HYDROLOGY M15/D14 ONE PLAN

M 15/D14

1 PLAN

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

MAYOR
Harry E. Kinney

CHIEF
ADMINISTRATIVE OFFICER
Frank A. Kleinhenz

drainage file

September 1, 1977

Mr. Kent M. Whitman
P.O. Box 1328
Corrales, New Mexico 87048

RE: DRAINAGE REPORT FOR SMALL OFFICE COMPLEX, CRADDOCK DEVELOPMENT COMPANY.

Dear Mr. Whitman:

I have reviewed the drainage report prepared for the above referenced complex, and it is in agreement with the discussions we have had on the subject. Therefore, the drainage report is hereby approved.

Very truly yours,

Bruno Conegliano
Assistant City Engineer-Hydrology

BC/kr

CITY OF ALBUQUERQUE, NEW MEXICO

CITY ENGINEER'S OFFICE

MEMORANDUM - June 7, 1978

TO: G.R. Kielich, Asst. City Engineer-Design
FROM: Bruno Conegliano, Asst. City Engineer-Hydrology B.C.

RE: CRADDOCK DEVELOPMENT IN THE AIRPORT INDUSTRIAL TRACT
(SOUTH OF ALAMO & YALE & M-1B-Z)

The office of the City Engineer has a long standing agreement with the Craddock development to replace the arroyo @ the southern boundary of the referenced development with a storm sewer. We need to proceed with the design and construction of this facility since according to Kim, money is a available.

I'll be glad to help as best as I can if you need it.

BC/gm

cc; V.M. Kimmick
Drainage file

DRAINAGE REPORT
FOR
SMALL OFFICE COMPLEX

PREPARED FOR:

CRADDOCK DEVELOPMENT COMPANY
ALBUQUERQUE, NEW MEXICO
AUGUST 1977

Kent M. Whitman

KENT M. WHITMAN, P.E.

KENT M. WHITMAN
STATE OF
NO. 6170
NEW MEXICO
REGISTERED PROFESSIONAL ENGINEER

P.O. Box 1328
Corrales, New Mexico 87048
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SURVEYING
ENGINEERING
LAND PLANNING

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DRAINAGE REPORT

CRADDOCK SMALL OFFICE COMPLEX

A) Purpose & Scope

Craddock Development Company is presently planning construction of a small office complex in southeast Albuquerque. The site contains approximately 3.0 acres, and the purpose of this report is to propose a method of disposal for storm runoff which meets the requirements of the City of Albuquerque and the Albuquerque Metropolitan Arroyo Flood Control Authority.

B) Site Location & topography

The site for the small office complex is located on the west side of Yale Boulevard S.E. approximately 700 feet south of Gibson Boulevard. (See Plate I). The ground is very rugged falling in a general southwesterly pattern at slopes of up to 18%. Soils are typically silty sands and gravels.

C) Design Criteria

(1) Engineering Parameters

Rate of runoff calculations have been based on the frequency - intensity - duration relationship for a 100 year storm as presented by Gordon Herkenhoff and Associates in their 1963 Master Plan of Drainage for the City of Albuquerque. This relationship is expressed by the following equation: $I = 189/(Tc+25)$. For times of concentration equal to 10 minutes or less the value of I is taken as 5.4 inches per hour, and this value has been assumed here. Coefficients of runoff equal to 0.4 for natural ground and 0.90 for the developed site were used to determine flow rates.

Volume calculations have been based on a 100 year-6 hour rainfall of 2.2".

(2) Flood Control Regulations

The Drainage Plan presented in the report has been designed to comply with the 1972 AMAFCA Resolution in regard to rate and volume of runoff leaving the site. That Resolution has been interpreted to say that the rate of runoff allowed to leave the site after development shall be no greater than the rate occurring prior to development.

D) Off-Site Drainage

Plate 1 indicates that 0.84 acres of land located immediately north of the subject parcel drains toward and onto the site. This area will continue to drain onto the site, and runoff generated from it will be directed into the driveway swales proposed for the property and discharged into the special construction inlet shown on Plate III. (See appendix A for calculations).

E) On-Site Drainage

In order to meet AMAFCA requirements on-site runoff will be controlled in two ways:

(1) Scupper outlet controls will be used on all roof outlets to dissipate roof runoff over a 24 hour period.

(2) A block wall will be constructed in the SW corner of the property to form a retention basin. A controlled inlet will limit discharge to the natural rate of 8.3 cfs. An emergency overflow will be provided in case a storm larger than the 100 year design storm occurs.

APPENDIX A - CALCULATIONS

1) Flow Rates

I_{100} = 5.4 inches/hour
$C_{DEV.}$ = 0.9
$C_{NAT.}$ = 0.4

Area A = 0.84 acres
Area B = 0.23 acres
Area C = 1.54 acres
Area D = 0.37 acres

A) Point 1 - Areas A & B contributing:

$Q_1 = 0.4\ (5.4)(0.84) + 0.9\ (5.4)(0.23) = 2.9$ cfs

B) Point 2 - Areas A, B, & C contributing:

$Q_2 = Q_1 + 0.9\ (5.4)(1.54) = 10.4$ cfs.

C) Point 3 - Areas A, B, C & D contributing:

$Q_3 = Q_2 + 0.9\ (5.4)(0.37) = 12.2$ cfs

2) Surface Flow Capacities

Based on $Q = \frac{A(1.49)}{n} R^{2/3} s^{1/2}$

A) Point 1:

bottom width = 0
sideslope = 30:1
n= 0.015
slope = 3.33%
depth = 0.5'

Q = 54 cfs > 2.9 OK

B) Point 2:

bottom width = 0
sideslope = 18:1
n = 0.015
slope = 1%
depth = 0.67'

Q = Q calc./2 = 19 cfs > 10.4 OK

3) Required Ponding

Area = 3.0 Acres
R = 2.2 inches = 0.2'
$C_{NAT.}$ = 0.4
$C_{DEV.}$ = 0.9

Vol required = (0.9 - 0.4)(0.2)(3)(43560)
= 13070 ft^3

Roof areas = 33880 ft^2
Roof volume = 0.2 x 33880 = 6780 ft^3

Corner pond volume = 6215 ft^3 @ el 80.25

∴ Total volume provided = 12995 ft^3
≅13070 OK

4) Natural Runoff Rate

C = 0.4
I - 5.4
A = 3.84

Q = CIA = 8.3 cfs

5) Flow Rate - Special Inlet

h = 2.0'
C_o = 0.6 (with grate)
A = 1.8 S.F.
CF = clog factor = 0.67
$Q = CF\ C_o\ A\ \sqrt{2gh}$ = 8.2 cfs

6) Orifice Sizes - Scupper Outlet Controls

We will use 1 scupper for each 1690 S.F. of surface. Each control will have 5 orifices.

A_r = 1690/5 = 338
T = 86400 sec
Y_1 = 0.2
Y_2 = 0'
C_d = 0.62

$$A_o = \frac{2\ Ar}{C_d\ T\ \sqrt{2g}} \left(\sqrt{Y_1} - \sqrt{Y_2} \right)$$

$$= .0007\ S.F.$$

$$= \frac{\pi d^2}{4}$$

$$d = 0.03'$$

$$= 11/32''\ \not{\varnothing}\ \text{orifice}$$

PLATE I

LOCATION MAP & OFFSITE DRAINAGE

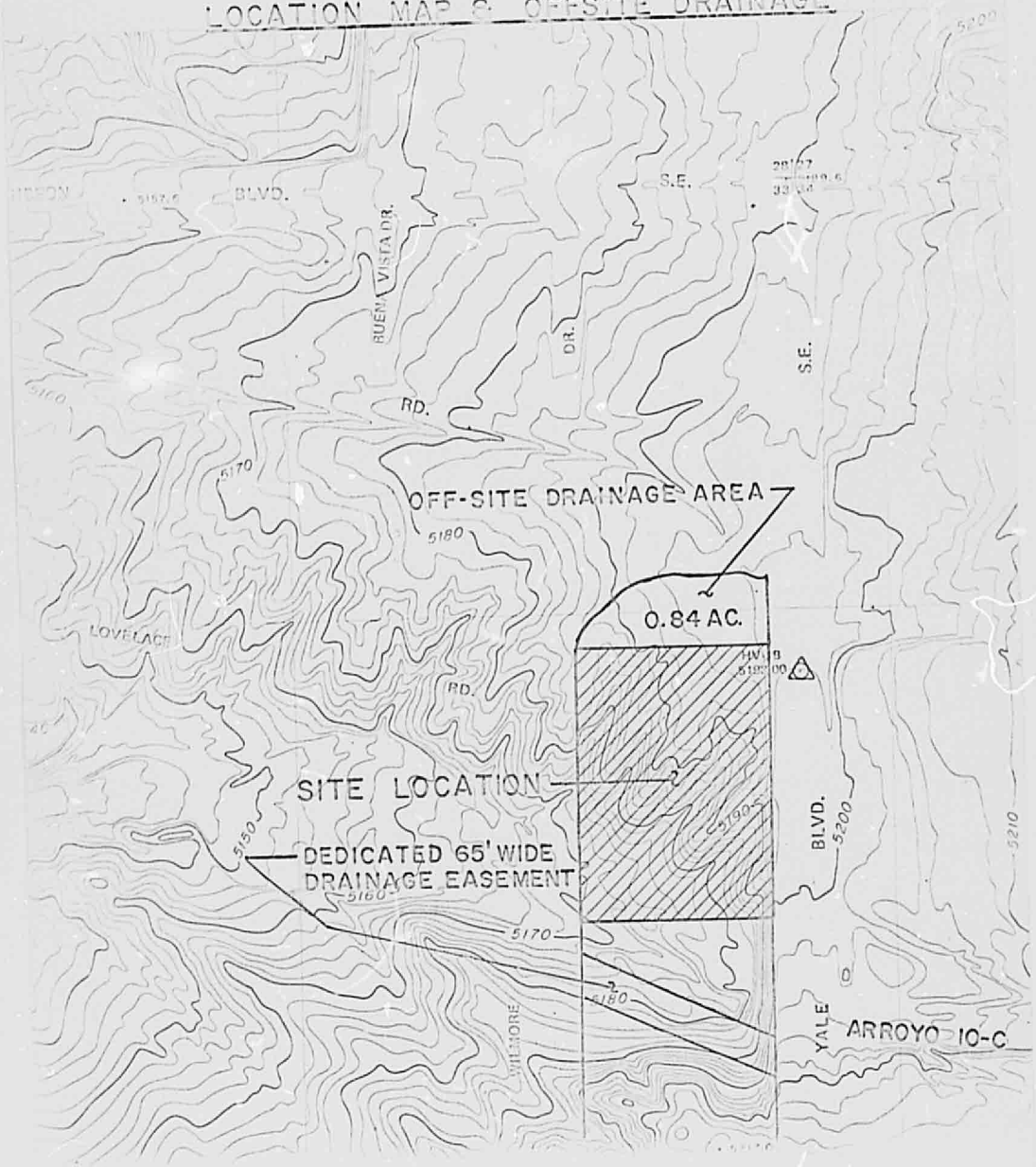
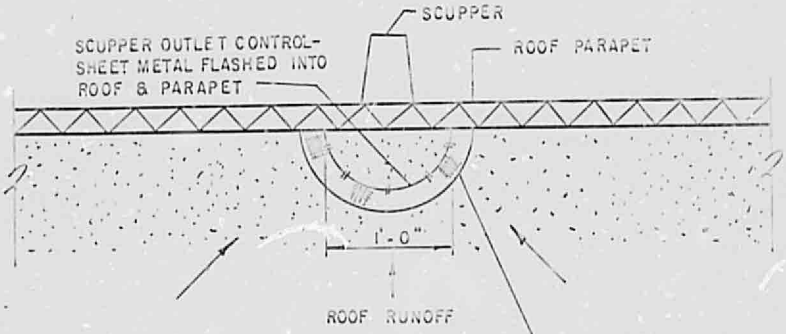


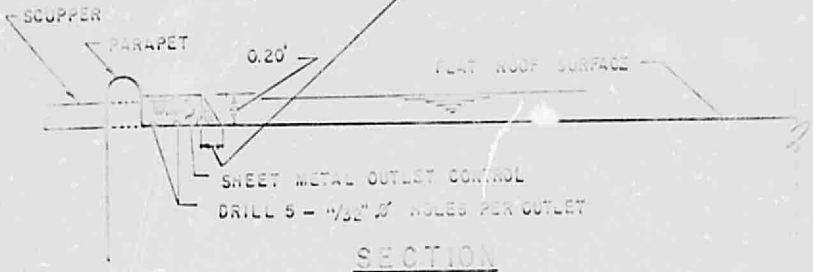
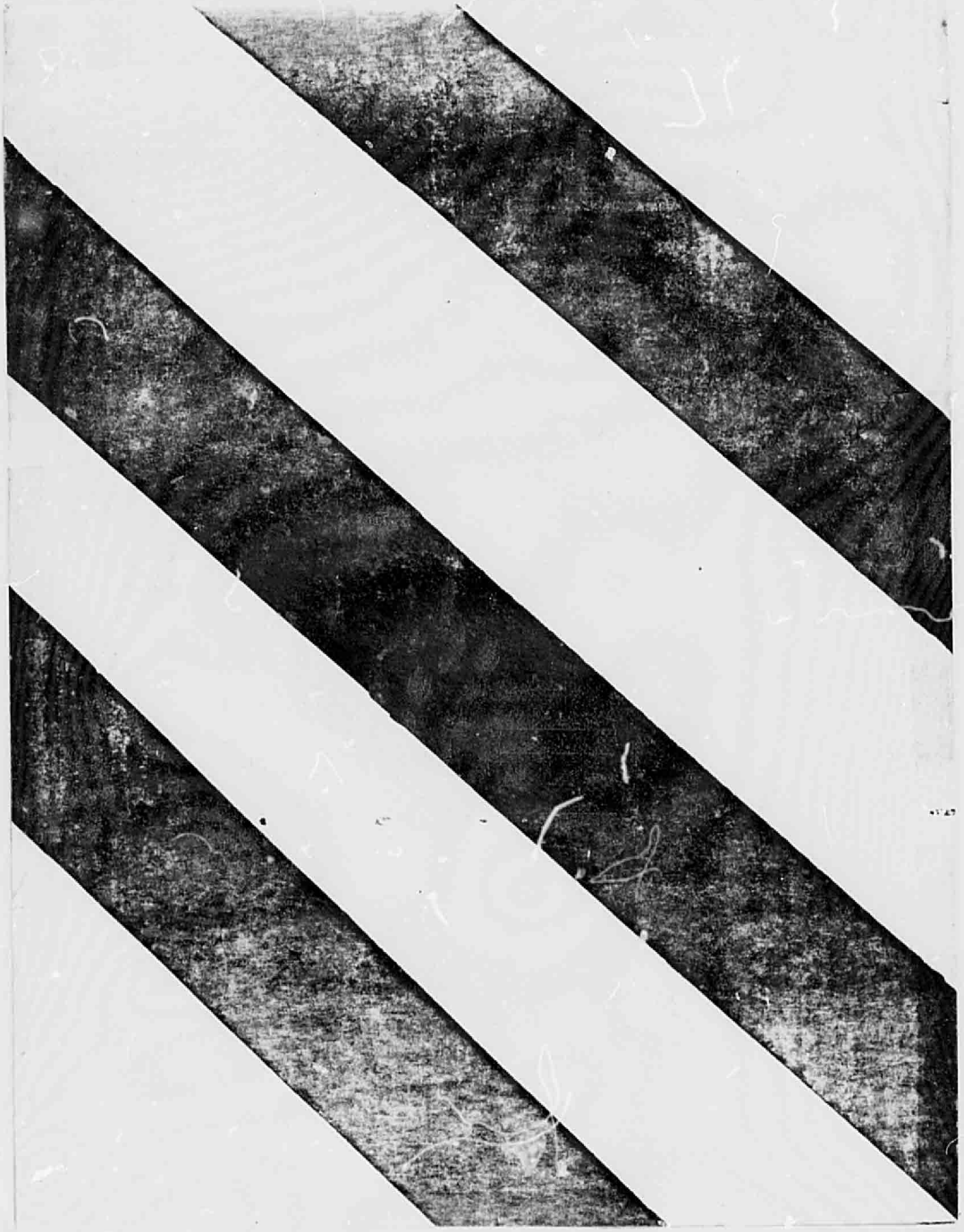
PLATE 2

SCUPPER OUTLET CONTROL



PLAN
NTS

PROVIDE HEAVY DUTY
GALVANIZED SCREEN AROUND
CIRCUMFERENCE OF CONTROL
TO CATCH TRASH. TAR SEAL
TO ROOF AT DISTANCE OF 3"
FROM BASE OF CONTROL



SECTION
NTS