HYDROLOGY M16/D14 4 PLANS

M16/D14

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4 Plans

CITY OF ALBUQUERQUE

ALBUQUERQUE, NEW MEXICO

INTER-OFFICE CORRESPONDENCE June 16, 1981 REF. NO. M 16-014

TO: C. M. Easterling, Principal Asst. C.E./Hydrology

FROM: Bruno Conegliano, Assistant Hydrology Engineer B. C.

SUBJECT: Airport Drainage Plan by Molzen/Corbin

The plan submitted by M&C is basically a palliative since only minor relief will be provided to the two car-rental organizations. The major consequence of the plan will be a backwater effect for the portion of the Airport property, south of the Post Office, where localized flooding may be experienced. Airport officials do not seem concerned with the problem and there is uncertainty regarding responsibilities if not jurisdiction. The airport does not seem to be served by facilities designed according to currently adopted (?) standards, but by make-shift engineered pipe sizes. If land to the north of the existing parking lot is to be leased to third parties , the City Engineer's must demand an upgrading of the existing facilities, following a well thought out Master Plan.

To the proposal of M&C I suggest that we interpose no objection but disclaim our confidence in the overall beneficial effect of the work.

BC/fs

I see a benefit in that the pavement being replaced will last a lot longer.

CME
6/17/81

MOLZEN-CORBIN & Associates
CONSULTING ENGINEERS

Craddock Commerce Center
2301 Yale Blvd. S.E.
P.O. Box 3632
Albuquerque, NM 87190

(505) 242-5700

June 3, 1981

LRF
M 16-D14

Mr. B. Conegliano
City of Albuquerque
Department of Municipal Development
Engineering Division
P. O. Box 1293
Albuquerque, New Mexico 87103

RECEIVED
JUN 03 1981
CITY ENGINEER

RE: Reconstruction of East Employees' Parking Lot
Albuquerque International Airport

Dear Mr. Conegliano:

This letter is written in response to your request for a brief outline of the drainage considerations involved in the referenced project to accompany the construction plans submitted for review.

Existing Conditions

The existing parking lot is slightly crowned and has a bituminous surface treatment. No runoff enters the lot from the adjacent lands. All the rain that falls on the lot except that which collects in potholes, runs off to the ditch between the parking lot and Access Road "A" as indicated on the enclosed print of the Airport's topographic map of the area. From there it runs northwesterly across the National Car Rental and Hertz Rent-A-Car parking lots down to Sunport Blvd. and north along the curb to an existing drop inlet on the Terminal Area storm sewer system.

National and Hertz have complained about the additional flow across their lots, and the Aviation Dept. has promised to do what they can to improve the situation.

Proposed Improvements

The parking lot will be reconstructed with asphaltic concrete pavement, chainlink fencing, lighting, and marking as required for a permanent installation. It is proposed to collect the rain that falls in the lot area by dishing the surface and installing drop inlets with a connection to the existing Terminal Area storm sewer system at the parking lot entrance.

Effects on Drainage Conditions

Before and after the construction, the East Employees' Parking Lot runoff will wind up in the same storm sewer at the manhole in the center of the lower level of the main parking lot. After the construction, the quantity will be increased slightly since there will no longer be any potholes, and the water will get there faster since it will be drawn into the storm sewer system immediately rather than after approximately 1,000 ft. overland flow as is now the case.

The proposed improvement may cause some existing drop inlets between the employees' parking lot and the manhole in the main parking lot, to function less efficiently during a very severe storm due to the increased competition for space in the storm sewer lines, but the Aviation Dept. says that this is not a major concern.

Please let me know if I can be of further assistance in this matter.

Sincerely,

MOLZEN-CORBIN & ASSOCIATES

Hans H. Coucheron-Aamot

Hans H. Coucheron-Aamot, P.E.

dep

CITY OF ALBUQUEQUERE, NEW MEXICO

CITY ENGINEER'S OFFICE

MEMORANDUM- 06-02-81
(DATE)

TO:
- [ ] Robert Fosnaugh, Traffic Engineer
- [ ] Water Resources Department - 2 Copies
- [x] Bruno Conegliano, Assistant City Engineer-Hydrology
- [ ] Bill Kearney, Assistant City Engineer-Field
- [ ] Bob Kielich, Assistant City Engineer-Design/Design Engineer
- [ ] Monte Urban, Chief Surveyor/ Grant Snyder
- [ ] George Paul, Street Maintenance Engineer
- [ ]
- [ ]

FROM: Q.R. Kielich, Assistant City Engineer-Design

SUBJECT: 1131-
Reconstruct East Employees Parking Lot
Albuq. International Airport

Attached drawing are for WATER, SANITARY SEWER, STORM SEWER, PAVING, STREET GRADES, DRAINAGE, AND _____, for subject proposed project.

Request review and comments on attached drawings. Typed comments will be submitted thru the (MASTER SCHEDULER) LINDA KASPER BY 06-10-81, ENGINEER SERGIO MIRANDA

QRK/tl
Attachments

1330

2340 Yale S.E.

PRELIMINARY

ENGINEER'S DRAINAGE REPORT

For

PROPOSED MOTEL & RESTAURANT

At

NE CORNER OF ALAMO AVE. & YALE BLVD. SE

WILSON & COMPANY

ENGINEERS & ARCHITECTS

1321 SAN PEDRO N.E.

ALBUQUERQUE, NEW MEXICO

REGISTERED PROFESSIONAL ENGINEER
STATE OF NEW MEXICO
ROBERT F. SYKES

MAY 1979

(79-507A)

WILSON & COMPANY ENGINEERS ARCHITECTS

PRELIMINARY

ENGINEER'S DRAINAGE REPORT

For

PROPOSED MOTEL & RESTAURANT

At

NE CORNER OF ALAMO AVE. & YALE BLVD. SE

LOCATION: The proposed motel and restaurant is located at the northeast corner of the intersection of Alamo Ave. and Yale Blvd. SE on the south 300 feet of Lots 1-A and 1-B, Block 2, Airport Industrial Park in the City of Albuquerque, New Mexico. The exact location is shown on the attached copy of Zone Atlas Map M-16.

DESIGN CRITERIA: The six hour, 100 year rainfall value of 2.6 is used for computing run-off volumes.

The Rational Formula is used to compute the rate of run-off. The Rational Formula is as follows:

$Q = CiA$

Q = Rate of run-off in cubic feet per second

C = Coefficient of run-off

i = Rainfall intensity

A = Drainage area in acres

The value for i for a 100 year rainfall is determined by the following formula as adopted by the 1954 Albuquerque Master Drainage Study.

$$i_{100} = \frac{189}{tc+25}$$

tc = time of concentration in minutes.

DISCUSSION: The location for the proposed improvements is discussed in the Albuquerque District, Corps of Engineers publication "Flood Plain Information, Albuquerque Arroyos, Albuquerque, New Mexico, Part V" dated April 1975.

Arroyo 10-C of the study crosses the southwest corner of the project. The 100 year flood crest elevation at the intersection of Yale Blvd. and Alamo Ave. is 5205.0 which is approximately 0.8 ft. above the top of curb at the west end of the northeast curb return.

Since the Corps of Engineers study was completed the property along the south side of Alamo Street has been improved by the construction of an office and warehouse complex. A drainage ditch has been constructed along the south side of the complex and a 60-inch storm sewer constructed to connect the ditch with the storm sewer in Alamo Ave.

The total drainage area at the intersection of Yale and Alamo is 215 acres with maximum 100 year rate of flow of 424 cfs.

The area south of the development along the south side of Alamo Ave. has been designated A-1 and is intercepted by the drainage ditch and 60-inch concrete storm sewer. The 100 year peak rate of run-off is 207 cfs. The slope of the 60-inch pipe from drainage easement to Alamo Ave. is approximately 2.7%. To develop a flow of 207 cfs it is necessary to have a depth of water of 6-feet at the entrance to the pipe and this is possible at the existing pipe entrance. The flow in the storm sewer will be supercritical. With an n value of 0.024 the depth of flow in the pipe would be about 3.6 feet with a velocity of 13-feet per second. With an n value of 0.015 the depth of flow in the pipe would be about 2.4-feet with a velocity of about 19-feet per second. Under existing conditions area A-1 does not have an effect on the project site.

The area that drains directly to Alamo Ave. has been designated A-2. The 100 year peak flow is 245 cfs. The capacity of Alamo Ave. flowing curb full is 198 cfs at a velocity of 10.7 fps.

There has been a storm sewer system constructed in Alamo Ave. From the Urban Storm Drainage Manual developed by the Denver Regional Council of Governments a Double C inlet on a 4% grade will intercept about 10 cfs. The two inlets immediately east of the intersection of Yale and Alamo have a combined capacity of 107 cfs. Thus the total maximum amount of flow intercepted is 167 cfs and approximately 78 cfs will flow by the intersection of Alamo and Yale and thence north on Yale. If a safety factor of one is assumed for the grate inlets the maximum amount of flow intercepted would be 229 cfs, but I do not believe this is a valid assumption. The flow by should not be serious since most of the flow in Yale south of Alamo is intercepted in a series of curb and cattle guard inlets.

The total run-off valume from the undeveloped site for a 6 hour, 100 year rainfall is 2,830 cu.ft. The total run-off volume with the proposed improvements for the same storm is 23,785 cu.ft. Thus it will be necessary to provide ponding capacity of about 20,955 cu.ft.

RECOMMENDATIONS: Since there is adequate storm sewer facilities in Alamo Avenue it is recommended the parking area be graded to retain the run-off and that the run-off then be discharged to the 60-inch storm sewer at the rate of 3 cubic feet per second. Based on a run-off factor of 0.85 and 100 year rainfall and a discharge rate of 3 cfs the required volume of storage is 11,000 cubic feet.

It is also recommended that the landscaped area along the sidewalk be bermed to an elevation about a foot above the top of curb.

Enclosures include:

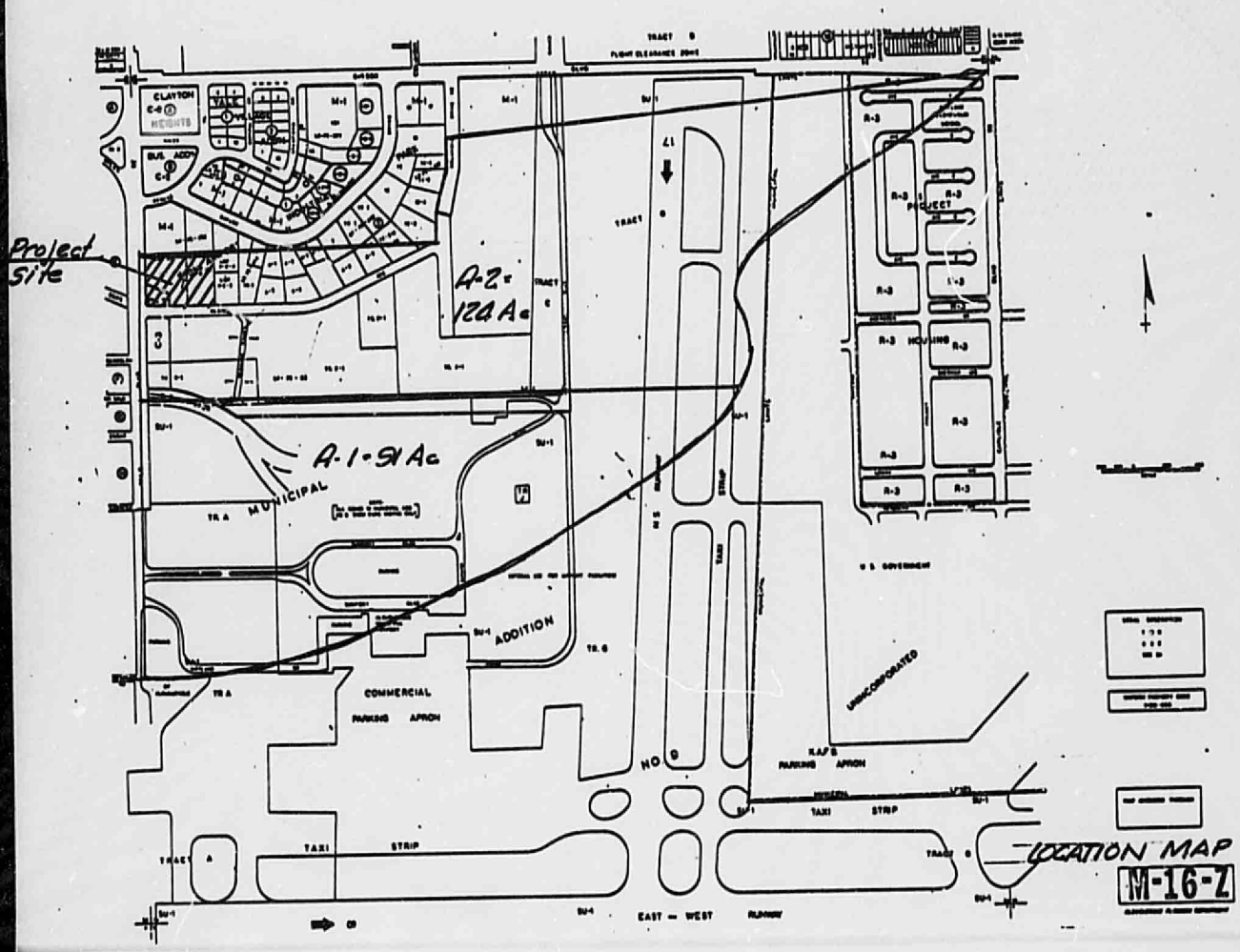
Location Map

Storm Sewer Map

4 Pages of Calculations

Preliminary Topography Map

*Preliminary Site Development Plan – not included having was given to the architect and final plan has been revised several times since


Project Site
A-2 = 124 Ac
A-1 = 91 Ac
MUNICIPAL
ADDITION
COMMERCIAL
PARKING APRON
TAXI STRIP
EAST — WEST RUNWAY
U.S. GOVERNMENT
UNINCORPORATED
R-3 HOUSING PROJECT
CLAYTON HEIGHTS
LOCATION MAP
M-16-Z

RFS

DATE 2 May 79

WILSON & COMPANY
ENGINEERS & ARCHITECTS
BOX 5305
ALBUQUERQUE
NEW MEXICO

LOC. Albuquerque FILE 79-507A
PROJ. Drain Report SHEET 1
SUBJ. OF 4

Total Flow @ Intersection Alamo & Yale SE (Incl. Storm Sew)

Area = 215 Ac $t_c = \frac{3900}{2 \times 60} = 32.5$ min

$i_{100} = \frac{189}{t_c + 25} = \frac{189}{57.5} = 3.29$ in/hr

C = 0.60

Q = CiA = (0.60)(3.29)(215) = 424 cfs

Max Flow in Street @ Alamo & Yale SE Area A-2

Area = 124 Ac $t_c = \frac{3900}{2 \times 60} = 32.5$ min

$i_{100} = \frac{189}{t_c + 25} = \frac{189}{57.5} = 3.29$ in/hr

C = 0.60

Q = CiA = (0.60)(3.29)(124) = 245 cfs

Total Flow From Lot Undeveloped

100yr 6hr rainfall = 2.6 in

C = 0.10 (fine sand)

Total Flow = $3 \times 43560 \times \frac{2.6}{12} \times 0.10$ = 2,830 cu ft

Total Flow From Lot Developed

Roof = .65 Ac = 28,310 ft²	C = $\frac{.65}{3.00}$	× .95 =	.21
Grass = .61 Ac = 26,572 ft²	C = $\frac{.61}{3.00}$	× .00 =	.00
Parking 1.74 Ac 75,794 ft²	C = $\frac{1.74}{3.00}$	× .95 =	.55
		Σ =	.84

Total Flow = $3 \times 43560 \times \frac{2.6}{12} \times .84$ = 23,783 cu ft

Max Flow Area A-1

Area = 91 Ac C = 0.60 $t_c = \frac{3000}{2 \times 60} = 25$ min

$i = \frac{189}{25 + 25} = \frac{189}{50} = 3.78$

Q_{100} = CiA = (0.60)(3.78)(91) = 207 cfs

LFS

DATE 3 May 79

WILSON & COMPANY
ENGINEERS & ARCHITECTS
BOX 3283
ALBUQUERQUE
NEW MEXICO

LOC Albuquerque FILE 79-502A
PROJ Drain Report SHEET 2
SUBJ. OF 4

Total Flow From Lot Developed with roof ponding

Gross = .61 Ac = 26,572 ft² C = .61 / 3.00 x .40 = .08
Roof = .65 Ac = 28,314 ft² C = .65 / 3.00 x 0 = .00
Parking = 1.74 Ac = 75,794 ft² C = 2.28 / 3.00 x .95 = .55
C = 0.63

Total Flow = 3 x 43560 x 2.6/12 x 0.63 = 12,838 cu ft.

Capacity Alamo St.
St Width = 44' F-F 6" Crown S = .0386 '/ft

Area Curb Full = (.17)(44) + (.5)(44)(.5) = 7.48 + 11 = 18.48 sq ft.

Wetted Perimeter = 44 + 1.33 = 45.33

R = 18.48 / 45.33 = 0.41 R^2/3 = .55

Vel. Velocity curb full = (1.486/.015)(.55)(.0386)^1/2 = 10.70 ft/sec

Q = Av = 18.48 x 10.70 = 198 cfs.

Capacity Dbl C Inlet in depression Curb Full

Curb Openning Q = CA√2gh
C = coef = 0.6
A = Area side opening,
h = vertical head from top of water to mid point side opening
g = 32.16

A = (0.5)(6.5) = 3.25 ft²

h = ((10.75 - 6)/12) + 3 = .6458 ft

Q = (0.6)(3.25)(2 x .6458 x 32.16)^1/2 = 12.57 cfs

RFS

DATE 3 May 79

WILSON & COMPANY
ENGINEERS & ARCHITECTS
BOX 3283
ALBUQUERQUE
NEW MEXICO

LOC. Albuquerque FILE 79-507A
PROJ. Drain Rept. SHEET 3
SUBJ. OF 4

Grate Opening $Q = \frac{CL(H)^{3/2}}{2}$

C = coef = 3
L = Gross Perimeter
H = vertical height top of grate to water surfac
2 = safety factor

$L = (2.125 + 7)(2) = 18.25$

$H = \frac{7.25 + 10.75}{2 \times 12} = 0.75$

$H^{2/3} = .83$

$Q = \frac{(3)(18.25)(.83)}{2} = 22.60$ cfs

$Q_{TOTAL} = 12.57 + 22.60 = 35.17$ cfs.

Capacity Quadruple C Inlet

Curb Opening $A = 13.5 \times .5 = 6.75$ ft²
$h = .6458$ ft

$Q = (.6)(A)(2gh)^{1/2} = (.6)(6.75)(2 \times .6458 \times 32.16)^{1/2} = 26.10$ cfs

Grate
$L = (2.125 + 10)(2) = 32.25$
$H^{2/3} = .83$
$Q = \frac{(3)(L)(H)^{3/2}}{2} = \frac{(3)(32.25)(.83)}{2} = 40.15$ cfs

$Q_{TOTAL} = 32.25 + 40.15 = 72.40$ cfs.

TOTAL INLET CAPACITY STREET FLOWING CURB FULL

$Q = (6)(10) + 35.17 + 72.40 = 167.57$ cfs

RFS

DATE 3 May 79

WILSON & COMPANY
ENGINEERS & ARCHITECTS
BOX 3283
ALBUQUERQUE
NEW MEXICO

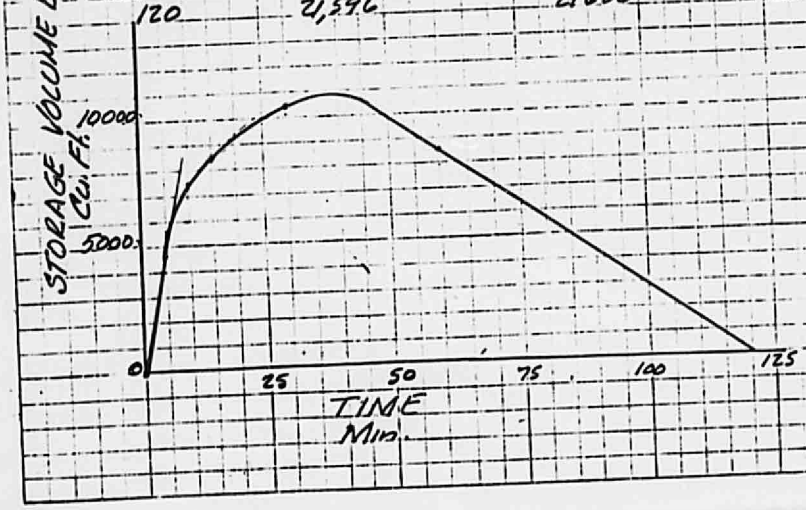
LOC. Albuquerque FILE 79-507A
PROJ. Drain Rept SHEET 4
SUBJ. OF 4

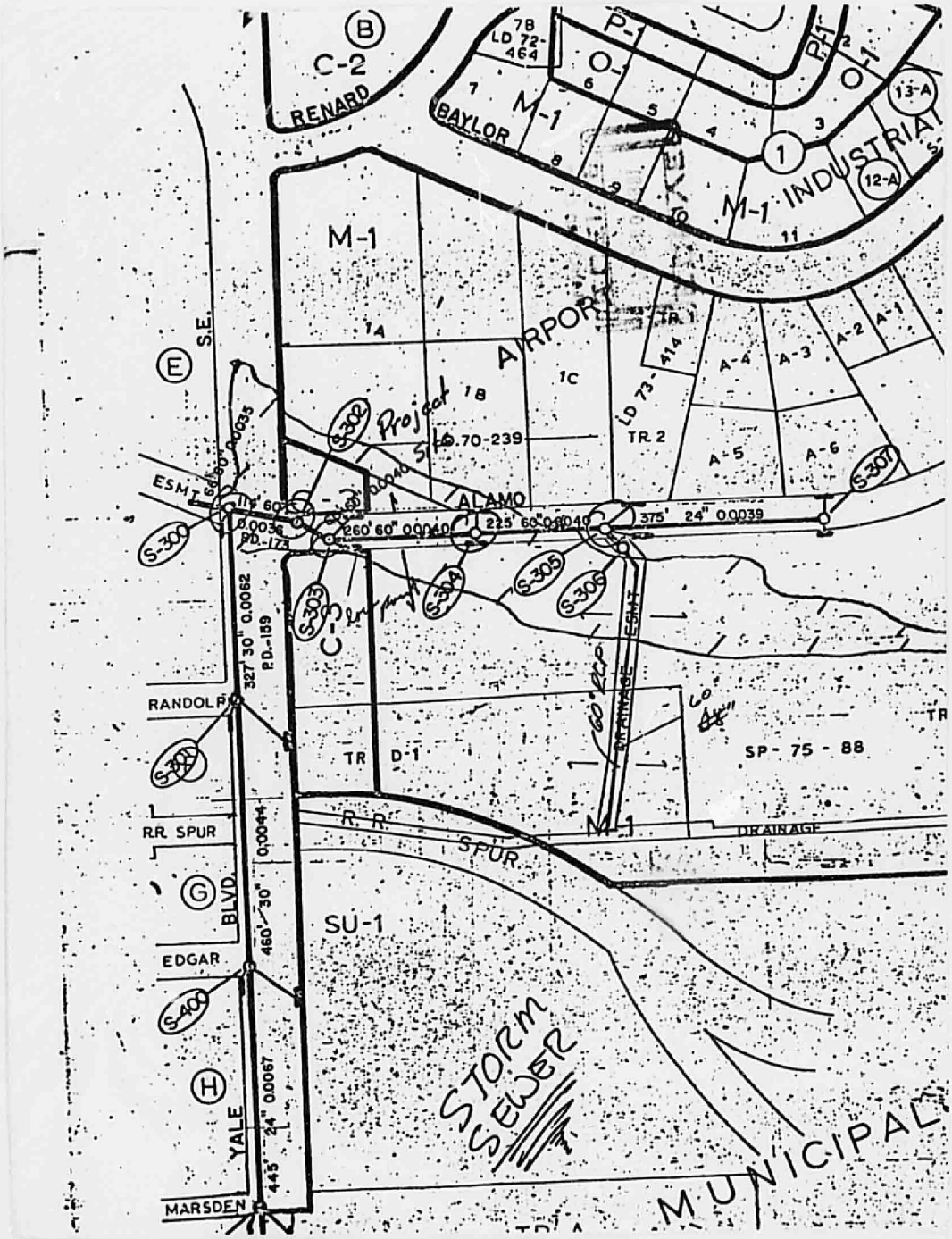
100 Year Rainfall

Time	Inches Rainfall
5 min	0.6
10 min	1.0
15 min	1.2
30 min	1.7
1 hr	2.1
2 hr	2.3
3 hr	2.4
6 hr	2.6
24 hr	3.2

Based on C=0.85 and an area of 130,680 sq ft and a discharge rate of 3 cfs

Time min	Volume Inflow Cu. ft	Volume Outflow cu ft	Volume Storage Cu. ft
5	5554	900	4654
10	9257	1800	7457
15	11,108	2700	8408
30	15,736	5400	10336
60	19,439	10800	8639
120	21,596	21600	0




C-2
RENARD
BAYLOR
M-1
M-1 INDUSTRIAL
AIRPORT
ALAMO
RANDOLPH
R.R. SPUR
EDGAR
YALE BLVD.
MARSDEN
SU-1
STORM SEWER
MUNICIPAL
S-300
S-301
S-302
S-303
S-304
S-305
S-306
S-400
Project Site
Culvert
SP-75-88
TR D-1
DRAINAGE
ESMT
S.E.

7 of 6
3 of 6

WILSON & COMPANY
ENGINEERS & ARCHITECTS
BOX 2508
ALBUQUERQUE
NEW MEXICO

COMP. RFS
CK.
DATE 1 Nov 79

LOC. Alb. FILE
PROJ. Mtol & Valle Alamo
SUBJ. Area A-3 OF

Area A_3

Elev	Area	Vol
06.0	0	
		88
06.5	530	
		502
07.0	1570	
		Σ- 590

Area A_3 = 4608 ft²
100 year 6 hr rainfall = 2.6 in
Area = Grass Assume C = 0.60
Vol Storage = $4608 \times \frac{2.6}{12} \times .60 = 599$

REGISTERED PROFESSIONAL ENGINEER
STATE OF NEW MEXICO
ROBERT F. SYKES

COMP. RFS

CK.

DATE 1 Nov 77

WILSON
COMPANY
ENGINEERS &
ARCHITECTS
BOX 3388
ALBUQUERQUE
NEW MEXICO

LOC. Alb FILE

PROJ. Motel @ Yale & Alamo

SUBJ. Area A-4 OF

Area A4

Elev	Area ft²	Vol (ft³)
09.0	2206	
		2596
09.5	8929	

Vol Reqd A-4 Area 8929 ft²

6 hr 100yr rainfall = 2.6 in

C = .80

Vol = $8929 \times \frac{2.6}{12} \times .80 = 1547$

REGISTERED PROFESSIONAL ENGINEER
STATE OF NEW MEXICO
ROBERT F. SYKES

WILSON & COMPANY
ENGINEERS
ARCHITECTS

505 255-4350

Office Location... 1921 SAN PEDRO N.E. • ALBUQUERQUE, NEW MEXICO 87110

ENGINEERS
ARCHITECTS
PLANNERS

An Equal Opportunity Employer

Mailing Address... P.O. BOX 3305 • ALBUQUERQUE, NEW MEXICO 87190

October 17, 1979

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

Re: Final Grading Plan
Motel at NE Corner Yale & Alamo St. SE

Dear Mr. Conegliano:

Enclosed is a print of the final grading plan for the motel at the northeast corner of Yale and Alamo.

Also enclosed is a print of the connection showing details of the connection to the storm sewer in Alamo. We have controlled the flow with a "V" notched weir. The flow is restricted to about 3.8 cfs.

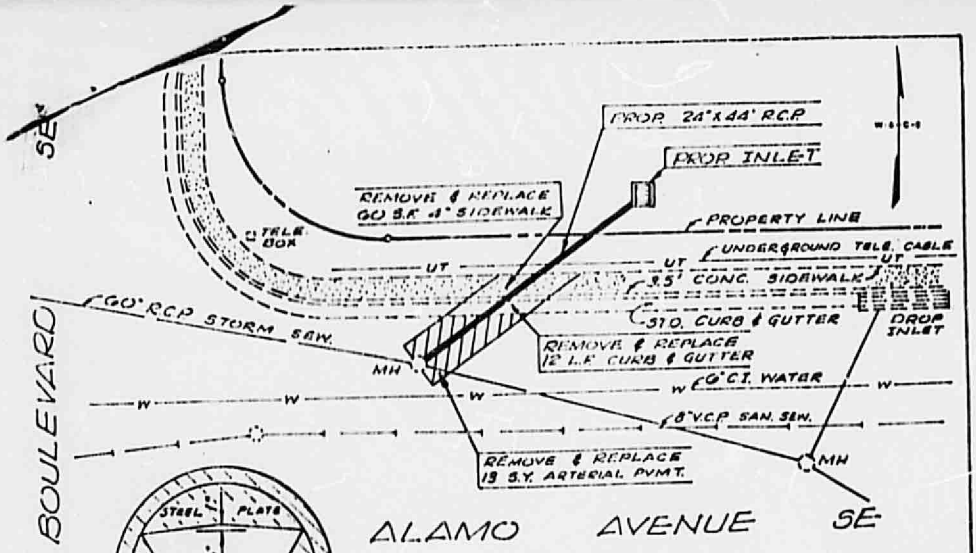
Please give me a call if you have any questions.

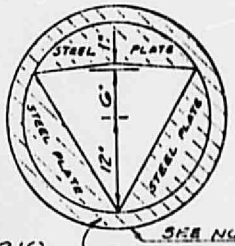
Very truly yours,
WILSON & COMPANY

Robert F. Sykes, P.E.

Enclosures

sp



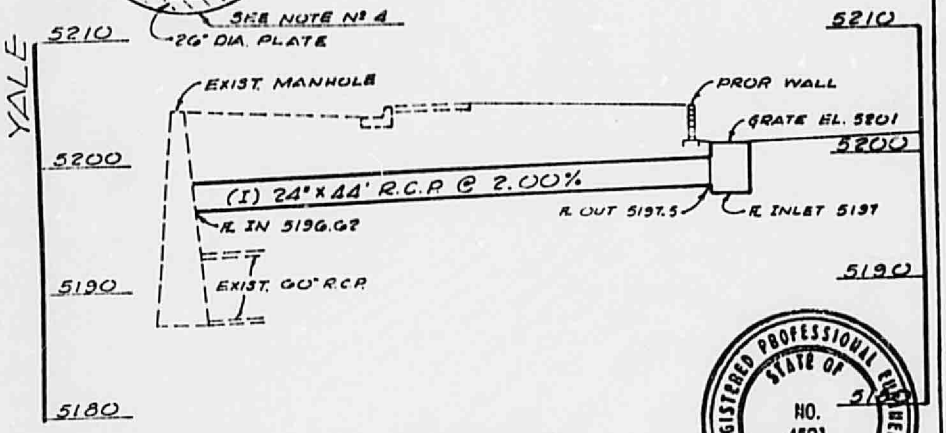


SEE NOTE Nº 4

26" DIA. PLATE

PLAN

SCALE ~ 1" = 20'



PROFILE

SCALE ~ 1" = 10' HORIZ. & VERT.

REGISTERED PROFESSIONAL ENGINEER STATE OF NEW MEXICO NO. 4591 ROBERT F. SYKES

NOTES

1. Contractor to obtain excavation permit from City prior to work in public Right-of-Way.
2. All work to be in accordance to with City Contract for City-Wide Utilities and Cash Paving Nº 28.
3. Location of buried telephone is approximate. Contractor should contact Telephone Company for exact location 765-1234.
4. Contractor will install wier cut to the dimension shown in the bell of the storm sewer at the proposed inlet. Wier to be cut from 1/8" min. steel plate.

WILSON & COMPANY
ENGINEERS ARCHITECTS
ALBUQUERQUE NEW MEXICO

CITY OF ALBUQUERQUE

APPROVALS	ENGINEER	DATE	TITLE: MOTEL @ YALE & ALAMO SE STORM SEWER CONNECTION	
A.C.E. DESIGN				
WATER RESOURCES			PROJECT NO.:	MAP NO.: M-16-Z
CITY ENGINEER				

79-507 A

RFS

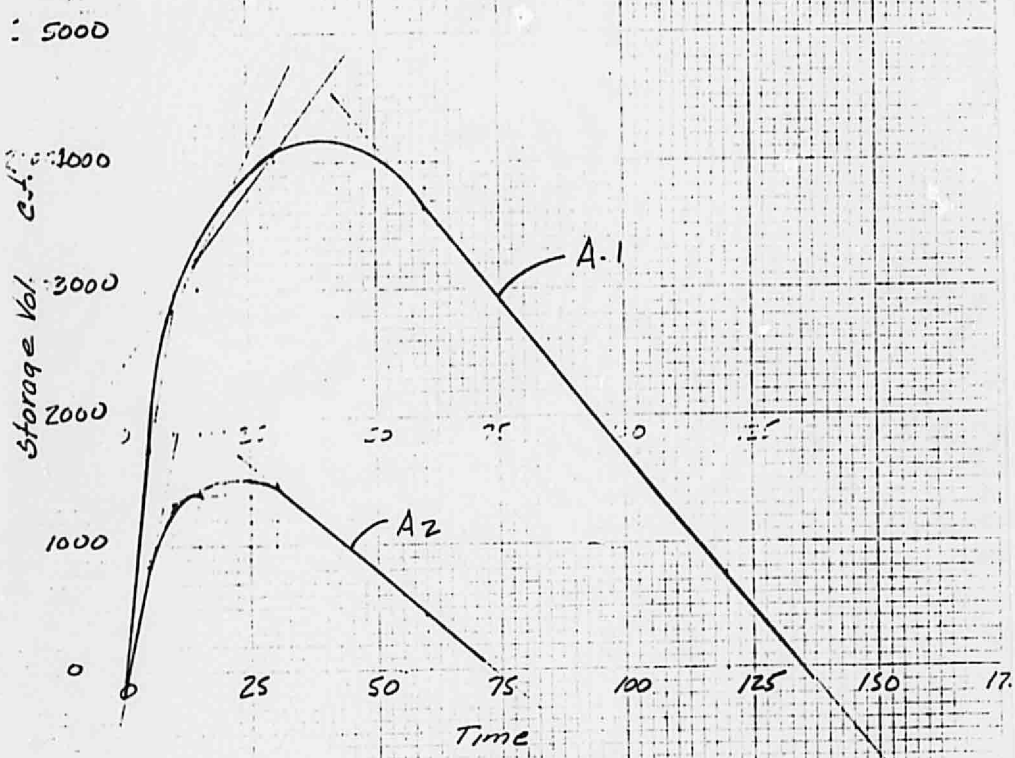
WILSON & COMPANY ENGINEERS & ARCHITECTS

DATE 16 Oct 79

LOC A/b FILE 79-507

SUBJ Motel Abiquiu Vale SHEET 3

SUBJ Storage Curve OF 3



TIME - STORAGE CURVE

Discharge Rate = 1 cfs

Telephone Company for exact location 765-1234.

m-cm

WILSON & COMPANY
ENGINEERS & ARCHITECTS
BOX 3283
ALBUQUERQUE
NEW MEXICO

CK
DATE

LOC Alb. FILE 79-507
PROJ Motel Abnio Vale SHEET 2
SUBJ Final Drain. Plan OF 3

Area A-2
Area = 24,200 ft²

Storage Volume

Elev	Area	Vol	Σ Vol
08.5	0		
		41	41
09	243		
		1138	1179
10	2406		
		4072	5251
11	6008		

C = 0.95 Outflow = 1 cfs

Time	Vol Inflow	Discharge	Storage
5min	1150	300	850
10min	1916	600	1316
15min	2299	900	1399
30min	3257	1800	1457
60min	4023	3600	423
120min	4406	7200	—

Roof:
Area = 21,970 ft²
C = 1.00
9 roof drains @ 0.2 cfs = 1.8 cfs.

Time	Vol Inflow	Discharge	Storage
5	1099	540	559
10	1831	1080	751
15	2197	1620	577
30	3112	3240	0

WILSON & COMPANY
ENGINEERS & ARCHITECTS
505 3308
ALBUQUERQUE NEW MEXICO

BY RFS
CK
DATE 16 Oct 79

LOC Alb. FILE 79-507
PROJ Motel Akmal & Vib SHEET 1
SUBJ Final Drainage Plan OF 3

100 yr rainfall

Time	Inches rainfall
5min	0.6
10min	1.0
15min	1.2
30min	1.7
1 hr	2.1
2 hr	2.3
3 hr	2.4
6 hr	2.6
24 hr	3.2

Area A-1

Area = 43,600 ft²

Storage Volume
Area @ Elev

Elev	Area	Vol	Σ Vol
01	0		
		152	15.2
02	456		
		1348	1500
03	2516		
		5179	6679
04	8418		

Discharge @ 1 cfs C = 0.95

Time	Vol Inflow cfs	Discharge cfs	Storage Reqd cfs.
5	2071	300	1771
10	3452	1600	2852
15	4102	900	3202
30	5868	1800	4068
60	7249	3600	3649
120	7939	7200	739
180	8284	10800	0

N
ANY
EERS
ITECTS

505 255-4100

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PLANNERS

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Mailing Address... P.O. BOX 3205 • ALBUQUERQUE, NEW MEXICO 87190

October 17, 1979

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

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Very truly yours,
WILSON & COMPANY

Robert F. Sykes, P.E.

Enclosures

sp

[redacted] [redacted]

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

May 18, 1979

Mr. Robert F. Sykes
Wilson & Company
1321 San Pedro N.E.
Albuquerque, New Mexico 87110

Re: Preliminary Drainage Report - Motel and Restaurant at Northeast Corner Yale & Alamo S.E.

Dear Mr. Sykes:

The preliminary report for the referenced project is approved. The site grading plan for this property will have to be submitted, as discussed, paying particular attention to the preservation of the integrity of the properties to the east and to the north.

The drainage areas served by the different ponds must be delineated and it must be shown that the balance exists between the drainage areas and individual ponding volumes. It is also requested that the overflow (the natural discharge in excess of the ponding capacity) be released from the property through curb cuts without overflow of the sidewalks.

The recommendation is also made that the ponds be connected through a small diameter pipe (2"-4" dia.) to allow the ponds to be drained into the storm sewer in Alamo St.

If additional information is needed, please do not hesitate to call my office.

Very truly yours,

Bruno Conegliano
Assistant City Engineer-Hydrology

BC/fs

cc - Dick Heller, City Engineer
Rich Leonard, AMAFCA
Drainage File

1901