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**Albuquerque
Metropolitan
Arroyo
Flood
Control
Authority**

2600 PROSPECT N.E. - ALBUQUERQUE, N.M. 87107
TELEPHONE (505) 884-2215

February 23, 1999

Kim Kemper, P.E.
Kemper-Vaughan
3700 Coors Road NW
Albuquerque, NM 87120

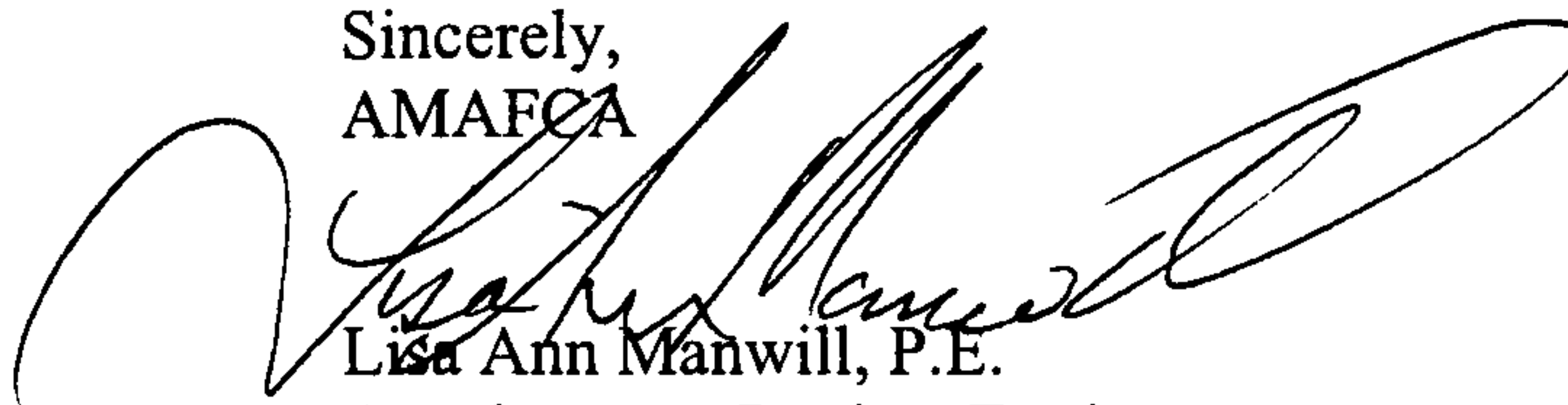
**RE: DEL PASEO BUSINESS PARK (ZAP D16). ENGINEER'S STAMP DATED
FEBRUARY 1, 1999.**

Dear Mr. Kemper:

Based on the information provided on your February 3, 1993 submittal, the above referenced project is acceptable.

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

Sincerely,
AMAFCA



Lisa Ann Manwill, P.E.
Development Review Engineer

c: File



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

February 22, 1999

Kim Kemper, P.E.
Kemper-Vaughan
3700 Coors Road NW
Albuquerque, NM 87120

***RE: DEL PASEO BUSINESS PARK (D16-D7). GRADING AND DRAINAGE PLAN FOR
BUILDING PERMIT APPROVAL. ENGINEER'S STAMP DATED FEBRUARY 1,
1999.***

Dear Mr. Kemper:

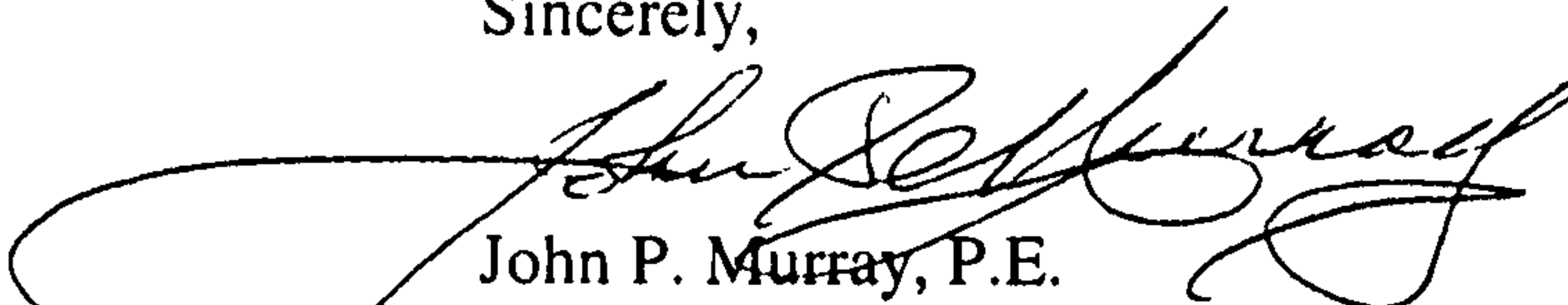
Based on the information provided on your February 3, 1999 submittal, the above referenced project is approved for Building Permit.

Add the executed signature block by AMAFCA to this approved plan and attach the plan to the construction sets prior to sign-off by Hydrology.

Prior to Certificate of Occupancy approval, an Engineer's Certification per the DPM will be required.

If I can be of further assistance, please feel free to contact me at 924-3984.

Sincerely,



John P. Murray, P.E.
Hydrology

c: Andrew Garcia

✓ File

DEL PASEO BUSINESS PARK

GRADING PLAN & DRAINAGE REPORT

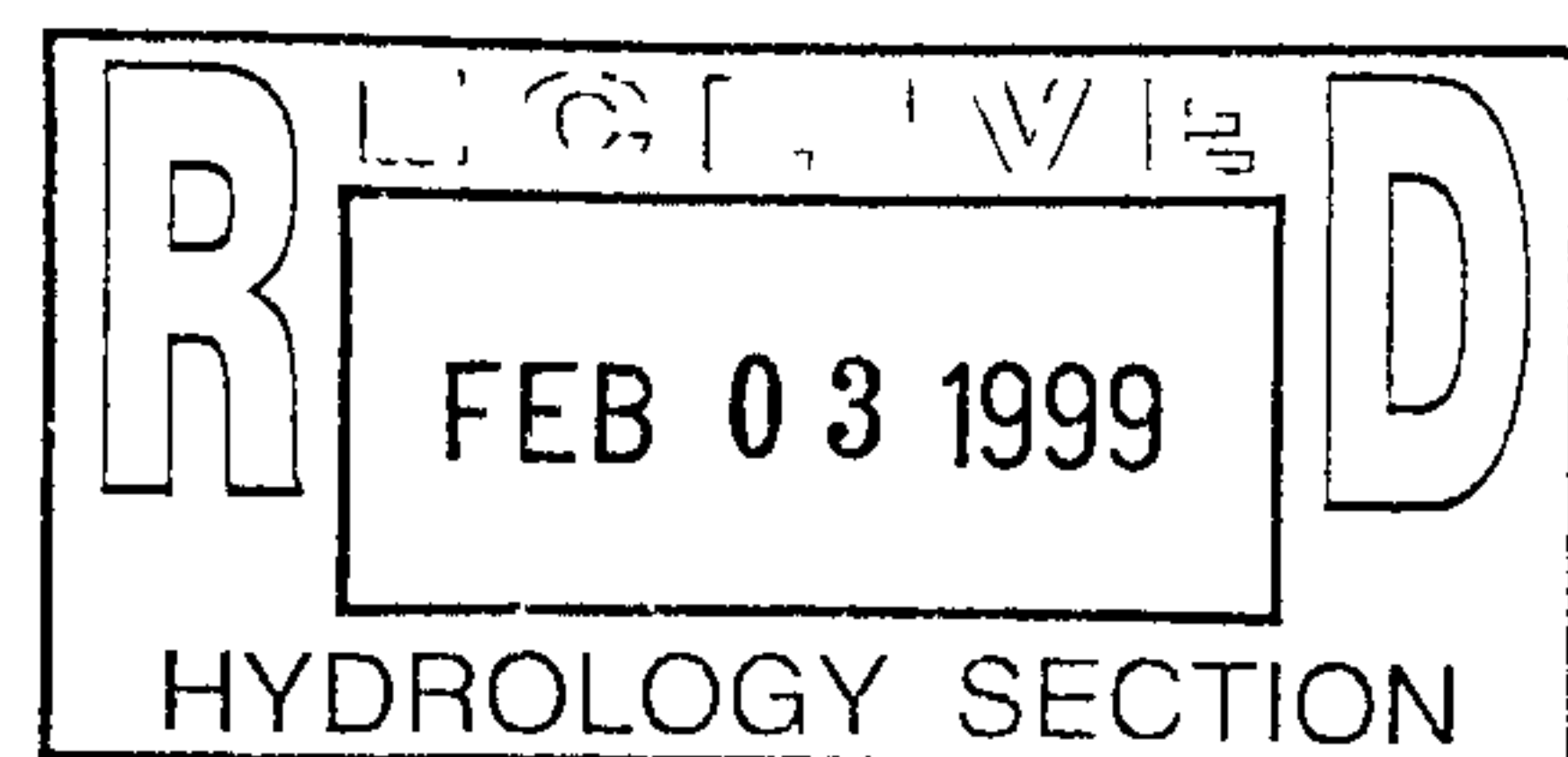
February 1999

Prepared for:

K₂M Ltd. Company.

11500 Carmel N.E.

Albuquerque, New Mexico 87122

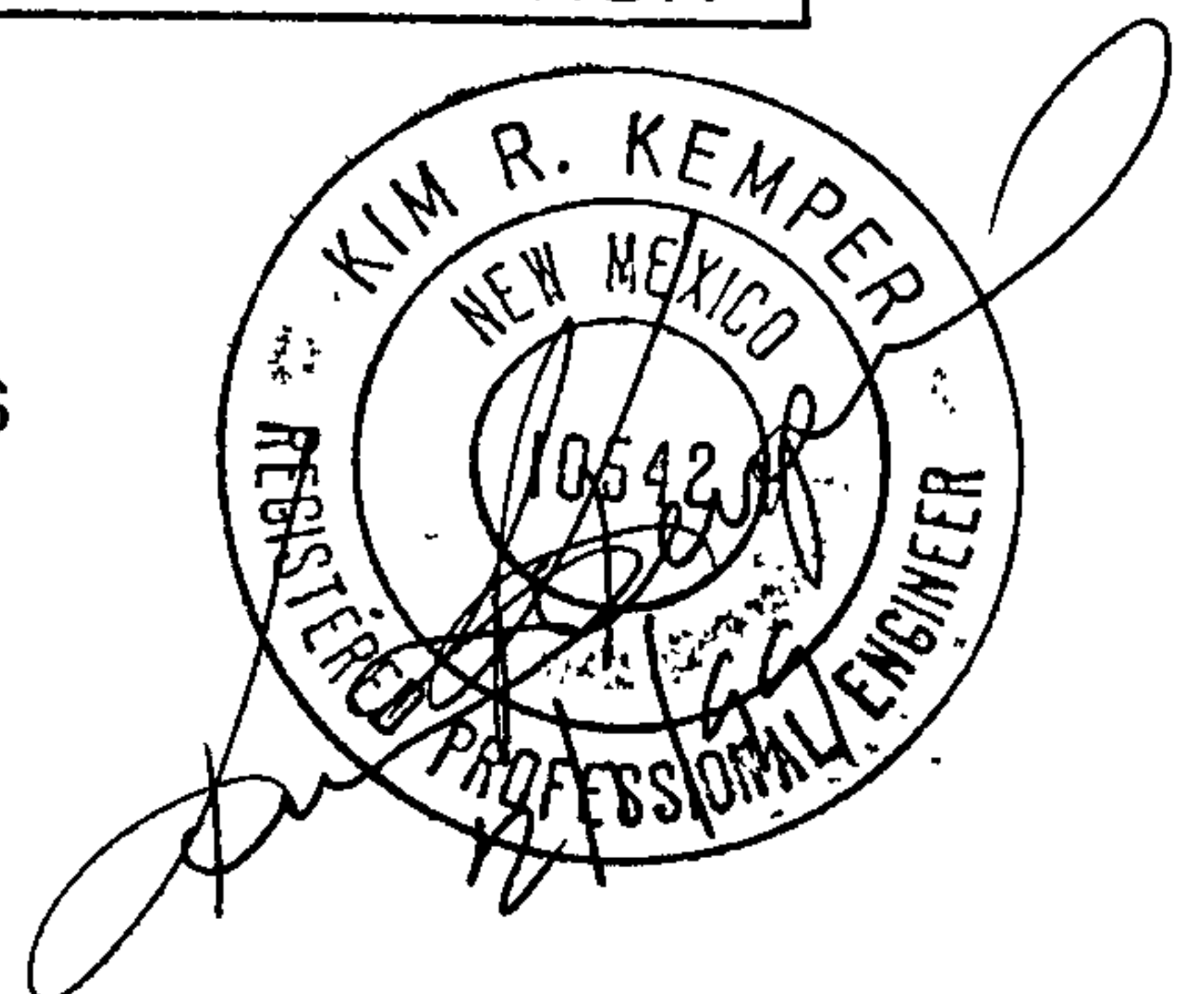


Prepared by:

KEMPER-VAUGHAN CONSULTING ENGINEERS

3700 Coors Road NW

Albuquerque, New Mexico 87120



11/11/11

PROJECT OVERVIEW

The site is located is located approximately 800 ft. south of Paseo Del Norte immediate east of the North Diversion Channel right-of-way. As shown on FIRM Panel 136, the site is not within a designated 100-yr flood hazard area. The site contains 2.56 acres in total. The property is currently has two (2) structures and a trailer which are scheduled to be removed. The lot has generally been used to store construction materials & equipment. The proposed site improvements include the construction of three (3) new office/warehouse buildings and related parking and landscaping.

LEGAL DESCRIPTION

Lot B of the lands of Kuidis, Bernalillo County, New Mexico, as the same is shown and designated on the replat filed in the office of the County Clerk, Bernalillo County, New Mexico on February 19, 1986, in map Bk. C29, Folio 134.

DRAINAGE PLAN

In its current state drainage "sheet flows" overland and enters the existing side channel immediately adjacent to the AMAFCA North Diversion Channel. Storm waters then flow both north and south to existing side inlets of the Diversion Channel. The planned improvements include collecting site storm waters in concrete inlets and piping runoff beneath the access road through the side of the side channel. Erosion control improvements are proposed within the side channel as shown on sheet C2 of the grading plan.

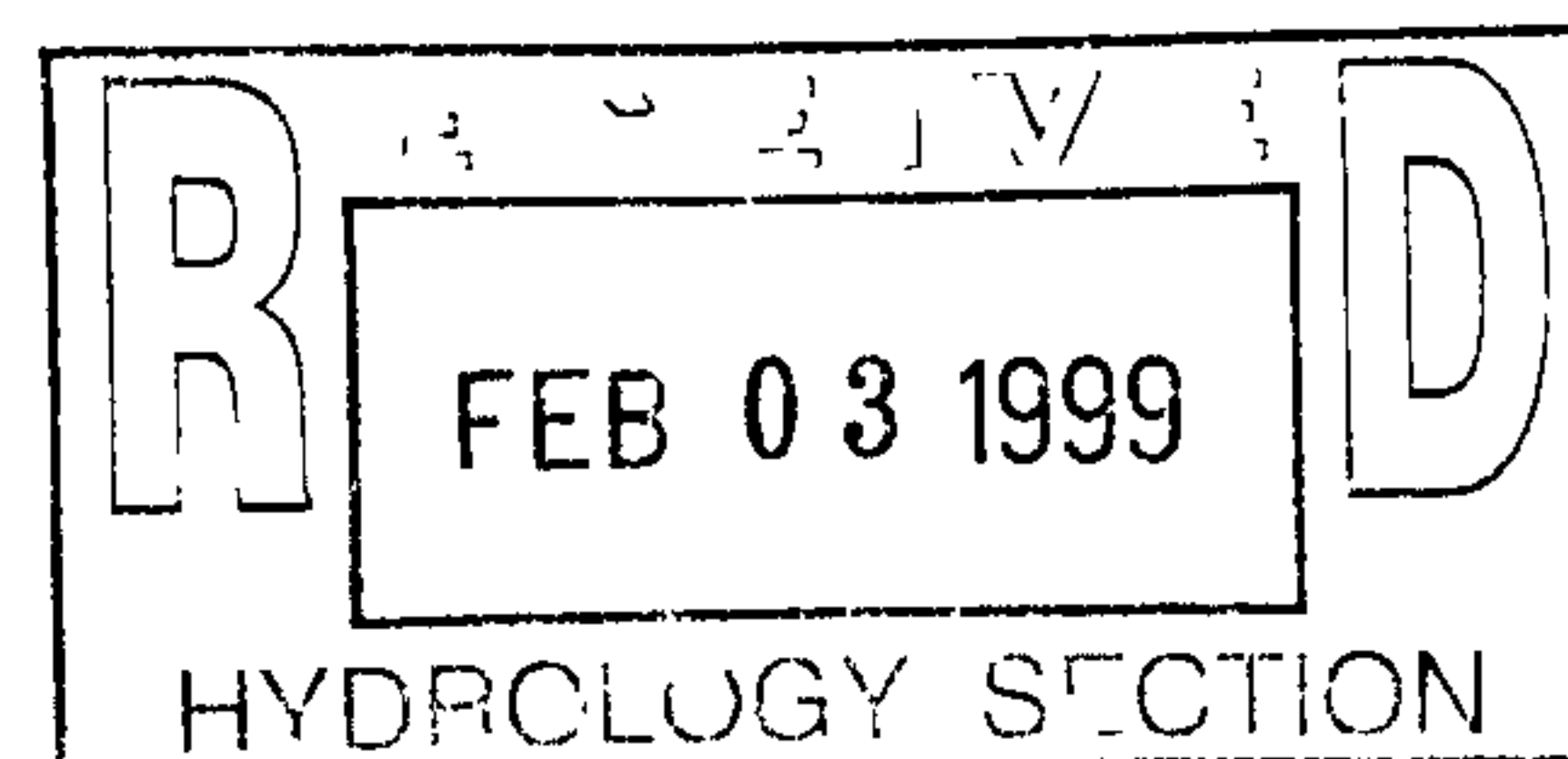
No offsite flows enter the subject site. Most are captured by PNM ponding facilities and the balance generally flow north. The property north of the subject parcel is current developed. An approved grading and drainage plan for that site is on file at the City offices, File D16-004.

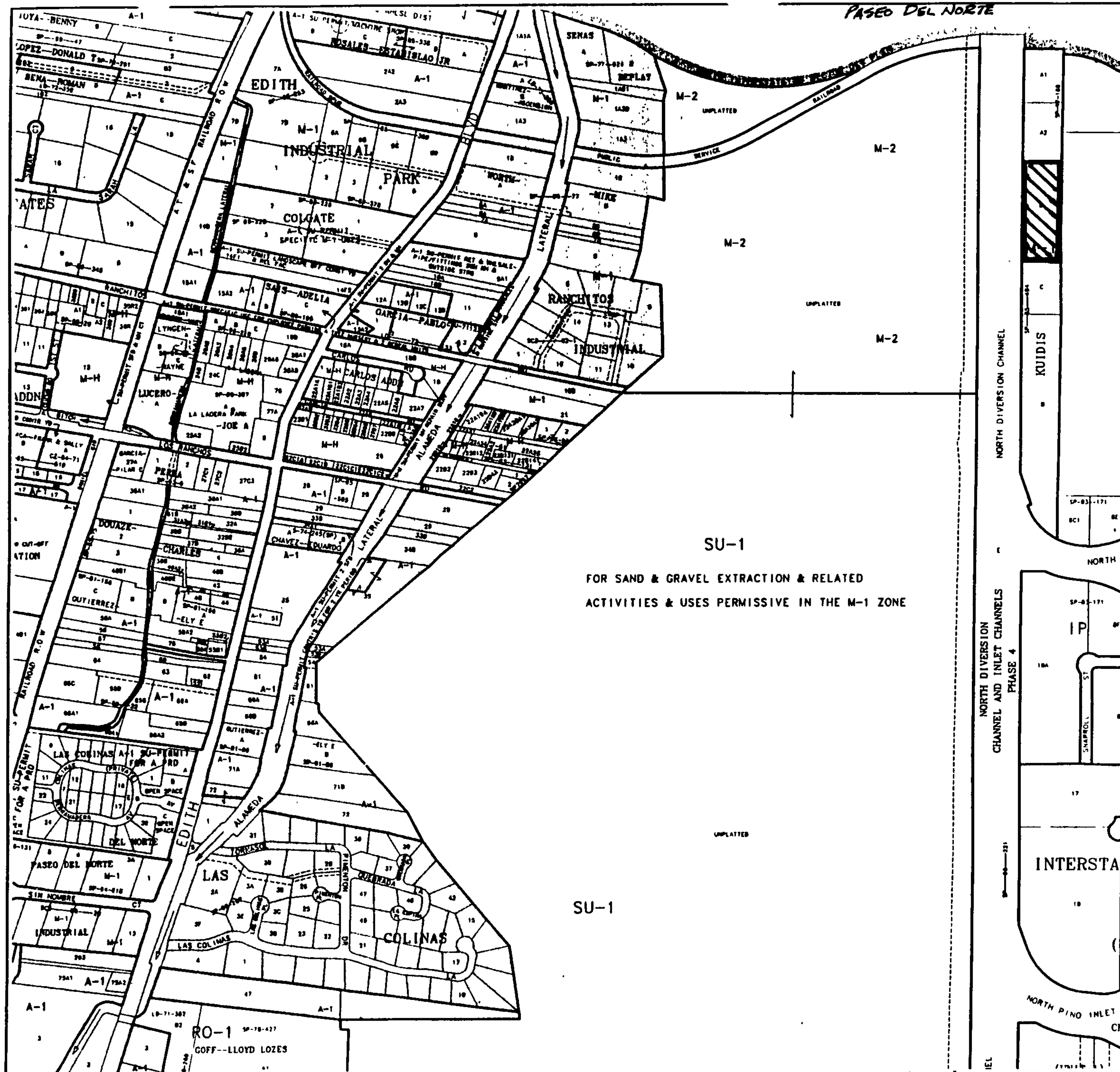
The site was defined into six (6) separate basins. Graphic delineation of those basins is attached. Subsurface conduits were designed to convey waters internal to the site as well as to the AMAFCA channel. All areas within the proposed development (five of the defined basins) will be collected and piped to the side channel. The existing access road currently has a slight super elevation and "sheet flows" directly into the side channel. This condition will remain unchanged.

The site information shown on the grading plans was prepared from a field survey performed by Rio Grande Surveying Co., Inc. in January of 1999. A subsequent field inspection by this office revealed that the data shown is consistent with the actual conditions and that no grading or filling has been done.

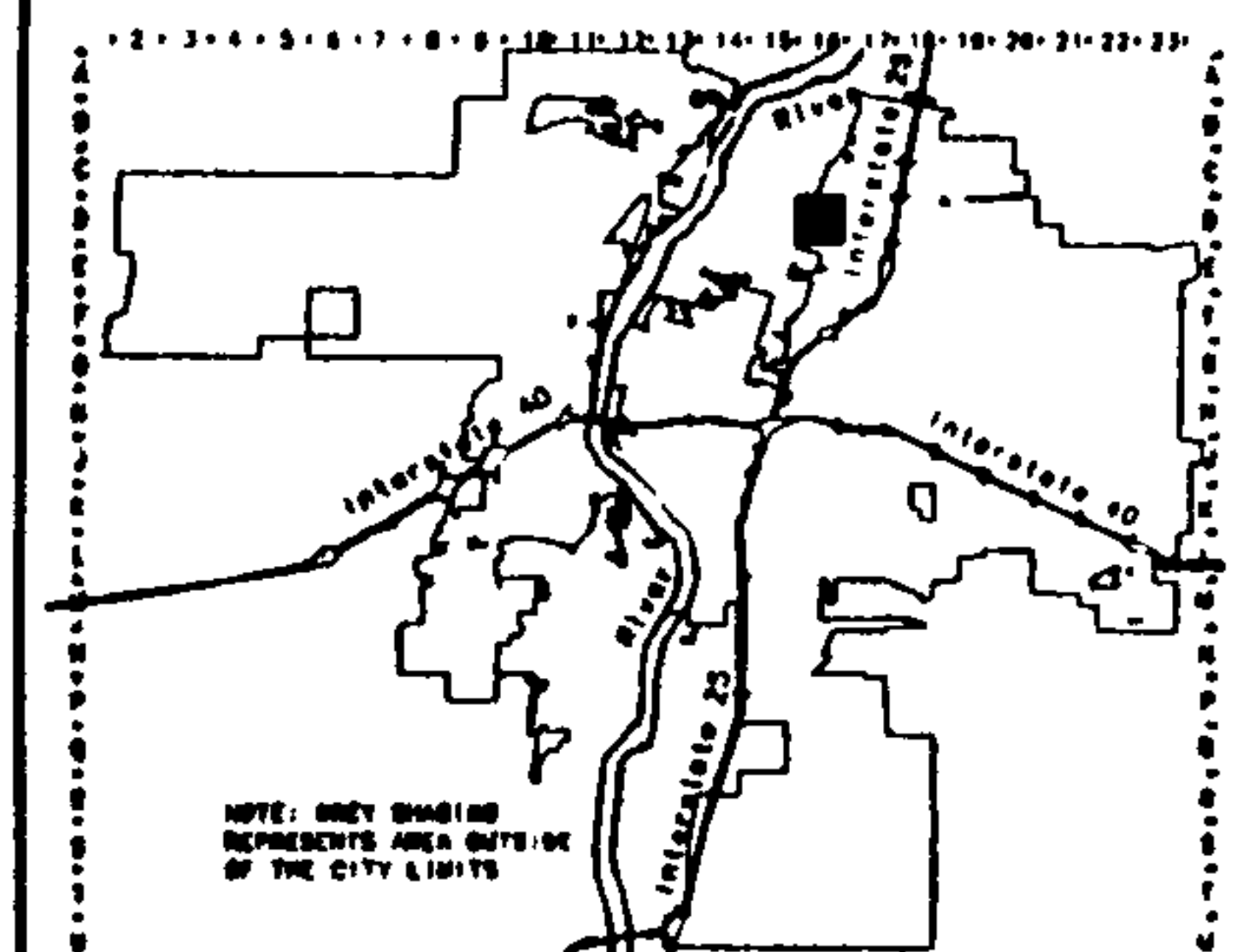
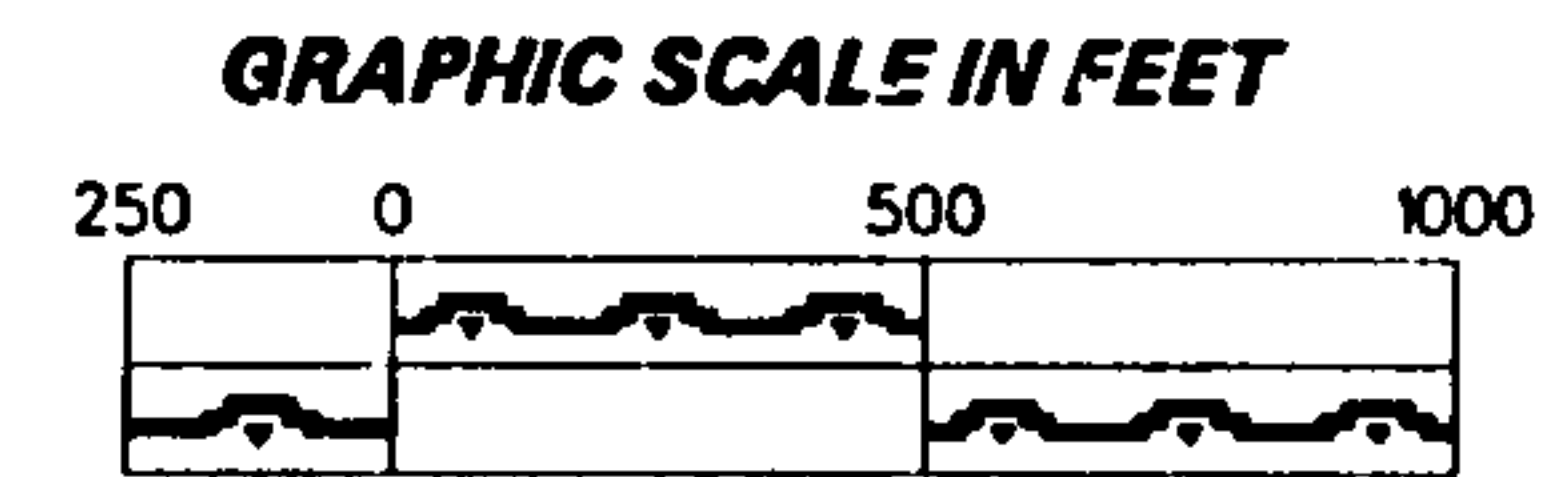
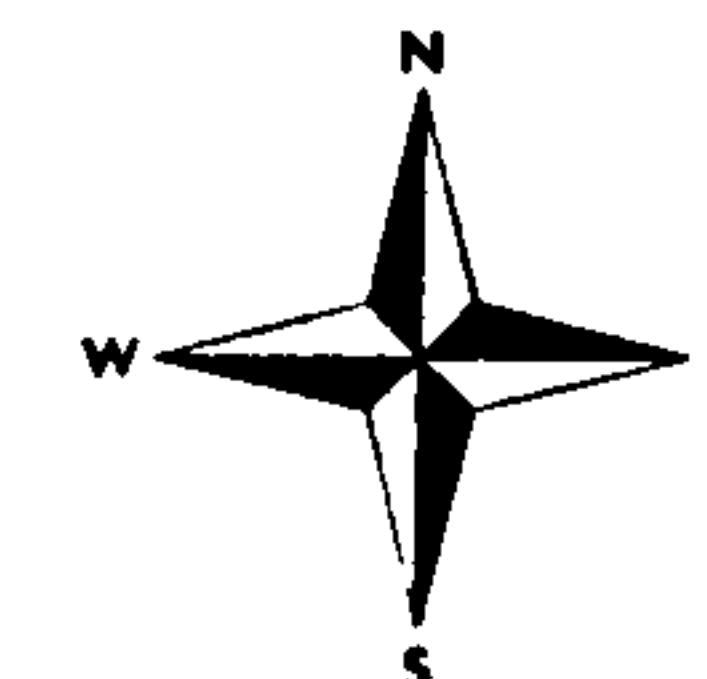
Attachments to this plan include the following:

1. Copy of Zone Atlas D-16-Z
2. Copy of FIRM panel 136
3. Sub-basin delineation drawing
4. Basin A-1 Drainage Calculations
5. Basin A-2 Drainage Calculations
6. Basin B Drainage Calculations
7. Basin C Drainage Calculations
8. Basin D Drainage Calculations
9. Roadway Drainage Calculations
10. Rating Curve Computations for onsite constructed swales
11. Performance Curves for Culvert Designs.
12. Grading Plans – Sheets C1 and C2





CITY OF
Albuquerque
A large Geographic Information System
PLANNING DEPARTMENT
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Zone Atlas Page
D-16-Z

Map Amended through
February 26, 1998



100-YEAR FLOOD
CONFINED TO
CONSTRUCTED CHANNEL

PASEO DEL NORTE

ATCHISON TOPEKA AND SANTA FE

RM15

SITE

ZONE X

OF ALBUQUERQUE
350002

100-YEAR FLOOD CONFINED TO CONSTRUCTED

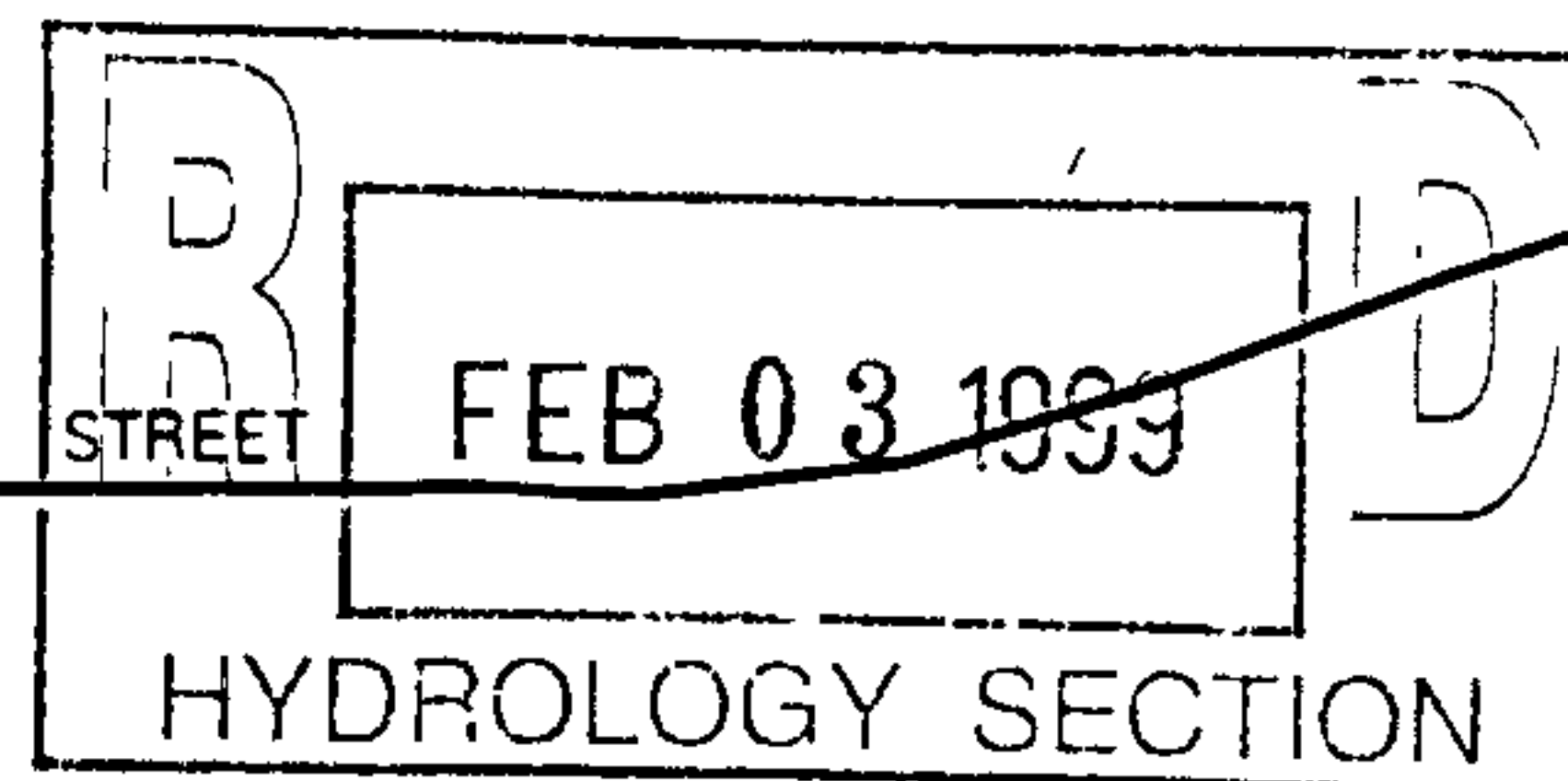
ZONE X

ZONE A

L IS LOCATED WITHIN

ZONE A

MASTHEAD



ZONE X

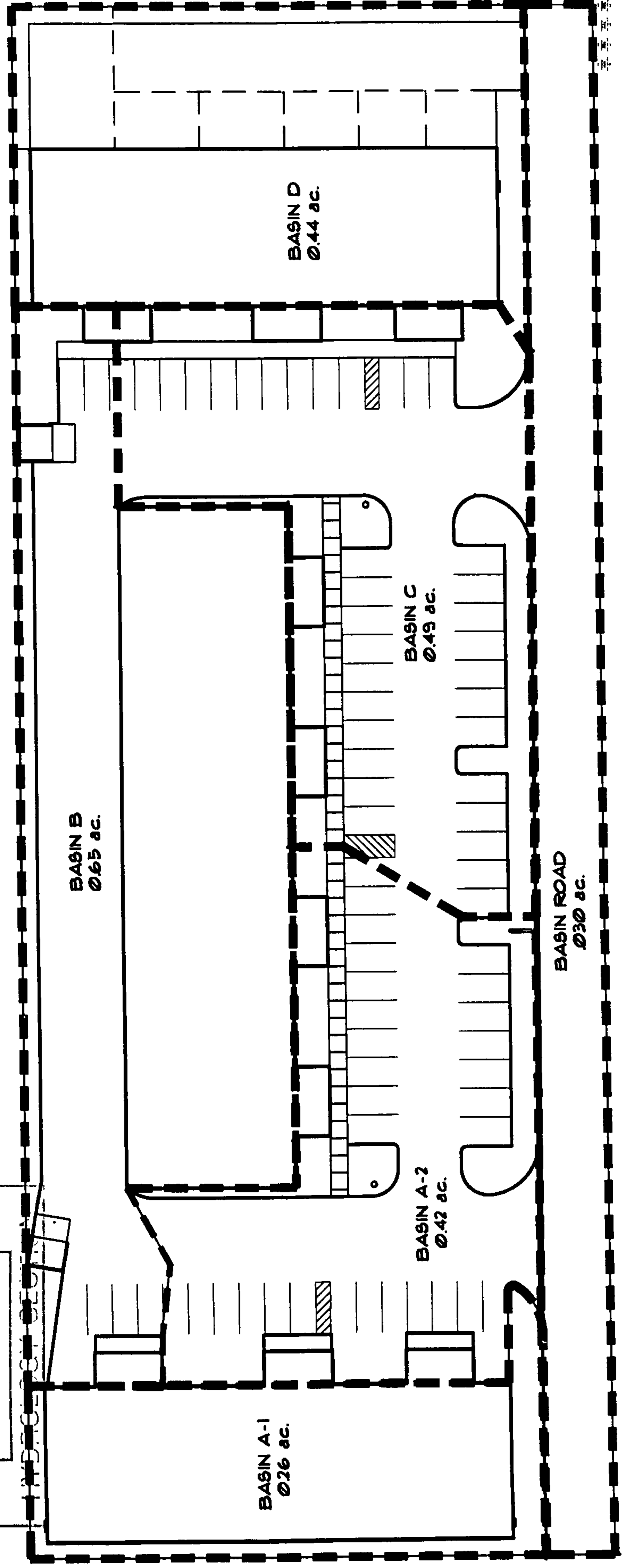
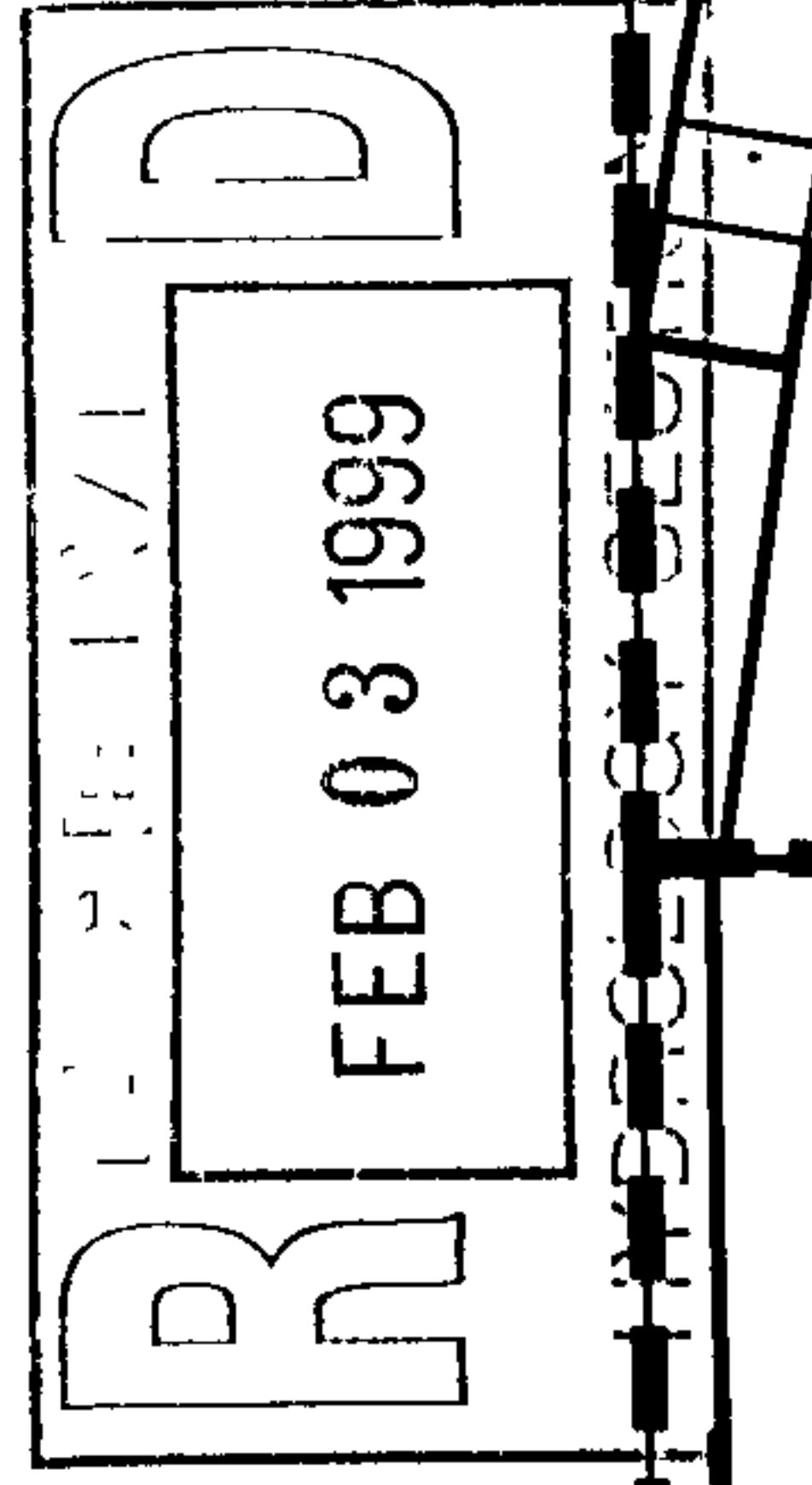
FIRM PANEL 136

HAWKINS

STREET

**SUB-BASINS INTERNAL TO THE SITE
AS PROVIDED IN ATTACH CALCULATIONS**

NO SCALE



BASIN A-1 AREA = 0.26 ac.

DRAINAGE ZONE 2

PRECIPITATION: 360 = 2.35 in.
1140 = 2.75 in.
10day = 3.95 in.

EXCESS PRECIPITATION:

PEAK DISCHARGE:

TREATMENT A	0.53 in.	1.56	cfs/ac.
TREATMENT B	0.78 in.	2.28	cfs/ac.
TREATMENT C	1.13 in.	3.14	cfs/ac.
TREATMENT D	2.12 in.	4.70	cfs/ac.

EXISTING CONDITIONS:

AREA

PROPOSED CONDITIONS:

AREA

TREATMENT A	0 ac.	0 ac.
TREATMENT B	0 ac.	0.04 ac.
TREATMENT C	0.26 ac.	0 ac.
TREATMENT D	0 ac.	0.22 ac.

EXISTING EXCESS PRECIPITATION:

$$\text{Weighted E} = (0.53 \times 0.00) + (0.78 \times 0.00) + (1.13 \times 0.26) + (2.12 \times 0.00) / 0.26 \text{ ac.} \\ = 1.13 \text{ in.}$$

$$V_{100-360} = (1.13 \times 0.26) / 12 = 0.024483 \text{ ac-ft} = 1066 \text{ cf}$$

EXISTING PEAK DISCHARGE:

$$Q_{100} = (1.56 \times 0.00) + (2.28 \times 0.00) + (3.14 \times 0.26) + (4.70 \times 0.00) = 0.82 \text{ cfs}$$

PROPOSED EXCESS PRECIPITATION:

$$\text{Weighted E} = (0.53 \times 0.00) + (0.78 \times 0.04) + (1.13 \times 0.00) + (2.12 \times 0.22) / 0.26 \text{ ac.} \\ = 1.91 \text{ in.}$$

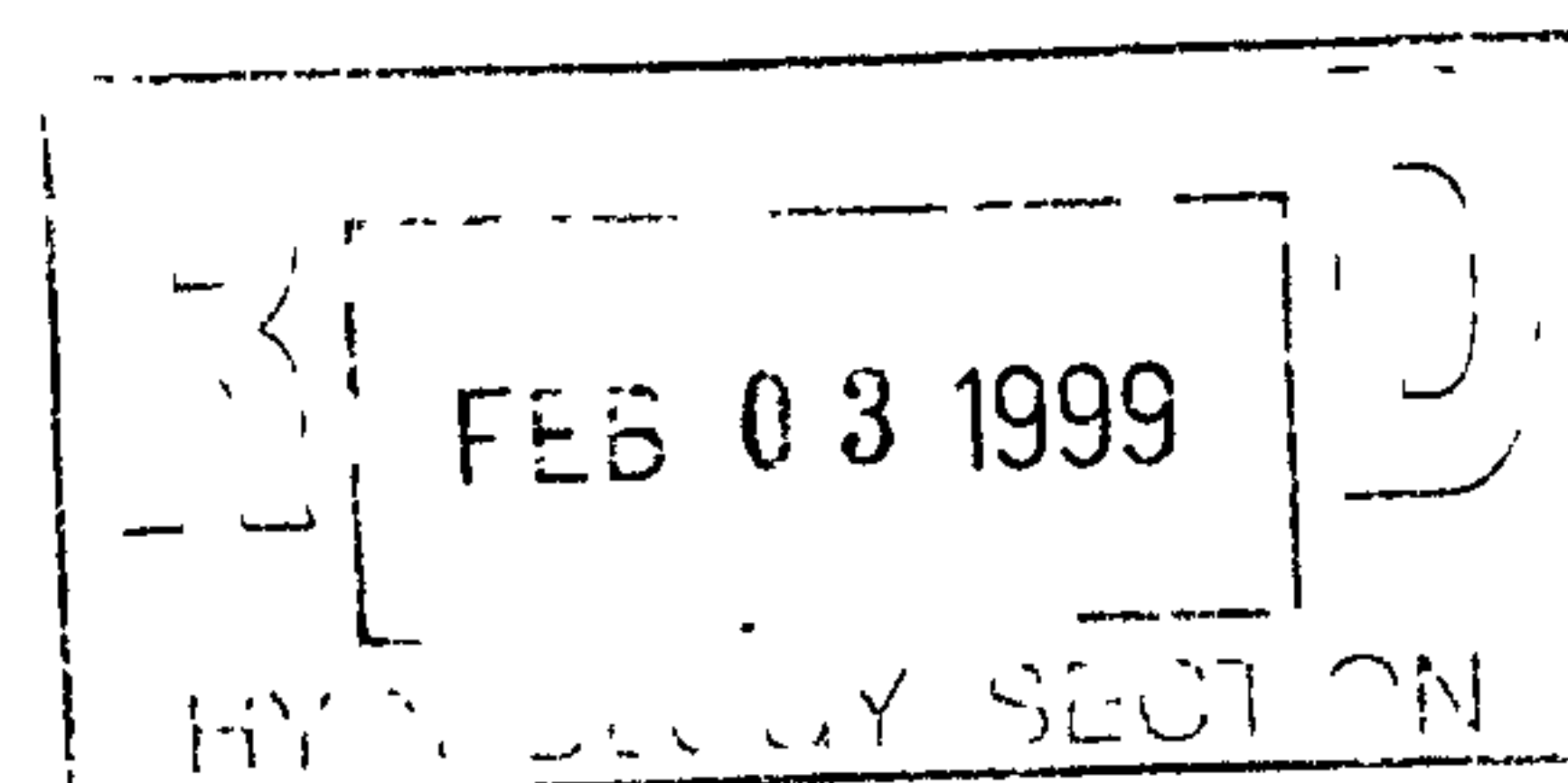
$$V_{100-360} = (1.91 \times 0.26) / 12.0 = 0.041467 \text{ ac-ft} = 1806 \text{ cf}$$

$$V_{100-1440} = (0.04) + (0.22 \times (2.75 - 2.35)) / 12 = 0.048800 \text{ ac-ft} = 2126 \text{ cf}$$

$$V_{100-10\text{day}} = (0.04) + (0.22 \times (3.95 - 2.35)) / 12 = 0.070800 \text{ ac-ft} = 3084 \text{ cf}$$

PROPOSED PEAK DISCHARGE:

$$Q_{100} = (1.56 \times 0.00) + (2.28 \times 0.04) + (3.14 \times 0.00) + (4.70 \times 0.22) = 1.13 \text{ cfs}$$



BASIN A-2 AREA = 0.42 ac.

DRAINAGE ZONE 2

PRECIPITATION: 360 = 2.35 in.
1140 = 2.75 in.
10day = 3.95 in.

EXCESS PRECIPITATION:

PEAK DISCHARGE:

TREATMENT A	0.53 in.	1.56	cfs/ac.
TREATMENT B	0.78 in.	2.28	cfs/ac.
TREATMENT C	1.13 in.	3.14	cfs/ac.
TREATMENT D	2.12 in.	4.70	cfs/ac.

EXISTING CONDITIONS:

AREA

TREATMENT A	0 ac.
TREATMENT B	0 ac.
TREATMENT C	0.42 ac.
TREATMENT D	0 ac.

PROPOSED CONDITIONS:

AREA

TREATMENT A	0 ac.
TREATMENT B	0.07 ac.
TREATMENT C	0 ac.
TREATMENT D	0.35 ac.

EXISTING EXCESS PRECIPITATION:

$$\text{Weighted E} = (0.53) \times (0.00) + (0.78) \times (0.00) + (1.13) \times (0.42) + (2.12) \times (0.00) / 0.42 \text{ ac.} \\ = 1.13 \text{ in.}$$

$$\text{V100-360} = (1.13) \times (0.42) / 12 = 0.039550 \text{ ac-ft} = 1723 \text{ cf}$$

EXISTING PEAK DISCHARGE:

$$\text{Q100} = (1.56) \times (0.00) + (2.28) \times (0.00) + (3.14) \times (0.42) + (4.70) \times (0.00) = 1.32 \text{ cfs}$$

PROPOSED EXCESS PRECIPITATION:

$$\text{Weighted E} = (0.53) \times (0.00) + (0.78) \times (0.07) + (1.13) \times (0.00) + (2.12) \times (0.35) / 0.42 \text{ ac.} \\ = 1.90 \text{ in.}$$

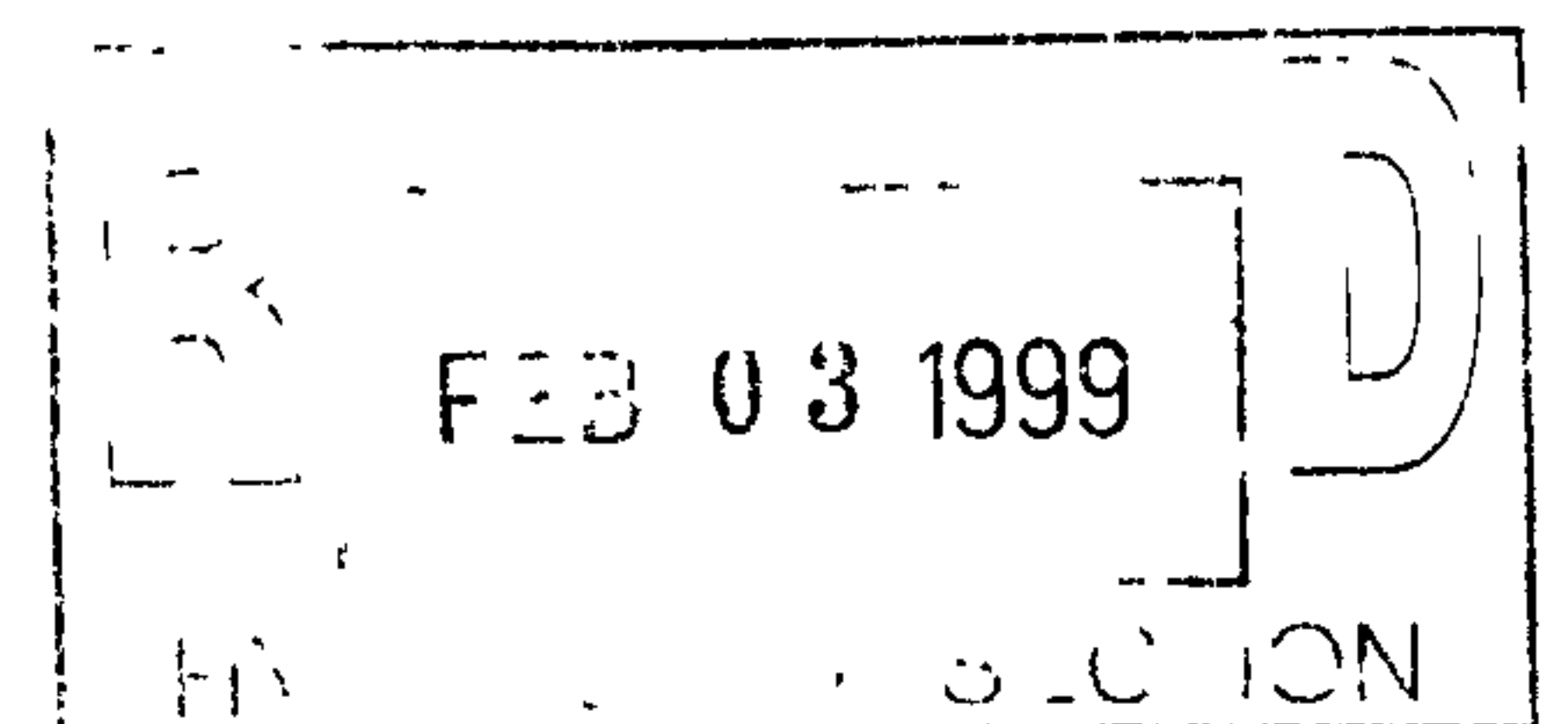
$$\text{V100-360} = (1.90) \times (0.42) / 12.0 = 0.066383 \text{ ac-ft} = 2892 \text{ cf}$$

$$\text{V100-1440} = (0.07) + (0.35) \times (2.75 - 2.35) / 12 = 0.078050 \text{ ac-ft} = 3400 \text{ cf}$$

$$\text{V100-10day} = (0.07) + (0.35) \times (3.95 - 2.35) / 12 = 0.113050 \text{ ac-ft} = 4924 \text{ cf}$$

PROPOSED PEAK DISCHARGE:

$$\text{Q100} = (1.56) \times (0.00) + (2.28) \times (0.07) + (3.14) \times (0.00) + (4.70) \times (0.35) = 1.80 \text{ cfs}$$



BASIN B AREA = 0.65 ac.

DRAINAGE ZONE 2

PRECIPITATION: 360 = 2.35 in.
1140 = 2.75 in.
10day = 3.95 in.

EXCESS PRECIPITATION:

PEAK DISCHARGE:

TREATMENT A	0.53 in.	1.56	cfs/ac.
TREATMENT B	0.78 in.	2.28	cfs/ac.
TREATMENT C	1.13 in.	3.14	cfs/ac.
TREATMENT D	2.12 in.	4.70	cfs/ac.

EXISTING CONDITIONS:

AREA

TREATMENT A	0 ac.
TREATMENT B	0 ac.
TREATMENT C	0.65 ac.
TREATMENT D	0 ac.

PROPOSED CONDITIONS:

AREA

TREATMENT A	0 ac.
TREATMENT B	0.05 ac.
TREATMENT C	0 ac.
TREATMENT D	0.60 ac.

EXISTING EXCESS PRECIPITATION:

$$\text{Weighted E} = (0.53 \times 0.00) + (0.78 \times 0.00) + (1.13 \times 0.65) + (2.12 \times 0.00) / 0.65 \text{ ac.} \\ = 1.13 \text{ in.}$$

$$V_{100-360} = (1.13 \times 0.65) / 12 = 0.061208 \text{ ac-ft} = 2666 \text{ cf}$$

EXISTING PEAK DISCHARGE:

$$Q_{100} = (1.56 \times 0.00) + (2.28 \times 0.00) + (3.14 \times 0.65) + (4.70 \times 0.00) = 2.04 \text{ cfs}$$

PROPOSED EXCESS PRECIPITATION:

$$\text{Weighted E} = (0.53 \times 0.00) + (0.78 \times 0.05) + (1.13 \times 0.00) + (2.12 \times 0.60) / 0.65 \text{ ac.} \\ = 2.02 \text{ in.}$$

$$V_{100-360} = (2.02 \times 0.65) / 12.0 = 0.109250 \text{ ac-ft} = 4759 \text{ cf}$$

$$V_{100-1440} = (0.11) + (0.60 \times (2.75 - 2.35)) / 12 = 0.129250 \text{ ac-ft} = 5630 \text{ cf}$$

$$V_{100-10\text{day}} = (0.11) + (0.60 \times (3.95 - 2.35)) / 12 = 0.189250 \text{ ac-ft} = 8244 \text{ cf}$$

PROPOSED PEAK DISCHARGE:

$$Q_{100} = (1.56 \times 0.00) + (2.28 \times 0.05) + (3.14 \times 0.00) + (4.70 \times 0.60) = 2.93 \text{ cfs}$$

BASIN C AREA = 0.49 ac.

DRAINAGE ZONE 2

PRECIPITATION: 360 = 2.35 in.
 1140 = 2.75 in.
 10day = 3.95 in.

EXCESS PRECIPITATION:

PEAK DISCHARGE:

TREATMENT A	0.53 in.	1.56	cfs/ac.
TREATMENT B	0.78 in.	2.28	cfs/ac.
TREATMENT C	1.13 in.	3.14	cfs/ac.
TREATMENT D	2.12 in.	4.70	cfs/ac.

EXISTING CONDITIONS:

AREA

TREATMENT A	0 ac.
TREATMENT B	0 ac.
TREATMENT C	0.44 ac.
TREATMENT D	0.05 ac.

PROPOSED CONDITIONS:

AREA

TREATMENT A	0 ac.
TREATMENT B	0.10 ac.
TREATMENT C	0 ac.
TREATMENT D	0.39 ac.

EXISTING EXCESS PRECIPITATION:

$$\text{Weighted E} = (0.53) \times (0.00) + (0.78) \times (0.00) + (1.13) \times (0.44) + (2.12) \times (0.05) / 0.49 \text{ ac.} \\ = 1.23 \text{ in.}$$

$$V_{100-360} = (1.23) \times (0.49) / 12 = 0.050267 \text{ ac-ft} = 2190 \text{ cf}$$

EXISTING PEAK DISCHARGE:

$$Q_{100} = (1.56) \times (0.00) + (2.28) \times (0.00) + (3.14) \times (0.44) + (4.70) \times (0.05) = 1.62 \text{ cfs}$$

PROPOSED EXCESS PRECIPITATION:

$$\text{Weighted E} = (0.53) \times (0.00) + (0.78) \times (0.10) + (1.13) \times (0.00) + (2.12) \times (0.39) / 0.49 \text{ ac.} \\ = 1.85 \text{ in.}$$

$$V_{100-360} = (1.85) \times (0.49) / 12.0 = 0.075400 \text{ ac-ft} = 3284 \text{ cf}$$

$$V_{100-1440} = (0.08) + (0.39) \times (2.75 - 2.35) / 12 = 0.088400 \text{ ac-ft} = 3851 \text{ cf}$$

$$V_{100-10\text{day}} = (0.08) + (0.39) \times (3.95 - 2.35) / 12 = 0.127400 \text{ ac-ft} = 5550 \text{ cf}$$

PROPOSED PEAK DISCHARGE:

$$Q_{100} = (1.56) \times (0.00) + (2.28) \times (0.10) + (3.14) \times (0.00) + (4.70) \times (0.39) = 2.06 \text{ cfs}$$

BASIN D AREA = 0.44 ac.

DRAINAGE ZONE 2

PRECIPITATION: 360 = 2.35 in.
1140 = 2.75 in.
10day = 3.95 in.

EXCESS PRECIPITATION:

PEAK DISCHARGE:

TREATMENT A	0.53 in.	1.56	cfs/ac.
TREATMENT B	0.78 in.	2.28	cfs/ac.
TREATMENT C	1.13 in.	3.14	cfs/ac.
TREATMENT D	2.12 in.	4.70	cfs/ac.

EXISTING CONDITIONS:

AREA

TREATMENT A	0 ac.
TREATMENT B	0 ac.
TREATMENT C	0.38 ac.
TREATMENT D	0.06 ac.

PROPOSED CONDITIONS:

AREA

TREATMENT A	0 ac.
TREATMENT B	0.03 ac.
TREATMENT C	0 ac.
TREATMENT D	0.41 ac.

EXISTING EXCESS PRECIPITATION:

$$\text{Weighted E} = (0.53 \times 0.00) + (0.78 \times 0.00) + (1.13 \times 0.38) + (2.12 \times 0.06) / 0.44 \text{ ac.} \\ = 1.27 \text{ in.}$$

$$V_{100-360} = (1.27 \times 0.44) / 12 = 0.046383 \text{ ac-ft} = 2020 \text{ cf}$$

EXISTING PEAK DISCHARGE:

$$Q_{100} = (1.56 \times 0.00) + (2.28 \times 0.00) + (3.14 \times 0.38) + (4.70 \times 0.06) = 1.48 \text{ cfs}$$

PROPOSED EXCESS PRECIPITATION:

$$\text{Weighted E} = (0.53 \times 0.00) + (0.78 \times 0.03) + (1.13 \times 0.00) + (2.12 \times 0.41) / 0.44 \text{ ac.} \\ = 2.03 \text{ in.}$$

$$V_{100-360} = (2.03 \times 0.44) / 12.0 = 0.074383 \text{ ac-ft} = 3240 \text{ cf}$$

$$V_{100-1440} = (0.07) + (0.41 \times (2.75 - 2.35)) / 12 = 0.088050 \text{ ac-ft} = 3835 \text{ cf}$$

$$V_{100-10\text{day}} = (0.07) + (0.41 \times (3.95 - 2.35)) / 12 = 0.129050 \text{ ac-ft} = 5621 \text{ cf}$$

PROPOSED PEAK DISCHARGE:

$$Q_{100} = (1.56 \times 0.00) + (2.28 \times 0.03) + (3.14 \times 0.00) + (4.70 \times 0.41) = 2.00 \text{ cfs}$$

BASIN ROAD AREA = 0.30 ac.

DRAINAGE ZONE 2

PRECIPITATION: 360 = 2.35 in.
1140 = 2.75 in.
10day = 3.95 in.

EXCESS PRECIPITATION:

PEAK DISCHARGE:

TREATMENT A	0.53 in.	1.56	cfs/ac.
TREATMENT B	0.78 in.	2.28	cfs/ac.
TREATMENT C	1.13 in.	3.14	cfs/ac.
TREATMENT D	2.12 in.	4.70	cfs/ac.

EXISTING CONDITIONS:

AREA

TREATMENT A	0 ac.
TREATMENT B	0 ac.
TREATMENT C	0.30 ac.
TREATMENT D	0 ac.

PROPOSED CONDITIONS:

AREA

0 ac.
0 ac.
0.30 ac.
0.00 ac.

EXISTING EXCESS PRECIPITATION:

$$\begin{aligned}\text{Weighted E} &= (0.53) \times (0.00) + (0.78) \times (0.00) + (1.13) \times (0.30) + (2.12) \times (0.00) / 0.30 \text{ ac.} \\ &= 1.13 \text{ in.} \\ V_{100-360} &= (1.13) \times (0.30) / 12 = 0.028250 \text{ ac-ft} = 1231 \text{ cf}\end{aligned}$$

EXISTING PEAK DISCHARGE:

$$Q_{100} = (1.56) \times (0.00) + (2.28) \times (0.00) + (3.14) \times (0.30) + (4.70) \times (0.00) = 0.94 \text{ cfs}$$

PROPOSED EXCESS PRECIPITATION:

$$\begin{aligned}\text{Weighted E} &= (0.53) \times (0.00) + (0.78) \times (0.00) + (1.13) \times (0.30) + (2.12) \times (0.00) / 0.30 \text{ ac.} \\ &= 1.13 \text{ in.}\end{aligned}$$

$$V_{100-360} = (1.13) \times (0.30) / 12.0 = 0.028250 \text{ ac-ft} = 1231 \text{ cf}$$

$$V_{100-1440} = (0.03) + (0.00) \times (2.75 - 2.35) / 12 = 0.028250 \text{ ac-ft} = 1231 \text{ cf}$$

$$V_{100-10\text{day}} = (0.03) + (0.00) \times (3.95 - 2.35) / 12 = 0.028250 \text{ ac-ft} = 1231 \text{ cf}$$

PROPOSED PEAK DISCHARGE:

$$Q_{100} = (1.56) \times (0.00) + (2.28) \times (0.00) + (3.14) \times (0.30) + (4.70) \times (0.00) = 0.94 \text{ cfs}$$

TRAPEZOIDAL CHANNEL ANALYSIS
RATING CURVE COMPUTATION

January 28, 1999
CONSTRUCTED SWALE
BEHIND BLDG. A (NORTH)
DESIGN FLOWRATE 1.13 cfs (max)

PROGRAM INPUT DATA:
DESCRIPTION

DESCRIPTION	VALUE
Channel Bottom Slope (feet per foot).....	0.0060
Manning's Roughness Coefficient (n-value).....	0.0450
Channel Side Slope - Left Side (horizontal/vertical)....	2.00
Channel Side Slope - Right Side (horizontal/vertical)...	2.00
Channel Bottom Width (feet).....	1.0

PROGRAM RESULTS:

Depth (ft)	Flow Rate (cfs)	Velocity (fps)	Froude Number	Velocity Head(ft)	Energy Head(ft)	Flow Area (sq ft)	Top Width (ft)
0.1	0.1	0.49	0.293	0.004	0.104	0.1	1.4
0.2	0.2	0.72	0.319	0.008	0.208	0.3	1.8
0.3	0.4	0.89	0.335	0.012	0.312	0.5	2.2
0.4	0.7	1.04	0.347	0.017	0.417	0.7	2.6
→ 0.5	1.2	1.17	0.357	0.021	0.521	1.0	3.0
0.6	1.7	1.29	0.365	0.026	0.626	1.3	3.4
0.7	2.4	1.40	0.372	0.031	0.731	1.7	3.8
0.8	3.1	1.51	0.379	0.035	0.835	2.1	4.2
0.9	4.1	1.61	0.384	0.040	0.940	2.5	4.6
1.0	5.1	1.71	0.390	0.046	1.046	3.0	5.0

TRAPEZOIDAL CHANNEL ANALYSIS COMPUTER PROGRAM, Version 1.3 (c) 1986
Dodson & Associates, Inc., 7015 W. Tidwell, #107, Houston, TX 77092
(713) 895-8322. A manual with equations & flow chart is available.

TRAPEZOIDAL CHANNEL ANALYSIS
RATING CURVE COMPUTATION

January 28, 1999
CONSTRUCTED SWALE
WEST SIDE OD BLDG. A
DESIGN FLOWRATE 1.13 cfs

PROGRAM INPUT DATA:
DESCRIPTION

	VALUE
Channel Bottom Slope (feet per foot).....	0.0060
Manning's Roughness Coefficient (n-value).....	0.0450
Channel Side Slope - Left Side (horizontal/vertical)....	4.00
Channel Side Slope - Right Side (horizontal/vertical)...	4.00
Channel Bottom Width (feet).....	2.0

PROGRAM RESULTS:

Depth (ft)	Flow Rate (cfs)	Velocity (fps)	Froude Number	Velocity Head(ft)	Energy Head(ft)	Flow Area (sq ft)	Top Width (ft)
0.1	0.1	0.49	0.298	0.004	0.104	0.2	2.8
0.2	0.4	0.73	0.328	0.008	0.208	0.6	3.6
0.3	0.9	0.92	0.346	0.013	0.313	1.0	4.4
0.4	1.5	1.07	0.359	0.018	0.418	1.4	5.2
0.5	2.4	1.21	0.370	0.023	0.523	2.0	6.0
0.6	3.5	1.34	0.380	0.028	0.628	2.6	6.8
0.7	4.9	1.46	0.388	0.033	0.733	3.4	7.6
0.8	6.6	1.58	0.395	0.039	0.839	4.2	8.4
0.9	8.5	1.69	0.401	0.044	0.944	5.0	9.2
1.0	10.7	1.79	0.407	0.050	1.050	6.0	10.0

TRAPEZOIDAL CHANNEL ANALYSIS COMPUTER PROGRAM, Version 1.3 (c) 1986
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(713) 895-8322. A manual with equations & flow chart is available.

PIPE CULVERT ANALYSIS
COMPUTATION OF CULVERT PERFORMANCE CURVE

January 28, 1999
18" CMP
BASINS A-1, A-2, & B
DESIGN FLOWRATE 5.86 cfs

PROGRAM INPUT DATA:
DESCRIPTION

DESCRIPTION	VALUE
Culvert Diameter (feet).....	1.50
FHWA Chart Number (1,2 or 3).....	2
Scale Number on Chart (Type of Culvert Entrance).....	1
Manning's Roughness Coefficient (n-value).....	0.0250
Entrance Loss Coefficient of Culvert Opening.....	0.50
Culvert Length (feet).....	60.0
Culvert Slope (feet per foot).....	0.0050

PROGRAM RESULTS:

Flow Rate (cfs)	Tailwater Depth (ft)	Headwater Inlet Control	Headwater Outlet Control	Normal Depth (ft)	Critical Depth (ft)	Depth at Outlet (ft)	Outlet Velocity (fps)
1.0	0.00	0.51	0.66	0.52	0.37	0.37	2.91
2.0	0.00	0.74	0.82	0.77	0.53	0.53	3.58
3.0	0.00	0.93	1.03	0.99	0.66	0.66	4.02
4.0	0.00	1.11	1.27	1.29	0.77	0.77	4.41
5.0	0.00	1.28	1.57	1.50	0.86	0.86	4.77
→ 5.9	0.00	1.42	1.86	1.50	0.93	0.93	5.06
6.0	0.00	1.44	1.91	1.50	0.95	0.95	5.11

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PIPE CULVERT ANALYSIS
COMPUTATION OF CULVERT PERFORMANCE CURVE

January 28, 1999
12" PVC
BASIN B
DESIGN FLOWRATE 2.93 cfs

PROGRAM INPUT DATA:
DESCRIPTION

DESCRIPTION	VALUE
Culvert Diameter (feet).....	1.00
FHWA Chart Number (1,2 or 3).....	1
Scale Number on Chart (Type of Culvert Entrance).....	1
Manning's Roughness Coefficient (n-value).....	0.0120
Entrance Loss Coefficient of Culvert Opening.....	0.50
Culvert Length (feet).....	170.0
Culvert Slope (feet per foot).....	0.0050

PROGRAM RESULTS:

Flow Rate (cfs)	Tailwater Depth (ft)	Headwater Inlet Control (ft)	Headwater Outlet Control (ft)	Normal Depth (ft)	Critical Depth (ft)	Depth at Outlet (ft)	Outlet Velocity (fps)
0.5	0.00	0.40	-0.16	0.29	0.29	0.29	2.65
1.0	0.00	0.60	0.01	0.42	0.42	0.42	3.21
1.5	0.00	0.76	0.25	0.53	0.52	0.53	3.56
2.0	0.00	0.92	0.56	0.64	0.60	0.64	3.79
2.5	0.00	1.08	0.93	0.75	0.68	0.75	3.94
→ 3.0	0.00	1.28	1.38	1.00	0.74	0.74	4.80
3.5	0.00	1.46	1.90	1.00	0.80	0.80	5.20

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PIPE CULVERT ANALYSIS
COMPUTATION OF CULVERT PERFORMANCE CURVE

January 28, 1999
12" CMP
BASIN C
DESIGN FLOWRATE 2.06 cfs

PROGRAM INPUT DATA:
DESCRIPTION

DESCRIPTION	VALUE
Culvert Diameter (feet).....	1.00
FHWA Chart Number (1,2 or 3).....	2
Scale Number on Chart (Type of Culvert Entrance).....	1
Manning's Roughness Coefficient (n-value).....	0.0250
Entrance Loss Coefficient of Culvert Opening.....	0.50
Culvert Length (feet).....	75.0
Culvert Slope (feet per foot).....	0.0100

PROGRAM RESULTS:

Flow Rate (cfs)	Tailwater Depth (ft)	Headwater Inlet Control	Headwater Outlet Control	Normal Depth (ft)	Critical Depth (ft)	Depth at Outlet (ft)	Outlet Velocity (fps)
0.5	0.00	0.40	-0.04	0.35	0.29	0.35	2.00
1.0	0.00	0.59	0.22	0.52	0.42	0.52	2.43
1.5	0.00	0.75	0.58	0.68	0.52	0.68	2.63
2.0	0.00	0.91	1.07	1.00	0.60	0.60	4.04
→ 2.1	0.00	0.92	1.14	1.00	0.61	0.61	4.08
2.5	0.00	1.06	1.68	1.00	0.68	0.68	4.41
3.0	0.00	1.26	2.42	1.00	0.74	0.74	4.80

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PIPE CULVERT ANALYSIS
COMPUTATION OF CULVERT PERFORMANCE CURVE

January 28, 1999
12" CMP
BASIN D
DESIGN FLOWRATE 2.00 cfs

PROGRAM INPUT DATA:
DESCRIPTION

DESCRIPTION	VALUE
Culvert Diameter (feet).....	1.00
FHWA Chart Number (1,2 or 3).....	2
Scale Number on Chart (Type of Culvert Entrance).....	1
Manning's Roughness Coefficient (n-value).....	0.0250
Entrance Loss Coefficient of Culvert Opening.....	0.50
Culvert Length (feet).....	80.0
Culvert Slope (feet per foot).....	0.0100

PROGRAM RESULTS:

Flow Rate (cfs)	Tailwater Depth (ft)	Headwater Inlet Control	Headwater Outlet Control	Normal Depth (ft)	Critical Depth (ft)	Depth at Outlet (ft)	Outlet Velocity (fps)
0.5	0.00	0.40	-0.09	0.35	0.29	0.35	2.00
1.0	0.00	0.59	0.18	0.52	0.42	0.52	2.43
1.5	0.00	0.75	0.57	0.68	0.52	0.68	2.63
→ 2.0	0.00	0.91	1.08	1.00	0.60	0.60	4.04
2.5	0.00	1.06	1.72	1.00	0.68	0.68	4.41
3.0	0.00	1.26	2.50	1.00	0.74	0.74	4.80

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DRAINAGE INFORMATION SHEET

PROJECT TITLE: DEL PASEO BUSINEESS PARK ATLAS/DRNG. FILE #: D-16 / D007

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

LEGAL DESCRIPTION: LOT B LANDS OF KUIDIS

CITY ADDRESS: _____

ENGINEERING FIRM: KEMPER-VAUGHAN CONS. ENGRS. CONTACT: KIM R. KEMPER

ADDRESS: 3700 COORS RD, NW SUITE C PHONE: 831-4520

OWNER: K2M LTD., CO. CONTACT: MONTY MOLA

ADDRESS: 11500 CARMEL NE PHONE: 797-3211

ARCHITECT: RON WITHERSPOON CONTACT: _____

ADDRESS: 6801 JEFFERSON, SUITE 100 PHONE: 761-9700

SURVEYOR: RIO GRANDE SURVEYING CO., INC. CONTACT: REX VOLGER

ADDRESS: 3700 COORS RD NW SUITE C PHONE: 841-4511

CONTRACTOR: _____ CONTACT: _____

ADDRESS: _____ PHONE: _____

TYPE OF SUBMITTAL:

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

☐ PRE-DESIGN MEETING

☐ YES

☒ NO

☐ COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:

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

DATE SUMITTED:

BY: *Kim R. Kemper*
2/2/99

