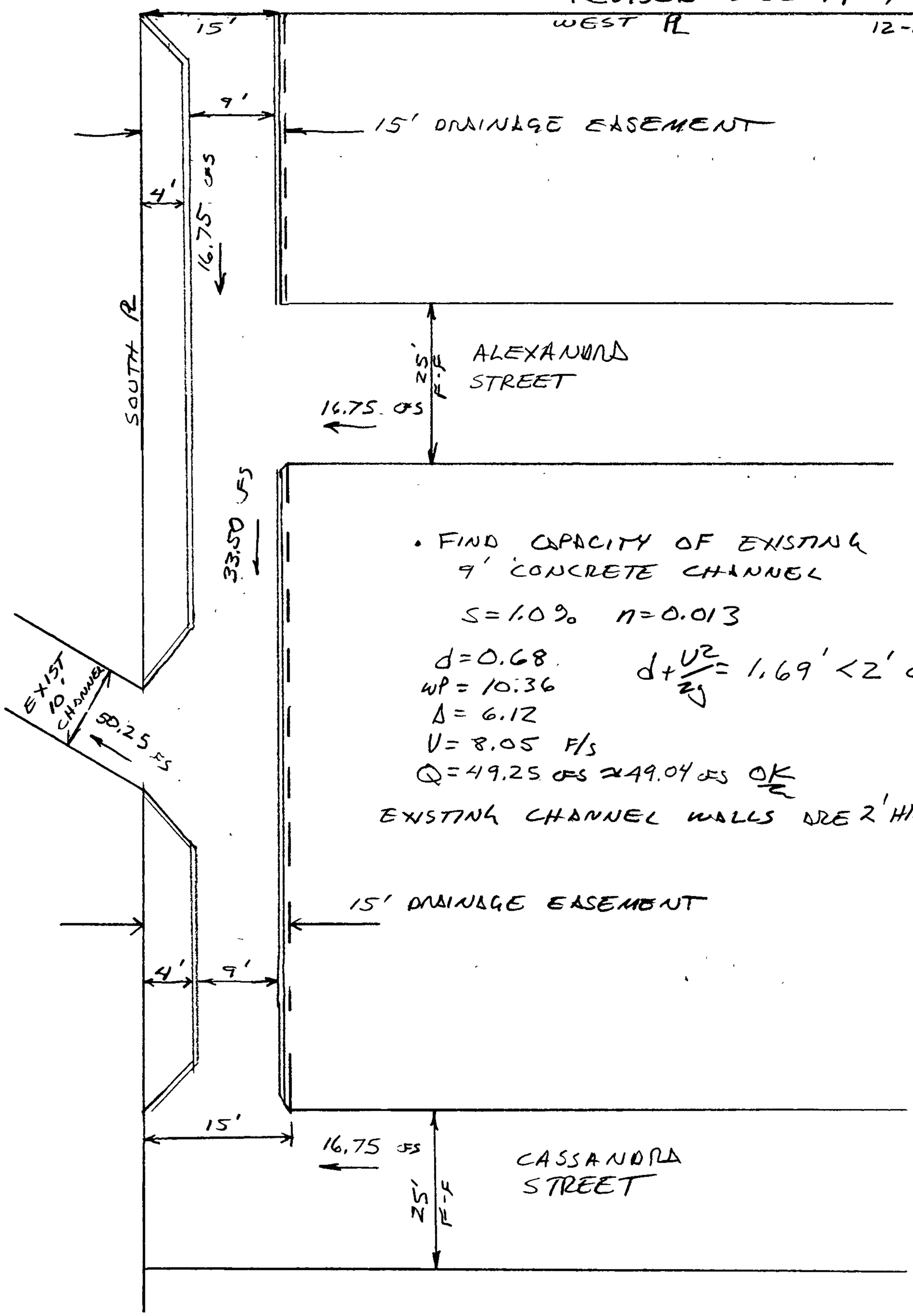
e-mail: dmg@swcp.com

PROJECT SAGE POINTE
SUBJECT DRAINAGE CALCS
BY GJK DATE 1-27-99
CHECKED _____ DATE _____
SHEET 4 OF ____

REVISED 3-30-99 4-1-02
12-2-02



- FIND CAPACITY OF EXISTING 9' CONCRETE CHANNEL

$S = 1.0\%$ $n = 0.013$

$d = 0.68$ $d + \frac{V^2}{2g} = 1.69' < 2'$ OK
$WP = 10.36$
$A = 6.12$
$V = 8.05$ F/S
$Q = 49.25$ CFS ≈ 49.04 CFS OK

EXISTING CHANNEL WALLS ARE 2' HIGH OK

D. Mark Goodwin & Associates, P.A.
Consulting Engineers
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e-mail: dmg@swcp.com

PROJECT SAGE POINTE
SUBJECT DRAINAGE CALCS
BY GJK DATE 4-20-99
CHECKED _____ DATE _____
SHEET 5 OF ____

REVISED 12-2-02

- PER THE SUN SAGE HILLS SUBDIVISION (M-9/D14) PREPARED BY MARK GOODWIN AND ASSOCIATES AND APPROVED BY THE CITY ON OCTOBER 11, 1996 THERE IS 198.4 CFS IN SAPPHIRE BEFORE THE INLETS.

- THIS REPORT WILL MODIFY THAT REPORTS BASINS AND RUN OFF TO VERIFY EXISTING STREET CAPACITY.

- BASINS THAT WILL BE MODIFIED ARE 108 AND 110.
  - BASIN 108 WILL BE REDUCED WITH A PORTION BEING ADDED TO BASIN 110.
  - BASIN 110 WILL BE INCREASED WITH PART OF BASIN 108 BEING ADDED ALONG WITH ADDITIONAL AREA TO THE NORTH AND EAST (WHICH IS SAGE POINTE).

BASIN	AREA PER SUNSAGE HILLS	REVISE AREA
108	0.0107 SM.	0.0102 SM.
110	0.00345 SM.	0.0232 SM.

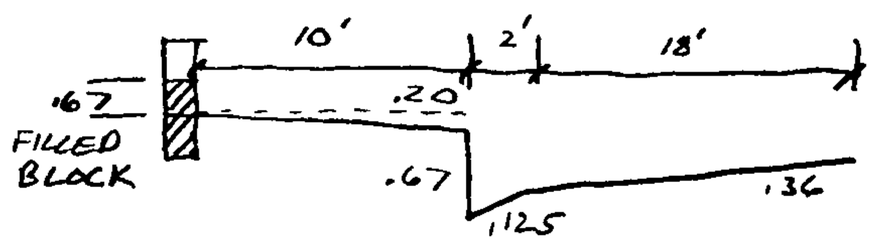
BASIN	Q_{100} PER SUNSAGE HILLS	Q_{100} REVISED
108	12.3 CFS	20.89
110	4.0 CFS	48.62 CFS

BASIN	B	C	D	
108	35%	23%	42%	PER SUNSAGE HILLS
110	41.35 %	0%	58.65 %	PER SAGE PT.

FROM AHYMO OUTPUT SHEETS 11-4/2

Q AT INLETS = 239.60 CFS

- Find d in SAPPHIRE BEFORE INLETS



SECTION PER WESTGATE HEIGHTS UNIT 3 STD SECTION FOR SAPPHIRE.

CAPACITY
d = 1.54
WP = 62.68
A = 65.77
V = 10.68 F/S
Q = 702.42 CFS

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 SAGE POINTE
SUBJECT DRAINAGE CALCS
BY GJK DATE 4-20-99
CHECKED _____ DATE _____
SHEET 6 OF ____

REVISED 12-2-02

d = 1.02
WP = 61.64
A = 34.57
V = 7.034 F/s
Q = 243.16 CFS ≈ 239.60 CFS OK

THIS IS WELL WITHIN CAPACITY.

- THIS FLOW THEN ENTERS THE TRENCH DRAIN AND INLETS IN SAPPHIRE. PER THE DESIGN OF THESE PER ISAACSON & ARFMAN FOR SUNRISE ESTATES UNIT 1 413 CFS IS CAPABLE OF ENTERING THE SYSTEM AT THIS POINT.

- VERIFY CAPACITY OF SCOTTY COURT AND VERIFY WATER IN SCOTTY COURT DOES NOT IMPACT LOTS ON SOUTH SIDE OF SAPPHIRE AT INTERSECTION.

SCOTTY COURT 32' F-F
S = 2%

Q = 61.93 CFS FROM AHYMO OUTPUT BASIN 109 + 110

d = 0.58
WP = 33.16
A = 10.89
V = 5.88 F/s

$d + V^2/2g = 1.12' < 1.54'$ OK

Q = 64.08 > 61.93 OK

D. Mark Goodwin & Associates, P.A.
Consulting Engineers
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PROJECT SAGE POINTE
SUBJECT DRAINAGE CALCS
BY GJK DATE 3-16-99
CHECKED _____ DATE _____
SHEET 7 OF ____

• FIND CAPACITY OF SAGE ROAD.

PER THE TOWER/SAGE DRAINAGE MASTER PLAN THE STORMDRAIN IS TO BEGIN AT 82nd STREET.

LENGTH OF SAGE ROAD = 1020'
ROW = 86'
TYPE D = 75%
TYPE B = 25%
AREA = 2.0138 AC

• FIND D S=0.5 n=0.017

d = 0.345
WP = 13.345
A = 1.775
$V_{1/2}$ = 1.6106 F/S
$Q_{1/2}$ = 2.8587 CFS = CAPACITY OF 13' CURB LANE

FROM AHYMO OUTPUT SHEETS 35-37

Q = 4.75 CFS
Q 1/2 = 2.375 CFS < 2.8587 OK

```
START                    TIME=0.0
***** HYDROGRAPH FOR SAGE POINTE 86 LOTS
RAINFALL                 TYPE=1 RAIN QUARTER=0.0 IN
                         RAIN ONE=1.87 IN RAIN SIX=2.20 IN
                         RAIN DAY=2.66 IN DT=0.03333 HR
COMPUTE NM HYD           ID=1 HYD NO=101.1 AREA=0.015398 SQ MI
                         PER A=0 B=41.35 C=0 D=58.65
                         TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD                ID=1 CODE=1
FINISH
```

AHYMO PROGRAM (AHYMO194) - AMAFCA Hydrologic Model - January, 1994

RUN DATE (MON/DAY/YR) = 12/02/2002
START TIME (HR:MIN:SEC) = 09:24:51 USER NO.= M_GOODWN.I01
INPUT FILE = SAGEPT.DAT

START TIME=0.0
***** HYDROGRAPH FOR SAGE POINTE 86 LOTS
RAINFALL TYPE=1 RAIN QUARTER=0.0 IN
RAIN ONE=1.87 IN RAIN SIX=2.20 IN
RAIN DAY=2.66 IN DT=0.03333 HR

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

     COMPUTE NM HYD       ID=1 HYD NO=101.1 AREA=0.015398 SQ MI
                          PER A=0 B=41.35 C=0 D=58.65
                          TP=0.1333 HR MASS RAINFALL=-1

         K =    .072649HR    TP =    .133300HR    K/TP RATIO =    .545000
SHAPE CONSTANT, N =  7.106420
         UNIT PEAK =   35.655    CFS   UNIT VOLUME =    .9990       B =
526.28      P60 = 1.8700
         AREA =       .009031 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 =   15.623    CFS   UNIT VOLUME =    .9995       B =
327.09      P60 = 1.8700
         AREA =       .006367 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

                                          PARTIAL HYDROGRAPH   101.10


         RUNOFF VOLUME =     1.42872 INCHES     =       1.1733 ACRE-FEET
         PEAK DISCHARGE RATE =      33.50 CFS  AT   1.500 HOURS   BASIN
AREA =   .0154 SQ. MI.


                 FINISH

                     NORMAL PROGRAM FINISH          END TIME (HR:MIN:SEC) = 09:24:51
```

```
START                    TIME=0.0
***** SUN SAGE HILLS SUBDIVISION - DEVELOPED CONDITIONS - REVISED W/
SAGE PT
***** 100-YEAR 6-HOUR STORM EVENT
*****   REAR YARD PONDS IN SUB-BASINS 102-106, 108, 110;
*****   ASSUME 56% OF TOTAL LOT AREA CONTRIBUTES TO STREET RUNOFF
*****   FOR SUB-BASINS (102-06,108,110) WITH REAR YARD PONDS;
*****   SPLIT B/C LAND TREATMENT 60/40
*****   SB 100 LIMIT DISCHARGE TO 1.4 CFS WHERE Q(DEV)=0.1 CFS/ACRE
*****   ***************************************
*****   FILE: SAGEDO2.DAT  JULY 26 1996 BY:DLH
*****   ***************************************
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=41.35 PER C=0 PER D=58.65
                       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

FINISH
```

```
          AHYMO PROGRAM (AHYMO194) - AMAFCA Hydrologic Model - January,
1994
               RUN DATE (MON/DAY/YR) = 12/02/2002
               START TIME (HR:MIN:SEC) = 09:45:30     USER NO.=
M_GOODWN.I01
               INPUT FILE = SAGESUN.DAT

     START                    TIME=0.0
     ***** SUN SAGE HILLS SUBDIVISION - DEVELOPED CONDITIONS - REVISED
W/ SAGE PT
     ***** 100-YEAR 6-HOUR STORM EVENT
     *****   REAR YARD PONDS IN SUB-BASINS 102-106, 108, 110;
     *****   ASSUME 56% OF TOTAL LOT AREA CONTRIBUTES TO STREET RUNOFF
     *****   FOR SUB-BASINS (102-06,108,110) WITH REAR YARD PONDS;
     *****   SPLIT B/C LAND TREATMENT 60/40
     *****   SB 100 LIMIT DISCHARGE TO 1.4 CFS WHERE Q(DEV)=0.1 CFS/ACRE
     *****   ***************************************
     *****   FILE: SAGEDO2.DAT  JULY 26 1996 BY:DLH
     *****   ***************************************
     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

                    COMPUTED 6-HOUR RAINFALL DISTRIBUTION BASED ON NOAA
ATLAS 2 - PEAK AT 1.40 HR.
                    DT =    .033300 HOURS       END TIME =     5.994000
HOURS
                       .0000   .0016   .0033   .0050   .0067   .0085
.0103
                       .0121   .0140   .0160   .0180   .0200   .0221
.0243
                       .0265   .0288   .0312   .0336   .0361   .0387
.0414
                       .0442   .0471   .0501   .0533   .0566   .0600
.0636
                       .0674   .0714   .0757   .0808   .0863   .0922
.1044
                       .1323   .1754   .2374   .3221   .4335   .5756
.7527
                       .9690  1.1767  1.2619  1.3336  1.3972  1.4551
1.5084
                      1.5579  1.6041  1.6474  1.6881  1.7266  1.7629
1.7973
                      1.8298  1.8607  1.8900  1.9178  1.9442  1.9515
1.9573
                      1.9627  1.9680  1.9729  1.9777  1.9823  1.9867
1.9909
                      1.9950  1.9990  2.0029  2.0066  2.0102  2.0137
2.0172
                      2.0205  2.0238  2.0269  2.0300  2.0331  2.0360
2.0389
                      2.0418  2.0446  2.0473  2.0500  2.0526  2.0552
2.0578
                      2.0603  2.0627  2.0651  2.0675  2.0698  2.0721
2.0744
                      2.0766  2.0788  2.0810  2.0832  2.0853  2.0873
2.0894
                      2.0914  2.0934  2.0954  2.0974  2.0993  2.1012
2.1031
                      2.1050  2.1068  2.1086  2.1104  2.1122  2.1140
```

2.1157						
	2.1174	2.1191	2.1208	2.1225	2.1242	2.1258
2.1274						
	2.1290	2.1306	2.1322	2.1338	2.1353	2.1369
2.1384						
	2.1399	2.1414	2.1429	2.1444	2.1459	2.1473
2.1487						
	2.1502	2.1516	2.1530	2.1544	2.1558	2.1571
2.1585						
	2.1599	2.1612	2.1625	2.1639	2.1652	2.1665
2.1678						
	2.1691	2.1703	2.1716	2.1729	2.1741	2.1754
2.1766						
	2.1778	2.1791	2.1803	2.1815	2.1827	2.1839
2.1850						
	2.1862	2.1874	2.1886	2.1897	2.1909	2.1920
2.1931						
	2.1943	2.1954	2.1965	2.1976	2.1987	2.1998

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

        K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000
SHAPE CONSTANT, N =  7.106420
        UNIT PEAK =   77.816    CFS   UNIT VOLUME =    .9992       B =
526.28      P60 = 1.8700
        AREA =      .019710 SQ MI    IA =    .10000 INCHES    INF =
.04000 INCHES PER HOUR
        RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER
METHOD - DT =   .033300


        K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442
SHAPE CONSTANT, N =  3.992480
        UNIT PEAK =   5.8269    CFS   UNIT VOLUME =    .9982       B =
354.67      P60 = 1.8700
        AREA =      .002190 SQ MI    IA =    .42500 INCHES    INF =
1.04000 INCHES PER HOUR
        RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER
METHOD - DT =   .033300

     PRINT HYD           ID=1 CODE=1

                                        PARTIAL HYDROGRAPH   100.00


        RUNOFF VOLUME =     1.85049 INCHES     =       2.1614 ACRE-FEET
        PEAK DISCHARGE RATE =      58.56 CFS  AT   1.499 HOURS   BASIN
AREA =   .0219 SQ. MI.


     *****
     ***** 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

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

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
.00	.00	19.00	.000	.00
.33	.00	19.00	.000	.00
.67	.00	19.00	.000	.00
1.00	.00	19.00	.000	.00
1.33	16.89	19.13	.083	.10
1.67	29.83	20.85	1.207	1.10
2.00	14.08	21.57	1.726	1.32
2.33	3.00	21.80	1.896	1.39
2.66	1.24	21.82	1.911	1.40
3.00	.66	21.80	1.898	1.39
3.33	.44	21.77	1.874	1.38
3.66	.36	21.73	1.847	1.37
4.00	.32	21.70	1.819	1.36
4.33	.31	21.66	1.790	1.35
4.66	.32	21.62	1.762	1.34
5.00	.33	21.58	1.734	1.32
5.33	.35	21.54	1.707	1.31
5.66	.37	21.51	1.681	1.30
5.99	.40	21.47	1.656	1.29
6.33	.04	21.43	1.626	1.28
6.66	.01	21.38	1.592	1.27
6.99	.00	21.34	1.558	1.25
7.33	.00	21.29	1.523	1.24
7.66	.00	21.24	1.489	1.22
7.99	.00	21.20	1.456	1.21
8.33	.00	21.15	1.423	1.20
8.66	.00	21.11	1.390	1.18
8.99	.00	21.06	1.358	1.17
9.32	.00	21.02	1.326	1.16
9.66	.00	20.97	1.294	1.14
9.99	.00	20.93	1.263	1.13
10.32	.00	20.88	1.232	1.11
10.66	.00	20.84	1.202	1.10
10.99	.00	20.80	1.172	1.09
11.32	.00	20.75	1.142	1.07
11.66	.00	20.71	1.113	1.06
11.99	.00	20.67	1.084	1.04
12.32	.00	20.63	1.055	1.03
12.65	.00	20.59	1.027	1.02
12.99	.00	20.55	.999	1.01
13.32	.00	20.51	.972	.99
13.65	.00	20.47	.945	.98
13.99	.00	20.43	.918	.96
14.32	.00	20.39	.892	.94
14.65	.00	20.35	.866	.92
14.99	.00	20.31	.841	.91

15.32	.00	20.28	.816	.89
15.65	.00	20.24	.792	.88
15.98	.00	20.20	.768	.86
16.32	.00	20.17	.745	.84
16.65	.00	20.13	.722	.83
16.98	.00	20.10	.699	.81
17.32	.00	20.07	.677	.80
17.65	.00	20.03	.655	.78
17.98	.00	20.00	.634	.77
18.32	.00	19.97	.613	.74

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
18.65	.00	19.94	.593	.72
18.98	.00	19.91	.573	.69
19.31	.00	19.88	.554	.67
19.65	.00	19.85	.536	.65

PEAK DISCHARGE = 1.397 CFS - PEAK OCCURS AT HOUR 2.60
MAXIMUM WATER SURFACE ELEVATION = 21.823
MAXIMUM STORAGE = 1.9113 AC-FT INCREMENTAL TIME= .033300HRS

PRINT HYD ID=2 CODE=1

HYDROGRAPH FROM AREA POND.101

RUNOFF VOLUME = 1.40559 INCHES = 1.6417 ACRE-FEET
PEAK DISCHARGE RATE = 1.40 CFS AT 2.597 HOURS BASIN AREA = .0219 SQ. MI.

*****
***** 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

K = .072649HR TP = .133300HR K/TP RATIO = .545000
SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 33.100 CFS UNIT VOLUME = .9990 B = 526.28 P60 = 1.8700
AREA = .008384 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .120523HR TP = .133300HR K/TP RATIO = .904149
SHAPE CONSTANT, N = 3.918663
UNIT PEAK = 12.372 CFS UNIT VOLUME = .9994 B = 349.71 P60 = 1.8700
AREA = .004716 SQ MI IA = .43750 INCHES INF = 1.07500 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

```
PRINT HYD            ID=1 CODE=1

                                        PARTIAL HYDROGRAPH   101.00


     RUNOFF VOLUME =     1.54209 INCHES     =       1.0774 ACRE-FEET
     PEAK DISCHARGE RATE =      30.61 CFS  AT   1.499 HOURS   BASIN
AREA =   .0131 SQ. MI.


*****
*****ADD SB 100 AND SB 101
*****
ADD HYD              ID=3 HYD=101 ID=1  ID=2
PRINT HYD            ID=3 CODE=1

                                        PARTIAL HYDROGRAPH   101.00


     RUNOFF VOLUME =     1.45667 INCHES     =       2.7191 ACRE-FEET
     PEAK DISCHARGE RATE =      31.34 CFS  AT   1.499 HOURS   BASIN
AREA =   .0350 SQ. MI.


*****
***** 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

                                        RATING CURVE VALLEY SECTION
9.0
                                            WATER       FLOW
FLOW        TOP
                                          SURFACE      AREA
RATE        WIDTH
                                           ELEV        SQ FT       CFS
FT
                                            .00          .00
.00          .00
                                            .05          .03
.02         1.45
                                            .09          .13
.10         2.91
                                            .14          .30
.27         5.21
                                            .18          .65
.64         9.79
                                            .23         1.20
1.39       14.38
                                            .27         1.97
2.63       18.96
```

4.46	23.55
6.97	28.14
10.38	32.01
15.35	32.02
21.05	32.03
27.44	32.03
34.47	32.04
42.12	32.05
48.98	33.56
54.42	37.67
60.93	41.78
68.53	45.89
77.24	50.00

.32	2.94
.37	4.12
.41	5.51
.46	6.98
.50	8.44
.55	9.91
.60	11.38
.64	12.85
.69	14.33
.73	15.96
.78	17.78
.82	19.78
.87	21.98

COMPUTE TRAVEL TIME ID=4 REACH NO=1 NO VS=1 LENGTH=250 FT SLOPE= 0.005

TRAVEL TIME TABLE

REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.046	.033	.02	.1449
.092	.133	.10	.0913
.137	.305	.27	.0770
.183	.648	.64	.0703
.229	1.202	1.39	.0600
.275	1.965	2.63	.0519
.321	2.938	4.46	.0458
.366	4.122	6.97	.0411
.412	5.513	10.38	.0369
.458	6.979	15.35	.0316
.504	8.445	21.05	.0279
.549	9.911	27.44	

```
.0251
                                        .595      11.378       34.47
.0229
                                        .641      12.845       42.12
.0212
                                        .687      14.326       48.98
.0203
                                        .733      15.956       54.42
.0204
                                        .778      17.776       60.93
.0203
                                        .824      19.783       68.53
.0200
                                        .870      21.978       77.24
.0198
     ROUTE                ID=4 HYD NO=201  INFLOW ID=3 DT=0.0
     PRINT HYD            ID=4 CODE=1

                                     PARTIAL HYDROGRAPH   201.00

         RUNOFF VOLUME =     1.45470 INCHES     =       2.7154 ACRE-FEET
         PEAK DISCHARGE RATE =      31.14 CFS  AT   1.532 HOURS   BASIN
AREA =   .0350 SQ. MI.


     *****
     ***** 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

         K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000
SHAPE CONSTANT, N =  7.106420
         UNIT PEAK =   22.385    CFS   UNIT VOLUME =    .9988       B =
526.28      P60 = 1.8700
         AREA =      .005670 SQ MI    IA =    .10000 INCHES    INF =
.04000 INCHES PER HOUR
         RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER
METHOD - DT =   .033300

         K =   .120595HR    TP =   .133300HR    K/TP RATIO =   .904691
SHAPE CONSTANT, N =  3.916166
         UNIT PEAK =   20.532    CFS   UNIT VOLUME =    .9998       B =
349.54      P60 = 1.8700
         AREA =      .007830 SQ MI    IA =    .43793 INCHES    INF =
1.07621 INCHES PER HOUR
         RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER
METHOD - DT =   .033300

     PRINT HYD            ID=1 CODE=1

                                     PARTIAL HYDROGRAPH   104.00


         RUNOFF VOLUME =     1.28283 INCHES     =        .9236 ACRE-FEET
         PEAK DISCHARGE RATE =      27.72 CFS  AT   1.499 HOURS   BASIN
AREA =   .0135 SQ. MI.
```

```
*****
***** ADD SB 100 AND 101 AND 104
*****
ADD HYD              ID=2 HYD=104 ID=1  ID=4
PRINT HYD            ID=2 CODE=1

                                        PARTIAL HYDROGRAPH   104.00

        RUNOFF VOLUME =     1.40686 INCHES     =       3.6390 ACRE-FEET
        PEAK DISCHARGE RATE =      58.10 CFS  AT   1.532 HOURS   BASIN
AREA =  .0485 SQ. MI.

*****
***** 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

                                        RATING CURVE VALLEY SECTION
9.0
                                            WATER       FLOW
FLOW        TOP
                                           SURFACE      AREA
RATE        WIDTH
                                            ELEV        SQ FT       CFS
FT
                                             .00         .00
.00          .00
                                             .05         .03
.03         1.45
                                             .09         .13
.18         2.91
                                             .14         .30
.50         5.21
                                             .18         .65
1.16         9.79
                                             .23        1.20
2.52        14.38
                                             .27        1.97
4.77        18.96
                                             .32        2.94
8.07        23.55
                                             .37        4.12
12.62        28.14
                                             .41        5.51
18.80        32.01
                                             .46        6.98
27.79        32.02
```

38.12	32.03
49.69	32.03
62.43	32.04
76.28	32.05
88.71	33.56
98.56	37.67
110.35	41.78
124.11	45.89
139.89	50.00

COMPUTE TRAVEL TIME ID=3 REACH NO=1 NO VS=1 LENGTH=770 FT SLOPE= 0.0164

TRAVEL TIME TABLE

REACH= 1.0

TRAVEL TIME HRS	WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS
.2464	.046	.033	.03
.1552	.092	.133	.18
.1310	.137	.305	.50
.1195	.183	.648	1.16
.1020	.229	1.202	2.52
.0882	.275	1.965	4.77
.0778	.321	2.938	8.07
.0699	.366	4.122	12.62
.0627	.412	5.513	18.80
.0537	.458	6.979	27.79
.0474	.504	8.445	38.12
.0427	.549	9.911	49.69
.0390	.595	11.378	62.43
.0360	.641	12.845	76.28
.0345	.687	14.326	88.71
	.733	15.956	98.56
	.50	8.44	
	.55	9.91	
	.60	11.38	
	.64	12.85	
	.69	14.33	
	.73	15.96	
	.78	17.78	
	.82	19.78	
	.87	21.98	

```
.0346
                                        .778      17.776      110.35
.0345
                                        .824      19.783      124.11
.0341
                                        .870      21.978      139.89
.0336
     ROUTE                ID=3 HYD NO=204  INFLOW ID=2 DT=0.0
     PRINT HYD            ID=3 CODE=1

                                          PARTIAL HYDROGRAPH   204.00


          RUNOFF VOLUME =     1.40424 INCHES     =       3.6323 ACRE-FEET
          PEAK DISCHARGE RATE =      56.61 CFS  AT   1.532 HOURS   BASIN
AREA =    .0485 SQ. MI.


     *****
     ***** 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

          K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000
SHAPE CONSTANT, N =  7.106420
          UNIT PEAK =   25.860    CFS   UNIT VOLUME =    .9989       B =
526.28      P60 = 1.8700
          AREA =      .006550 SQ MI    IA =    .10000 INCHES    INF =
.04000 INCHES PER HOUR
          RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER
METHOD - DT =   .033300


          K =   .120942HR    TP =   .133300HR    K/TP RATIO =   .907291
SHAPE CONSTANT, N =  3.904285
          UNIT PEAK =   17.136    CFS   UNIT VOLUME =    .9996       B =
348.74      P60 = 1.8700
          AREA =      .006550 SQ MI    IA =    .44000 INCHES    INF =
1.08200 INCHES PER HOUR
          RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER
METHOD - DT =   .033300

     PRINT HYD            ID=1 CODE=1

                                          PARTIAL HYDROGRAPH   102.00


          RUNOFF VOLUME =     1.37477 INCHES     =        .9605 ACRE-FEET
          PEAK DISCHARGE RATE =      28.19 CFS  AT   1.499 HOURS   BASIN
AREA =    .0131 SQ. MI.


     *****
     ***** 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

        K =    .072649HR    TP =    .133300HR    K/TP RATIO =    .545000
SHAPE CONSTANT, N =  7.106420
        UNIT PEAK =   7.3852    CFS   UNIT VOLUME =    .9978       B =
526.28      P60 = 1.8700
        AREA =       .001871 SQ MI    IA =    .10000 INCHES    INF =
.04000 INCHES PER HOUR
        RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER
METHOD - DT =    .033300


        K =    .121037HR    TP =    .133300HR    K/TP RATIO =    .908002
SHAPE CONSTANT, N =  3.901043
        UNIT PEAK =   5.5151    CFS   UNIT VOLUME =    .9980       B =
348.52      P60 = 1.8700
        AREA =       .002109 SQ MI    IA =    .44057 INCHES    INF =
1.08358 INCHES PER HOUR
        RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER
METHOD - DT =    .033300

     PRINT HYD            ID=2 CODE=1

                                        PARTIAL HYDROGRAPH   103.00


        RUNOFF VOLUME =     1.33869 INCHES     =        .2842 ACRE-FEET
        PEAK DISCHARGE RATE =       8.42 CFS  AT   1.499 HOURS   BASIN
AREA =   .0040 SQ. MI.


     *****
     ***** ADD SB 102 AND 103
     *****
     ADD HYD              ID=4 HYD=103 ID=1  ID=2
     PRINT HYD            ID=4 CODE=1

                                        PARTIAL HYDROGRAPH   103.00


        RUNOFF VOLUME =     1.36633 INCHES     =       1.2446 ACRE-FEET
        PEAK DISCHARGE RATE =      36.61 CFS  AT   1.499 HOURS   BASIN
AREA =   .0171 SQ. MI.


     *****
     ***** ADD SB 100, 101, 102, 103, 104
     *****
     ADD HYD              ID=2 HYD=104 ID=3  ID=4
     PRINT HYD            ID=2 CODE=1

                                        PARTIAL HYDROGRAPH   104.00


        RUNOFF VOLUME =     1.39436 INCHES     =       4.8769 ACRE-FEET
        PEAK DISCHARGE RATE =      92.11 CFS  AT   1.532 HOURS   BASIN
AREA =   .0656 SQ. MI.
```

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

RATING CURVE VALLEY SECTION

9.0

FLOW RATE FT	TOP WIDTH	WATER SURFACE ELEV	FLOW AREA SQ FT	CFS
.00	.00	.00	.00	
.03	1.45	.05	.03	
.20	2.91	.09	.13	
.55	5.21	.14	.30	
1.28	9.79	.18	.65	
2.78	14.38	.23	1.20	
5.26	18.96	.27	1.97	
8.92	23.55	.32	2.94	
13.93	28.14	.37	4.12	
20.76	32.01	.41	5.51	
30.69	32.02	.46	6.98	
42.10	32.03	.50	8.44	
54.88	32.03	.55	9.91	
68.94	32.04	.60	11.38	
84.23	32.05	.64	12.85	
97.96	33.56	.69	14.33	
108.84	37.67	.73	15.96	
121.86	41.78	.78	17.78	
137.06	45.89	.82	19.78	
		.87	21.98	

154.48 50.00
COMPUTE TRAVEL TIME ID=3 REACH NO=1 NO VS=1 LENGTH=150 FT SLOPE=
0.02

TRAVEL TIME TABLE
REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.046	.033	.03	.0435
.092	.133	.20	.0274
.137	.305	.55	.0231
.183	.648	1.28	.0211
.229	1.202	2.78	.0180
.275	1.965	5.26	.0156
.321	2.938	8.92	.0137
.366	4.122	13.93	.0123
.412	5.513	20.76	.0111
.458	6.979	30.69	.0095
.504	8.445	42.10	.0084
.549	9.911	54.88	.0075
.595	11.378	68.94	.0069
.641	12.845	84.23	.0064
.687	14.326	97.96	.0061
.733	15.956	108.84	.0061
.778	17.776	121.86	.0061
.824	19.783	137.06	.0060
.870	21.978	154.48	.0059

ROUTE ID=3 HYD NO=203 INFLOW ID=2 DT=0.0
PRINT HYD ID=3 CODE=1

PARTIAL HYDROGRAPH 203.00

RUNOFF VOLUME = 1.39402 INCHES = 4.8757 ACRE-FEET
PEAK DISCHARGE RATE = 92.38 CFS AT 1.532 HOURS BASIN
AREA = .0656 SQ. MI.

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

        K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000
SHAPE CONSTANT, N =  7.106420
        UNIT PEAK =   8.7220    CFS   UNIT VOLUME =    .9980       B =
526.28      P60 = 1.8700
        AREA =      .002209 SQ MI    IA =    .10000 INCHES    INF =
.04000 INCHES PER HOUR
        RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER
METHOD - DT =   .033300

        K =   .120595HR    TP =   .133300HR    K/TP RATIO =   .904691
SHAPE CONSTANT, N =  3.916166
        UNIT PEAK =   7.9999    CFS   UNIT VOLUME =    .9988       B =
349.54      P60 = 1.8700
        AREA =      .003051 SQ MI    IA =    .43793 INCHES    INF =
1.07621 INCHES PER HOUR
        RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER
METHOD - DT =   .033300

     PRINT HYD           ID=1 CODE=1

                                        PARTIAL HYDROGRAPH   105.00

        RUNOFF VOLUME =     1.28283 INCHES     =        .3599 ACRE-FEET
        PEAK DISCHARGE RATE =      10.81 CFS  AT   1.499 HOURS   BASIN
AREA =   .0053 SQ. MI.


*****
***** ADD SB 100 THRU 104 AND 105
*****
     ADD HYD             ID=2 HYD=105 ID=1  ID=3
     PRINT HYD           ID=2 CODE=1

                                        PARTIAL HYDROGRAPH   105.00

        RUNOFF VOLUME =     1.38576 INCHES     =       5.2355 ACRE-FEET
        PEAK DISCHARGE RATE =     102.90 CFS  AT   1.532 HOURS   BASIN
AREA =   .0708 SQ. MI.


*****
***** 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

9.0

FLOW RATE FT	TOP WIDTH
.00	.00
.02	1.45
.15	2.91
.41	5.21
.96	9.79
2.08	14.38
3.94	18.96
6.67	23.55
10.43	28.14
15.53	32.01
22.97	32.02
31.50	32.03
41.07	32.03
51.59	32.04
63.03	32.05
73.31	33.56
81.45	37.67
91.19	41.78
102.56	45.89
115.60	50.00

RATING CURVE VALLEY SECTION

WATER SURFACE ELEV	FLOW AREA SQ FT	CFS
.00	.00	
.05	.03	
.09	.13	
.14	.30	
.18	.65	
.23	1.20	
.27	1.97	
.32	2.94	
.37	4.12	
.41	5.51	
.46	6.98	
.50	8.44	
.55	9.91	
.60	11.38	
.64	12.85	
.69	14.33	
.73	15.96	
.78	17.78	
.82	19.78	
.87	21.98	

COMPUTE TRAVEL TIME ID=3 REACH NO=1 NO VS=1 LENGTH=1050 FT SLOPE= 0.0112

TRAVEL TIME TABLE

REACH= 1.0

WATER	AVERAGE	FLOW

TRAVEL TIME HRS	DEPTH FEET	AREA SQ.FT.	RATE CFS
.4066	.046	.033	.02
.2562	.092	.133	.15
.2161	.137	.305	.41
.1972	.183	.648	.96
.1683	.229	1.202	2.08
.1455	.275	1.965	3.94
.1284	.321	2.938	6.67
.1153	.366	4.122	10.43
.1035	.412	5.513	15.53
.0886	.458	6.979	22.97
.0782	.504	8.445	31.50
.0704	.549	9.911	41.07
.0643	.595	11.378	51.59
.0594	.641	12.845	63.03
.0570	.687	14.326	73.31
.0571	.733	15.956	81.45
.0569	.778	17.776	91.19
.0563	.824	19.783	102.56
.0555	.870	21.978	115.60

```
ROUTE                ID=3 HYD NO=205  INFLOW ID=2 DT=0.0
PRINT HYD            ID=3 CODE=1

                                        PARTIAL HYDROGRAPH   205.00


     RUNOFF VOLUME =     1.38279 INCHES     =       5.2243 ACRE-FEET
     PEAK DISCHARGE RATE =      92.41 CFS  AT   1.565 HOURS   BASIN
AREA =   .0708 SQ. MI.


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

```
        K =    .072649HR    TP =    .133300HR    K/TP RATIO =    .545000
SHAPE CONSTANT, N =  7.106420
        UNIT PEAK =    34.379    CFS   UNIT VOLUME =    .9990       B =
526.28       P60 = 1.8700
        AREA =       .008708 SQ MI    IA =    .10000 INCHES    INF =
.04000 INCHES PER HOUR
        RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER
METHOD - DT =    .033300


        K =    .120756HR    TP =    .133300HR    K/TP RATIO =    .905895
SHAPE CONSTANT, N =  3.910652
        UNIT PEAK =    26.776    CFS   UNIT VOLUME =    .9999       B =
349.17       P60 = 1.8700
        AREA =       .010222 SQ MI    IA =    .43889 INCHES    INF =
1.07889 INCHES PER HOUR
        RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER
METHOD - DT =    .033300

     PRINT HYD            ID=1 CODE=1

                                        PARTIAL HYDROGRAPH   106.00


        RUNOFF VOLUME =     1.32880 INCHES     =       1.3415 ACRE-FEET
        PEAK DISCHARGE RATE =      39.79 CFS  AT   1.499 HOURS   BASIN
AREA =   .0189 SQ. MI.


     *****
     ***** ADD SB 100 THRU 105 AND 106
     *****
     ADD HYD              ID=2 HYD=106 ID=1  ID=3
     PRINT HYD            ID=2 CODE=1

                                        PARTIAL HYDROGRAPH   106.00


        RUNOFF VOLUME =     1.37140 INCHES     =       6.5659 ACRE-FEET
        PEAK DISCHARGE RATE =     126.54 CFS  AT   1.565 HOURS   BASIN
AREA =   .0898 SQ. MI.


     *****
     ***** 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

                                        RATING CURVE VALLEY SECTION
9.0
```

FLOW RATE FT	TOP WIDTH
.00	.00
.03	1.45
.17	2.91
.45	5.21
1.05	9.79
2.29	14.38
4.32	18.96
7.33	23.55
11.45	28.14
17.05	32.01
25.22	32.02
34.59	32.03
45.09	32.03
56.64	32.04
69.20	32.05
80.48	33.56
89.42	37.67
100.12	41.78
112.60	45.89
126.92	50.00

WATER SURFACE ELEV	FLOW AREA SQ FT	CFS
.00	.00	
.05	.03	
.09	.13	
.14	.30	
.18	.65	
.23	1.20	
.27	1.97	
.32	2.94	
.37	4.12	
.41	5.51	
.46	6.98	
.50	8.44	
.55	9.91	
.60	11.38	
.64	12.85	
.69	14.33	
.73	15.96	
.78	17.78	
.82	19.78	
.87	21.98	

COMPUTE TRAVEL TIME ID=3 REACH NO=1 NO VS=1 LENGTH=400 FT SLOPE= 0.0135

TRAVEL TIME TABLE

REACH= 1.0

TRAVEL TIME HRS	WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS
.1411	.046	.033	.03
	.092	.133	.17

.0889
.0750
.0684
.0584
.0505
.0446
.0400
.0359
.0307
.0271
.0244
.0223
.0206
.0198
.0198
.0197
.0195
.0192

.137	.305	.45
.183	.648	1.05
.229	1.202	2.29
.275	1.965	4.32
.321	2.938	7.33
.366	4.122	11.45
.412	5.513	17.05
.458	6.979	25.22
.504	8.445	34.59
.549	9.911	45.09
.595	11.378	56.64
.641	12.845	69.20
.687	14.326	80.48
.733	15.956	89.42
.778	17.776	100.12
.824	19.783	112.60
.870	21.978	126.92

```
     ROUTE                ID=3 HYD NO=206  INFLOW ID=2 DT=0.0
     PRINT HYD            ID=3 CODE=1

                                          PARTIAL HYDROGRAPH   206.00


          RUNOFF VOLUME =     1.37058 INCHES     =       6.5619 ACRE-FEET
          PEAK DISCHARGE RATE =     125.13 CFS  AT   1.565 HOURS   BASIN
AREA =   .0898 SQ. MI.


     *****
     ***** 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

          K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000
SHAPE CONSTANT, N =  7.106420
          UNIT PEAK =   24.245    CFS   UNIT VOLUME =    .9989       B =
526.28      P60 = 1.8700
          AREA =      .006141 SQ MI    IA =    .10000 INCHES    INF =
.04000 INCHES PER HOUR
          RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER
```

```
METHOD - DT =   .033300

        K =   .123487HR    TP =   .133300HR    K/TP RATIO =   .926384
SHAPE CONSTANT, N =  3.819526
        UNIT PEAK =   52.894    CFS   UNIT VOLUME =    1.000       B =
342.95      P60 = 1.8700
        AREA =      .020559 SQ MI    IA =    .45519 INCHES    INF =
1.12455 INCHES PER HOUR
        RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER
METHOD - DT =   .033300

     PRINT HYD           ID=1 CODE=1

                                        PARTIAL HYDROGRAPH   107.00

        RUNOFF VOLUME =     1.03176 INCHES     =       1.4692 ACRE-FEET
        PEAK DISCHARGE RATE =      46.95 CFS  AT   1.499 HOURS   BASIN
AREA =   .0267 SQ. MI.


     *****
     ***** 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

        K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000
SHAPE CONSTANT, N =  7.106420
        UNIT PEAK =   16.913    CFS   UNIT VOLUME =    .9986       B =
526.28      P60 = 1.8700
        AREA =      .004284 SQ MI    IA =    .10000 INCHES    INF =
.04000 INCHES PER HOUR
        RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER
METHOD - DT =   .033300

        K =   .121029HR    TP =   .133300HR    K/TP RATIO =   .907941
SHAPE CONSTANT, N =  3.901327
        UNIT PEAK =   15.468    CFS   UNIT VOLUME =    .9995       B =
348.54      P60 = 1.8700
        AREA =      .005916 SQ MI    IA =    .44052 INCHES    INF =
1.08345 INCHES PER HOUR
        RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER
METHOD - DT =   .033300

     PRINT HYD           ID=2 CODE=1

                                        PARTIAL HYDROGRAPH   108.00

        RUNOFF VOLUME =     1.27962 INCHES     =        .6961 ACRE-FEET
        PEAK DISCHARGE RATE =      20.89 CFS  AT   1.499 HOURS   BASIN
AREA =   .0102 SQ. MI.


     *****
```

```
***** ADD SB 107 AND 108
*****
ADD HYD              ID=4 HYD=108 ID=1  ID=2
PRINT HYD            ID=4 CODE=1

                                        PARTIAL HYDROGRAPH   108.00


     RUNOFF VOLUME =     1.10025 INCHES     =       2.1653 ACRE-FEET
     PEAK DISCHARGE RATE =      67.84 CFS  AT   1.499 HOURS   BASIN
AREA =   .0369 SQ. MI.


*****
***** ADD SB 100 THRU 108
*****
ADD HYD              ID=2 HYD=108 ID=3  ID=4
PRINT HYD            ID=2 CODE=1

                                        PARTIAL HYDROGRAPH   108.00


     RUNOFF VOLUME =     1.29183 INCHES     =       8.7272 ACRE-FEET
     PEAK DISCHARGE RATE =     184.52 CFS  AT   1.565 HOURS   BASIN
AREA =   .1267 SQ. MI.


*****
***** 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

                                        RATING CURVE VALLEY SECTION
11.0
                                          WATER        FLOW
FLOW          TOP                        SURFACE      AREA
RATE          WIDTH                       ELEV        SQ FT        CFS
FT                                          .00         .00
.00            .00                          .09         .37
.40           8.51                          .18        1.48
2.55         16.43                          .26        3.25
7.33         23.92                          .35        5.69
15.46         31.41
```

27.58	38.90
45.89	42.16
69.36	40.86
93.94	42.05
120.55	47.35
152.43	52.65
189.99	57.95
238.86	59.96
296.03	59.97
357.91	59.98
424.30	60.00
495.01	60.01
569.91	60.02
648.85	60.04
731.70	60.05

.44	8.78
.53	12.44
.62	16.08
.70	19.66
.79	23.59
.88	27.98
.97	32.84
1.05	38.08
1.14	43.35
1.23	48.62
1.32	53.90
1.41	59.17
1.49	64.44
1.58	69.72
1.67	75.00

COMPUTE TRÀVEL TIME ID=3 REACH NO=1 NO VS=1 LENGTH=300 FT SLOPE= 0.014

TRAVEL TIME TABLE

REACH= 1.0

TRAVEL TIME HRS	WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS
.0777	.088	.374	.40
.0484	.176	1.481	2.55
.0370	.264	3.254	7.33
.0307	.352	5.686	15.46
.0265	.439	8.777	27.58
.0226	.527	12.435	45.89
.0193	.615	16.084	69.36
.0174	.703	19.659	93.94
.0163	.791	23.588	120.55
	.879	27.983	152.43

```
.0153
                                        .967      32.843      189.99
.0144
                                       1.055      38.080      238.86
.0133
                                       1.143      43.350      296.03
.0122
                                       1.231      48.622      357.91
.0113
                                       1.318      53.895      424.30
.0106
                                       1.406      59.169      495.01
.0100
                                       1.494      64.444      569.91
.0094
                                       1.582      69.721      648.85
.0090
                                       1.670      74.998      731.70
.0085
     ROUTE                ID=3 HYD NO=208  INFLOW ID=2 DT=0.0
     PRINT HYD            ID=3 CODE=1

                                        PARTIAL HYDROGRAPH   208.00


         RUNOFF VOLUME =     1.29123 INCHES     =       8.7231 ACRE-FEET
         PEAK DISCHARGE RATE =     185.36 CFS  AT   1.565 HOURS   BASIN
AREA =   .1267 SQ. MI.


     *****
     ***** 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

         K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000
SHAPE CONSTANT, N =  7.106420
         UNIT PEAK =   8.7765    CFS   UNIT VOLUME =    .9980       B =
526.28      P60 = 1.8700
         AREA =      .002223 SQ MI    IA =    .10000 INCHES    INF =
.04000 INCHES PER HOUR
         RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER
METHOD - DT =   .033300


         K =   .120695HR    TP =   .133300HR    K/TP RATIO =   .905437
SHAPE CONSTANT, N =  3.912748
         UNIT PEAK =   9.1114    CFS   UNIT VOLUME =    .9989       B =
349.31      P60 = 1.8700
         AREA =      .003477 SQ MI    IA =    .43852 INCHES    INF =
1.07787 INCHES PER HOUR
         RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER
METHOD - DT =   .033300

     PRINT HYD            ID=1 CODE=1

                                        PARTIAL HYDROGRAPH   109.00
```

```
        RUNOFF VOLUME =      1.24675 INCHES      =          .3790 ACRE-FEET
        PEAK DISCHARGE RATE =       11.48 CFS  AT   1.499 HOURS   BASIN
AREA =   .0057 SQ. MI.


     *****
     ***** 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=41.35 PER C=0 PER D=58.65
                          TP=0.1333 HR MASS RAINFALL=-1

        K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000
SHAPE CONSTANT, N =  7.106420
        UNIT PEAK =   53.720    CFS   UNIT VOLUME =    .9991       B =
526.28      P60 = 1.8700
        AREA =      .013607 SQ MI    IA =    .10000 INCHES    INF =
.04000 INCHES PER HOUR
        RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER
METHOD - DT =   .033300


        K =   .130992HR    TP =   .133300HR    K/TP RATIO =   .982685
SHAPE CONSTANT, N =  3.593448
        UNIT PEAK =   23.539    CFS   UNIT VOLUME =    .9998       B =
327.09      P60 = 1.8700
        AREA =      .009593 SQ MI    IA =    .50000 INCHES    INF =
1.25000 INCHES PER HOUR
        RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER
METHOD - DT =   .033300

     PRINT HYD            ID=2 CODE=1

                                          PARTIAL HYDROGRAPH   110.00


        RUNOFF VOLUME =      1.42870 INCHES      =          1.7678 ACRE-FEET
        PEAK DISCHARGE RATE =       50.44 CFS  AT   1.499 HOURS   BASIN
AREA =   .0232 SQ. MI.


     *****
     ***** ADD SB 109 AND 110
     *****
     ADD HYD              ID=4 HYD=110 ID=1  ID=2
     PRINT HYD            ID=4 CODE=1

                                          PARTIAL HYDROGRAPH   110.00


        RUNOFF VOLUME =      1.39279 INCHES      =          2.1467 ACRE-FEET
        PEAK DISCHARGE RATE =       61.93 CFS  AT   1.499 HOURS   BASIN
AREA =   .0289 SQ. MI.


     *****
     ***** ADD SB 100 thru 110
```

```
*****
ADD HYD              ID=2 HYD=110 ID=3  ID=4
PRINT HYD            ID=2 CODE=1

                                   PARTIAL HYDROGRAPH | 110.00

     RUNOFF VOLUME =     1.31010 INCHES     =      10.8699 ACRE-FEET
     PEAK DISCHARGE RATE =     238.79 CFS  AT   1.532 HOURS   BASIN
AREA =   .1556 SQ. MI.


*****
***** 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

                                   RATING CURVE VALLEY SECTION
9.0
                                       WATER        FLOW
FLOW          TOP                      SURFACE      AREA
RATE          WIDTH                    ELEV         SQ FT        CFS
FT                                       .00          .00
.00           .00                        .05          .04
.04          1.67                        .11          .18
.25          3.34                        .16          .43
.66          7.26                        .21          .95
1.73        12.53                        .26         1.75
3.79        17.81                        .32         2.83
7.09        23.08                        .37         4.18
11.88        28.35                       .42         5.81
18.37        33.62                       .47         7.72
26.76        38.89                       .53         9.82
39.16        40.03                       .58        11.93
54.05        40.04                       .63        14.03
70.76        40.04                       .68        16.15
88.08        40.91
```

		.74	18.39
104.16	44.09		
		.79	20.79
122.18	47.27		
		.84	23.36
142.24	50.45		
		.89	26.10
164.43	53.64		
		.95	29.01
188.84	56.82		
		1.00	32.08
215.55	60.00		

COMPUTE TRAVEL TIME ID=3 REACH NO=1 NO VS=1 LENGTH=200 FT SLOPE= 0.014

TRAVEL TIME TABLE

REACH= 1.0

TRAVEL TIME HRS	WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS
.0631	.053	.044	.04
.0398	.105	.176	.25
.0362	.158	.433	.66
.0305	.211	.954	1.73
.0257	.263	1.752	3.79
.0221	.316	2.828	7.09
.0196	.368	4.181	11.88
.0176	.421	5.812	18.37
.0160	.474	7.720	26.76
.0139	.526	9.820	39.16
.0123	.579	11.927	54.05
.0110	.632	14.034	70.76
.0102	.684	16.148	88.08
.0098	.737	18.385	104.16
.0095	.789	20.790	122.18
.0091	.842	23.361	142.24
.0088	.895	26.101	164.43
.0085	.947	29.007	188.84
	1.000	32.081	215.55

```
.0083
     ROUTE                    ID=3 HYD NO=210  INFLOW ID=2 DT=0.0
 TRAVEL TIME TABLE EXCEEDED
     PRINT HYD                ID=3 CODE=1

                                          PARTIAL HYDROGRAPH   210.00


          RUNOFF VOLUME =     1.30986 INCHES     =      10.8679 ACRE-FEET
          PEAK DISCHARGE RATE =     239.60 CFS  AT   1.565 HOURS   BASIN
AREA =    .1556 SQ. MI.



     FINISH

          NORMAL PROGRAM FINISH          END TIME (HR:MIN:SEC) = 09:45:30
```

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

April 1, 1999

Gregory J. Krenik, P.E.
Mark Goodwin & Associates, PA
P. O. Box 90606
Albuquerque, New Mexico 87199

RE: Drainage Report and Grading and Drainage Plan for Sage Pointe Subdivision (M9/D21), Engineer's Stamp Dated 3/16/99.

Dear Mr. Krenik:

The above referenced Drainage Report appears to be adequate with the following exception. Prior to Preliminary Plat approval, street capacity calculations for Scotty Court and Sapphire must be provided to demonstrate that the streets can handle the developed flows from your site without adversely impacting the existing residences. Also provide an analysis at the intersection of Scotty Court and Sapphire to examine the potential for a hydraulic jump.

It also appears that the above referenced plan must be revised to address the following:

1. A minimum 15' turning radius must be provided between the north end of the existing 10' wide concrete channel and your proposed 10' wide concrete channel. This is required for City Storm Drain Maintenance access. It appears that the addition of this turn radius may cause an alteration of the proposed public drainage easement.

2. The plan must show the proposed wall at the west end of Scott Pointe Trail. Also show the gates, or bollards, which will be provided at the south end of Alexandra Lane and the west end of the 10' wide concrete channel. The 4' wide channel must be within a private drainage easement.

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

Sincerely,

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

c: Rex Wilson, C & W Land Development
File

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

May 17, 1999

Gregory J. Krenik, P.E.
Mark Goodwin & Associates
P.O. Box 90606
Albuquerque, NM 87199

Re: Sage Point Subdivision: File # M-9/D-21, drainage report dated April 20, 1999 and grading plan dated March 16, 1999.

Dear Mr. Krenik:

The referenced submittal is approved for preliminary plat and rough grading. This approval is with the understanding that your re-submittal referenced above satisfied the downstream issue raised by Ms. Calongne in her letter dated April 1, 1999. The downstream issue was the containment of the developed storm flows within the City's right-of-way (Scotty Court and a portion of Sapphire) per Chapter 22 of the DPM. The other issues regarding the turning radius and the gate/bollards will be addressed at DRC.

Sincerely,

Fred J. Aguirre, P.E.
City Hydrologist
Public Works Department

c: file

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

[redacted]

RECEIVED
APR 20 1999
HYDROLOGY SECTION

MARK GOODWIN & ASSOCIATES
CONSULTING ENGINEERS

DRAINAGE REPORT

for

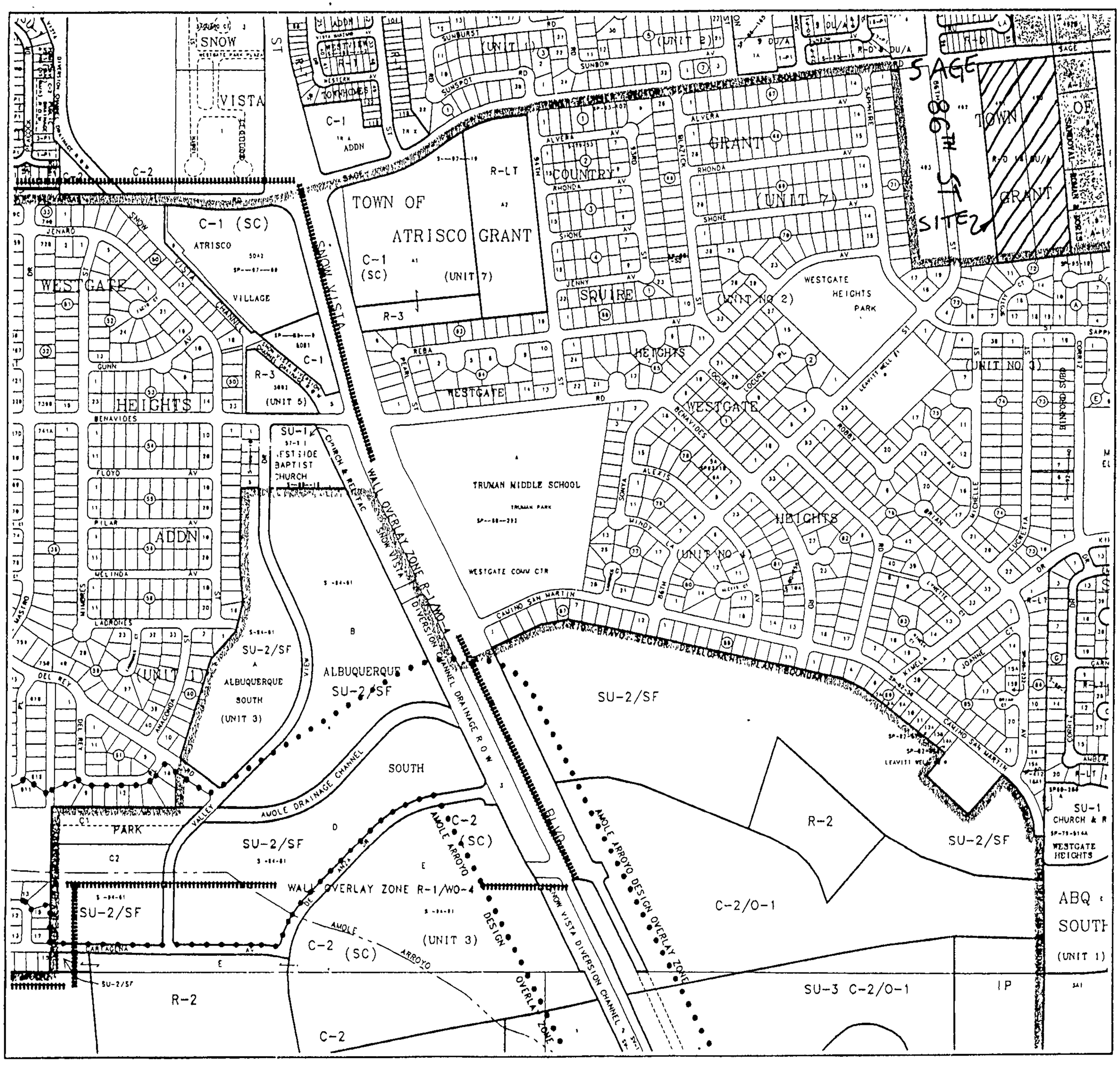
SAGE POINTE SUBDIVISION

RECEIVED
APR 20 1999
HYDROLOGY SECTION

GREGORY JAMES HARDIN
11920
REGISTERED PROFESSIONAL ENGINEER
2-4-99

3-16-99
3-30-99
4-20-99

February 1999



CITY OF Albuquerque

A Albuquerque G Geographic I Information S System

PLANNING DEPARTMENT

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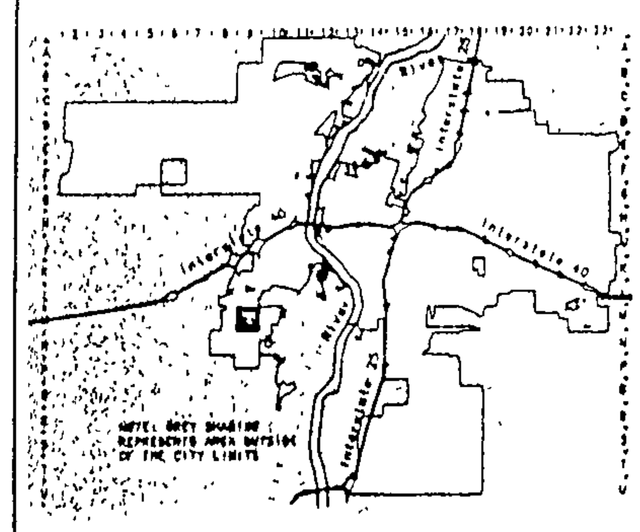
N W E S

GRAPHIC SCALE IN FEET

250 0 500 1000



Zone Atlas Page

M-9-Z

Map Amended through
December 10, 1998

D. Mark Goodwin & Associates, P.A.
Consulting Engineers
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e-mail: dmg@swcp.com

PROJECT SAGE POINTE
SUBJECT DRAINAGE CALCS
BY GJK DATE 1-27-99
CHECKED _____ DATE _____
SHEET 1 OF ____
REVISED 4-20-99

- SITE DOES NOT LIE IN A 100 YR FLOOD PLAIN.
- OFFSITE FLOWS FROM THE WEST IMPACT THE SITE AND WILL BE ALLOWED TO FLOW ACCROSS THIS PROPERTY IN ONE LOCATION.
- RUNOFF WILL BE ALLOWED DIRECT DISCHARGE THROUGH AN EXISTING CONCRETE CHANNEL AT THE SOUTH END OF THE PROPERTY.
- THIS PROPERTY IS PART OF BASINS 108 & 110 OF THE SUN SAGE HILLS REPORT PREPARED BY MARK GOODWIN AND ASSOCIATES.

- TOTAL SITE = 9.8546 AC

58 LOTS

DRIVE PADS = 20x20x58 = 23,200 SF = 0.5326 AC TYPE "D"
PADS = 27x60x58 = 93,960 SF = 2.1570 AC TYPE "D"
ROW = 3.2213 AC 80% "D" = 2.5770 AC
20% "B" = 0.6443 AC

	TOTAL	
"B"	= 4.5880 AC	46.56%
"D"	= 5.2666 AC	53.44%
	9.8546	

$P_1 = 1.87$ in

$P_6 = 2.20$ in

$P_{24} = 2.66$ in

FROM AHYMO OUTPUT SHEETS 8-10

$Q = 32.29$ CFS $= 0.5567$ CFS / LOT

FLOW WILL BE SPLIT ALONG THE N-S STREETS EVENLY.

$Q = 16.145$ CFS

- FIND STREET CAPACITY

$S = 0.5\%$ $n = 0.017$ 28' F-F

MOUNTABLE CURB

$d = 0.33$
$wp = 28.67$
$A = 4.735$
$V = 1.86$ F/s
$Q = 8.81$ CFS

$d + \frac{V^2}{2g} = 0.38 < 0.53$

No of LOTS $= 8.81 / 0.565 = 15.59$

TRANSITION FROM MOUNTABLE TO STD C+G AFTER 15 LOTS.

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PROJECT SAGE POINTE
SUBJECT DRAINAGE CALCS
BY GJK DATE 1-27-99
CHECKED _____ DATE _____
SHEET 2 OF ____

- FIND STREET CAPACITY OF STD C+G

S=0.5%
28' F-F

d = 0.67
WP = 29.34
A = 12.63
V = 3.52 F/S
Q = 44.46 CFS > 16.145 OK

$d + \frac{V^2}{2g} = 0.86 \approx 0.87$ OK

- FIND STREET CAPACITY OF 22' F-F STREET W/ STD C+G

d = 0.67
WP = 23.34
A = 10.62
V = 2.46 F/S
Q = 26.13 CFS > 16.145 OK

$d + \frac{V^2}{2g} = 0.76 < 0.87$ OK

- SIZE CURB OPENING TO CHANNEL AT SOUTH END OF PROPERTY.

$Q = 2.95\ L\ H^{1.5}$

USE 0.5 FOR H
16.145 = Q

L = 15.48'

USE 0.67 FOR H

L = 10.13'

- USE 15 OPENING

WATER SURFACE = 0.51'

- SIZE CHANNEL AT SOUTH END ON EAST SIDE

S = 2.87 % n = 0.013 4' WIDE

d = 0.5
WP = 5
A = 2
V = 10.51 F/S
Q = 21.03 CFS > 16.145 OK

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PROJECT SAGE POINTE
SUBJECT DRAINAGE CALCS
BY GJK DATE 1-27-99
CHECKED _____ DATE _____
SHEET 3 OF ____

- SIZE CHANNEL AT SOUTH END ON WEST SIDE

  $S = 3.11\%$ $n = 0.013$

  - OFFSITE FLOWS FROM THE WEST WILL ALSO FLOW THROUGH THIS CHANNEL.
    - AREA IS APPROX. 5 ACRES.
    - ASSUME SAME LAND TREATMENTS
    - $Q = \frac{1}{2}$ OF OUR SITE = 16.145 CFS

  TOTAL FLOW IN CHANNEL
  $Q = 16.145 + 16.145$
  $= 32.29$ CFS

  USE A 6' WIDE CHANNEL

  $d = 0.5$
  $wp = 7$
  $A = 3$
  $V = 11.46$ F/s
  $Q = 34.38$ CFS > 32.29 OK

  - OPENING FROM OUR SITE TO CHANNEL WILL BE THE WIDTH OF THE STREET = 22'

- SIZE CHANNEL FROM PROPERTY TO WEST TO STREET

  $Q = 16.4$ CFS $S = 1.52\%$ $n = 0.013$

  USE 5' WIDE

  $d = 0.5$
  $wp = 6$
  $A = 2.5$
  $V = 7.86$ F/s
  $Q = 19.65$ CFS > 16.145 OK

- SIZE OPENING FROM WEST

  USE 15' OPENING

  $Q = 2.95 L H^{1.5}$ $Q = 16.145$ CFS

  $H = 0.51'$ USE 0.67' TALL WALLS ON CHANNEL

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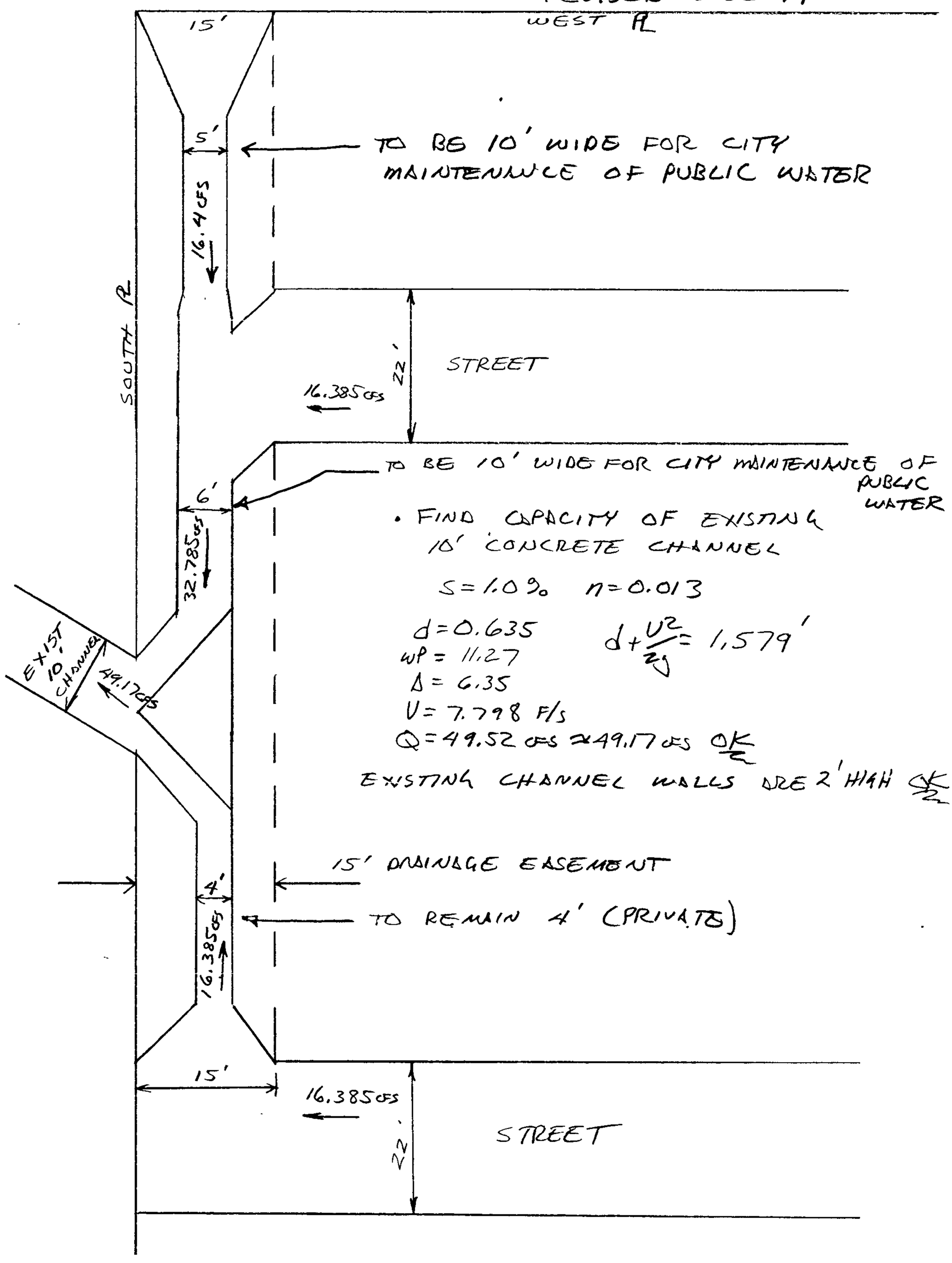
PROJECT SAGE POINTE
SUBJECT DRAINAGE CALCS
BY GJK DATE 1-27-99
CHECKED _____ DATE _____
SHEET 4 OF _____

REVISED 3-30-99



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PROJECT SAGE POINTE
SUBJECT DRAINAGE CALCS
BY GJK DATE 4-20-99
CHECKED _____ DATE _____
SHEET 5 OF ____

- PER THE SUN SAGE HILLS SUBDIVISION (M-9/D14) PREPARED BY MARK GOODWIN AND ASSOCIATES AND APPROVED BY THE CITY ON OCTOBER 11, 1996 THERE IS 198.4 CFS IN SAPPHIRE BEFORE THE INLETS.

- THIS REPORT WILL MODIFY THAT REPORTS BASINS AND RUN OFF TO VERIFY EXISTING STREET CAPACITY.

  - BASINS THAT WILL BE MODIFIED ARE 108 AND 110.
    - BASIN 108 WILL BE REDUCED WITH A PORTION BEING ADDED TO BASIN 110.
    - BASIN 110 WILL BE INCREASED WITH PART OF BASIN 108 BEING ADDED ALONG WITH ADDITIONAL AREA TO THE NORTH AND EAST (WHICH IS SAGE POINTE)

BASIN	AREA PER SUNSAGE HILLS	REVISE AREA
108	0.0107 SM.	0.0102 SM.
110	0.00345 SM.	0.0232 SM.

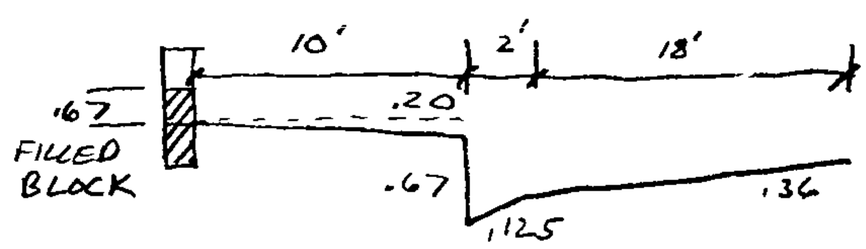
BASIN	Q_{100} PER SUNSAGE HILLS	Q_{100} REVISED
108	12.3 CFS	20.89
110	4.0 CFS	48.62 CFS

BASIN	B	C	D	
108	35%	23%	42%	PER SUNSAGE HILLS
110	46.56%	0%	53.44%	PER SAGE PT.

FROM AHYMO OUTPUT SHEETS 11-34

Q AT INLETS = 238.60 CFS

- Find d in SAPPHIRE BEFORE INLETS



SECTION PER WESTGATE HEIGHTS UNIT 3 STD SECTION FOR SAPPHIRE.

CAPACITY
d = 1.54
WP = 62.68
A = 65.77
V = 10.68 F/S
Q = 702.42 CFS

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PROJECT SAGE POINTE
SUBJECT DRAINAGE CALCS
BY GJK DATE 4-20-99
CHECKED _____ DATE _____
SHEET 6 OF ____

d = 1.02
WP = 61.64
A = 34.57
V = 7.034 F/S
Q = 243.16 CFS ≈ 238.60 CFS OK

THIS IS WELL WITHIN CAPACITY.

- THIS FLOW THEN ENTERS THE TRENCH DRAIN AND INLETS IN SAPPHIRE. PER THE DESIGN OF THESE PER ISAACSON & ARFMAN FOR SUNRISE ESTATES UNIT 1 413 CFS IS CAPABLE OF ENTERING THE SYSTEM AT THIS POINT.

- VERIFY CAPACITY OF SCOTTY COURT AND VERIFY WATER IN SCOTTY COURT DOES NOT IMPACT LOTS ON SOUTH SIDE OF SAPPHIRE AT INTERSECTION.

SCOTTY COURT 32' F-F
S = 2%

Q = 60.11 CFS FROM AHYMO OUTPUT BASIN 109 + 110

d = 0.57
WP = 33.14
A = 10.57
V = 5.77 F/S
Q = 61.00 ≈ 60.11 OK

$d + V^2/2g = 1.09' < 1.54'$ OK

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PROJECT SAGE POINTE
SUBJECT DRAINAGE CALCS
BY GJK DATE 3-16-99
CHECKED _____ DATE _____
SHEET 7 OF ____

• FIND CAPACITY OF SAGE ROAD.

PER THE TOWER/SAGE DRAINAGE MASTER PLAN THE STORMDRAIN IS TO BEGIN AT 82nd STREET.

LENGTH OF SAGE ROAD = 1020'
ROW = 86'
TYPE D = 75%
TYPE B = 25%
AREA = 2.0138 AC

• FIND D S=0.5 n=0.017

d = 0.345
WP = 13.345
A = 1.775
$V_{1/2}$ = 1.6106 F/S
$Q_{1/2}$ = 2.8587 CFS = CAPACITY OF 13' CURB LANE

FROM AHYMO OUTPUT SHEETS 35-37

Q = 4.75 CFS
Q 1/2 = 2.375 CFS < 2.8587 OK

```
START                  TIME=0.0
***** HYDROGRAPH FOR SAGE POINTE 58 LOTS
RAINFALL               TYPE=1 RAIN QUARTER=0.0 IN
                       RAIN ONE=1.87 IN RAIN SIX=2.20 IN
                       RAIN DAY=2.66 IN DT=0.03333 HR
COMPUTE NM HYD         ID=1 HYD NO=101.1 AREA=0.015398 SQ MI
                       PER A=0 B=46.56 C=0 D=53.44
                       TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD              ID=1 CODE=1
FINISH
```

```
AHYMO PROGRAM (AHYMO194) - AMAFCA Hydrologic Model - January, 1994
      RUN DATE (MON/DAY/YR) = 02/01/1999
      START TIME (HR:MIN:SEC) = 10:39:42      USER NO.= M_GOODWN.I01
      INPUT FILE = SAGEPT.DAT

START                TIME=0.0
***** HYDROGRAPH FOR SAGE POINTE 58 LOTS
RAINFALL             TYPE=1 RAIN QUARTER=0.0 IN
                     RAIN ONE=1.87 IN RAIN SIX=2.20 IN
                     RAIN DAY=2.66 IN DT=0.03333 HR

              COMPUTED 6-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2 - PEAK AT 1.40 H
              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

COMPUTE NM HYD       ID=1 HYD NO=101.1 AREA=0.015398 SQ MI
                     PER A=0 B=46.56 C=0 D=53.44
                     TP=0.1333 HR MASS RAINFALL=-1

    K =    .072649HR    TP =    .133300HR    K/TP RATIO =    .545000     SHAPE CONSTANT, N =
    UNIT PEAK =   32.487    CFS   UNIT VOLUME =    ..9990       B =   526.28      P60 = 1.87
    AREA =       .008229 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 =
    UNIT PEAK =   17.592    CFS   UNIT VOLUME =    .9995       B =   327.09      P60 = 1.87
    AREA =       .007169 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

                                   PARTIAL HYDROGRAPH   101.10
```

```
RUNOFF VOLUME =      1.36109 INCHES      =        1.1178 ACRE-FEET
PEAK DISCHARGE RATE =      32.29 CFS  AT   1.500 HOURS   BASIN AREA =   .0154 SQ. MI.


FINISH

NORMAL PROGRAM FINISH          END TIME (HR:MIN:SEC) = 10:39:42
```

```
START                    TIME=0.0
***** SUN SAGE HILLS SUBDIVISION - DEVELOPED CONDITIONS - REVISED W/ SAGE PT
***** 100-YEAR 6-HOUR STORM EVENT
*****   REAR YARD PONDS IN SUB-BASINS 102-106, 108, 110;
*****   ASSUME 56% OF TOTAL LOT AREA CONTRIBUTES TO STREET RUNOFF
*****   FOR SUB-BASINS (102-06,108,110) WITH REAR YARD PONDS;
*****   SPLIT B/C LAND TREATMENT 60/40
*****   SB 100 LIMIT DISCHARGE TO 1.4 CFS WHERE Q(DEV)=0.1 CFS/ACRE
*****   ************************************
*****   FILE: SAGEDO2.DAT  JULY 26 1996 BY:DLH
*****   ************************************
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
*****
DD HYD                 ID=2 HYD=110 ID=3  ID=4
RINT 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

FINISH
```

```
    AHYMO PROGRAM (AHYMO194) - AMAFCA Hydrologic Model - January, 1994
         RUN DATE (MON/DAY/YR) = 04/20/1999
         START TIME (HR:MIN:SEC) = 09:27:14      USER NO.= M_GOODWN.I01
         INPUT FILE = SAGESUN.DAT

START                TIME=0.0
***** SUN SAGE HILLS SUBDIVISION - DEVELOPED CONDITIONS - REVISED W/ SAGE PT
***** 100-YEAR 6-HOUR STORM EVENT
*****   REAR YARD PONDS IN SUB-BASINS 102-106, 108, 110;
*****   ASSUME 56% OF TOTAL LOT AREA CONTRIBUTES TO STREET RUNOFF
*****   FOR SUB-BASINS (102-06,108,110) WITH REAR YARD PONDS;
*****   SPLIT B/C LAND TREATMENT 60/40
*****   SB 100 LIMIT DISCHARGE TO 1.4 CFS WHERE Q(DEV)=0.1 CFS/ACRE
*****   ************************************
*****   FILE: SAGEDO2.DAT  JULY 26 1996 BY:DLH
*****   ************************************
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

                COMPUTED 6-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2 - PEAK AT 1.40 H
                DT =     .033300 HOURS        END TIME =     5.994000 HOURS
                   .0000   .0016   .0033   .0050   .0067   .0085   .0103
                   .0121   .0140   .0160   .0180   .0200   .0221   .0243
                   .0265   .0288   .0312   .0336   .0361   .0387   .0414
                   .0442   .0471   .0501   .0533   .0566   .0600   .0636
                   .0674   .0714   .0757   .0808   .0863   .0922   .1044
                   .1323   .1754   .2374   .3221   .4335   .5756   .7527
                   .9690  1.1767  1.2619  1.3336  1.3972  1.4551  1.5084
                  1.5579  1.6041  1.6474  1.6881  1.7266  1.7629  1.7973
                  1.8298  1.8607  1.8900  1.9178  1.9442  1.9515  1.9573
                  1.9627  1.9680  1.9729  1.9777  1.9823  1.9867  1.9909
                  1.9950  1.9990  2.0029  2.0066  2.0102  2.0137  2.0172
                  2.0205  2.0238  2.0269  2.0300  2.0331  2.0360  2.0389
                  2.0418  2.0446  2.0473  2.0500  2.0526  2.0552  2.0578
                  2.0603  2.0627  2.0651  2.0675  2.0698  2.0721  2.0744
                  2.0766  2.0788  2.0810  2.0832  2.0853  2.0873  2.0894
                  2.0914  2.0934  2.0954  2.0974  2.0993  2.1012  2.1031
                  2.1050  2.1068  2.1086  2.1104  2.1122  2.1140  2.1157
                  2.1174  2.1191  2.1208  2.1225  2.1242  2.1258  2.1274
                  2.1290  2.1306  2.1322  2.1338  2.1353  2.1369  2.1384
                  2.1399  2.1414  2.1429  2.1444  2.1459  2.1473  2.1487
                  2.1502  2.1516  2.1530  2.1544  2.1558  2.1571  2.1585
                  2.1599  2.1612  2.1625  2.1639  2.1652  2.1665  2.1678
                  2.1691  2.1703  2.1716  2.1729  2.1741  2.1754  2.1766
                  2.1778  2.1791  2.1803  2.1815  2.1827  2.1839  2.1850
                  2.1862  2.1874  2.1886  2.1897  2.1909  2.1920  2.1931
                  2.1943  2.1954  2.1965  2.1976  2.1987  2.1998

*****
***** 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

    K =    .072649HR    TP =    .133300HR    K/TP RATIO =    .545000     SHAPE CONSTANT, N =
    UNIT PEAK =    77.816    CFS    UNIT VOLUME =    .9992        B =    526.28       P60 = 1.87
    AREA =       .019710 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
```

RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .118429HR TP = .133300HR K/TP RATIO = .888442 SHAPE CONSTANT, N =
UNIT PEAK = 5.8269 CFS UNIT VOLUME = .9982 B = 354.67 P60 = 1.87
AREA = .002190 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 100.00

RUNOFF VOLUME = 1.85049 INCHES = 2.1614 ACRE-FEET
PEAK DISCHARGE RATE = 58.56 CFS AT 1.499 HOURS BASIN AREA = .0219 SQ. MI.

*****
***** 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

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

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
.00	.00	19.00	.000	.00
.33	.00	19.00	.000	.00
.67	.00	19.00	.000	.00
1.00	.00	19.00	.000	.00
1.33	16.89	19.13	.083	.10
1.67	29.83	20.85	1.207	1.10
2.00	14.08	21.57	1.726	1.32
2.33	3.00	21.80	1.896	1.39
2.66	1.24	21.82	1.911	1.40
3.00	.66	21.80	1.898	1.39
3.33	.44	21.77	1.874	1.38
3.66	.36	21.73	1.847	1.37
4.00	.32	21.70	1.819	1.36
4.33	.31	21.66	1.790	1.35
4.66	.32	21.62	1.762	1.34
5.00	.33	21.58	1.734	1.32
5.33	.35	21.54	1.707	1.31
5.66	.37	21.51	1.681	1.30
5.99	.40	21.47	1.656	1.29
6.33	.04	21.43	1.626	1.28
6.66	.01	21.38	1.592	1.27
6.99	.00	21.34	1.558	1.25

7.33	.00	21.29	1.523	1.24
7.66	.00	21.24	1.489	1.22
7.99	.00	21.20	1.456	1.21
8.33	.00	21.15	1.423	1.20
8.66	.00	21.11	1.390	1.18
8.99	.00	21.06	1.358	1.17
9.32	.00	21.02	1.326	1.16
9.66	.00	20.97	1.294	1.14
9.99	.00	20.93	1.263	1.13
10.32	.00	20.88	1.232	1.11
10.66	.00	20.84	1.202	1.10
10.99	.00	20.80	1.172	1.09
11.32	.00	20.75	1.142	1.07
11.66	.00	20.71	1.113	1.06
11.99	.00	20.67	1.084	1.04
12.32	.00	20.63	1.055	1.03
12.65	.00	20.59	1.027	1.02
12.99	.00	20.55	.999	1.01
13.32	.00	20.51	.972	.99
13.65	.00	20.47	.945	.98
13.99	.00	20.43	.918	.96
14.32	.00	20.39	.892	.94
14.65	.00	20.35	.866	.92
14.99	.00	20.31	.841	.91
15.32	.00	20.28	.816	.89
15.65	.00	20.24	.792	.88
15.98	.00	20.20	.768	.86
16.32	.00	20.17	.745	.84
16.65	.00	20.13	.722	.83
16.98	.00	20.10	.699	.81
17.32	.00	20.07	.677	.80
17.65	.00	20.03	.655	.78
17.98	.00	20.00	.634	.77
18.32	.00	19.97	.613	.74

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
18.65	.00	19.94	.593	.72
18.98	.00	19.91	.573	.69
19.31	.00	19.88	.554	.67
19.65	.00	19.85	.536	.65

PEAK DISCHARGE = 1.397 CFS - PEAK OCCURS AT HOUR 2.60
MAXIMUM WATER SURFACE ELEVATION = 21.823
MAXIMUM STORAGE = 1.9113 AC-FT INCREMENTAL TIME= .033300HRS

PRINT HYD ID=2 CODE=1

HYDROGRAPH FROM AREA POND.101

RUNOFF VOLUME = 1.40559 INCHES = 1.6417 ACRE-FEET
PEAK DISCHARGE RATE = 1.40 CFS AT 2.597 HOURS BASIN AREA = .0219 SQ. MI.

*****
***** 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

K =    .072649HR    TP =    .133300HR    K/TP RATIO =    .545000    SHAPE CONSTANT, N =
UNIT PEAK =   33.100    CFS   UNIT VOLUME =    .9990       B =   526.28       P60 = 1.87
AREA =       .008384 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033300


K =    .120523HR    TP =    .133300HR    K/TP RATIO =    .904149    SHAPE CONSTANT, N =
UNIT PEAK =   12.372    CFS   UNIT VOLUME =    .9994       B =   349.71       P60 = 1.87
AREA =       .004716 SQ MI    IA =    .43750 INCHES    INF =   1.07500 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033300

PRINT HYD           ID=1 CODE=1

                                PARTIAL HYDROGRAPH   101.00

    RUNOFF VOLUME =     1.54209 INCHES      =       1.0774 ACRE-FEET
    PEAK DISCHARGE RATE =      30.61 CFS  AT   1.499 HOURS   BASIN AREA =   .0131 SQ. MI.


*****
*****ADD SB 100 AND SB 101
*****
ADD HYD             ID=3 HYD=101 ID=1  ID=2
PRINT HYD           ID=3 CODE=1

                                PARTIAL HYDROGRAPH   101.00


    RUNOFF VOLUME =     1.45667 INCHES      =       2.7191 ACRE-FEET
    PEAK DISCHARGE RATE =      31.34 CFS  AT   1.499 HOURS   BASIN AREA =   .0350 SQ. MI.


*****
***** 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

                                RATING CURVE VALLEY SECTION  9.0
                                   WATER      FLOW       FLOW       TOP
                                  SURFACE     AREA       RATE      WIDTH
                                   ELEV       SQ FT      CFS       FT
                                    .00        .00        .00       .00
                                    .05        .03        .02      1.45
                                    .09        .13        .10      2.91
                                    .14        .30        .27      5.21
                                    .18        .65        .64      9.79
```

.23	1.20	1.39	14.38
.27	1.97	2.63	18.96
.32	2.94	4.46	23.55
.37	4.12	6.97	28.14
.41	5.51	10.38	32.01
.46	6.98	15.35	32.02
.50	8.44	21.05	32.03
.55	9.91	27.44	32.03
.60	11.38	34.47	32.04
.64	12.85	42.12	32.05
.69	14.33	48.98	33.56
.73	15.96	54.42	37.67
.78	17.78	60.93	41.78
.82	19.78	68.53	45.89
.87	21.98	77.24	50.00

COMPUTE TRAVEL TIME ID=4 REACH NO=1 NO VS=1 LENGTH=250 FT SLOPE=0.005

TRAVEL TIME TABLE

REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.046	.033	.02	.1449
.092	.133	.10	.0913
.137	.305	.27	.0770
.183	.648	.64	.0703
.229	1.202	1.39	.0600
.275	1.965	2.63	.0519
.321	2.938	4.46	.0458
.366	4.122	6.97	.0411
.412	5.513	10.38	.0369
.458	6.979	15.35	.0316
.504	8.445	21.05	.0279
.549	9.911	27.44	.0251
.595	11.378	34.47	.0229
.641	12.845	42.12	.0212
.687	14.326	48.98	.0203
.733	15.956	54.42	.0204
.778	17.776	60.93	.0203
.824	19.783	68.53	.0200
.870	21.978	77.24	.0198

ROUTE ID=4 HYD NO=201 INFLOW ID=3 DT=0.0
PRINT HYD ID=4 CODE=1

PARTIAL HYDROGRAPH 201.00

. . . . .

RUNOFF VOLUME = 1.45470 INCHES = 2.7154 ACRE-FEET
PEAK DISCHARGE RATE = 31.14 CFS AT 1.532 HOURS BASIN AREA = .0350 SQ. MI.

*****
***** 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

```
K =    .072649HR    TP =    .133300HR    K/TP RATIO =    .545000    SHAPE CONSTANT, N =
UNIT PEAK =    22.385    CFS    UNIT VOLUME =    .9988    B =    526.28    P60 = 1.87
AREA =    .005670 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .033300

K =    .120595HR    TP =    .133300HR    K/TP RATIO =    .904691    SHAPE CONSTANT, N =
UNIT PEAK =    20.532    CFS    UNIT VOLUME =    .9998    B =    349.54    P60 = 1.87
AREA =    .007830 SQ MI    IA =    .43793 INCHES    INF =    1.07621 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .033300

PRINT HYD          ID=1 CODE=1

                    PARTIAL HYDROGRAPH    104.00

RUNOFF VOLUME =    1.28283 INCHES    =    .9236 ACRE-FEET
PEAK DISCHARGE RATE =    27.72 CFS    AT    1.499 HOURS    BASIN AREA =    .0135 SQ. MI.

*****
***** ADD SB 100 AND 101 AND 104
*****
ADD HYD            ID=2 HYD=104 ID=1  ID=4
PRINT HYD          ID=2 CODE=1

                    PARTIAL HYDROGRAPH    104.00

RUNOFF VOLUME =    1.40686 INCHES    =    3.6390 ACRE-FEET
PEAK DISCHARGE RATE =    58.10 CFS    AT    1.532 HOURS    BASIN AREA =    .0485 SQ. MI.

*****
***** 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

                RATING CURVE VALLEY SECTION  9.0
                WATER     FLOW     FLOW     TOP
                SURFACE   AREA     RATE     WIDTH
                ELEV      SQ FT    CFS      FT
                  .00       .00      .00      .00
                  .05       .03      .03     1.45
                  .09       .13      .18     2.91
                  .14       .30      .50     5.21
                  .18       .65     1.16     9.79
                  .23      1.20     2.52    14.38
                  .27      1.97     4.77    18.96
                  .32      2.94     8.07    23.55
```

.37	4.12	12.62	28.14
.41	5.51	18.80	32.01
.46	6.98	27.79	32.02
.50	8.44	38.12	32.03
.55	9.91	49.69	32.03
.60	11.38	62.43	32.04
.64	12.85	76.28	32.05
.69	14.33	88.71	33.56
.73	15.96	98.56	37.67
.78	17.78	110.35	41.78
.82	19.78	124.11	45.89
.87	21.98	139.89	50.00

COMPUTE TRAVEL TIME ID=3 REACH NO=1 NO VS=1 LENGTH=770 FT SLOPE=0.0164

TRAVEL TIME TABLE

REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.046	.033	.03	.2464
.092	.133	.18	.1552
.137	.305	.50	.1310
.183	.648	1.16	.1195
.229	1.202	2.52	.1020
.275	1.965	4.77	.0882
.321	2.938	8.07	.0778
.366	4.122	12.62	.0699
.412	5.513	18.80	.0627
.458	6.979	27.79	.0537
.504	8.445	38.12	.0474
.549	9.911	49.69	.0427
.595	11.378	62.43	.0390
.641	12.845	76.28	.0360
.687	14.326	88.71	.0345
.733	15.956	98.56	.0346
.778	17.776	110.35	.0345
.824	19.783	124.11	.0341
.870	21.978	139.89	.0336

ROUTE ID=3 HYD NO=204 INFLOW ID=2 DT=0.0
PRINT HYD ID=3 CODE=1

PARTIAL HYDROGRAPH 204.00

RUNOFF VOLUME = 1.40424 INCHES = 3.6323 ACRE-FEET
PEAK DISCHARGE RATE = 56.61 CFS AT 1.532 HOURS BASIN AREA = .0485 SQ. MI.

*****
***** 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

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N =
UNIT PEAK = 25.860 CFS UNIT VOLUME = .9989 B = 526.28 P60 = 1.87
AREA = .006550 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR

```
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033300

K =    .120942HR    TP =    .133300HR    K/TP RATIO =    .907291    SHAPE CONSTANT, N =
UNIT PEAK =   17.136    CFS   UNIT VOLUME =    .9996       B =   348.74      P60 = 1.87
AREA =       .006550 SQ MI    IA =    .44000 INCHES    INF =   1.08200 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033300

PRINT HYD            ID=1 CODE=1

                                PARTIAL HYDROGRAPH   102.00

RUNOFF VOLUME =      1.37477 INCHES      =         .9605 ACRE-FEET
PEAK DISCHARGE RATE =       28.19 CFS  AT   1.499 HOURS   BASIN AREA =   .0131 SQ. MI.


*****
***** 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

K =    .072649HR    TP =    .133300HR    K/TP RATIO =    .545000    SHAPE CONSTANT, N =
UNIT PEAK =    7.3852    CFS   UNIT VOLUME =    .9978       B =   526.28      P60 = 1.87
AREA =       .001871 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033300


K =    .121037HR    TP =    .133300HR    K/TP RATIO =    .908002    SHAPE CONSTANT, N =
UNIT PEAK =    5.5151    CFS   UNIT VOLUME =    .9980       B =   348.52      P60 = 1.87
AREA =       .002109 SQ MI    IA =    .44057 INCHES    INF =   1.08358 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033300

PRINT HYD            ID=2 CODE=1

                                PARTIAL HYDROGRAPH   103.00

RUNOFF VOLUME =      1.33869 INCHES      =         .2842 ACRE-FEET
PEAK DISCHARGE RATE =        8.42 CFS  AT   1.499 HOURS   BASIN AREA =   .0040 SQ. MI.


*****
***** ADD SB 102 AND 103
*****
ADD HYD              ID=4 HYD=103 ID=1  ID=2
PRINT HYD            ID=4 CODE=1

                                PARTIAL HYDROGRAPH   103.00

RUNOFF VOLUME =      1.36633 INCHES      =        1.2446 ACRE-FEET
PEAK DISCHARGE RATE =       36.61 CFS  AT   1.499 HOURS   BASIN AREA =   .0171 SQ. MI.
```

```
*****
***** ADD SB 100, 101, 102, 103, 104
*****
ADD HYD              ID=2 HYD=104 ID=3  ID=4
PRINT HYD            ID=2 CODE=1

                                PARTIAL HYDROGRAPH   104.00


    RUNOFF VOLUME =      1.39436 INCHES      =       4.8769 ACRE-FEET
    PEAK DISCHARGE RATE =      92.11 CFS  AT   1.532 HOURS   BASIN AREA =   .0656 SQ. MI.


*****
***** 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

                                RATING CURVE VALLEY SECTION  9.0
                                    WATER        FLOW        FLOW        TOP
                                   SURFACE       AREA        RATE       WIDTH
                                    ELEV         SQ FT       CFS        FT
                                     .00          .00         .00        .00
                                     .05          .03         .03       1.45
                                     .09          .13         .20       2.91
                                     .14          .30         .55       5.21
                                     .18          .65        1.28       9.79
                                     .23         1.20        2.78      14.38
                                     .27         1.97        5.26      18.96
                                     .32         2.94        8.92      23.55
                                     .37         4.12       13.93      28.14
                                     .41         5.51       20.76      32.01
                                     .46         6.98       30.69      32.02
                                     .50         8.44       42.10      32.03
                                     .55         9.91       54.88      32.03
                                     .60        11.38       68.94      32.04
                                     .64        12.85       84.23      32.05
                                     .69        14.33       97.96      33.56
                                     .73        15.96      108.84      37.67
                                     .78        17.78      121.86      41.78
                                     .82        19.78      137.06      45.89
                                     .87        21.98      154.48      50.00
COMPUTE TRAVEL TIME ID=3 REACH NO=1  NO VS=1 LENGTH=150 FT SLOPE=0.02

                        TRAVEL TIME TABLE
                                     REACH=  1.0

                        WATER       AVERAGE     FLOW        TRAVEL
                        DEPTH       AREA        RATE        TIME
                        FEET        SQ.FT.      CFS         HRS
                          .046        .033        .03        .0435
```

.092	.133	.20	.0274
.137	.305	.55	.0231
.183	.648	1.28	.0211
.229	1.202	2.78	.0180
.275	1.965	5.26	.0156
.321	2.938	8.92	.0137
.366	4.122	13.93	.0123
.412	5.513	20.76	.0111
.458	6.979	30.69	.0095
.504	8.445	42.10	.0084
.549	9.911	54.88	.0075
.595	11.378	68.94	.0069
.641	12.845	84.23	.0064
.687	14.326	97.96	.0061
.733	15.956	108.84	.0061
.778	17.776	121.86	.0061
.824	19.783	137.06	.0060
.870	21.978	154.48	.0059

```
ROUTE          ID=3 HYD NO=203  INFLOW ID=2 DT=0.0
PRINT HYD      ID=3 CODE=1

                         PARTIAL HYDROGRAPH   203.00


    RUNOFF VOLUME =      1.39402 INCHES      =       4.8757 ACRE-FEET
    PEAK DISCHARGE RATE =      92.38 CFS  AT   1.532 HOURS   BASIN AREA =   .0656 SQ. MI.


*****
***** 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

    K =    .072649HR    TP =    .133300HR    K/TP RATIO =    .545000     SHAPE CONSTANT, N =
    UNIT PEAK =   8.7220    CFS   UNIT VOLUME =    .9980       B =   526.28      P60 = 1.87
    AREA =       .002209 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033300

    K =    .120595HR    TP =    .133300HR    K/TP RATIO =    .904691     SHAPE CONSTANT, N =
    UNIT PEAK =   7.9999    CFS   UNIT VOLUME =    .9988       B =   349.54      P60 = 1.87
    AREA =       .003051 SQ MI    IA =    .43793 INCHES    INF =   1.07621 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033300

PRINT HYD            ID=1 CODE=1

                         PARTIAL HYDROGRAPH   105.00


    RUNOFF VOLUME =      1.28283 INCHES      =        .3599 ACRE-FEET
    PEAK DISCHARGE RATE =      10.81 CFS  AT   1.499 HOURS   BASIN AREA =   .0053 SQ. MI.


*****
***** ADD SB 100 THRU 104 AND 105
*****
```

```
ADD HYD              ID=2 HYD=105 ID=1  ID=3
PRINT HYD            ID=2 CODE=1

                                   PARTIAL HYDROGRAPH   105.00


    RUNOFF VOLUME =      1.38576 INCHES      =       5.2355 ACRE-FEET
    PEAK DISCHARGE RATE =      102.90 CFS  AT   1.532 HOURS   BASIN AREA =   .0708 SQ. MI.


*****
***** 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

                                RATING CURVE VALLEY SECTION  9.0
                                   WATER        FLOW        FLOW        TOP
                                  SURFACE       AREA        RATE       WIDTH
                                   ELEV        SQ FT       CFS         FT
                                     .00         .00        .00         .00
                                     .05         .03        .02        1.45
                                     .09         .13        .15        2.91
                                     .14         .30        .41        5.21
                                     .18         .65        .96        9.79
                                     .23        1.20       2.08       14.38
                                     .27        1.97       3.94       18.96
                                     .32        2.94       6.67       23.55
                                     .37        4.12      10.43       28.14
                                     .41        5.51      15.53       32.01
                                     .46        6.98      22.97       32.02
                                     .50        8.44      31.50       32.03
                                     .55        9.91      41.07       32.03
                                     .60       11.38      51.59       32.04
                                     .64       12.85      63.03       32.05
                                     .69       14.33      73.31       33.56
                                     .73       15.96      81.45       37.67
                                     .78       17.78      91.19       41.78
                                     .82       19.78     102.56       45.89
                                     .87       21.98     115.60       50.00
COMPUTE TRAVEL TIME ID=3 REACH NO=1  NO VS=1 LENGTH=1050 FT SLOPE=0.0112

                         TRAVEL TIME TABLE
                                      REACH=  1.0

                         WATER       AVERAGE     FLOW        TRAVEL
                         DEPTH       AREA        RATE        TIME
                         FEET        SQ.FT.      CFS         HRS
                           .046        .033        .02        .4066
                           .092        .133        .15        .2562
                           .137        .305        .41        .2161
                           .183        .648        .96        .1972
```

.229	1.202	2.08	.1683
.275	1.965	3.94	.1455
.321	2.938	6.67	.1284
.366	4.122	10.43	.1153
.412	5.513	15.53	.1035
.458	6.979	22.97	.0886
.504	8.445	31.50	.0782
.549	9.911	41.07	.0704
.595	11.378	51.59	.0643
.641	12.845	63.03	.0594
.687	14.326	73.31	.0570
.733	15.956	81.45	.0571
.778	17.776	91.19	.0569
.824	19.783	102.56	.0563
.870	21.978	115.60	.0555

```
ROUTE          ID=3 HYD NO=205  INFLOW ID=2 DT=0.0
PRINT HYD      ID=3 CODE=1

                    PARTIAL HYDROGRAPH   205.00

RUNOFF VOLUME =      1.38279 INCHES      =        5.2243 ACRE-FEET
PEAK DISCHARGE RATE =      92.41 CFS  AT   1.565 HOURS   BASIN AREA =   .0708 SQ. MI.


*****
***** 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

K =    .072649HR    TP =    .133300HR    K/TP RATIO =    .545000     SHAPE CONSTANT, N =
UNIT PEAK =    34.379    CFS   UNIT VOLUME =     .9990        B =   526.28       P60 = 1.87
AREA =       .008708 SQ MI    IA =     .10000 INCHES    INF =     .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .033300


K =    .120756HR    TP =    .133300HR    K/TP RATIO =    .905895     SHAPE CONSTANT, N =
UNIT PEAK =    26.776    CFS   UNIT VOLUME =     .9999        B =   349.17       P60 = 1.87
AREA =       .010222 SQ MI    IA =     .43889 INCHES    INF =   1.07889 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .033300

PRINT HYD           ID=1 CODE=1

                    PARTIAL HYDROGRAPH   106.00

RUNOFF VOLUME =      1.32880 INCHES      =        1.3415 ACRE-FEET
PEAK DISCHARGE RATE =      39.79 CFS  AT   1.499 HOURS   BASIN AREA =   .0189 SQ. MI.


*****
***** ADD SB 100 THRU 105 AND 106
*****
ADD HYD             ID=2 HYD=106 ID=1  ID=3
PRINT HYD           ID=2 CODE=1
```

PARTIAL HYDROGRAPH 106.00

RUNOFF VOLUME = 1.37140 INCHES = 6.5659 ACRE-FEET
PEAK DISCHARGE RATE = 126.54 CFS AT 1.565 HOURS BASIN AREA = .0898 SQ. MI.

*****
***** 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

RATING CURVE VALLEY SECTION 9.0

WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH FT
.00	.00	.00	.00
.05	.03	.03	1.45
.09	.13	.17	2.91
.14	.30	.45	5.21
.18	.65	1.05	9.79
.23	1.20	2.29	14.38
.27	1.97	4.32	18.96
.32	2.94	7.33	23.55
.37	4.12	11.45	28.14
.41	5.51	17.05	32.01
.46	6.98	25.22	32.02
.50	8.44	34.59	32.03
.55	9.91	45.09	32.03
.60	11.38	56.64	32.04
.64	12.85	69.20	32.05
.69	14.33	80.48	33.56
.73	15.96	89.42	37.67
.78	17.78	100.12	41.78
.82	19.78	112.60	45.89
.87	21.98	126.92	50.00

COMPUTE TRAVEL TIME ID=3 REACH NO=1 NO VS=1 LENGTH=400 FT SLOPE=0.0135

TRAVEL TIME TABLE
REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.046	.033	.03	.1411
.092	.133	.17	.0889
.137	.305	.45	.0750
.183	.648	1.05	.0684
.229	1.202	2.29	.0584
.275	1.965	4.32	.0505
.321	2.938	7.33	.0446

.366	4.122	11.45	.0400
.412	5.513	17.05	.0359
.458	6.979	25.22	.0307
.504	8.445	34.59	.0271
.549	9.911	45.09	.0244
.595	11.378	56.64	.0223
.641	12.845	69.20	.0206
.687	14.326	80.48	.0198
.733	15.956	89.42	.0198
.778	17.776	100.12	.0197
.824	19.783	112.60	.0195
.870	21.978	126.92	.0192

```
ROUTE              ID=3 HYD NO=206  INFLOW ID=2 DT=0.0
PRINT HYD          ID=3 CODE=1

                                PARTIAL HYDROGRAPH   206.00


    RUNOFF VOLUME =      1.37058 INCHES      =       6.5619 ACRE-FEET
    PEAK DISCHARGE RATE =     125.13 CFS  AT   1.565 HOURS   BASIN AREA =   .0898 SQ. MI.


*****
***** 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

    K =    .072649HR    TP =    .133300HR    K/TP RATIO =    .545000     SHAPE CONSTANT, N =
    UNIT PEAK =   24.245    CFS   UNIT VOLUME =    .9989       B =   526.28      P60 = 1.87
    AREA =       .006141 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033300


    K =    .123487HR    TP =    .133300HR    K/TP RATIO =    .926384     SHAPE CONSTANT, N =
    UNIT PEAK =   52.894    CFS   UNIT VOLUME =    1.000       B =   342.95      P60 = 1.87
    AREA =       .020559 SQ MI    IA =    .45519 INCHES    INF =   1.12455 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033300

PRINT HYD            ID=1 CODE=1

                                PARTIAL HYDROGRAPH   107.00


    RUNOFF VOLUME =      1.03176 INCHES      =       1.4692 ACRE-FEET
    PEAK DISCHARGE RATE =      46.95 CFS  AT   1.499 HOURS   BASIN AREA =   .0267 SQ. MI.


*****
***** 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

    K =    .072649HR    TP =    .133300HR    K/TP RATIO =    .545000     SHAPE CONSTANT, N =
    UNIT PEAK =   16.913    CFS   UNIT VOLUME =    .9986       B =   526.28      P60 = 1.87
```

```
AREA =        .004284 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .033300

K =    .121029HR    TP =    .133300HR    K/TP RATIO =    .907941    SHAPE CONSTANT, N =
UNIT PEAK =    15.468    CFS    UNIT VOLUME =    .9995    B =    348.54    P60 = 1.87
AREA =        .005916 SQ MI    IA =    .44052 INCHES    INF =    1.08345 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .033300

PRINT HYD            ID=2 CODE=1

                                PARTIAL HYDROGRAPH    108.00

RUNOFF VOLUME =      1.27962 INCHES      =        .6961 ACRE-FEET
PEAK DISCHARGE RATE =      20.89 CFS  AT    1.499 HOURS    BASIN AREA =    .0102 SQ. MI.

*****
***** ADD SB 107 AND 108
*****
ADD HYD              ID=4 HYD=108 ID=1  ID=2
PRINT HYD            ID=4 CODE=1

                                PARTIAL HYDROGRAPH    108.00

RUNOFF VOLUME =      1.10025 INCHES      =        2.1653 ACRE-FEET
PEAK DISCHARGE RATE =      67.84 CFS  AT    1.499 HOURS    BASIN AREA =    .0369 SQ. MI.

*****
***** ADD SB 100 THRU 108
*****
ADD HYD              ID=2 HYD=108 ID=3  ID=4
PRINT HYD            ID=2 CODE=1

                                PARTIAL HYDROGRAPH    108.00

RUNOFF VOLUME =      1.29183 INCHES      =        8.7272 ACRE-FEET
PEAK DISCHARGE RATE =      184.52 CFS  AT    1.565 HOURS    BASIN AREA =    .1267 SQ. MI.

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

RATING CURVE VALLEY SECTION 11.0

WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH FT
.00	.00	.00	.00
.09	.37	.40	8.51
.18	1.48	2.55	16.43
.26	3.25	7.33	23.92
.35	5.69	15.46	31.41
.44	8.78	27.58	38.90
.53	12.44	45.89	42.16
.62	16.08	69.36	40.86
.70	19.66	93.94	42.05
.79	23.59	120.55	47.35
.88	27.98	152.43	52.65
.97	32.84	189.99	57.95
1.05	38.08	238.86	59.96
1.14	43.35	296.03	59.97
1.23	48.62	357.91	59.98
1.32	53.90	424.30	60.00
1.41	59.17	495.01	60.01
1.49	64.44	569.91	60.02
1.58	69.72	648.85	60.04
1.67	75.00	731.70	60.05

COMPUTE TRAVEL TIME ID=3 REACH NO=1 NO VS=1 LENGTH=300 FT SLOPE=0.014

TRAVEL TIME TABLE

REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.088	.374	.40	.0777
.176	1.481	2.55	.0484
.264	3.254	7.33	.0370
.352	5.686	15.46	.0307
.439	8.777	27.58	.0265
.527	12.435	45.89	.0226
.615	16.084	69.36	.0193
.703	19.659	93.94	.0174
.791	23.588	120.55	.0163
.879	27.983	152.43	.0153
.967	32.843	189.99	.0144
1.055	38.080	238.86	.0133
1.143	43.350	296.03	.0122
1.231	48.622	357.91	.0113
1.318	53.895	424.30	.0106
1.406	59.169	495.01	.0100
1.494	64.444	569.91	.0094
1.582	69.721	648.85	.0090
1.670	74.998	731.70	.0085

ROUTE ID=3 HYD NO=208 INFLOW ID=2 DT=0.0

PRINT HYD ID=3 CODE=1

PARTIAL HYDROGRAPH 208.00

RUNOFF VOLUME = 1.29123 INCHES = 8.7231 ACRE-FEET

PEAK DISCHARGE RATE = 185.36 CFS AT 1.565 HOURS BASIN AREA = .1267 SQ. MI.

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

    K =    .072649HR    TP =    .133300HR    K/TP RATIO =    .545000     SHAPE CONSTANT, N =
    UNIT PEAK =   8.7765    CFS   UNIT VOLUME =    .9980        B =   526.28      P60 = 1.87
    AREA =       .002223 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033300


    K =    .120695HR    TP =    .133300HR    K/TP RATIO =    .905437     SHAPE CONSTANT, N =
    UNIT PEAK =   9.1114    CFS   UNIT VOLUME =    .9989        B =   349.31      P60 = 1.87
    AREA =       .003477 SQ MI    IA =    .43852 INCHES    INF =   1.07787 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033300

PRINT HYD             ID=1 CODE=1

                                        PARTIAL HYDROGRAPH   109.00


    RUNOFF VOLUME =      1.24675 INCHES      =         .3790 ACRE-FEET
    PEAK DISCHARGE RATE =       11.48 CFS  AT   1.499 HOURS   BASIN AREA =   .0057 SQ. MI.


*****
***** 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

    K =    .072649HR    TP =    .133300HR    K/TP RATIO =    .545000     SHAPE CONSTANT, N =
    UNIT PEAK =   48.948    CFS   UNIT VOLUME =    .9991        B =   526.28      P60 = 1.87
    AREA =       .012398 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033300


    K =    .130992HR    TP =    .133300HR    K/TP RATIO =    .982685     SHAPE CONSTANT, N =
    UNIT PEAK =   26.505    CFS   UNIT VOLUME =    .9998        B =   327.09      P60 = 1.87
    AREA =       .010802 SQ MI    IA =    .50000 INCHES    INF =   1.25000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033300

PRINT HYD             ID=2 CODE=1

                                        PARTIAL HYDROGRAPH   110.00


    RUNOFF VOLUME =      1.36107 INCHES      =        1.6841 ACRE-FEET
    PEAK DISCHARGE RATE =       48.62 CFS  AT   1.499 HOURS   BASIN AREA =   .0232 SQ. MI.


*****
```

```
***** ADD SB 109 AND 110
*****
ADD HYD              ID=4 HYD=110 ID=1  ID=2
PRINT HYD            ID=4 CODE=1

                                   PARTIAL HYDROGRAPH   110.00


    RUNOFF VOLUME =      1.33850 INCHES      =       2.0631 ACRE-FEET
    PEAK DISCHARGE RATE =      60.11 CFS  AT   1.499 HOURS   BASIN AREA =   .0289 SQ. MI.


*****
***** ADD SB 100 thru 110
*****
ADD HYD              ID=2 HYD=110 ID=3  ID=4
PRINT HYD            ID=2 CODE=1

                                   PARTIAL HYDROGRAPH   110.00


    RUNOFF VOLUME =      1.30001 INCHES      =      10.7862 ACRE-FEET
    PEAK DISCHARGE RATE =     237.13 CFS  AT   1.532 HOURS   BASIN AREA =   .1556 SQ. MI.


*****
***** 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

                                   RATING CURVE VALLEY SECTION  9.0
                                       WATER       FLOW        FLOW        TOP
                                     SURFACE      AREA        RATE       WIDTH
                                      ELEV        SQ FT       CFS         FT
                                       .00         .00         .00         .00
                                       .05         .04         .04        1.67
                                       .11         .18         .25        3.34
                                       .16         .43         .66        7.26
                                       .21         .95        1.73       12.53
                                       .26        1.75        3.79       17.81
                                       .32        2.83        7.09       23.08
                                       .37        4.18       11.88       28.35
                                       .42        5.81       18.37       33.62
                                       .47        7.72       26.76       38.89
                                       .53        9.82       39.16       40.03
                                       .58       11.93       54.05       40.04
                                       .63       14.03       70.76       40.04
                                       .68       16.15       88.08       40.91
                                       .74       18.39      104.16       44.09
                                       .79       20.79      122.18       47.27
                                       .84       23.36      142.24       50.45
```

.89	26.10	164.43	53.64
.95	29.01	188.84	56.82
1.00	32.08	215.55	60.00

COMPUTE TRAVEL TIME ID=3 REACH NO=1 NO VS=1 LENGTH=200 FT SLOPE=0.014

TRAVEL TIME TABLE

REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.053	.044	.04	.0631
.105	.176	.25	.0398
.158	.433	.66	.0362
.211	.954	1.73	.0305
.263	1.752	3.79	.0257
.316	2.828	7.09	.0221
.368	4.181	11.88	.0196
.421	5.812	18.37	.0176
.474	7.720	26.76	.0160
.526	9.820	39.16	.0139
.579	11.927	54.05	.0123
.632	14.034	70.76	.0110
.684	16.148	88.08	.0102
.737	18.385	104.16	.0098
.789	20.790	122.18	.0095
.842	23.361	142.24	.0091
.895	26.101	164.43	.0088
.947	29.007	188.84	.0085
1.000	32.081	215.55	.0083

ROUTE ID=3 HYD NO=210 INFLOW ID=2 DT=0.0

TRAVEL TIME TABLE EXCEEDED

PRINT HYD ID=3 CODE=1

PARTIAL HYDROGRAPH 210.00

RUNOFF VOLUME = 1.29977 INCHES = 10.7842 ACRE-FEET

PEAK DISCHARGE RATE = 238.60 CFS AT 1.565 HOURS BASIN AREA = .1556 SQ. MI.

FINISH

NORMAL PROGRAM FINISH END TIME (HR:MIN:SEC) = 09:27:15

```
ᴗTART                    TIME=0.0
***** HYDROGRAPH FOR SAGE POINTE 10 YEAR ON SAGE ROAD
 AINFALL                 TYPE=1 RAIN QUARTER=0.0 IN
                         RAIN ONE=1.25 IN RAIN SIX=1.47 IN
                         RAIN DAY=2.66 IN DT=0.03333 HR
 ᴐMPUTE NM HYD           ID=1 HYD NO=101.1 AREA=0.003147 SQ MI
                         PER A=0 B=25 C=0 D=75
                         TP=0.1333 HR MASS RAINFALL=-1
 RINT HYD                ID=1 CODE=1
 INISH
```

```
AHYMO PROGRAM (AHYMO194) - AMAFCA Hydrologic Model - January, 1994
     RUN DATE (MON/DAY/YR) = 03/04/1999
     START TIME (HR:MIN:SEC) = 14:29:05      USER NO.= M_GOODWN.I01
     INPUT FILE = SAGERD.DAT

START                TIME=0.0
***** HYDROGRAPH FOR SAGE POINTE 10 YEAR ON SAGE ROAD
RAINFALL             TYPE=1 RAIN QUARTER=0.0 IN
                     RAIN ONE=1.25 IN RAIN SIX=1.47 IN
                     RAIN DAY=2.66 IN DT=0.03333 HR

                COMPUTED 6-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2 - PEAK AT 1.40 H
                DT =     .033330 HOURS        END TIME =     5.999400 HOURS
                   .0000    .0011    .0022    .0033    .0045    .0056    .0069
                   .0081    .0094    .0106    .0120    .0133    .0147    .0162
                   .0177    .0192    .0208    .0224    .0241    .0258    .0276
                   .0294    .0314    .0334    .0355    .0377    .0400    .0424
                   .0449    .0476    .0504    .0538    .0575    .0615    .0700
                   .0889    .1181    .1600    .2173    .2925    .3884    .5078
                   .6535    .7888    .8453    .8930    .9354    .9740   1.0095
                  1.0425   1.0733   1.1022   1.1294   1.1551   1.1793   1.2022
                  1.2240   1.2446   1.2641   1.2827   1.3003   1.3044   1.3083
                  1.3119   1.3154   1.3187   1.3219   1.3249   1.3279   1.3307
                  1.3335   1.3361   1.3387   1.3411   1.3436   1.3459   1.3482
                  1.3504   1.3526   1.3547   1.3568   1.3588   1.3608   1.3627
                  1.3646   1.3665   1.3683   1.3701   1.3719   1.3736   1.3753
                  1.3769   1.3786   1.3802   1.3818   1.3833   1.3849   1.3864
                  1.3879   1.3893   1.3908   1.3922   1.3936   1.3950   1.3964
                  1.3977   1.3991   1.4004   1.4017   1.4030   1.4042   1.4055
                  1.4067   1.4080   1.4092   1.4104   1.4116   1.4128   1.4139
                  1.4151   1.4162   1.4173   1.4185   1.4196   1.4207   1.4217
                  1.4228   1.4239   1.4249   1.4260   1.4270   1.4280   1.4291
                  1.4301   1.4311   1.4321   1.4330   1.4340   1.4350   1.4359
                  1.4369   1.4378   1.4388   1.4397   1.4406   1.4415   1.4425
                  1.4434   1.4443   1.4451   1.4460   1.4469   1.4478   1.4486
                  1.4495   1.4503   1.4512   1.4520   1.4529   1.4537   1.4545
                  1.4553   1.4562   1.4570   1.4578   1.4586   1.4594   1.4601
                  1.4609   1.4617   1.4625   1.4633   1.4640   1.4648   1.4655
                  1.4663   1.4670   1.4678   1.4685   1.4693   1.4700

COMPUTE NM HYD       ID=1 HYD NO=101.1 AREA=0.003147 SQ MI
                     PER A=0 B=25 C=0 D=75
                     TP=0.1333 HR MASS RAINFALL=-1

     K =    .072649HR    TP =    .133300HR    K/TP RATIO =    .545000     SHAPE CONSTANT, N =
     UNIT PEAK =   9.3184    CFS    UNIT VOLUME =    .9982      B =    526.28     P60 = 1.25
     AREA =       .002360 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =    .033330


     K =    .141901HR    TP =    .133300HR    K/TP RATIO =  1.064525     SHAPE CONSTANT, N =
     UNIT PEAK =   1.8105    CFS    UNIT VOLUME =    .9923      B =    306.75     P60 = 1.25
     AREA =       .000787 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

                                PARTIAL HYDROGRAPH    101.10
```

```
RUNOFF VOLUME =        .98448 INCHES      =        .1652 ACRE-FEET
PEAK DISCHARGE RATE =        4.75 CFS  AT   1.500 HOURS   BASIN AREA =   .0031 SQ. MI.


FINISH

NORMAL PROGRAM FINISH          END TIME (HR:MIN:SEC) = 14:29:06
```

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

SAGE POINTE SUBDIVISION

Albuquerque, New Mexico

JOE P. KELLEY
NEW MEXICO
9996
REGISTERED PROFESSIONAL ENGINEER

12/11/97

December, 1997

COA Drainage Report No. M10/D11

C-G Project No. A42-101-5197

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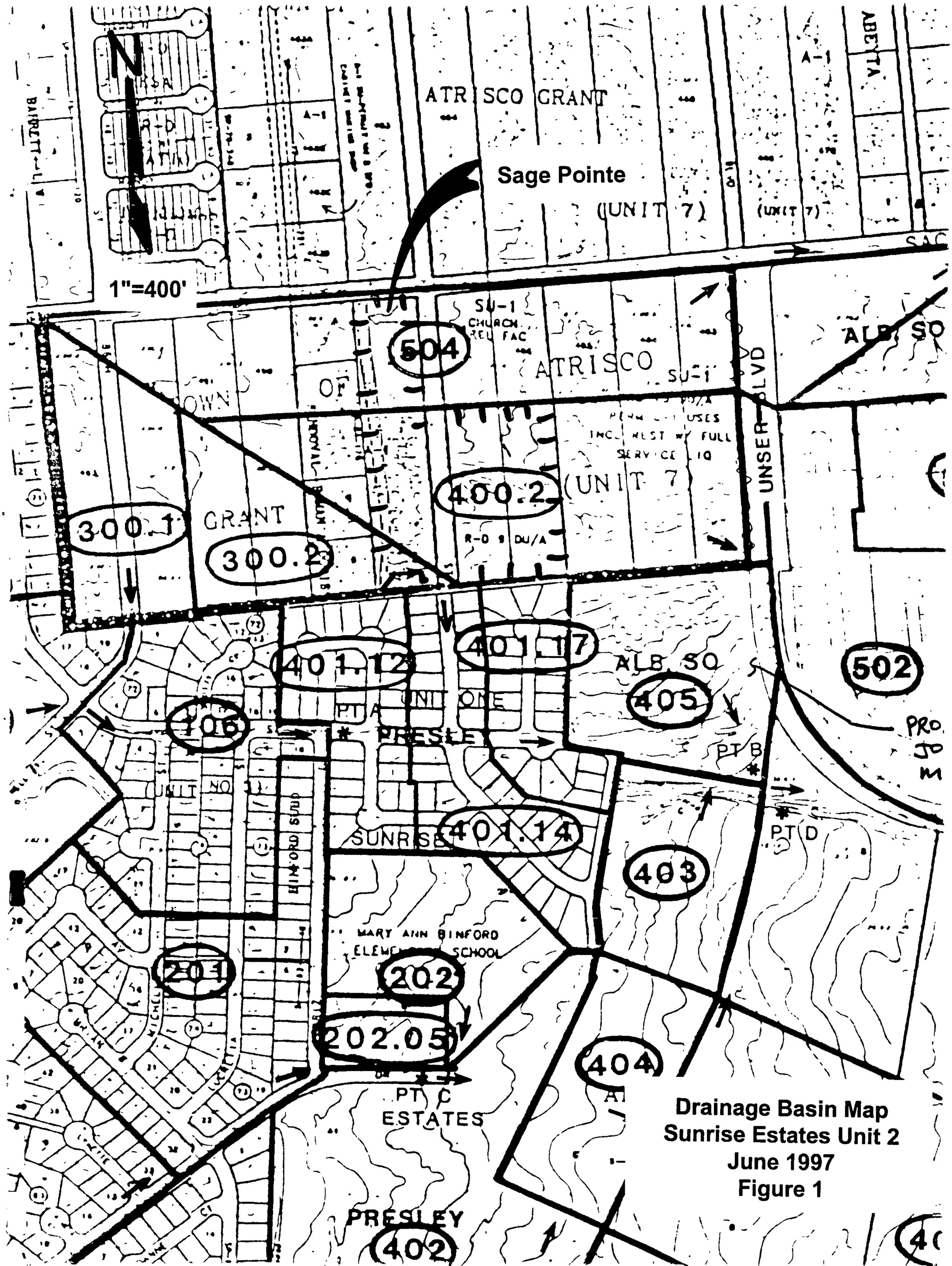
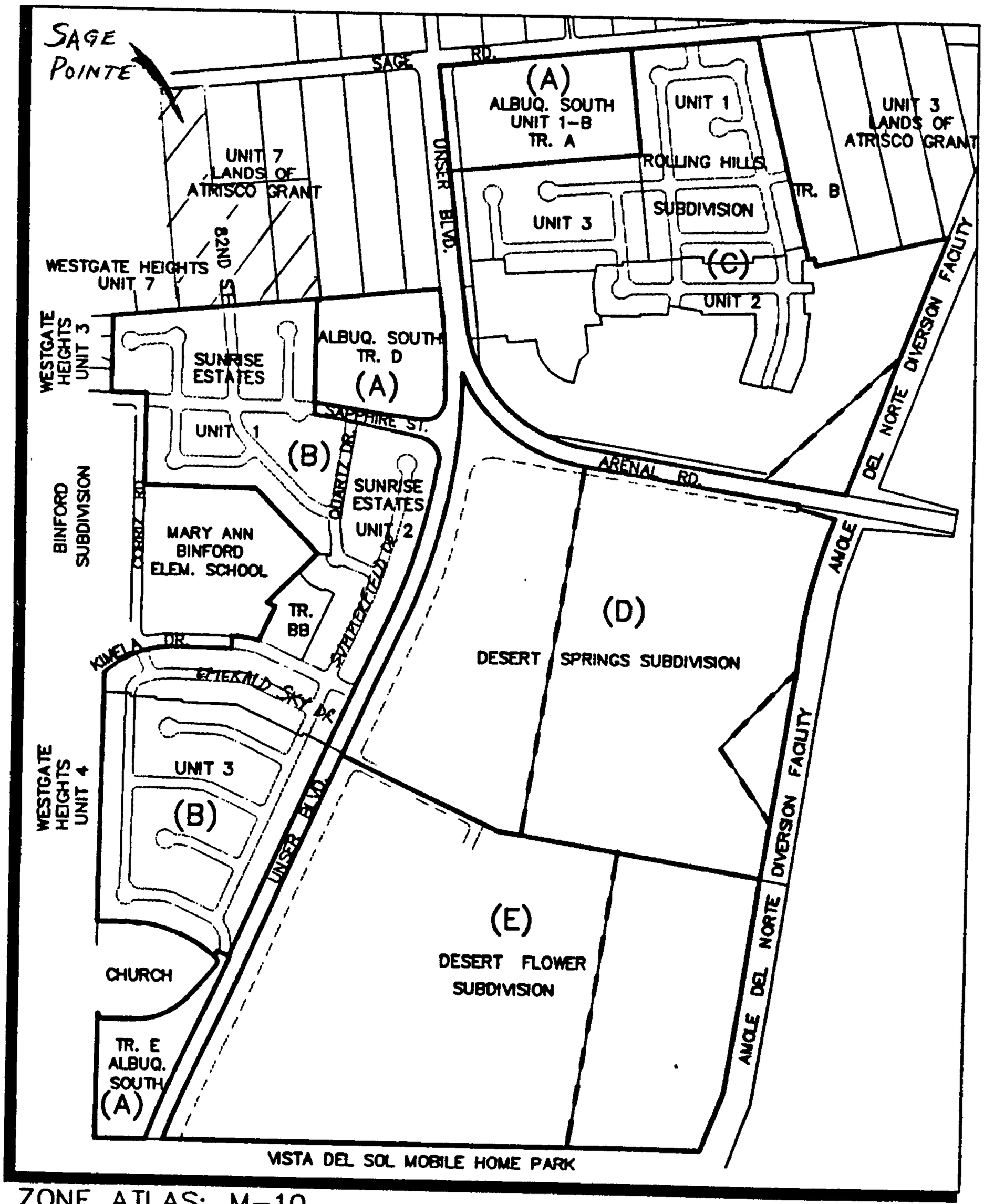


Drainage Basin Map
Sunrise Estates Unit 2
June 1997
Figure 1

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	--	18.43	Ribbon Channel	71.58	A-32
1 north	12.99	48.99	82nd Street	66.42	A-16, 28,29
2	5.56	0	Ground Surface	--	A-41
2 north	--	1.2	Ribbon Channel	17.3	A-46
2 west	--	2.39	Ribbon Channel	11.45	A-45
2 south	--	22.75	Pipe	50.69*	A-46, 47
3	21.2	0	Ground Surface	--	A-41
4	--	19.18	Pipe	42.15*	A-43, 44
5	--	3.88	New Street	88.82	A-42
6	--	15.3	New Street	108.78	A-43
7 west	--	42.32	New Street	54.39	A-25, 26
7 south	--	45.17	New Street	66.42	A-27, 28
8	--	32.64	New Street	54.39	A-22
9	--	9.78	New Street	74.05	A-25
10		76.59	82nd Street	91.05	A-34, 35
11	71.44	71.44	Sapphire Street	126.28	A-15, 16
11 east	415.66	456.66	Pipe	625.67	A-36, 37
11 east	--	47.58	Sapphire Street	103.11	A-38
12 north	--	1.55	Ribbon Channel	17.45	A-31
12 west	--	16.88	Ribbon Channel	71.58	A-29, 30
13		7.77	Ribbon Channel	9.67	A-23
14		7.77	Ribbon Channel	9.67	A-20
15		21.66	Ribbon Channel	25.91	A-17
16 north	--	38.06	Fut. From Basin 400.2	--	A-48
16 south	--	59.98	Pipe	91.17	A-48, 49

FIGURE 3

Analysis Point Summary					
Analysis Point	**Exist. Q (cfs)**	**Dev. Q (cfs)**	**Conveyance**	**Capacity (cfs)**	**Cross Reference**
17 west	--	621.85	Pipe	625.67	A-50, 51
18	92.58	49.75	Surface at Sage Rd.	--	A-75
D	--	17.32	Det. Pond Vol. (Ac-ft)	21.31	A-60, 70

* 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

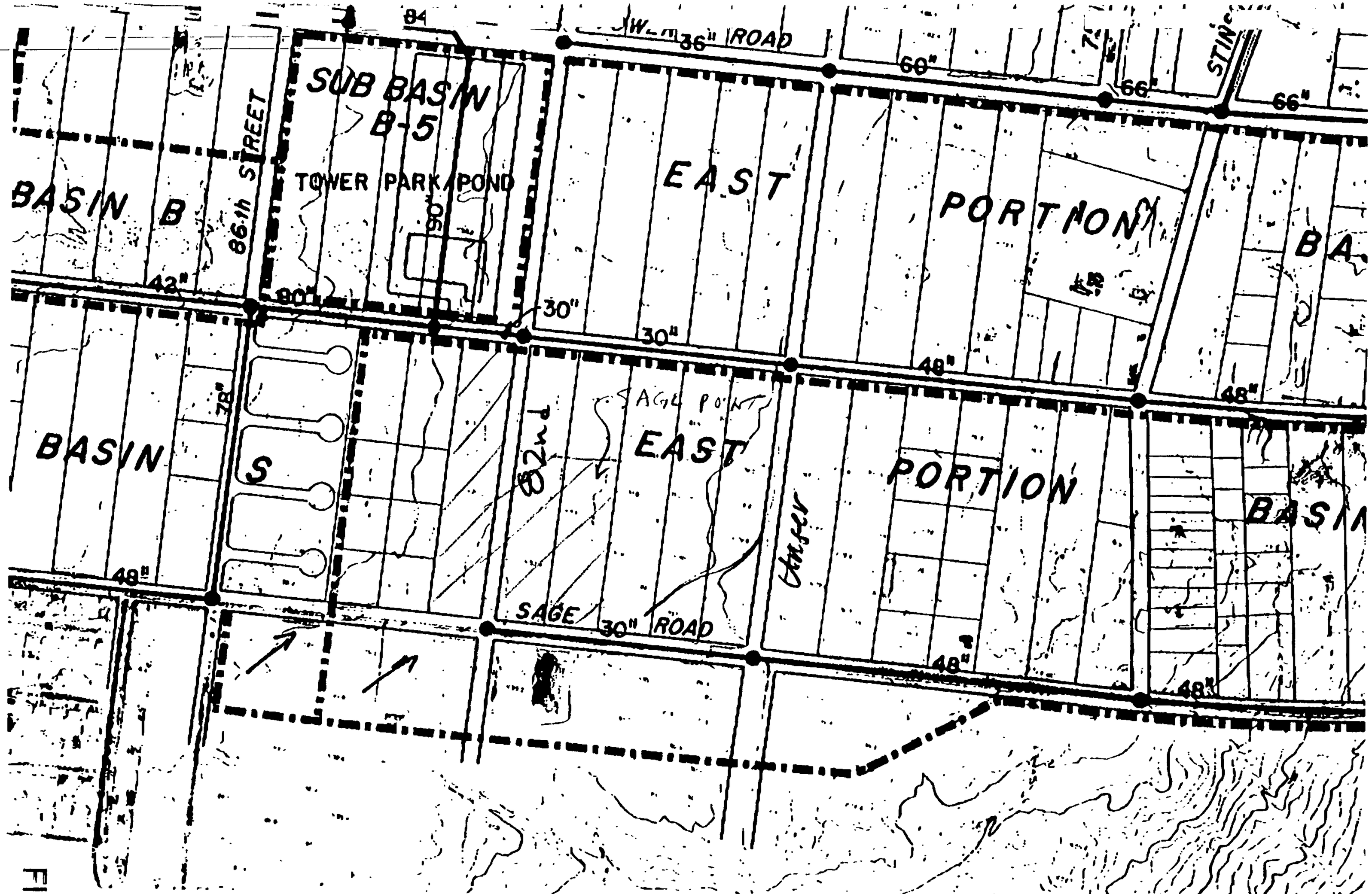
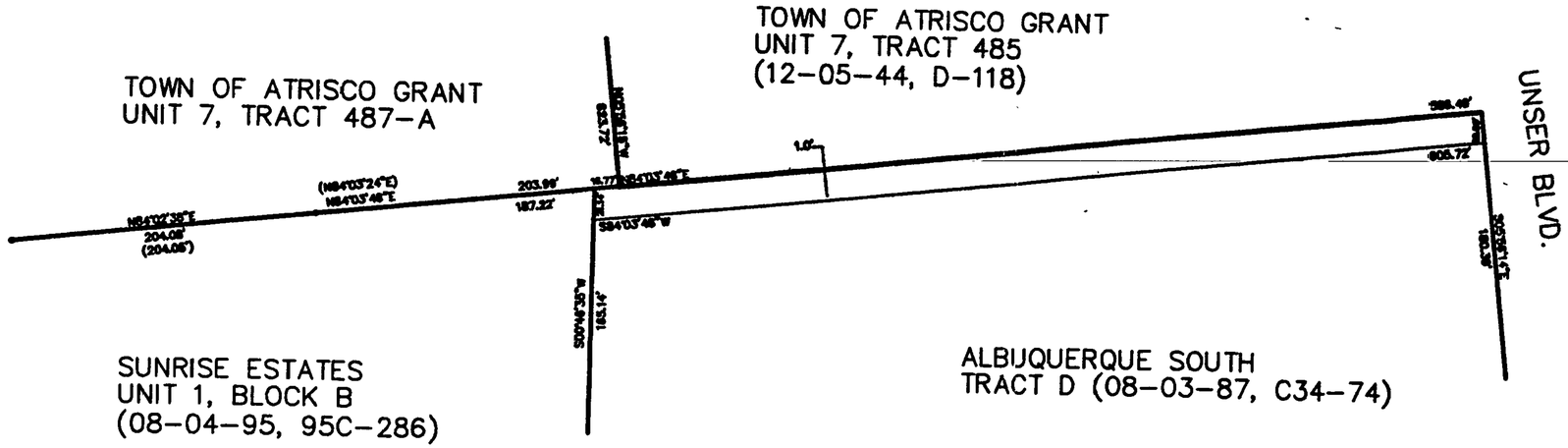


FIGURE 4

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 11 of 100.3

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[illegible] 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-MANAGING 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 is slated to confirm this approval 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 just east of the northern part 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, but all 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 Drive 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 Drive 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 Drive 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 drainage infrastructure will be needed along the front footage of Sage Pointe.

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 east of 82nd and north of a portion of the subdivision is served by a paved entrance constructed in the 82nd Street right-of-way, which 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 City Hydrology current practice, Sage Pointe must be designed to accommodate all the runoff from Basin 300.2 which may eventually cross the west property line, as well as correct the discharge 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 C6-C7), 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 and ribbon channels. Off-site runoff from the west was computed based on the approved A/UDMP land treatment factors. This runoff will be intercepted by a new ribbon channel just outside the property wall along the west tract boundary. The ribbon channel will be outside the wall to prevent undermining. This channel will be in a new private drainage easement that will be owned and maintained by the respective lot owner upon whose lot the channel sits.

The runoff that is intercepted by the ribbon channels will be collected at the low points along the west boundary line, and then conveyed to the east via ribbon channels into the streets. 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 the Sapphire Street. From this point, the runoff will be discharged to the west via the storm drain and the street, in accordance with the plans by Isaacson and Arfman. As summarized in Figure 3, there is substantial street and storm drain capacity to enact this scenario.

The remainder of the on-site runoff will be discharged to the Sapphire 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). A few lots will discharge into new ribbon channels to be constructed along the south and east property lines. The ribbon channels will discharge into a new inlet at the southeast corner of the site (Analysis Point 2). 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. Because the southwest corner is in a sump condition, the new storm drain has been designed to accommodate twice the 100-year design storm to provide additional capacity in accordance with City Hydrology standard practice (Figure 3). add inlets or overflow

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 621.85 cfs (page A-50 and Fig. 3), and the 100-year pond elevation for the hydraulic grade line calculation is 5024.67 (page A-61). 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

Runoff from the west will be intercepted by the new private ribbon channel (section 5/C4). The channel will be concrete to minimize maintenance and resist undermining.

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 line, but it does not deter runoff and erosion. A private ribbon channel will be constructed adjacent to this fence (section 3/C4). This channel will intercept the runoff and end the erosion problem.

On-site runoff naturally discharges to the east along the east property line. The northerly lots (7-14) will be graded such that they discharge to the new street, while the southerly lots (15-17) will have private ribbon channels at the rear per section 3/C4. The channel will prevent off-site erosion.

A small portion of the church site naturally discharges across the north property line. This runoff is very minor in quantity, and will continue to be accepted by the new subdivision lots.

On the far north, Sage Road will receive less runoff than it does under existing conditions. All of the new roof runoff will discharge to the new street, while the backyards will discharge to the road.

The new lots on the west side of 82nd Street will have a split drainage pattern. The roofs and front yards will discharge to the new street on the west, while the back yards will discharge directly to 82nd Street (section 7/C4).

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 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 (AHYMO194) - AMAFCA Hydrologic Model - January, 1994
     RUN DATE (MON/DAY/YR) = 12/11/1997
     START TIME (HR:MIN:SEC) = 10:24:39     USER NO.= CHVZ_GNM.I01
     INPUT FILE = 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
```

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

```
    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
```

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

```
PRINT HYD          ID=4   CODE=1

                                   PARTIAL HYDROGRAPH   102.00


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


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

RATING CURVE VALLEY SECTION 1.0

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

```
COMPUTE TRAVEL TIME  ID=5 REACH NO=1 NO VS=1 L=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       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=7 REACH NO=1 NO VS=1 L=1040 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       .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.
```

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```
*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 DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME 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
```

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```
    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
```

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

```
COMPUTE TRAVEL TIME  ID=17 REACH NO=1 NO VS=1 L=357 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	.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
```

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```
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 DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME 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
```

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

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.

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*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.

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*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 SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	MAX WIDTH 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.
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*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       AVERAGE     FLOW        TRAVEL
DEPTH       AREA        RATE        TIME
FEET        SQ.FT.      CFS         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".
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*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
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```
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 VIA RIBBON CHANNEL TO ANALYSIS POINT 15.
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 SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH FT
.00	.00	.00	.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=3 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=3 HYD NO=A_P_15  INFLOW ID=1  DT=0.03333
PRINT HYD      ID=3 CODE=1

                         HYDROGRAPH FROM AREA A_P_15


   RUNOFF VOLUME =     1.29862 INCHES     =        .7210 ACRE-FEET
   PEAK DISCHARGE RATE =      21.67 CFS  AT   1.500 HOURS   BASIN AREA =   .0104 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 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=14 REACH NO=1 NO VS=1 L=160 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	.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=14 HYD NO=TO_A_P_8  INFLOW ID=3 DT=0.03333
PRINT HYD      ID=14 CODE=1

                         HYDROGRAPH FROM AREA TO_A_P_8

    RUNOFF VOLUME =     1.29862 INCHES     =        .7210 ACRE-FEET
    PEAK DISCHARGE RATE =      21.63 CFS  AT   1.533 HOURS   BASIN AREA =   .0104 SQ. MI.


*S*  COMPUTE BASIN 300.2-C
COMPUTE NM HYD      ID=1 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

    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=1  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 FOR SUBTOTAL AT ANALYSIS POINT 8.
ADD HYD             ID=17  HYD=A_P_8  ID I=1  ID II=14
PRINT HYD           ID=17  CODE=1

                         HYDROGRAPH FROM AREA A_P_8


    RUNOFF VOLUME =     1.32696 INCHES     =        .8429 ACRE-FEET
    PEAK DISCHARGE RATE =      24.94 CFS  AT   1.533 HOURS   BASIN AREA =   .0119 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
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```
                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 =      7.7 CFS  AT   1.500 HOURS   BASIN AREA =   .0037 SQ. MI.


*S*  ROUTE VIA RIBBON CHANNEL TO ANALYSIS POINT 14.
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         .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=A_P_14  INFLOW ID=1  DT=0.03333
PRINT HYD          ID=3 CODE=1

                                HYDROGRAPH FROM AREA A_P_14

    RUNOFF VOLUME =     1.29865 INCHES     =        .2583 ACRE-FEET
    PEAK DISCHARGE RATE =       7.77 CFS  AT   1.500 HOURS   BASIN AREA =   .0037 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=14 REACH NO=1 NO VS=1 L=50 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	.0277
.071	.077	.06	.0175
.106	.172	.18	.0133
.141	.310	.36	.0121
.176	.553	.66	.0116
.212	.919	1.23	.0104
.247	1.410	2.12	.0092
.282	2.025	3.39	.0083
.317	2.765	5.09	.0075
.353	3.629	7.27	.0069
.388	4.601	10.35	.0062
.423	5.588	14.30	.0054
.458	6.576	18.74	.0049
.494	7.563	23.64	.0044
.529	8.551	28.98	.0041
.564	9.538	34.74	.0038
.599	10.525	40.91	.0036
.635	11.513	47.46	.0034
.670	12.500	54.39	.0032

```
ROUTE              ID=14 HYD NO=TO_A_P_8  INFLOW ID=3 DT=0.03333
PRINT HYD          ID=14 CODE=1

                                   HYDROGRAPH FROM AREA TO_A_P_8

    RUNOFF VOLUME =     1.29866 INCHES     =        .2583 ACRE-FEET
    PEAK DISCHARGE RATE =       7.71 CFS  AT   1.500 HOURS   BASIN AREA =   .0037 SQ. MI.


*S*  ADD FOR TOTAL AT ANALYSIS POINT 8.
ADD HYD            ID=17  HYD=AP_8_TOT  ID I=14  ID II=17
PRINT HYD          ID=17  CODE=1

                                   HYDROGRAPH FROM AREA AP_8_TOT

    RUNOFF VOLUME =     1.32018 INCHES     =       1.1012 ACRE-FEET
    PEAK DISCHARGE RATE =      32.64 CFS  AT   1.533 HOURS   BASIN AREA =   .0156 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
```

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

```
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 VIA RIBBON CHANNEL 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         .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=A_P_13  INFLOW ID=1  DT=0.03333
```

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

```
PRINT HYD          ID=3 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*  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=0.0139 FP SLOPE=0.0139 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	.08	2.17
.11	.17	.24	3.26
.14	.31	.48	5.11
.18	.55	.90	8.63
.21	.92	1.67	12.16
.25	1.41	2.88	15.68
.28	2.03	4.61	19.21
.32	2.76	6.93	22.74
.35	3.63	9.90	26.26
.39	4.60	14.09	28.00
.42	5.59	19.47	28.00
.46	6.58	25.51	28.00
.49	7.56	32.18	28.00
.53	8.55	39.45	28.00
.56	9.54	47.29	28.00
.60	10.53	55.69	28.00
.63	11.51	64.61	28.00
.67	12.50	74.05	28.00

```
COMPUTE TRAVEL TIME ID=14 REACH NO=1 NO VS=1 L=50 FT SLP=0.0139
```

TRAVEL TIME TABLE

REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.035	.019	.01	.0204
.071	.077	.08	.0128
.106	.172	.24	.0098
.141	.310	.48	.0089
.176	.553	.90	.0085
.212	.919	1.67	.0076
.247	1.410	2.88	.0068
.282	2.025	4.61	.0061
.317	2.765	6.93	.0055
.353	3.629	9.90	.0051
.388	4.601	14.09	.0045
.423	5.588	19.47	.0040
.458	6.576	25.51	.0036
.494	7.563	32.18	.0033
.529	8.551	39.45	.0030

```
                                .564        9.538        47.29        .0028
                                .599       10.525        55.69        .0026
                                .635       11.513        64.61        .0025
                                .670       12.500        74.05        .0023
ROUTE                ID=14 HYD NO=TO_A_P_9  INFLOW ID=3 DT=0.03333
PRINT HYD            ID=14 CODE=1

                                     HYDROGRAPH FROM AREA TO_A_P_9


    RUNOFF VOLUME =     1.29866 INCHES     =        .2583 ACRE-FEET
    PEAK DISCHARGE RATE =       7.73 CFS  AT   1.500 HOURS   BASIN AREA =   .0037 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*  ADD OFF-SITE BASIN FOR TOTAL AT ANALYSIS POINT 9.
ADD HYD              ID=19  HYD=A_P_9  ID I=1  ID II=14
PRINT HYD            ID=19  CODE=1

                                     HYDROGRAPH FROM AREA A_P_9


    RUNOFF VOLUME =     1.34192 INCHES     =        .3306 ACRE-FEET
    PEAK DISCHARGE RATE =       9.78 CFS  AT   1.500 HOURS   BASIN AREA =   .0046 SQ. MI.


*S*  ADD TO THE TOTAL FROM ANALYSIS POINT 8.
ADD HYD              ID=19  HYD=A_P_9&8  ID I=19 ID II=17
PRINT HYD            ID=19  CODE=1

                                     HYDROGRAPH FROM AREA A_P_9&8


    RUNOFF VOLUME =     1.32514 INCHES     =       1.4318 ACRE-FEET
    PEAK DISCHARGE RATE =      42.32 CFS  AT   1.500 HOURS   BASIN AREA =   .0203 SQ. MI.
```

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

```
*S*  ROUTE TO ANALYSIS POINT 7.
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=14 REACH NO=1 NO VS=1 L=50 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	.0277
.071	.077	.06	.0175
.106	.172	.18	.0133
.141	.310	.36	.0121
.176	.553	.66	.0116
.212	.919	1.23	.0104
.247	1.410	2.12	.0092
.282	2.025	3.39	.0083
.317	2.765	5.09	.0075
.353	3.629	7.27	.0069
.388	4.601	10.35	.0062
.423	5.588	14.30	.0054
.458	6.576	18.74	.0049
.494	7.563	23.64	.0044
.529	8.551	28.98	.0041
.564	9.538	34.74	.0038
.599	10.525	40.91	.0036
.635	11.513	47.46	.0034
.670	12.500	54.39	.0032

```
ROUTE          ID=14 HYD NO=TO_A_P_7  INFLOW ID=19 DT=0.03333
PRINT HYD      ID=14 CODE=1
```

HYDROGRAPH FROM AREA TO_A_P_7

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

```
    RUNOFF VOLUME =      1.32516 INCHES      =        1.4319 ACRE-FEET
    PEAK DISCHARGE RATE =       42.56 CFS  AT   1.533 HOURS   BASIN AREA =   .0203 SQ. MI.


*S*  COMPUTE BASIN 300.2-B
COMPUTE NM HYD       ID=1 HYD NO=300.2_B  AREA=0.00118 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 =   3.0747    CFS   UNIT VOLUME =    .9955       B =   526.28      P60 = 1.8700
    AREA =       .000779 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 =   .98445    CFS   UNIT VOLUME =    .9862       B =   327.09      P60 = 1.8700
    AREA =       .000401 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      =         .0959 ACRE-FEET
    PEAK DISCHARGE RATE =        2.71 CFS  AT   1.500 HOURS   BASIN AREA =   .0012 SQ. MI.


*S*  ADD FOR TOTAL AT ANALYSIS POINT 7.
ADD HYD              ID=14  HYD=A_P_7  ID I=1  ID II=14
PRINT HYD            ID=14  CODE=1

                                        HYDROGRAPH FROM AREA A_P_7


    RUNOFF VOLUME =      1.33608 INCHES      =        1.5278 ACRE-FEET
    PEAK DISCHARGE RATE =       45.17 CFS  AT   1.533 HOURS   BASIN AREA =   .0214 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=19 REACH NO=1 NO VS=1 L=420 FT SLP=0.01

                         TRAVEL TIME TABLE
                                   REACH=  1.0

                         WATER      AVERAGE     FLOW       TRAVEL
                         DEPTH      AREA        RATE       TIME
                         FEET       SQ.FT.      CFS        HRS
                          .035        .019        .01       .2015
                          .071        .077        .07       .1270
                          .106        .172        .21       .0969
                          .141        .310        .41       .0880
                          .176        .553        .76       .0846
                          .212        .919       1.42       .0756
                          .247       1.410       2.45       .0672
                          .282       2.025       3.91       .0604
                          .317       2.765       5.88       .0549
                          .353       3.629       8.40       .0504
                          .388       4.617      11.54       .0467
                          .423       5.721      15.73       .0424
                          .458       6.849      21.22       .0377
                          .494       7.978      27.34       .0340
                          .529       9.106      34.05       .0312
                          .564      10.235      41.34       .0289
                          .599      11.363      49.18       .0270
                          .635      12.492      57.55       .0253
                          .670      13.620      66.42       .0239
ROUTE              ID=19 HYD NO=TO_A_P_1  INFLOW ID=14 DT=0.03333
PRINT HYD          ID=19 CODE=1

                                HYDROGRAPH FROM AREA TO_A_P_1


    RUNOFF VOLUME =     1.33610 INCHES     =       1.5278 ACRE-FEET
    PEAK DISCHARGE RATE =      45.51 CFS  AT   1.533 HOURS   BASIN AREA =   .0214 SQ. MI.


*S*  COMPUTE BASIN 300.2-A
COMPUTE NM HYD      ID=1 HYD NO=300.2_A  AREA=0.00158 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 =   4.1170    CFS   UNIT VOLUME =    .9965       B =   526.28      P60 = 1.8700
    AREA =      .001043 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 =   1.3182    CFS   UNIT VOLUME =    .9903       B =   327.09      P60 = 1.8700
    AREA =      .000537 SQ MI    IA =    .50000 INCHES    INF =   1.25000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330
```

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

```
PRINT HYD            ID=1  CODE=1

                                        HYDROGRAPH FROM AREA 300.2_A

    RUNOFF VOLUME =      1.52413 INCHES     =        .1284 ACRE-FEET
    PEAK DISCHARGE RATE =       3.63 CFS  AT   1.500 HOURS   BASIN AREA =   .0016 SQ. MI.


*S*  ADD FOR SUBTOTAL AT ANALYSIS POINT 1.
ADD HYD              ID=19  HYD=A_P_1  ID I=1  ID II=19
PRINT HYD            ID=19  CODE=1

                                        HYDROGRAPH FROM AREA A_P_1

    RUNOFF VOLUME =      1.34897 INCHES     =       1.6562 ACRE-FEET
    PEAK DISCHARGE RATE =      48.99 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

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 VIA RIBBON CHANNEL TO ANALYSIS POINT 12.
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        .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=3 REACH NO=1 NO VS=1 L=100 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       .0123
                           .105        .526       1.87       .0078
                           .158        .789       3.65       .0060
                           .211       1.053       5.86       .0050
                           .263       1.316       8.44       .0043
                           .316       1.579      11.36       .0039
                           .368       1.842      14.60       .0035
                           .421       2.105      18.12       .0032
                           .474       2.368      21.90       .0030
                           .526       2.632      25.94       .0028
                           .579       2.895      30.22       .0027
                           .632       3.158      34.71       .0025
                           .684       3.421      39.42       .0024
                           .737       3.684      44.33       .0023
                           .789       3.947      49.43       .0022
                           .842       4.211      54.71       .0021
                           .895       4.474      60.17       .0021
                           .947       4.737      65.79       .0020
                          1.000       5.000      71.58       .0019
ROUTE              ID=3 HYD NO=A_P_12  INFLOW ID=1  DT=0.03333
PRINT HYD          ID=3 CODE=1

                                HYDROGRAPH FROM AREA A_P_12

    RUNOFF VOLUME =     1.29862 INCHES     =        .5617 ACRE-FEET
    PEAK DISCHARGE RATE =      16.89 CFS  AT   1.500 HOURS   BASIN AREA =   .0081 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
```

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```
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*  ROUTE VIA RIBBON CHANNEL TO ANALYSIS POINT 12.
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEG=1 MIN EL=0 MAX EL=1
                    CH SLOPE=0.01 FP SLOPE=0.01 N=0.013 DIST=2
                    DIST  ELEV  DIST  ELEV  DIST  ELEV  DIST  ELEV
                    0     1     0     0     2     0     2     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	.11	.17	2.00
.11	.21	.52	2.00
.16	.32	1.00	2.00
.21	.42	1.59	2.00
.26	.53	2.28	2.00
.32	.63	3.04	2.00
.37	.74	3.87	2.00
.42	.84	4.76	2.00
.47	.95	5.71	2.00
.53	1.05	6.71	2.00
.58	1.16	7.76	2.00
.63	1.26	8.85	2.00
.68	1.37	9.98	2.00
.74	1.47	11.15	2.00
.79	1.58	12.35	2.00
.84	1.68	13.58	2.00
.89	1.79	14.84	2.00
.95	1.89	16.13	2.00
1.00	2.00	17.45	2.00

```
COMPUTE TRAVEL TIME ID=4 REACH NO=1 NO VS=1 L=40 FT SLP=0.01
```

TRAVEL TIME TABLE

REACH= 1.0

WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.053	.105	.17	.0070
.105	.211	.52	.0045
.158	.316	1.00	.0035
.211	.421	1.59	.0029
.263	.526	2.28	.0026
.316	.632	3.04	.0023
.368	.737	3.87	.0021
.421	.842	4.76	.0020
.474	.947	5.71	.0018
.526	1.053	6.71	.0017
.579	1.158	7.76	.0017
.632	1.263	8.85	.0016

```
                                .684       1.368        9.98       .0015
                                .737       1.474       11.15       .0015
                                .789       1.579       12.35       .0014
                                .842       1.684       13.58       .0014
                                .895       1.789       14.84       .0013
                                .947       1.895       16.13       .0013
                               1.000       2.000       17.45       .0013
ROUTE                ID=4 HYD NO=A_P_12  INFLOW ID=1  DT=0.03333
PRINT HYD            ID=4 CODE=1

                                     HYDROGRAPH FROM AREA A_P_12


    RUNOFF VOLUME =      1.52447 INCHES     =        .0545 ACRE-FEET
    PEAK DISCHARGE RATE =        1.55 CFS  AT   1.500 HOURS   BASIN AREA =   .0007 SQ. MI.


*S*  ADD FOR TOTAL AT ANALYSIS POINT 12.
ADD HYD              ID=14  HYD=A_P_12  ID I=3  ID II=4
PRINT HYD            ID=14  CODE=1

                                     HYDROGRAPH FROM AREA A_P_12


    RUNOFF VOLUME =      1.31574 INCHES     =        .6161 ACRE-FEET
    PEAK DISCHARGE RATE =       18.43 CFS  AT   1.500 HOURS   BASIN AREA =   .0088 SQ. MI.


*S*  ROUTE VIA RIBBON 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         .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=3 REACH NO=1 NO VS=1 L=40 FT SLP=0.02

                           TRAVEL TIME TABLE
                                          REACH=  1.0
```

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WATER DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME HRS
.053	.263	.59	.0049
.105	.526	1.87	.0031
.158	.789	3.65	.0024
.211	1.053	5.86	.0020
.263	1.316	8.44	.0017
.316	1.579	11.36	.0015
.368	1.842	14.60	.0014
.421	2.105	18.12	.0013
.474	2.368	21.90	.0012
.526	2.632	25.94	.0011
.579	2.895	30.22	.0011
.632	3.158	34.71	.0010
.684	3.421	39.42	.0010
.737	3.684	44.33	.0009
.789	3.947	49.43	.0009
.842	4.211	54.71	.0009
.895	4.474	60.17	.0008
.947	4.737	65.79	.0008
1.000	5.000	71.58	.0008

```
ROUTE                ID=3 HYD NO=A_P_1  INFLOW ID=14  DT=0.03333
PRINT HYD            ID=3 CODE=1

                                        HYDROGRAPH FROM AREA A_P_1

    RUNOFF VOLUME =     1.31580 INCHES     =        .6161 ACRE-FEET
    PEAK DISCHARGE RATE =      18.44 CFS  AT   1.500 HOURS   BASIN AREA =   .0088 SQ. MI.


*S*  ADD FOR TOTAL AT ANALYSIS POINT 1.
ADD HYD              ID=6  HYD=A_P_1_TOTL  ID I=3  ID II=19
PRINT HYD            ID=6  CODE=1

                                        HYDROGRAPH FROM AREA A_P_1_TOTL

    RUNOFF VOLUME =     1.33980 INCHES     =       2.2723 ACRE-FEET
    PEAK DISCHARGE RATE =      67.00 CFS  AT   1.533 HOURS   BASIN AREA =   .0318 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
.67 .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 DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME 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=6  DT=0.03333
PRINT HYD            ID=7 CODE=1
```

HYDROGRAPH FROM AREA STRT_TO_AP10

RUNOFF VOLUME = 1.33981 INCHES = 2.2723 ACRE-FEET
PEAK DISCHARGE RATE = 66.84 CFS AT 1.533 HOURS BASIN AREA = .0318 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

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```
    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 =     1.33435 INCHES     =       2.6075 ACRE-FEET
    PEAK DISCHARGE RATE =      76.59 CFS  AT   1.533 HOURS   BASIN AREA =   .0366 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 =      1.32908 INCHES      =        3.0459 ACRE-FEET
PEAK DISCHARGE RATE =      89.35 CFS  AT   1.533 HOURS   BASIN AREA =   .0430 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 =      1.33206 INCHES      =        3.1003 ACRE-FEET
PEAK DISCHARGE RATE =      90.85 CFS  AT   1.533 HOURS   BASIN AREA =   .0436 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 =      1.33207 INCHES      =         .6712 ACRE-FEET
PEAK DISCHARGE RATE =      49.85 CFS  AT   1.533 HOURS   BASIN AREA =   .0094 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 =      1.03383 INCHES      =       17.8703 ACRE-FEET
PEAK DISCHARGE RATE =     456.66 CFS  AT   1.533 HOURS   BASIN AREA =   .3241 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 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=15  REACH=1  VS NO=1  L=1100  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	.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 =     1.03383 INCHES     =      17.8703 ACRE-FEET
PEAK DISCHARGE RATE =     458.45 CFS  AT   1.567 HOURS   BASIN AREA =   .3241 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
.67	.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 =      1.33261 INCHES      =        .6714 ACRE-FEET
PEAK DISCHARGE RATE =      47.58 CFS  AT   1.567 HOURS   BASIN AREA =   .0094 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 =     1.31857 INCHES     =       1.1292 ACRE-FEET
    PEAK DISCHARGE RATE =      59.33 CFS  AT   1.567 HOURS   BASIN AREA =   .0161 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 =     1.31860 INCHES     =       1.1292 ACRE-FEET
    PEAK DISCHARGE RATE =      57.69 CFS  AT   1.567 HOURS   BASIN AREA =   .0161 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
```

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

```
                                HYDROGRAPH FROM AREA AP17_PIPE

    RUNOFF VOLUME =      1.04539 INCHES      =       18.8953 ACRE-FEET
    PEAK DISCHARGE RATE =     484.75 CFS  AT   1.567 HOURS   BASIN AREA =   .3389 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 2.  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-D, DISCHARGE TO RED SAGE AVE. LOW POINT.
COMPUTE NM HYD       ID=1  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
```

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

```
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=1  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*  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-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
```

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

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*  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=1  ID II=2
PRINT HYD           ID=1  CODE=1
```

HYDROGRAPH FROM AREA A_P_4_TOTL

RUNOFF VOLUME = 1.52406 INCHES = .6811 ACRE-FEET
PEAK DISCHARGE RATE = 19.18 CFS AT 1.500 HOURS BASIN AREA = .0084 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	.99	1.66	1.55	21.00	19.18 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 =     1.52412 INCHES     =        .6812 ACRE-FEET
    PEAK DISCHARGE RATE =      19.16 CFS  AT   1.500 HOURS   BASIN AREA =   .0084 SQ. MI.


*S*  COMPUTE BASIN 400.2-A, DISCHARGE TO SE CORNER VIA RIBBON CHANNEL.
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
```

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

```
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 CAPACITY OF RIBBON CHANNEL TO DETERMINE DEPTH OF FLOW.
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEG=1 MIN EL=0 MAX EL=0.67
                    CH SLOPE=0.014 FP SLOPE=0.014 N=0.013 DIST=2
                    DIST  ELEV  DIST  ELEV  DIST  ELEV  DIST  ELEV
                     0    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	.00
.04	.07	.10	2.00
.07	.14	.32	2.00
.11	.21	.62	2.00
.14	.28	.99	2.00
.18	.35	1.42	2.00
.21	.42	1.90	2.00
.25	.49	2.43	2.00
.28	.56	3.01	2.00
.32	.63	3.62	2.00
.35	.71	4.27	2.00
.39	.78	4.96	2.00
.42	.85	5.68	2.00
.46	.92	6.42	2.00
.49	.99	7.20	2.00
.53	1.06	8.00	2.00
.56	1.13	8.83	2.00
.60	1.20	9.68	2.00
.63	1.27	10.55	2.00
.67	1.34	11.45	2.00

```
*S*  COMPUTE BASIN 400.2-B, DISCHARGE TO SE CORNER VIA RIBBON CHANNEL.
COMPUTE NM HYD      ID=2  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=2  CODE=1
```

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```
                                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 CAPACITY OF RIBBON CHANNEL TO DETERMINE DEPTH OF FLOW.
COMPUTE RATING CURVE CID=1 VS NO=1 NO SEG=1 MIN EL=0 MAX EL=0.67
                    CH SLOPE=0.032 FP SLOPE=0.032 N=0.013 DIST=2
                    DIST  ELEV  DIST  ELEV  DIST  ELEV  DIST  ELEV
                     0    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         .00
                                   .04          .07         .15        2.00
                                   .07          .14         .48        2.00
                                   .11          .21         .94        2.00
                                   .14          .28        1.49        2.00
                                   .18          .35        2.14        2.00
                                   .21          .42        2.87        2.00
                                   .25          .49        3.68        2.00
                                   .28          .56        4.54        2.00
                                   .32          .63        5.47        2.00
                                   .35          .71        6.46        2.00
                                   .39          .78        7.50        2.00
                                   .42          .85        8.58        2.00
                                   .46          .92        9.71        2.00
                                   .49          .99       10.89        2.00
                                   .53         1.06       12.10        2.00
                                   .56         1.13       13.35        2.00
                                   .60         1.20       14.63        2.00
                                   .63         1.27       15.95        2.00
                                   .67         1.34       17.30        2.00
*S*  ADD THE TWO RIBBON CHANNEL FLOWS FOR THE TOTAL INTO THE NEW INLET
*S*  AT THE SE CORNER--ANALYSIS POINT 2.
ADD HYD             ID=4  HYD=A_P_2_SFC  ID I=1  ID II=2
PRINT HYD           ID=4  CODE=1

                                HYDROGRAPH FROM AREA A_P_2_SFC

    RUNOFF VOLUME =      1.52378 INCHES     =        .1268 ACRE-FEET
    PEAK DISCHARGE RATE =        3.60 CFS  AT   1.500 HOURS   BASIN AREA =   .0016 SQ. MI.


*S*  ADD THIS FLOW TO THE PIPE FLOW TO GET THE TOTAL FROM THE SUBDIVISION.
ADD HYD             ID=3  HYD=A_P_2_PIPE  ID I=4  ID II=3
PRINT HYD           ID=3  CODE=1

                                HYDROGRAPH FROM AREA A_P_2_PIPE

    RUNOFF VOLUME =      1.52402 INCHES     =        .8079 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
```

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

```
*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 SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	MAX WIDTH 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 1.20	2.59	25.26 22.75	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 DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME 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
```

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```
                                HYDROGRAPH FROM AREA PIP_TO_AP16

    RUNOFF VOLUME =     1.52407 INCHES     =        .8080 ACRE-FEET
    PEAK DISCHARGE RATE =      22.56 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 =     1.63760 INCHES     =       2.1843 ACRE-FEET
    PEAK DISCHARGE RATE =      59.98 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 1.56  2.910       53.04 59.98 .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 =     59.94 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 =     1.08609 INCHES     =     21.0796 ACRE-FEET
    PEAK DISCHARGE RATE =    540.06 CFS  AT   1.533 HOURS   BASIN AREA =   .3639 SQ. MI.


*S ** BASIN 405 DRAINS TO SAPPHIRE ST.
```

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```
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 =     1.09478 INCHES     =      22.0617 ACRE-FEET
    PEAK DISCHARGE RATE =     568.42 CFS  AT   1.533 HOURS   BASIN AREA =   .3778 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 =     1.10390 INCHES     =      23.1909 ACRE-FEET
    PEAK DISCHARGE RATE =     621.85 CFS  AT   1.567 HOURS   BASIN AREA =   .3939 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
PRINT HYD          ID=19  CODE=1
```

HYDROGRAPH FROM AREA PIP_TO_POND

```
    RUNOFF VOLUME =     1.10390 INCHES     =      23.1909 ACRE-FEET
    PEAK DISCHARGE RATE =     622.49 CFS  AT   1.567 HOURS   BASIN AREA =   .3939 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
```

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

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

```
COMPUTE TRAVEL TIME  ID=3 REACH NO=1 NO VS=1 L=595 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	.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.

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

```
*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 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=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       FLOW        FLOW        TOP
                                      SURFACE      AREA        RATE        WIDTH
                                       ELEV        SQ FT       CFS         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 =     1.10698 INCHES     =      32.3948 ACRE-FEET
    PEAK DISCHARGE RATE =     866.75 CFS  AT   1.567 HOURS   BASIN AREA =   .5487 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 =     1.10698 INCHES     =      12.7854 ACRE-FEET
    PEAK DISCHARGE RATE =     124.00 CFS  AT   1.400 HOURS   BASIN AREA =   .2166 SQ. MI.


PRINT HYD            ID=19  CODE=1

                                        HYDROGRAPH FROM AREA   404.60
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Sage Pointe Subdivision -- 100-Year Design Storm AHYMO Analysis

RUNOFF VOLUME = 1.10698 INCHES = 19.6094 ACRE-FEET
PEAK DISCHARGE RATE = 742.75 CFS AT 1.567 HOURS BASIN AREA = .3321 SQ. MI.

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*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
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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

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

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	51.03	.08	.070	.00
1.43	195.85	.48	.410	.01
1.47	379.72	1.22	1.203	.01
1.50	565.65	3.00	4.600	.02
1.53	706.04	3.00	4.600	.02
1.57	742.75	3.67	6.246	4.02
1.60	718.03	4.45	8.234	13.25
1.63	656.98	5.16	10.076	24.20
1.67	559.33	5.74	11.674	32.42
1.70	466.43	6.22	12.987	39.90
1.73	391.81	6.59	14.050	46.61
1.77	327.40	6.89	14.904	52.01
1.80	272.62	7.12	15.582	55.94
1.83	227.39	7.30	16.113	58.79

STORM DRAIN PEAK AT 1.567 HOURS

POND HIGH = POND BOTTOM EL + DEPTH

= 5021.0 + 3.67

= 5024.67

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
1.87	189.53	7.44	16.522	60.99
1.90	157.07	7.54	16.829	62.64
1.93	129.50	7.61	17.050	63.82
1.97	106.43	7.66	17.198	64.62
2.00	86.84	7.69	17.285	65.09
2.03	69.98	7.71	17.322	65.28
2.07	54.98	7.70	17.314	65.24
2.10	39.34	7.69	17.265	64.98
2.13	21.53	7.65	17.170	64.47
2.17	2.75	7.61	17.027	63.70
2.20	.00	7.55	16.857	62.79
2.23	.00	7.49	16.685	61.87
2.27	.00	7.43	16.516	60.96
2.30	.00	7.38	16.349	60.06
2.33	.00	7.32	16.185	59.18
2.37	.00	7.27	16.023	58.31
2.40	.00	7.22	15.864	57.46
2.43	.00	7.16	15.706	56.61
2.47	.00	7.11	15.552	55.78
2.50	.00	7.06	15.399	54.96
2.53	.00	7.01	15.249	54.16
2.57	.00	6.96	15.101	53.25
2.60	.00	6.91	14.956	52.33
2.63	.00	6.86	14.813	51.43
2.67	.00	6.81	14.672	50.54
2.70	.00	6.76	14.534	49.67
2.73	.00	6.71	14.399	48.81
2.77	.00	6.67	14.265	47.97
2.80	.00	6.62	14.134	47.14
2.83	.00	6.57	14.006	46.33
2.87	.00	6.53	13.879	45.53
2.90	.00	6.49	13.755	44.75
2.93	.00	6.44	13.632	43.97
2.97	.00	6.40	13.512	43.22
3.00	.00	6.36	13.394	42.47
3.03	.00	6.32	13.278	41.74
3.07	.00	6.28	13.164	41.02
3.10	.00	6.24	13.052	40.31
3.13	.00	6.20	12.942	39.61
3.17	.00	6.16	12.834	38.93
3.20	.00	6.13	12.728	38.26
3.23	.00	6.09	12.623	37.60

3.27	.00	6.05	12.521	36.95
3.30	.00	6.02	12.420	36.31
3.33	.00	5.98	12.321	35.75
3.37	.00	5.95	12.223	35.24
3.40	.00	5.91	12.126	34.75
3.43	.00	5.88	12.031	34.26
3.47	.00	5.84	11.938	33.77
3.50	.00	5.81	11.845	33.30
3.53	.00	5.77	11.754	32.83
3.57	.00	5.74	11.664	32.37
3.60	.00	5.71	11.576	31.91
3.63	.00	5.68	11.489	31.46
3.67	.00	5.64	11.403	31.02
3.70	.00	5.61	11.318	30.58

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
3.73	.00	5.58	11.234	30.15
3.77	.00	5.55	11.152	29.73
3.80	.00	5.52	11.070	29.31
3.83	.00	5.49	10.990	28.90
3.87	.00	5.46	10.911	28.49
3.90	.00	5.43	10.833	28.09
3.93	.00	5.41	10.756	27.69
3.97	.00	5.38	10.681	27.30
4.00	.00	5.35	10.606	26.92
4.03	.00	5.32	10.532	26.54
4.07	.00	5.30	10.460	26.17
4.10	.00	5.27	10.388	25.80
4.13	.00	5.25	10.317	25.44
4.17	.00	5.22	10.248	25.08
4.20	.00	5.19	10.179	24.72
4.23	.00	5.17	10.112	24.38
4.27	.00	5.15	10.045	24.03
4.30	.00	5.12	9.979	23.69
4.33	.00	5.10	9.914	23.36
4.37	.00	5.07	9.851	23.03
4.40	.00	5.05	9.788	22.71
4.43	.00	5.03	9.725	22.39
4.47	.00	5.01	9.664	22.07
4.50	.00	4.98	9.604	21.72
4.53	.00	4.96	9.545	21.35
4.57	.00	4.94	9.486	20.99
4.60	.00	4.91	9.429	20.63
4.63	.00	4.89	9.373	20.29
4.67	.00	4.87	9.317	19.94
4.70	.00	4.85	9.263	19.61
4.73	.00	4.83	9.209	19.28
4.77	.00	4.81	9.157	18.95
4.80	.00	4.79	9.105	18.63
4.83	.00	4.77	9.054	18.32
4.87	.00	4.75	9.004	18.01
4.90	.00	4.73	8.955	17.70
4.93	.00	4.71	8.906	17.41
4.97	.00	4.69	8.859	17.11
5.00	.00	4.68	8.812	16.82
5.03	.00	4.66	8.766	16.54
5.07	.00	4.64	8.721	16.26
5.10	.00	4.62	8.676	15.99
5.13	.00	4.61	8.633	15.72
5.17	.00	4.59	8.590	15.45
5.20	.00	4.57	8.548	15.19
5.23	.00	4.56	8.506	14.93

5.27	.00	4.54	8.465	14.68
5.30	.00	4.53	8.425	14.43
5.33	.00	4.51	8.386	14.19
5.37	.00	4.50	8.347	13.95
5.40	.00	4.48	8.309	13.72
5.43	.00	4.47	8.272	13.48
5.47	.00	4.45	8.235	13.26
5.50	.00	4.44	8.199	13.03
5.53	.00	4.43	8.163	12.81
5.57	.00	4.41	8.128	12.60

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
5.60	.00	4.40	8.094	12.38
5.63	.00	4.39	8.060	12.18
5.67	.00	4.37	8.026	11.97
5.70	.00	4.36	7.994	11.77
5.73	.00	4.35	7.962	11.57
5.77	.00	4.34	7.930	11.37
5.80	.00	4.32	7.899	11.18
5.83	.00	4.31	7.868	10.99
5.87	.00	4.30	7.838	10.81
5.90	.00	4.29	7.809	10.63
5.93	.00	4.28	7.780	10.45
5.97	.00	4.27	7.751	10.27
6.00	.00	4.26	7.723	10.10
6.03	.00	4.25	7.696	9.93
6.07	.00	4.23	7.669	9.76
6.10	.00	4.22	7.642	9.59
6.13	.00	4.21	7.616	9.43
6.17	.00	4.20	7.590	9.27
6.20	.00	4.19	7.565	9.12
6.23	.00	4.19	7.540	8.96
6.27	.00	4.18	7.515	8.81
6.30	.00	4.17	7.491	8.66
6.33	.00	4.16	7.467	8.52
6.37	.00	4.15	7.444	8.37
6.40	.00	4.14	7.421	8.23
6.43	.00	4.13	7.399	8.09
6.47	.00	4.12	7.377	7.96
6.50	.00	4.11	7.355	7.82
6.53	.00	4.11	7.334	7.69
6.57	.00	4.10	7.313	7.56
6.60	.00	4.09	7.292	7.43
6.63	.00	4.08	7.272	7.31
6.67	.00	4.07	7.252	7.18
6.70	.00	4.07	7.232	7.06
6.73	.00	4.06	7.213	6.94
6.77	.00	4.05	7.194	6.83
6.80	.00	4.04	7.175	6.71
6.83	.00	4.04	7.157	6.60
6.87	.00	4.03	7.139	6.49
6.90	.00	4.02	7.121	6.38
6.93	.00	4.02	7.104	6.27
6.97	.00	4.01	7.087	6.16
7.00	.00	4.00	7.070	6.06
7.03	.00	4.00	7.053	5.98
7.07	.00	3.99	7.037	5.94
7.10	.00	3.98	7.020	5.90
7.13	.00	3.98	7.004	5.86
7.17	.00	3.97	6.988	5.83
7.20	.00	3.96	6.972	5.79
7.23	.00	3.96	6.956	5.75

7.27	.00	3.95	6.940	5.71
7.30	.00	3.95	6.925	5.67
7.33	.00	3.94	6.909	5.63
7.37	.00	3.93	6.894	5.60
7.40	.00	3.93	6.878	5.56
7.43	.00	3.92	6.863	5.52

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
7.47	.00	3.91	6.848	5.48
7.50	.00	3.91	6.833	5.45
7.53	.00	3.90	6.818	5.41
7.57	.00	3.90	6.803	5.38
7.60	.00	3.89	6.788	5.34
7.63	.00	3.88	6.774	5.30
7.67	.00	3.88	6.759	5.27
7.70	.00	3.87	6.745	5.23
7.73	.00	3.87	6.730	5.20
7.77	.00	3.86	6.716	5.16
7.80	.00	3.85	6.702	5.13
7.83	.00	3.85	6.688	5.10
7.87	.00	3.84	6.674	5.06
7.90	.00	3.84	6.660	5.03
7.93	.00	3.83	6.646	4.99
7.97	.00	3.83	6.632	4.96
8.00	.00	3.82	6.619	4.93
8.03	.00	3.82	6.605	4.89
8.07	.00	3.81	6.592	4.86
8.10	.00	3.80	6.578	4.83
8.13	.00	3.80	6.565	4.80
8.17	.00	3.79	6.552	4.77
8.20	.00	3.79	6.539	4.73
8.23	.00	3.78	6.526	4.70
8.27	.00	3.78	6.513	4.67
8.30	.00	3.77	6.500	4.64
8.33	.00	3.77	6.487	4.61
8.37	.00	3.76	6.475	4.58
8.40	.00	3.76	6.462	4.55
8.43	.00	3.75	6.450	4.52
8.47	.00	3.75	6.437	4.49
8.50	.00	3.74	6.425	4.46
8.53	.00	3.74	6.413	4.43
8.57	.00	3.73	6.401	4.40
8.60	.00	3.73	6.389	4.37
8.63	.00	3.72	6.377	4.34
8.67	.00	3.72	6.365	4.31
8.70	.00	3.71	6.353	4.28
8.73	.00	3.71	6.341	4.25
8.77	.00	3.70	6.329	4.22
8.80	.00	3.70	6.318	4.20
8.83	.00	3.69	6.306	4.17
8.87	.00	3.69	6.295	4.14
8.90	.00	3.68	6.284	4.11
8.93	.00	3.68	6.272	4.08
8.97	.00	3.68	6.261	4.06
9.00	.00	3.67	6.250	4.03
9.03	.00	3.67	6.239	4.00
9.07	.00	3.66	6.228	3.98
9.10	.00	3.66	6.217	3.95
9.13	.00	3.65	6.206	3.92
9.17	.00	3.65	6.195	3.90
9.20	.00	3.64	6.185	3.87
9.23	.00	3.64	6.174	3.85

9.27	.00	3.64	6.163	3.82
9.30	.00	3.63	6.153	3.79

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
9.33	.00	3.63	6.142	3.77
9.37	.00	3.62	6.132	3.74
9.40	.00	3.62	6.122	3.72
9.43	.00	3.61	6.112	3.69
9.47	.00	3.61	6.101	3.67
9.50	.00	3.61	6.091	3.65
9.53	.00	3.60	6.081	3.62
9.57	.00	3.60	6.071	3.60
9.60	.00	3.59	6.062	3.57
9.63	.00	3.59	6.052	3.55
9.67	.00	3.59	6.042	3.53
9.70	.00	3.58	6.032	3.50
9.73	.00	3.58	6.023	3.48
9.77	.00	3.57	6.013	3.46
9.80	.00	3.57	6.004	3.43
9.83	.00	3.57	5.994	3.41
9.87	.00	3.56	5.985	3.39
9.90	.00	3.56	5.976	3.36
9.93	.00	3.56	5.966	3.34
9.97	.00	3.55	5.957	3.32
10.00	.00	3.55	5.948	3.30
10.03	.00	3.54	5.939	3.28
10.07	.00	3.54	5.930	3.25
10.10	.00	3.54	5.921	3.23
10.13	.00	3.53	5.912	3.21
10.17	.00	3.53	5.903	3.19
10.20	.00	3.53	5.895	3.17
10.23	.00	3.52	5.886	3.15
10.27	.00	3.52	5.877	3.13
10.30	.00	3.52	5.869	3.10
10.33	.00	3.51	5.860	3.08
10.37	.00	3.51	5.852	3.06
10.40	.00	3.51	5.843	3.04
10.43	.00	3.50	5.835	3.02
10.47	.00	3.50	5.827	3.00
10.50	.00	3.50	5.818	2.98
10.53	.00	3.49	5.810	2.96
10.57	.00	3.49	5.802	2.94
10.60	.00	3.49	5.794	2.92
10.63	.00	3.48	5.786	2.90
10.67	.00	3.48	5.778	2.88
10.70	.00	3.48	5.770	2.86
10.73	.00	3.47	5.762	2.85
10.77	.00	3.47	5.755	2.83
10.80	.00	3.47	5.747	2.81
10.83	.00	3.46	5.739	2.79
10.87	.00	3.46	5.731	2.77
10.90	.00	3.46	5.724	2.75
10.93	.00	3.45	5.716	2.73
10.97	.00	3.45	5.709	2.72
11.00	.00	3.45	5.701	2.70
11.03	.00	3.44	5.694	2.68
11.07	.00	3.44	5.687	2.66
11.10	.00	3.44	5.679	2.64
11.13	.00	3.44	5.672	2.63
11.17	.00	3.43	5.665	2.61

TIME	INFLOW	ELEV	VOLUME	OUTFLOW

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(HRS)	(CFS)	(FEET)	(AC-FT)	(CFS)
11.20	.00	3.43	5.658	2.59
11.23	.00	3.43	5.650	2.57
11.27	.00	3.42	5.643	2.56
11.30	.00	3.42	5.636	2.54
11.33	.00	3.42	5.629	2.52
11.37	.00	3.42	5.622	2.51
11.40	.00	3.41	5.616	2.49
11.43	.00	3.41	5.609	2.47
11.47	.00	3.41	5.602	2.46
11.50	.00	3.40	5.595	2.44
11.53	.00	3.40	5.589	2.42
11.57	.00	3.40	5.582	2.41
11.60	.00	3.40	5.575	2.39
11.63	.00	3.39	5.569	2.37
11.67	.00	3.39	5.562	2.36
11.70	.00	3.39	5.556	2.34
11.73	.00	3.39	5.549	2.33
11.77	.00	3.38	5.543	2.31
11.80	.00	3.38	5.537	2.30
11.83	.00	3.38	5.530	2.28
11.87	.00	3.38	5.524	2.27
11.90	.00	3.37	5.518	2.25
11.93	.00	3.37	5.512	2.24
11.97	.00	3.37	5.505	2.22
12.00	.00	3.37	5.499	2.21
12.03	.00	3.36	5.493	2.19
12.07	.00	3.36	5.487	2.18
12.10	.00	3.36	5.481	2.16
12.13	.00	3.36	5.475	2.15
12.17	.00	3.35	5.469	2.13
12.20	.00	3.35	5.464	2.12
12.23	.00	3.35	5.458	2.11
12.27	.00	3.35	5.452	2.09
12.30	.00	3.34	5.446	2.08
12.33	.00	3.34	5.441	2.06
12.37	.00	3.34	5.435	2.05
12.40	.00	3.34	5.429	2.04
12.43	.00	3.33	5.424	2.02
12.47	.00	3.33	5.418	2.01
12.50	.00	3.33	5.413	2.00
12.53	.00	3.33	5.407	1.98
12.57	.00	3.33	5.402	1.97
12.60	.00	3.32	5.396	1.96
12.63	.00	3.32	5.391	1.94
12.67	.00	3.32	5.386	1.93
12.70	.00	3.32	5.380	1.92
12.73	.00	3.32	5.375	1.90
12.77	.00	3.31	5.370	1.89
12.80	.00	3.31	5.365	1.88
12.83	.00	3.31	5.359	1.87
12.87	.00	3.31	5.354	1.85
12.90	.00	3.30	5.349	1.84
12.93	.00	3.30	5.344	1.83
12.97	.00	3.30	5.339	1.82
13.00	.00	3.30	5.334	1.80
13.03	.00	3.30	5.329	1.79

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
13.07	.00	3.29	5.324	1.78
13.10	.00	3.29	5.319	1.77

13.13	.00	3.29	5.315	1.76
13.17	.00	3.29	5.310	1.75
13.20	.00	3.29	5.305	1.73
13.23	.00	3.28	5.300	1.72
13.27	.00	3.28	5.295	1.71
13.30	.00	3.28	5.291	1.70
13.33	.00	3.28	5.286	1.69
13.37	.00	3.28	5.281	1.68
13.40	.00	3.28	5.277	1.67
13.43	.00	3.27	5.272	1.65
13.47	.00	3.27	5.268	1.64
13.50	.00	3.27	5.263	1.63
13.53	.00	3.27	5.259	1.62
13.57	.00	3.27	5.254	1.61
13.60	.00	3.26	5.250	1.60
13.63	.00	3.26	5.245	1.59
13.67	.00	3.26	5.241	1.58
13.70	.00	3.26	5.237	1.57
13.73	.00	3.26	5.232	1.56
13.77	.00	3.26	5.228	1.55
13.80	.00	3.25	5.224	1.54
13.83	.00	3.25	5.220	1.53
13.87	.00	3.25	5.216	1.52
13.90	.00	3.25	5.211	1.51
13.93	.00	3.25	5.207	1.50
13.97	.00	3.25	5.203	1.49
14.00	.00	3.24	5.199	1.48
14.03	.00	3.24	5.195	1.47
14.07	.00	3.24	5.191	1.46
14.10	.00	3.24	5.187	1.45
14.13	.00	3.24	5.183	1.44
14.17	.00	3.24	5.179	1.43
14.20	.00	3.23	5.175	1.42
14.23	.00	3.23	5.171	1.41
14.27	.00	3.23	5.167	1.40
14.30	.00	3.23	5.164	1.39
14.33	.00	3.23	5.160	1.38
14.37	.00	3.23	5.156	1.37
14.40	.00	3.22	5.152	1.36
14.43	.00	3.22	5.148	1.35
14.47	.00	3.22	5.145	1.34
14.50	.00	3.22	5.141	1.34
14.53	.00	3.22	5.137	1.33
14.57	.00	3.22	5.134	1.32
14.60	.00	3.22	5.130	1.31
14.63	.00	3.21	5.127	1.30
14.67	.00	3.21	5.123	1.29
14.70	.00	3.21	5.119	1.28
14.73	.00	3.21	5.116	1.27
14.77	.00	3.21	5.112	1.27
14.80	.00	3.21	5.109	1.26
14.83	.00	3.21	5.105	1.25
14.87	.00	3.20	5.102	1.24
14.90	.00	3.20	5.099	1.23

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
14.93	.00	3.20	5.095	1.22
14.97	.00	3.20	5.092	1.22
15.00	.00	3.20	5.089	1.21
15.03	.00	3.20	5.085	1.20
15.07	.00	3.20	5.082	1.19
15.10	.00	3.19	5.079	1.18

15.13	.00	3.19	5.075	1.18
15.17	.00	3.19	5.072	1.17
15.20	.00	3.19	5.069	1.16
15.23	.00	3.19	5.066	1.15
15.27	.00	3.19	5.063	1.14
15.30	.00	3.19	5.059	1.14
15.33	.00	3.19	5.056	1.13
15.37	.00	3.18	5.053	1.12
15.40	.00	3.18	5.050	1.11
15.43	.00	3.18	5.047	1.11
15.47	.00	3.18	5.044	1.10
15.50	.00	3.18	5.041	1.09
15.53	.00	3.18	5.038	1.08
15.57	.00	3.18	5.035	1.08
15.60	.00	3.18	5.032	1.07
15.63	.00	3.17	5.029	1.06
15.67	.00	3.17	5.026	1.06
15.70	.00	3.17	5.023	1.05
15.73	.00	3.17	5.021	1.04
15.77	.00	3.17	5.018	1.04
15.80	.00	3.17	5.015	1.03
15.83	.00	3.17	5.012	1.02
15.87	.00	3.17	5.009	1.01
15.90	.00	3.17	5.006	1.01
15.93	.00	3.16	5.004	1.00
15.97	.00	3.16	5.001	.99
16.00	.00	3.16	4.998	.99
16.03	.00	3.16	4.995	.98
16.07	.00	3.16	4.993	.97
16.10	.00	3.16	4.990	.97
16.13	.00	3.16	4.987	.96
16.17	.00	3.16	4.985	.96
16.20	.00	3.16	4.982	.95
16.23	.00	3.15	4.980	.94
16.27	.00	3.15	4.977	.94
16.30	.00	3.15	4.974	.93
16.33	.00	3.15	4.972	.92
16.37	.00	3.15	4.969	.92
16.40	.00	3.15	4.967	.91
16.43	.00	3.15	4.964	.91
16.47	.00	3.15	4.962	.90
16.50	.00	3.15	4.959	.89
16.53	.00	3.15	4.957	.89
16.57	.00	3.14	4.954	.88
16.60	.00	3.14	4.952	.88
16.63	.00	3.14	4.950	.87
16.67	.00	3.14	4.947	.86
16.70	.00	3.14	4.945	.86
16.73	.00	3.14	4.942	.85
16.76	.00	3.14	4.940	.85

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
16.80	.00	3.14	4.938	.84
16.83	.00	3.14	4.936	.84
16.86	.00	3.14	4.933	.83
16.90	.00	3.13	4.931	.82
16.93	.00	3.13	4.929	.82
16.96	.00	3.13	4.926	.81
17.00	.00	3.13	4.924	.81
17.03	.00	3.13	4.922	.80
17.06	.00	3.13	4.920	.80
17.10	.00	3.13	4.918	.79

17.13	.00	3.13	4.915	.79
17.16	.00	3.13	4.913	.78
17.20	.00	3.13	4.911	.78
17.23	.00	3.13	4.909	.77
17.26	.00	3.12	4.907	.77
17.30	.00	3.12	4.905	.76
17.33	.00	3.12	4.903	.76
17.36	.00	3.12	4.901	.75
17.40	.00	3.12	4.899	.75
17.43	.00	3.12	4.896	.74
17.46	.00	3.12	4.894	.74
17.50	.00	3.12	4.892	.73
17.53	.00	3.12	4.890	.73
17.56	.00	3.12	4.888	.72
17.60	.00	3.12	4.886	.72
17.63	.00	3.12	4.884	.71
17.66	.00	3.11	4.883	.71
17.70	.00	3.11	4.881	.70
17.73	.00	3.11	4.879	.70
17.76	.00	3.11	4.877	.69
17.80	.00	3.11	4.875	.69
17.83	.00	3.11	4.873	.68
17.86	.00	3.11	4.871	.68
17.90	.00	3.11	4.869	.67
17.93	.00	3.11	4.867	.67
17.96	.00	3.11	4.866	.67
18.00	.00	3.11	4.864	.66
18.03	.00	3.11	4.862	.66
18.06	.00	3.11	4.860	.65
18.10	.00	3.10	4.858	.65
18.13	.00	3.10	4.857	.64
18.16	.00	3.10	4.855	.64
18.20	.00	3.10	4.853	.63
18.23	.00	3.10	4.851	.63
18.26	.00	3.10	4.850	.63
18.30	.00	3.10	4.848	.62
18.33	.00	3.10	4.846	.62
18.36	.00	3.10	4.844	.61
18.40	.00	3.10	4.843	.61
18.43	.00	3.10	4.841	.61
18.46	.00	3.10	4.839	.60
18.50	.00	3.10	4.838	.60
18.53	.00	3.10	4.836	.59
18.56	.00	3.10	4.834	.59
18.60	.00	3.09	4.833	.59
18.63	.00	3.09	4.831	.58

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
18.66	.00	3.09	4.830	.58
18.70	.00	3.09	4.828	.57
18.73	.00	3.09	4.826	.57
18.76	.00	3.09	4.825	.57
18.80	.00	3.09	4.823	.56
18.83	.00	3.09	4.822	.56
18.86	.00	3.09	4.820	.56
18.90	.00	3.09	4.819	.55
18.93	.00	3.09	4.817	.55
18.96	.00	3.09	4.816	.54
19.00	.00	3.09	4.814	.54
19.03	.00	3.09	4.813	.54
19.06	.00	3.09	4.811	.53
19.10	.00	3.09	4.810	.53

19.13	.00	3.08	4.808	.53
19.16	.00	3.08	4.807	.52
19.20	.00	3.08	4.805	.52
19.23	.00	3.08	4.804	.52
19.26	.00	3.08	4.803	.51
19.30	.00	3.08	4.801	.51
19.33	.00	3.08	4.800	.51
19.36	.00	3.08	4.798	.50
19.40	.00	3.08	4.797	.50
19.43	.00	3.08	4.796	.50
19.46	.00	3.08	4.794	.49
19.50	.00	3.08	4.793	.49
19.53	.00	3.08	4.792	.49
19.56	.00	3.08	4.790	.48
19.60	.00	3.08	4.789	.48
19.63	.00	3.08	4.788	.48
19.66	.00	3.08	4.786	.47
19.70	.00	3.08	4.785	.47
19.73	.00	3.07	4.784	.47
19.76	.00	3.07	4.782	.46
19.80	.00	3.07	4.781	.46
19.83	.00	3.07	4.780	.46
19.86	.00	3.07	4.779	.45
19.90	.00	3.07	4.777	.45
19.93	.00	3.07	4.776	.45
19.96	.00	3.07	4.775	.45

PEAK DISCHARGE = 65.284 CFS - PEAK OCCURS AT HOUR 2.03
MAXIMUM WATER SURFACE ELEVATION = 7.705
MAXIMUM STORAGE = 17.3216 AC-FT INCREMENTAL TIME= .033330HRS

PRINT HYD ID=20 CODE=1

HYDROGRAPH FROM AREA 405.70

RUNOFF VOLUME = .83747 INCHES = 14.8352 ACRE-FEET
PEAK DISCHARGE RATE = 65.28 CFS AT 2.033 HOURS BASIN AREA = .3321 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

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                                    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       AVERAGE     FLOW        TRAVEL
                         DEPTH       AREA        RATE        TIME
                         FEET        SQ.FT.      CFS         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 =      .83722 INCHES     =      14.8309 ACRE-FEET
    PEAK DISCHARGE RATE =      65.24 CFS  AT   2.066 HOURS   BASIN AREA =   .3321 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
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    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
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    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
```

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

```
    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
```

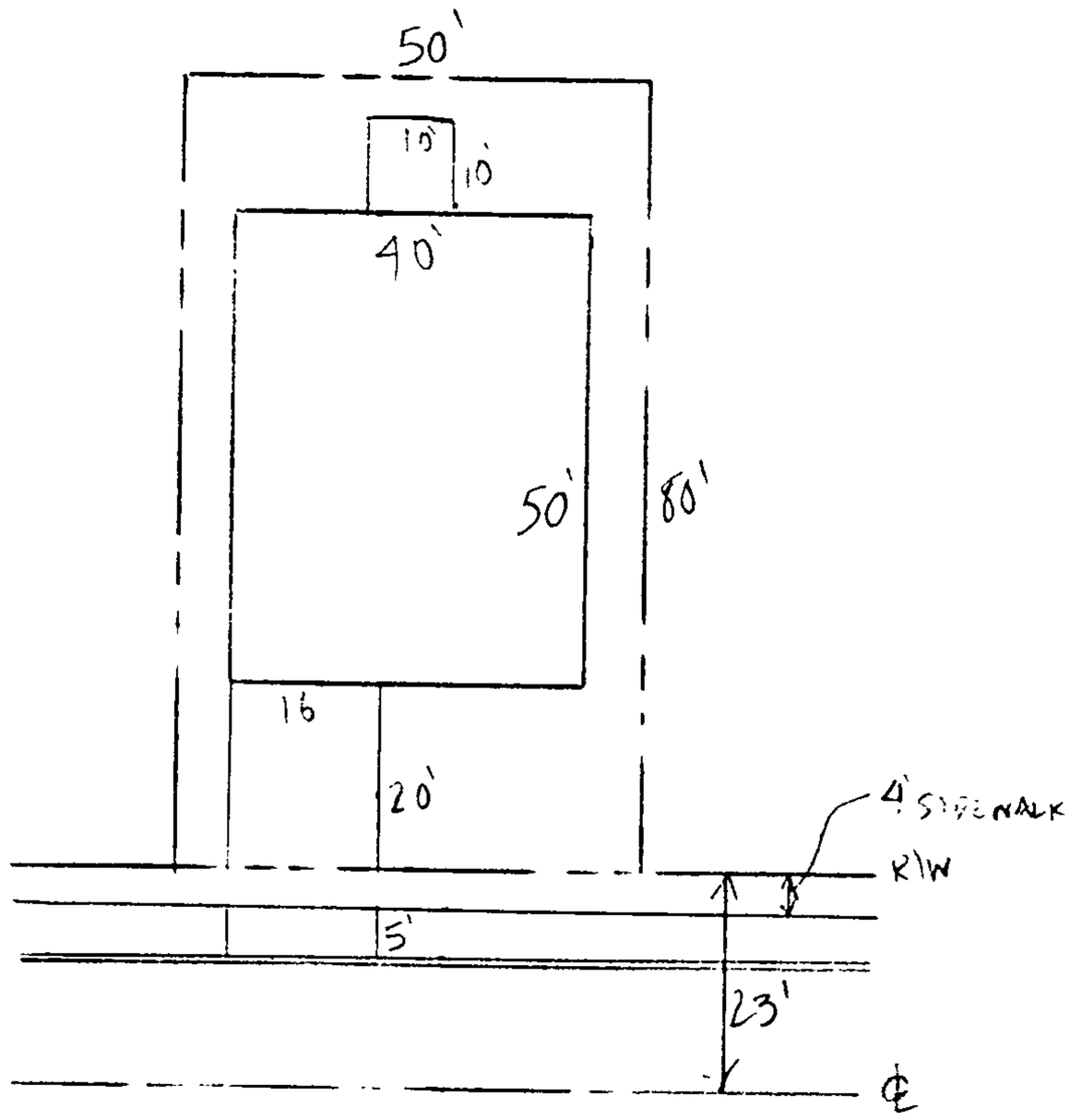
Sage Pointe Subdivision -- 100-Year Design Storm AHYMO Analysis

```
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) = 06:39:18
```

CHAVEZ • GRIEVES
CONSULTING ENGINEERS, INC.
5639 JEFFERSON STREET N.E. • ALBUQUERQUE, NEW MEXICO 87109
PHONE (505) 344-4080 • FAX (505) 343-8759

SHEET NO. _____ OF _____
JOB SAGE POINTE 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

APPENDIX B

HYDRAULIC COMPUTATIONS

CHAVEZ • GRIEVES
CONSULTING ENGINEERS, INC.
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PHONE (505) 344-4080 • FAX (505) 343-8759

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

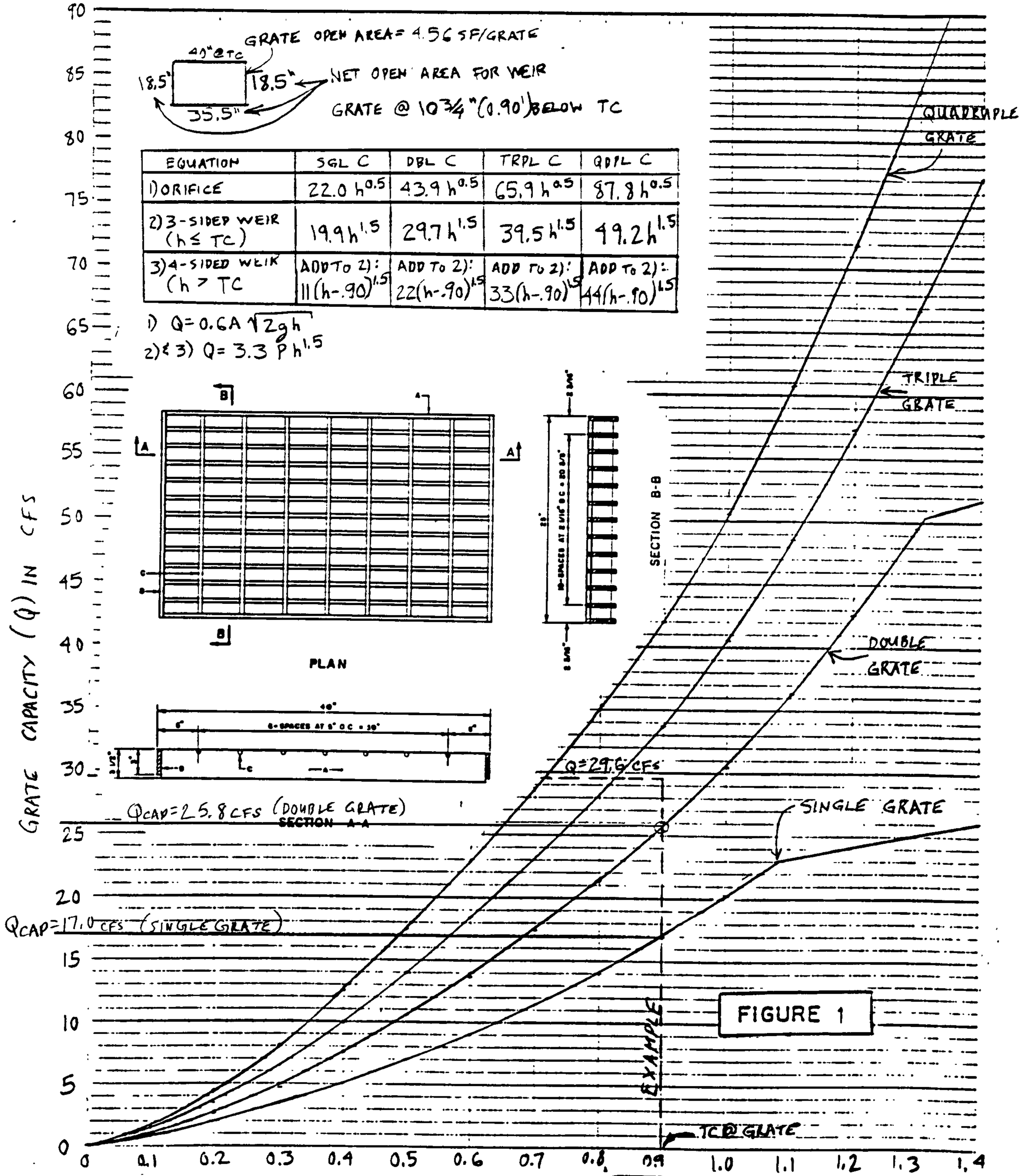


FIGURE 1

CHAVEZ · GRIEVES
CONSULTING ENGINEERS INC
5638 JEFFERSON STREET NE • ALBUQUERQUE NEW MEXICO 87109
PHONE (505) 344-4080 • FAX (505) 343-8759

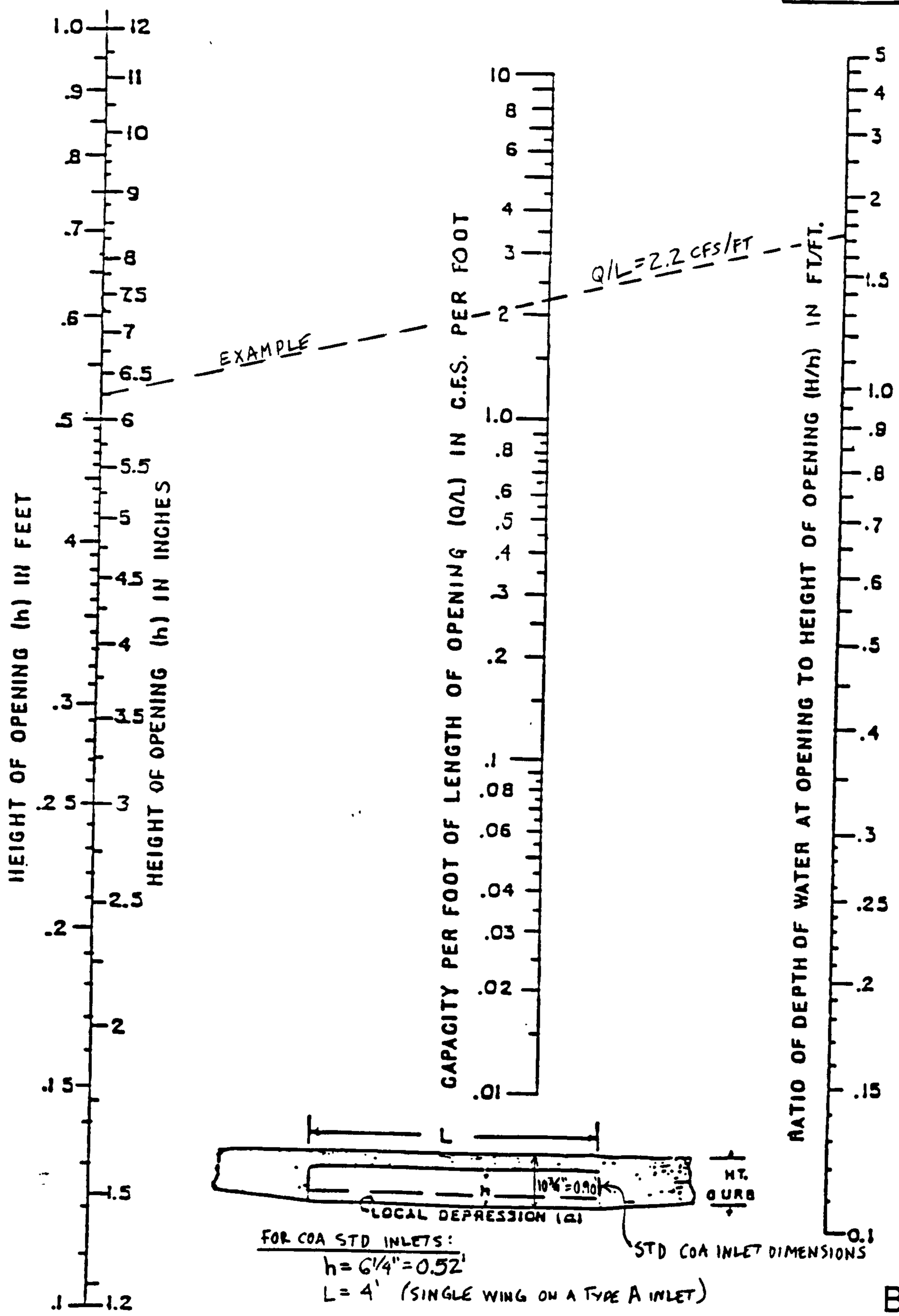
B-2

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



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)	K - Factor	Friction Slope Sf	Pipe Length (feet)	Pipe Curve (degrees)	Bend Angle (degrees)	Junction Angle (degrees)	Friction Loss Hf	Curve Loss Hc	Junction Loss Hj	Manhole Loss Hmh	Transition Loss Ht	Bend Loss Hb	Total Losses (feet)	Hydraulic Grade Line (dnstream)	Hydraulic Grade Line (upstream)	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	3358	0 0343	270 00	0.00											24 75	20 20	25 70	30 00		
8+49 94	Junction											9 26												10 64	
		42	59 98	9 62	6 23	1006	0 0036	55 69	0 00									9 26							
7+91 25	Transition											0 20						0 00	30 00	30 00	23 15	28 65	33 10		30 60
		30	59 98	4 91	12 22	410	0 0214	347 29	0 00							0 56		0 20						0 60	
4+41 96	Manhole											7 43						0 56	30 20	30 75	23 80	27 30	33 10		30 20
		30	59 98	4 91	12 22	410	0 0214	323 01	0 00						0 06	0 00		7 43						2 32	
1+14 95	Manhole											6 91						0 06	38 18	38.24	34 80	37 30	48 89		38 18
																		6 91						2 32	
																			45 15	50 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)	Comments
				HGL @ pond elev
30 60				Q per W O 5057 91 = 623 cfs
				HGL per W O 5057 91 = 30 0 , HGL (dwn) adjusted manually to this value
30 75				
38 24				
50 26				HGL inside pipe HGL (up) adjusted to Manning's depth