City of · Albuquerque

August 2, 1979

$J2!-02$

Engineering Associates, Inc.
2819 Claremont Place N.E.
Albuquerque, New Mexico 87110

Attention: August F. Mosimann, P.E.

Re: Drainage Report for Arby's Roast Beef
     Indian School and Juan Tabo N.E.

Dear Mr. Mosimann:

Your drainage report submitted to the Code Administration Division of the Municipal Development Department has been reviewed by the City Engineer's Office. As no site plan was submitted, the drainage concepts cannot be checked in depth.

This site is also in a flood prone area Map P-17. Your report does not address this problem. Further review of this plan cannot be done by staff until the above two concerns are addressed with an addendum to your report.

Very truly yours,

Richard S. Heller
City Engineer

RSH/fs

cc Bruno Conegliano
    Rich Leonard
    Drainage File

Drainage Report

for

Arby's Roast Beef

Indian School and Juan Tabo, N.E.

Lorn David Shields, Architect

August F. Mosimann, P.E.

for

Engineering Associates, Inc.

2819 Claremont Pl., N.E.

Albuquerque, New Mexico 87110

Now file

The site includes Lot Number 1-A of the replat of Lot Number 1 of
Eastwood Plaza Addition, Albuquerque, New Mexico. It is located
at the corner of Juan Tabo and Indian School, Northeast.

Design Guidelines

The following formulas are used throughout this study:

Rational Formula $\qquad Q = CIA$

and

Runoff Volume Formula $\qquad V = CPA$

where

Q = Runoff Rate (CFS)

I = Intensity (IN/HR)

A = Area (Acres or ft^2)

V = Volume (Cu. Ft.)

C = Runoff Coefficient

P = Precipitation

The precipitation amount for this area is 2.6 in. for 100 year
6-hour storm (see figure 1).

The assumed runoff coefficients (C) are as follows:

Area Type	C
Paved	.90
Roof	.90
Landscaped	.40
Unimproved	.40

Existing Site Study

The existing site is undeveloped and slopes from the Northeast
to the Southwest. An existing concrete curb and gutter along
the North and East property lines intercepts all offsite flows.

The existing undeveloped site includes .82 Ac. (35710 = S.F.) and
the runoff calculations for this site are the following:

The runoff coefficient is .40
The slope is 2 percent
The runoff length is 240'
The concentration time is 10 min. (see figure 3)
The intensity is 189/10 + 25 = 5.4 in./hr. (see figure 2)
The area is .82 Ac. (35710 S.F.)

The runoff flow is
$$Q = CIA = .40 \times 5.4 \times .82 = 1.77 \text{ CFS}$$

The runoff volume is
$$V = CPA = .40 \times \frac{2.6}{12} \times 35710 = 3095$$

Developed Site Study

The development will consist of a 4827 S.F. restaurant, 28953 S.F.
of paved parking and driveways, and 1930 S.F. of depressed land-
scaping which will serve as a pond.

The composite runoff coefficient "C" for the new development is
as follows:

Portion	Area (S.F.)	C	C X Area
Paving	28953	.9	26057
Roof	4827	.9	4344.3
Landscaped	1930	.4	772
Totals			31174

$$C = \frac{31174}{35710} = .87$$

The land slope is 3 percent 5/182
The length of runoff is 182 ft.
The concentration time is 10 min. (see figure 4)
The intensity is 189/ (10 + 25) = 5.4 in./hr. (figure 2)
The runoff flow is

$$Q = CIA = .87 \times 5.4 \times \frac{35710}{43560} = 3.86 \text{ CFS}$$

The runoff volume is

$$V = CPA = .87 \times \frac{2.6}{12} \times 35710 = 6731 \text{ Cu.Ft.}$$

The quantity of water required to be ponded and dispersed in the
ground on the developed site is:

Developed Site Runoff   6731
Less Undeveloped Site Runoff -3095
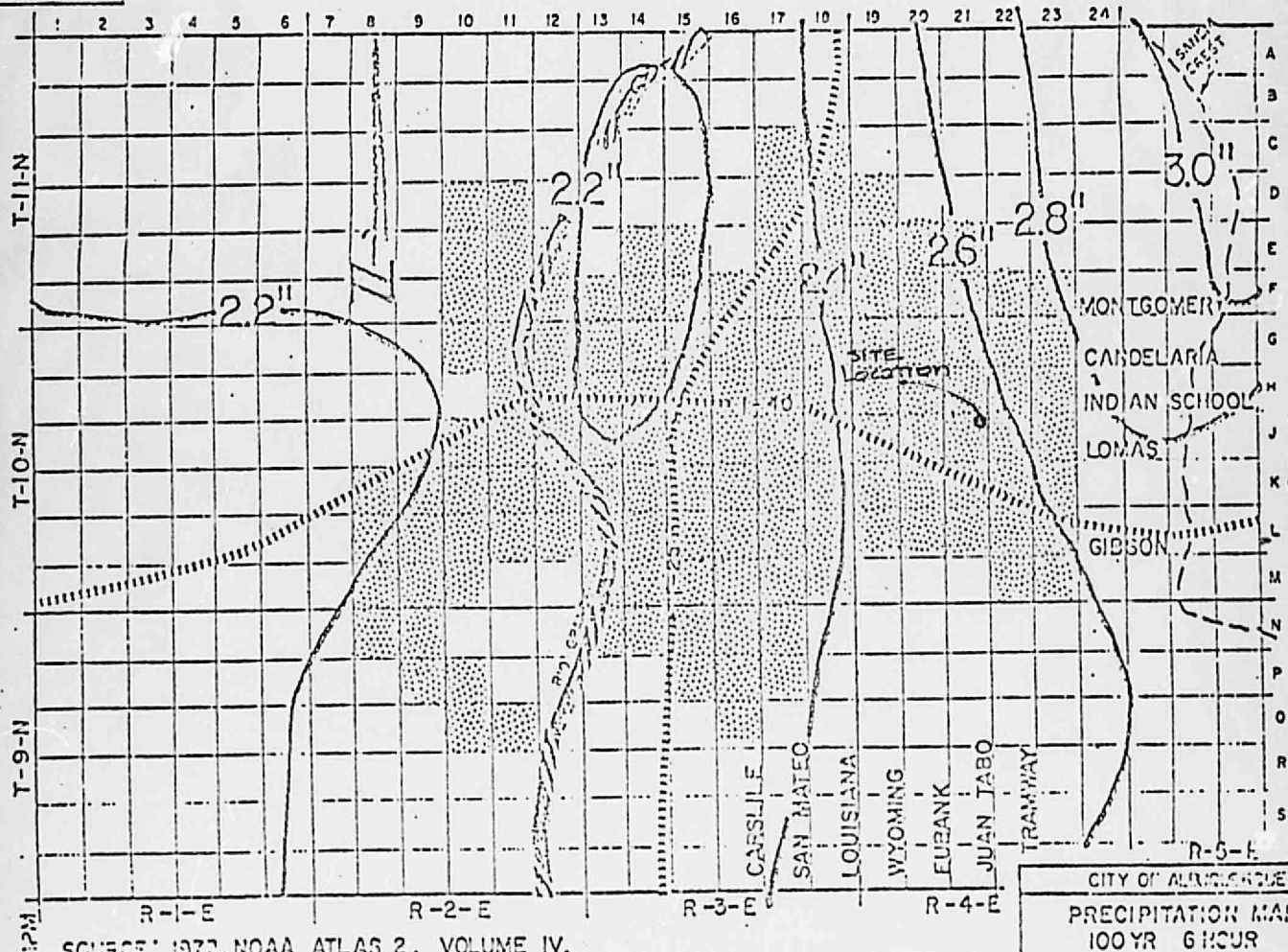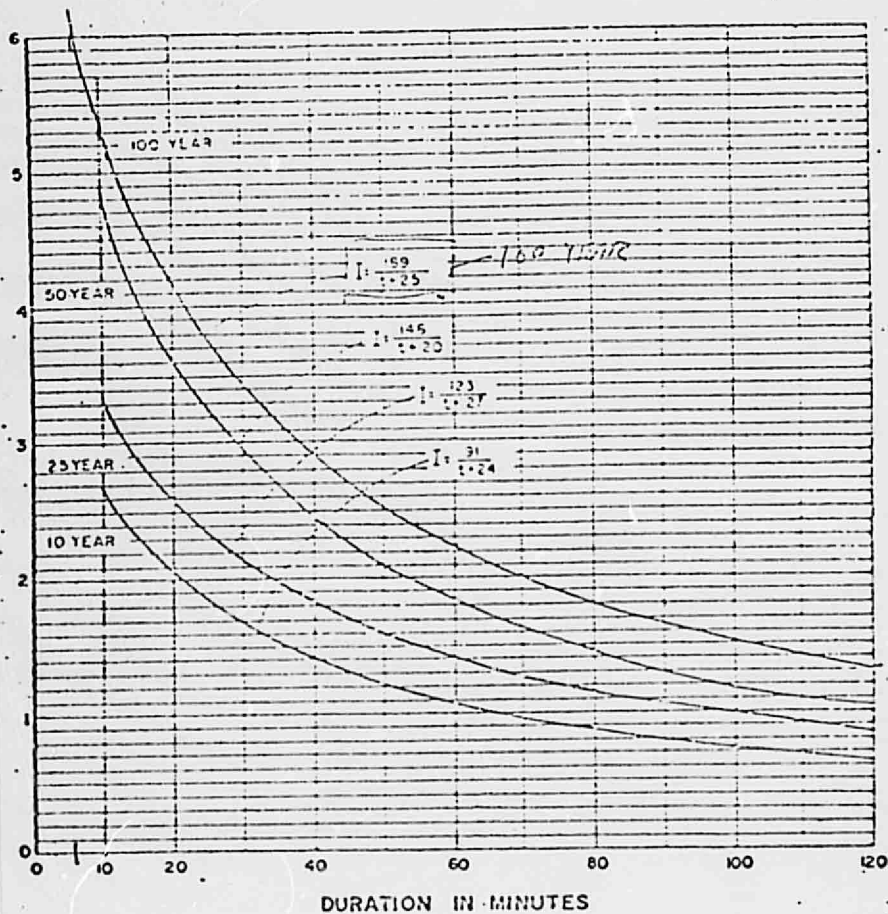   Ponding Required   3636 Cu.Ft.

Recommendations

Grade the site so that the runoff from the roof and paved areas
will be directed into a ponding area between Indian School Road
and the new building. The pond volume should be 3636 Cu.Ft. or
more. Overflow from the pond should be directed toward the
South property line which is where runoff from the undeveloped
site is collecting. The overflow runoff volume will be the
same as the undeveloped site runoff volume.

Conclusions

Grading the site as outlined under Recommendations will insure that
existing drainage patterns will not be altered.

SANDIA CREST

3.0"

2.2"

2.8"

2.6"

2.2"

2.0"

SITE LOCATION

MONTGOMERY

CANDELARIA

INDIAN SCHOOL

LOMAS

GIBSON

T-11-N

T-10-N

T-9-N

R-1-E   R-2-E   R-3-E   R-4-E   R-5-E

CARLISLE
SAN MATEO
LOUISIANA
WYOMING
EUBANK
JUAN TABO
TRAMWAY

FIG 1

| CITY OF ALBUQUERQUE |
| PRECIPITATION MAP |
| 100 YR 6 HOUR |

SOURCE: 1973. NOAA ATLAS 2. VOLUME IV.

DURATION IN MINUTES

Equations visible on chart:

$$I = \frac{159}{t + 25} \quad 100 \text{ YEAR}$$

$$I = \frac{145}{t + 25}$$

$$I = \frac{123}{t + 27}$$

$$I = \frac{91}{t + 24}$$

Curve labels: 100 YEAR, 50 YEAR, 25 YEAR, 10 YEAR

MASTER PLAN OF DRAINAGE
CITY OF ALBUQUERQUE — NEW MEXICO
AND ENVIRONS

INTENSITY DURATION
FREQUENCY CURVES

(ALBUQUERQUE AREA - 1961)

GORDON HERKENHOFF & ASSOC CHART
CONSULTING ENGINEERS   1
ALBUQUERQUE, NEW MEXICO

FIG 2

DRAINAGE — RUNOFF — I

FIG A. — ONE-HOUR RAINFALL, IN INCHES, TO BE EXPECTED ONCE IN 2 YEARS.

FIG B. — ONE-HOUR RAINFALL, IN INCHES, TO BE EXPECTED ONCE IN 10 YEARS.

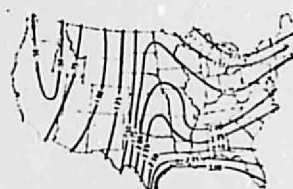FIG C. — ONE-HOUR RAINFALL, IN INCHES, TO BE EXPECTED ONCE IN 50 YEARS.

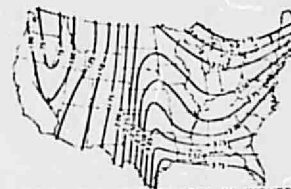FIG D. — ONE-HOUR RAINFALL, IN INCHES, TO BE EXPECTED ONCE IN 5 YEARS.

FIG E. — ONE-HOUR RAINFALL, IN INCHES, TO BE EXPECTED ONCE IN 25 YEARS.

FIG F. — ONE-HOUR RAINFALL, IN INCHES, TO BE EXPECTED ONCE IN 100 YEARS.

COMPUTATION OF i IN RATIONAL FORMULA.

EXAMPLE: Assume expectancy period = 5 years, see Fig. D, assume locality, find 1 hour intensity = 1.75 in. per hour.
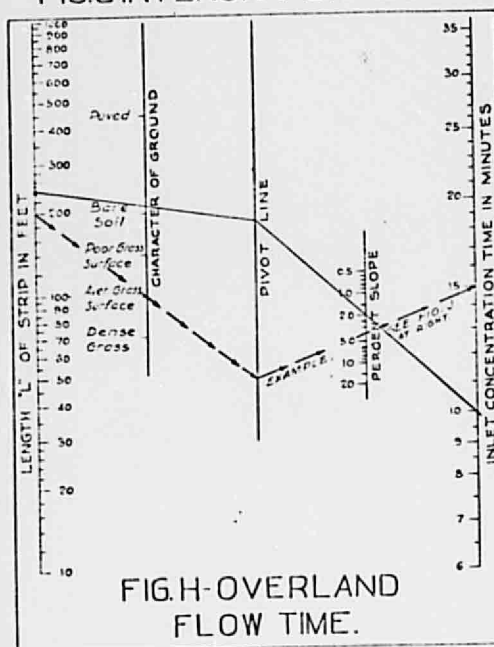
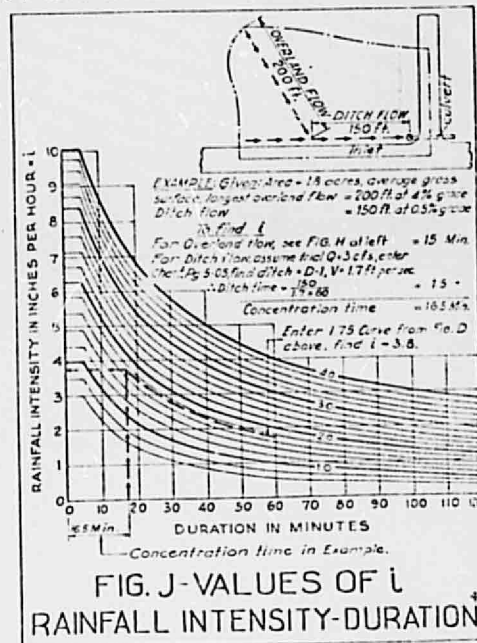## FIG. G INTENSITY EXPECTATION FOR ONE-HOUR RAINFALL.

FIG. H — OVERLAND FLOW TIME.

FIG. J — VALUES OF i RAINFALL INTENSITY-DURATION.
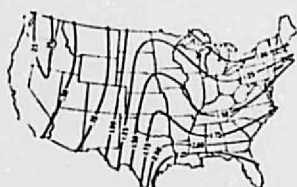
Fig 3

DRAINAGE — RUNOFF — I

FIG. A. — ONE-HOUR RAINFALL, IN INCHES, TO BE EXPECTED ONCE IN 2 YEARS.

FIG. B. — ONE-HOUR RAINFALL, IN INCHES, TO BE EXPECTED ONCE IN 10 YEARS.
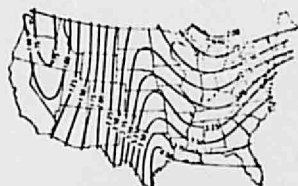
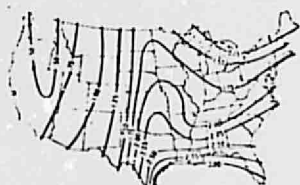FIG. C. — ONE-HOUR RAINFALL, IN INCHES, TO BE EXPECTED ONCE IN 50 YEARS.

FIG. D. — ONE-HOUR RAINFALL, IN INCHES, TO BE EXPECTED ONCE IN 5 YEARS.
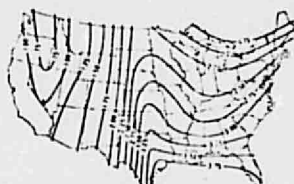
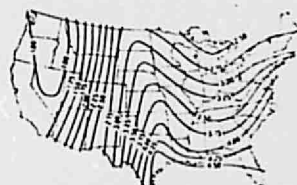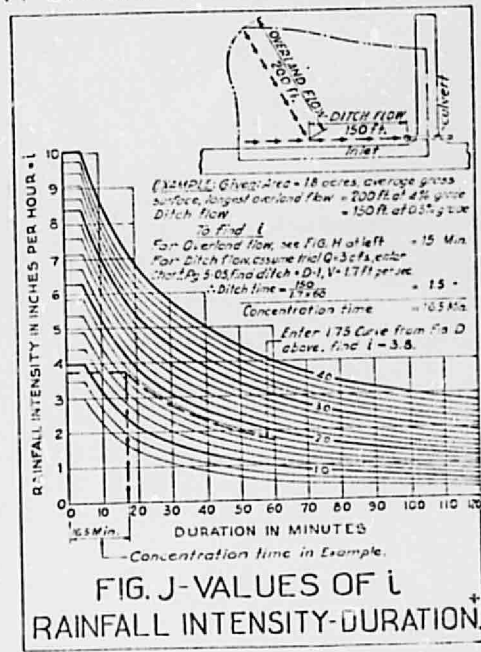FIG. E. — ONE-HOUR RAINFALL, IN INCHES, TO BE EXPECTED ONCE IN 25 YEARS.
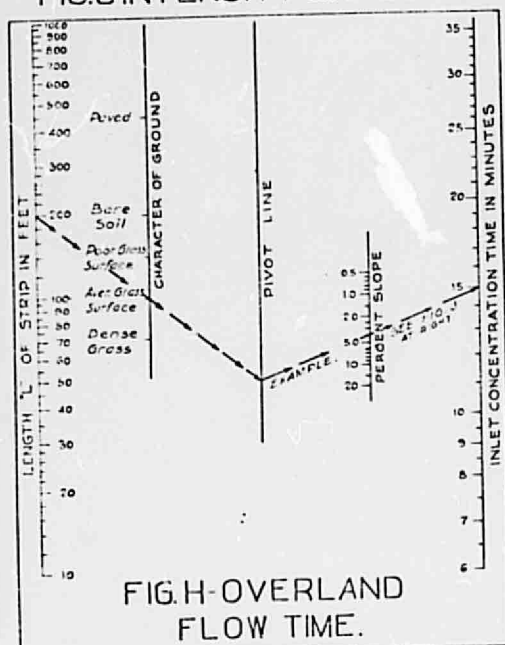
FIG. F. — ONE-HOUR RAINFALL, IN INCHES, TO BE EXPECTED ONCE IN 100 YEARS.

COMPUTATION OF i IN RATIONAL FORMULA.

EXAMPLE: Assume expectancy period = 5 years, See Fig. D, assume locality, find 1 hour intensity = 1.75 in. per hour.

FIG. G·INTENSITY EXPECTATION FOR ONE-HOUR RAINFALL.

FIG. H · OVERLAND FLOW TIME.

LENGTH "L" OF STRIP IN FEET

CHARACTER OF GROUND

Paved

Bare Soil

Poor Grass Surface

Aver. Grass Surface

Dense Grass

PIVOT LINE

PERCENT SLOPE

INLET CONCENTRATION TIME IN MINUTES

FIG. J · VALUES OF i RAINFALL INTENSITY-DURATION.

RAINFALL INTENSITY IN INCHES PER HOUR = i

DURATION IN MINUTES

EXAMPLE: Given: Area = 18 acres, average grass surface, longest overland flow = 200 ft. at 4% grass, Ditch flow = 150 ft. at 0.5% grass.

To find i

For Overland flow, see Fig. H at left = 15 Min.

For Ditch flow, assume trial Q = 3 cfs, enter chart D, S = 0.5, find ditch = D-1, V = 1.7 ft. per sec.

∴ Ditch time = 150/1.7·60 = 1.5

Concentration time = 16.5 Min.

Enter 1.75 Curve from Fig D above, find i = 3.8.

Concentration time in Example.

*Reproduced from Miscellaneous Publication No.204, U.S. Dept. of Agriculture, by David L. Yarnell.

†Adapted from Engineering Manual of the War Department, Part XIII Chap 1, Dec. 45.

FIG 4