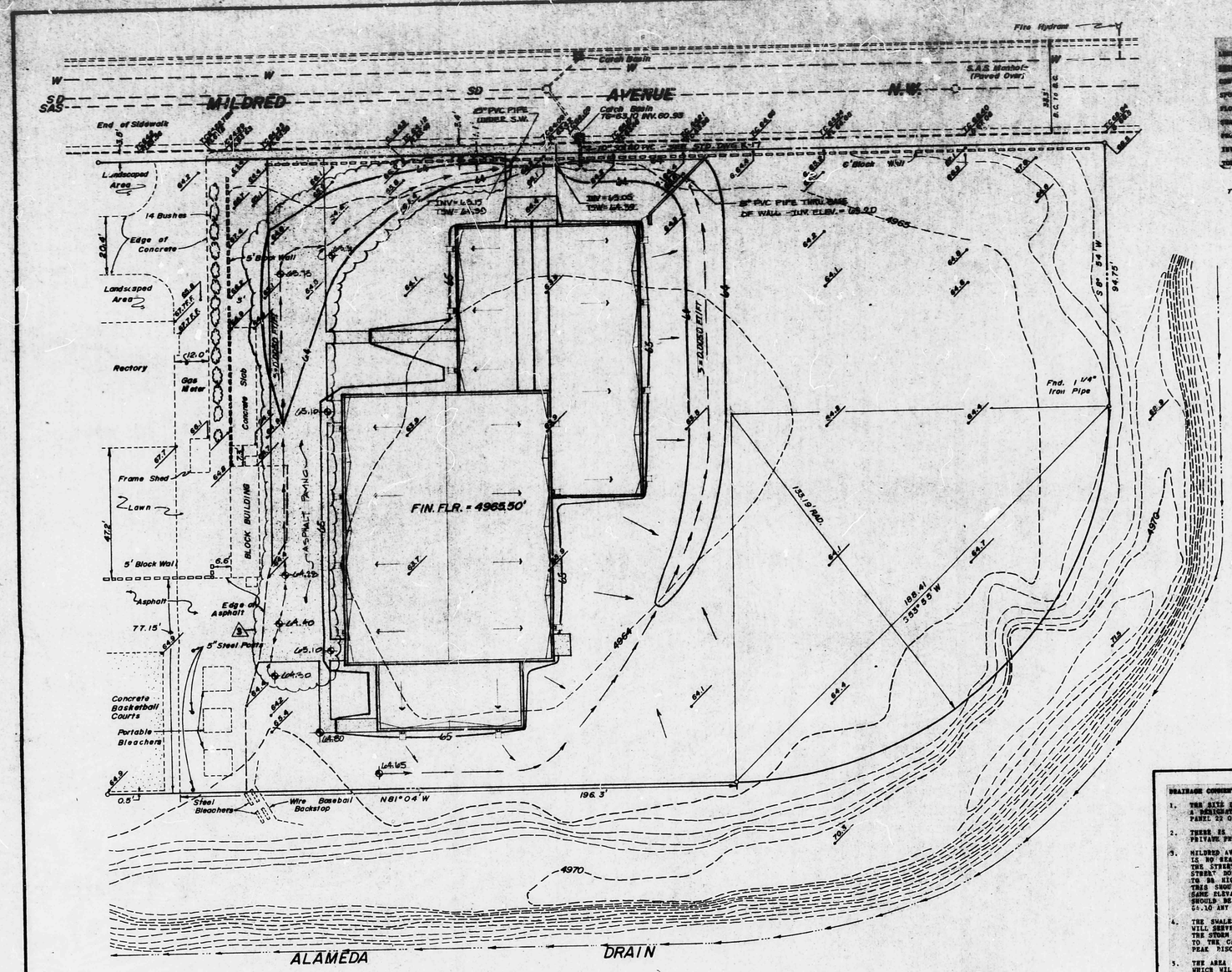
HYDROLOGY

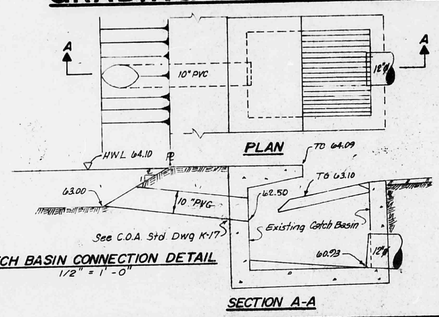
G14/D26
2 PLANS

G14/D26

2 Plans



GRADING AND DRAINAGE PLAN



CATCH BASIN CONNECTION DETAIL
1/2" = 1'-0"

CONSTRUCTION NOTES:

1. TWO (2) WORKING DAYS PRIOR TO ANY EXCAVATION, CONTRACTOR MUST CONTACT LINE LOCATING SERVICE AT 765-1234 FOR LOCATION OF EXISTING UTILITIES.
2. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL EXCAVATE AND VERIFY THE HORIZONTAL AND VERTICAL LOCATION OF ALL POTENTIAL OBSTRUCTIONS; SHOULD A CONFLICT EXIST, THE CONTRACTOR SHALL NOTIFY THE ENGINEER SO THAT THE CONFLICT CAN BE RESOLVED WITH A MINIMUM AMOUNT OF DELAY.
3. ALL WORK ON THIS PROJECT SHALL BE PERFORMED IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE, AND LOCAL LAWS, RULES, AND REGULATIONS CONCERNING CONSTRUCTION SAFETY AND HEALTH.
4. ALL CONSTRUCTION WITHIN CITY RIGHT-OF-WAY SHALL BE PERFORMED IN ACCORDANCE WITH APPLICABLE CITY OF ALBUQUERQUE STANDARDS AND PROCEDURES.

BENCH MARK:

THE STATION IS A STANDARD N.G.S. BRASS TABLET STAMPED "11-014", 1979" LOCATED AT THE SW INTERSECTION OF SECOND STREET N.W. AND CANDELARIA ROAD. N.W. ELEVATION = 4988.03 FEET.

LEGAL DESCRIPTION:

COMPRISING PORTIONS OF PROPERTY DESIGNATED AS TRACTS 81-B, 84, 91-A, AND 97-A ON M.R.G.C.D. PROPERTY MAP NO. 33, LOT 3 OF THE BISHOP ADDITION AND LOT 9 OF THE PAPPE ADDITION.

0 25' 50'
SCALE 1" = 20'

NUMBER		
DESCRIPTION		
CONTOUR		
SPOT ELEVATION		
FLOW DIRECTION		
WALL		
DRIVEWAY, CURB		
INVERT		
TOP OF STRUCTURE		

TBM - TOP OF CURB AT EAST CURB RETURN OF RECTORY DRIVE. ELEV. 4964.22

VICINITY MAP

DRAINAGE CALCULATIONS

I. REFERENCES:

A. CITY OF ALBUQUERQUE DEVELOPMENT PROCESS MANUAL (DPM) VOLUME 2, DESIGN CRITERIA, CHAPTER 22, DRAINAGE, FLOOD CONTROL AND EROSION CONTROL.

B. FLOODWAY MAP, PANEL 22 OF 50, FEDERAL EMERGENCY MANAGEMENT AGENCY, OCTOBER 14, 1983.

II. ON-SITE RUNOFF CHARACTERISTICS:

A. UNDEVELOPED RUNOFF COEFFICIENTS:

TYPE OF SURFACE	AREA	"C" VALUE	AREA("C")
STREETS, DRIVES, WALKS			
ROOFS			
LAWNS & LANDSCAPING			
UNDEVELOPED	28,956	0.40	
TOTAL AREA	28,956 = 0.66 Acre		

WEIGHTED "C" VALUE = 0.40

B. DEVELOPED RUNOFF COEFFICIENTS:

TYPE OF SURFACE	AREA	"C" VALUE	AREA("C")
STREETS, DRIVES, WALKS	2,346	0.95	2,229
ROOFS	13,724	0.90	12,352
LAWNS & LANDSCAPING	4,584	0.25	1,127
UNDEVELOPED	8,390	0.40	3,356
TOTAL AREA	28,956		19,054

WEIGHTED "C" VALUE = 19,054/28,956 = 0.65

C. RAINFALL, 100-YR.,6-HR.:(REF. A., PLATE 22.2 D-1) P_6 = 2.2 INCHES

D. TIME OF CONCENTRATION:USE 10 MINUTES, MINIMUM Tc.

E. RAINFALL INTENSITY,I: (REF. A., PLATE 22.2 D-1) CURVE VALUE = 2.15
$I = P_6 \times$ CURVE VALUE = 2.2 X 2.15 = 4.73

III. ON-SITE PEAK DISCHARGE:

A. EXISTING CONDITIONS:
Q_{100} = 0.40 X 4.73 X 0.66 = 1.25 cfs
Q_{10} = 0.657 X 1.25 = 0.82 cfs

B. DEVELOPED CONDITIONS:
Q_{100} = 0.65 X 4.73 X 0.66 = 2.02 cfs
Q_{10} = 0.657 X 2.02 = 1.32 cfs

IV. ON-SITE VOLUME:

A. EXISTING CONDITIONS:
V_{100} = 0.40 (2.2/12)28,956 = 2,123 CF
V_{10} = 0.657 X 2,123 = 1,395 CF

B. DEVELOPED CONDITIONS:
V_{100} = 0.65 (2.2/12)28,956 = 3,451 CF
V_{10} = 0.657 X 3,451 = 2,267 CF

V. PIPE CAPACITY:

A. PIPE UNDER WEST SIDEWALK.
THIS PIPE DRAINS ONE-HALF OF THE WEST SECTION OF THE BUILDING. AREA = 0.0824 Acre
Q = 0.9 X 4.73 X 0.0824 = 0.35 CFS
USE ORIFICE EQUATION TO DETERMINE CAPACITY OF 6" PIPE.

$Q = CA(2GH)^{1/2}$ SPRING LINE ELEV. = 63.80 HWL = 64.10
H = 0.30 A = 0.1963 C = 0.6
$Q = 0.6 \times 0.1963 (2 \times 32.2 \times 0.3)^{1/2} = 0.52$ CFS
0.52 CFS > 0.35 CFS ONE 6" PIPE IS ADEQUATE.

B. PIPE UNDER MAIN SIDEWALK.
THIS PIPE DRAINS ONE-HALF OF THE TWO MAIN BUILDING SECTIONS. 0.0824 + 0.0386 = 0.1210 ACRES
Q = 0.90 X 4.73 X 0.1210 = 0.52 CFS
TRY 8" PIPE - SPRING LINE ELEV. = 63.48 HWL = 64.10
H = 64.10 - 63.48 = 0.62 A = 0.35 SF
$Q = 0.6 \times 0.35 (2 \times 32.2 \times 0.62)^{1/2} = 1.33$ CFS
1.33 > 0.52 THEREFORE, ONE 8" PVC PIPE IS ADEQUATE.

C. PIPE CONNECTION TO CATCH BASIN. USE 10" PVC A = 0.54 SF SPRING LINE ELEV. = 63.42 HWL = 64.10
H = 0.68
$Q = 0.6 \times 0.54 (2 \times 32.2 \times 0.68)^{1/2} = 2.14$ CFS
2.14 CFS > 2.02 CFS THEREFORE, ONE 10" PIPE IS ADEQUATE.

DRAINAGE COMMENTS:

1. THE SITE DOES NOT LIE WITHIN, LIE ADJACENT TO, OR CONTAIN A DESIGNATED FLOOD HAZARD AREA AS SHOWN ON FLOODWAY MAP, PANEL 22 OF 50.
2. THERE IS NO OFFSITE FLOW FROM OR TO ADJACENT PUBLIC OR PRIVATE PROPERTY.
3. MILDRED AVE. IS NOT SHOWN AS A FLOOD HAZARD AREA AND THERE IS NO REASON TO BELIEVE THAT ANY PONDING WILL OCCUR IN THE STREET. IN THE UNLIKELY EVENT THAT PONDING IN THE STREET DOES OCCUR, IT WOULD CERTAINLY NOT BE EXPECTED TO BE HIGHER THAN CURB-TOP LEVEL, ELEVATION 64.10. IF THIS SHOULD HAPPEN, PONDING ON-SITE WOULD OCCUR TO THE SAME ELEVATION. THE SWALES ON BOTH SIDES OF THE BUILDING SHOULD BE GRADED SO THAT THERE IS NO POINT LOWER THAN 64.10 ANY CLOSER THAN 15 FEET FROM THE BUILDING.
4. THE SWALES SHOWN ARE NOT ACTUALLY DESIGNED AS PONDS BUT WILL SERVE THE PURPOSE OF PONDS IN THE UNLIKELY EVENT THAT THE STORM SEWER DOES NOT CARRY THE FLOW. ALL PIPES LEADING TO THE CATCH BASIN ARE ADEQUATELY SIZED TO HANDLE THE PEAK DISCHARGE ASSUMING THERE IS NOT DOWNSTREAM HEAD.
5. THE AREA EAST OF THE PROPOSED BUILDING IS A PLAYING FIELD WHICH WILL BE GRADED FLAT. IT IS ASSUMED THAT WHATEVER PRECIPITATION FALLS ON THIS AREA WILL REMAIN THERE AND INFILTRATE. THIS AREA IS NOT INCLUDED IN THE RUNOFF CALCULATIONS FOR THE SITE. THE ONLY AREA INCLUDED IN RUNOFF CALCULATIONS LIES BETWEEN THE PLAYING FIELD AND THE EXISTING DEVELOPMENT. I.E., ONLY THAT AREA WHICH IS TO BE BUILT UPON, INCLUDING DRAINAGE SWALES.
6. THE SMALL AREA AT THE SOUTHWEST CORNER OF THE BUILDING IS ALSO CONSIDERED TO HOLD WHATEVER PRECIPITATION FALLS ON IT SINCE THERE ARE NO ROOF DRAINS DISCHARGING TO THIS AREA.
7. THE STORM SEWER SYSTEM THAT SERVES MILDRED AVENUE IS QUITE EXTENSIVE AND IS SUBJECT TO VOLUME PROBLEMS. A NEW OUTFALL HAS BEEN CONSTRUCTED INTO THE ALAMEDA DRAIN WHICH BYPASSES AN OVERLOADED PUMP STATION. WHEN THE CONCEPTUAL GRADING AND DRAINAGE PLAN WAS SUBMITTED, IT WAS DETERMINED BY THE CITY ENGINEERING DIVISION THAT ON-SITE PONDING WOULD BE REQUIRED DUE TO THE VOLUME PROBLEM. HOWEVER, DUE TO THE NEW OUTFALL AND DUE TO ITS RELATIVE NEARNESS TO THE SITE, THERE IS NOW BELIEVED TO BE JUSTIFICATION FOR FREE DISCHARGE.

RECEIVED
FEB 13 1987
HYDROLOGY SECTION

FRANK J. LOVELADY
NEW MEXICO
6512
REGISTERED PROFESSIONAL ENGINEER

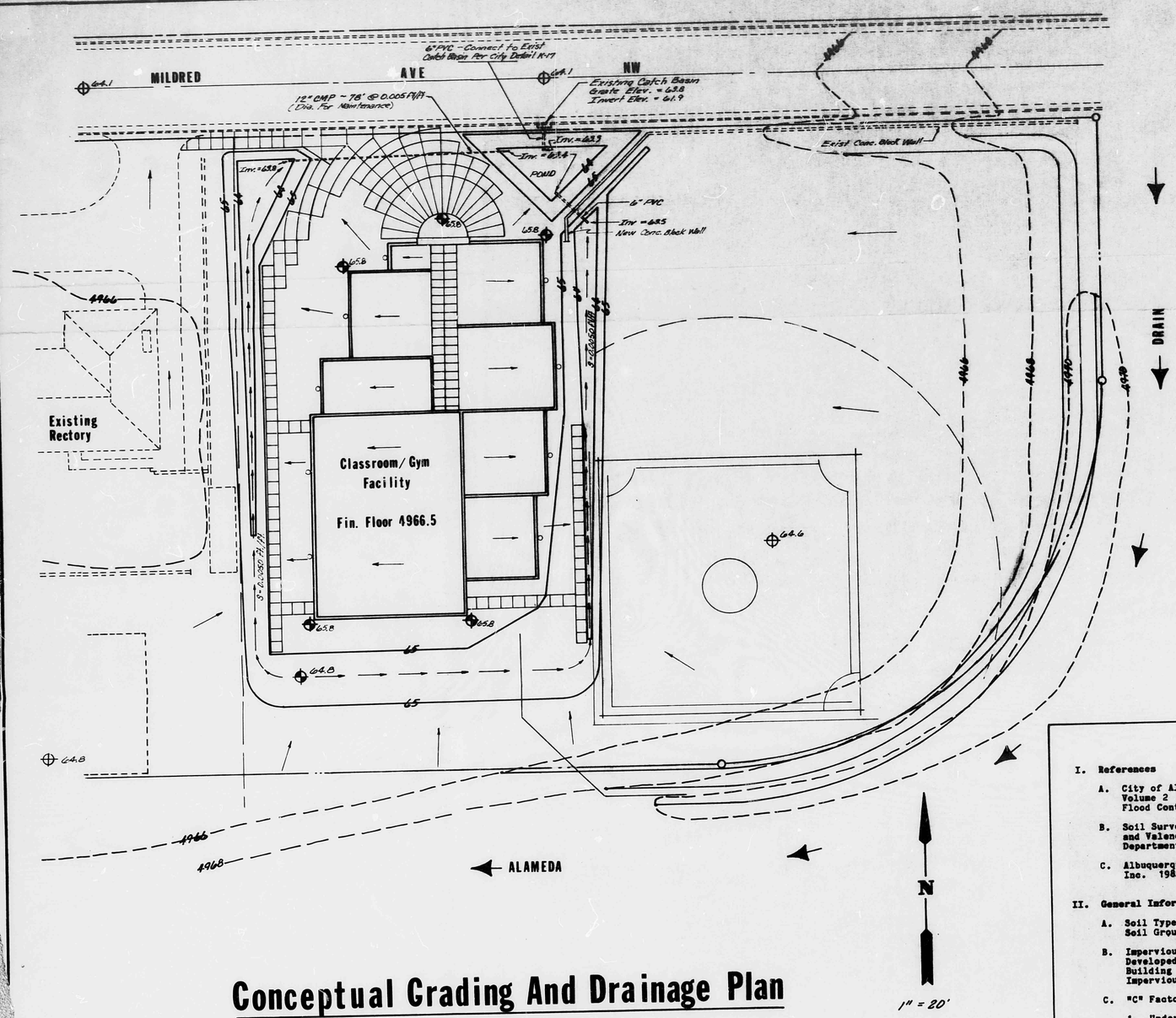
GRADING AND DRAINAGE PLAN
FOR
ST. THERESE CHURCH COMMUNITY CENTER
300 MILDRED AVE., N.W.
ALBUQUERQUE, NEW MEXICO

ROBERT L. TORRES & ASSOCIATES
1601 Lomas Boulevard Northwest Albuquerque, New Mexico 87104 Tel. 505-243-3754

GRADING AND DRAINAGE PLAN

ST. THERESE CHURCH COMMUNITY CENTER

C-2



Conceptual Grading And Drainage Plan

LEGEND

	Existing	New
Contour		
Spot Elevation		
Flow Direction		
Property Line		
Roof Drain		

BENCH MARK :

Conceptual Grading Plan based on City Topo Map.

LEGAL DESCRIPTION :

Comprising portions of property designated as Tracts B1-b, B4, 91-a, & 97-a, on MRGCD Property Map No. 33 Lot 3 of the Bishop Addn. & Lot 9 of the PRAPE Addn.

VICINITY MAP

G-14

DRAINAGE CALCULATIONS

I. References

A. City of Albuquerque Development Process Manual (DPM) Volume 2 Design Criteria, Chapter 22, Drainage, Flood Control and Erosion Control.

B. Soil Survey of Bernalillo County and Parts of Sandoval and Valencia Counties, New Mexico, United States Department of Agriculture, Soil Conservation Service.

C. Albuquerque Master Drainage Study, Bohannan Huston, Inc. 1982.

II. General Information

A. Soil Type (See Ref. B.) Soil is Ge, Gila, Hydrologic Soil Group B.

B. Imperviousness. Existing site, zero percent impervious. Developed site area is approximately 120' x 170'. Building is 9,840 SF; Sidewalk is 320 SF. Impervious = 100 (9,840 + 320)/20,400 = 49.8 say 50%

C. "C" Factor (See Ref. A. Plate 22.2 C-1)

1. Undeveloped - Curve B for zero percent impervious - C = 0.34

2. Developed - Curve B for 50% impervious - C = 0.58

3. When entire parcel west of Rectory wall is considered imperviousness is 14% - C = 0.40

D. Rainfall, 100-year, 6-hour. (R_6) (See Ref. A, plate 22.2 D-1) The site is west of the 2.2 inch rainfall line. Therefore, R_6 = 2.2 inches.

E. Time of Concentration (Tc) Use Kirpich Equation

$$Tc = 0.0078\ (L^{0.77}/S^{0.385})$$

Where: L = distance from most hyd. remote point to point of disch. assume diagonal length - 330'

S = Average Watershed slope assume 1%

$$Tc = 0.0078\ (320^{0.77}/0.01^{0.385}) = 3.9 \text{ min.}$$

Use 10 minutes, minimum time of concentration.

F. Site Area - Total site including playing field 1.6348.
Building site 120' x 170' = 20,400 SF = 0.4683 Ac.
Building Area - Approx. 9,840 SF
Sidewalk Area 320
10,160

Impervious area = 10,160 SF = 0.2332 Ac

G. Rainfall Intensity - (See Ref. A. Plate 22.2 D-2)

$$I = R_6 \times 6.84 \times Tc^{-0.51}$$

$$= 2.2 \times 6.84 \times 10^{-0.51} = 4.65 \text{ inches/hour.}$$

III. Peak Discharge

A. Considering Entire site including playing fields
Q_{100} = CIA = 0.40 x 4.65 x 1.6348 = 3.04 cfs

B. Considering only 120' x 170' Building Site
Q_{100} = CIA = 0.58 x 4.65 x 0.4683 = 1.26 cfs

IV. Volume

A. Developed - Considering only 120' x 170' Building Site

V_{100} = 0.58 (2.2/12) 20,400 = 2.169/cu.ft.

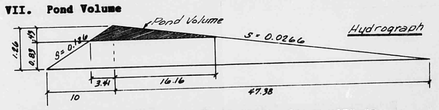
V. Duration

T_{100} = 2V/60Q = (2 x 2,169/60 x 1.26) = 57.38 min.

VI. Allowable Discharge

1/2 cfs per acre = 0.5 x 1.63 = 0.83 cfs

VII. Pond Volume



Pond Volume = 1/2 (3.41 + 16.16) 0.43 x 60 = 252 CF

ROBERT L. TORRES & ASSOCIATES
1001 Lomas Boulevard Northwest Albuquerque, New Mexico 87104 Tel. 505-243-3764

GRADING AND DRAINAGE PLAN

ST. THERESE CHURCH COMMUNITY CENTER

D