HYDROLOGY G21/D7 NO PLANS

G21/D7

No Plans

DRAINAGE

GALERIA MALL

JUNE 22, 1973

ENCHANTMENT
ENGINEERING

DESCRIPTION OF AREA

GALERIA MALL SHOPPING CENTER IS A 5.82 ACRE TRACT OF LAND LOCATED ON THE SOUTHEAST CORNER OF MONTGOMERY BOULEVARD AND EUBANK BOULEVARD N.E. PRESENTLY THE LAND CONSISTS OF POOR GRASS AND DRAINS FROM EAST TO WEST WITH AN AVERAGE SLOPE OF 3.5%.

DRAINAGE FROM OTHER PROPERTIES DOES NOT ENTER THIS TRACT OF LAND DUE TO EXISTING STRUCTURES AND THE NATURAL TOPOGRAPHY OF THE SURROUNDING LAND. MONTGOMERY BOULEVARD CHANNELS WATER PAST THE PROPERTY ON THE NORTH, AN EXISTING CONCRETE WALL AND CURB PREVENTS WATER FROM ENTERING ON THE EAST, AND ELEVATION DIFFERENCES KEEP WATER FROM ENTERING ON THE SOUTH AND WEST.

IT IS THE PLAN OF THIS REPORT TO SHOW THAT RUNOFF AFTER DEVELOPMENT WILL NOT BE GREATER THAN THE NATURAL RUNOFF. THIS WILL BE ACCOMPLISHED BY STORING THE INCREASED RUNOFF IN DRY WELLS.

NATURAL RUNOFF FROM THE PROPERTY

A = 5.82 ACRES ?
C = 0.283
I = 4.4 in/hr

Q = CIA = 7.25 CFS

DEVELOPED RUNOFF

ROOFED AREA = 1.66 ACRES
C = .875 FLAT ROOF
I = 5.73 in/hr

Q = CIA = 8.32 CFS

PAVED AREA = 3.96 ACRES
C = 0.92
I = 5.73 in/hr

Q = CIA = 20.87 CFS

PONDING AREA = 0.20 ACRES
C = 0.285
I = 4.4 in/hr

Q = CIA = 0.25 CFS

TOTAL DEVELOPED RUNOFF = 29.44 CFS

INCREASED RUNOFF FROM PROPERTY = 22.19 CFS

PONDING ON PROPERTY

VOLUME OF NATURAL RUNOFF

$253{,}726\ FT^2 \times 2.8^{*}\ in \times \frac{1\ FT}{12\ in} \times .283$

$= 16{,}754\ FT^3$

VOLUME OF DEVELOPED RUNOFF

ROOF TOP PONDING WILL BE USE TO STORE THE RUNOFF FROM THE ROOFS.

PAVED AREA

$172465\ FT^2 \times 2.8^{*}\ in \times \frac{1\ FT}{12\ in} \times .92$

$= 37020\ FT^3$

POND AREA

$8948 \times 2.8^{*}\ in \times \frac{1\ FT}{12\ in} \times .283$

$= 591\ FT^3$

TOTAL DEVELOPED VOL. = 37611 FT^3

REQ. PONDING VOL. = 37611 - 16754

= 20857 FT^3

* 100 YEAR - 6 hr precipitation (NOAA/FCA)

AVAILABLE PONDING VOLUME

$8948 \times 2.5 = 22370$ FT^3

THEREFORE THE STORAGE WELLS WILL CONTAIN THE DEVELOPED RUNOFF

Absorption Rate of Soil

Absorption tests were performed in this area to determine the rate at which rain water runoff will soak into the soil. It is concluded from these tests that the developed runoff, which will be stored in the dry wells, will seep into the soil at a minimum rate of 0.9 in for the last 5 min.,

therefore

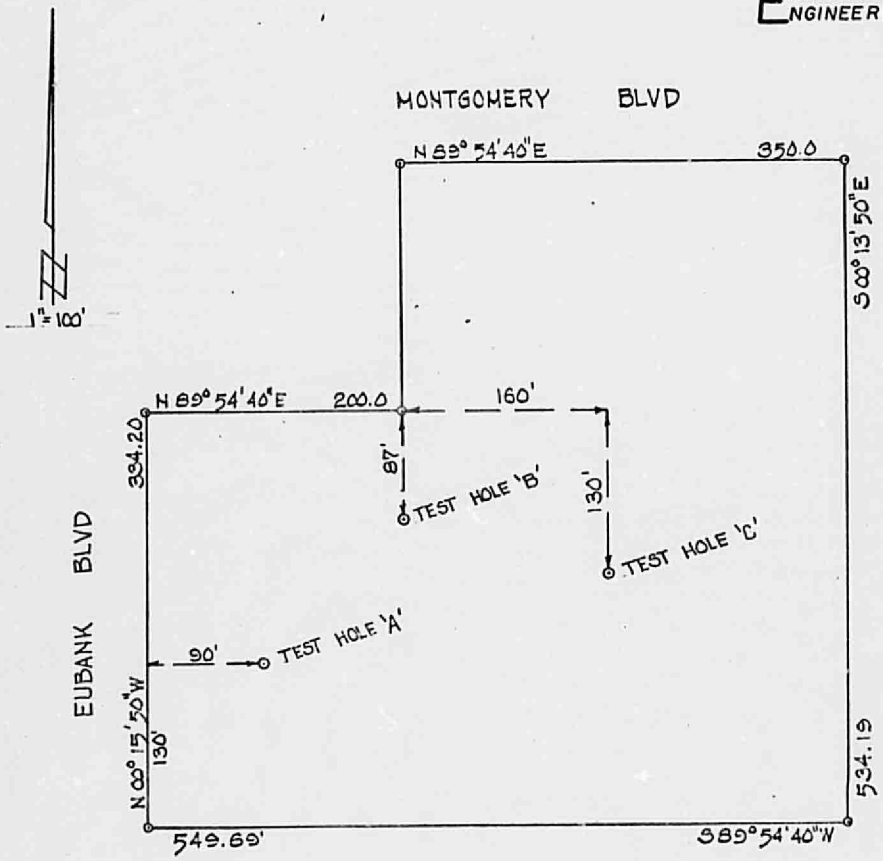
$$K_m = \frac{0.075 \text{ ft}}{5 \text{ min}} = 0.015 \text{ ft/min}$$

hence the estimated maximum time for the dry wells to empty

$$= \frac{2.5 \text{ ft}}{0.015 \text{ ft/min}} = 166.66 \text{ mins}$$

$$= \underline{2.77 \text{ hours}}$$

ENCHANTMENT ENGINEERING



TEST HOLE LOCATION

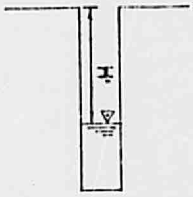
ENCHANTMENT ENGINEERING

PROJECT GALERIA MALL

CLIENT UNLIMITED VENTURES

DATE JAN 17, 1973

TEST HOLE 'A'



DEPTH 40½ in. DIAMETER 8 in

TIME FILLED 10:00 o'clock A M

CHECKED & REFILLED 11:30 o'clock A M

TEST STARTED @ t_o = 12:25 o'clock P M

Watch Time	Δt (mins)	Elapsed Time (from t_o)	H (ins)	ΔH (ins)	Total ΔH (ins)
12.25	—	—	15.4	—	—
12:30	5	5	20.4	5	5
12:35	5	10	22.7	2.3	7.3
12:40	5	15	24.4	1.7	9.0
12:45	5	20	25.7	1.3	10.3
12:50	5	25	26.7	1.0	11.3

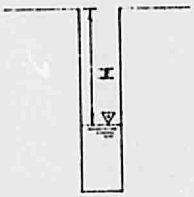
ENCHANTMENT ENGINEERING

PROJECT GALERIA MALL

CLIENT UNLIMITED VENTURES

DATE JAN. 17, 1973

TEST HOLE 'B'



DEPTH 39 3/4 in. DIAMETER 8 in

TIME FILLED 10:10 o'clock A M

CHECKED & REFILLED 11:30 o'clock A M

TEST STARTED & t_o = 12:26 o'clock P M

Watch Time	Δt (mins)	Elapsed Time (from t_o)	H (ins)	ΔH (ins)	Total ΔH (ins)
12:26	–	–	16.6	–	–
12:31	5	5	18.3	1.7	1.7
12:36	5	10	19.6	1.3	3.0
12:41	5	15	20.7	1.1	4.1
12:46	5	20	21.8	1.1	5.2
12:51	5	25	22.7	0.9	6.1

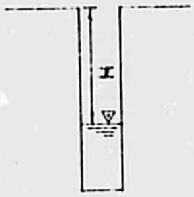
ENCHANTMENT ENGINEERING

PROJECT GALERIA MALL

CLIENT UNLIMITED VENTURES

DATE JAN. 17, 1973

TEST HOLE 'B'



DEPTH 39 3/4 in. DIAMETER 8 in

TIME FILLED 10:10 o'clock A M

CHECKED & REFILLED 11:30 o'clock A M

TEST STARTED & t_o = 12:26 o'clock P M

Watch Time	Δt (mins)	Elapsed Time (from t_o)	H (ins)	ΔH (ins)	Total ΔH (ins)
12:26	-	-	16.6	-	-
12:31	5	5	18.3	1.7	1.7
12:36	5	10	19.6	1.3	3.0
12:41	5	15	20.7	1.1	4.1
12:46	5	20	21.8	1.1	5.2
12:51	5	25	22.7	0.9	6.1

ENCHANTMENT ENGINEERING

PROJECT GALERIA MALL

CLIENT UNLIMITED VENTURES

DATE JAN. 17, 1973

TEST HOLE 'C'

DEPTH 41 in. DIAMETER 8 in

TIME FILLED 10:20 o'clock A M

CHECKED & REFILLED _____ o'clock ___ M

TEST STARTED, t_o = _____ o'clock ___ M

Watch Time	Δt (mins)	Elapsed time from t_o	H (ins)	ΔH (ins)	Total ΔH (ins)

USED 80 gals. OF WATER & NEVER COULD GET HOLE TO FILL OVER 8"

ROOF TOP PONDING

IN ORDER TO PREVENT UNCONTROLLED DISCHARGE FROM THE ROOF AREAS IT WILL BE NECESSARY TO RAISE ROOF SCUPPERS 3 INCHES. This will provide THE NECESSARY VOLUME TO CONTAIN THE STORM WATER RUNOFF FOR A 100-year 6 hour PRECIPITATION project STORM.

THE PONDED ROOF WATER WILL BE DISCHARGED FROM THE ROOF BY LETTING IT DRAIN THROUGH pipes PLACED below THE ROOF SCUPPERS INLETS. DETAILS OF THE ROOF SCUPPER AND ROOF SCUPPER WITH PIPE ARE SHOWN ON THE FOLLOWING SHEETS.

Total RELEASE OF THE ROOF PONDED RUNOFF is TO BE ACCOMPLISHED IN A minimum OF 6 hours AND A MAXIMUM OF 24 hours. Discharge time FOR A FALLING HEAD RESERVOIR IS GIVEN BY THE EQUATION

$$t = -\frac{1}{C_d A_o \sqrt{2g}} \int_{y_1}^{y_2} A_R \, y^{-1/2} \, dy$$

where t = discharge time (sec)
A_o = area of orifice (FT^2)
C_d = discharge coefficient
A_R = horizontal area of reservoir as related to depth (FT^2)
y_1 & y_2 = limits through which head falls (FT)

FOR THE SPECIAL CASE OF A TANK WITH A CONSTANT CROSS-SECTION THIS EQUATION REDUCES TO

$$t = \frac{2A_R}{C_d A_o \sqrt{2g}} \left(\sqrt{y_2} - \sqrt{y_1} \right)$$

THEREFORE THE DISCHARGE TIME FOR THE <u>LOWER ROOF</u> IS AS FOLLOWS;

$$t = \frac{2A_R}{C_d A_o \sqrt{2g}} \left(\sqrt{y_2} - \sqrt{y_1} \right)$$

$A_R = 21420 \text{ FT}^2$
$C_d = 0.59$
$A_o = 2 - 2''\text{OD pipe} = 0.1268 \text{ FT}^2$
$y_2 = 3 \text{ in} = 0.25 \text{ FT}$
$y_1 = 0$

$t = 35678 \text{ sec} = 9.9 \text{ hours.}$

DISCHARGE TIME FOR <u>MIDDLE ROOF</u>

$$t = \frac{2A_R}{C_d A_o \sqrt{2g}} \left(\sqrt{y_2} - \sqrt{y_1} \right)$$

$A_R = 42543 \text{ FT}^2$
$C_d = 0.59$
$A_o = 2 - 2''\text{OD PIPE} = 0.1268 \text{ FT}$
$y_2 = 0.25 \quad y_1 = 0$

$t = 70862 \text{ sec} = 19.7 \text{ hours}$

DISCHARGE TIME FOR <u>UPPER</u> <u>ROOF</u>

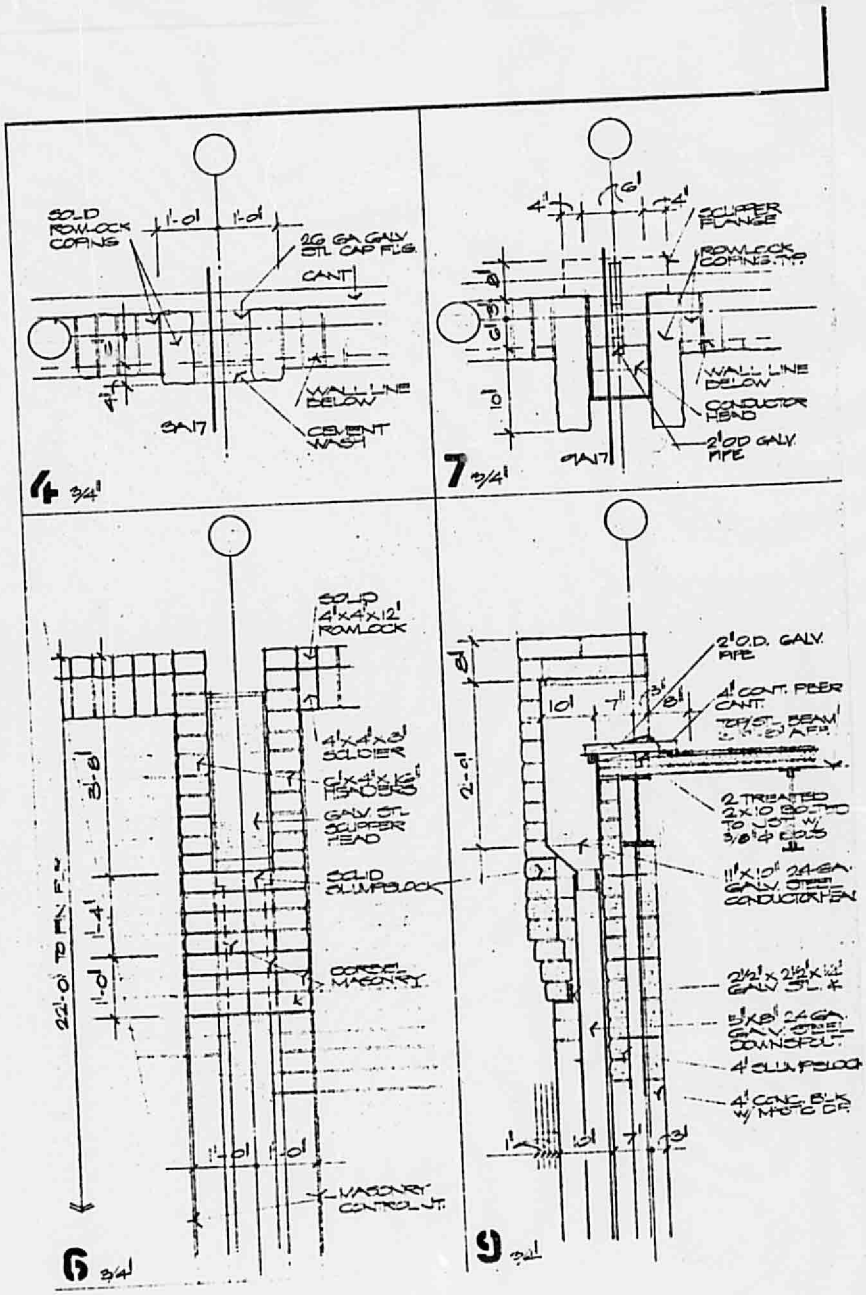
$$t = \frac{2A_R}{C_d A_o \sqrt{2g}} \left(\sqrt{y_2} - \sqrt{y_1}\right)$$

$A_R = 8350 \text{ FT}^2$
$C_d = 0.59$
$A_o = 1 - 2''\text{OD pipe} = 0.0654 \text{ FT}^2$
$y_2 = 0.25 \text{ FT}$
$y_o = 0$

$t = 27824 \text{ SEC.} = 7.7 \text{ HOURS.}$

THEREFORE by placing two scuppers with drain pipes in the lower AND MIDDLE ROOFS AND ONE SCUPPER WITH drain pipe IN THE UPPER ROOF THE DISCHARGE FROM THE ROOFS will FALL within the 6 to 24 hour limits.

Roof Scupper Details



DRAINAGE AFTER DEVELOPMENT

DRAINAGE AFTER DEVELOPMENT IS SIMILAR TO THAT SHOWN ON THE DEVELOPMENT PLAT.

BIBLIOGRAPHY

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2. 1963 Master Plan of Drainage for
City of Albuquerque and its Environs
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3. Fluid Mechanics 4th edit.; McGraw-Hill,
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THE HINKLE CORPORATION

INVESTMENT REAL ESTATE
DEVELOPMENT
PROPERTY MANAGEMENT
LEASING AGENTS

RECEIVED

DEC 22 1983

ENGINEERING

December 21, 1983

Mr. Fred Aguirre
The City Of Albuquerque
Hydrology Division
P. O. 1293
Albuquerque, N.M. 87103

RE: Paradise Square Shopping Center
9800 Montgomery Boulevard N. E,
Albuquerque, New Mexico

Dear Mr. Aguirre:

Montgomery-Eubank Partnership is the owner of approximately 3.8 acres of land and improvements within the 7 acre shopping center located at the South East corner of Montgomery/Eubank N.E (C-21-Z). The Hinkle Corporation has served as managing agent for this property since August, 1975.

The Hinkle Corporation requests a variance from your Division in order that the property complies with all governing rules and regulations set forth by your Division.

Any deviation in the property presently with that of any previous plan has been made with the following justifications:

1. The property was originaaly constructed as shown on the attached photocopy of the site.

2. In the Spring of 1978 the ponds located generally at the South East corner of the property were covered at the urging of the City Environmental Health Department and I was told, by the general contractor, approved by AMAPCA (Mr. Roberts).

3. During 1979, the landscaped ponding areas within the front parking lot were covered. I met a City health official and a drainage person on the site and was told that the restaurants within the center could not operate so long as water ponded in the landscape areas, therefore the ponds were covered with instructions to do so.

CERTIFIED PROPERTY MANAGER®
GENE E. HINKLE, CPM®
DONALD L. HARVEY, CPM®

ACCREDITED MANAGEMENT ORGANIZATION®
GENE E. HINKLE, CCIM®
ROBERT B. KEEFAN, CCIM®

First National Bank Bldg. East / Central & San Mateo, N.E. / P.O. Box 8920 / Albuquerque, N.M. 87198 / (505) 265-9505

We have complied with all previous instructions given to us and ask that you please grant a waiver in favor of the property as it exists today.

Should you desire any additional information from us or our agents please do not hesitate to call me.

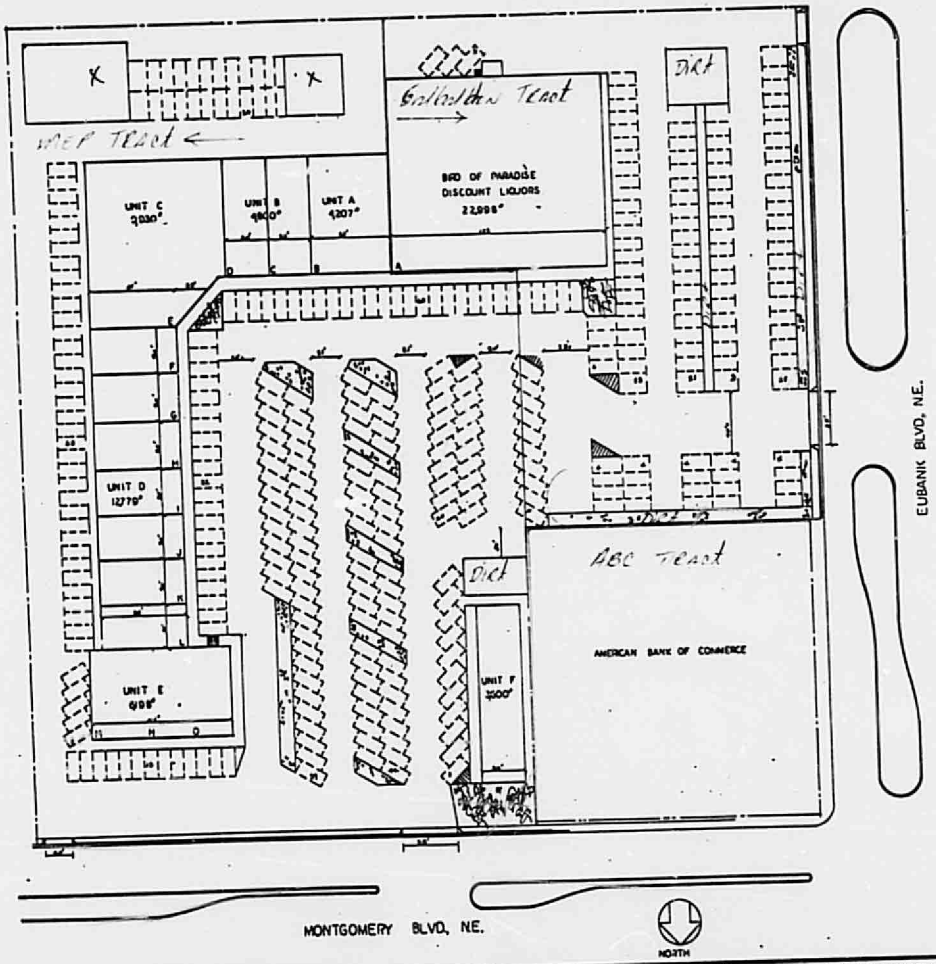
Sincerely,

THE HINKLE CORPORATION

Donald L. Harvey, CPM

DLH:lac

cc: Sandy Eads
Jerry Torr
Montgomery-Burbank Partnership



FLOOR AREA

UNIT	AREA
BIRD OF PARADISE	22,998°
UNIT A	4,207°
UNIT B	4,800°
UNIT C	9,030°
UNIT D	12,779°
UNIT E	6,198°
UNIT F	3,500°
TOTAL	64,512°

PARKING SPACES REQ'D — 304
PARKING SPACES PROVIDED — 305

MONTGOMERY AND EUBANK PLAZA
8800 MONTGOMERY BLVD. NE.

THE HINKLE CORPORATION
LEASING & MANAGEMENT DIVISION
FIRST NATIONAL BANK BLDG. EAST
ALBUQUERQUE, NEW MEXICO

DATED 1-13-78
SCALE 1"=30'0"

SCHEDULE A

AMOUNT $1,750,000.00 Date of Policy: August 14, 1975 at 2:05 PM POLICY NO. 0 1 03453

File No. or GF TI 27,478 gc/tp

1. Name of Insured:

MONTGOMERY - EUBANK PARTNERSHIP, a New Mexico Partnership

2. The estate or interest in the land described herein and which is covered by this policy is: (a fee, a leasehold, etc.)
Fee Simple

3. The estate or interest referred to herein is at Date of Policy vested in:
MONTGOMERY - EUBANK PARTNERSHIP, a New Mexico Partnership

4. The land referred to in this policy is described as follows:

A certain tract of land situate in the Coda Development, a subdivision, City of Albuquerque, New Mexico, and more particularly described as follows:

Beginning at the Southeast corner of the herein described tract whence the Northeast corner of Lot 12, Block 1, San Gabriel Village, No. 5, a subdivision, Albuquerque, New Mexico, (Plat filed December 8, 1965), bears N. 89° 54' 40" E., a distance of 450.00 feet; thence S. 00° 13' 50" E., 336.42 feet and from said beginning point running thence S. 89° 54' 40" W., 549.69 feet; thence N. 00° 15' 50" W., 334.20 feet; thence N. 89° 54' 40" E., 200.00 feet; thence N. 00° 15' 50" W., 200.00 feet; thence N. 89° 54' 40" E., 350.00 feet; thence S. 0° 15' 50" E., 534.19 feet to the point of beginning and containing 5.828 Acres, more or less.

EXCEPTING THEREFROM:
A certain tract of land situate in the Coda Development, a subdivision, City of Albuquerque, New Mexico, and more particularly described as follows:

Beginning at the Southeast corner of the herein described tract whence the Northeast corner of Lot 12, Block 1, San Gabriel Village, No. 5, a subdivision, Albuquerque, New Mexico, (Plat filed December 8, 1965), bears N. 89° 54' 40" E., a distance of 708.34 feet; thence S. 00° 13' 50" E, 336.42 feet and from said beginning point running thence S. 89° 54' 40" W., 291.35 feet; thence N. 00° 15' 50" W., 334.20 feet; thence N. 89° 54' 40" E., 200 feet; thence S. 00° 15' 50" E., 100.00 feet; thence N. 89° 54' 40" E., 92.29 feet; thence S. 00° 02' 10" E., 234.20 feet to the point of beginning and containing 2.02 Acres, more or less. = Excluded Tract

Albuquerque

USLIFE TITLE INSURANCE Company of Dallas
1301 Main Street
Dallas, Texas 75202

JOHN B. ROBERT
EXECUTIVE ENGINEER

B. H. SWINBURNE, CHAIRMAN
FRED LUTHY, JR., VICE-CHAIRMAN
RICHARD H. CLOUGH, SEC.-TREAS.
WILLIAM V. HEREFORD, DIRECTOR
FRANCES McCOY, DIRECTOR

Albuquerque Metropolitan Arroyo Flood Control Authority

2112 GIRARD N.E.
P. O. BOX 25851 - ALBUQUERQUE, N. M. 87125
TELEPHONE 266-4519

July 25, 1973

Memorandum to File

Subject: Galeria Mall (Eubank & Montgomery) Drainage Report by Enchantment Engineering. July 1973

Ponding capacity is capable of holding all water falling onto the site. That rainfall which falls on the paved area of the site will be infiltrated in 10 shallow underground wells. That rainfall which falls on the rooftops will be temporarily ponded there and then discharged over a period of 7.7 to 19.7 hours.

Percolation tests have been taken, off-site drainage areas have been considered and rooftop discharge pipes have been calculated. The overall system does satisfy AMAFCA requirements. It is a novel plan to date.

MB
Michael F. Beautz

7/25 Talked with Bob Foglesong - they will specify plantings in the depressed ponding areas.

G21

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

Ken Schultz
Mayor

UTILITY DEVELOPMENT DIVISION
HYDROLOGY SECTION
(505) 768-2650

June 12, 1987

Bird of Paradise, Inc.
9800 Montgomery Boulevard, NE
Albuquerque, New Mexico 87111

Our office has received a complaint, verified by field inspection, that runoff water from your building at 9800 Montgomery Boulevard, NE, is crossing over the retaining wall to the south, carrying large amounts of sediment into the Eubank Heights Apartment Complex. According to the approved grading plan (enclosed), your runoff was designed to enter into Eubank Boulevard.

We hereby request that you contact our office within 30 days to discuss with us your proposals for correcting the problem. If we are not contacted we will have no alternative but to turn this matter over to the City Legal Department for enforcement of the Drainage Ordinance.

Cordially,

Richard L. Duran
Drainage Inspector

xc: Hayfair

RLD/bsj

enclosure