



*FINAL*  
DRAINAGE REPORT  
FOR  
CONTINENTAL  
AT  
COLORADO CENTRE  
EL PASO COUNTY, COLORADO

JANUARY 17, 1986

REVISED APRIL 30, 1986

REVISED JULY 31, 1986

Prepared for:

Valley Housing and Development  
P. O. Box 2951  
Grand Junction, CO 81502

Prepared by:

United Planning and Engineering  
5040 Corporate Plaza Drive  
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(303) 599-5982

Job No. 85-0611

UNITED  
PLANNING &  
ENGINEERING

planners • consultants • engineers • landscape architects • surveyors  
(303) 599-5982

July 31, 1986

El Paso County  
Land Use Department  
27 East Vermijo  
Colorado Springs, CO 80903

Attention: Mr. Ken Rowberg

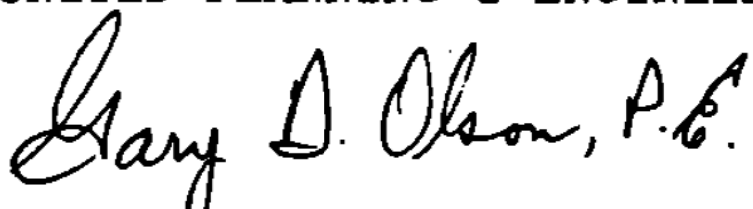
Dear Sir:

Contained herein is the Drainage Plan and Report for the proposed CONTINENTAL AT COLORADO CENTRE Project, El Paso County, Colorado, for your review.

If there are any questions, please contact our office.

Very truly yours,

UNITED PLANNING & ENGINEERING

  
Gary D. Olson, P.E.

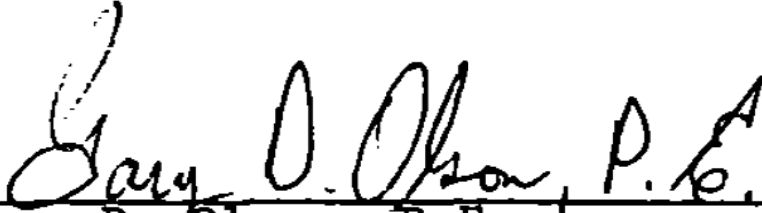
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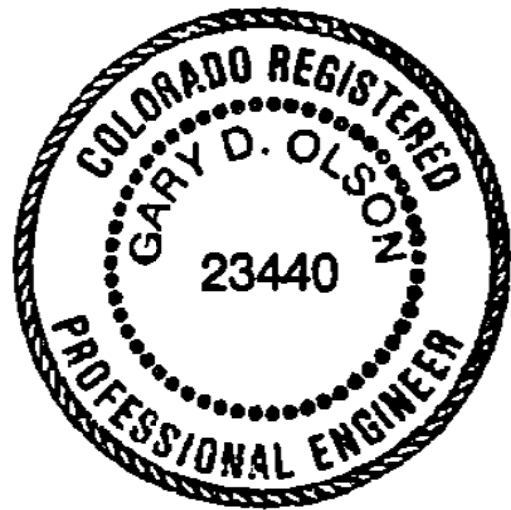
CONTINENTAL  
AT  
COLORADO CENTRE  
EL PASO COUNTY, COLORADO

CERTIFICATIONS AND APPROVALS

Engineer:

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 any negligent acts, errors, or omissions on my part in preparing this report.

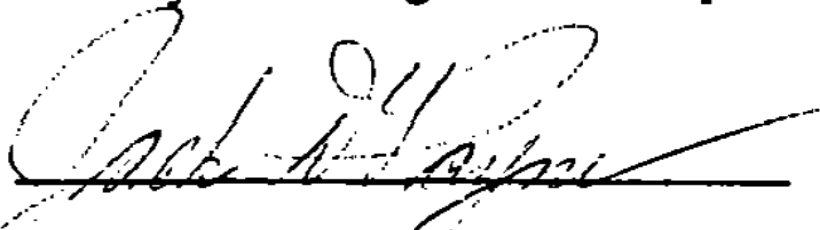
  
\_\_\_\_\_  
Gary D. Olson, P.E.



Owner or Developer of Site:

The developer/owner has read and will comply with all of the requirements specified in this drainage report as filed.

Valley Housing & Development

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


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

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SITE LOCATION AND SOILS MAP  
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## REFERENCES:

The Master Drainage Plan for Colorado Centre, dated March, 1985, and the Continental F.E.M.A. Study prepared by JR Developers, dated January 3, 1986, were used as a basis for this report.

## LOCATION:

Continental at Colorado Centre is located in the southeast quarter of Section 35, Township 15 South, Range 65 West of the 6th Principle Meridian. It is bounded on the north and east by land owned by Aries Properties, Inc., 25 North Cascade, Suite 210, Colorado Springs, Colorado, 80903, on the south by Old Drennan Road, and on the west by land owned by LP Associates, 3300 East First Avenue, Suite 680, Denver, Colorado. The overall site contains approximately 65 acres. Filing No. 1 contains 28.1509 acres.

## SOILS:

The soils on the site as classified by the Soil Conservati Service consist of Manzanola Clay Loam, a deep, well drain soil, and Bijou Sandy Loam, also a deep, well drained soil. As shown on the enclosed soils map in the Appendix, the majority of the site consists of Manzanola Clay Loam, which falls in Hydrologic Group C. The Bijou Sandy Loam located in the eastern portion of the site falls in Hydrologic Group B.

## FLOOD PLAIN STATEMENT:

A portion of the site now lies in the F.E.M.A. Flood Plain

It is anticipated that this portion will be removed from the flood plain through application to the Federal Emergency Management Agency (F.E.M.A.) for a Letter of Map Amendment. The Colorado Centre Metropolitan District is submitting this application. For details involved, please refer to "CONTINENTAL F.E.M.A. STUDY" as prepared by JR Developers, Ltd., 2120 Hollowbrook Drive, Suite 201, Colorado Springs, Colorado.

PROPOSED LAND USE:

The site will be developed to accomodate manufactured homes. Main access to the site will be from Old Drennan Road.

OFFSITE DRAINAGE:

By grading the "Open Space" on the north end of the site to divert existing historic flows to the west and through construction of the levee to the east of the site, the only offsite flows anticipated to enter the property will come from the existing electrical easement that borders the east property line. These flows have been calculated and are included in this report. Flows leaving the site will be channeled to both the Franceville Tributary of Jimmy Camp Creek and Jimmy Camp Creek itself as shown on the Drainage Plan. The existing ditch along the north side of Old Drennan Road must be regraded and improved west to Jimmy Camp Creek. Design and scope of this ditch improvement is not included in the scope of this report.

ONSITE DRAINAGE:

Flows on the site will be collected in the streets and conveyed to various discharge points as shown on the Drainage Plan. When streets near their allowable capacities, flows will be collected in inlets and channels and eventually discharge into the previously discussed ditch on the north side of Old Drennan Road.

DESIGN AND ANALYSIS CRITERIA:

As described on Page 64 of the El Paso County Subdivision Criteria Manual, the site is analyzed using the Soil Conservation Service Method of storm analysis for a Type IIA, 5 year 24 hour storm. This development does not require 100 year storm analysis.

DRAINAGE FEES:

Filing No. 1 consists of 28.1509 acres and lies in the Jimmy Camp Creek Basin, which requires drainage fees of \$2,822.00 per acre. This totals to a fee of \$79,441.88. Payment of the drainage fee and costs of public drainage improvements shall be the responsibility of the developer.

ESTIMATED COST OF PUBLIC DRAINAGE IMPROVEMENTS FOR  
CONTINENTAL FILING NO. 1:

21" R.C.P. CL IV	48 L.F. @	24.00 =	\$ 1,152.00
24" R.C.P. CL IV	80 L.F. @	28.00 =	2,240.00
30" R.C.P. CL IV	240 L.F. @	38.00 =	9,120.00
24" R.C.P. Flared End Sections	2 EA. @	525.00 =	1,050.00
30" R.C.P. Flared End Sections	1 EA. @	560.00 =	560.00
10' Inlet	1 EA. @	2000.00 =	2,000.00
12' Inlet	1 EA. @	2400.00 =	2,400.00
Rip-Rap	40 TONS @	18.00 =	720.00
Concrete Channels	260 L.F. @	11.00 =	2,860.00
			<hr/>
	ESTIMATED CONSTRUCTION COSTS		\$22,102.00
	PLUS 10% ENGINEERING		2,210.20
			<hr/>
TOTAL ESTIMATED PUBLIC DRAINAGE IMPROVEMENTS			\$24,312.20



STREET CAPACITIES

34' STREET WITH CARRY RAMP CURBS @ 0.50%

$$Q_{cap} = \frac{1.486}{n} (A) (R)^{2/3} (S_o)^{1/2}$$

$$Q_{cap} = (92.875) (7.73) (.363) (.0707) = 18.4 \text{ CFS}$$

-----

34' STREET WITH CARRY RAMP CURBS @ 0.60%

$$Q_{cap} = (92.875) (7.73) (.363) (.0775) = 20.2 \text{ CFS}$$

-----

34' STREET WITH CARRY RAMP CURBS @ 0.70%

$$Q_{cap} = \frac{1.486}{.016} (7.73) \left(\frac{7.73}{35.3}\right)^{2/3} (.007)^{1/2}$$

$$= (92.875) (7.73) (.363) (.0837) = 21.8 \text{ CFS}$$

-----

34' STREET WITH CARRY RAMP CURBS @ 0.88%

$$Q_{cap} = (92.875) (7.73) (.363) (.0938) = 24.4 \text{ CFS}$$

-----

34' STREET WITH CARRY RAMP CURBS @ 1.0%

$$Q_{cap} = (92.875) (7.73) (.363) (.10) = 26.1 \text{ CFS}$$

STREET CAPACITIES (Cont.)

34' STREET WITH CARRY RAMP CURBS @ 1.2%

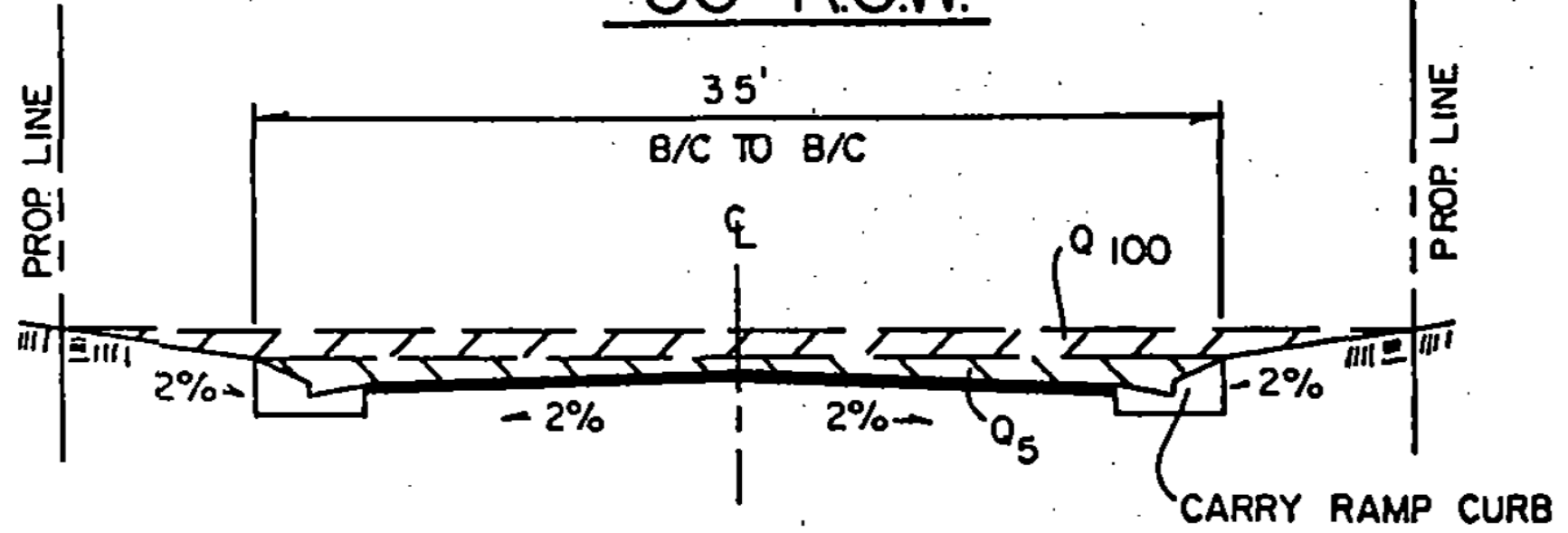
$$Q_{cap} = (92.875) (7.73) (.363) (.1095) = 28.5 \text{ CFS}$$

-----

40' STREET WITH TYPE 1 CURB AND GUTTER @ 0.50%

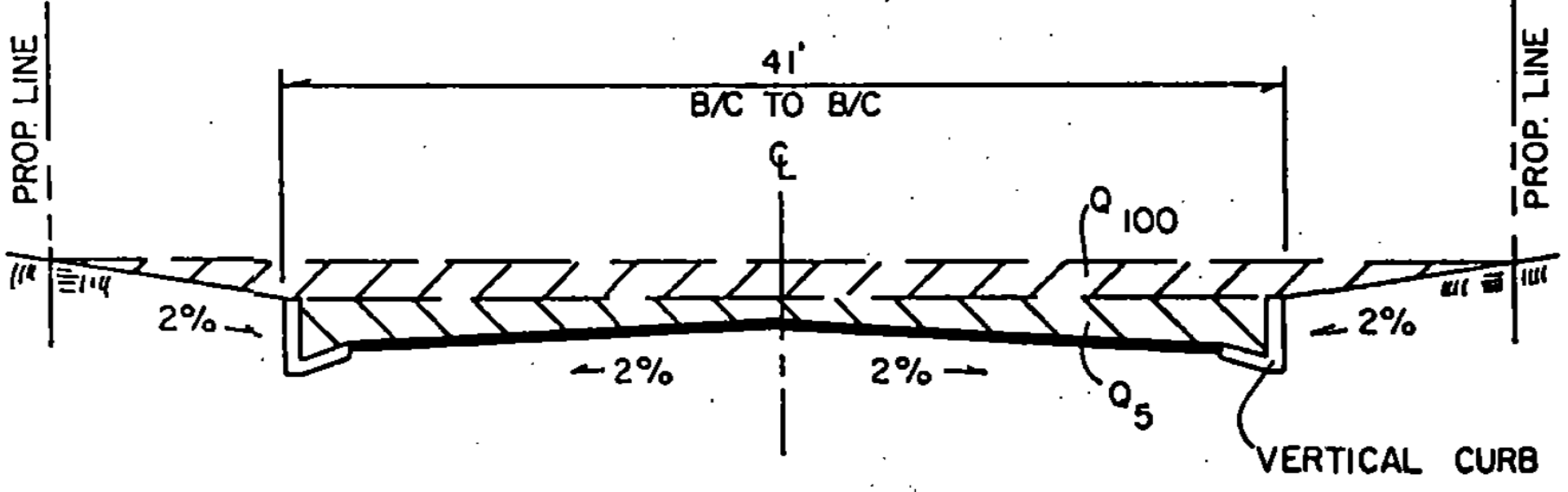
$$Q_{cap} = (92.875) (13.86) \left(\frac{13.86}{41.2}\right)^{2/3} (0.0050)^{1/2} = 44.0 \text{ CFS}$$

50' R.O.W.



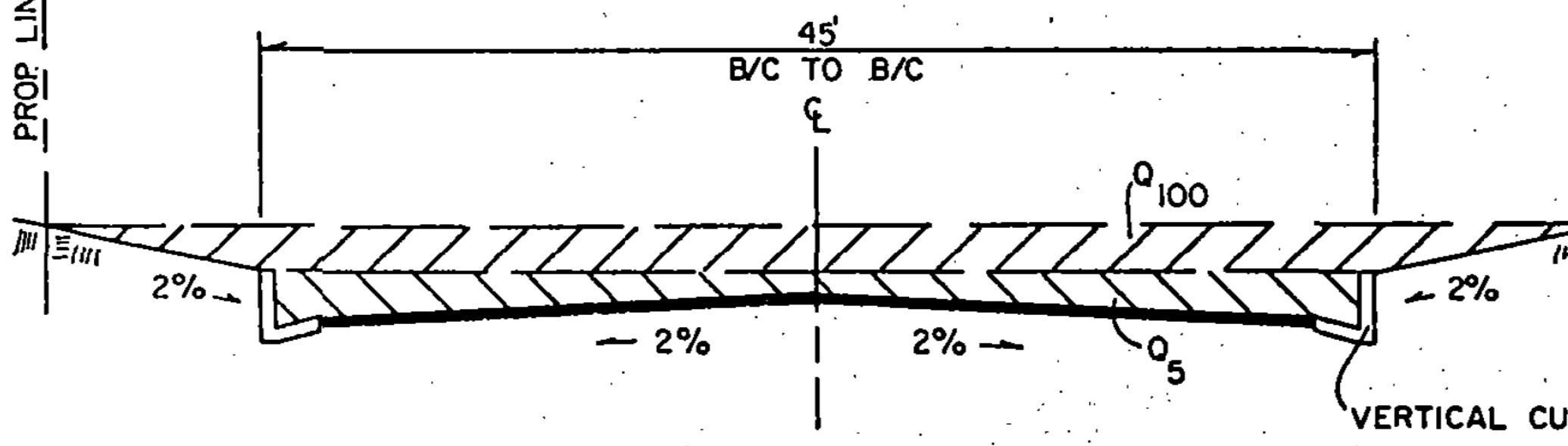
$A_{Q_5} = 7.73$  SQFT.  
 $A_{Q_{100}} = 14.11$  SQFT.

60' R.O.W.



$A_{Q_5} = 13.86$  SQFT.  
 $A_{Q_{100}} = 23.46$  SQFT.

80' R.O.W.



$A_{Q_5} = 14.34$  SQFT.  
 $A_{Q_{100}} = 36.22$  SQFT.

EXHIBIT A

A P P E N D I X



2240 FEET

LOCATION & SOILS MAP

STORM DRAINAGE SYSTEM PRELIMINARY DESIGN DATA

Location of Design Point	Basins Size SQ. MI.	Length ft.	Height ft.	Hydro Group	Curve No.	Time of Concentration hours	P (in) 6 hr	P (in) 24 hr	Direct Runoff $Q_{run}$ inches	Direct Runoff $Q_{rain}$ inches	Summation Runoff cfs	Street		Pipe		Street		Pipe		Remarks	
												Slope %	Allowable Capacity cfs	Slope %	Size in.	Capacity cfs	Design cfs	Velocity fps	Design cfs		Velocity fps
BASIN A (5)	0.0089	1200	9	C	83	0.20	2.5	820	1.10	2.80	8.0	0.50	18.4							34' STREET	23
BASIN B (5)	0.0015	440	2	C	70	0.11	2.5	980	1.50	2.2	2.2	-	-							DITCH	
BASIN C (5)	0.0034	540	2	C	90	0.14	2.5	910	1.50	4.6	4.6	-	-							DITCH	
BASIN D (5)	0.0182	1210	7	C	87	0.22	2.5	800	1.25	15.2	15.2	0.50	18.4							34' STREET	
BASIN E (5)	0.121	1130	7	C	87	0.21	2.5	820	1.25	12.4	12.4	0.50	44.0							40' & 44' ARTERIAL	
BASIN F (5)	0.0055	400	3	C	87	0.08	2.5	1000	1.25	6.9	6.9	0.60	20.2							40' CAPACITY LISTED	
BASIN G (5)	0.0058	700	8	C	87	0.11	2.5	980	1.25	7.1	7.1	0.50	18.4							34' STREET	
BASIN H (5)	0.0104	700	10	C	87	0.14	2.5	710	1.25	11.8	11.8	1.0	20.1							34' STREET	
BASIN I (5)	0.0232	1100	12	C	80	0.16	2.5	880	0.90	18.4	18.4	0.88	24.4							34' STREET	
BASIN J (5)	0.130	1240	14	C	80	0.17	2.5	870	0.9	10.2	10.2	1.20	28.5							34' STREET	
BASIN K (5)	0.272	3000	20	C	80	0.34	2.5	630	0.90	15.4	15.4	-	-							OPEN SPACE - ELEV. EASEMENT	
BASIN L (5)	0.0071	1110	5	C	87	0.23	2.5	780	1.5	8.5	8.5	0.50	44.0							40' & 44' ARTERIAL	
BASIN M (5)	0.0022	340	2	C	87	0.05	2.5	1000	1.4	3.0	3.0	0.50	18.4							40' CAPACITY LISTED	
Σ E.M.T.	0.213	7400	21	C	83.7	0.23	2.6	690			22.1										
							1.9'				52.5										

FIGURE 6-1. TYPICAL FORM FOR STORM DRAINAGE SYSTEM PRELIMINARY DESIGN DATA

CONTINENTAL

# CONTINENTAL AT COLORADO CENTRE

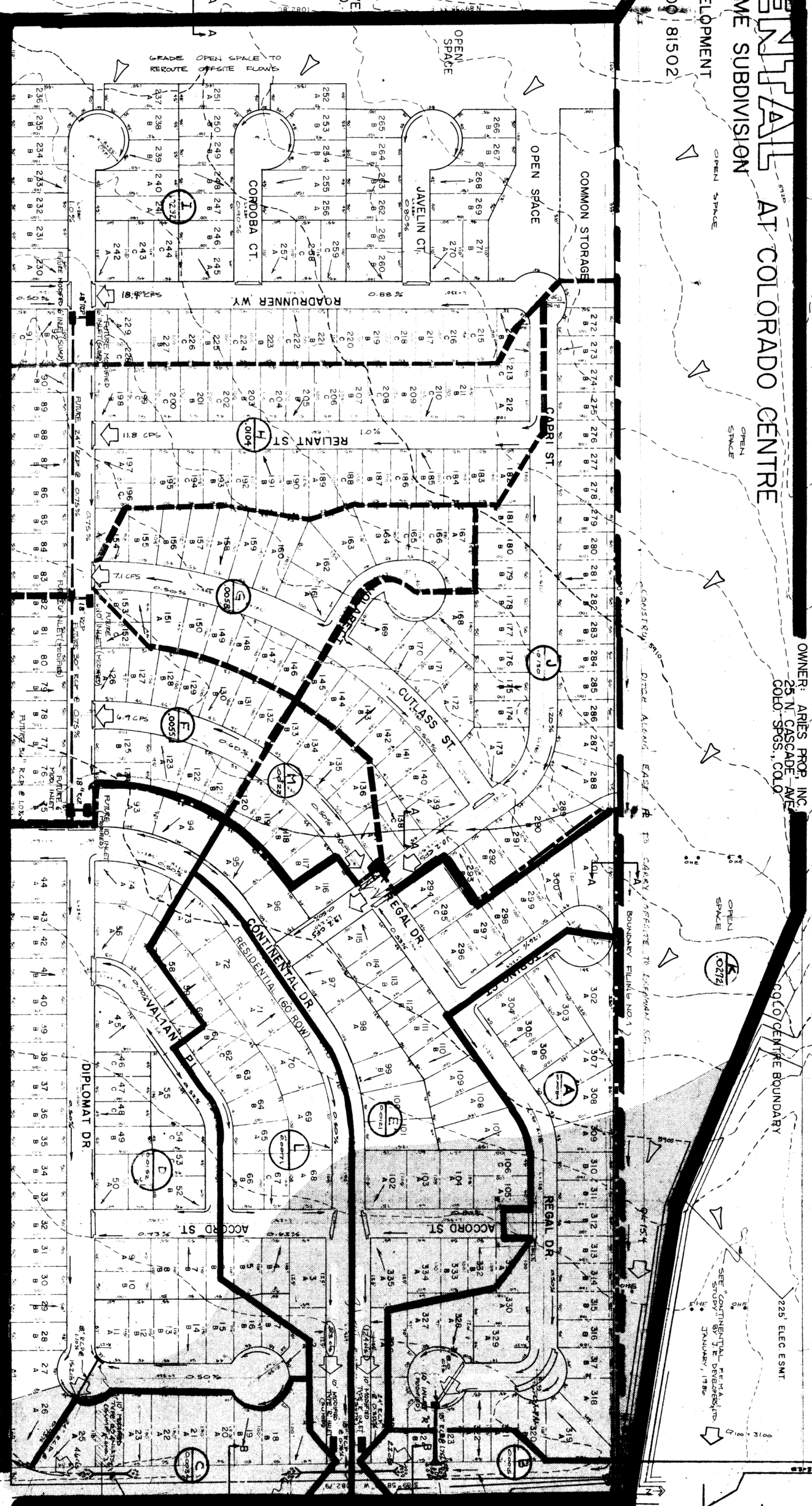
A MANUFACTURED HOME SUBDIVISION  
 DEVELOPED BY:  
 VALLEY HOUSING AND DEVELOPMENT  
 P.O. BOX 295  
 GRAND JUNCTION, COLORADO 81502

OWNER: ARIES PROP. INC.  
 25 N. CASCADE AVE.  
 COLO. SPRGS., COLO.

OWNER: ARIES PROP. INC.  
 25 N. CASCADE AVE.  
 COLO. SPRGS., COLO.

OWNER: ROBT C. NORRIS  
 2993 BRADWOOD  
 COLO. SPRGS., CO  
 80906

OWNER: ARIES PROP INC.  
 25 N. CASCADE AVE.  
 COLO. SPRGS., COLO.



## LEGEND

- BASIN BOUNDARY
- SUB-BASIN BOUNDARY
- FUTURE SUB-BASIN BOUNDARY
- FILING BOUNDARY
- SUB-BASIN DESIGNATION
- SUB-BASIN AREA (SQ. MILES)
- FLOW DIRECTION
- CROSS PAN
- DESIGN POINT

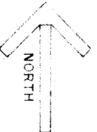
EXISTING FLOODPLAIN - PLAT RESTRICTION MAY BE REQUIRED PENDING F.E.M.A. LETTER OF BELIEF

NOTE: CONTAINER THROUGH EACH BASIN. ALONG NORTH EDGE OF FRONT 1/2" IS TO BE SET. SEE PLAN FOR EXISTING PLUMBING.

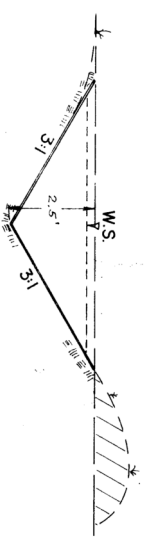
OWNER: L-P ASSOCIATES  
 3200 E. 1ST AVE. SUITE 680  
 DENVER, CO 80208

FUTURE CONNECTION TO OLD DRENNAN ROAD

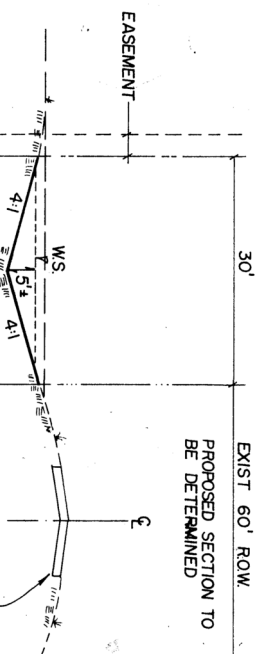
## DRAINAGE PLAN



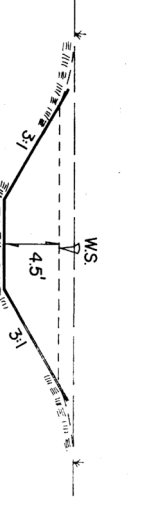
SECTION A-A  
NTS



SECTION B-B  
NTS



SECTION C-C  
NTS



REVISED 7/86  
 REVISED 4/96