HYDROLOGY E20/D14 TWO PLANS

E20/D14

2 Plans

E70-04

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

Ken Schultz
Mayor

UTILITY DEVELOPMENT DIVISION
HYDROLOGY SECTION
(505) 768-2650

May 5, 1987

Ron Castleman
9305 Admiral Lowell Avenue, NE
Albuquerque, New Mexico 87111

Dear Mr. Castleman:

In response to your request pertaining to drainage, a field inspection was made and the drainage report for Pino Canyon Development was researched.

According to the Drainage Report (see attached) each lot was required to retain all runoff that falls within each lot in a rear yard pond.

Since the City has no control on grading changes to single family lots done by individual property owners (such as landscaping, etc.), the drainage ordinance has no enforcement authority on single family residential lots. Therefore, situations such as yours are considered to be civil in nature to be arbitrated between the property owners.

If you have any questions, please feel free to call me at 764-1699.

Cordially,

Richard L. Duran

Richard L. Duran
Drainage Inspector

Enclosure

RLD/bsj

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

MAYOR
David Rusk

March 16, 1979

Mr. John Robert, P.E. & L.S.
Andrews,Asbury & Robert, Inc.
401 San Pedro N.E.
Albuquerque, New Mexico 87108

Re: Pino Canyon Town Homes Subdivision

Dear Mr. Robert:

Your letter amending the submitted drainage report for the captioned development satisfies the requirements of this office. The drainage report as amended is hereby approved.

Very truly yours,

Bruno Conegliano
Assistant City Engineer/Hydrology

BC/fs

cc - Dick Heller
Rich Leonard
Drainage File

ANDREWS, ASBURY & ROBERT, INC.
Consulting Engineers
401 San Pedro, NE, Albuquerque, New Mexico 87108
(505) 265-6631

John A. Andrews, P.E.
Charles T. Asbury, P.E.
John B. Robert, P.E. & L.S.

RECEIVED
MAR 1 4 1979
CITY ENGINEERS

March 13, 1979

Mr. Bruno Conegliano
Assistant City Engineer
CITY OF ALBUQUERQUE
PO Box 1293
Albuquerque, New Mexico 87103

SUBJECT: PINO CANYON TOWN HOMES SUBDIVISION

Dear Bruno:

As per our discussion of yesterday, we will re-design the intersection of Admiral Dewey and Admiral Lowell Avenues so that the water continues westerly down Admiral Lowell to its intersection with Layton Avenue.

We will re-design the intersection of Academy Road and Casa de Vita Intersection so that water on Academy Road will drain Southerly to discharge into the Bear Arroyo Tributary.

We will design a storm sewer Northerly on Layton Avenue from its intersection to Estrellita Del Norte to intercept the water discharging into the Estrellita Del Norte/Layton Avenue Intersection at a point approximately one-hundred fifty feet (150') from the intersection of Layton Avenue and Admiral Lowell. Also, inlets will be provided on the West side of Layton Avenue South of Estrellita Del Norte to intercept a portion of the flow on Layton Avenue from the South.

The design of the Estrellita Del Norte/Layton Avenue Intersection with its storm drain inlets will be coordinated with the Engineering firm of Meurer, Serafini & Meurer, Inc., 2601 Wyoming Blvd., NE, Albuquerque, New Mexico.

The above changes will be incorporated into the final plans for the subdivision which should be forwarded to your office within the next two (2) weeks.

Very truly yours,

John B. Robert

JOHN B. ROBERT, P.E. & L.S.

JBRsm

CITY OF ALBUQUERQUE, NEW MEXICO
MUNICIPAL DEVELOPMENT DEPARTMENT
Office of the City Engineer

Attachment No. 1

Back up data required for final plan submissions.

1. Hydraulic calculations including

   a. Existing and proposed channel profile on plan.
   b. Q & V on plan.
   c. Water surface (open channel) or HGL for close conduit on plan.
   d. Street cross sections showing depth of flow in street at intersections, storm drain inlets and rundowns.
   e. Channel cross section at 100' intervals on plans.

2. Grading Plan

   a. Sufficient offsite contours showing water courses channels, etc. w/100 year storm water surface.
   b. Wall elevations bottom and top including existing walls and proposed walls.
   c. Pond elevations, configurations and volumes, sideslopes and slope protection.
   d. Flow arrows on lots.
   e. Flow arrows on streets (layout sheet).

(Feb. 1[illegible], 197[illegible])

CITY OF ALBUQUERQUE, NEW MEXICO
MUNICIPAL DEVELOPMENT DEPARTMENT
Office of the City Engineer

Attachment No. 1

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   e. Flow arrows on streets (layout sheet).

(Feb. 16, 1979)

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

MAYOR
David Rusk

March 12, 1979

Andrews, Asbury & Robert Inc.
401 San Pedro N.E.
Albuquerque, New Mexico 87108

Attention: John Robert

Re: Drainage Report for Pino Canyon Townhouses

Dear Mr. Robert:

While I am in agreement with the proposal for handling the onsite flows of this parcel, there are some questions regarding the offiste flows which have not been addressed in the drainage report and need scrutiny.

It is your proposal to construct the southern half of Academy Rd. N.E. from the parcel indicated as Tract C on the 2.A. map E 20 immediately S.E. of the intersection of Moon and Academy, to Layton. What is the flow collected by this road and what is its final disposition? It is possible that the firm of Molzen and Corbin in their planning for P.D. 196 have investigated this question. At the same time since you are planning this construction, an answer to the question above needs to be supplied.

Since Academy is a major arterial it does not seem that the original plan of the consulting firm CCIC of routing the flow of Academy Hills, Unit 2 from Admiral Lowell Ave. to this major thoroughfare, is a good and acceptable solution. This flow of 32.3cfs(according to your design) should then be turned from Academy into Layton and this requirement would cause problems at a major roadway intersection. From the point of view of the City the more desirable solution is to continue the flow from Admiral Lowell across this parcel with a point of discharge at the intersection of Admirals Lowell and Layton. Please incorporate this concept into your street design. The existing half street intersection of Admiral Lowell and Admiral Dewey will have to be modified, but such minor changes would result in a better overall design.

Apparently there is a conflict between some preliminary discharge figures that your firm has received from the consulting firm of M.S.M. and the flows computed in the approved master plan of Academy Hills and Academy Hills, Unit 1 prepared by the firm of CCIC.

According to these studies, at the intersection of Layton Ave, Academy Hills Drive, a flow of 73cfs from the S.E. and a flow of 72cfs from the N.E. would combine with the flow of 56.1cfs indicated in your report. These flows would in turn combine with the flows discharging onto Estrellita del Norte from Tract B1, Unit 7, Academy Estates.

These street flows will have to be reduced by 50% through interception via a storm sewer and conveyed safely to the Bear Canyon Tributary Arroyo.

I anticipate that a meeting will be required between representatives of the developer of Academy Estates 7, your firm, and the City, in order to develop a mutually acceptable solution.

Very truly yours,

Bruno Conegliano

Bruno Conegliano
Assistant City Engineer-Hydrology

BC/fs

cc - Dick Heller
Rich Leonard
Drainage File

ANDREWS, ASBURY & ROBERT, INC.
Consulting Engineers
401 San Pedro, NE, Albuquerque, New Mexico 87108
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John A. Andrews, P.E.
Charles T. Asbury, P.E.
John B. Robert, P.E. & L.S.

RECEIVED
FEB 01 1979
CITY ENGINEERS

January 31, 1979

Mr. Bruno Conegliano
Assistant City Engineer, Hydrology
CITY OF ALBUQUERQUE
PO Box 1293
Albuquerque, New Mexico 87103

HAND-DELIVERED
City Hall

SUBJECT: PINO CANYON TOWN HOMES SUBDIVISION
DRAINAGE REPORT

Dear Mr. Conegliano:

We hand you herewith this date for your review and approval two (2) copies of the Drainage Report for Pino Canyon Town Homes Subdivision, Site Improvements.

Please note that, in addition to improvements to the subdivision site, it is proposed to improve Academy Road to the North and West of the subdivision and Layton Avenue to the West and South of the subdivision.

Your earliest review of this report will be appreciated. Please call if you have any questions.

Very truly yours,

John A. Andrews

JOHN A. ANDREWS, P.E.

JAAsm
Enclosures
cc: Mr. Gary Swearingen

ACADEMY DEVELOPMENT COMPANY

ALBUQUERQUE, NEW MEXICO

RECEIVED
FEB 01 1979
CITY ENGINEERS

DRAINAGE REPORT
FOR
PINO CANYON TOWN HOMES
SITE IMPROVEMENTS

JANUARY, 1979

ANDREWS, ASBURY & ROBERT, INC.
Consulting Engineers
401 San Pedro, NE
Albuquerque, New Mexico 87108
505-265-6631

DRAINAGE REPORT
FOR
PINO CANYON TOWN HOMES
SITE IMPROVEMENTS

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III	Developed Conditions	
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	B. Offsite	6
IV	Lot Ponding Requirements	8
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V	Drainage Analysis	10
		Sheets 1 through 9

MAPS

Existing Conditions	MAP NO. 2
Developed Conditions	MAP NO. 3

(See pocket at back of report for Map No. 2 and Map No. 3)

I

INTRODUCTION

Academy Development Company propose to improve a 9.36 acre tract of land designated as Pino Canyon Town Homes Subdivision. Said tract of land lies within the Southeast quarter of Section 29, Township 11 North, Range 4 East, N.M.P.M., and is located in the Northeast Heights of Albuquerque, New Mexico. The subdivision is bounded on the North by Academy Road, NE, on the East by Admiral Dewey Avenue, NE, on the South by Academy Hills Subdivision, Unit No. 1, and on the West by Layton Avenue, NE. (See enclosed Location Map, Map No. 1, Page E-20 of the Zone Atlas).

The type of development proposed for this Subdivision is zero lot line, single family, townhouse units.

It is the intent of this report to provide a plan to control storm water runoff under proposed developed conditions that will conform to applicable drainage resolutions and ordinances. The storm drainage analysis included herein is based on a 100-year, frequency storm.

In addition to the improvements to the subdivision site, it is proposed to construct curb and gutter and pavement on the following adjacent streets:

1. Admiral Dewey Avenue, NE, on the East side of the subdivision;
2. Layton Avenue, NE, on the West side of the subdivision and to the South approximately 600 feet;
3. Academy Road, NE, on the North side of the subdivision and to the West approximately 2150 feet. (South half of street only).

See Location Map, Map No. 1 for limits of proposed street paving.

II

EXISTING CONDITIONS

The proposed subdivision site is presently undeveloped and the existing drainage condition is shown on Map No. 2 of this report.

Bounding the site on the South is a concrete block wall which serves as a backyard fence for existing single-family residential units. Therefore, no offsite drainage reaches the site from the South. Existing off-site areas generating storm water runoff to the subdivision lay to the East and North. Academy Hills, Unit No. 2, which lies to the East, is an existing developed subdivision of which a portion, approximately 15 acres, generates storm flows that presently drain through the subject property.

It is assumed that the Academy Hills, Unit No. 2, was developed under the conditions set forth in the Albuquerque Metropolitan Arroyo Flood Control Authority Drainage Resolution 1972-2. Therefore, the coefficient of runoff for determining storm water flows generated from the contributory area of the subdivision was assumed to be equal to 0.40. Small drainage areas lying to the North of the site generate storm runoff which enters the North Boundary of the subdivision as sheet flow.

For determining storm water runoff values under the existing conditions, the subdivision site was divided into two drainage areas - Drainage Area A and Drainage Area B. These two drainage areas were then further divided into two sub-areas each - Drainage Area A being divided into Area A-1 (offsite) and Area A-2 (onsite); Drainage Area B similarly divided into Area B-1 (offsite) and Area B-2 (onsite). See Map No. 2 for these Drainage Area designations and resulting flows.

III

DEVELOPED CONDITIONS

A. ONSITE

The proposed method of drainage for the subdivision under the developed conditions is shown on Map No. 3 enclosed herein.

As shown on Map No. 3, it is proposed to grade the site to provide for drainage flows generally to the West and onto Layton Avenue. This method of grading will allow the storm flows to leave the site in approximately the same location as under existing conditions.

The guidelines to be used for controlling storm water runoff when developing the subdivision are stated in the design analysis attached hereto and are restated as follows:

1. Provide for infiltration and backyard and/or roof ponding of 100% of rainfall that falls on the area lying 40 feet back of the street right-of-way or equivalent storm water retention.

2. Rainfall that falls on the street right-of-way and to 40 feet back from the right-of-way will be allowed to run off and flow to the streets, then be carried by street flow out of the subdivision.

3. Total runoff rate from the developed subdivision will not be allowed to increase from the runoff under existing conditions.

B. OFFSITE

Included in the scope of the project, along with developing the subdivision site, is the paving of the South half of Academy Road, NE, Beginning at a point approximately 2150 feet West of the Academy Road and Layton Avenue intersection and ending at Admiral Dewey Avenue as shown on Map No. 3. In addition, Layton Avenue will be paved South from Academy Road to a point approximately 600 feet South of the Pino Canyon Town Homes Subdivision. Presently, that portion of Layton Road which lies South of the Subdivision site is paved on the East half only. This project provides for widening Layton to a full-width street.

The North half of Academy Road is presently in Paving District No. 196 which is being designed by Molzen-Corbin & Associates, Engineers, under a contract with the City of Albuquerque. Design work of this project is being coordinated with Molzen-Corbin & Associates.

It is the intent to drain the South half of Academy Road, NE, onto Layton Avenue. Storm water flowing on the North half of Academy Road will continue to the West.

The storm water runoff that will be diverted South from Academy Road onto Layton Avenue will flow South on Layton to the Layton Avenue-Academy Hills Drive intersection. At this point

the storm runoff will flow Southwest on Estrellita Del Norte Road, a future street in the Academy Estates Unit No. 7 development, to the Bear Canyon Arroyo.

Meurer, Serafini and Muerer, Engineers, are presently designing the site improvements for Academy Estates, Unit No. 7 for an R-1 type development. Their design provides for storm flows to be routed South from Academy Road towards the Bear Canyon Arroyo and, therefore, the development of Academy Estates, Unit No. 7 will not increase the storm flows on Academy Road West of Layton Avenue.

Drainage Areas I, II, III, IV and V, along with their corresponding flows, are shown on Map No. 3. Computations made to determine these flows are included hereinafter in the Design Analysis. (See Sheets 1 through 9).

The flows shown on Layton Avenue South of the Academy Hills Drive intersection and the flows shown on Academy Hills Drive, East of Layton Avenue, have been obtained from the firm of Meurer, Serafini and Muerer. The flows on Estrellita Del Norte to the Southwest of the Layton Avenue-Academy Hills Intersection were also obtained from this firm.

IV

LOT PONDING REQUIREMENTS

As established previously in this report, retention of 100 percent of the rainfall that falls on the area lying 40 feet back of the street right-of-way is to be provided for by backyard and/or roof ponding or other acceptable means.

The basis for determining the ponding requirements is as follows:

Landscaped Area to be ponded = 71%/Lot
Hard Surfaced Area to be ponded = 29%/Lot

therefore:

Average Runoff Factor = (.71)(.4)+(.29)(.9) = .55

and

Rainfall to be Ponded = (2.5)(1/12)(.55) = 0.115 $ft.^3/ft.^2$ of Area

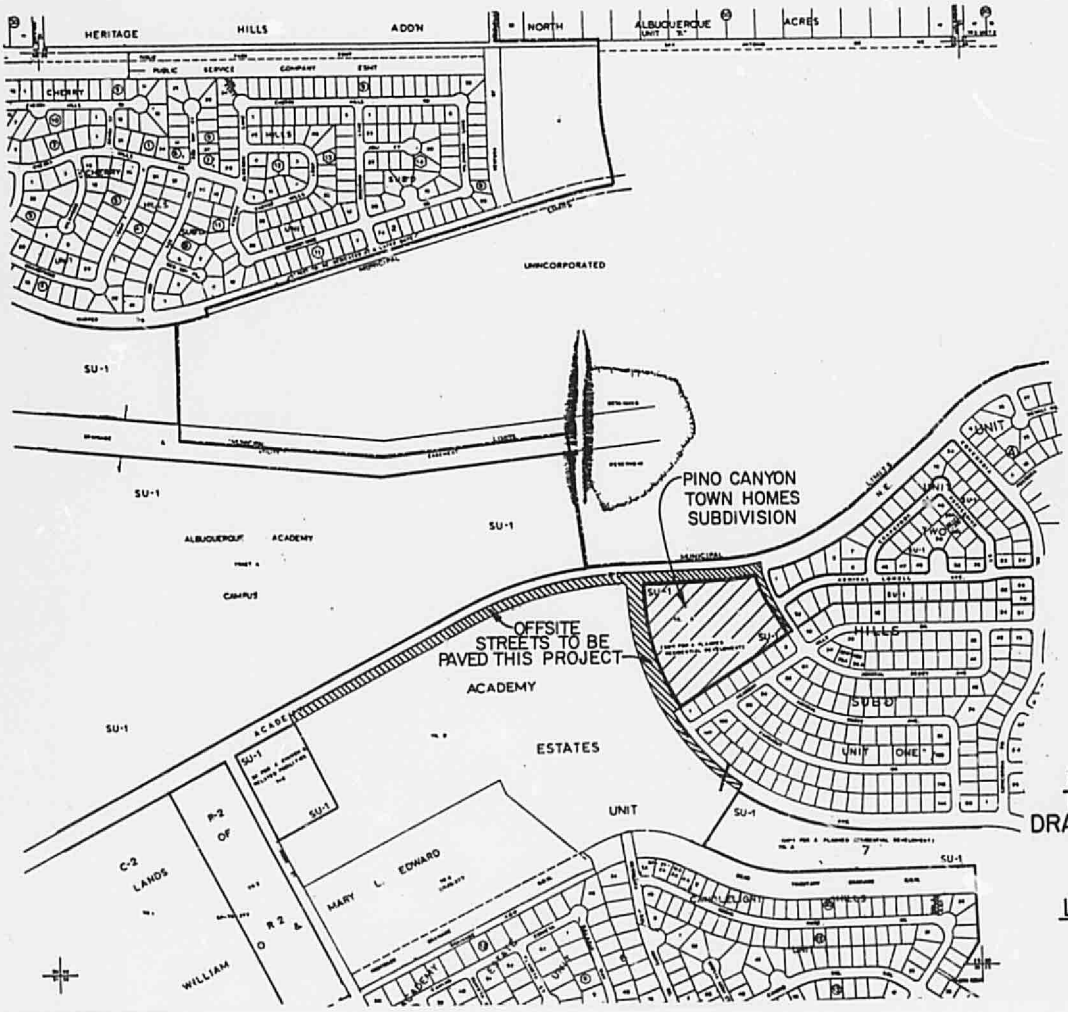
The area of each lot lying 40 feet back of the street right-of-way was computed and this area then multiplied by the applicable rainfall to be ponded to determine the Lot Ponding Requirements shown in the following tabulation:

PINO CANYON TOWN HOMES

DRAINAGE ANALYSIS

LOT PONDING REQUIREMENTS

	LOT	STORAGE VOLUME REQUIRED (Cu.Ft.)
BLOCK 1	1	431
	2-16	350 per lot
	17	443
BLOCK 2	1	522
	2	352
	3	351
	4	350
	5	350
	6	350
	7	351
	8	352
	9	568
	10	1044
	11	966
	12	474
	13-19	345 per lot
	20	525
	21	715
	22	679
	23	311
	24	309
	25	381
BLOCK 3	1	437
	2	415
	3	407
	4	396
	5	406
	6	413
	7	431
	8	540
	9	428
	10	365
	11	301
	12	455
	13	353
	14	484
	15	300
	16	355
	17	411
	18	556



PINO CANYON
TOWN HOMES
DRAINAGE ANALYSIS

LOCATION MAP

E·20·Z

MAP No. 1

V

DRAINAGE ANALYSIS

Following is the Drainage Analysis (computations) for the drainage areas affecting the Pino Canyon Town Homes Subdivision, both in the existing and developed conditions.

ANDREWS, ASBURY & ROBERT, INC.
CONSULTING ENGINEERS
401 San Pedro, NE., Albuquerque, N.M. 87108
Telephone (505) 265-6631

DRAINAGE ANALYSIS

CRITERIA

1. DESIGN STORM - 100 year frequency, 6 hour precipitation
2. AMAFCA DRAINAGE RESOLUTION 1972-2
3. City of Albuquerque DRAINAGE ORDINANCE

REFERENCE MATERIAL

1. Albuquerque AREA (1961) INTENSITY - DURATION - FREQUENCY CURVES (HERKENHOFF)
2. 100 YEAR, 6 HOUR PRECIPITATION RAINFALL FREQUENCY MAP FOR NEW MEXICO (U.S. WEATHER BUREAU, 1967)
3. TIME OF CONCENTRATION NOMOGRAPH, (P. 2, KIRPICH)

DESIGN PARAMETERS

1. PEAK RUNOFF RATE - RATIONAL FORMULA, $Q = CIA$
2. RUNOFF VOLUME = V = RUNOFF COEFFICIENT × RAINFALL × AREA
3. RUNOFF COEFFICIENTS;
   a.) EXISTING GROUND SURFACE = 0.40
   b.) PAVED & ROOFED SURFACES = 0.90
   c.) LANDSCAPED SURFACE = 0.40

EXISTING CONDITIONS - OFFSITE

PEAK FLOWS
(REFER TO MAP Nº 2 FOR
DRAINAGE AREA DESIGNATIONS)

DRAINAGE AREA 'A-1"

A = AREA = 15.4 AC.
H = ELEV. DIFFERENCE = 5628 - 5578 = 50 ft.
L = LENGTH OF DRAINAGE AREA = 1890 FT.
C = RUNOFF COEFFICIENT = 0.40
TC = TIME OF CONCENTRATION = 4 MINS USE 10 min.
I = INTENSITY = 5.4 in/hr.

$Q = CIA = 0.40 \times 5.4 \times 15.4 = 33.3$ CFS

DRAINAGE AREA "B-1"

A = 0.82 AC.
H = 5586 - 5570 = 16 FT.
L = 260 FT
C = 0.40
TC = 1.7 MINS < 10 ∴ USE 10 MINS.
I = 5.4 in/hr.

$Q = CIA = 0.40 \times 5.4 \times 0.82 = 1.8$ CFS.

Existing Conditions - Onsite

Peak Flows & Volumes

Drainage Area "A-2"

A = 7.12 ac
H = 5578 - 5561 = 17 ft
L = 740 ft
C = 0.40
TC = 5.5 mins < 10 ∴ use 10 min.
I = 5.4 in/hr

$Q = CIA = 0.40 \times 5.4 \times 7.12 = 15.4$ cfs

$V = 0.4 \times 2.5'' \times 7.12 \times \frac{43560}{12} = 25846$ ft³

Drainage Area "B-2"

A = 2.24 ac.
H = 5583 - 5570 = 13 ft
L = 450 ft
C = 0.40
TC = 5.2 mins < 10 ∴ use 10 mins.
I = 5.4 in/hr.

$Q = CIA = 0.40 \times 5.4 \times 2.24 = 4.8$ cfs

$V = 0.4 \times 2.5'' \times 2.24 \times \frac{43560}{12} = 8131$ ft³

Summary - Onsite

	Q(cfs)	V (ft³)
Drainage Area A-2	15.4	25846
Drainage Area B-2	4.8	8131
Total	20.20	33977

Existing Conditions - Combined Onsite & Offsite

Drainage Areas "A-1" & "A-2"

A = 22.52
C = 0.40
TC < 10 min ∴ use 10 min.
I = 5.4 in/hr

$Q = CIA = 0.40 \times 5.4 \times 22.52 = 48.7$ cfs

Drainage Areas "B-1" & "B-2"

A = 3.06 ac.
C = 0.40
TC < 10 mins ∴ use 10 mins.
I = 5.4 in/hr.

$Q = CIA = 0.40 \times 5.4 \times 3.06 = 6.6$ cfs.

Meurer, Serafini and Meurer are presently preparing a drainage report for Academy Estates Unit 7. The flows on Layton Avenue south of the Academy Hills Drive intersection and the flows on Academy Hills Drive, east of Layton Ave. were obtained from that firm. As of 1-29-79 the storm runoff flowing north in Layton Ave is 3.6 cfs. The storm runoff flowing southwest in Academy Hills Dr. is 63.3 cfs.

ANDREWS, ASBURY & ROBERT, INC.
CONSULTING ENGINEERS
401 San Pedro, NE., Albuquerque, N.M. 87108
Telephone (505) 265-6631

Project: PINO CANYON TOWN HOMES Sheet 5 of 9
DRAINAGE ANALYSIS Job No. 142
By BEF Ck'd JA Date 1-26-79

RUNOFF DEVELOPED CONDITIONS

REFER TO MAP Nº 3 FOR DRAINAGE AREA DESIGNATIONS

NOTES:

AS A METHOD OF CONTROLLING VOLUME AND RATE OF STORM WATER RUNOFF FROM THE SUBDIVISION UNDER DEVELOPED CONDITIONS DUE TO THE CONSTRUCTION OF HARD SURFACE AREAS, THE FOLLOWING DESIGN CONCEPTS ARE PROPOSED:

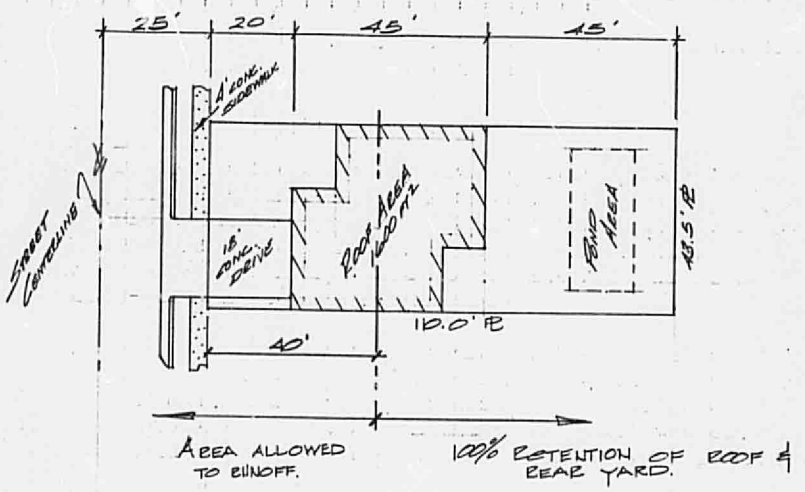
1. PROVIDE FOR BACKYARD AND/OR ROOF AREA PONDING OF 100% OF THE RAINFALL THAT FALLS ON THE AREA LYING 40 FT BACK OF THE STREET RIGHT-OF-WAY LINE OR EQUIVALENT.

2. RAINFALL THAT FALLS ON THE STREET RIGHT-OF-WAY AND TO 40 FT. BACK FROM THE RIGHT-OF-WAY WILL BE ALLOWED TO FLOW TO THE STREETS AND OUT OF THE SUBDIVISION.

3. TOTAL RUNOFF RATE FROM THE DEVELOPED SUBDIVISION WILL NOT BE ALLOWED TO INCREASE FROM THE EXISTING CONDITIONS.

ANDREWS, ASBURY & ROBERT, INC. CONSULTING ENGINEERS 401 San Pedro, NE., Albuquerque, N.M. 87108 Telephone (505) 265-6631	Project PINO CANYON TOWN HOMES Sheet 6 of 9 DRAINAGE ANALYSIS Job No. 142 By BSF Chk'd JA Date 1-26-79

TYPICAL LOT PLAN



DETERMINATION OF COMBINED RUNOFF COEFFICIENT FOR AREAS DRAINING TO STREETS:

TOTAL AREA ALLOWED TO RUNOFF = 43.5' × 65'
= 2827.5 FT²/LOT
(COMPRIZES AREA FROM CENTERLINE OF ROAD TO 40' BACK OF R.O.W.)

ROOF & PAVED AREA = 1405 FT²

LANDSCAPED AREA = 1422.5 FT²

$$\therefore C_{COMBINED} = \frac{1405 \times 0.90 + 1422.5 \times 0.40}{2827.50}$$

$$= 0.65$$

ANDREWS, ASBURY & ROBERT, INC.
CONSULTING ENGINEERS
401 San Pedro, NE., Albuquerque, N.M. 87108
Telephone (505) 265-6631

Developed Conditions

Drainage Area I - Offsite

(comprises the west half of Admiral Dewey that will be allowed to drain through the site.)

A = 0.12 ac.
H = 5580 - 5578.5 = 1.5 ft.
L = 220 ft.
C = 0.90
TC = 1.3 mins < 10 ∴ use 10 mins.
I = 5.4 in/hr.

$$Q = CIA = 0.9 \times 5.4 \times 0.12 = 0.6 \text{ cfs}$$

Drainage Area II - Onsite

A = 2.65 ac. contributing to runoff
H = 5583 - 5570 = 13 ft.
L = 880 ft
C = 0.65 from sh. 6
TC = 2.8 mins < 10 ∴ use 10 mins.
I = 5.4 in/hr.

$$Q = CIA = 0.65 \times 5.4 \times 2.65 = 9.3 \text{ cfs}$$

$$V = 0.65 \times 2.5'' \times 2.65 \times \frac{43560}{12} = 15631 \text{ ft}^3$$

Drainage Area III - Onsite

A = 2.35 ac. contributing to runoff
H = 5586 - 5560 = 26 ft
L = 780 ft
C = 0.65 from sh. 6
TC = 2.1 mins < 10 mins ∴ use 10 mins.
I = 5.4 in/hr

$$Q = CIA = 0.65 \times 5.4 \times 2.35 = 8.3 \text{ cfs}$$

$$V = 0.65 \times 2.5'' \times 2.35 \times \frac{43560}{12} = 13862 \text{ ft}^3$$

ANDREWS, ASBURY & ROBERT, INC.
CONSULTING ENGINEERS
401 San Pedro, NE., Albuquerque, N.M. 87108
Telephone (505) 265-6631

Summary - Developed Onsite

	Q(cfs)	V(ft³)
Drainage Area II	9.3	15631
Drainage Area III	8.3	13862
Total	17.6	29493

Combined Flow - Drainage Areas I, II & III

A = 5.12 ac.
H = 5586 - 5560 = 26 ft
L = 1000 ft
C = 0.66
TC = 2.9 mins < 10 mins ∴ use 10 mins
I = 5.4 in/hr

Q = CIA = 0.66 x 5.4 x 5.12 = 18.2 cfs

Drainage Area IV - Offsite

A = 13.91 ac.
H = 5628 - 5571 = 57 ft
L = 2440 ft
C = 0.43
TC = 5.6 mins < 10 ∴ use 10 mins.
I = 5.4 in/hr

Q = CIA = 0.43 x 5.4 x 13.91 = 32.3 cfs.

ANDREWS, ASBURY & ROBERT, INC. CONSULTING ENGINEERS 401 San Pedro, NE., Albuquerque, N.M. 87108 Telephone (505) 265-6631	Project Pino Canyon Town Homes Sheet 9 of 9 Drainage Analysis Job No. 142. By BF Chk'd JA Date 1-29-79

DRAINAGE AREA V - OFFSITE

A = 1.14 AC.
H = 5571 - 5560 = 11 FT
L = 830 FT
C = 0.90
TC = 2.8 MINS < 10 ∴ USE 10 MINS.
I = 5.4 IN/HR

Q = CIA = .9 × 5.4 × 1.14 = 5.54 CFS

COMBINED FLOW - DRAINAGE AREAS I, II, III, IV & V

A = 20.17 AC.
C = 0.52
TC < 10 USE 10 MINS
I = 5.4 IN/HR.

Q = CIA = 0.52 × 5.4 × 20.17 = 56.1 CFS.

AS STATED PREVIOUSLY, MEURER, SERAFINI AND MEURER ARE PRESENTLY PREPARING A DRAINAGE REPORT IN WHICH THE STORM WATER RUNOFF FOR THAT PORTION OF LAYTON AVE, WHICH FLOWS NORTH, AND ACADEMY HILLS DR. WERE OBTAINED, TOGETHER WITH THE PEAK FLOW THAT WILL DRAIN SOUTHWEST ON ESTRELLITA DEL NORTE RD., WHICH INCLUDES THE COMBINED FLOW FROM DRAINAGE AREAS I, II, III, IV & V OF THIS STUDY. AS OF 1-29-79 THE PEAK FLOW IN ESTRELLITA DEL NORTE IS 114.3 CFS.

0 5 8 2