



CITY OF  
Albuquerque  
Public Works Department

RECEIVED JUL 9 1997

File...  
INM Jefferson  
"Correspondence"  
6020

June 30, 1997

Martin J. Chávez, Mayor

Robert E. Gurulé, Director

Carlos Padilla  
AVID Engineering, Inc.  
6100 Seagull St. NE Suite 102  
Albuquerque, NM 87109

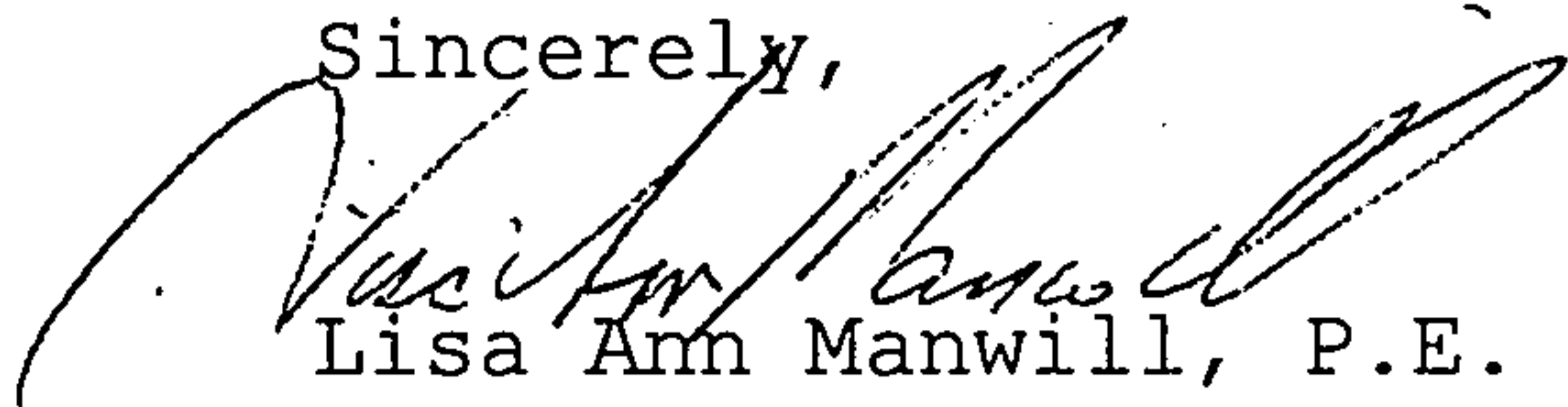
**RE: JEFFERSON STREET INDUSTRIAL PARK (C17-D13B). ENGINEER'S  
CERTIFICATION. ENGINEER'S CERTIFICATION DATED JUNE 17,  
1997.**

Dear Mr. Padilla:

Based on the information provided on your June 17, 1997  
submittal, the Engineer's Certification is acceptable for the  
above referenced project.

If I can be of further assistance, please feel free to contact me  
at 768-3622.

Sincerely,

  
Lisa Ann Manwill, P.E.  
Engineering Assoc./Hyd.

c: Andrew Garcia  
File

Good for You, Albuquerque!

P.O. Box 1293, Albuquerque, New Mexico 87103





CITY OF  
Albuquerque  
Public Works Department

File...  
INM- Jefferson  
"Correspondence"  
RECEIVED JUN 25 1997 6020

June 20, 1997

Martin J. Chávez, Mayor

**CERTIFICATION OF COMPLETION AND ACCEPTANCE**

Robert E. Gurulé, Director

Jack J. Clifford  
President  
The Grayland Corporation  
2403 San Mateo Blvd. NE, Suite W24  
Albuquerque, NM 87110

RE: LOOP INDUSTRIAL DISTRICT UNIT 5; CITY PROJECT NO. 550781; MAP NO.  
C-17

Dear Mr. Clifford:

This is to certify that the City of Albuquerque accepts the construction of the infrastructure provided in the Work Order Construction Plans, City Project No. 5507.81 as compliance with completing the required public infrastructure listed in the Subdivision Improvements Agreement (SIA) The Grayland Corporation and the City of Albuquerque executed on November 26, 1996.

Having satisfied the requirements referenced above, the SIA and any associated Financial Guaranty, held by the City, can now be released. The Contractors one-year warranty period started at the date of acceptance by the Chief Construction Engineer, dated June 17, 1997.

Please be advised this Certificate of Completion and Acceptance shall only become effective upon final plat approval and filing in the office of the Bernalillo County Clerk's Office.

Should you have any questions or issues regarding this project, please contact me.

Sincerely,

Ricardo B. Roybal, P.E.  
City Engineer  
Dev. & Bld. Services Div.  
Public Works Department

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RECEIVED JUN 20 1997

File...  
FMM- Jefferson  
"Correspondence"  
6020

# City of Albuquerque

P. O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103  
PUBLIC WORKS DEPARTMENT

June 17, 1997

## CERTIFICATE OF WORK ORDER COMPLETION

Grayland Corp.  
2015 Wyoming NE  
Albuquerque, NM 87112

**RE: LOOP INDUSTRIAL DIST. UNIT 5 PHASE/UNIT 1 - PROJECT NO. 550781  
(MAP NO. C-17)**

Dear Sir:

This is to certify that the City of Albuquerque accepts Project No. 550781 as being completed according to approved plans and construction specifications. Please be advised this certificate of completion and acceptance shall only become effective upon final plat approval and filing in the office of the Bernalillo County Clerk's Office.

The project is described as follows:

- Install 10" PVC waterline "A" in Industrial Loop from Jefferson to lot 14-A-2-B, including 2-firehydrants at each ends, 2-isolation gate valves and water serviceline stubs.
- Also, installed 10" PVC waterline "B" in the 24" easement driveway from Jefferson to cul-de-sac, including 3-firehydrants, 3-gate valves and water serviceline stubs, and 6" PVC "private" fireline "C" with a firehydrant.
- Install 8" PVC sanitary sewer pipeline in the 24' easement driveway from the lot 14-A-2-B to Jefferson, including manholes and service stubouts.



June 30, 1997

Martin J. Chávez, Mayor

Robert E. Gurulé, Director

Carlos Padilla  
AVID Engineering, Inc.  
6100 Seagull St. NE Suite 102  
Albuquerque, NM 87109

**RE: JEFFERSON STREET INDUSTRIAL PARK (C17-D13B). ENGINEER'S  
CERTIFICATION. ENGINEER'S CERTIFICATION DATED JUNE 17,  
1997.**

Dear Mr. Padilla:

Based on the information provided on your June 17, 1997  
submittal, the Engineer's Certification is acceptable for the  
above referenced project.

If I can be of further assistance, please feel free to contact me  
at 768-3622.

Sincerely,

Lisa Ann Manwill, P.E.  
Engineering Assoc./Hyd.

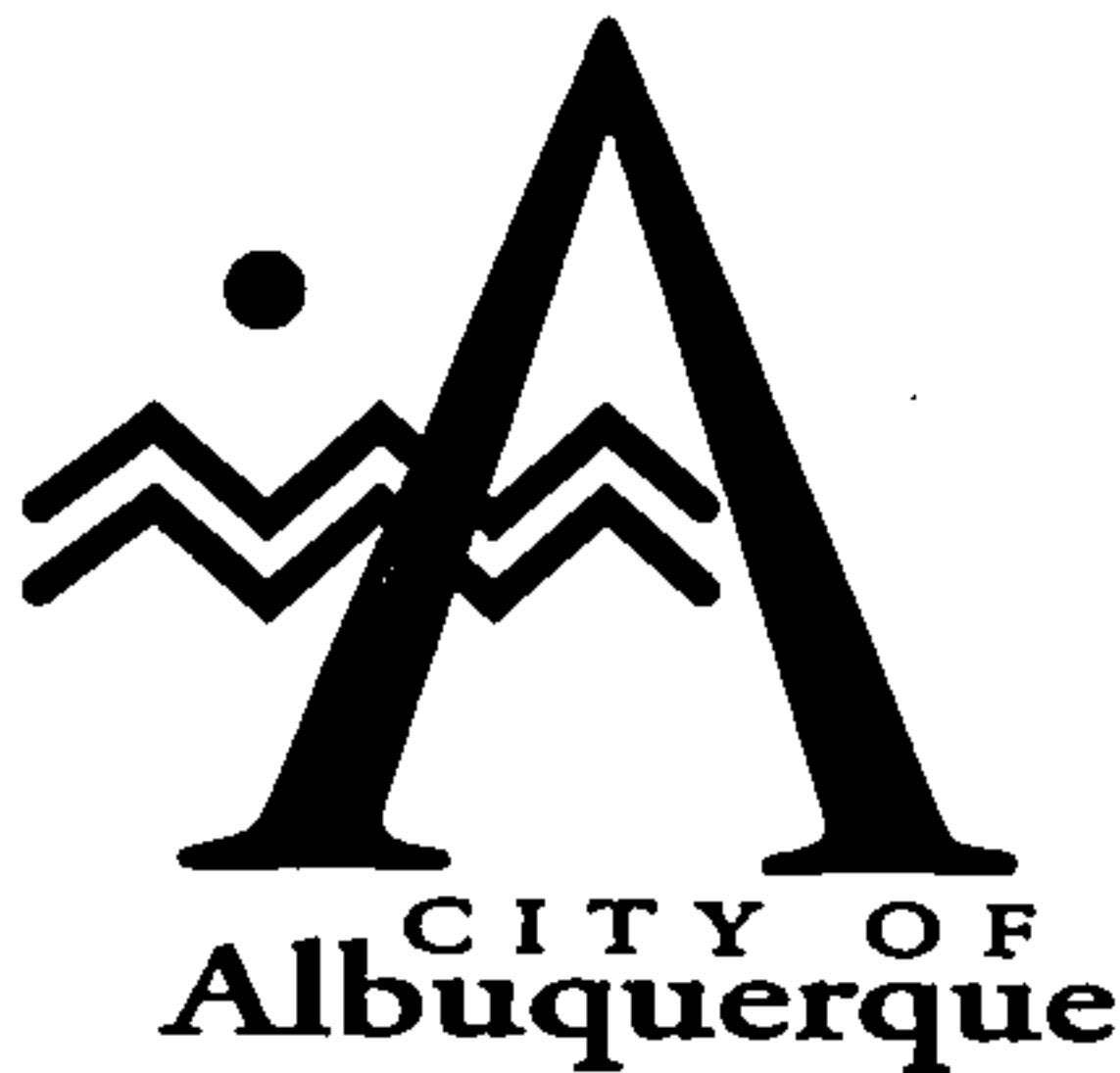
c: Andrew-Garcia  
File

Good for You, Albuquerque!

P.O. Box 1293, Albuquerque, New Mexico 87103







June 26, 1996

Martin J. Chávez, Mayor

Carlos Padilla  
AVID Engineering, Inc.  
6100 Seagull St. NE Suite 102  
Albuquerque, NM 87109

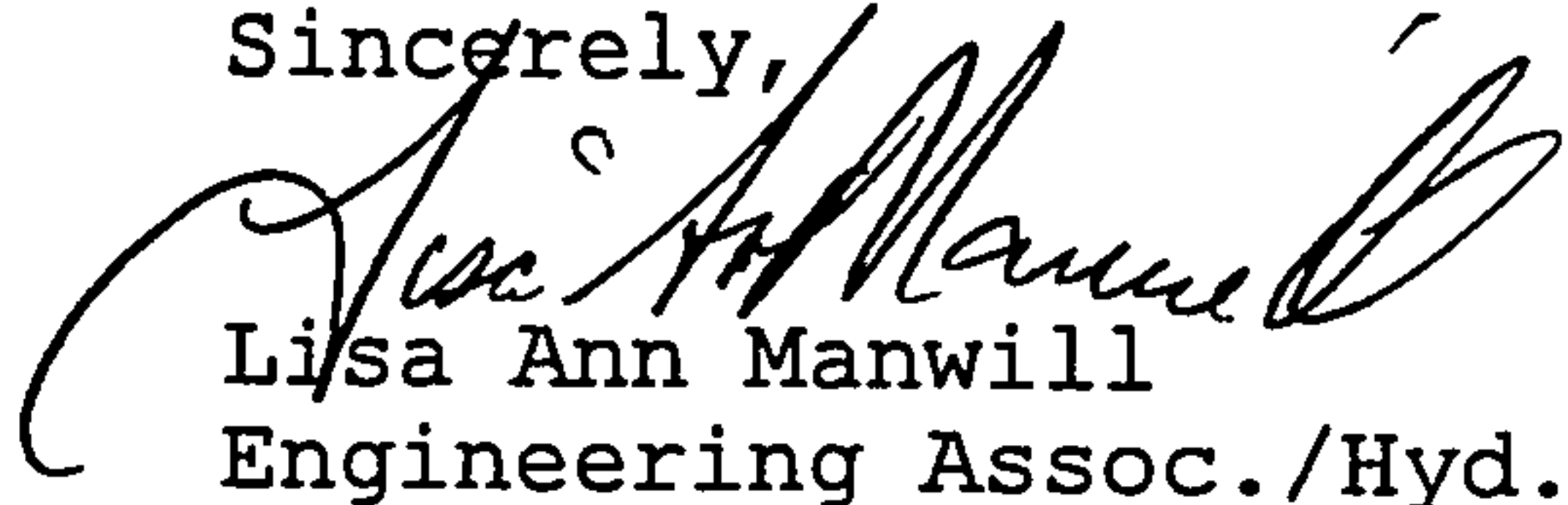
**RE: JEFFERSON STREET INDUSTRIAL PARK (C17-D13B). DRAINAGE PLANS  
FOR FINAL PLAT APPROVAL. ENGINEER'S STAMP DATED JUNE 24,  
1996.**

Dear Mr. Padilla:

Based on the information provided on your June 25, 1996  
submittal, the above referenced project is approved for Final  
Plat.

If I can be of further assistance, please feel free to contact me  
at 768-3622.

Sincerely,



Lisa Ann Manwill  
Engineering Assoc./Hyd.

c: Andrew Garcia

File

Good for You, Albuquerque!





May 6, 1998

Joseph DeFronzo, P.E.  
Chavez-Grieves  
5639 Jefferson Street NE  
Albuquerque, NM 87109

**RE: FOREIGN ACCENTS (C17-13B). DRAINAGE REPORT FOR BUILDING PERMIT  
APPROVAL. ENGINEER'S STAMP DATED 4-15-98.**

Dear Mr. DeFronzo:

Based on the information provided on your April 15, 1998 submittal, the above referenced project is approved for Building and SO #19 Permits. Indicate the locations of Ponds A & B as was done on the submittal with Engineer's Stamp dated 3-18-98 (The two plans are almost identical). The acute angle at the transition from the shallow "V" channel to the rectangular channel is of concern.

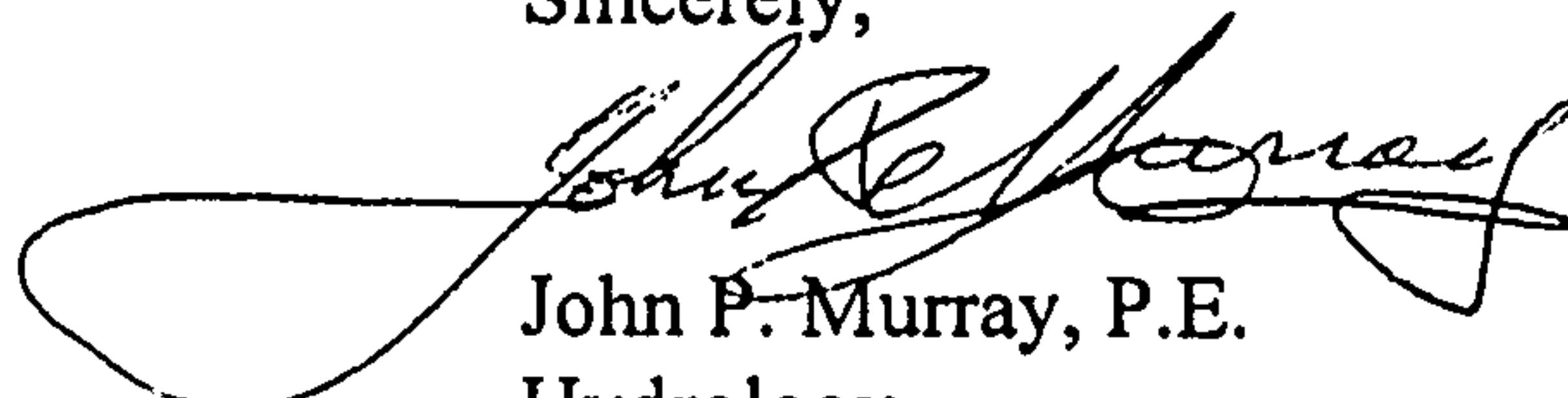
Please attach a copy of this approved plan to the construction sets prior to sign-off by Hydrology.

A separate permit is required for construction within the City right-of-way. A copy of this approval letter must be on hand when applying for the Excavation Permit.

Prior to Certificate of Occupancy approval, an Engineer's Certification per DPM will be required.

If I can be of further assistance, please feel free to contact me at 924-3984.

Sincerely,

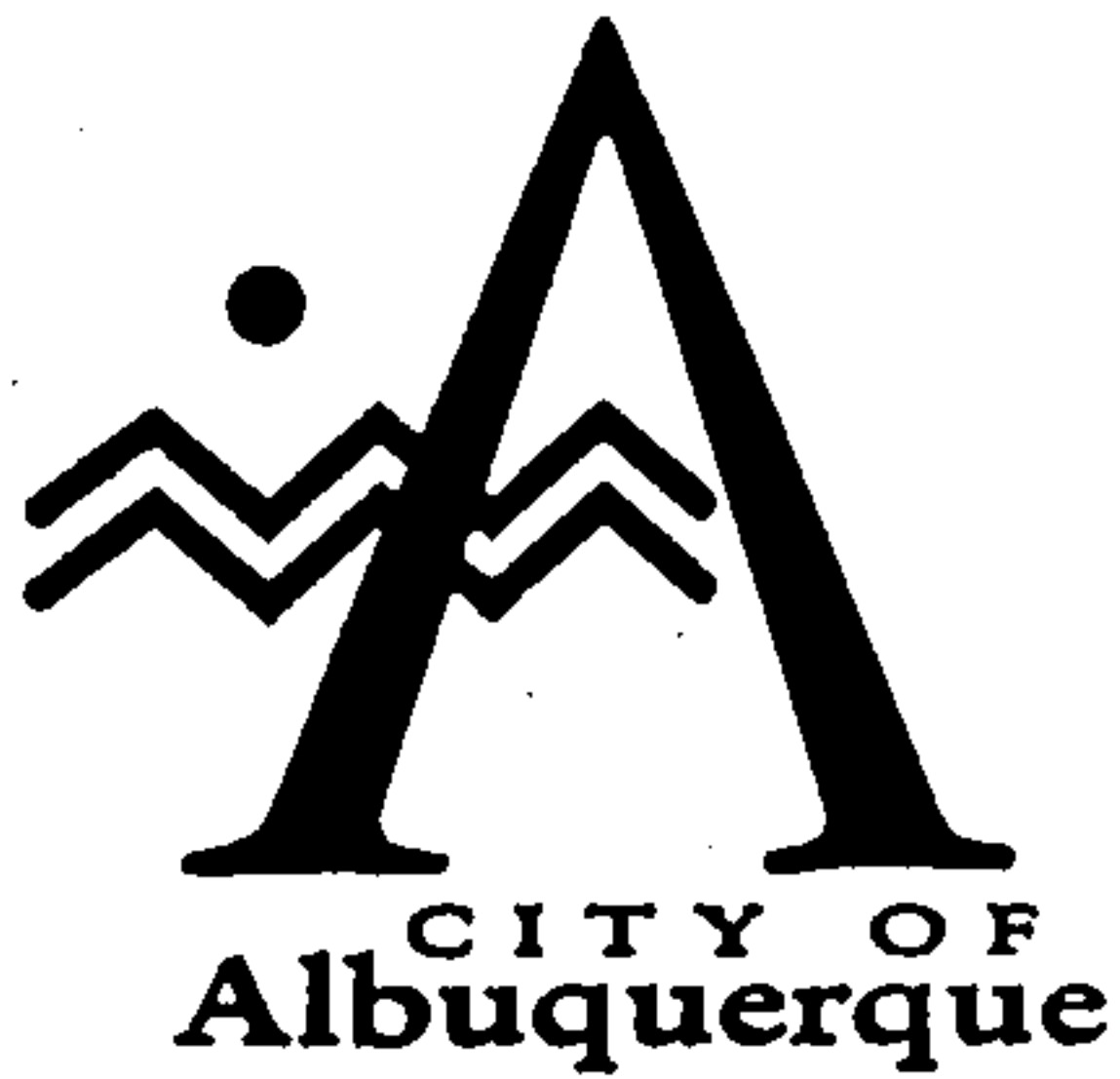


John P. Murray, P.E.  
Hydrology

c: D. Salas, St. Maint.  
Chris Ehram  
Andrew Garcia  
✓File

Good for You, Albuquerque!





March 18, 1998

Louis Medrano, P.E.  
Chavez-Grieves  
5639 Jefferson Street NE  
Albuquerque, NM 87109

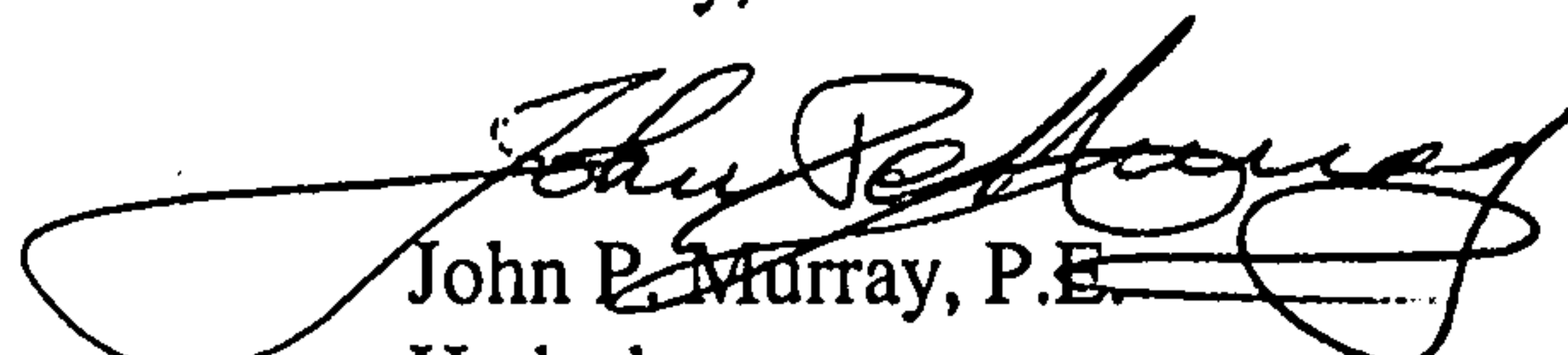
**RE: FOREIGN ACCENTS (C17-13B). GRADING AND DRAINAGE PLAN FOR  
CERTIFICATE OF OCCUPANCY APPROVAL. ENGINEER'S STAMP DATED  
AUGUST 27, 1998.**

Dear Mr. Medrano:

Based on the information provided on your August 27, 1998 submittal, City Hydrology accepts the Engineer's Certification of grading and drainage.

If I can be of further assistance, please feel free to contact me at 924-3984.

Sincerely,

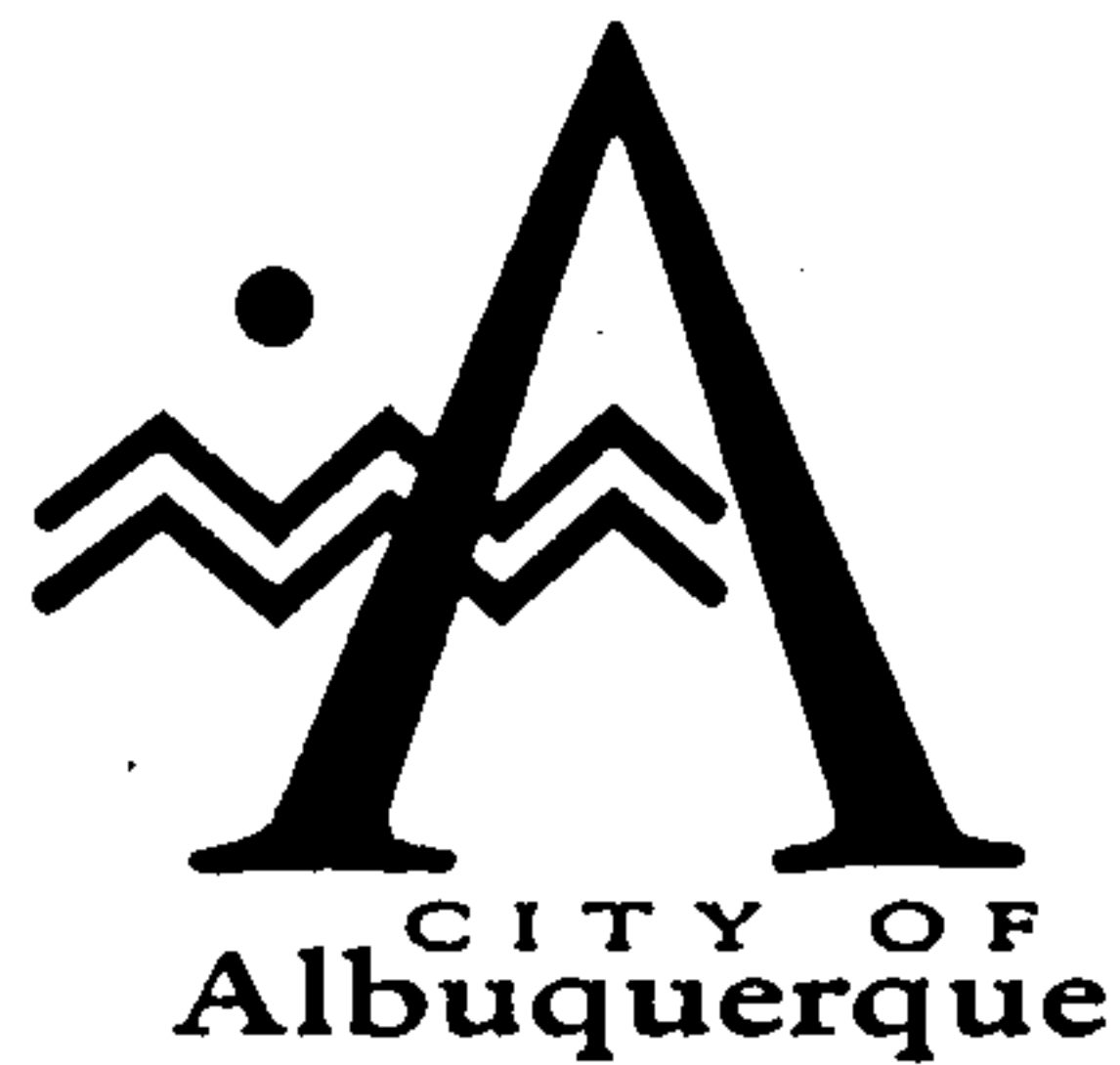
  
John P. Murray, P.E.  
Hydrology

C:

✓ Andrew Garcia  
File

Good for You, Albuquerque!





March 18, 1998

Chris Ehram  
Chavez-Grieves  
5639 Jefferson Street NE  
Albuquerque, NM 87109

**RE: FOREIGN ACCENTS (C17-13B). DRAINAGE REPORT FOR BUILDING AND SO  
#19 PERMIT APPROVALS. ENGINEER'S STAMP DATED 3-18-98.**

Dear Ms. Ehram:

Based on the information provided on your March 5, 1998 submittal, the above referenced project is approved for Building and SO #19 Permits.

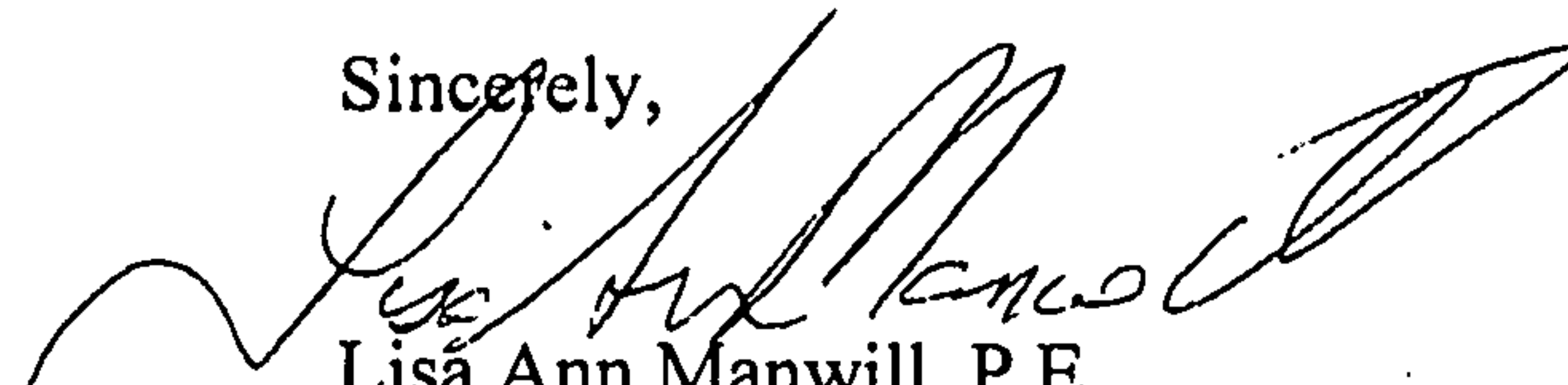
Please attach a copy of this approved plan to the construction sets prior to sign-off by Hydrology.

A separate permit is required for construction within City right-of-way. A copy of this approval letter must be on hand when applying for the excavation permit.

Prior to Certificate of Occupancy approval, an Engineer's Certification will be required.

If I can be of further assistance, please feel free to contact me at 924-3984.

Sincerely,



Lisa Ann Manwill, P.E.  
Hydrology

c: Arlene Portillo  
Andrew Garcia  
File

Good for You, Albuquerque!





CITY OF ALBUQUERQUE  
PUBLIC WORKS DEPARTMENT

March 18, 1998

INTEROFFICE CORRESPONDENCE

HYDROLOGY DIVISION

TO: Desiderio Salas, Street Maintenance Division  
FROM: Lisa Ann Manwill, P.E. Engineering Associate, PWD *LAM*  
SUBJECT: **PRIVATE DRAINAGE FACILITIES WITHIN PUBLIC RIGHT-OF-WAY  
DRAINAGE FILE NUMBER C17-D13B.**

---

Transmitted herewith, is a copy of the approved drainage plan for the referenced project incorporating the SO #19 design.

This plan is being submitted to you for permitting and inspection. Please provide this section with a signed-off copy per the signature block upon construction and acceptance by your office.

As you are aware, the signed off SO #19 is required by this office for Certificate of Occupancy release; therefore your expeditious processing of this plan would be greatly appreciated and would avoid any unnecessary delay in the release of the Certificate of Occupancy.

Thank you for your cooperation and if you should have any questions and/or comments, please feel free to call me at 924-3984.

Attachment

*FILE*

**GRADING AND DRAINAGE PLAN**  
**FOR**  
**FOREIGN ACCENTS**

*Albuquerque, New Mexico*



***March 1998***

## **LOCATION**

This site is located near Jefferson Street NE between Paseo del Norte and Alameda Blvd. NE just south of Wilshire Ave. The site consists of .6534 acres.

## **LEGAL DESCRIPTION**

Tract 14-A-2-D Loop Industrial District Unit V, Bernalillo County, City of Albuquerque.

## **ZONING AND SURROUNDING DEVELOPMENT**

The site is zone SU-2/M1. The private access road Firestone Lane has been paved and roll type curb and gutter installed. None of the lots in the surrounding Jefferson Street Industrial Park have been developed.

## **FLOOD HAZARD ZONES**

As shown in figure 1, Panel 350002 009 of the National Flood Insurance Rate Maps for the City of Albuquerque, dated Oct. 14, 1983, the site is in a floodplain, zone C. Zone C indicates areas of minimal flooding.

## **RELATED REPORTS**

The Master Grading and Drainage Plan for Jefferson Street Industrial Park, (C17) dated June 17, 1997 has been approved by City Hydrology. This report was prepared by Carlos Padilla of Avid Engineers Inc.

## **EXISTING SITE CONDITIONS AND DRAINAGE PATTERN**

The existing site is sparsely vegetated by desert shrubs and grass. The site slopes 3 percent from east to west. The private access road Firestone Lane has been paved including roll type curb and gutter. This road carries offsite flow coming from the eastern portion of the industrial park to Jefferson Street, see figure 2. The 24' wide private access and utility easement along the south property line has been paved and has a north to south cross-slope.

## **PROPOSED SITE CONDITIONS AND DRAINAGE PATTERN**

A 8170 square foot warehouse/office is proposed for this site. The roof of the building will be peaked in the middle and slope to the north and south. The runoff from the southern portion of the roof will discharge to roof drains and then to an asphalt swale along the western property line. This runoff will then be conveyed to the northwest corner of the property and then discharge into a proposed off-site concrete channel. The concrete channel will be built in a dedicated drainage easement as designated on the master drainage plan. The runoff from the northern portion of the roof will discharge to roof drains and then discharge via sheet flow to the northwest corner of



the parking lot and then into the concrete channel. Two landscaped ponds designated as ponds "A" and "B" will be built in the parking area. The ponds are to hold the difference in runoff volume between the master grading and drainage plan and the proposed site. The volume needed to pond is 281 cf. Pond A will hold 122 cf of runoff and Pond B will hold 207 cf. (See Grading and Drainage Plan and page B-6.) The sum of these ponds 329 cf is greater than required. The concrete channel will convey 4329 cf of the onsite flow and discharge into Jefferson Street as allowed by the master grading and drainage plan.

Analysis was performed to find the depth of flow at the driveway entrance shown on figure 2 as point A. According to the master drainage plan a portion of a mobile home park designated as basin B and lot 14-A-2-H and a portion of 14-A-2-L designated as basin A flow to this point. The developed conditions give a flowrate of 9.68 cfs at point A. The software Flowmaster by Haestad was used to compute the street capacity of Firestone at Point A. The water surface elevation is 0.33 ft. A waterblock elevation was set 0.50 above the flowline at the street. See Firestone Street Capacity on page B-1. The flows in the street are carried down Firestone Lane to Jefferson Street.

The master drainage plan used 100% land treatment C for the undeveloped conditions and land treatment values of 30% C and 70% D for developed conditions. Using these the developed runoff rate for the site would be 2.77 cfs with a runoff volume of 4329 cf. The actual developed site will have a runoff rate of 2.87 cfs and a runoff volume of 4610 cf. The increase of runoff rate is 0.10 cfs, and runoff volume is 281 cf. The difference of the volume will be ponded in the northwest corner of the parking lot. See Grading and Drainage Plan in pocket.

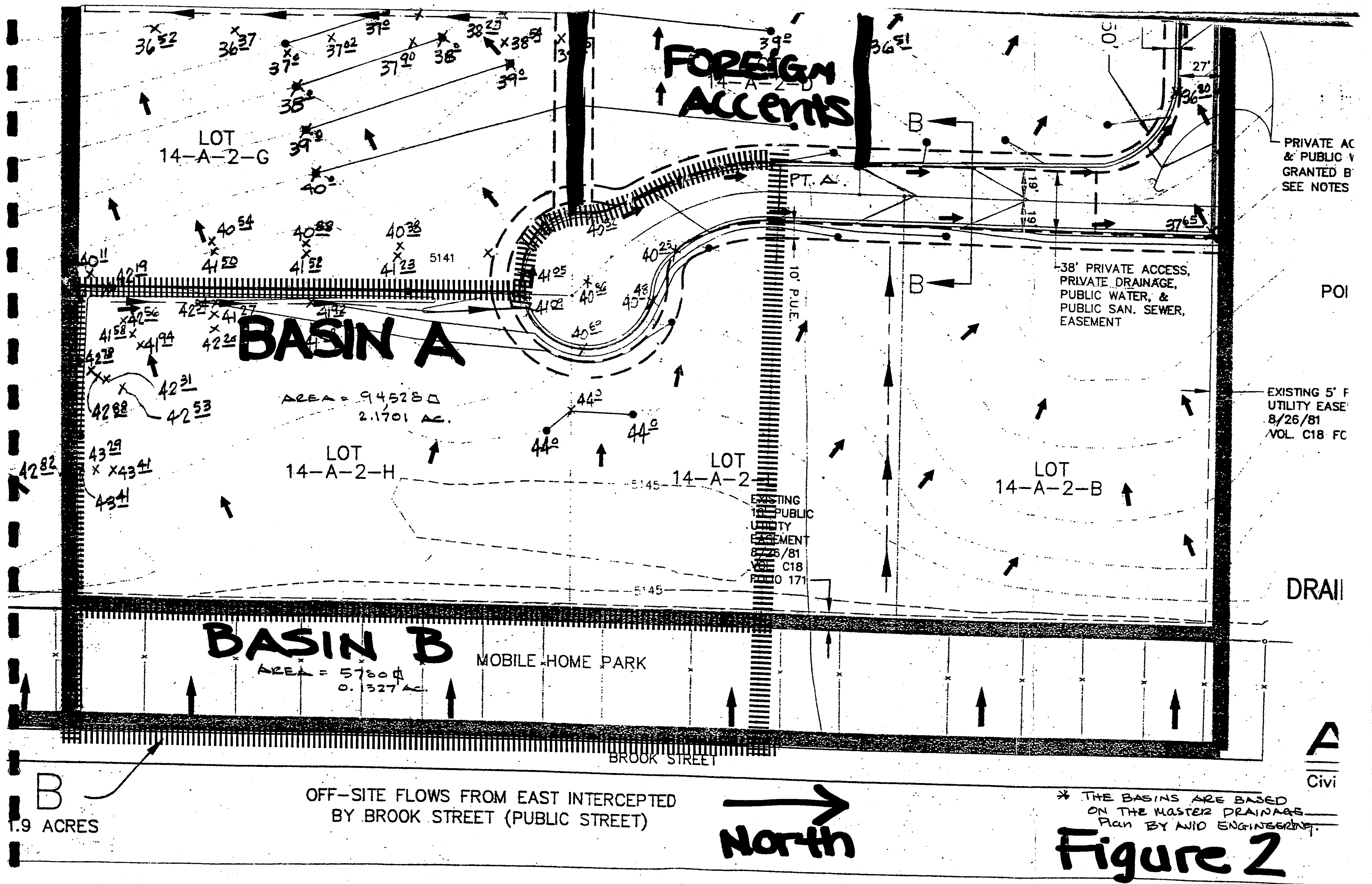
Basin C discharges to the asphalt swale along the western property line, see figure 3. This is in concurrence with the master drainage plan. Analysis using Flowmaster indicates that the swale is more than adequate to handle the runoff from the southern portion of the property. The developed runoff is 0.83 cfs and the channel is capable of 6.17 cfs at a depth of 0.5 feet. See page B-3.

A concrete channel will be built in the designated drainage easement as shown on the master drainage plan. The developed runoff rate and runoff volume for the developed site is 2.89 cfs and 4663 cf. The capacity of the 4 foot wide x 6" channel is 23.22 cfs per page B-5, which is more than adequate.

## **HYDROLOGY/HYDRAULICS**

The runoff calculations and design have been done in accordance with Section 22.2 of the Development Process Manual of the City of Albuquerque, January 1993.







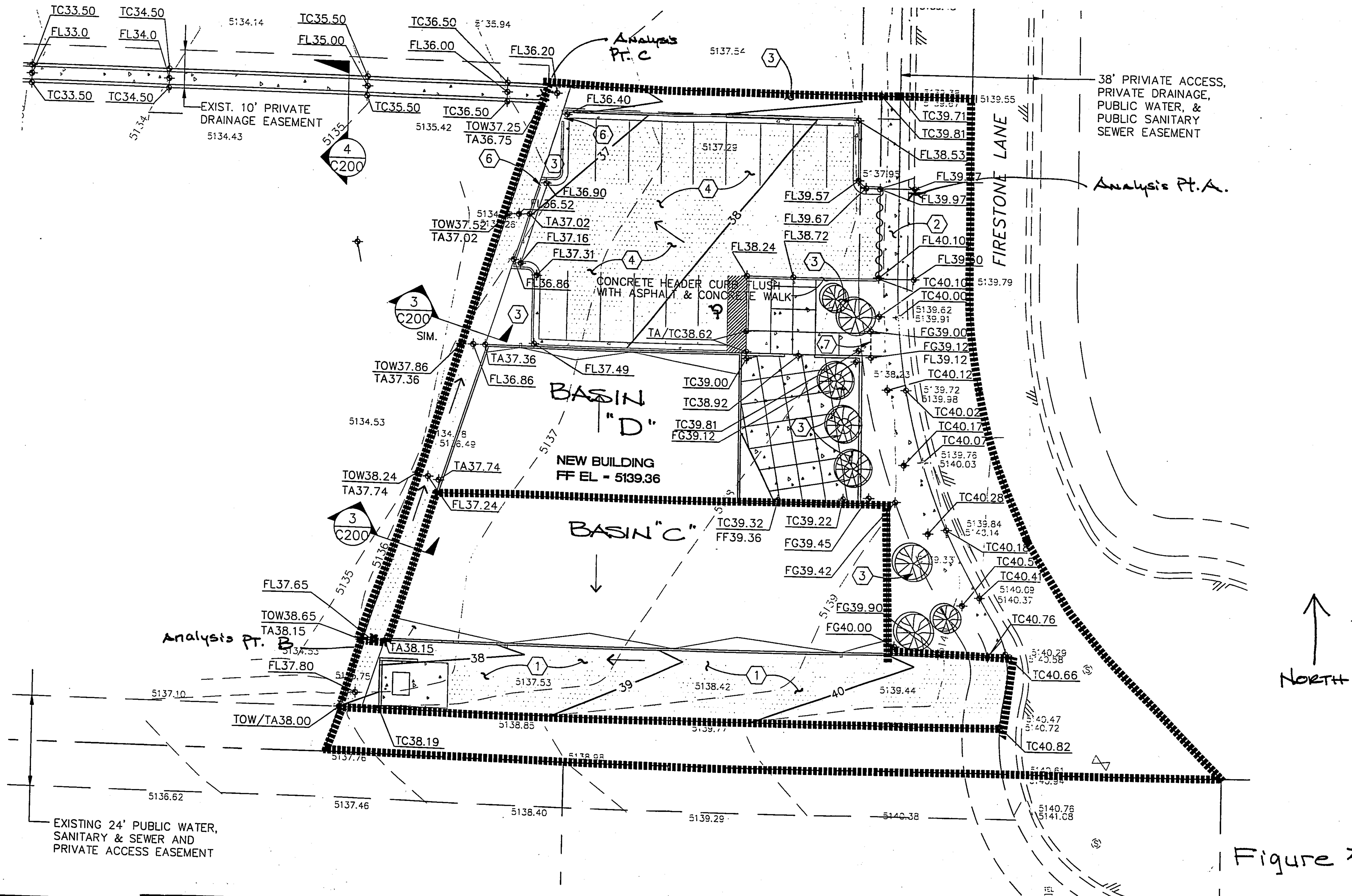


Figure 3

Basin Runoff Summary			
Basin	Exist. Q (cfs)	Dev. Q (cfs)	Discharge Point
OFF-SITE A	6.81	9.18	A.P.A
OFF-SITE B	0.5	0.5	OFF-SITE TRACT BOUNDARY
ON-SITE C	0.55	0.83	A.P.B.
ON-SITE D	1.69	2.06	A.P.C.

Capacities				
Location/ Conveyance	From	To	Capacity (cfs)	Q Required (cfs)
Firestone St.	Basin A & B	A.P.A	9.68	9.68
Asphalt Swale	Basin C	A.P.B.	6.17	0.83
Concrete Channel	Basin C & D	A.P.C.	23.22	2.89



**CHAVEZ - GRIEVES / CONSULTING ENGINEERS, Inc.**

5639 Jefferson Street NE, Albuquerque, New Mexico 87109

Phone (505) 344-4080 - Fax (505) 343-8759

**RUNOFF CALCULATIONS - SIMPLIFIED PROCEDURE**By: Christina A. EhramDate: 12-16-97Project: Foreign AccentsZone Atlas: C-17

This procedure is in accordance with the City of Albuquerque Development Process Manual, Volume 2, Section 22.2, "Hydrology", peak discharge rate for small watersheds less than forty acres in size.

Precipitation Zone from Figure A-1: 2

Land treatment descriptions are in Table A-4.

**1. RUNOFF RATE COMPUTATION**Use Equation a-10:  $Q_P = Q_{PA} A_A + Q_{PB} A_B + Q_{PC} A_C + Q_{PD} A_D$ Values of  $Q_{pi}$  are from Table A-9, and are in CFS/acre. Area values are in acres.

BASIN	$Q_{PA}$	$A_A$	$Q_{PB}$	$A_B$	$Q_{PC}$	$A_C$	$Q_{PD}$	$A_D$	$Q_P$
<b>EXISTING RATE OF RUNOFF (CFS)</b>									
<b>Offsite</b>									
Basin A	0.000	0.000	0.000	0.000	3.140	2.170	0.000	0.000	6.81
Basin B	0.000	0.000	2.280	0.053	0.000	0.000	4.700	0.080	0.50
Total									7.31
<b>Onsite</b>									
Basin C	0.000	0.000	0.000	0.000	3.140	0.176	0.000	0.000	0.55
Basin D	0.000	0.000	0.000	0.000	3.140	0.357	4.700	0.121	1.69
Total									2.24
<b>DEVELOPED RATE OF RUNOFF (CFS)</b>									
<b>Offsite</b>									
Basin A	0.000	0.000	0.000	0.000	3.140	0.651	4.700	1.519	9.18
Basin B	0.000	0.000	2.280	0.053	0.000	0.000	4.700	0.080	0.50
Total									9.68
<b>Onsite</b>									
Basin C	0.000	0.000	0.000	0.000	0.000	0.000	4.700	0.176	0.83
Basin D	0.000	0.000	2.280	0.076	0.000	0.000	4.700	0.402	2.06
Total									2.89



**2. RUNOFF VOLUME COMPUTATION**

Use Equation a-5 to compute weighted excess precipitation:

$$\text{Weighted E} = "E" = (E_A A_A + E_B A_B + E_C A_C + E_D A_D) / (A_A + A_B + A_C + A_D)$$

$$(A_A + A_B + A_C + A_D) = \sum A_i$$

Use Equation a-6 to compute the volume:

$$V_{360} = "E" \times (A_A + A_B + A_C + A_D) \times 3630 \text{ feet}^3/\text{acre}\cdot\text{inch}$$

Values of  $E_i$  are from Table A-8, and are in inches. Area values are in acres.

BASIN	E <sub>A</sub>	A <sub>A</sub>	E <sub>B</sub>	A <sub>B</sub>	E <sub>C</sub>	A <sub>C</sub>	E <sub>D</sub>	A <sub>D</sub>	ΣA <sub>i</sub>	“E”	V <sub>360</sub>
EXISTING VOLUME OF RUNOFF (CUBIC FEET)											
Offsite											
Basin A	0.000	0.000	0.000	0.000	1.130	2.170	0.000	0.000	2.170	1.130	8901.12
Basin B	0.000	0.000	0.780	0.053	0.000	0.000	2.120	0.080	0.133	1.586	765.70
Total											9666.83
Onsite											
Basin C	0.000	0.000	0.000	0.000	1.130	0.176	0.000	0.000	0.176	1.130	721.93
Basin D	0.000	0.000	0.000	0.000	1.130	0.357	2.120	0.121	0.478	1.381	2395.55
Total											3117.48
DEVELOPED VOLUME OF RUNOFF (CUBIC FEET)											
Offsite											
Basin A	0.000	0.000	0.000	0.000	1.130	0.651	2.120	1.519	2.170	1.823	14359.95
Basin B	0.000	0.000	0.780	0.053	0.000	0.000	2.120	0.080	0.133	1.590	765.70
Total											15125.65
Onsite											
Basin C	0.000	0.000	0.000	0.000	0.000	0.000	2.120	0.176	0.176	2.120	1354.43
Basin D	0.000	0.000	0.780	0.076	0.000	0.000	2.120	0.402	0.478	1.907	3308.91
Total											4663.34

# CHAVEZ - GRIEVES / CONSULTING ENGINEERS, Inc.

5639 Jefferson Street NE, Albuquerque, New Mexico 87109 Phone (505) 344-4080 - Fax (505) 343-8759

## RUNOFF CALCULATIONS - SIMPLIFIED PROCEDURE

By: Christina A. EhramDate: 12-16-97Project: Foreign AccentsZone Atlas: C-17

This procedure is in accordance with the City of Albuquerque Development Process Manual, Volume 2, Section 22.2, "Hydrology", peak discharge rate for small watersheds less than forty acres in size.

Precipitation Zone from Figure A-1:2

Land treatment descriptions are in Table A-4.

### 1. RUNOFF RATE COMPUTATION

Use Equation a-10:  $Q_P = Q_{PA} A_A + Q_{PB} A_B + Q_{PC} A_C + Q_{PD} A_D$ Values of  $Q_{pi}$  are from Table A-9, and are in CFS/acre. Area values are in acres.

BASIN	$Q_{PA}$	$A_A$	$Q_{PB}$	$A_B$	$Q_{PC}$	$A_C$	$Q_{PD}$	$A_D$	$Q_P$
<b>EXISTING RATE OF RUNOFF (CFS)</b>									
Basin A	0.000	0.000	0.000	0.000	3.140	0.654	0.000	0.000	2.054
<b>Total</b>									<b>2.054</b>
<b>DEVELOPED RATE OF RUNOFF (CFS)</b>									
Basin A	0.000	0.000	0.000	0.000	3.140	0.196	4.700	0.458	2.768
<b>Total</b>									<b>2.768</b>

### 2. RUNOFF VOLUME COMPUTATION

Use Equation a-5 to compute weighted excess precipitation:

$$\text{Weighted } E = "E" = (E_A A_A + E_B A_B + E_C A_C + E_D A_D) / (A_A + A_B + A_C + A_D)$$

$$(A_A + A_B + A_C + A_D) = \sum A_i$$

Use Equation a-6 to compute the volume:

$$V_{360} = "E" \times (A_A + A_B + A_C + A_D) \times 3630 \text{ feet}^3/\text{acre} \cdot \text{inch}$$

Values of  $E_i$  are from Table A-8, and are in inches. Area values are in acres.

BASIN	$E_A$	$A_A$	$E_B$	$A_B$	$E_C$	$A_C$	$E_D$	$A_D$	$\sum A_i$	"E"	$V_{360}$
<b>EXISTING VOLUME OF RUNOFF (CUBIC FEET)</b>											
Basin A	0.000	0.000	0.000	0.000	1.130	0.654	0.000	0.000	0	1.130	2682.643
<b>Total</b>											<b>1682.643</b>
<b>DEVELOPED VOLUME OF RUNOFF (CUBIC FEET)</b>											
Basin A	0.000	0.000	0.000	0.000	1.130	0.196	2.120	0.458	0.654	1.823	4328.967
<b>Total</b>											<b>4328.967</b>

# FIRESTONE STREET CAPACITY

## Worksheet for Irregular Channel

Project Description	
Project File	c:\haestad\fmw\foreign .fm2
Worksheet	FIRESTONE STREET CAPACITY
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

### Input Data

Channel Slope		0.004000 ft/ft			
Elevation range: 0.00 ft to 0.33 ft.					
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness	
0.00	0.33	0.00	32.00	0.017	
1.00	0.00				
2.00	0.06				
16.00	0.27				
30.00	0.06				
31.00	0.00				
32.00	0.33				
Discharge	9.68	cfs			

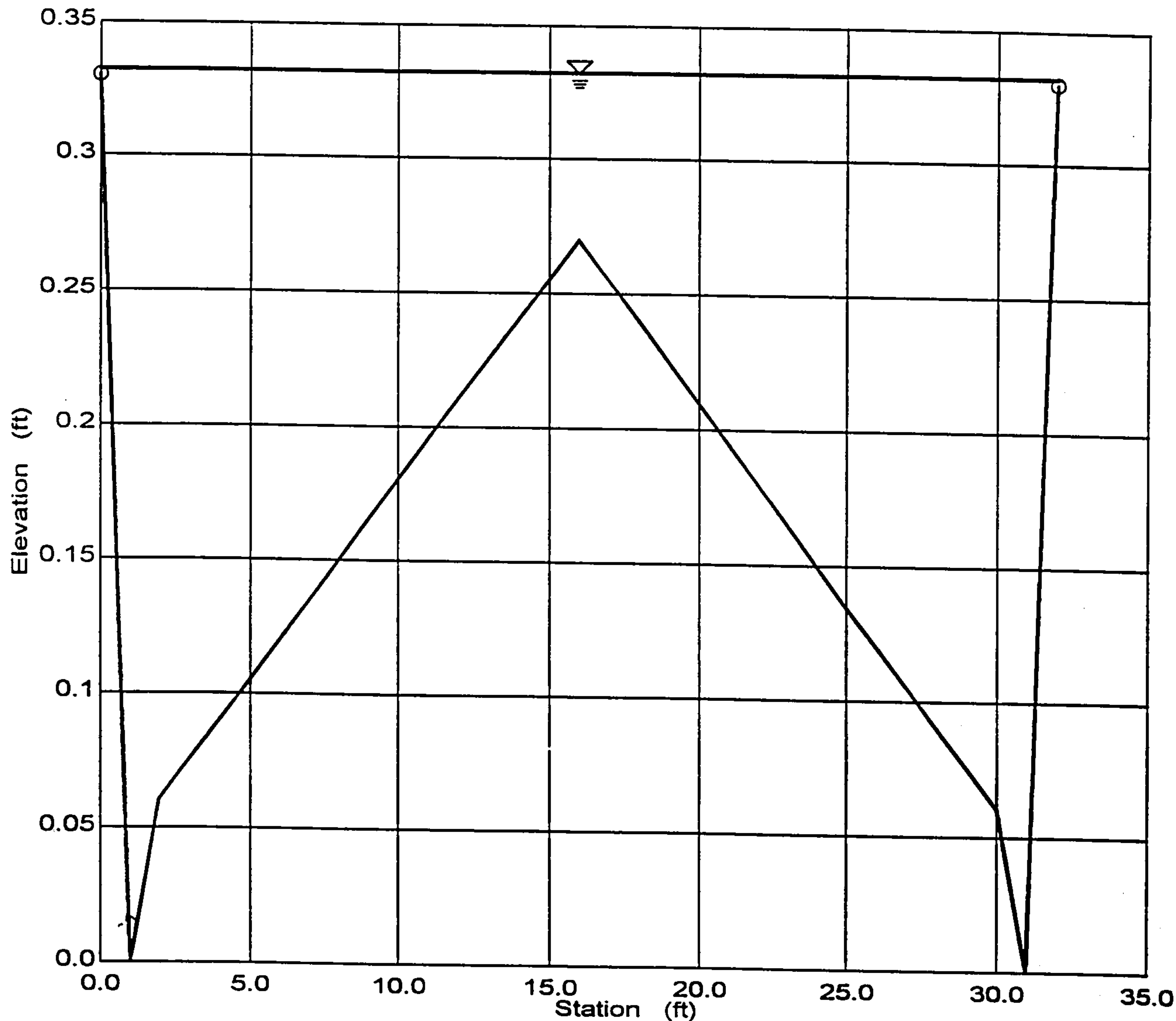
### Results

Wtd. Mannings Coefficient	0.017	
Water Surface Elevation	0.33	ft
Flow Area	5.61	ft <sup>2</sup>
Wetted Perimeter	32.12	ft
Top Width	32.00	ft
Height	0.33	ft
Critical Depth	0.30	ft
Critical Slope	0.008101	ft/ft
Velocity	1.73	ft/s
Velocity Head	0.05	ft
Specific Energy	0.38	ft
Froude Number	0.73	
Flow is subcritical.		
Water elevation exceeds lowest end station by 0.18e-2 ft.		

Cross Section  
Cross Section for Irregular Channel

Project Description	
Project File	c:\haestad\fmw\foreign .fm2
Worksheet	FIRESTONE STREET CAPACITY
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data	
Wtd. Mannings Coefficient	0.017
Channel Slope	0.004000 ft/ft
Water Surface Elevation	0.33 ft
Discharge	9.68 cfs





Worksheet  
Worksheet for Triangular Channel

Project Description	
Project File	c:\haestad\fmw\foreign .fm2
Worksheet	west pl 2
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Discharge

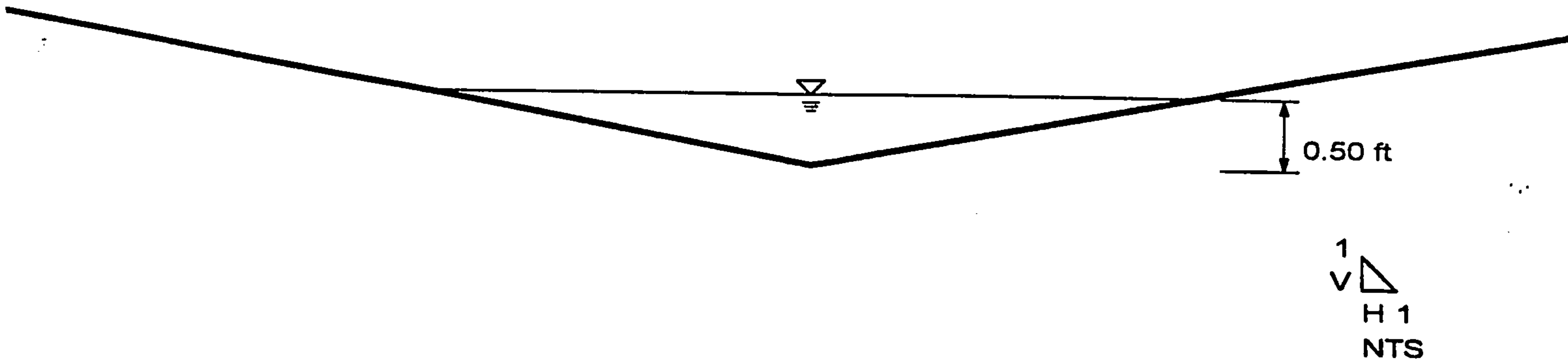
Input Data	
Mannings Coefficient	0.013
Channel Slope	0.010000 ft/ft
Depth	0.50 ft
Left Side Slope	5.500000 H : V
Right Side Slope	5.500000 H : V

Results		
Discharge	6.17	cfs
Flow Area	1.38	ft <sup>2</sup>
Wetted Perimeter	5.59	ft
Top Width	5.50	ft
Critical Depth	0.60	ft
Critical Slope	0.003758	ft/ft
Velocity	4.49	ft/s
Velocity Head	0.31	ft
Specific Energy	0.81	ft
Froude Number	1.58	
Flow is supercritical.		

Cross Section  
Cross Section for Triangular Channel

Project Description	
Project File	c:\haestad\fmw\foreign .fm2
Worksheet	west pl 2
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Discharge

Section Data	
Mannings Coefficient	0.013
Channel Slope	0.010000 ft/ft
Depth	0.50 ft
Left Side Slope	5.500000 H : V
Right Side Slope	5.500000 H : V
Discharge	6.17 cfs



Worksheet  
Worksheet for Rectangular Channel

Project Description	
Project File	c:\haestad\fmw\foreign .fm2
Worksheet	jefferson channel
Flow Element	Rectangular Channel
Method	Manning's Formula
Solve For	Discharge

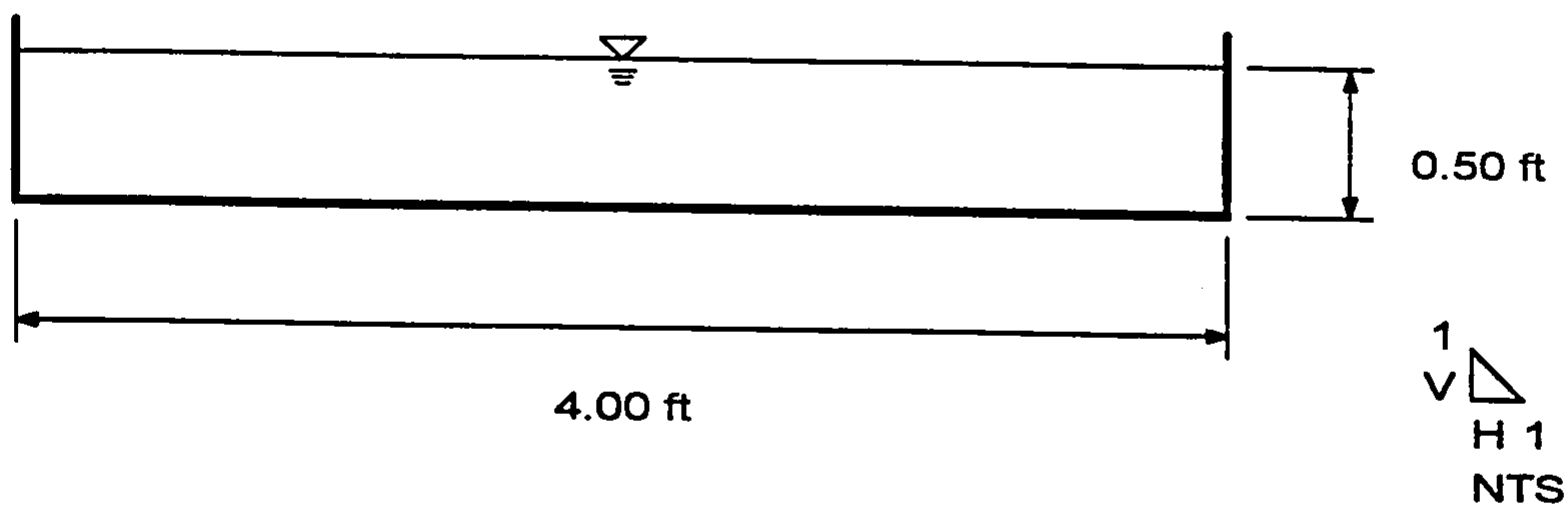
Input Data	
Mannings Coefficient	0.013
Channel Slope	0.035000 ft/ft
Depth	0.50 ft
Bottom Width	4.00 ft

Results	
Discharge	23.22 cfs
Flow Area	2.00 ft <sup>2</sup>
Wetted Perimeter	5.00 ft
Top Width	4.00 ft
Critical Depth	1.02 ft
Critical Slope	0.004236 ft/ft
Velocity	11.61 ft/s
Velocity Head	2.09 ft
Specific Energy	2.59 ft
Froude Number	0.00

# Cross Section Cross Section for Rectangular Channel

Project Description	
Project File	c:\haestad\fmw\foreign .fm2
Worksheet	jefferson channel
Flow Element	Rectangular Channel
Method	Manning's Formula
Solve For	Discharge

Section Data	
Mannings Coefficient	0.013
Channel Slope	0.035000 ft/ft
Depth	0.50 ft
Bottom Width	4.00 ft
Discharge	23.22 cfs







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SHEET NO. \_\_\_\_\_ OF \_\_\_\_\_  
JOB \_\_\_\_\_  
SUBJECT \_\_\_\_\_  
CLIENT \_\_\_\_\_ JOB NO. \_\_\_\_\_  
BY \_\_\_\_\_ DATE \_\_\_\_\_  
CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_

Pond A.

VOLUME USING AVERAGE END METHOD.

$$A_1 = \frac{10.0' + 15.0'}{2} \times 17.5' = 218.75$$

$$A_2 = \frac{4.0' + 9.0'}{2} \times 11.5' = 74.75$$

$$VOL = \frac{218.75 + 74.75}{2} \times .83 = 121.80 \text{ CF}$$

Pond B

VOLUME USING AVERAGE END METHOD.

$$\frac{13.5' + 20.0'}{2} \times 20.5' = 343.0$$

$$\frac{7.5' + 14}{2} \times 14.5' = 155.88$$

$$VOL = \frac{343.0 + 155.9}{2} \times .83 = 207 \text{ CF}$$

329 CF > 281 needed.