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

DESIGN HYDROLOGY SECTION
123 Central NW, Albuquerque, NM 87102
(505) 766-7644

September 17, 1985

Mr. Lee Bell
DMJM
5700 Harper Dr. NE, Suite 280
Albuquerque, NM 87109

RE: DRAINAGE SUBMITTAL RECEIVED AUGUST 29, 1985 (L9-D3)

Dear Mr. Bell:

The above referenced material is in compliance with my request at our meeting on August 21, 1985.

The construction sets for both Westview Townhomes and for Sunset West may be brought by and I will sign-off for Hydrology.

Should you have any qu stions or comments or need further assistance, please call at 766-7644.

Cordially,

Billy J. Goolsby

Billy J. Goolsby
CE/Design Hydrology

BJG/cl

L-9/D3 Sunset West, Unit 1 (Ph. II)

DMJM/Adam, Hamlyn, Anderson

August 28, 1985

Mr. Billy J. Goolsby
City of Albuquerque
Design Hydrology Section
P. O. Box 1293
Albuquerque, NM 87103

RECEIVED
AUG 29 1985
HYDROLOGY SECTION

Dear Mr. Goolsby:

Per our meeting August 21, 1985, I have the following comments in response to your concerns.

1. Our letter dated May 17, 1985 states that the channel on the B.O.R. power line has been extended to I-40. This would reduce the flow rate by reducing the drainage area contributing to the intersection. No other development west of this project has been constructed to increase the runoff. Therefore, the 469 C.F.S. as shown on the approved drainage report has been used as an offsite flow rate for the project.

2. Exhibit "A" shows clearly that the drainage flows in a Southeasterly direction. Section B-B (See exhibit B) shows a maximum capacity of 551 C.F.S. for Sage Road west of the 98th Street-Sage Road intersection. (60 C.F.S. is entering the intersection from 98th Street) per the report. Section C-C indicates no confinement of these flows on the south side of Sage from 100' to 200' within the intersection. Because there is no confinement, the water will sheet flow to the south and east of the ditch and dike section on the west side of Snow Vista Blvd. Sections A-A and D-D show that the existing capacity of Sage Road east of 98th Street to be 190 C.F.S. if that much gets there. This figure is somewhat larger than the 150 C.F.S. shown in the drainage report M9-D1. These cross sections were taken from the contour map for Westview Townhomes. Any flows greater than 190 C.F.S. will flow in a southeasterly direction, not east in Sage Road.

3. The developed flow entering Sage Road at the Sunspot Road intersection is 23 C.F.S. per the approved drainage report. Although on lot ponding is being used, this is not considered in the computed flow. The discharge from the detention pond in Westview Townhomes is 8.7 C.F.S., per the updated drainage report.

A Division of
Daniel, Mann, Johnson, & Mendenhall

Suite 200
8700 Harper Drive, N.E.
Albuquerque, New Mexico 87109
Telephone: 505/823-7866

Planning
Engineering
Systems
Economics

4. The Sage Road improvements for Westview Townhomes and Sunset West Unit One subdivisions accumulate this flow on the north half of Sage Road. An 8" curb on Sage Road will carry 206 C.F.S. The 12" curb shown on the construction drawings for Sunset West will carry 298 C.F.S. The accomulated flow at the east side of Sunset West Unit One = 221 C.F.S. This is less than the 298 C.F.S. using the 12" curb.

5. The "solid block wall" along 98th Street is not part of the original drainage report. It was a concession to Bruno Conegliano to provide additional protection to the west side of Westview Townhomes. Field observations and a close look at the proposed top of curb elevations on 98th Street show no need for this wall. The existing street section will carry more than 100 C.F.S. at the intersection of 98th Street and San Ygnacio. If the block wall at the north end of the mobile home park were to fail during the 100 year storm, the bulk of this flow would still go across 98th at the 3-36" RCP's. See exhibit B. If one half of this "flood" were to turn south down 98th Street, the street would still contain these flows. The block wall proposed for the west R.O.W. of Westview Townhomes would be a requirement for FHA financing. Considering this wall as a flood control device is unreasonable (additional protection, "maybe).

All this information is contained in the drainage reports on file. (M9-D1, L9-D-3, L9-D4). It is recommended that the City Hydrology Engineer approve the construction drawings for Sunset West and Westview Townhomes. These drawings meet the requirements per meetings with Mr. Fred Aquirre on May 29, 1985 and on April 3, 1985. Approval letters were written on June 14, 1985 and June 13, 1985 accepting the updated requirements for these subdivisions.

After you have reviewed this, please contact me regarding sign-off for the construction drawings.

Thank you,

Lee Bell

Lee Bell

LB/dt

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

DESIGN HYDROLOGY SECTION
123 Central NW, Albuquerque, NM 87102
(505) 766-7644

June 14, 1985

Mr. Charles Burm
DMJM/Adam, Hamlyn, Anderson
5700 Harper Dr., NE, Suite 280
Albuquerque, NM 87109

REF: REVISED GRADING PLAN FOR SUNSET WEST UNIT I (PHASE 2) (L9/D3)
RECEIVED MAY 31, 1985

Dear Charles,

I have reviewed the above referenced submittal and do hereby grant approval for drainage.

Please attach a copy of these approved plans to the Work Order Construction Set for Hydrology sign-off.

If I can be of further assistance, please call me at 766-7644.

Cordially,

Billy J. Goolsby

Billy J. Goolsby
C.E./Design Hydrology

BJG/cl

CITY OF ALBUQUERQUE
MUNICIPAL DEVELOPMENT DEPARTMENT
ENGINEERING DIVISION/DESIGN HYDROLOGY SECTION

HYDROLOGY SECTION PROJECT NO.: L9-D3 DATE: 5/29/85

PLANNING DIVISION NOS. EPC: _____ DRB: _____

CONFERENCE RECAP

SUBJECT: Sunset West Unit 1 (Tract 2)

APPROVAL REQUESTED:

_____ PRELIMINARY PLAT _____ FINAL PLAT

_____ SITE DEVELOPMENT PLAN _____ BUILDING PERMIT

✓ ~~ROUGH GRADING~~ WORK ORDER

	WHO	REPRESENTING
ATTENDENCE:	Charles Burm	T.M.J.M.
	Fred J. Aguirre	

FINDINGS: 1. An updated grading plan in compliance with the approved drainage report will be required for the proposed grade changes.

RECEIVED
MAY 31 1985
HYDROLOGY SECTION

The undersigned agrees that the above findings are summarized accurately and are only subject to change if further investigation reveals that they are not reasonable or that they are based on inaccurate information.

SIGNED: Fred J. Aguirre SIGNED: Charles Burm

TITLE: _____ TITLE: _____

DATE: 5/29/85 DATE: 5-29-85

NOTE PLEASE PROVIDE A COPY OF THIS RECAP WITH THE DRAINAGE SUBMITTAL

DRAINAGE INFORMATION SHEET

ECT TITLE: _____ ZONE ATLAS/DRNG. FILE #: L9-D3

L. DESCRIPTION: SUNSET WEST UNIT I (PHASE 2)

Y ADDRESS: N/A

INEERING FIRM: DMJM CONTACT: CHARLES BURM

ADDRESS: 5700 HARPER DRIVE, N.E., SUITE 280 PHONE: 822-7955

ER: SUNCOR ENTERPRISES, INC. CONTACT: H. GRIFFIN PICKARD JR.

ADDRESS: 2701 SAN PEDRO, N. E. PHONE: 883-0900

ITECT: N/A CONTACT: _____

ADDRESS: _____ PHONE: _____

VEYOR: N/A CONTACT: _____

ADDRESS: N/A PHONE: _____

RACTOR: N/A CONTACT: _____

ADDRESS: _____ PHONE: _____

DESIGN MEETING:

_ YES

_ NO

X COPY OF CONFERENCE RECAP SHEET PROVIDED

RECEIVED
MAY 31 1985
HYDROLOGY SECTION

DRB NO. _____

EPC NO. _____

PROJ. NO. _____

TYPE OF SUBMITTAL:

X DRAINAGE REPORT

_ DRAINAGE PLAN

_ CONCEPTUAL GRADING & DRAINAGE PLAN

_ GRADING PLAN

_ EROSION CONTROL PLAN

_ ENGINEER'S CERTIFICATION

CHECK TYPE OF APPROVAL SOUGHT:

___ SKETCH PLAT APPROVAL

___ PRELIMINARY PLAT APPROVAL

___ SITE DEVELOPMENT PLAN APPROVAL

___ FINAL PLAT APPROVAL

___ BUILDING PERMIT APPROVAL

___ FOUNDATION PERMIT APPROVAL

___ CERTIFICATE OF OCCUPANCY APPROVAL

___ ROUGH GRADING PERMIT APPROVAL

___ GRADING/PAVING PERMIT APPROVAL

X OTHER WORK ORDER (SPECIFY)

SUBMITTED: 5-31-85

BY: Charles Burm

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

reading file

August 31, 1979

Mr. Richard E. Leonard
Executive Director, AMAFCA

K9-D3

Dear Rich:

I'm enclosing the drainage report and approvals granted to the Sunset West Subdivision. (See attached letter.) I'm also attaching to this letter a copy of the comments that Chris Weiss made in the review of the drainage report which were conveyed verbally by Mr. Heller to Joe Pino. (See first paragraph of letter by Herkenhoff dated August 21, 1979.) Joe has indicated that he doesn't have any objection to the requested easement west of Sunset West; I will, therefore, sign the plat when it is submitted.

Very truly yours,

Bruno Conegliano
Assistant City Engineer - Hydrology

BC/bm

CC - Richard Heller
Drainage File

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

August 30, 1979

K9-D3

Mr. Joe Pino
Gordon Herkenhoff & Assoc.
302 Eighth Street N.W.
Albuquerque, New Mexico 87102

RE: SUNSET WEST UNIT ONE

Dear Mr. Pino:

I have reviewed your letter dated August 21, 1979 which addresses, in a satisfactory manner, the concerns of the City Engineers Office. I feel that it is desirable to dedicate a temporary drainage easement along the west side of the property as indicated to you by telephone which will revert to the owner at the time of the development of the parcel of property between this Subdivision and 98th Street. Conveyance of an appropriate instrument, satisfactory to the City Engineers Office, will allow signature of the plat for this development.

Very truly yours,

Bruno Conegliano
Asst. City Engineer-Hydrology

BC/tal

cc: Rick Leonard, AMAFCA
R. S.Heller, City Engineer
File

1695-1651.26-79

GORDON HERKENHOFF & ASSOCIATES, INC.
302 Eighth Street, N.W.
Albuquerque, New Mexico 87102
(505) 247-0295

August 21, 1979

RECEIVED
AUG 21 1979
CITY ENGINEER

Mr. Richard Heller, City Engineer
City of Albuquerque
City Hall
400 Marquette Avenue N.W.
Albuquerque, New Mexico 87102

RE: COMMENTS ON DRAINAGE REPORT
SUNSET WEST SUBDIVISION UNIT ONE

Dear Mr. Heller:

Pursuant to the comments received in our meeting in your office on August 20, 1979 regarding the referenced report, we respond as follows:

Item 1 - It is proposed to effect the turn from San Ygnacio to 90th Street in a channel with a 150 foot radius with dike protection each side of the channel, and the accumulated flow will be turned off 90th Street into the existing arroyo approximately 100 feet north of Sage Road with a similar channel-dike system. The channel-dike at the intersection of San Ygnacio and 90th Street will be largely contained in the street intersection, and the lot area in the northeast corner of the "Future Development" will not be developed until the permanent drainage facility is constructed upstream (see Pg 2-Hydrology & Hydraulics-Drainage Report for Description of The Permanent Facility).

Item 2 - The permanent solution for intercepting the runoff that the sheet-flows into the subdivision from the west is to utilize a north-south street when the westerly area develops. The land west of the subdivision where the temporary ditch-dike will situate is held by the owner of the property addressed in this report, therefore no adverse land use offsite will be effected.

Item 3 - The text (pages 4 and 5 of the Drainage Report) is perhaps not completely clear with regard to the flows to be expected on Sage Road. The maximum flow anticipated is 150 C.F.S., therefore the 224 C.F.S. design capacity for the street is 50% more than the expected flow. The 469 C.F.S, anticipated at Sage Rd. and 98th Street is expected to split and flow south down the 98th Street channel-dike, southeast in the original arroyo channel, and east in the channel north of and adjacent to the existing Sage Road paving. The new street construction for Sage Road is in the alignment of the existing channelization, therefore flow from the west is directed into the new street. The added design capacity in the street is a factor of safety, since actual flows are uncalculable.

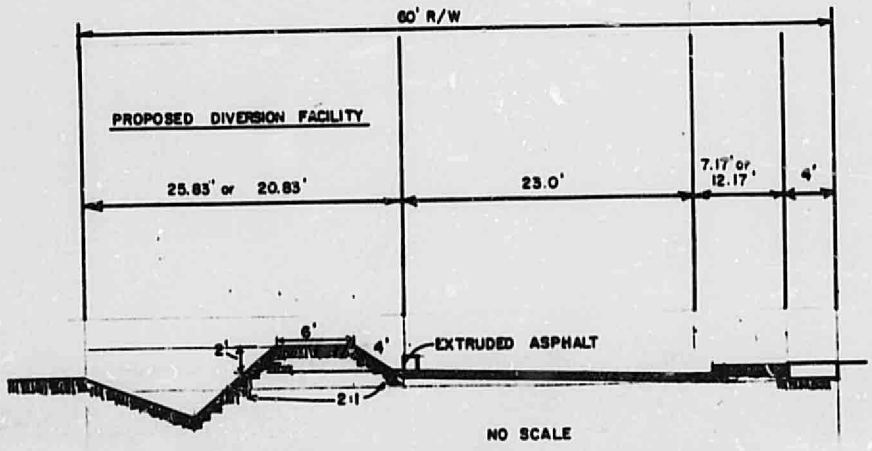
Item 4 - The four feet deep concrete cutoff walls mentioned on page 5 of the Drainage Report text are proposed to be constructed at right angles to the direction of flow to protect the new street pavement from undermining at its upstream beginning and its downstream termination. The 16" wall and the excess concrete paving adjacent to the sidewalk coupled with the cutoff wall on the west side of the tract at the Sage Road construction are designed to protect the street facility and lots in that area from erratic and unpredictable entrance conditions from the natural earth lined channel.

We trust that the preceeding commentary will satisfy requirements regarding the questions raised relative to the referenced report. If this letter completes all requirements, please advise us. If anything else is required, please notify us, and we will respond immediately.

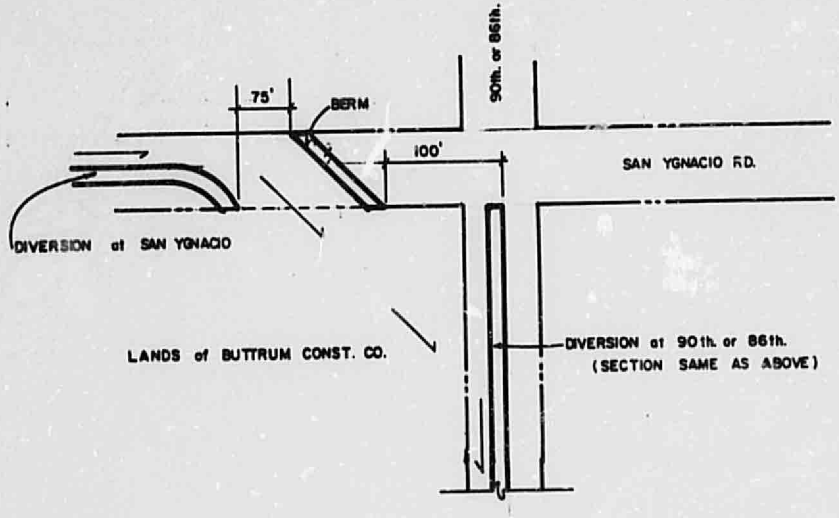
Very truly yours,

J. E. PINO
Jr/er

cc: Max Walker
Buttrum Construction Co., Inc.
P.O. Box 12315
Albuquerque, New Mexico 87195



PROPOSED TEMPORARY DIVERSION (TYP. at SAN YGNACIO RD.)



PLAN VIEW at 90th. or 86th.

NO SCALE

1234-1651.12-79

GORDON HERKENHOFF & ASSOCIATES, INC.
302 Eighth Street, N.W.
Albuquerque, New Mexico 87102
(505) 247-0295

June 20, 1979

RECEIVED
JUN 21 1979
CITY ENGINEER

Mr. Bruno Conegliano
Assistant City Engineer/Hydrology
City Hall
P.O. Box 1293
Albuquerque, New Mexico 87103

RE: FINAL PLAT - SUNSET WEST

Dear Mr. Conegliano:

Please find enclosed copies of the referenced plat and rough grading plan. We are preparing to carry the plat through for final signatures. In regards to this, are we required to have our drainage report completed and approved before you will sign-off on the plat?

We would ask that you please review the grading plan and contact me concerning any problems related to the same.

Sincerely,

Charles W Campbell

CHARLES W. CAMPBELL

CWC:mm
Enclosures

1378-1651.12-79

GORDON HERKENHOFF & ASSOCIATES, INC.
302 Eighth Street, N.W.
Albuquerque, New Mexico 87102
(505) 247-0295

July 12, 1979

RECEIVED
JUL 12 1979
CITY ENGINEER

Mr. Bruno Conegliano
Assistant City Engineer-Hydrology
City of Albuquerque
City Hall
400 Marquette Avenue N.W.
Albuquerque, New Mexico 87102

RE: DRAINAGE REPORT
SUNSET WEST SUBDIVISION UNIT 1

Dear Mr. Conegliano:

Attached please find three (3) copies of the referenced drainage report.

The developer is, of course, anxious to proceed with the development procedure for the subdivision, and much of this work is contingent upon drainage review and approval. We will appreciate any effort you can give us to expedite this procedure.

Please endorse and return one (1) copy at your earliest convenience.

Very truly yours,

J. E. PINO
JEP:er
Encls.
cc: Max Walker
Buttrum Construction Co.
P.O. Box 12315
Albuquerque, New Mexico 87195

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

MAYOR
David Rusk

April 2, 1979

Mr. Joe Ensenbarger
Middle Rio Grande Council of Governments
505 Marquette N.W.
Albuquerque, New Mexico 87102

Re: Sunset West Subdivision

Dear Mr. Ensenbarger:

In reply to your telephone request of March 30, 1979 I am enclosing a copy of a letter to the engineer for the captioned development. If you need further information, please feel free to contact my office.

Very truly yours,

Bruno Conegliano
Assistant City Engineer-Hydrology

BC/fs

cc - Dick Heller
Rich Leonard
Drainage File

Enclosure

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

MAYOR
David Rusk

March 22, 1979

Mr. Chuck Campbell
Gordon Herkenhoff & Assoc.
302 8 N.W.
Albuquerque, New Mexico 87101

Re: Sunset West Subdivision

Dear Mr. Campbell

Reference is made to the meeting of yesterday March 21, 1979, held in this office, in regard to the referenced project. At that meeting, Mr. Rich Leonard, Executive Engineer of AMAFCA, expressed his concern for the potential flooding conditions of the Westgate area and his interest in giving a higher priority to the flood protection works, recommended for this area in the master drainage plan for the West Mesa. Upon approval by the Board of Directors of AMAFCA, Mr. Leonard will initiate preliminary engineering design for the required interception and diversion of the flood flows potentially affecting the captioned development. In view of this intent, it is the opinion of the City Engineer that it would not be cost effective to upgrade the arroyo crossing of 98th Street to allow the 100 years flood flow to pass under the roadway through an appropriate structure. The main concern is the insurance that the roadway will be able to withstand the potential overflow from a 100 years flooding occurrence.

Therefore, if the developer will provide concrete rip rap or gunited protection for the upstream and downstream side of the crossing structure, as verbally indicated, together with the accessory provisions for runoff handling along the boundaries of this subdivision, the City Engineer's Office will not interpose objections to the development of the parcel of land in question.

Very truly yours,

Bruno Conegliano
Assistant City Engineer-Hydrology

BC/fs

cc - Dick Heller
Rich Leonard
Drainage File

CITY OF ALBUQUERQUE, NEW MEXICO
CITY ENGINEER'S OFFICE

K9. D3

MEMORANDUM - January 29, 1979

TO: Phil Garcia, Planning Department
FROM: Bruno Conegliano, Assist. City Engineer-Hydrology
SUBJECT: SUNSET WEST SUBDIVISION

A review of the drainage conditions of the area surrounding the referenced subdivision, my comments are as follows:

The intersection of 98th Street and Gibson Blvd. is presently subjected to a flow in excess of 800cfs with the occurrence of a 100 years frequency storm and is intransitible with the occurrence of storms of lesser magnitude. Sage Road is expected to receive more than 500cfs with the 100 years storm and would also be intransitible. Overflow across 98th Street by an unnamed arroyo some 600 feet north of the intersection with Towner, would also make difficult the access to the Westgate Heights area. A diversionary facility could conceivably be built to the north of the proposed subdivision to prevent the sheet flow flooding which presently is indicated to occur over 1/3 of the subdivision which has resulted in the designation of this area as subject to flooding on the Flood Hazard Boundary Map.

The engineer proposes the utilization of part of the R.O.W. of St. Ignacio Rd. S.W. for this diversion. It is questionable whether this use of public street R.O.W. is desirable. At the present time the existing ephermeral water courses disappear in the alluvial fans indicating that the major part of the flows infiltrate into the ground, and do not affect properties to the east. Major diversionary works and drainage channels have been recommended for this area, but implementation of the recommendations by the consultants for the City and for AMAFCA is far in the future. In view of the absence of outfall drainage channels (and R.O.W.) and of the access problems mentioned, I recommend against approval of further development in this area until adequate drainage facilities can be provided.

BC/fs

cc - Dick Heller
Chuck Campbell
Drainage File

129-1651.12-79

GORDON HERKENHOFF & ASSOCIATES, INC.
302 Eighth Street, N.W.
Albuquerque, New Mexico 87102

(505) 247-0295

January 17, 1979

Mr. Bruno Conegliano
Assistant City Engineer - Hydrology
City of Albuquerque
P.O. Box 1293
Albuquerque, New Mexico 87103

RE: SUNSET WEST SUBDIVISION

Dear Mr. Conegliano:

Pursuant to our continuing discussions involving flood control and drainage as it relates to the referenced subdivision, please find enclosed the following:

1) 1 = 200' AMAFCA topo indicating location of proposed subdivision and proposed diversions.

2) Schematic sections and plan view of proposed diversions.

3) Drainage characteristics Plan of Westgate Heights, Unit 3 as completed by Murray-McCormick, Inc., dated 10/22/76.

As you are aware, the northerly one-third of our proposed subdivison is indicated as a flood hazard area on FHBM #27. As we discussed, the area is subject to sheet flow, the extent of which is undefined on the West Mesa Drainage Management Plan and the recently completed Corps of Engineer's Study.

Our proposal to protect the subject lands from flooding is essentially as follows:

1) A diversion, built to the section as shown, shall be constructed in San Ygnaico Road from 98th Street to either 90th or 86th Street. It is our feeling that the speculated sheet flow currently flows in a southeasterly direction and at some point near 86th Street collects in and flows down the right-of-way of Sage Road. Buttrum Construction Company, the developer, is in the process of or has acquired these lands included between 94th Street and 90th Street.

2) A proposed berm would be constructed at 90th or 86th Street to divert the waters to the south and eventually to Sage Road. A diversion, with the same section as shown for San Ygnacio, will be constructed in 90th or 86th to conduct these floodwaters to Sage Road for normal ultimate disposal.

I have included Westgate Heights, Unit 3 as additional information indicating Associated Mortgage and Investment Company's solution to their drainage problems and as an indication of the flows encountered at Sage Road. Their solution, as you will note, exhibit the same characteristics as our proposed solutions.

Our client requires a written response to these proposals, so that he can evaluate his position regarding development as soon as possible.

Should you have any questions regarding the above, please feel free to call.

Sincerely,

Charles W. Campbell

Charles W. Campbell
CWC:er
Encl.
cc: Mr. Max Walker

90-1651.25-80

GORDON HERKENHOFF & ASSOCIATES, INC.
302 Eighth Street, N.W.
Albuquerque, New Mexico 87102
(505) 247-0294

January 15, 1980

K9-P3

RECEIVED
JAN 21 1980
CITY ENGINEER

Mr. Bruno Conegliano
Assistant City Engineer-Hydrology
Municipal Development Dept.
P.O. Box 1293
Albuquerque, New Mexico 87103

RE: FIA FLOOD HAZARD MAP - LETTER OF AMENDMENT
SUNSET WEST SUBDIVISION UNITS I & II

Dear Mr. Conegliano:

As you are aware Mr. Max Walker of Buttrum Construction Company is preparing to develop the referenced subdivision. Due to the drainage improvements we are constructing related to this subdivision, as outlined in our drainage report, we believe that the subdivision should be taken off the FIA maps as a flood hazard area.

As a consequence, we are hereby requesting that a Letter of Amendment be issued by the Office of Flood Insurance. We are submitting the following data to their Washington office for review:

1) Letter of request for a Flood Hazard Map amendment.

2) Supportive information for a letter of map amendment addressed to Dames and Moore Engineers including the following:

a) Topography maps of the area with indications as to drainage flows, finish floor elevations and flood areas.

b) Proposed construction documents for drainage improvements.

c) Recorded plat of subject property.

d) A copy of the official FHBM indicating the location of the subject property.

e) Copy of the letter of request as submitted to the Office of Flood Insurance.

f) The approved drainage report and related correspondence.

I am, by this correspondence, making you aware of the fact that we are applying for a Letter of Amendment should questions arise at a later date concerning this issue.

Sincerely,

Charles W. Campbell

Charles W. Campbell
CWC:er

cc: Mr. Richard Leonard

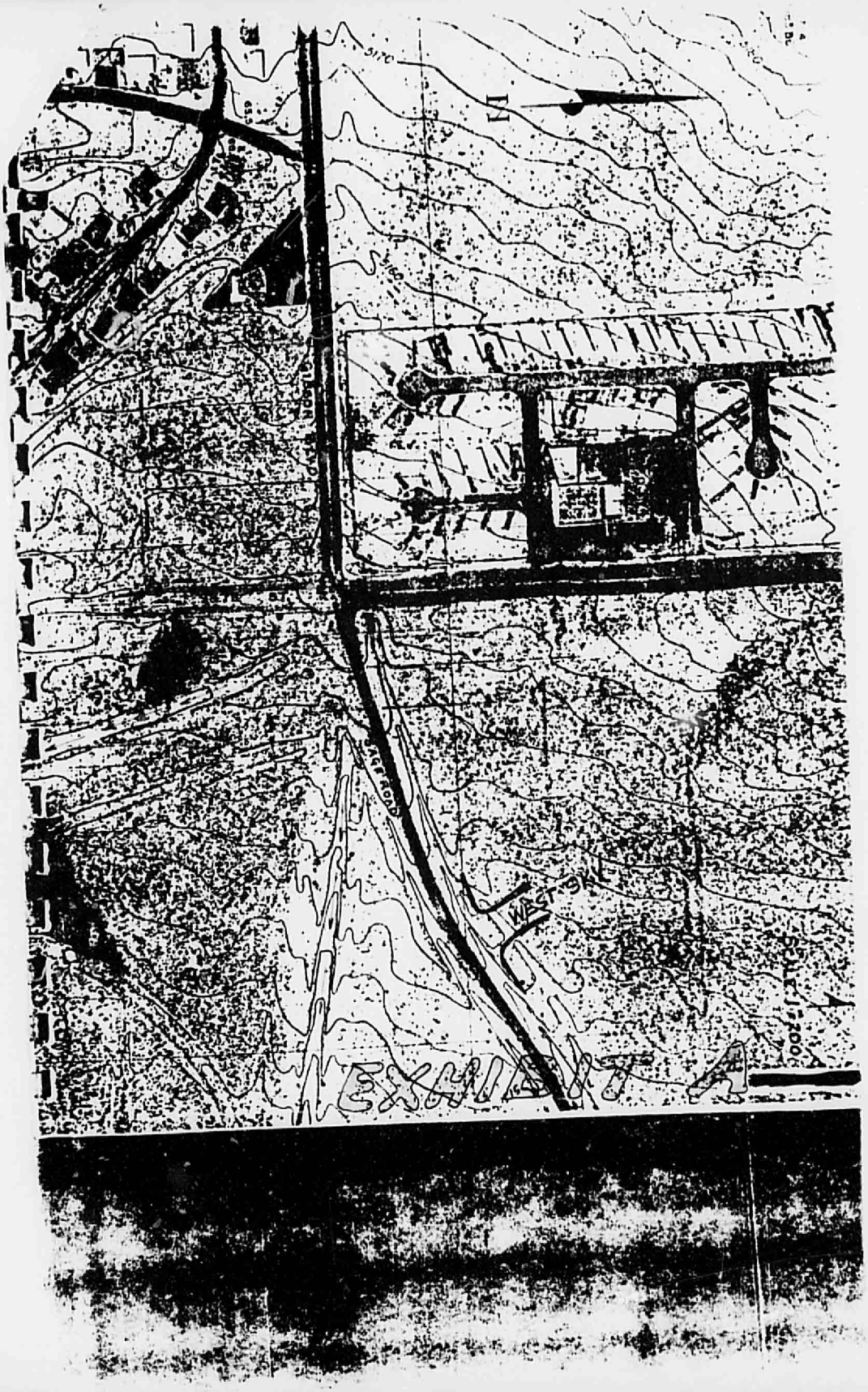
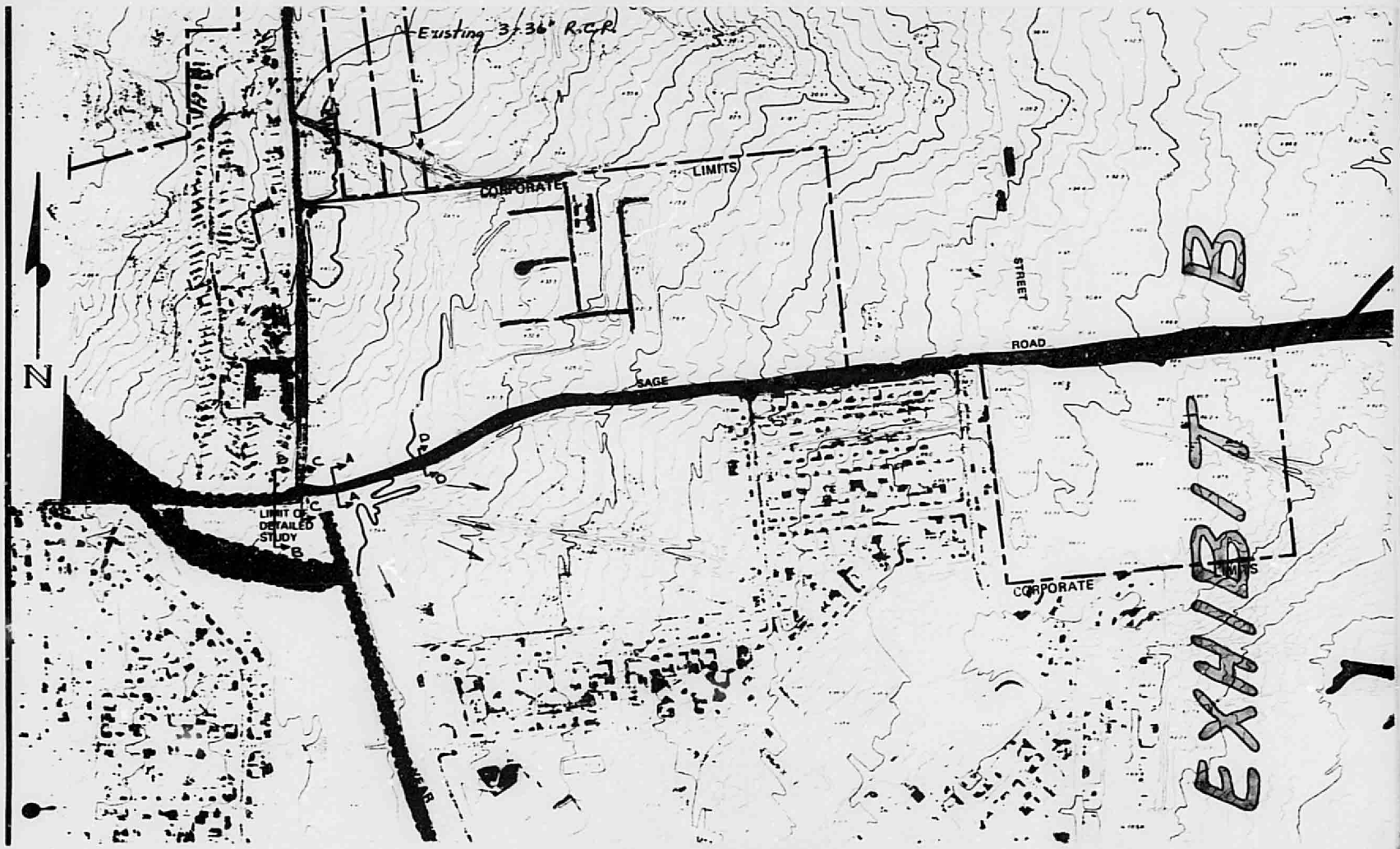
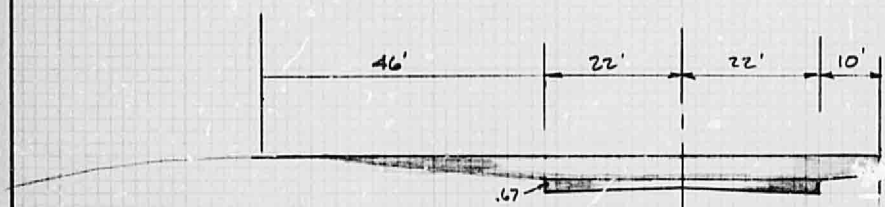


EXHIBIT A


Existing 3-36" R.C.P.
CORPORATE LIMITS
STREET
ROAD
SAGE
N
LIMIT OF DETAILED STUDY
CORPORATE LIMITS
EXHIBIT B



TYPICAL SECTION B-B
SAGE ROAD
Near 98th Street
West Side

for Water Curb Depth

Area = $\left(\frac{.67+.23}{2}\right)$ 22 (2) = 19.80 SF

WP = 44 + (.67)(2) = 45.33

V = (1.49/.015) $(19.80/45.33)^{2/3}$ $(.018)^{1/2}$ = 7.67

Q = (19.80) (7.67) = 151.91 CFS

for Water to Max Depth

Area = $\frac{(100)(1)}{2}$ + 19.80 = 70.00

WP = 100

V = (1.49/.02) $(70/100)^{2/3}$ $(.018)^{1/2}$ = 7.88

Q = 551 CFS

Maximum Amount of water that could enter the intersection = 551 C.F.S.

DMJM/AHA
PROJECT
SUBJECT
PROJECT NO.
DATE:
PAGE

DMJM / AHA
ALBUQUERQUE

PROJECT

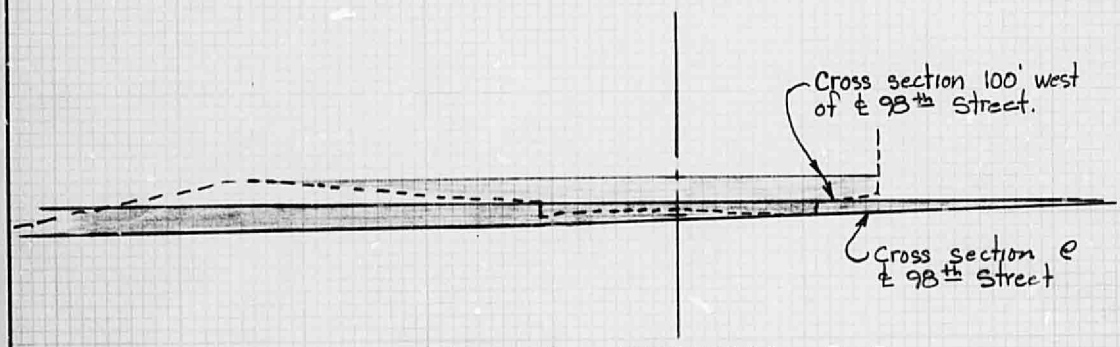
SUBJECT

PROJECT NO.

BY:

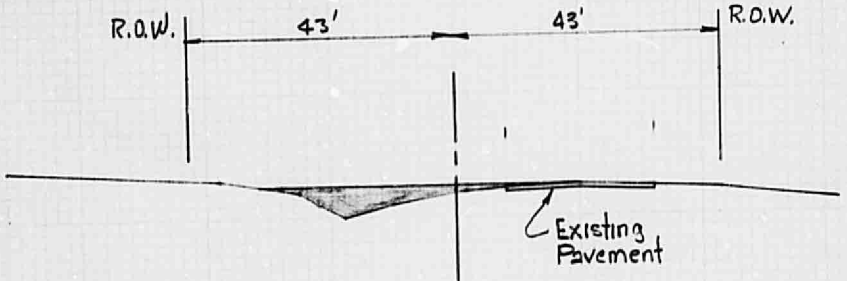
DATE:

PAGE



TYPICAL SECTION C-C
@ ℄ 98th Street

Maximum Amount of water that could cross intersection ?

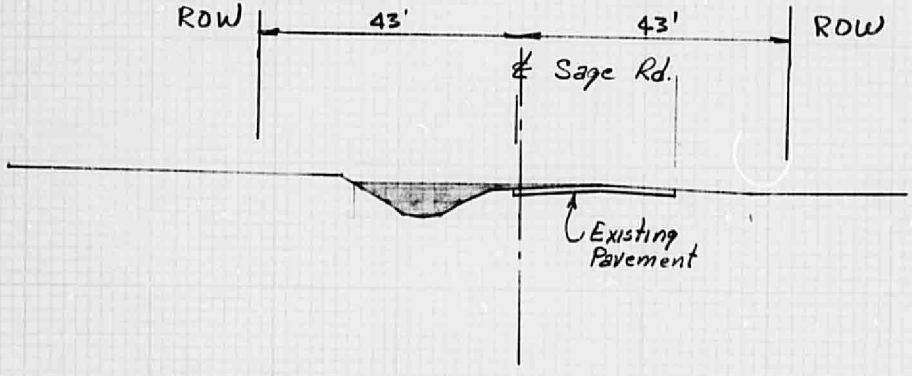


Area = 40 SF
WP = 58
$V = (1.49/.03)(40/58)^{2/3}(.015)^{1/2} = 4.75$
$Q = (40)4.75 = 190$ CFS

TYPICAL SECTION A-A
SAGE ROAD
Near 98th Street
East Side

Maximum Amount of Water that could flow Along Sage Road = 190 C.F.S.

DMJM/AHA
ALBUQUERQUE
SUBJECT
PROJECT
BY:
DATE:
PROJECT NO.
PAGE



Area = 36 SF
W.P = 43
V = 5.40
Q = 194 CFS

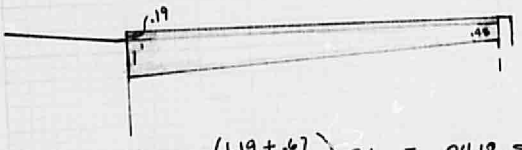
TYPICAL SECTION D-D
SAGE ROAD
600'ft. East of 98th Street

DMJM/AHA
ALBUQUERQUE
SUBJECT
PROJECT
BY:
DATE:
PROJECT NO.
PAGE

DMJM / AHA ALBUQUERQUE	PROJECT	PROJECT NO	PAGE
		BY: DATE:	
SUBJECT			

12" CURB ON SAGE ROAD

26'



$$\text{Area} = \left(\frac{1.19 + .67}{2}\right) 26 = 24.18 \text{ S.F.}$$

W.P. = 27.86

$$V = (1.49/.015)(24.18/27.86)^{2/3}(.0186)^{1/2} = 12.33$$

$$Q = (24.18)(12.33) = 298.05 \text{ CFS}$$

8" CURB ON SAGE ROAD

$$\text{Area} = \left(\frac{1 + .48}{2}\right) 26 = 19.24$$

W.P. = 27.48

$$V = (1.49/.015)(19.24/27.48)^{2/3}(.0126)^{1/2} = 10.68$$

$$Q = (19.24)(10.68) = 205.52 \text{ CFS}$$

ENGINEER'S REPORT

ON

1651.12

STORM DRAINAGE

FOR

SUNSET WEST

July, 1979

GORDON HERKENHOFF & ASSOCIATES, INC.
302 Eighth Street, N.W.
Albuquerque, New Mexico 87102
ENGINEERS ARCHITECTS PLANNERS

ENGINEER'S REPORT

1651.12

ON

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FOR

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July, 1979

GORDON HERKENHOFF & ASSOCIATES, INC.
302 Eighth Street, N.W.
Albuquerque, New Mexico 87102
ENGINEERS ARCHITECTS PLANNERS

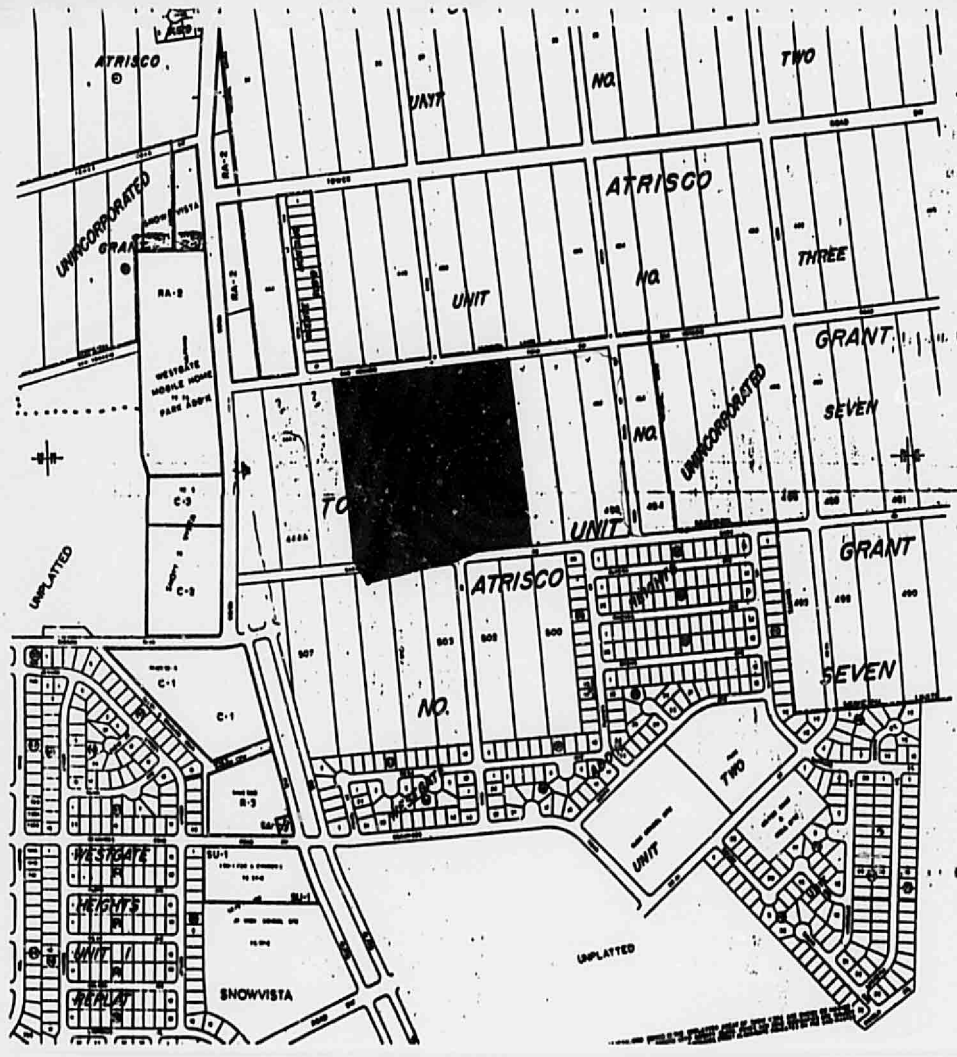
I hereby certify that this Drainage Report for Sunset West Subdivision Unit One was prepared under my direction, conforms to Drainage Resolution 1972-2 and City of Albuquerque Resolution No. 59-1976, and is true and correct to the best of my knowledge and belief.

J. E. Pino
N.M.P.E. & L.S. No. 1627

July 10, 1979
Date

Approved:

For the City of Albuquerque



VICINITY MAP
SUNSET WEST
UNIT I
ALBUQUERQUE,
NEW MEXICO

L-9-Z

VICINITY MAP
SUNSET WEST
UNIT I
ALBUQUERQUE,
NEW MEXICO

ENGINEER'S REPORT ON
STORM DRAINAGE
FOR SUNSET WEST
SUBDIVISION UNIT 1

INTRODUCTION: There are several offsite areas upstream from the site which must be evaluated in considering this tract. Some information for this area has been developed in the Albuquerque Metropolitan Arroyo Flood Control Authority's (A.M.A.F.C.A.) Drainage Management Plan Western Albuquerque Metropolitan Area and the Corps of Engineers Flood Plain Information, Albuquerque Arroyos Part III, Albuquerque, New Mexico. The Master Plan of Drainage, City of Albuquerque, New Mexico and Environs 1963 and the Flood Hazard Boundary Maps for the City of Albuquerque, N.M. were also consulted. The subdivision area appears to be outside any flood hazard area, although none of the aforementioned reports clearly exclude the site from possible flood-water encroachment. After careful study, it was concluded that the site could be protected from possible offsite flows with temporary and permanent facilities.

PURPOSE: The purpose of this report is to provide information regarding the hydrology and natural drainage facilities relating to the subdivision and design criteria for areas to be graded and for facilities to be constructed.

DESCRIPTION OF THIS SITE AND PROJECT: The site consists of a 26 acre tract which situates east of the northeast corner of the intersection of Sage Road (Gibson Boulevard) and 98th Street (Snow Vista Blvd.) S.W. between Sage Road and San Ygnacio Road S.W. and both east and west of 94th Street S.W. (See vicinity map).

The site will be subdivided into 118 lots for single family homes. The design size for lots was 61 feet by 100 feet, although the average lot is larger. Homes to be constructed within the project are anticipated to approximate 1,300 square feet of living area plus a double car garage.

Existing development in the immediate area consists of a single family subdivision in which the nearest homes are approximately 300 feet in a southeasterly direction on the south side of Sage Road S.W. and a mobile home park about 900 feet west across 98th Street.

HYDROLOGY AND HYDRAULICS: As discussed in the introduction of this report, several hydrologic studies have been conducted relative to this area, but none have either clearly eliminated from or situated the subdivision area within a flood hazard area. The aforementioned Corps of Engineers Report indicates a possibility that the arroyo intercepted by Tower Road S.W. at the 5150 contour (See Appendix A for 1:12,000 scale topographic map) could produce some shallow sheetflow north of the subdivision, although the limit of the study's extent was considerably north of the site. The A.M.A.F.C.A. study is no more definite. A.M.A.F.C.A. is planning, in the immediate future, to commission a study relating to diversion facilities planned to provide permanent protection from storm runoff for this immediate area downstream from approximately the 5170 contour. No funds are presently allocated for construction; however A.M.A.F.C.A.'s Executive Engineer has assigned a high priority for this work when funds become available. A.M.A.F.C.A. has had working drawings developed for extending the channel-dike system already partially constructed along the power line west of Westgate Subdivision (See Appendix A), and construction will be effected in the near future using their own maintenance forces. This will remove some area from a drainage basin contributing upstream (Area 4-Appendix A).

An extensive study was made of all available information and mapping together with several field inspections relative to the extent of offsite storm runoff that might encroach upon the subdivision site. It is believed that the aforementioned arroyo intercepted by Tower Road S.W. at the 5150 contour would not contribute to any flood hazard for the subdivision, since the depth of the Tower Road excavation is such that the large part of any flow would be diverted in an easterly direction on the road alignment. However, this is not a provable theory, therefore a combination ditch-dike will be placed within the San Ygnacio Road S.W. right of way (See Hydrologic & Hydraulic Computations-Appendix G) to provide protection from the possibility of this overflow. This facility will also serve to intercept and conduct flows accumulated in the arroyo crossing the north boundary of the subdivision. Prior to the construction of the mobile home park on 98th Street, drainage area (4) (See Appendix A) contributed approximately 71 C.F.S. (cubic feet per second) to the arroyo. Present facilities include a 24 inch C.M.P. (corrugated metal pipe) underground through the mobile home park, and a small area north of the mobile home park will contribute by overland flow. These two flows (approximately 30 C.F.S. from the 24 inch C.M.P. and 27 C.F.S. from the overland flow) will combine to flow through the three 36 inch R.C.P. (reinforced concrete pipe) structure under 98th Street into the arroyo channel. In order to ensure capacity in case of any failure of constructed facilities upstream, the ditch section of the ditch-dike is designed to accomodate 161 C.F.S. with the two foot high dike section above grade serving as additional protection. The ditch-dike will be extended east to 90th Street where it will be turned in a southerly direction to outfall into its original southeasterly course. A dike will also be placed on the easterly side of the 90th Street right of way to protect against overflow to the east.

There is a small area immediately west of the subdivision between 98th Street

and the westerly boundary of the subdivision which will contribute sheetflow to the lots on the west side of the subdivision. Flows anticipated on any single lot would not be substantial enough to require any diversion if it was not necessary to impound runoff on each lot. A combination ditch-dike (See Appendix G) is suggested as a temporary facility until development takes place that will permanently handle the local drainage. The ditch section indicated will conduct 42 C.F.S. with the one foot dike serving to provide freeboard. The accumulated flow from the 15 acre area is anticipated to be 32 C.F.S.

The most critical offsite flow to be considered is that which would utilize the southerly boundary of the subdivision (Sage Road) for outfall. Accumulated flows from Areas 1, 2, and 3 (See Appendix A) and the overflow not accomodated by the aforementioned 24 inch C.M.P. serving Area 4 would ultimately reach the intersection of Sage Road and 98th Street. Flows from the mobile home park development would also reach this point through the concrete flume discharge to 98th Street near the alignment of San Ygnacio and the 24 inch C.M.P. draining a 36 inch square catch basin at the southeast corner of the mobile home park. It is believed that any structural failures or other occurences which might reroute flows would still deliver and distribute flows in much the same manner as can presently be expected, although a somewhat greater flow might be anticipated in the channel north of Sage Road. A topographic map (Appendix E) indicates existing conditions in this vicinity. The maximum flow anticipated to reach the intersection is 469 C.F.S. including that contributed by all of Areas 1, 2, 3 and 4 and the mobile home park. Even the small scale topographic map in Appendix E clearly indicates the absolute certainty that there would be overflow creating sheetflow conditions in the intersection. While there is a defined channel on the north side of and adjacent to Sage Road, it is narrow and shallow, and the natural tendency

for outfall is in a southeasterly direction. It is speculated that at the outset of the flow only a small quantity would utilize the Sage Road channel, and, as the channel was scoured, a somewhat larger flow could be expected. It is estimated that one-fourth of the total flow with a maximum of 150 C.F.S. would be expected to follow this channel under the most adverse conditions. In order to ensure safe capacity of the designed section, the paved street will be constructed with a 12 inch high straight curb producing a hydraulic capacity of 224 C.F.S. (See Appendix G). A four foot deep concrete cutoff wall will be constructed at the westerly origin of paving across the constructed partial street section to the north right of way boundary to protect the section from erosion from upstream flows. A sixteen inch high wall will be constructed from the southwest corner of the subdivision 50 feet east along the north right of way boundary of Sage Road to ensure channelization of flows into the street section, and the entire area between the north back of curb and the right of way line in this reach will be paved with sidewalk to protect from overflow scouring. The intersection of Sage Road with Sunset Drive will be constructed with a temporary design as shown in Appendix G to accomodate anticipated flows, until permanent protection is afforded by construction of the A.M.A.F.C.A. Diversion Channel upstream. A retaining wall will be constructed on the street boundaries of the lot at the northeast corner of the intersection of Sage Road and Sunset Drive to the elevation of the rough pad grade to ensure that meandering flows at the intersection remain channelized, and a two foot high dike fifty feet long will be constructed between the edges of new pavement and existing pavement in lieu of the 8 inch extruded asphalt curb at the southeast corner of the intersection for the same purpose. A four foot concrete cutoff wall at the east extremity of the subdivision similiar to that to be constructed on the west edge will be placed to protect the downstream

outfall off the pavement. Need graphics ?

It is believed that the aforementioned facilities will provide adequate protection from offsite storm runoff.

Onsite construction will provide for compliance with Drainage Resolution 1972-2 (See Appendix G for Computations). The gross developed area including San Ygancio and Sage Roads is 27.17 acres. Prior to development this area would generate 100 year frequency storm runoff at a rate of 59 C.F.S. and a volume of 86,792 cubic feet (C.F.). The developed runoff will be generated from street areas, driveways and front yards, and a few lots draining directly to streets. The majority of lots will have interior drainage with no outfall to the streets. The developed area generating runoff that will enter the street system for conduct offsite is 12.54 acres, and a rate of 39.83 C.F.S. and a volume of 69,100 C.F. will be discharged. These are both well below natural runoff hereinbefore mentioned. The maximum interior street flow anticipated is approximately 23 C.F.S., and the minimum street capacity is 32 C.F.S.

The typical design lot cross section is indicated on the Rough Grading Plan (Appendix H), and is shown with a typical design lot plan in Appendix G. The anticipated volume of runoff on the undrained portion of a design lot is 524 C.F. The back yard impoundment will accomodate 630 C.F. in the V shaped yard and 678 C.F. in the back drained yard.

RECOMMENDATION: It is recommended that the City of Albuquerque approve this report, in that it provides for adequate site protection together with accomodating the requirements set forth in drainage regulations.

APPENDIX INDEX

then computed by dividing the total overland flow length by the average velocity.

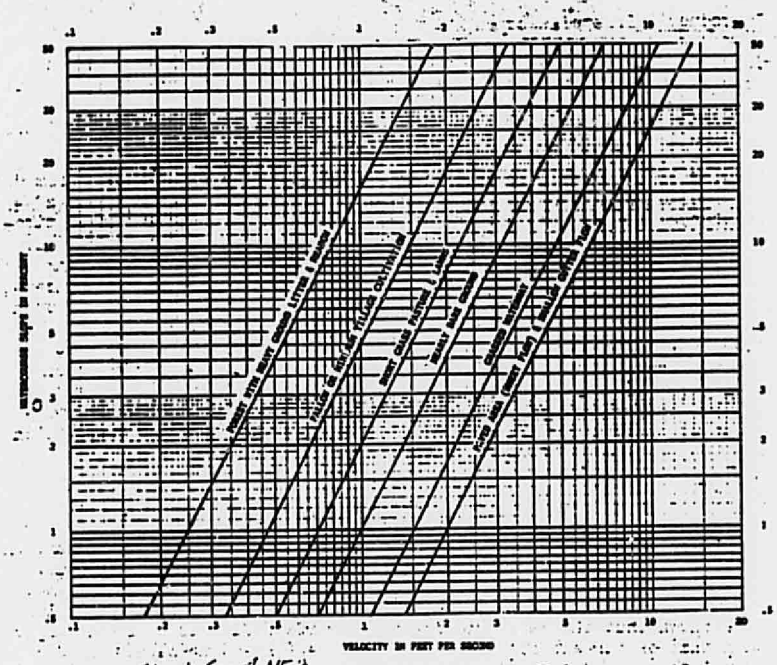


Figure 3-1.--Average velocities for estimating travel time for overland flow.

Storm sewer or road gutter flow

Travel time through the storm sewer or road gutter system to the main open channel is the sum of travel times in each individual component of the system between the uppermost inlet and the outlet. In most cases average velocities can be used without a significant loss of accuracy. During major storm events, the sewer system may be fully taxed and additional overland flow may occur, generally at a significantly lower velocity than the flow in the storm sewers. By using average conduit sizes and an average slope (excluding any vertical drops in the system), the average velocity can be estimated using Manning's formula.

Since the hydraulic radius of a pipe flowing half full is the same as when flowing full, the respective velocities are equal. Travel time may

APPENDIX C

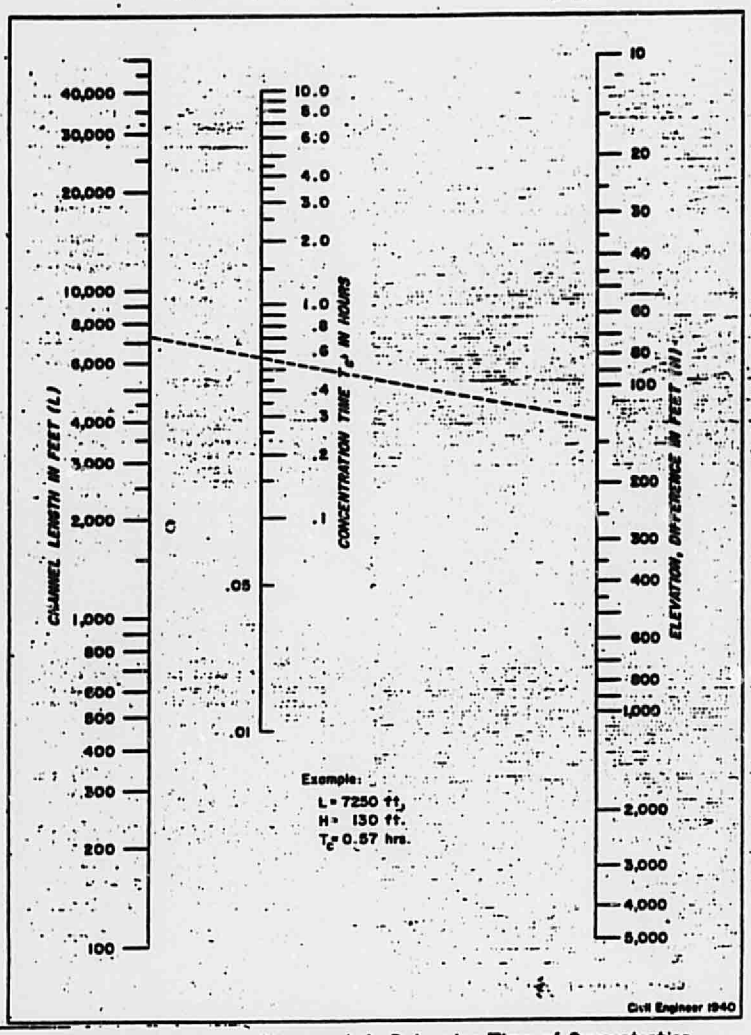
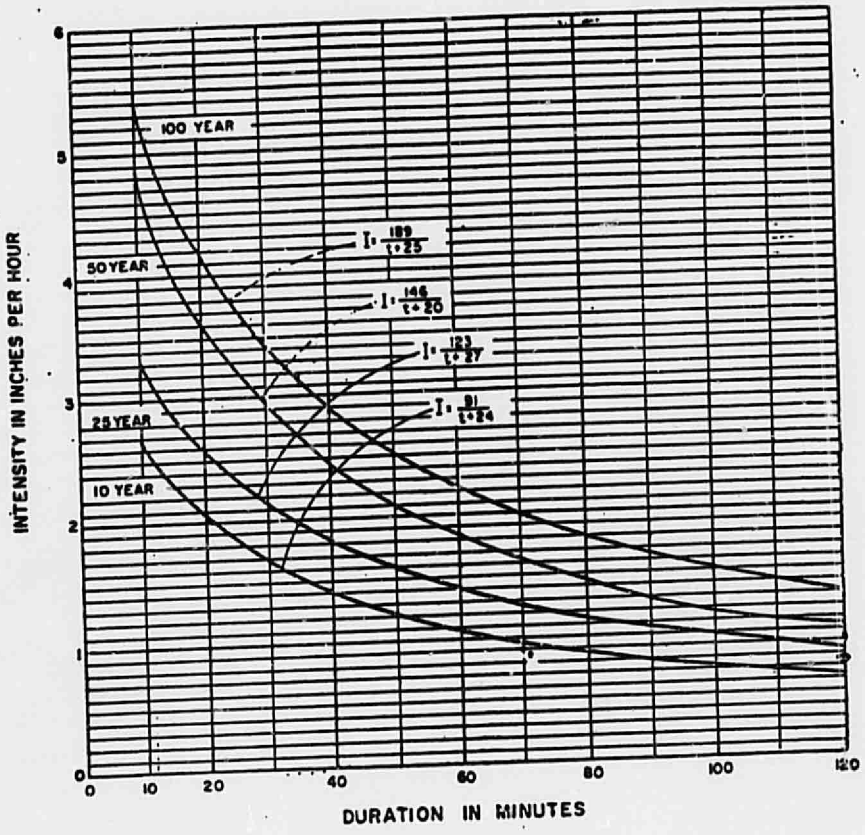


Figure 2-2 --- Nomograph to Determine Time of Concentration

CALIFORNIA CULVERT PRACTICE —

$$T_c = [11.9 (L_{MILES})^3 / H_{FEET}]^{0.385}$$

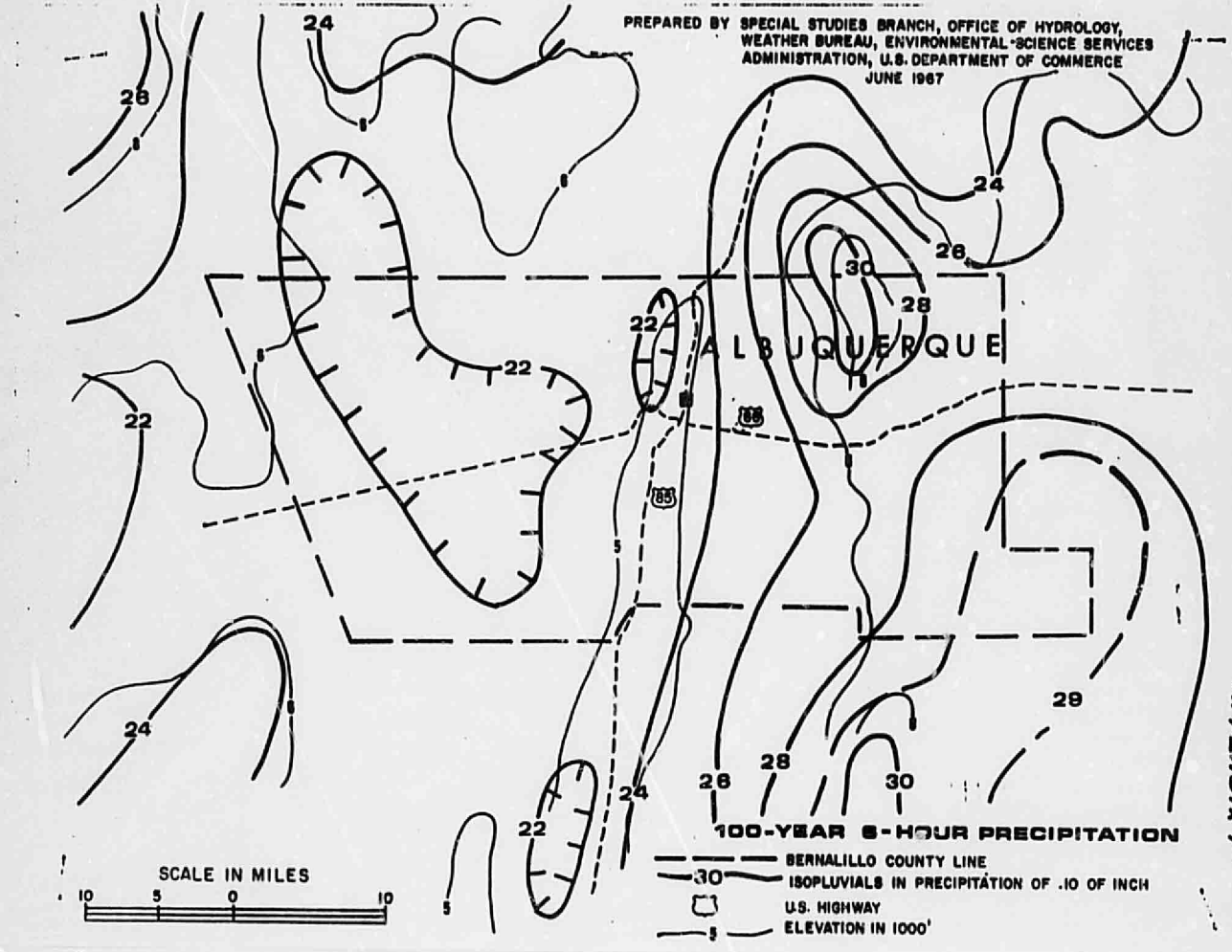
APPENDIX D



INTENSITY DURATION FREQUENCY CURVES

ALBUQUERQUE, N.M.

5170
5180
5190
I-17-4
583.86


PREPARED BY SPECIAL STUDIES BRANCH, OFFICE OF HYDROLOGY,
WEATHER BUREAU, ENVIRONMENTAL SCIENCE SERVICES
ADMINISTRATION, U.S. DEPARTMENT OF COMMERCE
JUNE 1967
ALBUQUERQUE
25
66
24
26
30
28
22
29
SCALE IN MILES
10 5 0 10
100-YEAR 6-HOUR PRECIPITATION
BERNALILLO COUNTY LINE
ISOPLUVIALS IN PRECIPITATION OF .10 OF INCH
U.S. HIGHWAY
ELEVATION IN 1000'

APPENDIX F

GORDON HERKENHOFF & ASSOCIATES SANTA FE NEW MEXICO ENGINEERING COMPUTATIONS	NAME OF PROJECT SUNSET WEST UNIT 1 HYDROLOGY & HYDRAULIC COMPUTATIONS			SHEET NUMBER 1 OF 4
	COMPUTED BY JP	CHECKED BY	JOB NUMBER	DATE 7/8/79

HYDROLOGY:

DRAINAGE AREA ④ (APPENDIX A)- C=0.40

AREA = 45.91 AC. ; Tc = 23.99 MIN. ; I = 189/(23.99+25) = 3.86 IN/HR

Q = 0.40 * 3.86 * 45.91 = 70.89 C.F.S.

DRAINAGE AREA WEST OF THE SUBDIVISION BETWEEN 98TH STREET AND THE WEST BOUNDARY—

AREA = 15.15 AC. ; Tc = 10.87 MIN. ; C = 0.40

I = 189/(25+10.87) = 5.27 IN./HR

Q = 0.40 * 5.27 * 15.15 = 31.94 C.F.S.

DRAINAGE AREAS 1, 2, 3, 4, AND THE MOBILE PARK—

AREA = 421.37 AC. ; Tc = 49.70 MIN ; I = 189/(25+49.70) = 2.53 IN/HR

COMPOSITE C = [(DEVELOPED 49.22 * .01) + (UNDEVELOPED 372.15 * .04)] / 421.37

= 0.44

Q = 421.37 * 0.44 * 2.53 = 469.07 CFS.

SUBDIVISION TRACT—

GROSS AREA = 27.17 AC.

NATURAL RUNOFF—

RATE—

AREA = 27.17 AC. ; C = 0.40

$Tc = \left[\frac{(1500/5280)^3 \, 11.9}{(48-16)}\right]^{0.385} = 0.16$ HR = 9.58 MIN.

I = 189/(25+9.58) = 5.47 IN./HR.

Q = 27.17 * 5.47 * 0.40 = 59.45 C.F.S.

VOLUME—

100YR-6HR PRECIPITATION = 2.2 INCHES

V = 27.17 * (2.2/12) * 0.40 = 1.99 AC. FT = 86,791.85 C.F.

DEVELOPED RUNOFF—

RATE—

AREA TO RUNOFF = STREET AREA PLUS FRONT YARD AREA.

HARD SURFACE—

4,942 L.F. STREET * 41.25 FT. =	203,858	SQ.FT.
1,043 L.F. STREET * 29.62 FT. =	30,894	SQ.FT.
1,023 L.F. STREET * 31.62 FT. =	32,347	SQ.FT.
118 DRIVEWAYS * 15FT * 20 FT. =	35,400	SQ.FT.
TOTAL =	302,499	SQ. FT.

UNPAVED SURFACE—

4,942 L.F. STREET * 8.75 FT. =	43,243	SQ. FT.
2,066 L.F. STREET * 3.38 FT. =	6,983	SQ. FT.
4,942 L.F. YARDS * 40.00 FT =	197,680	SQ. FT.
LESS DRIVEWAYS (ABOVE) =	- 35,400	SQ. FT.
TOTAL =	212,506	SQ. FT.

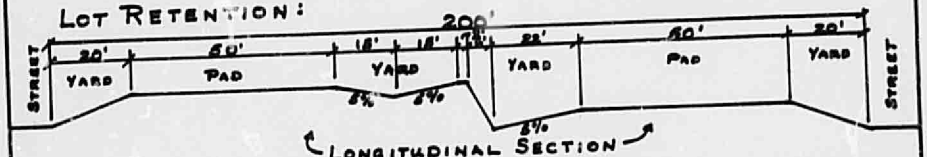
GORDON HERKENHOFF & ASSOCIATES SANTA FE NEW MEXICO ENGINEERING COMPUTATIONS	NAME OF PROJECT SUNSET WEST UNIT I HYDROLOGY & HYDRAULIC COMPUTATIONS			SHEET NUMBER 2 OF 4
	COMPUTED BY JP	CHECKED BY	JOB NUMBER	DATE 7/9/79

HYDROLOGY (CONT'D):
SUBDIVISION TRACT (CONT'D)-
DEVELOPED RUNOFF (CONT'D)-
RATE (CONT'D).-
AREA = 302,499 + 212,506 = 515,005 S.F. = 515,005 S.F.
= ENTIRE LOTS DRAINING TO STREET: 6 @ 65' BD = 31,200 S.F.
TOTAL = 546,205 S.F.
= 12.54 AC.

COMP. C = [(302,499 * 0.9) + (212,506 * 0.4)] / 515,005 = 0.69
TRAVEL = 2400 L.F., AVER. VEL = 2.5 F.P.S.
Tc = 2,400 / (2.5 * 60) = 16.00 MIN.
I = 189 / (25 + 16.00) = 4.61 IN./HR
Q = 12.54 * 4.61 * 0.69 = 39.89 C.F.S.

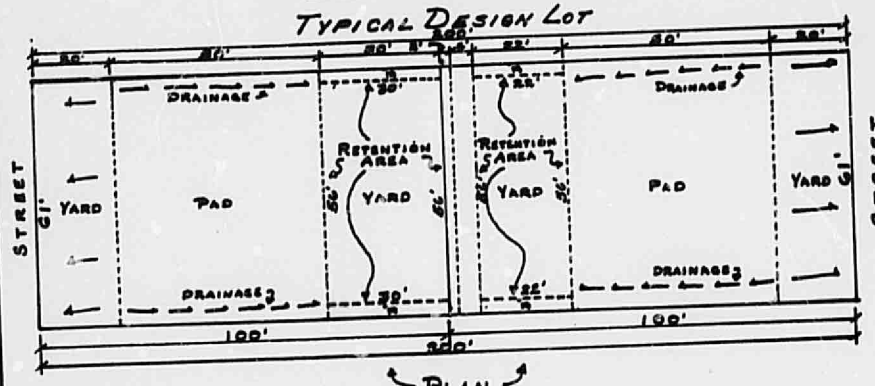
VOLUME -
V = 12.54 * (2.2/12) * 0.69 = 1.59 AC. FT. = 69,099.66 C.F.

LOT RETENTION:



LONGITUDINAL SECTION

TYPICAL DESIGN LOT



PLAN

ANTICIPATED VOLUME -
AREAS - 1,800 SQ. FT. HOUSE & GARAGE
3,080 SQ. FT. LANDSCAPED } 80 * 61 = 4,880 SQ. FT.
COMP. C = [(1800 * 0.9) + (3,080 * 0.4)] / 4,080 = 0.70
V = 4,080 * (2.2/12) * 0.70 = 524 C.F.

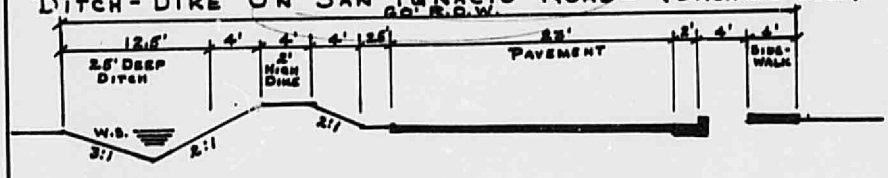
VOLUME AVAILABLE -
56 * 30 * 0.75/2 = 630 C.F. 56 * 22 * 1.10/2 = 677 C.F.

GORDON HERKENHOFF & ASSOCIATES SANTA FE NEW MEXICO ENGINEERING COMPUTATIONS	NAME OF PROJECT SUNSET WEST UNIT 1 HYDROLOGY & HYDRAULIC COMPUTATIONS			SHEET NUMBER 3 OF 4
	COMPUTED BY JP	CHECKED BY	JOB NUMBER	DATE 7/9/79

HYDRAULICS:

C.M.P. IN DRAINAGE AREA 4 (PASSING UNDERGROUND THROUGH THE MOBILE HOME PARK) -
24" C.M.P. 500 L.F. LONG ON A 2.5% SLOPE - Q = 30 C.F.S.±

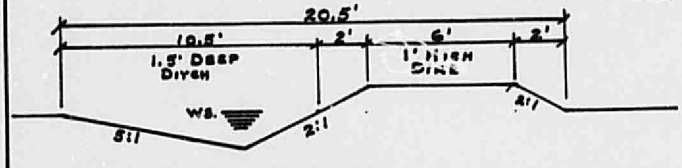
DITCH - DIKE ON SAN YGNACIO ROAD - (DITCH 2.5' DEEP)



S = 0.01925 ; n = 0.022
AREA = 12.5 * 2.5/2 = 15.63 Sq. FT. ; WP = 5.59 + 7.91 = 13.50 L.F.
V = (1.486/0.022)(15.63/13.50)$^{2/3}$(0.01925)$^{1/2}$ = 10.33 F.P.S.
Q = 15.63 * 10.33 = 161.51 C.F.S.

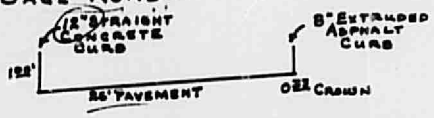
DITCH - DIKE WEST SIDE OF SUBDIVISION - (1.5' DEEP DITCH)

On whose land?



S = 0.01 MIN. ; n = 0.022
AREA = 10.5 * 1.5/2 = 7.88 S.F. ; W.P. = 3.35 + 7.65 = 11.0 L.F. (WETTED PERIMETER)
V = (1.486/0.022)(7.88/11.0)$^{2/3}$(0.01)$^{1/2}$ = 5.41 F.P.S.
Q = 7.88 * 5.41 = 42.61 C.F.S.

SAGE ROAD -

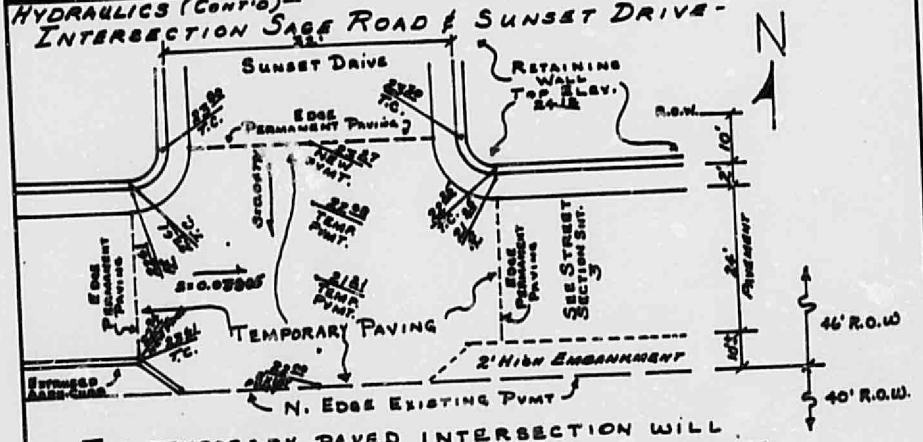


n = 0.015 ; S = 0.015 MINIMUM

AREA = (12.00 + 0.43)/2 * 26 = 21.71 SQ. FT.
WETTED PERIMETER = 27.67 L.F.
V = (1.486/0.015)(21.71/27.67)$^{2/3}$(0.015)$^{1/2}$ = 10.32 F.P.S.
Q = 21.71 * 10.32 = 224.08 C.F.S.

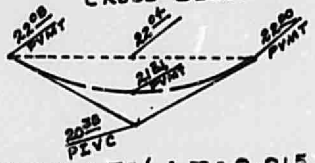
GORDON HERKENHOFF & ASSOCIATES SANTA FE NEW MEXICO ENGINEERING COMPUTATIONS	NAME OF PROJECT Sunset West Unit 1 Hydrology & Hydraulics Computation			SHEET NUMBER 4 OF 4
	COMPUTED BY JP	CHECKED BY	JOB NUMBER	DATE 7/9/79

HYDRAULICS (CONT'D) —
INTERSECTION SAGE ROAD & SUNSET DRIVE -



THE TEMPORARY PAVED INTERSECTION WILL HAVE A PARABOLIC CROSS-SECTION TO PROVIDE FOR ACCOMODATING THE ANTICIPATED FLOW AND TO PERMIT OPENING THE INTERSECTION TO VEHICULAR TRAFFIC.

Cross-Section



DEPTH = 0.83' ; WIDTH = 36' ; n = 0.015 ; S = 1.56/41 = 0.03805
AREA = 19.93 S.F. ; VELOCITY = (13.02 F.P.S.) ; Q = 259 C.F.S.

MINIMUM STREET CAPACITY —

n = 0.015 ; S min = 0.006

AREA = [(0.17+0.08)/2*8] + [(0.67+0.05)/2*24)
= 0.88 + 8.64 = 9.52 Sq. Ft
W.P. = 32.84 L.F.
R = 9.52/32.84 = 0.29
V = (1.486/0.015)(0.29)^2/3 (0.006)^1/2 = 3.36 F.P.S.
Q = 32.00 C.F.S.