HYDROLOGY F18/D5 ONE PLAN

F18-D5

1 PLAN

ENGINEERS & PHOTOGRAMMETRISTS

BOHANNAN WESTMAN HUSTON & ASSOCIATES INC.

4125 CARLISLE BLVD. N.E.
ALBUQUERQUE, NEW MEXICO 87107
PHONE 505 345-2681

6 April 1973

Hugh Knoell Builders, Inc.
4100 Silver SE
Suite C
Albuquerque, New Mexico 87108

ATTN: H. William Fanning, A.I.A.

RE: El Camino Hermoso

Gentlemen:

We are submitting this drainage report to you on your El Camino Hermoso development at the intersection of San Pedro NE and McLeod NE.

The recommended drainage control methods will retain a substantial portion of the runoff after development on the site. The runoff from the site will enter McLeod road and drain west along McLeod to its intersection with San Mateo. The runoff in McLeod will be slightly increased however, the decrease of concentration time at this point should reduce any harmful accumulation of this runoff with runoff from east of San Pedro.

We appreciate the opportunity to serve your firm. We will be available for further assistance should additional questions concerning this drainage arise.

Very truly yours,

Raymond R. Gibson, PE & LS
Civil Engineering Manager

RRG/teg

DRAINAGE REPORT

FOR

EL CAMINO HERMOSO

April 6, 1973

Prepared for

Hugh Knoell Builders, Inc.
H. William Fanning, A.I.A.
4100 Silver SE Suite C
Albuquerque, New Mexico
87108

By:

BOHANNAN WESTMAN HUSTON & ASSOCIATES, INC.
4125 Carlisle Blvd NE
Albuquerque, New Mexico
87107

REGISTERED PROFESSIONAL ENGINEER AND LAND SURVEYOR
NO. 3769
NEW MEXICO
RAYMOND R. GIBSON

DRAINAGE REPORT

El CAMINO HERMOSO
Albuquerque, New Mexico

TABLE OF CONTENTS

	PAGE
LOCATION AND DESCRIPTION	1
EXISTING DRAINAGE	1-2
DEVELOPMENT	2-3
METHODS	3
CALCULATIONS	4-7
CONCLUSIONS AND RECOMMENDATIONS	8
BIBLIOGRAPHY	9

PLATES

Plate 1 - General Location

Plate 2 - Site Layout and Grading Plan

Plate 3 - Recommended Typical Sections

DRAINAGE REPORT

EL CAMINO HERMOSO

LOCATION AND DESCRIPTION

This tract of land is located on San Pedro NE, several blocks north of Montgomery Avenue. It lies on the northwest corner of the intersection of San Pedro and McLeod Avenue.

The land at present is vacant with a very poor grass cover. It is used as an impromptu playground by many neighborhood children. Single family residents border the tract on the west and north boundaries. Across the street on McLeod Avenue are apartments, while to the east of San Pedro single family residents are found.

The tract slopes to the south west on about a 2.5% grade.

San Pedro is paved with curb and gutters. San Pedro has an island or median barrier with a break in the median opposite the proposed entrance. McLeod is paved with curbs and gutters. There are no existing sidewalks.

The tract is located on the primeval delta of the Bear Arroyo. The Bear Arroyo has incised a Canyon over 50 feet deep to the north of the tract. The tract and the surrounding area is on land which slopes into the Vineyard Arroyo Watershed.

The soil is decomposed granite and silt with a few granite cobbles. General infiltration characteristics should be good.

EXISTING DRAINAGE

The paved streets of San Pedro and McLeod carry all existing drainage around the tract so that there is no problem of runoff

from adjacent land.

The tract itself drains to the southwest through an existing curb cut into McLeod Street NE. In turn McLeod runs westward and drains to San Mateo. At San Mateo four storm sewer inlets collect the flow.

Existing drainage of the tract is computed at 11 cfs. See the Calculations section of this report.

McLeod Street NE drains an area east of San Pedro extending to Sherwood Street. This area comprises approximately 19 acres and will contribute 36 cfs to McLeod Avenue. See Plate 1 and Calculations. With the additions of the existing tract drainage with approximately the same time and concentration McLeod Street has adequate capacity for the combined flows.

DEVELOPMENT

Development on the tract is to consist of 32 townhouses on individual lots. The houses will be continuous at lot lines with a back patio and garden and a small front planting area. All precipitation falling in the back patio and garden and the front garden will be retained. The houses will be grouped around a circular roadway with a single entrance on San Pedro NE. There will be eight mini parks or planting areas. These range in size from 400 square feet to 9900 square feet.

These parks will be landscaped with grass cover and plantings of various shrubbery. Header curbs will be used to retain all precipitation falling on these areas. This retained runoff will infiltrate into the soil beneath.

The roadway will be graded to drain southwesterly to a drainageway leading to McLeod Road NE.

Calculations of runoff from the roofs, driveways, and street are shown in the Calculations sections of this report. The expected flow from the developed property is approximately 13 cfs. A major portion of the developed flow has been retained on the property.

METHODS

In accordance with the Albuquerque Metropolitan Arroyo Flood Control Authority resolution and present City Engineering policies the runoff has been retained on the property to the greatest extent possible. Retention and infiltration areas have been provided to allow valuable infiltration of runoff into the sub strata of the bajada and also to attenuate the flows from the developed property.

The remaining flow has been directed into McLeod Road where adequate capacity is available to carry accumulated runoff westward into the Vineyard Arroyo Watershed and collection facilities.

Precipitation runoff has been estimated for the 100 year storm and computations of runoff rates and total volumes accumulated accordingly.

CALCULATIONS

McLeod Avenue at present carries runoff from approximately 19 acres west of San Mateo. Using the rational formula Q = CiA and assuming parameters for fully developed housing areas, the flow can be calculated.

Assume C = .65 and length is approximately 1400 feet and the time of concentration is 18 minutes.
Intensity i = 4.2 inches per hour.

Then Q = .45 X 4.2 X 19 Acres = 36 cfs.

McLeod is a 32' street with a 6" crown and is on a 3% grade. It's capacity is approximately 130 cfs.

LOT AREA COMPUTATIONS

LOT NO.	TOTAL AREA	RUNOFF AREA	RETAINED AREAS
1	3,290	2,000	1,290
2	3,027	2,000	1,027
3 thru 9	20,790	14,000	6,790
10	4,620	2,000	2,620
11 thru 19	26,730	18,000	8,730
20	3,696	2,000	1,696
21 thru 25	14,850	10,000	4,850
26	3,412	2,000	1,412
27 thru 29	9,292	6,000	3,292
30	3,413	2,000	1,413
31	3,587	2,000	1,587
32	3,286	2,000	1,286
SUB TOTALS	99,993	64,000	35,993

TRACT AREA COMPUTATIONS

TRACT	TOTAL AREA	RUNOFF AREA	RETAINED AREA
A	36,420	36,420	0
B	9,899	0	9,899
C	8,150	0	8,150
D	5,791	0	5,791
E	1,362	0	1,362
F	3,125	0	3,125
G	930	0	930
H	1,359	0	1,359
J	371	0	371
SUB TOTAL	68,407	36,420	30,987

TRACT AREA SUMMARIES

DESCRIPTION	TOTAL AREA	RUNOFF AREA	RETAINED AREA
Lots	99,993	64,000	35,993
Tracts	67,407	36,420	30,987
TOTALS	167,400	100,420	66,980

Complete parcel area = 163,080 sq. ft. = 3.749 Acres.

Frontage Areas in Tracts

C and D on San Pedro = 4,320 sq. ft. = .099 Acres

Total Affected Area = 167,400 sq. ft. = 3.848 Acres

Total runoff prior to development by the rational formula is:

Q = CiA C = .65 A = 3.85 Acres

length = 500 feet slope = 2.30%

From: Seelye: Concentration time "t" is 18 minutes and intensity "i" for a 100 year storm is 4.4 inches per hour.

Q (prior to development) = 11.01 cfs.

After development all runoff areas will be roofed over or paved.

C = .95 & t = 7 minutes

i = approximately 6 inches per hour.

Q (after development) = 13.14 cfs.

TRACT ANALYSIS

Tract Number	Total Area	* Q in c.f.	Infiltration Area
B	9,899	1,966	3,900
C	8,150	1,619	2,713
D	5,791	1,150	2,046
E	1,362	270	608
F	3,125	621	1,250
G	930	185	930
H	1,359	270	863
J	371	74	371
TOTALS	30,987		11,144

Tract Number	Average Depth	Available Volume
B	.50 ft.	1,950 cu.ft.
C	.60 ft.	1,628 cu.ft.
D	.60 ft.	1,228 cu.ft.
E	.45 ft.	273 cu.ft.
F	.60 ft.	750 cu.ft.
G	.40 ft.	372 cu.ft.
H	.40 ft.	345 cu.ft.
J	.50 ft.	186 cu.ft.

$$*Q \text{ in cfs} = A \frac{(P - .2S)^2}{P + .8S} = A \quad (2.38 \text{ in})$$

For grassed in areas assume S = .6 where S is percent of runoff retained by soil and cover. Use P = 3" for a 100 year flood.

CONCLUSIONS AND RECOMMENDATIONS

The development of this tract will increase the runoff rate in McLeod by a very small percentage of its total flow, 2 c.f.s. versus 47 c.f.s. This increase can easily be accomodated by McLeod which has a capacity of approximately 130 c.f.s.

This increase may not occur unless the storm distribution and directions of travel is just right because of the change in concentration time. Under probable duration and distribution the decreased concentration time for the developed area would allow the flows from El Camino Hermoso to be passed their peak some 10 minutes before the peak flow from east of San Pedro occurs. These peaks are very nearly coincident in the undeveloped state.

Infiltration in the developed state should be equal to or perhaps greater than infiltration in the undeveloped state. At present the grass cover is very poor and runoff is expedited by numerous foot paths and bike trails across the property.

It is recommended that the methods of handling the drainage of this tract be approved and implemented in the site construction. The results obtained will conform to existing resolutions and policies and will not cause a detriment to adjacent property owners or downstream facilities.

* * * * * * * * * * *

BIBLIOGRAPHY

Gordon Herkenhoff & Associates for The City of Albuquerque	Master Plan of Drainage 1963
Elwin E. Seelye	Vol. I Design
U.S. Government	Technical paper No. 40 Rainfall Frequency Atlas of the United States.
U.S. Corps of Engineers	Floods - Part II July 1971
Hunter & Rouse	Engineering Hydraulics

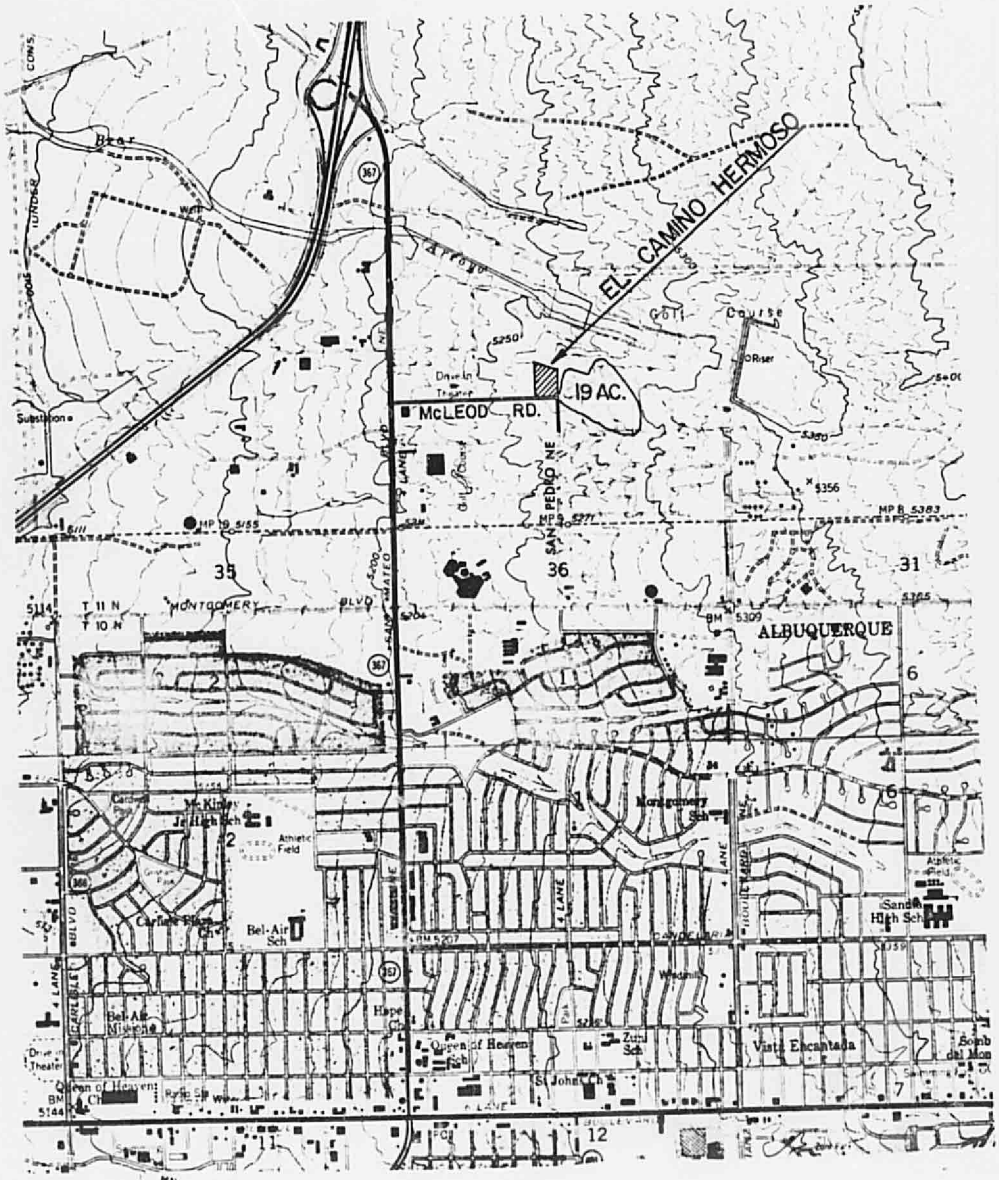
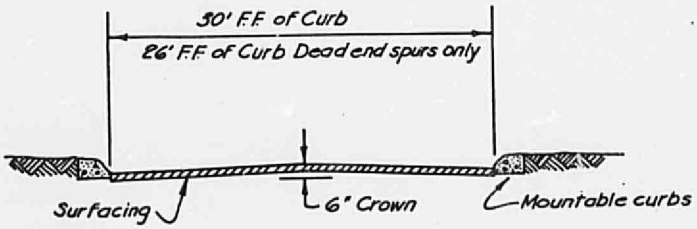
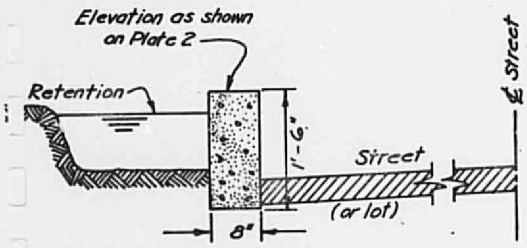


PLATE I
GENERAL LOCATION

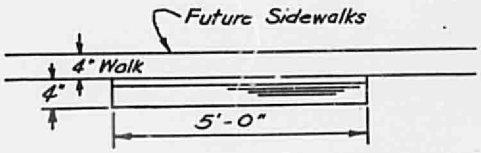


RECOMMENDED STREET SECTION

Max. required Q = 13 c.f.s. on 26' street.



CONCRETE HEADER CURB DETAILS

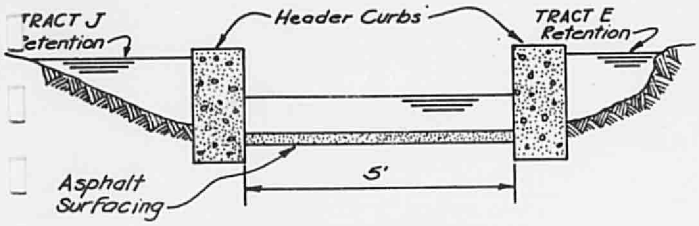


SIDEWALK UNDERDRAIN DETAILS

Q = 13 c.f.s.
V = 8 f.p.s.
Construct to match paved drainageway.

NOTE:

All sidewalks, curbs, street surfacing and other site construction items to be in conformance with Albuquerque City Standards.
No scale.



PAVED DRAINAGEWAY TO McLEOD ROAD

Q max. = 13 c.f.s.
V = 8 f.p.s.

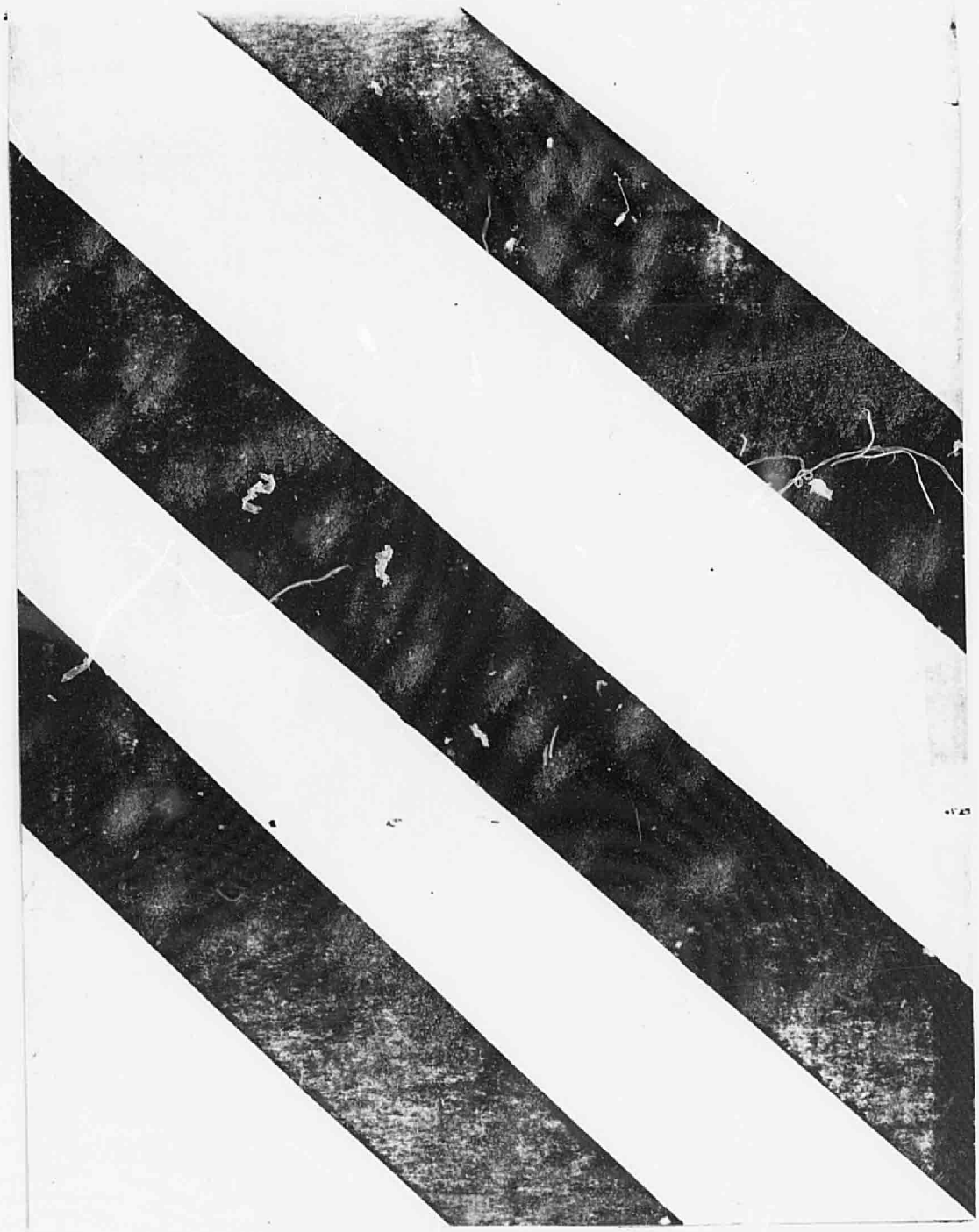



PLATE 3
RECOMMENDED TYPICAL SECTIONS