PLANS/PLATS ON FILE

FILE DESC: E-14/0001

PLANS/PLATS 3

Bruno

June 8, 1977

RECEIVED
RECEIVED
JUN 8 1977
CITY ENGINEERS
CITY ENGINEERS

Mr. V. M. Kimmick
City Engineer
City of Albuquerque
P.O. Box 1293
Albuquerque, New Mexico 87103

Re: Drainage Report for Leesure Acres

Dear Mr. Kimmick:

As agents for Sproul Investment Corporation, we are submitting the above referenced drainage report and pavement evaluation report for your review and approval.

If you should have any questions regarding this matter, please feel free to contact this office. We are looking forward to hearing from you in the near future.

Sincerely,

Michial M. Emery

Michial M. Emery, P. E.
Chief Design Engineer

Enclosure

cc: Sproul Investment Corporation

MJI/dlh
Job No. 77-054

BOHANNAN-HUSTON INC.
4125 CARLISLE BLVD., N.E. ALBUQUERQUE, NEW MEXICO 87107 505 881-2000

ENGINEERS PLANNERS PHOTOGRAMMETRISTS

BOHANNAN-HUSTON INC.

4125 CARLISLE BLVD., N.E. ALBUQUERQUE, NEW MEXICO 87107 505 881-2300

December 6, 1977

Mr. V. M. Kimmick
City Engineer
City of Albuquerque
P.O. Box 1293
Albuquerque, NM 87103

Re: Drainage Report of Leasure Acres Dated April, 1977

Dear Mr. Kimmick:

As a result of our meeting on November 30, 1977, it is assumed that all drainage concepts forwarded in the above-referenced report for the apartments, Tract 1 and Tract 2 are acceptable and that designs can proceed within the parameters of these concepts. If this assumption is correct, please sign below and return a copy of this letter for our files.

We would like to express our appreciation for your personal attention to this matter.

Sincerely yours,

Michael M. Emery

Michial M. Emery, P.E.
Chief Design Engineer

ACCEPTED: _____
V. M. Kimmick, City Engineer

cc: Mr. Elmer Sproul

MME/mna
Job No. 77-054

Carmans Inc.
Engineers · Planners
EL PASO, TEXAS

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

MAYOR
Harry E. Kinney

CHIEF
ADMINISTRATIVE OFFICER
Frank A. Kleinhenz

December 7, 1977

Michial Emery
Bohannan-Huston Inc.
4125 Carlisle Blvd.,NE
Albuquerque, New Mexico 87107

Dear Michial:

This letter follows our conversation of today in the offices of AMAFCA regarding some of the drainage reports that have been reviewed in my office. I want to confirm acceptance of the drainage reports for the following subdivisions.

1. La Charles Villa for the Gary L. Watson Company

2. Crestview V. and Casa Grande Park for H.G. Pickard and Associates

3. Panorama Heights Parcel 3 for Jack M. Clifford & Company

4. Leesure Acres for Sproul Investment Corporation

Very truly yours,

Bruno Conegliano
Asst. City Engineer-Hydrology

BC/gm

cc; Jim Smith
V.M. Kimmick
Drainage file

DRAINAGE REPORT
FOR
LEESURE ACRES

ZONE ATLAS SHEET E-14

APRIL 1977

BOHANNAN WESTMAN HUSTON

DRAINAGE REPORT
FOR
LEESURE ACRES

ZONE ATLAS SHEET H-14

APRIL 1977

BOHANNAN WESTMAN HUSTON & ASSOCIATES INC.
5 Carlisle Boulevard/NE Albuquerque, New Mexico 87110 Phone: 881-2000

DRAINAGE REPORT
FOR
LEESURE ACRES

ZONE ATLAS SHEET E-14

APRIL, 1977

PREPARED FOR

SPROUL INVESTMENT CORPORATION
1420 CARLISLE BLVD., N.E.
ALBUQUERQUE, NEW MEXICO 87107

PREPARED BY

BOHANNAN WESTMAN HUSTON AND ASSOCIATES, INC.
1425 CARLISLE BLVD., N.E.
ALBUQUERQUE, NEW MEXICO 87107

STATE OF NEW MEXICO
MICHIAL M.
EMERY
No. 5194
REGISTERED PROFESSIONAL ENGINEER

Michial M. Emery

MICHIAL M. EMERY, P.E.
NMPE NO. 5194

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APPENDIX

COMPUTATIONS

PLATES

PLATE I	VICINITY MAP
PLATE II	LEESURE ACRES
PLATE III & IV	STORM SEWER PLAN AND PROFILE

DRAINAGE REPORT FOR LEESURE ACRES

PURPOSE

The purpose of this report is twofold. The first objective is to determine the undeveloped and developed runoff from two tracts of land, generaged by a 100 year frequency storm, and to establish guidelines so that the developed runoff from these properties does not exceed acceptable values. Secondly, an investigation is made of the parking and street drainage characteristics within the Leesure Acres Apartments.

PROJECT LOCATION AND DESCRIPTION

The three parcels of land are adjecent to each other and northwest of the intersection of Guadalupe Trail and Fourth Street, N.W. (see Plate I).

Tract 1 contains approximately 3.4 acres of barren land, within the Leesure Acres Apartments. The property is nearly flat, with an average slope of 0.6% from north to south. Tract 1 is presently zoned SU-1 and it is anticipated that a YMCA will be constructed on the site.

Tract 2 contains approximately 15 acres and is located at the northwest corner of Guadalupe Trail and Fourth Street, N.W. It is bordered on the north by the Harwood Lateral. Tract 2 is also nearly flat with an existing slope of 0.7% from north to south. Vegetation is sparse. Presently, this property is expected to be developed as a community shopping center.

The third parcel of land consists of the developed portion of

the Leesure Acres Apartments and lies between Tracts 1 and 2. The apartments will be remodeled as condominiums. Streets and parking areas will be remodeled and renovated to meet the necessary City requirements.

HYDROLOGY

Peak flow rates were determined with the use of the rational formula for a 100 year frequency storm. Rainfall intensities were selected from curves presented in the Master Plan of Drainage, 1963, for the City of Albuquerque. Detention basin volume requirements were based on the modified rational method analysis as presented in Practices in Detention of Urban Storm Water Runoff, produced by the American Public Works Association. Calculations are provided in the Appendix.

DEVELOPMENT OF LEESURE ACRES APARTMENTS

A field investigation of the Leesure Acres Apartments was conducted to determine existing grades. Also, an analysis of the existing pavement is being conducted. With the above information, it was ascertained that positive drainage can be provided.

No attempt will be made to control the runoff from this already developed site, but there will be an extension of the storm sewer from Fourth Street to Track 1. The storm sewer has an excess capacity of 2.4 cfs, and 0.7 cfs of this capacity will be used to help drain the intersection of Guadalupe Trail and Grecian Road, the point to which Leesure Acres drains. This will be accomplished by the construction of a single "C" type drop inlet, with inlet control, at the intersection of Grecian Road and Guadalupe Trail (see Plate II and the Appendix).

DEVELOPMENT OF TRACT 1

Tract 1 receives minor flows from the developed portion of Leesure Acres. This flow will be retained in the Leesure Acres street system with the completion of the curb and gutter on the north side of the tract. Therefore, for the purpose of this report, no external flow will enter this tract.

Tract 1 has an undeveloped runoff rate of 7.1 cfs. According to the AMAFCA Drainage Resolution 1972-2, the development of property should not increase runoff. In accordance with this guideline, the developed runoff rate will not exceed 7.1 cfs. The excess runoff from the developed site will be stored on the site in a detention area, possibly the parking lot. The detention area will be designed such that it will hold all runoff volume minus the 0.8 cfs released through an orifice to the storm sewer that will be constructed to the site. There will be a weir on the detention basin with a maximum flow rate of 4.2 cfs, the crest of the weir being the top surface of the stored volume (see Plates II, IV, and the Appendix).

DEVELOPMENT OF TRACT 2

Tract 2 is lower, in elevation, than the surrounding streets. Therefore, Tract 2 receives upland runoff from the west half of Fourth Street and the north half of Guadalupe Trail. To prevent this upland flow from entering the property, the construction of a berm along Fourth Street and Guadalupe Trail is recommended. Therefore, for the purpose of this report, upland runoff will be neglected.

After the construction of the berm, all runoff from the site will be diverted to a detention area, preferably, along the inside edge of the berm. The detention basin will release 0.9 cfs through an inlet

control device into the storm sewer (see Appendix).

The berm and detention area both could be used to fulfill the City of Albuquerque's requirement for 7% of the property to be landscaped.

RECOMMENDATIONS

The following recommendations are made for the development of the three parcels.

1. Extend the storm sewer from Fourth Street to the east edge of Tract 1.

2. Construct a drop inlet at the intersection of Guadalupe Trail and Grecian Road with an orifice to control inlet capacity.

3. Limit discharge into the storm sewer from Tracts 1 and 2 after development to 0.8 and 0.9 cfs respectively. Procedures outlined in this report for controlling the runoff are suggested.

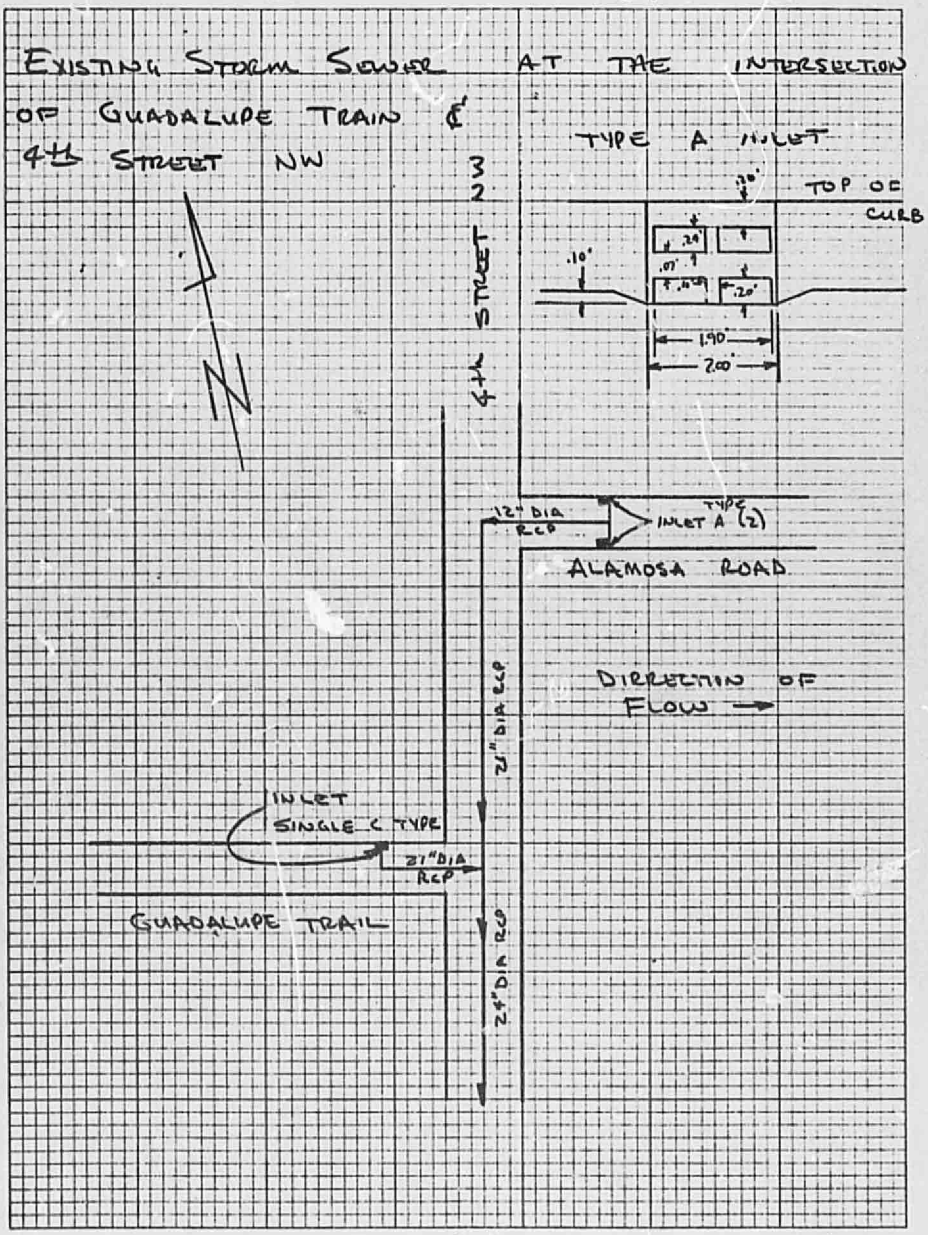
4. Construct curb and gutter to the north of Tract 1.

5. Upgrade pavement and valley gutters in the Leesure Acres apartment complex to allow positive drainage to Grecian Road and as outlined in the report by F. M. Fox & Associates.

APPENDIX

COMPUTATIONS

EXISTING STORM SEWER AT THE INTERSECTION OF GUADALUPE TRAIN & 4th STREET NW



PROJECT NAME	LEESURE ACRES	SHEET 1	OF 14
PROJECT NO.	77-054	BY MJJ	DATE 5-9-77
SUBJECT	DRAINAGE REPORT	CH'D	DATE

CALCULATE RESERVE CAPACITY OF 24" PIPE IN 4TH ST

$Q = cA\sqrt{2gh}$ FROM SEELYE DATA BOOK FOR CIVIL ENGR. DESIGN

$Q = (.6)(.44)(1.8)[(2)(32.2)(.39)]^{1/2}$

$Q = 2.38\ (.66)$ ← [CLOGGING FACTOR] !

$Q = \boxed{1.59\ CFS}$ INLET TYPE A

CAPACITY OF 12" PIPE @ S = .0012 IN ALAMUSA RD.

$$Q = \frac{1.49}{.011}\left(\frac{12}{4\times12}\right)^{2/3}(.0012)^{1/2}\left(\frac{\pi\left(\frac{12}{12}\right)^2}{4}\right)$$

= 1.46 CFS CAPACITY OF 12" PIPE CONTROLS FLOW FROM INLETS

CAPACITY OF 24" DIA PIPE IN 4th STREET

$$Q = \frac{1.49}{.011}\left(\frac{24}{4\times12}\right)^{2/3}(.0011)^{1/2}\left(\frac{\pi\left(\frac{24}{12}\right)^2}{4}\right)$$

Q = 8.89

CAPACITY REMAINING:

8.89 CFS − (1.46 + 5) = 2.43 CFS

1 SINGLE 'C' DROP INLET IN CULVERT-LIKE TRAIL

PROJECT NAME Leisure Acres SHEET 2 OF 14
PROJECT NO. 77-054 BY MJI DATE 4-13-77
SUBJECT Storm Sewer Capacity CH'D DATE

CALCULATE HEADWATER DEPTH WITH INLET CONTROL

FROM HYDRO CONDUIT CORP. MAN.

FOR PIPE IN ALAMOSA RD.

FOR 12" @ 1.59 CFS

FROM PG 5.22 NOMOGRAPH

HW/D = .79' = 9.84" < DEPTH OF DROP INLET

FOR PIPE IN 4th STREET

FOR 24" @ 8.89 CFS

HW/D = .84 = 20.16" = 1.68'

THIS IS TO CHECK CAPACITY OF PIPE AND TO INSURE FLOWS DO NO BACK UP FLOW UPSTREAM.

PROJECT NAME LEASURE ACRES SHEET 3 OF 14

PROJECT NO. 77-054 BY MJI DATE 4-13-77

SUBJECT HEADWATER DEPTH UP-STREAM CH'D _____ DATE _____

UNDEVELOPED RUNOFF FROM TRACT 1

$S = 0.6\%$ $L = 300'$ $A = 3.39$ ACRES

BARREN FLAT HARD PACKED SOIL

ASSUME $C = .45$

$T_c = \text{Log}^{-1}(.3641(B) + .3854(\text{Log}\,L) - .197(\text{Log}\,S) - .3613)$

WHERE: T_c IS TIME OF CONCENTRATION (MIN)

B IS GROUND FACTOR

(FOR BARE SOIL $B = 1.52$)

L LENGTH OF COURSE

S SLOPE OF LAND IN PERCENT

$T_c = \text{Log}^{-1}[.3641(1.52) + .3854(\text{Log}\,300) - .197(\text{Log}\,.6) - .3613]$

$T_c = 15.51$ MIN

$i = \frac{189}{T_c + 25}$ (RAINFALL INTENSITY FOR A 100 YR STORM)

$i = 4.67$ IN/HR

$Q = CiA$ WHERE C RUNOFF FACTOR

A AREA IN ACRES

$Q = .45(4.67)3.39 = \underline{7.12 \text{ CFS}}$

PROJECT NAME	LEASURE ACRES	SHEET 4	OF 4
PROJECT NO.	77-054	BY MVI	DATE 4-14-77
SUBJECT	DRAINAGE REPORT	CH'D	DATE

DEVELOPED RUNOFF FROM TRACT 1

FOR COMPUTATION IN TABLE 1, C = .77

S = .3% L = 500'

$T_c = \text{Log}^{-1}(.3641(.77) + .3854(\text{Log } 500) - .197(\text{Log } .3) - .3612)$

$T_c = 11.54$

$i = \frac{189}{11.54 + 25} = 5.17$ IN/HR

$Q = .85(5.17)3.39 = \underline{14.9 \text{ CFS}}$

(FOR COMPUTATIONS IN TABLE 1)

PROJECT NAME LEESURE ACRES SHEET 3 OF 14

PROJECT NO. 77-054 BY MJI DATE 4-14-77

SUBJECT DRAINAGE REPORT CH'D DATE

TABLE I

MAXIMUM VOLUME OF DETENTION TRACT 1

$i = \frac{189}{25+t_c}$ $Q = CiA$ C = RUNOFF FACTOR = .85

A = AREA 3.39 ACRES

STORM DURATION (t_c)	INTENSITY (i)	RUNOFF RATE (Q)	VOLUME OF RUNOFF	DISCHARGE RATE (Q_{out})	DISCHARGE VOLUME	Δ VOLUME
11 SMIN	5.17 in/hr	14.90 CFS	10280 CF	.8 CFS	550 CF	9730 CF
15	4.73	13.62	12250	.8	700	11550
20	4.20	12.10	14500	.8	950	13550
25	3.78	10.89	16350	.8	1200	15150
30	3.44	9.90	17800	.8	1450	16350
35	3.15	9.08	19050	.8	1700	17350
40	2.91	8.38	20100	.8	1900	18200
45	2.70	7.78	21000	.8	2150	18850
50	2.52	7.26	21800	.8	2400	19400
55	2.36	6.81	22450	.8	2650	19800
60	2.22	6.41	23050	.8	2900	20150
65	2.10	6.05	23600	.8	3100	20500
70	1.99	5.73	24100	.8	3350	20750
75	1.89	5.45	24500	.8	3600	20900
80	1.80	5.19	24900	.8	3850	21050

PROJECT NAME LEESURE ACRES SHEET 6 OF 14

PROJECT NO. 77-054 BY MJI DATE 4-14-77

SUBJECT WATER DETENTION CH'D _____ DATE _____

CONT.

STORM DURATION	INTENSITY	RUNOFF RATE	VOLUME OF RUNOFF	DISCHARGE RATE	DISCHARGE VOLUME	Δ VOLUME
85 MIN	1.72 IN/HR	4.95 CFS	25250	.8	4100	21150
90	1.64	4.74	25550	.8	4300	21250
95	1.58	4.54	25850	.8	4550	21300
100	1.51	4.36	26141	.8	4800	21341
105	1.45	4.19	26392	.8	5040	21352 *
110	1.40	4.03	26625	.8	5280	21345
115	1.35	3.89	26841	.8	5520	21321

VOLUME TO BE STORED ON SITE AT PEAK 21352 CF

PROJECT NAME LEESURE ACRES SHEET 7 OF 14
PROJECT NO. 77-054 BY MJI DATE 9-14-77
SUBJECT WATER RETENTION CH'D _____ DATE _____

UNDEVELOPED RUNOFF FROM TRACT 2

AREA 3.75 ACRES

B = 1.84 POOR GRASS

C = .20 " "

L = 400'

S = .5%

$T_c = \text{Log}^{-1}[.3641(1.84) + .3834(\text{Log } 400) - .197(\text{Log } .5) - .3612]$

= 23.48 MIN

$i = \frac{189}{23.48 + 25} = 3.90$ IN/HR

$Q = (.20)(3.90)(3.75) = \underline{2.92 \text{ CFS}}$

THE REMAINDER OF THIS TRACT DOES NOT DRAIN BUT IS DETAINED WITHIN.

THIS RUNOFF OCCURS ONLY ON THE PARCELS OF LAND SURROUNDING THE ADOBE HOUSE. ALL THE REMAINING PROPERTY IS LOWER THAN SURROUNDING LAND. THIS RUNOFF LEAVES THE PROPERTY AT THE INTERSECTION OF GRELIAN ROAD AND GUADALUPE TRAIL.

PROJECT NAME LEESURE ACRES SHEET 8 OF 14
PROJECT NO. 77-054 BY MJI DATE 1-18-77
SUBJECT DRAINAGE REPORT CH'D _____ DATE _____

POSSIBLE REPRODUCTION DUE TO THE POOR QUALITY OF THE ORIGINAL DOCUMENT.

POSIBLE (FOR COMPUTATION OF TABLE 2)
DEVELOPED RUNOFF RATES FROM TRACT 2

AREA = 15.01 ACRES L = 1200'

B = .77 S = .5 %

C = .85

$T_c = \text{Log}^{-1}\left[.3641(.77) + .2834 \text{ Log}(1200) - .157(\text{Log } .5) - .3601\right]$

$T_c = 14.62$

$i = \frac{189}{14.62+25} = 4.77$ in/HR

$Q = (.85)(4.77)(15.01) = 60.31$ cfs

(FOR COMPUTATIONS OF TABLE 2)

PROJECT NAME LEE SUBE ACRES SHEET 9 OF 14
PROJECT NO. 77-07-4 BY MJI DATE 4-19-77
SUBJECT DRAINAGE REPORT CH'D DATE

POSSIBLE REPRODUCTION DUE TO THE POOR QUALITY OF THE ORIGINAL DOCUMENT.

TABLE 2

MAXIMUM VOLUME OF DETENTION TRACT 2

$C = \frac{187}{25+t_c}$ $Q = CIA$ C = RUNOFF FACTOR = .85

A = AREA = 15.01 ACRES

STORM DURATION	INTENSITY	RUNOFF RATE	VOLUME OF RUNOFF	DISCHARGE RATE	DISCHARGE VOLUME	Δ VOLUME
(t_c)	(I)	(Q)	CF =	(Q_OUT)	CF	CF
115 MIN	1.35	17.22	118845	.9	6210	112635
120	1.30	16.63	119736	.9	6480	113256
125	1.26	16.08	120567	.9	6750	113818
130	1.22	15.56	121346	.9	7020	114326
135	1.18	15.07	122075	.9	7290	114785
140	1.15	14.61	122760	.9	7560	115200
145	1.11	14.18	123405	.9	7830	115575
150	1.08	13.78	124013	.9	8100	115913
155	1.05	13.40	124587	.9	8370	116217
160	1.02	13.03	125130	.9	8640	116490
165	.99	12.69	125644	.9	8910	116734
170	.97	12.37	126132	.9	9180	116952
175	.95	12.06	126596	.9	9450	117146
180	.92	11.76	127037	.9	9720	117317
185	.90	11.48	127457	.9	9990	117467

PROJECT NAME LEESURE ACRES SHEET 10 OF 14

PROJECT NO. 77-054 BY MWI DATE 4-18-77

SUBJECT DRAINAGE REPORT CH'D DATE

CON'T.

STORM DURATION	INTENSITY	RUNOFF RATE	VOLUME OF RUNOFF	DISCHARGE RATE	DISCHARGE VOLUME	Δ VOLUME
(td)	(i)	(Q)	CF	(Qout)	CF	CF
190	.88	11.22	127858	.9	10260	117598
195	.86	10.96	128240	.9	10530	117710
200	.84	10.72	128606	.9	10800	117805
205	.82	10.48	128955	.9	11070	117885
210	.80	10.26	129290	.9	11340	117950
215	.79	10.05	129610	.9	11610	118000
220	.77	9.84	129918	.9	11880	118038
225	.76	9.65	130213	.9	12150	118063
230	.74	9.46	130497	.9	12420	118077
235	.73	9.27	130770	.9	12690	118080 *
240	.71	9.10	131032	.9	12960	118072
245	.70	8.93	131285	.9	13230	118055

118080 CF STORAGE AREA

PROJECT NAME LEESBURG ACRES SHEET 11 OF 14
PROJECT NO. 77-054 BY MJI DATE 4-18-77
SUBJECT DRAINAGE REPORT CH'D _____ DATE _____

ORIFICE SIZING FOR TRACT 2

STORAGE AREA

$Q = CA\sqrt{2gh}$ WHERE C = ORIFICE COEF

USE .6

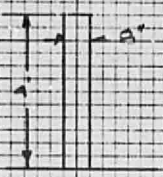
A = AREA REQ

g = 32.2 ft/sec²

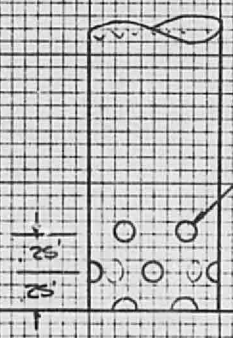
h = HEAD (4')

$Q = .6(A)\sqrt{2(32.2)4}$ WHERE Q = 1 CFS

A = .10 ft² 14.95 in² A 2.18" DIA PIPE



BOTTOM OF POND



1½" DIA HOLES 4 @ .25' FROM BOTTOM OF POND + 2 @ .5' FROM BOTTOM OF POND + 4 1½" DIA SEMI CIRCLES BOTTOM OF POND

PROJECT NAME LEESURE ACRES SHEET 12 OF 14

PROJECT NO. 77-054 BY MJI DATE 4-18-77

SUBJECT DRAINAGE REPORT CH'D DATE

Q FOR STAND PIPE

$$Q = \frac{(.75)^2\pi}{144}(.6)\sqrt{2(32.2)35} + \frac{(.75)^2\pi}{144}(.4)(.6)\sqrt{2(32.2)3.75}$$

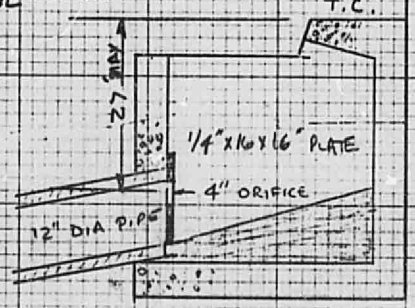
$$+ \frac{(.75)^2\pi}{(144)2}(.6)\sqrt{2(32.2)4}$$

$Q = .9$ CFS

THIS DISCHARGE FROM THE STORAGE AREA FOR TRACT 2 SHOULD BE LOCATED IN THE VICINITY OF THE SOUTH EAST CORNER OF THE TRACT AND DISCHARGE INTO THE MANHOLE AT THE INTORSECTION OF 4th AND GUADALUPE TRAIL

INLET CONTROL AT DROP INLET

AT THE INTERSECTION OF GRECIAN ROAD AND GUADALUPE TRAIL



$Q = (.6)(.0873)[(2)(32.2)(27)]^{1/2}$ 2.7' HEAD

$= .69$ CFS

$Q = (.6)(.0873)[(2)(32.2)(3.4)]^{1/2}$ 2.4' HEAD

$= .78$ CFS

PROJECT NAME LEASURE ACRES SHEET 14 OF 14

PROJECT NO. 77-054 BY MJ DATE

SUBJECT DROP INLET CONTROL CH'D DATE

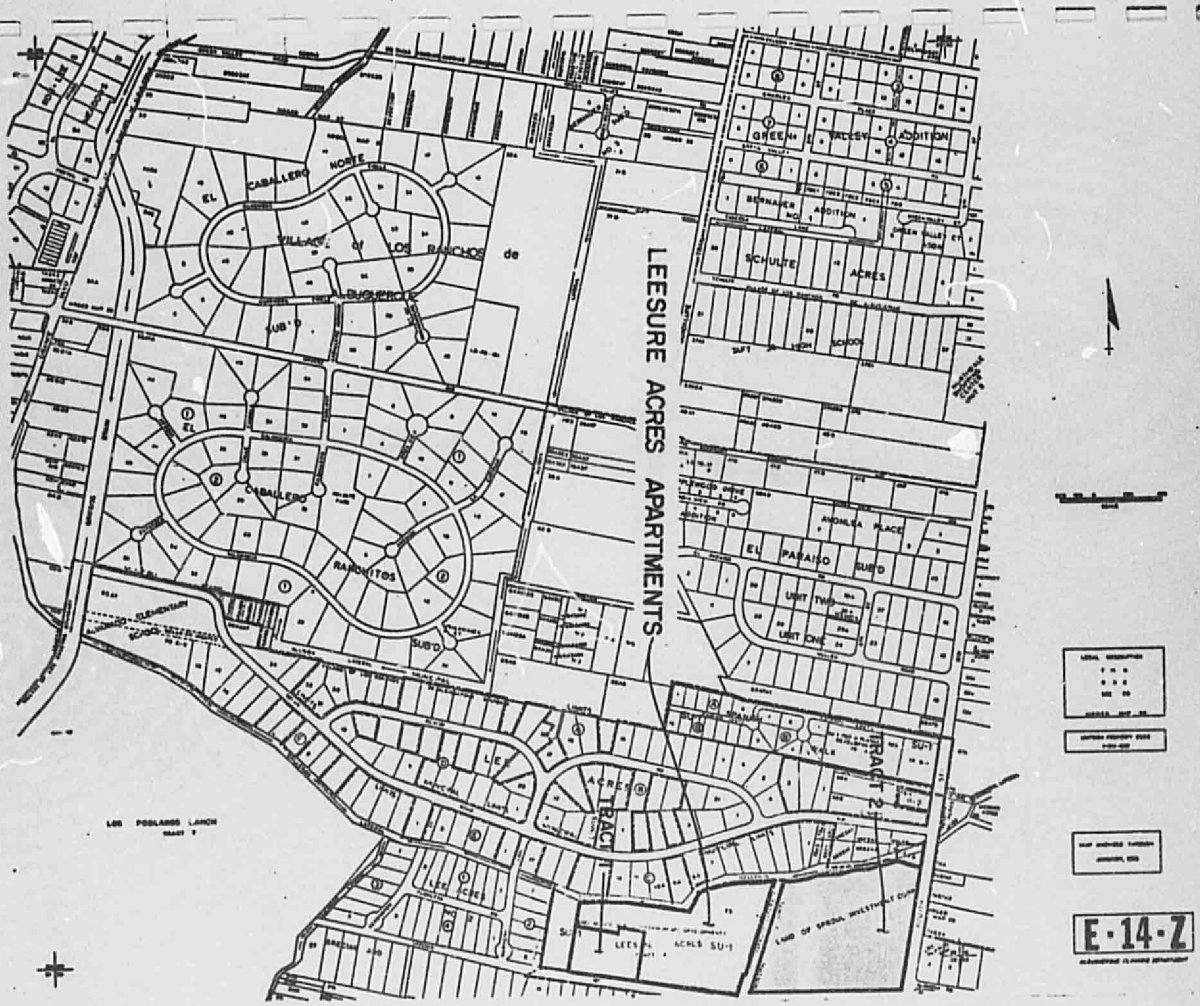

LEESURE ACRES APARTMENTS
TRACT 1
TRACT 2
EL CABALLERO NORTE
VILLAGE of LOS RANCHOS de ALBUQUERQUE
SUB'D
EL CABALLERO
RANCHITOS
SUB'D
GREEN PRESERVE ADDITION
BERNALILLO ADDITION
SCHULTE ACRES
ANDALUSIA PLACE
EL PARAISO SUB'D
UNIT TWO
UNIT ONE
LEES ACRES
LEES ACRES SU-1
LOS PODLANDS LANCH
E-14-Z

PLATE I

BOHANNAN WESTMAN HUSTON & ASSOCIATES, INC.

PLAN/PLATS

ON

FILE

1488