VICINITY MAP J-13

SCALE : 1" = 800'

N.I.C.

N 80°47' W
250.00'
244.85'
PROPOSED BUILDING
EXISTING BUILDING
20th STREET N.W.
MOUNTAIN ROAD N.W.
Δ=91°02'49"
R=15.55
L=24.71'
Δ=22°22'46"
R=612.96'
L=239.42'
PROPOSED LANDSCAPING
EXIST. RAILROAD TRACKS
END RAILROAD TRACKS
ACS BM 5-J13A
EXIST. TRAFFIC SIGN
EXIST. TRAFFIC LIGHT
PROPOSED CURB & GUTTER
PROPOSED ASPHALT
PROPOSED SIDEWALK
EXIST. WATER VALVE
EXIST. SIGN
EXIST. STORM MANHOLE
EXIST. STORM INLET
EXIST. STEPS
EXIST. CONCRETE
EXIST. ASPHALT
EXIST. TREE
PROPOSED CONCRETE
PROPOSED DRIVEWAY
PROPOSED DO DRIVEWAY
PROPOSED DO DRIVEWAY
PROPOSED DO

VICINITY MAP J-13

N.I.C.

SECTION A-A
SCALE: 1" = 2'-0"

SECTION B-B
SCALE: 1" = 1'-0"

SECTION C-C
SCALE: 1" = 1'-0"

DRAINAGE PLAN

The following items concerning the Recreational Equipment, Inc. Grading and Drainage Plan are contained herein:

1. Vicinity Map
2. Grading Plan
3. Calculations

As shown by the Vicinity Map, the site is located at the northwest corner of the intersection of Mountain Road N.W. and 20th Street N.W. At present, the site is mostly developed with partial paving. The proposed improvements consist of a building, paving and landscaping. As shown by Panel 28 of the Federal Emergency Management Agency Flood Boundary and Floodway Map, dated October 16, 1981, this site lies adjacent to and partially within a designated Flood Hazard Zone and thus contributes runoff into the Flood Hazard Area. Because of this, the controlled release of runoff is appropriate.

The Grading Plan shows 1) existing and proposed grades indicated by spot elevations and contours at 1'-0" intervals, 2) continuity between existing and proposed grades, and 3) the limit and character of the proposed improvements. At present, the site drains southeast to northwest and discharges runoff to 20th Street N.W. via an existing driveway and to an existing storm inlet to the south. A small amount of runoff drains south onto Mountain Road N.W. via an existing concrete driveway and continues west on Mountain Road N.W. to an existing storm inlet. Also, some runoff enters the adjacent property to the north as the existing north lot is slightly topographically lower than the project site. Because of this, no offsite flows enter the project site from the north. No offsite flows enter the site along the east property line because of an existing raised railroad bed along the east property. Offsite flows from the south and west appear to be contained in the adjacent roads--20th Street N.W. and Mountain Road N.W. with the exception of any overflow which may contribute to the existing floodzone.

As shown by this plan, the runoff generated from the proposed improvements will be directed within the parking area to the northern section of the site where a detention pond will be constructed. Two inlets will be constructed with a 4" drain line connecting them and discharging into the existing storm inlet on Mountain Road N.W. This will be accomplished at a controlled rate of 0.5 cfs. Pond volume is 7,500 cf which is greater than the required ~~7,100~~ 7,000 cf due to Hydrograph analysis. Ponded water level rises above the elevation of 55.25 feet the drainage on the northwest end of the pond will act as a spillway for the pond and discharge into 20th Street N.W. Presently, the site discharges freely onto the adjacent streets. By implementing this plan, the situation will be improved. In addition, the proposed pond is in "cut", therefore avoiding any displaced volume of the existing flood zone.

The Calculations which appear hereon analyze both the existing and developed conditions for the 100-year, 6-hour rainfall event. The Rational Method has been used to approximate the peak rate of discharge and the SCS Method has been used to approximate the volume of runoff. Both Methods have been used in accordance with the City of Albuquerque Development Process Manual, Volume II, and the Mayor's Emergency Rule adopted January 14, 1986. As shown by these calculations, the proposed improvements will result in a net decrease in peak runoff by a controlled rate of 0.5 cfs. The pond volume was determined using the Average End Over Area Method and discharge from the inlet was determined using the Venturi Meter Equation.

HYDROGRAPH

CALCULATIONS

Ground Cover Information

From SCS Bernalillo County Soil Survey, Plate J-13: De - Gila Clay Loam
Hydrologic Soil Group: B
Existing Pervious CN = 70 (DPM Plate 22.2 C-2
Pasture or Range Land: fair condition)
Developed Pervious CN = 61 (DPM Plate 22.2 C-2
Open Spaces: good condition)

Time of Concentration/Time to Peak

$T_C = 0.0078\ L^{0.77}/S^{0.385}$ (Kirpich Equation)

$T_P = T_C = 10$ min.

Point Rainfall

$P_6 = 2.21$ in. (DPM Plate 22.2 D-1)

National Method

Discharge: Q = CiA

where, C varies
$i = P_6\ (6.84)\ T_C^{-0.51} = 4.67$ in/hr
$P_6 = 2.21$ in (DPM Plate 22.2D-1)
$T_C = 10$ min (minimum)
A = area, acres

SCS Method

Volume: V = 3630(DRO) A

Where DRO = Direct runoff in inches
A = area, acres

Existing Condition

Atotal = 63,760 sf = 1.5 Ac
Roof area = 6,040 sf (0.25)
Paved area = 9,400 sf (0.15)
Undeveloped area = 38,320 sf (0.60)
C = 0.61 (Weighted average per Emergency Rule, 1/14/86)
Qtot = CiA = 0.61(4.67)(1.5) = 4.3 cfs
Aimp = 25,440 sf; % impervious = 40 %
Com site CN = 81 (DPM Plate 22.2 C-3)
DRO = 0.7 in (DPM Plate 22.2 C-4)
Vtot = 3630 (DRO)A = 4,190 cf

Developed Condition

Atotal = 63,760 sf = 1.5 Ac
Roof area = 11,120 sf (0.17)
Paved area = ~~47,500~~ sf (0.55)
Landscaped Area = ~~5,140~~ sf (0.08) ~~7,000~~ sf (0.12)
C = ~~0.80~~ (Weighted average per Emergency Rule, 1/14/86) 0.86
Qtot = CiA = ~~4.7~~ cfs ~~5.0~~ cfs
Aimp = ~~38,620~~ sf; % impervious = ~~61 %~~ 60.6% 60%
Composite CN = ~~86~~ (DPM Plate 22.2 C-3) 85
DRO = ~~4.76~~ in (DPM Plate 22.2 C-4) 4.65
Vtot = 3630 (DRO)A = ~~8,140~~ cf = ~~8440~~ cf

Inlet Discharge

$Q = CA\sqrt{2gh}$ (Orifice Equation)
$= 0.85(0.0873)\sqrt{2(32.2)(55.25-51.83)}$
$= 0.67$ cfs
$Q = 1.49\ AR^{2/3}S^{1/2}/n$ (Mannings Equation)
$= 1.49\ (0.0873)(0.0873)^{2/3}(0.0058)^{1/2} = 0.21$ cfs
0.039
$= 0.21 < 0.67$, Therefore Manning's Controls

Pond Calculations

Qinlet = ~~4.4~~ cfs = ~~5.0~~ cfs
Vinlet = ~~7,700~~ cf = ~~8440~~ cf
Release = 0.5 cfs
$T_1 = 1/2\sqrt{2gh}$
$V = (0.2)(10\ min)(60) = 4,440$ cf = 1800 cf
$V_1 = V_{inlet} - V_2 = 8440 - 1800 = 6640$ cf
$V_2 = 1/2\sqrt{2gh}T_1 = 1800$ cf
$V_R = \frac{Q_{inlet} + Q_{release}}{2} T_R = \frac{(4.4 + 0.5)}{2}(60) = 300$ cf
$V_{req} = 1/2\sqrt{2gh} - Q_R T_R + V_1 (2)$
$= 1/2\ 8440 - 0.5\ 1800 + 6640\ (2)$
$= 7000$ cf 7000 cf ok

Volume Rundown

Q = CiA (Weir Equation)
i = 2.21
A = Qcfs / C
$= 5.0/(2)(9.67)^{1/2} = 0.29$ cfs < Capacity

DELETED

Required

Atotal = 4.680 sf = 0.11
Pavement = 2,140 (0.23)
Roof area = 6,040 (0.25)
Landscaping = 5,140 (0.25)
C = 0.80
Qtot = CiA = 0.80(4.83)(1.5) = 5.8 cfs
Vtot = 7,700 cf required
Capacity < required

DELETED

Deduction

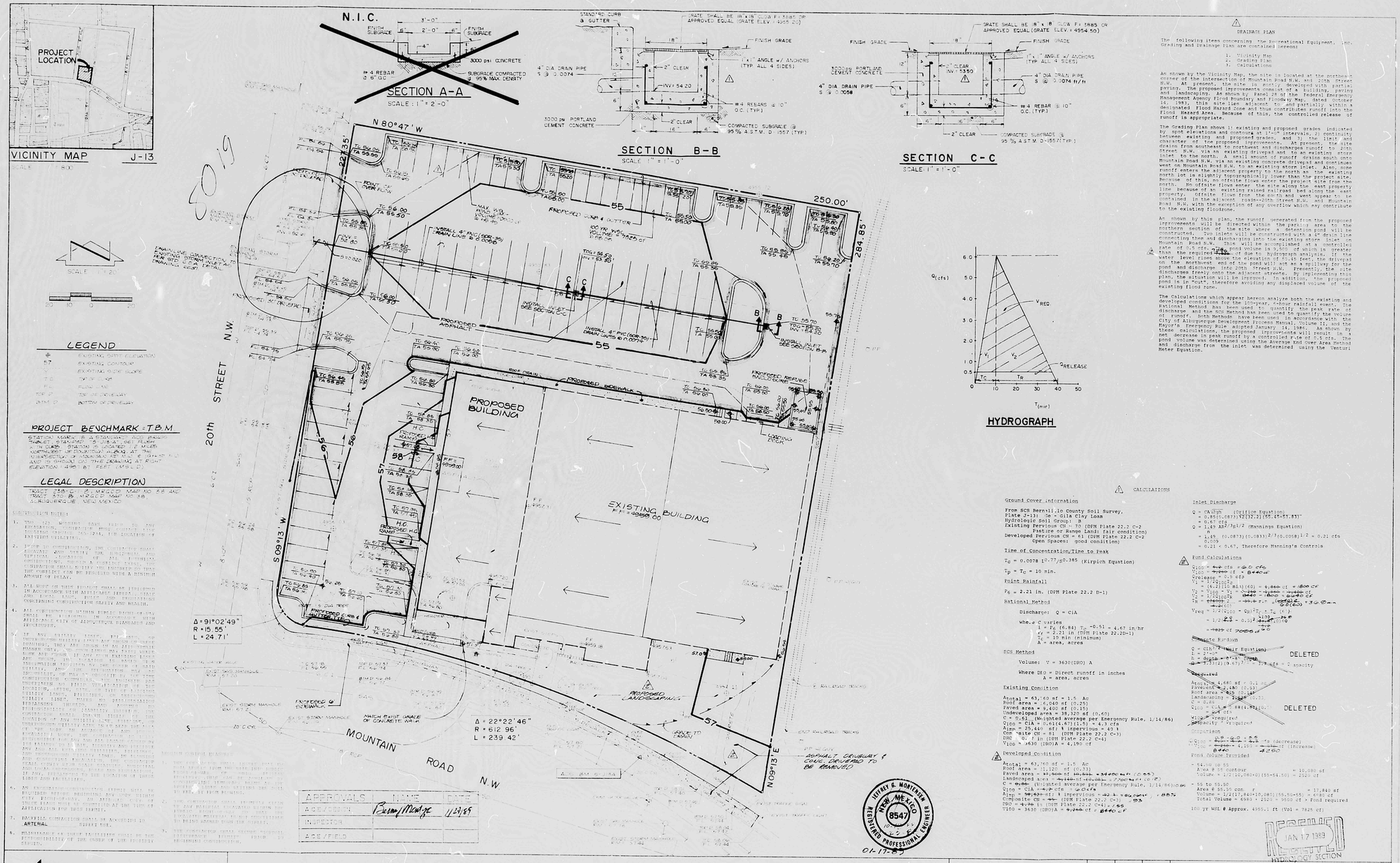
Qtot = ~~2.9~~ ~~0.0~~ ~~0.5~~ cfs (decrease)
Vtot = ~~7,700~~ ~~4,190~~ cf (decrease)
~~8440~~ 4250

Pond Volume Provided

- 54.00 to 55
Area @ 55 contour = 10,080 sf
Volume = 1/2 (10,080+0)(55-54.50) = 2520 cf

- 55 to 55.50
Area @ 55.50 con. f = 17,840 sf
Volume = 1/2(17,840+10,080)(55.50-55) = 6480 cf
Total Volume = 6980 + 2520 = 9500 cf > Pond required

100 yr WSL @ Approx. 4955.1 ft (Vol = 7825 cf)



APPROVALS	NAME	DATE
A.C.E./DESIGN	Berry/Montoya	1/23/89
IN SPECTOR		
A.C.E./FIELD		

JERRY G. MONTOYA
NEW MEXICO
8547
REGISTERED PROFESSIONAL ENGINEER
01-17-89

RECEIVED
JAN 17 1989
HYDROLOGY SECTION

THIS PLAN SHOT TWICE
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ONCE ON DARK.

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8810 JEFFERSON N.E. ALBUQUERQUE, NEW MEXICO
TELEPHONE 505-823-1000

GRADING AND DRAINAGE PLAN
RECREATIONAL EQUIPMENT, INC.

DESIGN BY	DRAWN BY	APPROVED BY		DATE	BY	REVISION	DATE	
G.C.J	S.G.H. & R.A.R.	J.G.M.	1	10/88	G.C.J.	RECALCULATE POND VOLUMES & ADJUST RIM'S FOR PAD. ADJUST INVERTS & TURN ON NOTE.	880851	
			2	1/89	G.C.J.	POND AREA IS LANDSCAPED — REVISE CALCS TO REFLECT CHANGES IN LANDSCAPING	9/88	
							1	1

J-13/D045

D 24 C 20 B 16 A 12

CITY OF ALBUQUERQUE

C D