PARKING STUDY
FOR
ADDITION TO
ST. JOHN'S METHODIST CHURCH

SCHLEGEL & LEWIS, ARCHITECTS

Engineering Associates, Inc.
August F. Mosimann P. E.
2819 Claremont Place N. E.
Albuquerque, New Mexico 87110

October 27, 1978

Design Concepts:

The following formulas are used throughout this study:

Rational Formula $Q = CIA$

and

Runoff Volume Formula $V = CPA$

Where

Q = Runoff Rate (CFS)

I = Intensity (IN/HR)

A = Area (Acres or ft^2)

V = Volume (Cu. Ft.)

C = Runoff Coefficient

P = Precipitation (in)

The precipitation amount for this area is 2.4 in. for the 100 year - 6 hour storm. (See Fig. I).

The assumed runoff coefficients (C) are as follows:

Area Type	C
Paved	1.0
Roof	.95
Landscaped	.60
Unimproved	.40

I. Existing Site Study:

There are no significant offsite flows affecting the site.

There are two existing buildings which run approximately from the center of the north boundary to the center of the south boundary. The buildings roughly split the site into an east half and a west half.

East Half of Existing Site:

The portions contributing to the east half runoff and the composite runoff coefficient "C" are as follows:

Portion	Area (S.F.)	C	CX AREA
1/2 of Roofs	12,325	.95	11,709
Parking	72,450	1.00	72,450
Grass	23,990	.4	9,596
Totals	108,765		93,755

Composite "C" = $\frac{93,755}{108,765}$ = .86

The land slope is less than one percent.
The length of the runoff is 300 ft.
The concentration time is 10 minutes (See Fig. 2).
The intensity is 189/10 + 25 = 5.40 in/hr (See Fig. 3).

The runoff flow is:

$$Q = CIA = .86 \cdot 5 \cdot 40 \cdot \frac{108,765}{43,560} = 12 \text{ CFS}$$

The runoff volume is:

$$V = CPA = .86 \cdot 2 \cdot 4 \cdot 108,765/12 = 18,708 \text{ Cu. Ft.}$$

NOT TRUE. Half of this runoff is discharged into Phoenix Avenue on the north, and half into the unpaved alley on the south.

West Half of Existing Site:

The portions contributing to the west half runoff and the composite runoff coefficient "C" are as follows:

Portion	Area (S.F.)	C	CX AREA
1/2 of Roofs	12,325	.95	11,709
Parking	28,900	1.00	28,900
Unimproved	39,875	.40	15,950
Totals	81,100		56,559

Composite "C" = $\frac{56,559}{81,100}$ = .70

The land slope is 2%.
The length of the runoff is 160 ft.
The concentration time is 10 minutes (See Fig. 4).
The intensity is 189/10 + 25 = 5.4 in/hr (See Fig. 3).

The runoff flow is:

$$A = CIA = .70 \cdot 5 \cdot 4 \cdot \frac{81,100}{43,560} = 7 \text{ CFS}$$

The runoff volume is:

$$V = CPA = .70 \cdot 2 \cdot 4 \cdot 81,100/12 = 11,354 \text{ Cu. Ft.}$$

This runoff exits the property along Arizona Street through curb cuts.

II Developed Site Study:

The development consists of adding a new classroom and administration building which will connect the two existing buildings, and landscaping a formerly unimproved lot.

The eastern half of the site will be virtually uneffected by the development. ✓

On the western half the administration portion of the new building will replace an existing paved area and the classroom portion will be placed on formerly unimproved land. The site will be graded so that the runoff from the classroom roof and the new landscaped area will be routed to a pond in the new landscaped area. The portions contributing to the pond and the related composite runoff coefficient "C" are as follows:

Portion	Area (S.F.)	C	CX AREA
New Roof (Covers existing)	14,488	.95	13,763
New Landscaped	30,175	.40 → 100	12,070 3 ponding ∴ all contributing.
Totals	44,663		25,833

$$\text{Composite "C"} = \frac{25,833}{44,663} = .58 \cdot$$

The runoff volume is: .95 8486

$$V = CPA = .58 \cdot \frac{2.4}{12} \cdot 44,663 = 5,167 \text{ Cu. Ft.}$$

The pond size is 167 ft. long x 58 ft. wide x 4 in. deep, which gives a volume of 3,228 cu. ft.

The pond overflow which enters Arizona Street is 5,167 - 3,228 = 1,939 Cu. Ft.

The runoff from the western half not routed through the pond is calculated below:

	Area (S.F.)	C	CX AREA
Administration Roof	2,500	.95	2,375
Paved Area	28,900	1.00	28,900
1/2 of Existing Roof	7,538	.95	7,161
Totals	38,938		38,436

Composite "C" = $\frac{38,436}{38,938}$ = .99

The runoff volume is:

$$V = CPA = .99 \cdot \frac{2.4}{12} \cdot 38,938 = 7,687 \text{ Cu. Ft.}$$

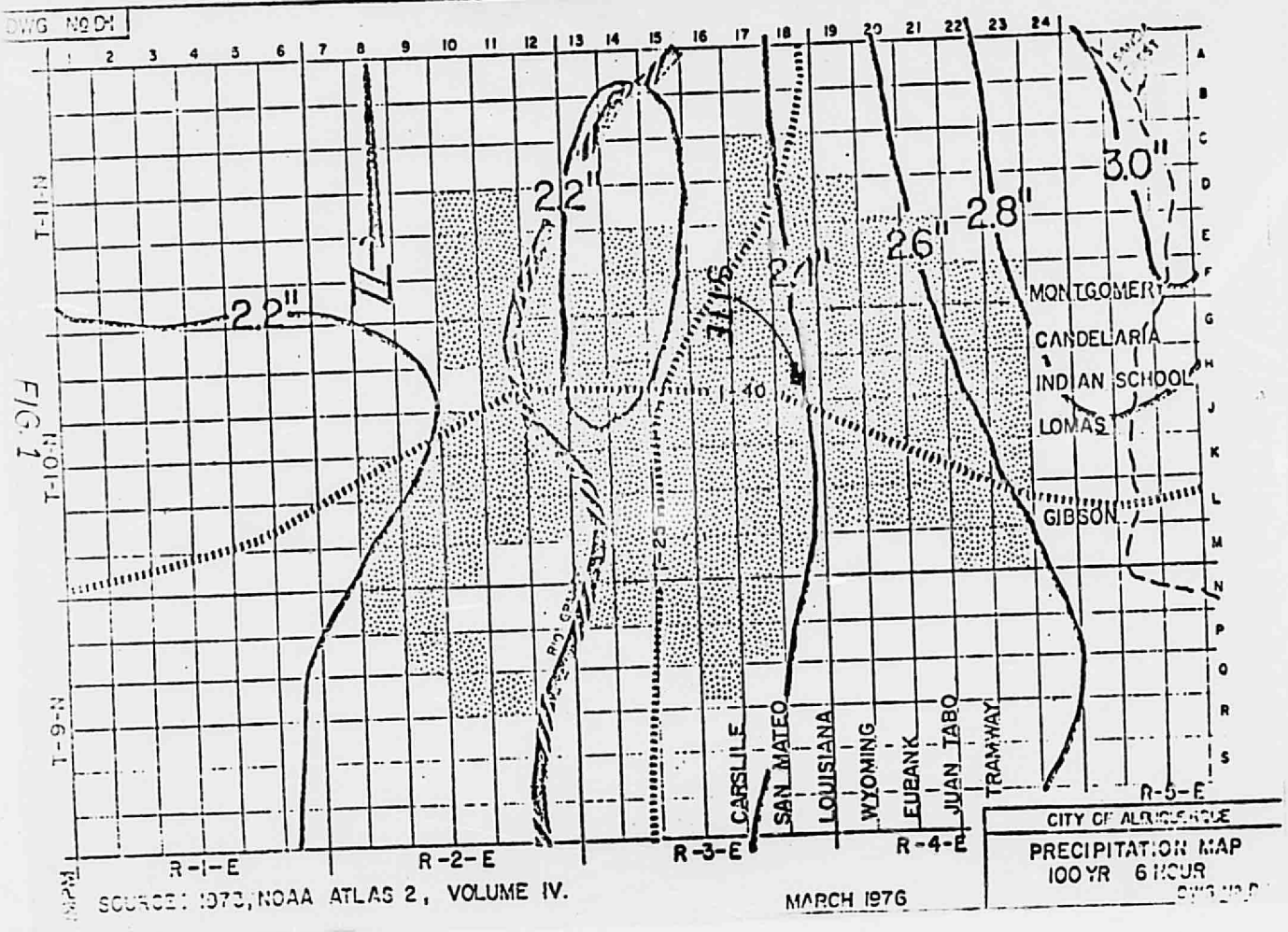
The total volume of water leaving the developed western half is 1,939 Cu. Ft.
plus 7,687 " "
9,626 Cu. Ft.

This water exits through curb cuts along Arizona Street N. E.

Conclusions:

The volume of water leaving the eastern half of the site is 18,709 Cu. Ft. for both existing and developed states. The flow rate for the eastern half is 12 C.F.S.

The volume of water leaving the western half is 11,354 Cu. Ft. for the existing state and 9,626 Cu. Ft. for the developed state. The runoff rate is roughly 7 C.F.S. for both states.



DRAINAGE — RUNOFF — I

FIG. A. – ONE-HOUR RAINFALL, IN INCHES, TO BE EXPECTED ONCE IN 2 YEARS.

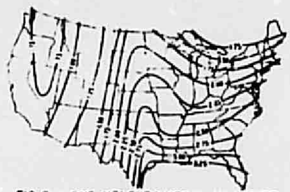


FIG. B. – ONE-HOUR RAINFALL, IN INCHES, TO BE EXPECTED ONCE IN 10 YEARS.

FIG. C. – ONE-HOUR RAINFALL, IN INCHES, TO BE EXPECTED ONCE IN 50 YEARS.

FIG. D. – ONE-HOUR RAINFALL, IN INCHES, TO BE EXPECTED ONCE IN 5 YEARS.

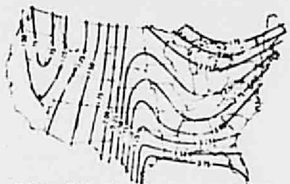


FIG. E. – ONE-HOUR RAINFALL, IN INCHES, TO BE EXPECTED ONCE IN 25 YEARS.

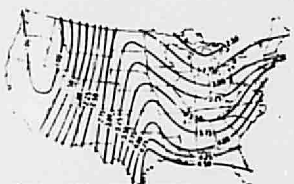


FIG. F. – ONE-HOUR RAINFALL, IN INCHES, TO BE EXPECTED ONCE IN 100 YEARS.

COMPUTATION OF i IN RATIONAL FORMULA.

EXAMPLE: Assume expectancy period = 5 years, see Fig. D, assume locality, find 1 hour intensity = 1.75 in. per hour.

FIG. G-INTENSITY EXPECTATION FOR ONE-HOUR RAINFALL.*

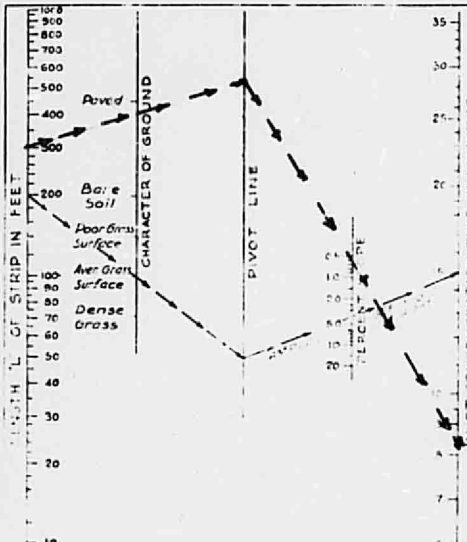


FIG. H-OVERLAND FLOW TIME.. Tc min = 10 min

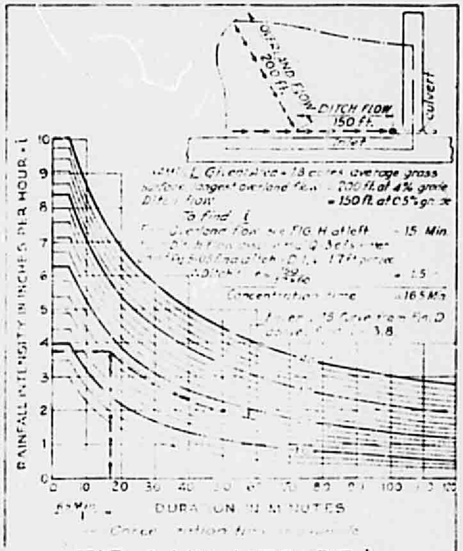
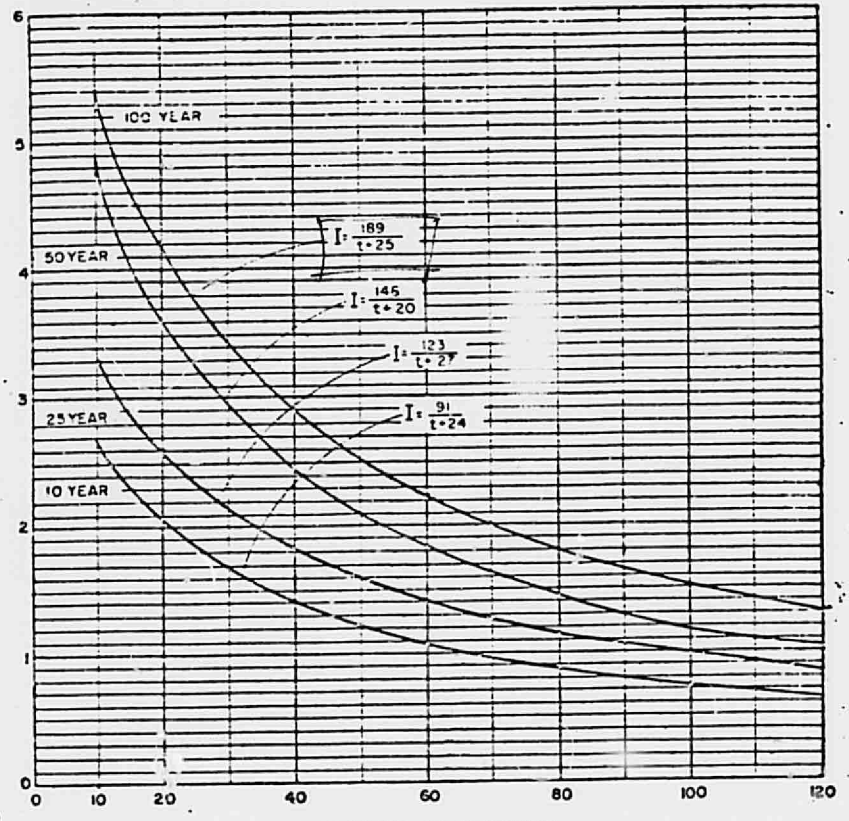


FIG. J VALUES OF i
RAINFALL INTENSITY-DURATION.

*Reproduced from [illegible] Publication No. 204, U.S. Dept. of Agriculture [illegible]
[illegible] from Engineering [illegible] Department [illegible]*

FIG. 2



MASTER PLAN OF DRAINAGE CITY OF ALBUQUERQUE - NEW MEXICO AND ENVIRONS	
INTENSITY DURATION FREQUENCY CURVES (ALBUQUERQUE AREA-1951)	
GORDON HERKENHOFF & ASSOC CONSULTING ENGINEERS ALBUQUERQUE, NEW MEXICO	CHART 1

FIG. 3

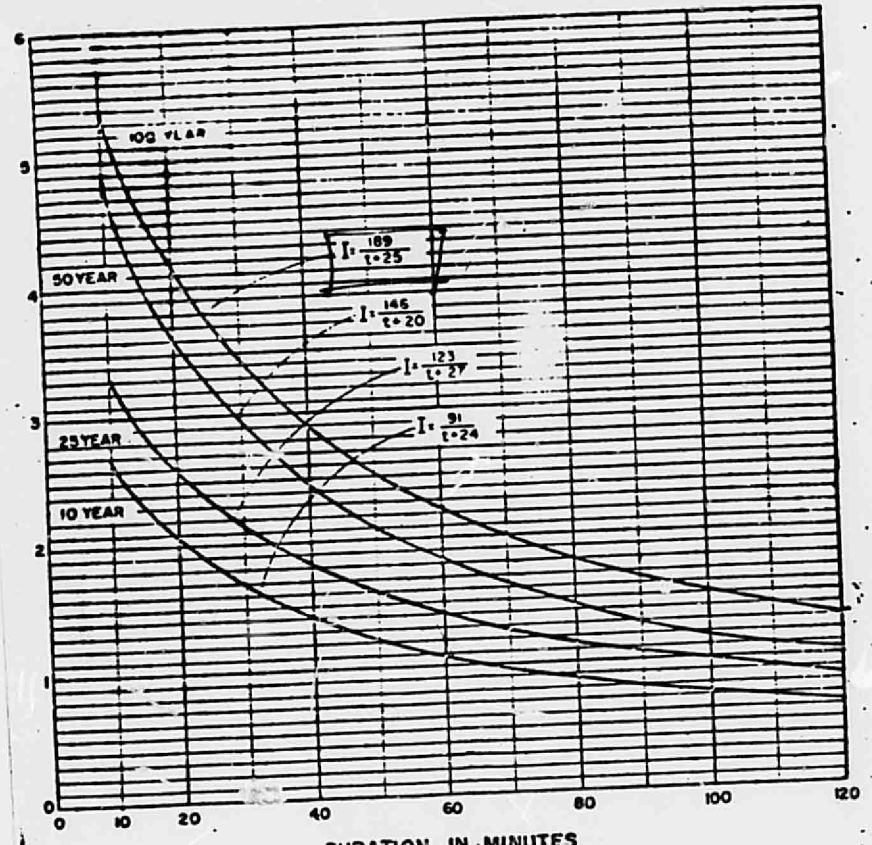


FIG. 3

MASTER PLAN OF DRAINAGE
CITY OF ALBUQUERQUE - NEW MEXICO
AND ENVIRONS

INTENSITY DURATION
FREQUENCY CURVES

(ALBUQUERQUE AREA - 1961)

GORDON KERKEN-HOFF & ASSOC
CONSULTING ENGINEERS

CHART 1

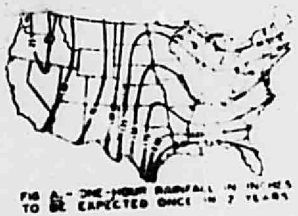


FIG A. - ONE-HOUR RAINFALL, IN INCHES, TO BE EXPECTED ONCE IN 2 YEARS.

FIG B. - ONE-HOUR RAINFALL, IN INCHES, TO BE EXPECTED ONCE IN 10 YEARS.

FIG C. - ONE-HOUR RAINFALL, IN INCHES, TO BE EXPECTED ONCE IN 50 YEARS.

FIG D. - ONE-HOUR RAINFALL, IN INCHES, TO BE EXPECTED ONCE IN 5 YEARS.

FIG E. - ONE-HOUR RAINFALL, IN INCHES, TO BE EXPECTED ONCE IN 25 YEARS.

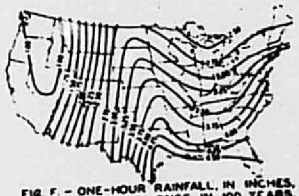


FIG F. - ONE-HOUR RAINFALL, IN INCHES, TO BE EXPECTED ONCE IN 100 YEARS.

COMPUTATION OF i IN RATIONAL FORMULA.

EXAMPLE: Assume expectancy period = 5 years, See fig. D assume locality. find 1 hour intensity = 1.75 in. per hour.

FIG. G - INTENSITY EXPECTATION FOR ONE-HOUR RAINFALL.

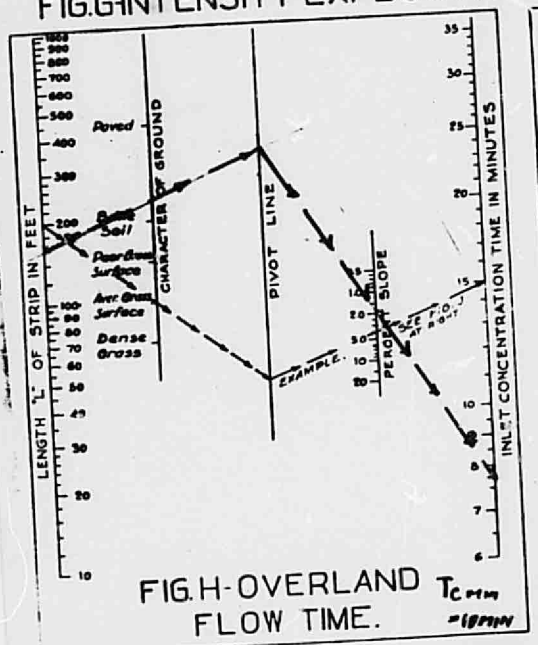
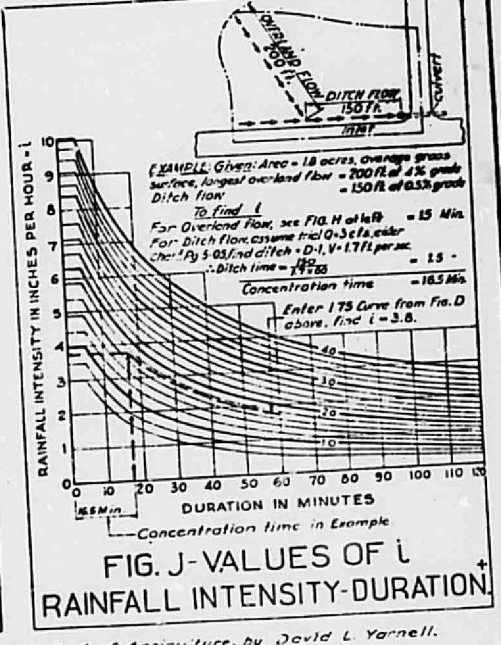


FIG. H - OVERLAND FLOW TIME. T_c = 19 MIN



EXAMPLE: Given: Area = 18 acres, average grass surface, longest overland flow = 200 ft. at 4% grade = 150 ft. at 0.5% grade Ditch flow

To find t

For Overland Flow, see FIG. H at left = 15 Min.

For Ditch flow, assume trial Q = 3 cfs, cedar check Fig 5-05 find ditch = D-1, V = 1.7 Ft. per sec.

$\therefore$ Ditch time = $\frac{150}{1.7 \times 60}$ = 1.5

Concentration time = 16.5 Min.

Enter 1.75 Curve from Fig. D above, find i = 3.8.

FIG. J - VALUES OF i RAINFALL INTENSITY-DURATION.

*Reproduced from Miscellaneous Publication No. 204, U.S. Dept. of Agriculture, by David L. Yarnell.

*Accepted from Engineering Manual of the War Department, Part XIII, Chap 1, Dec 45

FIG. 4

WILSON & COMPANY
ENGINEERS & ARCHITECTS

505 262-2116

Office Location... 1321 SAN PEDRO N.E. • ALBUQUERQUE, NEW MEXICO 87110

ENGINEERS
ARCHITECTS
PLANNERS

An Equal Opportunity Employer

Mailing Address... P.O. BOX 3305 • ALBUQUERQUE, NEW MEXICO 87190

H18-010

August 5, 1982

Mr. Andre Houle
Engineering Division - Hydrology
City of Albuquerque
P. O. Box 1293
Albuquerque, NM 87103

Re: St. John's United Methodist Church
2626 Arizone St., N.E.

Dear Mr. Houle:

Thank you for the prompt reply to our request to fill the detention pond. The enclosed grading plan shows a dike to be added at the northwest corner of the property. This should force excess run-off to flow out the drive and then south to Menaul as requested by you.

With this change we are assuming we have the City's permission to proceed with the filling of the detention pond.

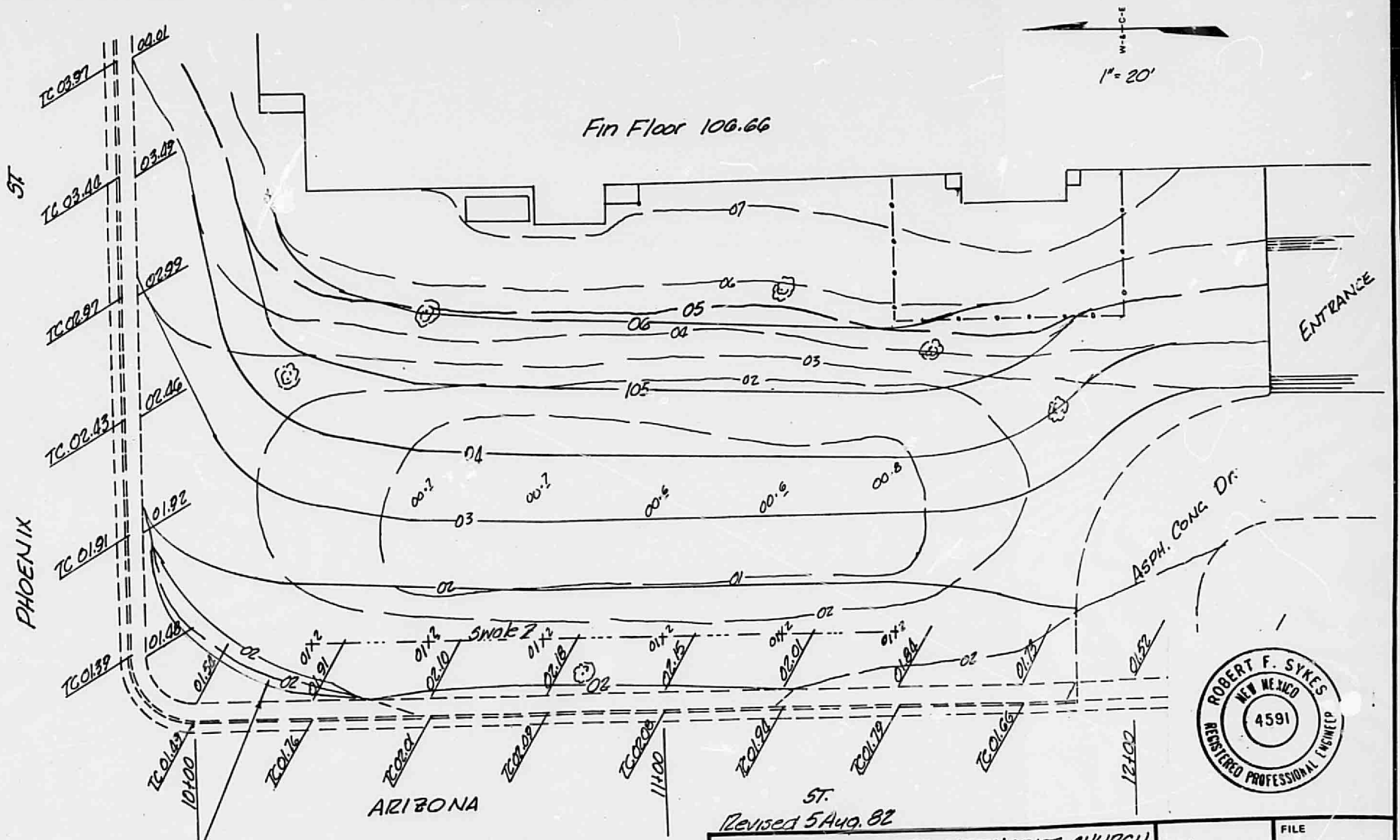
Very truly yours,
WILSON & COMPANY

Robert F. Sykes, P.E.

xc: Roy Sooter

Enclosure

-sap



Revised 5 Aug. 82

ST. JOHN'S UNITED METHODIST CHURCH

LOCATION Albuquerque PROJECT Drainage

COMP. _____ CHK. _____ APP. _____

WILSON & COMPANY ENGINEERS ARCHITECTS

FILE

DATE July 82

SHEET 1/1

WILSON & COMPANY
ENGINEERS & ARCHITECTS

505 262-2116

Office Location... 1921 SAN PEDRO N.E. ■ ALBUQUERQUE, NEW MEXICO 87110

Mailing Address... P.O. BOX 3305 ■ ALBUQUERQUE, NEW MEXICO 87190

ENGINEERS
ARCHITECTS
PLANNERS

An Equal Opportunity Employer ■

July 23, 1982

Mr. Charles M. Easterling
Engineering Division
City of Albuquerque
P. O. Box 1293
Albuquerque, NM 87103

RECEIVED
JUL 26 1982
CITY ENGINEER

Re: Drainage Retention Pond
St. John's United Methodist Church
2626 Arizona Street N.E.

Dear Mr. Easterling:

St. John's United Methodist Church is requesting permission from the City to fill a detention pond on their property at the southeast corner of Phoenix and Arizona St. The church plans to install an irrigation system and plant the area to grass if they are permitted to fill the pond.

The following is a summary of the vital information about the pond:

DA = 39,000 sq.ft. (0.90 Ac.)
8,100 sq. ft. roof
30,900 sq. ft. base ground
Volume Pond = 11,600 cu. ft.
Max. Vol. Reqd. 100 yr. 6 hr. rainfall of 2.4 in. = 7,800 cu. ft.
By Rational Method Max Q_{100} = 3.18 c.f.s.
C = .67 t_c = 10 minute i_{100} = 5.28

The above numbers are very conservative.

It is proposed to grade the site so there would be a pond about 9 inches, about 10 feet behind the sidewalk. The volume of this small pond is 2,750 cu. feet.

Please give me a call if you have any questions or need additional information.

Very truly yours,
WILSON & COMPANY

Robert F. Sykes, P.E.

xc: Roy Sooter
2842 San Pedro N.E. 87110