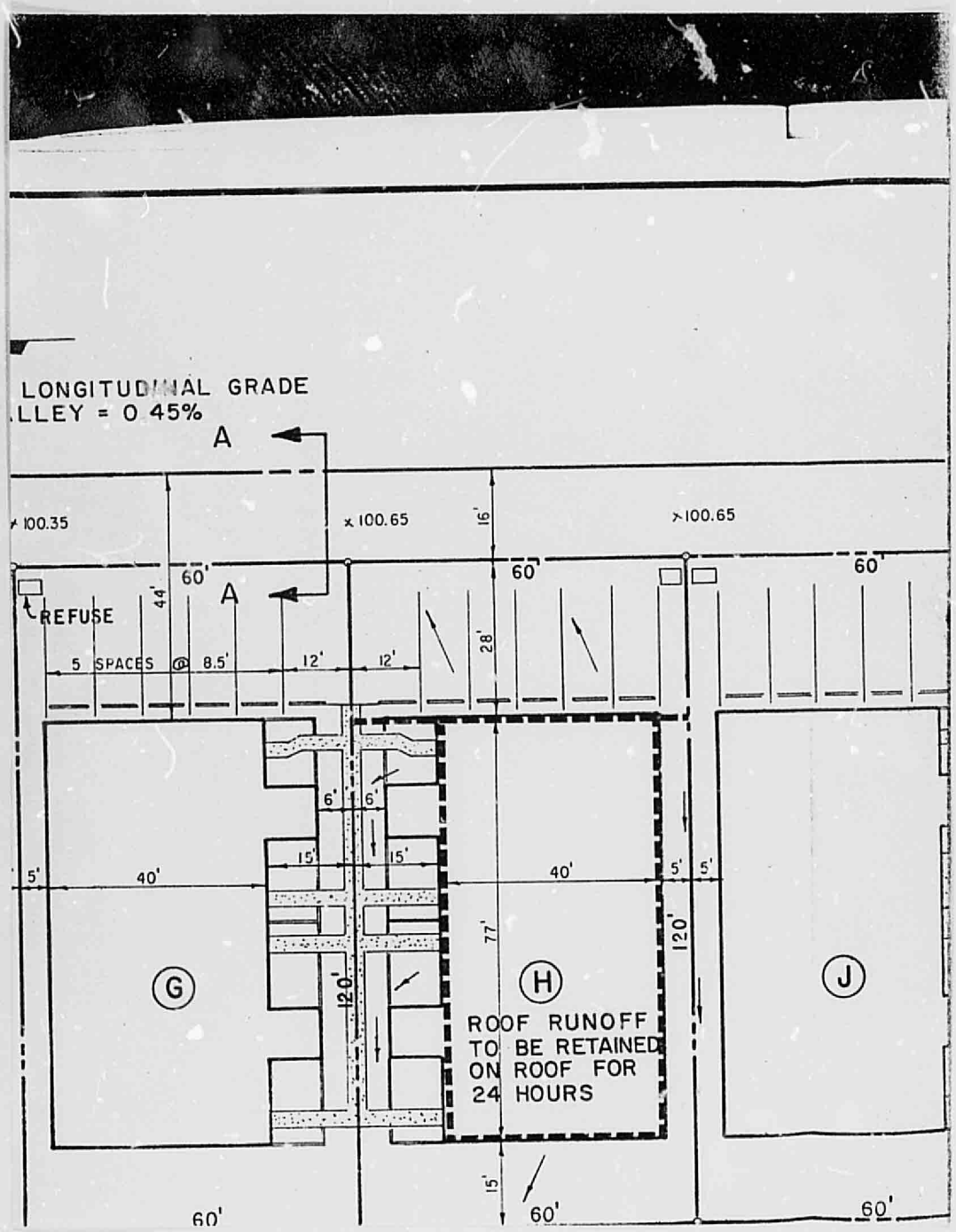
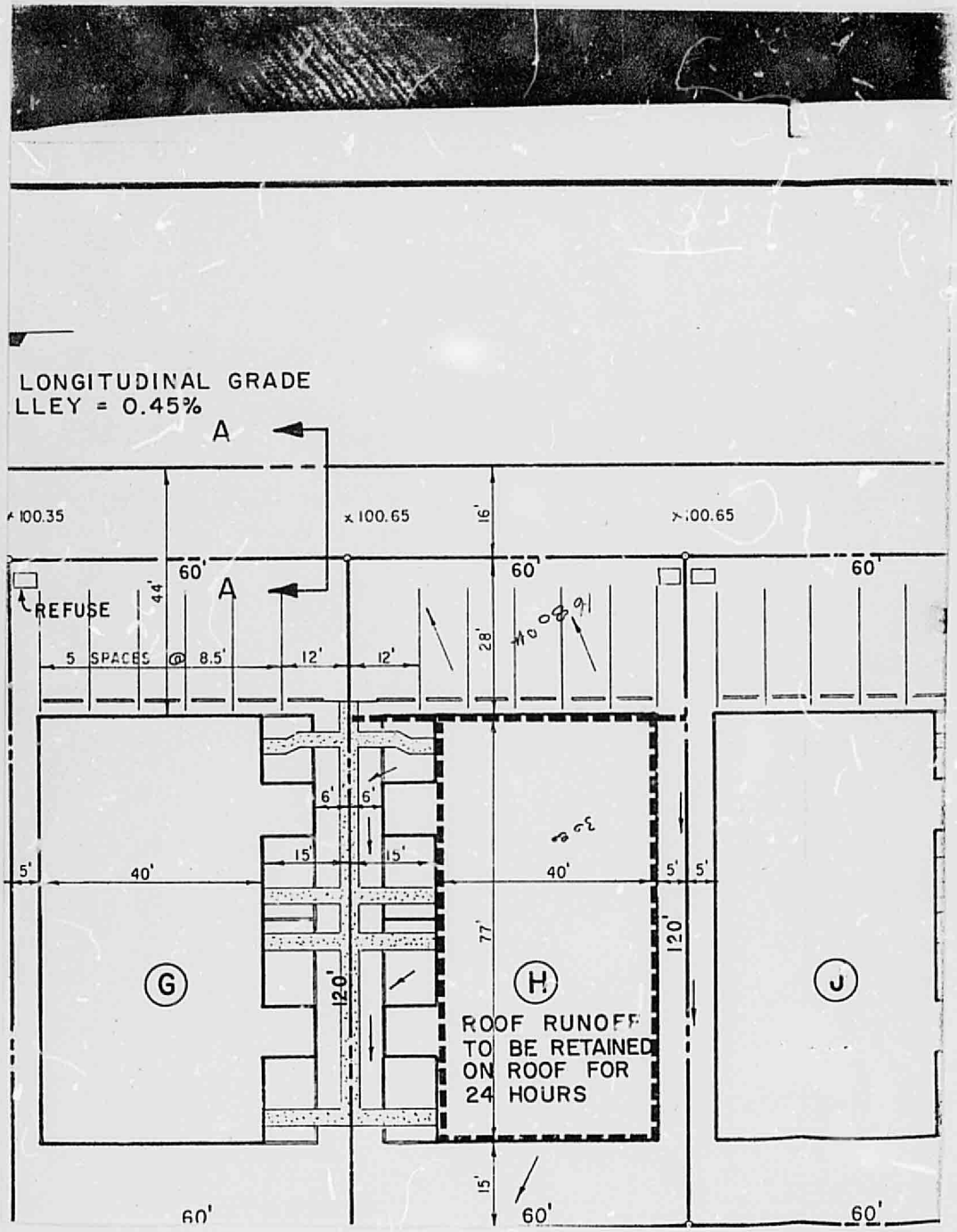
HYDROLOGY L18/D5 ONE PLAN

L18-D5

1 PLAN


LONGITUDINAL GRADE
ALLEY = 0.45%
A
A
100.35
100.65
100.65
16'
60'
60'
60'
44'
REFUSE
28'
5 SPACES @ 8.5'
12'
12'
6'
6'
15'
15'
5'
40'
40'
5'
5'
77'
120'
120'
G
H
J
ROOF RUNOFF
TO BE RETAINED
ON ROOF FOR
24 HOURS
15'
60'
60'
60'


LONGITUDINAL GRADE
LLEY = 0.45%
A
A
100.35
100.65
100.65
16'
60'
60'
60'
44'
REFUSE
5 SPACES @ 8.5'
12'
12'
28'
6'
6'
15'
15'
5'
40'
40'
5'
5'
77'
120'
120'
G
H
J
ROOF RUNOFF
TO BE RETAINED
ON ROOF FOR
24 HOURS
15'
60'
60'
60'

(1) Composite Coefficient

Total Area = 60 x 120 = 7200 S.F. (per lot)

Area @ C = 0.95 (hard surfaced) = 4964 S.F.
Area @ C = 0.15 (lawn) = 767 S.F.
Area @ C = 0.6 (S.W. Landscaping) = 1469 S.F.

$$C \text{ (composite)} = \frac{4964 \times 0.95}{7200} + \frac{767 \times 0.15}{7200} + \frac{1469 \times 0.6}{7200}$$

$$= 0.79$$

(2) Required Ponding Volume Per Lot

R (100yr.-6 hr.) = 2½" = 0.21'
$C_{(NAT.)}$ = 0.4

$Vol_{(NAT.)}$ = 0.4 x 0.21 x 7200 = 605 cu.ft.

$Vol_{(DEV.)}$ = 0.79 x 0.21 x 7200 = 1195 cu.ft.

Required Ponding = $Vol_{(DEV.)}$ - $Vol_{(NAT.)}$ = 590 cu.ft.

(3) Adequacy of Roof Top Ponding

Total Rooftop ponding =
0.95 x 0.21 x 3080 = 614 cu.ft. > 590 OK.

(4) Flow in Alley @ Lot C

Area contributing from West @ C = 0.95 = 0.49 acres
Max. Area contributing from East @ C = 0.4 = 1.32 acres

I_{100} = 5.4 inches / hour (From Yarnell Curves for Albuquerque)

Q = (0.95 x 5.4 x 0.94) + (0.4 x 5.4 x 1.32) = 5.4 cfs.

(5) Capacity of Alley @ Lot C

$$Q = A \frac{(1.49)}{n} (R^{2/3}) (s^{1/2})$$

$$= 5.88 \frac{(1.49)(0.28^{2/3})}{.025 \text{ (earth)}} (.0045^{1/2})$$

= 10.1 cfs > 5.4 cfs OK

Conversation w/ Kent Whitman
Community Science Corporation

① Indicated that in drainage report the Drainage area outside of property contributing to the alley flow should be clearly indicated.
He replied that in the absence of contour maps he included the adjacent block

② Indicated that the resolution 72-2 defines volumes not to be altered as well and not only rates therefore provisions for on site retention should be provided perhaps in the form of ~~retentio~~ french drain with adequate volume.
His contention is that it would cost $6000 per lot which would make it prohibitive.

③ Expressed doubt about the long term performance of the scuppers with 5 - 7/32" holes.
He maintained that it was the responsibility of the owners to maintain the functioning of the scuppers.

④ Question is there a change in City policy as far as drainage reports? If so set up a meeting with Mr Kimmerick.
Tentatively Tues 5 @ 9:00 Am

Hood's Corporation Drainage Study

① Since lots drain into different watersheds it is not appropriate to make lumped computations each area contributing to each watershed should be treated individually

② Roof top ponding. Since the roof is sloped towards the scuppers the cross section is triangular not rectangular ∴ volume of retention = 1/2 of indicated volume and in computation of runoff C = 1.0 for roof rather than 0.95
Long term functioning of the scuppers provided 7/32" is quite questionable
It is somewhat incorrect to state that the roof runoff is going to be retained for 24 hrs In reality the scuppers (if working) will be draining for an approximate period of 24 hrs

③ Because of ① it is not specified what is the difference in flow to San Pedro from Before and after the development. and to the alley

Construction Plans.

① The finished floor elevation of the individual buildings is not indicated.

② The grading of the property is not indicated particularly for the lot adjacent to other property outside of that owned by Hood's Corp.

③ Some reworking of the alley is indicated in drainage study that is not reflected in the construction plans.

D R A I N A G E R E P O R T

F O R

Hood Corporation - Fourplex Development

PREPARED FOR

Hood Development Corporation

Albuquerque, New Mexico

Kent M. Whitman

Kent M. Whitman, P.E.

KENT M. WHITMAN
STATE OF
NO. 6170
NEW MEXICO
REGISTERED PROFESSIONAL ENGINEER

SURVEYING
ENGINEERING
LAND PLANNING

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

TABLE OF CONTENTS

	Page No.
A) PURPOSE AND SCOPE	1
B) OFF-SITE DRAINAGE	1
C) DESIGN CRITERIA	1
D) PLAN FOR ON-SITE RUNOFF CONTROL	1 & 2
E) SUMMARY OF RECOMMENDATIONS	2
APPENDIX A	3 & 4
PLATE I - Location Map	5
PLATE II - Drainage Plan	6

FINAL APPROVAL OF
DRAINAGE REPORT

4/7/77
DATE

A) PURPOSE AND SCOPE

Hood Corporation is currently planning to construct 8 - Fourplex Structures on Lots C - K, Block 1 of the Elder Homestead Addition in southeast Albuquerque. (See location Map, Plate 1) The purpose of this report is to present a drainage management plan for this development which is acceptable to both the City of Albuquerque and AMAFCA.

B) OFF-SITE DRAINAGE

The subject property is bordered on the South by Anderson Avenue and on the West by San Pedro Boulevard. These streets will intercept any flows approaching from these directions. A public alley borders the property along the East. This alley will be graded to divert any flows approaching from the east northerly into Kathryn Drive. No drainage approaches the property from the North.

C) DESIGN CRITERIA

(1) Engineering Parameters

Coefficients of runoff equal to 0.4 for the natural state and 0.79 for the developed state were assumed for all calculations. In addition a 100 year - 6 hour rainfall of 2.5 inches has been used as a basis for design per AMAFCA requirements.

(2) Flood Control Regulations

The drainage plan presented in this report has been designed to comply with the 1972 AMAFCA Resolution in regard to rate and volume of runoff leaving the site. That Resolution has been interpreted to say that the rate and volume of runoff allowed to leave the site after development shall be no greater than the rate and volume running off prior to development.

D) PLAN FOR ON-SITE RUNOFF CONTROL

Plate II is a site plan for the development. Since all lots will be developed identically, lot H has been selected as typical and all calculations have been based on the

drainage plan shown for it. Each lot shall be drained in a similar fashion.

Appendix A contains some sample calculations, and as shown there the ponding requirement for each lot is 590 cu.ft. This requirement shall be met by retaining all roof top runoff for 24 hours through the use of scupper outlet controls. A detail of such a control is shown on Plate II. Since virtually no water will be discharged from the roofs through the duration of the storm, the remainder of each lot can runoff to the street system freely. Each parking area will drain into the adjacent alley while all other yard areas will drain into a landscaped infiltration area adjacent to San Pedro Blvd. Any overflow from the infiltration area will spill over into San Pedro. The alley will be graded as shown on Plate II to convey all parking lot runoff, as well as runoff from the east, northerly into Kathryn.

E) SUMMARY OF RECOMMENDATIONS

In conclusion we make the following recommendations regarding drainage management for the Hood Corporation Fourplex Development:

(1) That all roof top runoff be retained on the roofs for a period of 24 hours (100 yr. - 6 hr. storm) through the use of scupper outlet controls. Discharge from the scuppers should be directed into a landscaped infiltration area.

(2) That the remaining runoff be directed into the adjacent public alley.

APPENDIX A - SAMPLE CALCULATIONS

(1) Composite Coefficient

Total Area = 60 x 120 = 7200 S.F. (per lot)

Area @ C = 0.95 (hard surfaced) = 4964 S.F.
Area @ C = 0.15 (lawn) = 767 S.F.
Area @ C = 0.6 (S.W. Landscaping) = 1469 S.F.

$$C \text{ (composite)} = \frac{4964 \times 0.95}{7200} + \frac{767 \times 0.15}{7200} + \frac{1469 \times 0.6}{7200}$$

$$= 0.79$$

(2) Required Ponding Volume Per Lot

R (100yr.-6 hr.) = 2½" = 0.21'
$C_{(NAT.)}$ = 0.4

$Vol_{(NAT.)}$ = 0.4 x 0.21 x 7200 = 605 cu.ft.

$Vol_{(DEV.)}$ = 0.79 x 0.21 x 7200 = 1195 cu.ft.

Required Ponding = $Vol_{(DEV.)} - Vol_{(NAT.)}$ = 590 cu.ft.

(3) Adequacy of Roof Top Ponding

Total Rooftop ponding =
0.95 x 0.21 x 3080 = 614 cu.ft. > 590 OK.

(4) Flow in Alley @ Lot C

Area contributing from West @ C = 0.95 = 0.49 acres
Max.Area contributing from East @ C = 0.4 = 1.32 acres

I_{100} = 5.4 inches / hour (From Yarnell Curves for Albuquerque)

Q = (0.95 x 5.4 x 0.94) + (0.4 x 5.4 x 1.32) = 5.4 cfs.

(5) Capacity of Alley @ Lot C

$$Q = A \frac{(1.49)}{n} (R^{2/3}) (s^{1/2})$$

$$= 5.88 \frac{(1.49)(0.28^{2/3})}{.025 \text{ (earth)}} (.0045^{1/2})$$

= 10.1 cfs > 5.4 cfs OK

(6) <u>Oriface size for Scupper Outlet Control</u>

We will use 5 scuppers with 5 orifaces each

$\therefore A_r = 3080/25 = 123$ SF

$T = 24 \times 60^2 = 86400$ sec.

$Y_1 = 0.21'$

$Y_2 = 0'$

$Cd = 0.62$

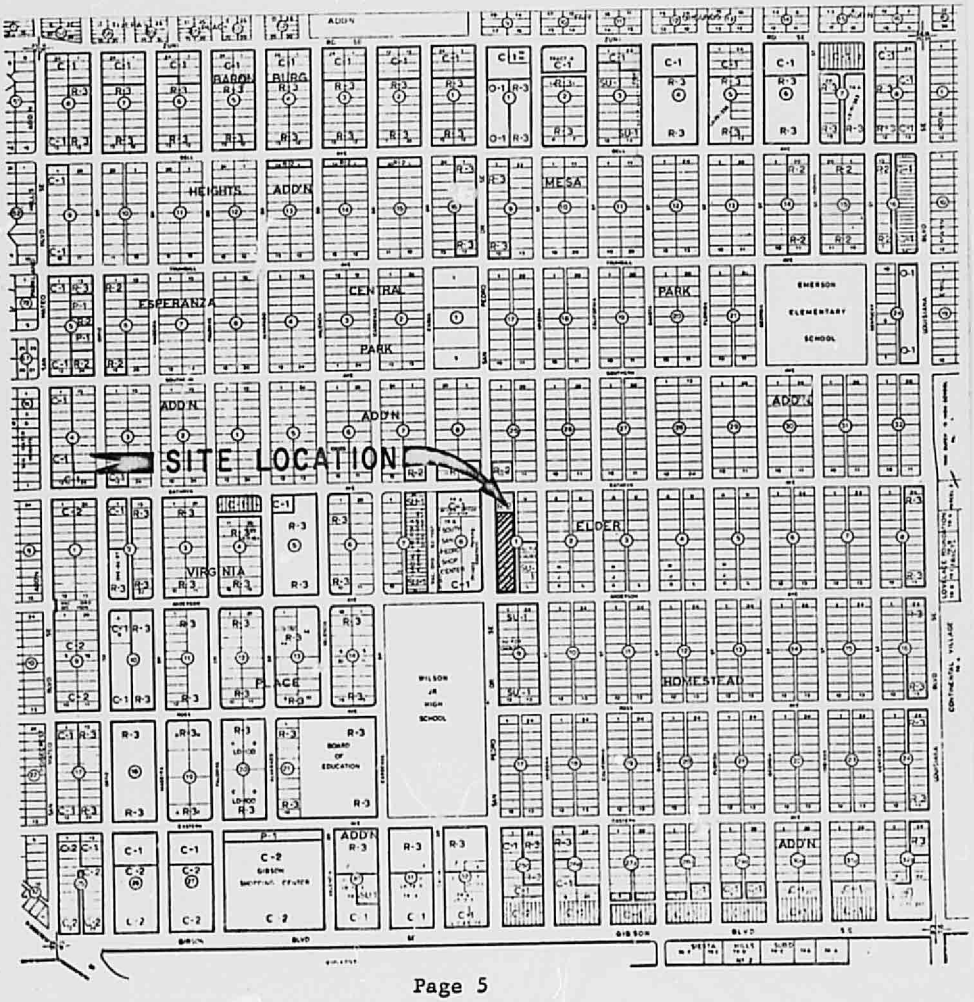
$$A_o = \frac{2 A_r}{Cd\ T \sqrt{2g}} (\sqrt{Y_1} - \sqrt{Y_2})$$

$$= 0.000262 \text{ SF}$$

$$= \frac{\pi d^2}{4}$$

$$d = \sqrt{\frac{4\ (.000262)}{\pi}} = 0.018'$$

$$= 7/32''\phi \text{ oriface}$$

PLATE I

LOCATION MAP