City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

November 1, 1994

Mark Goodwin, P.E.
D. Mark Goodwin & Assoc
Post Office Box 90606
Albuquerque, New Mexico 87199

RE: ENGINEER'S CERTIFICATION FOR WEST MESA CHRISTIAN CHURCH (C-12/D4)
RECEIVED OCTOBER 17, 1994 FOR CERTIFICATE OF OCCUPANCY APPROVAL
ENGINEER'S STAMP DATED 10/17/94

Dear Mr. Goodwin:

Based on the information included in the submittal referenced above, City Hydrology approves a permanent Certificate of Occupancy for this project at 8721 Golf Course Road NW.

If I can be of further assistance, you may contact me at 768-2727.

Sincerely,

John P. Curtin

John P. Curtin, P.E.
Civil Engineer/Hydrology

c: Andrew Garcia

WPHYD/2985/jpc

THE CITY OF ALBUQUERQUE IS AN EQUAL OPPORTUNITY/REASONABLE ACCOMMODATION EMPLOYER

City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

February 17, 1994

Mark Goodwin, P.E.
D. Mark Goodwin & Associates
Post Office Box 90606
Albuquerque, New Mexico 87199

RE: REVISED DRAINAGE & GRADING PLAN FOR WEST MESA CHRISTIAN CHURCH (C-12/D4)
RECEIVED FEBRUARY 15, 1994 FOR BUILDING PERMIT APPROVAL
ENGINEER'S STAMP DATED 2/15/94

Dear Mr. Goodwin:

Based on the information included in the submittal referenced above, City Hydrology approves this project for Building Permit.

Include a copy of the Grading & Drainage Plan in the set of construction document submitted to the "one stop" for the Building Permit.

The Site Dev.Plan for Bldg Permit will not be signed for AMAFCA until the Agreement with AMAFCA is signed by the Church.

Engineer's Certification of grading & drainage per DPM checklist must be approved before any Certificate of Occupancy will be released. The as-built survey must indicate the extent of all grading including any changes caused by the construction of Golf Course Road.

If you have any questions about this project, you may contact me at 768-2727.

Sincerely,

John P. Curtin

John P. Curtin, P.E.
Civil Engineer/Hydrology

xc: INSPECTOR
Clifford Anderson, AMAFCA
Dr. Neidhart, P.O. Box 901, Corrales, N.M. 87048

WPHYD/2985/jpc

THE CITY OF ALBUQUERQUE IS AN EQUAL OPPORTUNITY/REASONABLE ACCOMMODATION EMPLOYER

City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

January 14, 1994

Mark Goodwin, P.E.
D. Mark Goodwin & Associates
Post Office Box 90606
Albuquerque, New Mexico 87199

RE: REVISED DRAINAGE & GRADING PLAN FOR WEST MESA CHRISTIAN CHURCH (C-12/D4)
RECEIVED JANUARY 10, 1994 FOR BUILDING PERMIT APPROVAL
ENGINEER'S STAMP DATED 1/6/94

Dear Mr. Goodwin:

Based on the information included in the submittal referenced above, City Hydrology approves this project for Building Permit.

Include a copy of the Grading & Drainage Plan in the set of construction document submitted to the "one stop" for the Building Permit.

The agreement with AMAFCA must be executed prior to release of the Certificate of Occupancy.

Engineer's Certification of grading & drainage per DPM checklist must be approved before any Certificate of Occupancy will be released.

If you have any questions about this project, you may contact me at 768-2727.

Sincerely,

John P. Curtin

John P. Curtin, P.E.
Civil Engineer/Hydrology

xc: INSPECTOR
Clifford Anderson, AMAFCA
Dr. Neidhart, P.O. Box 901, Corrales, N.M. 87048

WPHYD/2985/jpc

City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

December 30, 1993

Mark Goodwin, P.E.
D. Mark Goodwin & Associates
Post Office Box 90606
Albuquerque, New Mexico 87199

RE: DRAINAGE & GRADING PLAN FOR WEST MESA CHRISTIAN CHURCH (C-12/D4)
RECEIVED DECEMBER 21, 1993 FOR BUILDING PERMIT APPROVAL
ENGINEER'S STAMP DATED 12/20/93

Dear Mr. Goodwin:

Based on the information included in the submittal referenced above, City Hydrology approves this project for Building Permit.

Include a copy of the Grading & Drainage Plan in the set of construction document submitted to the "one stop" for the Building Permit.

The agreement with AMAFCA must be executed prior to release of the Certificate of Occupancy.

Engineer's Certification of grading & drainage per DPM checklist must be approved before any Certificate of Occupancy will be released.

If you have any questions about this project, you may contact me at 768-2727.

Sincerely,

John P. Curtin, P.E.
Civil Engineer/Hydrology

xc: Alan Martinez
Clifford Anderson, AMAFCA
Dr. Neidhart, P.O. Box 901, Corrales, N.M. 87048

WPHYD/2985/jpc

DRAINAGE REPORT

for

WEST MESA CHRISTIAN CHURCH

ALBUQUERQUE, NEW MEXICO

December 13, 1999

LAWRENCE D. READ
NEW MEXICO
10998
REGISTERED PROFESSIONAL ENGINEER
5/2/2000

Prepared by
Larry D. Read, P.E.
12836-B Lomas Blvd., N.E.
Albuquerque, New Mexico 87112
(505) 237-8421

RECEIVED
MAY 04 2000
HYDROLOGY SECTION

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DRAINAGE REPORT

for

WEST MESA CHRISTIAN CHURCH

ALBUQUERQUE, NEW MEXICO

December 13, 1999

LOCATION & DESCRIPTION

The proposed site is 5.00 acres located at the southwest corner of Golf Course Road and Marna Lynn Avenue, as shown on **Exhibit 1**. The site is located within the area master planned for free discharge into the Golf Course Storm Drain and therefore must comply with the master drainage plan for this area (See **Related Reports**).

The site is currently developed with a church building, play ground, and asphalt parking lot. The proposed improvements for this project include expansion of the existing building for an education addition and an additional asphalt parking lot. Additional area has been identified and the hydrology for this future expansion is addressed in this report.

RELATED REPORTS

The "**Drainage Study for Las Marcadas Subdivision**," (C-12/D002B) prepared by Community Sciences Corporation establishes the drainage requirements for runoff in Marna Lynn Avenue as it leaves the residential subdivision. In addition "**AMAFCA's Piedras Marcadas Drainage Master Plan**," (C-12/D004) dated October 17, 1994, included an agreement with the area land owners which provided for free discharge into AMAFCA's storm drain in Golf Course Road. The third report which covers this piece of property is the "**Grading and Drainage Plan for West Mesa Christian Church**," dated February 15, 1994, and prepared by Mark Goodwin and Associates. This plan covered the first stage of development on this property.

FLOODPLAIN STATUS

This project, as shown on FEMA's Flood Insurance Rate Map 350001C0116 D, dated September 20, 1996, is not within any designated 100-year floodplain. **Exhibit 2** is a copy of this flood insurance map with the project area delineated.

METHODOLOGY

The hydrology for this project was analyzed using the Quick Calculations of the June 1997 release of the City of Albuquerque Development Process Manual, Section 22.2.

PRECIPITATION

The 100-yr 6-hr duration storm was used as the design storm for this analysis. This site is within Zone 1 as identified in the City of Albuquerque Development Process Manual, Section 22.2. Tables within this section were used to establish the 6-hour precipitation, excess precipitation, and peak discharge.

EXISTING DRAINAGE

The site is currently divided into three drainage areas as shown on **Exhibit 3**. Basin 101 is the northwestern corner of the site and discharges to Marna Lynn Avenue via surface runoff. Basin 102 is the majority of the site and drains to an existing City of Albuquerque Type D inlet in the southeast corner of the existing parking lot. All of the developed area drains to this inlet except the entrance drive from Golf Course Road. An existing 12" PVC storm drain connects this inlet to the Golf Course Road storm. In addition, there is a three foot wide rundown from this inlet to allow surface runoff into Golf Course Road. The smallest basin (103 on **Exhibit 3**), discharges directly to Golf Course Road via surface flows. No changes will be made to this basin as a result of this development.

This site was modeled to demonstrate how the currently proposed conditions compare to existing conditions as well as future conditions for the next anticipated stage of development.

FULLY DEVELOPED CONDITION

As stated previously, the improvements to the site include expansion of the existing building and parking lot. Basin 101 (see **Exhibit 3**) from the existing conditions will be cut off by the new parking lot. However, a new Basin 101 (see **Exhibit 4**) will be created and piped to the existing inlet in Marna Lynn Avenue. This will discharge 3.53 cfs into the back of the existing Type A, double grate inlet while decreasing the flow entering Marna Lynn Avenue via surface flow by 1.59 cfs (see **Table 1** for calculations). The new Basin 102 will increase the flow to the existing Type D inlet in the parking lot from 7.50 cfs to 8.41 cfs. This is still below the combined capacity (9.23 cfs) of the inlet and rundown. Therefore, the 100-year runoff is still being contained within the site in accordance with the original drainage plan.

Following are the capacity calculations for the existing Type D inlet in the parking lot:

The rundown is controlled by a broad crest weir:

$Q_{weir} = 2.7LH^{1.5}$ where $L = 3.00'$ and $H = 0.5'$: $Q_{capacity} = 2.86$ cfs.

The inlet is controlled by inlet control of the 12" pipe: ✓
$Q_{orifice} = 0.6A(2gh)^{0.5}$ where A = 0.7854 square feet, g = 32.2 ft/sec.^{2}, and
h = 2.83': $Q_{capacity}$ = 6.37 cfs.

The combined capacity is 2.86 + 6.37 = 9.23 cfs which exceeds the required capacity of 8.41 cfs.

Following are the capacity calculations for the proposed Type D inlet in the landscaping:

Calculate weir capacity using 50% of the perimeter for effective flow:
$Q_{weir} = 2.7LH^{1.5}$ where L = 5.25' and Q = 3.97 cfs: solve for H
H = 0.43'

Calculate orifice capacity using 50% of the net area to account for clogging:
$Q_{orifice} = 0.6A(2gh)^{0.5}$ where A = 2.28 square feet, g = 32.2 ft/sec.^{2}, and
Q = 3.97 cfs: solve for h: h = 0.13'
The inlet is controlled by the weir capacity.

Calculate the inlet control capacity of the 18" pipe: ✓
$Q_{orifice} = 0.6A(2gh)^{0.5}$ where A = 1.7671 square feet, g = 32.2 ft/sec.^{2}, and
h = 0.80': $Q_{capacity}$ = 7.61 cfs.

Based on "Mannings Equation" the pipe has a capacity of 7.45 cfs. This is slightly over sized in order to allow for future a future tie-in when the far west end of the site is developed.

12" ~~or~~ 18"
237-8421

TABLE 1

100-YEAR HYDROLOGIC CALCULATIONS

BASIN #	AREA (acre)	LAND TREATMENT A (%)	B (%)	C (%)	D (%)	WEIGHTED E (in)	V (6-hr) (acre-ft)	V (6-hr) (cu-ft)	V(10 day) (acre-ft)	V(10 day) (cu-ft)	Q (cfs)
EXISTING CONDITIONS											
101	1.2317	100.00	0.00	0.00	0.00	0.44	0.05	1,967	0.05	1,967	1.59
102	3.2445	60.00	5.45	5.45	29.10	0.93	0.25	10,926	0.37	15,965	7.50
103	0.5263	60.00	11.70	12.00	16.30	0.78	0.03	1,495	0.04	1,952	1.09
TOTAL	**5.0025**						**0.33**	**14,388**	**0.46**	**19,884**	**10.18**
PROPOSED CONDITIONS											
101	1.1557	0.00	34.20	34.20	31.60	1.19	0.11	4,993	0.16	6,942	3.53
102	3.3205	54.00	5.45	5.45	35.10	1.02	0.28	12,289	0.42	18,508	8.29
103	0.5263	60.00	11.70	12.00	16.30	0.78	0.03	1,495	0.04	1,952	1.09
TOTAL	**5.0025**						**0.43**	**18,777**	**0.63**	**27,403**	**12.91**
FUTURE CONDITIONS											
101	1.1557	0.00	24.35	24.35	51.30	1.41	0.14	5,935	0.21	9,099	3.97
102	3.3205	54.00	4.55	4.55	36.90	1.04	0.29	12,536	0.44	19,074	8.41
103	0.5263	60.00	11.70	12.00	16.30	0.78	0.03	1,495	0.04	1,952	1.09
TOTAL	**5.0025**						**0.46**	**19,966**	**0.69**	**30,126**	**13.47**

EXCESS PRECIP.	0.44	0.67	0.99	1.97	E_i (in)
PEAK DISCHARGE	1.29	2.03	2.87	4.37	Q_{Pi} (cfs)

WEIGHTED E (in) = $(E_A)(\%A) + (E_B)(\%B) + (E_C)(\%C) + (E_D)(\%D)$

$V_{6\text{-HR}}$ (acre-ft) = (WEIGHTED E)(AREA)/12

V_{10DAY} (acre-ft) = $V_{6\text{-HR}} + (A_D)(P_{10DAY} - P_{6\text{-HR}})/12$

Q (cfs) = $(Q_{PA})(A_A) + (Q_{PB})(A_B) + (Q_{PC})(A_C) + (Q_{PD})(A_D)$

ZONE = 1

$P_{6\text{-HR}}$ (in.) = 2.20

$P_{24\text{-HR}}$ (in.) = 2.66

P_{10DAY} (in.) = 3.67