HYDROLOGY H 16 / D4 2 PLANS

H16/D4

2 PLANS

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

MAYOR
Harry E. Kinney

CHIEF
ADMINISTRATIVE OFFICER
Frank A. Kleinhenz

RECEIVED
SEP 30 1984
HYDROLOGY
ENGINEERING

October 3, 1984

Mr. Jey Gunasegaram, M.D., P.A., F.R.C.S.
8016 Constitution Place, N. E.
Albuquerque, New Mexico 87110

Dear Mr. Gunasegaram:

Your letter of September 26, 1984 concerning drainage at 3032 McCoy Place, N. E. has been received in this office. I should point out that this Division has no authority over the drainage patterns of the City. Drainage problems involving one and two family dwellings is considered a civil matter and should be resolved by the parties involved.

I contacted Fred Aguirre of the Engineering Division and he produced a plan of the area in question showing the grading, ponding areas, etc. This plan is in file No. H16-D4 of the Engineering Division (Drainage) Office and is available for your review, if you desire. This office is located on the second floor of 123 Central N.W.

A City building inspector was sent to the site and noted that dirt has been deposited against the wall at the rear of 3032 MCoy Place in excess of the allowable depth for non-retaining walls. This wall needs to be strengthened to qualify as a retaining wall. The builder has been notified of the problem.

Sincerely,

Charles W. Volz, AIA
Chief Building Official
Code Administration Division

CWV/cc

FILE W/ REP

UROLOGY AND
GENITO-URINARY SURGERY

DIPLOMATE
AMERICAN BOARD OF UROLOGY

JEY GUNASEGARAM, M.D., P.A.
F.R.C.S. (ENG.) & (EDIN.)
8016 CONSTITUTION PLACE, N.E.
ALBUQUERQUE, NEW MEXICO 87110

TELEPHONE (505) 293-4172

September 26, 1984

Charles Volz and Clifford Gilbert
P.O. Box 1293
Albuquerque, New Mexico 87103

RE: 3032 McCoy Pl. N.E., That Place On Dartmouth Subdivision.

Dear Sirs:

I reside on 3036 McCoy Place N.E.. The drainage plans for residences at Dartmouth N.E. and McCoy Place N.E. were done by Dartmouth Development Joint Venture and Contractors, Inc., and were accepted by the city. The drainage from the property in this area was meant to drain through a large underground drain located in front of 3036 McCoy Place and running under the easement at 3036 McCoy Place N.E., which is my residence. The Casa Alegre Construction Company is building a town-house at 3032 McCoy Place NE, That Place On Dartmouth subdivision. They have raised the elevation of 3032 McCoy Place by putting a further amount of dirt around the town-house.

I'm concerned about the drainage from this property, as I feel the water will now drain not on to the front of the property and into the main large underground drain, but westward and northward onto my property and back wall of my property. I would appreciate it if you would look into this matter and let me know the outcome.

Sincerely yours,

Jey Gunasegaram, M.D., P.A., F.R.C.S.

JG/gnh

cc: Clifford Gilbert

July 29, 1980

Mr. Bruno Conegliano
Municipal Development Dept.
City of Albuquerque
Post Office Box 1293
Albuquerque, New Mexico 87103

RE: That Place on Dartmouth

Dear Mr. Conegliano:

At the request of Jack Detweiller, agent for That Place on Dartmouth Subdivision, CCIC has re-investigated the storm drainage characteristics for the site. The original drainage study was undertaken by another consulting engineering firm, and since the grading plan (see Exhibit I) has been revised, all storm runoff calculations have been updated (see attachments).

In addition, a storm drain system has been preliminarily designed to replace the turfstone drainage channel at the subdivision's northeastern corner. The design shall be submitted to the City under the standard AHBA procedures. The deletion of the drainage channel shall in no way effect existing right-of-ways or easements.

The intent of this additional work is to revise grading and drainage so that a majority of lots can satisfy FHA standards. Since the engineering improvements are already built (except drainage channel mentioned earlier), and the grading and certification of pads is completed, only that portion of the lot surrounding the pad may be reworked (if possible) to allow storm water flows to exit onto public right-of-way or drainage easements. On lots that are situated and

Chambers, Campbell, Isaacson, Chaplin, Inc.
architects engineers planners 3500 indian school road ne albuquerque new mexico 87106 505-266-5521

built such that flows cannot be directed toward the streets, they must pond all waters on site. Where sufficient area exists, these ponds shall have 15 feet of separation between edge of the building's foundation and the surface edge of pond.

The New Mexico State Highway Department has consented to accepting all storm water runoff generated from this site. Flows are then routed overland to a storm drain system that then empties into the AMAFCA channel. This is the same concept that was previously approved for this site and should remain applicable since the increase flows do not rate that much of an increase.

Hopefully, you will find all is in order and be able to approve this amendment. If you have any questions, please contact CCIC for any assistance that we may be able to offer.

Very truly yours,

Fred C. Arfman

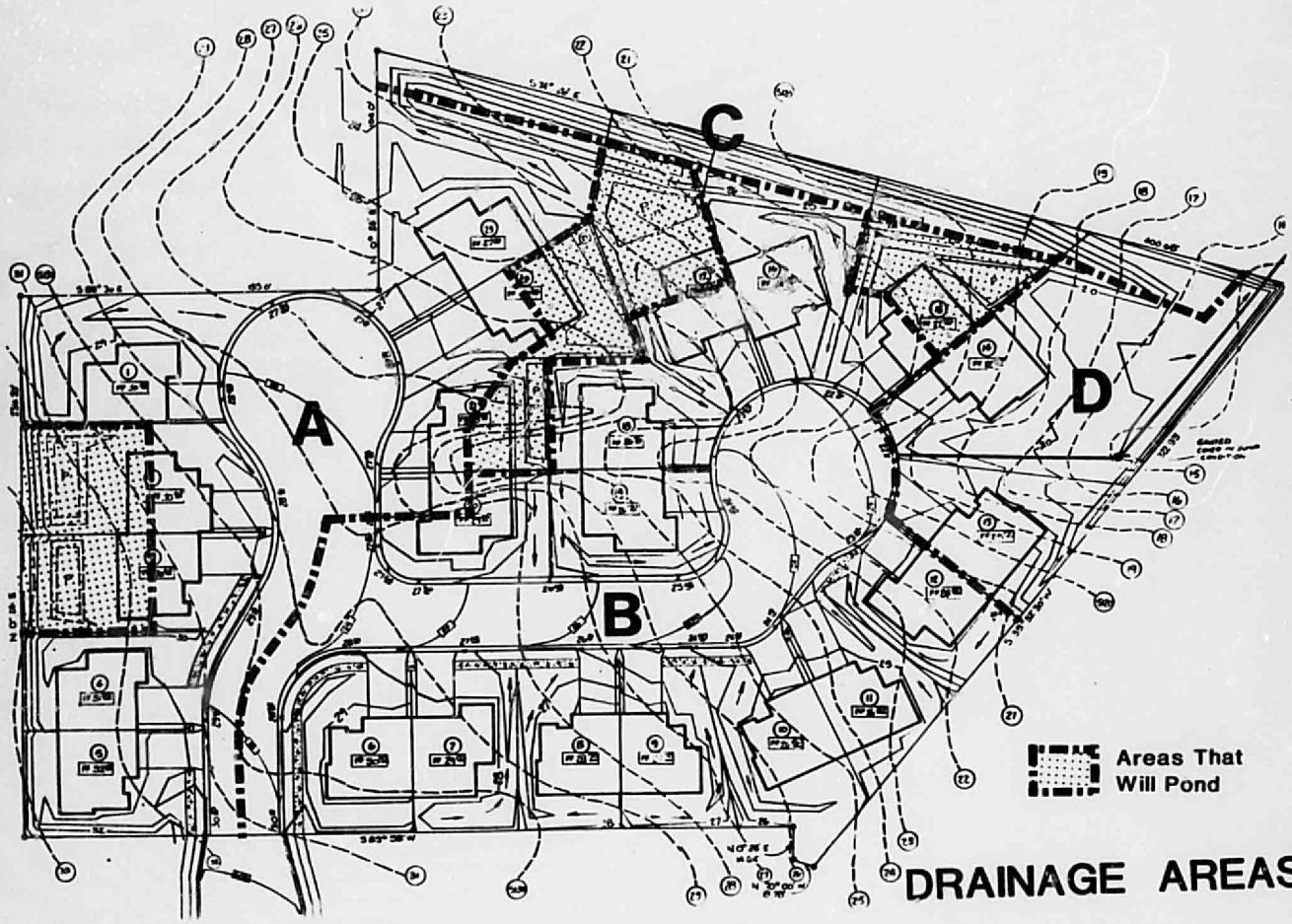
Fred C. Arfman, P.E.
Associate Vice President

FCA:df

Attachments

SEAL

FRED C. ARFMAN
NEW MEXICO
7322
REGISTERED PROFESSIONAL ENGINEER



DRAINAGE AREAS

Drainage Area Designation = A

	Area (Ac)	C	Q (cfs)	Vol. (ft³)
drives	.077	.92	.368	643
walks	.014	.92	.067	117
streets	.207	.92	.990	1728
roofs	.176	.87	.796	1390
open	.205	.40	.426	744
Totals	.679		2.647	4622

T_c = 11.35 min.

I = 5.2 in./Hr.

100 yr. - 6 Hr. storm = 2.5 in.

Q = CIA

V = APC

CCIC
ALBUQUERQUE, NEW MEXICO

SUBJECT That place Subd. JOB NO.
BY DATE SHEET NO. OF

Drainage Area Designation = B

	Area (Ac)	C	Q (cfs)	Vol. (ft³)
drives	.150	.92	.718	1252
walks	.027	.92	.129	225
streets	.550	.92	2.631	4592
roofs	.333	.87	1.506	2629
open	.485	.40	1.009	1761
Totals	1.567		5.993	10,459

T_c = 11.35 min.

I = 5.2 in./Hr.

100 yr. - 6 Hr. storm = 2.5 in.

Q = CIA

V = APC

CCIC
ALBUQUERQUE, NEW MEXICO

SUBJECT THAT PLACE SUBD. JOB NO.
BY DATE SHEET NO. OF

Drainage Area Designation = C

	Area (Ac.)	C	Q (cfs)	Vol. (ft.³)
drives				
walks				
streets				
roofs				
open	.142	.40	.295	515
Totals	.142		.295	515

T_c = 11.35 min.

I = 5.2 in./hr.

100 yr. - 6 hr. storm = 2.5 in.

Q = CIA

V = APC

CCIC
ALBUQUERQUE, NEW MEXICO

SUBJECT THAT PLACE Subd. JOB NO.
BY DATE SHEET NO. OF

Drainage Area Designation = D

	Area (Ac)	C	Q (cfs)	Vol. (ft³)
drives	.036	.92	.172	301
walks	.018	.92	.086	150
streets	0	0	0	0
roofs	.078	.87	.353	616
open	.238	.40	.495	864
Totals	.316		1.106	1931

T_c = 11.35 Min.

I = 5.2 in./Hr.

100 yr. - 6 Hr. storm = 2.5 in.

Q = CIA

V = APC

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ALBUQUERQUE, NEW MEXICO

SUBJECT THAT PLACE Subd. JOB NO.___
BY_____ DATE_____ SHEET NO.___ OF___

Inlet sizing

Inlet will be located in a 4" sump and will be of single inlet design.

Q = 6 cfs
Combination inlet in 4" sump
curb open length = 8'
curb open height = 6"
Grate clear opening = 8 sq. ft.

1. Allowable ponding depth over grate = 4"(sump) + 4"(curb)
   = 8"

2. Grate capacity = 8 ft² x 3.8 (from attached fig.)
   = 11.4 cfs

3. curb opening capacity = 8'-0" x 0.75 cfs/ft. = 2.25 cfs

4. Total theoretical capacity of inlet = 11.4 + 2.25
   = 13.65 cfs

5. Reduction = 13.65 x 0.65 = 8.87 cfs

6. 8.87 > 6 cfs → o.k.

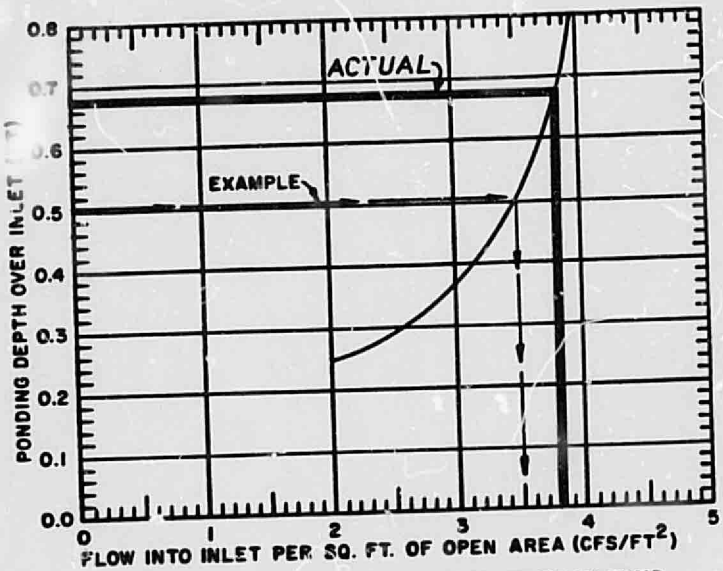


FIGURE 4-1. CAPACITY OF GRATED INLET IN SUMP

culvert sizing

using the attached culvert capacity nomograph and assuming $D_c = 18''$:

$D_c = 18''$

headwater H.W. = 18" + 15" + 7 1/8" = 40.25" = 3.35'

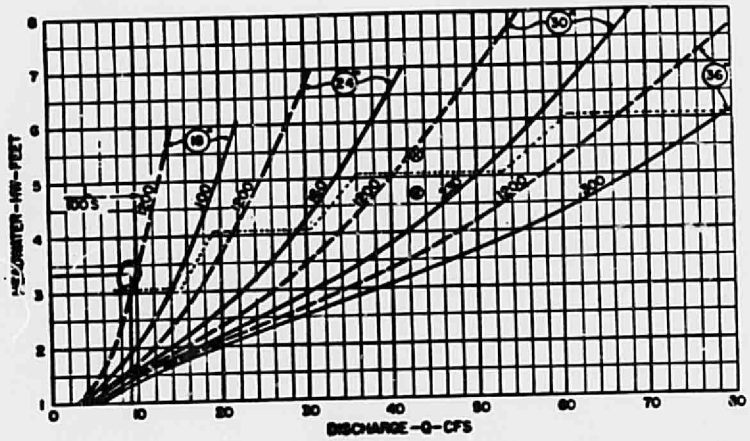
$Q = 3.67$

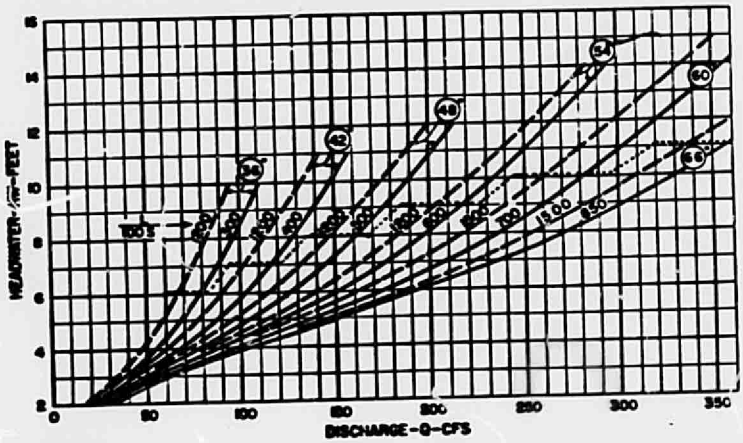
from nomograph $D_f < D_c$ → o.k.

$D_c = 18''$

CCIC
ALBUQUERQUE, NEW MEXICO

SUBJECT _____ JOB NO. ____
BY _____ DATE _____ SHEET NO. ____ OF ____





From BPR
EXAMPLE

- GIVEN:
  43 CFS ; ΔHW = 5.4 FT.
  L = 150 FT.; S_o = 0.002
- SELECT 30"
  HW = 4.7 FT.

CCIC
ALBUQUERQUE, NEW MEXICO

CULVERT CAPACITY
CIRCULAR CONCRETE PIPE
GROOVE-EDGED ENTRANCE
18" TO 66" O

SUBJECT _____ JOB NO. ____
BY _____ DATE _____ SHEET NO. ____ OF ____

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DRAINAGE REPORT

THAT PLACE ON EARTHWORTH

(A planned Residential Development)

PREPARED BY

ENCHANTMENT ENGINEERING
1517 Eubank Blvd., NE
Albuquerque, New Mexico 87111

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Offsite Drainage Patterns	Plate 3
Rundown Details	Plate 4

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PURPOSE

The purpose of this report is to present to governing agencies a reasonable and feasible method of complying with City Ordinance 59-1976 thereby lessening runoff from the development to an amount that approximates the flow expected from the property in its present state during a 100 year frequency storm. This report consists of a narrative of both existing and proposed conditions together with the necessary computations for determining and recommending runoff control structures.

LOCATION

The proposed development is located in the Northeast quadrant of the City and is bounded on the north by Interstate 40, on the east by Block 11 of the MIRACERROS ADDITION (Plat filed on August 3, 1950), on the west by Block 20 of NETHERWOOD PARK ADDITION (Plat filed October 22, 1951) and on the south by Blocks 1 and 2 as they appear on the same NETHERWOOD PARK plat.

See Plate 1

TERRAIN

In its present state, the development site shows some signs of previous earthwork. The most obvious feature is a cut that is twenty to thirty feet in width that runs from east to west across the center of the site. Slopes existing vary from two and one-half per cent near the southwest corner

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to a little over six per cent through the cut.

The soil is pretty much the same as that found in most areas of the Northeast Heights and consists primarily of alluvial sand with small amounts of clay. Vegetation currently covering the site consists of common weeds and may best be described as sparse. With the slope, soil and vegetation all considered, infiltration may be assumed to be less than one half inch per hour and natural on-site retention is negligible.

See Plate 2

PROPOSED DEVELOPMENT

The general site drainage plan included in this report shows the proposed layout of all buildings, walks, streets, walls stormwater ponding areas and channels. Along the north side of the site and adjacent to the freeway is a thirty foot wide noise and sewer easement upon which a five foot high berm is to be built. Curbs, driveways and walks are to be concrete, streets will be asphalt and all buildings will be of frame and stucco construction with composition roofs. All landscaping and stormwater ponding areas shall have natural surfaces.

UPLAND DRAINAGE

Dartmouth Drive which enters the site from the south is the only source of upland drainage. The tributary area is shown on Plate 3 and drains approximately .37 of an acre of which .209 acre is paved with asphalt or concrete and .161 acre is landscaped.

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A drop inlet at the west-north-west curb return of the intersection of Cutler Avenue and Dartmouth Drive catches west to east flows along the north curb of Cutler Avenue. The location and elevation of this D. I. is shown on Plate 3 along with selected elevations on Dartmouth Drive north of the intersection that are pertinent to this study. The total amount of expected upland flow that can be expected to enter the site from Dartmouth Drive during the 100 year frequency storm is 2330 ft^2. The rate of this flow is 1.386 cfs. As the plan shows, this upland flow is divided evenly and conveyed through the site via the western curb and gutter on the new portion of Dartmouth Drive and via the southern curb and gutter on McCoy Place. Discharges will be through each of the provided drain easements onto the Interstate 40 right-of-way.

INTERNAL DRAINAGE

With the exception of streets and some areas immediately adjacent to them which drain directly into the surface easements, internal drainage is controlled on a single lot basis with retention ponds provided on each lot. (See Plate 2 for precise delineation of direct drainage areas) Where the individual lot grades permit, discharge from the ponds has been provided through the drives into the gutters. This method is used on Lots 1 thru 12, 17, 18 and 21. Lots 13, 14, and 23 discharge directly into the surface easements upon reaching designed capacities. Flows on Lots 19 and 20 are routed into rear ponds, then are discharged directly onto

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McCoy Place. One hundred per cent retention of generated on-site flows is provided on Lots 15, 16 and 22 only. Each of the three above mentioned lots has ample rear yard space to dispose of all stored volumes by infiltration. For the purposes of the individual volume calculations per lot some standards had to be established. All roof areas were assumed to be 1200 ft^2. This figure not only closely approximates the average size of the planned units, but it allows a margin for lot design and leaves buyer options open. Typical coefficients of runoff used in the calcs were .87 for flat roofs, .92 for walks and streets, and .40 for open or landscaped areas. (See Table 1)

Pond side slopes in no instance exceed one foot in three and the maximum depth for any pond shown never exceeds 1.5 feet (only on Lot 15) with the typical designed depth being 1 foot for most of the lots. Specific elevations are given on Plate 2.

An atypical but necessary design feature has been employed on the surface drainage and sewer easement exiting from the cul-de-sac on McCoy Place. Because there is an existing sanitary sewer line in the easement for which access must be provided, the project designers have proposed lining this easement to a width of 10 feet with paving block in lieu of the standard rundown design (Section F-1). The block would then be plugged with turf. Not only would access be provided, but some on-site infiltration would occur. (See Plate 2 for Location and Plate 4 for section and detail)

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The surface drainage easement exiting Dartmouth Drive to the north will have a typical City standard paved rundown eight feet in width.

A third Drainage area as designated on the plan (D.A. 'C') drains only the north side of the noise barrier. The total runoff volume and rate from this area is minor.

(See tables on Drainage Plan for summaries of Runoff)

CONCLUSIONS

Flows generated by the proposed development will be partially stored on site. Those flows which are in excess of storage capacities will be allowed to exit the property via surface drainage easements to the east (from McCor Place) and to the north (from Dartmouth Drive). They will then be discharged onto the Highway right-of-way and will flow 547 feet within the Highway property to a 24" concrete pipe. This pipe runs under the freeway where it empties into the A.M.A.F.C.A. North Diversion Channel. Although the overall rate of discharge will be increased by 1 cfs and the volume will be increased by 1329 ft^3, the controls still greatly reduce the total generated runoff developed on-site.

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TABLE 1

POND DATA

LOT	AREA OF POND	DEPTH	VOLUME
1	554	1.0	553
2	748	0.7	33[illegible]
3	630	0.8	3[illegible]
4	428	1.0	3[illegible]5
5	428	1.0	3[illegible]5
6	478	1.0	[illegible]9
7	503	1.0	[illegible]6
8	48[illegible]	1.0	[illegible]
9	475	1.0	[illegible]
10	473	1.0	[illegible]
11	425	1.0	[illegible]
12	450	1.0	[illegible]
13	340	1.0	330
14	916	1.0	880
15	67[illegible]	1.5	608
16	977	1.0	363
17	742	1.0	574
18	466	1.0	[illegible]
19	500	1.0	480
20	378	1.0	380
21	512	1.0	35[illegible]
22	614	1.0	5[illegible]
23	752	1.0	630
TOTALS			8654

NOTES: ALL AREAS & VOLUMES ARE AS APPEAR ON THE PLAN AND ARE SUBJECT TO MINOR CHANGES

NO SIDE SLOPE SHALL EXCEED [illegible]

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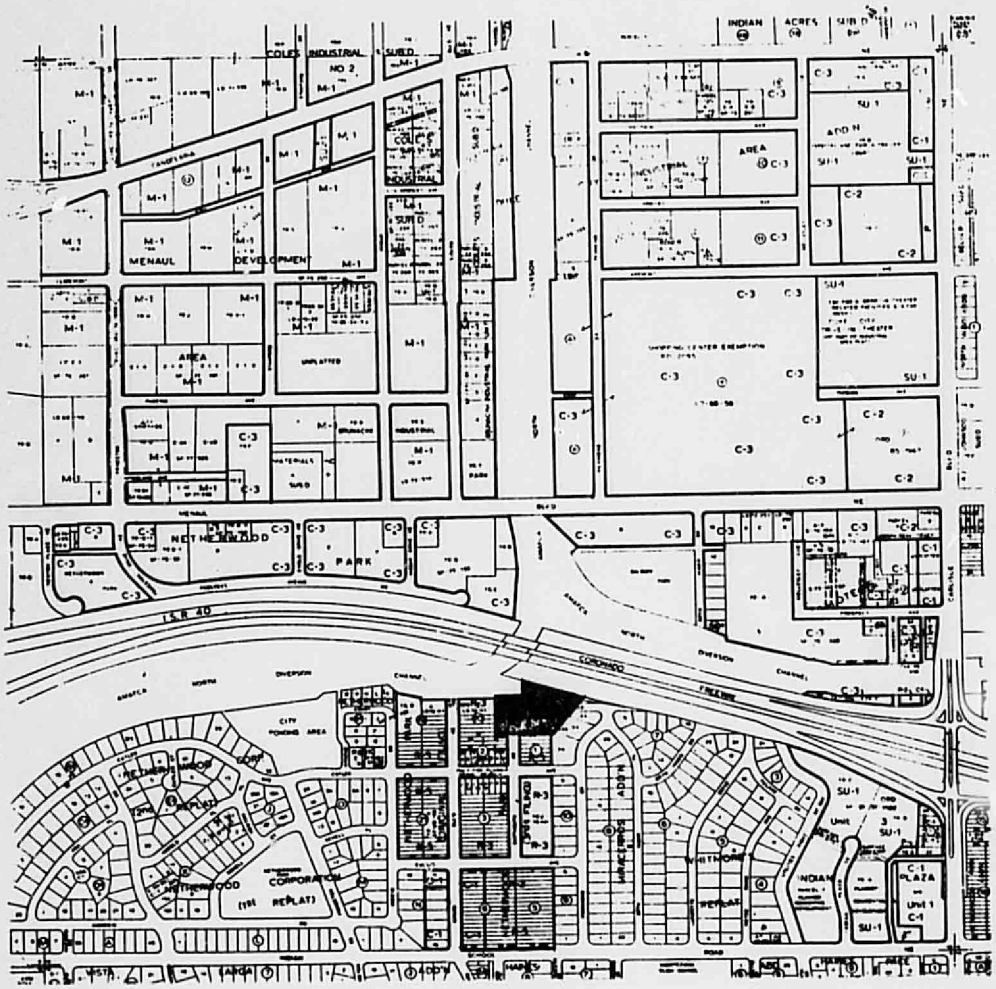

PLATE - 1
VICINITY MAP

H-16-Z

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PLATE - 3

OFFSITE DRAINAGE PATTERNS

1 = 200'

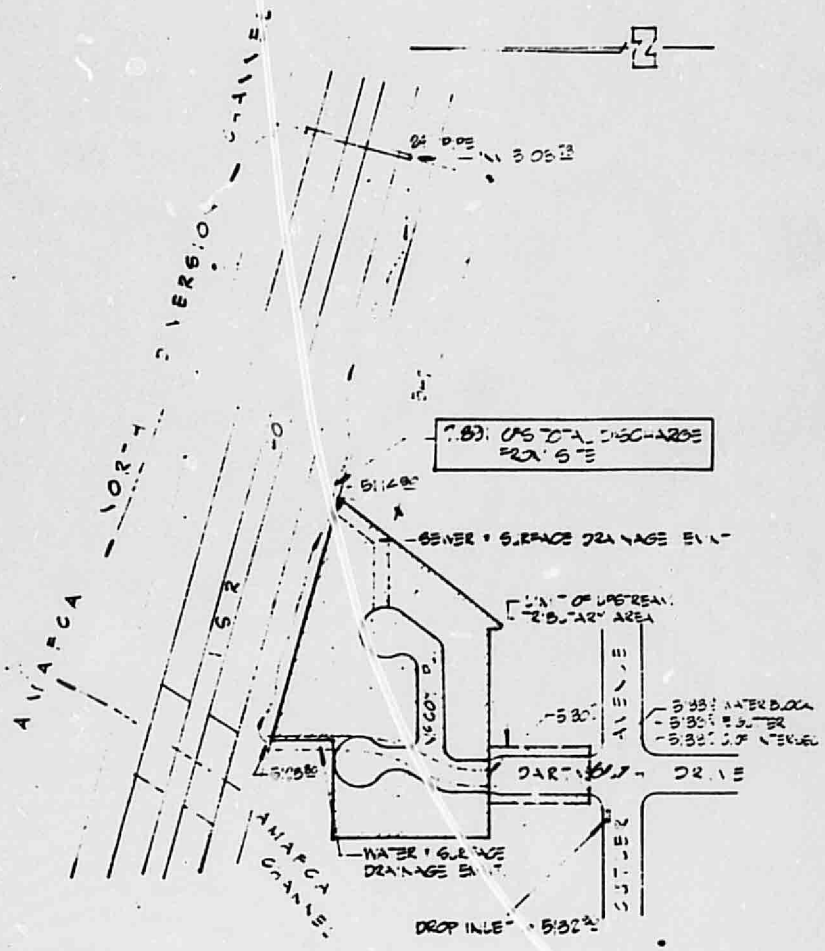

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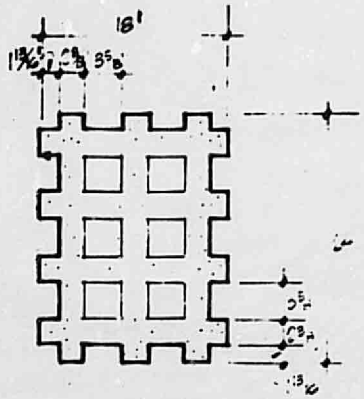
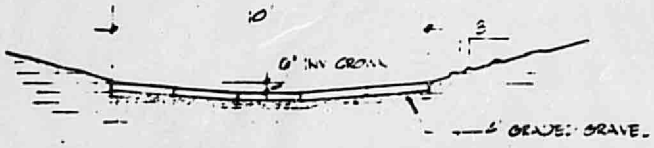
PLATE . 4

RUNDOWN DETAILS

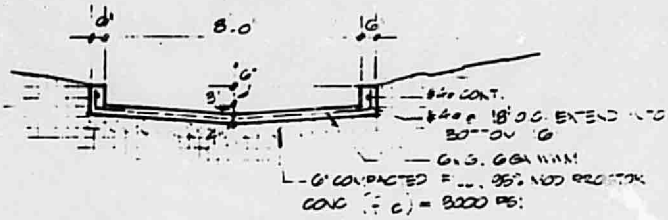


INFILTRATION AREA PER BLOCK
(8.625² x 12 = 187.7 in² = 1.1 ft²)

TYPICAL PAVING BLOCK
1" = 1'.0



TYPICAL SECTION - PAVING BLOCK
1/4" = 1'.0'



SECTION - PAVED RUNDOWN
1/4" = 1'.0'

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City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

MAYOR
David Rusk

June 28, 1979

Mr. John Bettis
Enchantment Engineering
1529 Eubank N.E.
Albuquerque, N.M. 87112

Re: That Place on Dartmouth

Dear Mr. Bettis:

Your report has been reviewed and the concepts outlined agree in principle with AMAFCA Resolution 72-2 and current City drainage practices and is therefore approved.

When submitting your final drainage and grading plans, the back up material listed on Attachment No. 1 must be included to facilitate the review procedure. If this data is not included it will cause delays in the checking procedure.

As indicated, details of the drainage rundowns (profiles, cross sections and transition to the Highway Dept. Channel) will have to be included in the construction plans. I have no objection to the use of block-cret in the eastern-most drainage rundown but Street Maintenance may not concur: please clear this application with Mr. George Paul.

Very truly yours,

Bruno Conegliano
Assistant City Engineer/Hydrology

cc: Dick Elliott
Richard Heller, City Engineer
Richard Leonard, AMAFCA
Drainage File

BC:ms

NEW MEXICO

STATE HIGHWAY DEPARTMENT

DISTRICT NO. 3

ADDRESS ALL CORRESPONDENCE
TO
DISTRICT ENGINEER
P. O. BOX 3768, STA. D

ALBUQUERQUE, NEW MEXICO 87190

January 18, 1979

Mr. Richard C. Elliott, Architect
Archi-Tekton
5105 Menaul, N. E.
Albuquerque, New Mexico 87110

Dear Mr. Elliott:

A field inspection was made concerning the request for increasing the drainage onto I-40 right of way as a result of the new housing construction by your company.

The proposed drainage area seems to be in an adequate location and will not create any burden on the New Mexico State Highway Department. This office therefore approves the drainage proposal as was discussed in my office January 12, 1979.

Sincerely,

Harry L. Apodaca, Jr.
cd

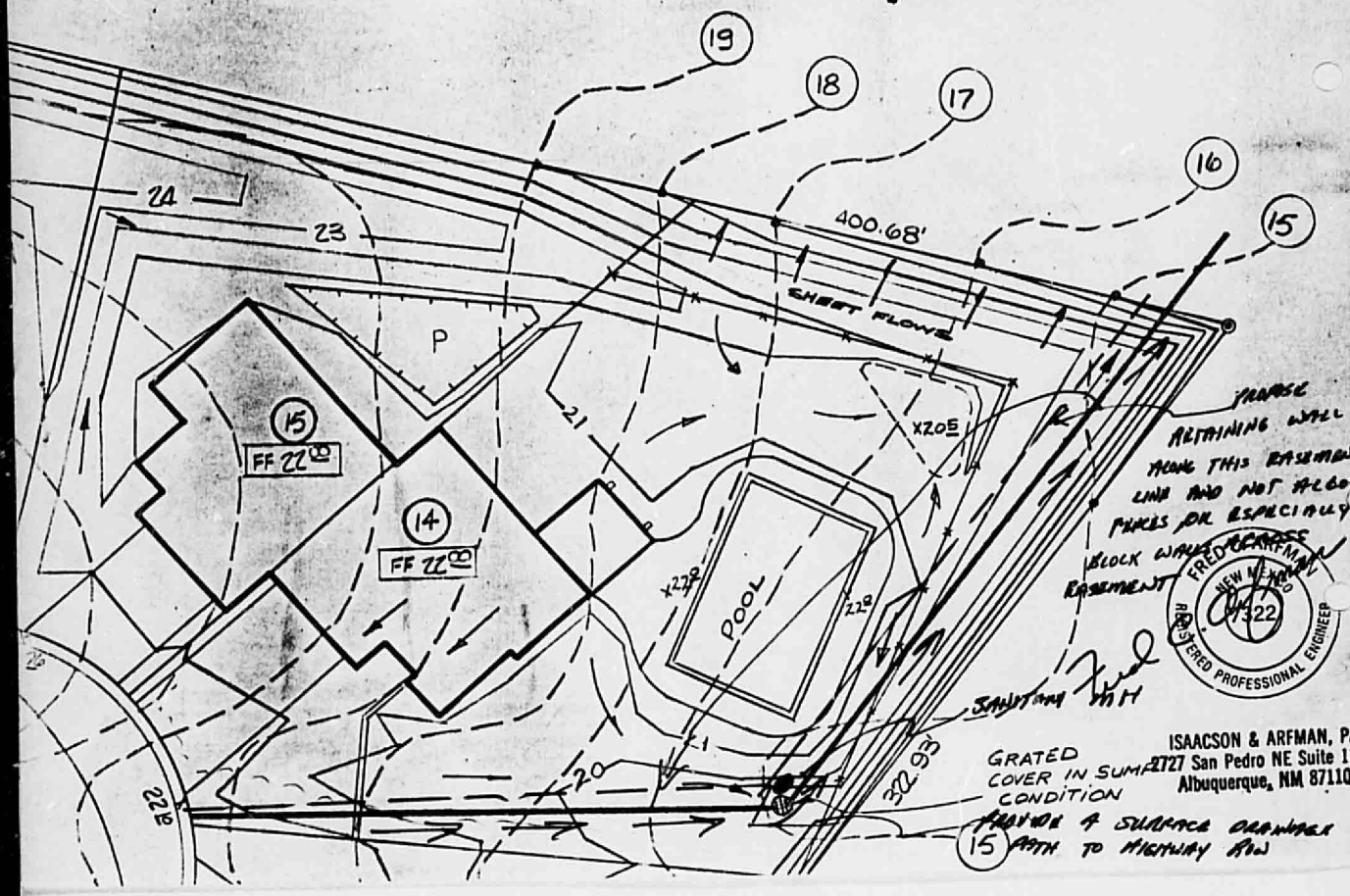
Harry L. Apodaca, Jr.
District Highway Engineer

HLA:cd

PROJECT : THAT PLACE ON DARTMOUTH
AMENDED GRADING-LOT 14.
CLIENT : CONTRACTORS, INC.
293-5151

GRADING NOTES:

1. Northern most strip to sheet flow into NMSHD R/W
2. Backyard flows to be ponded in northwest corner of lot. Pond bottom at 20.5
3. Yard area to the south of pool and D.U., shall have all flows directed to Storm Sewer MH w/ grated cover.



FRED ARFMAN
NEW MEXICO
7322
REGISTERED PROFESSIONAL ENGINEER

ISAACSON & ARFMAN, PA
2727 San Pedro NE Suite 114A
Albuquerque, NM 87110

PROJECT : THAT PLACE ON DARTMOUTH
AMENDED GRADING - LOT 14
CLIENT : CONTRACTORS, INC.
293-5151

GRADING NOTES:
1. Northern most strip to sheet flow into NMSHD R/W
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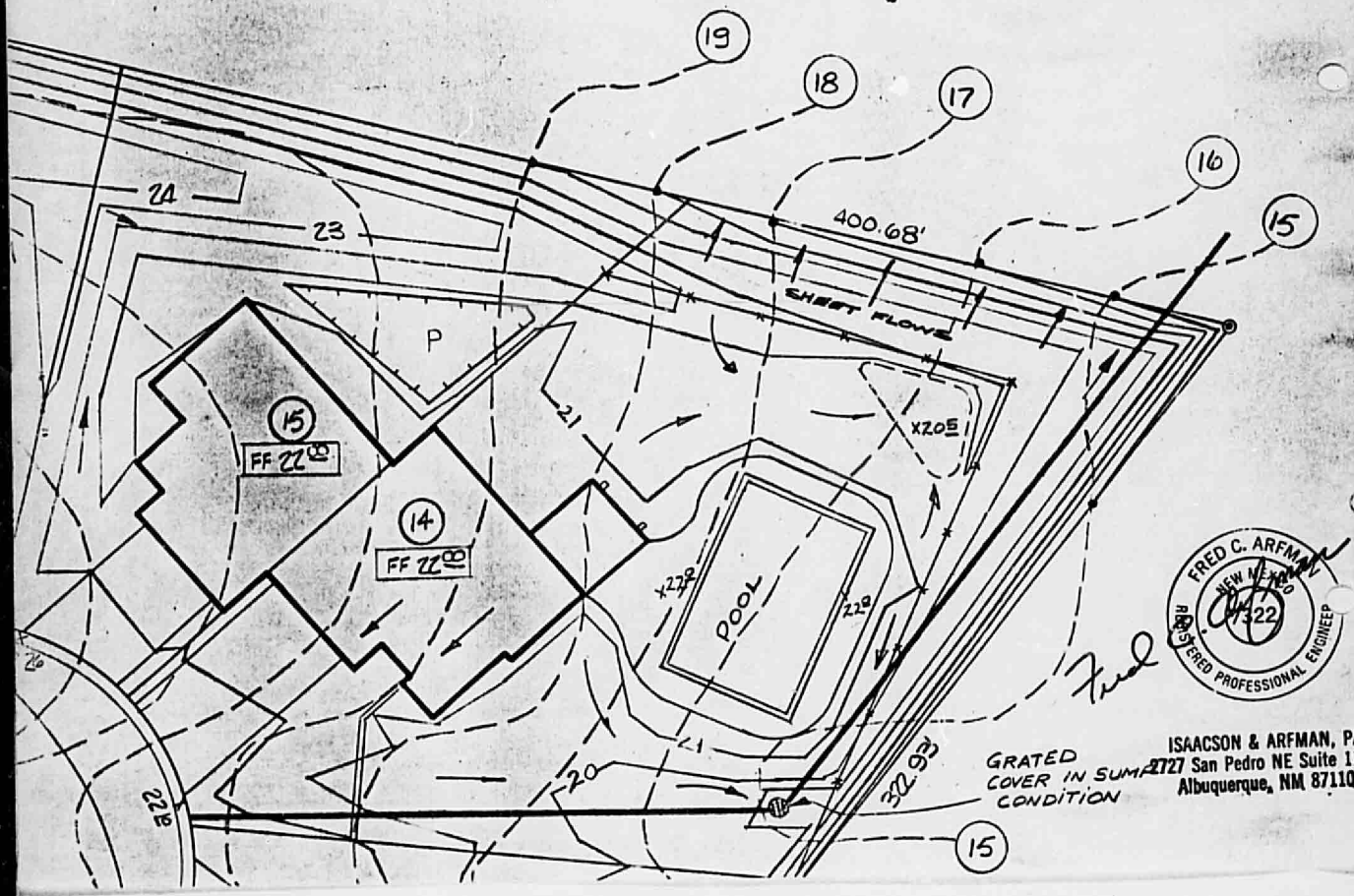


FRED C. ARFMAN
NEW MEXICO
7322
REGISTERED PROFESSIONAL ENGINEER

Final

ISAACSON & ARFMAN, PA
2727 San Pedro NE Suite 114A
Albuquerque, NM 87110

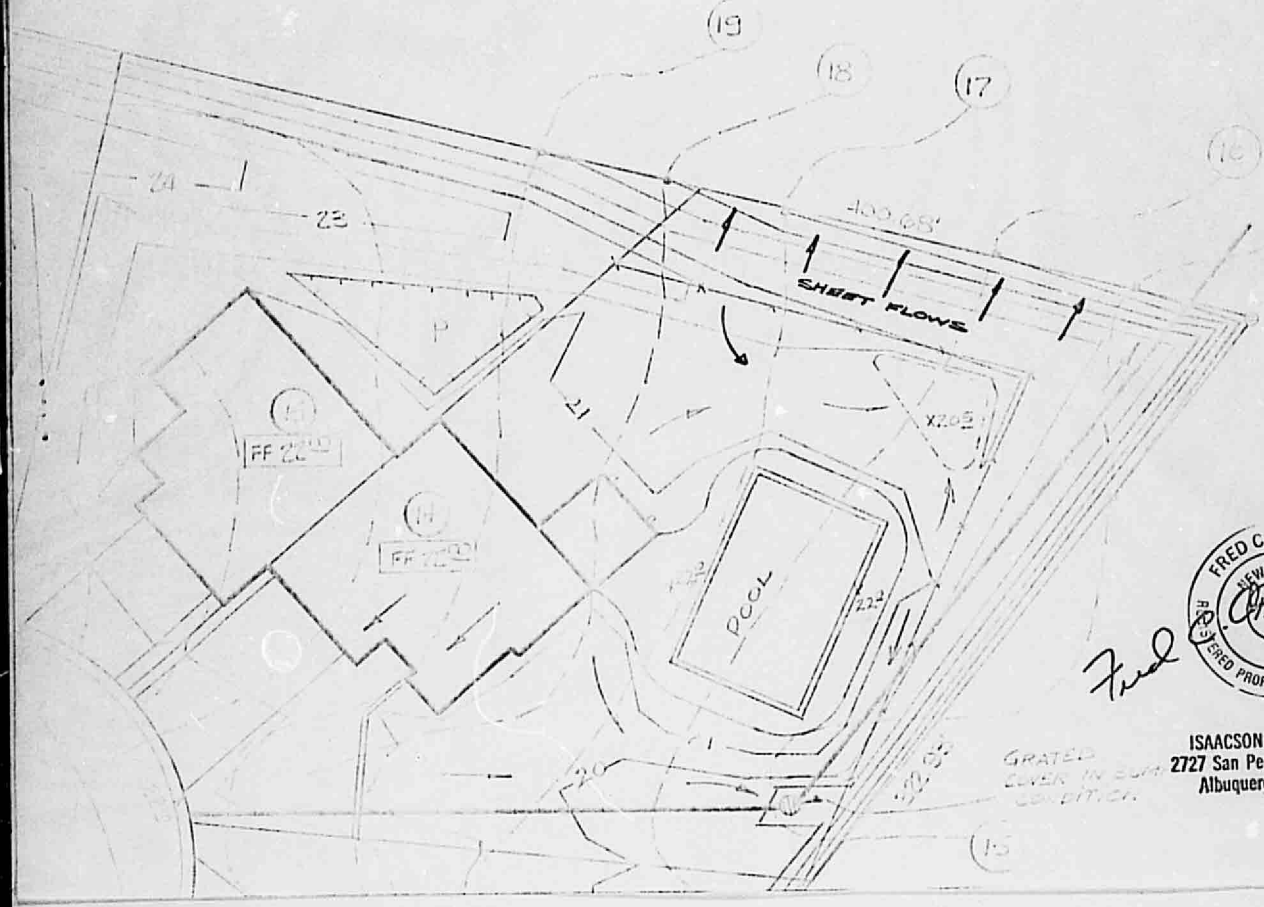
THE ORIGINAL DOCUMENT IS OF POOR QUALITY

PLAT PLACE OF DARTMOUTH
AMENDED VACATION-LOT 12
LOST ... INC.

293-5151

GRADING NOTES:

1. Northern most strip to sheet flow into NMSHD R/W
2. Backyard flows to be ponded in northwest corner of lot. Pond bottom at 20.5
3. Yard area to the south of pool and D.U., shall have all flows directed to Storm Sewer MHw/ grated cover.



FRED C. ARFMAN
NEW MEXICO
1322
REGISTERED PROFESSIONAL ENGINEER

Fred

ISAACSON & ARFMAN, PA
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June 3, 1981

LRF
M16-D14

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

M16-D4

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

DRAINAGE REPORT

THAT PLACE ON DARTMOUTH

(A planned Residential Development)

PREPARED BY

ENCHANTMENT ENGINEERING
1517 Eubank Blvd., NE
Albuquerque, New Mexico 87111

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PURPOSE

The purpose of this report is to present to governing agencies a reasonable and feasible method of complying with City Ordinance 59-1976 thereby lessening runoff from the development to an amount that approximates the flow expected from the property in its present state during a 100 year frequency storm. This report consists of a narrative of both existing and proposed conditions together with the necessary computations for determining and recommending runoff control structures.

LOCATION

The proposed development is located in the Northeast Quadrant of the City and is bounded on the north by Interstate 40, on the east by Block 11 of the MIRACERROS ADDITION (Plat filed on August 3, 1950), on the west by Block 20 of NETHERWOOD PARK ADDITION (Plat filed October 22, 1951) and on the south by Blocks 1 and 2 as they appear on the same NETHERWOOD PARK plat.

See Plate 1

TERRAIN

In its present state, the development site shows some signs of previous earthwork. The most obvious feature is a cut that is twenty to thirty feet in width that runs from east to west across the center of the site. Slopes existing vary from two and one-half per cent near the southwest corner

to a little over six per cent through the cut.

The soil is pretty much the same as that found in most areas of the Northeast Heights and consists primarily of alluvial sand with small amounts of clay. Vegetation currently covering the site consists of common weeds and may best be described as sparse. With the slope, soil and vegetation all considered, infiltration may be assumed to be less than one half inch per hour and natural on-site retention is negligible.

See Plate 2

PROPOSED DEVELOPMENT

The general site drainage plan included in this report shows the proposed layout of all buildings, walks, streets, walls stormwater ponding areas and channels. Along the north side of the site and adjacent to the freeway is a thirty foot wide noise and sewer easement upon which a five foot high berm is to be built. Curbs, driveways and walks are to be concrete, streets will be asphalt and all buildings will be of frame and stucco construction with composition roofs. All landscaping and stormwater ponding areas shall have natural surfaces.

UPLAND DRAINAGE

Dartmouth Drive which enters the site from the south is the only source of upland drainage. The tributary area is shown on Plate 3 and drains approximately .37 of an acre of which .209 acre is paved with asphalt or concrete and .161 acre is landscaped.

A drop inlet at the west-north-west curb return of the intersection of Cutler Avenue and Dartmouth Drive catches west to east flows along the north curb of Cutler Avenue. The location and elevation of this D. I. is shown on Plate 3 along with selected elevations on Dartmouth Drive north of the intersection that are pertinent to this study. The total amount of expected upland flow that can be expected to enter the site from Dartmouth Drive during the 100 year frequency storm is 2330 ft^3. The rate of this flow is 1.386 cfs. As the plan shows, this upland flow is divided evenly and conveyed through the site via the western curb and gutter on the new portion of Dartmouth Drive and via the southern curb and gutter on McCoy Place. Discharges will be through each of the provided drain easements onto the Interstate 40 right-of-way.

INTERNAL DRAINAGE

With the exception of streets and some areas immediately adjacent to them which drain directly into the surface easements, internal drainage is controlled on a single lot basis with retention ponds provided on each lot. (See Plate 2 for precise delineation of direct drainage areas) Where the individual lot grades permit, discharge from the ponds has been provided through the drives into the gutters.. This method is used on Lots 1 thru 12, 17, 18 and 21. Lots 13, 14, and 23 discharge directly into the surface easements upon reaching designed capacities. Flows on Lots 19 and 20 are routed into rear ponds, then are discharged directly onto

McCoy Place. One hundred per cent retention of generated on-site flows is provided on Lots 15, 16 and 22 only. Each of the three above mentioned lots has ample rear yard space to dispose of all stored volumes by infiltration. For the purposes of the individual volume calculations per lot some standards had to be established. All roof areas were assumed to be 1200 ft^2. This figure not only closely approximates the average size of the planned units, but it allows a margin for lot design and leaves buyer options open. Typical coefficients of runoff used in the calcs were .87 for flat roofs, .92 for walks and streets, and .40 for open or landscaped areas. (See Table 1)

Pond side slopes in no instance exceed one foot in three and the maximum depth for any pond shown never exceeds 1.5 feet (only on Lot 15) with the typical designed depth being 1 foot for most of the lots. Specific elevations are given on Plate 2.

An atypical but necessary design feature has been employed on the surface drainage and sewer easement exiting from the cul-de-sac on McCoy Place. Because there is an existing sanitary sewer line in the easement for which access must be provided, the project designers have proposed lining this easement to a width of 10 feet with paving block in lieu of the standard rundown design (Section K-1). The block would then be plugged with turf. Not only would access be provided, but some on-site infiltration would occur. (See Plate 2 for Location and Plate 4 for section and detail)

The surface drainage easement exiting Dartmouth Drive to the north will have a typical City standard paved rundown eight feet in width.

A third Drainage area as designated on the plan (D.A. 'C') drains only the north side of the noise barrier. The total runoff volume and rate from this area is minor.

(See tables on Drainage Plan for summaries of Runoff)

CONCLUSIONS

Flows generated by the proposed development will be partially stored on site. Those flows which are in excess of storage capacities will be allowed to exit the property via surface drainage easements to the east (from McCoy Place) and to the north (from Dartmouth Drive). They will then be discharged onto the Highway right-of-way and will flow 547 feet within the Highway property to a 24" concrete pipe. This pipe runs under the freeway where it empties into the A.M.A.F.C.A. North Diversion Channel. Although the overall rate of discharge will be increased by 1 cfs and the volume will be increased by 1329 ft^3, the controls still greatly reduce the total generated runoff developed on-site.

TABLE 1

POND DATA

LOT	AREA OF POND	DEPTH	VOLUME
1	564	1.0	353
2	748	0.7	384
3	680	0.8	321
4	428	1.0	315
5	428	1.0	315
6	478	1.0	279
7	503	1.0	276
8	484	1.0	282
9	475	1.0	277
10	478	1.0	275
11	425	1.0	271
12	450	1.0	247
13	340	1.0	230
14	916	1.2	880
15	671	1.5	608
16	977	1.0	563
17	742	1.0	574
18	466	1.0	256
19	300	1.1	289
20	378	1.0	280
21	512	1.2	557
22	624	1.2	512
23	782	1.2	630
TOTALS			8654

NOTES: ALL AREAS & VOLUMES ARE AS APPEAR ON THE PLAN AND ARE SUBJECT TO ANY CHANGES NO SIDE SLOPES SHALL EXCEED 1:1

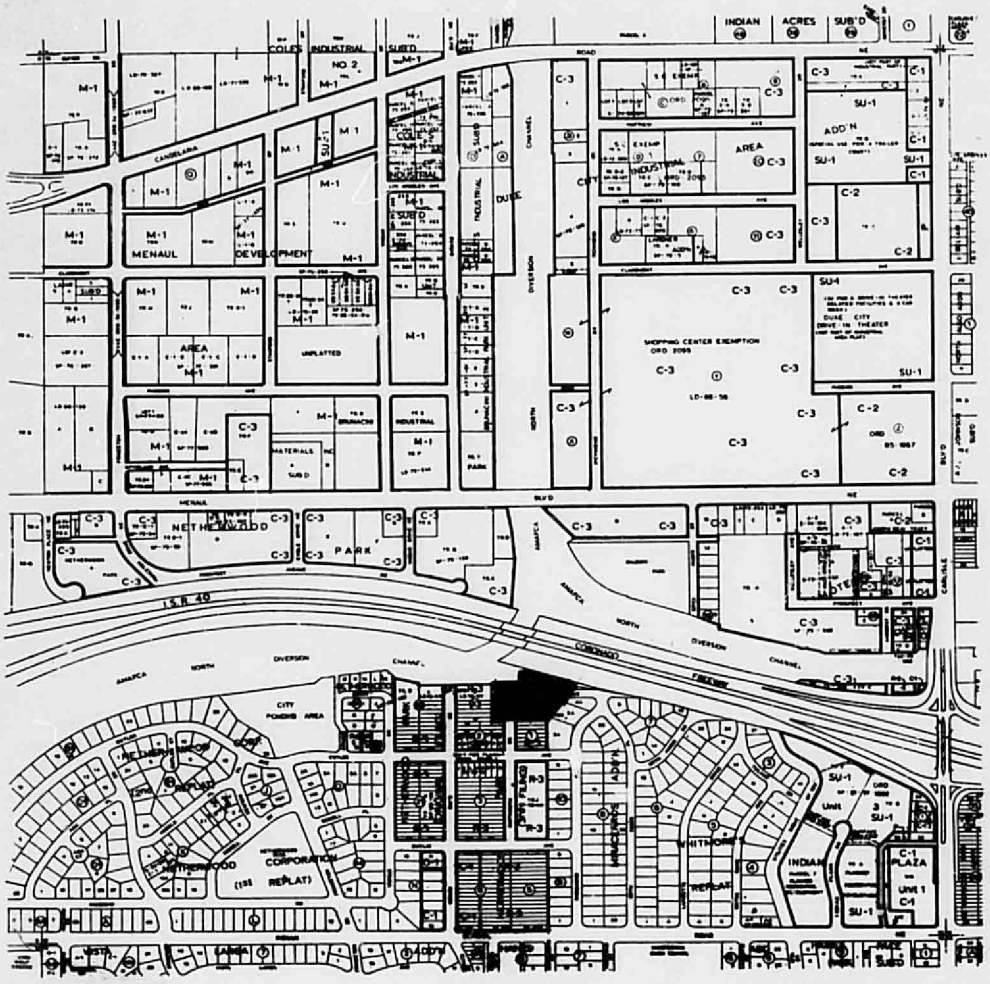


PLATE I
VICINITY MAP

H-16-Z

PLATE - 3

OFFSITE DRAINAGE PATTERNS

1" = 200'

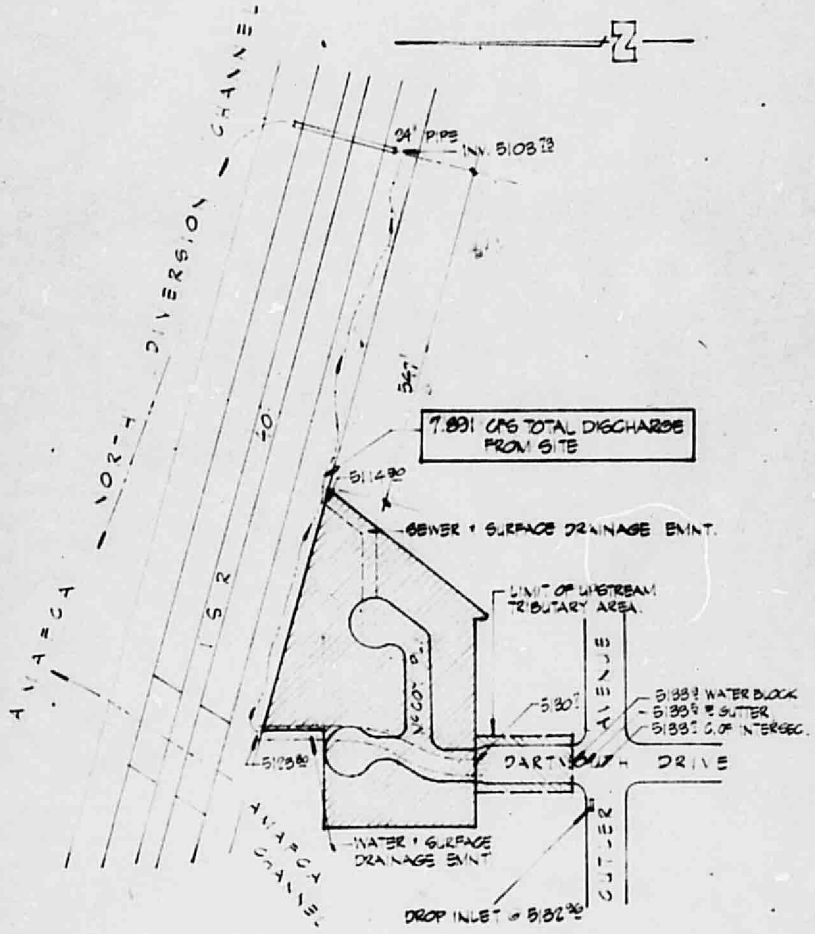
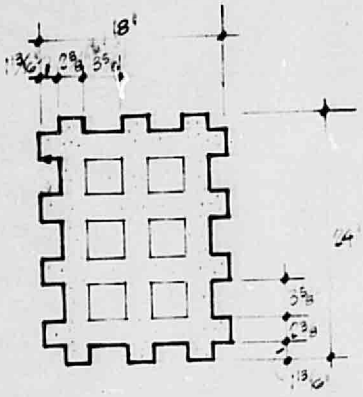


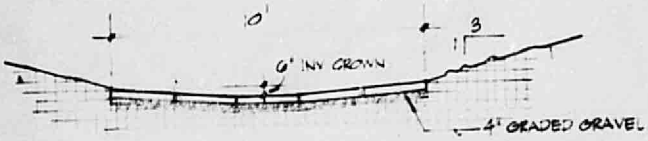
PLATE . 4

RUNDOWN DETAILS

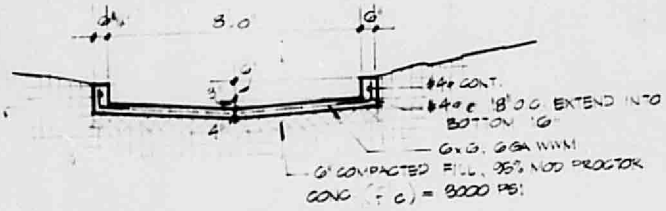


INFILTRATION AREA PER BLOCK
(8.625² × 12 = 157 IN² = 1.1 FT²)

TYPICAL PAVING BLOCK
1" = 1'-0"



TYPICAL SECTION - PAVING BLOCK
1/4" = 1'-0"



SECTION - PAVED RUNDOWN
1/4" = 1'-0"