HYDROLOGY F21/D23 NEW LIFE PRESBYTERIAN CHURCH ADD'N.

F21/D23

NEW LIFE
PRESBYTERIAN
CHURCH ADD'N.

1 PLAN

CITY OF ALBUQUERQUE DRAINAGE REPORT

ZONE ATLAS NO.	NAME OF CONSTRUCTION	OBSERVER	DATE OBSERVED
F-21	New Life Presbyterian	William R. Rogers	12-14-78

ADDRESS: 5504 Eubank NE.

Reason for Field Check: For the drainage report on this church.

FINDINGS AND CONCLUSION: There is three ponding areas all at the north west side of the the church bldg. a big pool of the land is not solved at this time so now they won't get much water (pond).

FOLLOW UP ACTION REQUIRED: No follow-up will be needed because this bldg. is finial

SKETCH:

William R. Rogers
OBSERVER

City of Albuquerque

January 23, 1984

Mr. Tyler Mason
P.O. Box 907
Cedar Crest, NM 87008

REF: NEW LIFE PRESBYTERIAN CHURCH ADDITION

Dear Mr. Tyler:

Based on the information that you have provided on your submittal of January 17, 1984, certain items listed below will have to be addressed on a revised plan before final approval is granted:

1. Show location and direction of downspouts.

2. Finish floor elevation to mean sea level on both existing and the proposed addition.

Also, advise your clients that if any further development is to take place, a drainage report will be required per the requirements in the Development Process Manual.

If you have any further qeustions, feel free to call me at 766-7644.

Sincerely,

Bernie J. Montoya

Bernie J. Montoya
Hydrologic Engineering Tech.
C.E.

BJM:mrk

MUNICIPAL DEVELOPMENT DEPARTMENT

Richard S. Heller, P.E., City Engineer
LaMonte J. Urban, P.L.S., Chief City Surveyor

ENGINEERING DIVISION

123 Central Avenue N.W.
Albuquerque, New Mexico 87102
Telephone (505) 766-5040

DRAINAGE CALCULATIONS
for
Parcel C, Tract K Academy Place
New Life Presbyterian Church
Eubank Ave. N.E.

I. Criteria & References

a. Albuquerque Metropolitan Arroyo Flood Control Authority Drainage Resolution 1972-2

1. 100 yr storm means 100 yr six (6) hour precipitation.

2. The analysis procedure to be used shall be any method which is in accord with generally accepted principals of hydrology. The "rational method" may be used for areas less than 5 square miles.

3. The storm water run-off from such lot, tract -------, in the alternative, will discharge from such lot, tract, or parcel at no greater rate of flow, velocity and quantity or different location than existed before such alteration.

b. Bruno Conegliano, verbal communication 28 February 1978: City of Albuquerque Public Works Department requires that 50% of 6 hour-100 year precipitation be retained on the property to be developed and 40% of the precipitation is assumed to be handled by existing drainage facilities and may be passed through.

c. References:

1. United States Bureau of Reclamation, Design of Small Dams, 1st edition.

2. Soil Survey of Bernalillo County and parts of Sandoval and Valencia Counties, New Mexico. Department of Agriculture and Department of Interior in cooperation with N. Mex. Agricultural Experiment Station.

3. Peak Rates of Discharge for Small Watersheds, Chapter 2 (Revised 10/73 for New Mexico) Engineering Field Manual for Conservation Practices, U.S. Department of Agriculture, Soil Conservation Service.

4. 100 yr 6-hour precipitation, Special Study Weather Service 1967.

II. Basic Information

a. Lot 2.4 acres, difference in elevation 27 ft., length 480 feet.

b. 6 hour-100 yr. precipitation 2.8 inches.

c. Soil complex as per reference I C(2) above is Embudo-Tijeras. From reference I C(3) this a group B soil with a CN of 79. This assumes ground cover the same as range land in poor condition with little vegetation. Commercial and impervious areas have CN values of 95.

d. The project will be developed in two phases.

	Phase I	Phase II addition
Building	4,670 sq.ft.	5,630
Porch	800	1,475
Walks	1,390	(gravel)
Parking Lot	22,120	11,120
	28,980 square ft.	18,225 square ft.

III. Calculations

a. Distribution of rain in accordance with Ref. I C (1) above Page 32.

Time hrs.	% of 6 hr. event	Increment %	Precipitation in period inch
0	0	0	0
1	64	64	1.79
2	76	12	0.34
3	83	7	0.19
4	89	6	0.17
5	95	6	0.17
6	100	5	0.14
			2.80

b. Rearrange precipitation for maximum run-off and compute run-off for natural state based on CN = 79. In accordance with references I C (1) and I C (3). Natural Condition CN = 79

Estimated Direct Runoff - Values in inches

Time hours	Increment rain	Accumulative rain	Runoff Accumulative	Runoff Increment	Incremental loss
0-1	.14	.14	0	0	0.14
1-2	.17	.31	0	0	0.17
2-3	.19	.50	0	0	0.19
3-4	1.79	2.29	0.69	0.69	1.10
4-5	.34	2.63	0.93	0.24	0.10
5-6	.17	2.80	1.05	0.12	0.05
			1.05		1.75

Volume = 2.4 x 43,560 x (1.05 ÷ 12) = 9,148 cubic ft.

check with rational equation Q = CIA

Use C = 0.4

Q = 0.4 x 2.8 x 2.4

Q = 2.688 inch-acres

= 2.688 ÷ 12 x 43,560

= 9,757 cubic ft.

c. Compute run-off for Phase I

Weighted CN

28,980 x 95 = 2753100

$\frac{75,564}{104,544}$ x 79 = $\frac{5969556}{8722656}$ ÷ 104,544 = 83.4 use CN = 84

Phase I Condition CN = 84

Estimated Direct Run-off - Values in inches

Time hours	Increment Rain	Accumulative Rain	Run-off Accumulative	Run-off Increment	Increment loss
0-2	.14	.14	0	0	.14
1-2	.17	.31	0	0	.17
2-3	.19	.50	.01	.01	.18
3-4	1.79	2.29	.96	.95	.84
4-5	.34	2.63	1.22	.26	.08
5-6	.17	2.80	1.36	.14	.03
			1.36		1.44

Volume = 2.4 x 43,560 x (1.44 ÷ 12) = 12,545 cubic ft.

Check using rational equation

weighted C value

28,980 x .9 = 26,082

$\frac{75,564}{104,544}$ x .4 = $\frac{30,226}{56,308}$ ÷ 104,544 = 0.538 use 0.5

Q = CIA

= 0.5 x 2.8 x 2.4

= 3.36 inch - acres

= 3.36 ÷ 12 x 43,560

Q = 12,197 cubic feet

Volume increase due to Phase I construction

12,545 - 9,148 = 3,397 cubic feet.

d. Compute run-off for Phase II

weighted CN

47,199 x 79 = 3728721

$\frac{57,345}{104,544}$ x 95 = $\frac{5447775}{9176496}$ ÷ 104,544 = 87.7 use CN = 88

Phase II Condition CN = 88

Estimated Direct Run-off - Values in inches

Time hours	Increment Rain	Accumulative Rain	Run-off Accumulative	Run-off Increment	Increment Loss
0-1	.14	.14	0	0	.14
1-2	.17	.31	0	0	.17
2-3	.19	.50	.03	.03	.16
3-4	1.79	2.29	1.20	1.17	.62
4-5	.34	2.63	1.49	.29	.05
5-6	.17	2.80	1.64	.15	.02
			1.64		1.16

Volume = 2.4 x 43,560 x (1.64 ÷ 12) = 14,288 cubic feet

Check using rational equation

weighted C value

47,199 x .4 = 18,880

$\frac{57,345}{104,544}$ x .9 = $\frac{51,610}{70,490}$ ÷ 104,544 = .67 use 0.7

Q = CIA

= 0.7 x 2.8 x 2.4

= 4.70 inch - acres

= 4.70 ÷ 12 x 43,560

= 17,061 cubic feet

Since the coefficients for the so called rational formula does not as nearly reflect actual conditions as does the SCS CN value. The quantities obtained by the SCS method are used.

Increased run-off
14,288 - 9,148 = 5,140 cubic feet

e. Direct precipitation

2.4 x 43,560 x 2.8 ÷ 12 = 24,394 cubic feet

40% direct prec. = .4 x 24,394 = 9,757 cubic feet

50% direct prec. = .5 x 24,394 = 12,197 cubic feet

IV. Conclusions:

a. Based on reference I(a)2 volume of storage required on site is:

Phase I construction 3,397 cubic feet

Phase II construction 5,140 cubic feet

Reference Ib

1. pass through 9,757 cubic feet

2. retention on site 12,197 cubic feet

b. The proposed four (4) retention ponds shown on the plot plan has a total capacity of 12,251 cubic feet.

c. These ponds should be adequate to meet the requirements as set forth in paragraph I(b) above.

State of New Mexico
County of Santa Fe

I, James L. Whiteman, being first duly sworn, upon my oath, state that I am the registered engineer and land surveyor that made the above drainage calculations consisting of 7 sheets for parcel C, tract K, Academy Place, City of Albuquerque, County of Bernalillo, New Mexico.

James L. Whiteman
Registered Professional Engineer
and Land Surveyor

License No. 2087

Subscribed and sworn to before me this 14th day of March, 1978.

Patricia M. McLaughlin
Notary Public

My Commission expires May 5, 1980.

DRAINAGE CALCULATIONS

Phase 1

Bldg.	4,667
Porch	797
Walk	1,392
Parking	22,119
	28,975

A

Elev.	Ft.^{2} Area	Ft.^{3}	Total Vol. (Ft.^{3})
91	319	0	0
92	838	579	579
93	1,564	1,201	1,780
94	2,277	1,921	3,701

B

Elev.	Ft.^{2} Area	Ft.^{3}	Total Vol. (Ft.^{3})
93	260	0	0
94	566	413	413
95	856	716	1,129

C

Elev.	Ft.^{2} Area	Ft.^{3}	Total Vol. (Ft.^{3})
98	342	0	0
99	838	590	590
100	1,534	1,186	1,776
101	2,567	2,051	3,827

D

Elev.	Ft.^{2} Area	Ft.^{3}	Total Vol. (Ft.^{3})
99	271	0	0
100	844	558	558
101	1,564	1,204	1,762
102	2,100	1,832	3,594

Future

Bldg.	5,375 + 252 = 5,627
Parking	11,122
Walkway	(gravel)
Porch	1,475
	18,224

A Alternate

Elev.	Ft.^{2} Area	Ft.^{3}	Total Vol. (Ft.^{3})
93	1,564	1,201	1,708
94	3,346	2,455	4,163
95	6,683	5,014	9,177

B Alternate

Elev.	Ft.^{2} Area	Ft.^{3}	Total Vol. (Ft.^{3})
94	566	413	413
95	1,676	1,121	1,534

	Vol.(c.f.)	Vol.(c.f.)
A	3,701	9,177
B	1,129	1,534
C	3,827	3,827
D	3,594	3,594
	12,251*	18,132*

*Parking lot area not consid

*Parking lot area considered

THIS MICROIMAGE IS THE BEST POSSIBLE REPRODUCTION DUE TO THE POOR QUALITY OF THE ORIGINAL DOCUMENT.

WATERSHED AREAS

AB Area

0.08
41.51
83.08
-.08

83.00 x 622.4 = 51,659 ÷ 2 = 25,830 s.f.

BA Area - Balance

2.4 x 43,560 = 104,544 - (38,178 + 25,830) = 40,536

Run-off to Ponds
Total run-off 24,394 x .9 = 21,955 ft^3
run-off ft. per $ft.^2$ = 21,955 ÷ 104,544 = .2100

C Area	D Area
0.05	0.07
40.05	21.57
79.86	42.94
-.05	-.07
79.81	42.87
42.87	

122.68 x 622.4 = 76,356 ÷ 2 = 38,178 s.f.

AB Area	BA Area	C Area
25,830	40,535	38,178
x .21	x .21	x .21
5,424	8,512	8,018
Retain:		
4,454	3,014	4,729
-3,827		

627 to A & B + inflow 4,729 = 5,356 - A & B (1,129 + 3700) = 526 s.f.*

*can be made up by using arch contours

2-5-0-2