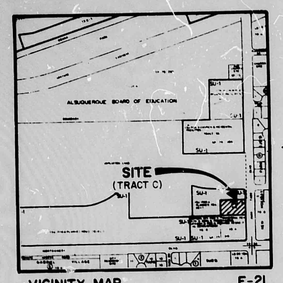
HYDROLOGY

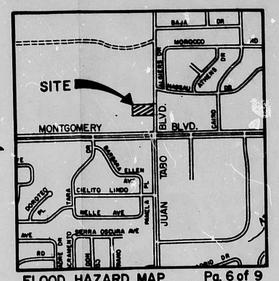
F21/D30

ONE PLAN



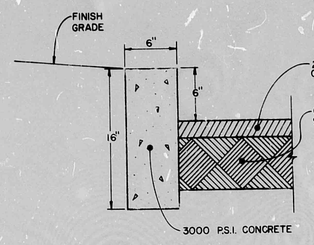
VICINITY MAP
1" = 800'

F-21



FLOOD HAZARD MAP
1" = 1000'

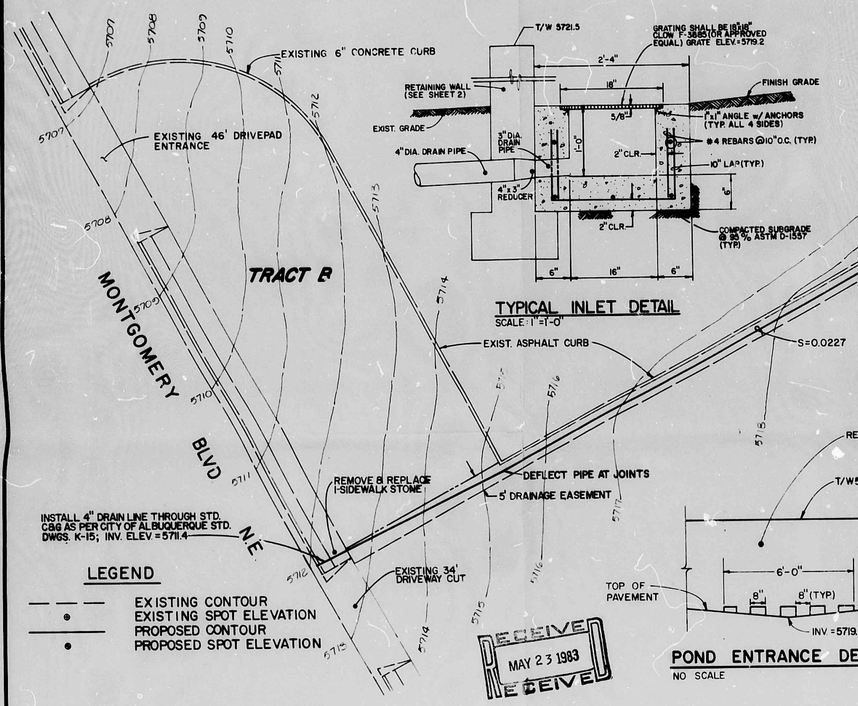
Pg. 6 of 9



CURB & PAVEMENT SECTION
SCALE: 1 1/2" = 1'-0"

△ PLACE 2"± CLEAN GRAVEL, 6" THICK, ON UNCOMPACTED SUBGRADE (DO NOT UNDERLAY GRAVEL, W/ PLASTIC SHEETING)

TYPICAL INLET DETAIL
SCALE: 1" = 1'-0"



LEGEND

- EXISTING CONTOUR
- EXISTING SPOT ELEVATION
- PROPOSED CONTOUR
- PROPOSED SPOT ELEVATION

RECEIVED
MAY 23 1983

DRAINAGE PLAN

The following items concerning the Tract C Office Complex drainage plan are contained hereon:

1. Vicinity Map
2. Flood Hazard Map
3. Grading Plan
4. Calculations

The proposed improvements, as shown by the Vicinity Map, are located at the northwest corner of the intersection of Juan Tabo Boulevard, NE. At present, the site is undeveloped. The land to the north and west of the site is undeveloped and slopes away from the site. The land to the south of the site is paved and also slopes away from the site. Juan Tabo Boulevard, NE lies along the east boundary of the site. It is believed that all flows within Juan Tabo Boulevard stay within the limits of paving improvements. From the information stated above, it has been determined that no off-site flows enter this site.

The site does not lie within a designated flood hazard zone as shown by the Flood Hazard Map. The finished floor elevation of the proposed office building has been determined to avoid flooding.

The Grading Plan shows 1) drainage Basins A, B and C, 2) that all runoff from Basin A is routed through a pond with positive discharge, 3) that all runoff from Basins B and C discharge directly off-site, 4) that Basin A_1 is a portion of Basin A, 5) existing contours at 1'-0" intervals, 6) proposed grades indicated by spot elevations and contours, 7) swales, and 8) continuity between proposed and existing elevations. Erosion will not result from the proposed improvements.

The site has been divided into Basins for quantitative analysis. The runoff from Basin A is routed through the pond located at the southwest corner of the site. This pond has been designed as a changing rate orifice retention basin for a 100-year frequency storm. Storm water will drain from the pond at a maximum rate equivalent to a 5-year storm calculated for the undeveloped condition. The pond averages 18 inches in depth and spills at elevation 21.0. The portion of the parking area utilized for ponding will flood to elevation 21.1 under maximum design conditions. This area is designed, however, to drain into the pond mentioned above. All runoff routed through this pond will drain into an inlet from which it will flow in a 4-inch PVC drain line to Montgomery Boulevard, N.E.

Basins B and C drain directly off-site. These two (2) Basins release a volume of runoff significantly less than the runoff generated in the undeveloped state.

CALCULATIONS

AREAS:

Area of Tract C = 45,720 sf
Area adjacent to R.O.W. = 20(165) = 3300 sf
Total area of site = 49,020 sf = 1.13 Acr

Impervious area = 32,900 sf
Pervious area = 16,120 sf

△2 Basin A_1 = 15,000 sf = 0.34 Ac
Basin A = 47,020 sf = 1.08 Ac
△2 Basin B = 810 sf = 0.02 Ac
Basin C = 390 sf = 0.01 Ac

Roof area = 136(80) = 10,880 sf = 0.25 Acr

ENTIRE SITE:

△2 $C = \frac{32900}{49020}(0.95) + \frac{16120}{49020}(0.40) = 0.77$

By Rational Formula, Q = CIA,

$Q_{Undeveloped,\ 100} = 0.40(5.4)(1.13) = 2.44$ cfs
$Q_{Developed,\ 100} = 0.77(5.4)(1.13) = 4.70$ cfs

$Q_{Allow} = Q_5 = 0.40(2.82)(1.13) = 1.27$ cfs

$Q_o = \frac{Q_5}{A(C)} = \frac{1.27}{1.13(0.77)} = 1.46$

$T = -25 + \sqrt{\frac{7087.5}{Q_o}} = 45$ min

$V_s = \frac{11340T}{T+25} - 400Q_oT = 4653$

$V_{req'd} = V_T = V_s(A)(C) = 4049$ cf

CALCULATIONS

Volume of ponding provided = 4114 cf as determined by the average end area method.

Elev.	Area (sf)	Vol. (cf)	Σ Vol. (cf)
19.2	0		
19.5	1250	187	187
20.0	1450	675	862
21.0	4400/3150	2925	2787
21.1	3400	327	4114

BASIN A_1 (a portion of Basin A):

△2 $C = \frac{3150}{15000}(0.95) + \frac{11850}{15000}(0.40) = 0.52$

△2 $Q_{Developed,\ 100} = 0.52(5.4)(0.34) = 0.95$ cfs

By weir approach ($Q = 3.33\ L\ H^{3/2}$),

$L = \frac{Q}{3.33} H^{-2/3} = 0.2'$

Where Q = 1 cfs and H = 0.5'.
Construct 12-inch curb opening.

BASIN A:

$Q_{Developed,\ 100} = 0.77(5.4)(1.08) = 4.49$ cfs

a. Pond entrance (submerged orifice)

$V_{entrance} = C_v\sqrt{2g\Delta h} = 2.08$ fps
Where $C_v = 0.82$
$g = 32.2$ ft/sec^2
$\Delta h = 21.1 - 21.0 = 0.1'$

$A_{entrance} = \frac{Q_{Basin}}{V_{entrance}} = 2.16$ sf

Using an 8-inch high entrance, the length of the opening must be 3.32 feet.

b. Pond exit (energy equation)

$5721 = 5711.4 + \frac{V^2}{2g}$; $V = 24.9$ fps

$V_{exit} = C_v V = 20.4$ fps

Where $C_v = 0.82$

$A = \frac{Q_{allow}}{V_{exit}} = \frac{1.27}{20.4} = 0.0623$ sf

$d = \sqrt{\frac{4}{\pi}A} = 0.28' = 3"$

c. Spillway (weir)

$L = \frac{Q_{100}}{3.33} H^{-2/3} = 0.85'$

Where Q = 4.49 cfs
H = 21.5 - 21.0 = 0.5'
Let the spillway width be 20'-0".

BASIN B:

△2 Q = 0.95(5.4)(0.02) = 0.10 cfs discharged directly offsite to the south.

BASIN C:

Q = 0.40(5.4)(0.01) = 0.02 cfs discharged directly offsite to Juan Tabo.

CANALES:

$Q_{Roof} = 0.95(5.4)(0.25) = 1.28$ cfs

For an 8" X 8" canale flowing approximately 4" full, the capacity = 0.43 cfs.

$Q = 3.33\ LH^{3/2} = 0.43$ cfs
Where L = 8" and H = 4"

$\frac{Q_{Roof}}{Q_{Canale}} = \frac{1.28}{0.43} = 3$ canales

For symmetrical appearance, use four (4) canales.

DRAINAGE CERTIFICATION

The plan contained hereon shows 1) design grades indicated by spot elevations and contours, 2) as-built spot elevations at key locations, and 3) as-built top-of-wall elevations.

The as-built conditions of the project are in substantial compliance with the approved drainage plan. This has been determined by field visits and survey information. The building finish floor elevation is approximately that which was designed. The survey information is the basis for the as-built spot elevations shown on this plan. Furthermore, the as-built conditions are compatible with the approved drainage plan. Based upon this information, a Certificate of Occupancy is hereby requested.

REGISTERED PROFESSIONAL ENGINEER — STATE OF NEW MEXICO — THOMAS F. MORAN — LAND SURVEYOR
5/19/83

PROJECT BENCHMARK:

A STANDARD NMSHC BRASS TABLET STAMPED, "JT-1A", SET IN THE TOP OF A CONCRETE POST FLUSH WITH THE GROUND AND LOCATED IN THE SOUTHERLY MEDIAN ON JUAN TABO BLVD. AND MONTGOMERY BLVD. (CITY OF ALBUQUERQUE BENCH MARK # JT-1A)
ELEVATION: 5721.25 FEET

△ NOTE: TEMPORARY BENCHMARK IS SAME AS PROJECT BENCHMARK.

Thomas F. Moran

Jenkins Martin Associates Inc.
811 DALLAS, N.E. · ALBUQUERQUE · NEW MEXICO · 87110
ENGINEERS

NO.	DATE	BY	REVISIONS
1	9-9-81	J.M.	LANDSCAPE POND, CLARIFY BM
2	9-29-81	J.M.	REMOVE 350 S.F. PAVING & REVISE CALCS ACCORDINGLY
3	5-18-83	J.G.M.	AS BUILT & CERTIFY

DESIGNED BY: J.M.
DRAWN BY: R.G.
APPROVED: T.M.

JOB NO. 1-010
DATE 8-81

TRACT C OFFICE COMPLEX - JUAN TABO BLVD. NE & MONTGOMERY BLVD. NE
GRADING & DRAINAGE PLAN

F21/D30(1)

FILE NO.
SHEET 1 OF 2