FILE COPY

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

KEN SCHULTZ
MAYOR

January 25, 1989

Tom Blaine
Epoch Engineering
2425 Margaret Drive
Bosque Farms 87068

RE: S.O. #19 FOR 9604 BOLACK DRIVE, NE
(D-20/D3) RECEIVED DECEMBER 29, 1988

Dear Mr. Blaine:

The referenced plan received December 29, 1988 is approved for Special Order #19.

In order to obtain an excavation permit, a copy of this approval letter should be provided.

If you should have any questions regarding this project, please call me at 768-2650.

Cordially,

Carlos A. Montoya, P.E.
City/County floodplain Administrator

CAM/bsj

xc: Becky Sandoval
(WP+1003)

DRAFT

Agreement between the City of Albuquerque and Bellamah Community Development regarding Heritage East Subdivision.

Part One: Relating to the Park Dedication.

1. The southeasterly boundary of the park will be moved 130 feet northwest of its present location.

2. Bellamah Community Development will assume responsibility for the full-width improvement of the Domingo Baca Arroyo adjacent to the remaining length of the northern boundary of the park.

3. Bellamah Community Development will assume responsibility for the full-width improvement of Quintana Drive southwest of and adjacent to the remainder of the park.

4. No City fees shall be charged for these projects.

Part Two: Relating to the westerly portion of the Domingo Baca Arroyo.

1. The City will acquire Lots 31 and 32 of Block 42, North Albuquerque Acres. The title to the remaining lands within said Lots 31 and 32, after excluding the right-of-way for the Domingo Baca Arroyo channel and the right-of-way for the easterly half of Ventura Boulevard within said Lot 32, shall be transferred to Bellamah Community Development.

2. The City will construct the easterly half of the crossing of the Domingo Baca Arroyo over Ventura Boulevard.

3. Bellamah Community Development will construct a concrete lined channel from the east boundary of Lot 31 to the crossing being constructed by the City of Ventura.

4. Cost sharing related to Lots 31 and 32 shall be as follows:

   a. City responsibility: Costs within said Lots 31 and 32 for Domingo Baca Channel right-of-way and Ventura Boulevard right-of-way.

   b. Bellamah Community Development responsibility: Costs for remaining lands within Lots 31 and 32 which are transferred to Bellamah Community Development. Permanent improvement of the Domingo Baca Arroyo through Lots 31 and 32 and permanent paving of the easterly one-half of Ventura Boulevard south of the southerly right-of-way line of the Domingo Baca Arroyo and abutting said Lot 32.

   c. After the acquisition of Lots 31 and 32 by the City and the receipt of bids for construction of the Domingo Baca Channel and Quintana Drive, an accounting of the costs incurred shall be made and Bellamah Community Development or the City shall pay for the difference in costs. No City fees shall be charged for these projects.

Part Three: Timing of all portions of the Agreement.

1. The improvement of the arroyo adjacent to the park, the paving of Quintana Road, the acquisition of Lots 31 and 32, the lining of the arroyo through Lots 31 and 32, and the completion of the eastern half of the Ventura Boulevard crossing over the Domingo Baca Arroyo shall all occur with the construction of the improvements for Heritage East, Unit 4.

community sciences corporation

DRAINAGE MANAGEMENT PLAN

FOR

HERITAGE HILLS EAST

a

Dale Bellamah Corporation Joint Venture

Prepared by

Community Sciences Corporation

Revised

March, 1983

Kent M. Whitman, P.E.

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

SURVEYING
ENGINEERING
LAND PLANNING

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A) PURPOSE & SCOPE

Dale Bellamah Corporation is currently planning development of their 272 acre Heritage Hills East development in northeast Albuquerque. The project will be subdivided into approximately 1100 R1 and RT lots, and is currently under planning review by the City as a sector development plan. The purpose of this report is to present a drainage management plan for the proposed development which is acceptable to the City of Albuquerque and to the Albuquerque Metropolitan Arroyo Flood Control Authority.

It is the intent of the owner and his consultant that this plan be appropriate for overall approval of the entire project with regards to major systems and improvements, and also that it serve as a detailed drainage study for the first phases of the project located in the southerly half of the parcel. It is recognized that potential changes in street geometry for later phases may necessitate additional study for those areas.

B) SITE LOCATION & TOPOGRAPHY

Heritage Hills East is located in northeast Albuquerque between San Antonio and Los Angeles Blvds., and immediately east of Ventura Blvd. (see Plate 1).

The land slopes from east to west at an average rate of 3%. Soils consist largely of alluvial sands and silts, and decomposed granite is the major soil constituent.

C) DESIGN CRITERIA

1) Engineering Parameters

In accordance with AMAFCA and City of Albuquerque Drainage Criteria all hydrological analysis is based on the 100 year frequency storm as represented in the rainfall frequency/intensity/duration curves prepared for the Albuquerque area by Gordon Herkenhoff and Associates. Rate calculations are based on the rational method, and runoff coefficients were estimated by calculation of composite values per anticipated land uses. A previous analysis outlined in the Tramway/Academy/Eubank Sector Plan Master Conveyance Study showed a typical residential lot runoff factor to be 0.67 for R1 and 0.8 for RT. In addition a factor of 0.3 was assumed for un-

developed areas and 0.9 for commercial areas. Calculations for each subcatchment have resulted in the composite values listed in Table 1.

2) Flood Control Regulations

The drainage plan presented in this report has been designed to comply with AMAFCA Resolution 80-15 and City of Albuquerque drainage policy. These regulations require that subdivisions be designed such that no flooding of private properties will occur during any storm up to the 100 year frequency event. Normal flow depths in streets may not exceed an elevation of 0.2' above the top of curb elevation. At intersections flow depths may not exceed the elevation of the ROW which is nominally 4" above the top of curb.

D) COMPUTATIONAL PROCEDURES

Appendix A contains samples of the various tupes of hydraulic calculations performed. Proposed conveyance channels were sized based on the Manning Equation for Uniform Flow. Times of concentration were estimated based upon the Kirpich Nomagraph for Overland Flow and average flow velocities in the various streets at approximated gradients.

Table 1 summarizes the hydrological data and peak flows for the project and is keyed to the point/area designations shown on Plate 3.

E) OFFSITE DRAINAGE

Plate 2 illustrates the offsite basins which contribute flow toward the site. Two large arroyo systems, the Domingo Baca and the North Pino, drain through the site. Concrete lined sections as shown on Plate 4 will be furnished for these arroyos. An agreement under negoiation between Bellamah and the City will trade the City's responsibility for construction of bridge crossings on Ventura for Bellamah's responsibility for same on Holbrook. This will eliminate the need for temporary dip sections along Holbrook at the Domingo Baca and the North Pino Arroyos at such time that development reaches the east boundary.

The Domingo Baca Arroyo has a split flood plain at Holbrook. It appears from AMAFCA topography and the outlet location of the new flood control dam upstream that the majority of arroyo flows will remain in the southerly thalweg where the bridge crossing will be constructed. However, we estimate that up to 300 cfs may spill over into the northerly thalweg. To accommodate this flow a 72" storm sewer will be constructed within the ROW of Holbrook to intercept and divert the runnoff to the location of the bridge crossing.

Construction of a 22' wide "half" section for Holbrook will provide the diversions necessary to direct offsite flows from most of the other minor offsite basins into the Domingo Baca or North Pino. However, the City has expressed concern over the potential for silt deposition into the street by these watersheds. Therefore, this revised report

proposes the construction of a 48" CMP (smooth lined) storm sewer to intercept flows from Area B (the largest minor watershed) and divert them into the North Pino. Areas A, C, and D are so minor that the small embankment created by construction of Holbrook across their respective thalwegs should provide backwater pools adequate for desiltation purposes until development occurs upstream.

Area A as shown on Plate 2 cannot be diverted into the Domingo Baca above the site. Instead runoff from this Basin will be directed into project streets as shown on Plate 3, and ultimately diverted into the Domingo Baca further to the west.

F) ONSITE DRAINAGE

Plate 3 illustrates the proposed drainage scheme and Table 1 itemizes flow rates for key points of confluence. Table 2 presents hydraulic data pertinent to intersection flow analysis. The major drainage networks will be discussed briefly below:

1) Areas 1-4:

At point 4 runoff from these subcatchments reaches the limits of street conveyance capacities. Therefore the street will be water blocked at this point, and the 100 year flows will be intercepted by six type C inlets and a 48" RCP storm sewer. The storm sewer will discharge directly into the North Pino Channel.

2) Areas 5-7:

These basins will discharge directly to Ventura Blvd. which will direct them on the surface to the North Pino Channel.

3) Areas 9 & 9A:

A water block on San Francisco Blvd. will direct flows from Area 9 into the subdivision to the south. From this point they will travel on local streets, join with area 9A runoff, and be discharged at point 9A across Ventura to a local street on the west side of Ventura. This location is the one which was planned to receive these flows by the engineer who designed the downstream development.

Due to the hydraulic characteristics of these flows at intersections 3 & 4, an extra 3" of elevation must be furnished at the right of way boundaries adjacent to these intersections. This extra elevation will provide the barrier necessary to ensure that flows turn and reaccelerate within the ROW limits.

4) Area 10:

Area 10 will discharge directly to Ventura Blvd. which will divert the flows down a local street to the west which was designed in anticipation of these flows.

5) Areas 11 & 12:

These areas will drain to an internal collector street which will discharge into a 30' wide easement channel and then directly into the Domingo Baca Channel.

6) Areas 13-15:

These areas drain naturally to a sump at point 15. Since downstream facilities do not anticipate these runoff rates, six type C inlets will collect the 100 year flows at point 15 and direct them into a 54" RCP storm sewer which will discharge into the Domingo Baca Channel.

7) Area 17:

Flows from area 17 will be diverted via a 20' wide easement channel directly into the Domingo Baca Channel.

8) Areas 18-20 & A:

A water block above point 19 will divert flows from areas A & 19 southerly. After combining with flows from areas 18 and 20 the total will be directed to the Domingo Baca Channel via a second street water block and a 20' wide easement channel.

9) Areas 21 & 22:

Runoff from these areas will discharge directly to Ventura Blvd. where they will be diverted on the surface into the Domingo Baca Channel.

TABLE 1

HYDROLOGICAL FLOW PARAMETERS

AREA/POINT DESIGNATION	AREA (ACRES)	C	AREAS CONTRIBUTING	GROSS AREA (ACRES)	COMPOSITE C	TC (MIN)	R(INCHES) 10 yr.	R(INCHES) 100yr.	Q_{10} PEAK (cfs)	Q_{100} PEAK (cfs)	REMARKS
A	20.90	0.3	A	20.90	0.30	10	2.68	5.4	17	34	
B	77.50	0.3	B	77.50	0.30	20	2.07	4.2	48	98	
1	11.40	.65	1	11.4	.65	10	2.68	5.4	20	40	assume 27% of flow turns
2	9.04	.65	2	9.04	.65	10	2.68	5.4	16	32	
3	19.80	.65	2,3	28.84	.65	10	2.68	5.4	50	101	
4	2.54	.65	1-4	42.78	.65	10	2.68	5.4	70	139	assumes 27% of Pt1 flows turn at Pt1 intersection
5	6.10	.65	5	6.10	.65	10	2.68	5.4	11	21	
6	7.77	.65	5,6	13.87	.65	10	2.68	5.4	24	49	
7	3.19	.65	5,6,7	17.06	.65	10	2.68	5.4	30	60	
8	15.06	.67	8	15.06	.67	10	2.68	5.4	27	54	
9	15.37	.80	9	15.37	.80	10	2.68	5.4	33	66	
9A	10.59	.67	9,9A	25.96	.75	13	2.46	4.97	48	97	
10	18.34	.82	10	18.34	.82	10	2.68	5.4	40	81	
11	26.89	.65	11	26.89	.65	11	2.6	5.25	45	92	
12	8.99	.52	11,12	35.88	.62	15	2.33	4.75	52	102	
13	23.29	.69	13	23.29	.69	11	2.6	5.25	42	84	
14	6.92	.65	14	6.92	.65	10	2.68	5.4	12	24	
15	5.48	.65	13-15	35.69	.68	11	2.6	5.25	63	127	
16	4.96	.73	16	4.96	.73	10	2.68	5.4	10	20	
17	21.44	.65	17	21.44	.65	10	2.68	5.4	37	75	
18	7.64	.65	18	7.64	.65	10	2.68	5.4	13	27	
19	6.28	.7	A,19	27.18	.39	13	2.46	4.97	26	53	
20	0.7	.65	18-20,A	35.52	.45	13	2.46	4.97	40	80	
21	6.29	.8	21	6.29	.8	10	2.68	5.4	13	27	
22	6.70	.8	21,22	12.99	.8	10	2.68	5.4	29	56	

TABLE 1 cont.:

HYDROLOGICAL FLOW PARAMETERS

AREA/POINT DESIGNATION	AREA (ACRES)	C	AREAS CONTRIBUTING	GROSS AREA (ACRES)	COMPOSITE C	TC (MIN)	R (INCHES) 10 yr.	R (INCHES) 100 yr.	Q_{10} PEAK (cfs)	Q_{100} PEAK (cfs)	REMARKS
C	7.3	0.3	C	7.3	0.3	<10	3.67	5.59	8.0	12.2	
D	33.3	0.3	D	33.3	0.3	12	3.33	5.07	33.3	50.7	

TABLE 2

STREET INTERSECTION DATA

POINT DESIGNATION	INTERSECTION LOCATION		Q	STREET WIDTH	SLOPE	Dn	Vn	F	Dc	Vc	JUMP DEPTH= $-\frac{y_1}{2}+\sqrt{\left(\frac{y_1}{2}\right)^2+\frac{2V_1^2 y_1}{g}}$	POOL DEPTH= $D+\frac{1.25\Delta V^2}{2g}$	COMMENTS
9	I 1	Upstream	66	48	.03	.45	6.38	2.3			.87		
		Downstream	66	32	.005	.68	4.39	1.07	.60	4.04		0.92	half crown
	I 2	Upstream	73	32	.005	.68	4.39	1.07			.68(drowned)		
		Downstream	73	32	.032	.46	7.71	2.5	.63	4.19		0.97	half crown
9A	I 3	Upstream	89	32	.032	.50	8.39	2.6			1.25		
		Downstream	89	32	.01	0.64	5.87	1.5	0.71	4.48		1.1	half crown
	I 4	Upstream	89	32	.01	.64	5.87	1.5			0.89		
		Downstream	92	32	.02	.56	7.35	2.07	.72	4.55		1.12	half crown
6	I 5	Upstream	49	40	.04	.39	6.5	2.6			0.84		
		Downstream	59	25	.005	.81	3.77	1.05	.81	3.63		1.06	assumes sidehill; w actually be less due to flow along median curb
10	I 6	Upstream	69	50	.005	0.77	3.68	1.05			0.77(drowned)		assumes sidehill wi flow along median a downhill curbs
		Downstream	81	32	NA				.67	4.33		1.05'	adequate since not all energy will be lost

APPENDIX A

SAMPLE CALCULATIONS

Note: All Conveyance computations are based on Manning's equation.

1) Capacity of Holbrook Half Section to Divert Offsite Flows:

ultimate width = 40'

n = .017

slope = .005 (min)

depth = 0.85'

crown = 0.40'

Q = 118/2 = 59 cfs. > 51 OK

$$\text{Rundown width} = \frac{51}{3(.85)^{1.5}} = 22' \text{ OK}$$

2) Capacity Section A Channel - N. Pino

Q = 642 cfs

slope = .025

sideslopes = 2:1

Bottom width = 10'

n = .015

depth = 2.13'

V = 21.1 fps

freeboard = 1.8

∴

Total channel depth = 4'

3) *Capacity Section B Channel - Domingo Baca*

Q = 1142 cfs

slope = .025

sideslopes = 2:1

Bottom width = 10'

n = .015

depth = 2.9

V = 24.91 fps

freeboard = 1.9'

$\therefore$

Total channel depth = 5'

4) *Street Capacity - Point 3*

Q = 101 cfs

width = 32'

n = .015

slope = .005 (min)

crown = 0.33'

depth = 0.82 < 0.87 OK

5) *Superelevation at bulb in Area 2*

Q = 32 cfs

s = .033

depth = 0.34

Velocity = 5.5 fps

Top width = 32'

Radius = 50'

$$\Delta h = \frac{5.52(32)}{2(32.2)\ (50)} = 0.3' \quad OK$$

6) *Street Capacity - Point 12*

Q = 102 cfs

width = 40'

n = .015

6) slope = 1%

crown = 0.4'

depth = 0.65 < 0.87 OK

Velocity = 5.71 fps

F = 1.5

7) Channel Capacity - Point 12

Bottom width = 30'

slope = 2%

Q = 102 cfs

sideslopes = 0

n = .015 (concrete)

D_2 = 0.3'

depth = 0.6' < 1.0' total channel depth

Velocity = 7.9 fps

8) Street Capacity - Point 13

Q = 84 cfs

width = 32'

n = .015

slope = .005

crown = 0.33'

depth = 0.73' < 0.87

9) Channel Capacities - Points 17 & 20

Q = 75 cfs

slope = 2%

Bottom width = 20'

D_2 = 0.2'

n = .015

sideslopes = 0

depth = 0.58' < 0.87' total channel depth

Velocity = 8.15 fps

10) *Entrance Adequacy - North Pino*

Q = 642 cfs

Upstream Cross Section:

sideslopes = 13.3:1

Bottom width = 80'

n = .02

D_2 *= 1'*

slope = .02

Assuming normal depth

depth = 1.37' with F = 1.77 and V = 8.98

Downstream Cross Section:

sideslopes = 2:1

Bottom width = 10'

D_2 *= 0*

Balancing energy equation

$$\frac{V_U^2}{2g} + S_O L + D_U = \frac{V_D^2}{2g} + D_D + S_E \Delta L$$

for D_D *with* S_O *= .08, L = 80', and n = .025,*

D_D *= 2.64'* $< 5'$ *OK*

11) *Entrance Adequacy - Domingo Baca*

Q = 1142

Upstream Cross Section:

sideslopes = 3:1

Bottom width = 180'

n = .025

D_2 *= 1'*

slope = .035

Assuming normal depth

depth = 1.22, V = 8.85 F = 1.86

11) *Downstream Cross Section:*

sideslopes = 2:1

Bottom width = 10'

$D_2 = 0$

Balancing energy equation for D_D *with S = .0385, L = 260', and n = .025,*

$D_D = 5.13' < 6'$ *OK*

8890735

157

DRAINAGE EASEMENT

THIS INDENTURE made and entered into this 5th day of October, 1988, by and between FELIX DUPRE and LINDA M. DUPRE, his wife, hereinafter referred to as "Grantors" and WILLIAM F. FILTER and SHERRILL K. FILTER, his wife, hereinafter designated as "Grantees";

W I T N E S S E T H

The Grantors, for consideration paid the receipt of which is hereby acknowledged by the Grantors, do hereby grant, bargain, sell and convey unto the Grantees, as owners of the real estate, commonly known as 9604 Bolack Drive, N.E., Albuquerque, New Mexico and more particularly described as:

> Lot numbered Twelve (12) in Block numbered Fourteen (14) of HERITAGE EAST UNIT TWO, a Subdivision in the City of Albuquerque, New Mexico, as the same is shown and designated on the plat thereof, filed for record in the office of the County Clerk of Bernalillo County, New Mexico, on March 19, 1985 in Volume C26, Folio 156.

an easement for drainage purposes, subject to the provisions set forth in the attached Exhibit "A", along, in, over and across the rear thirty (30) inches of the property commonly known as 9608 Bolack Drive, N.E., Albuquerque, New Mexico and more particularly described as:

> Lot numbered Thirteen (13) in Block numbered Fourteen (14) of HERITAGE EAST UNIT TWO, a Subdivision in the City of

WFF JLS
FD SKF

Albuquerque, New Mexico, as the same is shown and designated on the plat thereof, filed for record in the office of the County Clerk of Bernalillo County, New Mexico, on March 19, 1985 in Volume C26, Folio 156.

as indicated on the attached Exhibit "B", and reasonable access to said easement for installation of a drainage pipe and for repairs and maintenance in connection with said drainage purposes, to have and to hold the said easement for the uses and purposes aforesaid unto the Grantees, their heirs, successors, and assigns for so long as said easement shall not be abandoned for use as aforesaid, but in the event of abandonment, the easement granted herein shall thereupon terminate and revert to the Grantors, their heirs, successors or assigns.

Grantors shall fully use and enjoy the aforesaid premises except for the rights herein granted to Grantees.

Felix Dupre
FELIX DUPRE

Linda M Dupre — gave easement
LINDA M. DUPRE

William F. Filter
WILLIAM F. FILTER

Sherrill K. Filter
SHERRILL K. FILTER

STATE OF NEW MEXICO)
)ss.
COUNTY OF BERNALILLO)

The foregoing instrument was subscribed, sworn to, and acknowledged before me this 5th day of October, 1988, by Linda M. Dupre.

Notary Public

My Commission Expires:

1/24/92

STATE OF NEW MEXICO)
)ss.
COUNTY OF BERNALILLO)

The foregoing instrument was subscribed, sworn to, and acknowledged before me this 31 day of October, 1988, by William F. Filter.

Notary Public

My Commission Expires:

April 11, 1992

W47
SKF
FD

STATE OF NEW MEXICO)
)ss.
COUNTY OF BERNALILLO)

The foregoing instrument was subscribed, sworn to, and acknowledged before me this 3rd day of October, by Sherrill K. Filter.

Notary Public

My Commission Expires:

1-24-92

30 WAA
30 SEC
FD

The foregoing instrument was subscribed, sworn to, and acknowledged before me this 27th day of Sept. 1988, 1988, by Felix Dupre, a member of the armed forces of the United States, in Wonju, South Korea.

Ernest Earl Butts
Major US Army

WAA
SLF
FD.

EXHIBIT "A"

1. Any pipe used for drainage in the easement shall be buried and not exposed.

2. The pipe for drainage shall be laid as close to the property line within the easement as good engineering practices allow.

3. The pipe shall be a solid pipe so no drainage onto Grantors' property shall occur.

4. Once in place, no alterations shall be made to the pipe unless required for repair or maintenance.

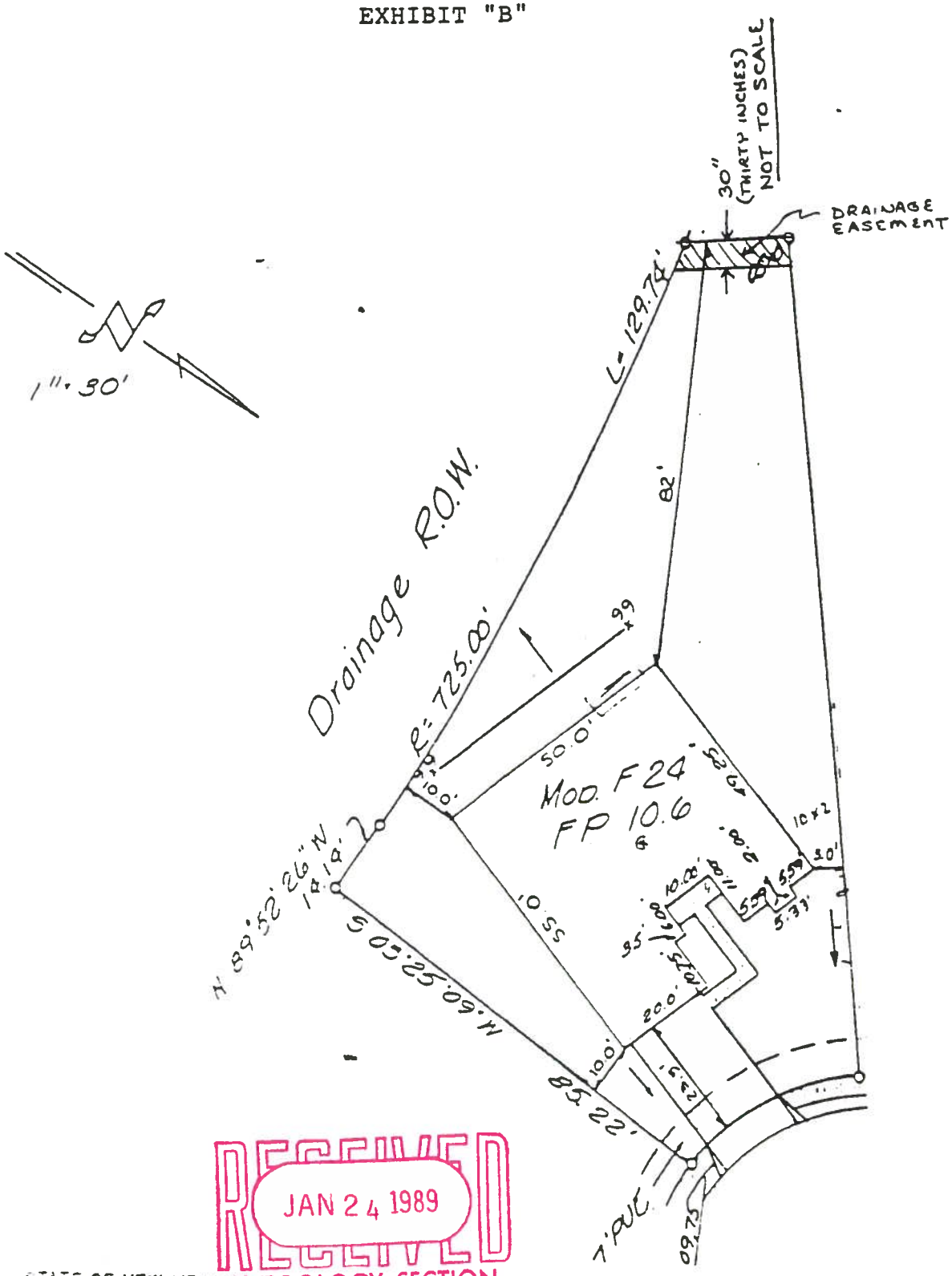
5. Grantees shall repair the Grantors' premises at their expense to their original condition after any repairs or maintenance.

6. All repairs and maintenance shall be at Grantee's expense and will use the least obtrusive method reasonably possible.

7. The Grantees will give notice to Grantors before any repairs or maintenance necessitating access to their property, unless it is an emergency or Grantees are unable to reasonably contact Grantors.

8. Grantees shall, where reasonably possible, use engineering practices which minimize the maintenance required.

EXHIBIT "B"



9608 BOLACK

WA
SLC
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