HYDROLOGY K14/D5a 2 PLANS

K14/D5a

2 PLANS

ADAM, HAMLYN, ANDERSON
consulting engineers inc.
4055 MONTGOMERY BOULEVARD, N.E.
ALBUQUERQUE, NEW MEXICO 87109
505-881-1808

RECEIVED
JUN 29 1982
RECEIVED

RECEIVED
JUN 29 1982
RECEIVED

Mr. Richard Heller, City Engineer
P.O. Box 1293
Albuquerque, New Mexico 87103
June 25, 1982

Attn: Mr. F. Aguirre
Re: 405 Grand Ave. N.E.

Dear Sir:

On June 25, 1982, I personally inspected the subject project with respect to drainage. During the inspection, I also took spot elevation at points I considered to be critical. Included with this letter are three prints showing as built conditions with as built spot elevations at points I considered to be critical to the drainage.

I hereby certify that the drainage facilities as constructed will operate as designed in the drainage report prepared by me and approved by the City of Albuquerque.

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

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

PRINCIPALS:
CARL H. ADAM, P.E.
RICHARD L. HAMLYN, P.E.
JAMES D. ANDERSON, P.E.
DOYLE L. WISTE, P.E.
JEAN J. BORDENAVE, P.E.

ASSOCIATE:
PHILLIP K. MATTHEWS, P.E.

ADAM, HAMLYN, ANDERSON CONSULTING ENGINEERS, INC.	DRAINAGE REPORT 405 GRAND AVE.	JOB NO. AC8157 DATE: 4/20/82 BY:	SHT. NO. 1 OF 3

MAX. $Q_{ALLOW} = 0.74$ cfs

Max. $H = 75.0 - 73.5 - 0.21 = 1.29'$

$Q = 0.74 = 0.6 A \sqrt{2gH}$

$0.74 = 5.4687 A = \frac{\pi D^2}{4}$

$D = 0.415' = 4.98$ inches say 5"

Area = = .13635 ft

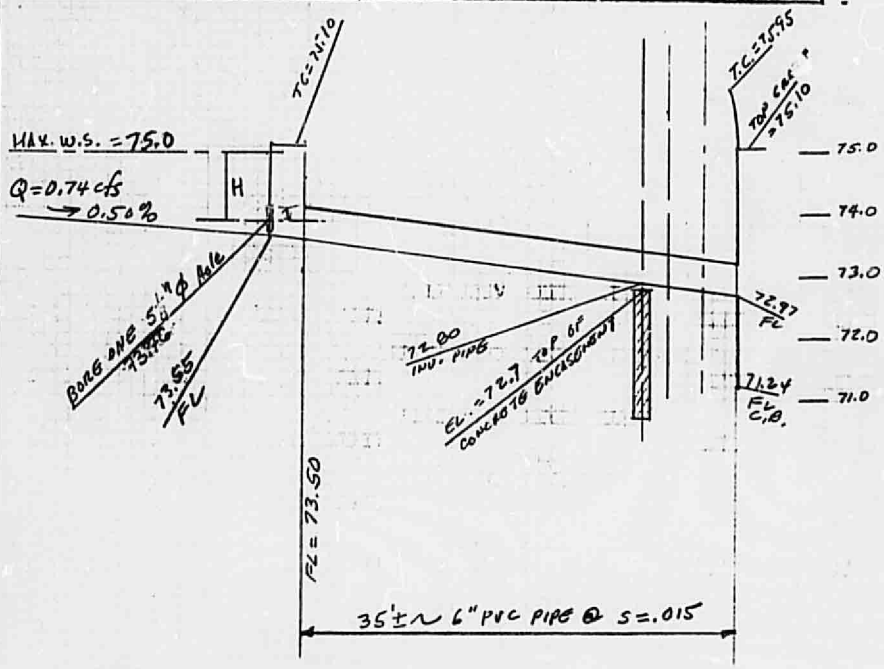
Runoff to pond: Volume = 28551 x Rainfall/12
= 2379 x Rainfall

TIME	ACCUM RAINFALL	RUNOFF TO POND	ORIFICE HEAD			INCREM OUTFLOW		ACCUM OUTFLOW	POND STORAGE
min	inches	ft³	W.S. Elev.	Ave Elev.	Head ft	CFS	ft³	ft³	ft³
0			74.0						
				74.38	0.62	0.513	154		
5	0.59	1404	74.75					154	1251
				74.81	1.05	0.673	232		
10	0.92	2188	74.87					394	1832
				74.90	1.14	0.700	210		
15	1.17	2783	74.93					604	2179
				74.95	1.19	0.716	214		
20	1.35	3211	74.97					818	2393
				74.98	1.22	0.725	217		
25	1.50	3569	74.99					1035	2534
				74.99	1.23	0.728	218		
30	1.62	3854	75.00					1253	2601
				74.99	1.23	0.728	218		
35	1.69	4021	74.99					1471	2550

ADAM, HAMLYN, ANDERSON CONSULTING ENGINEERS, INC.	DRAINAGE REPORT 405 GRAND AVE	JOB NO. AC 815 77 DATE: 4/13/82 BY:	SHT. NO. 2 OF 3

PEAK SITE RUNOFF

Time mins	5	10	15	20	25	30	35
Direct Runoff cfs	0.63	0.49	0.42	0.36	0.32	0.29	0.26
Detained Runoff cfs	0.51	0.67	0.70	0.72	0.72	0.73	0.73
Total Runoff cfs	1.14	1.16	1.12	1.08	1.04	1.02	0.99



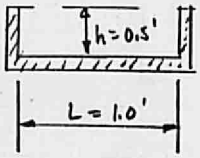
CHECK FOR CAPACITY OF PIPE USING 6" PVC PIPE:

$Area = \frac{\pi D^2}{4} = 0.19635$, $n^{3/2} = \left(\frac{.015}{2}\right)^{3/2} = 0.24998$

$S^{1/2} = (.015)^{1/2} = .12247$ $\quad Q_{cap} = A.V. = .19635 \times \frac{1.486}{.012} \times .24998 \times .12247 = 0.74 \sim$

Q=0.74 ~

ADAM, HAMLYN, ANDERSON CONSULTING ENGINEERS, INC.	DRAINAGE REPORT 405 GRAND AVE	JOB NO. AC 81577 DATE: 4/13/82 BY:	SHT. NO. 3 OF 3



Area = 0.5 × 1 = 0.50 ☐'

W.P. = 2.0' $r^{2/3} = \left(\frac{A}{W.P.}\right)^{2/3} = 0.3968$

$S^{\frac{1}{2}} = (.005)^{1/2} = .0707$

Cap. = A.V. = $0.50 \times \frac{1.486}{.012} \cdot .3968 \times .0707 = 1.73$ cfs > 0.74 cfs.

SIZE OF OPEN BOX = 0.5' × 1.0'

CITY OF ALBUQUERQUE

DRAINAGE FACILITIES WITHIN CITY RIGHT-OF-WAY

N

See Revised Sheets attached

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

VICINITY MAP (K-14)

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.

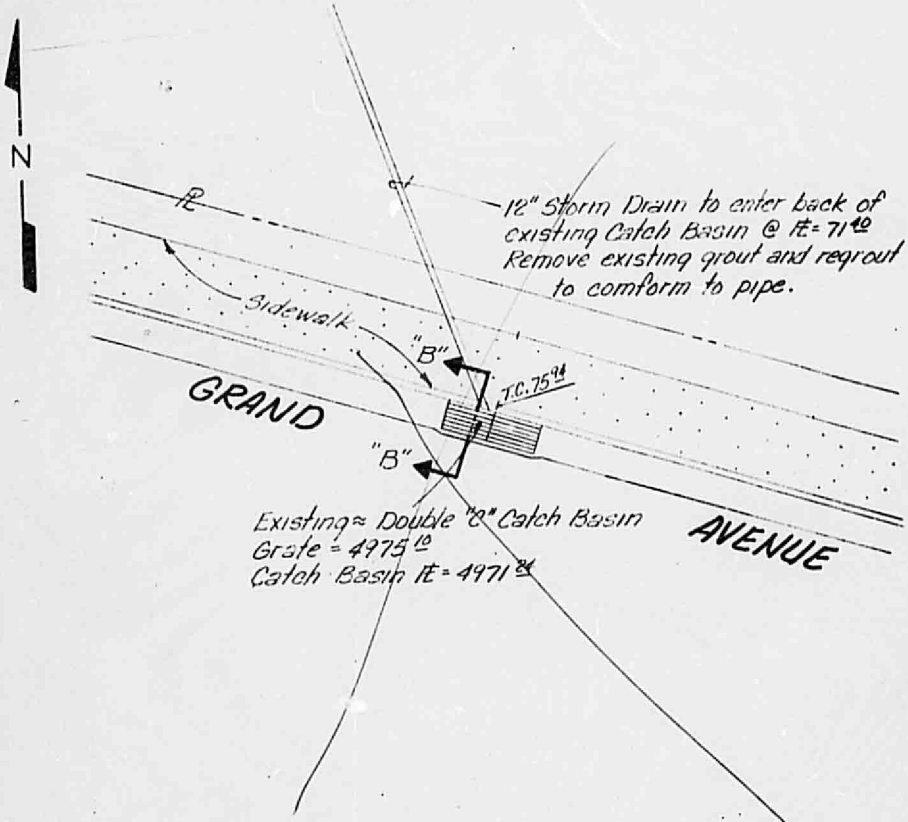
5. Backfill compaction shall be according to N/A street use.

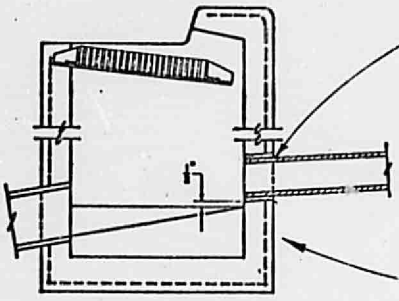
KA-DSA B-13

APPROVALS	NAME	DATE	TITLE: CATCH BASIN 405 Grand Avenue N.E.	
A.C.E./DESIGN	[illegible]	26 Feb 82		
INSPECTOR	[illegible]	6/29/82	PERMIT NO. D-7712 SHEET 1 OF 2	MAP NO. K-14
A.C.E./FIELD				

CITY OF ALBUQUERQUE

DRAINAGE FACILITIES WITHIN CITY RIGHT-OF-WAY





Core drill into back of existing Catch Basin. Grout with nonshrink nonmetallic grout.

Existing Double "C" Catch Basin
See Drawing K-17

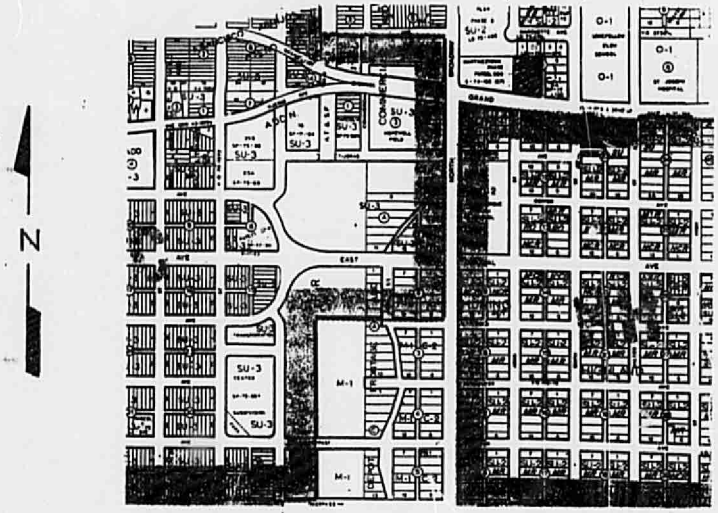
SECTION B-B

APPROVALS	NAME	DATE	TITLE: CATCH BASIN 405 Grand Avenue N.E.	
A.C.E./DESIGN	[illegible]	26 Feb 82		
INSPECTOR			PERMIT NO.	MAP NO. K-14
A.C.E./FIELD			SHEET 2 OF 2	

CITY OF ALBUQUERQUE

DRAINAGE FACILITIES WITHIN CITY RIGHT-OF-WAY

VICINITY MAP (K-14)



REGISTERED PROFESSIONAL ENGINEER AND LAND SURVEYOR
5110
7/26/82
JEFFREY J. BORDINAUD

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 "
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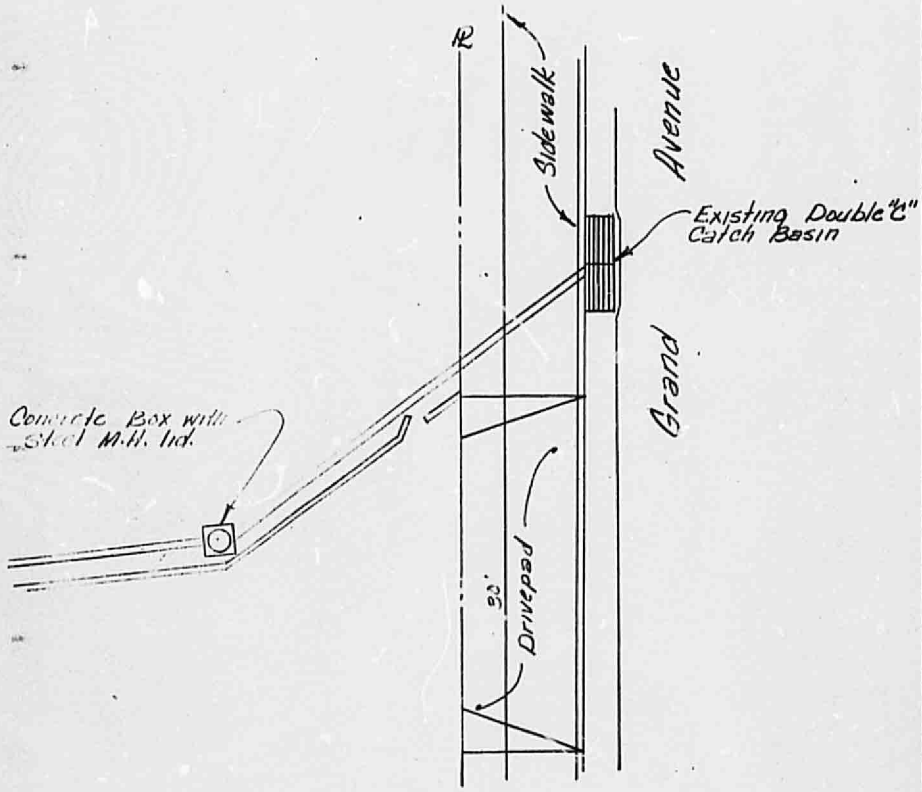
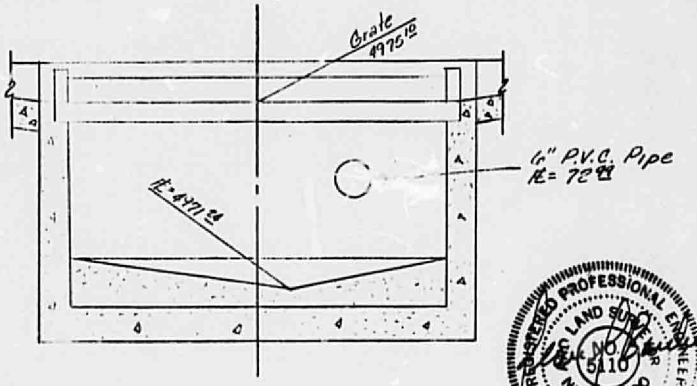
4. Prior to construction, the contractor shall excavate and verify the horizontal and vertical locations of all obstructions. Should a conflict exist, the contractor shall notify the engineer so that the conflict can be resolved with a minimum amount of delay.
5. Backfill compaction shall be according to N/A street use.

APPROVALS	NAME	DATE	TITLE: 405 Grand Avenue Catch Basin	
A.C.E./DESIGN				
INSPECTOR				
A.C.E./FIELD	W.D. Kearney	7-1-82	PERMIT NO. SHEET 1 OF 2	MAP NO. K-14

CITY OF ALBUQUERQUE

DRAINAGE FACILITIES WITHIN CITY RIGHT-OF-WAY





REGISTERED PROFESSIONAL ENGINEER
PROFESSIONAL LAND SURVEYOR
NEW MEXICO
JERRY J. BORDENAVE
No. 5110
10/25/82

As Built

APPROVALS	NAME	DATE
A.C.E./DESIGN		
INSPECTOR		
A.C.E./FIELD		

TITLE: 405 Grand Avenue Catch Basin

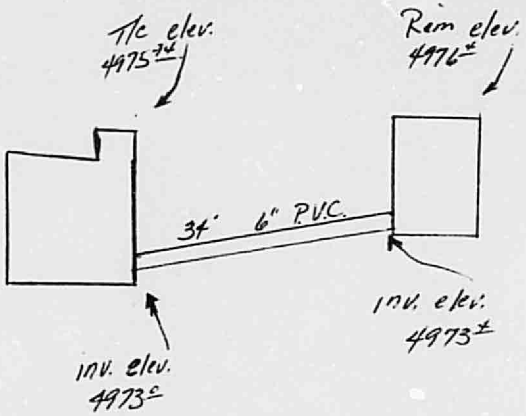
PERMIT NO.

SHEET 2 OF 2

MAP NO. K-14

405 Grand N.E.

As Built 6/29/82
[illegible]



Existing Double "C"
Catch Basin

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

April 27, 1982

Adam, Hamlyn, Anderson
Jake Bordenave, P.E.
4055 Montgomery Blvd. NE
Albuquerque, New Mexico 87110

REF: 405 Grand NE Drainage Report Dated 4/28/82 (File K14-D5A)

Dear Mr. Bordenave:

The revised drainage plan referenced above is approved. Please submit a revised Special Order 19 reflecting the proposed change to the Assistant City Engineer/Design for his approval and an up-dated drainage plan to this office showing the proposed drive pad along Grand Avenue.

In order to expedite or prevent loss of time reviewing minor field changes by this office, such as this one, I would recommend that the owner retain his engineer to perform periodic inspections and certify his project upon completion. At the completion of the project this office would only require an as-built plan accompanied with the engineer's letter of certification to release the Certificate of Occupancy.

If you have any questions regarding the above, please feel free to call me at 766-7644.

Sincerely,

Fred J. Aguirre

Fred J. Aguirre, PE
Civil Engineer/Hydrology

FJA/el

cc: Drainage File
Reading File

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

K14 - D5A

January 5, 1982

Mr. Jake Bordanave
Adam, Hamlyn, Anderson
4055-A Montgomery Blvd. NE
Albuquerque, NM 87109

RE: 405 GRAND DRAINAGE REPORT

Dear Jake:

The referenced drainage report is approved. Please see that the revised plans dated 1/4/82 are placed in the construction set. Mr. Fred Aguirre will sign off for Hydrology when this is done.

Very truly yours,

BGB

Brian G. Burnett
Civil Engineer/Hydrology

BGB/tsl

cc: Alan Rex
Bill Sellers, Jaynes Corp.

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

D20-D3

January 5, 1982

Mr. Cliff A. Spirock
Community Sciences Corp.
P.O. Box 1328
Corrales, N.M. 87048

RE: CORRESPONDENCE DATED DECEMBER 23, 1981

Dear Cliff:

I have enclosed for your review a copy taken from the approved Heritage Hills Unit 2 Construction Set. You will note that rundowns and a specific channel treatment are called out on the sheet. We are still investigating the type of channel treatments required for the Domingo Baca and North Pino. This decision will be based primarily on compatibility with downstream arroyo treatments (East of Wyoming) and Park Department needs in Heritage Hills Unit 2 (The North Pino).

If I can be of further help, please call.

Very truly yours,

BGB

Brian G. Burnett
Civil Engineer/Hydrology

BGB/tsl

DRAINAGE REPORT
FOR
405 GRAND AVENUE NE
ALBUQUERQUE, NEW MEXICO

DRAINAGE REPORT

FOR

405 GRAND AVENUE NE

ALBUQUERQUE, NEW MEXICO

RECEIVED

DEC 30 1981

ENGINEERING

Prepared by:

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

Prepared for:

Alan Rex & Associates
Architects
2709-J Pan American Fwy. NE
Albuquerque, New Mexico 87107

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

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

12/8/81

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RAINFALL CHARTS

APPENDIX B

COMPUTATIONS

PLATE I

LOCATION MAP

PLATE II

AREA TOPOGRAPHY

PLATE III

GRADING AND DRAINAGE PLAN

DRAINAGE REPORT
405 GRAND AVENUE NE
ALBUQUERQUE, NEW MEXICO

PURPOSE

The purpose of this report is to provide a method of construction which will comply with the City of Albuquerque Interim Drainage Policy dated November, 1979 as verbally altered by Mr. Charles Easterling, City Hydrologist. The verbal alteration allows a 5 year existing conditions run-off, rather than 1 year run-off stated in Interim Drainage Policy.

LOCATION AND TERRAIN

The tract is located on the north side of Grand Avenue approximately mid-way between Broadway and Edith. See Plate I for exact location. The site slopes Northwesterly at approximately 3-1/2% and very little vegetation is present due to grading of adjoining property. Soils are comprised of silty sands.

UPLAND DRAINAGE

Upland flows are contained within the streets and storm sewer on Grand Avenue. Depth of flow on Grand Avenue is less than curb depth and no flows are expected to enter the site.

INTERNAL DRAINAGE

Internal flows are split into 3 basins. Basin 1 flows to the alley at the east boundary of property. Basin 2 flows to Marquette via a pedestrian walkway. Basin 3 is piped into the City Storm Drainage System on Grand Avenue. An attempt was made to divert Basin 2 to Basin 3, but vertical constraints would not allow both drainage to the south and the pedestrian walkway at the northwest corner of the property. All flows from the building and major portion of parking area, are directed to an on-site Catch Basin and then piped to an existing Double C Catch Basin on Grand Avenue.

CONCLUSION

100 year storm flows after development will be less than 5 year storm flows prior to development, and approximately 1/2 of 100 year storm flows prior to development. Drainage directed to pedestrian walkway is not a desirable condition, however, due to physical constraints of the site, it is necessary for flows to travel in this direction. Flows through the pedestrian walkway have been reduced to maximum extent possible.

CONCLUSION (CONT'D)

The impact of run-off due to development has been reduced to the maximum extent possible for this site and run-off to the adjacent property on the west has been eliminated. Development of this property will eliminate flooding of retention ponds on the adjacent property thereby making them effective for the purpose for which they were intended.

APPENDIX A

ADAM, HAMLYN, ANDERSON CONSULTING ENGINEERS, INC.	DRAINAGE REPORT 405 GRAND AVE	JOB NO. AC81577 DATE: 12/8/81 BY: MB	SHT. NO. B1 OF 4

EXISTING CONDITION - 5 YEAR STORM

SITE AREA = 38,845 ♯

use t_c = 5 min

i_5 = 3.84 in/hr

Q_5 = (0.4)(3.84)(38,845/43,560)
= 1.37 cfs

DEVELOPED CONDITION - 100 YEAR STORM

DIRECT RUNOFF

SITE AREA

A_1 = 480 ♯
A_2 = 4480 ♯
total = 4960 ♯

use t_c = 5 min.

Area A_1

Q_{100} = (0.95)(7.08)(480/43560)
= 0.07 cfs to Alley

Area A_2 = [(0.95)(3220) + (0.30)(1260)](7.08/43560)

Q_{100} = 0.56 cfs to Marquette

Total direct flow = 0.63 cfs

DETAINED RUNOFF

Allowable Q = 1.37 - 0.63 = 0.74 cfs

SITE AREA A_3 = 38845 - 4960 = 33,885 ♯

impervious	28285	0.95	26871
pervious	5600	0.30	1680
			28551

APPROX. POND REQ'D (assume 30 min. to peak)

(28551)(1.62)/12 = 3854 ft³ inflow
(0.65)(30)(60) = 1170 ft³ outflow
2684 ft³ volume

DETAINED RUNOFF (cont.)

POND PROV.

Elev.	Area, ft²	Volume, ft³
74º	14	
74⅝	1,940	488
75º	6,510	2112
75¼	7,020	676
		3276

POND CHARACTERISTICS

from elev. 74º to 74⅝

@ elev. 74º Area = 14 Volume = 0

@ elev. 74⅝ = 1940 Volume = 488

@ 74º ≤ Elev ≤ 74⅝ Area = 14 + 3852d

Volume = 14d + 1926 d²

depth, d = $\frac{-1 + (1 + 39.3061 \text{Vol})^{1/2}}{275.1429}$

from elev. 74⅝ to 75º

@ elev. 74⅝ Area = 1940 Volume = 0

@ elev. 75º = 6,510 2112

@ 74⅝ ≤ elev ≤ 75º = 1940 + 9140d

Volume = 1940 d + 4570 d²

depth, d = $\frac{-1 + (1 + 0.0049 \text{Vol})^{1/2}}{4.7113}$

from elev. 75º to 75¼

@ elev 75º Area = 6,510 Volume = 0

@ elev 75¼ = 7,020 = 676

@ 75º ≤ elev ≤ 75¼ = 6510 + 5100d

Volume = 6510 d + 2550 d²

depth, d = $\frac{-1 + (1 + 0.0002 \text{Vol.})^{1/2}}{0.7834}$

ADAM, HAMLYN, ANDERSON CONSULTING ENGINEERS, INC.	DRAINAGE REPORT 405 GRAND AVE	JOB NO. AC81577 DATE: 12/8/81 BY: AB	SHT. NO. B3 OF 4

DETAINED RUNOFF (cont.)

Outlet Orifice

approx head 75.1 - 72.1 = 3.0 ft

$Q = Ca\sqrt{2gh}$

$= 0.74$ cfs (from B1)

$0.74 = 0.6\, a \sqrt{64.4(3)}$

$a = 0.0887$ ⌀

Use 4" dia hole

$a = 0.0873$ ⌀ , head = 2.0 + depth - 0.17 + 0.50

Runoff to Pond

Vol. = 28551 (Rainfall/12)

= 2379 Rainfall

Time	Accum. Rainfall	Runoff to Pond	Orifice Head			Increm Outflow		Accum. Outflow	Pond Storage
min	in.	ft^3	ft.			cfs	ft^3	ft^3	ft^3
0				0.12	2.45	0.658	197		
5	0.59	1404	0.24					197	1,207
10	0.92	2188	0.36	0.30	2.63	0.682	205	402	1,786
15	1.17	2783	0.43	0.40	2.73	0.694	208	610	2,173
20	1.35	3211	0.47	0.46	2.78	0.701	210	820	2,391
25	1.50	3569	0.49	0.48	2.82	0.706	212	1032	2,537
30	1.62	3854	0.50	0.50	2.83	0.707	212	1244	2,610
35	1.69	4021	0.50	0.50	2.83	0.707	212	1456	2,565

ADAM, HAMLYN, ANDERSON CONSULTING ENGINEERS, INC.	DRAINAGE REPORT 405 GRAND AVE	JOB NO. AC81577 DATE: 12/8/81 BY: P/B	SHT. NO. 13d OF 4

PEAK SITE RUNOFF

Time	Min.	5	10	15	20	25	30	35
Direct Runoff	cfs	0.63	0.49	0.42	0.36	0.32	0.29	0.26
Detained Runoff	cfs	0.67	0.69	0.70	0.70	0.71	0.71	0.71
Total Runoff	cfs	1.30	1.18	1.12	1.06	1.03	1.00	0.97

EXISTING VS DEVELOPED CONDITIONS

Existing	Developed
Q_5 = 1.37 cfs	> 1.00 cfs
Q_{100} = 2.53 cfs	1.30 cfs

APPENDIX B

PRECIPITATION DATA

ALBUQUERQUE, SAN PEDRO BLVD WEST

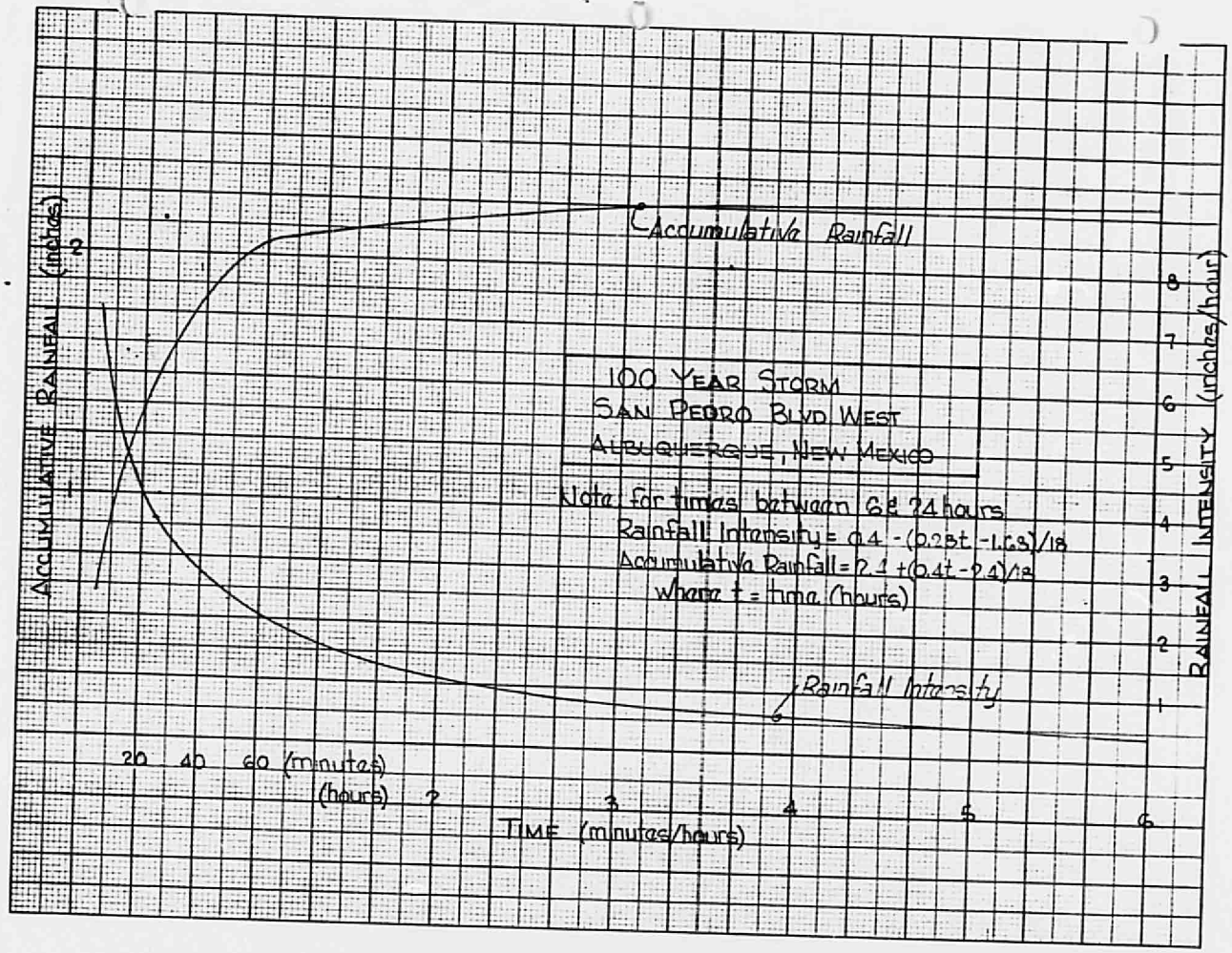
from NOAA Atlas 2, Volume IV, New Mexico

Recur. Inter.	Duration	min / hour	5	10	15	30	1	2	3	6	12	24
2 Year	Rainfall	inches	0.23	0.36	0.45	0.62	0.79	0.88	0.94	1.05	1.18	1.3
	Intensity	inches/hour	2.76	2.16	1.80	1.24	0.79	0.44	0.31	0.18	0.10	0.05
5 Year	Rainfall	inches	0.32	0.49	0.62	0.86	1.09	1.18	1.24	1.35	1.50	1.65
	Intensity	inches/hour	3.84	2.94	2.48	1.72	1.09	0.55	0.41	0.23	0.13	0.07
10 Year	Rainfall	inches	0.37	0.58	0.73	1.02	1.29	1.40	1.47	1.6	1.75	1.9
	Intensity	inches/hour	4.44	3.48	2.92	2.04	1.29	0.70	0.49	0.27	0.15	0.08
25 Year	Rainfall	inches	0.46	0.71	0.89	1.24	1.57	1.68	1.76	1.9	2.13	2.35
	Intensity	inches/hour	5.52	4.26	3.56	2.48	1.57	0.84	0.59	0.32	0.18	0.10
50 Year	Rainfall	inches	0.52	0.81	1.03	1.43	1.81	1.94	2.03	2.2	2.40	2.6
	Intensity	inches/hour	6.24	4.86	4.12	2.86	1.81	0.97	0.68	0.37	0.20	0.11
100 Year	Rainfall	inches	0.59	0.92	1.17	1.62	2.05	2.17	2.25	2.4	2.60	2.8
	Intensity	inches/hour	7.08	5.52	4.68	3.24	2.05	1.09	0.75	0.4	0.22	0.12

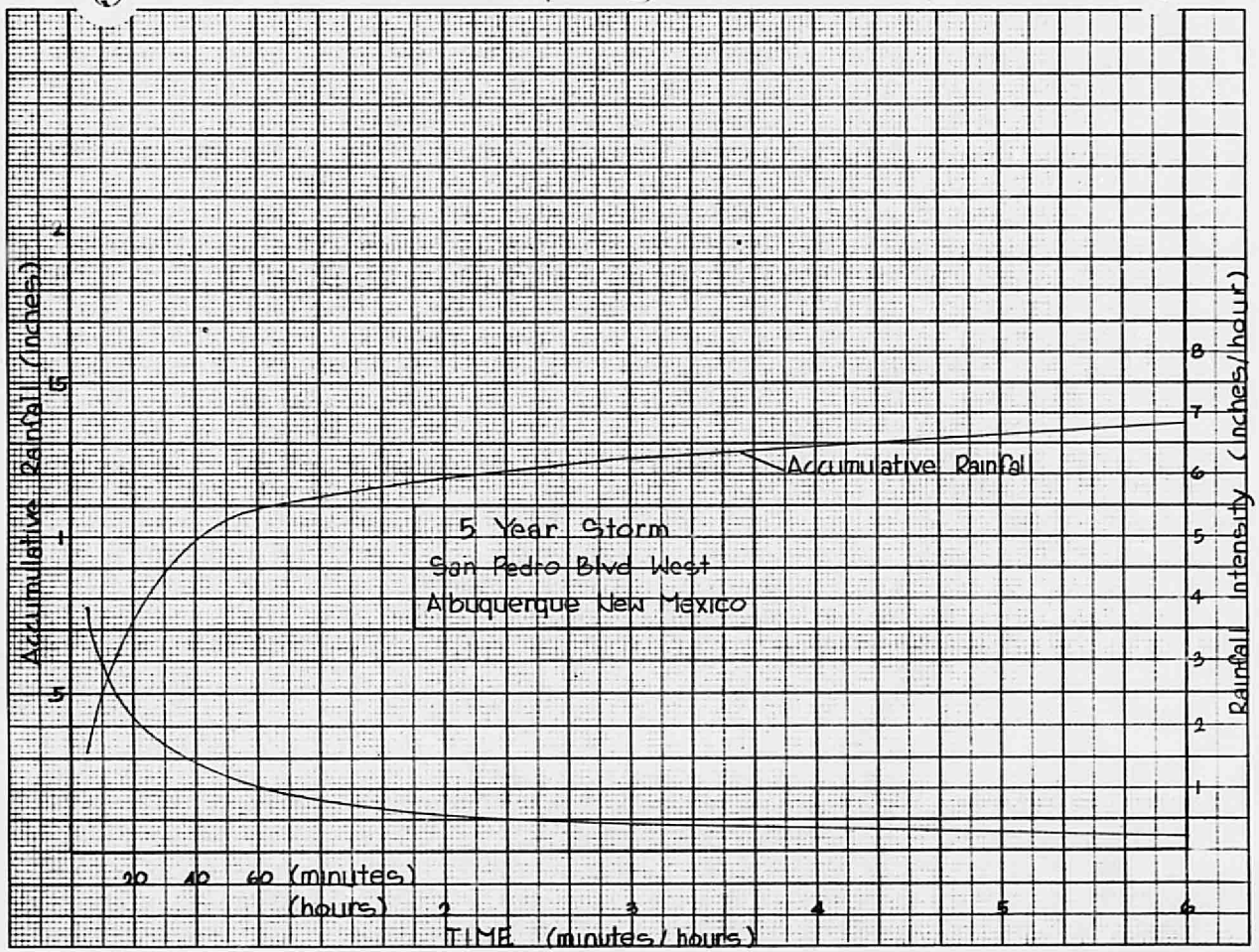
2 year 1 hour = $-0.011 + 0.942(1.05^2/1.3) = 0.79$ in.

100 year 1 hour = $0.494 + 0.755(2.4^2/2.8) = 2.05$ in.

3 hour = 0.569 (6 hour) + 0.431 (1 hour)
2 hour = 0.341 (6 hour) + 0.659 (1 hour)
30 min = 0.79 (1 hour)
15 min = 0.57 (1 hour)
10 min = 0.45 (1 hour)
5 min = 0.29 (1 hour)



KEUFFEL & ESSER CO. N. Y.



KEUFFEL & ESSER CO. N. Y.

AMBROSIO
GARDEN
ADD
SU-3
CENTRAL
AVE
SU-2
SU-3
SU-3
SU-3
SU-3
SU-3
SU-3
SU-3
SU-3
SU-3
SU-2
SU-2
SU-2

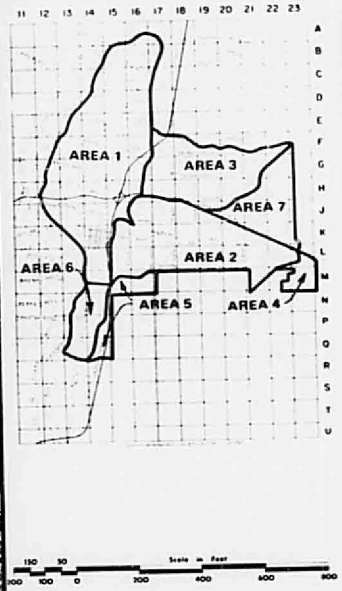

11 12 13 14 15 16 17 18 19 20 21 22 23
A B C D E F G H J K L M N P Q R S T U
AREA 1
AREA 3
AREA 7
AREA 2
AREA 6
AREA 5
AREA 4
Scale in Feet

PLATE II