



City of Albuquerque

January 14, 2000

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

RE: *Grading and Drainage Certification Plan for Sun Sage Hills Subdivision (M9/D14)*
Submitted for Release of Financial Guarantees, Engineer's Certification Stamp Dated
1/12/00.

Dear Ms. Hoelzer:

Based on the information provided, the above referenced plan is adequate to satisfy the Grading and Drainage Certification requirement per the Infrastructure List dated March 3, 1998 for the release of financial guarantees for the Sun Sage Hills Subdivision.

If you have any questions, or if I may be of further assistance to you, please call me at 924-3982.

Sincerely,

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

c: Terri Martin, DRB-98-52, City Project No. 562380
 Pierre Amestoy, Jr., A Management Corporation
 File

DRAINAGE INFORMATION SHEET

PROJECT TITLE: Sun Sage Hills Subdivision ZONE ATLAS#: M-9/D-14
DRB#: 98-52 EPC# 96-87 WORK ORDER#: _____
LEGAL DESCRIPTION: Portions of Tracts 503 and Parcel A, Town of Atrisco Grant (SP-83-237)
CITY ADDRESS: _____

ENGINEERING FIRM:	<u>Mark Goodwin & Associates, PA</u>	CONTACT:	<u>Diane Hoelzer, PE</u>
ADDRESS:	<u>P.O. Box 90606, Albuquerque, NM 87199</u>	PHONE:	<u>828-2200</u>
OWNER:	<u>A Management Corporation</u>	CONTACT:	<u>Pierre Amestoy</u>
ADDRESS:	<u>8661 San Pedro NE, Albuquerque, NM 87113</u>	PHONE:	<u>822-8585</u>
ARCHITECT:	_____	CONTACT:	_____
ADDRESS:	_____	PHONE:	_____
SURVEYOR:	<u>Aldrich Land Surveying</u>	CONTACT:	<u>Tim Aldrich</u>
ADDRESS:	<u>P.O. Box 30701, Albuquerque, NM 87190</u>	PHONE:	<u>884-1990</u>
CONTACTOR:	_____	CONTACT:	_____
ADDRESS:	_____	PHONE:	_____

TYPE OF SUBMITTAL:

☐ DRAINAGE REPORT
☐ DRAINAGE PLAN
☐ CONCEPTUAL GRADING & DRAINAGE PLAN
☐ GRADING PLAN
☐ EROSION CONTROL
☒ ENGINEER'S CERTIFICATION
☐ OTHER
☐ EASEMENT VACATION

PRE-DESIGN MEETING:

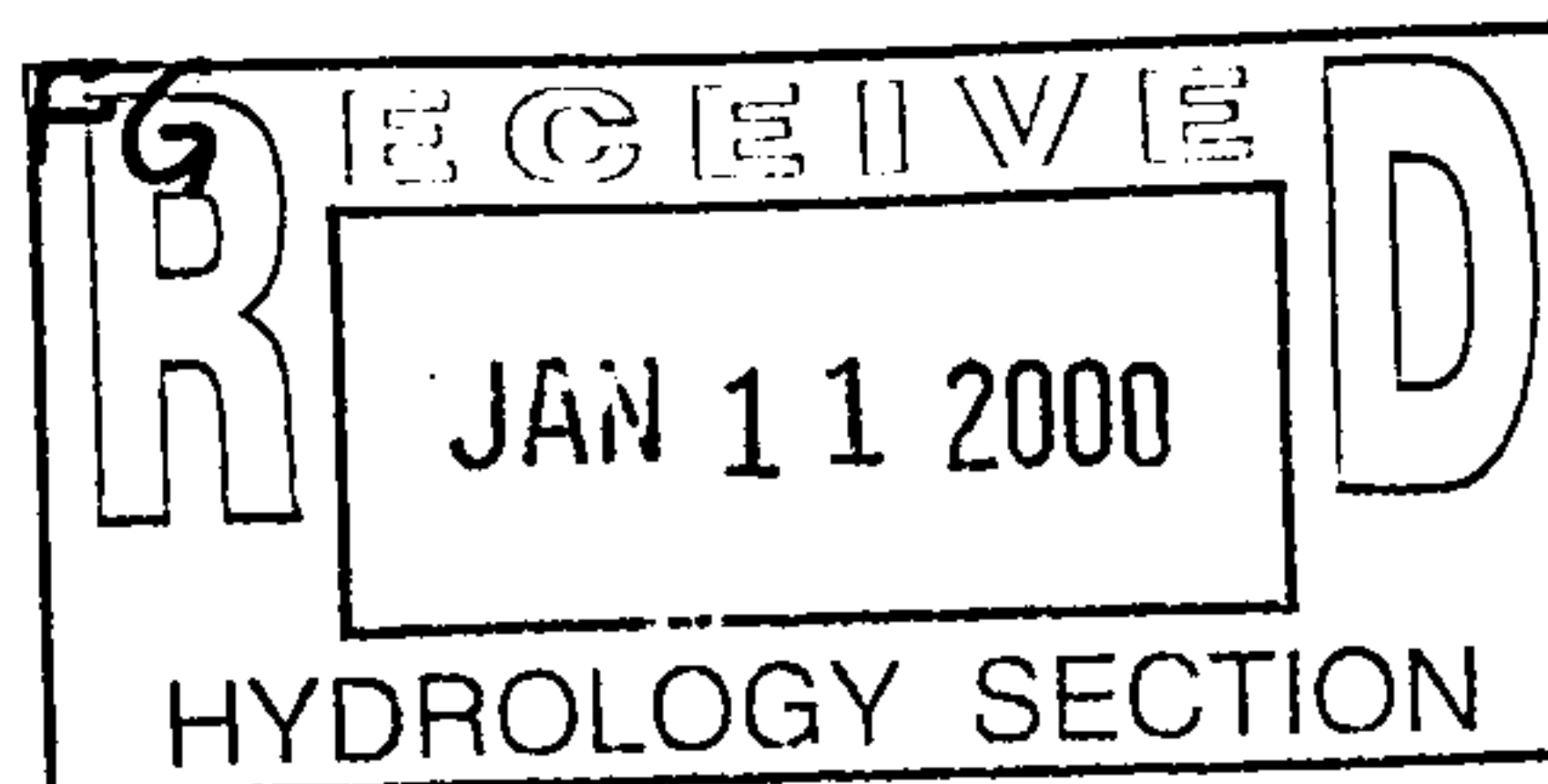
☐ YES
☒ NO
☐ COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:

☐ SKETCH PLAT APPROVAL
☐ PRELIMINARY PLAT APPROVAL
☐ S. DEV. PLAN FOR SUB'D APPROVAL
☐ S. DEV. PLAN FOR BLDG PERMIT APPROVAL
☐ SECTOR PLAN APPROVAL
☐ FINAL PLAT APPROVAL
☐ FOUNDATION PERMIT APPROVAL
☐ BUILDING PERMIT APPROVAL
☐ CERTIFICATION OF OCCUPANCY APPROVAL
☐ GRADING PERMIT APPROVAL
☐ PAVING PERMIT APPROVAL
☐ S.A.D. DRAINAGE REPORT
☐ DRAINAGE REQUIREMENTS
☐ OTHER
☐ RELEASE OF FINANCIAL GUARANTY
☐ TRAFFIC CIRCULATION LAYOUT

☒ X

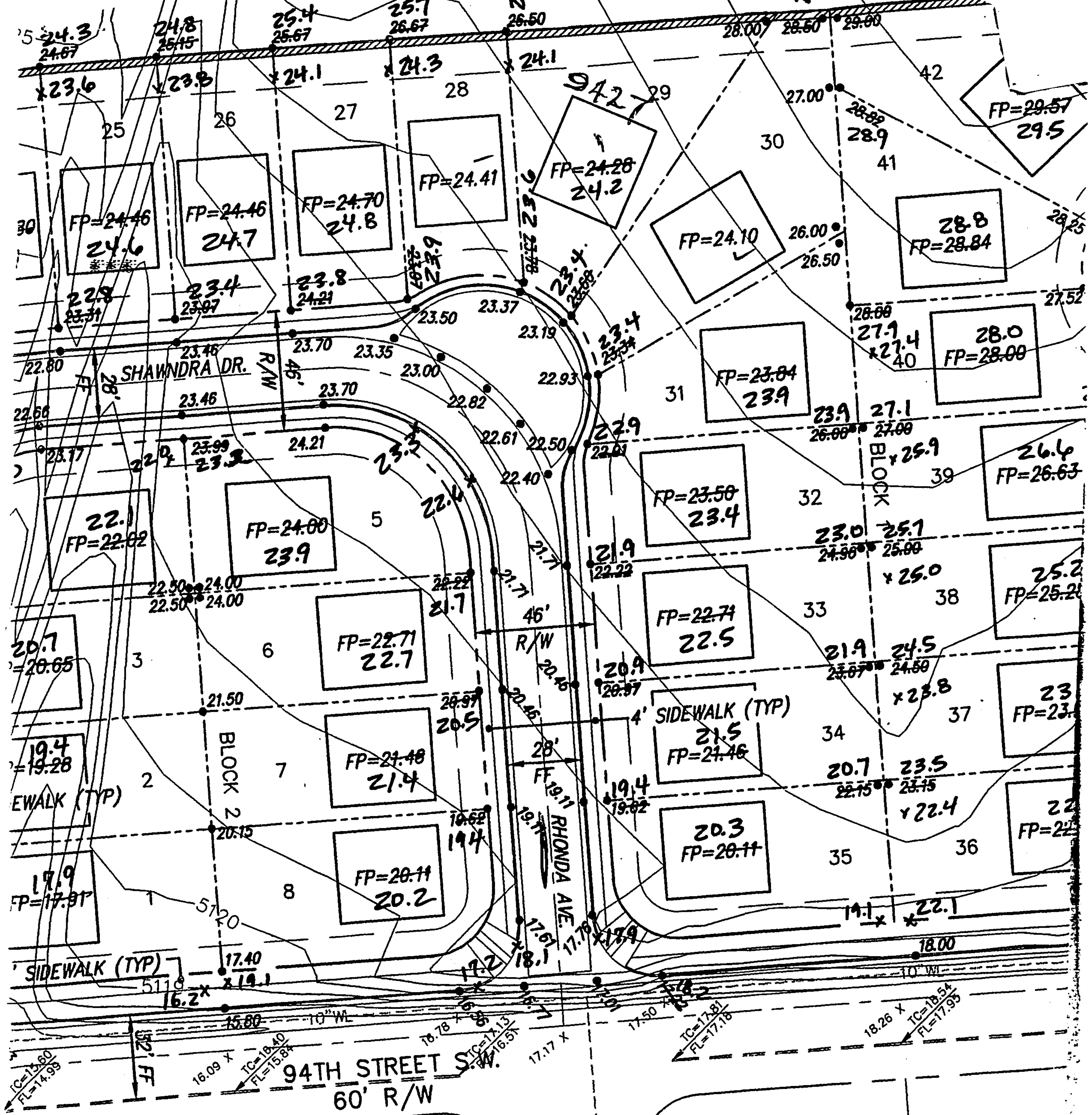
ROFFG



DATE SUBMITTED: 1/12/00

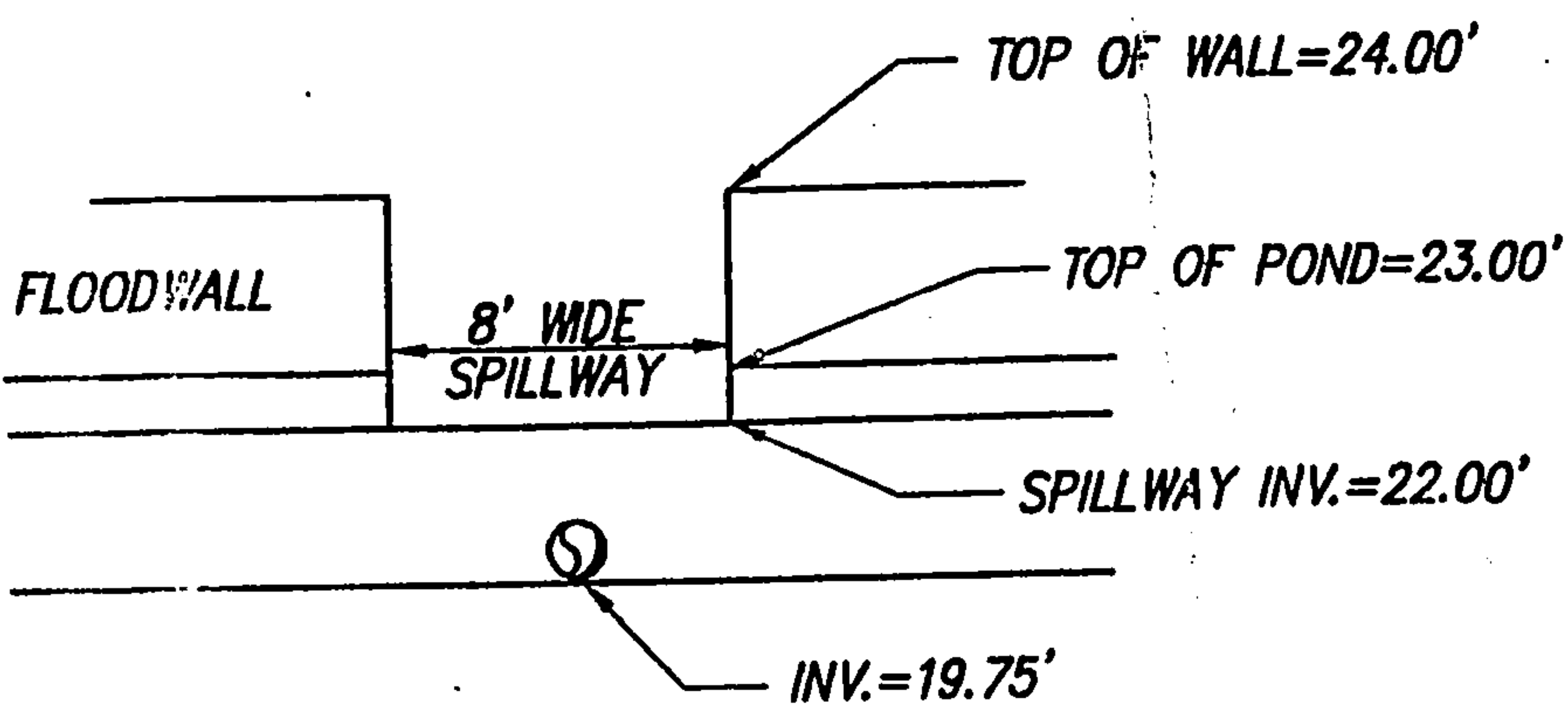
BY: Sheri Westgate

for Diane Hoelzer, PE



(EXISTING RESIDENTIAL HOMES)

M9/D14
SUN SAGE HILLS Sub D
C.O. Stamped 1/12/00



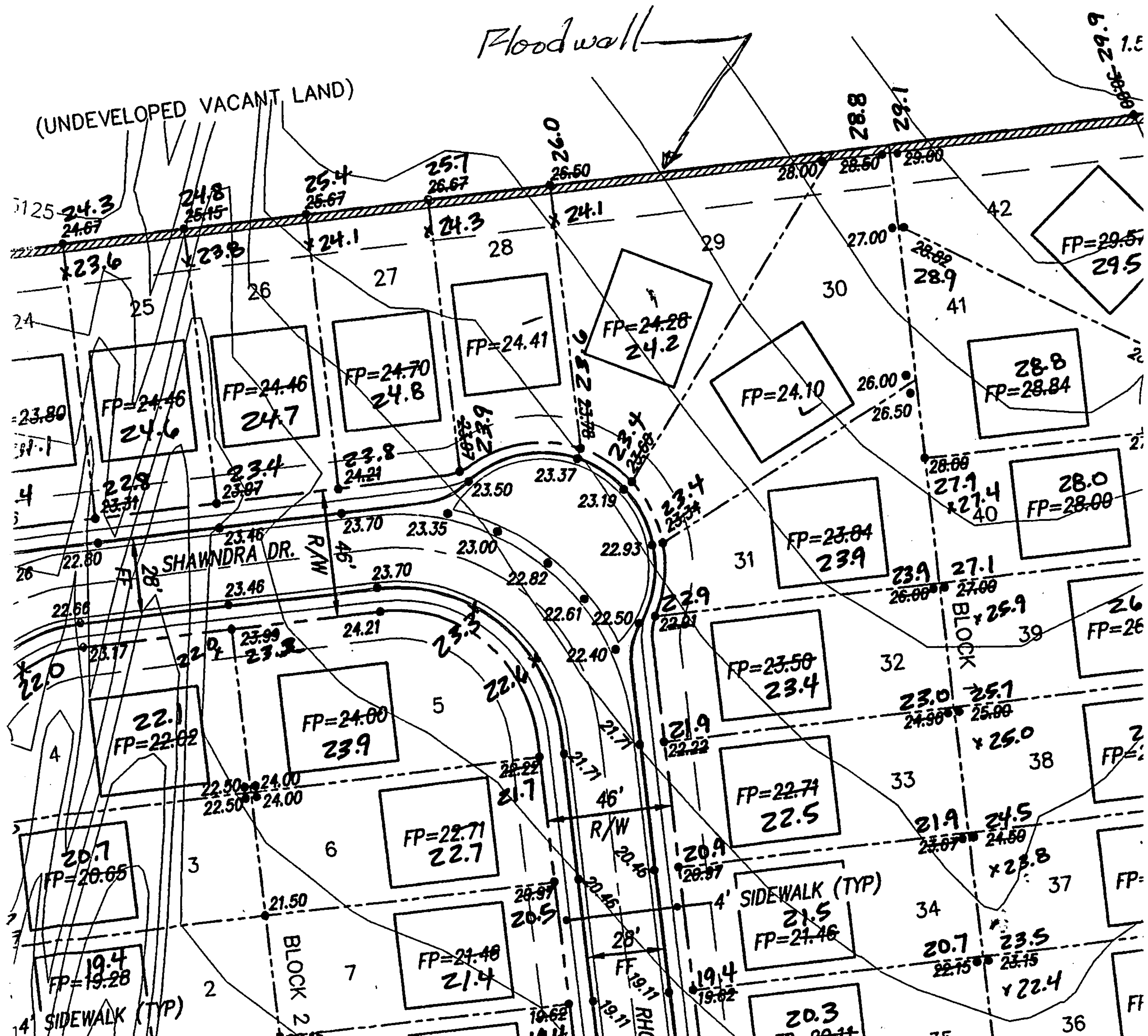
SPILLWAY CALCS

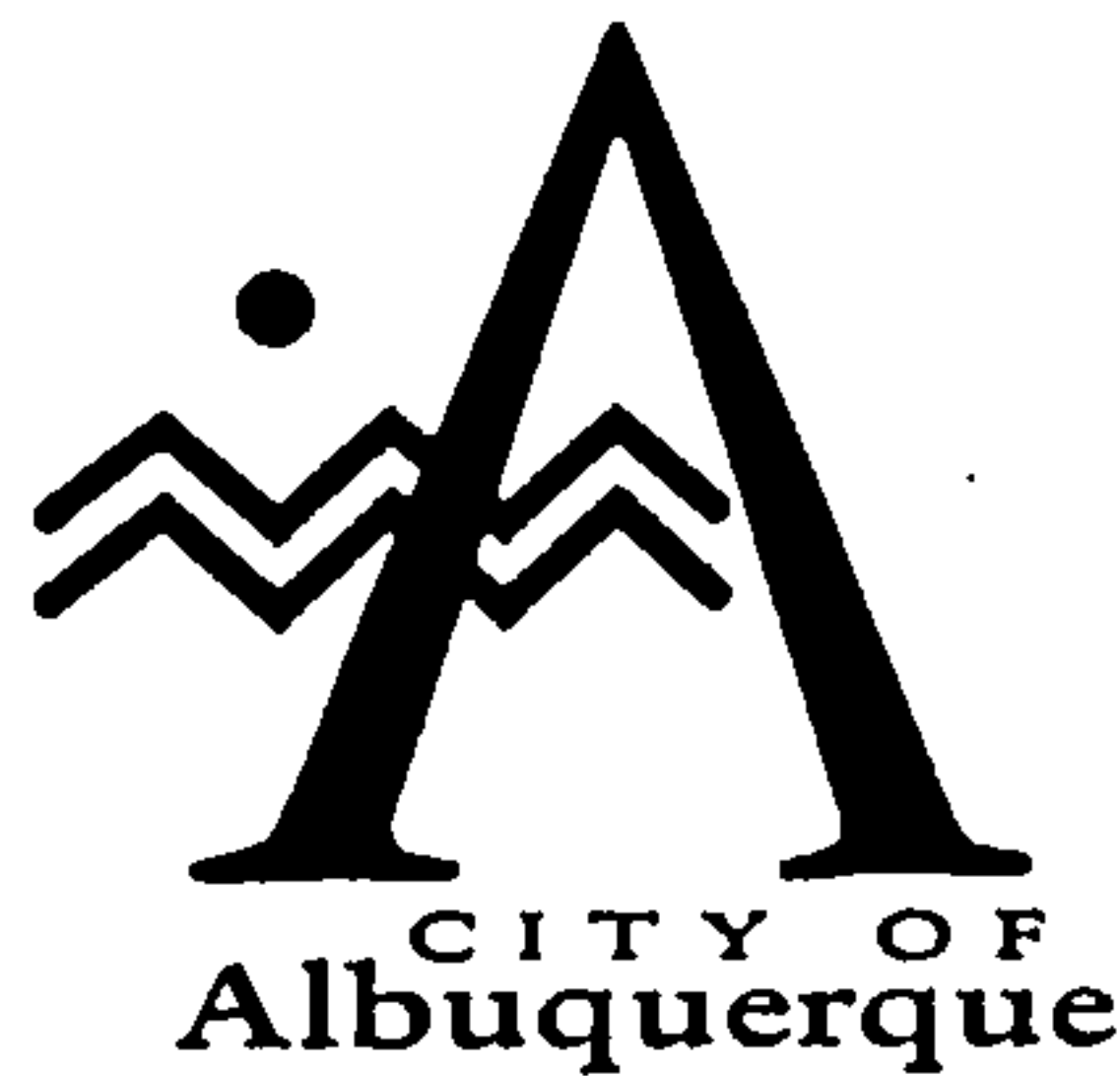
$$Q = \text{CLM}^{1.5} \quad \text{N.T.S.}$$

$$18.2 \text{ CFS} = 3.6 (8.0') H^{1.5}$$

$$H = .736' \text{ OR } 8.8"$$

(UNDEVELOPED VACANT LAND)





March 2, 1998

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

RE: Grading and Drainage Plan for Sun Sage Hills Subdivision (M9/D14) Submitted for Preliminary and Final Plat Approval and Grading Permit Release, Engineer's Stamp Dated 2/3/98.

Dear Ms. Hoelzer:

Based on the information provided in the submittal of February 5, 1998, the above referenced plan is approved for Preliminary Plat action and Grading Permit release.

Please be advised that SAD 222 identifies a 36" storm drain in Sage Road adjacent to this site. This storm drain must be included on the Infrastructure List. Also, an Easement and an Agreement and Covenant are required for the temporary detention pond located adjacent to this site. These must also be included on the Infrastructure List.

The SIA must be in place for this subdivision prior to Final Plat approval. The Grading and Drainage Certification is required prior to release of Financial Guarantees.

If you have any questions, or if I may be of further assistance to you, please call me at 924-3982.

Sincerely,

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

c: Fred Aguirre, DRB-98-52
Pierre Amestoy, Jr., A Management Corporation
File

Good for You, Albuquerque!



DRAINAGE INFORMATION SHEET

PROJECT TITLE: Sun Sage Hills Subdivision ZONE ATLAS/DRNG, FILE#: M9/D14
DRB #: 98-52 EPC #: 96-87 WORK ORDER #: _____
LEGAL DESCRIPTION: Parcel A-1, Unit 7, Town of Atrisco Grant
CITY ADDRESS: Southwest corner of 84th St. and Sage Rd.

ENGINEERING FIRM: Mark Goodwin & Associates, PA
ADDRESS: PO Box 90606 ABQ NM 87199
OWNER: A Management Corporation
ADDRESS: 8661 San Pedro Ave. ABQ, NM 87113
ARCHITECT: N/A
ADDRESS: _____
SURVEYOR: ALS, Inc.
ADDRESS: PO Box 30701 ABQ NM 87190
CONTRACTOR: _____
ADDRESS: _____

CONTACT: Diane Hoelzer, PE
PHONE: 828-2200
CONTACT: Pierre Amestoy, Jr.
PHONE: 822-8585
CONTACT: _____
PHONE: _____
CONTACT: Tim Aldrich
PHONE: 884-1990
CONTACT: _____
PHONE: _____

TYPE OF SUBMITTAL:

CHECK TYPE OF APPROVAL SOUGHT:

☐ DRAINAGE REPORT
☒ DRAINAGE PLAN
☐ CONCEPTUAL GRADING & DRAINAGE PLAN
☒ GRADING PLAN
☐ EROSION CONTROL PLAN
☐ ENGINEER'S CERTIFICATION
☐ OTHER

☐ SKETCH PLAT APPROVAL
☒ PRELIMINARY PLAT APPROVAL
☐ S. DEV. PLAN FOR SUB'D APPROVAL
☐ S. DEV. PLAN FOR BLDG PERMIT APPROVAL
☐ SECTOR PLAN APPROVAL
☒ FINAL PLAT APPROVAL
☐ FOUNDATION PERMIT APPROVAL
☐ BUILDING PERMIT APPROVAL
☐ CERTIFICATION OF OCCUPANCY APPROVAL
☒ GRADING PERMIT APPROVAL
☐ PAVING PERMIT APPROVAL
☐ S.A.D. DRAINAGE REPORT
☐ DRAINAGE REQUIREMENTS
☐ OTHER RELEASE OF FINANCIAL GUARANTY

PRE-DESIGN MEETING:

☐ YES
☒ NO
☐ COPY PROVIDED

DATE SUBMITTED: 2-6-98

BY: Diane Hoelzer

Diane Hoelzer, PE



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

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

February 3, 1998

One Stop Hydrology
Plaza Del Sol
City of Albuquerque, NM
PO Box 1293
Albuquerque, NM 87103

Re: Grading and Drainage Plan Sun Sage Hills Subdivision (M-9/D-14)

Dear Mr. Curtin,

This letter is in response to your letter dated October 11, 1996 in which you gave us preliminary plat and rough grading approval as well as some additional comments that needed to be addressed before final plat approval.

Since the preliminary plat expired for this project, I am now seeking preliminary, final plat and infrastructure list approval and have addressed your additional comments below:

1. Temporary bench mark has been added to the grading plan. A detail of the outlet and emergency spillway has been added to the G & D Plan. The shared swale section detail has been corrected to read 1'-8".
2. A note has been added to the plat that "a 10' Private Drainage Easement is centered on all side lot lines". A drainage covenant for the detention pond will be fully processed and recorded when the recording information from the final plat is complete.

I am submitting a revised grading and drainage plan with additional details and grade changes in order to balance the site as well as an infrastructure list. The contents of the previously approved drainage report which is in your files remains unchanged.

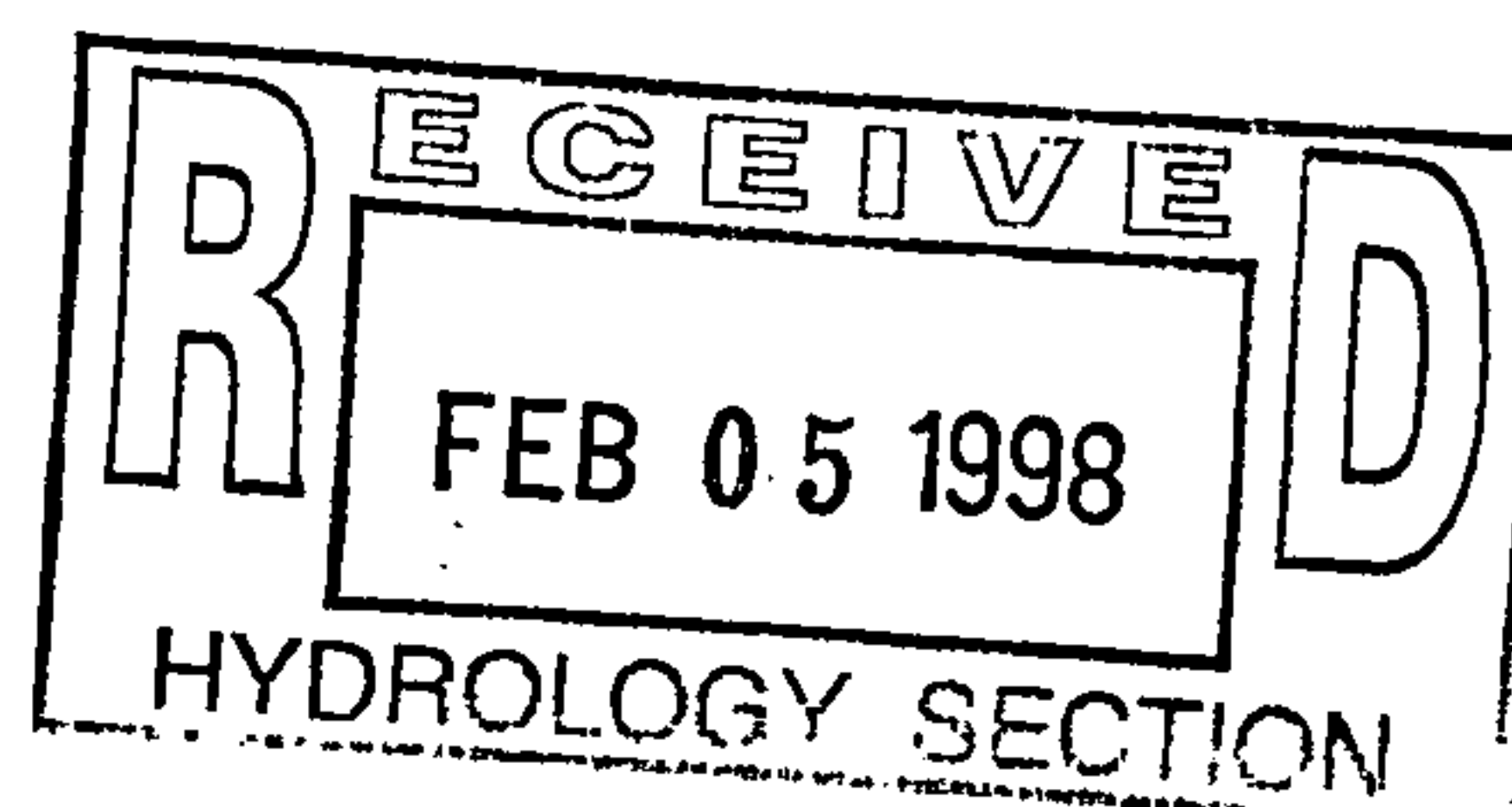
Sincerely,

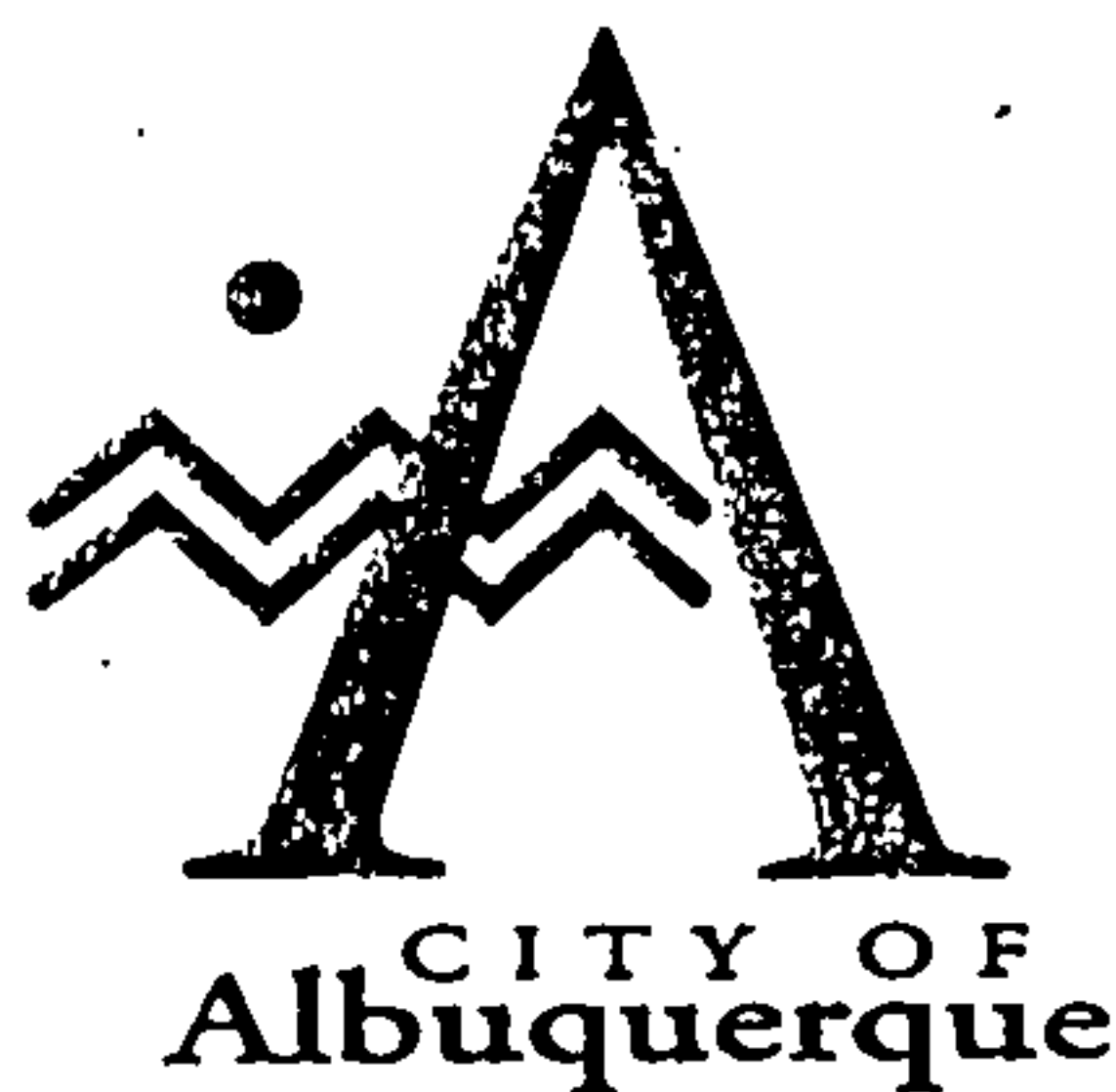
MARK GOODWIN & ASSOCIATES, P.A.

Diane Hoelzer, P.E.

DLH/sb

b:\sunsage\drin13.ltr





P.O. Box 1293 Albuquerque, NM 87103

October 11, 1996

Martin J. Chávez, Mayor

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

RE: GRADING PLAN FOR SUN SAGE HILLS (M-9/D14)
RECEIVED SEPTEMBER 18, 1996 FOR PRELIMINARY PLAT, GRADING & BUILDING
PERMIT
ENGINEER'S STAMP DATED 9-18-96

Dear Ms. Hoelzer:

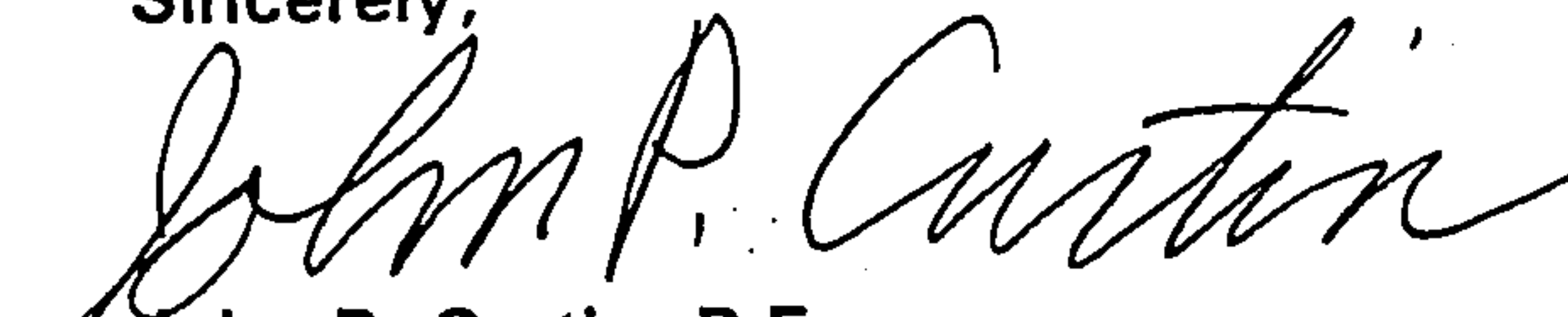
Based on the information included in the submittal referenced above, City Hydrology accepts the grading plan for preliminary plat & rough grading. City Hydrology does not review subdivisions for building permit. The following comments must be addressed before Final Plat & Work Order:

Where is the temporary benchmark located on the Grading Plan. Provide a detail for the outlet & emergency spillway for the detention pond. On the shared swale section, the dimension from the swale invert to the pad should be 1'-8" or 1.67' instead of 1.8'. When the difference between pad elevations exceeds 1.37', a wall is required.

Add a note on the Plat stating " A 10' Private Drainage Easement is Centered on All Side Lot Lines. Execute a Drainage Covenant for the detention pond and submit it to the City for processing & recording. The detention pond must not be removed until downstream capacity is adequate without it.

If you have any questions about this project, You may contact me at 768-2727.

Sincerely,

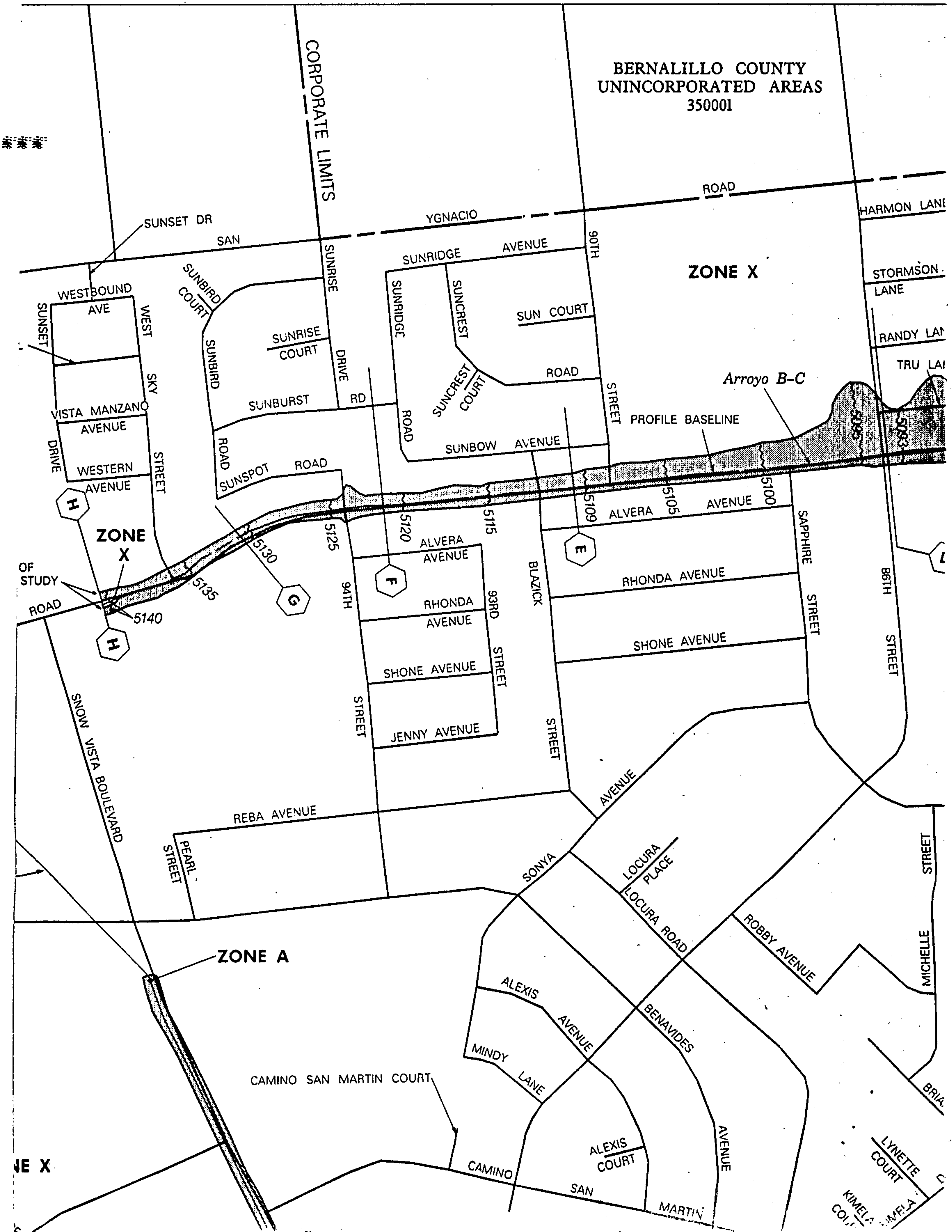

John P. Curtin, P.E.
Civil Engineer, Hydrology

c: Andrew Garcia
Fred Aguirre, DRB 95-356

Good for You, Albuquerque!



BERNALILLO COUNTY
UNINCORPORATED AREAS
350001



LETTER OF TRANSMITTAL



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

P.O. BOX 90606, ALBUQUERQUE, NM 87199
(505) 828-2200

TO

*** One Stop

DATE	2-5-98	JOB NO.
ATTENTION	Hydrology Staff	
RE:	Sun Sage Hills	
	M-9/D-14	

WE ARE SENDING YOU ☐ Attached ☐ Under separate cover via _____ the following items:

- | | | | | |
|---|---------------------------------------|--------------------------------|----------------------------------|---|
| ☐ Shop drawings | ☐ Prints | ☐ Plans | ☐ Samples | ☐ Specifications |
| ☐ Copy of letter | ☐ Change order | ☐ _____ | | |

COPIES	DATE	NO.	DESCRIPTION
1	2-3-98		Cover letter Response
1	10-11-96		Hydrology Previous Comment / Approval Letter
1	2-3-98		Revised E+D Plan.
1			Plat
1			I.L.

THESE ARE TRANSMITTED as checked below:

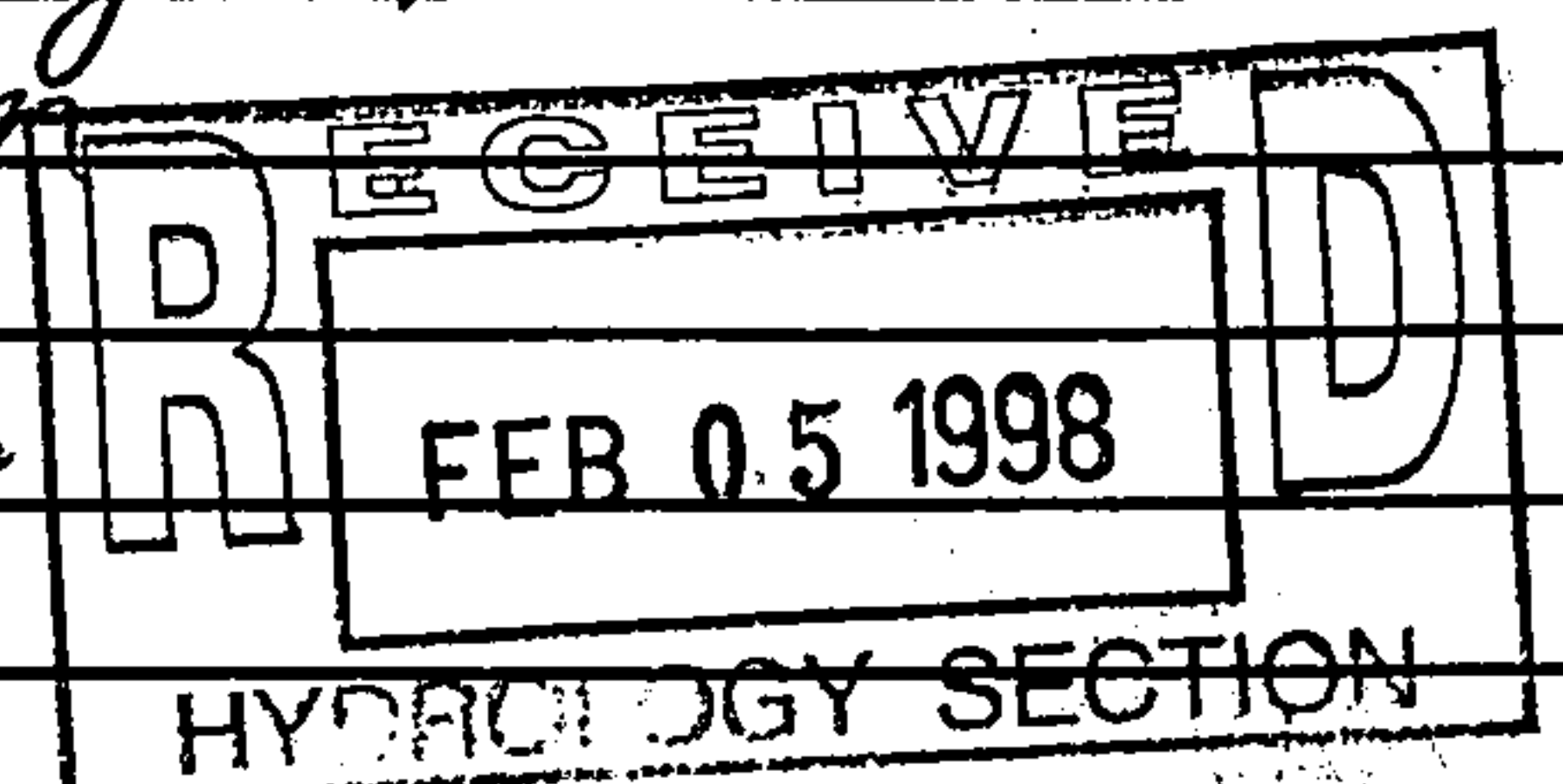
- | | | |
|--|---|---|
| ☐ For approval | ☐ Approved as submitted | ☐ Resubmit _____ copies for approval |
| ☐ For your use | ☐ Approved as noted | ☐ Submit _____ copies for distribution |
| ☐ As requested | ☐ Returned for corrections | ☐ Return _____ corrected prints |
| ☐ For review and comment | ☐ _____ | |
| ☐ FOR BIDS DUE _____ 19 _____ ☐ PRINTS RETURNED AFTER LOAN TO US | | |

REMARKS

This project was previously approved for Prel-Plat and Rough Grading by John P. Curtin.

Drainage Rpt. remains unchanged, but I am submitting revised E+D Plan.

Call if you have questions.



COPY TO _____

SIGNED:

Diane Heiber

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

**BERNALILLO COUNTY,
NEW MEXICO AND
INCORPORATED AREAS**

PANEL 336 OF 825

(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS:
COMMUNITY

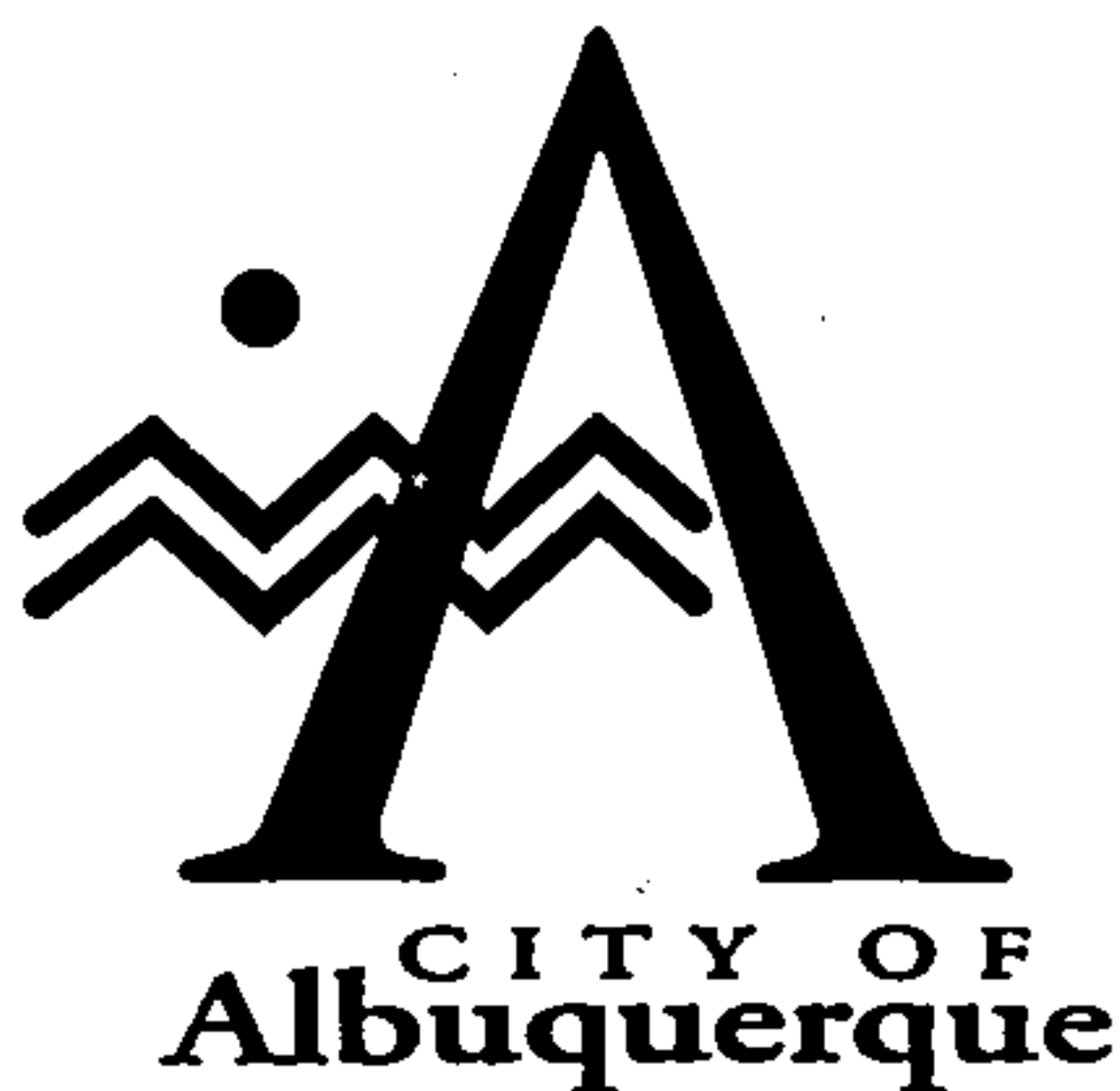
	<u>NUMBER</u>	<u>PANEL</u>	<u>SUFFIX</u>
ALBUQUERQUE, CITY OF	350002	0336	D
BERNALILLO COUNTY, UNINCORPORATED AREAS	350001	0336	D

**MAP NUMBER
35001C0336 D**

**EFFECTIVE DATE:
SEPTEMBER 20, 1996**



Federal Emergency Management Agency



P.O. Box 1293 Albuquerque, NM 87103

October 11, 1996

Martin J. Chávez, Mayor

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

RE: GRADING PLAN FOR SUN SAGE HILLS (M-9/D14)
RECEIVED SEPTEMBER 18, 1996 FOR PRELIMINARY PLAT, GRADING & BUILDING
PERMIT
ENGINEER'S STAMP DATED 9-18-96

Dear Ms. Hoelzer:

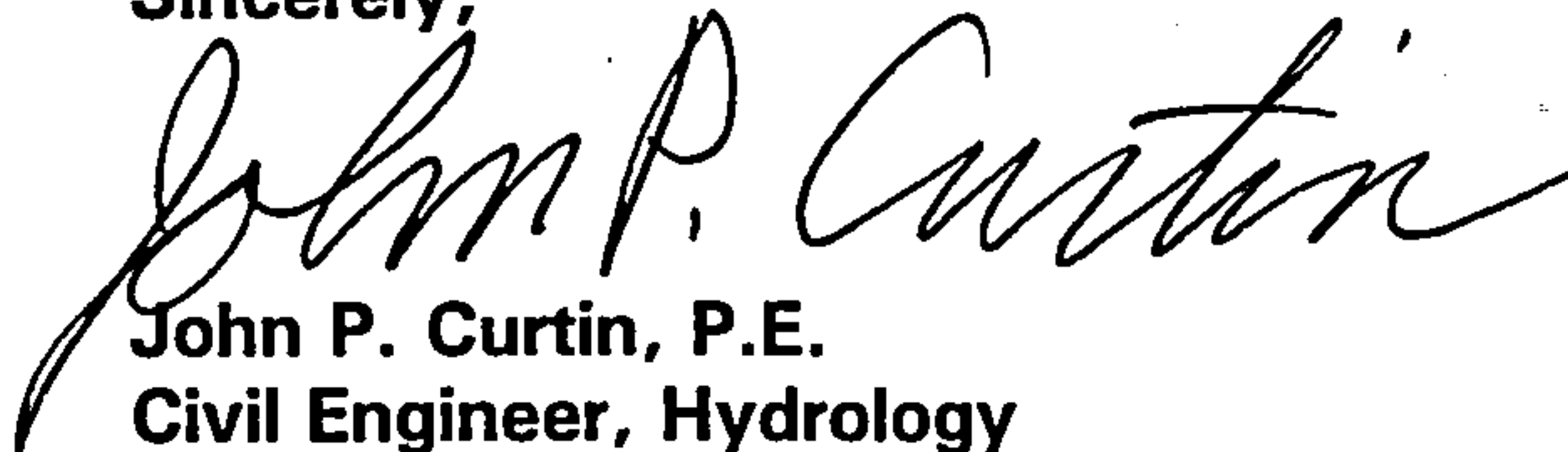
Based on the information included in the submittal referenced above, City Hydrology accepts the grading plan for preliminary plat & rough grading. City Hydrology does not review subdivisions for building permit. The following comments must be addressed before Final Plat & Work Order:

Where is the temporary benchmark located on the Grading Plan. Provide a detail for the outlet & emergency spillway for the detention pond. On the shared swale section, the dimension from the swale invert to the pad should be 1'-8" or 1.67' instead of 1.8'. When the difference between pad elevations exceeds 1.37', a wall is required.

Add a note on the Plat stating " A 10' Private Drainage Easement is Centered on All Side Lot Lines. Execute a Drainage Covenant for the detention pond and submit it to the City for processing & recording. The detention pond must not be removed until downstream capacity is adequate without it!

If you have any questions about this project, You may contact me at 768-2727.

Sincerely,


John P. Curtin, P.E.
Civil Engineer, Hydrology

c: Andrew Garcia
Fred Aguirre, DRB 95-356

Good for You, Albuquerque!





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

P.O. BOX 90606, ALBUQUERQUE, NM 87199
(505) 345-2010

September 18, 1996

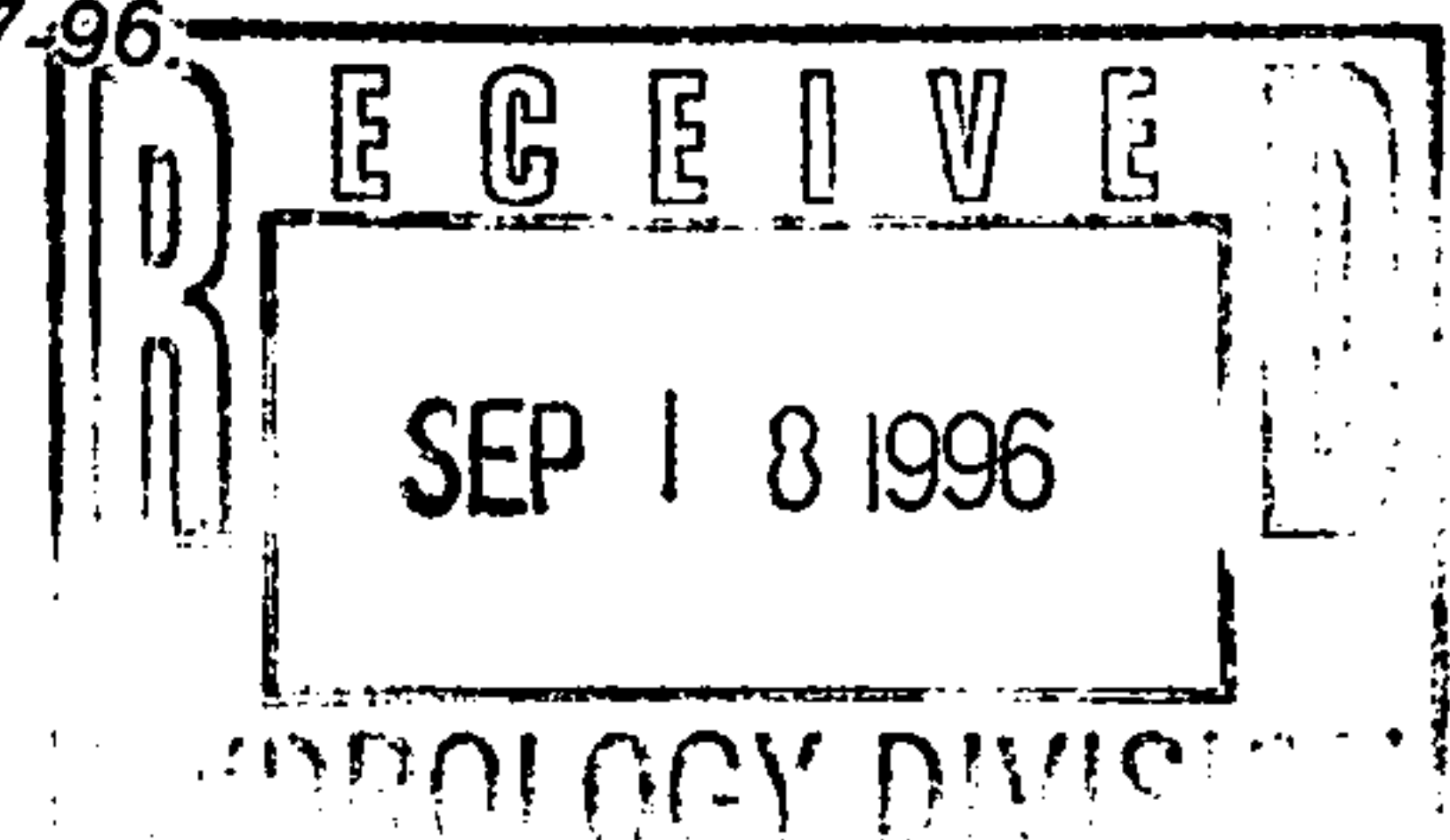
Mr. John P. Curtin, PE
City of Albuquerque
Hydrology Department
P.O. Box 1293
Albuquerque, NM 87103

**Re: Sun Sage Hills (M-9/D-14) Grading and Drainage Plan For Building Permit, Engineer's Stamp
Dated 9-17-96**

Dear Mr. Curtin:

This letter is in response to comments in your letter dated August 29, 1996.

1. The original "conceptual" grading and drainage plan submittal has been changed to a grading and drainage plan and includes the legal description, ACS & temporary benchmark and an erosion control plan.
2. Regarding your comment that we need to add backyard ponds on each lot, my previous two submittals did not include backyard ponds in the hydrologic analyses for this site's drainage management plan. The required attenuation of the peak discharge as a result of increased impervious areas in Sun Sage Hills and the adjacent proposed commercial site are being controlled using a detention pond on the adjacent commercial site. In our phone conversation on September 16th regarding this matter, it is my understanding that the Sun Sage Hills subdivision will either be required to have backyard ponds on each lot or else the detention pond on the commercial site will have to attenuate flows such that the combined "developed" flows from the residential and commercial site cannot exceed the combined "existing" flows. Given these options, we have decided to go with Option 2 utilizing a temporary detention pond on the commercial site that will restrict flows from this site to 1.4 cfs. The 1.4 cfs restrictive flow from the commercial site will be included in the Bulk Land Plat that divides off the portion of property to be included as part of the Sun Sage Hills subdivision.
3. A typical section showing the 10' private drainage easement centered between each side lot line as well as the 0.3' swale invert below the lowest pad elevation has been added to the grading and drainage plan.
4. A typical lot grading detail has been added to the grading and drainage plan.
5. The 1.5' flood wall has been extended around the north side of the project site as shown on the grading and drainage plan.
6. The recently completed infrastructure list and preliminary plat are being submitted with the revised grading and drainage plan.
7. Table 5 Summary of On-site Street Capacities and page 1 have been corrected and are being submitted to be exchanged for the two pages in the Drainage Report dated 8-7-96.



Mr. John P. Curtin, PE
September 18, 1996
Page 2

I hope that I have adequately addressed all of your concerns, but if you have any further questions or comments, don't hesitate to call me.

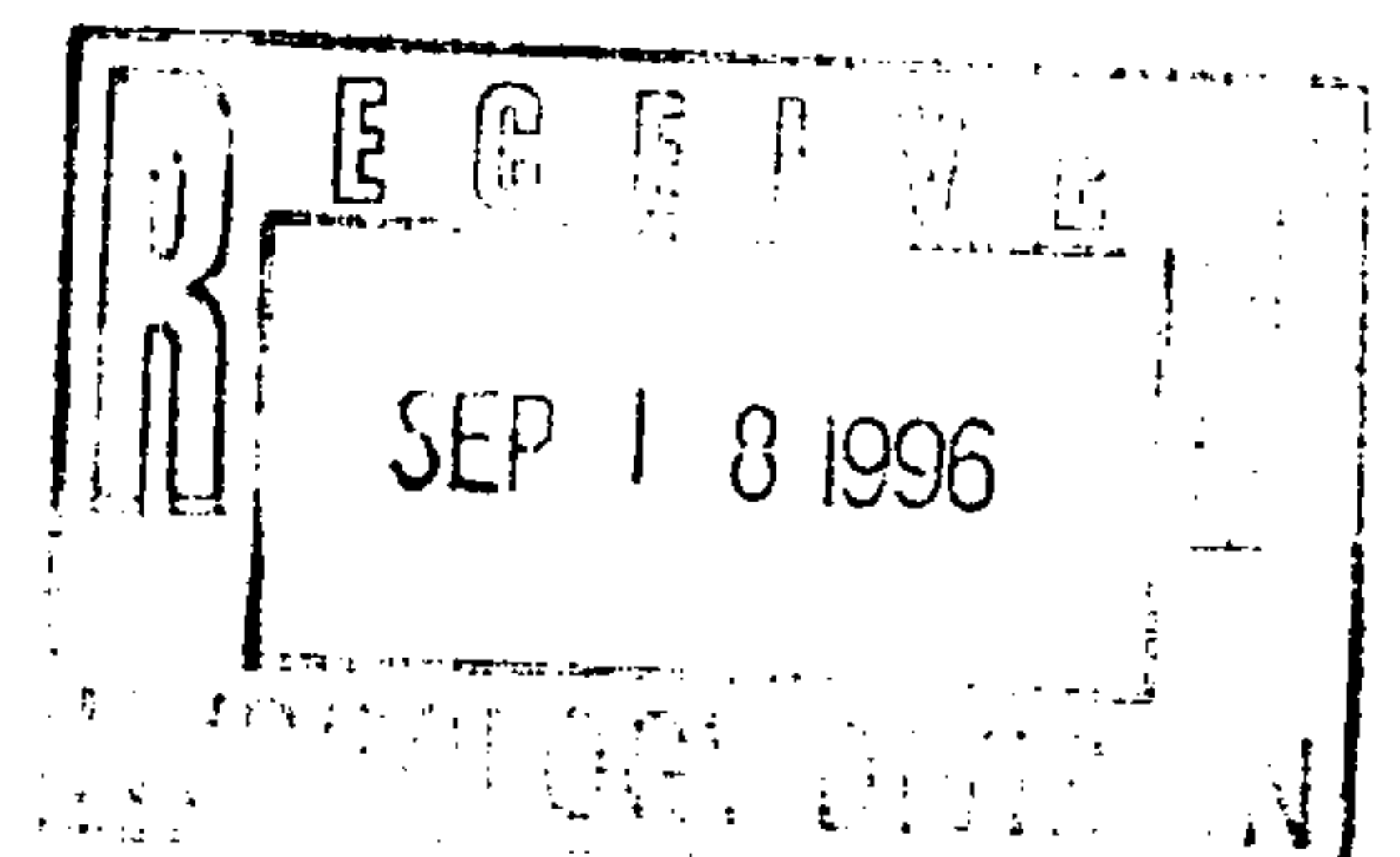
Sincerely,

D. MARK GOODWIN & ASSOCIATES, PA

Diane Hoelzer
Diane Hoelzer, PE

DHL/sb

b:\sunsage\comments.no3



DRAINAGE INFORMATION SHEET

PROJECT TITLE: Sun Sage Hills Subdivision ZONE ATLAS/DRNG, FILE#: M-9 / 14
DRB #: 95-356 EPC #: 96-87 WORK ORDER #: _____
LEGAL DESCRIPTION: Portions of Tracts 503 and Parcel A, Town of Atrisco Grant (SP-83-237)
CITY ADDRESS: _____

ENGINEERING FIRM: Mark Goodwin & Associates PA CONTACT: Diane Hoelzer, PE
ADDRESS: PO Box 90606 PHONE: 345-2010
OWNER: A Management Corporation CONTACT: Pierre Amestoy
ADDRESS: 8661 San Pedro NE Albuquerque 87113 PHONE: 822-8585
ARCHITECT: _____ CONTACT: _____
ADDRESS: _____ PHONE: _____
SURVEYOR: ALS, Inc. CONTACT: Tim Aldrich
ADDRESS: PO Box 30701 PHONE: 884-1990
CONTRACTOR: _____ CONTACT: _____
ADDRESS: _____ PHONE: _____

TYPE OF SUBMITTAL:

CHECK TYPE OF APPROVAL SOUGHT:

☒ DRAINAGE REPORT
☒ DRAINAGE PLAN
☐ CONCEPTUAL GRADING & DRAINAGE PLAN
☒ GRADING PLAN
☐ EROSION CONTROL PLAN
☐ ENGINEER'S CERTIFICATION
☐ OTHER

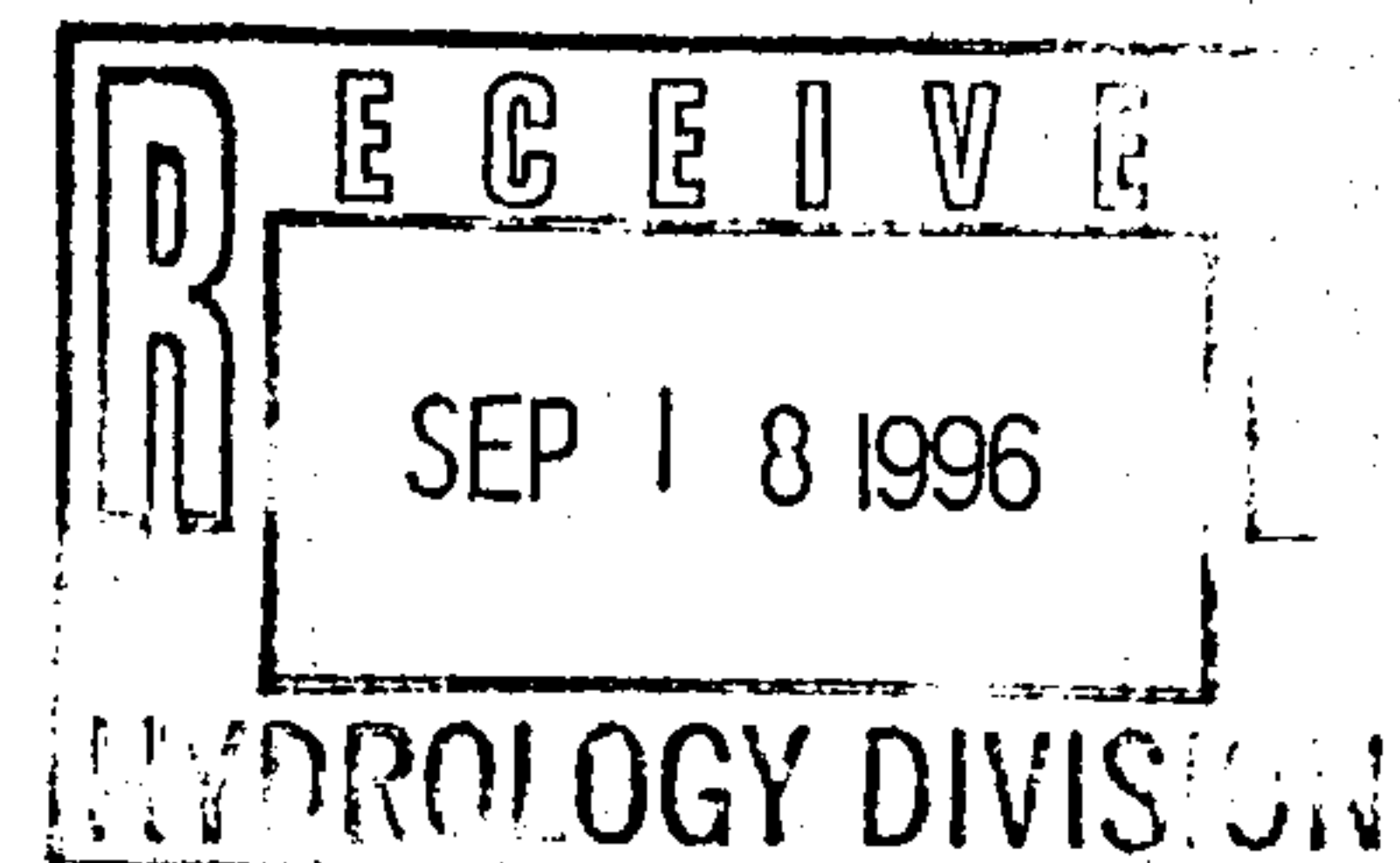
☐ SKETCH PLAT APPROVAL
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☐ S. DEV. PLAN FOR BLDG PERMIT APPROVAL
☐ SECTOR PLAN APPROVAL
☐ FINAL PLAT APPROVAL
☐ FOUNDATION PERMIT APPROVAL
☒ BUILDING PERMIT APPROVAL
☐ CERTIFICATION OF OCCUPANCY APPROVAL
☒ GRADING PERMIT APPROVAL
☐ PAVING PERMIT APPROVAL
☐ S.A.D. DRAINAGE REPORT
☐ DRAINAGE REQUIREMENTS
☐ OTHER _____ (Specify)

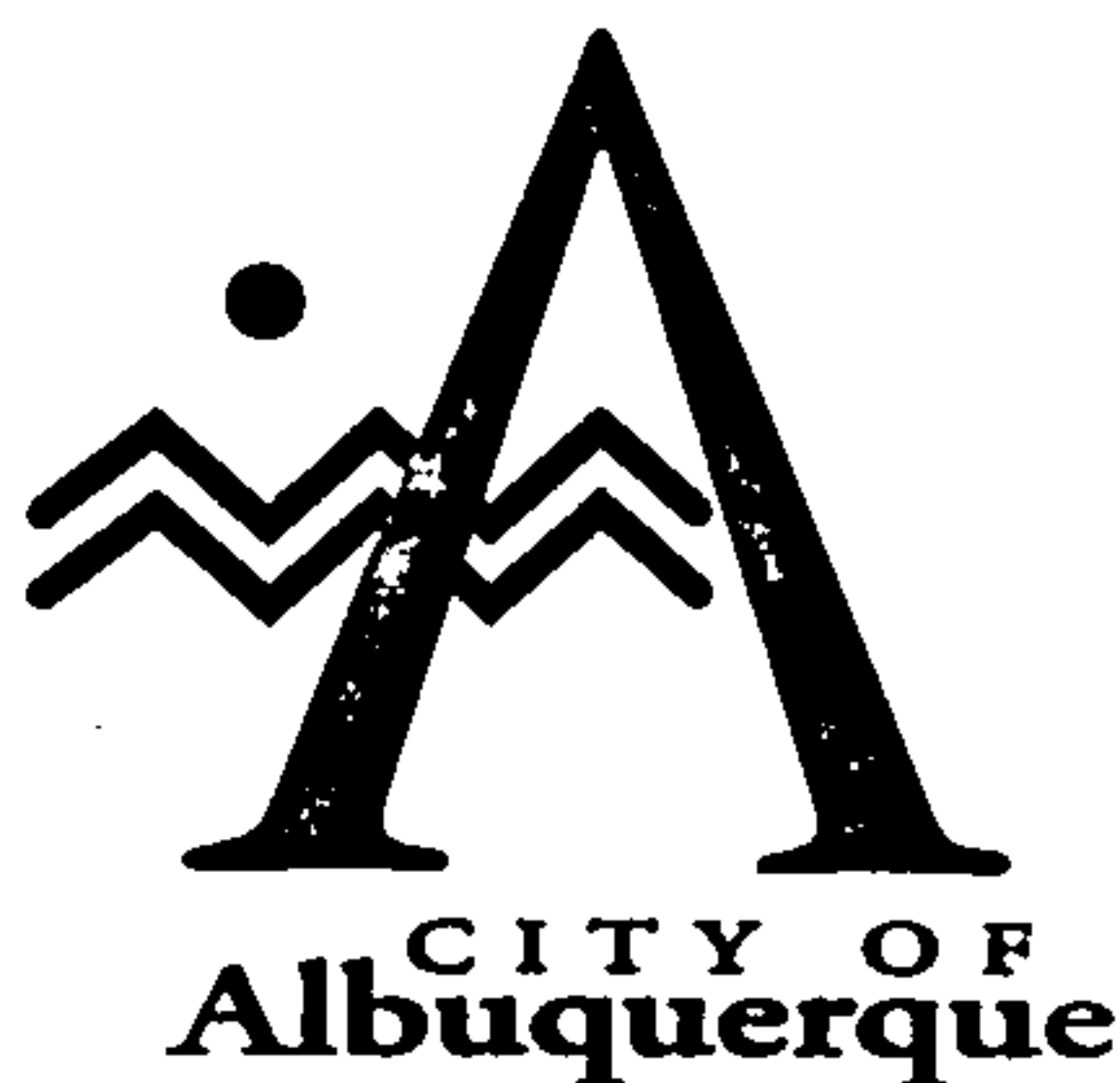
PRE-DESIGN MEETING:

☐ YES
☒ NO
☐ COPY PROVIDED

DATE SUBMITTED: _____

BY: Diane Hoelzer
Diane Hoelzer PE





P.O. Box 1293 Albuquerque, NM 87103

August 29, 1996

Martin J. Chávez, Mayor

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

RE: DRAINAGE REPORT FOR SUN SAGE HILLS (M-9/D14)
RECEIVED AUGUST 8, 1996 FOR PRELIMINARY PLAT, GRADING & BUILDING PERMIT
ENGINEER'S STAMP DATED 8-7-96

Dear Ms. Hoelzer:

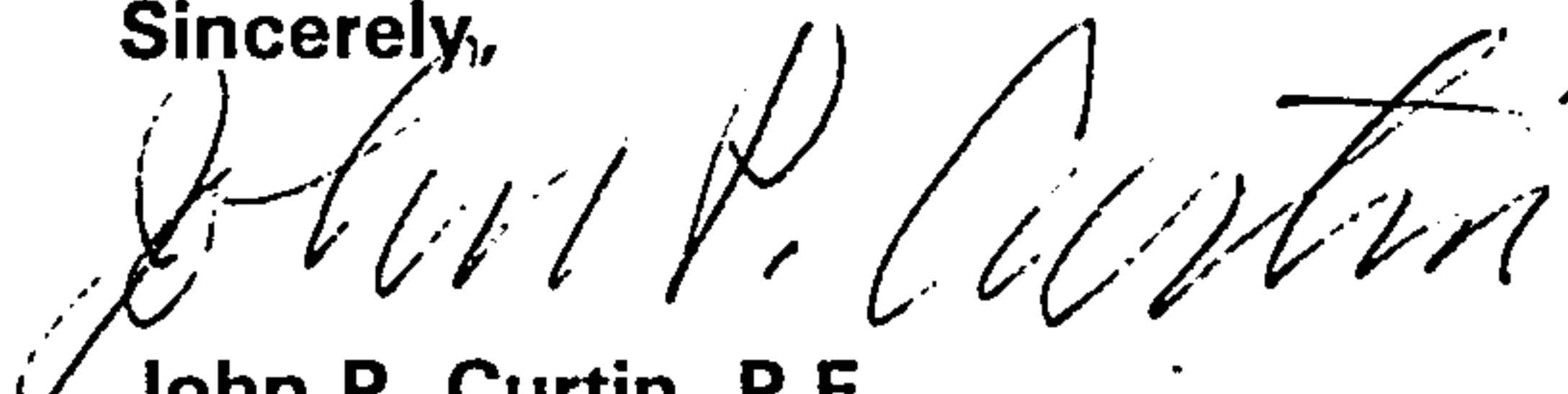
Based on the information included in the submittal referenced above, City Hydrology accepts the Drainage Report for Site Development Plan for Subdivision. Option 1 is accepted, because it is consistent with the existing drainage scheme for Westgate. Any future analysis of this area must include the backyard basins as 100% land treatment "A" to be consistent with current procedures. The following comments must be addressed:

A conceptual grading & drainage plan is only adequate for site development plan. A grading plan must include legal description, ACS & temporary benchmark and erosion control notes. Indicate backyard ponds on each lot. The shared swale requires a 10' private drainage easement centered on each side lot line. City Hydrology recommends that the invert of the swale be .3' below the lowest pad elevation instead of .03'. Provide a typical lot grading detail showing the fine grading that the Building Contractor must complete. The depth shown on FIRM panel 33 is the average depth. Continue the flood wall around the north side to protect the site from the FHZ A0 in Sage Blvd.

City Hydrology does not review subdivisions for building permit. Include the DRB number and a copy of the preliminary plat & the proposed infrastructure list in the submittal for preliminary plat. Why does Alvera Ct have a much higher Q than the rest of the streets? Shouldn't Jenny Ave have 25.9 cfs instead?

If you have any questions about this project, You may contact me at 768-2727.

Sincerely,



John P. Curtin, P.E.
Civil Engineer, Hydrology

c: Andrew Garcia
Fred Aguirre, EPC 96-87

Good for You, Albuquerque!



FIGURE 6
CITY OF ALBUQUERQUE
NOTICE OF D.R.C. MEETING
5-16-97
(DATE)

DRB NO: 95-354
PROJECT NO: 5102380
ZONE ATLAS: m-9

PROJECT NAME: Sum Sage Hills
LOCATION: 94th & Sage

TYPE OF PROJECT: AHBA ☒ CIP ☐ PWC ☐ SAD ☐ ALL PRIVATE ☐

Contact Person: Diane Hoelzer Phone: 345-2010
Firm: Mark Goodwin

☒ Scheduled with the D.R.C. on 5-29-97 at 1:30 Plaza Del Sol/2nd Fl.
☐ No DRC Meeting Scheduled. Please return any comments by _____

The Project Is Scheduled For:

☐ / / Design Report Review	☐ / / Final Plan Review
☐ / / Pre-Design Meeting	☐ / / Signoff of Plans
☒ / / Preliminary Plan Review	☐ / / _____

The Project Relates To:

☒ / / Water ☒ / / San. Sewer ☒ / / Paving ☐ / / Storm Drainage ☐ / / _____

The Attached Package Includes:

/D/ Drawings /S/ Spec's /E/ Estimate /R/ Report /M/ Memo Only

Indicated below are the Departments/Divisions that have received project documents and/or are invited to attend. It will be the Project Managers responsibility to notify consulting engineering firms of date and time of scheduled meetings.

☒ DRC Chairman	Project Review Section	All Drawings
☒ Traffic Repres	Transportation Development	All Drawings
☒ Water Repres.	Utility Design	All Drawings
☒ Hydro Repres.	Hydrology	All Drawings
☒ Const. Repres.	Construction	All Drawings
☒ Ray Chavez	Traffic Operations	All Drawings
☒ Sergio Miranda	Water (Shutoff Plan)	All Water Shutoff
☒ Parks Repres.	Parks & Recreation	ALL Landscaping
/ / Andre Houle	Street Maintenance	All Paving
/ /	Utility Coordinator	ALL PWC & CIP
/ / Jim Hamel	Transit Department	CIP/Memo
/ / Rick Roybal	Construction Coordinator	CIP/Memo
/ / Jim Fink	Line Maintenance	CIP & SAS/Memo
/ / John Rupley	City Architect	Arch. Drawings
/ / Lee Lunsford	SAD Engineer	SAD/Memo
/ / Joe Luehring	Transportation Develop.	CIP/Memo
/ / Roger Green	Utility Design	CIP/Water & SAS
/ / Gene Bustamante	General Services Dept.	Arch. Drawings
/ / Greg Smith	PWD/Legal	Specs & Dwgs.
/ / Richard Sertich	Planning Department	CIP/Memos
/ / CIP Manager	CIP	CIP/Memos
/ / Donald Bartlett	Risk Management	Arch. Drawings
/ / _____	_____	_____

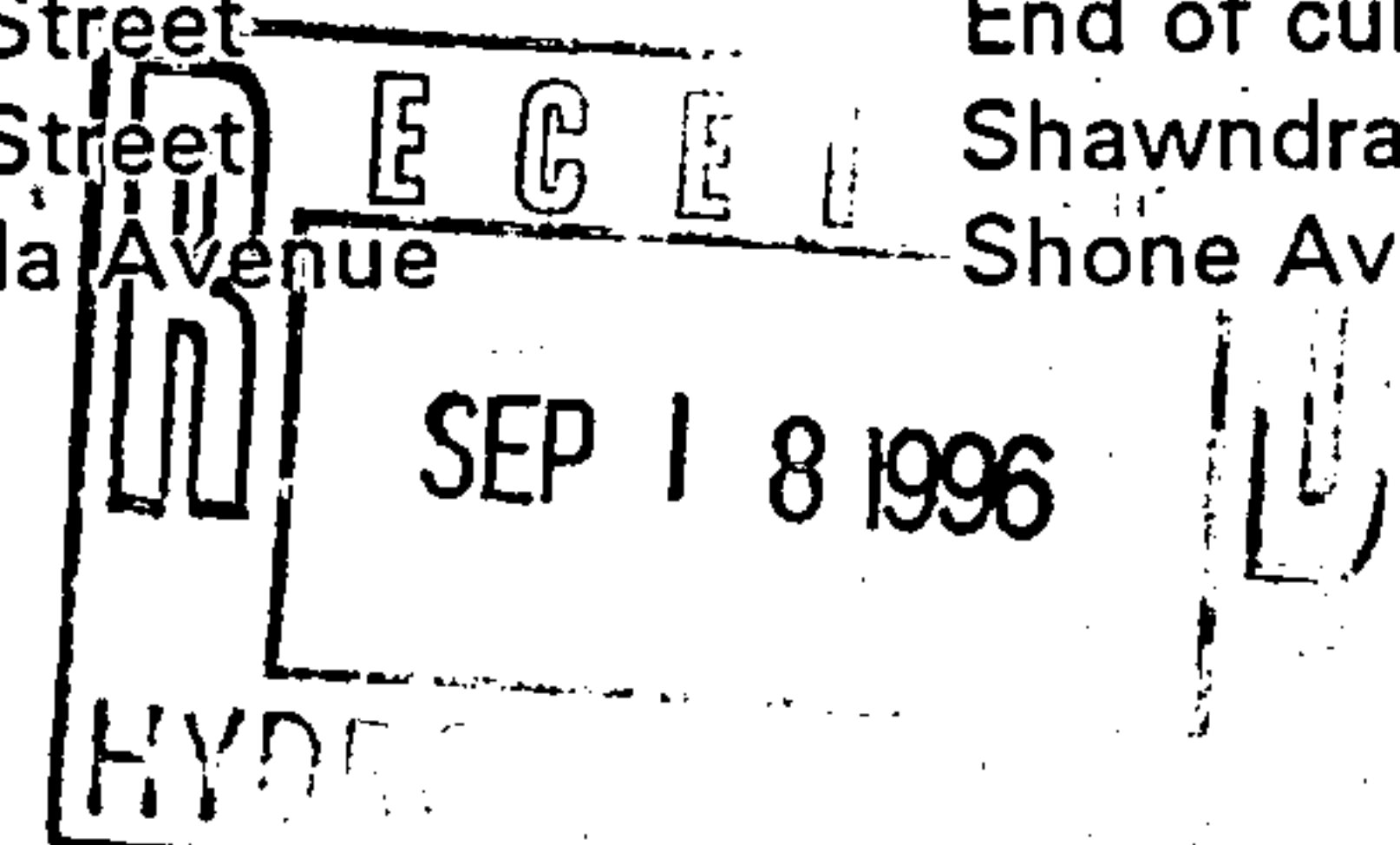
D.R.B. Case No. _____
D.R.C. Project No. _____
Date Submitted 9/13/96
Prelim. Plat Approved _____
Prelim. Plat Expires _____

Figure 12

EXHIBIT "A"
To Subdivision Improvements Agreement
DEVELOPMENT REVIEW BOARD (DRB) REQUIRED INFRASTRUCTURE LISTING
for Sun Sage Hills Subdivision

Following is a summary of Public/Private Infrastructure required to be constructed or financially guaranteed to be constructed for the above development. This summary is not necessarily a complete listing. During the design process, if the City determines that appurtenant items have not been included in the summary, those items will be included in the listing and related financial guarantee, if the items normally are the Subdivider responsibility. In addition, any unforeseen items which arise during construction which are necessary to complete the project and which normally are the Subdivider's responsibility are the responsibility of the Subdivider and will be included in the financial guarantee provided to the City.

<u>Size</u>	<u>Type Improvement</u>	<u>Location</u>	<u>From</u>	<u>To</u>
28'FF 4' *	Residential Paving Mountable C & G Sidewalk (both sides)	Alvera Court	94th Street	End of cul-de-sac
28'FF 4' *	Residential Paving Mountable C & G Sidewalk (both sides)	Rhonda Avenue	94th Street	Shawndra Drive
28'FF 4' *	Residential Paving Mountable C & G Sidewalk (both sides)	Shawndra Drive	Rhonda Avenue	Shone Avenue
28'FF 4' *	Residential Paving Mountable C & G Sidewalk (both sides)	Shone Avenue	Shawndra Drive	94th Street
28'FF 4' *	Residential Paving Std. C & G Sidewalk (both sides)	Jenny Court	94th Street	End of cul-de-sac
4' *	Sidewalk (W. side)	94th Street	Sage Road	Lot 1, Blk 1
6"	Waterline	Alvera Court	94th Street	End of cul-de-sac
6"	Waterline	Rhonda Avenue	94th Street	Shawndra Drive
6"	Waterline	Shawndra Drive	Rhonda Avenue	Shone Avenue
6"	Waterline	Shone Avenue	Shawndra Drive	94th Street
6"	Waterline	Jenny Court	94th Street	End of cul-de-sac
8"	SAS Gravity Line	Alvera Court	94th Street	End of cul-de-sac
8"	SAS Gravity Line	Rhonda Avenue	94th Street	Shawndra Drive
8"	SAS Gravity Line	Shawndra Drive	Rhonda Avenue	Shone Avenue



DRB Case No. _____
DRC Project No. _____
Date Submitted _____
Prelim. Plat Approved _____
Prelim. Plat Expires _____

<u>Size</u>	<u>Type of Improvement</u>	<u>Location</u>	<u>From</u>	<u>To</u>
8"	SAS Gravity Line	Shone Avenue	Shawndra Drive	94th Street
8"	SAS Gravity Line	Jenny Court	94th Street	End of cul-de-sac
8"	SAS Gravity Line	20' Easement	W. Property line	Jenny Ct, end cul-de-sac
1.5'	Floodwall	W. Property Line	Lot 44, Blk 1	Lot 7, Blk 1
1.5'	Floodwall	N. Property Line	Lot 44, Blk 1	Lot 50, Blk 1
per design	Drainage Channel	20' Easement	W. Property Line	Jenny Ct, end cul-de-sac

* Internal Sidewalk to be deferred.

Water infrastructure to include valves, fittings, valveboxes and fire hydrants.

Sanitary sewer to include manholes and services connections.

Engineer's Certification for Grading and Drainage per DPM including Floodwalls as shown on the Grading Plan for Release of SIA and Financial Guarantees.

Prepared By: Diane Hoelzer
Print Name: Diane Hoelzer, PE
Firm: Mark Goodwin & Associates, PA

Page 2 of 2

Development Review Board Member Approvals

Transportation Dev.	Date	Utility Dev.	Date
Parks & General Services	Date	Engineer/AMAFCA	Date
DRB Chairman	Date	NMUI	Date

DRAINAGE INFORMATION SHEET

PROJECT TITLE: Sun Sage Hills Subdivision ZONE ATLAS/DRNG, FILE#: M-9 / 114
DRB #: _____ EPC #: 96-87 WORK ORDER #: _____
LEGAL DESCRIPTION: Tracts 503 and Portion of Parcel A, Town of Atrisco Grant (SP-83-237)
CITY ADDRESS: _____

ENGINEERING FIRM: Mark Goodwin & Associates PA CONTACT: Diane Hoelzer, PE
ADDRESS: PO Box 90606 PHONE: 345-2010
OWNER: Pierre Amestoy CONTACT: Pierre Amestoy
ADDRESS: 8661 San Pedro SE PHONE: 822-8585
ARCHITECT: _____ CONTACT: _____
ADDRESS: _____ PHONE: _____
SURVEYOR: _____ CONTACT: _____
ADDRESS: _____ PHONE: _____
CONTRACTOR: _____ CONTACT: _____
ADDRESS: _____ PHONE: _____

TYPE OF SUBMITTAL:

☒ DRAINAGE REPORT
☒ DRAINAGE PLAN
☐ CONCEPTUAL GRADING & DRAINAGE PLAN
☒ GRADING PLAN
☐ EROSION CONTROL PLAN
☐ ENGINEER'S CERTIFICATION
☐ OTHER

PRE-DESIGN MEETING:

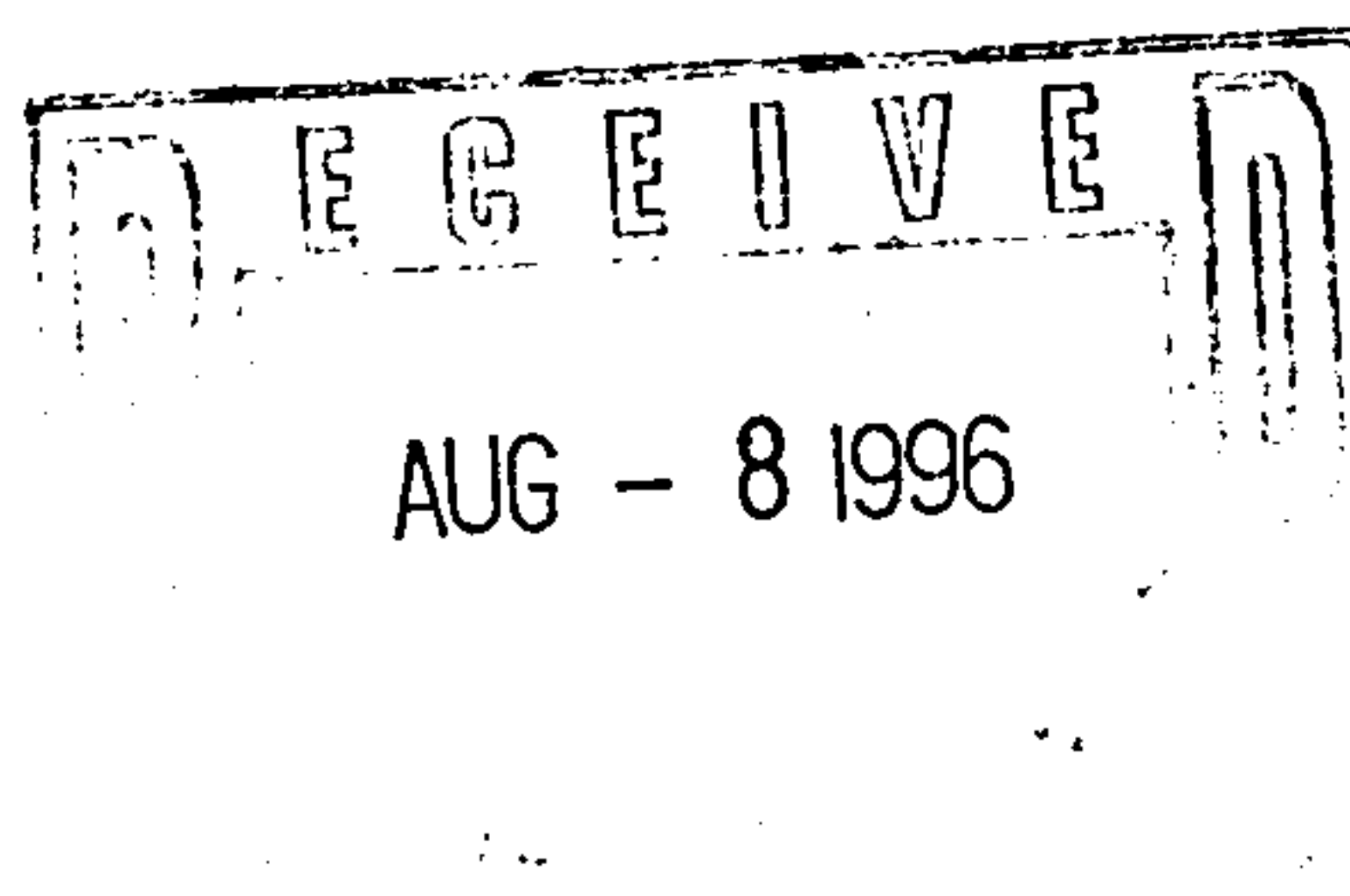
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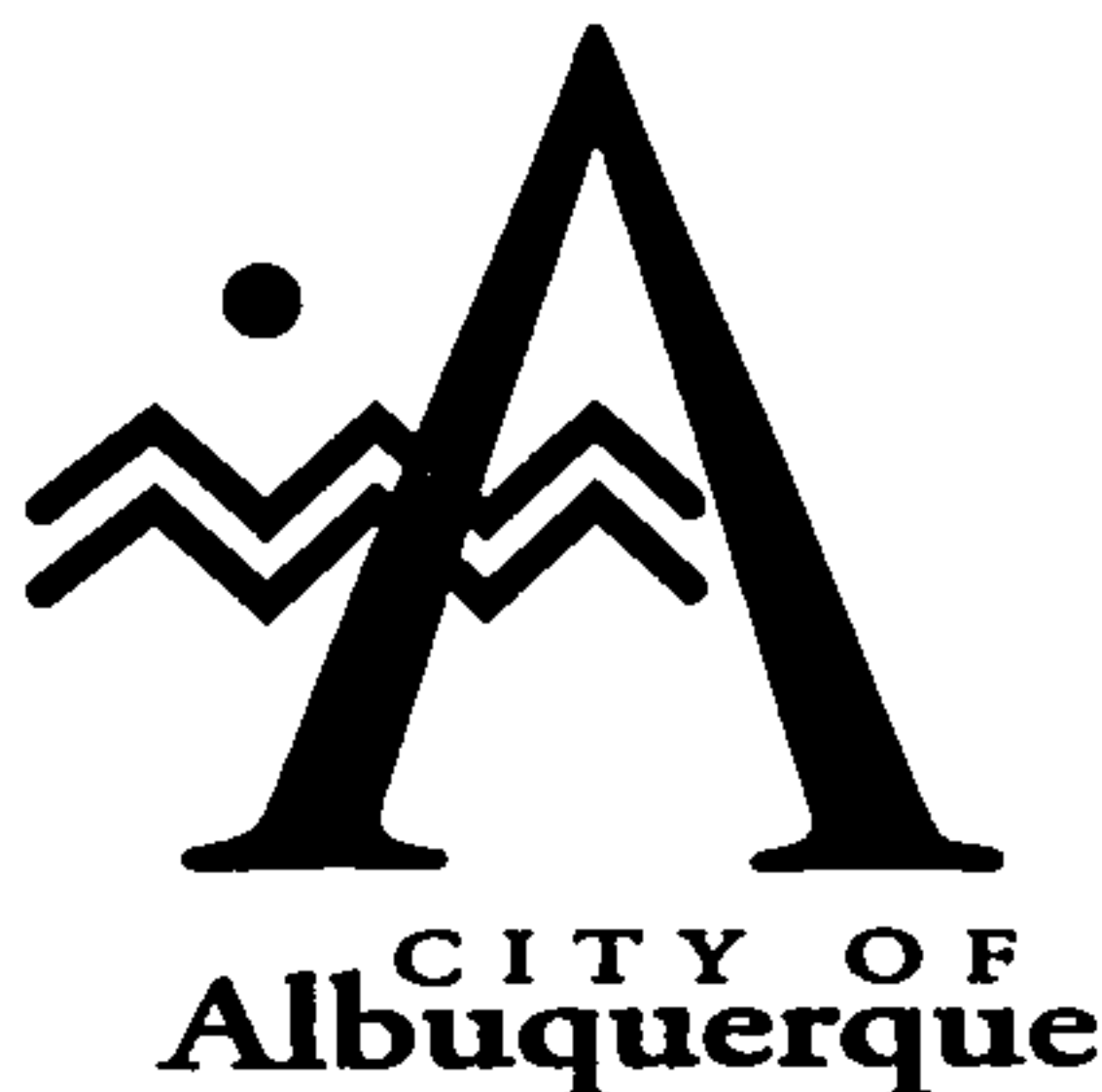
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☒ PRELIMINARY PLAT APPROVAL
☐ S. DEV. PLAN FOR SUB'D APPROVAL
☐ S. DEV. PLAN FOR BLDG PERMIT APPROVAL
☐ SECTOR PLAN APPROVAL
☐ FINAL PLAT APPROVAL
☐ FOUNDATION PERMIT APPROVAL
☒ BUILDING PERMIT APPROVAL
☐ CERTIFICATION OF OCCUPANCY APPROVAL
☒ GRADING PERMIT APPROVAL
☐ PAVING PERMIT APPROVAL
☐ S.A.D. DRAINAGE REPORT
☐ DRAINAGE REQUIREMENTS
☐ OTHER _____ (Specify)

DATE SUBMITTED: 8-7-96

BY: Diane Hoelzer
Diane Hoelzer PE





P.O. Box 1293 Albuquerque, NM 87103

July 8, 1996

Martin J. Chávez, Mayor

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

RE: DRAINAGE REPORT FOR SUN SAGE HILLS (M-9/D14)
RECEIVED JUNE 10, 1996 FOR SITE DEV PLAN
ENGINEER'S STAMP DATED 6-7-96

Dear Ms. Hoelzer:

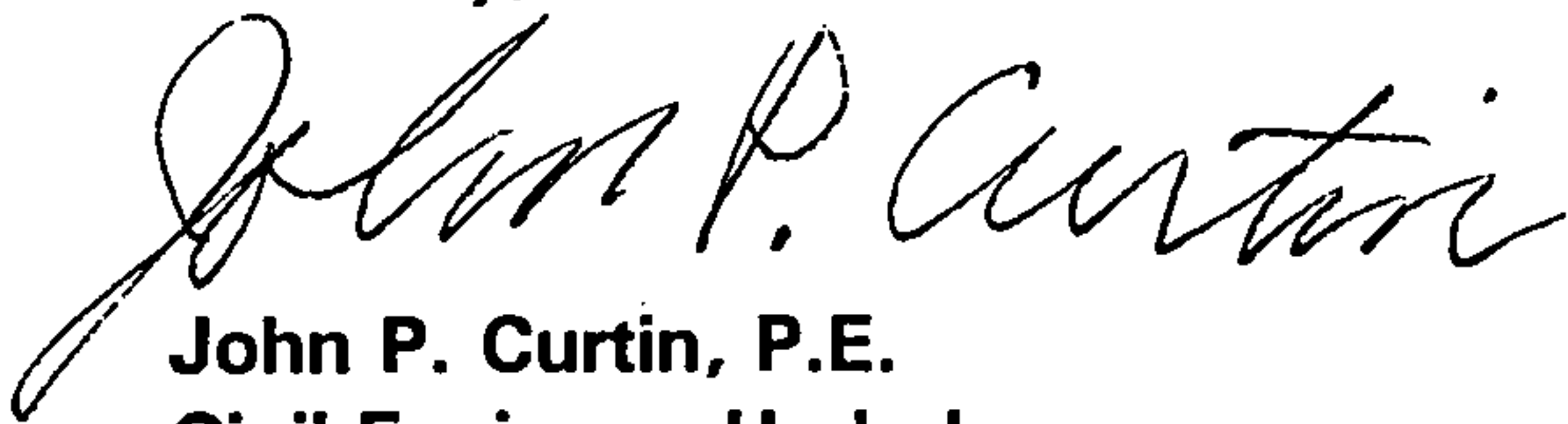
Based on the information included in the submittal referenced above, City Hydrology has the following comments that must be addressed:

If a variance from the current City criteria is requested, it must be clearly stated and justified. Based on the Report, there is a downstream capacity problem. Further development must not aggravate the existing condition. Who owns the commercial tract to the west? No work can be done on the adjacent property without written permission from the owner.

Drainage channels must be at least 15' wide for maintenance requirements. Could a flood wall be used instead of the temporary asphalt channel. The street sections used in the AHYMO ignored the .125' gutter lip. This caused the program to significantly over estimate the street capacity.

If you have any questions about this project, You may contact me at 768-2727.

Sincerely,


John P. Curtin, P.E.
Civil Engineer, Hydrology

c: Andrew Garcia
Fred Aguirre, DRB ??? Good for You. Albuquerque!



DRAINAGE INFORMATION SHEET

PROJECT TITLE: Sun Sage Hills Subdivision ZONE ATLAS/DRNG, FILE#: M-9/1014
DRB #: _____ EPC #: _____ WORK ORDER #: _____
LEGAL DESCRIPTION: Tracts 503 and Portion of Parcel A, Town of Atrisco Grant (SP-83-237)
CITY ADDRESS: _____

ENGINEERING FIRM: Mark Goodwin & Associates PA CONTACT: Diane Hoelzer, PE
ADDRESS: PO Box 90606 PHONE: 345-2010
OWNER: Pierre Amestoy CONTACT: Pierre Amestoy
ADDRESS: 8661 San Pedro SE ? PHONE: 822-8585
ARCHITECT: _____ CONTACT: _____
ADDRESS: _____ PHONE: _____
SURVEYOR: _____ CONTACT: _____
ADDRESS: _____ PHONE: _____
CONTRACTOR: _____ CONTACT: _____
ADDRESS: _____ PHONE: _____

TYPE OF SUBMITTAL:

☒ DRAINAGE REPORT
☒ DRAINAGE PLAN
☐ CONCEPTUAL GRADING & DRAINAGE PLAN
☒ GRADING PLAN
☐ EROSION CONTROL PLAN
☐ ENGINEER'S CERTIFICATION
☐ OTHER

PRE-DESIGN MEETING:

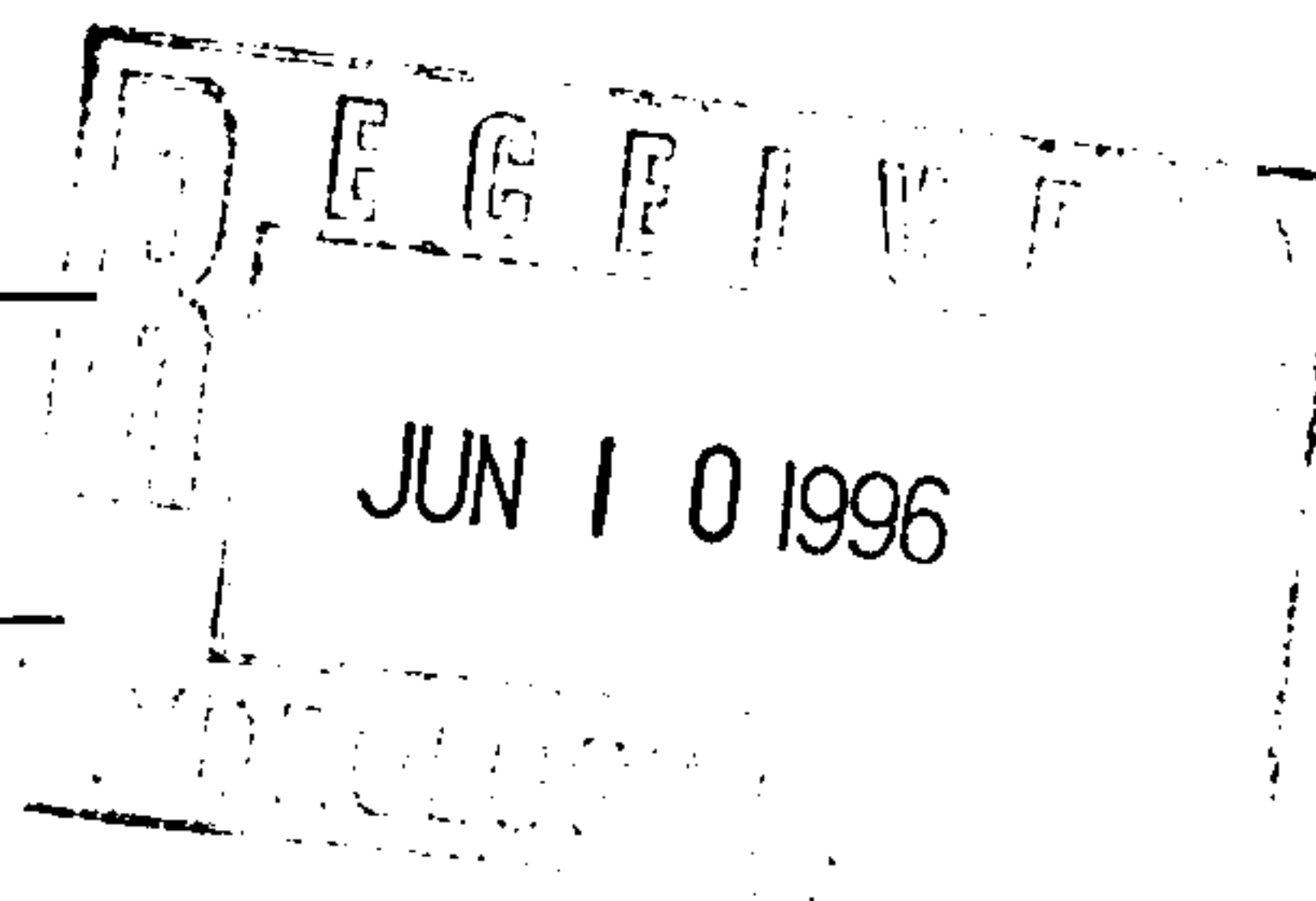
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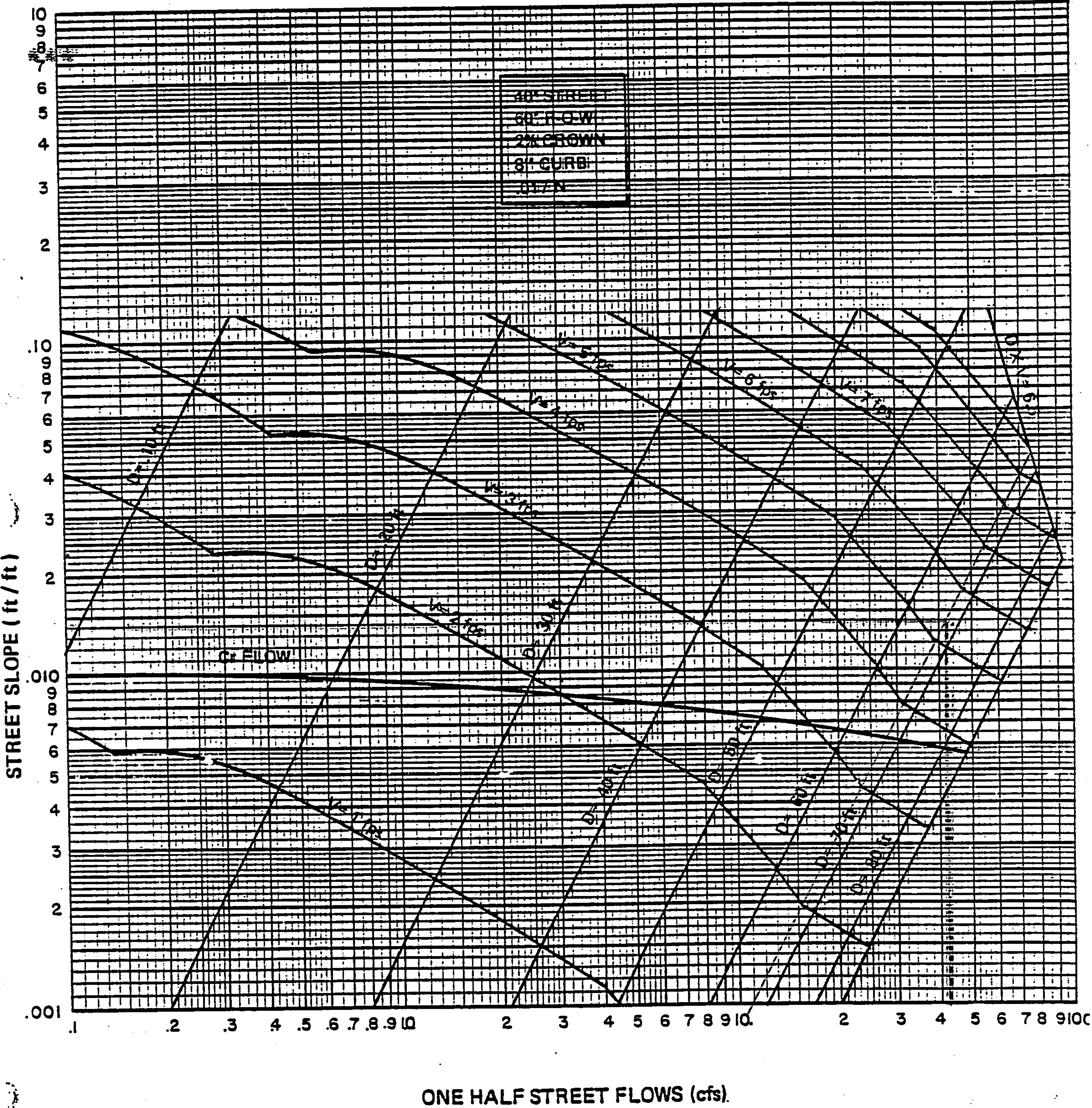
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☒ S. DEV. PLAN FOR SUB'D APPROVAL
☐ S. DEV. PLAN FOR BLDG PERMIT APPROVAL
☐ SECTOR PLAN APPROVAL
☐ FINAL PLAT APPROVAL
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☐ GRADING PERMIT APPROVAL
☐ PAVING PERMIT APPROVAL
☐ S.A.D. DRAINAGE REPORT
☐ DRAINAGE REQUIREMENTS
☐ OTHER _____ (Specify)

DATE SUBMITTED: June 7, 1996

BY: Diane Hoelzer
Diane Hoelzer PE

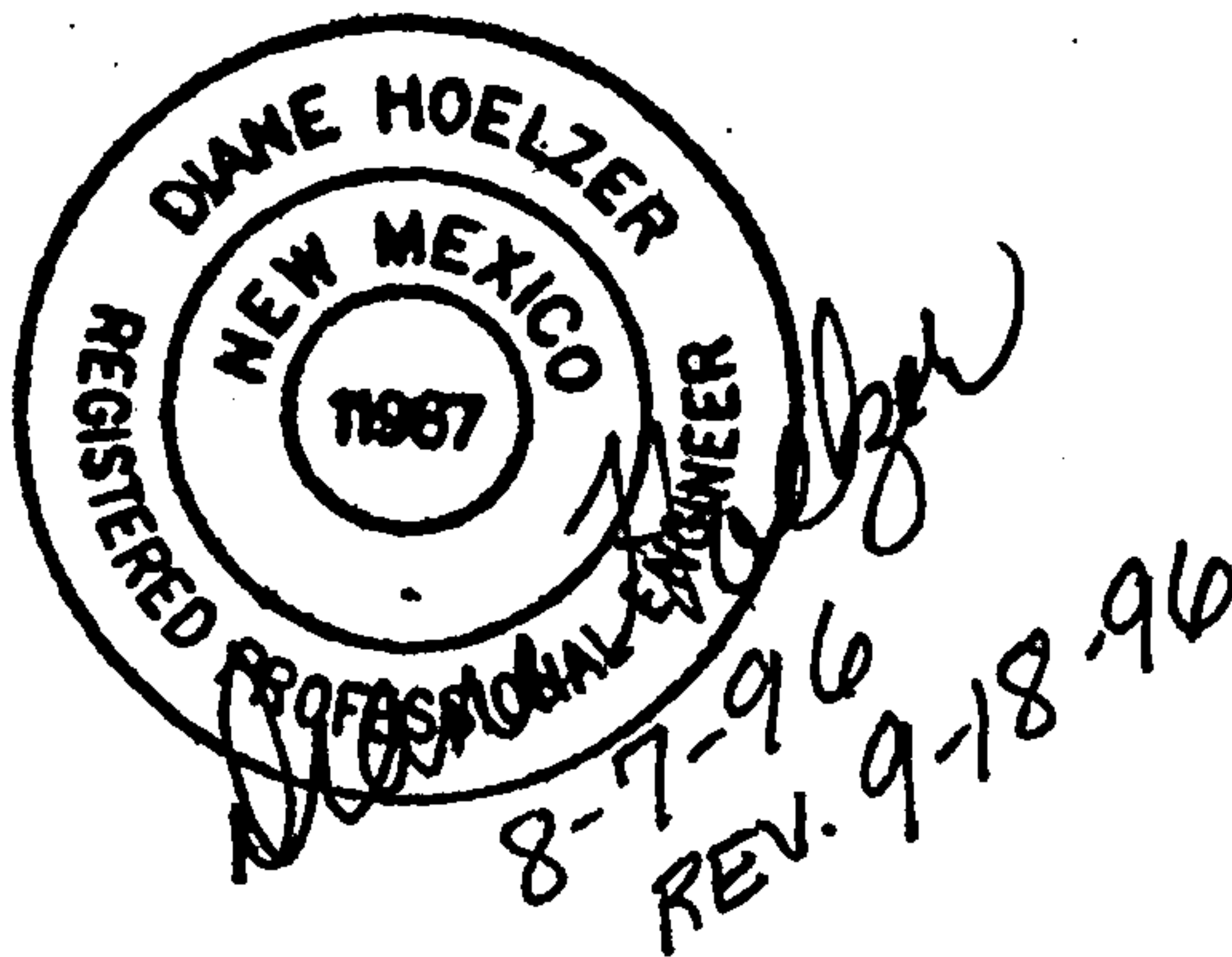


STREET CAPACITY



DRAINAGE REPORT
for
SUN SAGE HILLS SUBDIVISION

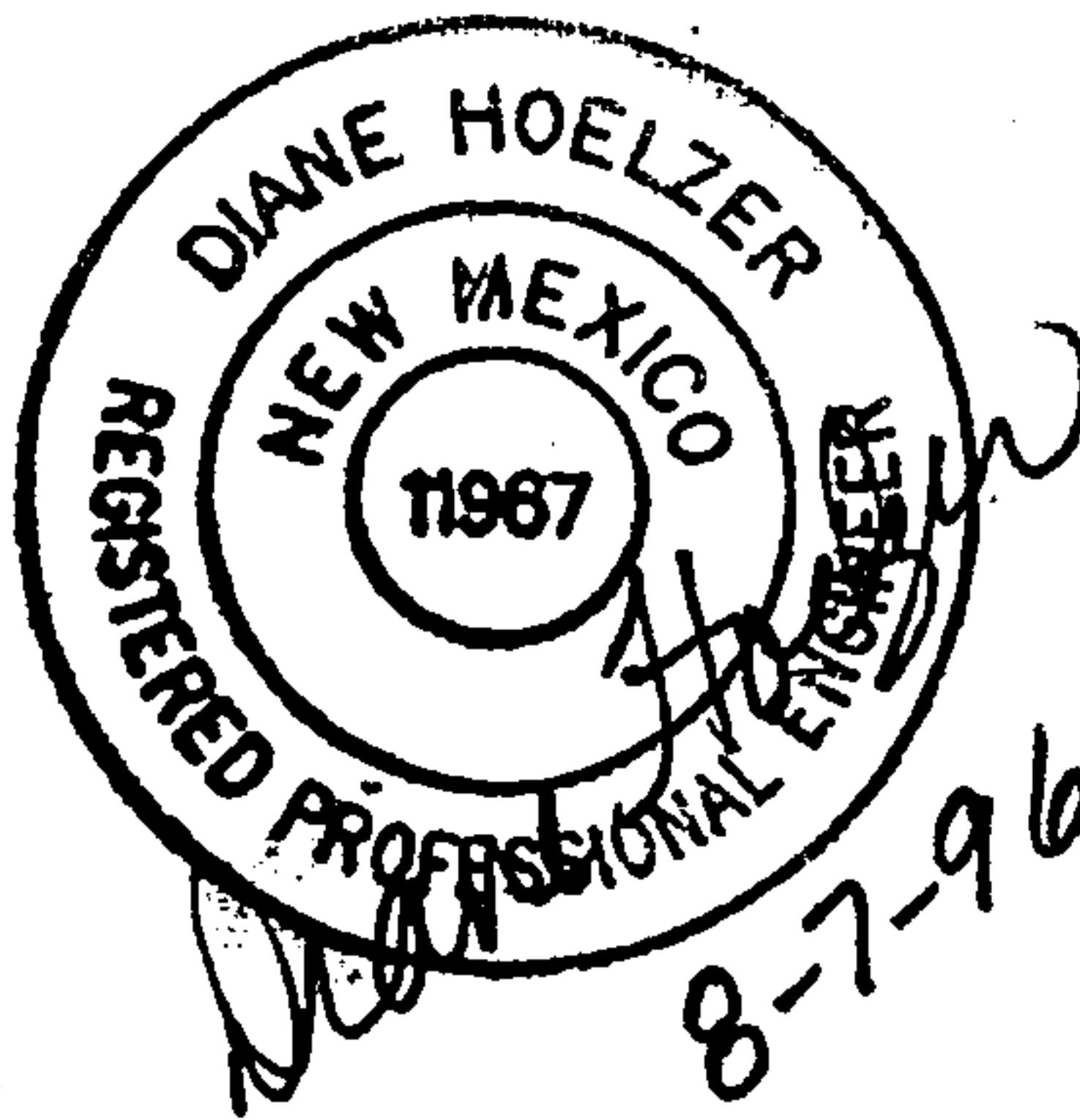
ZONE ATLAS MAP M-9



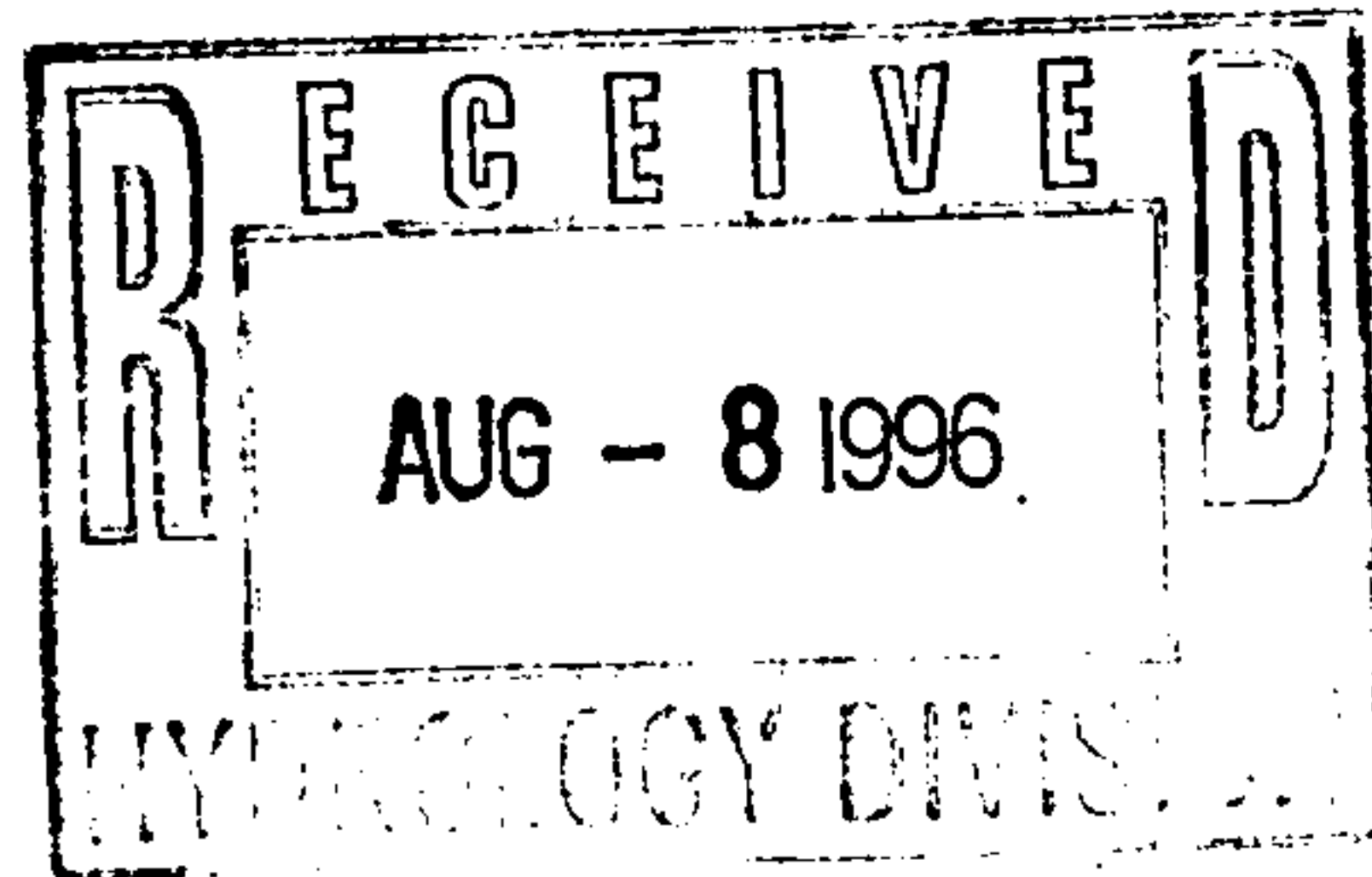
August 1996

DRAINAGE REPORT
for
SUN SAGE HILLS SUBDIVISION

ZONE ATLAS MAP M-9



August 1996





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

P.O. BOX 90606, ALBUQUERQUE, NM 87199
(505) 345-2010

August 7, 1996

Mr. John P. Curtin
City of Albuquerque
Hydrology Department
P.O. Box 1293
Albuquerque, NM 87103

Re: Sun Sage Hills Drainage Report — Second Submittal (M-9/D14), Engineer's Stamp dated 8/7/96

Dear Mr. Curtin:

This resubmittal is in response to your letter dated July 8, 1996 and several subsequent meetings we've had since then regarding the Sun Sage Hills development.

In response to your comment regarding a downstream capacity problem, I have done additional field investigations of the watershed basin and have adjusted the AHYMO model to reflect field conditions and adjustments per construction plan designs. More specifically, I have: per your request changed the typical street cross section to include the 0.125' gutter lip per COA standard drawings, included an 8" berm section on Sapphire between 86th street and Michelle per construction plan design (which was field verified), and reduced the elevation increase within the 9' and 10' right-of-way section on either side of the typical street section from 0.33' to 0.2' per construction plans.

The revised "existing" conditions model indicates that the 100-year flows will rise above the top of curb in Sonya and Sapphire streets but will remain within the existing right-of-way limits. Field investigations reveal that when the top of curb is exceeded in this area, runoff will flow to lower elevations in the Westgate Park site before rising to the outer limits of the right of way or into the adjacent residential homes.

For "developed" conditions, two options are being presented as feasible drainage management plans for Sun Sage Hills and the undeveloped commercial site to the west. In both options all discharge from sub-basin 100 will flow in and through Sun Sage Hills subdivision through a permanent 20' sanitary sewer and drainage easement. All the drainage easements and covenants required for this project will be handle through a bulk land plat that includes parcels in sub-basins 100 and 101. Both options will also require a flood wall to be constructed along the west boundary of the Sun Sage Hills development.

Option 1 would restrict developed flows from sub-basin 100 to be no greater than existing flows from the site which is 18.2 cfs for the 100-year storm. The combined "developed" flows would increase from 29.2 cfs for existing conditions to 48.8 cfs for developed conditions.

Option 2 would require the restriction of flow further from sub-basin 100 to 1.4 cfs which equates to 0.1 cfs per acre. This option would require the construction of a temporary detention pond with the Sun Sage Hills project to be located entirely within the southeast corner of the commercial tract (sub-basin 100). The combined flows would increase from 29.2 cfs for existing conditions to 31.3 cfs for developed conditions.

For both of the options, the AHYMO model demonstrated that the Sun Sage Hills development would increase the maximum depth by 0.07' (option 1) and 0.04' (option 2) which would neither be noticeable or detectable by residents in the area and is well within the limits of accuracy of the AHYMO model.

Mr. John P. Curtin, PE
August 7, 1996
Page 2

It is our hope that the city would recommend implementation of Option 1 as the drainage management solution since it would require minimal construction and disturbance to the undeveloped commercial site to the west. A temporary detention pond would not be required and when a permanent detention facility is built in conjunction with the development of the commercial site, the pond should be able to completely drain within a 24 hour period. However, if the city wants combined developed flows from sub-basins 100 and the Sun Sage project site to not exceed combined existing flows from these two sub-basins then option 2 is also feasible. But Option 2 will require a temporary detention pond and a permanent detention pond when the commercial site develops. The AHYMO analysis of one possible permanent detention pond design for the option 2 developed conditions indicates that the pond would not completely drain within a 24 hour period.

If you have any further questions please call me.

Sincerely,

Diane Hoelzer
Diane Hoelzer, P.E.

TABLE OF CONTENTS

- I. LOCATION AND DESCRIPTION
- II. DRAINAGE DESIGN CRITERIA AND ASSUMPTIONS
- III. EXISTING DRAINAGE CONDITIONS
- IV. DEVELOPED DRAINAGE CONDITIONS
- V. CONCLUSIONS
- VI. REFERENCES

TABLE 1: COMPARISON OF DISCHARGES BETWEEN RATIONAL METHOD AND AHYMO ANALYSIS

TABLE 2: EXISTING AND DEVELOPED CONDITIONS, HYDROLOGIC PARAMETERS & PEAK Q₁₀₀

TABLE 3: SUMMARY OF AHYMO ANALYSIS FOR DEVELOPED CONDITIONS WITH S.B. 100
MAXIMUM OUTFLOW = 18.0 CFS

TABLE 4: SUMMARY OF AHYMO ANALYSIS FOR DEVELOPED CONDITIONS WITH S.B. 100
MAXIMUM OUTFLOW = 1.4 CFS

TABLE 5: SUMMARY OF ON-SITE STREET CAPACITIES

FIGURE 1: VICINITY MAP

FIGURE 2: FEMA LOCATION MAP

FIGURE 3: SUB-BASIN BOUNDARY MAP

FIGURE 4: SUNRISE ESTATES UNIT ONE, SHEETS 20, 21

FIGURE 5: WESTGATE UNIT 3-DIVERSION WALL CONSTRUCTION PLAN SHEET

FIGURE 6: WESTGATE HEIGHTS TYPICAL LOT PLAN

APPENDIX A

HYDRAULIC CALCULATIONS

APPENDIX B

EXISTING CONDITIONS - SUMMARY OUTPUT

EXISTING CONDITIONS - DETAILED OUTPUT

APPENDIX C

DEVELOPED CONDITIONS, NO RESTRICTED OUTFLOW - SUMMARY OUTPUT

OPTION 1 - DEVELOPED CONDITIONS (Q_{MAX}=18.2 CFS) - SUMMARY OUTPUT

OPTION 1 - DEVELOPED CONDITIONS - DETAILED OUTPUT

OPTION 2 - DEVELOPED CONDITIONS (Q_{MAX}=1.4 CFS) - SUMMARY OUTPUT

OPTION 2 - DEVELOPED CONDITIONS - DETAILED OUTPUT

OPTION 2 - TEMPORARY DETENTION POND (Q_{MAX}=1.4 CFS) - SUMMARY OUTPUT

OPTION 2 - TEMPORARY DETENTION POND - DETAILED OUTPUT

APPENDIX D

PHOTOS

POCKET 1: PRELIMINARY GRADING AND DRAINAGE PLAN

LOCATION AND DESCRIPTION

The proposed Sun Sage Hills subdivision is comprised of approximately 8.39 acres and is located south of Sage Road and west of 94th Street in the southwest quadrant of the City of Albuquerque. The site is bounded by Sage Road to the north and 94th Street to the east with existing residential developments adjacent to these roads. The south property line is directly adjacent to an existing residential area. Vacant land that is planned to be developed as a commercial site borders the west property line. The project site is being proposed for zoned as RLT. The topography on-site and in the immediate adjacent areas falls in a southeasterly direction at a slope of approximately 2 percent.

The FEMA map indicates that the site is not within a 100-year floodplain. Sage Road to the north lies within the Zone AO designation which indicates 100-year flooding at an average depth of 1.0 foot. An existing water block on 94th Street at Sage Road prevents runoff from diverting south from Sage to 94th Street.

Soils on-site and in the surrounding area consists primarily of bluepoint loamy fine sands with a hydrologic soil group classification A.

DRAINAGE DESIGN CRITERIA AND ASSUMPTIONS

The design criteria used in this report was in accordance with Section 22.2 Hydrology of the Development Process Manual, Volume 2, Design Criteria, January 1993 edition. The 100-year 24-hour storm event was analyzed using the AHYMO model for a Type 1 rainfall distribution. The site lies within ZONE 1 (west of Rio Grande), which results in the use of the following storm depths: P60=1.87" and P360=2.20".

Land treatment values were determined utilizing Table A-5 (DPM section 22.2) for Percent Land Treatment D (impervious) utilizing the number of units per acre equation for developed residential areas. The remaining pervious areas were split between Land Treatment B and C in a 60/40 ratio.

The approved drainage management plan for existing residential development in this area (sub-basins 102 thru 106) required developed flows to not exceed existing flows. To accomplish this requirement, back yard retention ponds were utilized to capture runoff originating from the backyard, side yards and half of the roof area. The remaining contributing area which included the front yard, streets and half of the roof area was used to determine "developed conditions" peak discharges using the rational method. The remaining contributing area was approximately half of the total lot/street area. To account for the backyard retention volume in the AHYMO analysis for sub-basins 102 thru 106, the sub-basin area used in the AHYMO model was 56% of the actual total sub-basin area.

The drainage management plan for the Country Squire Subdivision (sub-basin 102) required the utilization of back yard retention ponds as well as a retention pond located at the southeast corner of the site to capture the remaining front yard and street runoff with an overflow channel discharging to sub-basin 103. The elimination of the retention pond was to occur at the time downstream improvements were built to allow for free discharge through the overflow channel. As a conservative assumption in the "existing" and "developed" conditions AHYMO analysis, it was assumed the retention pond was eliminated and runoff was allowed to flow freely through the overflow channel.

Land Treatment A was assumed for all undeveloped areas in the "existing conditions" AHYMO model.

A minimum time of concentration of 12 minutes was assumed for all sub-basins with a resulting 8 minute time to peak used in the AHYMO analysis.

Runoff was routed through the streets using 8" curbs and either a 9 or 10 feet of additional right-of-way on either side of the street to an additional height of 0.2 feet.

LOCATION AND DESCRIPTION

The proposed Sun Sage Hills subdivision is comprised of approximately 8.39 acres and is located south of Sage Road and west of 94th Street in the southwest quadrant of the City of Albuquerque. The site is bounded by Sage Road to the north and 94th Street to the east with existing residential developments adjacent to these roads. The south property line is directly adjacent to an existing residential area. Vacant land that is planned to be developed as a commercial site borders the west property line. The project site is being proposed for zoned as RLT. The topography on-site and in the immediate adjacent areas falls in a southeasterly direction at a slope of approximately 2 percent.

The FEMA map indicates that the site is not within a 100-year floodplain. Sage Road to the north lies within the Zone AO designation which indicates 100-year flooding at a depth not greater than 1.0 foot. An existing water block on 94th Street at Sage Road prevents runoff from diverting south from Sage to 94th Street.

Soils on-site and in the surrounding area consists primarily of bluepoint loamy fine sands with a hydrologic soil group classification A.

DRAINAGE DESIGN CRITERIA AND ASSUMPTIONS

The design criteria used in this report was in accordance with Section 22.2 Hydrology of the Development Process Manual, Volume 2, Design Criteria, January 1993 edition. The 100-year 24-hour storm event was analyzed using the AHYMO model for a Type 1 rainfall distribution. The site lies within ZONE 1 (west of Rio Grande), which results in the use of the following storm depths: P60=1.87" and P360=2.20".

Land treatment values were determined utilizing Table A-5 (DPM section 22.2) for Percent Land Treatment D (impervious) utilizing the number of units per acre equation for developed residential areas. The remaining pervious areas were split between Land Treatment B and C in a 60/40 ratio.

The approved drainage management plan for existing residential development in this area (sub-basins 102 thru 106) required developed flows to not exceed existing flows. To accomplish this requirement, back yard retention ponds were utilized to capture runoff originating from the backyard, side yards and half of the roof area. The remaining contributing area which included the front yard, streets and half of the roof area was used to determine "developed conditions" peak discharges using the rational method. The remaining contributing area was approximately half of the total lot/street area. To account for the backyard retention volume in the AHYMO analysis for sub-basins 102 thru 106, the sub-basin area used in the AHYMO model was 56% of the actual total sub-basin area.

The drainage management plan for the Country Squire Subdivision (sub-basin 102) required the utilization of back yard retention ponds as well as a retention pond located at the southeast corner of the site to capture the remaining front yard and street runoff with an overflow channel discharging to sub-basin 103. The elimination of the retention pond was to occur at the time downstream improvements were built to allow for free discharge through the overflow channel. As a conservative assumption in the "existing" and "developed" conditions AHYMO analysis, it was assumed the retention pond was eliminated and runoff was allowed to flow freely through the overflow channel.

Land Treatment A was assumed for all undeveloped areas in the "existing conditions" AHYMO model.

A minimum time of concentration of 12 minutes was assumed for all sub-basins with a resulting 8 minute time to peak used in the AHYMO analysis.

Runoff was routed through the streets using 8" curbs and either a 9 or 10 feet of additional right-of-way on either side of the street to an additional height of 0.2 feet.

PREVIOUS DRAINAGE REPORTS

In previously approved drainage reports for existing residential subdivisions (sub-basins 102 thru 106) within the drainage watershed, in particular, the Westgate Heights subdivision and the Country Squire subdivision, the 100 year developed flows were not allowed to exceed the 100 year existing flows. To attenuate the difference in peak discharges due to an increase in impervious areas, back yard retention ponds were utilized to capture runoff from the backyard, side yards and half of the roof area. For "developed conditions" only the area contributing runoff to the street was considered in determining peak flows which included the front yard, street, sidewalk and half of the roof area. The rational method was used to determine peak discharges using a "C" coefficient of 0.38 for undeveloped conditions and 0.69 for developed conditions.

Using the previously approved rational method, peak discharges were determined for undeveloped and developed flows using updated sub-basin areas and compared to developed flows generated by this reports' AHYMO analysis. As shown in Table 1 the difference in peak discharges generated by these two different methodologies is negligible with the exception of sub-basin 109. The reason for the increase in developed flows generated by AHYMO is that back yard retention ponds were not part of the drainage management plan for this recently developed residential area.

A 1990 report done for the Vista Nueva Subdivision located east and south of the Corriz Drive-Sapphire Street intersection calculated the 100-year "developed" conditions peak discharge at this point to be 169 cfs. This value compares to 180 cfs at this point under existing conditions and 198 cfs and 191 cfs under Options 1 and 2 developed conditions. One of the reason for the discrepancy in values is that in the 1990 rational method analysis the "C" coefficient used was in their developed conditions analysis was for undeveloped conditions.

A 1994 report, the Master Drainage Report For A 417 Acre Portion of Land Between the Snow Vista Channel & the Amole Del Norte Channel (Isaacson & Arfman) determined the peak discharge reaching the inlets to be 447 cfs. There are several reasons for the resulting difference of approximately 200 cfs between the two AHYMO analyses. The total area contributing to runoff at this point in the 1994 report was approximately 180.8 acres. After careful field investigation, the sub-basin boundaries were redefined and the total contributing runoff area was determined to be approximately 114.8 acres, a reduction by 35% from the earlier report. Land treatment values were also revised to reflect the current knowledge of existing and future development.

EXISTING DRAINAGE CONDITIONS

Under existing conditions, runoff from the Sun Sage Hills project site and the undeveloped area to the west is in a southeasterly direction at a general slope of 2.0 percent. The Snow Vista Diversion Channel to the west functions as a water block intercepting most of the flows coming from that direction. Refer to Figure 3: Sub-basin boundary map. Offsite flows from the residential developments to the north are directed into their own onsite ponds or else along Sage Road eastward. Water blocks on 94th street, Blazick Street and Sapphire Street at Sage Road prevent runoff from flowing into this watershed from the north. Offsite flows from the undeveloped site immediately adjacent to the project site's west property boundary flow through the site and then south along 94th Street. Ultimately runoff from the project site flows south on 94th street, east on Reba Avenue, east on Sonya Avenue and then southeast on Sapphire Street combining with flows from the adjacent residential areas along the way. Until recently, these flows continued eastward, flowing through undeveloped areas before ultimately being intercepted by the Amole Del Norte Diversion Channel. (See Figure 3). Now these flows are intercepted by a series of Type C inlets and a drop inlet spanning Sapphire street just south of Corriz Drive.

Under existing drainage conditions a peak discharge of 10.9 cfs from the project site combines with 18.2 cfs from the undeveloped property (sub-basin 100) to the west and discharges into 94th Street. These flows then combine with sub-basins 102 through 110 for a total peak discharge of 180 cfs in Sapphire Street at Corriz Drive. At this point the runoff is intercepted by a series of seven Type C inlets and a 40 wide traverse drop inlet which have recently been constructed as part of the Sunrise Estate Unit One development (see Figure 4). According to the construction plans, this 60"/66" storm drain system has the capacity to carry a peak discharge of 380 cfs.

According to the "existing conditions" AHYMO analysis, the existing flows are within top of curb up to Sonya Avenue. At this location flows begin to exceed top of curb by 0.13' along Sonya Avenue and up to a maximum of 0.26' near the inlets on Sapphire street. In all location the peak runoff is contained within the right of way limits. Field investigations revealed that further protection against flooding of residential homes along these streets is provided because as soon as flows along Sonya Avenue and Sapphire street to 86th Street exceed top of curb, the runoff will flow to the lower lying areas within the adjacent Westgate Heights Park before spreading into and above the right of way limits. Since this situation was not considered in the AHYMO analysis, it is safe to assume that the actual depth of flow will be somewhat less than the maximum depth of flow determined in the "existing conditions" AHYMO analysis.

For the homes located along Sapphire street south of the 86th street intersection, per construction plans, these homes were elevated above the top of curb, several of which were designed to have an 8" diversion wall along the front yard boundary protecting them from potential flood waters. (See photos and Figure 5).

See Figure 3 for a depiction of the sub-basin boundaries and flow path. Refer to Table 2 for a summary of the peak discharges and hydrologic parameters used in the existing and developed conditions. The supporting AHYMO summary output and data input file for existing conditions can be found in the Appendix A.

PROPOSED DRAINAGE CONDITIONS

The peak discharge from the project site under developed conditions is 30.8 cfs, of which 7.7 cfs will be the maximum discharge on Shone Avenue, Rhonda Avenue, Alvera Court and Shawndra Drive. The proposed developed commercial site to the west will generate a peak discharge of 58.8 cfs. Two options are being presented to restrict the maximum developed flows from this site to either the existing 100-year peak discharge of 18.2 cfs (Option 1) or to 0.1 cfs per acre or a total maximum of 1.4 cfs (Option 2). Refer to Table 2 for a summary of existing and developed conditions peak discharges. Refer to Table 5 for a summary of on-site street capacities.

Two options are being presented as the possible drainage management plan for the development of the Sun Sage Hills subdivision and the commercial site to the west by restricting the maximum allowable discharge from the commercial site (sub-basin 100).

The first option would be to restrict the developed flows from sub-basin 100 to the existing undeveloped peak flow of 18.2 cfs. As long as sub-basin 100 remained undeveloped, a flood wall along Sun Sage Hills west boundary would intercept these flows and direct them south and east to Jenny Court through a 10' wide 1.5' deep permanent concrete diversion channel located within a 20' wide sanitary sewer /drainage easement. When the commercial site is developed, they would be require to attenuate their developed flows to a maximum discharge of 18.2 cfs, probably through the construction of a detention pond(s). The "developed conditions" AHYMO analysis has presented one feasible pond design using a 116'x116' pond with 3:1 side slopes, approximately 5.0 feet deep and which will drain in less than 24 hours using an orifice outfall structure. The maximum pond water surface elevation is 4.2 feet with a peak storage volume of 1.0 acre-feet. A temporary detention pond would not be required for this option.

Table 3 presents results of the comparison between Option 1 - "developed" conditions and the "existing" conditions analysis. The maximum difference in flow depths between developed and existing conditions is 0.07 feet along Sonya Avenue. This increase in depth would neither be noticeable or detectable in the field. Along Sapphire from Sonya to 86th street the AHYMO analysis indicates that flows will exceed the right of way limit by some small amount. To approximate this amount the right of way limits were extended vertical an additional 0.13 feet. When this situation was modeled the maximum water surface elevation rose to 0.88' with an estimated velocity of 5.9 fps. In addition as mentioned before, though not accounted for in the AHYMO model, flows overtopping the curb along Sonya and Sapphire would flow into the lower elevated areas of the Westgate Heights Park.

Option 2 would restrict the flows from sub-basin 100 to 0.1 cfs per acre or 1.4 cfs. This option would require the construction of a flood wall along Sun Sage Hills west property boundary and a temporary detention pond with this project and a permanent detention facility when the commercial site develops. A temporary detention pond design was modeled in AHYMO. A temporary pond with approximate dimensions of 111' by 111' with 3:1 side slopes releasing a maximum discharge of 1.4 cfs through a restricted orifice type outfall structure would reach a maximum storage volume of 0.4 acre-feet at a depth of 1.48 feet. A permanent detention pond with approximate dimensions of 181' by 181' with 3:1 side slopes and outfall structure to restrict flows to 1.4 cfs would require a maximum storage volume of approximately 1.91 acre-feet at a depth of 2.8 feet. The Option 2 "developed" conditions model indicates that the detained volume in the permanent pond would not completely drain within a 24 hour period. Table 4 presents results of the comparison between Option 2 - "developed" conditions and the "existing" conditions analysis. The maximum difference in flow depths between developed and existing conditions is 0.04 feet along Sapphire Street. This increase in depth would neither be noticeable or detectable in the field. Appendix A contains calculations associated with the detention ponds used in the AHYMO analysis.

A bulk land plat will address all the required drainage easements and covenants for the chosen option as necessary.

It should also be noted that sub-basins 100, 101, 108, 110, are the last parcels within this drainage basin to develop. Sub-basins 108 and 110 are comprised of only approximately 10 acres.

For "developed" conditions, a peak discharge of 198 cfs for Option 1 and 191 cfs for Option 2 will reach the drop inlet on Sapphire at Corriz at a maximum water depth of 0.97' and 0.95' respectively.

Under developed conditions, Land Treatment values changed for sub-basins 100, 108 and 110. Sub-basin 100 is proposed for future commercial development. Sub-basins 108 and 110 are assumed residential development with a maximum density of 4 units per acre utilizing back yard retention ponds which have historically been a part of the drainage management plan for this area.

CONCLUSIONS

Information from field verification of existing sub-basin boundaries and flow directions, updated knowledge on existing and proposed land treatment values in the watershed and information from previously approved drainage reports were used to update the hydrologic parameters input into the AHYMO model to analyze existing and developed drainage conditions in the watershed. The hydrologic analysis indicates that there is capacity within the existing right-of-way to convey runoff east and southeast along Reba, Sonya, Blazick and Sapphire streets to the recently construction series of inlets in Sapphire street at Corriz Drive.

In the "existing conditions" model as well as the option 1 and 2 "developed conditions" model, results indicate flows begin to overtop the curb in Sonya and Sapphire Streets. However, the use of back yard retention ponds, the elevation of homes above top of curb, the use of block walls and diversion walls around front yards and the floodwater ponding capacity of the Westgate Park along Sonya and Sapphire work together to minimize and/or prevent damage to residential homes during to the 100 year storm under existing and developed

conditions. As Options 1 and 2 "developed conditions" AHYMO analysis shows, the increase in runoff and flow depths as a result of developing Sun Sage Hills subdivision and the adjacent commercial site as well as the last two remaining developable parcels in the watershed, sub-basins 108 and 110, will not be noticeable or detectable by an observer in the field. In addition, the marginal increase in flow depth is well within the limits of accuracy of the AHYMO model capabilities.

The difference in the 100-year water surface elevations and velocities in the streets between Option 1 and Option 2 would not be detectable or noticeable to an observer in the field. Option 1 allowing a maximum discharge from sub-basin 100 of 18.2 cfs will require minimal disturbance to this site since a temporary detention pond would not be required until the site develops and under developed conditions could drain in approximately 6 hours. Option 2 allowing a maximum discharge from sub-basin 100 of 1.4 cfs will require a temporary detention pond and a permanent detention pond when the site develops. Under developed conditions the permanent detention would not drain within a 24 hour period.

REFERENCES

1. DRAINAGE REPORT FOR THE COUNTRY SQUIRE SUBDIVISION 14.99 Ac
 Goldberg-Mann & Associates, Inc. (M-9/D2) 77 Lots
 April 4, 1980 $C_{UN} = 0.4$
 $C_{Dev} = 0.8$ $4.96 + 1.94 = 6.90 \text{ Ac}$
2. WESTGATE HEIGHTS UNITS 2-A, COMPREHENSIVE DRAINAGE REPORT
 Meurer, Serafini and Meurer, Inc. (M-9/D5A) UN = 10 Ac
 October 1977 39 Lots Dev = 5.18 Ac
 $C_{Dev} = 0.69$
 $C_{UN} = 0.38$
3. DRAINAGE REPORT FOR VISTA NUEVA SUBDIVISION
 Bordenave Designs (M-10/D5A)
 March 5, 1990
4. MASTER DRAINAGE REPORT FOR A 417 AC PORTION OF LAND BETWEEN THE
 SNOW VISTA CHANNEL AND THE AMOLE DEL NORTE CHANNEL
 Isaacson and Arfman, P.A.
 May 1994 (M-10/D5)

Westgate 3 (M-9/D8)

36 Ac $C_{Res} = 0.69$
 $C_{School} = 0.38$
 $C_{Park} = 0.25$

TABLE 1

***Comparison of Peak Discharges Between
Previous Rational Method and This AHYMO Analysis***

<i>Sub Basin ID</i>	<i>Area (Acres)</i>	<i>Undeveloped Q 100 A</i>	<i>Developed Q 100 B</i>	<i>Developed Q 100 C</i>
<i>102</i>	<i>14.99</i>	<i>32.4</i>	<i>27.9</i>	<i>28.2</i>
<i>103</i>	<i>4.54</i>	<i>9.8</i>	<i>8.5</i>	<i>8.4</i>
<i>104</i>	<i>15.42</i>	<i>33.3</i>	<i>28.7</i>	<i>27.7</i>
<i>105</i>	<i>6.02</i>	<i>13.0</i>	<i>11.2</i>	<i>10.8</i>
<i>106</i>	<i>21.63</i>	<i>46.7</i>	<i>40.3</i>	<i>39.8</i>
<i>108</i>	<i>6.87</i>	<i>14.8</i>	<i>12.8</i>	<i>12.3</i>
<i>109</i>	<i>3.65</i>	<i>7.9</i>	<i>6.8</i>	<i>11.5</i>
<i>110</i>	<i>2.21</i>	<i>4.8</i>	<i>4.1</i>	<i>4.0</i>
<i>TOTAL</i>	<i>75.33</i>	<i>162.7</i>	<i>140.3</i>	<i>142.7</i>
<i>A) Q100 = cia = .38(5.4) * acres B) Q100 = cia = .69(5.4) * ½ acres C) Using AHYMO (1994 Methodology) using appropriate land treatment values and ½ of the actual area.</i>				

TABLE 2
***Existing and Developed Conditions
Hydrologic Parameters and Peak Discharge***

Sub-Basin I.D.	Actual Area Sq. Mi.	AHYMO Area Sq. Mi.		Existing Conditions				Ex. Q100 cfs	AHYMO Area Sq. Mi.		Developed Conditions				Dev. Q100 cfs
				A	B	C	D				A	B	C	D	
100	.0219	.0219	UND	100	0	0	0	18.2	.0219	COM	0	5	5	90	58.6
101	.0131	.0131	UND	100	0	0	0	10.9	.0131	RES	0	21	15	64	30.6
102	.0234	.01310	RES	0	30	20	50	28.2			Unchanged				28.2
103	.0071	.00398	RES	0	32	21	47	8.4			Unchanged				8.4
104	.0241	.01350	RES	0	34	24	42	27.7			Unchanged				27.7
105	.0094	.00526	RES	0	34	24	42	10.8			Unchanged				10.8
106	.0338	.01893	RES	0	32	22	46	39.8			Unchanged				39.8
107	.0267	.0267	PAR K	0	54	23	23	47.0			Unchanged				47.0
108	.0107	.0107	UND	100	0	0	0	8.9	.0060	RES	0	35	23	42	12.3
109	.0057	.0057	RES	0	36	25	39	11.5			Unchanged				11.5
110	.00345	.00345	UND	100	0	0	0	3.0	.00193	RES	0	34	24	42	4.0

RES = residential
COM = commercial
UND =undeveloped

TABLE 3

**Summary of AHYMO Analysis for Developed Conditions
(OPTION 1: Commercial Site Sub-Basin 100 Restricted Peak Discharge = 18.2 cfs)**

			DISCHARGE (cfs)				DEPTH (feet)				VELOCITY (fps)	
LOCATION		Slope %	ROW Cap	Top of Curb	Exist. Q100	Devel'd Q100	ROW Depth	Top of Curb	Existing Depth	Devel'd Depth	Existing Velocity	Devel'd
94th St. south to Reba	32' FF	.5	77.2	46.2	29.2	43.7	.87	.67	.56	.65	2.4	3.3
Reba Ave, 94th to Blazick	32' FF	1.64	139.9	83.7	56.2	70.8	.87	.67	.58	.62	5.3	5.8
Blazick St., Reba to Sonya	32' FF	2.0	154.5	92.5	87.7	104.1	.87	.67	.65	.71	6.6	7.4
Sonya Ave, Blazick to Sapphire	32' FF	1.12	115.6	69.2	98.1	114.4	.87	.67	.80	.87	5.1	5.3
Sapphire, Sonya to 86th	32' FF	1.35	126.9	76.0	121.6	136.7	.87	.67	.85	.88*	5.7	5.9*
Sapphire, 86th to Michelle	40' FF	1.4	823.0	83.0	168.2	185.4	1.67	.67	.90	.96	6.3	6.5
Sapphire, Michelle to inlets	40' FF	1.4	215.6	84.6	179.9	198.4	1.0	.67	.93	.97	6.4	6.6

* = outside of right of way, estimated value.

TABLE 4

**Summary of AHYMO Analysis for Developed Conditions
(OPTION 2: Commercial Site Sub-Basin 100 Restricted Peak Discharge = 1.40 cfs)**

			DISCHARGE (cfs)				DEPTH (feet)				VELOCITY (fps)	
LOCATION		Slope %	ROW Cap	Top of Curb	Exist. Q100	Devel'd Q100	ROW Depth	Top of Curb	Existing Depth	Devel'd Depth	Existing Velocity	Devel'd
94th St. south to Reba	32' FF	.5	77.2	46.2	29.2	31.3	.87	.67	.56	.57	2.4	2.9
Reba Ave, 94th to Blazick	32' FF	1.64	139.9	83.7	56.2	58.1	.87	.67	.58	.58	5.3	5.3
Blazick St., Reba to Sonya	32' FF	2.0	154.5	92.5	87.7	92.1	.87	.67	.65	.67	6.6	6.7
Sonya Ave, Blazick to Sapphire	32' FF	1.12	115.6	69.2	98.1	102.9	.87	.67	.80	.82	5.1	5.2
Sapphire, Sonya to 86th	32' FF	1.35	126.9	76.0	121.6	126.5	.87	.67	.85	.87	5.7	5.7
Sapphire, 86th to Michelle	40' FF	1.4	823.0	83.0	168.2	177.1	1.67	.67	.90	.94	6.3	5.7
Sapphire, Michelle to inlets	40' FF	1.4	215.6	84.6	179.9	190.9	1.0	.67	.93	.95	6.4	6.5

TABLE 5

Summary of On-Site Street Capacities

Location	Roadway	Slope %	Q (cfs)	Depth (feet)	Velocity (fps)	Top Width	EG
Jenny Court	28' FF, Std.	2.17	25.9	0.43	4.4	28.1	0.73
Rhonda Ave.	28' FF, Mt.	3.71	5.20	0.18	3.3	17.79	0.35
Shone Ave.	28' FF, Mt.	2.29	10.1	0.30	2.29	28.18	0.38
Alvera Court	28' FF, Mt.	3.00	7.7	0.27	2.10	27.16	0.34
Std. = Standard curb & gutter Mt. = Mountable curb & gutter							

Rev. 9/18/96

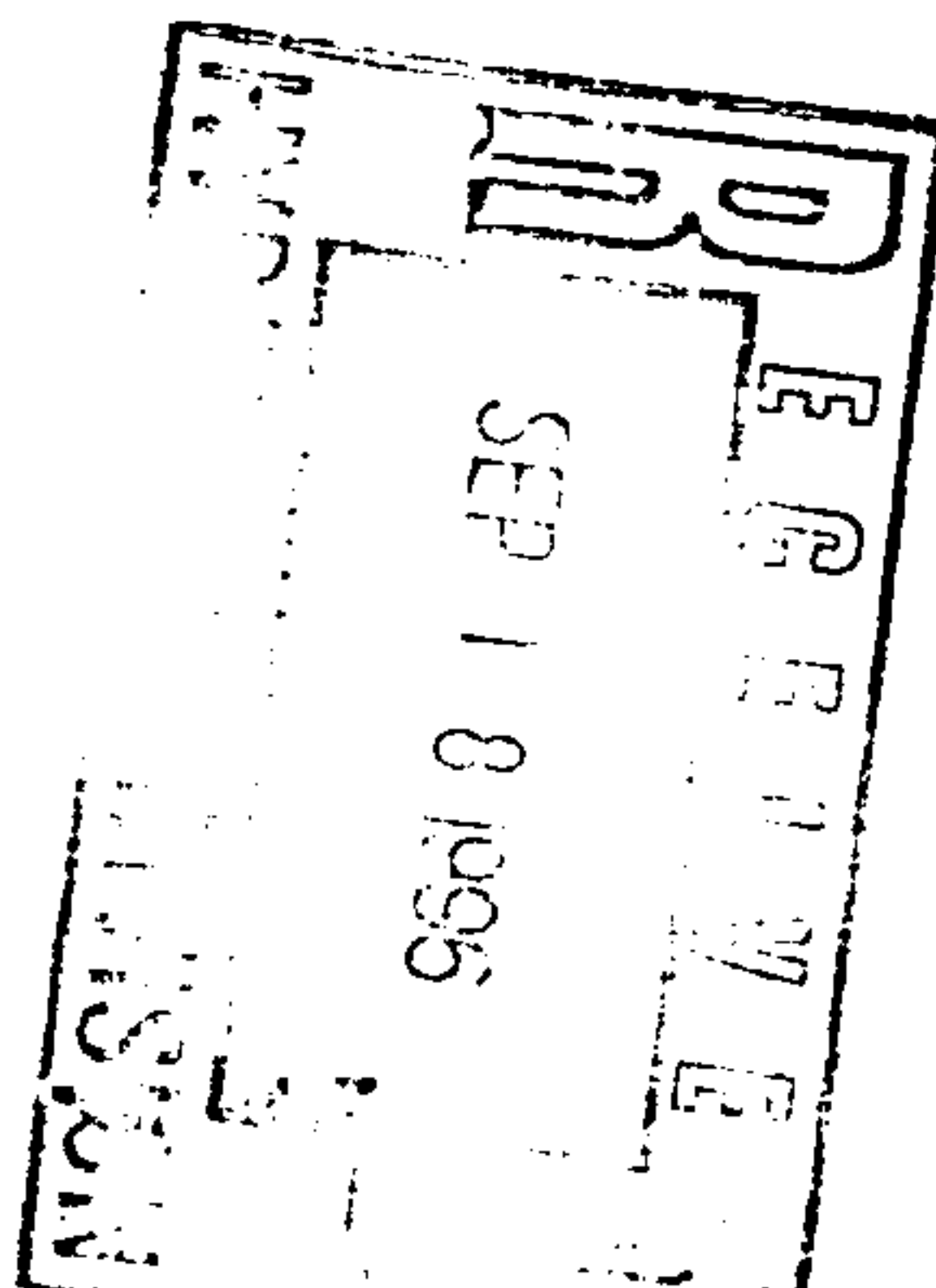


TABLE 5

Summary of On-Site Street Capacities

<i>Location</i>	<i>Roadway</i>	<i>Slope %</i>	<i>Q (cfs)</i>	<i>Depth (feet)</i>	<i>Velocity (fps)</i>	<i>Top Width</i>	<i>EG</i>
<i>Alvera Court</i>	<i>28' FF, Std.</i>	<i>2.17</i>	<i>25.9</i>	<i>0.43</i>	<i>4.4</i>	<i>28.1</i>	<i>0.73</i>
<i>Rhonda Ave.</i>	<i>28' FF, Mt.</i>	<i>1.96</i>	<i>7.7</i>	<i>0.23</i>	<i>2.9</i>	<i>23.2</i>	<i>0.36</i>
<i>Shone Ave.</i>	<i>28' FF, Mt.</i>	<i>1.96</i>	<i>7.7</i>	<i>0.23</i>	<i>3.3</i>	<i>23.2</i>	<i>0.36</i>
<i>Jenny Ave.</i>	<i>28' FF, Mt.</i>	<i>2.78</i>	<i>7.7</i>	<i>0.22</i>	<i>3.3</i>	<i>21.8</i>	<i>0.38</i>
<i>Std. = Standard curb & gutter Mt. = Mountable curb & gutter</i>							

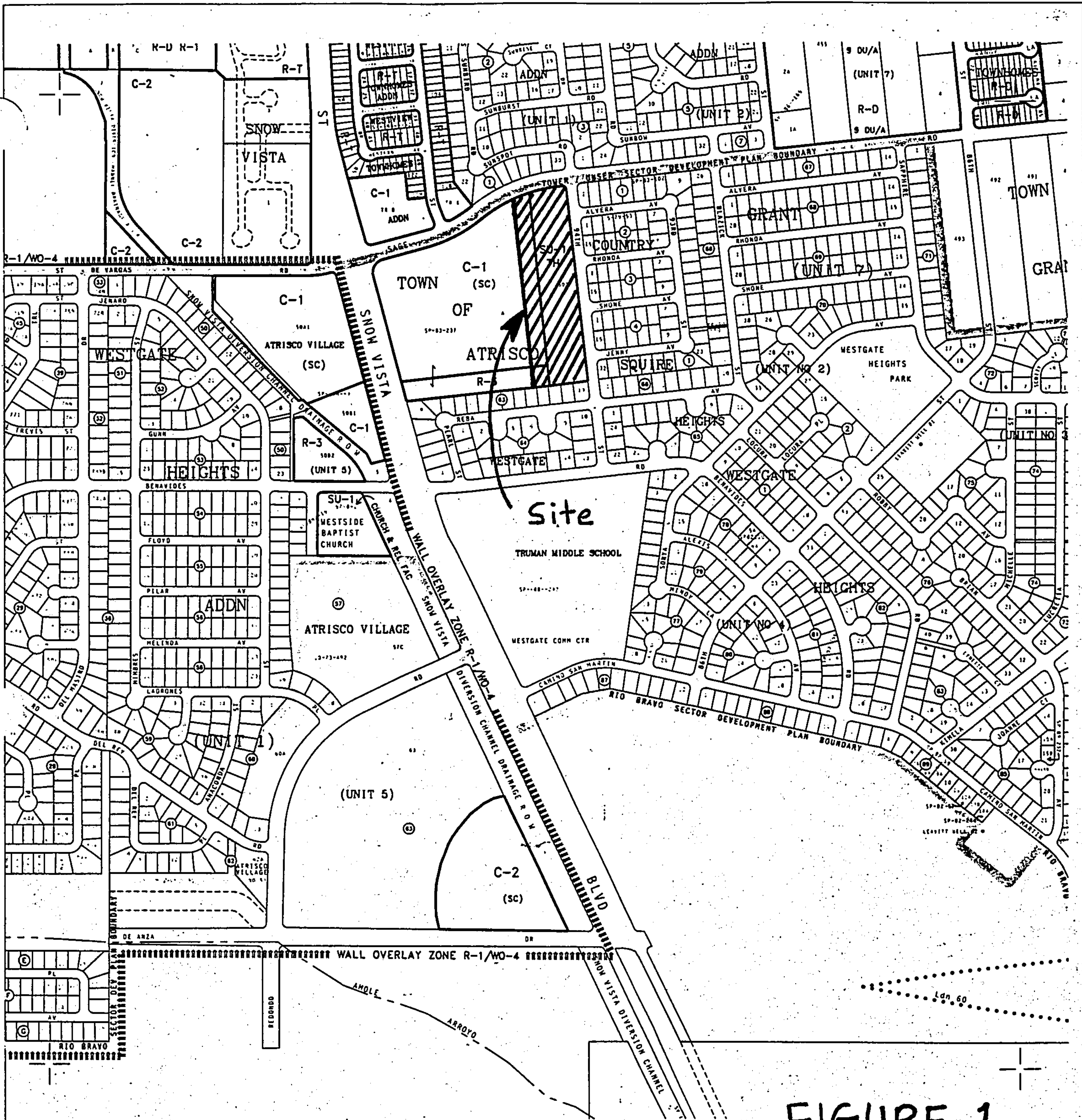
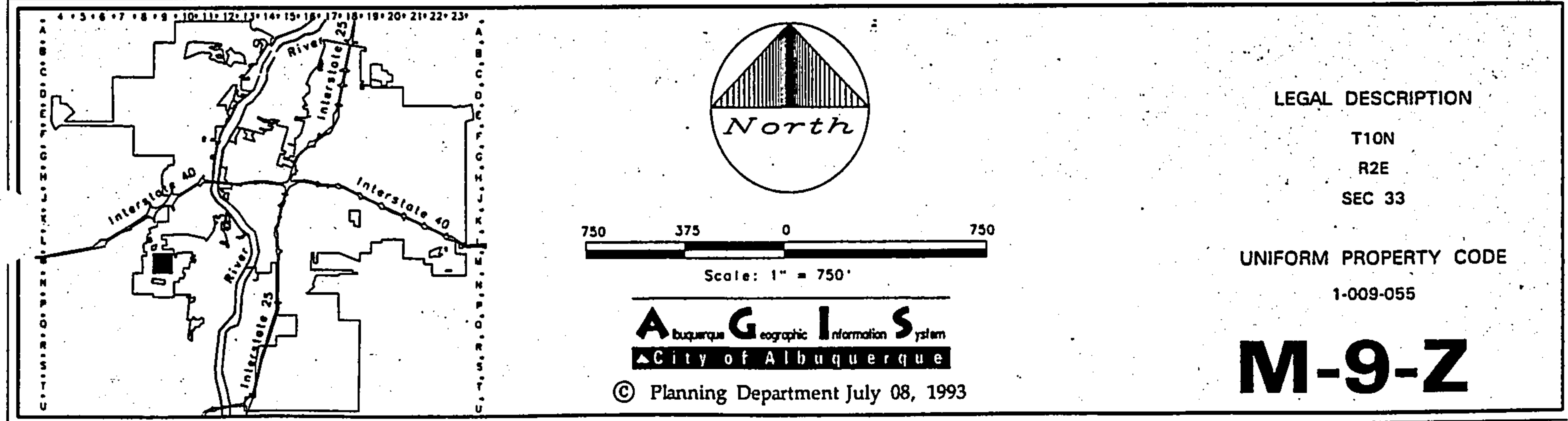
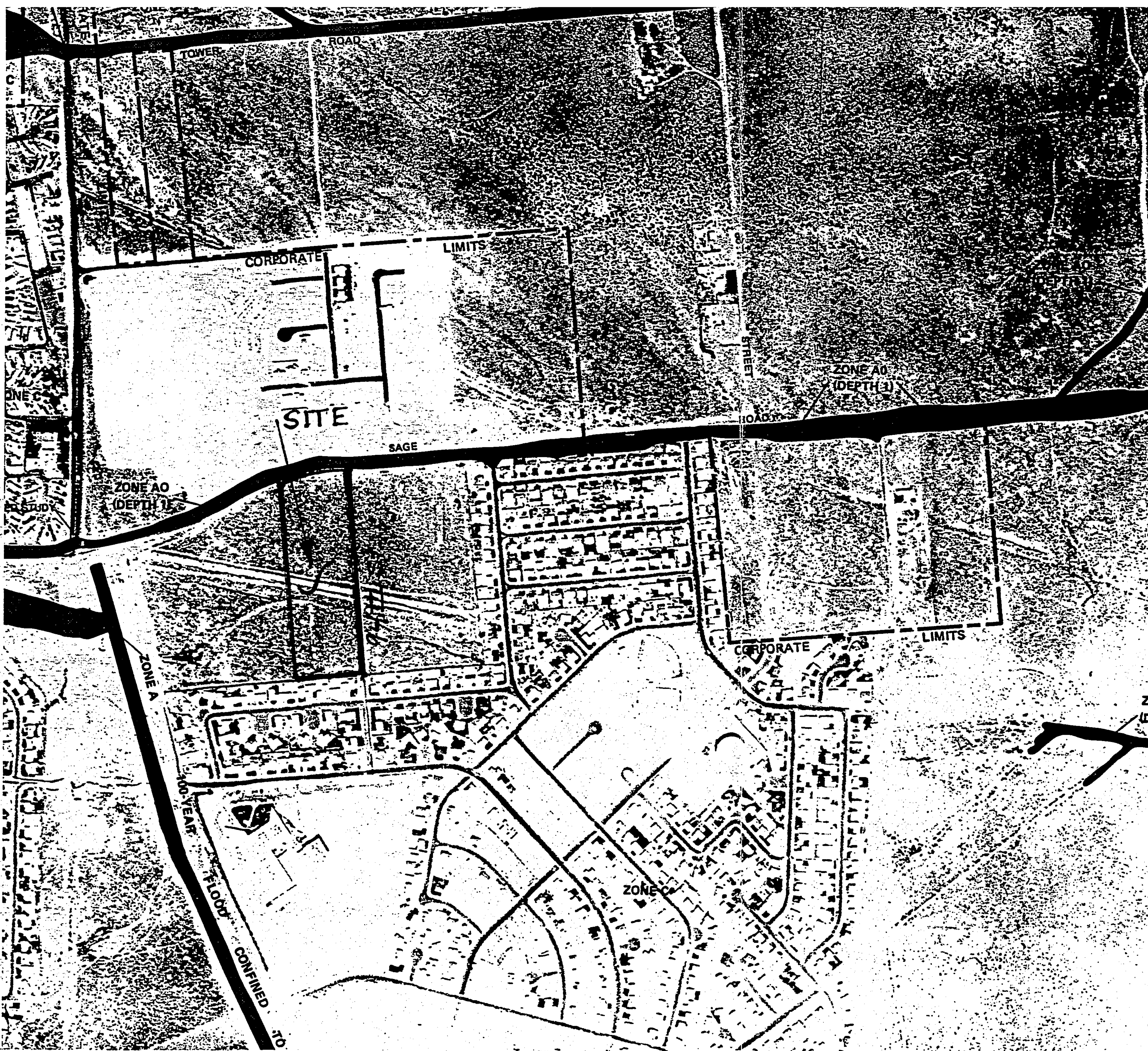


FIGURE 1





NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

CITY OF
ALBUQUERQUE,
NEW MEXICO
BERNALILLO COUNTY

PANEL 33 OF 50

COMMUNITY-PANEL NUMBER

350002 0033 C

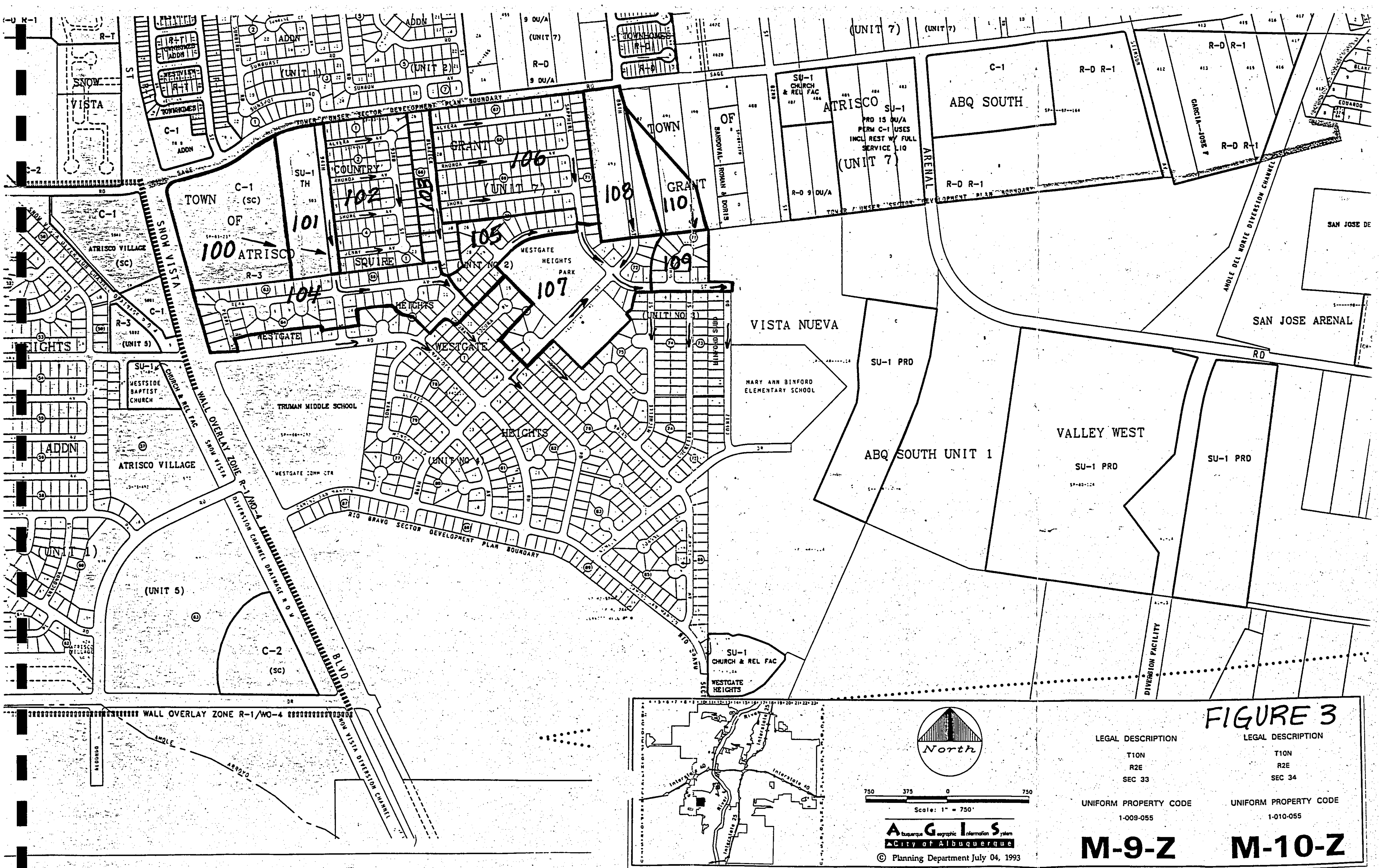
EFFECTIVE DATE:

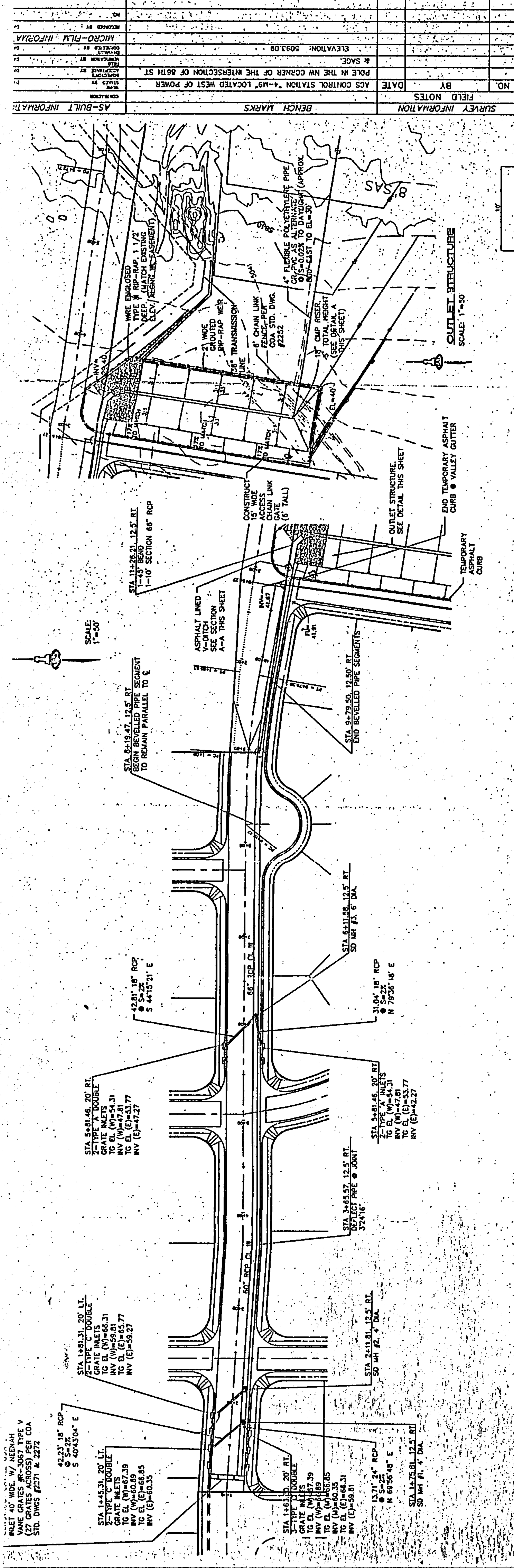
OCTOBER 14, 1983



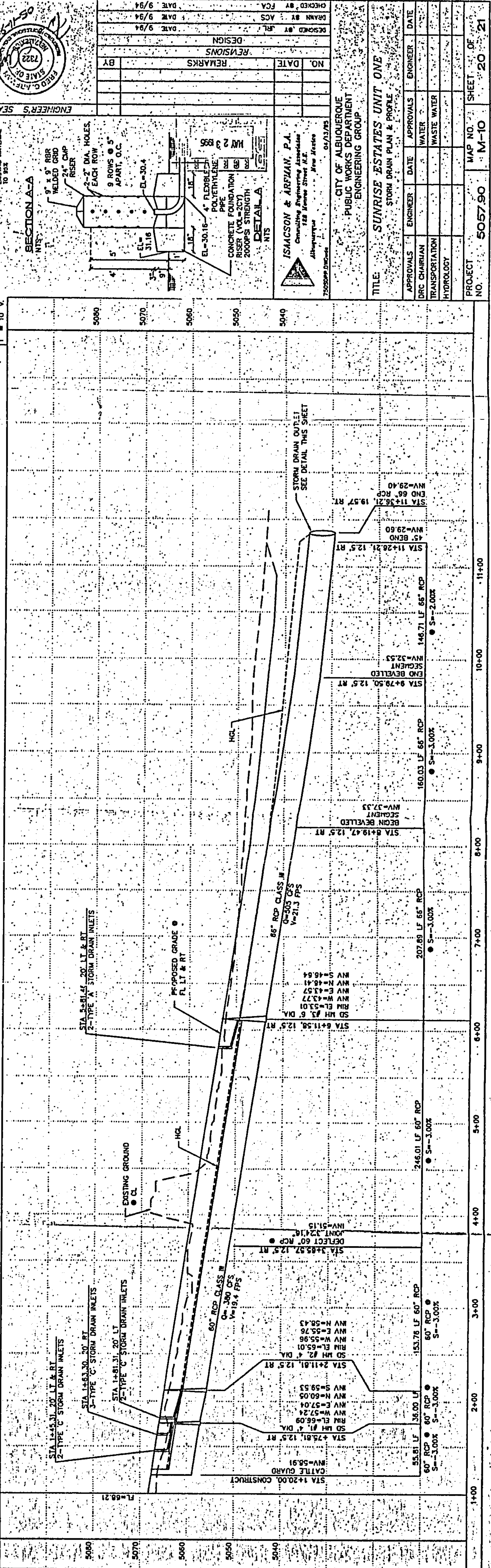
Federal Emergency Management Agency

FIGURE 2

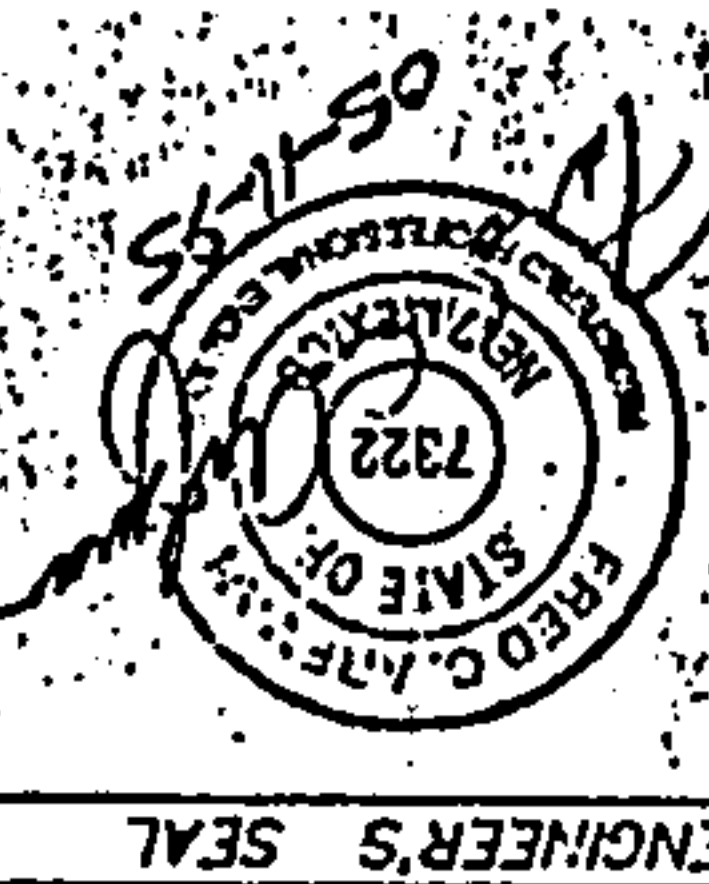




SAPPHIRE STREET



NO.	DATE	BY	FIELD NOTES
1	9/94		ACS CONTROL STATION "A-19" LOCATED WEST OF POWER
2	9/94		POLE IN THE NW CORNER OF THE INTERSECTION OF 85TH ST
3	9/94		SAGE
4	9/94		ELEVATION: 5093.09
5	9/94		CONTRACT NO. 2271 & 2272
6	9/94		CONTRACT NO. 2271 & 2272
7	9/94		CONTRACT NO. 2271 & 2272
8	9/94		CONTRACT NO. 2271 & 2272
9	9/94		CONTRACT NO. 2271 & 2272
10	9/94		CONTRACT NO. 2271 & 2272

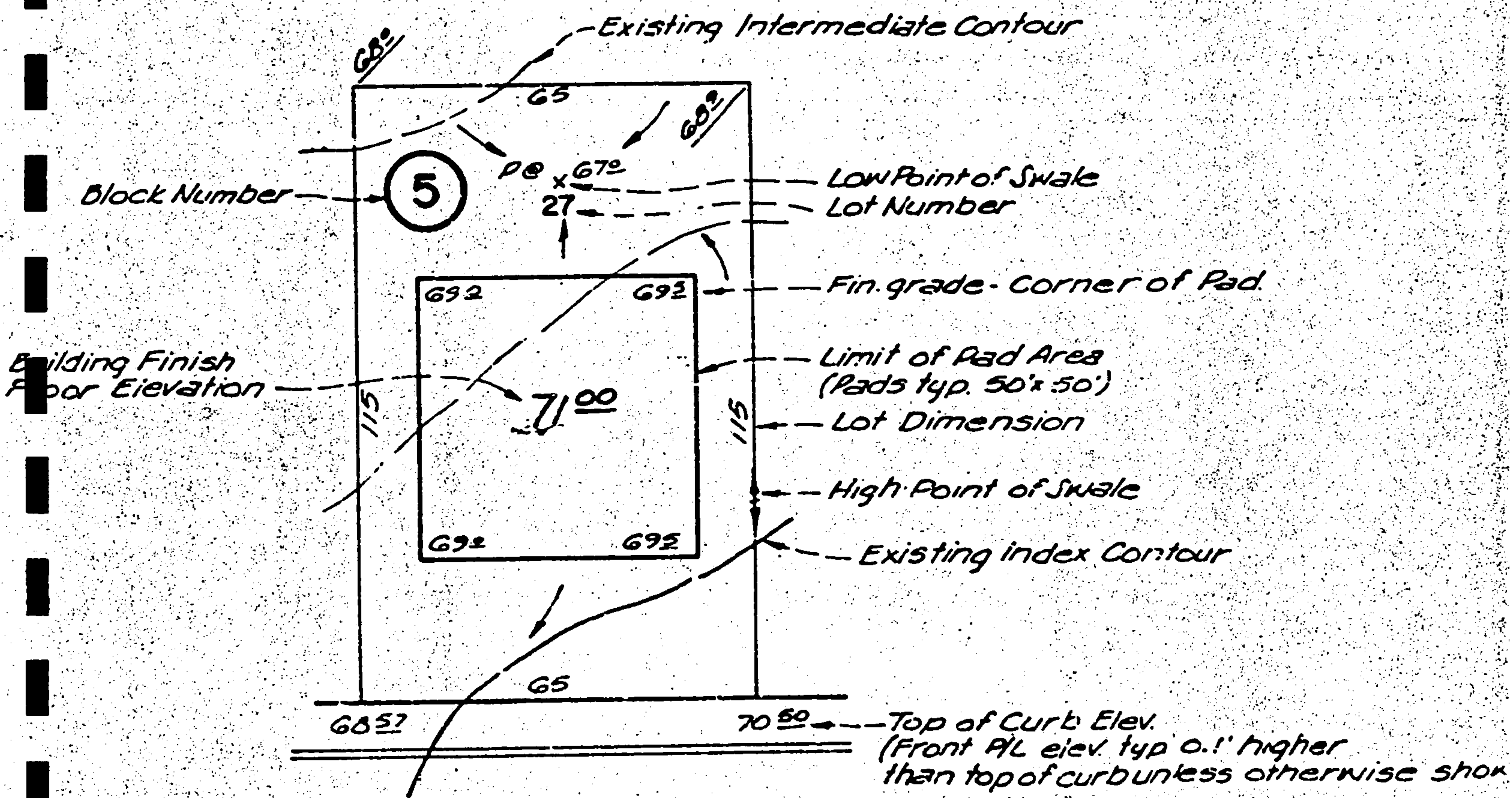


NO.	DATE	BY	REMARKS
1	9/94		DESIGN
2	9/94		REVISIONS
3	9/94		REVISIONS
4	9/94		REVISIONS
5	9/94		REVISIONS
6	9/94		REVISIONS
7	9/94		REVISIONS
8	9/94		REVISIONS
9	9/94		REVISIONS
10	9/94		REVISIONS

DESIGNED BY	DATE	BY	REMARKS
CHKD BY	DATE	BY	REMARKS
DRWN BY	DATE	BY	REMARKS
APP'D BY	DATE	BY	REMARKS
APPROVED BY	DATE	BY	REMARKS
APPROVED BY	DATE	BY	REMARKS
APPROVED BY	DATE	BY	REMARKS
APPROVED BY	DATE	BY	REMARKS
APPROVED BY	DATE	BY	REMARKS
APPROVED BY	DATE	BY	REMARKS

PROJECT NO.	505790	MAP NO.	M-10	SHEET	20	OF	21
CITY OF ALBUQUERQUE PUBLIC WORKS DEPARTMENT ENGINEERING GROUP							
TITLE: SUNRISE ESTATES UNIT ONE STORM DRAIN PLAN & PROFILE							
APPROVALS	ENGINEER	DATE	APPROVALS	ENGINEER	DATE	APPROVALS	ENGINEER
DRC CHAIRMAN			WATER			WATER	
TRANSPORTATION			WASTE WATER			WASTE WATER	
HYDROLOGY							

FIGURE 4a



TYPICAL LOT PLAN

Westgate Heights Units

Figure 6

APPENDIX A
HYDRAULIC CALCULATIONS

1*****

* WATER SURFACE PROFILES *

*

* VERSION OF SEPTEMBER 1988 *

*

* ERROR: 01,02 *

*

* UPDATED: 4 APRIL 1989 *

*

* RUN DATE 7/26/96 TIME 8:16:49 *

*

* U.S. ARMY CORPS OF ENGINEERS

* THE HYDROLOGIC ENGINEERING CENTER

* 609 SECOND STREET, SUITE D

* DAVIS, CALIFORNIA 95616-4687

* (916) 756-1104, (916) 551-1748

Permanent Concrete Diversion Channel
(from sub-basin 100 to street in Jenny Court)

X	X	XXXXXX	XXXX	XXXX
X	X	X	X	X
X	X	X	X	X
XXXXXX	XXXI	I	XXXXX	XXXXX
X	X	X	X	X
X	X	X	X	X
X	X	XXXXXX	XXXX	XXXXXX

END OF BANNER

1

7/26/96 8:16:49

PAGE 1

THIS RUN EXECUTED 7/26/96 8:16:49

HEC2 RELEASE DATED SEP 88 UPDATED APR 1989

ERROR CORR - 01,02

7

MODIFICATION -

T1 JENNY COURT DIVERSION CHANNEL - DEVELOPED CONDITIONS
T2 10' WIDE RECTANGULAR CONCRETE CHANNEL SUB-CRITICAL FLOW
T3 100-YEAR / 6-HOUR DESIGN STORM

J1	ICHECK	INQ	MINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	0	2	0	0	.005	0	0	0	0	0

J3 VARIABLE CODES FOR SUMMARY PRINTOUT

	38	43	1	2	26	4	68	3
MC	.017	.017	.017	.1	.3			
QT	1	18.2						
X1	1	4	0	10.2	0	0	0	0
GR	2.0	0	0	0.1	0	10.1	2.0	10.2

1

7/26/96 8:16:49

PAGE 2

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

*PROP 1

CCHV= .100 CBHV= .300

*SECHO 1.000

2096 WSEL NOT GIVEN, AVG OF MAX, MIN USED

1.00	.50	.50	.00	.00	.70	.21	.00	.00	2.00
18.	0.	18.	0.	0.	5.	0.	0.	0.	2.00
.00	.00	3.65	.00	.000	.017	.000	.000	.00	.08
.004987	0.	0.	0.	0	0	6	.00	10.05	10.12

0

1

7/26/96 8:16:49

PAGE 3

THIS RUN EXECUTED 7/26/96 8:16:49

HEC2 RELEASE DATED SEP 88 UPDATED APR 1989

ERROR CORR - 01,02

MODIFICATION -

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

100-YEAR / 6-HOUR DE

SUMMARY PRINTOUT

SECHO	Q	CWSEL	CRIWS	VCH	TOPWID	PRCH	EG
1.000	18.20	(.50)	.00	3.65	(10.05)	.91	.70
1							
7/26/96	8:16:49						

Handwritten notes:
wSEL 8'
14.4 cfs

Summary

PAGE 4

SUMMARY OF ERRORS AND SPECIAL NOTES



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

PROJECT Sun Sage Hills
SUBJECT _____
BY DLH DATE 8/7
CHECKED _____ DATE _____
SHEET _____ OF _____

PERMANENT DETENTION POND - OPTION 1

$Q_{MAX} = \text{OUTFLOW} = 18. \text{ cfs}$

OUTFLOW	STORAGE	ELEV.
0	0	19.0
1.74	.094	19.5
5.72	.194	20.0
7.40	.301	20.5
10.87	.414	21.
14.59	.662	22.
17.53	.938	23.
20.05	1.248	24.0

Peak Discharge = 18. cfs

Max. Storage Volume = .998 acre feet

Max. Water Surface Elev. = 23.2 feet

POND SIZE 116' x 116' with 3:1 side slopes

Outflow calculations using orifice equation

$$Q = .6 (\text{Area}) \sqrt{2gh}$$

$$18.2 = .6 (\text{Area}) \sqrt{64.4 (3.5)}$$

Elev.	Head	Q
19.0	0	
19.5	.5	1.74
20.0	1.0	5.72
20.5	1.5	7.4
21.0	2.0	10.87
22.0	2.25	14.59
23.0	3.25	17.53
24.0	4.25	20.05



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

PROJECT Sun Sage Hills
SUBJECT _____
BY DLH DATE _____
CHECKED _____ DATE 8/7
SHEET _____ OF _____

PERMANENT DETENTION POND - OPTION 2

Q MAX OUTFLOW = 1.4 cfs

OUTFLOW	STORAGE	ELEV.
0	0	19.0
.36	.31	19.5
.77	.63	20.0
.99	.97	20.5
1.15	1.31	21.0
1.45	2.04	22.0
1.70	2.82	23.0

Peak Discharge = 1.4 cfs

Max Storage Volume = 1.91 acre-feet

Max. Water Surface Elev. = 21.8 feet

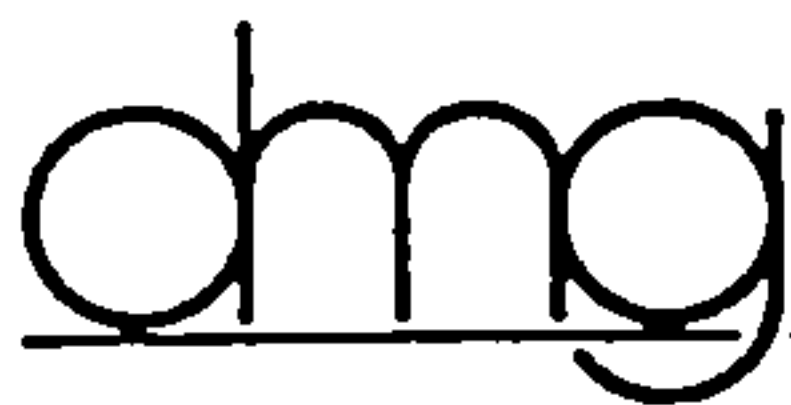
POND SIZE 181' x 181' with 3:1 side slopes.

OUTFLOW CALCULATED USING ORIFICE EQUATION.

$$Q = .6(\text{Area})\sqrt{2gh}$$

$$1.4 = .6(\text{Area})\sqrt{64.4(2.5)} \quad \text{Area} = .1838$$

Elev.	Head	Q
19.0	0	0
19.5	.5	.36
20.0	.76	.77
20.5	1.26	.99
21.0	1.76	1.15
22.0	2.76	1.45
23.0	3.76	1.70



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

PROJECT Sun Sage Hills
SUBJECT _____
BY DLH DATE 8/7
CHECKED _____ DATE _____
SHEET _____ OF _____

TEMPORARY DETENTION POND - OPTION 2

$$Q_{max} = 1.4 \text{ cfs}$$

APPROX. 111' x 111'

OUTFLOW	STORAGE	ELEV.
0	0	19.0
.47	.1229	19.5
1.08	.2532	20.0
1.40	.4000	20.5
1.65	.5361	21.0

OUTFLOW CALCS. ORIFICE (Max depth = 1.5')

$$Q = CA\sqrt{2gh} \Rightarrow 1.4 = .6(\text{Area})\sqrt{64.4(1.25)}$$

$$\text{Area} = .260$$

	Elev.	Head	Q cfs
19.0			
19.5	.50	.50	0.47
20.0	1.0	.75	1.084
20.5	1.5	1.25	1.40
21.0	2.0	1.75	1.656

APPENDIX B
EXISTING CONDITIONS

USER NO.= M GOODWIN.I01

INPUT FILE = sagex2.dat

		FROM	TO	PEAK	RUNOFF	TIME TO		CFS	PAGE = 1
	HYDROGRAPH	ID	ID	AREA	DISCHARGE	VOLUME	RUNOFF	PEAK	
COMMAND	IDENTIFICATION	NO.	NO.	(SQ MI)	(CFS)	(AC-FT)	(INCHES)	(HOURS)	ACRE
START									TIME= .00
RAINFALL TYPE= 1									RAIN6= 2.200
COMPUTE NM HYD	100.00	-	1	.02190	18.20	.513	.43919	1.532	1.299 PER IMP= .00
COMPUTE NM HYD	101.00	-	2	.01310	10.89	.307	.43919	1.532	1.299 PER IMP= .00
ADD HYD	101.00	1& 2	3	.03500	29.10	.820	.43918	1.532	1.299
ROUTE	201.00	3	4	.03500	29.24	.820	.43921	1.532	1.305
COMPUTE NM HYD	104.00	-	1	.01350	27.72	.924	1.28283	1.499	3.208 PER IMP= 42.00
ADD HYD	104.00	1& 4	2	.04850	56.19	1.743	.67402	1.532	1.810
ROUTE	204.00	2	3	.04850	54.25	1.743	.67403	1.565	1.748
COMPUTE NM HYD	102.00	-	1	.01310	28.19	.961	1.37477	1.499	3.362 PER IMP= 50.00
COMPUTE NM HYD	103.00	-	2	.00398	8.42	.284	1.33869	1.499	3.304 PER IMP= 47.00
ADD HYD	103.00	1& 2	4	.01708	36.61	1.245	1.36633	1.499	3.349
ADD HYD	104.00	3& 4	2	.06558	87.66	2.988	.85433	1.532	2.089
ROUTE	203.00	2	3	.06558	87.58	2.988	.85433	1.532	2.087
COMPUTE NM HYD	105.00	-	1	.00526	10.81	.360	1.28283	1.499	3.211 PER IMP= 42.00
ADD HYD	105.00	1& 3	2	.07084	98.09	3.348	.88614	1.532	2.164
ROUTE	205.00	2	3	.07084	88.83	3.348	.88615	1.598	1.959
COMPUTE NM HYD	106.00	-	1	.01893	39.79	1.342	1.32880	1.499	3.285 PER IMP= 46.00
ADD HYD	106.00	1& 3	2	.08977	121.59	4.689	.97948	1.565	2.116
ROUTE	206.00	2	3	.08977	119.68	4.690	.97949	1.598	2.083
COMPUTE NM HYD	107.00	-	1	.02670	46.95	1.469	1.03176	1.499	2.748 PER IMP= 23.00
COMPUTE NM HYD	108.00	-	2	.01073	8.92	.251	.43919	1.532	1.299 PER IMP= .00
ADD HYD	108.00	1& 2	4	.03743	55.64	1.721	.86188	1.499	2.323
ADD HYD	108.00	3& 4	2	.12720	168.16	6.410	.94487	1.565	2.066
ROUTE	208.00	2	3	.12720	167.68	6.410	.94488	1.565	2.060
COMPUTE NM HYD	109.00	-	1	.00570	11.48	.379	1.24675	1.499	3.148 PER IMP= 39.00
COMPUTE NM HYD	110.00	-	2	.00345	2.87	.081	.43919	1.532	1.301 PER IMP= .00
ADD HYD	110.00	1& 2	4	.00915	14.28	.460	.94222	1.499	2.439
ADD HYD	110.00	3& 4	2	.13635	180.28	6.870	.94470	1.565	2.066
ROUTE	210.00	2	3	.13635	179.87	6.870	.94470	1.565	2.061
FINISH									

AHYMO PROGRAM (AHYMO194) - AMAFCA Hydrologic Model - January, 1994
RUN DATE (MON/DAY/YR) = 07/24/1996
START TIME (HR:MIN:SEC) = 07:12:56 USER NO.= M_GOODWN.I01
INPUT FILE = sagex2.dat

START TIME=0.0
***** SUN SAGE HILLS SUBDIVISION - EXISTING CONDITIONS
***** 100-YEAR 6-HOUR STORM EVENT
***** REAR YARD PONDS IN SUB-BASINS 102-106;
***** REVISED ASSUME 56% OF LOT AREA CONTRIBUTES TO RUNOFF
***** FOR SUB-BASINS WITH REAR YARD PONDS;
***** REVISED SPLIT B/C LAND TREATMENT 60/40
***** REVISED TO INCLUDE 0.125 GUTTER LIP
***** *****
***** FILE: SAGEX2.DAT JULY 24 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

COMPUTE NM HYD ID=1 HYD NO=100.0 AREA=0.0219 SQ MI
PER A=100 PER B=0 PER C=0 PER D=0
TP=0.1333 HR MASS RAINFALL=-1

K = .163684HR TP = .133300HR K/TP RATIO = 1.227936 SHAPE CONSTANT, N = 2.899764
UNIT PEAK = 44.941 CFS UNIT VOLUME = .9993 B = 273.54 P60 = 1.8700
AREA = .021900 SQ MI IA = .65000 INCHES INF = 1.67000 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 = .43919 INCHES = .5130 ACRE-FEET
PEAK DISCHARGE RATE = 18.20 CFS AT 1.532 HOURS BASIN AREA = .0219 SQ. MI.

***** SUB-BASIN 101 UNDEVELOPED

COMPUTE NM HYD ID=2 HYD NO=101.0 AREA=0.0131 SQ MI
PER A=100 PER B=0 PER C=0 PER D=0
TP=0.1333 HR MASS RAINFALL=-1

K = .163684HR TP = .133300HR K/TP RATIO = 1.227936 SHAPE CONSTANT, N = 2.899764
UNIT PEAK = 26.882 CFS UNIT VOLUME = .9991 B = 273.54 P60 = 1.8700
AREA = .013100 SQ MI IA = .65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=2 CODE=1

PARTIAL HYDROGRAPH 101.00

RUNOFF VOLUME = .43919 INCHES = .3068 ACRE-FEET
PEAK DISCHARGE RATE = 10.89 CFS AT 1.532 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 = .43918 INCHES = .8198 ACRE-FEET
PEAK DISCHARGE RATE = 29.10 CFS AT 1.532 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=0.87

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 SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH 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 = .43921 INCHES = .8199 ACRE-FEET
PEAK DISCHARGE RATE = 29.24 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=0.0135 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 = .67402 INCHES = 1.7434 ACRE-FEET
PEAK DISCHARGE RATE = 56.19 CFS AT 1.532 HOURS BASIN AREA = .0485 SQ. MI.

***** ROUTE 770 FT EAST ON REBA AVE 32' FF 50' ROW

***** @ 0.0164 FT/FT

COMPUTE RATING CURVE CID=1 VS NO=9 NO SEGS=1

MIN ELEV=0.0 MAX ELEV=0.87

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 SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH 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 = .67403 INCHES = 1.7435 ACRE-FEET
 PEAK DISCHARGE RATE = 54.25 CFS AT 1.565 HOURS BASIN AREA = .0485 SQ. MI.

***** SUB-BASIN 102 RESIDENTIAL (5.1 UN/AC)

COMPUTE NM HYD ID=1 HYD NO=102.0 AREA=0.0131 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 = .85433 INCHES = 2.9881 ACRE-FEET
 PEAK DISCHARGE RATE = 87.66 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 SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH 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 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 = .85433 INCHES = 2.9881 ACRE-FEET
PEAK DISCHARGE RATE = 87.58 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 = .88614 INCHES = 3.3479 ACRE-Feet
PEAK DISCHARGE RATE = 98.09 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 SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH 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 DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME 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 = .88615 INCHES = 3.3480 ACRE-FEET
 PEAK DISCHARGE RATE = 88.83 CFS AT 1.598 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 = .97948 INCHES = 4.6895 ACRE-FEET
 PEAK DISCHARGE RATE = 121.59 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	FLOW	FLOW	TOP	
SURFACE	AREA	RATE	WIDTH	
ELEV	SQ FT	CFS	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	AVERAGE	FLOW	TRAVEL
DEPTH	AREA	RATE	TIME
FEET	SQ.FT.	CFS	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 = .97949 INCHES = 4.6895 ACRE-FEET
PEAK DISCHARGE RATE = 119.68 CFS AT 1.598 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

COMPUTE NM HYD ID=2 HYD NO=108.0 AREA=0.01073 SQ MI
PER A=100 PER B=0 PER C=0 PER D=0
TP=0.1333 HR MASS RAINFALL=-1

K = .163684HR TP = .133300HR K/TP RATIO = 1.227936 SHAPE CONSTANT, N = 2.899764
UNIT PEAK = 22.019 CFS UNIT VOLUME = .9990 B = 273.54 P60 = 1.8700
AREA = .010730 SQ MI IA = .65000 INCHES INF = 1.67000 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 = .43919 INCHES = .2513 ACRE-FEET
PEAK DISCHARGE RATE = 8.92 CFS AT 1.532 HOURS BASIN AREA = .0107 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 = .86188 INCHES = 1.7205 ACRE-FEET
PEAK DISCHARGE RATE = 55.64 CFS AT 1.499 HOURS BASIN AREA = .0374 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 = .94487 INCHES = 6.4100 ACRE-FEET
 PEAK DISCHARGE RATE = 168.16 CFS AT 1.565 HOURS BASIN AREA = .1272 SQ. MI.

 ***** ROUTE 300 FT SOUTHEAST ON SAPPHIRE ST. TO MICHELLE
 ***** INCLUDES 8" DIVERSION BERM
 ***** 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=1.67
 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 .67
 60 1.0 60.05 1.67

RATING CURVE VALLEY SECTION 9.0				
WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH FT	
.00	.00	.00	.00	
.09	.12	.15	2.79	
.18	.58	.93	9.06	
.26	1.76	3.82	17.86	
.35	3.72	10.17	26.66	
.44	6.45	21.08	35.46	
.53	9.86	39.44	40.03	
.62	13.38	65.39	40.04	
.70	16.93	93.65	42.05	
.79	20.86	122.77	47.35	
.88	25.26	157.57	52.65	
.97	30.12	198.48	57.95	
1.05	35.35	253.28	59.96	
1.14	40.63	318.68	59.97	
1.23	45.90	389.80	59.98	
1.32	51.17	466.37	60.00	
1.41	56.44	548.16	60.01	
1.49	61.72	634.98	60.02	
1.58	67.00	726.63	60.04	
1.67	72.27	822.96	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	.123	.15	.0673
.176	.579	.93	.0516
.264	1.762	3.82	.0384
.352	3.718	10.17	.0305
.439	6.448	21.08	.0255
.527	9.862	39.44	.0208
.615	13.381	65.39	.0171
.703	16.934	93.65	.0151
.791	20.863	122.77	.0142
.879	25.258	157.57	.0134
.967	30.118	198.48	.0126
1.055	35.355	253.28	.0116
1.143	40.625	318.68	.0106
1.231	45.897	389.80	.0098
1.318	51.170	466.37	.0091

	1.406	56.444	548.16	.0086
	1.494	61.719	634.98	.0081
	1.582	66.996	726.63	.0077
	1.670	72.273	822.96	.0073

ROUTE ID=3 HYD NO=208 INFLOW ID=2 DT=0.0
PRINT HYD ID=3 CODE=1

PARTIAL HYDROGRAPH 208.00

RUNOFF VOLUME = .94488 INCHES = 6.4100 ACRE-FEET
PEAK DISCHARGE RATE = 167.68 CFS AT 1.565 HOURS BASIN AREA = .1272 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

COMPUTE NM HYD ID=2 HYD NO=110.0 AREA=0.00345 SQ MI
PER A=100 PER B=0 PER C=0 PER D=0
TP=0.1333 HR MASS RAINFALL=-1

K = .163684HR TP = .133300HR K/TP RATIO = 1.227936 SHAPE CONSTANT, N = 2.899764
UNIT PEAK = 7.0797 CFS UNIT VOLUME = .9975 B = 273.54 P60 = 1.8700
AREA = .003450 SQ MI IA = .65000 INCHES INF = 1.67000 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 = .43919 INCHES = .0808 ACRE-FEET
PEAK DISCHARGE RATE = 2.87 CFS AT 1.532 HOURS BASIN AREA = .0035 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 = .94222 INCHES = .4598 ACRE-FEET
PEAK DISCHARGE RATE = 14.28 CFS AT 1.499 HOURS BASIN AREA = .0092 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 = .94470 INCHES = 6.8698 ACRE-FEET
PEAK DISCHARGE RATE = 180.28 CFS AT 1.565 HOURS BASIN AREA = .1364 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 .67 60 1.0

RATING CURVE VALLEY SECTION 9.0

WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH 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
 PRINT HYD ID=3 CODE=1

PARTIAL HYDROGRAPH 210.00

RUNOFF VOLUME = .94470 INCHES = 6.8698 ACRE-FEET
 PEAK DISCHARGE RATE = 179.87 CFS AT 1.565 HOURS BASIN AREA = .1364 SQ. MI.

FINISH

NORMAL PROGRAM FINISH END TIME (HR:MIN:SEC) = 07:13:02

APPENDIX C
DEVELOPED CONDITIONS
OPTION 1 AND OPTION 2

S.B.100 DEVELOPED

INPUT FILE = saged.dat

RUN DATE (MON/DAY/YR) =08/06/1996

USER NO.= M GOODWIN.101

		FROM	TO		PEAK	RUNOFF	TIME TO		CFS	PAGE = 1
	HYDROGRAPH	ID	ID	AREA	DISCHARGE	VOLUME	RUNOFF	PEAK	PER	
COMMAND	IDENTIFICATION	NO.	NO.	(SQ MI)	(CFS)	(AC-FT)	(INCHES)	(HOURS)	ACRE	NOTATION
START										TIME= .00
RAINFALL TYPE= 1										RAIN6= 2.200
COMPUTE NM HYD	100.00	-	1	.02190	58.56	2.161	1.85049	1.499	4.178	PER IMP= 90.00
COMPUTE NM HYD	101.00	-	2	.01310	30.61	1.077	1.54209	1.499	3.651	PER IMP= 64.00
ADD HYD	101.00	1& 2	3	.03500	89.17	3.239	1.73504	1.499	3.981	
ROUTE	201.00	3	4	.03500	87.02	3.239	1.73505	1.532	3.885	
COMPUTE NM HYD	104.00	-	1	.01350	27.72	.924	1.28283	1.499	3.208	PER IMP= 42.00
ADD HYD	104.00	1& 4	2	.04850	113.98	4.162	1.60916	1.532	3.672	
ROUTE	204.00	2	3	.04850	109.04	4.162	1.60917	1.565	3.513	
COMPUTE NM HYD	102.00	-	1	.01310	28.19	.961	1.37477	1.499	3.362	PER IMP= 50.00
COMPUTE NM HYD	103.00	-	2	.00398	8.42	.284	1.33869	1.499	3.304	PER IMP= 47.00
ADD HYD	103.00	1& 2	4	.01708	36.61	1.245	1.36633	1.499	3.349	
ADD HYD	104.00	3& 4	2	.06558	143.86	5.407	1.54592	1.532	3.428	
ROUTE	203.00	2	3	.06558	143.31	5.407	1.54593	1.532	3.415	
COMPUTE NM HYD	105.00	-	1	.00526	10.81	.360	1.28283	1.499	3.211	PER IMP= 42.00
ADD HYD	105.00	1& 3	2	.07084	153.83	5.767	1.52638	1.532	3.393	
ROUTE	205.00	2	3	.07084	139.30	5.767	1.52639	1.665	3.072	
COMPUTE NM HYD	106.00	-	1	.01893	39.79	1.342	1.32880	1.499	3.285	PER IMP= 46.00
ADD HYD	106.00	1& 3	2	.08977	165.01	7.108	1.48471	1.598	2.872	
ROUTE	206.00	2	3	.08977	164.22	7.108	1.48472	1.598	2.858	
COMPUTE NM HYD	107.00	-	1	.02670	46.95	1.469	1.03176	1.499	2.748	PER IMP= 23.00
COMPUTE NM HYD	108.00	-	2	.00600	12.29	.409	1.27962	1.499	3.201	PER IMP= 42.00
ADD HYD	108.00	1& 2	4	.03270	59.24	1.879	1.07722	1.499	2.831	
ADD HYD	108.00	3& 4	2	.12247	210.14	8.987	1.37591	1.565	2.681	
ROUTE	208.00	2	3	.12247	210.30	8.987	1.37591	1.598	2.683	
COMPUTE NM HYD	109.00	-	1	.00570	11.48	.379	1.24675	1.499	3.148	PER IMP= 39.00
COMPUTE NM HYD	110.00	-	2	.00193	3.98	.132	1.28283	1.499	3.219	PER IMP= 42.00
ADD HYD	110.00	1& 2	4	.00763	15.46	.511	1.25580	1.499	3.166	
ADD HYD	110.00	3& 4	2	.13010	222.14	9.498	1.36887	1.565	2.668	
ROUTE	210.00	2	3	.13010	222.86	9.498	1.36887	1.598	2.677	
FINISH										

OPTION 1

RUN DATE (MON/DAY/YR) =08/06/1996

USER NO.= M GOODMAN.I01

[illegible]

AHYMO PROGRAM (AHYMO194) - AMAFCA Hydrologic Model - January, 1994
RUN DATE (MON/DAY/YR) = 08/06/1996
START TIME (HR:MIN:SEC) = 16:48:33 USER NO.= M_GOODWN.I01
INPUT FILE = sagedo1.dat

START TIME=0.0
***** SUN SAGE HILLS SUBDIVISION - DEVELOPED CONDITIONS
***** 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 18.2 CFS WHERE Q.(EXIST)=Q(DEV)

***** FILE: SAGEDO1.DAT JULY 23 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 18.2 CFS
 ***** ROUTE THROUGH DETENTION POND (APPROX. POND AREA 116'x116')
 ***** USING AN ORIFICE TO CONSTRICT FLOW

 ROUTE RESERVOIR ID=2 HYD=POND.101 INFLOW=1 CODE=10

OUTFLOW(CFS) STORAGE(AC FT) ELEV(FT)

0	0	19.0
1.74	.094	19.5
5.72	.194	20.0
7.40	.301	20.5
10.87	.414	21.0
14.59	.662	22.0
17.53	.938	23.0
20.05	1.248	24.0

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	19.41	.077	1.43
1.67	29.83	22.92	.916	17.29
2.00	14.08	23.12	.977	17.84
2.33	3.00	22.22	.722	15.23
2.66	1.24	21.01	.416	10.90
3.00	.66	20.13	.222	6.16
3.33	.44	19.61	.117	2.65
3.66	.36	19.41	.077	1.42
4.00	.32	19.28	.053	.99
4.33	.31	19.21	.039	.72
4.66	.32	19.16	.030	.56
5.00	.33	19.13	.025	.46
5.33	.35	19.12	.022	.41
5.66	.37	19.11	.021	.39
5.99	.40	19.11	.021	.39
6.33	.04	19.09	.017	.31
6.66	.01	19.06	.010	.19
6.99	.00	19.03	.006	.12
7.33	.00	19.02	.004	.07
7.66	.00	19.01	.002	.04
7.99	.00	19.01	.001	.03
8.33	.00	19.00	.001	.02
8.66	.00	19.00	.001	.01
8.99	.00	19.00	.000	.01
9.32	.00	19.00	.000	.00

PEAK DISCHARGE = 18.021 CFS - PEAK OCCURS AT HOUR 1.86
 MAXIMUM WATER SURFACE ELEVATION = 23.195
 MAXIMUM STORAGE = .9984 AC-FT INCREMENTAL TIME= .033300HRS

PRINT HYD ID=2 CODE=1

HYDROGRAPH FROM AREA POND.101

RUNOFF VOLUME = 1.85047 INCHES = 2.1613 ACRE-FEET
 PEAK DISCHARGE RATE = 18.02 CFS AT 1.865 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 = 1.73501 INCHES = 3.2387 ACRE-FEET

PEAK DISCHARGE RATE = 43.69 CFS AT 1.532 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 SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH 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 = 1.73502 INCHES = 3.2387 ACRE-FEET
PEAK DISCHARGE RATE = 43.87 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 = 1.60914 INCHES = 4.1623 ACRE-FEET
 PEAK DISCHARGE RATE = 70.83 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 SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH 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 = 1.60915 INCHES = 4.1623 ACRE-FEET
 PEAK DISCHARGE RATE = 69.10 CFS AT 1.565 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 = 1.54590 INCHES = 5.4069 ACRE-FEET
PEAK DISCHARGE RATE = 104.14 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 SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH 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 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 = 1.54591 INCHES = 5.4069 ACRE-FEET
PEAK DISCHARGE RATE = 103.85 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 = 1.52636 INCHES = 5.7668 ACRE-FEET
 PEAK DISCHARGE RATE = 114.37 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 SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH 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 DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME 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 = 1.52637 INCHES = 5.7668 ACRE-Feet
 PEAK DISCHARGE RATE = 103.74 CFS AT 1.598 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 = 1.48470 INCHES = 7.1083 ACRE-Feet
 PEAK DISCHARGE RATE = 136.70 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 FLOW FLOW TOP
SURFACE AREA RATE WIDTH

ELEV SQ FT CFS 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 AVERAGE FLOW TRAVEL
DEPTH AREA RATE TIME
FEET SQ.FT. CFS 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
TRAVEL TIME TABLE EXCEEDED
PRINT HYD ID=3 CODE=1

PARTIAL HYDROGRAPH 206.00

RUNOFF VOLUME = 1.48470 INCHES = 7.1083 ACRE-FEET
PEAK DISCHARGE RATE = 134.57 CFS AT 1.598 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=0.00600 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 = 9.9491 CFS UNIT VOLUME = .9982 B = 526.28 P60 = 1.8700
AREA = .002520 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 = 9.0991 CFS UNIT VOLUME = .9990 B = 348.54 P60 = 1.8700
AREA = .003480 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 = .4095 ACRE-FEET
PEAK DISCHARGE RATE = 12.29 CFS AT 1.499 HOURS BASIN AREA = .0060 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 = 1.07722 INCHES = 1.8787 ACRE-FEET
PEAK DISCHARGE RATE = 59.24 CFS AT 1.499 HOURS BASIN AREA = .0327 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 = 1.37590 INCHES = 8.9869 ACRE-FEET
PEAK DISCHARGE RATE = 185.43 CFS AT 1.565 HOURS BASIN AREA = .1225 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 = 1.37590 INCHES = 8.9870 ACRE-FEET
 PEAK DISCHARGE RATE = 185.03 CFS AT 1.565 HOURS BASIN AREA = .1225 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=0.00193 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 = 3.2003 CFS UNIT VOLUME = .9960 B = 526.28 P60 = 1.8700
 AREA = .000811 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 = 2.9353 CFS UNIT VOLUME = .9958 B = 349.54 P60 = 1.8700
AREA = .001119 SQ MI IA = .43793 INCHES INF = 1.07621 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 = 1.28283 INCHES = .1320 ACRE-FEET
PEAK DISCHARGE RATE = 3.98 CFS AT 1.499 HOURS BASIN AREA = .0019 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 = 1.25580 INCHES = .5110 ACRE-FEET
PEAK DISCHARGE RATE = 15.46 CFS AT 1.499 HOURS BASIN AREA = .0076 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 = 1.36885 INCHES = 9.4980 ACRE-FEET
PEAK DISCHARGE RATE = 198.37 CFS AT 1.565 HOURS BASIN AREA = .1301 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 SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH 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
PRINT HYD ID=3 CODE=1

PARTIAL HYDROGRAPH 210.00

RUNOFF VOLUME = 1.36886 INCHES = 9.4980 ACRE-FEET
PEAK DISCHARGE RATE = 198.36 CFS AT 1.565 HOURS BASIN AREA = .1301 SQ. MI.

FINISH

NORMAL PROGRAM FINISH END TIME (HR:MIN:SEC) = 16:48:39

OPTION 2

RUN DATE (MON/DAY/YR) =08/06/1996

USER NO.= M GOODMAN.I01

[illegible]

AHYMO PROGRAM (AHYMO194) - AMAFCA Hydrologic Model - January, 1994
RUN DATE (MON/DAY/YR) = 08/06/1996
START TIME (HR:MIN:SEC) = 20:29:32 USER NO.= M_GOODWN.I01
INPUT FILE = sagedo2.dat

START TIME=0.0
***** SUN SAGE HILLS SUBDIVISION - DEVELOPED CONDITIONS
***** 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 SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH 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 = 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 SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH 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 = 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

WATER SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH 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 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

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

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 = 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=0.00600 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 = 9.9491 CFS UNIT VOLUME = .9982 B = 526.28 P60 = 1.8700
AREA = .002520 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 = 9.0991 CFS UNIT VOLUME = .9990 B = 348.54 P60 = 1.8700
AREA = .003480 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 = .4095 ACRE-FEET
PEAK DISCHARGE RATE = 12.29 CFS AT 1.499 HOURS BASIN AREA = .0060 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 = 1.07722 INCHES = 1.8787 ACRE-FEET
PEAK DISCHARGE RATE = 59.24 CFS AT 1.499 HOURS BASIN AREA = .0327 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 = 1.29225 INCHES = 8.4406 ACRE-FEET
PEAK DISCHARGE RATE = 177.12 CFS AT 1.565 HOURS BASIN AREA = .1225 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	
.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	AVERAGE	FLOW	TRAVEL
DEPTH	AREA	RATE	TIME
FEET	SQ.FT.	CFS	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 = 1.29163 INCHES = 8.4365 ACRE-FEET
PEAK DISCHARGE RATE = 177.53 CFS AT 1.565 HOURS BASIN AREA = .1225 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=0.00193 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 = 3.2003 CFS UNIT VOLUME = .9960 B = 526.28 P60 = 1.8700
AREA = .000811 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 = 2.9353 CFS UNIT VOLUME = .9958 B = 349.54 P60 = 1.8700
AREA = .001119 SQ MI IA = .43793 INCHES INF = 1.07621 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 = 1.28283 INCHES = .1320 ACRE-FEET
PEAK DISCHARGE RATE = 3.98 CFS AT 1.499 HOURS BASIN AREA = .0019 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 = 1.25580 INCHES = .5110 ACRE-FEET
PEAK DISCHARGE RATE = 15.46 CFS AT 1.499 HOURS BASIN AREA = .0076 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 = 1.28953 INCHES = 8.9475 ACRE-FEET
PEAK DISCHARGE RATE = 190.87 CFS AT 1.565 HOURS BASIN AREA = .1301 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 SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH 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
PRINT HYD ID=3 CODE=1

PARTIAL HYDROGRAPH 210.00

RUNOFF VOLUME = 1.28924 INCHES = 8.9456 ACRE-FEET
PEAK DISCHARGE RATE = 191.20 CFS AT 1.565 HOURS BASIN AREA = .1301 SQ. MI.

FINISH

NORMAL PROGRAM FINISH END TIME (HR:MIN:SEC) = 20:29:38

OPTION 2

RUN DATE (MON/DAY/YR) =08/06/1996

USER NO.= M GOODMAN.I01

[illegible]

AHYMO PROGRAM (AHYMO194) - AMAFCA Hydrologic Model - January, 1994
RUN DATE (MON/DAY/YR) = 08/06/1996
START TIME (HR:MIN:SEC) = 20:30:13 USER NO.= M_GOODWN.I01
INPUT FILE = sagedo2t.dat

START TIME=0.0
***** SUN SAGE HILLS SUBDIVISION - DEVELOPED CONDITIONS
***** 100-YEAR 6-HOUR STORM EVENT
***** TEMPORARY DETENTION POND WITH SB 100 UNDEVELOPED
***** 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: SAGEDO2T.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

COMPUTE NM HYD ID=1 HYD NO=100.0 AREA=0.0219 SQ MI
PER A=100 PER B=0 PER C=0 PER D=0
TP=0.1333 HR MASS RAINFALL=-1

K = .163684HR TP = .133300HR K/TP RATIO = 1.227936 SHAPE CONSTANT, N = 2.899764
UNIT PEAK = 44.941 CFS UNIT VOLUME = .9993 B = 273.54 P60 = 1.8700
AREA = .021900 SQ MI IA = .65000 INCHES INF = 1.67000 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 = .43919 INCHES = .5130 ACRE-Feet

PEAK DISCHARGE RATE = 18.20 CFS AT 1.532 HOURS BASIN AREA = .0219 SQ. MI.

***** MAXIMUM FLOW FROM SB 100 IS 1.4 CFS

***** ROUTE THROUGH DETENTION POND

***** ORIFICE OPENING

ROUTE RESERVOIR ID=2 HYD=POND.101 INFLOW=1 CODE=10

OUTFLOW(CFS) STORAGE(AC FT) ELEV(FT)

0	0	19.0
.47	.12298	19.5
1.084	.25319	20.0
1.40	.4000	20.5
1.656	.5361	21.0

* * * * *

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	.00	19.00	.000	.00
1.67	10.42	20.18	.306	1.20
2.00	1.72	20.48	.394	1.39
2.33	.86	20.46	.390	1.38
2.66	.44	20.40	.369	1.33
3.00	.22	20.30	.342	1.28
3.33	.11	20.20	.312	1.21
3.66	.06	20.10	.282	1.15
4.00	.03	20.00	.253	1.08
4.33	.01	19.89	.225	.95
4.66	.01	19.80	.201	.84
5.00	.00	19.72	.179	.74
5.33	.00	19.64	.160	.65
5.66	.00	19.58	.144	.57
5.99	.00	19.52	.129	.50
6.33	.00	19.47	.116	.44
6.66	.00	19.43	.105	.40
6.99	.00	19.38	.094	.36
7.33	.00	19.34	.085	.32
7.66	.00	19.31	.076	.29
7.99	.00	19.28	.069	.26
8.33	.00	19.25	.062	.24
8.66	.00	19.23	.056	.21
8.99	.00	19.20	.050	.19
9.32	.00	19.18	.045	.17
9.66	.00	19.17	.041	.16
9.99	.00	19.15	.037	.14
10.32	.00	19.13	.033	.13
10.66	.00	19.12	.030	.11
10.99	.00	19.11	.027	.10
11.32	.00	19.10	.024	.09
11.66	.00	19.09	.022	.08
11.99	.00	19.08	.019	.07
12.32	.00	19.07	.017	.07
12.65	.00	19.06	.016	.06
12.99	.00	19.06	.014	.05
13.32	.00	19.05	.013	.05
13.65	.00	19.05	.011	.04
13.99	.00	19.04	.010	.04
14.32	.00	19.04	.009	.04
14.65	.00	19.03	.008	.03
14.99	.00	19.03	.008	.03
15.32	.00	19.03	.007	.03

15.65	.00	19.02	.006	.02
15.98	.00	19.02	.006	.02
16.32	.00	19.02	.005	.02
16.65	.00	19.02	.004	.02
16.98	.00	19.02	.004	.02
17.32	.00	19.01	.004	.01
17.65	.00	19.01	.003	.01
17.98	.00	19.01	.003	.01
18.32	.00	19.01	.003	.01

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

18.65	.00	19.01	.002	.01
18.98	.00	19.01	.002	.01
19.31	.00	19.01	.002	.01
19.65	.00	19.01	.002	.01

PEAK DISCHARGE = 1.389 CFS - PEAK OCCURS AT HOUR 2.10
 MAXIMUM WATER SURFACE ELEVATION = 20.483
 MAXIMUM STORAGE = .3951 AC-FT INCREMENTAL TIME= .033300HRS

PRINT HYD ID=2 CODE=1

HYDROGRAPH FROM AREA POND.101

RUNOFF VOLUME = .43784 INCHES = .5114 ACRE-FEET
 PEAK DISCHARGE RATE = 1.39 CFS AT 2.098 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 = .85114 INCHES = 1.5888 ACRE-FEET

PEAK DISCHARGE RATE = 31.01 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 SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH FT
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.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 = .85110 INCHES = 1.5887 ACRE-FEET
PEAK DISCHARGE RATE = 30.86 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 = .97127 INCHES = 2.5123 ACRE-FEET
PEAK DISCHARGE RATE = 57.81 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 = .97121 INCHES = 2.5122 ACRE-FEET
PEAK DISCHARGE RATE = 56.28 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 = 1.07412 INCHES = 3.7568 ACRE-FEET
PEAK DISCHARGE RATE = 91.78 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 SURFACE ELEV	FLOW AREA SQ FT	FLOW RATE CFS	TOP WIDTH FT
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.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 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 = 1.07411 INCHES = 3.7568 ACRE-FEET
 PEAK DISCHARGE RATE = 92.05 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 = 1.08961 INCHES = 4.1167 ACRE-FEET
 PEAK DISCHARGE RATE = 102.57 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 DEPTH FEET	AVERAGE AREA SQ.FT.	FLOW RATE CFS	TRAVEL TIME 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 = 1.08954 INCHES = 4.1164 ACRE-FEET
PEAK DISCHARGE RATE = 92.13 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 = 1.13999 INCHES = 5.4579 ACRE-FEET
PEAK DISCHARGE RATE = 126.26 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 = 1.13997 INCHES = 5.4578 ACRE-FEET
PEAK DISCHARGE RATE = 124.84 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=0.00600 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 = 9.9491 CFS UNIT VOLUME = .9982 B = 526.28 P60 = 1.8700
AREA = .002520 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 = 9.0991 CFS UNIT VOLUME = .9990 B = 348.54 P60 = 1.8700
AREA = .003480 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 = .4095 ACRE-FEET
PEAK DISCHARGE RATE = 12.29 CFS AT 1.499 HOURS BASIN AREA = .0060 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 = 1.07722 INCHES = 1.8787 ACRE-FEET
PEAK DISCHARGE RATE = 59.24 CFS AT 1.499 HOURS BASIN AREA = .0327 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 = 1.12321 INCHES = 7.3365 ACRE-FEET
PEAK DISCHARGE RATE = 176.83 CFS AT 1.565 HOURS BASIN AREA = .1225 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 = 1.12320 INCHES = 7.3364 ACRE-FEET
PEAK DISCHARGE RATE = 177.24 CFS AT 1.565 HOURS BASIN AREA = .1225 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=0.00193 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 = 3.2003 CFS UNIT VOLUME = .9960 B = 526.28 P60 = 1.8700
AREA = .000811 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 = 2.9353 CFS UNIT VOLUME = .9958 B = 349.54 P60 = 1.8700
AREA = .001119 SQ MI IA = .43793 INCHES INF = 1.07621 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 = 1.28283 INCHES = .1320 ACRE-FEET
PEAK DISCHARGE RATE = 3.98 CFS AT 1.499 HOURS BASIN AREA = .0019 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 = 1.25580 INCHES = .5110 ACRE-FEET
PEAK DISCHARGE RATE = 15.46 CFS AT 1.499 HOURS BASIN AREA = .0076 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 = 1.13098 INCHES = 7.8474 ACRE-FEET
PEAK DISCHARGE RATE = 190.58 CFS AT 1.565 HOURS BASIN AREA = .1301 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
PRINT HYD ID=3 CODE=1

PARTIAL HYDROGRAPH 210.00

RUNOFF VOLUME = 1.13097 INCHES = 7.8474 ACRE-FEET
PEAK DISCHARGE RATE = 190.91 CFS AT 1.565 HOURS BASIN AREA = .1301 SQ. MI.

FINISH

NORMAL PROGRAM FINISH END TIME (HR:MIN:SEC) = 20:30:19

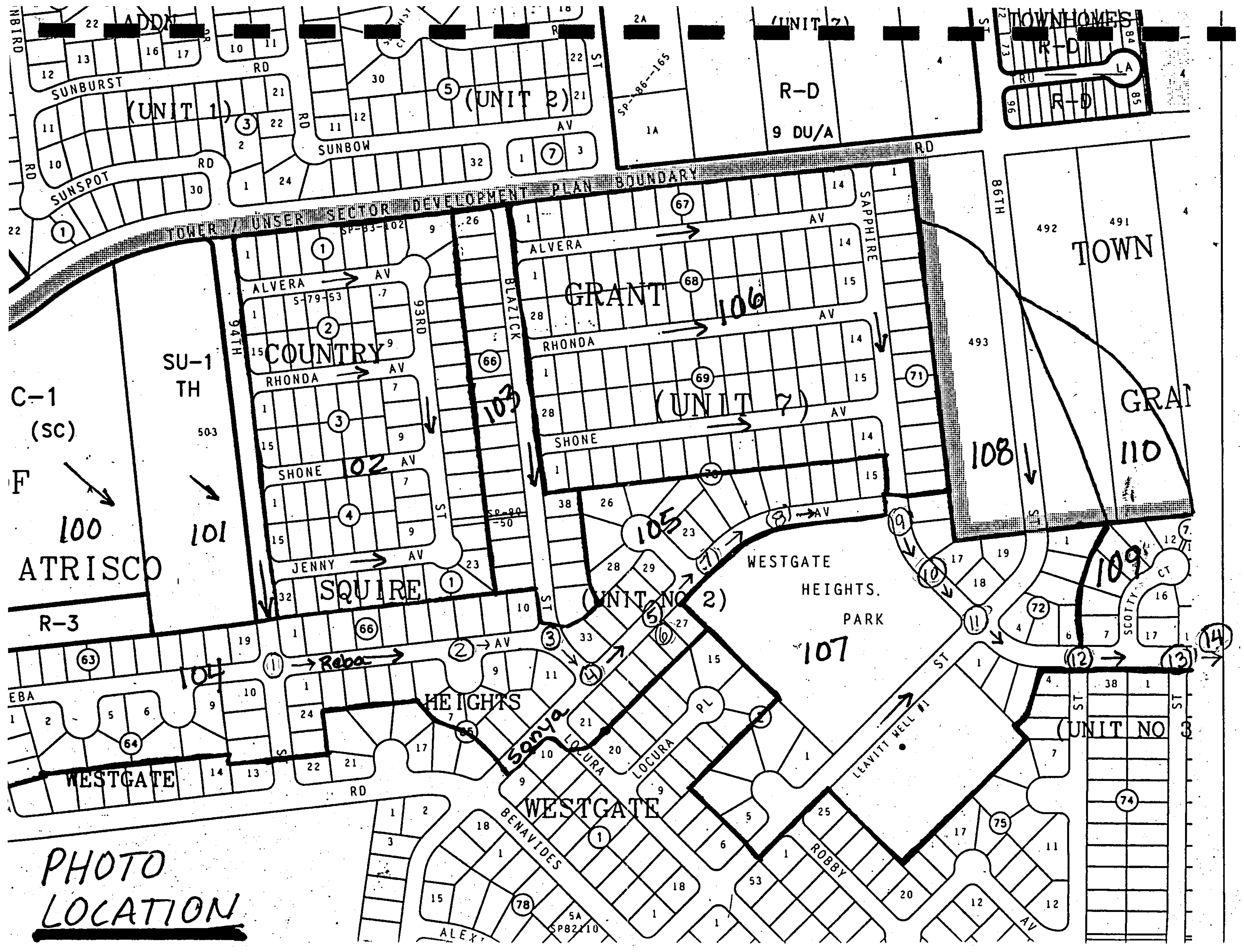


PHOTO
LOCATION