HYDROLOGY G23/D3 3 PLANS

G23/D3

3 Plans

CT-28-11

GLENWOOD SQUARE SUBDIVISION

DRAINAGE MANAGEMENT PLAN

Prepared For:

Dale Bellamah Corporation

By:

Community Sciences Corporation

August 1978

Kent M. Whitman

Kent M. Whitman, P.E.

KENT M. WHITMAN
STATE OF
NO. 6170
NEW MEXICO
REGISTERED PROFESSIONAL ENGINEER

P.O. Box 1328
Corrales, New Mexico 87048
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SURVEYING
ENGINEERING
LAND PLANNING

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A) PURPOSE AND SCOPE

Dale Bellamah Corporation is currently planning development of approximately 28 acres in northeast Albuquerque into 78 - R1 lots. This development will be called Glenwood Square Subdivision. The purpose of this report is to present a drainage management plan for Glenwood Square which is acceptable to the City of Albuquerque and to the Albuquerque Metropolitan Arroyo Flood Control Authority.

B) SITE LOCATION AND TOPOGRAPHY

Glenwood Square is located in northeast Albuquerque at the northeast corner of the intersection of Tramway Road and Commanche Boulevard (see Plate 1). The land slopes from northeast to southwest at an average rate of 6%. Soils consist largely of alluvial sands and silts, and decomposed granite is the major soil constituent.

C) DESIGN CRITERIA

1) Engineering Criteria:

For calculation of runoff rates and required storage volumes a C of 0.4 was assumed for undeveloped areas and composite C factors were calculated for developed lot areas resulting in the following values:

1) Street-side portion of lot - 0.75
2) Rear yard portion of lot - 0.64
3) Entire lot area - 0.68

All runoff calculations have been based on a 100 year - 6 hour rainfall of 2.8 (0.23') per AMAFCA requirements.

Rate of runoff calculations have been based on the frequency - intensity - duration relationship for a 100 year storm as presented by Gordon Herkenhoff and Associates in their 1963 Master Plan of Drainage for the City of Albuquerque. This relationship is expressed by the following equation: $I = 189/(Tc+25)$

2) Flood Control Regulations:

The drainage plan presented in this report has been designed to comply with the 1972 AMAFCA Resolution in regard to rate and volume of runoff leaving the site. That Resolution has been interpreted to say that the rate and volume of runoff allowed to leave the site after development shall be no greater than the rate and volume running off prior to development.

D) COMPUTATIONAL PROCEDURES

Appendix A contains samples of the various types of hydraulic calculations performed. Proposed easement channels were sized based on the Manning Equation for Uniform Flow. Street carrying capacities were calculated by means of the same equation using City of Albuquerque Standard Street Sections.

Hydrological flow rate calculations are based on the rational runoff method. Times of concentration were calculated using the Kirpich nomagraph for overland flow and the Manning equation for estimating street flow velocities. For flow convergence points having both developed and undeveloped areas contributing, composite runoff coefficients were calculated. Volume calculations for sizing individual lot ponds and for determination of central ponding requirements for areas A, B, and C were performed by multiplication of the applicable C factor times the 100 year - 6 hour rainfall (0.23) times the appropriate area to obtain cubic feet of water.

E) OFF-SITE DRAINAGE

Since a large drainage conveyance channel borders the site along the north boundary, off-site drainage can approach the site from the east only. Visual inspection of the area reveals that the land to the east is fully developed in R1 residences. These lots typically drain from a divide located roughly at the center of the structure into the respective rear yards and against yard walls located at the rear property lines. Most yard walls are block construction, however, several residents have cut drainage holes in their walls to allow runoff to run through the walls and onto Glenwood Square. For this reason an off-site drainage area running the entire length of the east boundary and 75' wide has been assumed. A 15' drainage easement with a graded earth swale will be provided along the east boundary to collect these flows and convey them into Commanche Boulevard.

F) ON-SITE DRAINAGE

A large 150' wide PNM easement divides the subject property into two parts. Discussions with PNM officials has resulted in their permission to use this easement to satisfy ponding requirements. Lots 55 through 78 will therefore drain via swales, streets, and yard grading into three retention ponds to be located within this easement (see Plate 3). These ponds will provide 100% retention for the design storm thereby satisfying the AMAFCA requirements for these lots.

Lots 1 - 54 will employ individual yard ponding as shown on Plate 2 to satisfy the AMAFCA requirements. Lot areas not draining into ponds will drain into the street system and ultimately discharge into the Tramway Boulevard ROW via a 19' wide by 0.5' deep concrete easement channel. Areas labeled "non contributory" on Plate 3 are those lot areas which will drain into yard ponds.

Table 1 summarizes flow rates and central ponding requirements for key locations shown on Plate 3.

TABLE 1

FLOW RATES AND VOLUME REQUIREMENTS

Area/Point Designation	Area (acres)	Individual C Factor	Areas Contributing	Gross Area Contributing (acres)	Overall C Factor	Time of Concentration (minutes)	I (inches/hour)	Q (cfs)	Required Ponding Volume (ft^3)
A1	1.23	0.64	A1	1.23	0.64	< 10	5.4	4.3	NA
A2	0.60	0.40	A1, A2	1.83	0.56	NA	NA	NA	10,400
B1	3.14	0.75	B1	3.14	0.75	< 10	5.4	12.7	NA
B2	2.24	0.70	B2	2.24	0.70	< 10	5.4	8.5	NA
B3	0.55	0.64	NA	NA	NA	NA	NA	NA	NA
B4	1.61	0.40	B1-4	7.54	0.65	< 10	5.4	NA	49,800
C1	0.53	0.68	NA	NA	NA	NA	NA	NA	NA
C2	0.15	0.40	C1, C2	0.68	0.62	< 10	5.4	NA	4,300
D1	1.56	0.75	D1	1.56	0.75	< 10	5.4	6.3	NA
D2	2.58	0.75	D1, D2	4.14	0.75	< 10	5.4	16.8	NA
D3	1.78	0.75	D3	1.78	0.75	< 10	5.4	7.2	NA
D4	0.66	0.75	D1-4	6.58	0.75	< 10	5.4	26.7	NA

APPENDIX A

SAMPLE CALCULATIONS

1) Composite C - Front Portion of Lot

Gross Area = 4,000 SF
Area hardsurfaced @ C = 0.95 = 2,200 SF = 56%
Area in SW Landscaping @ C = 0.7 = 900 SF = 22%
Area in Lawn @ C = 0.3 = 900 SF = 22%

$\therefore \quad C_{comp} = (0.56 \times 0.95) + (0.22 \times 0.70) + (0.22 \times 0.30)$
$= 0.75$

2) Composite C - Entire Lot

Gross Area = 11,600 SF
Area hardsurfaced @ C = 0.95 = 4,700 SF = 41%
Area in SW Landscaping @ C = 0.70 = 3,000 SF = 26%
Area in Lawn @ C = 0.30 = 3,000 SF = 26%
Area unsurfaced @ C = 0.40 = 900 SF = 7%

$C_{comp} = (0.95 \times 0.41) + (0.70 \times 0.26) + (0.30 \times 0.26)$
$+ (0.40 \times 0.07) = 0.68$

3) Required Ponding Volume - Yard Pond

A = 11,600 SF
R = 2.8" = 0.23'

Required Volume = (0.68 - 0.40) (0.23) (11,600)
= 747 cubic feet

4) Composite C - Rear Portion of Lot

Rear Portion = 66% of surface area
Front Portion = 34% of surface area

$(0.75 \times 0.34) + (C \times 0.66) = 0.68$

$C = 0.64$

5) Off-site Flow Rate

Area = 85' x 1,306' = 111,010 SF
= 2.55 acres

I = 5.4 inches/hour
C = 0.64

Q = (0.64) (5.4) (2.55) = 9 cfs.

6) Capacity - Swale Section A

Bottom Width = 10'
Sideslope = 3:1
Slope = 0.005 feet/feet (minimum)
Depth = 0.5'
n = 0.025 (earth)

$$Q = \frac{A\ (1.49)\ (R^{2/3})\ (S^{1/2})}{n}$$

= 14 > 9 OK

Maximum slope = 5.5%
∴ from same relationship maximum
Velocity = 4.5 fps.

7) Minimum Street Capacity - Curb Depth

Area = 16 SF
Wetted Perimeter = 33.3
Slope (minimum) = 0.005
n = 0.015

$$Q = \frac{16\ (1.49)\ (16/33.3)^{2/3}\ (.005)^{1/2}}{.015}$$

= 69 cfs. > 26.7 OK

8) Capacity City Easement Channel @ D4

Bottom Width = 19'
Sideslopes = 0
Slope = 0.01
Depth = 0.3'
n = 0.013

$$Q = \frac{A\ (1.49)\ R^{2/3}\ S^{1/2}}{n}$$

$$= 28.6 > 26.7 \text{ OK}$$

$$F = \frac{V}{\sqrt{gd}} = 1.61$$

$$yc = \left[\frac{q^2}{g}\right]^{1/3} = \left[\frac{(26.7/19)^2}{32.2}\right]^{1/3}$$

$$= 0.39'$$

$$Vc = Q/19\ yc$$
$$= 3.6 \text{ fps.}$$

$$\therefore \text{ total entrance depth} = 0.39 + \frac{3.6^2}{64.4}$$

$$= 0.59' < 0.67 \text{ OK}$$

9) Capacity - Single Type D Inlet

Assume Depth of Grate = 0.5'
Net Area of Grate = 4.14 SF
C_e = 0.65

$$Q = C_e\ A_{net}\ \sqrt{2\ gd}$$

$$= 0.65\ (4.14)\ \sqrt{64.4\ (.5)}$$

$$= 15.3 > 12.7 \text{ OK}$$

PLATE 1
LOCATION MAP

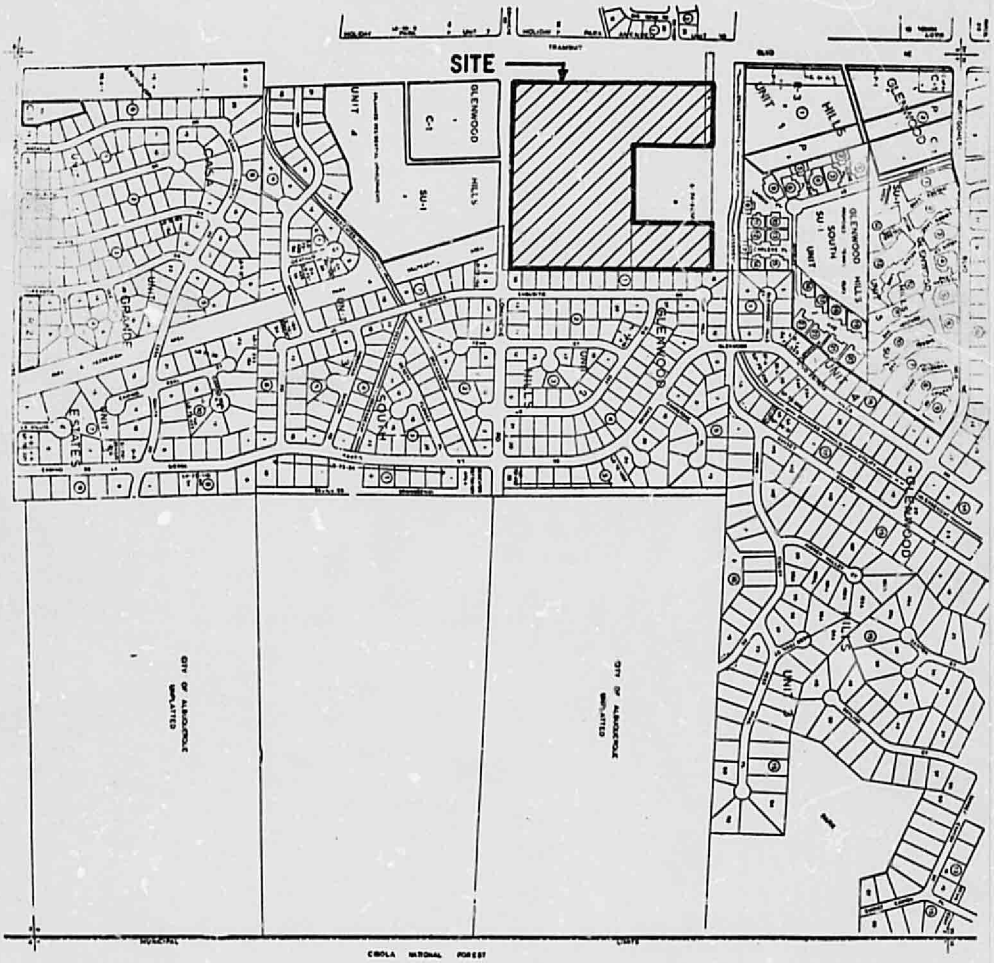
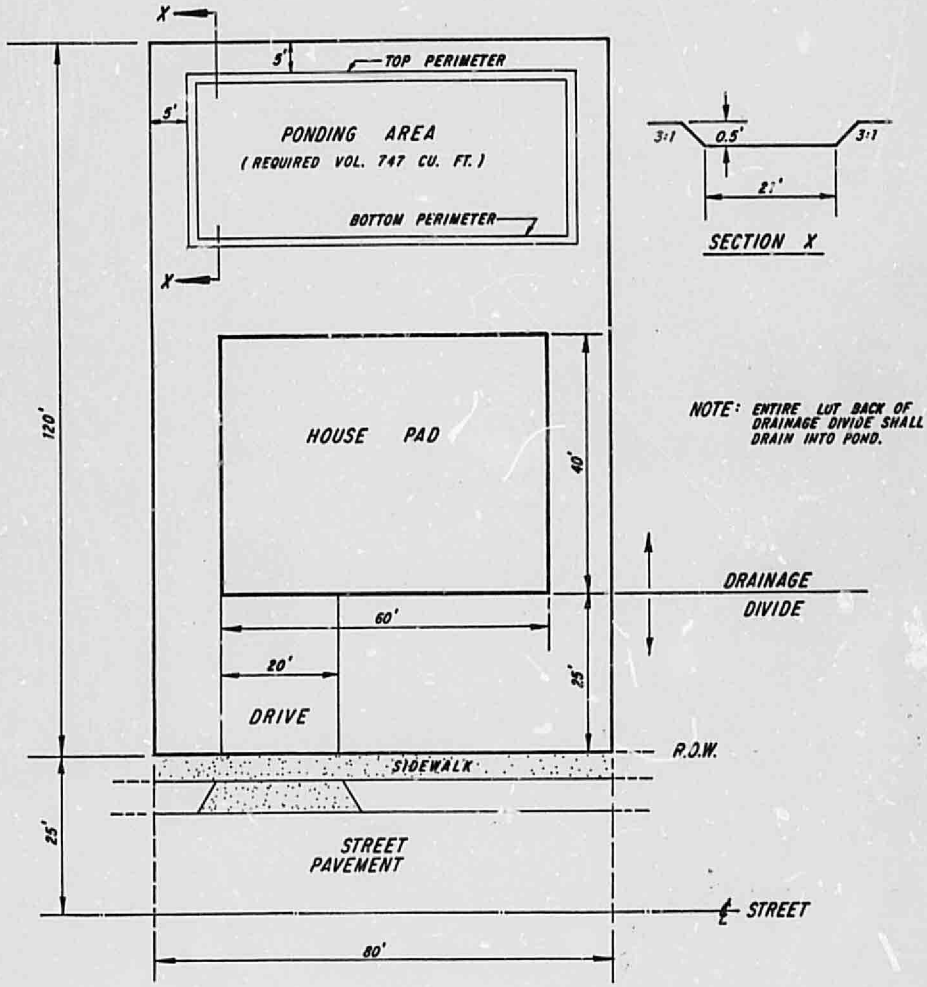


PLATE 2
TYP. PLOT PLAN
R-1 RESIDENTIAL
(LOTS 1-54)



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

MAYOR
Harry E. Kinney

CHIEF
ADMINISTRATIVE OFFICER
Frank A. Kleinhenz

Fred # 2540 (please see me on this)

No information 12/16/83

November 29, 1983

RECEIVED
DEC 01 1983
CITY ENGINEER

Mr. William C. Boyajan
Bellamah Community Development
P. O. Box 3300
Albuquerque, New Mexico 87190

RE: Request for Acceptance of Easements of Glenwood Square Subdivision Tracts A and B

Dear Mr. Boyajan:

Our review of your request indicates that the tracts identified, A and B, contain ponding areas that are part of the drainage solution for the eastern lots in the subdivision, and that the outfall provided on the western edge of the subdivision to the Tramway drainage facilities does not relieve the need for these ponds. We would welcome further discussion regarding this matter; however, any further consideration must involve a proposal for revising the original drainage concept utilizing the ponds. It will be necessary to modify that concept in some manner if the western drainage outfall is to provide any relief for the eastern lots protected by the ponds.

Please contact us if you desire to pursue this matter.

Very truly yours,

Carl P. Rodolph
Carl P. Rodolph
Director

CPR:DS:bjg

G23-D3

Bellamah
Community
Development

RECEIVED
ALBUQUERQUE, N.M.
NOV 9 1983
MUNICIPAL DEV. DEPT
ADMIN. DIV.

CPR_

November 8, 1983

Mr. Carl Rodolph, P.E. Director
Municipal Development Department
City of Albuquerque
P. O. Box 1293
Albuquerque, NM 87103

Dear Mr. Rodolph:

Subject: Glenwood Square, Tracts A - B

Bellamah Community Development would like to quitclaim its interest in the above tracts to the city of Albuquerque, at no expense to the city.

We would appreciate knowing the city's interest as soon as possible.

Please call me if you have any questions.

Sincerely,

William C Boyajan

William C. Boyajan
Development Coordinator

j.
Copy: Mr. Reuban Phillips
PNM Real Estate Division

to CPR 11/15/83

Both tracts are under a PNM easement and are used for storm drainage ponding. We're being offered the opportunity to do their maintenance — I've given copies to Duayne for response before we move further — LCM

New Mexico 87190 · (505) 884-6606
Texas

DRAINAGE & UTILITY EASEMENT
SP-80-222
65A
66A
B
S-74-91-(SP)
PWM Substation
SU-1
GLENWOOD
PINO
CALLE
CALLE
CALLE
CALLE
CEDRO
CALLE
CEREZA
OLIVO
OLIVO CT
NUEZ CT
ARBOLEDA SENDA
CASTANO CT.
CASTANO
CALLE
TR A
TR. B
SQUARE
SU-FOR A PLANNED RESID DEV.)
SP-81-236
76A
77A
GRAY HILL
DR
EMBUDITO
GLENWOOD
GLENWOOD
BIG
COMANCHE
TRAMWAY
PARK AVENUE
HOLIDAY
UNIT

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

MAYOR
David Rusk

February 21, 1979

Mr. Thomas N. Burlison
Project Engineer
Bellamah Corporation
P. O. Box 3325
Albuquerque, N.M. 87190

G23-D3

Subject: Test Turnkey Project Work Authorization #T-40
Glenwood Square Addition

Dear Mr. Burlison:

Under the provisions of the Test Turnkey Project procedures, this letter is the Work Authorization to begin field work on the project.

Sincerely,

Richard S. Heller

Richard S. Heller
City Engineer

RSH/fs

cc - H. R. Orr
The Wylie Corporation
Ray Dawson
Water Resources
Dwayne Sheppard
Bob Kielich
LaMonte Urban
Bruno Conegliano
Bill Mueller
Jim Milton, Traffic Engineering

November 21, 1978

Mr. Bruno Conegliano
City Engineering
City of Albuquerque
P.O. Box 1293
Albuquerque, New Mexico
87103

RECEIVED
NOV 27 1978
CITY ENGINEERS

SUBJECT: Glenwood Square - Revisions to Drainage Plan

Dear Bruno;

Pursuant to our meeting of November 13, 1978, I am writing to confirm the decisions made at that time with respect to the drainage plan submitted to your office for Glenwood Square Subdivision. We are altering the plan in the following ways in order to comply with your requests.

1) No central ponding will be provided for lot runoff. All lots will be shown to be equipped with yard ponding, and the street catch basins diverting flows into the PNM easement ponds will be deleted. The PNM ponds themselves will remain as designed in order to catch and retain water falling on the easement itself.

2) The small amount of offsite runoff approaching the site through wall drains from the east will be allowed to enter rear yard ponds along Calle Contano. Any overflow will then trickle past the units and into the street itself.

3) A temporary retention basin will be provided on the APS property to the west of the project in order to catch nuisance runoff from the streets which is directed out of the project via a City drainage easement. An easement for this purpose has already been acquired from APS.

It is our understanding that the construction plans will be approved with the above additions and/or alterations. We will be resubmitting them for your signatures within the week.

Sincerely yours,

Kent M. Whitman

Kent M. Whitman, P.E.

KMW/alw

cc: Sheilah Sweenhart, Bellamah

P.O. Box 1328
Corrales, New Mexico 87048
(505) 897-0000

SURVEYING
ENGINEERING
LAND PLANNING

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

MAYOR
David Rusk

Bob K
Bruno

RECEIVED
SEP 2 7 1978
CITY ENGINEER

September 28, 1978

Ms. Sheilah Sweenhart
Dale Bellamah Land Co., Inc.
P.O. Box 3325
Albuquerque, NM 87110

Re: S-78-1

Dear Ms. Sweenhart:

The Administrative Review Board approved the proposed plat of Glenwood Square Subdivision, subject to the following findings:

1. Cul-de-sac radii must be increased to a minimum of 45 ft.
2. Platting of this subdivision should allow the waterline to lie within one established easement and access to all lines must be maintained.
3. A drainage report satisfactory to the City Engineer & AMAFCA will be required prior to final plat sign off.
4. Compliance with the Park Dedication Ordinance is required prior to final plat sign off.
5. Land needed for the Tramway Expressway Drain shall be dedicated through this plat to the City.
6. Access problems to the adjacent parcel to the north need to be solved prior to final plat sign off.
7. All required reconstructions of roads will be at the developer's expense.

If you have any questions, please do not hesitate to contact this office.

Sincerely,

Phil Garcia
Principal Planner

dg

cc: Howard Shaver, 12709 Hugh Graham, NE; 87111

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

Date: September 12, 1978

Sheilah L. Sweenhart
Development Engineer
Dale Bellamah Corporation
P. O. Box 3325
Albuquerque, N.M. 87190

G23-D3

SUBJECT: SUBDIVISION REQUEST FOR USE OF TEST TURNKEY PROCEDURE

Dear Ms. Sweenhart:

We are in receipt of your letter of September 11, 1978 requesting the use of the Test Turnkey Procedures. Enclosed is a copy of the "Test Turnkey Project Flow Chart and Test Turnkey Operational Instructions" which will be followed in using this test procedure.

A very important element in this procedure and one which must be rigidly observed is the "Start of Construction Work" stage following Steps 18,19,20 and 21. No field work may commence under this test procedure until this point.

Therefore, your request to design and construct this subdivision is approved, subject to following the procedures enclosed.

Sincerely

C. D. Sheppard, P.E.

C. D. Sheppard
~~W. W. Klumpp~~ P.E.
Acting City Engineer

Copy to: H. R. Orr
Q. R. Kielich
Dwayne Sheppard
LaMonte Urban
~~Br~~uno Conegliano

Enclosures

DALE BELLAMAH CORPORATION

Land Division

September 11, 1978

RECEIVED
SEP 1 1978
CITY ENGINEERS

Dwayne Sheppard
City Engineer
City of Albuquerque
P. O. Box 1293
Albuquerque, NM 87103

Re: Request for Turnkey Procedure - Glenwood Square Subdivision

Dear Dwayne:

The Dale Bellamah Corporation would like to request permission for Turnkey Procedure for Glenwood Square Subdivision. This project includes new subdivision streets, drainage and utility improvements for Calle Castano, Castano Court, Calle Olivo, Olivo Corte, Senda Arboleda, Cedro Corte, Calle Pino, and Calle Cereza. We propose that Community Sciences Corporation be contracted as the engineer for this project. With your approval of this request, we will proceed to execute the Turnkey Agreement as set forth in the test procedure for turnkey projects dated March 13, 1978.

Sincerely,

DALE BELLAMAH LAND CO., INC.

Sheilah L. Sweenhart/kb

Sheilah L. Sweenhart
Development Engineer

SLS/kb
cc: Cliff Spirock, Community Sciences

Approved: G. W. Sheppard 9/12/78
Acting City Engineer

6400 Uptown Boulevard, NE • P.O. Box 3325 • Albuquerque, New Mexico 87190 • (505) 883-3000

JAMES D. SMITH
EXECUTIVE ENGINEER

B. H. SWINBURNE, CHAIRMAN
WILLIAM V. HEREFORD, VICE-CHAIRMAN
FRANCES McCOY, SECRETARY-TREASURER
VERNON DOAK, DIRECTOR
RICHARD H. CLOUGH, DIRECTOR

Albuquerque
Metropolitan
Arroyo
Flood
Control
Authority

2600 PROSPECT AVE. N.E.
P. O. BOX 25851 - ALBUQUERQUE, N. M. 87125
TELEPHONE 344-3516

March 7, 1978

Mr. Phil Garcia, Senior Planner
City of Albuquerque
Planning Department
City Hall, 6th Floor
Albuquerque, New Mexico 87103

Re: Glenwood Square S-78-1 and Z-78-2

Dear Phil:

Upon reviewing the above captioned development, we find several reservations in approving this plan. This site has a large unnamed arroyo which lies north of the proposed development. This arroyo was designated as the Glenwood Hills Channel in the drainage report by Bohannan, Westman & Huston of August 1972. This reports shows that this channel was to have been designed to carry 2208 cfs at a velocity of ≅22.7 fps.

It is significant that the above cited drainage report to drain units 1 and 2 of Glenwood Hills South was to be either a concrete lined or rip rap design channel for the portion of channel adjacent to Unit 1, Glenwood Hills South. This same channel is the same arroyo which lies north of the proposed development. A field inspection showed that the erosion protection called for throughout the above cited report has not been constructed and serious erosion has taken place in the constructed channel. The erosion checks appear non-existant and it is doubtful that this existing channel could carry a 100 year flood.

In view of the proposed plat which does not propose dedication of the flood channel or improvements to the channel, which was the result of this same builders previous development, we do not recommend approval of this plat until the developer and his engineer can show how the flood waters can be managed.

I am ready to assist in any way you feel necessary.

Sincerely,

Wiley R. Smith
Engineer

WRS:sls

cc: Mr. Bruno Conegliano