DRAINAGE REPORT

For

Sunrise Ranch Subdivision

MARK GOODWIN & ASSOCIATES
CONSULTING ENGINEERS

DRAINAGE REPORT

For

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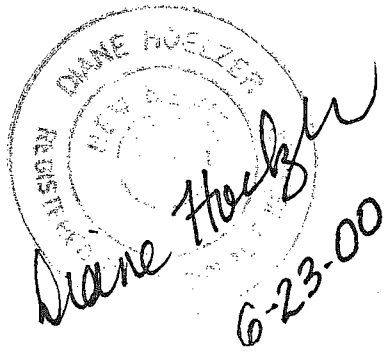


June 2000

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

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

June 23, 2000

Mr. Bradley Bingham
Plaza del Sol
Hydrology Dept.
P.O. Box 1293
Albuquerque, NM 87103

Re: Revised Drainage Plan for Sunrise Ranch
Engineer's stamp 6-23-00 (J22/D66)

Dear Mr. Bingham,

I am submitting a revised Drainage Report and Grading and Drainage Plan for the above referenced project. In response to you comment letter dated May 25, 2000:

1. A preliminary plat has been provided with this submittal.

2. The limits of the existing 100 year floodplain and the calculated 14.5 foot erosion setback have been added to the grading and drainage plan. An existing public drainage easement encompasses a majority of the floodplain limits as shown on the revise G&D plan. Since no development or grading is allowed or being proposed within the limits of the existing floodplain in Tract A it does not seem necessary to dedicate a drainage easement to AMAFCA at this time. When Tract A is proposed to be subdivided for development the limits of the drainage easement can be clearly defined and dedicated to AMAFCA.

   A HEC-2 analysis has been provided in Appendix B - Hydraulics for the upstream 'developed conditions' flow reaching the arroyo which according to the Amole-Hubbell Drainage Management Plan is 241.75 cfs.

   Since the erosion setback is outside the limits of proposed development, no scour walls are required.

3. Runoff from Subasin 190 north of Sunset Gardens Road under 'existing conditions' flows to the east. It appears that runoff from the vacant land to the west of the mobile home park flows toward the center of the mobile home park from a naturally occurring low spot. Drainage from the existing mobile home park flows to a retention pond located on the east side of their project site approximately 400 feet north of Sunset Gardens Road. Just east of this pond is a low spot in 102 street. There is an approximate rise 2-4' in grade from this low spot in 102 street south to Sunset Gardens Road. Under these existing conditions it is not physically possible for runoff to surface flow south to Sunset Gardens Road and then through our site to the Snow Vista Sedimentation Pond. In addition there is an existing berm along the south side of Sunset Gardens Road at the intersection with 102nd street that prevents any offsite flow from coming on our site.

   Given these existing physical constraints, it is recommended that drainage from subasin 190 be included in the SAD 222 storm drain system in 98th street. 'Developed flows' from this subasin could be conveyed eastward to 98th street in Sunset Gardens Road. Under present 'developed conditions' in the mobile home park it is not possible to rectify their drainage situation to convey their runoff to Sunset Gardens Road. However, if the site is ever redeveloped, the drainage can be redirected toward the southeast to Sunset Gardens Road. The existing approved flow restriction of '1.29 cfs per acre' should remain in effect for subasin 190. This restriction results in a maximum discharge of 25. 8 cfs from subasin 190 plus 7.64 cfs from Sunset Gardens Road runoff for a total additional runoff of 33.44 cfs into the 98th street SAD 222 storm drain system.

According to the Amole -Hubbell Drainage Management Plan there is no discharge constraint to the Snow Vista Sedimentation Pond for Subasin 200 of which the western most portion of our site is a part. Refer to Appendix D Supplemental Information.

4. *The lines in Mountain Dew are overhead electrical distribution and transmission power lines. I am presently coordinating with PNM and our client on relocating some of these lines underground.*

5. *Inlets and appurtenances in Eucariz road were constructed as part of the adjacent Fire Station 14 development. 'Inlets and appurtenances' on the south side of Sunset Gardens at 98th street will be added to the infrastructure list and coordinated with SAD 222 construction efforts.*

6. *Retaining walls have been added to Lot 48, Blk 7 and Lot 13, Blk 6 and between Lots 18-20, Blk 3 as requested. Retaining walls are not necessary on lots 5-17, Block 7.*

7. *The valley gutter has been removed.*

8. *The offsite contributing subasin 900 and 901 has been added to the temporary diversion swale discharge as part of the Phase I construction. Refer to the exhibit in report and the revised grading and drainage plan.*

9. *The FHWA nomograph for concrete culverts has been used.*

10. *Note 2 on the grading and drainage plan has been revised accordingly.*

If you have any questions, please call me.

Sincerely,

MARK GOODWIN AND ASSOCIATES, P.A.

Diane Hoelzer, P.E.

file: sunrise.ran/drainage.ltr

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

May 25, 2000

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

Re: Sunrise Ranch Drainage Report
Engineer's Stamp dated 5-3-00 (L9/D6)

Dear Ms. Hoelzer,

Based upon the information provided in your submittal dated 5-3-00, the above referenced plan cannot be approved for Preliminary Plat until the following comments are addressed:

- Please provide a copy of the Preliminary Plat for comment.
- Please indicate on the grading plan the erosion setback and the limits of the floodplain. A drainage easement, dedicated to AMAFCA, should encompass the erosion setback area. Please provide a HEC analysis of the incoming arroyo and provide scour depths for the floodwall footing (as you know, the top of footing must be below scour depth).
- Because part of your project drains to the Snow Vista channel, AMAFCA review and concurrence will be required. North of Sunset Gardens is part of the Snow Vista Basin (from the Amole DMP) that appears to be cutoff from the sedimentation basin. There is an existing 60' easement that crosses Phase 2 from 102nd and is present for this drainage but there is no mention of what you are doing for this drainage. This basin has a constraint of 1.29 cfs/acre, not 2.9 as you have stated in your calculations.
- What do the extra lines in Morning Dew denote? If they are electric lines, please do not show them on the grading plan. Is it permissible to encroach on the easement?
- Please provide preliminary profiles for Sunset Gardens, Eucariz and 98th. Storm drain, if needed, will need to be identified and bonded for Sunset Gardens and Eucariz.

- Please show retaining wall along the back of lots 5-17, Block 7. It also appears that a retaining wall will be needed south of lot 48, Block 7 (this may be lot 47 since there is a discrepancy with the phase plan); south side lot 13, Block 6; between lots 18-20, Block 3.

- Please remove the valley gutter from the knuckle @ Bridle Falls and Evening Fire.

- With respect to the temporary diversion swale, please show the contributing basin, pertinent spot elevations, typical section, runoff and add this runoff to your calculation for your asphalt rundown.

- Please use the FHWA nomograph for concrete culverts, not corrugated metal.

- Please modify Note 2 to include "...unless masonry walls are indicated."

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

Sincerely,

Bradley L. Bingham

Bradley L. Bingham, PE
Hydrology Review Engineer

C: file

Albuquerque
Metropolitan
Arroyo
Flood
Control
Authority

2600 PROSPECT N.E. - ALBUQUERQUE, NM 87107
PHONE: (505) 884-2215
FAX: (505) 884-0214

May 24, 2000

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

RE: SUNRISE RANCH (ZAP L8)

Dear Diane:

Based on your submittal dated May 3, 2000, AMAFCA has the following comments:

1. Please provide details for the outfall structure in AMAFCA's pond.
2. A manhole must be placed just inside AMAFCA's right-of-way for O&M purposes.
3. Use a minimum 24-inch RCP w/ orifice plate to penetrate the pond. The 18-inch is difficult to maintain.

The drainage concept (allowable discharge) appears to be consistent with the Amole-Hubble DMP and is acceptable to AMAFCA. Please address the above comments prior to work order approval.

If I can be of further assistance, please call me at 884-2215

Sincerely,
AMAFCA

Lisa Ann Manwill
Development Review Engineer

c: File

TABLE OF CONTENTS

I. PROJECT DESCRIPTION

The proposed Sunrise Ranch Subdivision located southwest of Sunset Gardens and 98 th street covers an area of approximately 26.7 acres. (Refer to the Vicinity Map). The site is to be developed into 184 single family residences in four phases. The southwest corner of the site lies within a Zone AO floodplain as shown on FEMA Panel 35001 C 0328.

II. DRAINAGE DESIGN CRITERIA AND PREVIOUS REPORTS

The design criteria used in this report was in accordance with Section 22.2 Hydrology of the Development Process Manual, Volume 2, Design Criteria, January 1993 edition. The 100-year 6-hour storm event was analyzed to determine street capacities using P(1 hr) = 1.90", P(6 hr)=2.22" and P(24 hr)=2.67". The onsite Land Treatment values used were Treatment D=60, Treatment C=20 and Treatment B=20 as determined using "Table A-5 Percent Treatment D" in the DPM. AHYMO printouts are provided in Appendix A.

This project site lies within the Amole-Hubbell Drainage Management Plan. In the Final Facilities Plan Report prepared by Leedshill-Herkenhoff, Inc. (July 99), the allowable peak discharge from this project into the 98th street storm drain is 89.28 cfs which is close to the calculated peak discharge of 83.51 cfs as determined in this report's hydrology analysis. An allowable discharge of 20.1 cfs from subasin 100 located at the western portion of the project site as determined in the Amole-Hubbell Drainage Management Plan. The actual peak discharge from this subasin into the Snow Vista Sedimentation Pond is 12.93 cfs.

III. EXISTING DRAINAGE CONDITIONS

Runoff from the project site flows in an eastward direction at an approximate slope of 3.0 percent. An existing arroyo originating to the west of the project site flows in a southeastward direction, ultimately discharging into the Snow Vista Sedimentation pond. Runoff from the unimproved Sunset Gardens Road flows eastward in roadside swales to 98th street. Runoff from Eucariz Road flows in an eastward direction to 98th street.

IV. DEVELOPED DRAINAGE CONDITIONS

The total "developed conditions" peak discharge from the site is 96.44 cfs. Runoff from subasin 1 (12.93 cfs) discharges to the Snow Vista Sedimentation Pond. This concept has been discussed and approved by Lisa Manwill at AMAFCA. The remaining runoff from the site, subasins 2 through 13 (83.5 cfs) is conveyed as street flow to the southeast corner of the property before being intercepted by a series of inlets that convey the stormwater runoff to a temporary retention pond facility. Ultimately runoff from this site will be intercepted by a storm drain system being built as part of SAD 222. I am currently coordinating our internal storm drain design connection to the SAD 222 master storm drain manhole at Eucariz Road and 98th street with John Andrews at the Larkin Group. Their projected schedule to begin the infrastructure construction is January 2001. At the time the SAS 222 storm drain is constructed the temporary retention pond facility will disappear.

This project is going to be developed in 4 phases as shown in Figure 5. Runoff from Phase 1 will be conveyed southward to the retention pond through a temporary asphalt swale in Evening Fire street. A portion of the runoff from Phase 2 will be conveyed to the Snow Vista Sedimentation Pond through a storm drain culvert and the remainder will be conveyed to the temporary retention pond through Rawhide Street in a temporary asphalt swale. When Phase 3 is built, a portion of the temporary drainage swale in Rawhide street will be eliminated. In Phase 4 the storm drain and inlets to the pond will be constructed. Refer to Figure 5 for Construction Phase Boundaries and Figure 6 for Onsite Subasin Boundaries.

Existing inlets in Eucariz Road at 98th street intercept street flows. Proposed inlets in Sunset Gardens at 98 th street will intercept Sunset Gardens street flow and flows from subasin 190 for a total of 33.44 cfs (25.8 cfs restricted flow of 1.29 cfs/acre from subasin 190 plus 'developed street flows from Sunset Gardens Road of 7.64 cfs)

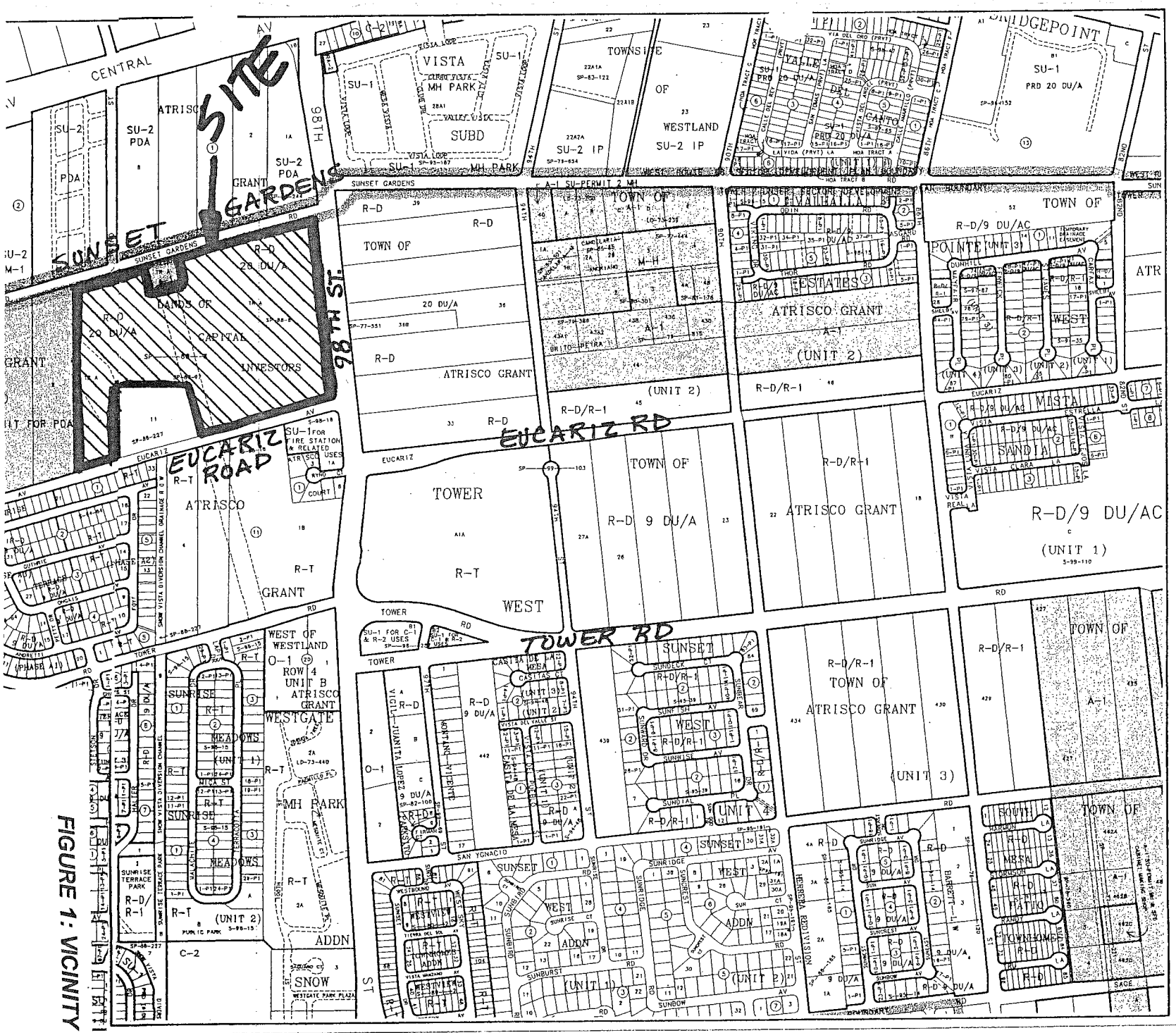


FIGURE 1: VICINITY MAP

CITY OF Albuquerque

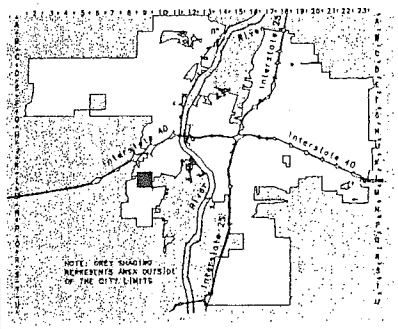
A lbuquerque G eographic I nformation S ystem

PLANNING DEPARTMENT

AGIS

GRAPHIC SCALE IN FEET

250 0 500 1000



Zone Atlas Page

L-9-Z

Map Amended through
September 17, 1999

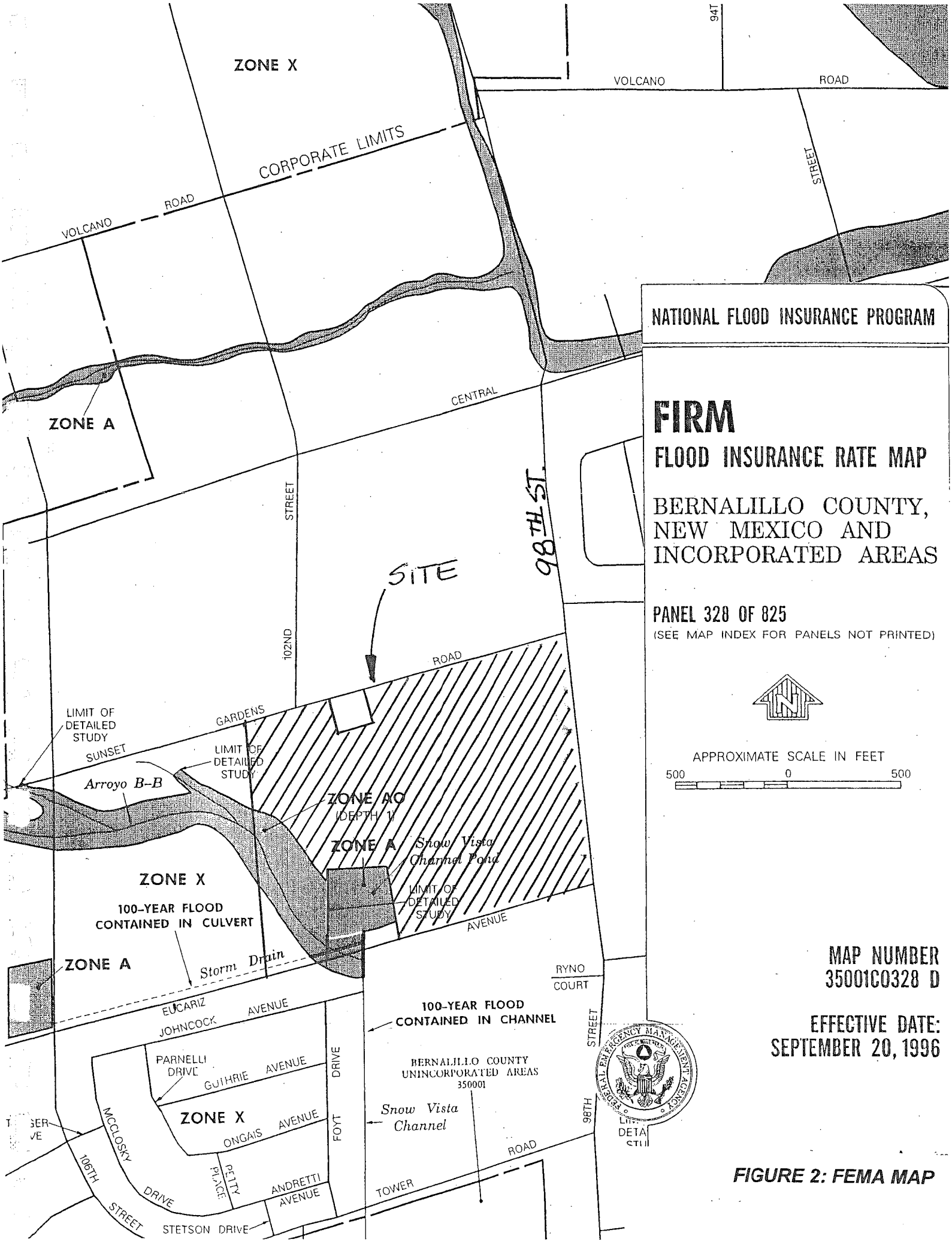
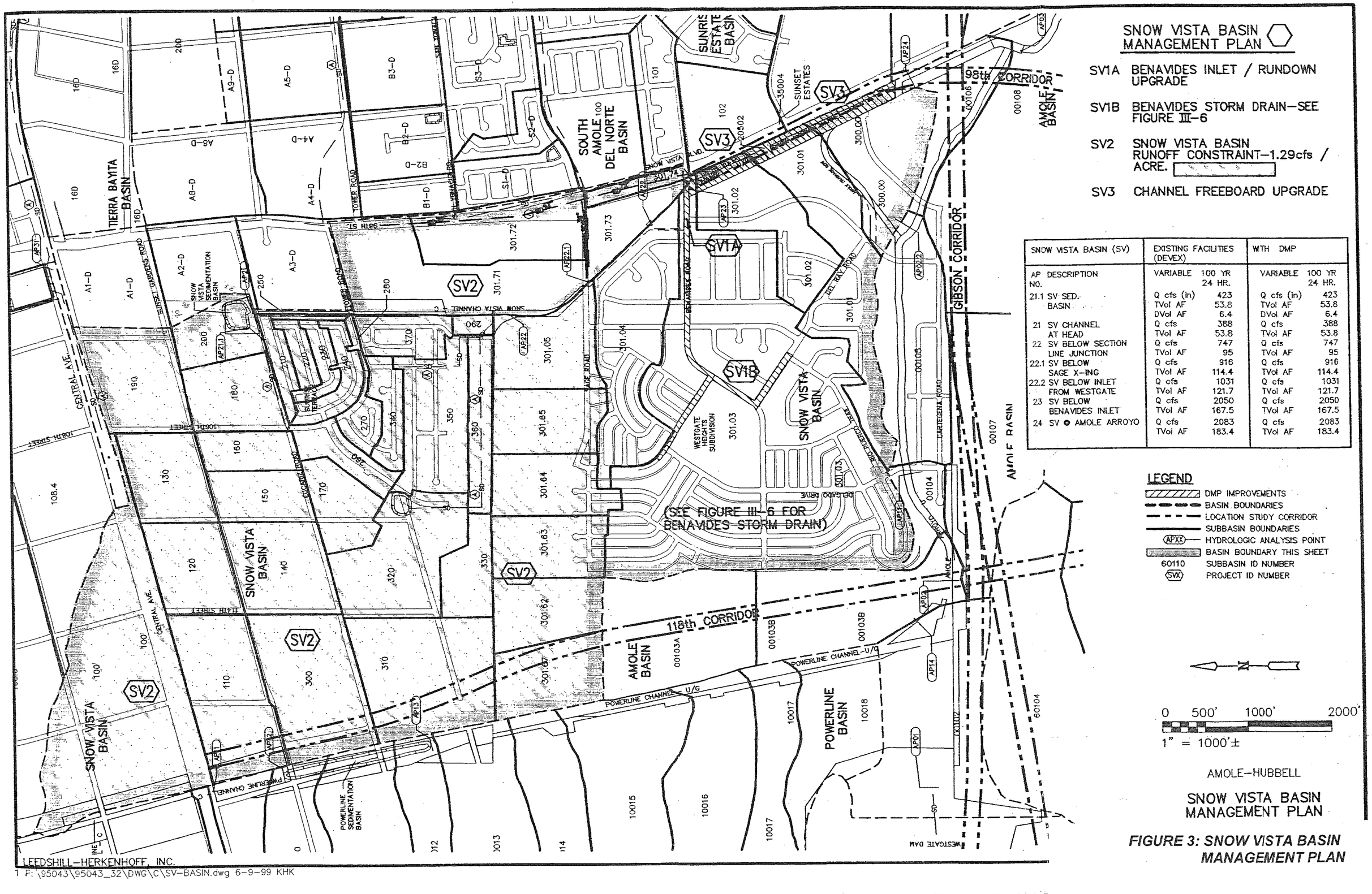


FIGURE 2: FEMA MAP



LEEDSHILL–HERKENHOFF, INC.

1 F:\95043\95043_32\DWG\C\SV–BASIN.dwg 6–9–99 KHK

AMOLE–HUBBELL

SNOW VISTA BASIN MANAGEMENT PLAN

FIGURE 3: SNOW VISTA BASIN MANAGEMENT PLAN

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

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

ATRISCO BUSINESS PARK BASIN
UNSER/214 BASIN
TIERRA BAYITA BASIN
98TH AND CENTRAL BASIN
SNOW VISTA BASIN
POWERLINE BASIN
TOWER SAGE BASIN
AD1
INTERSTATE 40
CENTRAL AVE.
AVALON ROAD
SOUTHERN BLVD.
TIERRA BAYITA CHANNEL
SNOW VISTA SEDIMENTATION BASIN
POWERLINE SEDIMENTATION BASIN
SAD 214 POND
POND

LEGEND
- DMP IMPROVEMENTS
- BASIN BOUNDARIES
- PLATTED EASEMENT/ROW
- SUBBASIN BOUNDARIES
- (APXX) HYDROLOGIC ANALYSIS POINT
- BASIN BOUNDARY THIS SHEET
- 6011D SUBBASIN ID NUMBER
- (SVX) PROJECT ID NUMBER

N

0 750' 1500' 3000'

1" = 1500'±

AMOLE-HUBBELL D.M.P.

AMOLE DEL NORTE BASIN MANAGEMENT PLAN

SEE FIGURE NO. III-13b FOR CONTINUATION

LEEDSHILL-HERKENHOFF, INC.

FIGURE 4

SOURCE: AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN 7/99

FIGURE 5: SNOW VISTA BASIN DEVELOPED CONDITIONS BASIN BOUNDARIES

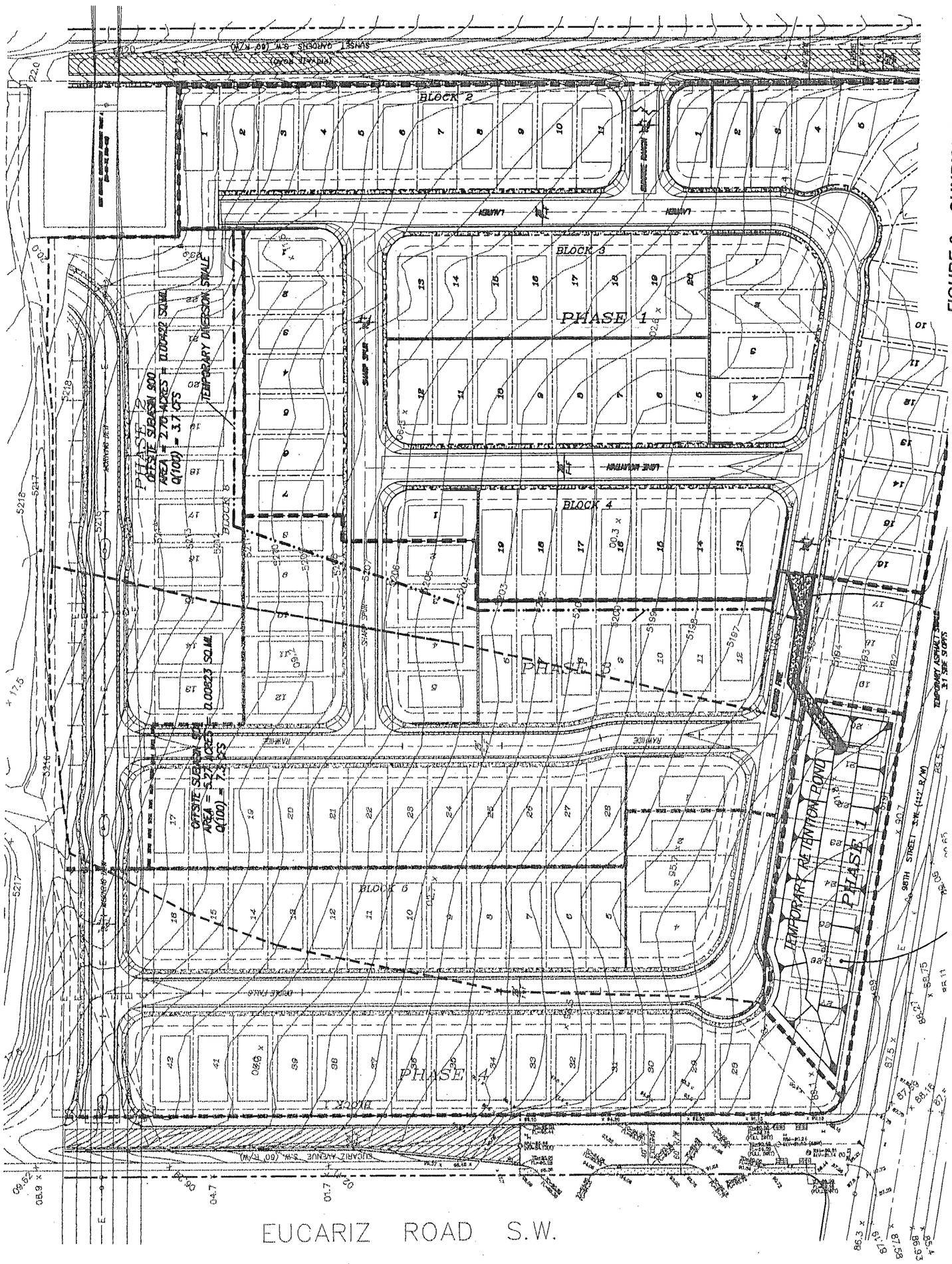


FIGURE 6: SUNRISE RANCH PHASE 1
TEMPORARY DRAINAGE SUBASINS

F:\DATA\DWGS\A00jobs\A00220NG\PH3_EX.c 32 2000 PLOTTED BY NHM

Don't use

SUNRISE RANCH SUBDIVISION

TABLE 1 SUMMARY OF STREET CAPACITIES

LOCATION	CURB	CROWN	WIDTH ft.	SLOPE %	Q cfs	DEPTH ft	EG ft.	Q inlet cfs	#/Type inlet	Q remain
Lone Mountain Street	MTB	Y	26' FF	3.724	10.43	0.23	0.47			
Round Up Street	MTB	N/2%	26' FF	2.735	12.00	0.33	0.62			
Sharp Spur Street	MTB	N/2%	26' FF	1.760	3.22	0.22	0.33			
Sharp Spur Stret	MTB	N/2%	26'FF	1.760	4.57	0.29	0.38			
Morning Dew Street	MTB	Y	28' FF	3.819	7.30	0.20	0.40			
Bridle Falls Street	MTB	Y	28' FF	3.038	7.47	0.21	0.38			
Bridle Falls Street	MTB	Y	28' FF	3.038	13.80(b)	0.26	0.50			
Lauren Street	MTB	Y	28' FF	3.036	10.50	0.24	0.45			
Morning Dew Street	MTB	N/2%	28' FF	1.500	9.00	0.33	0.49			
Rawhide Street	STD	Y	26' FF	3.252	32.48	0.43	0.92	9.4	2/DBL'A'	23.08(a)
Evening Fire Street	STD	Y	28'FF	0.600	17.50	0.46	0.56			
Evening Fire Street	STD	Y	28' FF	0.600	27.93	0.54	0.69			
Evening Fire Street	STD	Y	28' FF	0.600	31.33	0.56	0.73	16.0	2/DBL'A'	15.33(a)
Evening Fire Street	STD	Y	28' FF	0.600	38.41(a)	0.61	0.80	19.8	2/DBL'A'	18.61
Evening Fire Street	STD	Y	28' FF	0.600	18.61	0.47	0.58	9.4	2/SGL'A'	9.21(b)
Evening Fire Street	STD	Y	28' FF	0.600	28.91(b)			4.28	1/DBL'A'	24.63
Evening Fire knuckle SUMP**					24.63			28.17	TRP'C'	0
** Double Capacity=49.26 cfs								22.15	DBL'C'	0

(a) 23.08 cfs + 15.33 cfs = 38.41 cfs
(b) 23.01 cfs + 5.90 cfs(SB 11) = 28.91 cfs

MTB = Mountable Curb, STD = Standard Curb, File: f:\sunrise.ran \ strcap.sri 4-28-00

APPENDIX A

HYDROLOGY

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/22/2000
INPUT FILE = SUNRISE.DAT USER NO.= M_GOODWN.I01

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION	
START										TIME=	.00
RAINFALL TYPE= 1										RAIN6=	2.220
COMPUTE NM HYD	101.00	-	1	.00555	12.93	.452	1.52662	1.518	3.641	PER IMP=	60.00
COMPUTE NM HYD	102.00	-	1	.00313	7.30	.255	1.52661	1.518	3.645	PER IMP=	60.00
COMPUTE NM HYD	103.00	-	1	.00491	11.45	.400	1.52662	1.518	3.642	PER IMP=	60.00
COMPUTE NM HYD	104.00	-	1	.00196	4.57	.159	1.52661	1.518	3.650	PER IMP=	60.00
COMPUTE NM HYD	105.00	-	1	.00393	9.16	.320	1.52661	1.518	3.643	PER IMP=	60.00
COMPUTE NM HYD	106.00	-	1	.00138	3.22	.112	1.52661	1.518	3.655	PER IMP=	60.00
COMPUTE NM HYD	107.00	-	1	.00309	7.21	.252	1.52661	1.518	3.645	PER IMP=	60.00
COMPUTE NM HYD	108.00	-	1	.00451	10.50	.367	1.52662	1.518	3.642	PER IMP=	60.00
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COMPUTE NM HYD	110.00	-	1	.00146	3.40	.118	1.52662	1.518	3.654	PER IMP=	60.00
COMPUTE NM HYD	111.00	-	1	.00253	5.90	.206	1.52661	1.518	3.646	PER IMP=	60.00
COMPUTE NM HYD	112.00	-	1	.00320	7.47	.261	1.52661	1.518	3.644	PER IMP=	60.00
COMPUTE NM HYD	113.00	-	1	.00271	6.33	.221	1.52661	1.518	3.646	PER IMP=	60.00
COMPUTE NM HYD	114.00	-	1	.00178	1.54	.043	.45484	1.518	1.355	PER IMP=	.00
COMPUTE NM HYD	114.00	-	1	.00178	4.67	.169	1.78778	1.518	4.106	PER IMP=	79.50
COMPUTE NM HYD	114.00	-	1	.00296	7.64	.275	1.74424	1.518	4.034	PER IMP=	75.00
COMPUTE NM HYD	115.00	-	1	.00061	.53	.015	.45484	1.518	1.366	PER IMP=	.00
COMPUTE NM HYD	115.00	-	1	.00061	1.61	.058	1.78778	1.518	4.136	PER IMP=	79.50
COMPUTE NM HYD	900.00	-	1	.00422	3.74	.105	.46487	1.518	1.384	PER IMP=	.00
COMPUTE NM HYD	901.00	-	1	.00823	7.28	.204	.46487	1.518	1.383	PER IMP=	.00
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*****     100-YEAR 6-HOUR STORM EVENT
*****     FILE: SUNRISE.DAT  APR 2000 BY:DLH
RAINFALL             TYPE=1 RAIN QUARTER=0.0 IN
                     RAIN ONE=1.90 IN RAIN SIX=2.22 IN
                     RAIN DAY=2.66 IN DT=0.033 HR
***** ************************************************
*****                DEVELOPED CONDITIONS
***** ************************************************
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*****
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***** SUBASIN 3
*****
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                     TP=0.1333 HR MASS RAINFALL=-1
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***** SUBASIN 8
*****
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*****
***** SUBASIN 9
*****
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                     TP=0.1333 HR MASS RAINFALL=-1
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***** SUBASIN 10
*****
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*****
***** SUBASIN 11
*****
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                     TP=0.1333 HR MASS RAINFALL=-1
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*****
***** SUBASIN 12
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***** SUBASIN 13
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                     PER A=0 PER B=20 PER C=20 PER D=60
                     TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD            ID=1 CODE=1
*****
***** SUBASIN 14 (SUNSET GARDENS ROAD EXISTING)
*****
COMPUTE NM HYD       ID=1 HYD NO=114 AREA=0.0017756 SQ MI
                     PER A=100 PER B=0 PER C=0 PER D=0
                     TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD            ID=1 CODE=1
*****
***** SUBASIN 14 (SUNSET GARDENS ROAD 36' DEVELOPED)
*****
COMPUTE NM HYD       ID=1 HYD NO=114 AREA=0.0017756 SQ MI
                     PER A=0 PER B=0 PER C=20.5 PER D=79.5
                     TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD            ID=1 CODE=1
*****
***** SUBASIN 14 (SUNSET GARDENS ROAD ULTIMATE 60' R/W)
*****
COMPUTE NM HYD       ID=1 HYD NO=114 AREA=0.002959 SQ MI
                     PER A=0 PER B=0 PER C=25 PER D=75
                     TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD            ID=1 CODE=1
*****
***** SUBASIN 15 (EUCARIZ ROAD EXISTING)
*****
COMPUTE NM HYD       ID=1 HYD NO=115 AREA=0.0006069 SQ MI
                     PER A=100 PER B=0 PER C=0 PER D=0
                     TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD            ID=1 CODE=1
*****
***** SUBASIN 15 (EUCARIZ ROAD DEVELOPED)
*****
COMPUTE NM HYD       ID=1 HYD NO=115 AREA=0.0006069 SQ MI
                     PER A=0 PER B=0 PER C=20.5 PER D=79.5
                     TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD            ID=1 CODE=1
*****
***** SUBASIN 900 (PHASE 1 OFFSITE SUBASIN TO DIVERSION SWALE)
*****
COMPUTE NM HYD       ID=1 HYD NO=900 AREA=0.00422 SQ MI
                     PER A=95 PER B=5 PER C=0 PER D=0
                     TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD            ID=1 CODE=1
```

```
*****
***** SUBASIN 901  (PHASE 1 OFFSITE SUBASIN TO RUNDOWN)
*****
COMPUTE NM HYD       ID=1 HYD NO=901 AREA=0.00823 SQ MI
                     PER A=95 PER B=5 PER C=0 PER D=0
                     TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD            ID=1 CODE=1
FINISH
```

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

PROJECT Sunrise Ranch
SUBJECT Hydrology Calcs
BY DLH DATE 6-22-00
CHECKED _____ DATE _____
SHEET 1 OF 2

Retention Pond Calcs.

$P(1hr.) = 1.90"$ $\quad P_{10DAY} = 10 - (24.9 \div (P_{1440})^{1.4})$

$P(6hr.) = 2.20"$ $\quad P_{10DAY} = 3.70"$

$P(24hr.) = 2.67"$ $\quad A_D = 22.918$ acres

$$V_{10DAY} = V_{360} + A_D \left(\frac{P_{10DAY} - P_{360}}{12} \right)$$

$$= 2.915\,AF + 22.918\,acres\,(.60) \left(\frac{3.70" - 2.20"}{12} \right)$$

$V_{10DAY} = 4.63\,AF = 201,682.8\,CF$ (Req'd Volume)

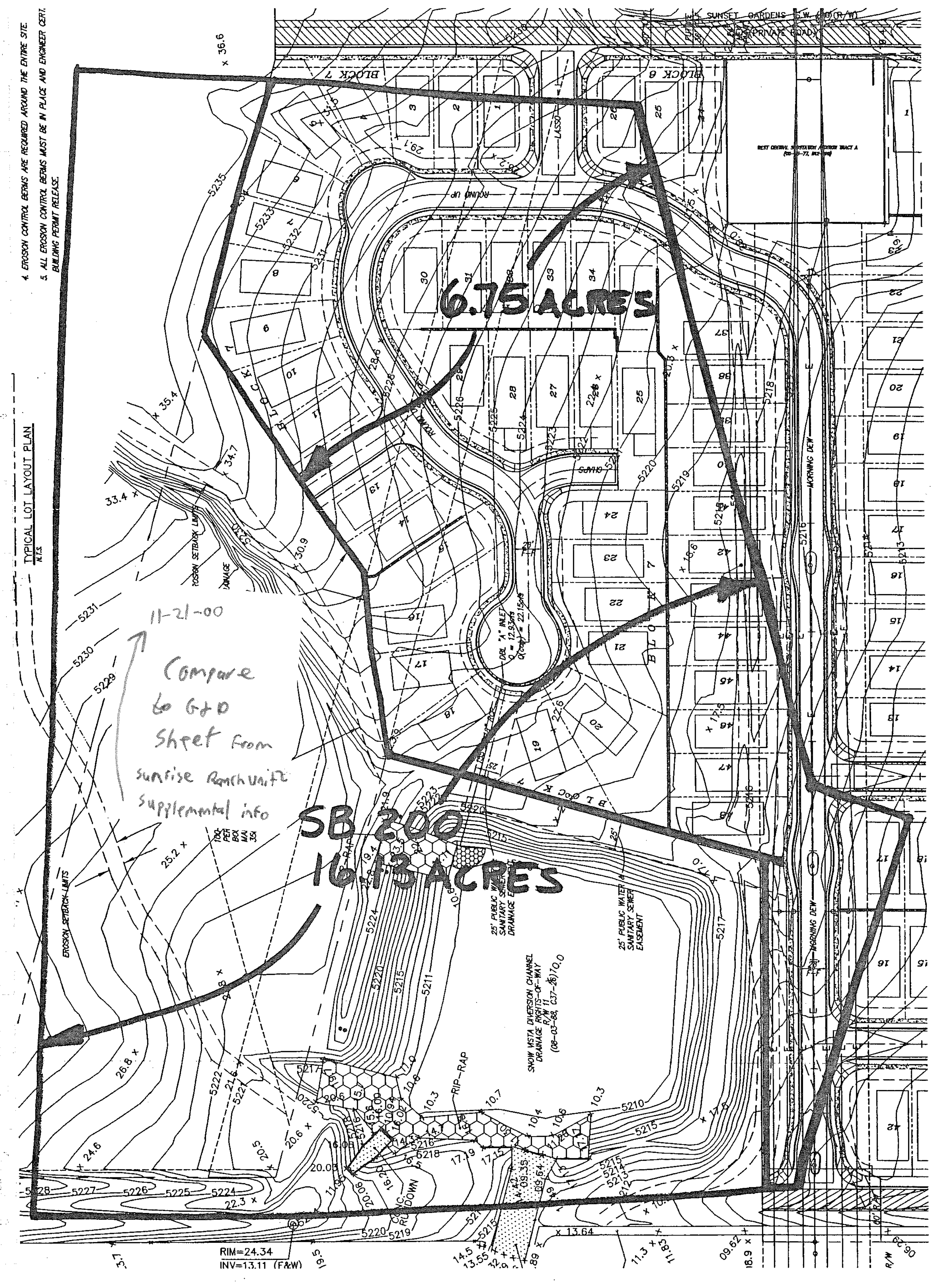
Design Volume Calcs

$A_1 = 25407$ SF

$A_2 = 5891$ SF

$$Volume = \frac{1}{3}(14)(25407 + 5891 + \sqrt{25407(5891)})$$

$= 203,149\,CF = 4.66\,AF$



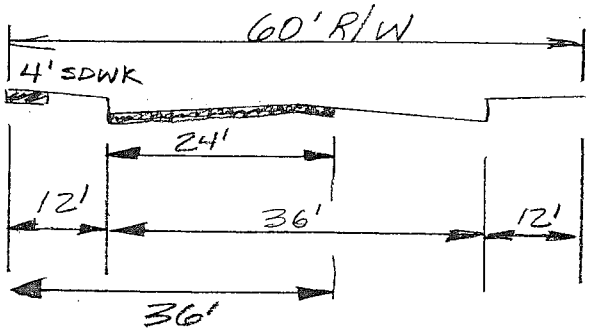
4. EROSION CONTROL BERMS ARE REQUIRED AROUND THE ENTIRE SITE.
5. ALL EROSION CONTROL BERMS MUST BE IN PLACE AND ENGINEER CERT. BUILDING PERMIT RELEASE.
TYPICAL LOT LAYOUT PLAN
N.T.S.
SUNSET GARDENS S.W.
(PRIVATE ROAD)
BLOCK 7
BLOCK 6
LASSO
ROUND UP
MORNING DEW
6.75 ACRES
SB 200
16.13 ACRES
11-21-00
Compare to G&D Sheet from sunrise Ranch unit 2 supplemental info
DBL "A" INLET
SNOW VISTA DIVERSION CHANNEL DRAINAGE RIGHTS-OF-WAY R/W 11 (08-03-88, C37-26)
25' PUBLIC WATER & SANITARY SEWER EASEMENT
RIP-RAP
EROSION SETBACK LIMITS
RIM=24.34
INV=13.11 (F&W)

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

PROJECT Sunrise Ranch
SUBJECT Hydrology Calcs
BY DLH DATE 6-22-00
CHECKED ____ DATE ____
SHEET 2 OF 2

Sunset Gardens Road.
1375 LF OF PVMT

Treatment D = 79.5%
Treatment C = 20.5%



Area = 1375 (36) = 49,500SF
= 0.0017756 sq.mi

Ultimate Area = 1375 (60) = 82500SF = .002959 sq.mi 75%D 25%C

Eucariz Road

Area = 470 LF (36) = 16920SF = 0.0006069 sq.mi

Snow Vista Subasin 200

$Q = \frac{49.6 \text{ cfs}}{16.128 \text{ acres}} = 3.075 \text{ cfs/acre}^{*} \text{ (allowable rate)}$

*source: Arnole - Hubbell Drainage Management Plan

Area of Sunrise Ranch Subasin 1 + 2 within SB 200.

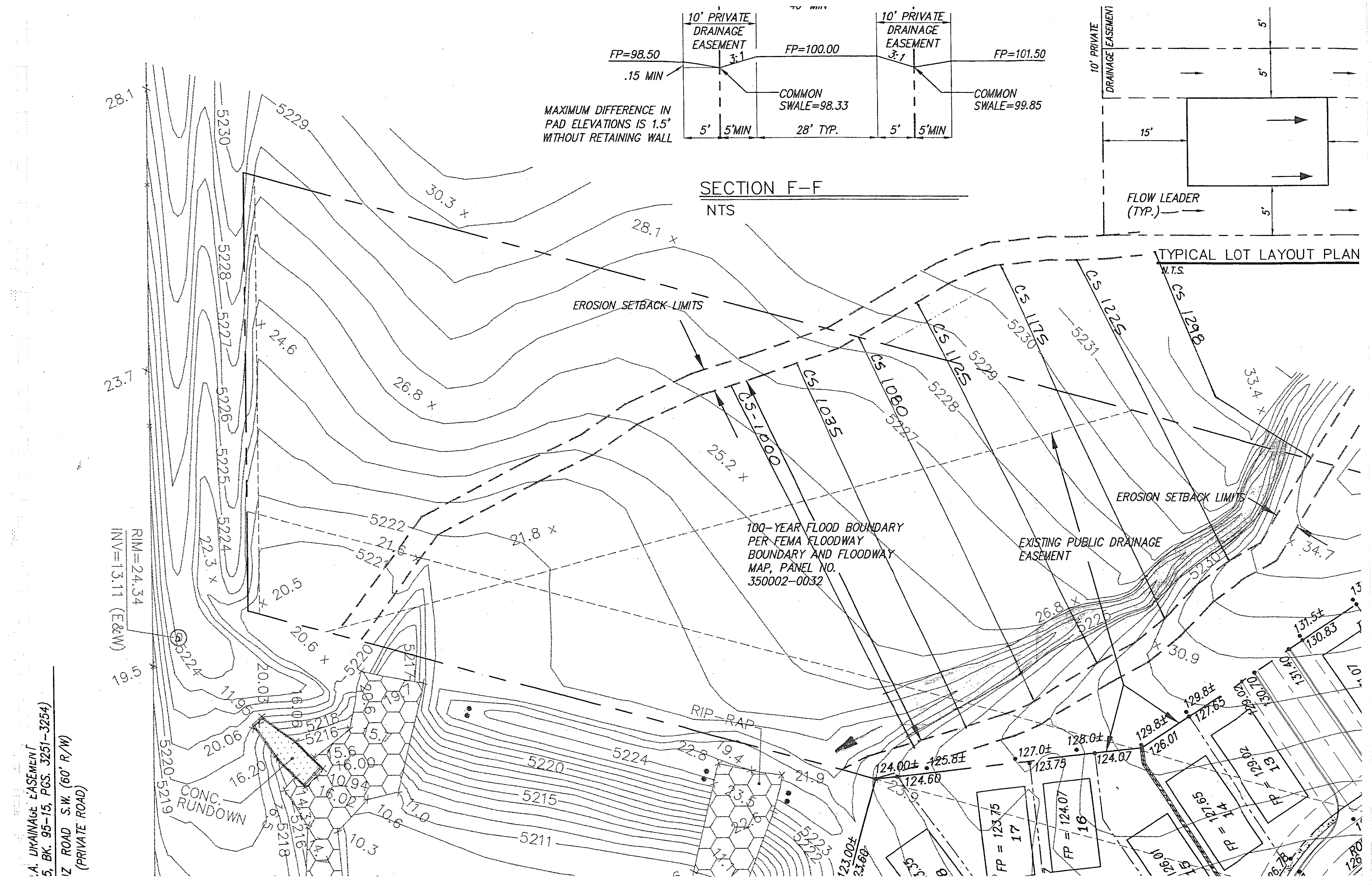
A = 6.75 acres

Q (allowable) = 3.075 cfs/ac (6.75ac) = 20.8 cfs.

Q (actual) = 12.93 cfs (SB 1)

APPENDIX B

HYDRAULICS


10' PRIVATE DRAINAGE EASEMENT
10' PRIVATE DRAINAGE EASEMENT
FP=98.50
.15 MIN
3:1
FP=100.00
3:1
FP=101.50
COMMON SWALE=98.33
COMMON SWALE=99.85
MAXIMUM DIFFERENCE IN PAD ELEVATIONS IS 1.5' WITHOUT RETAINING WALL
5'
5'MIN
28' TYP.
5'
5'MIN
SECTION F-F
NTS
10' PRIVATE DRAINAGE EASEMENT
15'
FLOW LEADER (TYP.)
TYPICAL LOT LAYOUT PLAN
N.T.S.
EROSION SETBACK LIMITS
EROSION SETBACK LIMITS
CS 1000
CS 1035
CS 1080
CS 1125
CS 1175
CS 1225
CS 1298
100-YEAR FLOOD BOUNDARY PER FEMA FLOODWAY BOUNDARY AND FLOODWAY MAP, PANEL NO. 350002-0032
EXISTING PUBLIC DRAINAGE EASEMENT
RIM=24.34
INV=13.11 (E&W)
RIP-RAP
CONC. RUNDOWN
FP = 123.75
17
FP = 124.07
16
FP = 127.65
14
FP = 129.02
13
Z ROAD S.W. (60' R/W)
(PRIVATE ROAD)

HEC-RAS Plan: Plan 01 Reach: ARROYO

River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1298	241.75	29.00	31.25	32.19	34.17	0.040006	13.72	17.62	13.23	2.10
1225	241.75	27.00	29.31	30.03	31.50	0.028620	11.86	20.39	14.89	1.79
1175	241.75	25.00	26.95	27.78	29.70	0.043197	13.31	18.16	15.68	2.18
1125	241.75	24.00	26.16	26.85	27.93	0.021720	10.69	22.98	21.41	1.59
1080	241.75	23.00	24.88	25.50	26.76	0.030960	11.01	21.95	19.88	1.85
1035	241.75	22.00	24.04	24.48	25.38	0.024189	9.26	26.10	25.65	1.62
1000	241.75	21.80	23.73	23.94	24.59	0.014317	7.42	32.57	30.24	1.26

HEC-RAS Plan: Plan 01 Reach: ARROYO Riv Sta: 1000 Profile: 1

W.S. Elev (ft)	23.73	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.86	Wt. n-Val.		0.025	
E.G. Elev (ft)	24.59	Reach Len. (ft)			
E.G. Slope (ft/ft)	0.014317	Flow Area (sq ft)		32.57	
Q Total (cfs)	241.75	Flow (cfs)		241.75	
Top Width (ft)	30.24	Top Width (ft)		30.24	
Vel Total (ft/s)	7.42	Avg. Vel. (ft/s)		7.42	
Max Chl Dpth (ft)	1.93	Hydr. Depth (ft)		1.08	
Crit W.S. (ft)	23.94	Wetted Per. (ft)		30.56	
Conv. Total (cfs)	2020.4	Conv. (cfs)		2020.4	

HEC-RAS Plan: Plan 01 Reach: ARROYO Riv Sta: 1125 Profile: 1

W.S. Elev (ft)	26.16	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.77	Wt. n-Val.	0.025	0.025	0.025
E.G. Elev (ft)	27.93	Reach Len. (ft)	45.00	45.00	45.00
E.G. Slope (ft/ft)	0.021720	Flow Area (sq ft)	0.10	22.55	0.33
Q Total (cfs)	241.75	Flow (cfs)	0.16	241.05	0.53
Top Width (ft)	21.41	Top Width (ft)	1.27	16.00	4.14
Vel Total (ft/s)	10.52	Avg. Vel. (ft/s)	1.61	10.69	1.62
Max Chl Dpth (ft)	2.16	Hydr. Depth (ft)	0.08	1.41	0.08
Crit W.S. (ft)	26.85	Wetted Per. (ft)	1.28	16.72	4.14
Conv. Total (cfs)	1640.3	Conv. (cfs)	1.1	1635.6	3.6

HEC-RAS Plan: Plan 01 Reach: ARROYO Riv Sta: 1080 Profile: 1

W.S. Elev (ft)	24.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.88	Wt. n-Val.		0.025	
E.G. Elev (ft)	26.76	Reach Len. (ft)	45.00	45.00	45.00
E.G. Slope (ft/ft)	0.030960	Flow Area (sq ft)		21.95	
Q Total (cfs)	241.75	Flow (cfs)		241.75	
Top Width (ft)	19.88	Top Width (ft)		19.88	
Vel Total (ft/s)	11.01	Avg. Vel. (ft/s)		11.01	
Max Chl Dpth (ft)	1.88	Hydr. Depth (ft)		1.10	
Crit W.S. (ft)	25.50	Wetted Per. (ft)		20.32	
Conv. Total (cfs)	1373.9	Conv. (cfs)		1373.9	

HEC-RAS Plan: Plan 01 Reach: ARROYO Riv Sta: 1035 Profile: 1

W.S. Elev (ft)	24.04	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.33	Wt. n-Val.		0.025	
E.G. Elev (ft)	25.38	Reach Len. (ft)	35.00	35.00	35.00
E.G. Slope (ft/ft)	0.024189	Flow Area (sq ft)		26.10	
Q Total (cfs)	241.75	Flow (cfs)		241.75	
Top Width (ft)	25.65	Top Width (ft)		25.65	
Vel Total (ft/s)	9.26	Avg. Vel. (ft/s)		9.26	
Max Chl Dpth (ft)	2.04	Hydr. Depth (ft)		1.02	
Crit W.S. (ft)	24.48	Wetted Per. (ft)		26.02	
Conv. Total (cfs)	1554.4	Conv. (cfs)		1554.4	

HEC-RAS Plan: Plan 01 Reach: ARROYO Riv Sta: 1298 Profile: 1

W.S. Elev (ft)	31.25	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.92	Wt. n-Val.		0.025	
E.G. Elev (ft)	34.17	Reach Len. (ft)	85.00	73.00	70.00
E.G. Slope (ft/ft)	0.040006	Flow Area (sq ft)		17.62	
Q Total (cfs)	241.75	Flow (cfs)		241.75	
Top Width (ft)	13.23	Top Width (ft)		13.23	
Vel Total (ft/s)	13.72	Avg. Vel. (ft/s)		13.72	
Max Chl Dpth (ft)	2.25	Hydr. Depth (ft)		1.33	
Crit W.S. (ft)	32.19	Wetted Per. (ft)		14.20	
Conv. Total (cfs)	1208.7	Conv. (cfs)		1208.7	

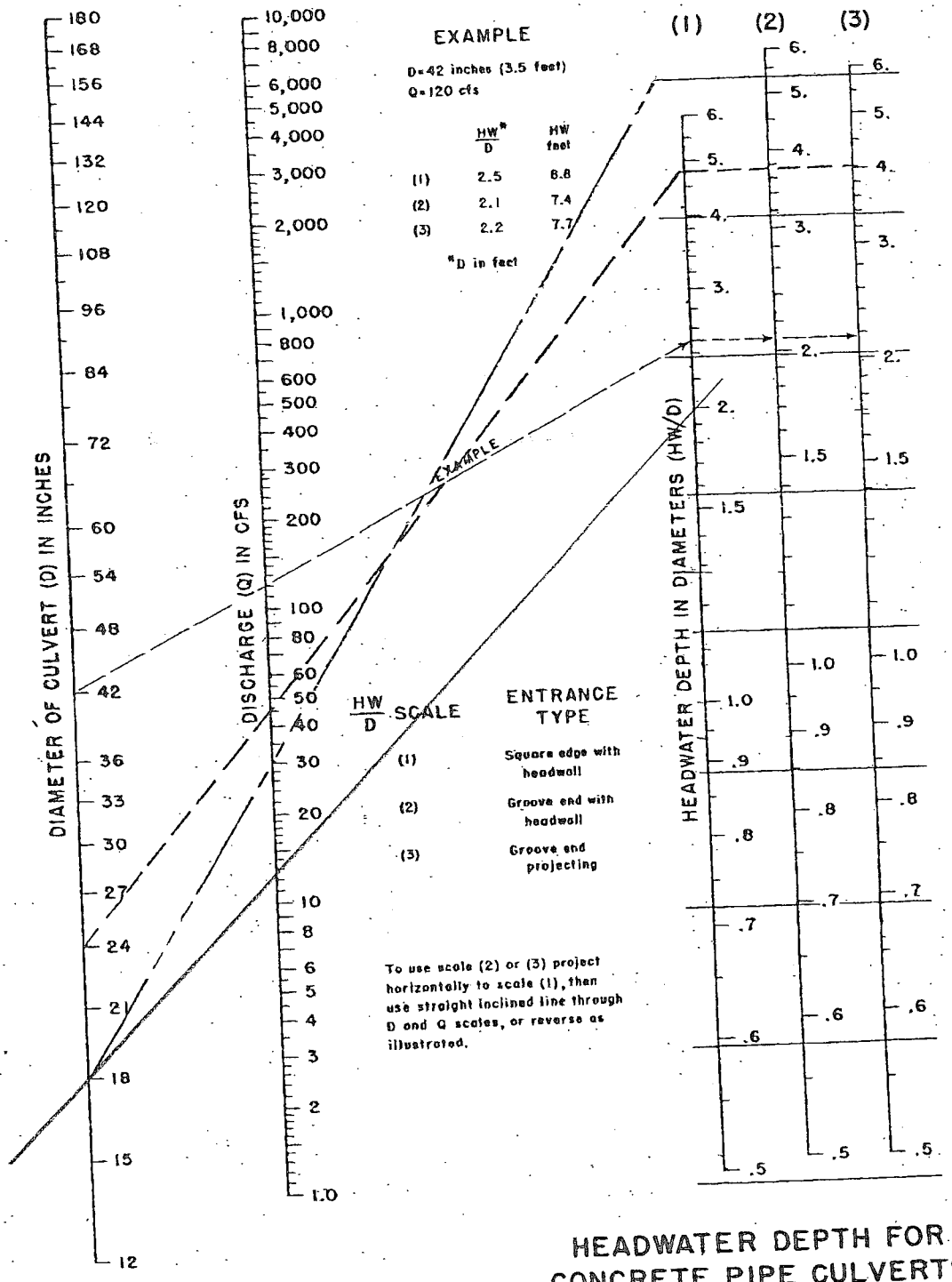
HEC-RAS Plan: Plan 01 Reach: ARROYO Riv Sta: 1225 Profile: 1

W.S. Elev (ft)	29.31	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.18	Wt. n-Val.		0.025	
E.G. Elev (ft)	31.50	Reach Len. (ft)	50.00	50.00	50.00
E.G. Slope (ft/ft)	0.028620	Flow Area (sq ft)		20.39	
Q Total (cfs)	241.75	Flow (cfs)		241.75	
Top Width (ft)	14.89	Top Width (ft)		14.89	
Vel Total (ft/s)	11.86	Avg. Vel. (ft/s)		11.86	
Max Chl Dpth (ft)	2.31	Hydr. Depth (ft)		1.37	
Crit W.S. (ft)	30.03	Wetted Per. (ft)		15.93	
Conv. Total (cfs)	1429.0	Conv. (cfs)		1429.0	

HEC-RAS Plan: Plan 01 Reach: ARROYO Riv Sta: 1175 Profile: 1

W.S. Elev (ft)	26.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.75	Wt. n-Val.		0.025	
E.G. Elev (ft)	29.70	Reach Len. (ft)	50.00	50.00	50.00
E.G. Slope (ft/ft)	0.043197	Flow Area (sq ft)		18.16	
Q Total (cfs)	241.75	Flow (cfs)		241.75	
Top Width (ft)	15.68	Top Width (ft)		15.68	
Vel Total (ft/s)	13.31	Avg. Vel. (ft/s)		13.31	
Max Chl Dpth (ft)	1.95	Hydr. Depth (ft)		1.16	
Crit W.S. (ft)	27.78	Wetted Per. (ft)		16.24	
Conv. Total (cfs)	1163.2	Conv. (cfs)		1163.2	

Culvert into Snow Vista Sediment Pond CHART 2



HEADWATER DEPTH FOR CONCRETE PIPE CULVERTS WITH INLET CONTROL

BUREAU OF PUBLIC ROADS JAN. 1963

```
1*****************************************************
 *  WATER SURFACE PROFILES                           *
 *  VERSION OF SEPTEMBER 1988                        *
 *  ERROR: 01,02                                     *
 *  UPDATED:  4 APRIL    1989                        *
 *  RUN DATE     4/26/ 0   TIME   13: 9:25           *
 *****************************************************
```

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

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

```
END OF BANNER
THIS RUN EXECUTED  4/26/ 0    13: 9:25
*****************************************************
  HEC2 RELEASE DATED SEP 88 UPDATED APR  1989
  ERROR CORR -  01,02
  MODIFICATION -
*****************************************************

T1          SUNRISE RANCH STREET CAPACITY (44' ROW)
T2          26'FF W/ MOUNTABLE CURB - CROWN
T3          LONE MOUNTAIN

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

      0         2         0         1     .03724         0         0         0         0         0

J3  VARIABLE CODES FOR SUMMARY PRINTOUT

     38        43         1         2        26         4        68         3

NC     .017      .017      .017       .1        .3
QT        1     10.43
X1        1         7         0        44         0         0         0         0         0         0
GR      .51         0       .33       8.9         0         9       .26        22         0        35
GR      .33      35.1       .51        44

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

*PROF 1

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

2096 WSEL NOT GIVEN, AVG OF MAX, MIN USED

3265 DIVIDED FLOW

1.00	.23	.23	.30	.00	.47	.24	.00	.00	.51
10.	0.	10.	0.	0.	3.	0.	0.	0.	.51
.00	.00	3.94	.00	.000	.017	.000	.000	.00	8.93
.037193	0.	0.	0.	0	11	6	.00	23.08	35.07

THIS RUN EXECUTED 4/26/ 0 13: 9:25

****

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

LONE MOUNTAIN

SUMMARY PRINTOUT

SECNO	Q	CWSEL	CRIWS	VCH	TOPWID	FRCH	EG
1.000	10.43	.23	.30	3.94	23.08	2.18	.47

SUMMARY OF ERRORS AND SPECIAL NOTES

```
1*****************************************************
 *  WATER SURFACE PROFILES                           *
 *  VERSION OF SEPTEMBER 1988                        *
 *  ERROR: 01,02                                     *
 *  UPDATED:  4 APRIL    1989                        *
 *  RUN DATE     4/26/ 0   TIME    8:19:30           *
 *****************************************************

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

END OF BANNER

                                                                THIS RUN EXECUTED  4/26/ 0     8:19:30

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

T1          SUNRISE RANCH - STREET CAPACITY (44' ROW)
T2          26'FF MOUNTABLE C&G - NO CROWN 2.0% cross slope
T3          ROUND UP

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

       0         2         0         1    .02735         0         0         0         0         0

J3  VARIABLE CODES FOR SUMMARY PRINTOUT

     38        43         1         2        26         4        68         3

NC     .017      .017      .017       .1        .3
QT        4     12.00      3.22     4.57     18.75
X1        1         6         0       44         0         0         0         0         0         0
GR      .51         0       .33      8.9         0         9       .52        35       .85      35.1
GR     1.03        44

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


*PROF 1

CCHV=      .100 CEHV=      .300
```

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

```
*SECNO 1.000
2096 WSEL NOT GIVEN, AVG OF MAX, MIN USED
     1.00      .33      .33      .43      .00      .62      .29      .00      .00      .51
      12.       0.      12.       0.       0.       3.       0.       0.       0.     1.03
      .00      .00     4.30      .00     .000     .017     .000     .000      .00     8.75
  .027292       0.       0.       0.        0       14        6      .00    16.89    25.65

T1 SHARP SPUR
T2 1.760% SLOPE
T3

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

     0         3         0         1     .01760

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

     2         0        -1         0         0         0         0         0         0         0

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


*PROF 2

CCHV=     .100 CEHV=     .300
*SECNO 1.000
2096 WSEL NOT GIVEN, AVG OF MAX, MIN USED
     1.00      .22      .22      .25      .00      .33      .11      .00      .00      .51
       3.       0.       3.       0.       0.       1.       0.       0.       0.     1.03
      .00      .00     2.63      .00     .000     .017     .000     .000      .00     8.93
  .017517       0.       0.       0.        0        5        6      .00    11.09    20.02

T1 SHARP SPUR
T2  1.76% SLOPE
T3

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

     0         4         0         1      .0176

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

     3         0        -1         0         0         0         0         0         0         0

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

```
*PROF 3

CCHV=      .100 CEHV=      .300
*SECNO 1.000
2096 WSEL NOT GIVEN, AVG OF MAX, MIN USED
     1.00       .25       .25       .29       .00       .38       .13       .00       .00       .51
       5.        0.        5.        0.        0.        2.        0.        0.        0.      1.03
      .00       .00      2.88       .00      .000      .017      .000      .000       .00      8.92
  .017590        0.        0.        0.         0         8         5       .00     12.64     21.56

T1
T2 3.252 % SLOPE
T3

J1   ICHECK     INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

       0          5         0         1     .03252

J2   NPROF      IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

      4          0         -1        0         0         0         0         0         0         0

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

*PROF 4

CCHV=      .100 CEHV=      .300
*SECNO 1.000
2096 WSEL NOT GIVEN, AVG OF MAX, MIN USED
     1.00       .39       .39       .50       .00       .76       .37       .00       .00       .51
      19.        0.       19.        0.        0.        4.        0.        0.        0.      1.03
      .00       .00      4.88       .00      .000      .017      .000      .000       .00      6.09
  .032873        0.        0.        0.         0        17         7       .00     22.25     28.34
                                                                                THIS RUN EXECUTED  4/26/ 0      8:19:30
**************************************************
  HEC2 RELEASE DATED SEP 88 UPDATED APR  1989
  ERROR CORR -  01,02
  MODIFICATION -
**************************************************

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

    ROUND UP
```

SUMMARY PRINTOUT

SECNO	Q	CWSEL	CRIWS	VCH	TOPWID	FRCH	EG
1.000	12.00	.33	.43	4.30	16.89	1.87	.62
1.000	3.22	.22	.25	2.63	11.09	1.40	.33
1.000	4.57	.25	.29	2.88	12.64	1.43	.38
1.000	18.75	.39	.50	4.88	22.25	2.07	.76

1

SUMMARY OF ERRORS AND SPECIAL NOTES

```
1*****************************************************
 *  WATER SURFACE PROFILES                           *
 *  VERSION OF SEPTEMBER 1988                        *
 *  ERROR: 01,02                                     *
 *  UPDATED:  4 APRIL    1989                        *
 *  RUN DATE     4/26/ 0   TIME    8:15:47           *
 *****************************************************

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

END OF BANNER

  THIS RUN EXECUTED  4/26/ 0     8:15:47
**************************************************
  HEC2 RELEASE DATED SEP 88 UPDATED APR  1989
  ERROR CORR -  01,02
  MODIFICATION -
**************************************************

T1          SUNRISE RANCH STREET CAPACITY
T2          28'FF W/ MOUNTABLE CURB SUB-CRITICAL FLOW
T3          MORNING DEW

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

       0        2         0         1    .03819         0         0         0         0         0

J3  VARIABLE CODES FOR SUMMARY PRINTOUT

     38        43         1         2        26         4        68         3

NC      .017      .017      .017       .1        .3
QT         4       7.3      7.47     13.80     10.5
X1         1         7         0       48         0         0         0         0         0         0
GR       .67         0       .33      9.9         0        10       .28        24         0        38
GR       .33      38.1       .67       48

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

*PROF 1

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

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

```
2096 WSEL NOT GIVEN, AVG OF MAX, MIN USED

3265 DIVIDED FLOW

     1.00      .20      .20      .26      .00      .40      .20      .00      .00      .67
       7.       0.       7.       0.       0.       2.       0.       0.       0.      .67
      .00      .00     3.61      .00     .000     .017     .000     .000      .00     9.94
  .037476       0.       0.       0.        0       15        7      .00    20.16    38.06

T1
T2 BRIDLE FALLS
T3

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

      0         3         0         1     .03038

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

     2         0        -1         0         0         0         0         0         0         0

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

*PROF 2

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

3265 DIVIDED FLOW

     1.00      .21      .21      .27      .00      .38      .17      .00      .00      .67
       7.       0.       7.       0.       0.       2.       0.       0.       0.      .67
      .00      .00     3.34      .00     .000     .017     .000     .000      .00     9.94
  .030023       0.       0.       0.        0       15        7      .00    21.20    38.06

T1
T2 BRIDLE FALL$
T3

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

      0         4         0         1     .03038

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

     3         0        -1         0         0         0         0         0         0         0
```

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

*PROF 3

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

3265 DIVIDED FLOW

      1.00       .26       .26       .33       .00       .50       .24       .00       .00       .67
       14.        0.       14.        0.        0.        4.        0.        0.        0.       .67
       .00       .00      3.92       .00      .000      .017      .000      .000       .00      9.92
   .030367        0.        0.        0.         0         5         7       .00     26.63     38.08

T1
T2 LAUREN
T3

J1   ICHECK     INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

       0          5         0         1     .03036

J2   NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

      4          0        -1         0         0         0         0         0         0         0

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

*PROF 4

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

3265 DIVIDED FLOW

      1.00       .24       .24       .30       .00       .45       .21       .00       .00       .67
       11.        0.       10.        0.        0.        3.        0.        0.        0.       .67
       .00       .00      3.65       .00      .000      .017      .000      .000       .00      9.93
   .030276        0.        0.        0.         0        15         7       .00     24.05     38.07
```

THIS RUN EXECUTED 4/26/ 0 8:15:47

****

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

MORNING DEW

SUMMARY PRINTOUT

SECNO	Q	CWSEL	CRIWS	VCH	TOPWID	FRCH	EG
1.000	7.30	.20	.26	3.61	20.16	2.38	.40
1.000	7.47	.21	.27	3.34	21.20	2.09	.38
1.000	13.80	.26	.33	3.92	26.63	1.95	.50
1.000	10.50	.24	.30	3.65	24.05	2.02	.45

SUMMARY OF ERRORS AND SPECIAL NOTES

```
1*****************************************************
 *  WATER SURFACE PROFILES                           *
 *  VERSION OF SEPTEMBER 1988                        *
 *  ERROR: 01,02                                     *
 *  UPDATED:  4 APRIL    1989                        *
 *  RUN DATE     4/26/ 0   TIME    8:20:38           *
 *****************************************************
```

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

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

```
END OF BANNER

  THIS RUN EXECUTED  4/26/ 0     8:20:38
**************************************************
  HEC2 RELEASE DATED SEP 88 UPDATED APR  1989
  ERROR CORR -  01,02
  MODIFICATION -
**************************************************

T1          SUNRISE RANCH - STREET CAPACITY (44' ROW)
T2          28!FF MOUNTABLE C&G - NO CROWN 2.0% cross slope
T3          MORNING DEW

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

      0         2         0         1      .0150         0         0         0         0         0

J3  VARIABLE CODES FOR SUMMARY PRINTOUT

     38        43         1         2        26         4        68         3

NC     .017      .017      .017       .1        .3
QT        1      9.00
X1        1         6         0        46         0         0         0         0         0         0
GR      .51         0       .33       8.9         0         9       .56        37       .89      37.1
GR     1.07        46

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

*PROF 1

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

```
2096 WSEL NOT GIVEN, AVG OF MAX, MIN USED
     1.00      .33      .33      .38      .00      .49      .16      .00      .00      .51
      9.       0.       9.       0.       0.       3.       0.       0.       0.      1.07
     .00      .00     3.19      .00     .000     .017     .000     .000      .00     8.67
  .015016       0.       0.       0.        0       14        6      .00    17.07    25.74

  THIS RUN EXECUTED  4/26/ 0      8:20:38
**************************************************
  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


    MORNING DEW

SUMMARY PRINTOUT

      SECNO         Q        CWSEL      CRIWS       VCH      TOPWID      FRCH        EG

      1.000      9.00         .33        .38      3.19      17.07      1.38        .49

 SUMMARY OF ERRORS AND SPECIAL NOTES
```

```
1*************************************************
*  WATER SURFACE PROFILES                       *
*  VERSION OF SEPTEMBER 1988                    *
*  ERROR: 01,02                                 *
*  UPDATED:  4 APRIL    1989                    *
*  RUN DATE     4/26/ 0   TIME    8:21:49       *
*************************************************
```

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

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

```
END OF BANNER

 THIS RUN EXECUTED  4/26/ 0     8:21:49
************************************************
  HEC2 RELEASE DATED SEP 88 UPDATED APR  1989
  ERROR CORR -  01,02
  MODIFICATION -
************************************************

T1          SUNRISE RANCH STREET CAPACITY (44' ROW)
T2          26'FF W/ STANDARD CURB SUB-CRITICAL FLOW - 8" CURB
T3          RAWHIDE

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

      0         2         0         1    .03252         0         0         0         0         0

J3  VARIABLE CODES FOR SUMMARY PRINTOUT

     38        43         1         2        26         4        68         3

NC     .017      .017      .017        .1        .3
QT        2     26.32     32.48
X1        1         9         0        44         0         0         0         0         0         0
GR      .85         0       .67       8.9         0         9      .125        11      .345        23
GR     .125        33         0        35       .67      35.1       .85        44

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

*PROF 1

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

```
2096 WSEL NOT GIVEN, AVG OF MAX, MIN USED
     1.00      .40      .40      .52      .00      .82      .42      .00      .00      .85
      26.       0.      26.       0.       0.       5.       0.       0.       0.      .85
      .00      .00     5.19      .00     .000     .017     .000     .000      .00     8.94
  .032485       0.       0.       0.        0       11        5      .00    26.12    35.06

T1 26' FF
T2 RAWHIDE
T3

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

      0         3         0         1     .03252

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

     2         0        -1         0         0         0         0         0         0         0

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

*PROF 2

CCHV=      .100 CEHV=      .300
*SECNO 1.000
2096 WSEL NOT GIVEN, AVG OF MAX, MIN USED
     1.00      .43      .43      .57      .00      .92      .49      .00      .00      .85
      32.       0.      32.       0.       0.       6.       0.       0.       0.      .85
      .00      .00     5.64      .00     .000     .017     .000     .000      .00     8.94
  .032515       0.       0.       0.        0       11        5      .00    26.13    35.06

  THIS RUN EXECUTED  4/26/ 0     8:21:49
**************************************************
  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


    RAWHIDE

SUMMARY PRINTOUT

      SECNO       Q        CWSEL     CRIWS       VCH      TOPWID     FRCH       EG

      1.000     26.32        .40       .52       5.19     26.12      2.08       .82
      1.000     32.48        .43       .57       5.64     26.13      2.12       .92
```

```
1*****************************************************
 *  WATER SURFACE PROFILES                           *
 *  VERSION OF SEPTEMBER 1988                        *
 *  ERROR: 01,02                                     *
 *  UPDATED:  4 APRIL    1989                        *
 *  RUN DATE     4/26/ 0   TIME    8:47:53           *
 *****************************************************
```

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

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

```
 END OF BANNER
1
     4/26/ 0       8:47:53                                                    PAGE    1
```

```
                                                        THIS RUN EXECUTED  4/26/ 0     8:47:53
 ***************************************************
   HEC2 RELEASE DATED SEP 88 UPDATED APR  1989


   ERROR CORR -  01,02
   MODIFICATION -
 ***************************************************

 T1          SUNRISE RANCH STREET CAPACITY CALCULATIONS
 T2          28'FF W/ 8" STD CURB SUB-CRITICAL FLOW
 T3          EVENING FIRE

 J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

       0         2         0         0      .006         0         0         0         0         0

 J3  VARIABLE CODES FOR SUMMARY PRINTOUT

      38        43         1         2        26         4        68         3

 NC     .017      .017      .017       .1        .3
```

```
 QT        6       17.5      27.93      31.33      38.41      18.61      32.4
 X1        1          9          0         48          0          0         0          0          0          0
 GR      1.0          0        .67        9.9          0         10      .125         12       .365         24
 GR     .125         36          0         38        .67       38.1       1.0         48
1
     4/26/ 0       8:47:53                                                                                PAGE     2

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


 *PROF 1

 CCHV=      .100 CEHV=      .300
 *SECNO 1.000
 2096 WSEL NOT GIVEN, AVG OF MAX, MIN USED
      1.00       .46       .46       .00       .00       .56       .10       .00       .00      1.00
       18.        0.       17.        0.        0.        7.        0.        0.        0.       1.00
       .00       .00      2.58       .00      .000      .017      .000      .000       .00      9.93
   .005996        0.        0.        0.         0         0         5       .00     28.14     38.07
0
1
     4/26/ 0       8:47:53                                                                                PAGE     3


 T1 EVENING FIRE
 T2 0.60 % SLOPE
 T3

 J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

       0         3         0         0       .006

 J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

      2         0        -1         0         0         0         0         0         0         0

1
     4/26/ 0       8:47:53                                                                                PAGE     4

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


 *PROF 2
```

```
 CCHV=      .100 CEHV=      .300
 *SECNO 1.000
 2096 WSEL NOT GIVEN, AVG OF MAX, MIN USED
      1.00       .54       .54       .00       .00       .69       .15       .00       .00      1.00
       28.        0.       28.        0.        0.        9.        0.        0.        0.      1.00
       .00       .00      3.09       .00      .000      .017      .000      .000       .00      9.92
    .005961        0.        0.        0.         0         0         5       .00     28.16     38.08
0
1
     4/26/ 0        8:47:53                                                                    PAGE     5


 T1 EVENING FIRE
 T2 0.60 % SLOPE
 T3

 J1   ICHECK     INQ        NINV       IDIR       STRT       METRIC     HVINS      Q          WSEL       FQ

       0          4          0          0        .006

 J2   NPROF      IPLOT      PRFVS      XSECV      XSECH      FN         ALLDC      IBW        CHNIM      ITRACE

      3          0         -1          0          0          0          0          0          0          0

1
     4/26/ 0        8:47:53                                                                    PAGE     6


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


 *PROF 3

 CCHV=      .100 CEHV=      .300
 *SECNO 1.000
 2096 WSEL NOT GIVEN, AVG OF MAX, MIN USED
      1.00       .56       .56       .00       .00       .73       .16       .00       .00      1.00
       31.        0.       31.        0.        0.       10.        0.        0.        0.      1.00
       .00       .00      3.23       .00      .000      .017      .000      .000       .00      9.92
    .005916        0.        0.        0.         0         0         5       .00     28.17     38.08
0
1
     4/26/ 0        8:47:53                                                                    PAGE     7


 T1 EVENING FIRE
 T2 0.60 % SLOPE
```

```
 T3

 J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

       0         5         0         0      .006

 J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

      4         0        -1         0         0         0         0         0         0         0

1
     4/26/ 0       8:47:53                                                                    PAGE     8

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


 *PROF 4

 CCHV=      .100 CEHV=      .300
 *SECNO 1.000
 2096 WSEL NOT GIVEN, AVG OF MAX, MIN USED
      1.00       .61       .61       .60       .00       .80       .19       .00       .00      1.00
       38.        0.       38.        0.        0.       11.        0.        0.        0.      1.00
       .00       .00      3.52       .00      .000      .017      .000      .000       .00      9.91
   .006009        0.        0.        0.         0        11         0       .00     28.18     38.09
0
1
     4/26/ 0       8:47:53                                                                    PAGE     9


 T1 EVENING FIRE
 T2 0.60 % SLOPE
 T3

 J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

       0         6         0         0      .006

 J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

      5         0        -1         0         0         0         0         0         0         0

1
     4/26/ 0       8:47:53                                                                    PAGE    10

    SECNO     DEPTH     CWSEL     CRIWS     WSELK     EG        HV        HL        OLOSS    BANK ELEV
```

```
    Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA    LEFT/RIGHT
    TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN      SSTA
    SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID     ENDST


 *PROF 5

 CCHV=      .100 CEHV=      .300
 *SECNO 1.000
 2096 WSEL NOT GIVEN, AVG OF MAX, MIN USED
      1.00       .47       .47       .00       .00       .58       .11       .00       .00      1.00
       19.        0.       19.        0.        0.        7.        0.        0.        0.       1.00
       .00       .00      2.64       .00      .000      .017      .000      .000       .00      9.93
   .005998        0.        0.        0.         0         0         5       .00     28.14     38.07
0
1
     4/26/ 0       8:47:53                                                                  PAGE   11


 T1 EVENING FIRE
 T2 0.60 % SLOPE
 T3

 J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

       0         7         0         0      .006

 J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

      6         0        -1         0         0         0         0         0         0         0

1
     4/26/ 0       8:47:53                                                                  PAGE   12


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


 *PROF 6

 CCHV=      .100 CEHV=      .300
 *SECNO 1.000
 2096 WSEL NOT GIVEN, AVG OF MAX, MIN USED
      1.00       .57       .57       .56       .00       .74       .17       .00       .00      1.00
       32.        0.       32.        0.        0.       10.        0.        0.        0.       1.00
       .00       .00      3.27       .00      .000      .017      .000      .000       .00      9.91
   .005900        0.        0.        0.         0         8         0       .00     28.17     38.09
```

THIS RUN EXECUTED 4/26/ 0 8:47:53

****
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

EVENING FIRE

SUMMARY PRINTOUT

SECNO	Q	CWSEL	CRIWS	VCH	TOPWID	FRCH	EG
1.000	17.50	.46	.00	2.58	28.14	.92	.56
1.000	27.93	.54	.00	3.09	28.16	.96	.69
1.000	31.33	.56	.00	3.23	28.17	.97	.73
1.000	38.41	.61	.60	3.52	28.18	.99	.80
1.000	18.61	.47	.00	2.64	28.14	.93	.58
1.000	32.40	.57	.56	3.27	28.17	.97	.74

SUMMARY OF ERRORS AND SPECIAL NOTES

```
1*************************************************
 *  WATER SURFACE PROFILES                       *
 *  VERSION OF SEPTEMBER 1988                    *
 *  ERROR: 01,02                                 *
 *  UPDATED:  4 APRIL    1989                    *
 *  RUN DATE     6/22/ 0   TIME   14:44:32       *
 *************************************************
```

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

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

```
END OF BANNER

 THIS RUN EXECUTED  6/22/ 0    14:44:32
**************************************************
  HEC2 RELEASE DATED SEP 88 UPDATED APR  1989
  ERROR CORR -  01,02
  MODIFICATION -
**************************************************

T1          SUNSET GARDENS ROAD CAPACITY CALCULATIONS
T2          36'FF R/W ULTIMATE CONDITION
T3          FULLY DEVELOPED FLOW 25.8 CFS + 7.64 CFS

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

      0         2         0         1      .0287        0         0         0         0         0

J3  VARIABLE CODES FOR SUMMARY PRINTOUT

     43         1         2        26         4        68         3

NC     .017      .017      .017       .1        .3
QT        1    33.44
X1        1         9         0        56         0         0         0         0         0         0
GR      .87         0       .67      11.9         0        12      .125        14      .445        30
GR     .125        46         0        48       .67      48.1       .87        60

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

*PROF 1

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

```
2096 WSEL NOT GIVEN, AVG OF MAX, MIN USED
     1.00      .45      .45      .56      .00      .82      .36      .00      .00      .87
      33.       0.      33.       0.       0.       7.       0.       0.       0.      .67
      .00      .00     4.85      .00     .000     .017     .000     .000      .00    11.93
  .028792       0.       0.       0.        0       11        6      .00    36.13    48.07


   THIS RUN EXECUTED  6/22/ 0    14:44:32
**************************************************
  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


    FULLY DEVELOPED FLOW

SUMMARY PRINTOUT

        Q       CWSEL      CRIWS       VCH      TOPWID      FRCH        EG

     33.440        .45        .56       4.85     36.13       1.95        .82

 SUMMARY OF ERRORS AND SPECIAL NOTES
```

```
1*************************************************
 *  WATER SURFACE PROFILES                       *
 *  VERSION OF SEPTEMBER 1988                    *
 *  ERROR: 01,02                                 *
 *  UPDATED:  4 APRIL    1989                    *
 *  RUN DATE     6/22/ 0   TIME   12:17:45       *
 *************************************************
```

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

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

```
END OF BANNER

                                                    THIS RUN EXECUTED  6/22/ 0    12:17:45

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

PHASE 1 TEMPORARY DRAINAGE SWALE

```
T1  SUNRISE RANCH ESTATES
T2  DRAINAGE SWALE 2.0' DEEP 12.0' WIDE  3:1 SIDE SLOPES
T3  1.35% SLOPE

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

       0         2         0         1      .0135        0         0         0         0         0

J3  VARIABLE CODES FOR SUMMARY PRINTOUT

     38        43         1         2        26         4        68         3

NC     .015      .015      .015       .1        .3
QT        1     30.6
X1        1         3         0      12.         0         0         0         0         0         0
GR      2.0         0         0       6.       2.0      12.

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

*PROF 1

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

```
2096 WSEL NOT GIVEN, AVG OF MAX, MIN USED
     1.00      1.15      1.15      1.44       .00      2.07       .92       .00       .00      2.00
      31.        0.       31.        0.        0.        4.        0.        0.        0.      2.00
      .00       .00      7.70       .00      .000      .015      .000      .000       .00      2.55
  .013517        0.        0.        0.         0        14         6       .00      6.91      9.45

 THIS RUN EXECUTED  6/22/ 0     12:17:45
**************************************************
  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

% SLOPE

SUMMARY PRINTOUT

      SECNO         Q        CWSEL      CRIWS       VCH       TOPWID      FRCH       EG

       1.000      30.60       1.15       1.44       7.70       6.91       1.79       2.07

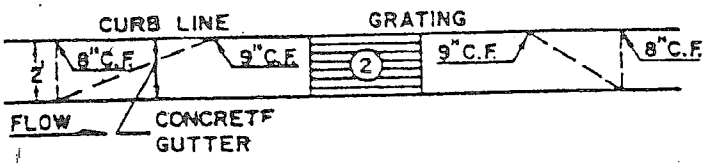

 SUMMARY OF ERRORS AND SPECIAL NOTES
```

APPENDIX C

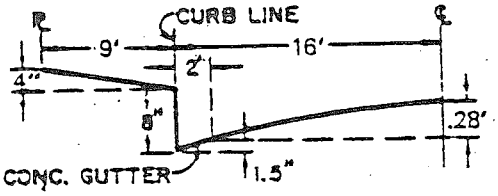
STORM DRAIN

SUNSET GARDENS ROAD INLETS

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



GRATING & GUTTER PLAN



TYPICAL HALF STREET SECTION
(ABOVE BASIN)

33.44 cfs
15.60 cfs
17.84 cfs
-12.00 cfs
5.84 cfs
5.80 cfs
0 cfs

3 inlets each side
1 SGL "A"
2 SGL "C"

```
1*****************************************************
 *  WATER SURFACE PROFILES                           *
 *  VERSION OF SEPTEMBER 1988                        *
 *  ERROR: 01,02                                     *
 *  UPDATED:  4 APRIL    1989                        *
 *  RUN DATE     6/23/ 0   TIME    7:42:17           *
 *****************************************************
```

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

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

```
END OF BANNER

 THIS RUN EXECUTED  6/23/ 0     7:42:17
************************************************
  HEC2 RELEASE DATED SEP 88 UPDATED APR  1989
  ERROR CORR -  01,02
  MODIFICATION -
************************************************
```

SUNSET GARDENS ROAD INLETS AT 98 th STREET

```
T1          SUNSET GARDENS ROAD CAPACITY CALCULATIONS
T2          36'FF R/W ULTIMATE CONDITION
T3          FULLY DEVELOPED FLOW 25.8 CFS + 7.64 CFS

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

       0        2         0         1      .0287        0         0         0         0         0

J3  VARIABLE CODES FOR SUMMARY PRINTOUT

     43         1         2        26         4        68         3

NC     .017      .017      .017       .1        .3
QT        3    33.44     17.84     5.84
X1        1        9         0        56         0         0         0         0         0         0
GR      .87        0       .67     11.9         0        12      .125        14      .445        30
GR     .125       46         0        48       .67      48.1       .87        60

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

```
*PROF 1

CCHV=      .100 CEHV=      .300
*SECNO 1.000
2096 WSEL NOT GIVEN, AVG OF MAX, MIN USED
     1.00       .45       .45       .56       .00       .82       .36       .00       .00       .87
      33.        0.       33.        0.        0.        7.        0.        0.        0.       .67
      .00       .00      4.85       .00      .000      .017      .000      .000       .00     11.93
  .028792        0.        0.        0.         0        11         6       .00     36.13     48.07

T1 SUNSET GARDENS
T2
T3

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

      0         3         0         1      .0287

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

     2         0        -1         0         0         0         0         0         0         0

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

*PROF 2

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

3265 DIVIDED FLOW

     1.00       .37       .37       .45       .00       .64       .26       .00       .00       .87
      18.        0.       18.        0.        0.        4.        0.        0.        0.       .67
      .00       .00      4.11       .00      .000      .017      .000      .000       .00     11.94
  .028607        0.        0.        0.         0         8         6       .00     28.91     48.06

T1 SUNSET GARDENS
T2
T3

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

      0         4         0         1      .0287

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

     3         0        -1         0         0         0         0         0         0         0
```

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

*PROF 3

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

3265 DIVIDED FLOW

     1.00      .27       .27       .32       .00       .42       .15       .00       .00       .87
       6.       0.        6.        0.        0.        2.        0.        0.        0.       .67
      .00      .00      3.15       .00      .000      .017      .000      .000       .00     11.96
  .028675       0.        0.        0.         0        19         8       .00     18.36     48.04

  THIS RUN EXECUTED  6/23/ 0     7:42:17
************************************************
  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

    FULLY DEVELOPED FLOW

SUMMARY PRINTOUT

        Q        CWSEL      CRIWS       VCH      TOPWID      FRCH       EG

     33.440        .45        .56       4.85      36.13       1.95       .82
     17.840        .37        .45       4.11      28.91       2.09       .64
      5.840        .27        .32       3.15      18.36       2.45       .42

SUMMARY OF ERRORS AND SPECIAL NOTES
```

CALCULATIONS FOR INLETS AT SUMP
for
Sunrise Ranch Estates

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

Evening Fire Knuckle sump inlets:

FOR DOUBLE 'C' INLET

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

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

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

FOR TRIPLE 'C' INLET

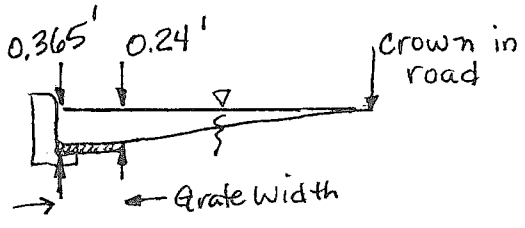
*Front Q cap = (3.0) x (9.75') x (0.725) **1.5 = 18.06 cfs*

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

Total Q cap = 12.04 cfs + 10.11 cfs = 28.17 cfs

The 100 year flow to the sump for this project is 24.63cfs. Since there is no overflow to the onsite retention pond the sump inlets are designed for 2 times the flow rate of 49.26 cfs. A Triple 'C' and Double 'C' inlet will have a combined capacity of 50.32 cfs which is double the actual 100 year flow rate.

Double 'A' sump Inlet on Evening Fire Street:

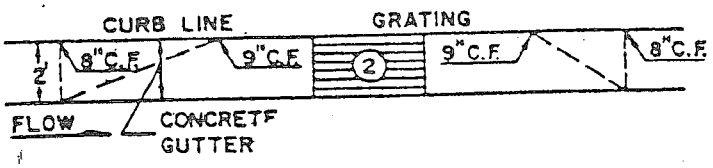


*Front Q cap = (3.0) x (6.5') x (0.24) **1.5 = 2.29 cfs*

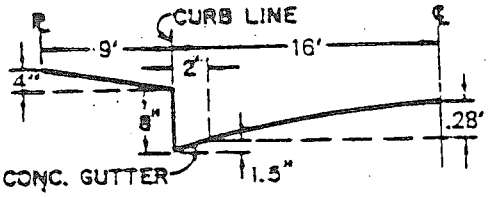
*Sides Q cap = (3.0) x (4.0') x (0.3025) **1.5 = 1.99 cfs*

Total Q intercepted = 2.29 cfs + 1.99 cfs = 4.28 cfs

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

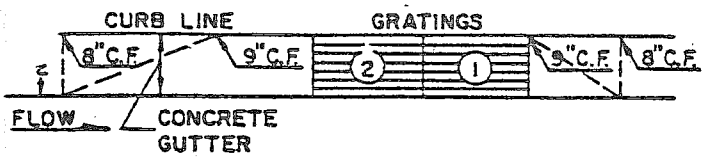


GRATING & GUTTER PLAN

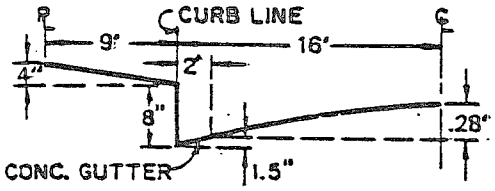


TYPICAL HALF STREET SECTION
(ABOVE BASIN)

GRATING CAPACITIES FOR TYPE DOUBLE "C," AND "D"



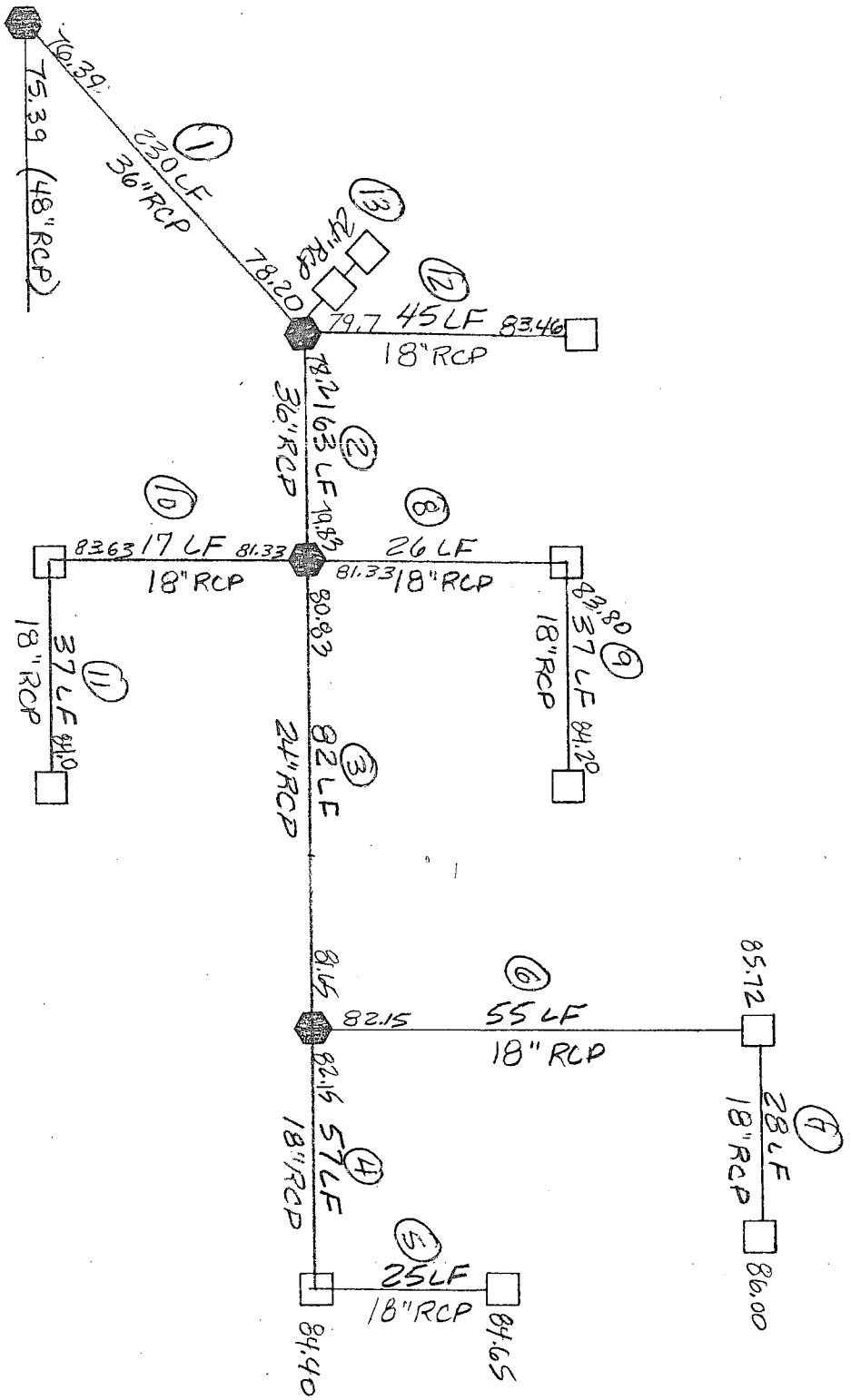
GRATING & GUTTER PLAN



TYPICAL HALF STREET SECTION
(ABOVE BASIN)

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

PROJECT Sunrise Ranch
SUBJECT Storm Drain Schematic
BY DLH DATE 5-1-00
CHECKED _____ DATE _____
SHEET ____ OF ____



D. Mark Goodwin & Associates, P.A.
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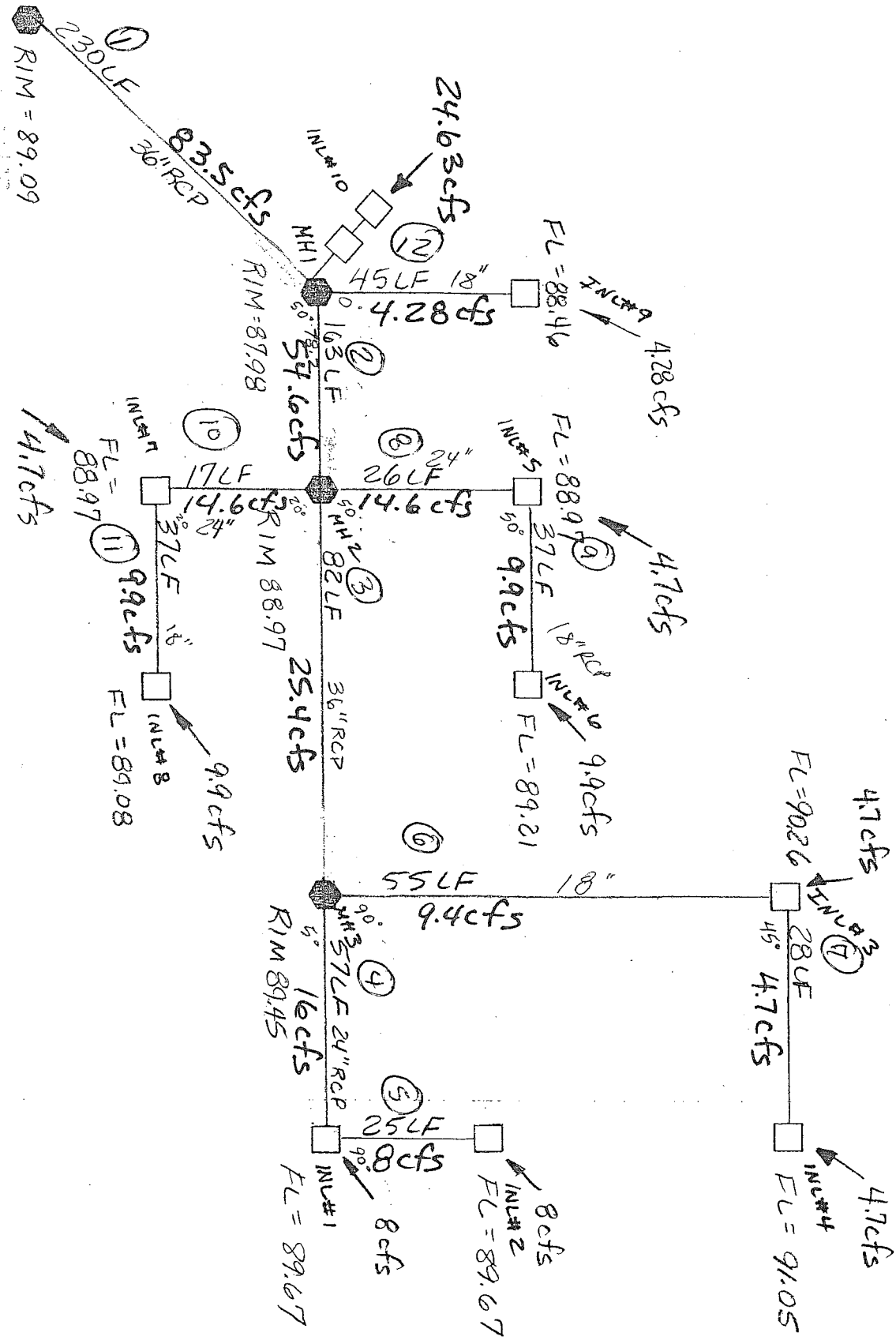
PROJECT Sunrise Ranch
SUBJECT Storm Drain
BY DLH DATE 5-1-00
CHECKED DATE
SHEET OF



TOTAL Q = 83.5cfs

HYDRAULIC REPORT FOR

PRELIMINARY

STORM DRAIN DESIGN

FOR

SUNRISE RANCH ESTATES

MAY 2000

MARK GOODWIN & ASSOCIATES

DLH

Run date: 05-01-2000
File:

Return Period = 5 Yrs
Rainfall file: Your_County

LINE 1 / Q = 83.5 / HT = 36 / WID = 36 / N = .013 / L = 230 / JLC = .1

EX.MH-MH1 / Outfall

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	80.00	36.00	76.39	11.82	82.17	0.00	9.69	7.07
UPSTRM	83.61	36.00	78.20	11.81	85.77	0.00	6.78	7.07

Drainage area (ac)	= 0	Slope of invert (%)	= 0.787
Runoff coefficient	= 0	Slope energy grade line (%)	= 1.568
Time of conc (min)	= 2	Critical depth (in)	= 33.87
Inlet time (min)	= 0	Req'd length curb inlet (ft)	= 0.0
Intensity (in/hr)	= 0.00	Req'd grate area (sf)	= 0.0
Cumulative C*A	= 0.0	Depth at inlet opening (in)	= 0
Flow contrib (cfs)	= 83.5	Confluence angle (deg)	= 45
Default Q (cfs)	= 83.5	Natural ground elev (ft)	= 87.98
Line capac. (cfs)	= 59.2	Line storage (cuft)	= 1626

LINE 2 / Q = 54.6 / HT = 36 / WID = 36 / N = .013 / L = 163 / JLC = .1

MH1-MH2 / DNLN = 1

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	83.82	36.00	78.20	7.73	84.75	0.00	6.78	7.07
UPSTRM	84.92	36.00	79.83	7.72	85.84	0.00	6.13	7.07

Drainage area (ac)	= 0	Slope of invert (%)	= 1.000
Runoff coefficient	= 0	Slope energy grade line (%)	= 0.670
Time of conc (min)	= 1	Critical depth (in)	= 28.25
Inlet time (min)	= 0	Req'd length curb inlet (ft)	= 0.0
Intensity (in/hr)	= 0.00	Req'd grate area (sf)	= 0.0
Cumulative C*A	= 0.0	Depth at inlet opening (in)	= 0
Flow contrib (cfs)	= 54.5	Confluence angle (deg)	= 50
Default Q (cfs)	= 54.6	Natural ground elev (ft)	= 88.97
Line capac. (cfs)	= 66.7	Line storage (cuft)	= 1152

LINE 3 / Q = 25.4 / HT = 24 / WID = 24 / N = .013 / L = 82 / JLC = .1

MH2-MH3 / DNLN = 2

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	85.01	24.00	80.83	8.09	86.02	0.00	6.13	3.14
UPSTRM	86.04	24.00	81.65	8.09	87.06	0.00	5.79	3.14

Drainage area (ac)	= 0	Slope of invert (%)	= 1.000
Runoff coefficient	= 0	Slope energy grade line (%)	= 1.261
Time of conc (min)	= 0	Critical depth (in)	= 21.61
Inlet time (min)	= 0	Req'd length curb inlet (ft)	= 0.0
Intensity (in/hr)	= 0.00	Req'd grate area (sf)	= 0.0
Cumulative C*A	= 0.0	Depth at inlet opening (in)	= 0
Flow contrib (cfs)	= 25.3	Confluence angle (deg)	= 0
Default Q (cfs)	= 25.4	Natural ground elev (ft)	= 89.45
Line capac. (cfs)	= 22.6	Line storage (cuft)	= 258

LINE 4 / Q = 16.0 / HT = 18 / WID = 18 / N = .013 / L = 57 / JLC = .1

MH3-INL#1 / DNLN = 3

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	86.15	18.00	82.15	9.06	87.42	0.00	5.79	1.77
UPSTRM	87.47	18.00	84.40	9.05	88.74	0.00	3.76	1.77

Drainage area (ac)	= 0	Slope of invert (%)	= 3.947
Runoff coefficient	= 0	Slope energy grade line (%)	= 2.322
Time of conc (min)	= 0	Critical depth (in)	= 17.32
Inlet time (min)	= 0	Req'd length curb inlet (ft)	= 0.0
Intensity (in/hr)	= 0.00	Req'd grate area (sf)	= 0.0
Cumulative C*A	= 0.0	Depth at inlet opening (in)	= 0
Flow contrib (cfs)	= 16	Confluence angle (deg)	= 5
Default Q (cfs)	= 16	Natural ground elev (ft)	= 89.67
Line capac. (cfs)	= 20.9	Line storage (cuft)	= 101

LINE 5 / Q = 8.0 / HT = 18 / WID = 18 / N = .013 / L = 25 / JLC = .1

INL#1-INL#2 / DNLN = 4

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	87.60	18.00	84.40	4.53	87.92	0.00	3.76	1.77
UPSTRM	87.77	18.00	84.65	4.53	88.09	0.00	3.51	1.77

Drainage area (ac)	= 0	Slope of invert (%)	= 1.000
Runoff coefficient	= 0	Slope energy grade line (%)	= 0.708
Time of conc (min)	= 0	Critical depth (in)	= 12.95
Inlet time (min)	= 0	Req'd length curb inlet (ft)	= 0.0
Intensity (in/hr)	= 0.00	Req'd grate area (sf)	= 0.0
Cumulative C*A	= 0.0	Depth at inlet opening (in)	= 0
Flow contrib (cfs)	= 8	Confluence angle (deg)	= 90
Default Q (cfs)	= 8	Natural ground elev (ft)	= 89.67
Line capac. (cfs)	= 10.5	Line storage (cuft)	= 44

LINE 6 / Q = 9.4 / HT = 18 / WID = 18 / N = .013 / L = 55 / JLC = .1

MH#3-INL#3 / DNLN = 3

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	86.15	18.00	82.15	5.32	86.58	0.00	5.79	1.77
UPSTRM	86.89	14.04	85.72	6.36	87.52	14.91	3.04	1.48

Drainage area (ac)	= 0	Slope of invert (%)	= 6.491
Runoff coefficient	= 0	Slope energy grade line (%)	= 1.695
Time of conc (min)	= 0	Critical depth (in)	= 14.04
Inlet time (min)	= 0	Req'd length curb inlet (ft)	= 0.0
Intensity (in/hr)	= 0.00	Req'd grate area (sf)	= 0.0
Cumulative C*A	= 0.0	Depth at inlet opening (in)	= 0
Flow contrib (cfs)	= 9.3	Confluence angle (deg)	= 90
Default Q (cfs)	= 9.4	Natural ground elev (ft)	= 90.26
Line capac. (cfs)	= 26.8	Line storage (cuft)	= 89

LINE 7 / Q = 4.7 / HT = 18 / WID = 18 / N = .013 / L = 28 / JLC = .1

INL#3-INL#4 / DNLN = 6

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	86.95	14.79	85.72	2.99	87.09	13.42	3.04	1.57
UPSTRM	86.92	10.74	86.00	4.28	87.21	17.66	3.55	1.10

Drainage area (ac)	= 0	Slope of invert (%)	= 1.000
Runoff coefficient	= 0	Slope energy grade line (%)	= 0.413
Time of conc (min)	= 0	Critical depth (in)	= 9.93
Inlet time (min)	= 0	Req'd length curb inlet (ft)	= 0.0
Intensity (in/hr)	= 0.00	Req'd grate area (sf)	= 0.0
Cumulative C*A	= 0.0	Depth at inlet opening (in)	= 0
Flow contrib (cfs)	= 4.6	Confluence angle (deg)	= 45
Default Q (cfs)	= 4.7	Natural ground elev (ft)	= 91.05
Line capac. (cfs)	= 10.5	Line storage (cuft)	= 37

LINE 8 / Q = 14.6 / HT = 18 / WID = 18 / N = .013 / L = 26 / JLC = .1

MH#2-INL#5 / DNLN = 2

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	85.01	18.00	81.33	8.26	86.07	0.00	6.13	1.77
UPSTRM	85.51	18.00	83.80	8.26	86.57	0.00	3.66	1.77

Drainage area (ac)	= 0	Slope of invert (%)	= 9.500
Runoff coefficient	= 0	Slope energy grade line (%)	= 1.933
Time of conc (min)	= 0	Critical depth (in)	= 16.93
Inlet time (min)	= 0	Req'd length curb inlet (ft)	= 0.0
Intensity (in/hr)	= 0.00	Req'd grate area (sf)	= 0.0
Cumulative C*A	= 0.0	Depth at inlet opening (in)	= 0
Flow contrib (cfs)	= 14.6	Confluence angle (deg)	= 50
Default Q (cfs)	= 14.6	Natural ground elev (ft)	= 88.97
Line capac. (cfs)	= 32.4	Line storage (cuft)	= 46

LINE 9 / Q = 9.9 / HT = 18 / WID = 18 / N = .013 / L = 37 / JLC = .1

INL#5-INL#6 / DNLN = 8

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	85.62	18.00	83.80	5.60	86.11	0.00	3.66	1.77
UPSTRM	86.00	18.00	84.20	5.60	86.48	0.00	3.51	1.77

Drainage area (ac)	= 0	Slope of invert (%)	= 1.081
Runoff coefficient	= 0	Slope energy grade line (%)	= 1.021
Time of conc (min)	= 0	Critical depth (in)	= 14.41
Inlet time (min)	= 0	Req'd length curb inlet (ft)	= 0.0
Intensity (in/hr)	= 0.00	Req'd grate area (sf)	= 0.0
Cumulative C*A	= 0.0	Depth at inlet opening (in)	= 0
Flow contrib (cfs)	= 9.8	Confluence angle (deg)	= 50
Default Q (cfs)	= 9.9	Natural ground elev (ft)	= 89.21
Line capac. (cfs)	= 10.9	Line storage (cuft)	= 65

LINE 10 / Q = 14.6 / HT = 18 / WID = 18 / N = .013 / L = 17 / JLC = .1

MH#2-INL#7 / DNLN = 2

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	85.01	18.00	81.33	8.26	86.07	0.00	6.13	1.77
UPSTRM	85.34	18.00	83.63	8.26	86.40	0.00	3.84	1.77

Drainage area (ac)	= 0	Slope of invert (%)	=13.529
Runoff coefficient	= 0	Slope energy grade line (%)	= 1.933
Time of conc (min)	= 0	Critical depth (in)	= 16.93
Inlet time (min)	= 0	Req'd length curb inlet (ft)	= 0.0
Intensity (in/hr)	= 0.00	Req'd grate area (sf)	= 0.0
Cumulative C*A	= 0.0	Depth at inlet opening (in)	= 0
Flow contrib (cfs)	= 14.6	Confluence angle (deg)	= 20
Default Q (cfs)	= 14.6	Natural ground elev (ft)	= 88.97
Line capac. (cfs)	= 38.6	Line storage (cuft)	= 30

LINE 11 / Q = 9.9 / HT = 18 / WID = 18 / N = .013 / L = 37 / JLC = .1

INL#7-INL#8 / DNLN = 10

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	85.44	18.00	83.63	5.60	85.93	0.00	3.84	1.77
UPSTRM	85.82	18.00	84.00	5.60	86.31	0.00	3.58	1.77

Drainage area (ac)	= 0	Slope of invert (%)	= 1.000
Runoff coefficient	= 0	Slope energy grade line (%)	= 1.021
Time of conc (min)	= 0	Critical depth (in)	= 14.41
Inlet time (min)	= 0	Req'd length curb inlet (ft)	= 0.0
Intensity (in/hr)	= 0.00	Req'd grate area (sf)	= 0.0
Cumulative C*A	= 0.0	Depth at inlet opening (in)	= 0
Flow contrib (cfs)	= 9.8	Confluence angle (deg)	= 20
Default Q (cfs)	= 9.9	Natural ground elev (ft)	= 89.08
Line capac. (cfs)	= 10.5	Line storage (cuft)	= 65

LINE 12 / Q = 4.3 / HT = 18 / WID = 18 / N = .013 / L = 45 / JLC = .1

MH#1-INL#9 / DNLN = 1

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	83.82	18.00	79.70	2.42	83.91	0.00	6.78	1.77
UPSTRM	84.28	9.49	83.46	4.53	84.60	17.97	3.5	0.94

Drainage area (ac)	= 0	Slope of invert (%)	= 8.356
Runoff coefficient	= 0	Slope energy grade line (%)	= 1.526
Time of conc (min)	= 0	Critical depth (in)	= 9.47
Inlet time (min)	= 0	Req'd length curb inlet (ft)	= 0.0
Intensity (in/hr)	= 0.00	Req'd grate area (sf)	= 0.0
Cumulative C*A	= 0.0	Depth at inlet opening (in)	= 0
Flow contrib (cfs)	= 4.2	Confluence angle (deg)	= 0
Default Q (cfs)	= 4.28	Natural ground elev (ft)	= 88.46
Line capac. (cfs)	= 30.4	Line storage (cuft)	= 61

LINE 13 / Q = 24.6 / HT = 24 / WID = 24 / N = .013 / L = 10 / JLC = .1

MH#1-INL#10 / DNLN = 1

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	83.82	24.00	79.20	7.84	84.78	0.00	6.78	3.14
UPSTRM	84.04	24.00	79.40	7.84	84.99	0.00	6.45	3.14

Drainage area (ac)	= 0	Slope of invert (%)	= 2.000
Runoff coefficient	= 0	Slope energy grade line (%)	= 1.186
Time of conc (min)	= 0	Critical depth (in)	= 21.24
Inlet time (min)	= 0	Req'd length curb inlet (ft)	= 0.0
Intensity (in/hr)	= 0.00	Req'd grate area (sf)	= 0.0
Cumulative C*A	= 0.0	Depth at inlet opening (in)	= 0
Flow contrib (cfs)	= 24.6	Confluence angle (deg)	= 90
Default Q (cfs)	= 24.63	Natural ground elev (ft)	= 87.86
Line capac. (cfs)	= 32.0	Line storage (cuft)	= 31

APPENDIX D

SUPPLEMENTAL INFORMATION

AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AMOLE-HUBBELL
DRAINAGE MANAGEMENT PLAN

VOLUME I

FINAL
FACILITIES PLAN REPORT

Prepared for

AMAFCA

ALBUQUERQUE METROPOLITAN
ARROYO FLOOD
CONTROL AUTHORITY

July 22, 1999

LEEDSHILL-HERKENHOFF, INC.
an ASCG Company
500 Copper Ave. N.W.
Albuquerque, New Mexico
(505) 247-0294

LH Project No. 95043

AMOLE-HUBBELL DRAINAGE MANAGEMENT

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/08/1999
INPUT FILE = SV_DMP.DAT USE NO.= STOCTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	
START										TIME=.00
*S										
*S	SNOW VISTA									
*S	WITH MANAGEMENT PLAN IN PLACE									
*S										
*S										
*S 100-YR, 24-HR STORM WITH NO SEDIMENT**										
*S FILE NAME : SV_DMP1.DAT										
*S BY: TOM BLAINE AND RICHARD STOCKTON/K. JACOBSEN										
*S LAST REVISION: 06-08-99 (PIPE FOR POND.71 CHANGED AND HYD=400)										
*S100 YEAR 24HR STORM DEVELOPED CONDITION										
RAINFALL TYPE= 2										RAIN24=2.660
COMPUTE NM HYD	100.00	-	2	.13520	340.82	15.597	2.16311	1.500	3.939	PER IMP=85.00
ROUTE RESERVOIR	100.10	2	5	.13520	111.60	15.611	2.16501	1.850	1.290	AC-FT=4.075
ROUTE	100.20	5	3	.13520	112.75	15.611	2.16502	1.400	1.303	
ROUTE	100.30	3	10	.13520	114.14	15.611	2.16502	1.450	1.319	
COMPUTE NM HYD	110.00	-	2	.07170	181.36	8.272	2.16311	1.500	3.952	PER IMP=85.00
ROUTE RESERVOIR	110.10	2	5	.07170	59.19	8.377	2.19060	2.600	1.290	AC-FT=.001
ROUTE	110.20	5	11	.07170	61.29	8.377	2.19061	1.400	1.336	
COMPUTE NM HYD	120.00	-	2	.04030	101.99	4.649	2.16311	1.500	3.954	PER IMP=85.00
ROUTE RESERVOIR	120.10	2	5	.04030	33.30	4.654	2.16525	1.850	1.291	AC-FT= 1.219
ADD HYD	120.20	11& 5	12	.11200	94.58	13.031	2.18148	1.400	1.319	
ROUTE	120.30	12	11	.11200	95.88	13.031	2.18148	1.400	1.338	
COMPUTE NM HYD	130.00	-	2	.03770	95.41	4.349	2.16311	1.500	3.954	PER IMP=85.00

P(6)= 2.2
P(24)= 2.66

AMOLE-HUBBELL DRAINAGE MANAGEMENT

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/08/1999
INPUT FILE = SV_DMP.DAT USE NO.= STOCTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	
ROUTE RESERVOIR	130.10	2	5	.03770	31.10	4.349	2.16310	1.850	1.289	AC-FT=1.142
ADD HYD	130.20	11& 5	12	.14970	126.97	17.380	2.17685	1.400	1.325	
ADD HYD	130.30	10&12	12	.28490	238.38	32.991	2.17123	1.450	1.307	
ROUTE	130.40	12	90	.28490	241.75	32.991	2.17124	1.450	1.326	
COMPUTE NM HYD	140.00	-	2	.04300	105.07	4.718	2.05746	1.500	3.818	PER IMP=79.00
ROUTE RESERVOIR	140.10	2	5	.04300	35.50	4.739	2.06628	1.800	1.290	AC-FT=1.198
ROUTE	140.20	5	11	.04300	36.97	4.739	2.06630	1.400	1.343	
COMPUTE NM HYD	150.00	-	2	.02420	55.95	2.451	1.89898	1.500	3.612	PER IMP= 70.00
ROUTE RESERVOIR	150.10	2	5	.02420	19.99	2.456	1.90318	1.800	1.291	AC-FT=.589
ADD HYD	150.20	11& 5	12	.06720	56.96	7.195	2.00755	1.400	1.324	
COMPUTE NM HYD	170.00	-	70	.02853	65.96	2.889	1.89898	1.500	3.612	PER IMP=70.00
ROUTE RESERVOIR	150.10	70	5	.02853	23.61	2.893	1.90140	1.800	1.293	AC-FT=.693
ADD HYD	170.20	12& 5	12	.09573	80.56	10.088	1.97591	1.400	1.315	
ROUTE	150.30	12	11	.09573	83.24	10.088	1.97592	1.400	1.359	
COMPUTE NM HYD	160.00	-	2	.02170	50.17	2.198	1.89898	1.500	3.612	PER IMP=70.00
ROUTE RESERVOIR	160.10	2	5	.02170	15.89	2.198	1.89896	1.850	1.144	AC-FT=.888
ADD HYD	160.20	11& 5	12	.11743	94.99	12.286	1.96168	1.850	1.264	
ROUTE	170.40	12	11	.11743	94.99	12.286	1.96169	1.850	1.264	
COMPUTE NM HYD	180.00	-	2	.02810	64.96	2.846	1.89898	1.500	3.612	PER IMP=70.00
ROUTE RESERVOIR	180.10	2	5	.02810	23.20	2.854	1.90432	1.800	1.290	AC-FT=.684
ADD HYD	180.20	11& 5	10	.14553	118.19	15.140	1.95061	1.850	1.269	
ROUTE	180.30	10	11	.14553	118.20	15.140	1.95061	1.850	1.269	
COMPUTE NM HYD	190.00	-	2	.03130	79.22	3.611	2.16311	1.500	3.955	PER IMP=85.00
ROUTE RESERVOIR	190.10	2	5	.03130	25.80	3.611	2.16310	1.850	1.288	AC-FT=.950

AMOLE-HUBBELL DRAINAGE MANAGEMENT

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/08/1999
INPUT FILE = SV_DMP.DAT USE NO.= STOCTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	
						Refer to Figure 3 (no restriction of flow)				
ADD HYD	190.00	90& 5	1	.31620	267.54	36.602	2.17043	1.450	1.322	
ROUTE	190.20	1	10	.31620	271.17	36.602	2.17043	1.450	1.340	
ADD HYD	190.30	11&10	12	.46173	380.80	51.742	2.10114	1.450	1.289	
COMPUTE NM HYD	200.00	-	2	.02520	49.60	2.074	1.54349	1.500	3.075	PER IMP=52.00
*S THE VOLUME FROM 200.1 IS THE SNOW VISTA POND VOLUME UNDER DEV. COND.										
*S HYD=200.1 IS *****AP 21.1*****										
ADD HYD	200.10	2&12	10	.48693	423.42	53.816	2.07228	1.450	1.359	
ROUTE RESERVOIR	200.20	10	3	.48693	387.71	53.814	2.07218	2.000	1.244	AC-FT=6.455
*S HYD=200.2 IS *****AP 21*****										
MODIFY TIME	200.20	3	3	.48693	388.53	53.814	2.07218	1.950	1.247	
*S BEGIN ONSITE WATERSHED										
COMPUTE NM HYD	210.00	-	2	.00920	20.66	.871	1.77514	1.500	3.509	PER IMP=61.00
ADD HYD	210.10	3& 2	10	.49613	393.57	54.685	2.06667	1.900	1.239	
ROUTE	210.20	10	11	.49613	393.76	54.684	2.06663	1.950	1.240	
COMPUTE NM HYD	220.00	-	2	.00800	17.97	.757	1.77514	1.500	3.510	PER IMP=61.00
ADD HYD	220.10	11& 2	10	.50413	397.90	55.441	2.06200	1.950	1.233	
ROUTE	220.20	10	11	.50413	397.80	55.440	2.06198	1.900	1.233	
COMPUTE NM HYD	230.00	-	2	.00940	21.11	.890	1.77514	1.500	3.509	PER IMP=61.00
ADD HYD	230.10	11& 2	10	.51353	403.48	56.330	2.05673	1.850	1.228	
ROUTE	230.20	10	11	.51353	404.02	56.330	2.05670	1.900	1.229	
COMPUTE NM HYD	240.00	-	2	.01450	32.56	1.373	1.77514	1.500	3.509	PER IMP=61.00
*S END ONSITE WATERSHED										
ADD HYD	240.10	11& 2	10	.52803	412.58	57.702	2.04897	1.800	1.221	
COMPUTE NM HYD	250.00	-	2	.00220	5.04	.201	1.71016	1.500	3.582	PER IMP=50.00

2. **Westgate Dam Basin (WG)**

The Westgate Dam AHYMO model developed for the Amole Westgate DMP (RD-61) for developed conditions with the East and West Amole Dams and outfall facility in place is utilized. (See Figure III-1). The output hydrograph is imported into the Amole Arroyo model. The AHYMO model from RD-61 contained several warning messages. Conveyance facilities were modified in the Westgate DMP and PMP models to provide adequate conveyance to ensure all runoff is accounted for. These revisions are not based on field or design data but are just pipe size or channel size increases to provide adequate conveyance.

3. **Powerline Basin (PL)**

The Powerline Basin AHYMO model for developed conditions utilizes existing drainage divides with the I-40 channel in place. (See Figure III-4). The output hydrograph at the Amole Arroyo is imported into the Amole Arroyo model.

4. **Snow Vista Basin (SV)**

The Snow Vista AHYMO model for developed conditions utilizes existing drainage divides, the I-40 Channel in place and a runoff constraint for undeveloped areas north of Sage Rd. and west of the channel of 1.29 cfs/acre. (See Figure III-5). The drainage area east of the Snow Vista Channel, west of 98th Street (Snow Vista Blvd.) and south of Tower Rd. is diverted by storm drain into the Snow Vista Channel south of Benavides Rd. as part of SAD 222 and the Tower/Sage Drainage Plan. This area is not included in the runoff restrictions in accordance with the City approved Tower/Sage Drainage Master Plan. The output hydrograph at the Amole Arroyo is imported into the Amole Arroyo model.

5. **South Powerline Channel Basin (SP)**

The South Powerline Channel Basin is developed only for the DMP model. The South Powerline Channel intercepts flows from the western portions of the Sacate Blanco, Rio Bravo and a portion of the Borrega Basin. The South Powerline Channel AHYMO model is incorporated in the Rio Bravo model since the outfall is into the Rio Bravo Channel.

6. **Sacate Blanco Basin (SB)**

The Sacate Blanco AHYMO model for developed conditions utilizes existing drainage divides. The current flow path of the South Sacate Blanco Arroyo, which has avulsed down an existing roadway, is incorporated in the model. The output hydrograph at the Amole Arroyo is imported into the Amole Arroyo model.

D. SNOW VISTA BASIN

1. EVALUATION

a. Situation

Location: The Snow Vista Basin is the drainage area which drains into the Snow Vista Diversion Channel. This area is located east of the Powerline Channel, north of the Amole Arroyo and west of the Snow Vista Channel. This basin is shown on Figure III-5.

Development: A large percentage of this basin is developed. Westgate Heights, Sunrise Terrace and other developments are already constructed.

b. Problem Description

The Snow Vista Basin has a significant amount of existing development. The channel that drains this area is concrete lined for approximately the first 60 percent of its length, and the remaining channel is earthen with riprap drop structures. The lower portion of the channel just upstream from the confluence with Amole Arroyo is riprap lined. Under existing conditions, runoff constraints have been imposed by the City on tributary areas upstream of the Sage bridge over the Snow Vista Channel. The runoff constraint of 1.29 cfs/ac is based on the existing channel capacity (See RD 44). In developed conditions, the flow in portion of the Snow Vista Channel below Sage Rd. exceeds the minimum freeboard requirements.

Downstream of the Sage crossing, the existing Westgate Heights neighborhood generates a large portion of the basin's runoff. Channel capacity in this area is exceeded and will require remedial work to increase channel freeboard. Runoff from Westgate Heights along Benavides Road exceeds the capacity of the inlets and rundown into the Snow Vista Channel. Additionally, Westgate Heights does not have a conveyance system to convey runoff from the 100 year event to the Snow Vista Channel. Therefore, localized flooding could occur.

c. Existing Facility Data

The existing development, including Westgate Heights and other existing developments currently free discharge. New developments in the Snow Vista Basin are constrained to 1.29 cfs per acre to avoid exceeding the capacity of the existing Snow Vista Channel.

The Snow Vista Diversion channel was constructed in 1986 to divert the runoff from Westgate Heights and developments north of Westgate Heights into the Amole Arroyo. This system consists of a sedimentation basin at the head of a concrete lined channel which transitions to an earthen channel with riprap grade control structures below Benavides Road. Existing conditions runoff in this channel encroaches on the freeboard.

d. Existing Right-of-Way

AMAFCA owns ROW or has drainage easements for the existing AMAFCA facilities within the Snow Vista Basin. (See ROW maps in Volume II.)

e. Developed Conditions Data

As a result of this DMP, areas of hydraulic deficiencies have been identified. The Snow Vista Channel does not have adequate freeboard to meet the design requirements of the City DPM below Sage Road. Additionally, the street capacity of Benavides Road will be exceeded during the design event.

f. Criteria

Provide modifications and improvements which:

- Identify and resolve capacity deficiencies on the existing channel and collection systems leading to the channel.
- Provide a solution commensurate with the option presented in the Amole Arroyo Basin section.

g. Alternative Evaluation

Peak Flow Reduction: One alternative identified for the Snow Vista Basin to reduce the peak flow at the entrance to the Amole Arroyo is to detain the runoff in one or more basins. Applying runoff constraints to limit the flows is not feasible due to the large percentage of the basin which is currently developed. Utilizing the existing ROW and modifying the existing channel to provide "in-line" detention is not a feasible alternate for Snow Vista due to the volume required to be stored and the limited ROW. Providing a regional detention basin located in the vicinity of the Snow Vista Channel confluence with the Amole Arroyo is one practical alternative to reduce flow rates. Therefore, included in the alternatives for the Amole Arroyo is a 166 ac-ft detention pond (See Amole Arroyo Basin for alternative specifics).

Rio Bravo Sector Plan: The Rio Bravo Sector Plan identifies the area at the confluence of the Snow Vista Channel and Amole Arroyo as an urban center. This plan also shows a realigned Amole Arroyo through this area and ROW for a portion of this realignment has been dedicated as part of a bulk land transfer. The land use categories used in the Developed Conditions AHYMO analysis conform to this Sector Plan. The proposed management plan for Snow Vista conforms to the alignment shown in the Sector Plan.

AHYMO Analysis: The Developed Conditions AHYMO model was not modified as a result of the alternatives analysis. Runoff constraints were applied to undeveloped areas in the entire Snow Vista Basin west of the Snow Vista Channel at a rate of 1.29 cfs/ac for developed conditions.

Runoff Constraints: The basin area which drains into Snow Vista above Sage Road is being developed with a runoff constraint of 1.29 cfs/ac (see RD 44). This constraint is based on the channel capacity above Sage Road. The undeveloped drainage areas along Sage Road west of the channel (301.61, 301.62, 301.63, 301.64, 301.65 and 301.05) are also assumed to be constrained to 1.29 cfs/ac for developed conditions. This is based on available capacity of the Snow Vista Channel at Sage Rd. The ponds constructed to retain public water will be owned and maintained by the City of Albuquerque.

The drainage area east of the Snow Vista Channel between the Channel and 98th Street south of Tower Rd. (Basins 301.71, 301.72, 301.73 and 301.74 Figure III-5) enters the Snow Vista Channel below the Benavides crossing. Runoff from this area is unrestrained as presented in the Tower/Sage Drainage Study (RD-25) which has been approved by the City. A storm drain along 98th Street is included in the Tower/Sage SAD 222 and this area free discharges to the Snow Vista Channel.

Developed conditions runoff is 2083 cfs at the Amole Arroyo confluence compared to the existing channel design capacity of approximately 1200 cfs and estimated bank full capacity of 2600 cfs.

2. PROPOSED MANAGEMENT PLAN

The proposed management plan is schematically shown on Figure III-5. The hydrologic results for the Snow Vista Basin with the proposed plan in place are contained in Table III-3.

The proposed management plan is:

a. Channel Improvements

Existing Channel Freeboard - Project SV3: Provide freeboard for segments along the concrete channel which do not meet current criteria. Pinned curb wall extensions or similar minimal improvements are envisioned.

Provide freeboard meeting current criteria by increasing the height of the riprap banks and/or improve hydraulic capacity of the riprap channel section below the energy dissipator south of Benavides Road. Increasing the east bank height, upgrading channel stability and providing new channel rundowns with increased west bank heights should be designed and constructed.

Priority - High - Existing capacity exceeded.

Benavides Rd./Snow Vista Inlet - Project SVIA: Provide additional inlet in Benavides and piping to convey the runoff to the Snow Vista Channel beyond the jump structure. Additional freeboard (0.5') is required for a short section of the side channel, this is envisioned as Pinned curb wall extensions or similar minimal improvements.

Benavides Storm Drain - Project SV1B: The runoff from a significant area of Westgate Heights which is currently developed collects and flows down Benavides Road and adjacent roadways. The predicted 100 year flow in Benavides Road is approximately 800 cfs and the estimated street capacity to meet COA DPM criteria is approximately 70 cfs. Construct a storm drain in Benavides Road and some tributary roads to bring these streets in compliance with the City drainage criteria. The system consists of approximately 4,700 ft of storm drain pipe ranging from 24" to 72" diameter and associated inlets, manholes, etc. (see Figure III-6).

Priority - Medium

b. Land Use Issues - Project SV2

Runoff Constraint: Continue to restrict all new development in the Snow Vista Basin north of Sage Road west of the Snow Vista Channel to the existing runoff constraint of 1.29 cfs/ac. This will avoid overloading the existing Snow Vista Channel above Benavides and reduce the freeboard requirements and minimize the impacts of additional runoff resulting from future development.

Priority - On-Going

Snow Vista/Amole Confluence: Realignment of the Amole Arroyo as proposed in the Rio Bravo Sector Plan or as development in the area occurs may require reconstruction of the lower portion of Snow Vista. The final alignment for the Amole Arroyo and the impact on the Snow Vista Channel will be established when development occurs in this area.

c. Crossing Structures

Crossing Structures for this area of the Amole-Hubbell DMP have been added only for Amole Arroyo Alternatives. The 98th and Gibson Corridor crossings of the Snow Vista Channel are assumed to be located upstream of the confluence with the Amole Arroyo. For all other alternatives it was assumed that the corridors would cross after that confluence and are included in the Amole Arroyo Alternative Costs.

d. Budget

Budget Estimate: The estimated project budget for the proposed facilities is:

Benavides Inlet Upgrades - $152,000
Benavides Storm Drain - $1,600,000
Snow Vista Channel Freeboard improvements - $104,000
Crossing Structures
Snow Vista Channel Freeboard Upgrade
(Amole Alternative 5 only) - $1,818,000

AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/08/1999
INPUT FILE = TS_DMP.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	TIME=
START										
.00										
*S										
*S	TOWER/SAGE WATERSHED SAD 222									
*S										
*S										
*S	100-YR, 24-HR STORM WITH SEDIMENT									
*S	FILE NAME: TS_DMP.DAT									
*S	BY: RICHARD STOCKTON PEER REVIEWED BY: DEBORAH DIXON									
*S	LAST REVISION: 06-8-99 (kmj HYD=AP#22R)									
RAINFALL	TYPE= 2									RAIN24=2.660
COMPUTE NM HYD	A1-D&AP#1	-	3	.04580	103.28	4.897	2.00463	1.500	3.523	PER IMP=76.0(
ROUTE	AP-1R	3	2	.04580	101.55	4.897	2.00464	1.550	3.464	
COMPUTE NM HYD	A2-D	-	3	.03950	89.28	4.001	1.89898	1.500	3.532	PER IMP=70.0(
ADD HYD	AP#2	2& 3	10	.08530	185.32	8.897	1.95570	1.500	3.395	
ROUTE	AP#2R	10	2	.08530	184.43	8.897	1.95571	1.550	3.378	
COMPUTE NM HYD	A3-D	-	3	.04190	94.80	4.047	1.81093	1.500	3.535	PER IMP=65.0(
ADD HYD	AP#3	2& 3	10	.12720	266.97	12.944	1.90801	1.550	3.279	
ROUTE	AP#3R	10	2	.12720	271.22	12.944	1.90801	1.550	3.332	
COMPUTE NM HYD	A4-D	-	3	.04390	101.56	4.858	2.07506	1.500	3.615	PER IMP=80.0(
ADD HYD	AP#4	2& 3	10	.17110	368.16	17.802	1.95087	1.550	3.362	
ROUTE	AP#4R	10	2	.17110	371.05	17.802	1.95087	1.550	3.388	
COMPUTE NM HYD	A5-D	-	3	.04520	95.53	4.153	1.72289	1.500	3.302	PER IMP=60.0(
ADD HYD	AP#5	2& 3	10	.21630	458.83	21.956	1.90323	1.550	3.314	
ROUTE	AP#5R	10	2	.21630	460.09	21.956	1.90323	1.550	3.324	

Refer to Figure 4

I. AMOLE DEL NORTE BASIN

1. EVALUATION

a. Situation

Location: The Amole del Norte basin is a large watershed south of I-40 and east of the Snow Vista Diversion Channel, which is collected in the Amole del Norte Diversion Channel. This watershed is approximately 6.5 square miles of the 16.1 square mile Amole watershed below Westgate Dam. This basin includes several subbasins which have been analyzed by others as part of on-going development in this area. These Subbasins and the analysis reports are as follows:

- 98th & Central Basin - Drainage between I-40 and Central Ave. West of 98th St. which is detained in a basin at the intersection of 98th St. and Central Ave. (Prepared by Griener for COA, RD #34).

- Tierra Bayita Basin - drainage which flows to the Tierra Bayita Channel along Bridge St. and into the N-S Coors Pond. (Prepared by Griener for COA, RDs # 6,32,33,34).

- Unser/214 Basin - The drainage area north of Tierra Bayita and west of Unser Blvd which is collected in the Unser Pond system. (Prepared by Easterling for Sunwest Bank, COA, AMAFCA, RD #29 and by Scanlon for COA, RD #23, included in SAD 214).

- Atrisco Business Park Basin - The drainage area east of Unser Blvd. and north of Bridge St. which drains to the N-S Coors Pond. (Prepared by Easterling for Sunwest Bank, COA, AMAFCA, RD #28).

- Tower/Sage Basin - The drainage area north of Sage Road and east of the Snow Vista Channel which drains into the proposed Tower Pond and to the Amole del Norte Channel. (Prepared by Andrews, Asbury and Robert for COA, RD #25, included in SAD 222).

- Sunrise Estates Basin - The drainage area south of Sage Road incorporating the Sunrise Estates Subdivision. (Prepared by Isaacson & Arfman, RD #59).

- South Amole del Norte Basin - The drainage area east of the Snow Vista Channel and Amole Arroyo and south and east of Sunrise Estates.

The Amole del Norte watershed and subbasins are shown on Figure III-13. See existing and developed conditions mapping in Volume II for more detail. The AHYMO model for the Amole del Norte Basin was constructed from the AHYMO models developed for each of these subbasins.

Modifications to the models included revising ID numbers, exporting hydrographs, revising sediment bulking and boundaries to construct a homogeneous AHYMO analysis. A revised rating curve was developed for the N-S Coors Pond based on COA provided survey data. (See detailed hydrologic data in Volume III).

The main trunk facilities are already in place in this basin. This area was included because all of the runoff from the Amole del Norte Diversion Channel drains to the Amole and Hubbell Lake Detention Basins impacting storage volumes and spillway requirements.

b. DRAINAGE MANAGEMENT PLAN

The facilities within the Amole del Norte watershed are controlled and maintained by the City of Albuquerque. The City is considering several independent studies, evaluations and design solutions for improvements within this watershed, many in conjunction with Special Assessment Districts and with proposed developments and COA studies.

It is intended that these independent design solutions will address the potential deficiencies with existing facilities identified in Volume III, Developed Conditions - Existing Facilities (DEVEX). Due to the evolving nature of these City and private development plans, studies and proposals, a detailed management plan for the Amole del Norte watershed has not been included in this DMP.

The Tower/Sage 60 AF Detention Pond and outfall storm drain is a programmed facility proposed as part of COA SAD 222. AMAFCA has been requested to participate in construction funding for this regional facility. The Tower/Sage Pond has been identified as Project AD1 in this report.

Conveyance Facilities: Conveyance (flow rate) issues for these existing facilities is deferred to the City. *The detention basins and ponds in the Amole del Norte watershed are required to mitigate the future conditions peak runoff rates which minimizes overloading of existing channels, storm drains and streets.*

Existing, proposed and potential future detention basins/ponds in the Amole del Norte watershed include:

98th & Central
Unser Diversion
214 Basin
Atrisco business Park
N/S Coors Pond
Sunrise Estates
Tower/Sage (Programmed)
90th & Central (Potential Future)
South Amole del Norte (Potential Future)

These and similar detention facilities are necessary to avoid exceeding the capacity of the existing Amole del Norte Channel as well as other existing streets, storm drains and channels.

Runoff Volume Storage: *The detention facilities which presently exist and are proposed for the areas draining to the Amole del Norte Diversion Channel do not reduce the Amole Dam and Hubbell Lake Dam volume requirements.*

The detention facilities controlling runoff rates to the Amole del Norte Channel are designed to detain a portion of the runoff and release it at a reduced rate. All of these facilities are essentially drained within 30 hours after the start of the storm. Drainage out of the Amole and Hubbell Lake facilities may not have started by the time these upstream basins have evacuated.

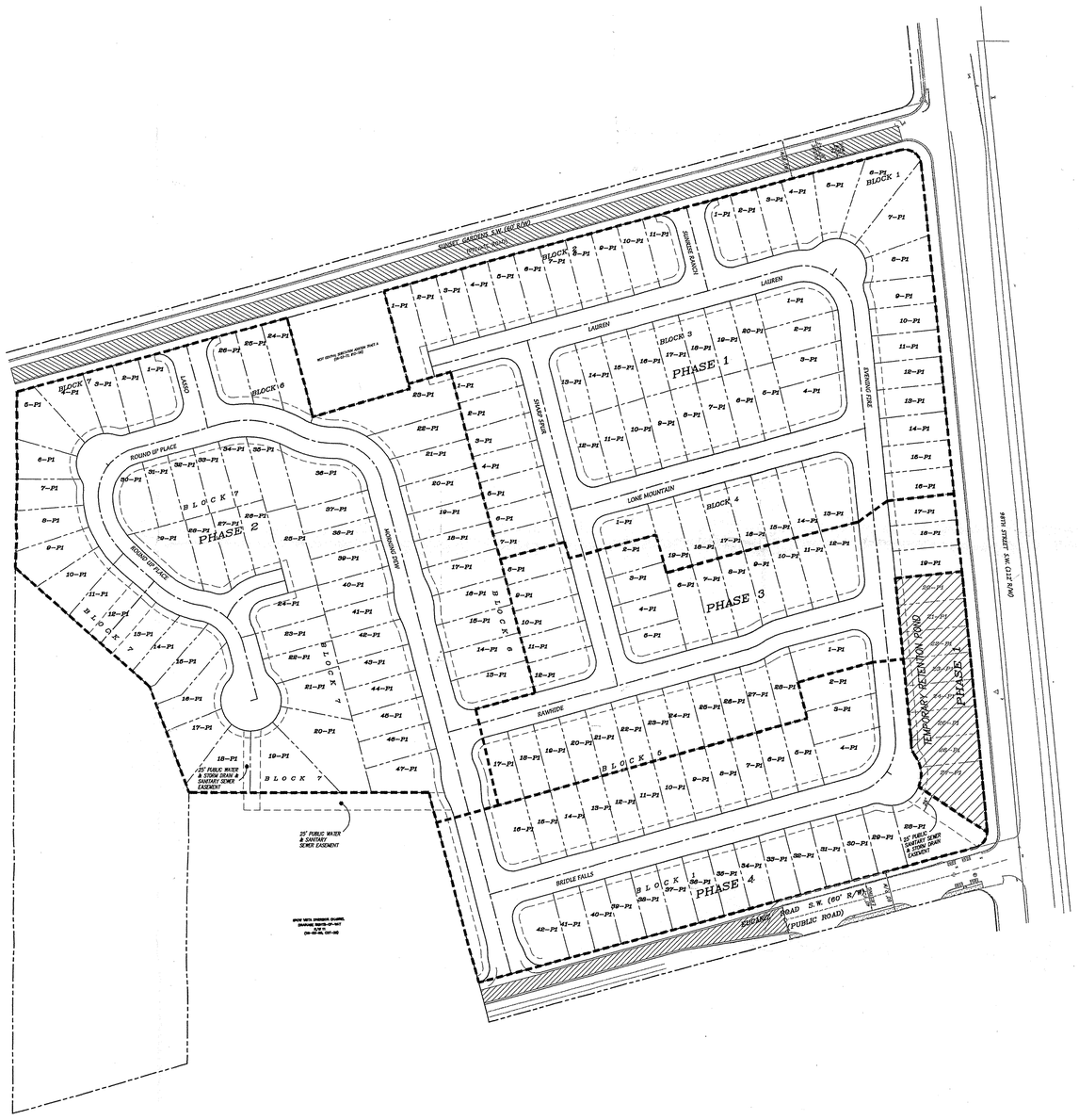
AHYMO Analysis: The hydrograph from the Developed Conditions - Existing Facilities (DEVEX) AHYMO analysis is incorporated in the total runoff entering the Amole Detention Basin to determine impacts to the Amole/Hubbell Dam system. Revised conveyance and detention facilities in the Amole del Norte watershed as a result of on-going improvements may alter the timing of the runoff entering the Amole Basin, but these differences are not anticipated to effect the total storage volume requirements for the Amole and Hubbell Lake Facilities.

The DEVEX AHYMO analysis indicated 13.7 AF of flow over the emergency spillway at the N/S Coors pond for fully developed conditions with existing facilities.

The DMP AHYMO which is summarized in this volume does not include any spillage out of the system. The DMP run routes all of the inflow hydrograph through N/S Coors to the Amole Dam so all of the volume is accounted for. The inflow hydrograph into the pond is the same as the DEVEX runs.

For the DMP analysis, in order to capture all of the volume, the pond is modeled as essentially having raised sides which raises the peak Q in the Amole del Norte Channel. This is conservative for the timing of this flow reaching the Amole Dam which was the intent. However, this overestimates the channel Q if the long term solution of N/S is to widen the pond or install detention upstream.

The truncated volume of 3.2 AF on Table II-3 is the sum of the truncations from all the ponding in the Amole del Norte watershed including 1.6 AF at N/S Coors.



PHASE 1 – 62 LOTS
PHASE 2 – 61(63) LOTS(±)
PHASE 3 – 41 LOTS
PHASE 4 – 30 LOTS(±)
PHASE 4 – 8 LOTS(POND)

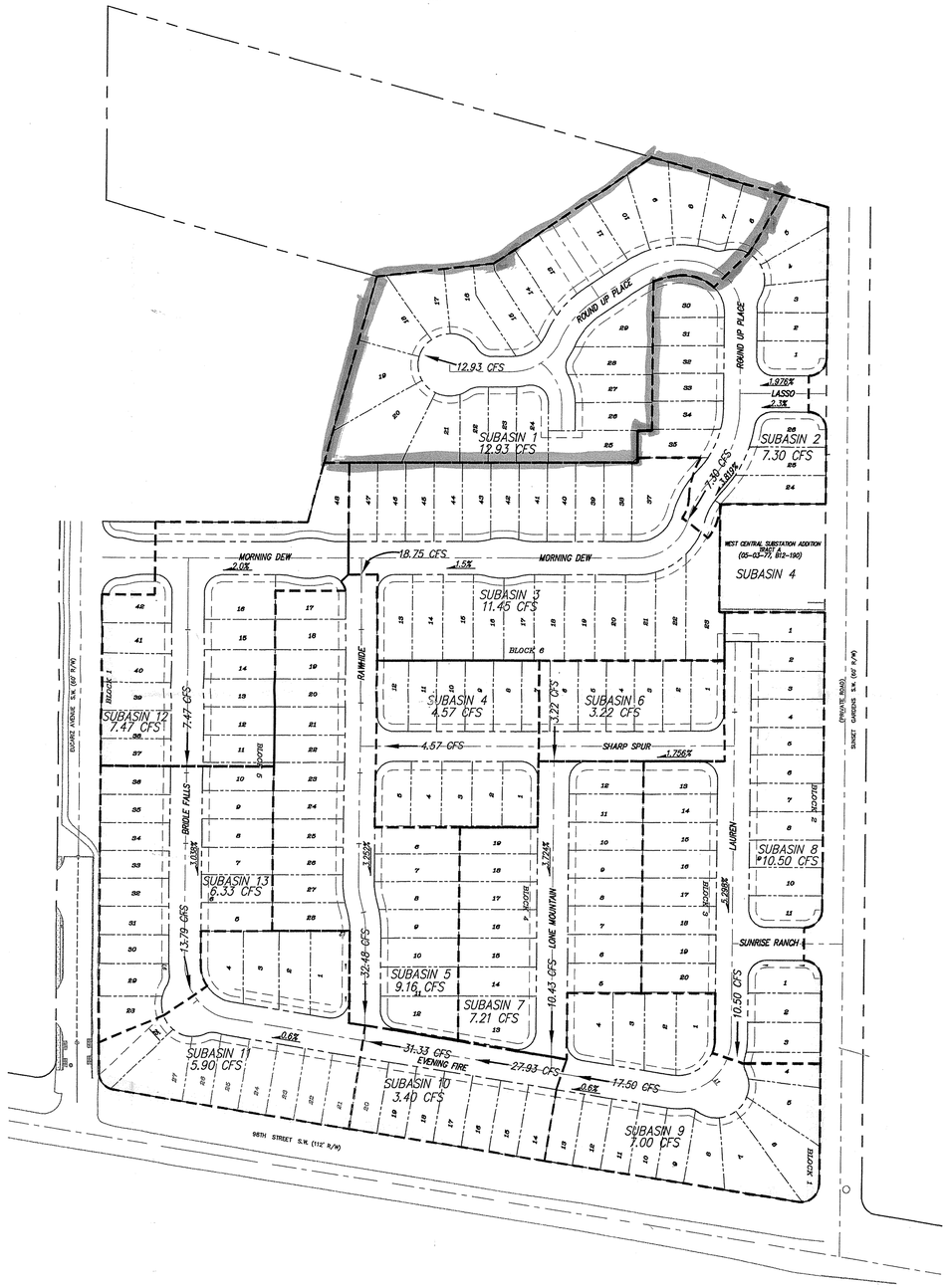
100' 50' 0 100' 200'
SCALE: 1" = 100'

A00022/FIG-5/06-23-00/ NHM

EXHIBIT 1
SUNRISE RANCH SUBDIVISION
PHASE CONSTRUCTION

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

Designed: DLH	Drawn: MJR	Checked: DMG		
Scale: 1" = 100'	Date: 5/1/00	Job: A00022	Sheet 1 of 1	



100' 50' 0 100' 200'

SCALE: 1" = 100'

A0022/FIG-6/6-23-00/ NHM

EXHIBIT 2

SUNRISE RANCH SUBDIVISION

SUB-BASIN BOUNDARIES

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

Designed: DLH	DRAWN: MJR	Checked: DMG	Sheet 1 of 1
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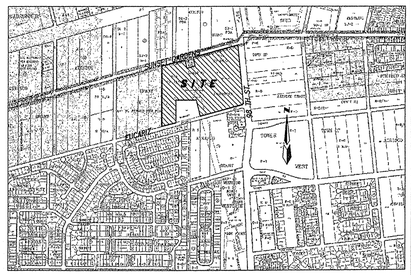

VICINITY MAP ZONE MAP: M-8, M-9

NOTES

1. ADD 5100' TO ALL SPOT ELEVATION.
2. MASONRY BLOCK WALLS (CMU) WILL BE CONSTRUCTED ON THE PROPERTY PERIMETER. FENCES WILL BE USED ON ALL INTERNAL PROPERTY LINES UNLESS MASONRY WALLS ARE INDICATED.

LEGEND

- FP= 30.36 — FINISHED PAD ELEVATION
- MOUNTABLE CURB & GUTTER
- STANDARD 8" CURB & GUTTER
- 28.53• — PROPOSED SPOT ELEVATION
- 3:1 SLOPE
- 20 — LOT 20
- PROPOSED DRAINAGE BASIN
- WATER BLOCK
- EXISTING WATER VALVE
- EXISTING SANITARY SEWER MANHOLE
- 5135 — EXISTING CONTOUR
- x 00.00 — EXISTING SPOT ELEVATION
- E — EXISTING OVERHEAD ELECTRIC LINE
- EXISTING POWER POLE
- TRACT/LOT BOUNDARY
- RIGHT OF WAY
- EASEMENTS
- CENTERLINE OF ROAD
- NEW RETAINING WALL
- 50' PAVEMENT TRANSITION
- FLOW DIRECTION
- SWALE
- NEW OFFSITE PAVEMENT
- NEW SIDEWALK

SCALE: 1" = 50'

EROSION CONTROL NOTES

1. CONTRACTOR IS RESPONSIBLE FOR OBTAINING A TOPSOIL DISTURBANCE PERMIT PRIOR TO BEGINNING WORK.
2. CONTRACTOR IS RESPONSIBLE FOR KEEPING ALL SEDIMENT OUT OF EXISTING RIGHT-OF-WAY.
3. CONTRACTOR IS RESPONSIBLE FOR CLEANING UP ANY SEDIMENT THAT GETS INTO EXISTING RIGHT-OF-WAY.
4. EROSION CONTROL SWALES ARE REQUIRED AROUND THE ENTIRE SITE.
5. ALL EROSION CONTROL SWALES MUST BE IN PLACE AND ENGINEER CERTIFIED PRIOR TO BUILDING PERMIT RELEASE.
6. SWALES TO BE BLOCKED AT EACH PROPERTY LINE.

TEMPORARY RETENTION POND REQ'D VOLUME = 4.63 A.F.
DESIGN VOLUME = 4.66 A.F.
TOP OF POND = 89.10
BOTTOM OF POND = 75.10
A FENCE OR BLOCK WALL, A MINIMUM OF 4' HIGH WILL BE CONSTRUCTED AROUND THE POND PERIMETER.

FUTURE STORM DRAIN TO BE BUILT WITH SAD 222

SECTION F-F
NTS

MAXIMUM DIFFERENCE IN PAD ELEVATIONS IS 1.5' WITHOUT RETAINING WALL

EROSION CONTROL SWALE DETAIL
N.T.S.

A0022LONG/0022GD1A/06/23/00\ DLH MJR NHM

SURVEY INFORMATION
FIELD NOTES — NO. — BY — DATE

BENCH MARKS
ACS MONUMENT "9-J9"
Y = 1480156.08
X = 353055.34
G-G = 0.99967636
DELTA ALPHA = -00°16'56"
CENTRAL ZONE (NAD 1927/SUD 1929)
ELEVATION = 5187.04

AS BUILT INFORMATION
CONTRACTOR
WORK STAKED BY — DATE
INSPECTIONS — DATE
ACCEPTANCE BY — DATE
FIELD LOCATION BY — DATE
DRAWINGS CORRECTED BY — DATE
MICRO-FILM INFORMATION
RECORDED BY — DATE
NO.

ENGINEER'S SEAL
DAVID HOELZER — NEW MEXICO — 9857 — REGISTERED PROFESSIONAL ENGINEER

NO.	DATE	REMARKS	BY
		REVISIONS	
		DESIGN	
DESIGNED BY	DLH	DATE	3/00
DRAWN BY	KS, MJR	DATE	3/00
CHECKED BY	DMG	DATE	3/00

JUN 23 2000 — PUBLIC WORKS DEPARTMENT

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

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
ENGINEERING DEVELOPMENT GROUP

TITLE:
SUNRISE RANCH SUBDIVISION GRADING AND DRAINAGE

DESIGN REVIEW COMMITTEE	CITY ENGINEER APPROVAL	LAST DESIGN UPDATE	MO./DAY/YR.	MO./DAY/YR.

CITY PROJECT NO.	ZONE MAP NO.	SHEET	OF
	L-8, L-9	1	2

EROSION CONTROL NOTES

1. CONTRACTOR IS RESPONSIBLE FOR OBTAINING A TOPSOIL DISTURBANCE PERMIT PRIOR TO BEGINNING WORK.
2. CONTRACTOR IS RESPONSIBLE FOR KEEPING ALL SEDIMENT OUT OF EXISTING RIGHT-OF-WAY.
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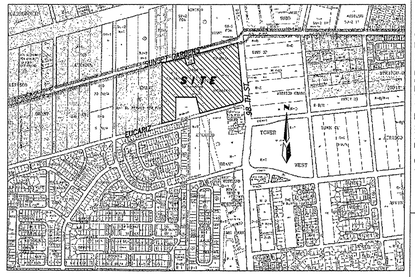
5. ALL EROSION CONTROL SWALES MUST BE IN PLACE AND ENGINEER CERTIFIED PRIOR TO BUILDING PERMIT RELEASE.
6. SWALES TO BE BLOCKED AT EACH PROPERTY LINE.



VICINITY MAP ZONE MAP: M-8, M-9

NOTES

1. ADD 5100' TO ALL SPOT ELEVATION.
2. MASONRY BLOCK WALLS(CMU) WILL BE CONSTRUCTED ON THE PROPERTY PERIMETER. FENCES WILL BE USED ON ALL INTERNAL PROPERTY LINES UNLESS MASONRY WALLS ARE INDICATED.

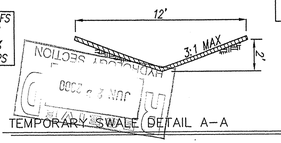
LEGEND

- FP= 30.38 — FINISHED PAD ELEVATION
- MOUNTABLE CURB & GUTTER
- STANDARD 8" CURB & GUTTER
- 28.53• — PROPOSED SPOT ELEVATION
- 3:1 SLOPE
- 20 — LOT 20
- PROPOSED DRAINAGE BASIN
- WATER BLOCK
- EXISTING WATER VALVE
- EXISTING SANITARY SEWER MANHOLE
- –5135– EXISTING CONTOUR
- x 00.00 EXISTING SPOT ELEVATION
- —E— EXISTING OVERHEAD ELECTRIC LINE
- EXISTING POWER POLE
- TRACT/LOT BOUNDARY
- RIGHT OF WAY
- EASEMENTS
- CENTERLINE OF ROAD
- NEW RETAINING WALL
- 50' PAVEMENT TRANSITION
- FLOW DIRECTION
- SWALE
- NEW OFFSITE PAVEMENT
- NEW SIDEWALK

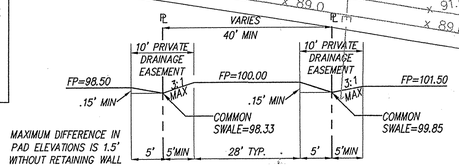
50' 25' 0 50' 100'
SCALE: 1" = 50'

TEMPORARY RETENTION POND
REQ'D VOLUME = 4.63 A.F.
DESIGN VOLUME = 4.66 A.F.
TOP OF POND = 89.10
BOTOM OF POND = 75.10
A FENCE OR BLOCK WALL, AMINIMUM OF 4' HIGH WILL BE CONSTRUCTED AROUND THE POND PERIMETER.

TEMPORARY ASPHALT SWALE
3:1 SIDE SLOPES
2' DEPTH
12' WIDE
Q = 30.6 CFS
D = 1.15'
S = 1.35%
V = 7.7 FPS

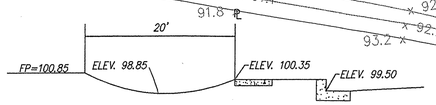


TEMPORARY SWALE DETAIL A-A
N.T.S.



MAXIMUM DIFFERENCE IN PAD ELEVATIONS IS 1.5' WITHOUT RETAINING WALL

SECTION F-F
NTS



EROSION CONTROL SWALE DETAIL
N.T.S.

A0022LONG/0022GD3/06-21-00\ DLH MJR NHM

AS BUILT INFORMATION

BENCH MARKS
ACS MONUMENT "9-L9"
Y = 1460156.08
X = 353055.34
C-G = 0.999676.36
DELTA ALPHA = -00°16'56"
CENTRAL ZONE (NAD 1927/SLD 1929)
ELEVATION = 5167.04

CONTRACTOR
WORK BY — DATE
INSPECTORS — DATE
ACCEPTANCE BY — DATE
AS-BUILT VERIFICATION BY — DATE
DRAWINGS CORRECTED BY — DATE
MICRO-FILM INFORMATION
RECORDED BY — DATE
NO.

SURVEY INFORMATION
FIELD NOTES

NO.	BY	DATE

ENGINEER'S SEAL
NEW MEXICO 12534 REGISTERED PROFESSIONAL ENGINEER
6-23-00

NO.	REMARKS	BY	DATE
	REVISIONS		
	DESIGN		3/00
DESIGNED BY	DLH		3/00
DRAWN BY	KS, MJR		3/00
CHECKED BY	DMG		3/00

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

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
ENGINEERING DEVELOPMENT GROUP

TITLE: SUNRISE RANCH SUBDIVISION
GRADING AND DRAINAGE - PHASE 1

DESIGN REVIEW COMMITTEE	CITY ENGINEER APPROVAL	LAST DESIGN UPDATE	MO./DAY/YR.	MO./DAY/YR.
	HYDROLOGY SECTION			

CITY PROJECT NO.	ZONE MAP NO.	SHEET	OF
	L-8, L-9	1	1