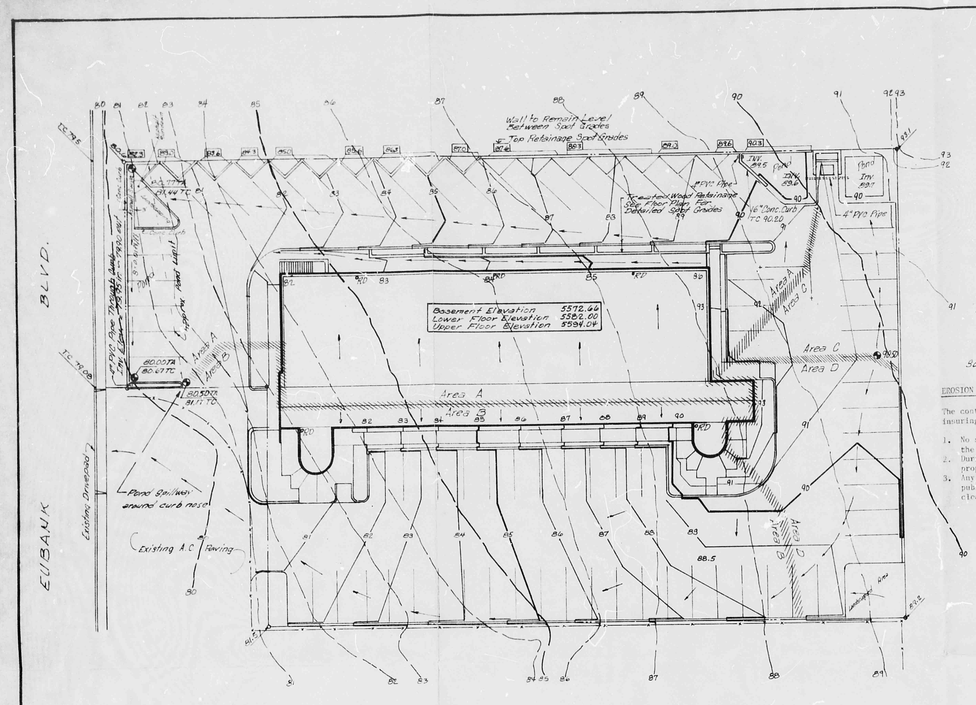
HYDROLOGY

F21/D12A

ONE PLAN



EROSION CONTROL NOTES

The contractor shall be responsible for insuring the following:

1. No sediment bearing water leaves the site during construction.
2. During grading operations adjacent property is protected from flooding.
3. Any and all eroded material entering public-right-of-way is promptly cleaned up.

LEGEND

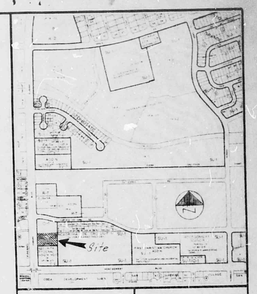
	Existing	New
Flow Direction		
Contour Line		86
Spot Elevation	•	5
Drainage Boundary		
Fence		
Top of Curb	TC	
Top of Asphalt	TA	

BENCH MARK

Elevations are referenced to Albuquerque City Survey Monument M-14 Elev = 5584.101

LEGAL DESCRIPTION

Portion Parcel A of Security Federal Addition Number Two (2) within SW¼ of Section 23, T11N, R4E, NMPM City of Albuquerque Bernalillo County, New Mexico, containing 41,245.44 SF (0.947 acre) more or less.



VICINITY MAP

ZONE ATLAS F-21

DRAINAGE PLAN
PROFESSIONAL OFFICE BUILDING
FOR
P. & R. DEVELOPMENT CO.

I. General Data

A. References
1. City of Albuquerque, Development Process Manual (DPM) Volume 2, Design Criteria, Chapter 22 Drainage, Flood Control and Erosion Control.
2. Soil Survey of Bernalillo County and Parts of Sandoval and Valencia Counties, New Mexico, U.S. Soil Conservation Service, Issued June 1977.

B. Soil Type: (Ref. 2, sheet 22) Soils TgB, Tijeras gravelly fine sandy loam, 1 to 5 percent slopes, Hydrologic Soils Group B.

C. Rainfall: The 6-hour 100-year rainfall, P_6, for the site location (See Ref. 1, Plate 22.2 D-1) is 2.45 inches.

D. Time of Concentration: By overland flow, Tijeras (See Ref. 1, Plate 22.2, B-1) the time of concentration, T_c, depends on slope, distance and type of surface. Distance from Eubank Blvd. to most remote off-site point is 425 feet. Change in Elevation is 5595-5578 = 17 feet.

Slope = 17/425 = 0.04 feet per foot
Velocity = 1.15 fps (Lower curve)
T_c = 425/(1.15x60) = 6.16 minutes (Undeveloped)
Velocity = 2.67 fps (Upper curve)
T_c = 425/(2.67x60) = 2.65 minutes (Developed)

Use T_c = 10 minutes for all flow calculations

E. Runoff Coefficient: (See Ref. 1, Plate 22.2, C-1) For SCS Soils Group B, the "C" Factor for zero percent impervious is 0.34. The following "C" Factors are used:
Roof surfaces, concrete and gravel over 6 mil PE film = 1.0
Asphalt paving = 0.9
Landscaping, gravel w/o PE film or natural = 0.34

F. Intensity: (See Ref. 1, Plate 22.2 D-2) Intensity is given by the equation $I = K_6 (6.84)(10)^{-0.51}$

$I = 2.45 (6.84)(10)^{-0.51} = 5.28$ Use 5.2 inches per hour.

G. Discharge: The 100-year peak flow is given by the rational equation $Q = CIA$.

H. Volume: The 100-year volume is given by the rational approach: $V = C (K_6/12)$Area in 30.27.

II. Off-Site Flow

At present, natural topography east of the site results in a triangular off-site area of approximately (150x165)/2 = 12,375 SF in natural state $Q = CIA = 0.34 \times 5.2 \times 0.2841 = 0.50$ cfs. This flow will be accepted and allowed to top the low concrete wall at the east property.

III. On-Site Flow

A. Drainage areas, and weighted "C" Factors are summarized in the following table:

Drainage Area	Roof	Conc.	Asphalt	Landscaping	Total
A	7130	1322	9401	1613	19466
B	1506	1260	10691	814	14371
C		182	2297	426	3005
D		186	3519	898	4603

B. Peak Discharge and Volume are summarized below.

Drainage Area	"C"	I	Area SQ. FT.	Acres	Q (cfs)	V (cf)
A	0.90	5.2	19466	0.4469	2.09	1577
B	0.89	5.2	14371	0.3299	1.53	2611
C	0.83	5.2	3005	0.0690	0.30	509
D	0.82	5.2	4603	0.1051	0.43	737
Totals			41245	0.9469	4.35	7434

IV. Pond Positive Discharge and Spillway

A. Pond in parking lot, lower end. $V = 1600 \times 0.5 / 2 = 400$ cf
Positive Discharge by orifice equation $Q = CA\sqrt{2gh}$
$C = 0.6$ $A = 0.0491$ SF $h = 0.38'$
$Q = 0.6(0.0491)\sqrt{2 \times 32.2 \times 0.38} = 0.15$ cfs
Spillway - water will flow around curb noses

B. Ponds at NE Corner of Site
Ponds are to be connected by 4" PVC pipe. Lower pond discharge is 3" PVC through concrete curb. Curb is to be set 0.1 feet lower than retainage at property line so that overflow, if any, will flow into property line.
Positive Discharge: $h = 0.58$ $D = 3"$ $Q = 0.18$ cfs

C. Pond at SE corner of site. Drainage area D is too small to warrant the cost of a positive discharge. The pond is shallow and will infiltrate.

V. Analysis of Downstream Conditions

Site discharges into Eubank Blvd. 250 feet north of Montgomery Blvd. Storm sewer in Montgomery Blvd is a 27" RCP. There are catch basins approximately 200 feet west of Eubank Blvd. Total Street flow time is obtained from Ref. 1 Plate 22.2 B-2.

Street	Length	Slope	Velocity	Time
Eubank	250	0.01	2.7	1.54
Montgomery	200	0.02	3.8	0.87

Total time to inlet = 1.54 + 0.87 + 10 minutes = 12.4 minutes.
The storm sewer system turns south at Moon Street and west again at Comanche approximately 1.5 miles from the site. Some flooding occurs at Wyoming and Comanche. This is largely due to overland flows in Comanche. Flow from the site should be in the storm sewer well ahead of the storm sewer flow peaks. Therefore, downstream capacity is adequate.

VI. Conclusions

1. The drainage plan presented herein adequately treats on-site and off-site flows so that the development will not be adversely affected by storm runoff.
2. Downstream capacity is adequate since runoff from the site will enter storm sewer well before the peak flow in the storm sewer.

DONALD O. LOVELADY
NEW MEXICO
5616
REGISTERED PROFESSIONAL ENGINEER

Sept 14, 1984
Revised Oct 29, 1984

APPROVED FOR DRAINAGE
11/9/84
DATE
Bruce J. Montoya
SIGNATURE
TITLE
ADVISE DRAINAGE INSPECTOR WHEN GRADING EXECUTED

RECEIVED
OCT 29 1984
HYDROLOGY SECTION

(1) F21/D12A

F 21, D12A