HYDROLOGY F21/D6 5 PLANS

F 21/D6

5 PLANS

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

Drainage

RECEIVED
JUN 19 1979
CITY ENGINEER

June 18, 1979

Mr. Thomas Krupiak
Krupiak Development and
Construction Company
9800 Elvin, N.E.
Albuquerque, NM 87112

Re: Approval of Plans for Academy Place Unit 7 and Unit 7, Tract A

Dear Tom:

I met with Mr. Richard Heller, City Engineer and Mr. Bruno Conegliano, City Hydrologist on Friday June 15, 1979, to discuss the approvals of the above-referenced plans. Neither Mr. Heller or Mr. Conegliano saw any problems with the drainage concepts, but Mr. Conegliano wanted to review the plans before signing. It was agreed that the plans would be reviewed and approved during the first part of this week and that Mr. Conegliano and Mr. Sheppard, in the absence of Mr. Heller, would sign-off on the plans so that work could proceed.

If you should have any further comments concerning this matter, please feel free to contact this office.

Sincerely yours,

Michael M. Emery

Michael M. Emery, P.E.
Vice President

cc: Mr. Richard Heller, City Engineer
Mr. Bruno Conegliano, City Hydrologist ✓

MME/js
Job No. 79-151

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

May 17, 1979

Meurer, Serafini & Meurer, Inc.
2601 Wyoming Blvd. N.E., Suite F
Albuquerque, New Mexico 87110

Attention: Carl Tebbens

Re: Academy Estates, Unit 7

Dear Carl:

I am in receipt of your letter dated May 14, 1979. I have reviewed same with staff and find that although your request for City funds to construct a storm drain within Academy Estates, Unit 7, is well founded, the City at this time does not have the funds available to provide for this large of an undertaking!

I am very sorry that your developer has once more been trapped by the old philosophy "the street can take on all the drainage", which was the philosophy when those projects east of Layton were designed and constructed.

At any time we would be happy to meet and discuss a solution of the drainage design so that the financial burden can be minimized to the developer.

Sincerely,

Richard S Heller

R. S. Heller
City Engineer

RSH/fs

cc - Bruno Conegliano, Assist. City Engineer-Hydrology
H. R. Orr, Deputy Director, MDD

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

Rcd OCT 18 1978

October 18, 1978

Mr. Bruno Conegliano
Public Works Department
City of Albuquerque
P.O. Box 1293
Albuquerque, NM 87103

RE: Academy Place Unit 7 Subdivision

Dear Mr. Conegliano:

In order to expedite the building of the referenced subdivision and the aquisition of the associated water line easement, we have completed a flood plain study of the Bear Arroyo, adjacent to Spain Road and the subdivision. We are providing this information as a supplemnt to the published drainage reports previously submitted for the single family area and the townhouse area.

The results of our analysis are enclosed, and include the calculation for critical flow depth based on Manning's equation and two plates. Sheet 1 is a grading plan showing the anticipated extent of the flood plain after grading occurs and proposed lot lines that will separate developable from undevelopable lots. Sheet 2 is the plat annotated to designate those lots which will not have structures built on them at this time due to the flood plain. This restriction will be lifted at the time the diversion in the Bear Arroyo east of Tramway is constructed.

If this approach meets with your approval we request that you inform Ron Ray Bohannan or me of this office so that we can obtain your initial on the plat and file it immediately.

Should you have any questions, please feel free to contact this office.

Sincerely,

Michial M. Emery

Michial M. Emery, P.E.
Vice President

cc: Mr. Tom Krupiak

Enclosure

MME/kb
Job No. 78-151

Conservative Q:

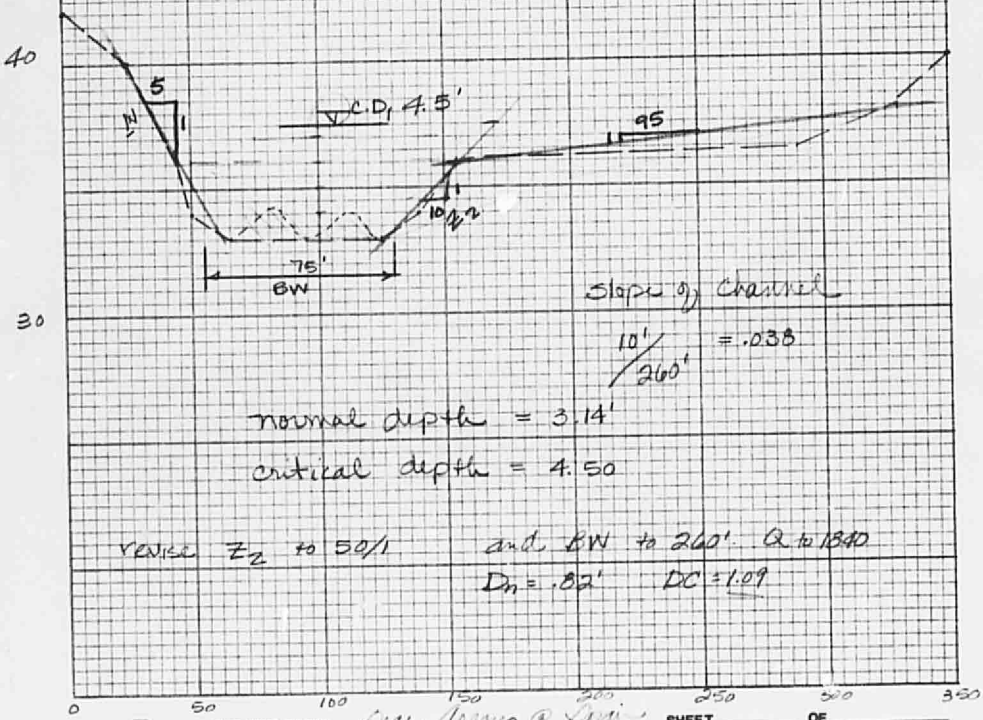
Q = 4704 + 608 + 210 = 5522 cfs

from Leonard Rice Report, 100 yr storm

Q for Bear Canyon @ Tramway = 4704

Q for Bear Arroyo @ Diversion = 608

Q for Bear Canyon @ Juan Tabo = 210



Slope of Channel

10'/260' = .038

normal depth = 3.14'

critical depth = 4.50

revise Z_2 to 50/1 and BW to 260'. Q to 1840

D_n = .82' DC = 1.09

PROJECT NAME Bear Arroyo @ Lipini Road & Juan Tabo

PROJECT NO.

SUBJECT

SHEET OF

BY DATE

CH'D DATE

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

MAYOR
David Rusk

cH
Bob K
Bruno

September 27, 1978

RECEIVED
SEP 29 1978
CITY ENGINEERS

Academy Development Co.
8401 Spain Rd., NE
Albuquerque, NM 87111

Re: S-69-27-7-1

Gentlemen:

The Administrative Review Board approved the proposed plat of Academy Estates, Unit 7, subject to the following findings:

1. Channel improvements in accordance with the Northeast Heights Drainage Plan are required.
2. A drainage plan satisfactory to the City Engineer and AMAFCA is required prior to final plat sign off.
3. Water service is available to a portion of the subject property immediately; however, the remainder of the property will be served by water which will not be available prior to February 1979.

If you have any questions, please do not hesitate to contact this office.

Sincerely,

Phil Garcia
Principal Planner

PG:mac

cc: Meurer, Serafini & Meurer, Inc., 2601 Wyoming Blvd., NE; 87110
Austin Brooks, COG
Bob Fosnaugh, Traffic Engineer
City Engineer
Water Engineer

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

September 20, 1978

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

Re: Academy Place, Unit 7, Tract A

Dear Mr. Conegliano:

Enclosed for your review and approval are two copies of Academy Place, Unit 7, Tract A drainage report.

If you have any questions concerning this report, please feel free to contact Bob Lucero or me of this office.

Sincerely,

Michial M. Emery

Michial M. Emery, P.E.
Vice President

Enclosures

cc: Mr. Thomas Krupiak

BL/mna
Job No. 78-151

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

MAYOR
Harry E. Kinney

CHIEF
ADMINISTRATIVE OFFICER
Frank A. Kleinhenz

August 22, 1977

F21-D6

Mr. Michael J. Irwin
Boharman & Huston, Inc.
4125 Carlisle Blvd., NE
Albuquerque, New Mexico 87107

RE: DRAINAGE REPORT FOR ACADEMY PLACE, UNIT 7.

Dear Mr. Irwin:

I have reviewed the drainage report for Academy Place, Unit 7, and it is approved in concept.

Very truly yours,

Bruno Conegliano

Bruno Conegliano
Assistant City Engineer-Hydrology

BC/kr

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

MAYOR
Harry E. Kinney

CHIEF
ADMINISTRATIVE OFFICER
Frank A. Kleinhenz

March 2, 1977

Mr. Michial M. Emery
Bohannan, Westman, Huston & Assoc., Inc.
4125 Carlisle Blvd. N.E.
Albuquerque, New Mexico 87110

SUBJECT: DRAINAGE REPORT FOR ACADEMY PLACE UNIT 7

Dear Mr. Emery:

The drainage report dated February 1977 has been reviewed.

1. There is a large portion of the southern part of the site which is within Zone A of the Preliminary Flood Hazard Boundary Map dated January 28, 1977. While measures proposed by this and other reports may remove the area from Zone A, this office cannot make such a judgment. It will be necessary to submit data to the Federal Flood Insurance Agency as outlined in Part 1920, Federal Register, Vol. 41, No. 207, Tuesday, October 26, 1976 via this office, to attempt such an action.

2. Flows directed to Spain Road should be discharged into the gutter and should not cross Spain Road.

Sincerely,

V. M. Kimmick
City Engineer

VMK/fs
cc: Jim Smith, Bob Kielich,
Dwayne Sheppard, Drainage File

Public Works Department

Director — Erwin F. Hensch, P. E. 766-7467
Engineering 766-7441 — V. M. Kimmick, P. E.
Street Maint. 766-7755 — G. E. Paul, P. E.

Ass't. Director — Harold R. Orr, Jr. P. E.
Liquid Waste 766-7535 — R. P. Lowe, P. E.
Water 766-7437 — W. H. Otto, P. E.

AN EQUAL OPPORTUNITY EMPLOYER

DRAINAGE REPORT
FOR
ACADEMY PLACE
UNIT 7

ZONE ATLAS SHEET F-21

FEBRUARY, 1977

BOHANNAN WESTMAN HUSTON

DRAINAGE REPORT
FOR
ACADEMY PLACE
UNIT 7

ZONE ATLAS SHEET F-21

FEBRUARY, 1977

BOHANNAN WESTMAN HUSTON & ASSOCIATES INC.
4125 Carlisle Boulevard/NE, Albuquerque, New Mexico 87107 Phone 881-2000

DRAINAGE REPORT
FOR
ACADEMY PLACE
UNIT 7

ZONE ATLAS SHEET F-21

FEBRUARY, 1977

PREPARED BY

KRUPIAK CONSTRUCTION AND DEVELOPMENT COMPANY
9600 ELVIN AVENUE, N.E.
ALBUQUERQUE, NEW MEXICO 87111

PREPARED BY

BOHANNAN WESTMAN HUSTON AND ASSOCIATES, INC.
4125 CARLISLE BOULEVARD, 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.
N.M.P.E. NO. 5194

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PLATE I	UNDEVELOPED RUNOFF AND FLOW PATTERNS
PLATE II	DEVELOPED RUNOFF AND FLOW PATTERNS

DRAINAGE REPORT FOR ACADEMY PLACE, UNIT 7

PURPOSE

The purpose of this report is to determine the runoff resulting from a 100-year frequency storm falling within Academy Place, Unit 7, under existing and developed conditions. Guidelines are established for development so drainage patterns and flow rates can be defined.

LOCATION AND PROJECT DESCRIPTION

The property is located at the northwest corner of Spain Road and Juan Tabo Boulevard. It is bordered on the west by Academy Place, Unit 4, and on the north by Unit 3. The area to be developed contains approximately 16.8 acres. An additional small tract of approximately 2.7 acres is located in the southeast corner of the parcel and will be developed at a later date.

Natural topography in the area slopes from east to west on grades less than ten percent. The land contains areas of fill composed of earth and discarded building materials. Natural soils are composed of granular decomposed granite. Vegetation is sparse native grass.

The proposed type of development is residential and density is expected to be between three and four dwelling units per acre.

HYDROLOGY

Peak runoff rates originating on the parcel were determined using 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 Albuquerque area.

DRAINAGE BEFORE DEVELOPMENT

The property in the past was affected by upland contributing areas to the east. Continuing development in this area has diminished flows onto the property and the completion of Juan Tabo Boulevard in the near future will intercept all of the upland flow. Therefore, for the purpose of this report, the upland drainage will be neglected.

The runoff originating in the parcel is divided into basins and flow paths concentrating in two natural channels. The larger basin (Area 1) gathers the majority of the runoff and discharges at the southwest corner. The smaller basin (Area 2) discharges at the midpoint of the southern boundary. These areas and flow rates are shown on Plate I.

DRAINAGE AFTER DEVELOPMENT

As stated in the AMAFCA Drainage Resolution 1972-2, the development of the property should not increase runoff. In accordance with this guidline, back yard ponding will be used to reduce runoff from the developed property. The remaining internal flows will be collected by the streets and discharged onto Spain Road at the southern boundary. This is shown on Plate II in the back of this report.

In addition to the developed area, a small tract will remain undeveloped in the southeast corner of the property. It is assumed that runoff from this parcel will flow west, be intercepted by a swale along the back walls of the developed property, and flow south onto Spain Road. This is also shown on Plate II in the back of this report.

RECOMMENDATIONS

The following recommendations are made for development of Academy Place, Unit 7.

1. Back yard ponding on all lots.

2. Construct swale to intercept and carry water along back walls adjacent to Tract "A".

APPENDIX

COMPUTATIONS

ACADEMY PLACE UNIT #7
UNDEVELOPED FLOW FROM UPLAND SOURCES IS INTERCEPTED BY ACADEMY UNIT #5 STREETS, EISENHOWER SCHOOL AND JUAN TABO.

FLOW FROM PROPERTY UNDEVELOPED

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

WHERE T_c = TIME OF CONCENTRATION (MINUTES)
B = GROUND FACTOR
L = LENGTH IN FEET
S = Slope in percent.

FOR AREA #1

B = 1.8 (BARE GROUND), L ≅ 1450', S ≅ 3%,

$T_c = \log^{-1}[.3641(1.8) + .3854(\text{Log}\,1450) - .197(\log 3) - .3613]$

T_c = 26.21 minutes

I = intensity in inches/hour; $I = \frac{189}{T_c + 25}$

$I = \frac{189}{26.21 + 25} = 3.69$ IN/HR.

Q = CIA
WHERE Q = Runoff in cfs
C = Runoff factor
I = Intensity of Rainfall in inches/hour.
A = AREA IN ACRES.

FOR AREA #1

C = .4 (UNDEVELOPED w/ POOR VEGETATION)
I = 3.69 in/hr
A ≅ 14.3
Q = CIA = (.4)(3.69)(14.3) = 21.1 cfs.
LEAVES PARCEL IN SW CORNER

FOR AREA #2

B = 1.8, L ≅ 800', S ≅ 4.5%

$T_c = \text{Log}^{-1}[.3641(1.8) + .3854(\text{Log}\,800) - .197(\log 4.5\%) - .3613]$

T_c = 19.24 minutes

PROJECT NAME ACADEMY | ACE UNIT 7 SHEET 1 OF 3
PROJECT NO. 76-120 BY GW DATE 1/26/77
SUBJECT UNDEVELOPED DRAINAGE CH'D DATE

UNDEVELOPED DRAINAGE FOR AREA #2 Cont'd.

$T_c = 19.24$

$I = \frac{189}{19.24+25} = 4.27$ inches/hour

RUNOFF AREA #1

$C = .4$, $I = 4.27$, $A = 5.2$ acres

$Q = CIA = .4(4.27)(5.2) = 8.9$ cfs.

THIS FLOW (8.8 cfs) leaves property on south boundary in the center.

DEVELOPED AREA RUNOFF

Runoff Coefficient Computation:

TYPICAL LOT SIZE = 75' x 110'
ASSUME SETBACK LINE IS 25' FROM WALK
USE BACKYARD PONDING ON ALL LOTS.

TOTAL CONTRIBUTING AREA PER LOT = 3750 ft²

Pavement
Street & walk = 75 x 25
DRIVE PAD = 16 x 20
TOTAL = 2195

GRASS AREA =
(16 x 5) + (59 x 25) = 1555

Pavement = 58.5%
GRASS = 41.5%

$C_{GRASS} = .20$

$C_{PVMT} = .95$

$C = (.585)(.95) + (.415)(.20)$

$C = .639$

For 62 lots with AVERAGE CONTRIBUTING AREA OF 3750 ft²
TOTAL IS $\frac{3750\ ft^2/lot \times 62\ lots}{43560\ ft^2/Acre} = 5.34$ acres

$B = .77$ (Pavement), $S \geq 3.0\%$, $L = 1350$

$T_c = 10.75$ minutes

$I = \frac{18}{10.75+25} = 5.09$ inches/hour.

PROJECT NAME ACADEMY PLACE UNIT 7 SHEET 2 OF 3
PROJECT NO. 76-120 BY GW DATE 1/26/77
SUBJECT DRAINAGE REPORT CH'D DATE

DEVELOPED AREA RUNOFF

FOR AREA "B"

# of lots = 34 lots

$\frac{34 \times 3750\ ft^2/lot}{43560} = 2.93$ acres of contributing area.

$Q = CIA = (.639)(5.29)(2.93) = 9.9$ cfs

FOR AREA "C" $T_c < 10$ min. use 10 min, $I = 5.4$

# of lots = 28

$\frac{28 \times 3750\ ft^2}{43560\ ft^2/acre} = 2.41$ acres.

$Q = CIA = (.639)(5.4)(2.41) = 8.3$ cfs

FOR TRACT "A" THAT REMAINS UNDEVELOPED

$L \doteq 500'$, $S \doteq 3\%$, $B = 1.8$

T_c COMPUTED = 17.39 minutes

Intensity $= \frac{189}{17.39 + 2.5} = 4.46$ in/hr.

$Q = CIA = (.4)(4.46)(2.7) = 4.8$ cfs

TOTAL from Undeveloped = 8.9 + 21.1 = 30.0 cfs

TOTAL from Developed PARCEL AND UNDEVELOPED TRACT A = 9.9 + 8.3 + 4.8 = 23.0 cfs.

PROJECT NAME	ACADEMY PLACE #7	SHEET 3	OF 3
PROJECT NO.	76-120	BY GW	DATE 1/26/77
SUBJECT	DRAINAGE REPORT	CH'D	DATE

BOHANNAN WESTMAN HUSTON & ASSOCIATES, INC.

THIS MICROIMAGE IS THE BEST POSSIBLE
REPRODUCTION DUE TO THE POOR QUALITY
OF THE ORIGINAL DOCUMENT

BOHANNAN-HUSTON INC.

4125 CARLISLE BOULEVARD, NORTHEAST, ALBUQUERQUE, NEW MEXICO 87107 (505) 881-2000

DRAINAGE REPORT

FOR

ACADEMY PLACE, UNIT 7, TRACT A

DRAINAGE REPORT

FOR

ACADEMY PLACE, UNIT 7, TRACT A

Zone Atlas Map F-21

SEPTEMBER, 1978

PREPARED FOR

Krupiak Development & Construction Co.
9600 Elvin, N.E.
Albuquerque, New Mexico 87112

PREPARED BY

Bohannan-Huston, Inc.
4125 Carlisle Boulevard, 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.
N.M.P.E. No. 5194

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PLATE I UNDEVELOPED RUNOFF & DEVELOPED FLOW PATTERNS

DRAINAGE REPORT

FOR

ACADEMY PLACE, UNIT 7, TRACT A

PURPOSE

The purpose of this report is to determine the runoff resulting from a 100-year frequency storm falling on the study parcel and it's contributing areas under existing and developed conditions. Guidelines for development are established so that drainage patterns and flow rates can be defined.

PROJECT LOCATION AND DESCRIPTION

The study parcel is bound on the east by Juan Tabo Blvd., on the south by Spain Road and on the west and north by Academy Place, Unit 7. This is shown on Plate I at the back of this report. Tract A contains 2.765 acres.

Existing topography in the study area slopes from east to west on an average slope of 2.5%. Natural soils are composed of granular decomposed granite. Vegetation is sparse native grass. The proposed type of development is residential in R-T zoning and density is expected to be approximately 11 dwellings per acre.

HYDROLOGY

Peak runoff rates originating on the parcel were determined using 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 Albuquerque area.

DRAINAGE BEFORE DEVELOPMENT

The property in the past was affected by upland flows from the east. Continuing development in this area has diminished flows onto the property and the completion of Juan Tabo Boulevard has allowed interception of any remaining upland flows. Comple-

tion of upland diversion facilities as recommended by the Leonard Rice Report will divert the majority of upland flows from Spain Road to the Bear Canyon.

DRAINAGE AFTER DEVELOPMENT

Runoff from the proposed development will be reduced by employing backyard ponding on all lots. This is shown on Plate I in the back of this report. The remaining flows will be collected by the streets and carried west into Tasia Drive in Academy Place Unit 7. Drainage concepts for Academy Place, Unit 7, have been previously approved. We believe that the benefits from increased densities in this area will offset the slight increase in runoff.

RECOMMENDATIONS

The following recommendations are made for development of Academy Place, Unit 7, Tract A.

1. Backyard ponding on all lots.

2. Construct inverted crown street section **or** construct finish floors of all buildings .5' above the maximum water level in the street. The inverted crown section is preferable if it could be approved by the City Engineer. We request his review of this concept and his opinion to be related with comments concerning this report. (See sketches on Plate I.)

APPENDIX

COMPUTATIONS

UNDEVELOPED RUNOFF
FROM TRACT 'A' ONTO TASIA ROAD

B = 1.8 L = 280' S = 2.5% AREA = 2.765 Ac

$T_c = \text{Log}^{-1} [.3641 (1.8) + .3854 (\text{Log } 280) - .197 (\text{Log } 2.5) - .3613]$

$= \text{Log}^{-1} [.65538 + .9431347 - .078394 - .3613]$

$= 14.42$ min.

INTENSITY (100 YEAR STORM)

$I_{100} = 189 / T_c + 25$

$= 189 / 14.42 + 25$

$= 189 / 39.42$

$= 4.79$ in/hr.

DEVELOPED FLOW (100 YR. STORM)

$Q_{100} = C \times I \times A$

$= .4 (4.79) 2.765$

$= 5.3$ CFS

PROJECT NAME Academy Pl Unit 7-A SHEET 1 OF 4
PROJECT NO. 78-151 BY CRC DATE 9/19
SUBJECT CH'D DATE

DEVELOPED RUNOFF
FROM TRACT 'A' ONTO TASIA DR.

B = .77 L = 670' S = 2.8% AREA = 1.725 AC.

CALCULATION OF C (RUNOFF COEFFICIENT)

IMPERVIOUS AREA = 1.45 AC

PERVIOUS AREA = .28 AC.

83.8% @ .95 = .80
16.2% @ .4 = .06

TOTAL AREA = 1.725 AC @ .86

$T_c = \text{Log}^{-1} [.3641 (.77) + .3854 \text{ Log } (670) - .197 \text{ Log } (2.8) - .3613]$

$= \text{Log}^{-1} (.92)$

$= 8.32$ min.

$I = 189 / T_c + 25$

$= 189 / 8.32 + 25$

$= 5.67$ in/hr

$Q = .86 (5.67) 1.725$

$= 8.41$ CFS

PROJECT NAME Academy Pl Unit 7-A SHEET 2 OF 4
PROJECT NO. BY CRC DATE 9/19
SUBJECT CH'D DATE

PONDING REQUIREMENTS - AREA A

IMPERVIOUS AREA .45 Ac

PERVIOUS AREA .32 Ac

42% @ .4 = .17

58% @ 95 = .55

TOTAL AREA = .77 Ac @ .72

VOLUME = C × AREA × PRECIP.

= .72 (31363.2) .2

= 4516.3 CU. FT.

AREA OF POND = 13,750 SQ. FT.

DEPTH OF POND = $\frac{4516.3}{13750}$ = .33 FT.

PROJECT NAME Academy Pl. Unit 7-A SHEET 3 OF 4

PROJECT NO. BY CRC DATE 9/15

SUBJECT CH'D DATE

PONDING REQUIREMENTS - AREA B

IMPERVIOUS AREA .12 Ac

PERVIOUS AREA .15 Ac

56% @ .95 = .53

44% @ .4 = .18

TOTAL AREA = .27 Ac @ .71

VOLUME = C x AREA x PRECIP

= .71 (11761.2) .2

= 1670.1 CU. FT.

AREA OF POND = 3950 SQ FT.

DEPTH OF POND = $\frac{1670.1}{3950}$ = .42 FT.

PROJECT NAME Academy Pl Unit 7-A SHEET 4 OF 4

PROJECT NO. BY CPC DATE 9/19

SUBJECT CH'D DATE