



FINAL

COLORADO CENTRE RESIDENTIAL

FILING NO. 3

FINAL DRAINAGE STUDY

MAY 17, 1985

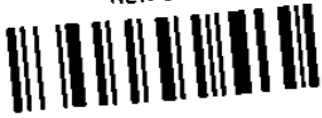
REVISED JULY 23, 1985

Prepared for:

M.D.C. Land Corp.  
3600 South Yosemite Suite 750  
Denver, Colorado 80237

Prepared by:

JR Developers, Ltd.  
2120 Hollowbrook Drive Suite 201  
Colorado Springs, Colorado 80918



July 29, 1985

Department of Transportation  
3105 North Stone  
Colorado Springs, Colorado 80907

Attn: Mr. Dave Watt

Re: Colorado Centre - Filing No. 3  
Drainage Study and Construction Drawings

Dear Mr. Watt:

The plans we submitted on July 24 have been revised per your request of July 15, 1985. The revisions are as follows:

Filing No. 2

1. Depth of low flow channel equal to 21"
2. Darken temporary diversion channel on grading plan

Filing No. 3

1. Add revegetation notes to streets and grading plans
2. Provide swale north of Horizonview Drive to prevent erosion and sediment within the subdivision
3. Provide vertical curb on Horizonpoint Drive
4. More clearly indicate match line of north and south profile on Amble Court
5. Provide barricade and detail at the north boundary of Horizonview Drive

JR Developers, Ltd. is submitting these plans for your approval. We respectfully request your signature below confirming that to the best of your knowledge, the plans are complete and you would favorably recommend Filing No. 3 remain on the August 9 agenda.

Thank you for your consideration in this matter.

Sincerely,

Joseph DesJardin  
JR Developers, Ltd.

\_\_\_\_\_  
Dave Watt

enc.

JD/svc

DRAINAGE REPORT STATEMENT

COLORADO CENTRE RESIDENTIAL FILING NO. 3

Engineer's Statement:

The attached drainage plan and report were prepared under my direction and supervision and are correct to the best of my knowledge and belief. Said drainage report has been prepared according to the criteria established by El Paso County for drainage reports. I accept responsibility for any liability caused by the negligent acts, errors or omissions on my part in preparing this report.

Michael B. McCarthy, P.E. #14617

Developer's Statement:

The developer has read and will comply with all the requirements specified in this drainage report.

M.D.C. Land Corporation

Business Name

By: \_\_\_\_\_

Title: \_\_\_\_\_

Address: 3600 South Yosemite

Suite 750

Denver, Colorado 80237

County of El Paso:

Filed in accordance with Section 45-1 of the El Paso County Land Development Code, January, 1980.

\_\_\_\_\_  
County Engineer

\_\_\_\_\_  
Date

Conditions:

TABLE OF CONTENTS

<u>ITEM</u>	<u>PAGE</u>
General Description	1
Drainage Characteristics	
A. Existing	2
B. Proposed	2
Hydrologic Calculations	3
Summary	4
Drainage Fees	5

APPENDIX

<u>ITEM</u>	<u>EXHIBIT</u>
Site Location	B
Offsite Basins	B
Soil Classification	C
Hydrologic Calculations	Table 1-5
Drainage Plan	Back Cover

FINAL DRAINAGE STUDY

COLORADO CENTRE RESIDENTIAL FILING NO. 3

MAY 17, 1985

REVISED JULY 23, 1985

General Description

Colorado Centre Residential, Filing No. 3, is located in the south half of Section 3, Township 15 South, Range 65 West of the Sixth Principal Meridian, in El Paso County, Colorado. The site lies northeast of Marksheffel Road and new Drennan Road, and consists of approximately 18.9689 acres (see Exhibit B).

Single family residential development will take place on this site.

Runoff associated with Filing No. 3 will discharge into an existing box culvert beneath Marksheffel Road and into Jimmy Camp Creek. A master drainage plan for all of Colorado Centre, prepared by Gilbert, Meyer & Sams, Inc. has been previously submitted.

## Drainage Characteristics

### A. Existing

The site presently consists of gentle slopes with poor grass cover. Four historic outfall points have been identified on the plan. Three of those points consist of culverts beneath old Marksheffel Road which all combine and discharge into a structure under the realigned Marksheffel Road. The fourth outfall point is where runoff discharges directly into Jimmy Camp Creek.

A 42" reinforced concrete pipe has been stubbed out, under Drennan Road, but both ends are buried.

The soil type is mostly Ustic Torrifuvents which has hydrologic group B characteristics (see Exhibit C).

### B. Proposed

Access to the site will be provided by a 44' collector street (Horizonview Drive) extending north from new Drennan Road. This street will have 8" vertical curb and gutter with a roadside ditch on the east side to channel offsite flows.

Within the subdivision, 36' streets with ramp curb which transition to vertical curb and gutter near catch basins will be installed.

Street grades permit routing of developed runoff towards drainage facilities at three locations in Filings 1 and 2. Runoff associated with the eastern portion of the site will be collected in a cluster of inlets at the southeast corner, Filing No. 1. The northwest portion will drain towards a pair of inlets on Bramble Lane and flow into the proposed open channel parallel to Marksheffel Road. The remaining runoff will discharge into a concrete spillway located in the southwest corner of Filing No. 2, then flow towards the Marksheffel drainage structure.

Offsite runoff to the north will be directed westward into the proposed open channel. Future development of these basins is anticipated and runoff quantities have been included for sizing of the open channel.

### Hydrologic Calculations

The method used for calculating the anticipated amount of runoff is the SCS Method as outlined in "Areawide Urban Runoff Control Manual" and "Procedures for Determining Peak Flows in Colorado".

Design storms with 5-year and 100-year return frequency and 24-hour duration were used to determine adequate sizing of the storm sewer facilities.

Runoff calculations for individual basins and design points are tabulated in Tables 1 through 5.

### Summary

The proposed Colorado Centre Residential, Filing No. 3 Drainage Study is in compliance with the master study, "Colorado Centre". No part of the proposed site lies within a floodplain.

The runoff quantities associated with the developed site will not adversely affect surrounding developments and will be safely channeled to adequate outfall facilities.

JDJ/svc



DRAINAGE FEES

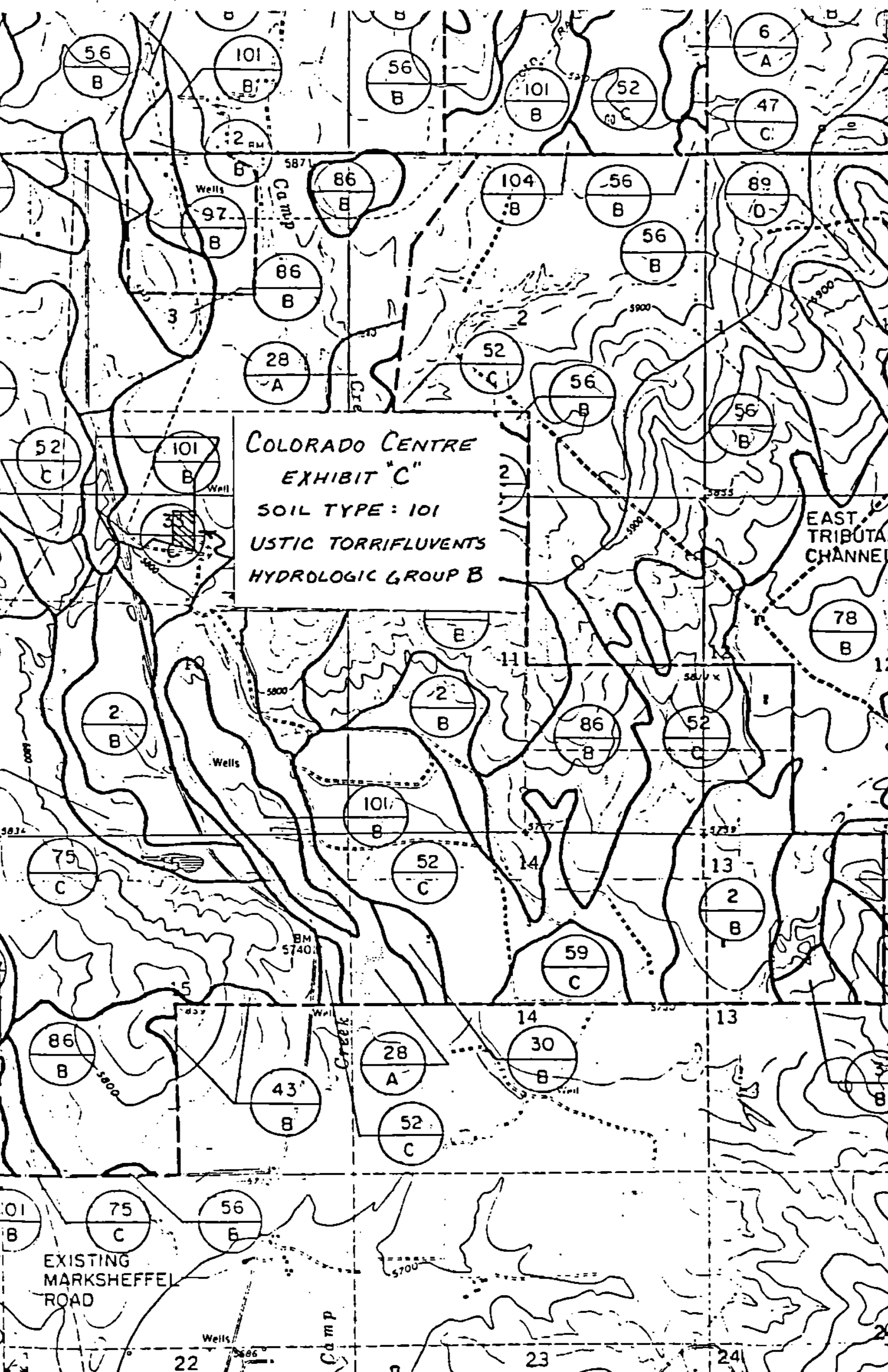
1985 Miscellaneous Basin Fee:

\$2601/Acre x 18.9689 Acres = \$ 49, 338.00

The developer has been requested by the Department of Transportation to provide a separate letter of credit for the amount of the drainage fee, to be held until the fee issue has been resolved.

APPENDIX





COLORADO CENTRE  
EXHIBIT "C"  
SOIL TYPE: 101  
USTIC TORRIFLUENTS  
HYDROLOGIC GROUP B

EAST TRIBUTARY CHANNEL

EXISTING MARKSHEFFEL ROAD

22

23

24



HYDROLOGIC COMPUTATION - BASIC DATA

BASIN	BASIN	Planim. Head.	MILE	LENGTH	HEIGHT	(HR.)	HP	GROUP	TYPE	NO.	Q	(CFS) q <sub>5</sub>	(CFS) q <sub>100</sub>
A	A	9.997	0.0036	1050	2 FPS	0.15	900	B	1/8 AC.	85	1.38 / 2.81	4.5	9.1
	B	41.18	0.0148	1150	2 FPS	0.16	880	B	1/8 AC.	85	1.38 / 2.81	18.0	36.6
	B'	7.87	0.0028	450	2 FPS	0.06	1000	B	1/8 AC.	85	1.38 / 2.81	3.9	7.9
	TOTAL		0.0176			0.16	830			85		21.4	41.4
B	C	4.619	0.0017	650	2 FPS	0.09	1000	B	1/8 AC.	85	1.38 / 2.81	2.3	4.1
	C'	26.505	0.0095	1600	2 FPS	0.22	800	B	1/8 AC.	85	1.38 / 2.81	10.5	21.4
	TOTAL		0.0112				800					12.4	25.2
C	D	7.641	0.0027	1200	2 FPS	0.17	865	B	1/8 AC.	85	1.38 / 2.81	3.2	6.6
	D'	2.743	0.0010	200	2 FPS	0.03	1000	B	1/8 AC.	85	1.38 / 2.81	1.4	2.8
	TOTAL		0.0037				865					4.4	9.0
D	E	4.976	0.0018	350	2 FPS	0.05	1000	B	1/8 AC.	85	1.38 / 2.81	2.5	5.1
	E'	1.689	0.0006	200	2 FPS	0.03	1000	B	1/8 AC.	85	1.38 / 2.81	0.8	1.7
	TOTAL		0.0024				1000					3.3	6.7





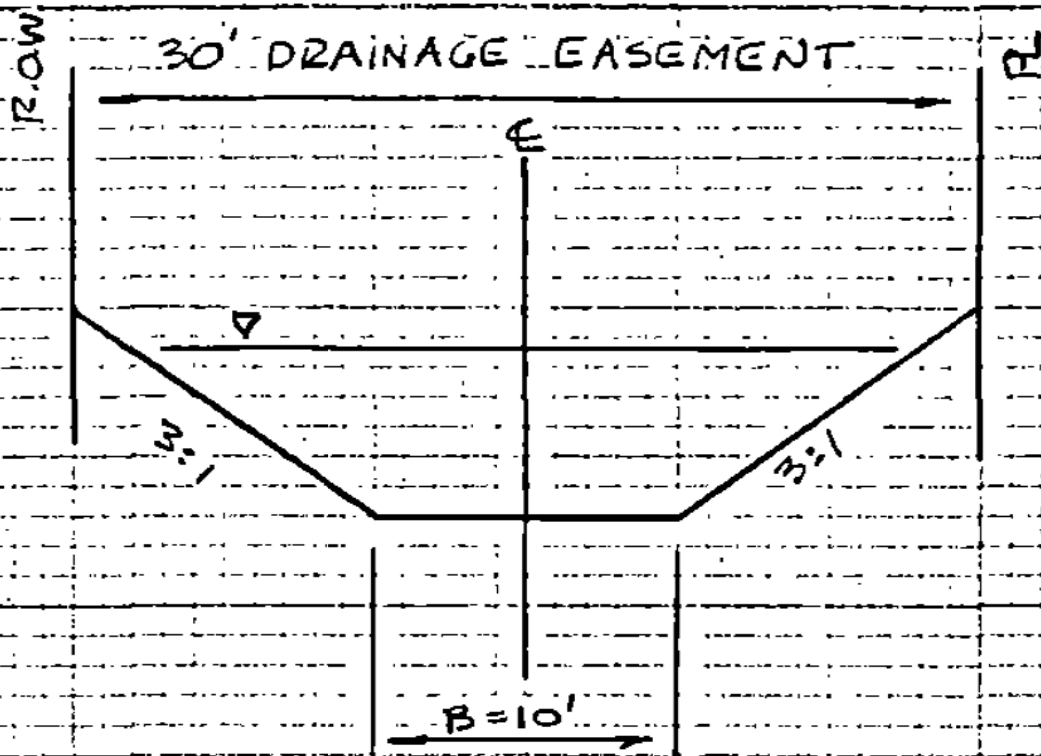






JR DEVELOPERS, LTD  
 2120 HOLLOWBROOK DR.  
 COLORADO SPRINGS, COLORADO 80918  
 303-528-8833

LAND DEVELOPMENT CONSULTANTS



$$Q_{100} = 231 \text{ CFS}$$

$$\text{SLOPE} = 0.3\%$$

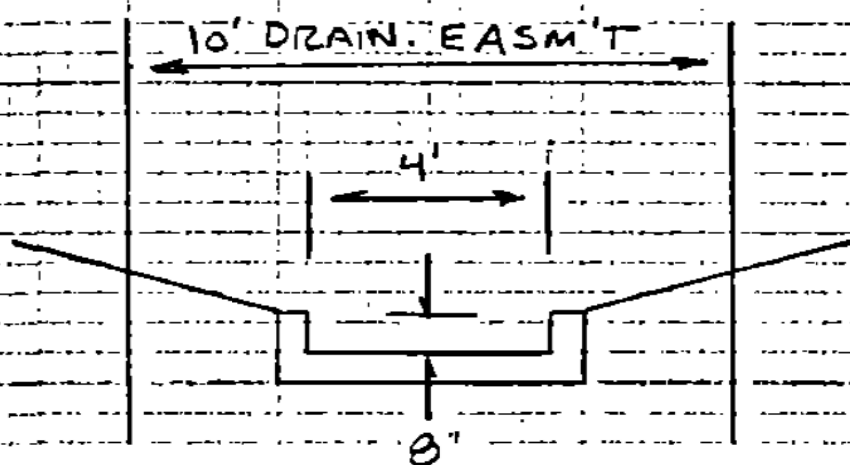
$$n = 0.045$$

$$A = 51.79 \text{ FT}^2$$

$$\Rightarrow \text{NORMAL DEPTH} = 2.81'$$

$$\text{AVE. VELOCITY} = 4.46 \text{ FPS}$$

### RIP-RAP OPEN CHANNEL CAPACITY



CONCRETE FLOWING FULL

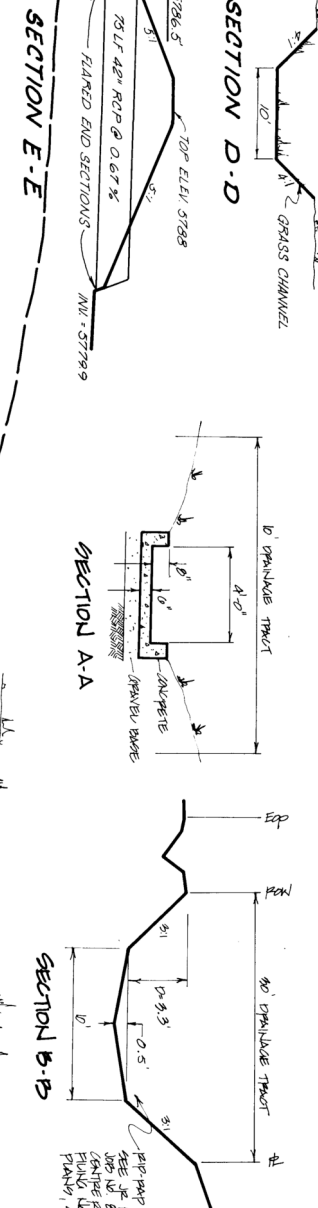
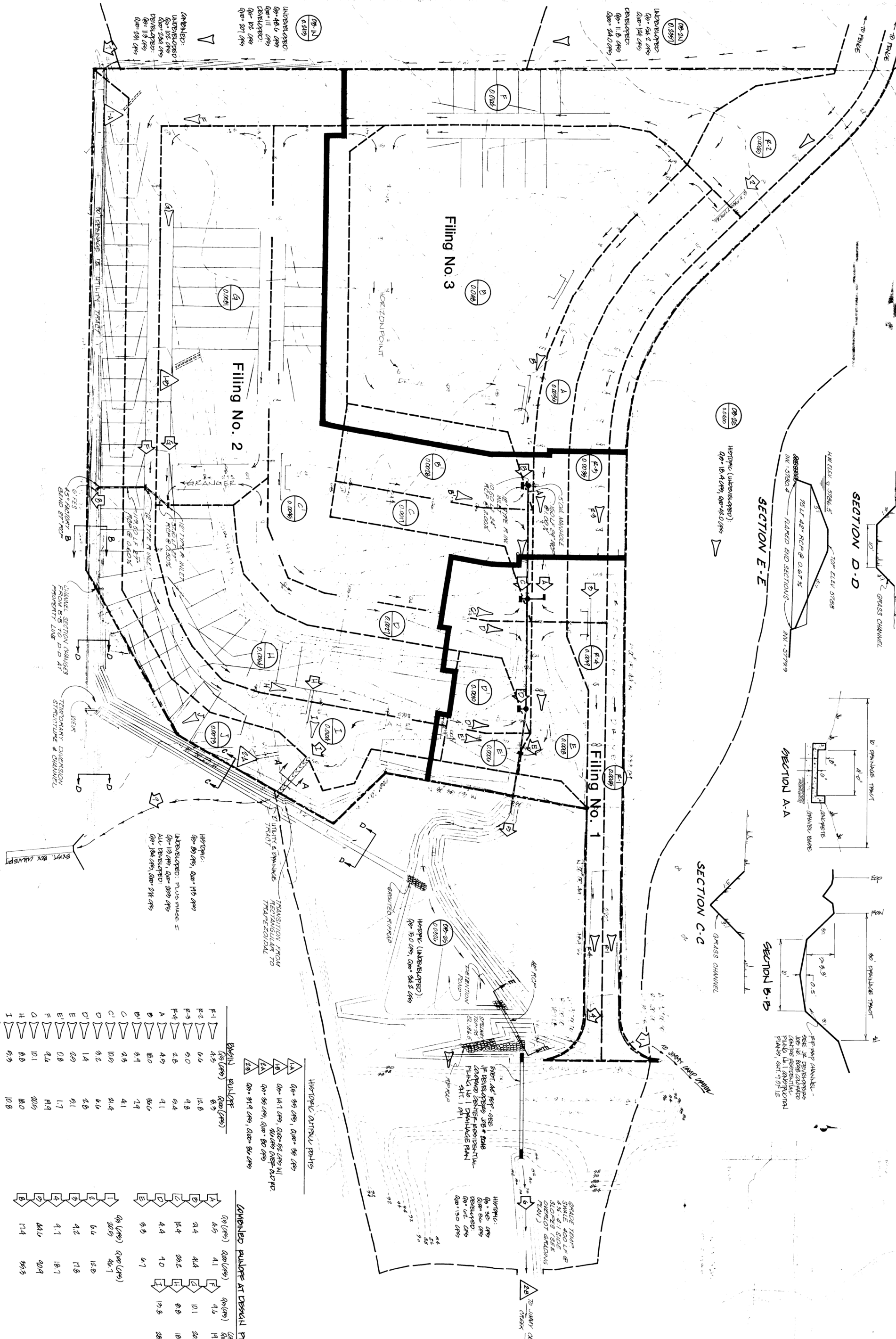
$$Q_{CAP} = \frac{1.486}{0.015} (2.68)^{2/3} (0.502) (0.01)^{1/2}$$

$$= 16.3 \text{ CFS}, V = 6.3 \text{ FPS}$$

$$Q_5 = 13.8 \text{ CFS}$$

$Q_{100} = 28.1 \text{ CFS} \rightarrow$  100 YEAR STORM WILL BE WITH-IN 10' EASEMENT.

### CONCRETE SPILLWAY CAPACITY



MANHOLE	DIAMETER	DEPTH	CONCRETE	PIPE	DIAMETER	DEPTH
M-1	48"	4.5'	4.5'	48"	4.5'	4.5'
M-2	48"	6.6'	12.8'	48"	6.6'	12.8'
M-3	48"	9.0'	9.8'	48"	9.0'	9.8'
M-4	48"	2.8'	9.4'	48"	2.8'	9.4'
M-5	48"	4.5'	4.1'	48"	4.5'	4.1'
M-6	48"	8.0'	8.0'	48"	8.0'	8.0'
M-7	48"	3.4'	7.9'	48"	3.4'	7.9'
M-8	48"	2.5'	4.1'	48"	2.5'	4.1'
M-9	48"	10.5'	21.4'	48"	10.5'	21.4'
M-10	48"	9.2'	6.1'	48"	9.2'	6.1'
M-11	48"	1.4'	2.8'	48"	1.4'	2.8'
M-12	48"	2.5'	9.1'	48"	2.5'	9.1'
M-13	48"	0.8'	1.7'	48"	0.8'	1.7'
M-14	48"	4.1'	19.4'	48"	4.1'	19.4'
M-15	48"	10.1'	20.5'	48"	10.1'	20.5'
M-16	48"	8.8'	10.8'	48"	8.8'	10.8'
M-17	48"	10.1'	20.5'	48"	10.1'	20.5'
M-18	48"	10.8'	19.5'	48"	10.8'	19.5'
M-19	48"	10.1'	20.5'	48"	10.1'	20.5'
M-20	48"	10.8'	19.5'	48"	10.8'	19.5'
M-21	48"	10.1'	20.5'	48"	10.1'	20.5'
M-22	48"	10.8'	19.5'	48"	10.8'	19.5'
M-23	48"	10.1'	20.5'	48"	10.1'	20.5'
M-24	48"	10.8'	19.5'	48"	10.8'	19.5'

**HISTORIC OUTFALL POINTS**

- M-1: 48" x 30' (48'), 400' x 30' (48')
- M-2: 48" x 14.1' (48'), 400' x 62' (48') N1
- M-3: 48" x 36' (48'), 400' x 80' (48')
- M-4: 48" x 31.9' (48'), 400' x 80' (48')

**COMBINED OUTFALL AT DESIGN PPS**

M-1	4.5'	4.1'	9.6'	14.9'
M-2	12.8'	4.4'	0.1'	20.9'
M-3	9.8'	12.4'	0.8'	18.0'
M-4	9.4'	4.4'	4.0'	19.8'
M-5	4.1'	8.3'	6.7'	28.1'

SHEET 1 OF 1  
 DATE: 4-10-85  
 DES BY: JD  
 CHK BY: [Signature]  
 DWN BY: TW

SCALE: 1" = 40'

NO	REVISION	BY	DATE