HYDROLOGY L20/D8 ONE PLAN

L20/D8

1 PLAN

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

DRAINAGE REPORT INFORMATION SHEET

PROJECT TITLE VILLAGE INN PANCAKE HOUSE

ZONE ATLAS PAGE NO. L-20-Z CITY ADDRESS S.W. CORNER - EUBANK + CENTRAL NE

LEGAL ADDRESS

ENGINEERING FIRM ENGINEERING ASSOC. CONTACT A. MOSIMANN

ADDRESS 1801 LOMAS NW PHONE 242-7522

OWNER CONTACT

ADDRESS PHONE

ARCHITECT/SURVEYOR JERRY TORR CONTACT JERRY TORR

ADDRESS 2740 WYOMING BLVD. PHONE 294-3098

DATE SUBMITTED APRIL 7, 1982

BY AUGUST MOSIMANN

RECEIVED

APR 08 1982

ENGINEERING

MUNICIPAL DEVELOPMENT DEPARTMENT

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

L20 - D8

May 5, 1982

Mr. August Mosimann
Engineering Associates
1801 Lomas N.W.
Albuquerque, N.M. 87104

RE: VILLAGE INN PANCAKE HOUSE DRAINAGE REPORT

Dear Mr. Mosimann:

The referenced report is approved. Please see that the plans dated 4/5/82 are placed in the City construction sets. Approved copies of Special Order No. 19 should also be included.

Very truly yours,

Brian G. Burnett
Civil Engineer/Hydrology

BGB/tsl

Drainage Report

for

Pancake House Restaurant

Eubank & Central N.E.

Jerry Torr, Architect

AUGUST F. MOSIMANN
STATE OF
NO.
6148
NEW MEXICO
REGISTERED PROFESSIONAL ENGINEER

August F. Mosimann
for
Engineering Associates, Inc.

April 6, 1982

Purpose:

In this drainage study we will analyze the runoff from the undeveloped and proposed developed state and make recommendations with regard to flood control. The basis of our recommendations will be that downstream runoff conditions will not be worsened by the development.

Design Criteria:

The following formulas are used throughout this study:

(1) Rational Formula $Q = CIA$

(2) Runoff Volume Formula $V = CPA$

Where:

Q = Runoff Rate (CFS)

I = Intensity (IN/HR)

A = Area (Acres or ft^2)

V = Area (Acres of ft^2)

C = Runoff Coefficient

P = Precipitation

Location:

The project is located at the southwest corner of the intersection of Central Avenue and Eubank Boulevard N. E. The legal description is Lots 1 thru 5, Block 9, Skyline Heights Addition. It is not considered to be located in the Valley.

Existing Site Study:

The existing site is 1.3652 Acres (59470.04 sq.ft.) and is undeveloped. Several unoccupied trailers are currently being stored on the site. Runoff leaves the site along the north property line and empties into Central Avenue. It flows west along Central Approximately one mile south to Wyoming Blvd. where it is intercepted by the City Storm Sewer System. See Figure 1 for the site location. The soil type is gravelly fine sandy loam as shown on Map 32 of the Soil Conservation's Soil Survey for Bernalillo County, See Figure 2.

The runoff from the existing site for the one hundred year storm is as follows:

The precipitation amount is 2.5 in. (see fig. 3)
The runoff coefficient is .4
The length of runoff is 100 ft.
The slope is 1.8 percent
The concentration time is 10 min. (see fig. 4)
The intensity is 189/(10 + 25) = 5.4 in/hr. (see fig. 5)
The runoff flow is

$$Q = CIA = .4 \times 5.4 \times 1.3652 = 2.95 \text{ CFS}$$
$$V = CPA = .4 \times 2.5 \times 59470/12 = 4956 \text{ Cu Ft}$$

Offsite Flows:

There are no offsite flows affecting this site. The runoff along Eubank Boulevard is intercepted by the curb and gutter along the East property line. The alley to the south is currently under review by the City and has been designed with an inverted crown so that it will carry its own runoff.

Developed Site Study:

The development will consist of a 5200 Sq.Ft. building, 1998 Sq.Ft. of landscaping, and the remainder as paving.

No planning action is currently underway for this area. The Zoning is C-2.

The runoff from the developed site for a 100 year storm is as follows:

The runoff coefficient is :

Area Type	Area	C	C x Area
Paved	52272	.9	47045
Roof	5200	.9	4680
Landscaped	1998	.4	799
	59470		52504

$$C = \frac{52504}{59470} = .88$$

The precipitation amount is 2.5 in. (fig. 3)
The slope is 1.8 percent
The length of runoff is 200 ft.
The concentration time is 10 min. (fig. 4)
The intensity is 189/(10 + 25) = 5.4 in/hr. (fig 5)
The runoff flow is

$$Q = CIA = .88 \times 5.4 \times 1.3652 = 6.49 \text{ CFS}$$

The runoff volume is

$$V = CPA = .88 \times 2.5 \times 52504 / 12 = 9626 \text{ Cu Ft}$$

Flood Control:

The City of Albuquerque's Master Drainage Study indicates a downstream flooding condition exists at Central Avenue and Wyoming Boulevard. The "Interim Drainage Guid ines" (Nov. 1979) requires that the flood control measures to be used are to provide a pond capable of holding the difference between the 100 year developed volume and the undeveloped 100 year volume. A discharge rate equal to the 5 year undeveloped runoff is required as well as an overflow spillway with a capacity equal to the 100 year developed runoff. These requirements will be met as follows:

a. A pond will be provided at the west end of the site. Its volume will be:

Developed Volume	-	9626
Less Undeveloped Volume	-	4956
Required Volume	-	4670 Cu Ft

The pond dimensions are 40 ft. by 80 ft. by 1.5 ft. deep giving a volume of 4800 Cu Ft.

b. The pond will discharge into Central Avenue at the five year undeveloped runoff rate:

$$Q = CIA = .4 \times 2.4 \times 1.3652 = 1.3106 \text{ CFS}$$

The Orifice Equation indicates that a six inch pipe with a head of 1.5 ft. will restrict the flow to 1.20 CFS as shown below:

$$Q = \frac{A\sqrt{h}}{.2} = \frac{.1963\ \sqrt{1.5}}{.2} = 1.20 \text{ CFS}$$

c. The spillway is required to have a capacity equal to the 100 year developed runoff capacity which is 6.49 CFS. The one provided will have a three inch head and be 16 ft. wide. Its capacity will be 8.53 CFS as indicated by the broad creasted wier equation below.

$$C = 3.27 + .4\ (H/P) = 3.27 + .4\ (.25/1.25) = 3.35$$

$$Quinitial = CLH^{3/2} = 3.35 \times 16 \times .25^{3/2} = 6.7 \text{ CFS}$$

$$V = Q/A = 6.7/\ (16x.25) = 1.675 \text{ ft.}$$
$$Hu = V^2/2g = 1.675^2/2 \cdot 32.2 = .0436 \text{ ft.}$$
$$Quinitial = CL\ (H + V^2/2g)^{3/2}$$

$$3.35x16x(.25+.0436)^{3/2} = 8.53 \text{ CFS}$$

The 6 inch diameter pipe will discharge its entire City required volume in 65 minutes. Everything in excess of this required Volume will leave via the spillway.

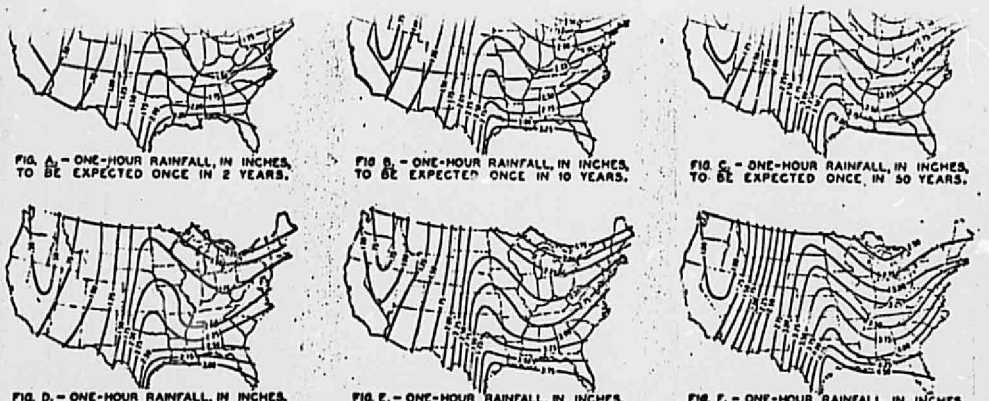


FIG. A. – ONE-HOUR RAINFALL, IN INCHES, TO BE EXPECTED ONCE IN 2 YEARS.

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.*

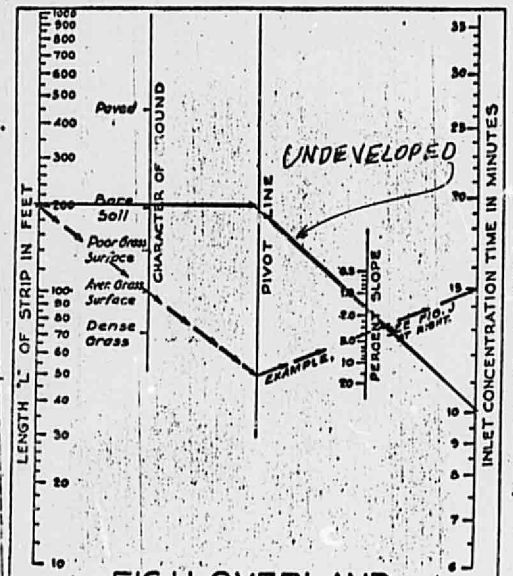


FIG. H-OVERLAND FLOW TIME.

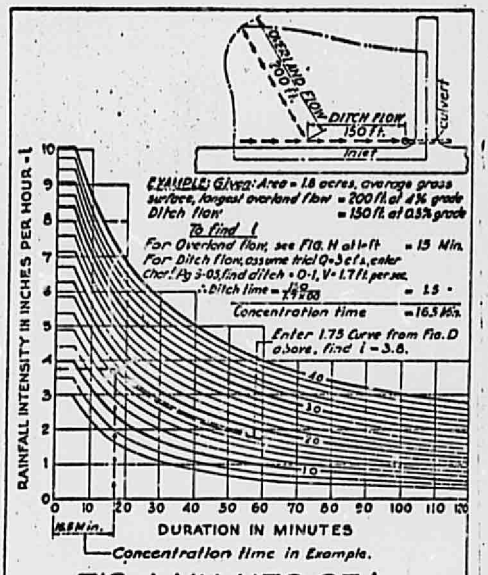
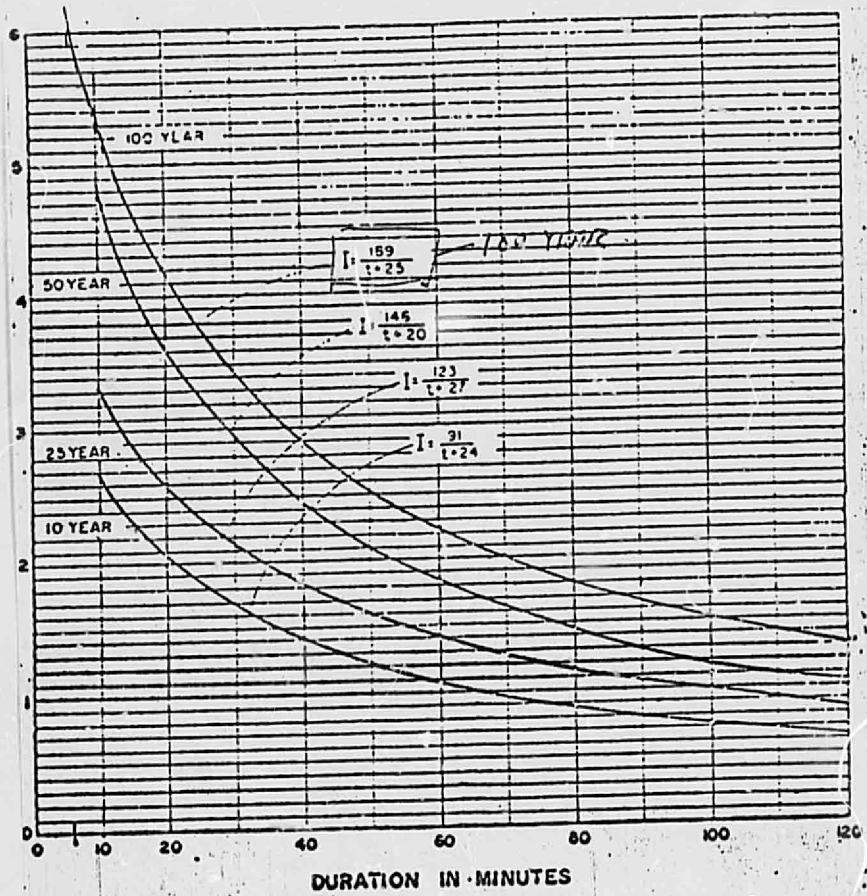


FIG. J-VALUES OF i
RAINFALL INTENSITY-DURATION.†

*Reproduced from Miscellaneous Publication No. 204, U.S. Dept. of Agriculture, by David L. Yarnell.
†Acapted from Engineering Manual of the War Department, Part XIII, Chap. I, Dec. 45.

FIG 4



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

INTENSITY DURATION
FREQUENCY CURVES

(ALBUQUERQUE AREA - 1951)

GORDON HERKENHOFF & ASSOC
CONSULTING ENGINEERS

CHART 1

FIG 5

CITY OF ALBUQUERQUE

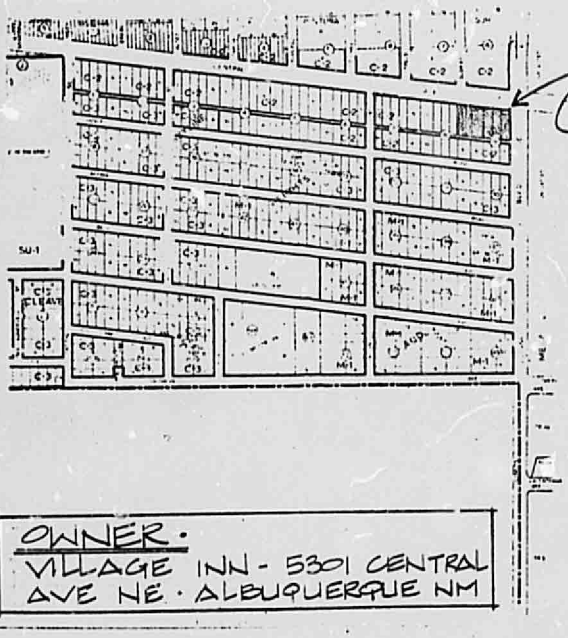
DRAINAGE FACILITIES WITHIN CITY RIGHT-OF-WAY

VICINITY MAP

SCALE: 1" ≈ 750.00'

(CITY MAP. NO. L-20-Z)

NORTH



PROJECT LOCATION

BLOCK 9, LOTS 5,1,2,3,4 (ZONED C-2) SKYLINE HEIGHTS SUBDIVISION

SEAL

AUGUST F. MORIARTY STATE OF NEW MEXICO NO. 6148 REGISTERED PROFESSIONAL ENGINEER

4/30/82

OWNER:
VILLAGE INN - 5301 CENTRAL AVE NE · ALBUQUERQUE NM

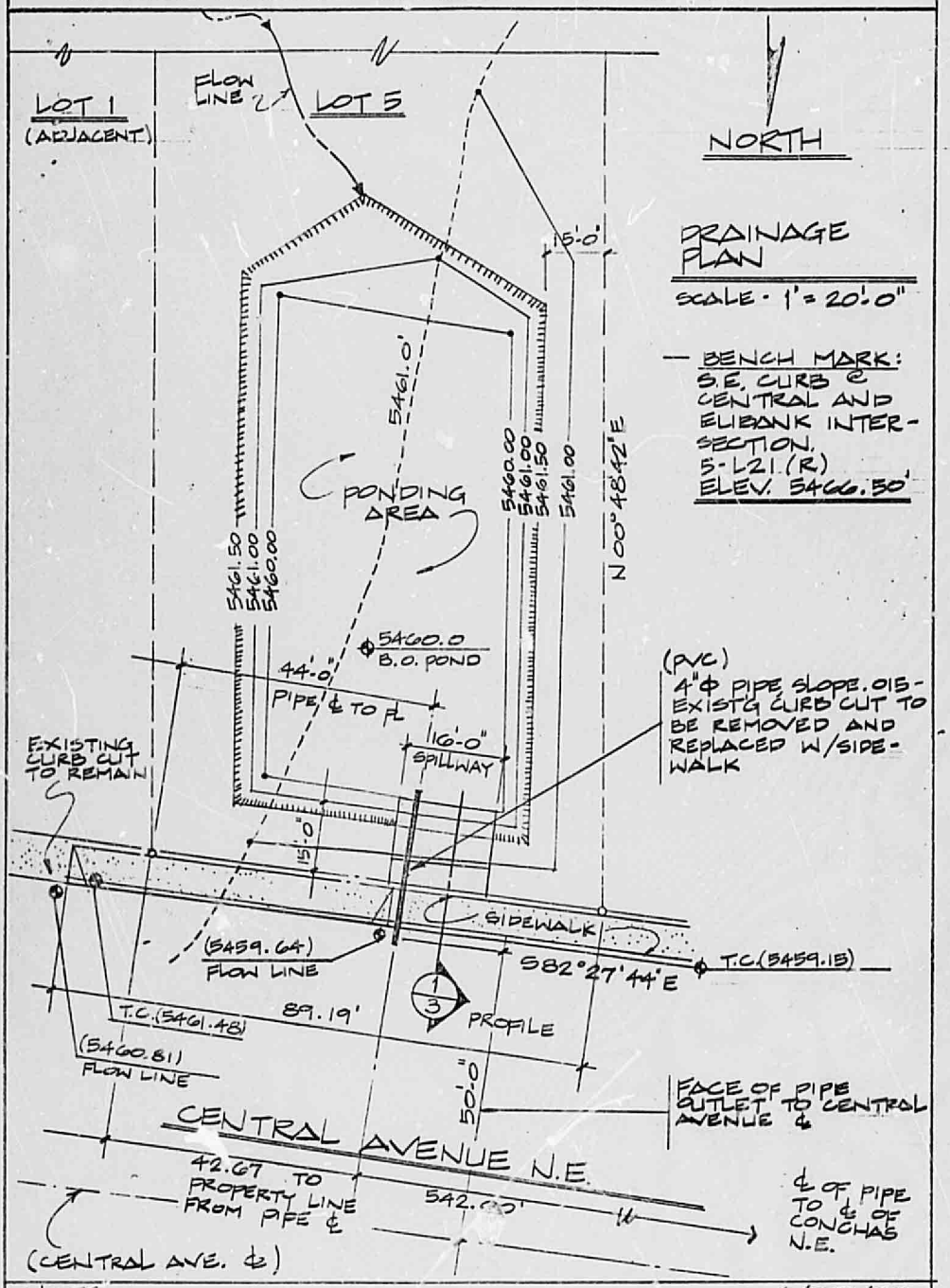
NOTICE TO CONTRACTOR

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 ARTERIAL street use.

APPROVALS	NAME	DATE	TITLE: VILLAGE INN PANCAKE HOUSE DRAINAGE
A.C.E./DESIGN	[illegible]	6 May 82	
INSPECTOR			PERMIT NO. / SHEET 1 OF 3 / MAP NO. L-20

CITY OF ALBUQUERQUE

DRAINAGE FACILITIES WITHIN CITY RIGHT-OF-WAY



NOTE:

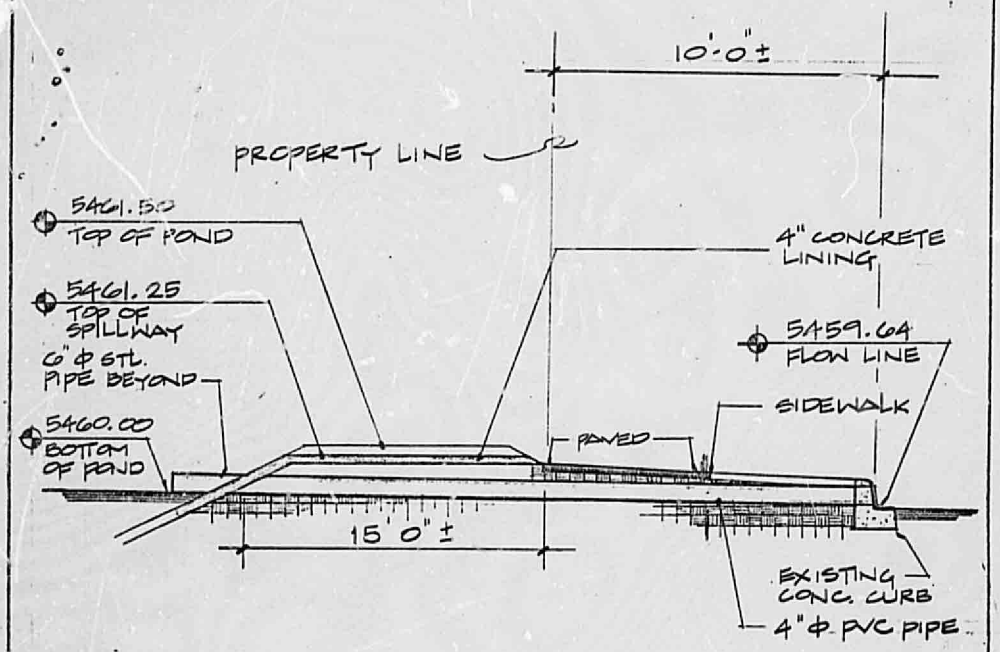
4/30/82

TO BE CONSTRUCTED IN ACCORDANCE W/STD. DETAIL DWG. K-15

APPROVALS	NAME	DATE	TITLE: VILLAGE INN PANCAKE HOUSE DRAINAGE	
A.C.E./DESIGN	J. Kelsch	6 May 82		
INSPECTOR			PERMIT NO. SHEET 2 OF 3	MAP NO. L-20
A.C.E./FIELD				

CITY OF ALBUQUERQUE

DRAINAGE FACILITIES WITHIN CITY RIGHT-OF-WAY



PROFILE:

(1/3) SECTION THRU SPILLWAY
NOT TO SCALE

NOTE: ALL ELEVATIONS ARE REFERENCED TO CITY OF ALBUQUERQUE MEAN SEA LEVEL DATUM.

TO BE CONSTRUCTED IN ACCORDANCE W/ STD. DETAIL DWG. NO. K-15

4/30/82

APPROVALS	NAME	DATE	TITLE: VILLAGE INN PANCAKE HOUSE: DRAINAGE	
A.C.E./DESIGN	J Kelich	6 May 82		
INSPECTOR			PERMIT NO. SHEET 3 OF 3	MAP NO. L-20
A.C.E./FIELD				