Hydrology G16/D8a Plains Electric

G16 / D8A

PLAINS ELECTRIC

1 PLAN

G16-DSA

BARKER·BOL & ASSOCIATES · ARCHITECTS & PLANNERS, A.I.A.
209 GOLD AVENUE, S.W. ALBUQUERQUE, NEW MEXICO 87102 TELEPHONE 842-6789

June 15, 1983

Mr. Fred Aguirre
Hydrology Dept.
City of Albuquerque
P. O. Box 1293
Albuquerque, NM 87103

Re: Plains Electric Cooperative
Office Addition, Phase II

Dear Mr. Aguirre:

As per our conversation of this morning, this letter is written to recognize that there is a minor discrepancy in grades on the referenced project, however, this does not affect off-site flows, and the discrepancy correction is schedule to begin June 20, 1983.

Sincerely,

Andrew S. Bol

ANDREW S. BOL

ASB:smh

City of Albuquerque

May 17, 1983

Andrew Bol
Barker-Bol & Associates
209 Gold Avenue SW
Albuquerque, NM 87102

REF: 2401 Aztec, Plains Electric Plant

Dear Mr. Bol:

The City Hydrology Section has inspected the referenced project. The overall development is in substantial completion with the drainage plan; however, the internal drainage has a deviation from the plans, specifically a remedial patch on the existing parking lot required to remove a ponding situation.

This Section will endorse the Certificate of Occupancy upon a letter from you or the owner acknowledging the discrepency in grades on the parking lot, and also relieving the City from any responsiblity and liability from any damages which may occur due to this "interior" site ponding problem which is a result caused by a deviation from the City approved building set.

Very truly,

Andre Houle
City Engineer/Hydrology

AH:mrk

cc: L. Alan Davidson, Director
Tony Reynolds
Fred Aguirre

MUNICIPAL DEVELOPMENT DEPARTMENT G16-D8A

Richard S. Heller, P.E., City Engineer
LaMonte J. Urban, P.L.S., Chief City Surveyor

ENGINEERING DIVISION

123 Central Avenue N.W.
Albuquerque, New Mexico 87102
Telephone (505) 766-5040

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

March 12, 1982

Mr. Jake Bordenave
Adam, Hamlyn, Anderson
4055 Montgomery Blvd. N.E.
Albuquerque, N.M. 87109

RE: PLAINS ELECTRIC DRAINAGE REPORT

Dear Jake:

The referenced drainage report is approved. Please see that the revised plans are placed in the construction sets.

Very truly yours,

BGB

Brian G. Burnett
Civil Engineer/Hydrology

BGB/tsl

MUNICIPAL DEVELOPMENT DEPARTMENT
Richard S. Heller, P.E., City Engineer ENGINEERING DIVISION Telephone (505) 766-7467

G16-D8A

DRAINAGE REPORT

FOR

PLAINS ELECTRIC

ALBUQUERQUE, NEW MEXICO

RECEIVED
FEB 26 1982
ENGINEERING

DRAINAGE REPORT

FOR

PLAINS ELECTRIC

ALBUQUERQUE , NEW MEXICO

RECEIVED
1982
CITY ENGINEER

Prepared by:

Adam, Hamlyn, Anderson
4055 Montgomery Blvd. NE
Albuquerque, New Mexico 87109

Prepared for;

Barker-Bol & Associates
209 Gold Avenue SW
Albuquerque, New Mexico 87102

Jean J. Bordenave, N.M. P.E. & L.S. #5110

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November, 1981

DRAINAGE REPORT FOR PLAINS ELECTRIC

PURPOSE:

This report is prepared for use by the owner to comply with drainage resolutions and policies of controlling governmental agencies and policies. In addition, this report is to revise a report previously prepared by Mr. Gil Gardner for a prior phase of this project.

LOCATION AND TERRAIN:

The project is located at the intersection of Stanford and Aztec, in the North-East quadrant of the City. See Plate 1 for exact location.

The site has been previously graded and is now used for ponding areas, storage areas and landscaping. Aside from existing landscaped area, vegetation is non-existant. Soils are sandy with some decomposed granite and the site slopes from southeast to northwest at approximately 2%.

UPLAND DRAINAGE:

Flows entering the site are limited to those generated within the developed property, immediately east of the site. Those flows will be allowed to enter the site in their historic pattern. No adverse effects have been experienced in the past, and none are anticipated in the future.

INTERNAL DRAINAGE:

The proposed construction has been divided into 2 basins; the most southerly basin drains to a detention pond located adjacent to Aztec. This pond has been designed with a controlled outlet to have a maximum discharge of the 1 year storm.

The northerly basin is designed to drain to a detention pond as designed in the Gardner report. This pond is being increased in size due to the increase of impervious surface area being constructed wit' this project.

CONCLUSION:

Due to previous construction and the method in which drainage was handled, storm water for the bulk of the site will be handled on a retention basis. Though this is not a desirable condition, at this point there is no choice. Storm waters generated within the site are handled in such a manner as to relieve downstream flooding potential.

APPENDIX A

ESTIMATED RETURN PERIODS FOR SHORT-DURATION PRECIPITATION (Inches)

Station: ALBUQUERQUE, BERNALILLO COUNTY, NEW MEXICO (CITY).
Latitude, 35° 05' N.; Longitude, 106° 39' W.; Elevation 4960 ft.

DURATION	RETURN PERIOD (YEARS) 1	2	5	10	25	50	100
5 min.	0.18	0.23	0.30	0.35	0.44	0.49	0.55
10 min.	0.27	0.35	0.47	0.55	0.63	0.77	0.86
15 min.	0.35	0.44	0.59	0.70	0.86	0.97	1.03
30 min.	0.48	0.62	0.82	0.95	1.19	1.34	1.50
1 hr.	0.61	0.78	1.04	1.22	1.50	1.70	1.90
2 hr.	0.63	0.81	1.09	1.23	1.57	1.78	1.99
3 hr.	0.64	0.83	1.13	1.33	1.63	1.86	2.03
6 hr.	0.68	0.90	1.25	1.47	1.80	2.05	2.30
12 hr.	0.72	0.96	1.35	1.59	1.95	2.22	2.50
24 hr.	0.75	1.02	1.46	1.72	2.10	2.40	2.70

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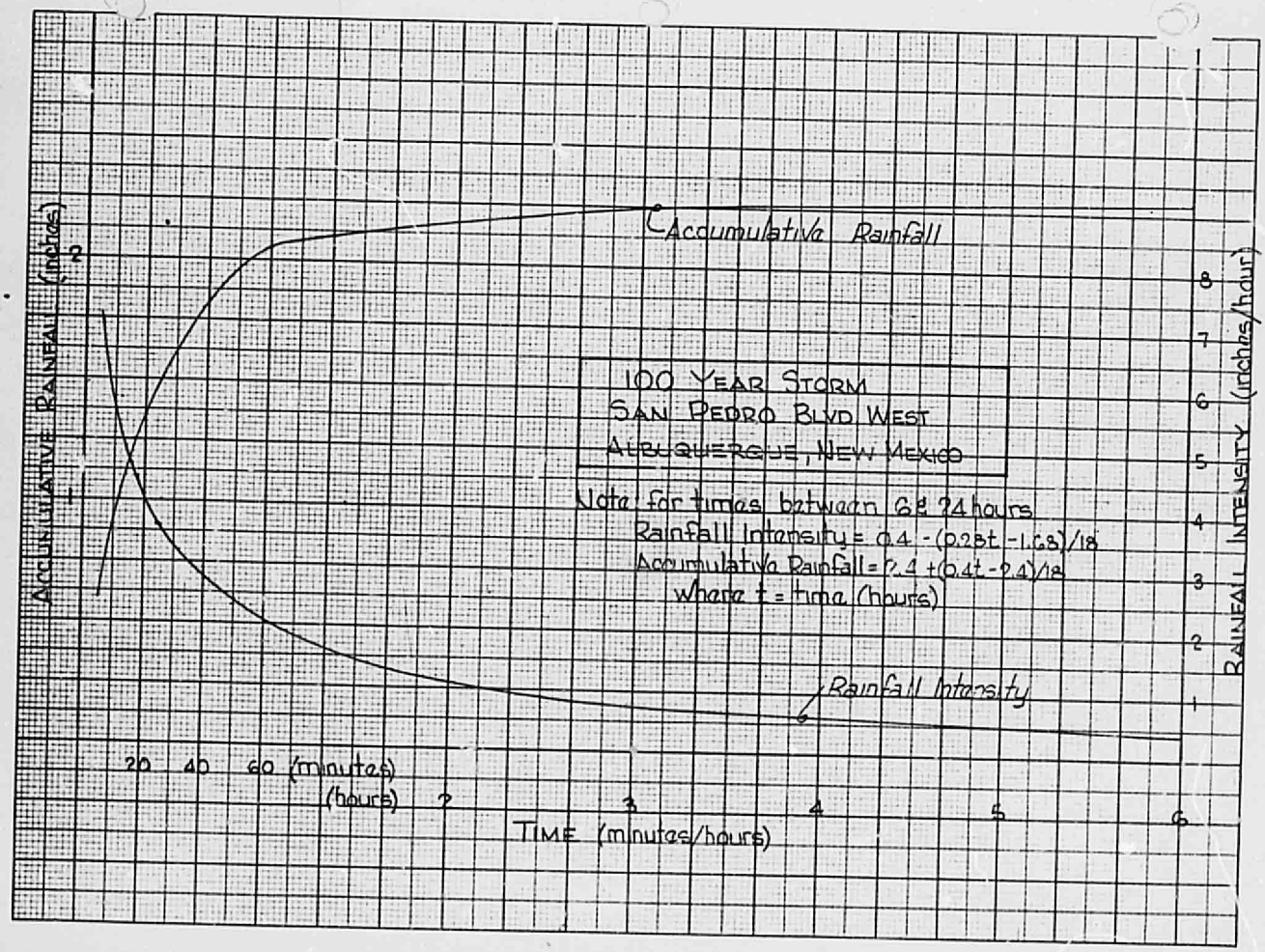


KEUFFEL & ESSER CO. N.Y.

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

APPENDIX B

ADAM, HAMLYN, ANDERSON CONSULTING ENGINEERS, INC.	PLAINS ELEC.	JOB NO. DATE: BY:	SHT. NO. OF

DIMENSIONS OF SOUTHEAST BASIN 1

SIZING OF PVC DRAINING SE BASIN 2

RETENTION CALCS SE BASIN 3

DIMENSIONS EAST BASIN 4

RETENTION CALCS EAST BASIN 5

RUNOFF AREAS TO EXISTING BASIN 6

NEW DIMENSIONS EXISTING BASIN 7

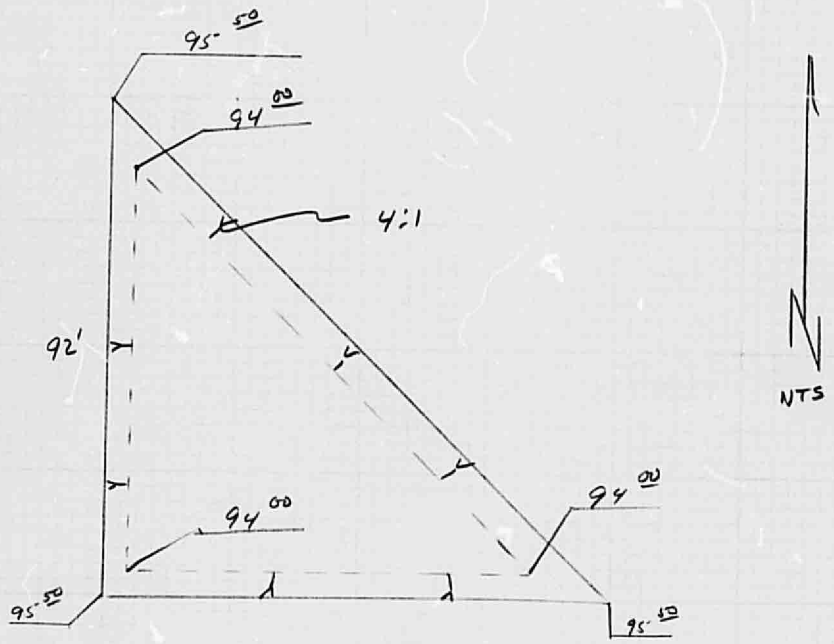
DRAINAGE SWALE FROM EXISTING PARKING 8

ROOF DRAINAGE TO LARGE BASIN 9

CONCRETE CHUTE ACROSS DRIVE & DISCHARGE 10

DETAIL OF CHANNELS CROSSING STREET 11

ADAM, HAMLYN, ANDERSON CONSULTING ENGINEERS, INC.	SOUTH POND	JOB NO. AC-81576 DATE: 9/2/81 BY: JMH	SHT. NO. 1 OF



VOLUME $(d=1.0) = 16(d^3 + 20d^2 + 2000)$; ft^3

SURFACE AREA $= \frac{(8d+80)^2}{2}$

CAPACITY $(1.0) = 3716\ ft^3$

ADAM, HAMLYN, ANDERSON CONSULTING ENGINEERS, INC.	6" PVC - SOUTHPOND DISCHARGE	JOB NO. AC-8/576 DATE: 9/3/81 BY: JMH	SHT. NO. 2 OF

Max Discharge - 1yr. storm pk.

$$\frac{(\text{Area})(C)(\text{Int.})\ \text{Time}}{43,560}$$

$$\frac{19,648(.4)(.18)(12)}{43,560} = .39 \text{ cfs}$$

SIZE ORIFICE

DISCHARGE $= .39 = 0.6\ A\sqrt{2gH}$ $\qquad H = .75$

$$A = \frac{.39}{.6\sqrt{64.4(.75)}}$$

$$A = .0935 = \pi r^2$$

$$r = \sqrt{\frac{.0935}{\pi}}$$

$$= .1725 \text{ Ft}$$

DIAMETER = 4.14"

ADAM, HAMLYN, ANDERSON CONSULTING ENGINEERS, INC.	ADDITION TO PLAINS ELEC OFF RETENTION CALCS	JOB NO. AC-81576 DATE: 9/2/81 BY: JMH	SHT. NO. 3 OF

Infiltration 2"/HR ½ HR
1"/HR ½ HR
½"/HR →

Run off Source

	AREA S.F.	C	EFF. AREA
Parking Lot	12,448	0.95	11,826
Pond & Vicinity	7,200	1.0	7,200
			19,000 S.F.

Runoff Volume $\frac{19,000}{12}$ = 1583 × RAINFALL

STORM DURATION	RAINFALL	RUNOFF VOLUME		AVG POND SURFACE		INCRE INFIL.	INCRE DRAIN	ACCUM INFIL.	STORAGE VOLUME
min.	in.	ft^3		ft^2		ft^3	ft^3	ft^3	ft^3
10	0.94	1488		0 (3200) 3500	3350	93	—	93	1395
20	1.28	2026	538	3595	3550	99	160	352	1674
30	1.70	2691	665 2339	3595	3595	99	160	611	2080
40	1.86	2944	253 2333	3600	3600	50	160	821	2123
50	1.97	3118	175 2298	3600	3600	50	160	1031	2087
60	2.04	3229	111 2198	3600	3600	50	160	1241	1988
70	2.07	3277	48 2036	3600	3600	25	160	1426	1851
80	2.08	3293	16 1867	3600		25	160	1611	1682
90	2.10	3324	1700	3530	3560	25	135	1771	1553

.3 = 989
.4 = 1321
.5 = 1682
.6 = 2038

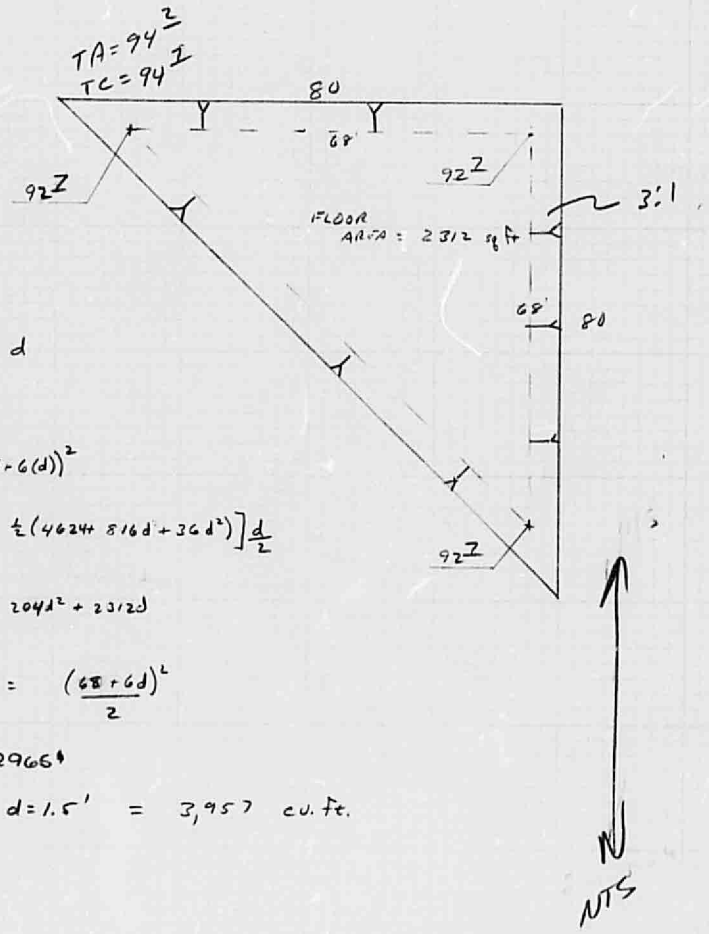
POND VOLUME = $16(d^3 + 20d^2 + 200d)$; ft^3

SURFACE AREA = $\frac{(2d + 80)^2}{2}$; ft^2

POND CAPACITY = 3,716 ft^3

75 % excess capacity

ADAM, HAMLYN, ANDERSON CONSULTING ENGINEERS, INC.	RETENTION BASIN NE PARKING	JOB NO. AC-81516 DATE: 9/3/81 BY: JMH	SHT. NO. 4 OF



$$Vol = \frac{A_1 + A_2}{2} d$$

$A_0 = 2312$

$A_n = \frac{1}{2}(68 + 6(d))^2$

$$Vol_d = \left[2312 + \frac{1}{2}(4624 + 816d + 36d^2)\right]\frac{d}{2}$$

$Vol_d =$

$$9d^3 + 204d^2 + 2312d$$

SURFACE AREA = $\frac{(68 + 6d)^2}{2}$

TOP AREA = 2966'

CAPACITY @ $d = 1.5'$ = 3,957 cu. ft.

ADAM, HAMLYN, ANDERSON CONSULTING ENGINEERS, INC.	ADDITION TO PLAINS ELECTRIC OFFICE NE PARKING RETENTION CALCS	JOB NO. AC-81-7K DATE: 9/2/81 BY: JMH	SHT. NO. 5 OF

Infiltration 2"/HR ½ HR
1"/HR ½ HR
½"/HR →

RUNOFF SOURCE	AREA S.F.	C	Adj. AREA
PARKING LOT	26,840	.95	25,500
POND	3,200	1.0	3,200
			28,700

RUNOFF VOLUME $\frac{28,700}{12}$ = 2390 (RAINFALL)

STORM DURATION	RAINFALL	RUNOFF VOLUME	AVG POND SURFACE	INCRE INFIL	OVERFLOW	ACCUM INFIL & OVER	STORAGE VOLUME
min.	in.	ft^3	ft^2	ft^3	ft^3	ft^3	ft^3
10	0.94	2,247	0 (2312) 2694 2500	69	—	69	2178
20	1.28	3,059	2780 2740	76	—	145	2914
30	1.70	4,063	2965 2870	80	~	225	3838
40	1.86	4,445	2966 2965	41	222	488	3957
50	1.97	4,708	2965 2965	41	222	751	3957
60	2.04	4,876	2965 2965	41	127	919	3957
70	2.07	4,947	2965 2965	21	50	990	3957
80	2.08	4971	2965 2965	21	3	1014	3957
					624		

USE 700 CF

VOL
.5 = 1208
1 = 2525
.9 = 2252
1.1 = 2802

POND VOLUME = $9d^3 + 204\,d^2 + 2312\,d$

SURFACE AREA : $\left(\frac{68 + 6d}{2}\right)^2$

CAPACITY (d) 1.5 = 3957

Note: overflow to existing pond North of NE Parking Area

ADAM, HAMLYN, ANDERSON CONSULTING ENGINEERS, INC.	ADDITION TO PLAINS ELECTRIC OFFICE RUNOFF AREAS TO EXISTING POND	JOB NO. AC-81516 DATE: 9/2/81 BY: JMH	SHT. NO. 6 OF

PAVEMENT C = 0.95

64(200) + 50(64) + 24(80) + 24(450) + 24(40) = 30,880 cFF.

29,340

ROOF TOP C = .95

110(180) = 19,800

18,810

LANDSCAPE C = 0.3

151,800 − ((110+205)/2)(180) = 123,450

37,035

POND C = 1.0

± 80(200)

16,000

101,185 Ft²

+ Excess From Triangular Parking (700 cu.Ft)

6 HR = 2.4 inches RAINFALL

$\frac{101,185(2.4)}{12} + 700$ = VOLUME REQ'D

20,937 cu.Ft.

− 6 HR INFIL = 3,750

15,000 (ft(6)(ft)) = 3,750 cu.ft

17,187 cu.Ft.

ADAM, HAMLYN, ANDERSON CONSULTING ENGINEERS, INC.	CAPACITY EXISTING POND (LARGE POND NORTH) SIZING OF NEW POND	JOB NO. AC-81676 DATE: 9/2/81 BY: JMH	SHT. NO. 7 OF

TOP AREA (92.0) = 45(200) = 9,000 sq ft

BOTTOM AREA (90.0) = 15(165) = 2,475

$$\left(\frac{A_1 + A_2}{2}\right) d = \left(\frac{9,000 + 2475}{2}\right) 2.5 = 14,300 \text{ cu.ft.}$$

ENLARGE TO 20,000 REQUIRES

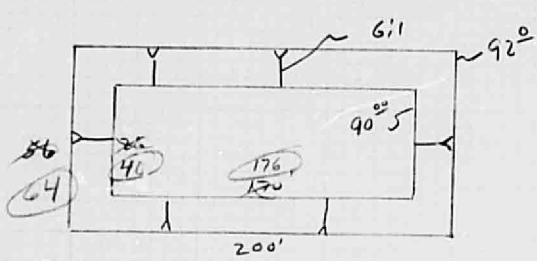
$$\left(\frac{(9,000+x)+2475-x)}{2}\right) 2.5 = 20,000$$

$$11,475 + 2x = 16,000$$

$$x = 2,262 \text{ ft}^2$$

$$x = 180(y) = 2262$$

$$y = 12.5 \text{ ft}$$



$$\frac{A_1 + A_2}{2} 2.5 = 19,575$$

$$\frac{A_1 + A_2}{2}(2) = 19,840$$

ADAM, HAMLYN, ANDERSON CONSULTING ENGINEERS, INC.	DRAINAGE FROM PARKING LOT TO LARGE BASIN	JOB NO. AC-81-576 DATE: 9/2/81 BY: JMH	SHT. NO. 8 OF

ASPHALT AREA $C = 0.95$

$64(270) + 50(64) = 20,480$

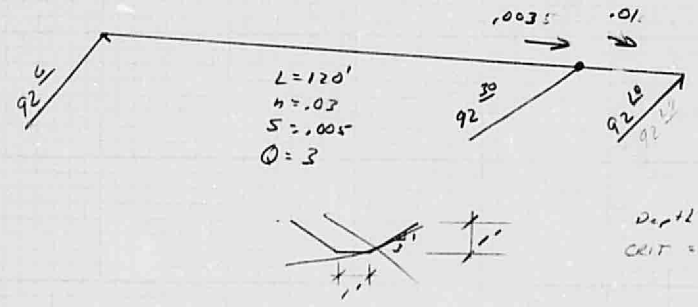
ADJ. AREA
19,500

T. C. = 5 MIN

PPT = .55

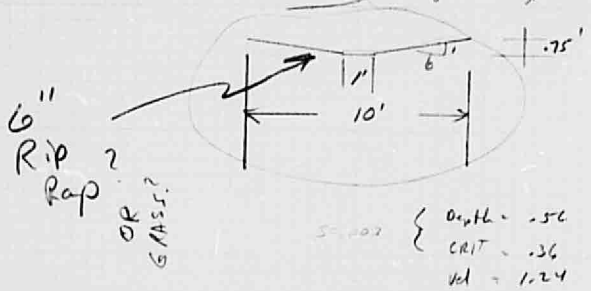
MAX. DIS.

$$\frac{29500\,(.95)(.55)\,12}{43,560} = 3 \text{ cfs}$$ ← DESIGN FOR CHANNEL



Depth = .61
CRIT = .44

Depth = .52
CRIT = .39



Depth = .50 ft
CRIT = .36
Vel = 1.5 fps

S = .002 { Depth = .50
CRIT = .36
Vel = 1.24

ADAM, HAMLYN, ANDERSON CONSULTING ENGINEERS, INC.	DRAINAGE FROM BLDG TO CARGO BASIN	JOB NO. AC-81576 DATE: 9/3/81 BY: JMH	SHT. NO. 9 OF

Roof Area

$110(180) = 19{,}800$ sq ft

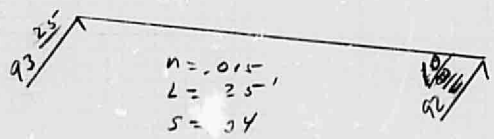
$T_c = 5$ min

Rain = .55

Max DIS:

$$Q = \frac{19{,}800(.95)(.55)\,12}{43{,}560} = 2.85 \text{ cfs}$$

RUN CONCRETE CHUTE TO ROAD CROSSING

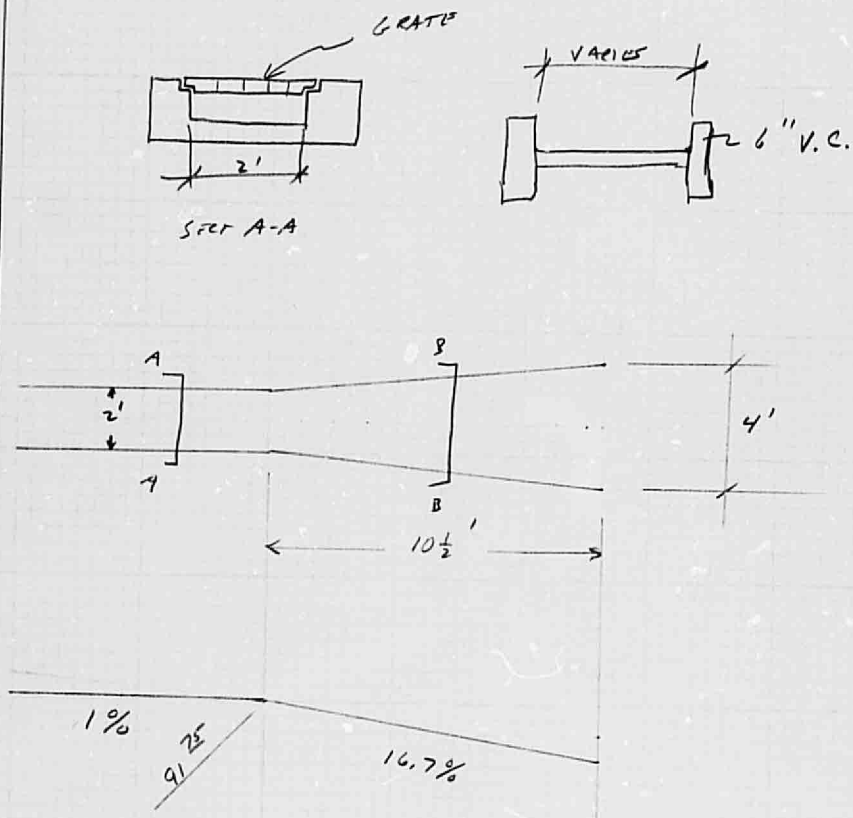


Depth = .15
V = 6.4 sqw

2'

Depth = .22
Vel = 6.4 fps

ADAM, HAMLYN, ANDERSON CONSULTING ENGINEERS, INC.	DISCHARGE CHUTE INTO RETENTION POND	JOB NO. DATE: BY:	SHT. NO 10 OF



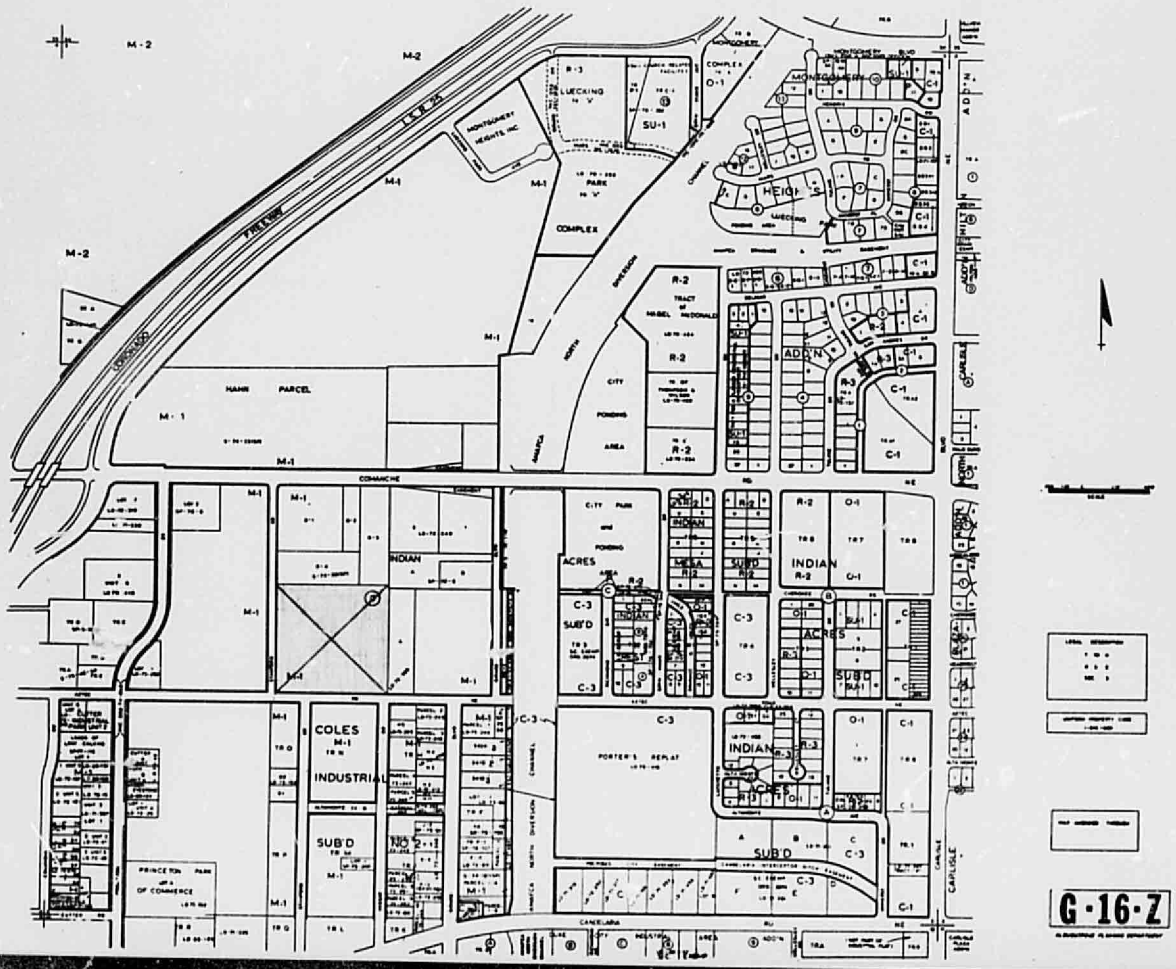


PLATE I

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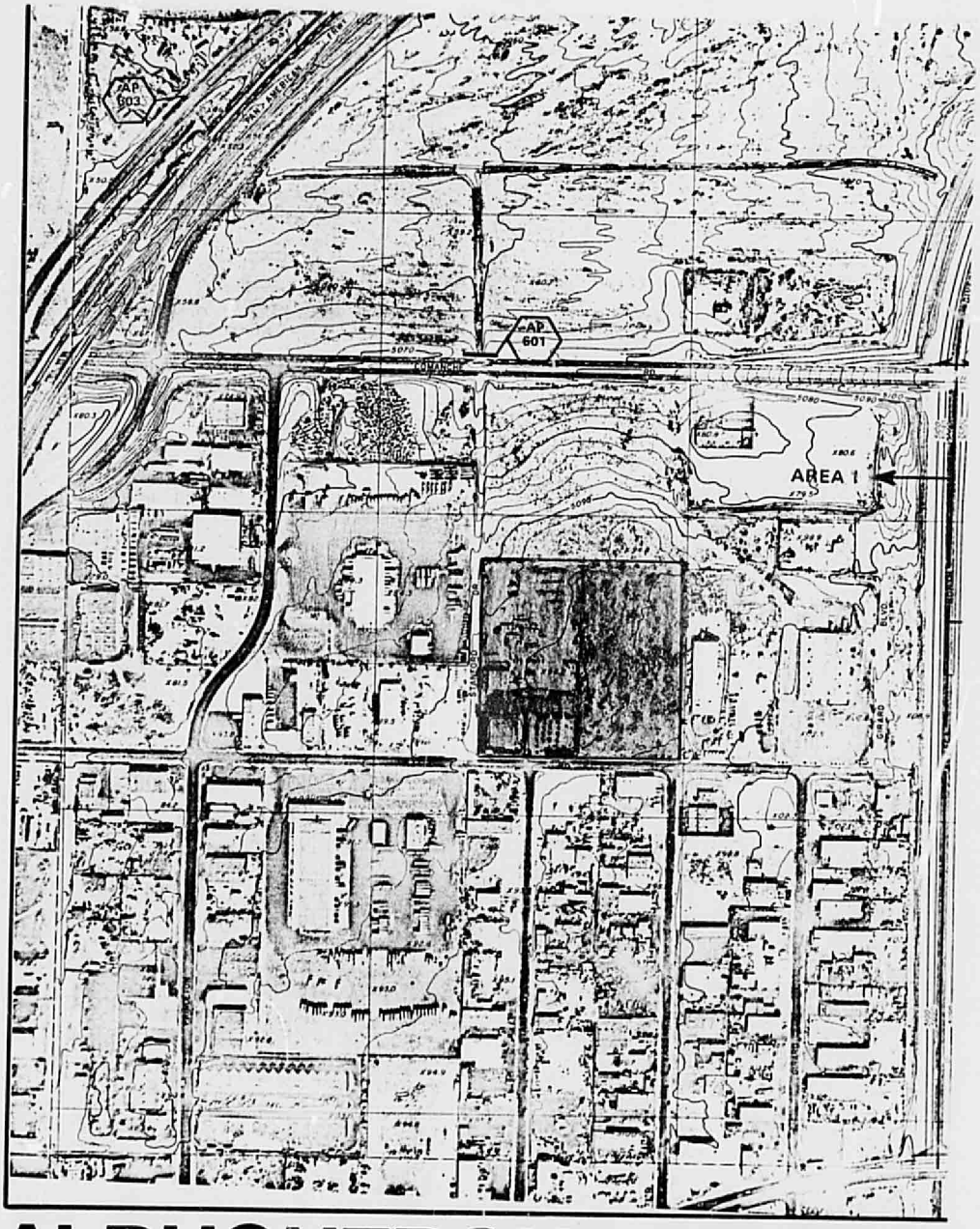

ALBUQUERQUE MASTE

PLATE II

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NATIONAL FLOOD INSURANCE PROGRAM

FHBM

FLOOD HAZARD BOUNDARY MAP

CITY OF
ALBUQUERQUE, NEW MEXICO
BERNALILLO COUNTY

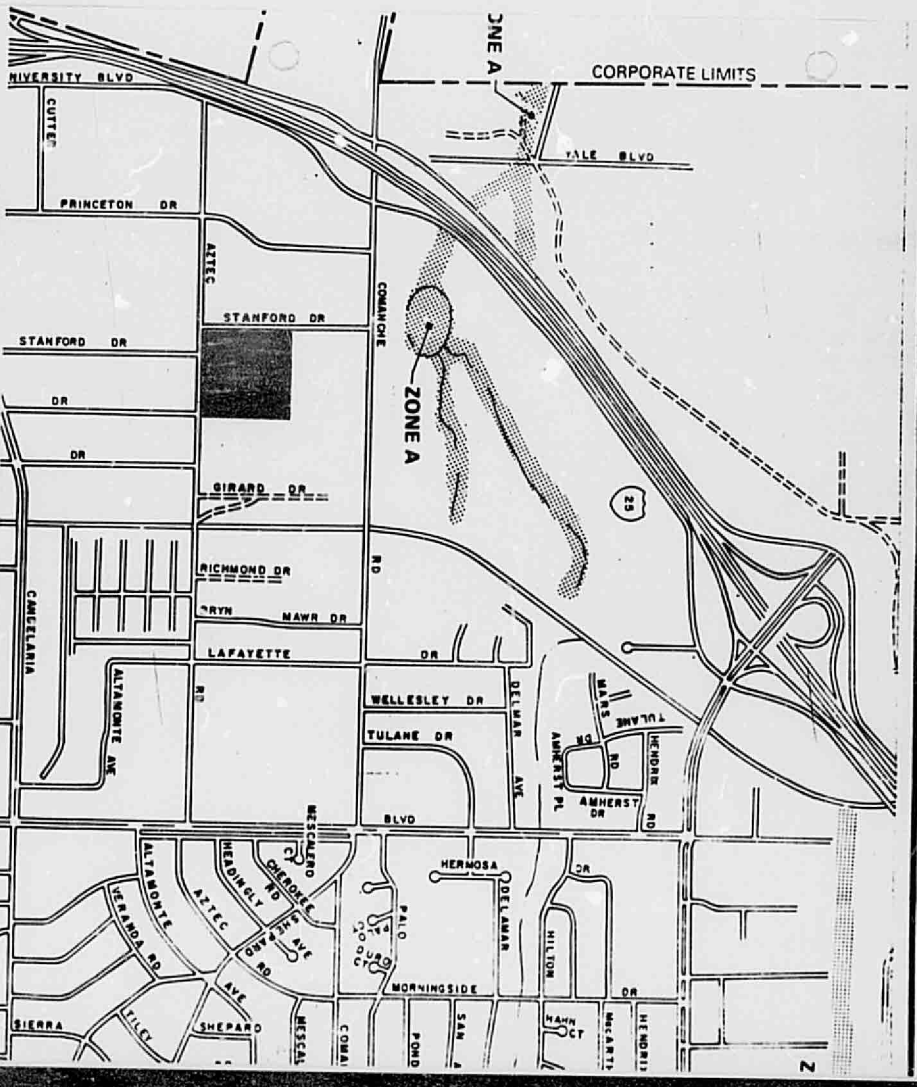
PAGE 5 OF 9
(SEE MAP INDEX FOR PAGES NOT PRINTED)

PLATE III

COMMUNITY-PANEL NUMBER
350002 0005 B

MAP REVISED:
DECEMBER 4, 1979

U.S. DEPARTMENT OF HOUSING
AND URBAN DEVELOPMENT
FEDERAL INSURANCE ADMINISTRATION



PERMIT FOR EXCAVATION & CONSTRUCTION, CITY OF ALBUQUERQUE

ENG **01739**

LOCATION 2801 Ested Rd. NE								DATE 1-24-83
SW	DP	C&G 12'	CC OK TRAFFIC	SEWER TAP	SEWER EXT.	WATER CUT	WATER EXT.	
NEW SERVICE		NEW YD. LINES	B/W CURBS	MAIN LEAK	OTHER: Drain			
SW: 4"	8"	TO PROPERTY	CURB	CITY TO RESURFACE: YES	NO			
LENGTH	WIDTH	TOTAL	NO. OF EX.	PAVED	UNPAVED			
STARTING DATE 1-24-83		COMPL. DATE 1-31-83		PERMIT EXPIRES 2-4-83				
INSURANCE EXP. 5/83		BOND EXPIRES 12/		SAW CUT: YES	NO			
QUALIFIED: Pete Jacobson								

Restoration Fee Required	YES	NO xx	BY al

Construction Fee $ 25.00 Cr. 443008 - 5253000

Excavation Fee $ N/C Cr. 443008 - 5253000

Restoration Fee $ N/C Cr. 461601 - 8233000

PERMIT IS APPROVED FOR WORK DESCRIBED ABOVE IN ACCORDANCE WITH CITY ORDINANCE NO. 8-1978 & 219 - 1972

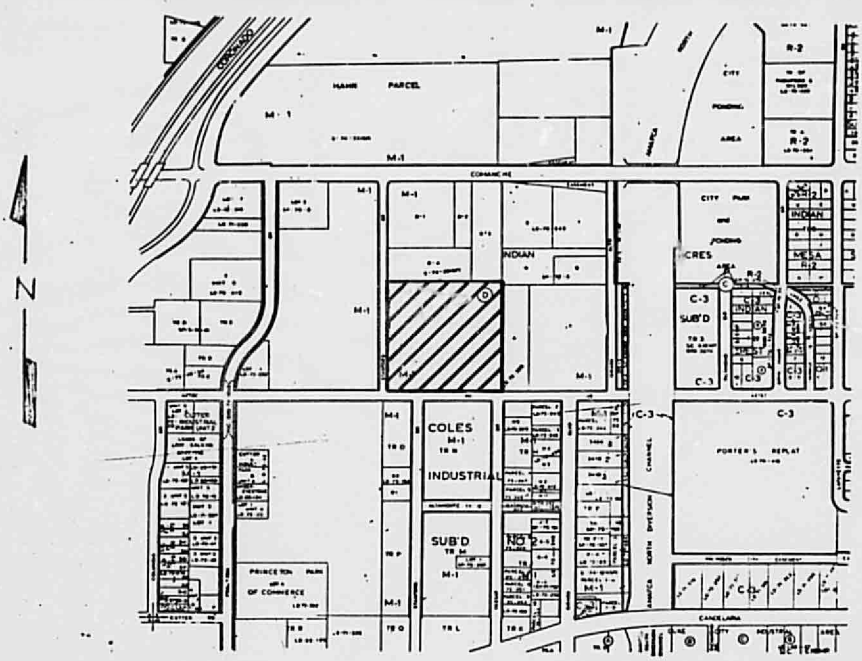
State License	Date	City License	Date
APPLICANT Farmer Const.		ADDRESS 3535 Girard NE.	PHONE NO. 884xxx-1366
SIGNATURE		APPROVED CITY ENGINEER al	BLUE STAKE NUMBER

Permit is granted in consideration of the permittee assuming all liability, defending, and holding the City harmless for claims for damages or injury to persons or property resulting from permittee's excavation work.

CONTR. _____ CODE _____

CAUTION: PROTECT UNDERGROUND UTILITIES.
CALL 765-1234, 48 HOURS IN ADVANCE FOR LINE STAKING

DRAINAGE FACILITIES WITHIN CITY RIGHT-OF-WAY



REGISTERED PROFESSIONAL ENGINEER AND LAND SURVEYOR NO. 5110 NEW MEXICO JEAN J. BORDENAVE

NOTICE TO CONTRACTOR

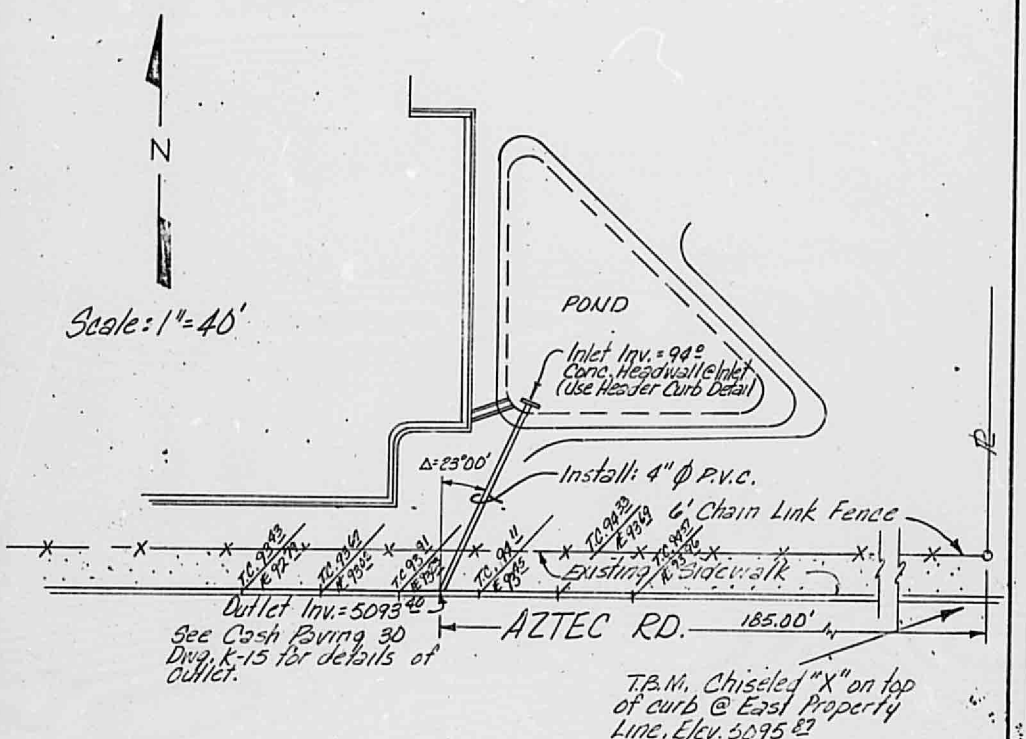
1. An excavation/construction permit will be required before beginning any work within City right-of-way. An approved copy of these plans must be submitted at the time of application for this permit.
2. All work detailed on these plans to be performed, except as otherwise stated or provided hereon, shall be constructed in accordance with "Contract Documents for City-Wide Utilities and Cash Paving No. 30 "
3. Two working days prior to any excavation, contractor must contact Line Locating Service, 765-1234, for location of existing utilities.
4. Prior to construction, the contractor shall excavate and verify the horizontal and vertical locations of all obstructions. Should a conflict exist, the contractor shall notify the engineer so that the conflict can be resolved with a minimum amount of delay.
5. Backfill compaction shall be according to N/A street use.

APPROVALS	NAME	DATE	TITLE: POND OUTLET PIPE. 501 ACEC ROAD N.E.
A.C.E./DESIGN	[illegible]	20 May 83	
INSPECTOR	[illegible]	3-19-83	
A.C.E./FIELD	[illegible]	5-16-83	PERMIT NO. SHEET 1 OF 2 — MAP NO. [illegible]

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

CITY OF ALBUQUERQUE

DRAINAGE FACILITIES WITHIN CITY RIGHT-OF-WAY



REGISTERED PROFESSIONAL ENGINEER AND LAND SURVEYOR NO. 5110 NEW MEXICO JEAN J. BORDENAVE

APPROVALS	NAME	DATE	TITLE: POND OUTLET PIPE 2401 AZTEC ROAD N.E.	
A.C.E./DESIGN	J. Kolesh	20 May 82		
INSPECTOR			PERMIT NO.	MAP NO. G-16
A.C.E./FIELD			SHEET 2 OF 2	