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April 8, 2011

RE: Preliminary Drainage & Erosion Control
Analysis for: Kihei Wellness Center
1488 S. Kihei Road
Kihei, Maui, Hi 96753

To Whom It May Concern:

The attached Exhibit "14-B", Drainage and Erosion Control Study dated August 1994 has been reviewed. As shown on the Hydrology Chart in the study and the Preliminary Grading Plan (Exhibit 14-A) for the proposed wellness center, the areas of building and paved areas considered are similar. The parking area covers .40 acres for both the studied project and the proposed wellness center. The building area for the studied project totals .35 acres and the building area for the proposed wellness center is .34 acres.

In conclusion, the Drainage and Erosion Control Study dated August 1994 is acceptable as a Preliminary Report for the proposed Kihei Wellness Center. Prior to the issuance of a building permit, a final Drainage and Erosion Control Study and Plans will be submitted for approval.

Respectfully Submitted,




EXHIBIT '15'

**PRELIMINARY
DRAINAGE & SOIL EROSION CONTROL STUDY
FOR
BEN FRANKLIN STORE
A T
KIHEI, MAUI, HAWAII
TAX MAP KEY: (2) 3-9-10:77**

**PREPARED FOR:
BEN FRANKLIN STORES, INC.
1043 MAKAWAO AVENUE
MAKAWAO, HAWAII - 96768**

**PREPARED BY:
R. T. TANAKA ENGINEERS, INC.
871 KOLU STREET, SUITE 201
WAILUKU, MAUI, HAWAII - 96793**

AUGUST 1994

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I. PRELIMINARY DRAINAGE STUDY:

A. DRAINAGE STUDY:

The proposed project site is located in Kihei, Maui, Hawaii, bordered by South Kihei Road in the block defined by West Welakahao Road, Halama Street and Waiohuli Street.

The site is designated as Parcel 77 of Tax Map Key 3-9-10.

B. EXISTING SITE CONDITIONS:

The project site is presently undeveloped land covered with noxious grass. African tulip trees and a rock revetment exist along the north boundary of the site, which delineate the flood storage area. Patches of bare soil are also evident in the area. The elevation of the area is between 2 feet and 7 feet above mean sea level, characterized by a high knoll located in the front third of the property, gently sloping toward the ocean and South Kihei Road.

C. FLOODING:

Map 2 shows the project site in relation to the flooding limits as delineated on the Flood Insurance Rate Map (Panel 265C). The project area is within Zone AH, an area of 100-year shallow flooding, where depths are between one (1) and three (3) feet. The base flood elevation is seven (7) feet.

Any improvement within these flooding limits should be designed according to flooding requirements.

C. EXISTING DRAINAGE PATTERN:

1. General Conditions;

Based on a field investigation and as shown on the existing topographic survey map of the site (Map 4), runoff from mauka lands is diverted away from the site by South Kihei Road.

Runoff generated onsite sheet flows into adjacent and downstream properties. Approximately half of the onsite runoff sheet flows into the flood storage area along the northern boundary of the site.

D. BASIS OF STUDY:

1. General:

This preliminary drainage study is based on applicable sections of the Maui County Drainage Master Plan. It is also based on available topo map of the project area.

2. Hydrology Calculations:

Storm runoff generated by onsite drainage areas as shown on Map 4 was estimated using the rational method. Estimated runoff quantities are tabulated on attached hydrology chart.

3. The Rational Method:

The rational method employs the formula:

$$Q = CIA$$

Where:

Q = Rate of flow in c.f.s.

I = Rainfall Intensity (in./hr.)

A = Drainage Basin Area (Acres)

C = Runoff Coefficient (determined from Table
I of the Drainage Master Plan)

4. Determination of Runoff Coefficient, C:

	<u>Existing Condition</u>	<u>New Condition</u>
Infiltration	0.14 (slow)	0.14 (slow)
Relief	0.00 (flat)	0.00 (flat)
Vegetal Cover	0.03 (good)	0.03 (good)
Development	<u>0.15</u> (open)	<u>0.55</u> (bus.)
	0.32	0.72

5. Proposed Improvements:

The proposed development consist of a retail Ben Franklin and Ace Hardware stores (Map 5). The proposed building will cover approximately 11,000 square feet of the total 1 acre parcel. Appurtenant parking and landscaping is also proposed.

The existing flood storage area will be kept intact and runoff from the proposed development will sheet flow into this area.

II. PRELIMINARY SOIL EROSION CONTROL STUDY

- A. The type of soil at the site belong to Jaucas Series (JcC) as classified by the Soil Conservation Service of the United States Department of Agriculture (Map 3). Generally, these soils occur near the ocean in areas where the water table is near the surface and salts have

accumulated. The erodibility factor of Jaucas Sand (JcC) is 0.10.

B. HESL Soil Loss for Project During Construction:

Erosion rate, as set forth by the County of Maui Ordinance are as follows:

$$E = RKLSCP$$

Where:

$$R = \text{Rainfall Factor} = 150 \text{ tons/acre/year}$$

$$K = \text{Soil Erodibility Factor} = 0.10$$

$$L = \text{LS Factor} = \text{Slope Length} = 230 \text{ ft.}$$

$$S = \text{LS Factor} = \text{Slope Gradient} = 2\%$$

$$LS = \text{Slope Length Factor} = 0.258$$

$$C = \text{Cover Factor, Use Bare Soil} = 1.0$$

$$E = 150 \times 0.10 \times .258 \times 1 \times 1 = 4 \text{ tons/acre/year}$$

C. Allowable Soil Loss for Site:

$$1. \quad \text{Coastal Water Hazard (D)} = \text{Class A} = 2$$

$$2. \quad \text{Downstream Hazard (F)} = 4$$

$$3. \quad \text{Duration of Site work} = \frac{1}{2} \text{ year}$$

$$4. \quad \begin{aligned} \text{Maximum Allowable Construction Area} \times \text{Erosion Rate} \\ = 5,000 \text{ tons/year} \end{aligned}$$

$$5. \quad \text{Area of Graded Land} = 1.0 \text{ acres}$$

$$6. \quad \begin{aligned} \text{Allowable Erosion Rate} &= 5,000/1.0 \\ &= 5,000 \text{ tons/acre/year} \end{aligned}$$

$$\text{Allowable } E = 5,000 > 4$$

D. Erosion Control Plan:

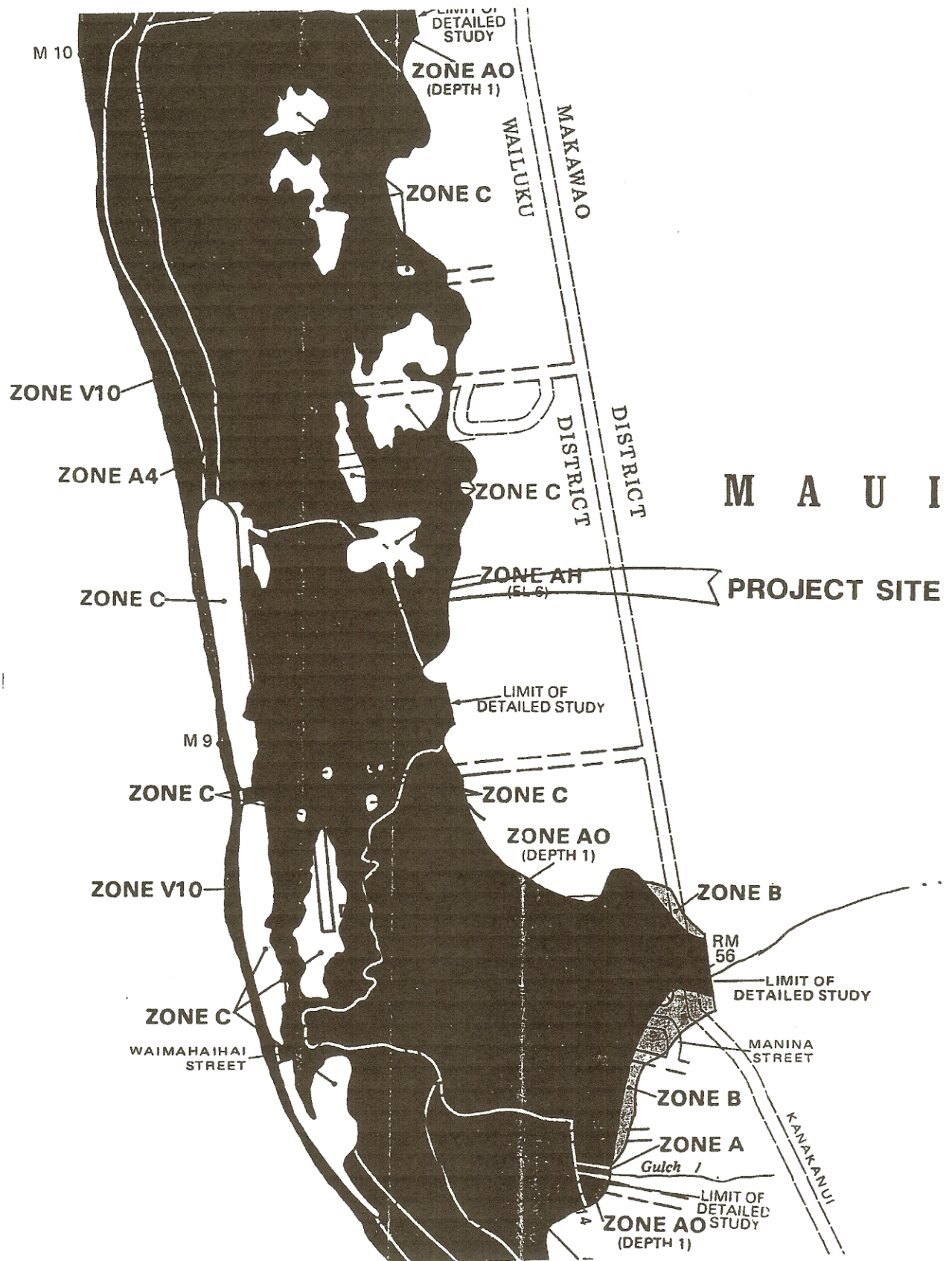
Erosion control measures will be guided by Chapter 20.08, "Soil Erosion and Sedimentation Control" of the Maui County Code. Some of these measures are:

1. Control dust by means of waterwagon and/or sprinklers during periods of construction.
2. Graded areas will be thoroughly watered after construction activity has ceased for the day, weekends and holidays.
3. Early construction of drainage swales, silting/retention basin and structure.
4. Construct temporary diversion ditches away from paved section to natural drainageways during construction.
5. All exposed graded areas shall be grassed or paved immediately upon completion of finish grading.

III. CONCLUSION:

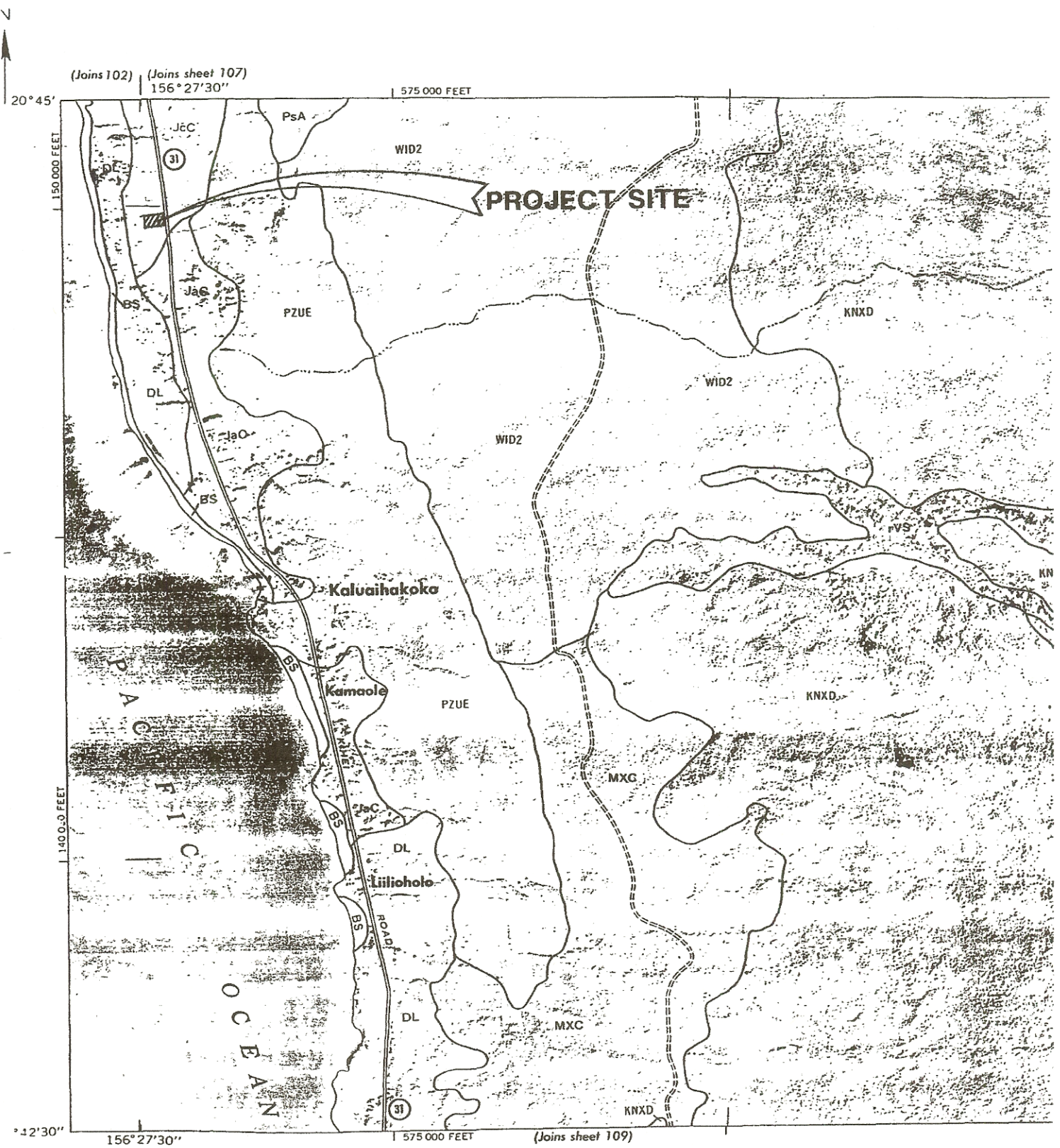
The development of the proposed project site will increase runoff by approximately 1.9 c.f.s. (3.0 c.f.s - 1.1 c.f.s). The internal drainage system that will be installed as part of the project's infrastructure will be designed to sheet flow the runoff from the graded and parking areas and transport it to the existing flood storage area within the project site where it will be discharged downstream, eventually finding its way to the ocean.

Since the anticipated erosion rate is much less than the allowable erosion rate, no additional erosion control measures, other than those outlined in this study, will be necessary. With the development of this project, no adverse effects to adjacent and downstream properties is anticipated.



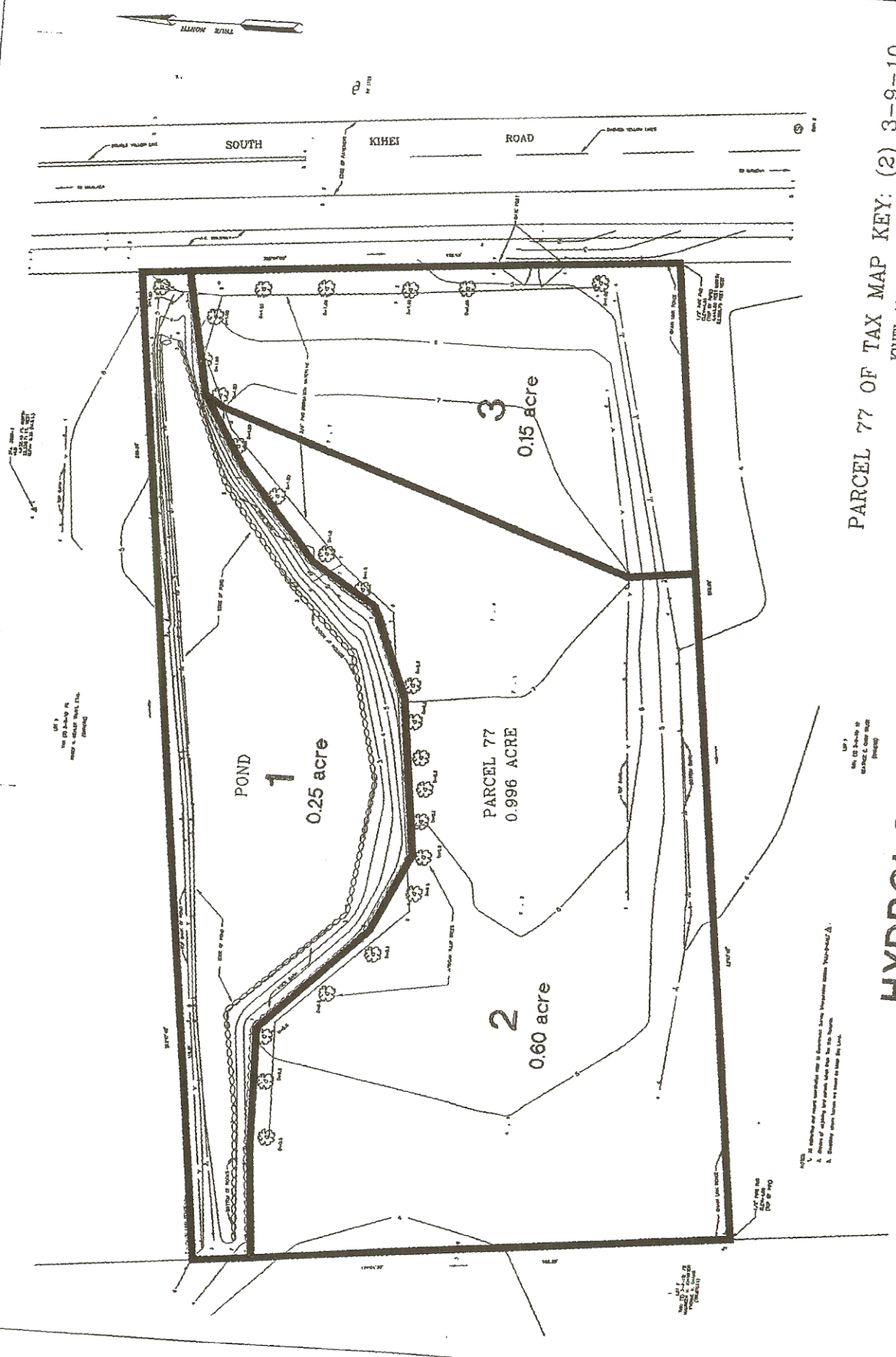
FLOOD MAP

SCALE: 1 in. = 1,000 ft.



SOILS MAP

SCALE: 1 in. = 2,000 ft.



PARCEL 77 OF TAX MAP KEY: (2) 3-9-10
KIHEI, MAUI, HAWAII

HYDROLOGY MAP (EXISTING)

SCALE: 1" = 40'

TWOC (2) 3-9-10: 77
SHEET 1 OF 1