ALAN M. ARAKAWA
Mayor

MICHAEL W. FOLEY
Director

WAYNE A. BOTEILHO
Deputy Director

COUNTY OF MAUI
DEPARTMENT OF PLANNING

July 29, 2005

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OFC. OF ENVIRONMENTAL QUALITY CONTROL

Ms. Genevieve Salmonson, Director
Office of Environmental Quality Control
235 South Beretania Street, Suite 702
Honolulu, Hawaii 96813

Dear Ms. Salmonson:

RE: Final Environmental Assessment (DEA) for the Proposed North-South Collector Road Extension - Walua Place to Keonekai Road, Located at TMK: 3-9-004: 005 & 145, 3-9-019: 004, 3-9-020: 004, 007, 012, 016, 020, & 027, Kihei, Island of Maui, Hawaii (EA 2005/0007) (SM1 2005/0007)

The Maui Planning Commission at its regular meeting on July 26, 2005, accepted the Final Environmental Assessment (FEA) for the subject project, and issued a Finding of No Significant Impact (FONSI). Please publish the FEA in the **August 23, 2005**, Office of Environmental Quality Control (OEQC) Environmental Notice.

We have enclosed a completed OEQC Publication Form and four (4) copies of the FEA. If you have any questions, please call Ms. Kivette Caigoy, Environmental Planner, of our office at 270-7735.

Sincerely,

MICHAEL W. FOLEY
Planning Director

MWF:KAC:lar
Enclosures
c: Kivette A. Caigoy, Environmental Planner
Paul Fasi, Staff Planner
Karlynn Kawahara, Munekiyo & Hiraga, Inc.
EA Project File
General File
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2005-08-23-MA-FONSI-NORTH-SOUTH COLLECTOR ROAD EXTENSION

AUG 23 2005

Final Environmental Assessment

prepared in support of the Special Management Area Use Permit Application for the

PROPOSED NORTH-SOUTH COLLECTOR ROAD EXTENSION - WALUA PLACE TO KEONEKAI ROAD

Prepared for:

Towne Development of Hawaii, Inc.
And
Accepting Authority, Maui Planning Commission

August 2005

MUNEKIYO & HIRAGA, INC.

Final Environmental Assessment

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CONTENTS

Executive Summary i

Preface ii

I. PROJECT OVERVIEW 1

A. PROJECT LOCATION, EXISTING USE, AND LAND OWNERSHIP 1

B. PROPOSED ACTION 5

II. DESCRIPTION OF THE EXISTING ENVIRONMENT 8

A. PHYSICAL ENVIRONMENT 8

1. Surrounding Environment 8

2. Climate 8

3. Flood and Tsunami Hazards 9

4. Wetlands and Streams 9

5. Topography and Soils 9

6. Flora and Fauna 11

7. Air Quality 14

8. Noise Characteristics 14

9. Archaeological Resources 14

10. Cultural Impact Considerations 15

11. Scenic and Open Space Resources 20

B. SOCIO-ECONOMIC ENVIRONMENT 20

1. Land Use and Community Character 20
2. Population and Economy 21
C. PUBLIC SERVICES 22
1. Police and Fire Protection 22
2. Health Care 22
3. Recreation 23
4. Education 23
5. Solid Waste 23
D. INFRASTRUCTURE 24
1. Roadways 24
2. Water 25
3. Wastewater 26
4. Drainage 27
5. Power, Telephone and CATV Services 27
III. POTENTIAL IMPACTS AND MITIGATION MEASURES 28
A. IMPACTS TO THE PHYSICAL ENVIRONMENT 28
1. Surrounding Uses 28
2. Flora and Fauna 28
3. Air Quality Conditions 29
4. Noise Conditions 29
5. Archaeological Resources 30
6. Assessment of Cultural Impacts 31

	7.	Scenic and Open Space Resources	39
B.	IMPACTS TO SOCIO-ECONOMIC ENVIRONMENT		39
	1.	Land Use and Community Character	39
	2.	Economy	39
	3.	Police, Fire and Health Care	40
	4.	Recreation and Education	40
	5.	Solid Waste	40
C.	IMPACTS TO INFRASTRUCTURE		41
	1.	Roadways	41
	2.	Water and Wastewater	47
	3.	Drainage	47
	4.	Power, Telephone and CATV Services	48
D.	CUMULATIVE AND SECONDARY IMPACTS		48
IV.	RELATIONSHIP TO LAND USE PLANS, POLICIES AND CONTROLS		51
A.	STATE LAND USE DISTRICTS		51
B.	MAUI COUNTY GENERAL PLAN		51
C.	KIHEI-MAKENA COMMUNITY PLAN		54
D.	ZONING		56
E.	COUNTY OF MAUI SPECIAL MANAGEMENT AREA		56
V.	SUMMARY OF ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED, AND IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES		65

VI. ALTERNATIVES ANALYSIS 66

A. DESIGN ALTERNATIVES 66

B. NO ACTION/DEFERRED ACTION ALTERNATIVE 66

VII. ANTICIPATED DETERMINATION AND FINDINGS AND REASONS SUPPORTING THE DETERMINATION 67

VIII. LIST OF PERMITS AND APPROVALS 71

IX. NEIGHBORHOOD/GROUP INFORMATION MEETINGS 72

X. AGENCIES CONSULTED DURING THE PREPARATION OF THE DRAFT ENVIRONMENTAL ASSESSMENT, LETTERS RECEIVED AND RESPONSES TO SUBSTANTIVE COMMENTS 73

XI. LETTERS RECEIVED DURING THE DRAFT ENVIRONMENTAL ASSESSMENT PUBLIC COMMENT PERIOD AND RESPONSES TO SUBSTANTIVE COMMENTS 149

REFERENCES i

LIST OF APPENDICES

A Right-of-Way Concept Map
B Facsimile Memo to State Historic Preservation Division, Dated November 20, 2004
C Letters from State Historic Preservation Division Regarding Ke Ali'i Kai II Subdivision, Dated April 30, 2004 and December 7, 2004
D Preliminary Engineering Report
E Acoustical Study
F Traffic Impact Analysis Report
G Letter from Kihei Community Association's Planning Committee, Dated March 11, 2004
H Letter to Kihei Community Association's Planning Committee, Dated April 13, 2005

LIST OF FIGURES

1	Regional Location Map	2
2	Project Site Map	3
3	Typical Section A and Section B	6
4	Flood Insurance Rate Map	10
5	Soil Association Map	12
6	*Soil Classification Map*	13
7	State Land Use Classifications	52
8	Community Plan Land Use Designations	55

townedev/rscoll/finalea.rpt

Executive Summary

Applicant:	Towne Development of Hawaii, Inc.
Determination Agency:	Maui Planning Commission
Agencies Consulted:	A total of three (3) Federal Government agencies, nine (9) State of Hawaii Government agencies, seven (7) County of Maui agencies, one (1) private company and one (1) community group were consulted in making the assessment. For further information, refer to Chapter X and Chapter XI of this Final Environmental Assessment.
General Description:	The applicant is proposing the extension of the existing North-South Collector Road (a.k.a. Liloa Drive) from Walua Place to Keonekai Road in Kihei, Maui (TMKs 3-9-04:05 and 145, 3-9-19:04, 3-9-20:04, 07, 12, 16, 20 and 27). The project proposes the construction of approximately 1,200 lineal feet of roadway. Two (2) typical sections will be utilized for the construction of the roadway. The first typical section, fully meeting County roadway standards, will be used for the portion of the roadway from Walua Place to the southern boundary of Ke Ali'i Kai II subdivision. The second typical section, involving the provision of two (2) travel lanes only (without curbs, gutters and sidewalks), will be utilized to construct the portion of the road from the southern boundary of the Ke Ali'i Kai II subdivision to Keonekai Road. East and west of the site are lands with existing single-family residential and multi-family residential/transient accommodation uses. The northern terminus of the subject roadway is located near the Ke Ali'i Alanui Road. The project's terminus to the south intersects with Keonekai Road, with existing residential and transient accommodation uses located beyond. An analysis with regards to the action's technical, economic, social and environmental aspects is provided in the following Final Environmental Assessment.

Preface

The applicant, Towne Development of Hawaii, Inc. (TDH), proposes to construct the extension of the existing North-South Collector Road (a.k.a. Liloa Drive) from Walua Place to Keonekai Road in Kihei, Maui. Identified by TMKs 3-9-04:05 and 145, 3-9-19:04, 3-9-20:04, 07, 12, 16, 20, and 27 the project scope entails the installation of approximately 1,200 lineal feet of roadway and related improvements.

Pursuant to Chapter 343, HRS, and Chapter 200 of Title 11, Department of Health Administrative Rules, Environmental Impact Statement Rules, this Environmental Assessment documents the project's technical characteristics, environmental impacts and alternatives, and advances findings and conclusions relative to the significance of the project.

Chapter I

Project Overview

I. PROJECT OVERVIEW

A. PROJECT LOCATION, EXISTING USE, AND LAND OWNERSHIP

The applicant, Towne Development of Hawaii, Inc. (TDH), proposes to develop an extension to the existing North-South Collector Road (a.k.a. Liloa Drive) in the vicinity of Walua Place to Keonekai Road in Kihei. See Figure 1. The project site is identified by portions of TMK Nos. 3-9-04:05 and 145, 3-9-19:04, 3-9-20:04, 07, 12, 16, 20 and 27 and covers approximately 1,200 lineal feet. See Figure 2. In addition to the foregoing parcels, the project will affect existing rights-of-way owned by the County of Maui, fronting the Kamaole Heights Subdivision and Regency Apartments.

The project site is located in an area of single-family residential and multi-family residential/transient accommodation uses. The northern terminus of the proposed roadway is located near the North-South Collector Road's intersection with Ke Ali'i Alanui. Residential uses, such as the Kihei Ali'i Kai Condominium, Kamaole Heights Subdivision and the Kihei Regency apartments, are found in this vicinity. Located west of the project corridor is South Kihei Road, which is bordered by various commercial and transient accommodation uses. The southern terminus of the roadway intersects with Keonekai Road. Surrounding residential uses at the southern terminus include the Keonekai Heights Subdivision and the Maui Banyan. Located west of the southern terminus is the Kamaole III Beach Park. The roadway rights-of-way and/or road widening lots are in place for most of the project corridor. As may be required, the County of Maui will initiate condemnation proceedings to secure the needed roadway right-of-way.

The proposed Liloa Drive extension is in line with the Kihei-Makena Community Plan as the construction of the North-South Collector Road is

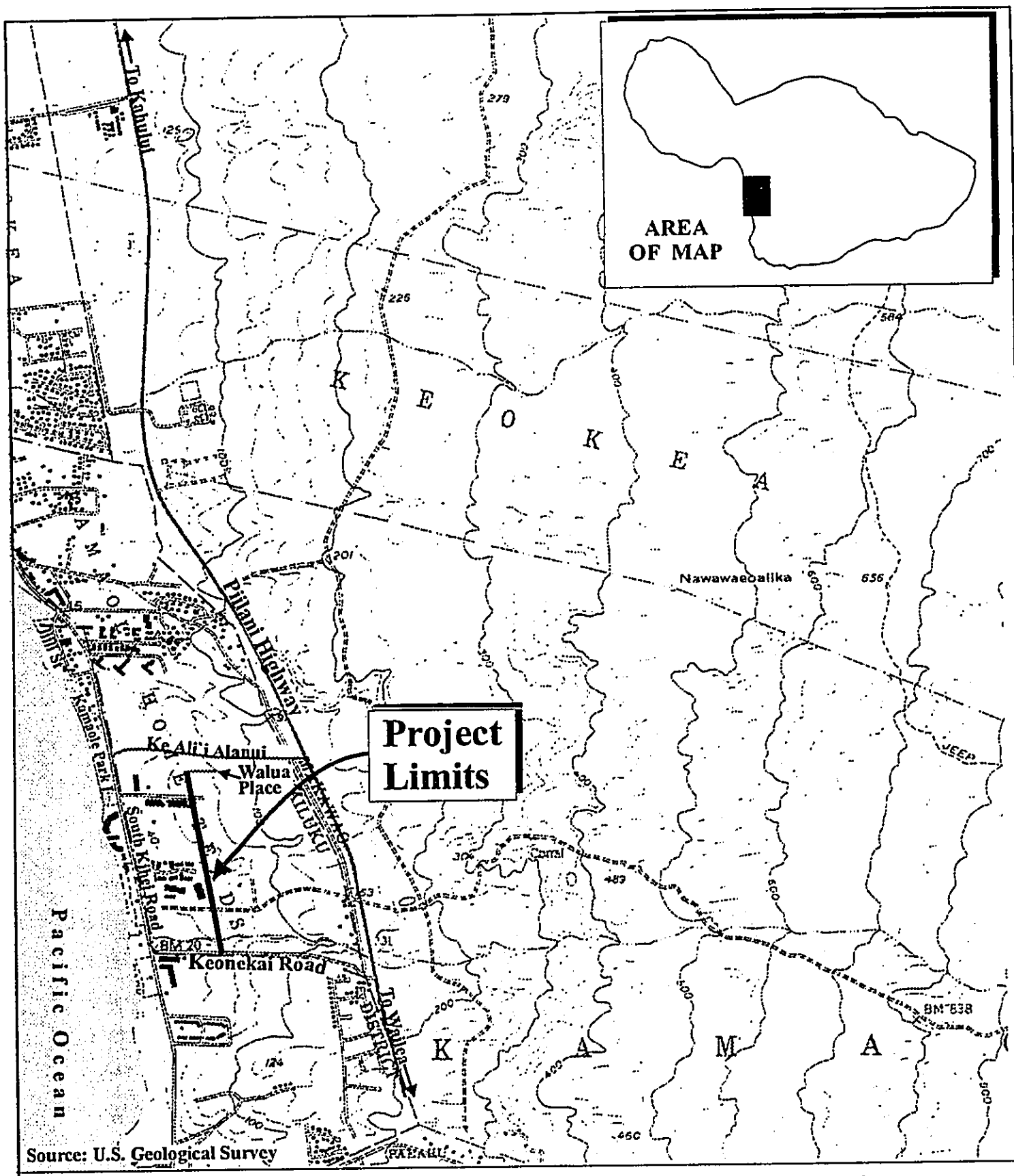

Figure 1 Proposed North-South Collector Road Extension From Walua Place to Keonekai Road

Regional Location Map

1000 Feet
0 500 2000

Prepared for: Towne Development of Hawaii, Inc.

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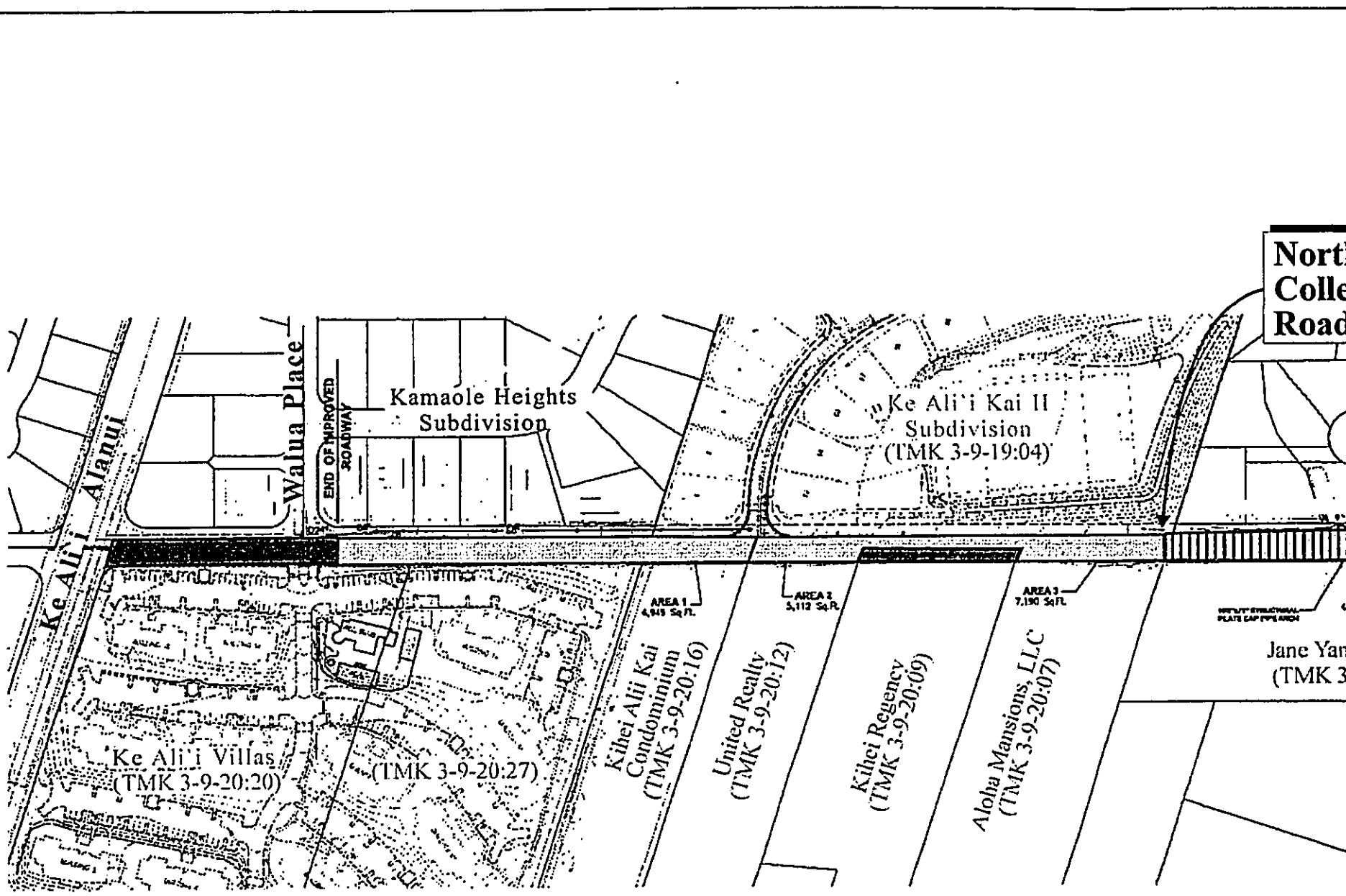
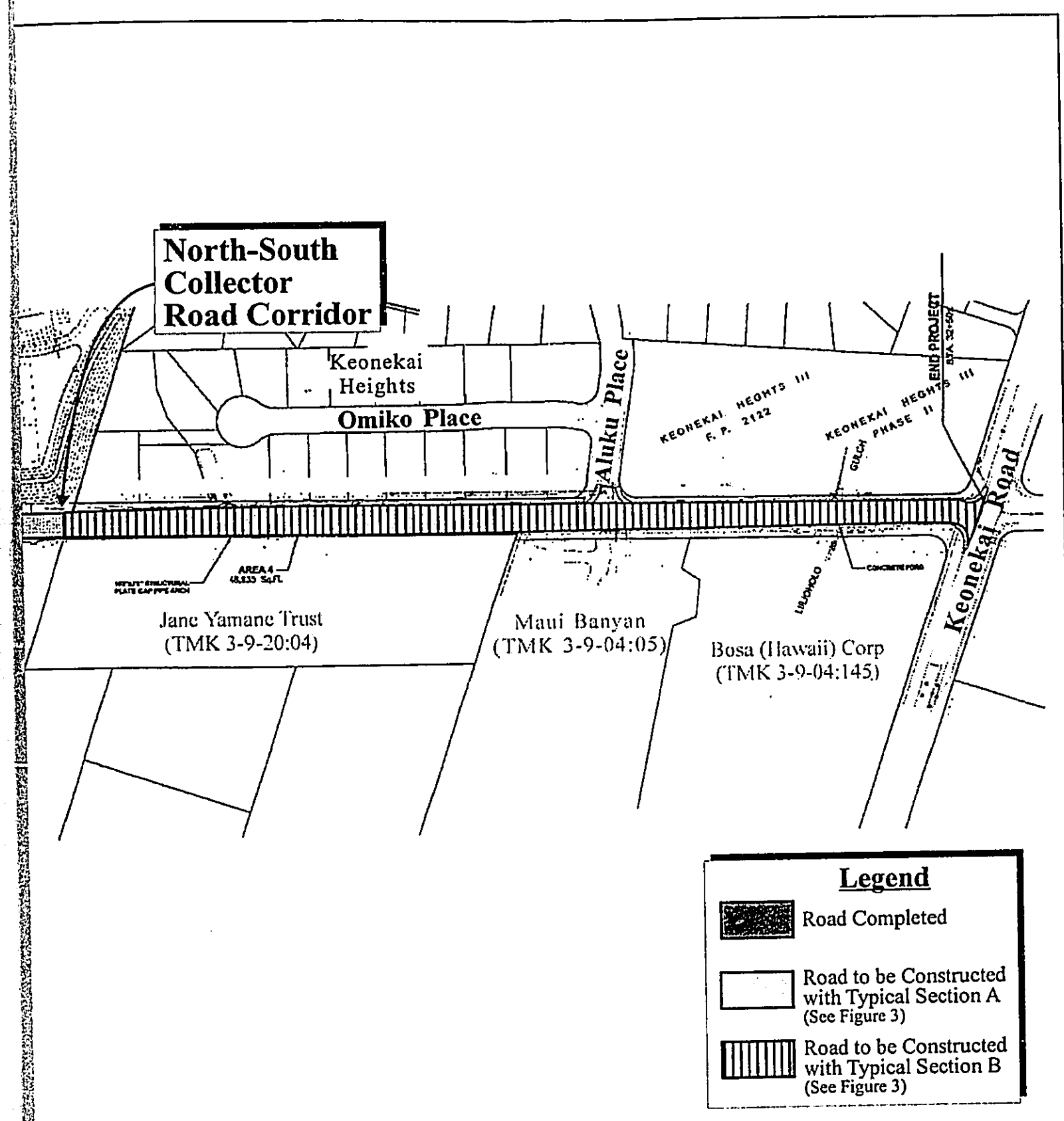


Source: Warren S. Unemori Engineering, Inc.

Figure 2

Proposed North-South Collector Roa
From Walua Place to Keonekai
Project Site Map

Prepared for: Towne Development of Hawaii, Inc.



ollector Road Extension
to Keonekai Road
ite Map

MUNEKIYO & HIRAGA, INC.

an implementing action and the Community Plan map delineates the roadway alignment. This project will serve to alleviate traffic congestion and provide an alternate transportation route for cars traveling on Piilani Highway or South Kihei Road.

The project corridor is owned by various parties, including the applicant and the County of Maui. See Table 1 and Appendix "A".

Table 1

LAND OWNERSHIP STATUS		
Tax Map Key	***Owner***	***Status***
3-9-004:005	Maui Banyan	Right-of-way to be dedicated in connection with the Maui Banyan Project
3-9-004:145	Bosa (Hawaii) Corp.	Right-of-way to be dedicated in connection with the Maui Banyan Project
3-9-019:004	KAK II, LLC[a]	Right-of-way to be provided in connection with the Ke Ali'i Kai II Subdivision
3-9-020:004	Jane Sawyer Yamane Trust	Right-of-way acquisition to be negotiated or secured through County condemnation process
3-9-020:007	Aloha Mansions, LLC	Right-of-way to be provided by Aloha Mansions, LLC
3-9-020:012	United Realty, Inc.	Right-of-way to be provided by landowner
3-9-020:016	Kihei Alii Kai Condominium	Right-of-way acquisition to be negotiated or secured through County condemnation process
3-9-020:020	Ke Ali'i Villas, LLC[a]	Right-of-way to be dedicated in connection with the Ke Ali'i Villas Project
3-9-020:27	Ke Ali'i Villas, LLC[a]	Right-of-way to be dedicated in connection with Ke Ali'i Kai II Subdivision
Existing County Right-of-way Fronting Kamaole Heights Subdivision (No TMK Number)	County of Maui	Right-of-way previously dedicated (not improved) in connection with Kamaole Heights Subdivision
Existing County Right-of-way Fronting Kihei Regency Apartments (No TMK Number)	County of Maui	Right-of-way previously dedicated and improved in connection with the Kihei Regency Apartments project
[a]Affiliate of applicant.		

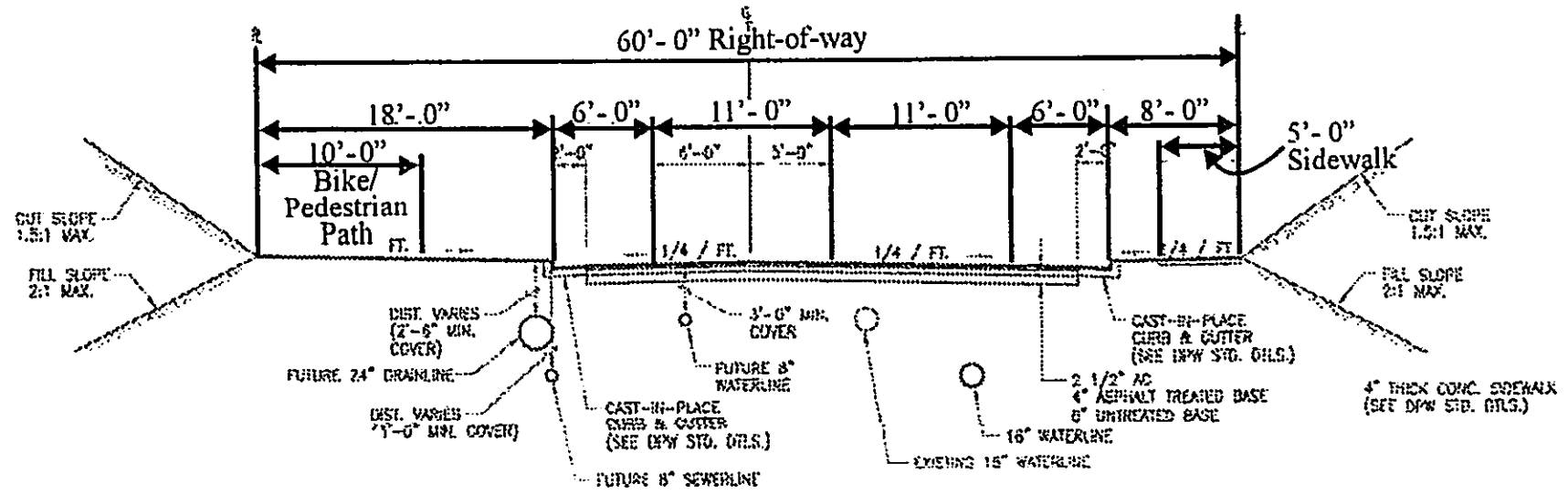
B. ***PROPOSED ACTION***

TDH plans to develop the portion of the North-South Collector Road from Walua Place to the southern boundary of the Ke Ali'i Kai II subdivision in accordance with proposed Typical Section A. See Figure 3. Typical Section A includes a 60-foot right-of-way with two (2) 11-foot wide travel lanes, 6-foot shoulders, a 5-foot sidewalk on the west (makai) side of the roadway, as well as concrete curbing and gutter. In addition, an 18-foot wide graded strip along the easterly (mauka) extent of the right-of-way, designed to accommodate a separate 10-foot wide bicycle/pedestrian path is proposed as part of Typical Section A.

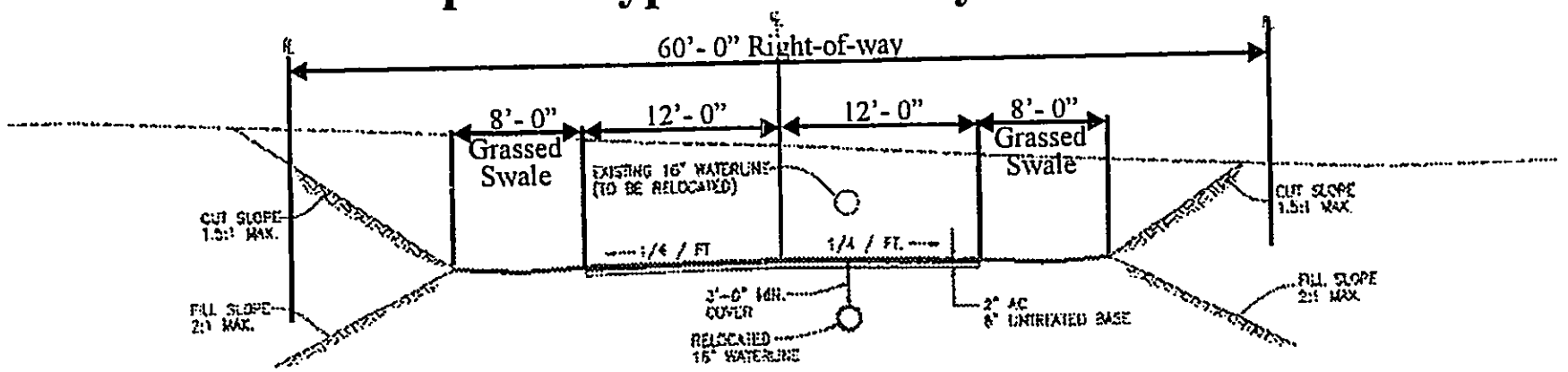
The proposed Typical Section B will be utilized for the portion of the road from the southern boundary of the Ke Ali'i Kai II subdivision to the intersection with Keonekai Road. Typical Section B includes a 60-foot right-of-way, with two (2) 11-foot wide travel lanes and 8-foot grassed swales on the east and west sides of the roadway. Refer to Figure 3. A majority of the road corridor is vacant land, however, there is an existing paved portion near the southern boundary of the Ke Ali'i Kai II subdivision, which was dedicated to the County and improved in connection with the Kihei Regency project. Refer to Figure 2.

The estimated cost of the project is $2.3 million. Construction of the roadway extension is anticipated to commence in second quarter of 2006, with completion by mid-2007.

The subject property falls within the limits of the Special Management Area (SMA) for the island of Maui. Accordingly, an application for a SMA Use Permit has been prepared and submitted to the Department of Planning for review and action by the Maui Planning Commisson. Additionally, inasmuch as portions of the underlying property are or will be



Proposed Typical Roadway Section A



Proposed Typical Roadway Section B

Source: Warren S. Unemori Engineering, Inc.

Figure 3 Proposed North-South Collector Road Extension From Walua Place to Keonekai Road
Typical Section A and Section B

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owned by the County of Maui, an environmental assessment has been prepared in accordance with Chapter 343, Hawaii Revised Statutes.

Chapter II

Description of the Existing Environment

II. DESCRIPTION OF THE EXISTING ENVIRONMENT

A. PHYSICAL ENVIRONMENT

1. Surrounding Environment

The project site is located in the Kamaole area of Kihei, Maui, within the southern portion of the Kihei District. The roadway corridor is located in a part of Kihei which is characterized by hotel, business/commercial, single-family and multi-family uses.

To the north of the project site, beyond Ke Ali'i Alanui, lie various hotel, condominium, apartment and timeshare projects, such as the Maui Coast Hotel, Pacific Shores, Maui Vista, and Worldmark, The Club. To the east of the site, beyond the Kamaole Heights Subdivision are Kamali'i Elementary School and the Keonekai Heights Subdivision, while to the south, beyond the Kihei Ali'i Kai, lie numerous condominium projects, including the Kihei Kai Nani, Kihei Akahi, Maui Banyan, and Haleakala Shores. To the west of the site are South Kihei Road, Kamaole Beach Park I and the Kamaole Surf Condominium.

Three (3) retail commercial centers located less than a quarter of a mile to the south of the project site include convenience stores, restaurants and other retail shops.

2. Climate

The Kihei Coast, which encompasses the site, is generally sunny, warm and dry the entire year. In Kihei Town, the average annual high temperature is in the low 90's with the average low temperature being in the low 60's. June through August are historically the warmer months of the year, while the cooler months are January to March.

Average rainfall distribution in the Kihei-Makena region varies from under 10 inches per year to 20 inches per year in the higher elevations. Rainfall in the Kihei-Makena region is highly seasonal, with most of the precipitation occurring in the winter months.

Northeast tradewinds prevail approximately 80 to 85 percent of the time. Winds average 10 to 15 miles per hour during afternoons, with slightly lighter winds during mornings and nights.

3. ***Flood and Tsunami Hazards***

According to the Flood Insurance Rate Map (FIRM) issued by the Federal Emergency Management Agency, the project site is primarily located in Zone C, an area of minimal flooding. See Figure 4. A short segment of the roadway will traverse the Liilioholo drainage gulch, which is designated Zone A4, an area of 100-year flood, having base flood elevations and flood hazard factors determined.

4. ***Wetlands and Streams***

There are no wetlands or streams affected by the proposed roadway extension. As noted above, however, the road will traverse the Liilioholo drainage gulch. The gulch conveys stormwater during periods of high rainfall. Additionally, there is a relatively small, unnamed gulch that intersects with the project corridor, approximately 1,600 feet south of Walua Place.

5. ***Topography and Soils***

The roadway corridor slopes in an easterly to westerly direction at an average cross slope of approximately 3 percent. Elevations along the corridor range from around 80 feet at the northern

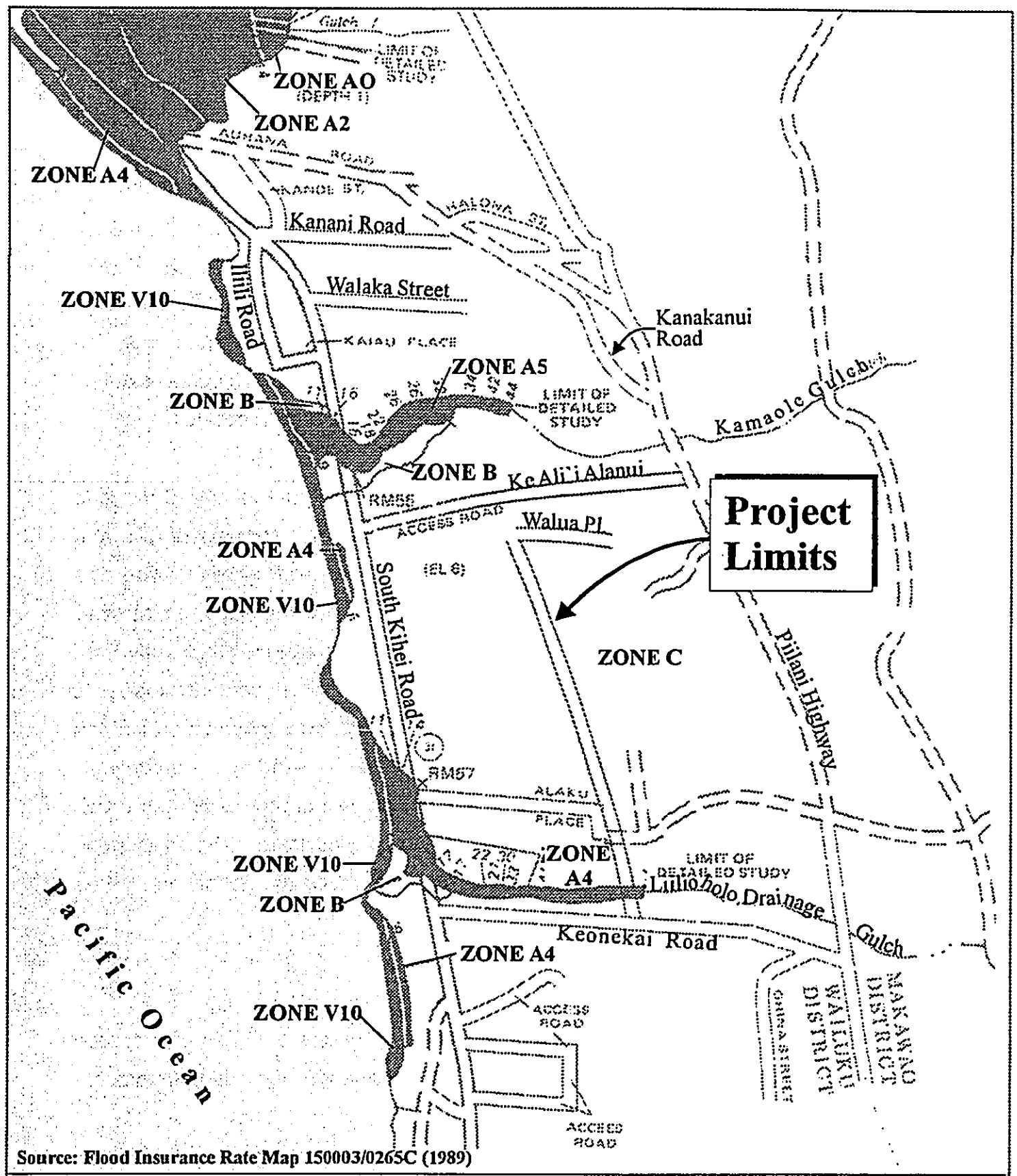

Figure 4 Proposed North-South Collector Road Extension From Walua Place to Keonekai Road

Flood Insurance Rate Map

0 250 500 1000 Feet

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terminus of the roadway to approximately 70 feet near the roadway's southern terminus.

Underlying the project site is the Pulehu-Ewa-Jaucas soil association. See Figure 5. The Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii characterizes the soils of this association as deep, nearly level to moderately sloping, well-drained and excessively drained soils. The underlying material is moderately fine-textured to course-textured subsoil. This soil occurs on alluvial fans and in basins.

The soil types prevalent around the project site include Dune land (DL) and Puuone sand (PZUE). Dune land consists of hills and ridges of sand-size particles drifted and piled by wind. The hills and ridges are actively shifting or are so recently fixed or stabilized that no soil horizons have developed. The sand is dominantly from coral and seashells. Puuone sand, 7 to 30 percent slopes, is located on sandhills near the ocean. In a representative profile, the surface layer is grayish brown, calcareous sand approximately 20 inches thick. This is underlain by grayish-brown cemented sand. Permeability is rapid above the cemented layer. Runoff is slow, and the hazard of wind erosion is moderate to severe. See Figure 6.

6. ***Flora and Fauna***

Vegetation on the subject property consists primarily of a sparse growth of kiawe trees and scrub vegetation such as buffelgrass.

Fauna and avifauna at the project site and surrounding areas are typical of species found in the urbanized Kihei area. Fauna typically found in the vicinity include mongoose, mice, rats, dogs

LEGEND

① Pulehu-Ewa-Jaucas association

② Waiakoa-Keahua-Molokai association

③ Honolua-Olelo association

④ Rock land-Rough mountainous land association

⑤ Puu Pa-Kula-Pane association

⑥ Hydrandepts-Tropaquods association

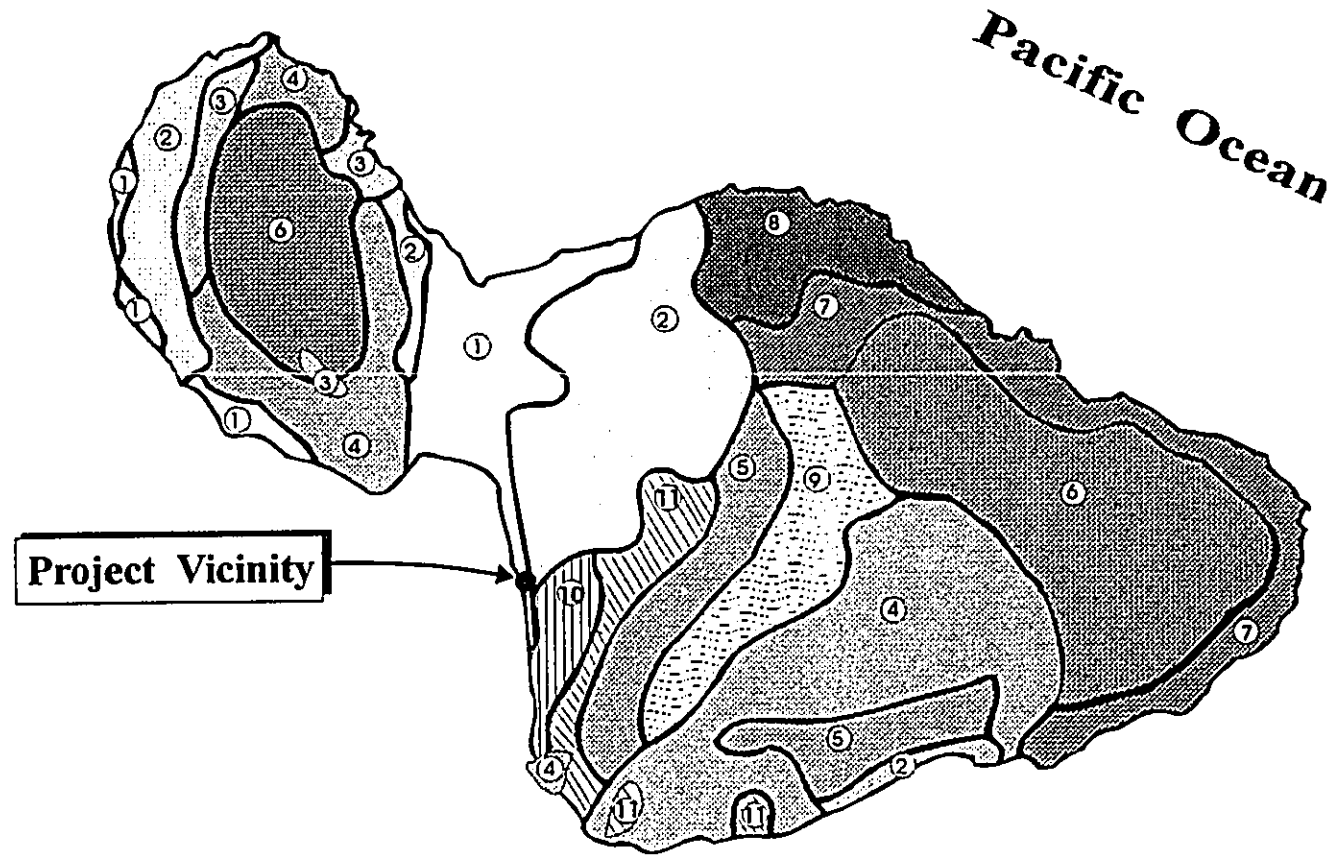
⑦ Hana-Makaalae-Kailua association

⑧ Pauwela-Haiku association

⑨ Laumaia-Kaipoipoi-Olinda association

⑩ Keawakapu-Makena association

⑪ Kamaole-Oanapuka association



Source: U.S. Department of Agriculture, Soil Conservation Service

Figure 5 Proposed North-South Collector Road Extension From Walua Place to Keonekai Road

Soil Association Map

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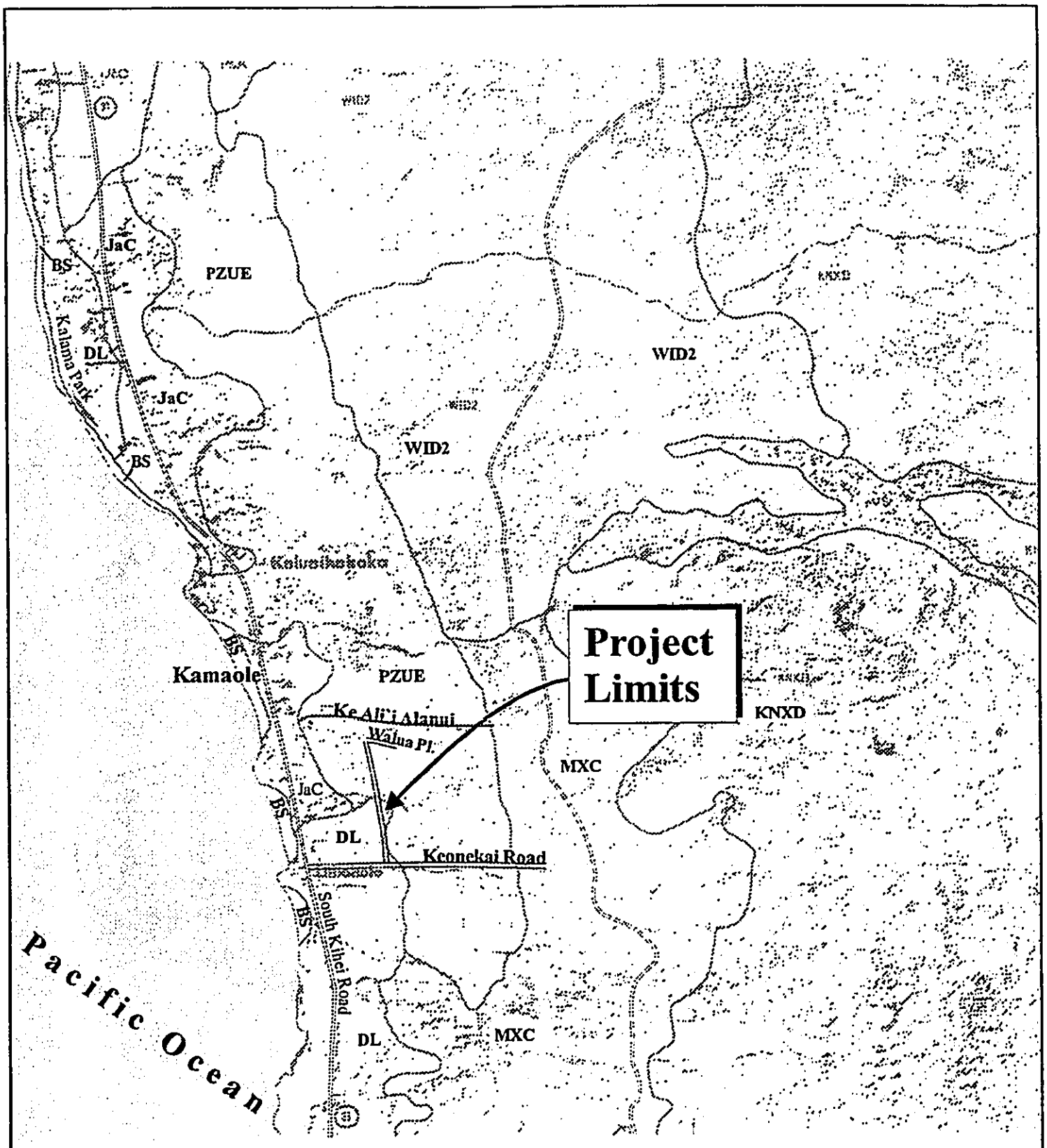

Source: U.S. Department of Agriculture, Soil Conservation Service

Figure 6 Proposed North-South Collector Road Extension From Walua Place to Keonekai Road

Soil Classification Map

0 500 1000 2000 Feet

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and cats. Avifauna typically include the Northern Cardinal, Common Mynah, Golden Plover, Spotted Dove, House Finch and Gray and Black Francolin.

There are no known rare, threatened or endangered wildlife species in the vicinity of the site.

7. ***Air Quality***

There are no point sources of airborne emissions in the immediate vicinity of the project site. The air quality of the Kihei area is considered good with existing airborne pollutants attributed primarily to automobile exhaust from the region's roadways. Another source of airborne emissions is the smoke from sugar cane burning which occurs in the Central Maui isthmus. This source is intermittent, however, and prevailing tradewinds quickly disperse particulates which are generated.

8. ***Noise Characteristics***

Background noise in this locale can be attributed to traffic travelling along South Kihei Road and Ke Ali'i Alanui, as well as within the Kamaole Heights Subdivision. Ocean surf is also a source of background noise.

9. ***Archaeological Resources***

The project site is located in an area of urban development. In 2004, three (3) Special Management Area (SMA) Use Permits were granted to properties surrounding the project corridor (Ke Ali'i Villas, Ke Ali'i Kai II Subdivision and Aloha Villages). As part of their SMA application, each project was required to conduct an archaeological inventory survey of their property and receive

approval of the report by the State Historic Preservation Division (SHPD).

A memorandum was sent to the SHPD Maui office to determine whether or not an archaeological inventory survey would be required for the North-South Collector Road project. See Appendix "B". The applicant consulted with the SHPD Maui office regarding archaeological requirements for the roadway extension and it was determined by SHPD that since archaeological monitoring plans were in place for the neighboring Ke Ali'i Kai II Subdivision, no additional inventory survey report would be required for the project. See Appendix "C". Additionally, SHPD would not require archaeological monitoring for the roadway extension, however, the applicant intends to provide monitoring during the road construction.

10. *Cultural Impact Considerations*

a. *Geopolitical Division*

Prior to Western contact in Hawaii, land was divided into units called *ahupua'a*. Ideally, each *ahupua'a* was self-sufficient, running from *mauka*, the mountain, to *makai*, the ocean (MacKenzie 3). These divisions served as both cultural and settlement systems as traditional Hawaiian life was tied intimately to the land. Hunting, gathering, cultivation, and habitation took place within three (3) zones which characterized the *ahupua'a*: the *Mauka* Zone, the Agricultural Zone, and the Coastal Zone. The *Mauka* Zone provided access to a variety of trees, plants, and herbs for various needs, customs and practices. Planting of yams, sweet potato, sugar cane, taro, and other foods took place

in the Agricultural Zone where gradual slopes of land allowed terraces to be constructed for more efficient irrigation. The Coastal Zone and low-lying areas were where most of the *kauhale*, group of houses, were found, as well as temples, fishing shrines, and fishponds (Minerbi 77).

Western contact brought changes to the Hawaiian land system along with the introduction of private ownership of land, a concept foreign to the native Hawaiians. A Board of Land Commissioners was established in 1845 to uphold or reject all private land claims of both foreigners and Hawaiians. The Commission adopted rules pertaining to the proof of claims, right of tenants, and commutation to the government in attempts to achieve the goal of totally partitioning undivided lands. All lands not claimed by February of 1848 were to be forfeited to the government (MacKenzie 6).

Following the enactment of these rules, the *Mahele* division of 1848 divided all lands of Hawaii between the king and chiefs. Two (2) years later the *Kuleana* act completed the *Mahele* process by authorizing the Land Commission to award fee simple titles to native tenants for their land. These *kuleana* parcels, also known as Land Commission Awards (LCA), were generally among the richest and most fertile in the islands and came from king, government, or chief's land. All claims and awards were numbered and recorded in the *Mahele* Book (MacKenzie 8). In addition, government lands were sold as "Royal Patent Grants" or "Grants" in order to meet the increasing costs of

government. These grants differed from LCAs, as it was not necessary for the recipients to obtain an award for their land from the Land Commission (Chinen 27-28).

b. ***Traditional and Customary Rights***

Hawaiian customs and practices are recognized as "Hawaiian usage" if it can be shown to have been exercised prior to November 25, 1892, which was when the Hawaiian Kingdom Legislature adopted British common law into the Hawaiian legal system (Minerbi 98). The traditional and customary rights of native Hawaiians can be broken down into access rights, gathering rights, burial rights, and religious rights.

Access

Native Hawaiians generally share the same access rights as the general public. However, they have the unique access rights to *kuleana* parcels and between *ahupua'a*. Access to *kuleana* parcels may involve access along ancient trails or expanded access not limited to any route. Additionally, the *Kuleana* Act granted unobstructed access within the *ahupua'a* to obtain items necessary to make the *kuleana* parcel productive. Access rights between *ahupua'a* involve access along ancient or well established trails (MacKenzie 214-220).

Gathering

In terms of gathering rights, the Hawaii Supreme Court has upheld gathering rights within an *ahupua'a* for firewood, house-timber, *aho* cord, thatch, and *ki*-leaf under three (3) conditions. The tenant must physically reside within the

ahupua'a, the right to gather can only be exercised upon undeveloped lands within the *ahupua'a*, and the right must be exercised only for the purpose of practicing native Hawaiian customs and traditions (MacKenzie 226).

Burial

According to traditional Hawaiian burial beliefs, following death, the *'uhane,* or spirit, must remain near the *na iwi,* or bones. Burial sites are chosen by Hawaiians for symbolic purposes in places for safekeeping. Often bones were hidden in caves, cliffs, sand dunes, or deposited in the ocean. Today, federal and state laws protect both unmarked and marked burial sites.

Religious

Hawaiian religion and beliefs were intimately tied to the land. While some practices and traditions were lost over the years, basic Hawaiian religious concepts remain. The terms *"aloha 'aina,"* love the land and *"malama 'aina,"* care for and protect the land, convey the unity of humans, nature, and the gods in Hawaiian philosophy (Minerbi 129). Furthermore, Hawaiians honored and worshiped *aumakua,* deities, and *akua*, gods. There were numerous *akua* of farming, fishing, tapa making, dancing, sports, and any other activity of Hawaiian life. The concept of *mana* or sacred attachment to places, people, or things also remains as a significant aspect of Hawaiian religion (MacKenzie 232).

The First Amendment of the U.S. Constitution guarantees the freedom to practice religion. To the native Hawaiians, freedom to practice religion includes a freedom to practice

a way of life which acknowledges the sacredness of places, animals, and natural forces (MacKenzie 240).

c. ***Kama'ole Ahupua'a***

The Kama'ole *ahupua'a* lies in the traditional district of Kula. The literal meaning of Kama'ole is "childless". Land conveyance records indicate that much of Kula was government land and in 1911, the territorial government of Hawaii sold these acreages of public land (Pantaleo, 2001). In the Kama'ole *ahupua'a*, 20 L.C.A.'s were awarded although none are noted in the vicinity of the project corridor. The majority of lands within this ahupua'a was used for cattle ranching.

As explained by Pantaleo (2001), permanent or seasonal habitation occurred along the dry coastal areas of Maui around A.D. 1000-1400 as these areas provided ready access to marine resources. Types of features found in coastal areas included enclosures and overhang shelters and mounds and small planting areas in selected localities. Mauka-makai trails linked the permanent upland habitation areas to the coastal areas.

As documented in Haun (2000), the coastal areas of Kama'ole were used for small-scale gardening, fishing and collecting marine resources. Between the shoreline and the upland residences (2,000 ft. elevation), was a broad, arid area that was largely unoccupied as hypothesized by Cordy. (The upland areas were generally used for permanent habitation.) Sites in this intermediate zone are largely limited

to trails linking the coast to the uplands and occasional temporary habitations.

During the historic period, Irish potato and sugar were being cultivated in upland areas. When demand for these products decreased, cattle ranching became predominant. Prior to and during World War II, the lower portion of Kama'ole ahupua'a was used for military training purposes.

11. *Scenic and Open Space Resources*

The roadway corridor is situated east or mauka of South Kihei Road, the coastal arterial highway in this region. Kamaole Beach Park I is located to the west, across South Kihei Road. Portions of the roadway alignment offer views of the ocean, as well as views to Haleakala. The islands of Kaho'olawe and Lana'i are also visible from the project corridor. Open space in the Kihei-Makena region is defined by a broad expanse of undeveloped lands mauka of Piilani Highway which extends in an easterly direction toward lower Kula.

The project corridor is not a part of, or in proximity to, scenic corridors.

B. *SOCIO-ECONOMIC ENVIRONMENT*

1. *Land Use and Community Character*

From a regional standpoint, the subject parcel is part of the Kihei-Makena Community Plan region which stretches from Maalaea to La Perouse Bay. The region includes a diverse range of physical and socio-economic environments. With its dry and mild climate

and proximity to recreation-oriented shoreline resources, the visitor-based economy has grown steadily over the past few years. The town of Kihei serves as the commercial and residential center of the region with the master-planned communities of Wailea and Makena serving as the focal point for visitor activities.

As previously noted, the area surrounding the project site includes residential, hotel, condominium and business/commercial uses. Kamaole Beach Park I is situated to the west of the proposed roadway extension, makai or west of South Kihei Road.

2. *Population and Economy*

The population of the County of Maui has exhibited relatively strong growth over the past decade, with the 2000 population of 128,241 increasing about 28 percent over the 1990 population of 100,504. Growth in the County is expected to continue, with a population projection for the year 2010 estimated to be 151,269 (SMS, June 2002).

Just as the County's population has grown, the resident population of the Kihei-Makena region has increased dramatically in the last few decades. Population gains were especially pronounced in the 1970's as the rapidly developing visitor industry attracted many new residents. The current resident population of the Kihei-Makena region is approximately 22,870. A projection of the resident population for the year 2010 is 27,181 (SMS, June 2002).

The economy of Maui is heavily dependent upon the visitor industry. The dependency on the visitor industry is especially evident in Kihei-Makena, which is one of the State's major resort

destination areas. The foundation for the region's visitor strength lies in world-class resorts and recreational facilities located in Wailea and Makena. Support for the visitor industry is found in Kihei, where numerous retail commercial centers are found.

C. PUBLIC SERVICES

1. Police and Fire Protection

The County of Maui's Police Department is headquartered at its Wailuku Station. The Department consists of several patrol, investigative and administrative divisions. The Department's Kihei Patrol, which covers the Kihei-Makena region, has a substation at the Kihei Town Center about 1.0 mile to the north of the roadway corridor.

Fire prevention, suppression and protection services are provided by the County's Department of Fire and Public Safety. The Kihei Station, which services the Kihei-Makena region, is located on South Kihei Road near Kalama Park approximately 1.0 mile north of the project area. The Wailea Fire Station is about 1.0 mile to the south of the project corridor. The Wailea Station services the area from Makena to Kamaole Park II and provides back-up support for the Kihei Station.

2. Health Care

Maui Memorial Medical Center, is the only major medical facility on the island, that services the Kihei-Makena region. Acute, general and emergency care services are provided by the 196-bed facility which is located in Wailuku. Privately operated medical/dental offices are located in the Kihei area to serve the region's residents.

3. *Recreation*

Diverse recreational opportunities are available in the Kihei-Makena region. Recreational facilities in close proximity to the project site include Kalepolepo Park, Elleair Maui Golf Club, Kalama Park, Kamaole Beach Parks I, II and III, and numerous other beach parks along the Kihei coastline. Shoreline recreation includes swimming, fishing, picnicking, snorkeling and windsurfing.

The Wailea-Makena resort areas to the south of the project site offer additional opportunities for golf, tennis and ocean-related activities.

4. *Education*

The existing school service area encompasses approximately 32 square miles. The State Department of Education (DOE) operates three (3) schools in the Kihei area. Kihei Elementary School and Kamali'i Elementary School cover grades K to 5. Lokelani Intermediate School includes grades 6 to 8. Public school students in grades 9 through 12 attend Maui High School in Kahului.

Maui Community College, a branch of the University of Hawaii system, is the primary institution of higher education on the island.

5. *Solid Waste*

Single-family residential solid waste collection service is provided by the County of Maui on a twice-a-week basis. Residential solid waste collected by County crews are disposed of at the County's Central Maui Landfill located 4.0 miles southeast of the Kahului Airport. In addition to County-collected refuse, the Central Maui Landfill accepts commercial waste from private collection

companies.

D. INFRASTRUCTURE

1. Roadways

Access to the Kihei region is provided by North Kihei Road from West Maui and the Wailuku area, and Mokulele Highway and Piilani Highway from the Kahului area and "Upcountry". North Kihei Road becomes South Kihei Road, near its junction with Mokulele Highway and continues southward through Kihei Town.

South Kihei Road is oriented in a north-south direction. This two-lane, two-way County roadway generally follows the coastline through Kihei Town. In the vicinity of the project corridor, the posted speed limit on South Kihei Road is 20 miles per hour (mph). The intersection of South Kihei Road and Ke Ali'i Alanui is signalized. The approaches to the intersection include separate turn lanes. The County has upgraded portions of South Kihei Road to urban collector standards.

Piilani Highway is the primary arterial highway for South Maui. This four-lane, two-way high quality State highway runs parallel to and mauka of South Kihei Road. In addition to paved shoulders, Piilani Highway has traffic signals, as well as left- and right-turn deceleration lanes at major intersections. Piilani Highway begins at North Kihei Road and terminates at Wailea Ike Drive in the Wailea Resort. In the project vicinity, the posted speed limit along Piilani Highway is 40 mph. The Piilani Highway and Ke Ali'i Alanui intersection is signalized. The intersection approaches provide for separate turn lanes.

Ke Ali'i Alanui is an urban collector oriented in an east-west direction. This two-lane, two-way County roadway links Piilani Highway and South Kihei Road and is immediately north of the project corridor. This road was designed to function as a four-lane collector. Currently, much of the space set aside for both outside travel lanes has been restriped to provide onstreet parking. In the project area, the posted speed limit on Ke Ali'i Alanui is 20 mph.

Kanakanui Road is generally a two-lane, two-way roadway parallel to Piilani Highway. There are separate turn lanes at the intersection with Ke Ali'i Alanui. The intersections of Kanakanui Road at Ke Ali'i Alanui and Kanakanui Road at Keonekai Road are STOP-sign controlled.

A portion of the North-South Collector Road through Kihei has been constructed, including the segment between Ke Ali'i Alanui and Walua Place. There is one (1) lane in each direction and a separate left-turn lane at the Ke Ali'i Alanui intersection. The intersection of Ke Ali'i Alanui and the North-South Collector Road segment is STOP-sign controlled, with the STOP sign along the collector road.

2. ***Water***

The project site is located in the Kihei low-level water service area. The wells at Mokuhau in Iao Valley are the primary source of water for this service area. The water from this source is supplemented by water from Shaft 33 and the Iao Valley tunnel source. Water from the Central Maui Joint Venture in upper Waiehu and wells at North Waihee also feed this system via storage tanks above Ohukai Road and above the Maui Research and Technology Park

(MR&T Park).

A series of 24-, 18-, and 16-inch transmission lines carry water from the Mokuhau source to Kilohana Road in Kihei. Water from the preceding supplemental water sources are connected to this transmission line at various locations enroute.

A 16-inch transmission line runs along the proposed extension alignment of the North-South Collector Road. See Appendix "D".

3. ***Wastewater***

The service area for the County's Kihei Wastewater Reclamation System extends from North Kihei to Makena. The system consists of a number of pump stations and force mains which convey wastewater through the County's transmission lines. Pump Station Nos. 2 to 5 convey flows from North Kihei to Pump Station No. 6 which is located adjacent to the Kihei Fire Station within Kalama Park. Pump Station Nos. 7 through 10 and 16 convey flows from Makena, Wailea and South Kihei to Pump Station No. 6. The combined flows are transported to the Kihei Wastewater Reclamation Facility, which is located mauka of Piilani Highway and south of the Elleair Maui Golf Club. The existing design capacity of this facility is 8.0 million gallons per day (MGD).

There is an 8-inch diameter gravity line within the Ke Ali'i Alanui right-of-way. This line feeds into a sewer pump station located at Kamaole Beach Park 1 on the west side of South Kihei Road. A series of other pump stations, force mains, and gravity interceptors then conveys wastewater to the Kihei Wastewater Reclamation Facility for treatment and disposal.

4. ***Drainage***

There are two (2) drainage gullies that are crossed by the North-South Collector Road extension. The first is a relatively small unnamed gulch located about 1,600 feet south of Walua Place. Refer to Appendix "D". The second, Liilioholo Gulch, is located approximately 250 feet north of Keonekai Road. There is an existing 24-inch culvert which conveys flows from Alaku Road (in the Keonekai Heights Subdivision) to Liilioholo Gulch. There are no other drainage improvements within the roadway corridor.

5. ***Power, Telephone and CATV Services***

Existing underground power, telephone, and cable television distribution systems lie along the shoulders of Ke Ali'i Alanui and the segment of the existing North-South Collector Road north of Walua Place.

Chapter III

Potential Impacts and Mitigation Measures

III. POTENTIAL IMPACTS AND MITIGATION MEASURES

A. IMPACTS TO THE PHYSICAL ENVIRONMENT

1. Surrounding Uses

Various land uses, encompassing commercial, hotel, recreational, and multi- and single-family activities, are found within the general vicinity of the project site.

Situated primarily along South Kihei Road, commercial zoned properties include the Dolphin Plaza, Kamaole Beach Center, Kamaole Shopping Center, Kihei Town Center and Rainbow Mall. The Kihei Alii Kai, Kamaole Sands, Kihei Akahi and Maui Vista condominiums represent the larger multi-family properties in the project area. Residential properties within the project vicinity include the Alaku, Ke Ali'i, Kamaole Heights, Kamaole Homesteads, Keonekai Heights and Pacific Terrace Subdivisions. The Maui Coast Hotel, Maui Banyan and Kamaole Beach Parks I, II and III typify the hotel and recreational land uses within the project area.

The proposed project is in keeping with the surrounding uses along the proposed roadway alignment.

2. Flora and Fauna

Vegetation associated with the project site consists primarily of introduced species such as buffelgrass and kiawe trees. None of these plants are listed as rare, threatened or endangered species.

Avifauna and fauna in the vicinity are typical of the Kihei-Makena region. There are no known rare, threatened or endangered species of wildlife found in the vicinity of the project site.

The proposed roadway extension project is not anticipated to have a significant adverse impact on botanical and wildlife resources.

3. ***Air Quality Conditions***

Existing airborne pollutants are attributed primarily to vehicle-generated exhaust from the region's roadways.

Other sources of airborne pollutants typically include dust resulting from construction activities, and smoke from sugar cane harvesting operations occurring in the Central Maui plain. These sources are considered intermittent, and the generated particulates are quickly dispersed by the prevailing tradewinds.

Emissions from construction equipment and other vehicles involved in construction activities may temporarily affect the ambient air quality within the immediate vicinity. However, these effects shall be minimized by properly maintaining construction equipment and vehicles.

In addition, dust generated during construction, especially from earth-moving operations, such as clearing, excavating and trenching, may also result in a temporary decrease in ambient air quality. Mitigation measures include utilizing dust barriers, waterwagons and/or sprinklers to control dust, and watering graded areas.

4. ***Noise Conditions***

As with air quality, ambient noise conditions will be temporarily impacted by construction activities. Heavy construction equipment, such as bulldozers, front-end loaders, and trucks and trailers

carrying materials would be the dominant source of noise during the construction period. Construction activities are anticipated to be limited to normal daylight working hours. Construction work on the existing waterline will be coordinated with affected properties.

An acoustical study was prepared for the proposed North-South Collector Road extension to evaluate potential noise impacts associated with the completed roadway. See Appendix "E". The existing traffic and background ambient noise levels in the project area do not exceed the U.S. Federal Highways Administration (FHWA) and State Department of Transportation (SDOT) noise abatement criteria.

In its analysis, the acoustical study reviewed noise measurements for the area, predicted future traffic noise for the roadway extension and estimated a future traffic mix for project build out of 98.8 percent automobiles, 1.0 percent medium trucks, and 0.2 percent heavy trucks and buses. The average travel speed of 30 miles per hour was used. The study concluded that the completed roadway should not exceed the traffic noise levels of the SDOT, at any existing dwelling units and one (1) planned ball field along the project corridor. Further, the study concluded that no park lands or public use facilities are expected to be adversely impacted by future traffic noise levels along the new roadway segment. For these reasons, the study concluded that traffic noise mitigation for the project should not be required.

5. ***Archaeological Resources***

As previously noted, the applicant has consulted with the SHPD-Maui office with regards to archaeological requirements for the

project. Although in initial consultation with the SHPD on the project, no archaeological monitoring was anticipated for the project due to previous archaeological work in the area, it is noted that the SHPD revised their opinion due to a recent discovery on an adjoining property. As previously noted, the applicant intended to provide archaeological monitoring although it was not anticipated as a requirement by the SHPD and will comply with the proposed requirements in the SHPD comment letter. Refer to Section XI of this document.

Should any archaeological features be exposed during construction activities, work in the vicinity of the find will promptly cease and the SHPD will be immediately notified in order to establish the significance of the unearthed features, and to determine an acceptable course of mitigative action.

6. *Assessment of Cultural Impacts*

a. *Informant Documentation*

An informant interview was conducted for a project proposed by an affiliate of the applicant, which abuts the project site. A summary of this interview with Mr. Kimokea Kapahulehua follows.

(1) Kimokeo Kapahulehua

Mr. Kimokeo Kapahulehua was born on Kauai in 1947. He graduated from Kauai High School in 1965 and studied business administration for three (3) years at Church College of Hawaii (now Bringham Young University). He moved to Maui in 1970 and has been living in Kihei since 1986. He is a member of the Kihei Canoe Club located in Waiakoa Ahupua'a and Halau Maui Nui-O-Kama, a native cultural

organization. He is also president of Ke-ie-ie-loko-ia Fishpond in Kalepolepo. Halau Maui Nui-O-Kama is very active in teaching native cultural practices in hula, chants and dissemination of cultural information. It is presently working in partnership with the U.S. Fish and Wildlife Service identifying native plants, native birds and native insects in the Ma'alaea-Kihei area and with the National Oceanic Atmospheric Administration to identify the sea animals along the coast from Ma'alaea Bay to Makena. Halau Maui Nui-O-Kama teaches native culture at the Kihei Charter High School one (1) hour per week and canoeing and paddling three (3) days per week. In their native cultural studies, the organization actively walks, hikes and paddles the Kihei coastline. They are also active in the reforestation of native plants and sand dune restoration. The main area of their work is in the area makai of South Kihei Road and along the coast from Ma'alaea Bay to Makena.

During a recent inspection of the project site, Mr. Kapahulehua observed ualoa and ilima growing on the property. He indicated that these plant species are common to the area and can be found growing on the mauka and makai sides of Pi'ilani Highway. He also noted that both plants are endemic, non-endangered species whose presence was made more apparent by recent winter rains. The ualoa plant is used for medicinal purposes by native Hawaiians for treating sore throats. The type of ilima growing at the site is a weed-like species about 3 to 4 feet in height with yellow flowers. In addition, Mr. Kapahulehua observed traces of a past brush fire (blackened soil and kiawe) which burned the subject property and the surrounding area.

During the site visit, Mr. Kapahulehua did not observe any archaeological sites or features on the property, nor was there evidence of any paths or trails that native Hawaiians used for travel between the uplands and the coast. He did note, however, that the project site has sandy soil and that archaeological sites have been discovered on other parcels in the area and

have been preserved in place. Mr. Kapahulehua indicated that native settlement areas were usually located along the coastline and in gulches or valleys with water resources. He also mentioned that the subject property was likely used as an open range for grazing cattle in the past.

Mr. Kapahulehua is not aware of any native Hawaiian cultural practices occurring on the subject property and indicated that it is unlikely the property was used for traditional cultural practices in the past.

To obtain a perspective about cultural resources relative to the subject property, informant interviews were conducted with Leonard Oka and Millie Wietcha. Summaries of their interviews follow.

(1) Leonard Oka

Mr. Leonard Oka was born in Puunene, Maui in 1952. When he was one (1) year old, he and his family moved to Kihei to a residence on Halama Street. He lived in the home until he completed college. He has two (2) brothers and two (2) sisters. His parents moved out of the home approximately 10 years ago.

Mr. Oka remembers that while growing up in Kihei, the roads did not go very far. The only access to Kihei was South Kihei Road and many of the roads that did exist, did not extend as high as the Piilani Highway does today. For example, he remembered that Lipoa Street only went as high as where it currently intersects with Liloa Drive (a.k.a. North-South Collector Road), near the existing Haggai Institute. Mr. Oka remembered that there were a lot of mango farms in the area, with the Yees and the Hashimotos. He also remembered that in the area of Lipoa Street, there was a slaughterhouse. The next major road that extended east from South Kihei Road, in the southern direction, that he remembered, was Welakahao Road. He remembers that area as

swamp land so there were hardly any residences. Mr. Oka noted that there may have been dirt roads leading from main roads such as Lipoa Street and Welakahao Road, but they likely lead to private residences. He also remembers the open drainage ditches along South Kihei Road. He noted that since then, many of the ditches have been covered up. Further south, along South Kihei Road, most roads today were non-existent. At Keala Place, which is near the project corridor, was the next major road that he remembers. The Suda family lived on Keala Place and their house was at the end of the street. He remembered that the Suda family had a mango and cotton farm. The cotton was used to make *futons* (padded blankets) and *zabutons* (cushions). Mr. Oka thought that the mangoes were for the family's consumption. At Alahele Place, he remembers going to a house that had chickens, but there were no other buildings around. He also remembered that Auhana Road did extend east and connected to Keonekai Road. He remembers traveling on Auhana Road to visit friends, but there weren't too many homes there. He did not remember traveling all the way on Auhana Road to Keonekai Road, but he remembered that they were connected. Mr. Oka recalled that most of the land in the area seemed like ranch lands, with weeds.

Further south along South Kihei Road, near the existing Charlie Young Bridge, Mr. Oka remembers going to some basketball courts that were located in kiawe trees. He recalled that there were other buildings around the basketball courts, and thought that they may have been a former military station. He also remembered Aunt Becky's, which was a nightclub and bar as well as the former Azeka and Tomokiyo Stores in the area where Foodland exists today. In the project corridor from Walua Place to Keonekai Road, Mr. Oka did not recall many other developments south and east of South Kihei Road. He thought there may have been dirt roads, but did not recall mango trees or other farms.

Mr. Oka remembered that there had been a "*ku*" organization for other Japanese families in the Kihei

area. They would hold annual picnics for fun. As the years went on, other families in the area also joined in and participated in "ku" activities.

Mr. Oka did not recall any cultural practices or activities on the roadway corridors. The land was open and covered with kiawe. As a child he played with friends in the open fields and remembers playing with the Takushi children near the slaughterhouse. He also recalled that people could purchase large lots which were not on the ocean front. Many families bought large parcels and farmed on them. He thought that the parcels with farms may have had their own water wells on them. Mr. Oka did note that native Hawaiian burials are always a concern, but other than that, he did not feel that there were "recent" cultural concerns for the area.

In terms of the location of the project corridors, Mr. Oka thought that the areas may not have significance and stated that it looked like they were already planned for. He noted that Kihei needs help with their traffic issues. He also thought that there would be two (2) sides on the proposed roadway projects: those that wanted to stop development and those that want to ease the burden of the existing roads. If the roadway project is stopped, then development in those areas may be stopped also, he noted. However, he felt that the roadway extension projects are needed because there is existing development in the area already.

(2) Millie Wietecha

Mrs. Millie Wietecha was born in Kihei, Maui in 1928. Her paternal grandfather was Auhana Akina and her paternal grandmother was Hannah Burns Akina. Her mother was Kanani Akina (formerly Thompson). She has lived in Kihei all her life. Her mother was a daughter of the late Charles and Annie Thompson of Kula. Her great-grandmother had royal blood and gave each of her daughters 1,000 acres of land. Mrs. Wietecha's grandmother received 1,000 acres in the Kula area. Her father was the youngest of the three (3) Akina brothers. Mrs. Wietecha had seven (7)

siblings, four (4) brothers and three (3) sisters. She is the oldest of the daughters. Her husband was from Massachusetts, however he passed away several years ago. She has five (5) grown children. Mrs. Wietecha has held various positions including Office Manager at the Maui Palms Hotel to owning her own furniture upholstery business.

Growing up, Mrs. Wietecha and her family lived in a home at the Kamaole I Beach Park before it existed, off of South Kihei Road. The home belonged to her Akina grandparents. It was located near the existing entrance to the park today. Her grandmother lived with them. Her father was an entrepreneur, with many businesses. He fished for akule, had a contract with the plantation to provide kiawe wood and started the Akina Bus service. Her father owned many acres of land in Kihei. She remembered that her father had their first home by the former Mormon Church, behind the Kihana Nursery. Her father also gave up land to build the South Kihei Road. Her father built a third home, mauka of where the Kamaole Beach Royal is today. She recalled that in her childhood, people would travel by horse and buggy in Kihei because there were no roads. She also remembers going to Makena through Ulupalakua. It was a full day to get there and the Akina family would stay for a month. Her father would tow a boat and they would fish with nets. Mrs. Wietecha thought that the current road to Makena did not exist until the military came during World War II and then they built a gravel road to connect Kihei and Makena.

To her knowledge, the project corridor was not used for anything, except perhaps ranch grazing. She remembered that there was a lot of kiawe trees on the lands and that no one lived on the property. There were no roads leading up to those lands, but she remembers playing among the kiawe and collecting flowers.

She remembered feeling isolated growing up, because there were very few homes in the area so friends were far away. A favorite treat for her was when her parents would take the family shopping to

Tomokiyo Store, which was located where the Kihei Foodland stands today. Mrs. Wietecha noted that the Tomokiyo family sold the last of their land in the area over the last few years. She currently lives near the Kihei Foodland. When homes were built in the area, there were burials that were discovered, however, she thought that family members were contacted and the bones were removed by them. She recalled that her grandparents were buried in the area, but her father had them reinterred at a cemetery.

She also recalled that her mother planted a mango tree orchard. It was her goal to have a tree of every type of mango. Mrs. Wietecha thought that some of the trees may still exist by the ABC Store off of South Kihei Road. She remembers her mother taking the mangoes to the markets to sell. Her mom also drove a school bus.

Mrs. Wietecha also recalled that her uncle had a charcoal business. Their charcoal pit was located near the current Rainbow Mall. However, her uncle's family has since sold the land in the area.

Mrs. Wietecha was not familiar with any types of associations or clubs that may be in existence in relation to the area. She thought that many years ago, when Kihei was first being developed that there was some kind of organization that was formed to talk about the development of Kihei. She also noted that graves are usually a concern, however, she was not aware of anyone living along the project corridor before Kihei was developed, so she felt that there may not be any burials there.

In terms of existing problems in the area, Mrs. Wietecha noted that traffic has become "really heavy" in recent years. She noted that it used to take her a few minutes to go to the Kihei Post Office from her home, but now it can take up to 30 minutes. She thought the proposed project was good and that it would help to take traffic off of Piilani Highway and South Kihei Road. Mrs. Wietecha stated that she thought the project was well needed by the community and when completed, would provide her

with an alternate route to get home when she goes to the post office. She currently uses the North-South Collector Road to get her as close to home as possible, and then connects with the South Kihei Road to complete her trip.

b. ***Other Informant Documentation***

Informant interviews were conducted for the Piilani Highway restriping project. The restriping of Piilani Highway has been completed to provide two (2) travel lanes in each direction between Mokulele Highway and Kilohana Drive. The project corridor is located west of and adjacent to the highway (makai of Kanakanui Road). In providing cultural perspectives for the Piilani Highway, Mr. Roy Suda and Mr. Kimokeo Kapahulehua described the Kihei area before the Piilani Highway was constructed (Munekiyo & Hiraga, Inc., 2002). Mr. Kapahulehua noted his work in teaching native cultural practices, including the conduct of native cultural studies and organized activities which involve native plant restoration. With regard to the area along the Piilani Highway corridor, he was not aware of native cultural practices or harvesting of plants currently being conducted.

c. ***Assessment of Cultural Impacts***

Based on research conducted in the region and based on findings of other archaeological studies in the surrounding vicinity, the Kama'ole *ahupua'a* contained a number of cultural sites. Archaeological field work on the neighboring properties found no evidence of sites suggested for confirmation by the SHPD. Refer to Appendix "C".

As noted, the value of the coastal region of the Kama'ole *ahupua'a* is found in its proximity to marine resources. The coastal areas were characterized by temporary habitation patterns as opposed to the upland's permanent habitation patterns. With the construction of four-lane Piilani Highway, between Mokulele Highway and Kilohana Drive, unobstructed mauka-makai access opportunities between the two (2) settlement regions is no longer available. Coupled with the growing pattern of urbanization which surrounds the subject property, there has been no evidence or observations that the project would have an adverse impact upon cultural resources or practices.

7. *Scenic and Open Space Resources*

The proposed project is an extension of the existing North-South Collector Road. The road will be built to balance cut and fill quantities and will not create any visual impact to the surrounding uses. The project site is not considered to be part of, or in proximity to, a scenic corridor.

B. *IMPACTS TO SOCIO-ECONOMIC ENVIRONMENT*

1. *Land Use and Community Character*

The North-South Collector Road is considered a significant element of the Kihei-Makena region's roadway infrastructural network. The proposed action is considered compatible with land uses found in the surrounding area.

2. *Economy*

On a short-term basis, the project will support construction and construction-related employment. The project is not anticipated to

have any adverse long-term impacts on the economy.

3. ***Police, Fire and Health Care***

The proposed project is anticipated to have a positive impact on the service capabilities of police, fire and emergency services by providing them with an alternate transportation route to serve the community. The project will not extend the existing service area limits for emergency services.

4. ***Recreation and Education***

The proposed roadway extension is not expected to have any impact on recreational facilities/services for the community. The project may provide an alternate transportation route for students attending Kamalii Elementary School, however, the project is not anticipated to affect enrollment at the school.

5. ***Solid Waste***

On a short-term basis, construction activities will require the disposal of construction-related solid waste. The applicant will work with the contractor to minimize the amount of solid waste generated during the construction of the project. As appropriate, a private construction waste disposal facility will be utilized by the contractor for the disposal of waste materials. Except for small amounts of greenwaste generated from regular roadside maintenance operations, the project will not generate solid waste which will affect solid waste collection and landfill system capacities.

C. *IMPACTS TO INFRASTRUCTURE*

1. *Roadways*

The proposed project calls for the construction of an extension to the existing North-South Collector Road. As previously noted, two (2) typical sections will be utilized for the road construction, pursuant to the Special Management Area Use Permit (SMA) approvals for the Ke Ali'i Kai II Subdivision and the Ke Ali'i Villas Condominium projects. The road extension will be paved between 24 feet and 34 feet, depending on the typical section. Refer to Figure 3. A traffic control plan will be prepared and appropriate measures will be implemented during the construction of the project to minimize impacts to traffic flow and provide for the safe passage of vehicles and pedestrians.

A Traffic Impact Analysis Report (TIAR) has been prepared for the proposed project. See Appendix "F". The following methodology was utilized for the study. Background traffic data was collected and summarized. The data collected consisted of existing peak hour traffic counts, intersection configurations, traffic control information and speed limits. Existing traffic volumes were obtained from the traffic studies for Ke Ali'i Villas and Ke Ali'i Kai II Subdivision.

The Maui Police Department was also contacted to inquire if they had any traffic concerns and if there were any issues raised by the community for the project area.

Using the data collected, existing traffic operating conditions within the study area were quantified. The appropriate methodology for signalized and unsignalizaed intersections described in the 2000

Highway Capacity Manual (HCM) was used to determine the levels-of-service (LOS) of the study intersections.

The year 2020 was selected as the design year. Using 2020 as the design year is consistent with the design year of the *Maui Long-Range Land Transportation Plan* and the *Makena Resort Master Plan Traffic Study*, which will add traffic to the Kihei roadway network.

Estimation of 2020 background traffic projections without the North-South Collector Road (NSCR) was accomplished in a two (2) step process. The first was to expand existing traffic volumes by the appropriate growth factor, which is 1.6 percent per year for 17 years (2003 to 2020). Second, the traffic generated by future developments, referred to as "related projects", within and adjacent to the study area was superimposed on the traffic forecasts. There were two (2) components to related projects traffic. The first was the traffic generated by development projects which had a development plan. For these projects, traffic assignments were obtained from the traffic study for the project or traffic was estimated based on the project description. The second component was traffic generated by related projects, for which no development plan was available. For these projects, future traffic was estimated based on the development allowed by the current zoning. The result was an estimate of future traffic projections upon build out of the area within and adjacent to the study area.

Estimations were then made for the 2020 traffic forecasts for roadway conditions with the NSCR in place. This was done by estimating the amount of background traffic diverted from Piilani

Highway and South Kihei Road to the NSCR and reassigning traffic generated by the related projects.

The impacts of the proposed NSCR were quantified by performing a Level-of-Service analysis of the study intersections for 2020 conditions without and with the NSCR. The results were then compared to identify the changes in the Levels-of-Service of the study intersections. Refer to Appendix "F".

The conclusions of the existing conditions of Level-of-Service analysis are:

1. There is sufficient capacity for all movements and Levels-of-Service are acceptable.

2. All movements operate at Level-of-Service C or better during both peak periods, except the left turn from eastbound Keonekai Road to northbound Piilani Highway which will operate at Level-of-Service D during the morning peak hour.

Analysis of Impacts of North-South Collector Road Extension

A Level-of-Service analysis for conditions without and with the NSCR was done. The impacts of the NSCR were assessed by comparing before and after approach and departure volumes at the key intersections and comparing the Levels-of-Service of the study intersections without and with the NSCR. Lastly, an analysis of the traffic along the NSCR was performed to determine the generator of future traffic along the roadway.

Changes in Peak Hour Traffic Volumes

The changes in the peak hour traffic volumes along South Kihei Road and Piilani Highway were analyzed for the morning and afternoon total approach volumes without and with the NSCR. The

implementation of the proposed North-South Collector Road extension will result in a redistribution of the north-south traffic volumes, as noted below.

1. Morning (AM) peak hour traffic volumes along South Kihei Road will decrease 11 percent south of Keali'i Alanui and 12 percent north of Keonekai Road.

2. Afternoon (PM) peak hour volumes along South Kihei Road will decrease approximately 9 percent.

3. AM peak hour volumes along the Piilani Highway will decrease approximately 3 percent.

4. PM peak hour volumes along Piilani Highway will decrease approximately 5 percent.

Changes in Level-of-Service

A Level-of-Service analysis was performed for conditions without and with the NSCR. The incremental difference between the two (2) conditions is the impact of the project. The assumptions used for the Level-of-Service analysis are:

1. The NSCR is a two-lane, two-way roadway. Separate left turn lanes are provided at all intersections.

2. All new intersections are unsignalized.

The following intersections were analyzed:

- Ke Ali'i Alanui - South Kihei Road;
- Ke Ali'i Alanui - Piilani Highway;
- Ke Ali'i Alanui - Kanakanui Road;
- Ke Ali'i Alanui - North-South Collector Road;
- Piilani Highway - Keonekai Road;
- Keonekai Road - Kanakanui Road;
- South Kihei Road - Keonekai Road;
- North-South Collector Road - Walua Place; and
- South Kihei Road - Aloha Village.

In addition, the following three (3) new intersections were analyzed:

- North-South Collector Road - Ke Ali'i Kai II Subdivision Access;
- North-South Collector Road - Keonekai Road; and
- North South Collector Road - Aloha Villages Access.

Results of the intersections analyses are found on pages 26 to 34 of the TIAR. Refer to Appendix "F".

Conclusions of the TIAR

Based on the analyses undertaken in the TIAR, the follow conclusions have been advanced.

1. The proposed NSCR will divert 285 vehicles per hour from South Kihei Road and Piilani Highway during the morning peak hour. During the afternoon peak hour, approximately 370 vehicles will be diverted to the NSCR.

2. These volumes are sufficient to reduce the volume-to-capacity ratios of key movements along South Kihei Road. Peak hour traffic volumes along South Kihei Road will be reduced 11 percent to 12 percent during the morning peak hour and approximately 9 percent during the afternoon peak hour.

3. An analysis of the composition of traffic along the NSCR was performed to determine the percentage of traffic generated by Ke Ali'i Villas and the Ke Ali'i Kai II Subdivision. During the morning peak hour, these two (2) projects contribute between 14.4 percent and 18.6 percent of the total traffic along the NSCR. The remainder of the traffic is generated by other development projects within the study area or is traffic diverted from South Kihei Road or Piilani Highway. During the afternoon peak hour, traffic generated by the Ke Ali'i Villas and Ke Ali'i Kai II Subdivision represents between 11 percent and 20.3 percent of the total traffic along the NSCR.

4. Because the proposed NSCR is only between Keali'i Alanui and Keonekai Road, the impacts of the NSCR on regional traffic is limited. The result is that the impacts of the NCSR on traffic conditions along Piilani Highway will not be as significant as along South Kihei Road. This is because

Piilani Highway serves more regional traffic than South Kihei Road.

5. Total traffic approaching South Kihei Road along Keonekai Road will decrease slightly as a result of the NSCR. However, traffic making left and right turns will be redistributed such that a larger proportion of the traffic will make left turns rather than right turns. As the delay for left turning traffic is greater than for traffic making right turns, the delay to left turning traffic increases. A preliminary assessment of the peak hour warrant for a traffic signal concluded that the warrants for a signal are marginally satisfied without and with the NSCR. Accordingly, the warrants for a traffic signal should be assessed periodically until it is determined that the warrants are satisfied. This warrant analysis should include an assessment of all eight (8) warrants in addition to the peak hour warrants.

6. Construction of the NSCR will result in increased traffic along the northbound approach of the NSCR at Keali'i Alanui. Without mitigation, the northbound approach will operate at Level-of-Service D. This approach will operate at Level-of-Service C without the NSCR. Accordingly, the viability of an all-way STOP controlled intersection was assessed. The analysis determined that, as an all-way STOP controlled intersection, the eastbound approach would operate at Level-of-Service C during the afternoon peak hour and other movments would operate at Level-of-Service B or better. Conversion to an all-way STOP controlled intersection would have additional traffic calming effects to traffic along Keali'i Alanui. This would be a positive impact considering the proximity of the intersection to Kamalii Elementary School.

Recommendations

1. The NSCR should be constructed between Ke Ali'i Alanui and Keonekai Road. Implementation will ease traffic congestion along South Kihei Road between Ke Ali'i Alanui and Keonekai Road.

2. This traffic study concluded that a two-lane cross section for the NSCR, along with separate turn lanes at intersections and major driveways, is sufficient to provide acceptable Levels-of-Service.

3. It is understood that the proposal from TDH to construct the NSCR between the southern boundary of Ke Ali'i Kai II Subdivision and Keonekai Road includes only the roadway. Accordingly, this study considered only the NSCR roadway and did not consider curbs and gutters, sidewalks, bike lanes or landscaping. These roadway elements have a negligible impact of the Level-of-Service analysis performed and would not affect the conclusions and recommendations of this report.

4. The intersection of Ke Ali'i Alanui at the proposed NSCR should be converted to an all-way STOP-sign controlled intersection upon completion of the NSCR between Ke Ali'i Kai Alanui and Keonekai Road.

5. A *Safe-Route to School Plan* for Kamalii Elementary School should be developed. This program is described thoroughly in the *Manual of Uniform Traffic Control Devices* (MUTCD). The plan is typically systematically developed by school, law enforcement and traffic officials and consists of a plan showing the streets, the school, existing traffic controls, established school walk routes, and established school crossings.

2. ***Water and Wastewater***

The proposed North-South Collector Road extension project is not anticipated to have any impact on water or wastewater systems upon its completion. The vertical profile of the existing 16-inch waterline will be adjusted to meet the vertical profile requirement of the North-South Collector Road. A new 8-inch sewer gravity line will be installed within the roadway right-of-way, between Walua Place and the Ke Ali'i Kai II Subdivision access road. This sewer line will serve the Ke Ali'i Kai II house lots. Refer to Appendix "D".

3. ***Drainage***

A Preliminary Drainage and Soil Erosion Control Report was prepared for the proposed project. Refer to Appendix "D". Proposed drainage improvements include the installation of catch

basins and culverts to convey roadway runoff to existing drainage receiving systems. At Liilioholo Gulch a concrete ford will be installed to allow vehicular crossing at the gulch. The ford improvement is intended to serve as an interim solution to cross the gulch. Ultimately, a new box culvert or arched culvert will be installed as the adjoining property is developed. An additional 71-inch by 103-inch culvert will be installed by TDH to allow crossing of the unnamed gully located about 1,600 feet south of Walua Place.

According to the engineering report, the runoff generated by the roadway extension project will not adversely impact downstream properties because retention capacity provided by the Ke Ali'i Kai II Subdivision will help offset new flows generated by the road.

4. *Power, Telephone and CATV Services*

The proposed project is not anticipated to increase demand for electricity, telephone and cable television service in the area. Underground utility connections will be provided in the roadway for the Ke Ali'i Villas and Ke Ali'i Kai II Subdivision.

D. *CUMULATIVE AND SECONDARY IMPACTS*

The proposed project is a portion of the Liloa Drive project, however, it is not expected to impact population parameters or result in significant new demands for public services and facilities and infrastructure. During the short term, the project will benefit the economy, directly and indirectly, through the payment of wages, salaries and benefits for employees involved in construction and construction-related jobs. Beneficial long-term traffic mitigation and circulation are anticipated from the proposed action.

A cumulative impact issue of concern for this area of Kihei relates to traffic impacts, particularly in the vicinity of the Kamali'i Elementary School. The proposed project involves construction of the roadway corridor for the proposed North-South Collector Road, between Ke Ali'i Alanui and Keonekai Road. The proposed Ke Ali'i Villas project, located at the southwest corner of Ke Ali'i Alanui and the North-South Collector will include approximately 150 condominium units and has received approval of its SMA permit application. Additionally, the Ke Ali'i Kai II Subdivision (90 house/lot packages) and the Aloha Village (78-unit townhouse complex), both located along the proposed roadway extensions, received their SMA Use permits. Other vacant properties along the North-South Collector corridor are also likely to be developed in the near future. As development along the corridor occurs, cumulative effects on traffic operations will be of greater concern.

The applicant, together with the developer of the Ke Ali'i Villas project (an affiliate of the applicant), proposed the construction of the North-South Collector Road between Ke Ali'i Alanui and Keonekai Road as a mitigation measure addressing traffic concerns of multiple projects. The completion of this segment of the roadway will provide circulation redundancy to relieve existing congestion at area intersections. Details and phasing requirements for roadway permitting, design, and construction were coordinated with the County's Department of Public Works and Environmental Management. An implementation strategy for the North-South Collector Road was prepared and submitted to the County of Maui.

The roadway extension is not anticipated to generate additional traffic in the region, instead, it will provide motorists with an alternate access route for Ke Ali'i Alanui, Keonekai Road and ultimately South Kihei Road and Piilani Highway. Thus, the proposed North-South Collector Road extension is not anticipated to have adverse cumulative impacts to the

area. Most of the land parcels surrounding the roadway alignment have existing entitlements for development, whether hotel, residential or commercial. A secondary impact of the development of the roadway extension may be the development of these parcels as more direct access to these properties will then be available.

Chapter IV

Relationship to Land Use Plans, Policies and Controls

IV. RELATIONSHIP TO LAND USE PLANS, POLICIES AND CONTROLS

A. STATE LAND USE DISTRICTS

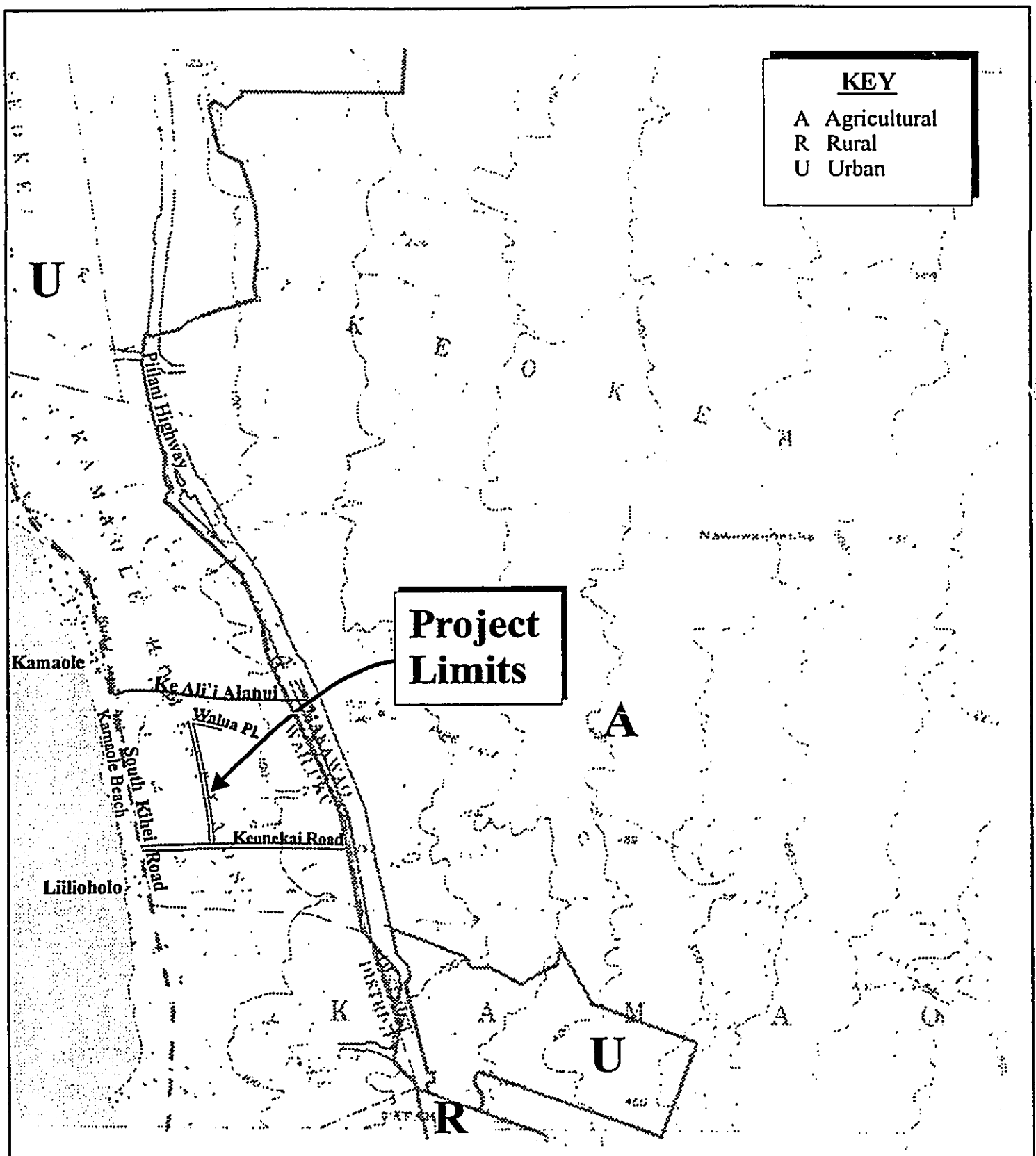
Chapter 205, Hawaii Revised Statutes, relating to the State Land Use Commission, establishes the four (4) major land use districts in which all lands in the State are placed. These districts are classified "Urban", "Rural", "Agricultural", and "Conservation". The proposed development is located within the "Urban" district and is compatible with the "Urban" classification. See Figure 7.

B. MAUI COUNTY GENERAL PLAN

The Maui County General Plan (1990 Update) sets forth broad objectives and policies to help guide the long-range development of the County. As stated in the Maui County Charter:

> *". . . indicate desired population and physical development patterns for each island within the county; shall address the unique problems and needs of each island and region within the county; shall explain the opportunities and the social, economic, and environmental consequences related to potential developments; and shall set forth the desired sequence, patterns, and characteristics of future developments. The general plan shall identify objectives to be achieved, and priorities, policies and implementing actions to be pursued with respect to population density, land use maps, land use regulations, transportation systems, public and community facility locations, waster and sewage systems, visitor destinations, urban design and other matters related to development."*

The Maui County General Plan advances five (5) major themes that focus on the overall goals of the plan. The proposed project responds to the following General Plan theme:



Source: State Land Use District Boundary Map, Kihei Quad

Figure 7 Proposed North-South Collector Road Extension From Walua Place to Keonekai Road

State Land Use Classifications

Prepared for: Towne Development of Hawaii, Inc.

MUNEKIYO & HIRAGA, INC.

Theme Number 2

Prepare a directed and managed growth plan.

- Amendments to the General Plan will preserve a desired quality of life where areas of urban settlement must be managed and directed within a framework that consistently and concurrently balances growth demands against human service needs and physical infrastructure supply.

The proposed action is in keeping with the following General Plan objectives relating to Visitor Industry and Transportation.

VISITOR INDUSTRY

Policy:

- Require that new developments contribute their fair share to infrastructural costs.

TRANSPORTATION

Objectives:

- To support an advanced and environmentally sensitive transportation system which will enable people and goods to move safely, efficiently and economically.

- To develop a program for anticipating and enlarging the local street and highway systems in a timely response to planned growth.

Policies:

- Support the development of a county-wide network or bikeways and pedestrian paths.

- Ensure that transportation facilities are anticipated and programmed for construction in order to support planned growth.

C. *KIHEI-MAKENA COMMUNITY PLAN*

Nine (9) community plan regions have been established in Maui County. Planning for each region is guided by the respective Community Plan, which is designed to implement the Maui County General Plan. Each Community Plan contains recommendations and standards which guide the sequencing, patterns and characteristics of future development in the region.

Land use guidelines are established by the Kihei-Makena Community Plan land use map, and as indicated, the project site alignment is noted on the map. See Figure 8.

The Kihei-Makena Community Plan sets forth recommendations consistent with the major categories of objectives and policies of the County General Plan. The proposed project is in consonance with the following community plan goal, objectives and policies:

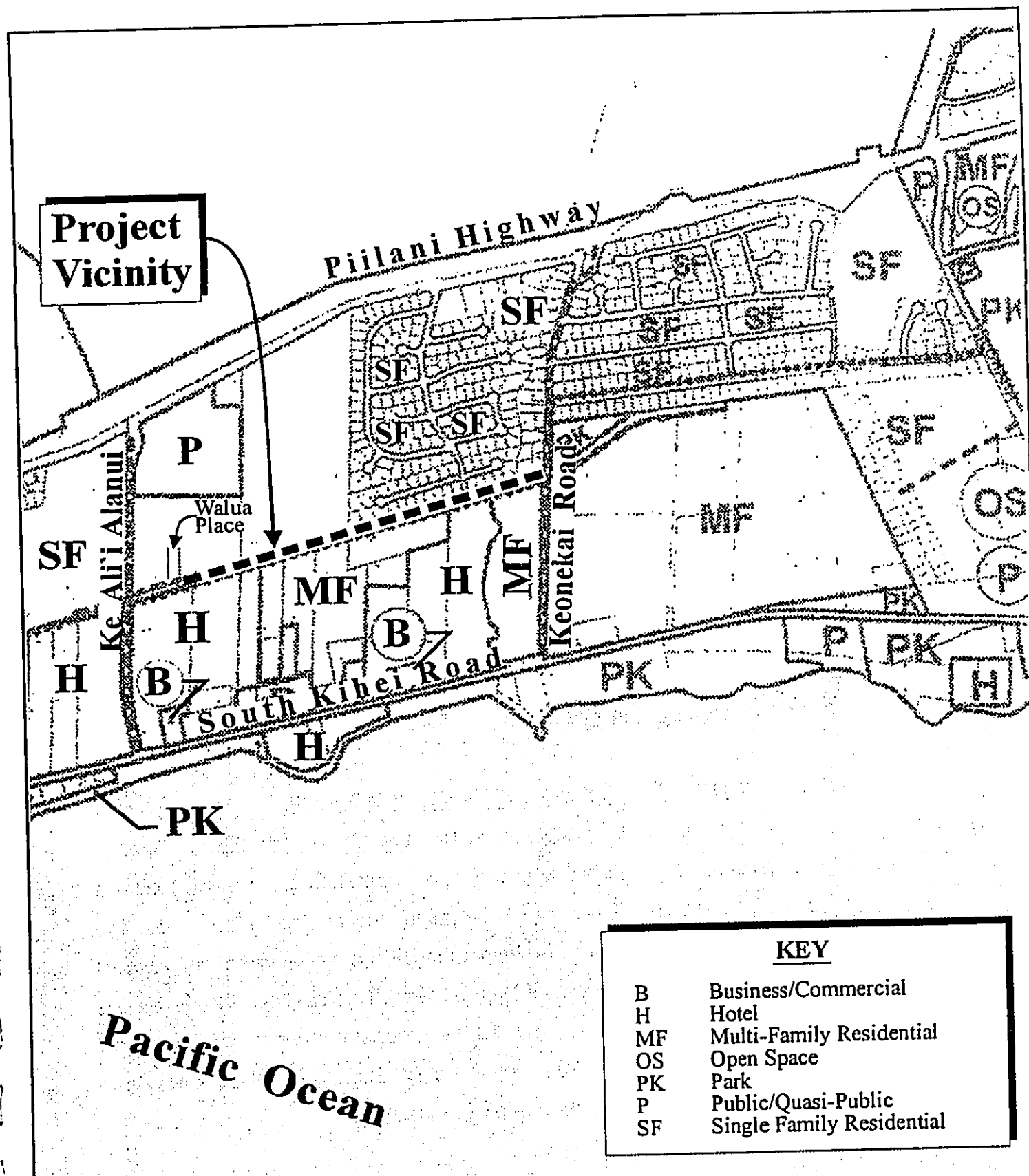
Physical and Social Infrastructure

Goal:

Provision of facility systems, public services and capital improvement projects in an efficient, reliable, cost effective and environmentally sensitive manner which accommodates the needs of the Kihei-Makena community, and fully support present and planned land uses, especially in the case of project district implementation.

Transportation (Objectives and Policies)

a. Develop and implement a well-planned road and public transportation system to allow residents and visitors to move safely, effectively and comfortably within the region. Roadway improvements should be planned, designed and constructed as prioritized under the Implementing Actions section, and as generally described in the Kihei Traffic Master Plan.



Source: Kihei-Makena Community Plan

Figure 8 Proposed North-South Collector Road Extension From Walua Place to Keonekai Road
Community Plan Land Use Designations

Prepared for: Towne Development of Hawaii, Inc.

MUNEKIYO & HIRAGA, INC.

h. Encourage join public/private participation in the planning, design and construction of roadway improvements, especially those identified in this plan.

Implementing Actions

b. Plan, design and construct appropriate sections of a new North-South Collector Road, from Uwapo Road to Keonekai Road, to facilitate improved traffic movement in Kihei proper. When selecting a specific alignment, impacting existing structures should be kept to a minimum. Consideration should be given to segments between Kaonoulu Street and Auhana Street as well as between Ke Ali'i Alanui and Keonekai Road. In terms of roadway improvements within the community plan region, this shall be the second priority.

D. ZONING

The proposed project will extend the existing portion of the North-South Collector Road. Although the zoning in the project corridor varies from "Residential" to "Hotel" zoning, roadway improvements are allowable uses in the affected zoning districts.

E. COUNTY OF MAUI SPECIAL MANAGEMENT AREA

The subject property is located within the County of Maui's Special Management Area (SMA). Pursuant to Chapter 205A, Hawaii Revised Statues, and the Rules and Regulations of the Maui Planning Commission, actions proposed within the SMA are evaluated with respect to SMA objectives, policies and guidelines. This section addresses the project's relationship to applicable coastal zone management considerations, as set forth in Chapter 205A and the Rules and Regulations of the Maui Planning Commission.

1. ***Recreational Resources***

Objective: Provide coastal recreational opportunities accessible to the public.

Policies:

(A) Improve coordination and funding of coastal recreational planning and management; and

(B) Provide adequate, accessible, and diverse recreational opportunities in the coastal zone management area by:

(i) Protecting coastal resources uniquely suited for recreational activities that cannot be provided in other areas;

(ii) Requiring replacement of coastal resources having significant recreational value including, but not limited to, surfing sites, fishponds, and sand beaches, when such resources will be unavoidably damaged by development; or requiring reasonable monetary compensation to the state for recreation when replacement is not feasible or desirable;

(iii) Providing and managing adequate public access, consistent with conservation of natural resources, to and along shorelines with recreational value;

(iv) Providing an adequate supply of shoreline parks and other recreational facilities suitable for public recreation;

(v) Ensuring public recreational uses of county, state, and federally owned or controlled shoreline lands and waters having recreational value consistent with public safety standards and conservation of natural resources;

(vi) Adopting water quality standards and regulating point and non-point sources of pollution to protect, and where feasible, restore the recreational value of coastal waters;

(vii) Developing new shoreline recreational opportunities, where appropriate, such as artificial lagoons, artificial beaches, and artificial reefs for surfing and fishing; and

(viii) Encouraging reasonable dedication of shoreline areas with recreational value for public use as part of discretionary approvals or permits by the land use commission, board of land and natural resources, and county authorities; and crediting such dedication

against the requirements of Section 46-6, HRS.

Response: The proposed project is not anticipated to affect existing coastal recreational resources. Access to the shoreline areas will remain unaffected by the proposed action.

2. ***Historic Resources***

Objective: Protect, preserve and, where desirable, restore those natural and manmade historic and prehistoric resources in the coastal zone management area that are significant in Hawaiian and American history and culture.

Policies:

(A) Identify and analyze significant archeological resources;
(B) Maximize information retention through preservation of remains and artifacts or salvage operations; and
(C) Support state goals for protection, restoration, interpretation, and display of historic resources.

Response: Should archaeological features be identified during the construction phase of development, appropriate mitigative measures will be developed in coordination with the SHPD.

3. ***Scenic and Open Space Resources***

Objective: Protect, preserve and, where desirable, restore or improve the quality of coastal scenic and open space resources.

Policies:

(A) Identify valued scenic resources in the coastal zone management area;
(B) Ensure that new developments are compatible with their visual environment by designing and locating such developments to minimize the alteration of natural landforms and existing public views to and along the shoreline;
(C) Preserve, maintain, and, where desirable, improve and restore shoreline open space and scenic resources; and
(D) Encourage those developments that are not coastal

dependent to locate in inland areas.

Response: The proposed roadway extension project will not adversely impact coastal scenic and open space resources. The proposed alignment is in the midst of an urbanized area of Kihei and is not a part of a scenic view corridor.

4. ***Coastal Ecosystems***

Objective: Protect valuable coastal ecosystems, including reefs, from disruption and minimize adverse impacts on all coastal ecosystems.

Policies:

(A) Exercise an overall conservation ethic, and practice stewardship in the protection, use, and development of marine and coastal resources;

(B) Improve the technical basis for natural resource management;

(C) Preserve valuable coastal ecosystems, including reefs, of significant biological or economic importance;

(D) Minimize disruption or degradation of coastal water ecosystems by effective regulation of stream diversions, channelization, and similar land and water uses, recognizing competing water needs; and

(E) Promote water quantity and quality planning and management practices that reflect the tolerance of fresh water and marine ecosystems and maintain and enhance water quality through the development and implementation of point and nonpoint source water pollution control measures.

Response: Improvements to the subject property are not expected to adversely impact coastal ecosystems. Drainage improvements shall be engineered to ensure that coastal water impacts are mitigated. Mitigative measures for soil erosion control will be implemented during and after construction.

5. ***Economic Uses***

Objective: Provide public or private facilities and improvements important to the State's economy in suitable locations.

Policies:

(A) Concentrate coastal dependent development in appropriate areas;

(B) Ensure that coastal dependent development such as harbors and ports, and coastal related development such as visitor facilities and energy generating facilities, are located, designed, and constructed to minimize adverse social, visual, and environmental impacts in the coastal zone management area; and

(C) Direct the location and expansion of coastal dependent developments to areas presently designated and used for such developments and permit reasonable long-term growth at such areas, and permit coastal dependent development outside of presently designated areas when:
   (i) Use of presently designated locations is not feasible;
   (ii) Adverse environmental effects are minimized; and
   (iii) The development is important to the State's economy.

Response: The project will provide short-term jobs from construction. The project site does not abut the shoreline and does not affect coastal development necessary to the State's economy. The project is in keeping with the land use patterns established by the Kihei-Makena Community Plan.

6. ***Coastal Hazards***

Objective: Reduce hazard to life and property from tsunami, storm waves, stream flooding, erosion, subsidence and pollution.

Policies:

(A) Develop and communicate adequate information about storm wave, tsunami, flood, erosion, subsidence, and point and nonpoint source pollution hazards;

(B) Control development in areas subject to storm wave,

tsunami, flood, erosion, hurricane, wind, subsidence, and point and nonpoint pollution hazards;

(C) Ensure that developments comply with requirements of the Federal Flood Insurance Program; and

(D) Prevent coastal flooding from inland projects.

Response: The project site falls within Zone C, an area of minimal flooding. The segment of the road which crosses Liilioholo Gulch is designated as Zone A4. A drainage and erosion control plan will be developed for the project. The proposed drainage measures which will be implemented with the project will ensure that downstream and adjacent properties will not be adversely impacted. The roadway corridor is not subject to coastal hazards, such as stormwater or tsunami events.

7. ***Managing Development***

Objective: Improve the development review process, communication, and public participation in the management of coastal resources and hazards.

Policies:

(A) Use, implement, and enforce existing law effectively to the maximum extent possible in managing present and future coastal zone development;

(B) Facilitate timely processing of applications for development permits and resolve overlapping of conflicting permit requirements; and

(C) Communicate the potential short and long-term impacts of proposed significant coastal developments early in their life cycle and in terms understandable to the public to facilitate public participation in the planning and review process.

Response: In compliance with the Rules of Practice and Procedures for the Maui Planning Commission and the Special Management Area Rules for the Maui Planning Commission, requested documentation for the project will be filed with the

County Planning Department and will undergo public hearing and decision by the Maui Planning Commission. Opportunity for public review and consideration of the proposed action is provided through the Special Management Area permitting process.

Applicable State and County requirements will be adhered to in the designed construction of the proposed project.

8. ***Public Participation***

Objective: Stimulate public awareness, education, and participation in coastal management.

Policies:

(A) Promote public involvement in coastal zone management processes;
(B) Disseminate information on coastal management issues by means of educational materials, published reports, staff contact, and public workshops for persons and organizations concerned with coastal issues, developments, and government activities; and
(C) Organize workshops, policy dialogues, and site-specific mediations to respond to coastal issues and conflicts.

Response: A public hearing is required as part of the County's SMA process. The proposed project complies with the objective of public awareness, education and participation. It is noted that the roadway extension project was presented to the Maui Planning Commission in connection with SMA applications for the Ke Ali'i Kai II Subdivision and Ke Ali'i Villas projects.

Public review of the project is also offered through the Chapter 343, HRS environmental assessment process.

9. ***Beach Protection***

Objective: Protect beaches for public use and recreation.

Policies:

(A) Locate new structures inland from the shoreline setback to conserve open space, minimize interference with natural shoreline processes, and minimize loss of improvements due to erosion;

(B) Prohibit construction of private erosion-protection structures seaward of the shoreline, except when they result in improved aesthetic and engineering solutions to erosion at the sites and do not interfere with existing recreational and waterline activities; and

(C) Minimize the construction of public erosion-protection structures seaward of the shoreline.

Response: The project corridor is located upland from the shoreline, at an average elevation of about 75 feet above mean sea level. No adverse impact to beaches in the vicinity is anticipated.

10. ***Marine Resources***

Objective: Promote the protection, use, and development of marine and coastal resources to assure their sustainability.

Policies:

(A) Ensure that the use and development of marine and coastal resources are ecologically and environmentally sound and economically beneficial;

(B) Coordinate the management of marine and coastal resources and activities to improve effectiveness and efficiency;

(C) Assert and articulate the interests of the State as a partner with federal agencies in the sound management of ocean resources within the United States exclusive economic zone;

(D) Promote research, study, and understanding of ocean processes, marine life, and other ocean resources in order to acquire and inventory information necessary to

understand how ocean development activities relate to and impact upon ocean and coastal resources; and

(E) Encourage research and development of new, innovative technologies for exploring, using, or protecting marine and coastal resources.

Response: Improvements to the subject properties will not adversely impact ocean resources. Best Management Practices (BMPs) will be incorporated during construction to support the policies of effective management of marine resources. The proposed project is not anticipated to affect marine and coastal resources.

It is noted that the proposed North-South Collector Road project is being implemented in conjunction with the Ke Ali'i Villas Condominium and the Ke Ali'i Kai II Subdivision projects. The SMA approvals for these projects include identical conditions which state:

> *"If the Special Management Area permit for the North-South Collector Road is not approved, then the applicant shall comply with the County's Affordable Housing Policy."*

Should the SMA request for the North-South Collector Road not be approved by the Maui Planning Commission, appropriate coordination with the County Department of Planning and Department of Housing and Human Concerns will be undertaken to address requirements for satisfying the County's affordable housing policy.

Chapter V

Summary of Environmental Effects Which Cannot Be Avoided, and Irreversible and Irretrievable Commitments of Resources

V. SUMMARY OF ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED, AND IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The proposed project will result in unavoidable construction-related impacts which include noise-generated impacts occurring from the proposed improvements. In addition, there may be temporary air quality impacts associated with dust generated from exhaust emissions discharged by construction equipment. Appropriate mitigation measures will be implemented to minimize these construction-related impacts. The proposed project is not anticipated to create any significant, long-term, adverse environmental effects.

The construction of the proposed project would involve the commitment of land for the proposed action. However, this commitment is consistent with land use policies and plans for the region. There are no other significant irreversible and irretrievable commitment of resources associated with the proposed action.

Chapter VI

Alternatives Analysis

VI. ALTERNATIVES ANALYSIS

A. DESIGN ALTERNATIVES

A number of design alternatives were evaluated to ensure that development constraints were adequately addressed. In particular, roadway sections and configurations were evaluated with respect to site topographic and drainage conditions, with attention given to the existing sections for the portions of the North-South Collector Road. The proposed horizontal alignment, vertical profile, and typical sections are considered optimum in terms of the foregoing criteria.

B. NO ACTION/DEFERRED ACTION ALTERNATIVE

The "no action" alternative will result in the subject property remaining in its current vacant and undeveloped condition. This alternative does not possess beneficial community value, particularly since the Kihei-Makena Community Plan sets aside the subject lands specifically for the North-South Collector Road. Likewise, the "deferred action" alternative would not result in a realized community need having immediate value.

Chapter VII

Anticipated Determination and Findings and Reasons Supporting the Determination

VII. ANTICIPATED DETERMINATION AND FINDINGS AND REASONS SUPPORTING THE DETERMINATION

The significance criteria of Section 12, of the Administrative Rules of Title 11, Chapter 200, "Environmental Impact Statement Rules", were reviewed and analyzed to determine whether the completed action will have adverse impacts to the environment.

1. ***No Irrevocable Commitment to Loss or Destruction of any Natural or Cultural Resources Would Occur as a Result of the Project***

The project will not result in any adverse environmental impacts. There are no known, rare threatened, or endangered species of flora, fauna or avifauna located within the project site.

The development of the property is not expected to result in any adverse impacts to archaeological resources. Should any artifacts or human remains be encountered during construction, work will stop in the immediate vicinity of the find and the State Historic Preservation Division will be immediately notified to establish an appropriate mitigation strategy.

2. ***The Proposed Action Would Not Curtail the Range of Beneficial Uses of the Environment***

The proposed project and the commitment of land resources would not curtail the range of beneficial uses of the environment.

3. ***The Proposed Action Does Not Conflict with the State's Long-Term Environmental Policies or Goals or Guidelines as Expressed in Chapter 344, Hawaii Revised Statutes***

The State's Environmental Policy and Guidelines are set forth in Chapter 344, Hawaii Revised Statutes. The proposed action does not contravene provisions of Chapter 344, Hawaii Revised Statutes.

4. ***The Economic or Social Welfare of the Community or State Would Not Be Substantially Affected***

The proposed project will have a beneficial impact on the local economy during construction. No adverse impacts to the economic or social welfare of the community or state are anticipated.

5. ***The Proposed Action Does Not Affect Public Health***

No adverse impacts to the public's health and welfare are anticipated as a result of the proposed project. It is noted that responses for emergency services should be improved with this addition to the local roadway network.

6. ***No Substantial Secondary Impacts, Such as Population Changes or Effects on Public Facilities are Anticipated***

No population changes are anticipated as a result of the proposed project.

From a land use standpoint, the proposed project is in keeping with the objectives, policies, and implementing actions of the Kihei-Makena Community Plan. The proposed project complements and is compatible with surrounding land uses.

No adverse impacts to water and wastewater capacities and facilities are anticipated.

7. ***No Substantial Degradation of Environmental Quality is Anticipated***

During the construction phase of the project, there will be short-term air quality and noise impacts as a result of the project. In the long term, effects upon air quality and ambient noise levels should be minimal. The project is not anticipated to significantly affect the open space and scenic character of the area.

No substantial degradation of environmental quality resulting from the project is anticipated.

8. ***The Proposed Action Does Not Involve a Commitment to Larger Actions, Nor Would Cumulative Impacts Result in Considerable Effects on the Environment***

The proposed action does not represent a commitment to larger actions. In addition, the proposed action is not expected to result in cumulative impacts that would adversely affect the environment.

9. ***No Rare, Threatened or Endangered Species or Their Habitats Would Be Adversely Affected By the Proposed Action***

There are no rare, threatened or endangered species of flora, fauna or avifauna that will be adversely affected by the proposed action.

10. ***Air Quality, Water Quality or Ambient Noise Levels Would Not Be Detrimentally Affected by the Action***

Construction activities will result in short-term air quality and noise impacts. Dust control measures, such as regular watering and sprinkling, will be implemented to minimize wind-blown emissions. Noise impacts will occur primarily from construction-related activities. It is anticipated that construction will be limited to daylight working hours. Water quality is not expected to be affected.

In the long term, the project is not anticipated to have a significant impact on air, noise and water quality.

11. ***The Proposed Project Would Not Affect Environmentally Sensitive Areas, Such as Flood Plains, Tsunami Zones, Erosion-prone Areas, Geologically Hazardous Lands, Estuaries, Fresh Waters or Coastal Waters***

The project is not located within and would not affect environmentally sensitive areas. The project site is not subject to flooding or tsunami inundation. Soils underlying the project site are not considered to be erosion-prone. There are no geologically hazardous lands, estuaries, or coastal waters within or adjacent to the project site.

12. ***The Proposed Action Would Not Substantially Affect Scenic Views and Viewplanes Identified in County Plans or Studies***

The project site is not identified as a scenic vista or viewplane. The proposed project will not affect scenic corridors and coastal scenic and open space resources.

13. ***The Proposed Action Would Not Require Substantial Energy Consumption***

The proposed project will involve the short-term commitment of fuel for equipment, vehicles, and machinery during construction activities. However, this use is not anticipated to result in a substantial consumption of energy resources.

Based on the foregoing findings, it is anticipated that the proposed action will not result in significant adverse impacts.

Chapter VIII

List of Permits and Approvals

VIII. LIST OF PERMITS AND APPROVALS

The following permits and approvals will be required prior to the implementation of the proposed North-South Collector Road extension project.

State of Hawaii

1. NPDES permit (for stormwater discharge associated with construction activities)

County of Maui

1. County Special Management Area Use Permit
2. Grading permit

Chapter IX

Neighborhood/Group Information Meetings

IX. NEIGHBORHOOD/GROUP INFORMATION MEETINGS

The applicant presented the plans for the proposed North-South Collector Road extension to the Kihei Community Association's Planning Committee (KCA) on March 8, 2004. The KCA submitted a letter of support for the project which included some suggestions for the roadway. See Appendix "G". The KCA was also included in the early consultation review for the project and received a copy of the Draft EA, as well as the SMA Use Permit application for the project.

Additionally, the applicant held a workshop during the March 23, 2004 Maui Planning Commission meeting. Preliminary plans and scope of work were presented at the meeting.

Chapter X

Agencies Consulted During the Preparation of the Draft Environmental Assessment, Letters Received and Responses to Substantive Comments

X. AGENCIES CONSULTED DURING THE PREPARATION OF THE DRAFT ENVIRONMENTAL ASSESSMENT, LETTERS RECEIVED AND RESPONSES TO SUBSTANTIVE COMMENTS

The following agencies were consulted during the preparation of the Draft Environmental Assessment. Agency comments and responses to substantive comments are also included in this section.

1. Ranae Ganske-Cerizo, Acting District Conservationist
Natural Resources Conservation Service
U.S. Department of Agriculture
210 Imi Kala Street, Suite 209
Wailuku, Hawaii 96793-2100

2. George Young, P.E.
U.S. Department of the Army
U.S. Army Engineer District, Honolulu
Building 230
Fort Shafter, Hawaii 96858-5440

3. Robert P. Smith
Pacific Islands Manager
U. S. Fish and Wildlife Service
300 Ala Moana Blvd.
Rm. 3-122, Box 50088
Honolulu, Hawaii 96813

4. Mary Lou Kobayashi,
Planning Program Administrator
State of Hawaii
Office of Planning
P. O. Box 2359
Honolulu, Hawaii 96804

5. Patricia Hamamoto, Superintendent
State of Hawaii
Department of Education
P. O. Box 2360
Honolulu, Hawaii 96804

6. Denis Lau, Chief
Clean Water Branch
State of Hawaii
Department of Health
919 Ala Moana Blvd., Room 300
Honolulu, Hawaii 96814

7. Herbert Matsubayashi
District Environmental Health
State of Hawaii
Department of Health
54 High Street
Wailuku, Hawaii 96793

8. Peter Young
State of Hawaii
Department of Land and Natural Resources
P. O. Box 621
Honolulu, Hawaii 96809

9. Melanie Chinen, Administrator
State of Hawaii
Department of Land and Natural Resources
State Historic Preservation Division
601 Kamokila Blvd., Room 555
Kapolei, Hawaii 96707

10. Rodney Haraga, Director
State of Hawaii
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

11. Clyde Namu'o, Administrator
Office of Hawaiian Affairs
711 Kapiolani Boulevard, Suite 500
Honolulu, Hawaii 96813

12. Carl Kaupalolo, Chief
County of Maui
Department of Fire and Public Safety
200 Dairy Road
Kahului, Hawaii 96732

13. Alice Lee, Director
County of Maui
Department of Housing and Human Concerns
200 South High Street
Wailuku, Hawaii 96793

14. Michael W. Foley, Director
County of Maui
Department of Planning
250 South High Street
Wailuku, Hawaii 96793

15. Glenn Correa, Director
County of Maui
Department of Parks and Recreation
700 Hali'a Nakoa Street, Unit 2
Wailuku, Hawaii 96793

16. Milton Arakawa, Director
County of Maui
Department of Public Works and Environmental Management
200 South High Street
Wailuku, Hawaii 96793

17. Thomas Phillips, Chief
County of Maui
Police Department
55 Mahalani Street
Wailuku, Hawaii 96793

18. George Tengan, Director
County of Maui
Department of Water Supply
200 South High Street
Wailuku, Hawaii 96793

19. Maui Electric Company, Ltd.
P. O. Box 398
Kahului, Hawaii 96732

20. Judith Michaels, President
Kihei Community Association
P. O. Box 662
Kihei, Hawaii 96753

DEC 0 9 2004

DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
FT. SHAFTER, HAWAII 96858-5440

REPLY TO
ATTENTION OF

Regulatory Branch

December 7, 2004

Ms. Karlynn Kawahara
Project Planner
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, HI 96793

Dear Ms. Kawahara:

This responds to your request for written comments for a draft Environmental Assessment (dEA) which will address activities and impacts of the proposed roadway extension of Liloa Drive, aka North-South Collector Road, Kihei, Maui Island (about 2,100 lineal feet).

The dEA should indicate whether waters of the United States, as represented by perennial or intermittent streams, and wetlands are in, adjacent to, or absent from, the proposed project area. The dEA should state in appropriate sections that there is, or no potential for waters of the U.S. to be impacted by construction of project structures and associated ground disturbing activities within the proposed improvement area. Upon our receipt of the dEA, it may be then be determined whether a Department of Army (DA) permit for Section 404 activities of the Clean Water Act may, or may not be, required for the proposed roadway extension of Liloa Drive between Keonekai Road and Walua Place.

Thank you for your consideration of potential impacts to the aquatic environment of the Kihei watershed. Please contact Mr. Farley Watanabe of my staff at 438-7701, or facsimile 438-4060, if you have any questions or need additional information. Please refer to File Number **POH-2004-1123** in any future correspondence with us regarding this project.

Sincerely,

George P. Young, P.E.
Chief, Regulatory Branch

MUNEKIYO & HIRAGA, INC.

December 21, 2004

Mr. George P. Young, P.E.
Chief, Regulatory Branch
Department of the Army
U.S. Army Engineer District, Honolulu
Fort Shafter, Hawaii 96858-5440

SUBJECT: Early Consultation Request for Towne Development of Hawaii's Proposed North-South Collector Road Extension from Walua Place to Keonekai Road, Kihei, Maui, Hawaii - File No. POH-2004-1123

Dear Mr. Young:

We are in receipt of your letter dated December 7, 2004 with your comments on the subject project. On behalf of our client, Towne Development of Hawaii, Inc. we would like to offer the following response.

The Draft Environmental Assessment (DEA) for the project will include a description of the surrounding area and note whether or not there are streams of any nature or wetlands in the project area. Further, we will provide review within the DEA as to whether or not there is a potential for waters of the U.S. to be affected by the construction of the project. We look forward to working with you on this project in the future.

Should you have any further questions, please feel free to call me at (808)244-2015.

Very truly yours,

Karlynn Kawahara, Planner

KK:yp
cc: Takeshi Matsukata, Towne Development of Hawaii, Inc.
Warren Unemori, Warren S. Unemori Engineering, Inc.
townedevVnscollVarmy.res

305 High Street, Suite 104 Wailuku, Hawaii 96793 ph: (808)244-2015 fax: (808)244-8729 planning@mhinconline.com

LINDA LINGLE
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O. BOX 3378
HONOLULU, HAWAII 96801-3378

CHIYOME L. FUKINO, M.D.
DIRECTOR OF HEALTH

DEC 21 2004

In reply, please refer to:
EMD / CWB

12042PKP.04

December 17, 2004

Ms. Karlynn Kawahara
Planner
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Kawahara:

Subject: Early Consultation Request for Preparation of a Draft Environmental Assessment, Liloa Drive (a.k.a. North-South Collector Road) Extension Kihei, Maui, Hawaii

The Department of Health (DOH), Clean Water Branch (CWB), has reviewed the subject document and offers the following comments:

1. The Army Corps of Engineers should be contacted at (808) 438-9258 to identify whether a Federal license or permit (including a Department of Army permit) is required for this project. Pursuant to Section 401(a)(1) of the Federal Water Pollution Control Act (commonly known as the "Clean Water Act"), a Section 401 Water Quality Certification is required for "[a]ny applicant for Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may result in any discharge into the navigable waters..."

2. A National Pollutant Discharge Elimination System (NPDES) general permit coverage is required for the following activities:

   a. Storm water associated with industrial activities, as defined in Title 40, Code of Federal Regulations, Sections 122.26(b)(14)(i) through 122.26(b)(14)(ix) and 122.26(b)(14)(xi).

   b. Construction activities, including clearing, grading, and excavation, that result in the disturbance of equal to or greater than one (1) acre of total land area. The total land area includes a contiguous area where multiple separate and distinct construction activities may be taking place at different times on different schedules under a larger common plan of development or sale. **An NPDES permit is required before the commencement of the construction activities.**

   c. Discharges of treated effluent from leaking underground storage tank remedial activities.

   d. Discharges of once through cooling water less than one (1) million gallons per day.

e. Discharges of hydrotesting water.

f. Discharges of construction dewatering effluent.

g. Discharges of treated effluent from petroleum bulk stations and terminals.

h. Discharges of treated effluent from well drilling activities.

i. Discharges of treated effluent from recycled water distribution systems.

j. Discharges of storm water from a small municipal separate storm sewer system.

k. Discharges of circulation water from decorative ponds or tanks.

The CWB requires that a Notice of Intent (NOI) to be covered by an NPDES general permit for any of the above activities be submitted at least 30 days before the commencement of the respective activities. The NOI forms may be picked up at our office or downloaded from our website at:
http://www.hawaii.gov/health/environmental/water/cleanwater/index.html

3. The applicant may be required to apply for an individual NPDES permit if there is any type of activity in which wastewater is discharged from the project into State waters and/or coverage of the discharge(s) under the NPDES general permit(s) is not permissible (i.e. NPDES general permits do not cover discharges into Class 1 or Class AA State waters). An application for the NPDES permit is to be submitted at least 180 days before the commencement of the respective activities. The NPDES application forms may also be picked up at our office or downloaded from our website at:
http://www.hawaii.gov/health/environmental/water/cleanwater/index.html

4. Hawaii Administrative Rules, Section 11-55-38, also requires the applicant to either submit a copy of the new NOI or NPDES permit application to the State Department of Land and Natural Resources, State Historic Preservation Division (SHPD), or demonstrate to the satisfaction of the DOH that the project, activity, or site covered by the NOI or application has been or is being reviewed by SHPD.

If you have any questions, please contact Ms. Kris Poentis of the Engineering Section, CWB, at (808) 586-4309.

Sincerely,

DENIS R. LAU, P.E., CHIEF
Clean Water Branch

KP:np

MUNEKIYO & HIRAGA, INC.

January 12, 2005

Mr. Denis Lau, P.E., Chief
Clean Water Branch
Department of Health
P. O. Box 3378
Honolulu, Hawaii 96801-3378

SUBJECT: Early Consultation Request for Towne Development of Hawaii's Proposed North-South Collector Road Extension from Walua Place to Keonekai Road, Kihei, Maui, Hawaii

Dear Mr. Lau:

Thank you for your letter dated December 17, 2004, providing us with your comments on the subject project. Our client, Towne Development of Hawaii (TDH), has been in contact with the Army Corps of Engineers for early consultation on the project.

Secondly, TDH will work with the contractor, once selected, to insure that all applicable permits are in place before the commencement of any construction activities.

Third, an early consultation request was submitted to the Department of Land and Natural Resources, State Historic Preservation Division and we are awaiting their early consultation response on the project.

Should you have any questions, please feel free to contact me at (808)244-2015.

Very truly yours,

Karlynn Kawahara, Planner

KK:yp
cc: Takeshi Matsukata, Towne Development of Hawaii, Inc.
Warren Unemori, Warren S. Unemori Engineering, Inc.
townedevinscoll\dohcwb.res

environment
planning
305 High Street, Suite 104 · Wailuku, Hawaii 96793 · ph: (808)244-2015 · fax: (808)244-8729 · planning@mhinconline.com

LINDA LINGLE
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF EDUCATION
P.O. BOX 2360
HONOLULU, HAWAII 96804

PATRICIA HAMAMOTO
SUPERINTENDENT

OFFICE OF THE SUPERINTENDENT

December 20, 2004

Ms. Karlynn Kawahara, Planner
Munekiyo & Hiraga Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Kawahara:

Subject: Early Consultation on the Extension of Liloa Drive, Kihei, Maui, Hawaii

The Department of Education (DOE) is responding to your request for early consultation comments on the proposed extension of Liloa Drive (Liloa) from Walua Place to Keonekai Road in Kihei, Maui.

The DOE believes the extension of Liloa will be used by students of Kamali'i Elementary School as they walk to and from school. The DOE is concerned that only the proposed Section A portion of the road will have one sidewalk and bikepath. We assume students will eventually come from residential units located both mauka and makai of Liloa. If there is only a sidewalk on the makai side of the road, students living in the subdivisions mauka of the road would have to cross the street twice just to walk on a sidewalk. The DOE is more concerned about the plans for the Section B portion of the road which would have no sidewalk and no bikepath.

The DOE would be interested in the number of crosswalks that are proposed for Liloa and where they would be located. It would also be useful to know the posted speed limit for the road.

The DOE will be looking for assurances that efforts will be made to reduce construction-related dust and noise during school hours. It would be mutually advantageous to do the loudest, dirtiest work on Section A during the school's summer break. The DOE requests that the principal of Kamalii Elementary be kept fully informed in advance of inconveniences such as blasting, earth moving, street closures and other traffic detours, and interruptions of utility services.

If you have any questions, plèase call Rae Loui, Assistant Superintendent of the Office of Business Services, at (808) 586-3444 or Heidi Meeker of the Facilities and Support Services Branch, at (808) 733-4862.

Very truly yours,

Patricia Hamamoto
Superintendent

PH:jmb

c: Rae Loui, Asst. Supt., OBS
Kenneth Nomura, CAS, Baldwin, Kekaulike, Maui Complex Area
Sandra Shawhan, Kamalii Principal

MUNEKIYO & HIRAGA, INC.

January 25, 2005

Patricia Hamamoto, Superintendent
State of Hawaii
Department of Education
P. O. Box 2360
Honolulu, Hawaii 96804

SUBJECT: Early Consultation Request for Towne Development of Hawaii's Proposed North-South Collector Road Extension from Walua Place to Keonekai Road, Kihei, Maui, Hawaii

Dear Ms. Hamamoto:

Thank you for your comments on the subject project, dated December 20, 2004. On behalf of our client, Towne Development of Hawaii, Inc. (TDH), we would like to offer the following responses to your concerns.

1. The proposed typical sections for the roadways were developed in conjunction with the County of Maui, Department of Public Works and Environmental Management (DPWEM). Currently, TDH and DPWEM are drafting a Memorandum of Understanding (MOU) on the North-South Collector Road construction. As part of the MOU, the DPWEM will require the owners of the adjoining parcels where Typical Roadway Section B will be used, to install frontage improvements. These improvements would include sidewalks, curbs and gutters along the Liloa Drive extension. TDH will only be responsible for the installation of the roadway for the section from the Ke Alii Kai II Subdivision to Keonekai Road. For the portion of the road from Walua Place to the Ke Alii Kai II Subdivision, TDH intends to provide a 10-foot wide bicycle/pedestrian path on the mauka side of the road and a 5-foot wide sidewalk on the makai side. Revised roadway sections will be provided in the DEA.

2. Further details on the number and locations of crosswalks on the future Liloa Drive extension will be provided in the construction plans. Plans can be submitted to the Department of Education for review upon their completion. It is our understanding that the posted speed limit for the Liloa Drive extension will be 20 miles per hour (mph) as it is currently posted on other portions of the road.

planning environment

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3. To the extent practicable construction phasing will be undertaken to minimize conflict with school operations. As TDH shares your concern with regard to nuisance effects of construction, a construction site coordinator will be appointed to ensure that concerns of the school are addressed in a timely and effective manner. In this regard, we will inform the principal of Kamalii School of any anticipated blasting, street closures and other traffic detours and/or utility interruptions associated with the proposed project.

Should you have any further questions, please feel free to contact me at (808) 244-2015.

Very truly yours,

Karlynn Kawahara, Planner

KK:yp
cc: Takeshi Matsukata, Towne Development of Hawaii, Inc.
Warren Unemori, Warren S. Unemori Engineering, Inc.
townedevvnscolldoe.res

LINDA LINGLE
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF HEALTH
MAUI DISTRICT HEALTH OFFICE
54 HIGH STREET
WAILUKU, MAUI, HAWAII 96793-2102

CHIYOME L. FUKINO, M.D.
DIRECTOR OF HEALTH

LORRIN W. PANG, M. D., M.P.H.
DISTRICT HEALTH OFFICE

DEC 30 2004

December 28, 2004

Ms. Karlynn Kawahara
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawai'i 96793

Dear Ms. Kawahara:

Subject: **Liloa Drive Extension**
TMK: (2) 3-9-04:05 & 145; 3-9-19:04; 3-9-20:04, 07, 12, 16, & 20

Thank you for the opportunity to participate in the early consultation process for the environmental assessment. The following comments are offered:

The noise created during the construction phase of the project may exceed the maximum allowable levels as set forth in Hawaii Administrative Rules, Chapter 11-46, "Community Noise Control". A noise permit may be required and should be obtained before the commencement of work.

Should you have any questions, please call me at 984-8230.

Sincerely,

Herbert S. Matsubayashi
District Environmental Health Program Chief

MUNEKIYO & HIRAGA, INC.

January 12, 2005

Mr. Herbert Matsubayashi
District Environmental Health Program Chief
Maui District Health Office
54 High Street
Wailuku, HI 96793

SUBJECT: Early Consultation Request for Towne Development of Hawaii's Proposed North-South Collector Road Extension from Walua Place to Keonekai Road, Kihei, Maui, Hawaii

Dear Mr. Matsubayashi:

Thank you for your letter dated December 28, 2004, providing us with your comments on the proposed project.

Our client, Towne Development of Hawaii, Inc., will work with the contractor to insure that all permits, including a noise permit, are approved prior to the start of construction.

Should you have any questions, please feel free to contact me at 244-2015.

Very truly yours,

Karlynn Kawahara, Planner

KK:yp
cc: Takeshi Matsukata, Towne Development of Hawaii, Inc.
Warren Unemori, Warren S. Unemori Engineering, Inc.
townedev\nscott\dohmaui.res

305 High Street, Suite 104 · Wailuku, Hawaii 96793 · ph: (808)244-2015 · fax: (808)244-8729 · planning@mhinconline.com

environment
planning
government

DEPARTMENT OF
HOUSING AND HUMAN CONCERNS
COUNTY OF MAUI

DEC 15 2004

ALAN M. ARAKAWA
Mayor

ALICE L. L
Direc

HERMAN T. ANDAYA
Deputy Director

200 SOUTH HIGH STREET • WAILUKU, HAWAII 96793 • PHONE (808) 270-7805 • FAX (808) 270-7165

December 1, 2004

Ms. Karlynn Kawahara, Planner
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Kawahara:

Subject: Early Consultation Request for Preparation of a Draft Environmental Assessment, Liloa Drive (a.k.a. North-South Collector Road) extension, Kihei, Maui, Hawaii

We have reviewed your November 30, 2004 letter and enclosures and would like to offer the following comments:

1. Project Specific Condition No. 31 in the Planning Director's September 16, 2004 SMA approval letter for the Ke Alii Kai II Subdivision reads as follows:

   "If the Special Management Area permit for the North-South Collector Road is not approved, then the applicant shall comply with the County's Affordable Housing Policy."

2. Project Specific Condition No. 26 in the Planning Director's September 16, 2004 SMA approval letter for the Ke Alii Villas Condominium reads as follows:

   "If the Special Management Area permit for the North-South Collector Road is not approved, then the applicant shall comply with the County's Affordable Housing Policy."

Please include the above conditions in the draft Environmental Assessment.

Thank you.

Very truly yours,

ALICE L. LEE
Director

ETO:bp

c: Housing Administrator

MUNEKIYO & HIRAGA, INC.

December 21, 2004

Alice L. Lee, Director
Department of Housing and Human Concerns
200 South High Street
Wailuku, Hawaii 96793

SUBJECT: Early Consultation Request for Towne Development of Hawaii's Proposed North-South Collector Road Extension from Walua Place to Keonekai Road, Kihei, Maui, Hawaii

Dear Ms. Lee:

We are in receipt of your letter dated December 1, 2004 with your comments on the subject project. On behalf of our client, Towne Development of Hawaii, Inc. we would like to offer the following response.

We note your comments with regards to the inclusion of the Special Management Area (SMA) Use Permit conditions for the Ke Alii Kai II and Ke Alii Villas Condominium projects in the Draft Environmental Assessment (DEA). We will include language in the DEA describing the conditions which would require compliance with the County of Maui's Affordable Housing Policy should the SMA application for the North-South Collector Road not be accepted.

Should you have any further questions, please feel free to call me at 244-2015.

Very truly yours,

Karlynn Kawahara, Planner

KK:yp
cc: Takeshi Matsukata, Towne Development of Hawaii, Inc.
townedev\nscoll\dhhc.res

305 High Street, Suite 104 Wailuku, Hawaii 96793 ph: (808)244-2015 fax: (808)244-8729 planning@mhinconline.com

DEC 15 2004

ALAN M. ARAKAWA
Mayor

GLENN T. CORREA
Director

JOHN L. BUCK III
Deputy Director

(808) 270-7230
Fax (808) 270-7934

DEPARTMENT OF PARKS & RECREATION

700 Hali'a Nakoa Street, Unit 2 , Wailuku, Hawaii 96793

December 8, 2004

Munekiyo & Hiraga, Inc.
Attention: Karlynn Kawahara
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Kawahara:

SUBJECT: Early Consultation Request for Preparation of a Draft Environmental Assessment, Liloa Drive (a.k.a. North-South Collector Road) Extension, Kihei, Maui, Hawaii

Thank you for the opportunity to review and comment on the proposed actions.

We have reviewed the subject application and have no comments or objections to the proposed actions. Please contact Mr. Patrick Matsui, Chief of Planning and Development at 270-7387 should you have any questions.

Sincerely,

GLENN T. CORREA
Director

c: Patrick Matsui, Chief of Parks Planning and Development
Takeshi Matsukata, Towne Development of Hawaii, Inc.
Warren Unemori, Warren S. Unemori Engineering, Inc.

DEC 16 2004

ALAN M. ARAKAWA
MAYOR

CARL M. KAUPALOLO
CHIEF

NEAL A. BAL
DEPUTY CHIEF

COUNTY OF MAUI
DEPARTMENT OF FIRE AND PUBLIC SAFETY

200 DAIRY ROAD
KAHULUI, MAUI, HAWAII 96732
(808) 270-7561
FAX (808) 270-7919

December 14, 2004

Munekiyo & Hiraga, Inc.
Attention: Karlynn Kawahara
305 High Street, Suite 104
Wailuku, HI 96793

Subject: Early Consultation Request, Liloa Drive extension, Kihei , Maui

Dear Ms. Kawahara,

The roadway meets our width requirements and I have no further comments at this time.

Sincerely,

Valeriano F. Martin
Captain
Fire Prevention Bureau

ALAN M. ARAKAWA
Mayor

MICHAEL W. FOLEY
Director

WAYNE A. BOTEILHO
Deputy Director

DEC 21 2004

COUNTY OF MAUI
DEPARTMENT OF PLANNING

December 20, 2004

Ms. Karlynn Kawahara
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Kawahara;

RE: Preconsultation Comments for the Proposed North-South Collector Roadway (a.k.a. Liloa Drive) Extension from Walua Place to Keonekai Road, TMK: 3-9-004: 005 and 145, 3-9-019: 004, 3-9-020: 004, 007, 012, 016, and 020, Kihei, Island of Maui, Hawaii (LTR 2004/4427)

The Maui Planning Department (Department) has received the above referenced request and provides the following comments:

1. Identify funding sources for all phases of project implementation and construction.

2. Outline anticipated time frames for all phases of project implementation and construction.

3. Provide an archaeological and cultural assessment.

4. Identify participants in the proposed project through previous permitting actions.

Thank you for the opportunity to comment. Should you require additional clarification, please contact Ms. Kivette A. Caigoy, Environmental Planner, at 270-7735.

Sincerely,

MICHAEL W. FOLEY
Planning Director

MWF:KAC:dm
c: Wayne Boteilho, Deputy Planning Director
Kivette Caigoy, Environmental Planner
Colleen Suyama, Staff Planner
General File
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MUNEKIYO & HIRAGA, INC.

January 26, 2005

Michael W. Foley, Director
Department of Planning
250 South High Street
Wailuku, Hawaii 96793

SUBJECT: Early Consultation Request for Towne Development of Hawaii's Proposed North-South Collector Road Extension from Walua Place to Keonekai Road, Kihei, Maui, Hawaii

Dear Mr. Foley:

Thank you for your letter dated December 20, 2004 regarding the subject project. On behalf of our client, Towne Development of Hawaii, Inc. (TDH), we would like to offer the following responses to your comments.

1. The proposed extension of the North-South Collector Road from Walua Place to Keonekai Road will be privately funded by TDH, with the exception of the portion fronting the Aloha Village site, as conditioned by the Special Management Area (SMA) Use Permit approvals for the Ke Ali'i Kai II Subdivision and Ke Ali'i Villas projects (Condition No. 23a). Aloha Village (TMK 3-9-020:007) will fund their portion of the roadway.

2. The applicant provided the department with a copy of the executed Memorandum of Understanding (MOU) which includes a phasing plan for the implementation of the North-South Collector Road. The Department of Public Works and Environmental Management (DPWEM) approved the MOU as conditioned by the SMA approval. The copy of the MOU was filed with the Department of Planning on January 19, 2005, by the applicant's attorney, Carlsmith Ball.

3. An archaeological inventory report and a cultural assessment of the project area will be included in the Draft Environmental Assessment (DEA) document.

4. To our knowledge, the only other participant in the proposed project due to permitting actions is the Aloha Village project. The Aloha Village SMA permit (SM1 2003/0029) has conditions which require the installation frontage improvements to the North-South Collector Road, a provision for the dedication of a road widening lot to the DPWEM and construction of their portion of the North-South Collector

305 High Street, Suite 104 · Wailuku, Hawaii 96793 · ph: (808)244-2015 · fax: (808)244-8729 · planning@mhinconline.com

Road to standards approved by the DPWEM. TDH is working with Aloha Village, other area land owners, and the DPWEM to secure the roadway rights-of-way for the project.

Should you have any questions, please feel free to contact me at 244-2015.

Very truly yours,

Karlynn Kawahara, Planner

KK:yp
cc: Takeshi Matsukata, Towne Development of Hawaii, Inc.
Warren Unemori, Warren S. Unemori Engineering, Inc.
townedev\nsd\planning.res

JAN 05 2005

ALAN M. ARAKAWA
MAYOR

GEORGE Y. TENGAN
DIRECTOR
JEFFREY T. PEARSON,
P.E.

DEPARTMENT OF WATER SUPPLY
COUNTY OF MAUI
P.O. BOX 1109
WAILUKU, MAUI, HAWAII 96793-7109
Telephone (808) 270-7816 • Fax (808) 270-7833

December 22, 2004

Ms. Karlynn Kawahara, Planner
Munekiyo & Hiraga, Inc.
305 High Street Suite 104
Wailuku HI 96793

Subject: Early Consultation Request for the Preparation of an Draft Environmental Assessment for Liloa Drive (a.k.a. North-South Collector Road) Extension, Kihei, Maui, Hawaii

Dear Ms. Kawahara:

Thank you for the opportunity to provide comments on the preparation of this Draft Environmental Assessment (EA). The Department of Water Supply provides the following information:

Source Availability and Consumption
The project area is served by the Central Maui System. The main sources of water for this system are the designated Iao aquifer, the Waihee aquifer, the Iao tunnel and the Iao-Waikapu Ditch. The Department will not issue temporary construction meters for Central Maui projects. Reclaimed water is readily available from the Department of Public Works and Environmental Management Wastewater Division.

System Infrastructure
The Department 16-inch water line runs along the North-South Collector Road of the project site. A section of the fire protection map is enclosed for your reference. Construction plans need to be reviewed by the Department of Water Supply. Water valve covers must be lifted to match the finished grade of the roadway. The applicant should contact our engineering division at 270-7835 with regard to these issues.

Pollution Prevention
The project overlies the Kamaole aquifer. The Department of Water Supply strives to protect the integrity of surface and groundwater resources by encouraging the applicant to adopt best management practices (BMPs) designed to minimize infiltration and runoff from all construction and vehicle operations. We have attached sample BMPs for principle operations for reference. Additional information can be obtained from the State Department of Health.

Conservation
We recommend that the following water conservation measures be included in the EA and implemented in project design and construction:
Use Climate-adapted Plants: The project is located in the "Maui County Planting Plan" - Plant Zone 5. Native plants adapted to the area conserve water and protect the watershed from degradation due to invasive alien species. Please refer to the attached brochure: "Saving Water In The Yard - What and How to Plant In Your Area" for roadside landscaping.

By Water All Things Find Life

Prevent Over-Watering By Automated Systems: Provide rain-sensors on all automated irrigation controllers in landscaped areas. Check and reset controllers at least once a month to reflect the monthly changes in evapo-transpiration rates at the site. As an alternative, provide the more automated, soil-moisture sensors on controllers.

Should you have any questions, please contact our Water Resources and Planning Division at 270-7199.

Sincerely,

George Y. Tengan
Director
emb

c: engineering division
applicant, with attachments:

Maui County Planting Plan - Saving Water in the Yard-What and How to Plant in your Area
Selected BMP's from "Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters"-EPA

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United States
Environmental Protection
Agency

Office of Water
Washington, DC 20460

840-B-92-002
January 1993

EPA

Guidance Specifying Management Measures For Sources Of Nonpoint Pollution In Coastal Waters

Issued Under the Authority of
Section 6217(g) of the Coastal Zone Act
Reauthorization Amendments of 1990

a highway and a watercourse that is needed to buffer the runoff flow and prevent potential contaminants from entering surface waters. Other design elements such as project alignment, gradient, cross section, and the number of stream crossings also must be taken into account to achieve successful control of erosion and nonpoint sources of pollution. (Refer to Chapter 3 of this guidance for details on road designs for different terrains.)

The following case study illustrates some of the problems and associated costs that may occur due to poor road construction and design. These issues should be addressed in the planning and design phase.

CASE STUDY - ANNAPOLIS, MARYLAND

Poor road siting and design resulted in concentrated runoff flows and heavy erosion that threatened several house foundations adjacent to the road. Sediment-laden runoff was also discharged into Herring Bay. To protect the Chesapeake Bay and the nearby houses, the county corrected the problem by installing diversions, a curb-and-drain urban runoff conveyance, and a rock wall filtration system, at a total cost of $100,000 (Munsey, 1992).

3. Management Measure Selection

This management measure was selected because it follows the approach to highway development recommended by the American Association of State Highway and Transportation Officials (AASHTO), Federal Highway Administration (FHWA) guidance, and highway location and design guidelines used by the States of Virginia, Maryland, Washington, and others.

Additionally, AASHTO has location and design guidelines (AASHTO, 1990, 1991) available for State highway agency use that describe the considerations necessary to control erosion and highway-related pollutants. Federal Highway Administration policy (FHWA, 1991) requires that Federal-aid highway projects and highways constructed under direct supervision of the FHWA be located, designed, constructed, and operated according to standards that will minimize erosion and sediment damage to the highway and adjacent properties and abate pollution of surface water and ground-water resources.

4. Practices

As discussed more fully at the beginning of this chapter and in Chapter 1, the following practices are described for illustrative purposes only. State programs need not require implementation of these practices. However, as a practical matter, EPA anticipates that the management measure set forth above generally will be implemented by applying one or more management practices appropriate to the source, location, and climate. The practices set forth below have been found by EPA to be representative of the types of practices that can be applied successfully to achieve the management measure described above.

- *a. Consider type and location of permanent erosion and sediment controls (e.g., vegetated filter strips, grassed swales, pond systems, infiltration systems, constructed urban runoff wetlands, and energy dissipators and velocity controls) during the planning phase of roads, highway, and bridges. (AASHTO, 1991; Hartigan et al., 1989)*

- *b. All wetlands that are within the highway corridor and that cannot be avoided should be mitigated. These actions will be subject to Federal Clean Water Act section 404 requirements and State regulations.*

c. *Assess and establish adequate setback distances near wetlands, waterbodies, and riparian areas to ensure protection from encroachment in the vicinity of these areas.*

Setback distances should be determined on a site-specific basis since several variables may be involved such as topography, soils, floodplains, cut-and-fill slopes, and design geometry. In level or gently sloping terrain, a general rule of thumb is to establish a setback of 50 to 100 feet from the edge of the wetland or riparian area and the right-of-way. In areas of steeply sloping terrain (20 percent or greater), setbacks of 100 feet or more are recommended. Right-of-way setbacks from major waterbodies (oceans, lakes, estuaries, rivers) should be in excess of 100 to 1000 feet.

d. *Avoid locations requiring excessive cut and fill. (AASHTO, 1991)*

e. *Avoid locations subject to subsidence, sink holes, landslides, rock outcroppings, and highly erodible soils. (AASHTO, 1991; TRB, Campbell, 1988)*

f. *Size rights-of-way to include space for siting runoff pollution control structures as appropriate. (AASHTO, 1991; Hartigan, et al., 1989)*

Erosion and sediment control structures (extended detention dry ponds, permanent sediment traps, catchment basins, etc.) should be planned and located during the design phase and included as part of the design specifications to ensure that such structures, where needed, are provided within the highway right-of-way.

g. *Plan residential roads and streets in accordance with local subdivision regulations, zoning ordinances, and other local site planning requirements (International City Managers Association, Model Zoning/Subdivision Codes). Residential road and street pavements should be designed with minimum widths.*

Local roads and streets should have right-of-way widths of 36 to 50 feet, with lane widths of 10 to 12 feet. Minimum pavement widths for residential streets where street parking is permitted range from 24 to 28 feet between curbs. In large-lot subdivisions (1 acre or more), grassed drainage swales can be used in lieu of curbs and gutters and the width of paved road surface can be between 18 and 20 feet.

h. *Select the most economic and environmentally sound route location. (FHWA, 1991)*

i. *Use appropriate computer models and methods to determine urban runoff impacts with all proposed route corridors. (Driscoll, 1990)*

Computer models to determine urban runoff from streets and highways include TR-55 (Soil Conservation Service model for controlling peak runoff); the P-8 model to determine storage capacity (Palmstrom and Walker); the FHWA highway runoff model (Driscoll et al., 1990); and others (e.g., SWMM, EPA's stormwater management model; HSP continuous simulation model by Hydrocomp, Inc.).

j. *Comply with National Environmental Policy Act requirements including other State and local requirements. (FHWA, T6640.8A)*

k. *Coordinate the design of pollution controls with appropriate State and Federal environmental agencies. (Maryland DOE, 1983)*

l. Develop local official mapping to show location of proposed highway corridors.

Official mapping can be used to reserve land areas needed for public facilities such as roads, highways, bridges, and urban runoff treatment devices. Areas that require protection, such as those which are sensitive to disturbance or development-related nonpoint source pollution, can be reserved by planning and mapping necessary infrastructure for location in suitable areas.

5. Effectiveness Information and Cost Information

The most economical time to consider the type and location of erosion, sediment, and NPS pollution control is early in the planning and design phase of roads and highways. It is much more costly to correct polluted runoff problems after a road or highway has already been built. The most effective and often the most economical control is to design roads and highways as close to existing grade as possible to minimize the area that must be cut or filled and to avoid locations that encroach upon adjacent watercourses and wet areas. However, some portions of roads and highways cannot always be located where NPS pollution does not pose a threat to surface waters. In these cases, the impact from potential pollutant loadings should be mitigated. Interactive computer models designed to run on a PC are available (e.g., FHWA's model, Driscoll et al., 1990) and can be used to examine and project the runoff impacts of a proposed road or highway design on surface waters. Where controls are determined to be needed, several cost-effective management practices, such as vegetated filter strips, grassed swales, and pond systems, can be considered and used to treat the polluted runoff. These mitigating practices are described in detail in the discussion on urban developments (Management Measure IV.A).

B. Management Measure for Bridges

Site, design, and maintain bridge structures so that sensitive and valuable aquatic ecosystems and areas providing important water quality benefits are protected from adverse effects.

1. Applicability

This management measure is intended to be applied by States to new, relocated, and rehabilitated bridge structures in order to control erosion, streambed scouring, and surface runoff from such activities. Under the Coastal Zone Act Reauthorization Amendments of 1990, States are subject to a number of requirements as they develop coastal NPS programs in conformity with this management measure and will have some flexibility in doing so. The application of management measures by States is described more fully in *Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance*, published jointly by the U.S. Environmental Protection Agency (EPA) and the National Oceanic and Atmospheric Administration (NOAA) of the U.S. Department of Commerce.

2. Description

This measure requires that NPS runoff impacts on surface waters from bridge decks be assessed and that appropriate management and treatment be employed to protect critical habitats, wetlands, fisheries, shellfish beds, and domestic water supplies. The siting of bridges should be a coordinated effort among the States, the FHWA, the U.S. Coast Guard, and the Army Corps of Engineers. Locating bridges in coastal areas can cause significant erosion and sedimentation, resulting in the loss of wetlands and riparian areas. Additionally, since bridge pavements are extensions of the connecting highway, runoff waters from bridge decks also deliver loadings of heavy metals, hydrocarbons, toxic substances, and deicing chemicals to surface waters as a result of discharge through scupper drains with no overland buffering. Bridge maintenance can also contribute heavy loads of lead, rust particles, paint, abrasive, solvents, and cleaners into surface waters. Protection against possible pollutant overloads can be afforded by minimizing the use of scuppers on bridges traversing very sensitive waters and conveying deck drainage to land for treatment. Whenever practical, bridge structures should be located to avoid crossing over sensitive fisheries and shellfish-harvesting areas to prevent washing polluted runoff through scuppers into the waters below. Also, bridge design should account for potential scour and erosion, which may affect shellfish beds and bottom sediments.

3. Management Measure Selection

This management measure was selected because of its documented effectiveness and to protect against potential pollution impacts from siting bridges over sensitive waters and tributaries in the coastal zone. There are several examples of siting bridges to protect sensitive areas. The Isle of Palms Bridge near Charleston, South Carolina, was designed without scupper drains to protect a local fishery from polluted runoff by preventing direct discharge into the waters below. In another example, the Louisiana Department of Transportation and Development specified stringent requirements before allowing the construction of a bridge to protect destruction of fragile wetlands near New Orleans. A similar requirement was specified for bridge construction in the Tampa Bay area in Florida (ENR, 1991).

4. Practices

As discussed more fully at the beginning of this chapter and in Chapter 1, the following practices are described for illustrative purposes only. State programs need not require implementation of these practices. However, as a practical matter, EPA anticipates that the management measure set forth above generally will be implemented by applying one or more management practices appropriate to the source, location, and climate. The practices set forth below have been found by EPA to be representative of the types of practices that can be applied successfully to achieve the management measure described above.

Additional erosion and sediment control management practices are listed in the construction section for urban sources of pollution (Management Measure IV.A).

a. Coordinate design with FHWA, USCG, COE, and other State and Federal agencies as appropriate.

b. Review National Environmental Policy Act requirements to ensure that environmental concerns are met (FHWA, T6640.8A and 23 CFR 771).

c. Avoid highway locations requiring numerous river crossings. (AASHTO, 1991)

d. Direct pollutant loadings away from bridge decks by diverting runoff waters to land for treatment.

Bridge decks should be designed to keep runoff velocities low and control pollutant loadings. Runoff waters should be conveyed away from contact with the watercourse and directed to a stable storm drainage, wetland, or detention pond. Conveyance systems should be designed to withstand the velocities of projected peak discharge.

e. Restrict the use of scupper drains on bridges less than 400 feet in length and on bridges crossing very sensitive ecosystems.

Scupper drains allow direct discharge of runoff into surface waters below the bridge deck. Such discharges can be of concern where the waterbody is highly susceptible to degradation or is an outstanding resource such as a spawning area or shellfish bed. Other sensitive waters include water supply sources, recreational waters, and irrigation systems. Care should be taken to protect these areas from contaminated runoff.

f. Site and design new bridges to avoid sensitive ecosystems.

Pristine waters and sensitive ecosystems should be protected from degradation as much as possible. Bridge structures should be located in alternative areas where only minimal environmental damage would result.

g. On bridges with scupper drains, provide equivalent urban runoff treatment in terms of pollutant load reduction elsewhere on the project to compensate for the loading discharged off the bridge.

5. Effectiveness Information and Cost Information

Effectively controlling NPS pollutants such as road contaminants, fugitive dirt, and debris and preventing accidental spills from entering surface waters via bridge decks are necessary to protect wetlands and other sensitive ecosystems. Therefore, management practices such as minimizing the use of scupper drains and diverting runoff waters to land for treatment in detention ponds and infiltration systems are known to be effective in mitigating pollutant loadings. Tables 4-7 and 4-8 in Section II provide cost and effectiveness data for ponds, constructed wetlands, and filtration devices.

C. Management Measure for Construction Projects

(1) Reduce erosion and, to the extent practicable, retain sediment onsite during and after construction and

(2) Prior to land disturbance, prepare and implement an approved erosion control plan or similar administrative document that contains erosion and sediment control provisions.

1. Applicability

This management measure is intended to be applied by States to new, replaced, restored, and rehabilitated road, highway, and bridge construction projects in order to control erosion and offsite movement of sediment from such project sites. Under the Coastal Zone Act Reauthorization Amendments of 1990, States are subject to a number of requirements as they develop coastal NPS programs in conformity with this management measure and will have some flexibility in doing so. The application of management measures by States is described more fully in *Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance*, published jointly by the U.S. Environmental Protection Agency (EPA) and the National Oceanic and Atmospheric Administration (NOAA) of the U.S. Department of Commerce.

2. Description

Erosion and sedimentation from construction of roads, highways, and bridges, and from unstabilized cut-and-fill areas, can significantly impact surface waters and wetlands with silt and other pollutants including heavy metals, hydrocarbons, and toxic substances. Erosion and sediment control plans are effective in describing procedures for mitigating erosion problems at construction sites before any land-disturbing activity begins. Additional relevant practices are described in Management Measures III.A and III.B of this chapter.

Bridge construction projects include grade separations (bridges over roads) and waterbody crossings. Erosion problems at grade separations result from water running off the bridge deck and runoff waters flowing onto the bridge deck during construction. Controlling this runoff can prevent erosion of slope fills and the undermining failure of the concrete slab at the bridge approach. Bridge construction over waterbodies requires careful planning to limit the disturbance of streambanks. Soil materials excavated for footings in or near the water should be removed and relocated to prevent the material from being washed back into the waterbody. Protective berms, diversion ditches, and silt fences parallel to the waterway can be effective in preventing sediment from reaching the waterbody.

Wetland areas will need special consideration if affected by highway construction, particularly in areas where construction involves adding fill, dredging, or installing pilings. Highway development is most disruptive in wetlands since it may cause increased sediment loss, alteration of surface drainage patterns, changes in the subsurface water table, and loss of wetland habitat. Highway structures should not restrict tidal flows into salt marshes and other coastal wetland areas because this might allow the intrusion of freshwater plants and reduce the growth of salt-tolerant species. To safeguard these fragile areas, the best practice is to locate roads and highways with sufficient setback distances between the highway right-of-way and any wetlands or riparian areas. Bridge construction also can impact water circulation and quality in wetland areas, making special techniques necessary to accommodate construction. The following case study provides an example of a construction project where special considerations were given to wetlands.

CASE STUDY - BRIDGING WETLANDS IN LOUISIANA

To provide protection for an environmentally critical wetland outside New Orleans, the Louisiana Department of Transportation and Development (DOTD) required a special construction technique to build almost 2 miles of twin elevated structures for the Interstate 310 link between I-10 and U.S. Route 90. A technique known as "end-on" construction was devised to work from the decks of the structures, building each section of the bridge from the top of the last completed section and using heavy cranes to push each section forward one bay at a time. The cranes were also used to position steel platforms, drive in support pilings, and lay deck slabs, alternating this procedure between each bay. Without this technique, the Louisiana DOTD would not have been permitted to build this structure. The twin 9,200-foot bridges took 485 days to complete at a cost of $25.3 million (*Engineering News Record*, 1991).

3. Management Measure Selection

This management measure was selected because it supports FHWA's erosion and sediment control policy for all highway and bridge construction projects and is the administrative policy of several State highway departments and local governmental agencies involved in land development activity. Examples of erosion and sediment controls and NPS pollutant control practices are described in AASHTO guidelines and in several State erosion control manuals (AASHTO, 1991; North Carolina DOT, 1991; Washington State DOT, 1988). A detailed discussion of cost-effective management practices is available in the urban development section (Section II) of this chapter. These example practices are also effective for highway construction projects.

4. Practices

As discussed more fully at the beginning of this chapter and in Chapter 1, the following practices are described for illustrative purposes only. State programs need not require implementation of these practices. However, as a practical matter, EPA anticipates that the management measure set forth above generally will be implemented by applying one or more management practices appropriate to the source, location, and climate. The practices set forth below have been found by EPA to be representative of the types of practices that can be applied successfully to achieve the management measure described above.

Additional erosion and sediment control management practices are listed in the construction section (Section III) of this chapter.

a. Write erosion and sediment control requirements into plans, specifications, and estimates for Federal aid construction projects for highways and bridges (FHWA, 1991) and develop erosion control plans for earth-disturbing activities.

Erosion and sediment control decisions made during the planning and location phase should be written into the contract, plans, specifications, and special provisions provided to the construction contractor. This approach can establish contractor responsibility to carry out the explicit contract plan recommendations for the project and the erosion control practices needed.

b. Coordinate erosion and sediment controls with FHWA, AASHTO, and State guidelines.

Coordination and scheduling of the project work with State and local authorities are major considerations in controlling anticipated erosion and sediment problems. In addition, the contractor should submit a general work schedule and plan that indicates planned implementation of temporary and permanent erosion control practices, including shutdown procedures for winter and other work interruptions. The plan also should include proposed methods of control on restoring borrow pits and the disposal of waste and hazardous materials.

c. *Install permanent erosion and sediment control structures at the earliest practicable time in the construction phase.*

Permanent or temporary soil stabilization practices should be applied to cleared areas within 15 days after final grade is reached on any portion of the site. Soil stabilization should also be applied within 15 days to denuded areas that may not be at final grade but will remain exposed to rain for 30 days or more. Soil stabilization practices protect soil from the erosive forces of raindrop impact and flowing water. Temporary erosion control practices usually include seeding, mulching, establishing general vegetation, and early application of a gravel base on areas to be paved. Permanent soil stabilization practices include vegetation, filter strips, and structural devices.

Sediment basins and traps, perimeter dikes, sediment barriers, and other practices intended to trap sediment on site should be constructed as a first step in grading and should be functional before upslope land disturbance takes place. Structural practices such as earthen dams, dikes, and diversions should be seeded and mulched within 15 days of installation.

d. *Coordinate temporary erosion and sediment control structures with permanent practices.*

All temporary erosion and sediment controls should be removed and disposed of within 30 days after final site stabilization is achieved or after the temporary practices are no longer needed. Trapped sediment and other disturbed soil areas resulting from the disposition of temporary controls should be permanently stabilized to prevent further erosion and sedimentation (AASHTO, 1991).

e. *Wash all vehicles prior to leaving the construction site to remove mud and other deposits. Vehicles entering or leaving the site with trash or other loose materials should be covered to prevent transport of dust, dirt, and debris. Install and maintain mud and silt traps.*

f. *Mitigate wetland areas destroyed during construction.*

Marshes and some types of wetlands can often be developed in areas where fill material was extracted or in ponds designed for sediment control during construction. Vegetated strips of native marsh grasses established along highway embankments near wetlands or riparian areas can be effective to protect these areas from erosion and sedimentation (FHWA, 1991).

g. *Minimize the area that is cleared for construction.*

h. *Construct cut-and-fill slopes in a manner that will minimize erosion.*

Cut-and-fill slopes should be constructed in a manner that will minimize erosion by taking into consideration the length and steepness of slopes, soil types, upslope drainage areas, and ground-water conditions. Suggested recommendations are as follows: reduce the length of long steep slopes by adding diversions or terraces; prevent concentrated runoff from flowing down cut-and-fill slopes by containing these flows within flumes or slope drain structures; and create roughened soil surfaces on cut-and-fill slopes to slow runoff flows. Wherever a slope face crosses a water seepage plane, thereby endangering the stability of the slope, adequate subsurface drainage should be provided.

i. *Minimize runoff entering and leaving the site through perimeter and onsite sediment controls.*

j. *Inspect and maintain erosion and sediment control practices (both on-site and perimeter) until disturbed areas are permanently stabilized.*

k. *Divert and convey offsite runoff around disturbed soils and steep slopes to stable areas in order to prevent transport of pollutants off site.*

l. *After construction, remove temporary control structures and restore the affected area. Dispose of sediments in accordance with State and Federal regulations.*

m. *All storm drain inlets that are made operable during construction should be protected so that sediment-laden water will not enter the conveyance system without first being filtered or otherwise treated to remove sediment.*

5. Effectiveness Information and Cost Information

The detailed cost and effectiveness information presented under the construction measure for urban development is also applicable to road, highway, and bridge construction. See Tables 4-15 and 4-16 in Section III.

D. Management Measure for Construction Site Chemical Control

(1) Limit the application, generation, and migration of toxic substances;

(2) Ensure the proper storage and disposal of toxic materials; and

(3) Apply nutrients at rates necessary to establish and maintain vegetation without causing significant nutrient runoff to surface water.

1. Applicability

This management measure is intended to be applied by States to new, resurfaced, restored, and rehabilitated road, highway, and bridge construction projects in order to reduce toxic and nutrient loadings from such project sites. Under the Coastal Zone Act Reauthorization Amendments of 1990, States are subject to a number of requirements as they develop coastal NPS programs in conformity with this management measure and will have some flexibility in doing so. The application of management measures by States is described more fully in *Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance*, published jointly by the U.S. Environmental Protection Agency (EPA) and the National Oceanic and Atmospheric Administration (NOAA) of the U.S. Department of Commerce.

2. Description

The objective of this measure is to guard against toxic spills and hazardous loadings at construction sites from equipment and fuel storage sites. Toxic substances tend to bind to fine soil particles; however, by controlling sediment mobilization, it is possible to limit the loadings of these pollutants. Also, some substances such as fuels and solvents are hazardous and excess applications or spills during construction can pose significant environmental impacts. Proper management and control of toxic substances and hazardous materials should be the adopted procedure for all construction projects and should be established by erosion and sediment control plans. Additional relevant practices are described in Management Measure III.B of this chapter.

3. Management Measure Selection

This management measure was selected because of existing practices that have been shown to be effective in mitigating construction-generated NPS pollution at highway project sites and equipment storage yards. In addition, maintenance areas containing road salt storage, fertilizers and pesticides, snowplows and trucks, and tractor mowers have the potential to contribute NPS pollutants to adjacent watercourses if not properly managed (AASHTO, 1988, 1991a). This measure is intended to safeguard surface waters and ground water from toxic and hazardous pollutants generated at construction sites. Examples of effective implementation of this measure are presented in the section on construction in urban areas. Several State environmental agencies are using this approach to regulate toxic and hazardous pollutants (Florida DER, 1988; Puget Sound Basin, .1991).

4. Practices

As discussed more fully at the beginning of this chapter and in Chapter 1, the following practices are described for illustrative purposes only. State programs need not require implementation of these practices. However, as a practical matter, EPA anticipates that the management measure set forth above generally will be implemented by applying one or more management practices appropriate to the source, location, and climate. The practices set forth below have been found by EPA to be representative of the types of practices that can be applied successfully to achieve the management measure described above.

The practices that are applicable to this management measure are described in Section III.B.

5. Effectiveness Information and Cost Information

The detailed cost and effectiveness data presented in the Section III.A of this chapter describing NPS controls for construction projects in urban development areas are also applicable to highway construction projects.

E. Management Measure for Operation and Maintenance

Incorporate pollution prevention procedures into the operation and maintenance of *roads, highways, and bridges* to reduce pollutant loadings to surface waters.

1. Applicability

This management measure is intended to be applied by States to existing, restored, and rehabilitated roads, highways, and bridges. Under the Coastal Zone Act Reauthorization Amendments of 1990, States are subject to a number of requirements as they develop coastal NPS programs in conformity with this management measures and will have some flexibility in doing so. The application of measures by States is described more fully in *Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance*, published jointly by the U.S. Environmental Protection Agency (EPA) and the National Oceanic and Atmospheric Administration (NOAA) of the U.S. Department of Commerce.

2. Description

Substantial amounts of eroded material and other pollutants can be generated by operation and maintenance procedures for roads, highways, and bridges, and from sparsely vegetated areas, cracked pavements, potholes, and poorly operating urban runoff control structures. This measure is intended to ensure that pollutant loadings from roads, highways, and bridges are minimized by the development and implementation of a program and associated practices to ensure that sediment and toxic substance loadings from operation and maintenance activities do not impair coastal surface waters. The program to be developed, using the practices described in this management measure, should consist of and identify standard operating procedures for nutrient and pesticide management, road salt use minimization, and maintenance guidelines (e.g., capture and contain paint chips and other particulates from bridge maintenance operations, resurfacing, and pothole repairs).

3. Management Measure Selection

This management measure for operation and maintenance was selected because (1) it is recommended by FHWA as a cost-effective practice (FHWA, 1991); (2) it is protective of the human environment (Puget Sound Water Quality Authority, 1989); (3) it is effective in controlling erosion by revegetating bare slopes (AASHTO, 1991b); (4) it is helpful in minimizing polluted runoff from road pavements (Transportation Research Board, 1991); and (5) both Federal (Richardson, 1974) and State highway agencies (Minnesota Pollution Control Agency, 1989; Pitt, 1973) advocate highway maintenance as an effective practice for minimizing pollutant loadings.

Maintenance of erosion and sediment control practices is of critical importance. Both temporary and permanent controls require frequent and periodic cleanout of accumulated sediment. Any trapping or filtering device, such as silt fences, sediment basins, buffers, inlets, and check dams, should be checked and cleaned out when approximately 50 percent of their capacity is reached, as determined by the erodible nature of the soil, flow velocity, and quantity of runoff. Seasonal and climatic differences may require more frequent cleanout of these structures. The sediments removed from these control devices should be deposited in permanently stabilized areas to prevent further erosion and sediment from reaching drainages and receiving streams. After periods of use, control devices may require replacement of deteriorated materials such as straw bales and silt fence fabrics, or restoration and reconstruction of sediment basins and riprap installations.

Permanent erosion controls such as vegetated filter strips, grassed swales, and velocity dissipators should be inspected periodically to determine their integrity and continued effectiveness. Continual deterioration or damage to these controls may indicate a need for better design or construction.

4. Practices

As discussed more fully at the beginning of this chapter and in Chapter 1, the following practices are described for illustrative purposes only. State programs need not require implementation of these practices. However, as a practical matter, EPA anticipates that the management measure set forth above generally will be implemented by applying one or more management practices appropriate to the source, location, and climate. The practices set forth below have been found by EPA to be representative of the types of practices that can be applied successfully apply to achieve the management measure described above.

a. *Seed and fertilize, seed and mulch, and/or sod damaged vegetated areas and slopes.*

b. *Establish pesticide/herbicide use and nutrient management programs.*

Refer to the Management Measure for Construction Site Chemical Control in this chapter.

c. *Restrict herbicide and pesticide use in highway rights-of-way to applicators certified under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) to ensure safe and effective application.*

d. *The use of chemicals such as soil stabilizers, dust palliatives, sterilants, and growth inhibitors should be limited to the best estimate of optimum application rates. All feasible measures should be taken to avoid excess application and consequent intrusion of such chemicals into surface runoff.*

e. *Sweep, vacuum, and wash residential/urban streets and parking lots.*

f. *Collect and remove road debris.*

g. *Cover salt storage piles and other deicing materials to reduce contamination of surface waters. Locate them outside the 100-year floodplain.*

h. *Regulate the application of deicing salts to prevent oversalting of pavement.*

i. *Use specially equipped salt application trucks.*

j. *Use alternative deicing materials, such as sand or salt substitutes, where sensitive ecosystems should be protected.*

k. *Prevent dumping of accumulated snow into surface waters.*

l. *Maintain retaining walls and pavements to minimize cracks and leakage.*

m. *Repair potholes.*

n. *Encourage litter and debris control management.*

o. *Develop an inspection program to ensure that general maintenance is performed on urban runoff and NPS pollution control facilities.*

To be effective, erosion and sediment control devices and practices must receive thorough and periodic inspection checks. The following is a suggested checklist for the inspection of erosion and sediment controls (AASHTO Operating Subcommittee on Design, 1990):

- Clean out sediment basins and traps; ensure that structures are stable.
- Inspect silt fences and replace deteriorated fabrics and wire connections; properly dispose of deteriorated materials.
- Renew riprapped areas and reapply supplemental rock as necessary.
- Repair/replace check dams and brush barriers; replace or stabilize straw bales as needed.
- Regrade and shape berms and drainage ditches to ensure that runoff is properly channeled.
- Apply seed and mulch where bare spots appear, and replace matting material if deteriorated.
- Ensure that culverts and inlets are protected from siltation.
- Inspect all permanent erosion and sediment controls on a scheduled, programmed basis.

p. *Ensure that energy dissipators and velocity controls to minimize runoff velocity and erosion are maintained.*

q. *Dispose of accumulated sediment collected from urban runoff management and pollution control facilities, and any wastes generated during maintenance operations, in accordance with appropriate local, State, and Federal regulations.*

r. *Use techniques such as suspended tarps, vacuums, or booms to reduce, to the extent practicable, the delivery to surface waters of pollutants used or generated during bridge maintenance (e.g., paint, solvents, scrapings).*

s. *Develop education programs to promote the practices listed above.*

5. Effectiveness Information and Cost Information

Preventive maintenance is a time-proven, cost-effective management approach. Operation schedules and maintenance procedures to restore vegetation, proper management of salt and fertilizer application, regular cleaning of urban runoff structures, and frequent sweeping and vacuuming of urban streets have effective results in pollution control. Litter control, clean-up, and fix-up practices are a low-cost means for eliminating causes of pollution, as is the proper handling of fertilizers, pesticides, and other toxic materials including deicing salts and abrasives. Table 4-30 presents summary information on the cost and effectiveness of operation and maintenance practices for roads, highways, and bridges. Many States and communities are already implementing several of these practices within their budget limitations. As shown in Table 4-30, the use of road salt alternatives such as calcium magnesium acetate (CMA) can be very costly. Some researchers have indicated, however, that reductions in corrosion of infrastructure, damage to roadside vegetation, and the quantity of material that needs to be applied may offset the higher cost of CMA. Use of road salt minimization practices such as salt storage protection and special salt spreading equipment reduces the amount of salt that a State or community must purchase. Consequently, implementation of these practices can pay for itself through savings in salt purchasing costs. Similar programs such as nutrient and pesticide management can also lead to decreased expenditures for materials.

CMA Eligible for Matching Funds

Calcium magnesium acetate (CMA) is now eligible for Federal matching funds under the Bridge Program of the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991. The Act provides 80 percent funding for use of CMA on salt-sensitive bridges in order to protect against corrosion and to extend their useful life. CMA can also be used to protect vegetation from salt damage in environmentally sensitive areas.

Table 4-30. Effectiveness and Cost Summary for Roads, Highways, and Bridges Operation and Maintenance Management Practices

Management Practice	% Removal TSS	TP	TN	COD	Pb	Zn	Cost
MAINTAIN VEGETATION							
For Sediment Control							Natural succession allowed to occur -
Average:	90	NA	NA	NA	NA	NA	Avg: $100/ac/year
Reported Range:	50-100	NA	NA	NA	NA	NA	Reported Range: $50-$200/ac/year
Probable Range:	80-100	-	-	-	-	-	
For Pollutant Removal							Natural succession not allowed to occur -
Average:	60	40	40	50	50	50	Avg: $800/ac/year
Reported Range	0-100	0-100	0-70	20-80	0-100	50-60	Reported Range: $700-$900/ac/year
Probable Range:	0-100	0-100	0-100	0-100	0-100	0-100	
PESTICIDE/HERBICIDE USE MANAGEMENT							Generally accepted as an economical program to control excessive use
Average:	NA						
Reported Range:	NA						
Probable Range:							
STREET SWEEPING							
Smooth Street, Frequent Cleaning (One or More Passes Per Week)							Avg: $20/curb mile
Average:	20	NA	NA	5	25	NA	Reported Range: $10-$30/curb mile
Reported Range:	20	NA	NA	0-10	5-35	NA	
Probable Range:	20-50	-	-	0-10	20-50	10-30	
Infrequent Cleaning (One Pass Per Month or Less)							
Average:	NA	NA	NA	NA	5	NA	
Reported Range:	NA	NA	NA	NA	0-10	NA	
Probable Range:	0-20	-	-	-	0-20	0-10	
LITTER CONTROL							Generally accepted as an economical approach to control excessive use
Average:	NA						
Reported Range:	NA						
Probable Range:							

Table 4-30. (Continued)

Management Practice	% Removal TSS	TP	TN	COD	Pb	Zn	Cost
GENERAL MAINTENANCE (e.g., pothole and roadside repairs)							Generally accepted as an economical preventive maintenance program by local and State agencies
Average:	NA						
Reported Range:	NA						
Probable Range:							
PROTECTION OF SALT PILES							For salt storage building -
Average:	NA						Ave: $30/ton salt
Reported Range:	NA						Reported Range: $10-$70/ton salt
Probable Range:	90-100[a]						
MINIMIZATION OF APPLICATION OF DEICING SALTS							Generally accepted as an economical preventive maintenance program by local and State agencies
Average:	NA						
Reported Range:	NA						
Probable Range:	Deicing salts that are not applied to roads will not enter runoff.						
SPECIALLY EQUIPPED SALT APPLICATION TRUCKS							For spread rate control on truck - Ave: $6,000/truck
Average:	NA						Reported Range: $6,000/truck
Reported Range:	NA						
Probable Range:	Deicing salts that are not applied to roads will not enter runoff.						
USE OF ALTERNATIVE DEICING MATERIALS							CMA - Ave: $650/ton
Average:	NA						Reported Range: $650/ton
Reported Range:	NA						(note: cost of salt $30/ton)
Probable Range:	Deicing salts that are not applied to roads will not enter runoff.						
CONTAIN POLLUTANTS GENERATED DURING BRIDGE MAINTENANCE							Varies with method of containment use
Average:	NA						
Reported Range:	NA						
Probable Range:	50-100[b]						

NA = Not applicable.
[a]Measured as reduction in salt.
[b]Measured as reduction of all pollutants.

F. Management Measure for Road, Highway, and Bridge Runoff Systems

Develop and implement runoff management systems for existing roads, highways, and bridges to reduce runoff pollutant concentrations and volumes entering surface waters.

(1) Identify priority and watershed pollutant reduction opportunities (e.g., improvements to existing urban runoff control structures; and

(2) Establish schedules for implementing appropriate controls.

1. Applicability

This management measure is intended to be applied by States to existing, resurfaced, restored, and rehabilitated roads, highways, and bridges that contribute to adverse effects in surface waters. Under the Coastal Zone Act Reauthorization Amendments of 1990, States are subject to a number of requirements as they develop coastal NPS programs in conformity with this management measure and will have some flexibility in doing so. The application of management measures by States is described more fully in *Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance*, published jointly by the U.S. Environmental Protection Agency (EPA) and the National Oceanic and Atmospheric Administration (NOAA) of the U.S. Department of Commerce.

2. Description

This measure requires that operation and maintenance systems include the development of retrofit projects, where needed, to collect NPS pollutant loadings from existing, reconstructed, and rehabilitated roads, highways, and bridges. Poorly designed or maintained roads and bridges can generate significant erosion and pollution loads containing heavy metals, hydrocarbons, sediment, and debris that run off into and threaten the quality of surface waters and their tributaries. In areas where such adverse impacts to surface waters can be attributed to adjacent roads or bridges, retrofit management projects to protect these waters may be needed (e.g., installation of structural or nonstructural pollution controls). Retrofit projects can be located in existing rights-of-way, within interchange loops, or on adjacent land areas. Areas with severe erosion and pollution runoff problems may require relocation or reconstruction to mitigate these impacts.

Runoff management systems are a combination of nonstructural and structural practices selected to reduce nonpoint source loadings from roads, highways, and bridges. These systems are expected to include structural improvements to existing runoff control structures for water quality purposes; construction of new runoff control devices, where necessary to protect water quality; and scheduled operation and maintenance activities for these runoff control practices. Typical runoff controls for roads, highways, and bridges include vegetated filter strips, grassed swales, detention basins, constructed wetlands, and infiltration trenches.

3. Management Measure Selection

This management measure was selected because of the demonstrated effectiveness of retrofit systems for existing roads and highways that were constructed with inadequate nonpoint source pollution controls or without such controls. Structural practices for mitigating polluted runoff from existing highways are described in the literature (Silverman, 1988).

4. Practices

As discussed more fully at the beginning of this chapter and in Chapter 1, the following practices are described for illustrative purposes only. State programs need not require implementation of these practices. However, as a practical matter, EPA anticipates that the management measure set forth above generally will be implemented by applying one or more management practices appropriate to the source, location, and climate. The practices set forth below have been found by EPA to be representative of the types of practices that can be applied successfully to achieve the management measure described above.

- *a. Locate runoff treatment facilities within existing rights-of-way or in medians and interchange loops.*
- *b. Develop multiple-use treatment facilities on adjacent lands (e.g., parks and golf courses).*
- *c. Acquire additional land for locating treatment facilities.*
- *d. Use underground storage where no alternative is available.*
- *e. Maximize the length and width of vegetated filter strips to slow the travel time of sheet flow and increase the infiltration rate of urban runoff.*

5. Effectiveness Information and Cost Information

Cost and effectiveness data for structural urban runoff management and pollution control facilities are outlined in Tables 4-15 and 4-16 in Section III and discussed in Section IV of this chapter and are applicable to determine the cost and effectiveness of retrofit projects. Retrofit projects can often be more costly to construct because of the need to locate the required structures within existing space or the need to locate the structures within adjacent property that requires purchase. However, the use of multiple-use facilities on adjacent lands, such as diverting runoff waters to parkland or golf courses, can offset this cost. Nonstructural practices described in the urban section also can be effective in achieving source control. As with other sections of this document, the costs of loss of habitat, fisheries, and recreational areas must be weighed against the cost of retrofitting control structures within existing rights-of-way.

6. Pollutants of Concern

Table 4-31 lists the pollutants commonly found in urban runoff from roads, highways, and bridges and their sources. The disposition and subsequent magnitude of pollutants found in highway runoff are site-specific and are affected by traffic volume, road or highway design, surrounding land use, climate, and accidental spills.

The FHWA conducted an extensive field monitoring and laboratory analysis program to determine the pollutant concentration in highway runoff from 31 sites in 11 States (Driscoll et al., 1990). The event mean concentrations (EMCs) developed in the study for a number of pollutants are presented in Table 4-32. The study also indicated that for highways discharging into lakes, the pollutants of major concern are phosphorus and heavy metals. For highways discharging into streams, the pollutants of major concern are heavy metals—cadmium, copper, lead, and zinc.

Table 4-31. Highway Runoff Constituents and Their Primary Sources

Constituents	Primary Sources
Particulates	Pavement wear, vehicles, atmosphere, maintenance
Nitrogen, Phosphorus	Atmosphere, roadside fertilizer application
Lead	Leaded gasoline (auto exhaust), tire wear (lead oxide filler material, lubricating oil and grease, bearing wear)
Zinc	Tire wear (filler material), motor oil (stabilizing additive), grease
Iron	Auto body rust, steel highway structures (guard rails, bridges, etc.), moving engine parts
Copper	Metal plating, bearing and bushing wear, moving engine parts, brake lining wear, fungicides and insecticides
Cadmium	Tire wear (filler material), insecticide application
Chromium	Metal plating, moving engine parts, break lining wear
Nickel	Diesel fuel and gasoline (exhaust), lubricating oil, metal plating, bushing wear, brake lining wear, asphalt paving
Manganese	Moving engine parts
Cyanide	Anticake compound (ferric ferrocyanide, sodium ferrocyanide, yellow prussiate of soda) used to keep deicing salt granular
Sodium, Calcium, Chloride	Deicing salts
Sulphate	Roadway beds, fuel, deicing salts
Petroleum	Spills, leaks or blow-by of motor lubricants, antifreeze and hydraulic fluids, asphalt surface leachate

In colder regions where deicing agents are used, deicing chemicals and abrasives are the largest source of pollutants during winter months. Deicing salt (primarily sodium chloride, NaCl) is the most commonly used deicing agent. Potential pollutants from deicing salt include sodium chloride, ferric ferrocyanide (used to keep the salt in granular form), and sulfates such as gypsum. Table 4-33 summarizes potential environmental impacts caused by road salt. Other chemicals used as a salt substitute include calcium magnesium acetate (CMA) and, less frequently, urea and glycol compounds. Researchers have differing opinions on the environmental impacts of CMA compared to those of road salt (Chevron Chemical Company, 1991; Salt Institute, undated; Transportation Research Board, 1991).

Table 4-32. Pollutant Concentrations in Highway Runoff (Driscoll et al., 1990)

Pollutant	Event Mean Concentration for Highways With Fewer Than 30,000 Vehicles/Day[a] (mg/L)	Event Mean Concentration for Highways With More Than 30,000 Vehicles/Day[a] (mg/L)
Total Suspended Solids	41	142
Volatile Suspended Solids	12	39
Total Organic Carbon	8	25
Chemical Oxygen Demand	49	114
Nitrite and Nitrate	0.46	0.76
Total Kjeldahl Nitrogen	0.87	1.83
Phosphate Phosphorus	0.16	0.40
Copper	0.022	0.054
Lead	0.080	0.400
Zinc	0.080	0.329

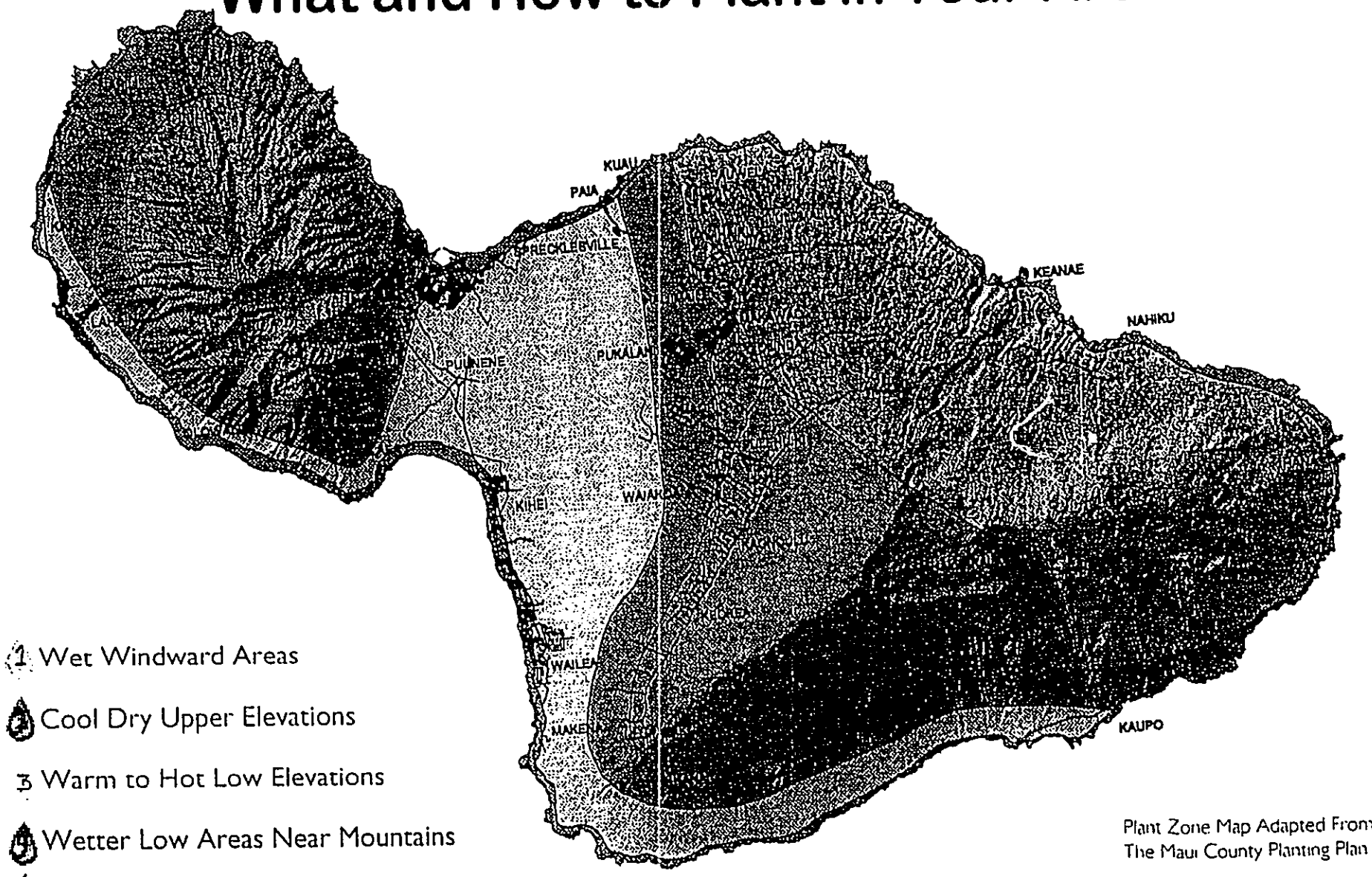
[a]Event mean concentrations are for the 50% median site.

Table 4-33. Potential Environmental Impacts of Road Salts

Environmental Resource	Potential Environmental Impact of Road Salt (NaCl)
Soils	May accumulate in soil. Breaks down soil structure, increases erosion. Causes soil compaction that results in decreased permeability.
Vegetation	Osmotic stress and soil compaction harm root systems. Spray causes foliage dehydration damage. Many plant species are salt-sensitive.
Ground Water	Mobile Na and Cl ions readily reach ground water. Increases NaCl concentration in well water, as well as alkalinity and hardness.
Surface Water	Causes density stratification in ponds and lakes that can prevent reoxygenation. Increases runoff of heavy metals and nutrients through increased erosion.
Aquatic Life	Monovalent Na and Cl ions stress osmotic balances. Toxic levels: Na - 500 ppm for stickleback; Cl - 400 ppm for trout.
Human/Mammalian	Sodium is linked to heart disease and hypertension. Chlorine causes unpleasant taste in drinking water. Mild skin and eye irritant. Acute oral LD_{50} in rats is approximately 3,000 mg/kg (slightly toxic).

Saving Water in The Yard

What and How to Plant in Your Area



1 Wet Windward Areas

2 Cool Dry Upper Elevations

3 Warm to Hot Low Elevations

4 Wetter Low Areas Near Mountains

5 Windward Coastal Salt Spray Zones

Plant Zone Map Adapted From
The Maui County Planting Plan

Tips From The Maui County Department of Water Supply

'By Water All Things Find Life

Zone-specific Native and Polynesian plants for Maui County

Zone 1

TYPE: F Fern G Grass Gr Ground Cover Sh Shrub P Palm S Sedge Tr Tree V Vine

Type	Scientific Name	Common Name	Height	Spread	Elevation	Water req.
F	Psilotum nudum	moa, moa kula	1'	1'	sea to 3,000'	Dry to Wet
F	Sadleria cyatheoides	'ama'u, ama'uma'u				
Gr - Sh	Lipochaeta succulenta	nehe	2'	5'	sea to 1,000'	Dry to Wet
P	Cocos nucifera	coconut, niu	100'	30'	sea to 1,000'	Dry to Wet
P	Pritchardia arecina	lo'ulu, hawane	40'	10'	1,000' to 3,000'	Dry to Wet
P	Pritchardia forbesiana	lo'ulu	15'			
P	Pritchardia hillebrandii	lo'ulu, fan palm	25'	15'	sea to 1,000'	Dry to Wet
S	Mariscus javanicus	marsh cypress, 'ahu'awa	0.5'	0.5'	sea to 1,000'	Dry to Medium
Sh	Bidens hillebrandiana ssp. hillebrandiana	ko'oko'olau	1'	2'	sea to 1,000'	Dry to Wet
Sh	Cordyline fruticosa	ti, ki	6			
Sh	Hedyotis spp.	au, pilo	3'	2'	1,000' to 3,000'	Dry to Wet
Sh - Tr	Broussonetia papyrifera	wauke, paper mulberry	8'	6'	sea to 1,000'	Dry to Medium
Tr	Acacia koa	koa	50' - 100'	40' - 80'	1,500' to 4,000'	Dry to Medium
Tr	Aleurites moluccana	candlenut, kukui	50'	50'	sea to 3,000'	Medium to Wet
Tr	Calophyllum inophyllum	kamani, alexandrian laurel	60'	40'	sea to 3,000'	Medium to Wet
Tr	Charpentiera obovata		15'			
Tr	Cordia subcordata	kou	30'	25'	sea to 1,000'	Dry to Wet
Tr	Hibiscus furcellatus	'aklohala, hau-hele	8'			
Tr	Metrosideros polymorpha var. macrophylla	ohi'a lehua	25'	25'	sea to 1,000'	Dry to Wet
Tr	Morinda citrifolia	indian mulberry, noni	20'	15'	sea to 1,000'	Dry to Wet
Tr	Pandanus tectorius	hala, puhala (HALELIST)	35'	25'	sea to 1,000'	Dry to Wet
V	Alyxia oliviformis	maile	Vine		sea to 6,000'	Medium to Wet

Zone-specific Native and Polynesian plants for Maui County

Zone 2

TYPE: F Fern G Grass Gr Ground Cover Sh Shrub P Palm S Sedge Tr Tree V Vine

Type	Scientific Name	Common Name	Height	Spread	Elevation	Water req.
F	Psilotum nudum	moa, moa kula	1'	1'	sea to 3,000'	Dry to Wet
F	Sadleria cyatheoides	'ama'u, ama'uma'u				
G	Eragrostis monticola	kalamalo	1'	2'	sea to 3,000'	Dry to Medium
Gr	Ipomoea tuboides	Hawaiian moon flower, 'uala	1'	10'	sea to 3,000'	Dry to Medium
Gr	Peperomia leptostachya	'ala'ala-wai-nui	1'	1'	sea to 3,000'	Dry to Medium
Gr	Plumbago zeylanica	'ilie'e	1'			
Gr - Sh	Hibiscus calyphyllus	ma'o hau hele, Rock's hibiscus	3'	2'	sea to 3,000'	Dry to Medium
Gr - Sh	Lipochaeta rockii	nehe	2'	2'	sea to 3,000'	Dry to Medium
Sh	Argemone glauca var. decipiens	pua kala	3'	2'	sea to 3,000'	Dry to Medium
Sh	Artemisia mauiensis var. diffusa	Maui wormwood, 'ahinahina	2'	3'	1,000' to higher	Dry to Medium
Sh	Chenopodium oahuense	'aheahea, 'aweoweo	6'		sea to higher	Dry to Medium
Sh	Dianella sandwicensis	'uki	2'	2'	1,000' to higher	Dry to Medium
Sh	Lipochaeta lavarum	nehe	3'	3'	sea to 3,000'	Dry to Medium
Sh	Osteomeles anthyllidifolia	'ulei, eluehe	4'	6'	sea to 3,000'	Dry to Medium
Sh	Senna gaudichaudii	kolomana	5'	5'	sea to 3,000'	Dry to Medium
Sh	Styphelia tamelamelae	pukiawe	6'	6'	1,000' to higher	Dry to Medium
Sh	Vitex rotundifolia	pohinahina	3'	4'	sea to 1,000'	Dry to Medium
Sh - Tr	Myoporum sandwicense	naio, false sandalwood	10'	10'	sea to higher	Dry to Medium
Sh - Tr	Nototrichium sandwicense	kulu'i	8'	8'	sea to 3,000'	Dry to Medium
Sh-Tr	Dodonaea viscosa	'a'ali'i	6'	8'	sea to higher	Dry to Medium
Tr	Acacia koa	koa	50' - 100'	40' - 80'	1,500' to 4,000'	Dry to Medium
Tr	Charpentiera obovata		15'			
Tr	Erythrina sandwicensis	wiliwili	20'	20'	sea to 1,000'	Dry
Tr	Metrosideros polymorpha var. macrophylla	ohi'a lehua	25'	25'	sea to 1,000'	Dry to Wet

Zone-specific Native and Polynesian plants for Maui County

Zone 2

Type	Scientific Name	Common Name	Height	Spread	Elevation	Water req.
Tr	Nestegis sandwicensis	olopua	15'	15'	1,000' to 3,000'	Dry to Medium
Tr	Pleomele auwahiensis	halapepe	20'			
Tr	Rauvolfia sandwicensis	hao	20'	15'	sea to 3,000'	Dry to Medium
Tr	Santalum ellipticum	coastal sandalwood, 'ili-ahi	8'	8'	sea to 3,000'	Dry to Medium
Tr	Sophora chrysophylla	mamane	15'	15'	1,000' to 3,000'	Medium
V	Alyxia oliviformis	maile	Vine		sea to 6,000'	Medium to Wet

Zone-specific Native and Polynesian plants for Maui County

Zone 3

TYPE: F Fern G Grass Gr Ground Cover Sh Shrub P Palm S Sedge Tr Tree V Vine

Type	Scientific Name	Common Name	Height	Spread	Elevation	Water req.
F	Psilotum nudum	moa, moa kula	1'	1'	sea to 3,000'	Dry to Wet
G	Colubrina asiatica	'anapanapa	3'	10'	sea to 1,000'	Dry to Wet
G	Eragrostis monticola	kalamalo	1'	2'	sea to 3,000'	Dry to Medium
G	Eragrostis variabilis	'emo-loa	1'	2'	sea to 3,000'	Dry to Medium
G	Fimbristylis cymosa ssp. spathacea	mau'u'aki'aki fimbristylis	0.5'	1'	sea to 1,000'	Dry to Medium
Gr	Boerhavia repens	alena	0.5'	4'	sea to 1,000'	Dry to Medium
Gr	Chamaesyce celastroides var. laehiensis	'akoko	2'	3'	sea to 1,000'	Dry to Medium
Gr	Cressa truxillensis	cressa	0.5'	1'	sea to 1,000'	Dry to Medium
Gr	Heliotropium anomalum var. argenteum	hinahina ku kahakai	1'	2'	sea to 1,000'	Dry to Medium
Gr	Ipomoea tuboides	Hawaiian moon flower, 'uala	1'	10'	sea to 3,000'	Dry to Medium
Gr	Jacquemontia ovalifolia ssp. sandwicensis	pa'u o hi'iaka	0.5'	6'	sea to 1,000'	Dry to Medium
Gr	Lipochaeta integrifolia	nehe	1'	5'	sea to 1,00'	Dry to Medium
Gr	Peperomia leptostachya	'ala'ala-wai-nui	1'	1'	sea to 3,000'	Dry to Medium
Gr	Plumbago zeylanica	'ilie'e	1'			
Gr	Sesuvium portulacastrum	'akulikuli, sea-purslane	0.5'	2'	sea to 1,000'	Dry to Wet
Gr	Sida fallax	'ilima	0.5'	3'	sea to 1,000'	Dry to Medium
Gr	Tephrosia purpurea var. purpurea	'auhuhu	2'	2'	sea to 1,000'	Dry to Medium
Gr - Sh	Hibiscus calyphyllus	ma'o hau hele, Rock's hibiscus	3'	2'	sea to 3,000'	Dry to Medium
Gr - Sh	Lipochaeta rockii	nehe	2'	2'	sea to 3,000'	Dry to Medium
Gr - Sh	Lipochaeta succulenta	nehe	2'	5'	sea to 1,000'	Dry to Wet
Gr - Sh	Lycium sandwicense	'ohelo-kai, 'ae'ae	2'	2'	sea to 1,000'	Dry to Medium
P	Cocos nucifera	coconut, niu	100'	30'	sea to 1,000'	Dry to Wet
P	Pritchardia hillebrandii	lo'ulu, fan palm	25'	15'	sea to 1,000'	Dry to Wet
S	Mariscus javanicus	marsh cypress, 'ahu'awa	0.5'	0.5'	sea to 1,000'	Dry to Medium

Zone-specific Native and Polynesian plants for Maui County

Zone 3

Type	Scientific Name	Common Name	Height	Spread	Elevation	Water req.
Sh	Argemone glauca var. deciplens	pua kala	3'	2'	sea to 3,000'	Dry to Medium
Sh	Bidens mauiensis	ko'oko'olau	1'	3'	sea to 1,000'	Dry to Medium
Sh	Bidens menziesii ssp. menziesii	ko'oko'olau	1'	3'		
Sh	Bidens micrantha ssp. micrantha	ko'oko'olau	1'	3'		
Sh	Chenopodium oahuense	'aheahea, 'aweoweo	6'		sea to higher	Dry to Medium
Sh	Dianella sandwicensis	'uki	2'	2'	1,000' to higher	Dry to Medium
Sh	Gossypium tomentosum	mao, Hawaiian cotton	5'	8'	sea to 1,000'	Dry to Medium
Sh	Hedyotis spp.	au, pilo	3'	2'	1,000' to 3,000'	Dry to Wet
Sh	Lipochaeta lavarum	nehe	3'	3'	sea to 3,000'	Dry to Medium
Sh	Osteomeles anthyllidifolia	'ulei, eluehe	4'	6'	sea to 3,000'	Dry to Medium
Sh	Scaevola sericea	naupaka, naupaka-kahakai	6'	8'	sea to 1,000'	Dry to Medium
Sh	Senna gaudichaudii	kolomana	5'	5'	sea to 3,000'	Dry to Medium
Sh	Solanum nelsonii	'akia, beach solanum	3'	3'	sea to 1,00'	Dry to Medium
Sh	Styphelia tameiameiae	pukiawe	6'	6'	1,000' to higher	Dry to Medium
Sh	Vitex rotundifolia	pohinahina	3'	4'	sea to 1,000'	Dry to Medium
Sh	Wikstroemia uva-ursi kaualensis kaualensis	'akia, Molokai osmanthus				
Sh - Tr	Broussonetia papyrifera	wauke, paper mulberry	8'	6'	sea to 1,000'	Dry to Medium
Sh - Tr	Myoporum sandwicense	naio, false sandalwood	10'	10'	sea to higher	Dry to Medium
Sh - Tr	Nototrichium sandwicense	kulu'i	8'	8'	sea to 3,000'	Dry to Medium
Sh-Tr	Dodonaea viscosa	'a'ali'i	6'	8'	sea to higher	Dry to Medium
Tr	Aleurites moluccana	candlenut, kukui	50'	50'	sea to 3,000'	Medium to Wet
Tr	Calophyllum inophyllum	kamani, alexandrian laurel	60'	40'	sea to 3,000'	Medium to Wet
Tr	Canthium odoratum	Alahe'e, 'ohe'e, walahe'e	12'	8'	sea to 3,000'	Dry to Medium
Tr	Cordia subcordata	kou	30'	25'	sea to 1,000'	Dry to Wet
Tr	Diospyros sandwicensis	lama	12'	15'	sea to 3,000'	Dry to Medium
Tr	Erythrina sandwicensis	wiliwili	20'	20'	sea to 1,000'	Dry
Tr	Metrosideros polymorpha var. macrophylla	ohi'a lehua	25'	25'	sea to 1,000'	Dry to Wet

Zone-specific Native and Polynesian plants for Maui County

Zone 3

Type	Scientific Name	Common Name	Height	Spread	Elevation	Water req.
Tr	Morinda citrifolia	Indian mulberry, noni	20'	15'	sea to 1,000'	Dry to Wet
Tr	Nesoluma polynesicum	keahi	15'	15'	sea to 3,00'	Dry
Tr	Nestegis sandwicensis	olopua	15'	15'	1,000' to 3,000'	Dry to Medium
Tr	Pandanus tectorius	hala, puhala (HALELIST)	35'	25'	sea to 1,000'	Dry to Wet
Tr	Pleomele auwahiensis	halapepe	20'			
Tr	Rauvolfia sandwicensis	hao	20'	15'	sea to 3,000'	Dry to Medium
Tr	Reynoldsia sandwicensis	'ohe makai	20'	20'	1,000' to 3,000'	Dry
Tr	Santalum ellipticum	coastal sandalwood, 'ili-ahi	8'	8'	sea to 3,000'	Dry to Medium
Tr	Thespesia populnea	milo	30'	30'	sea to 3,000'	Dry to Wet

Zone-specific Native and Polynesian plants for Maui County

Zone 4

TYPE: F Fern G Grass Gr Ground Cover Sh Shrub P Palm S Sedge Tr Tree V Vine

Type	Scientific Name	Common Name	Height	Spread	Elevation	Water req.
F	Psilotum nudum	moa, moa kula	1'	1'	sea to 3,000'	Dry to Wet
F	Sadleria cyatheoides	'ama'u, ama'uma'u				
G	Colubrina asiatica	'anapanapa	3'	10'	sea to 1,000'	Dry to Wet
G	Eragrostis monticola	kalamalo	1'	2'	sea to 3,000'	Dry to Medium
G	Eragrostis variabilis	'emo-loa	1'	2'	sea to 3,000'	Dry to Medium
G	Fimbristylis cymosa ssp. spathacea	mau'u'aki'aki fimbristylis	0.5'	1'	sea to 1,000'	Dry to Medium
Gr	Chamaesyce celastroides var. laehlensis	'akoko	2'	3'	sea to 1,000'	Dry to Medium
Gr	Ipomoea tuboides	Hawaiian moon flower, 'uala	1'	10'	sea to 3,000'	Dry to Medium
Gr	Jacquemontia ovalifolia ssp. sandwicensis	pa'u o hi'iaka	0.5'	6'	sea to 1,000'	Dry to Medium
Gr	Lipochaeta integrifolia	nehe	1'	5'	sea to 1,00'	Dry to Medium
Gr	Peperomia leptostachya	'ala'ala-wai-nui	1'	1'	sea to 3,000'	Dry to Medium
Gr	Plumbago zeylanica	'ilie'e	1'			
Gr	Sida fallax	'ilima	0.5'	3'	sea to 1,000'	Dry to Medium
Gr	Tephrosia purpurea var. purpurea	'auhuhu	2'	2'	sea to 1,000'	Dry to Medium
Gr - Sh	Hibiscus calyphyllus	ma'o hau hele, Rock's hibiscus	3'	2'	sea to 3,000'	Dry to Medium
Gr - Sh	Lipochaeta rockii	nehe	2'	2'	sea to 3,000'	Dry to Medium
Gr - Sh	Lipochaeta succulenta	nehe	2'	5'	sea to 1,000'	Dry to Wet
P	Cocos nucifera	coconut, niu	100'	30'	sea to 1,000'	Dry to Wet
P	Pritchardia arecina	lo'ulu, hawane	40'	10'	1,000' to 3,000'	Dry to Wet
P	Pritchardia forbesiana	lo'ulu	15'			
P	Pritchardia hillebrandii	lo'ulu, fan palm	25'	15'	sea to 1,000'	Dry to Wet
S	Mariscus javanicus	marsh cypress, 'ahu'awa	0.5'	0.5'	sea to 1,000'	Dry to Medium
Sh	Argemone glauca var. decipiens	pua kala	3'	2'	sea to 3,000'	Dry to Medium
Sh	Artemisia australis	'ahinahina	2'	3'	sea to 3,000'	Dry to Medium

Zone-specific Native and Polynesian plants for Maui County

Zone 4

Type	Scientific Name	Common Name	Height	Spread	Elevation	Water req.
Sh	Artemisia mauiensis var. diffusa	Maui wormwood, 'ahinahina	2'	3'	1,000' to higher	Dry to Medium
Sh	Bidens hillebrandiana ssp. hillebrandiana	ko'oko'olau	1'	2'	sea to 1,000'	Dry to Wet
Sh	Bidens menziesii ssp. menziesii	ko'oko'olau	1'	3'		
Sh	Bidens micrantha ssp. micrantha	ko'oko'olau	1'	3'		
Sh	Cordyline fruticosa	ti, ki	6			
Sh	Dianella sandwicensis	'uki	2'	2'	1,000' to higher	Dry to Medium
Sh	Lipochaeta lavarum	nehe	3'	3'	sea to 3,000'	Dry to Medium
Sh	Osteomeles anthyllidifolia	'ulei, eluehe	4'	6'	sea to 3,000'	Dry to Medium
Sh	Scaevola sericea	naupaka, naupaka-kahakai	6'	8'	sea to 1,000'	Dry to Medium
Sh	Solanum nelsonii	'akia, beach solanum	3'	3'	sea to 1,00'	Dry to Medium
Sh	Styphelia tameiameiae	pukiawe	6'	6'	1,000' to higher	Dry to Medium
Sh	Vitex rotundifolia	pohinahina	3'	4'	sea to 1,000'	Dry to Medium
Sh	Wikstroemia uva-ursi kauaiensis kauaiensis	'akia, Molokai osmanthus				
Sh - Tr	Broussonetia papyrifera	wauke, paper mulberry	8'	6'	sea to 1,000'	Dry to Medium
Sh - Tr	Myoporum sandwicense	naio, false sandalwood	10'	10'	sea to higher	Dry to Medium
Sh - Tr	Nototrichium sandwicense	kulu'i	8'	8'	sea to 3,000'	Dry to Medium
Sh-Tr	Dodonaea viscosa	'a'ali'i	6'	8'	sea to higher	Dry to Medium
Tr	Acacia koa	koa	50' - 100'	40' - 80'	1,500' to 4,000'	Dry to Medium
Tr	Aleurites moluccana	candlenut, kukui	50'	50'	sea to 3,000'	Medium to Wet
Tr	Calophyllum inophyllum	kamani, alexandrian laurel	60'	40'	sea to 3,000'	Medium to Wet
Tr	Canthium odoratum	Alahe'e, 'ohe'e, walahe'e	12'	8'	sea to 3,000'	Dry to Medium
Tr	Charpentiera obovata		15'			
Tr	Cordia subcordata	kou	30'	25'	sea to 1,000'	Dry to Wet
Tr	Diospyros sandwicensis	lama	12'	15'	sea to 3,000'	Dry to Medium
Tr	Hibiscus furcellatus	'akiohala, hau-hele	8'			
Tr	Metrosideros polymorpha var. macrophylla	ohi'a lehua	25'	25'	sea to 1,000'	Dry to Wet
Tr	Morinda citrifolia	indian mulberry, noni	20'	15'	sea to 1,000'	Dry to Wet

Zone-specific Native and Polynesian plants for Maui County

Zone 4

Type	Scientific Name	Common Name	Height	Spread	Elevation	Water req.
Tr	Nestegis sandwicensis	olopua	15'	15'	1,000' to 3,000'	Dry to Medium
Tr	Pandanus tectorius	hala, puhala (HALELIST)	35'	25'	sea to 1,000'	Dry to Wet
Tr	Pleomele auwahiensis	halapepe	20'			
Tr	Rauvolfia sandwicensis	hao	20'	15'	sea to 3,000'	Dry to Medium
Tr	Santalum ellipticum	coastal sandalwood, 'ili-ahi	8'	8'	sea to 3,000'	Dry to Medium
Tr	Sophora chrysophylla	mamane	15'	15'	1,000' to 3,000'	Medium
Tr	Thespesia populnea	milo	30'	30'	sea to 3,000'	Dry to Wet
V	Alyxia oliviformis	maile	Vine		sea to 6,000'	Medium to Wet

Zone-specific Native and Polynesian plants for Maui County

Zone 5

TYPE: F Fern G Grass Gr Ground Cover Sh Shrub P Palm S Sedge Tr Tree V Vine

Type	Scientific Name	Common Name	Height	Spread	Elevation	Water req.
G	Colubrina asiatica	'anapanapa	3'	10'	sea to 1,000'	Dry to Wet
G	Eragrostis variabilis	'emo-loa	1'	2'	sea to 3,000'	Dry to Medium
G	Fimbristylis cymosa ssp. spathacea	mau'u'aki'aki fimbristylis	0.5'	1'	sea to 1,000'	Dry to Medium
Gr	Boerhavia repens	alena	0.5'	4'	sea to 1,000'	Dry to Medium
Gr	Chamaesyce celastroides var. laehlensis	'akoko	2'	3'	sea to 1,000'	Dry to Medium
Gr	Cressa truxillensis	cressa	0.5'	1'	sea to 1,000'	Dry to Medium
Gr	Heliotropium anomalum var. argenteum	hinahina ku kahakai	1'	2'	sea to 1,000'	Dry to Medium
Gr	Jacquemontia ovalifolia ssp. sandwicensis	pa'u o hi'iaka	0.5'	6'	sea to 1,000'	Dry to Medium
Gr	Lipochaeta integrifolia	nehe	1'	5'	sea to 1,00'	Dry to Medium
Gr	Sesuvium portulacastrum	'akulikuli, sea-purslane	0.5'	2'	sea to 1,000'	Dry to Wet
Gr	Sida fallax	'ilima	0.5'	3'	sea to 1,000'	Dry to Medium
Gr	Tephrosia purpurea var. purpurea	'auhuhu	2'	2'	sea to 1,000'	Dry to Medium
Gr - Sh	Hibiscus calyphyllus	ma'o hau hele, Rock's hibiscus	3'	2'	sea to 3,000'	Dry to Medium
Gr - Sh	Lycium sandwicense	'ohelo-kai, 'ae'ae	2'	2'	sea to 1,000'	Dry to Medium
P	Cocos nucifera	coconut, niu	100'	30'	sea to 1,000'	Dry to Wet
P	Pritchardia hillebrandii	lo'ulu, fan palm	25'	15'	sea to 1,000'	Dry to Wet
S	Mariscus javanicus	marsh cypress, 'ahu'awa	0.5'	0.5'	sea to 1,000'	Dry to Medium
Sh	Argemone glauca var. deciplens	pua kala	3'	2'	sea to 3,000'	Dry to Medium
Sh	Artemisia australis	'ahinahina	2'	3'	sea to 3,000'	Dry to Medium
Sh	Bidens hillebrandiana ssp. hillebrandiana	ko'oko'olau	1'	2'	sea to 1,000'	Dry to Wet
Sh	Bidens maulensis	ko'oko'olau	1'	3'	sea to 1,000'	Dry to Medium
Sh	Chenopodium oahuense	'aheahea, 'aweoweo	6'		sea to higher	Dry to Medium
Sh	Dianella sandwicensis	'uki	2'	2'	1,000' to higher	Dry to Medium
Sh	Gossypium tomentosum	mao, Hawaiian cotton	5'	8'	sea to 1,000'	Dry to Medium

Zone-specific Native and Polynesian plants for Maui County

Zone 5

Type	Scientific Name	Common Name	Height	Spread	Elevation	Water req.
Sh	Hedyotis spp.	au, pilo	3'	2'	1,000' to 3,000'	Dry to Wet
Sh	Lipochaeta lavarum	nehe	3'	3'	sea to 3,000'	Dry to Medium
Sh	Osteomeles anthyllidifolia	'ulei, eluehe	4'	6'	sea to 3,000'	Dry to Medium
Sh	Scaevola sericea	naupaka, naupaka-kahakai	6'	8'	sea to 1,000'	Dry to Medium
Sh	Senna gaudichaudii	kolomana	5'	5'	sea to 3,000'	Dry to Medium
Sh	Solanum nelsonii	'akia, beach solanum	3'	3'	sea to 1,00'	Dry to Medium
Sh	Vitex rotundifolia	pohinahina	3'	4'	sea to 1,000'	Dry to Medium
Sh	Wikstroemia uva-ursi kauaiensis kauaiensis	'akia, Molokai osmanthus				
Sh - Tr	Myoporum sandwicense	naio, false sandalwood	10'	10'	sea to higher	Dry to Medium
Sh-Tr	Dodonaea viscosa	'a'ali'i	6'	8'	sea to higher	Dry to Medium
Tr	Aleurites moluccana	candlenut, kukui	50'	50'	sea to 3,000'	Medium to Wet
Tr	Calophyllum inophyllum	kamani, alexandrian laurel	60'	40'	sea to 3,000'	Medium to Wet
Tr	Cordia subcordata	kou	30'	25'	sea to 1,000'	Dry to Wet
Tr	Hibiscus furcellatus	'aklohala, hau-hele	8'			
Tr	Morinda citrifolia	Indian mulberry, noni	20'	15'	sea to 1,000'	Dry to Wet
Tr	Pandanus tectorius	hala, puhala (HALELIST)	35'	25'	sea to 1,000'	Dry to Wet
Tr	Thespesia populnea	milo	30'	30'	sea to 3,000'	Dry to Wet
V	Ipomoea pes-caprae	beach morning glory, pohuehue	1			

DO NOT PLANT THESE PLANTS !!!

Common name	Scientific name	Plant family
black wattle	Acacia mearnsii	Mimosaceae
blackberry	Rubus argutus	Rosaceae
blue gum	Eucalyptus globulus	Myrtaceae
bocconia	Bocconia frutescens	Papaveraceae
broad-leaved cordia	Cordia glabra	Boraginaceae
broomsedge, yellow bluestem	Andropogon virginicus	Poaceae
buffelgrass	Cenchrus ciliaris	Poaceae
butterfly bush, smoke bush	Buddleja madagascariensis	Buddlejaceae
cats claw, Mysore thorn, wait-a-bit	Caesalpinia decapetala	Caesalpiniaceae
common ironwood	Casuarina equisetifolia	Casuarinaceae
common velvet grass, Yorkshire fog	Holcus lanatus	Poaceae
fiddlewood	Citharexylum spinosum	Verbenaceae
fire tree, faya tree	Myrica faya	Myricaceae
glorybower	Clerodendrum laponicum	Verbenaceae
hairy cat's ear, gosmore	Hypochoeris radicata	Asteraceae
haole koa	Leucaena leucocephala	Fabaceae
ivy gourd; scarlet-fruited gourd	Coccinia grandis	Cucurbitaceae
juniper berry	Citharexylum caudatum	Verbenaceae
kahili flower	Grevillea banksii	Proteaceae
klu, popinac	Acacia farnesiana	Mimosaceae
logwood, bloodwood tree	Haematoxylon campechianum	Caesalpiniaceae
loquat	Eriobotrya japonica	Rosaceae
meadow ricegrass	Ehrharta stipoides	Poaceae
melaleuca	Melaleuca quinquenervia	Myrtaceae
miconia, velvet leaf	Miconia calvescens	Melastomataceae
narrow-leaved carpetgrass	Axonopus fissifolius	Poaceae
oleaster	Elaeagnus umbellata	Elaeagnaceae
oriental mangrove	Bruguiera gymnorrhiza	Rhizophoraceae
padang cassia	Cinnamomum burmanii	Lauraceae
palmgrass	Setaria palmifolia	Poaceae
pearl flower	Heterocentron subtriplinervium	Melastomataceae
quinine tree	Cinchona pubesens	Rubiaceae
satin leaf, caimitillo	Chrysophyllum oliviforme	Sapotaceae
silkwood, Queensland maple	Flindersia brayleyana	Rutaceae
silky oak, silver oak	Grevillea robusta	Proteaceae
strawberry guava	Psidium cattleianum	Myrtaceae
swamp oak, saltmarsh, longleaf ironwood	Casuarina glauca	Casuarinaceae
sweet vernalgrass	Anthoxanthum odoratum	Poaceae
tree of heaven	Ailanthus altissima	Simaroubaceae
trumpet tree, guarumo	Cecropia obtusifolia	Cecropiaceae
white ginger	Hedychium coronarium	Zingiberaceae
white moho	Heliocarpus popayanensis	Tiliaceae
yellow ginger	Hedychium flavescens	Zingiberaceae

DO NOT PLANT THESE PLANTS !!!

Common name	Scientific name	Plant family
	Jasminum fluminense	Oleaceae
	Arthrostema ciliatum	Melastomataceae
	Dissotis rotundifolia	Melastomataceae
	Erigeron karvinskianus	Asteraceae
	Eucalyptus robusta	Myrtaceae
	Hedychium gardnerianum	Zingiberaceae
	Juncus planifolius	Juncaceae
	Lophostemon confertus	Myrtaceae
	Medinilla cumingii	Melastomataceae
	Medinilla magnifica	Melastomataceae
	Medinilla venosa	Melastomataceae
	Melastoma candidum	Melastomataceae
	Melinis minutiflora	Poaceae
	Olea europaea	
	Oxyspora paniculata	Melastomataceae
	Panicum maximum	Poaceae
	Paspalum urvillei	Poaceae
	Passiflora edulis	Passifloraceae
	Phormium tenax	Agavaceae
	Pinus taeda	Pinaceae
	Prosopis pallida	Fabaceae
	Pterolepis glomerata	Melastomataceae
	Rhodomyrtus tomentosa	Myrtaceae
	Schefflera actinophylla	Araliaceae
	Syzygium jambos	Myrtaceae
Australian blackwood	Acacia melanoxylon	Mimosaceae
Australian tree fern	Cyathea cooperi	Cyatheaceae
Australian tree fern	Sphaeropteris cooperi	Cyatheaceae
Beggar's tick, Spanish needle	Bidens pilosa	Asteraceae
California grass	Brachiaria mutica	Poaceae
Chinese banyon, Maylayan banyon	Ficus microcarpa	Moraceae
Chinese violet	Asystasia gangetica	Acanthaceae
Christmasberry, Brazilian pepper	Schinus terebinthifolius	Anacardiaceae
Formosan koa	Acacia confusa	Mimosaceae
German ivy	Senecio mikanioides	Asteraceae
Japanese honeysuckle	Lonicera japonica	Caprifoliaceae
Koster's curse	Clidemia hirta	Melastomataceae
Lantana	Lantana camara	Verbenaceae
Mauritius hemp	Furcraea foetida	Agavaceae
Mexican ash, tropical ash	Fraxinus uhdei	Oleaceae
Mexican tulip poppy	Hunnemannia fumariifolia	Papaveraceae
Mules foot, Madagascar tree fern	Angiopteris evecta	Marattiaceae
New Zealand laurel, karakaranut	Corynocarpus laevigatus	Corynocarpaceae
New Zealand tea	Leptospermum scoparium	Myrtaceae
Pampas grass	Cortaderia jubata	Poaceae
Panama rubber tree, Mexican rubber tree	Castilloa elastica	Moraceae
Shoebutton ardisia	Ardisia elliptica	Myrsinaceae
banana poka	Passiflora mollissima	Passifloraceae

Selection

As a general rule, it is best to select the largest and healthiest specimens. However, be sure to note that they are not pot-bound. Smaller, younger plants may result in a low rate of plant survival.[1] When selecting native species, consider the site they are to be planted in, and the space that you have to plant. For example: Mountain species such as koa and maile will not grow well in hot coastal areas exposed to strong ocean breezes. Lowland and coastal species such as wiliwili and Kou require abundant sunshine and porus soil. They will not grow well with frequent cloud cover, high rainfall and heavy soil.

Consider too, the size that the species will grow to be. It is not wise to plant trees that will grow too large.[2] Overplanting tends to be a big problem in the landscape due to the underestimation of a species' height, width or spread.

A large, dense canopied tree such as the kukui is a good shade tree for a lawn. However, it's canopy size and density of shade will limit what can be planted in the surrounding area. Shade. cast by a koa and ohia lehua is relatively light and will not inhibit growth beneath it.

Keep seasons in mind when you are selecting your plants. Not all plants look good year round, some plants such as ilima will look scraggly after they have flowered and formed seeds. Avoid planting large areas with only one native plant. Mixing plants which naturally grow together will ensure the garden will look good all year round.[3] Looking at natural habitats helps to show how plants grow naturally in the landscape.

When planting an area with a mixed-ecosystem, keep in mind the size and ecological requirements of each plant. Start with the hardiest and most easily grown species, but allow space for fragile ones in subsequent plantings.

Acquiring natives

Plants in their wild habitat must be protected and maintained. It is best and easiest to get your plants from nurseries (see list), or friend's gardens. Obtain proper permits from landowners and make sure you follow a few common sense rules:

- collect sparingly from each plant or area.
- some plants are on the state or Federal Endangered Species list. Make sure you get permits (see app. A,B)

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[1] K. Nagata, P.6

[2] K. Nagata, P.9

[3] Nagata, P.9

Soil

Once you have selected your site and the plants you wish to establish there, you must look at the soil conditions on the site. Proper soil is necessary for the successful growth of most native plants, which preform poorly in hard pan, clay or adobe soils. If natives are to be planted in these types of soil, it would be wise to dig planting holes several times the size of the rootball and backfill with 50-75% compost.[4] A large planting hole ensures the development of a strong root system. The plant will have a headstart before the roots penetrate the surrounding poor soil.[5]

It is recommended that native plants not be planted in ground that is more dense than potting soil. If there is no alternative, dig a hole in a mound of soil mixed with volcanic cinder which encourages maximum root development. Fill the hole with water, if the water tends to puddle or drain too slowly, dig a deeper hole until the water does not puddle longer than 1 or 2 minutes.[6] Well-drained soil is one of the most important things when planting natives as you will see in the next section.

Irrigation

Most natives do very poorly in waterlogged conditions. Do not water if the soil is damp. Water when the soil is dry and the plants are wilting. Once established, a good soaking twice a week should suffice. Deep soaking encourages the development of stronger, and deeper root systems. This is better than frequent and shallow watering which encourage weaker, more shallow root systems.

The following is a watering schedule from Kenneth Nagata's Booklet, *How To Plant A Native Hawaiian Garden*:

WATER REQUIREMENT	WATERING FREQUENCY
Heavy	3x / week
Moderate	2x / week
Light	1x / week

Red clay soils hold more water for a longer period of time than sandy soils do. If your area is very sunny or near a beach, things will dry out faster. Even in the area of one garden, there are parts that will need more or less water. Soils can vary and amount of shade and wind differ. After plants are established (a month or two for most plants, up to a year for some trees), you can back off watering.

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[4] Nagata, p. 6.

[5] Nagata, p. 8

[6] Nagata, p. 8

Automatic sprinkler systems are expensive to install and must be checked and adjusted regularly. Above-ground systems allow you to monitor how much water is being put out, but you lose a lot due to malfunctioning of sprinkler heads and wind. The most efficient way to save water and make sure your plants get enough water, is to hand-water. This way you are getting our precious water to the right places in the right amounts.[7]

Fertilizer

An all-purpose fertilizer 10-10-10 is adequate for most species. They should be applied at planting time, 3 months later, and 6 months thereafter. Use half the dosage recommended for ornamentals and pay special attention to native ferns which are sensitive to strong fertilizers. Use of organic composts and aged animal manures is suggested instead of chemical fertilizers. In addition, use of cinders for providing trace minerals is strongly recommended.[8]

Natives are plants which were here hundreds of years before the polynesians inhabited the Hawaiian Islands. They were brought here by birds, or survived the harsh ocean conditions to float here. They are well-adapted to Hawaii's varying soil and environmental conditions. This is why they make prime specimens for a xeriscape garden. However, natives will not thrive on their own, especially under harsh conditions. On the other hand, like any other plant, if you over-water and over-fertilize them, they will die. Follow the instructions given to you by the nursery you buy the plant from, or from this booklet. Better yet, buy a book (suggested readings can be found in the bibliography in the back of this pamphlet), read it, and learn more about native plants. I guarantee that you will be pleased with the results.

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[7] Bornhorst, p. 19-20

[8] Nagata, p. 6

Propagation

There are many ways to propagate and plant-out native Hawaiian species. One of the most thourough and helpful book is Heidi Bornhorst's book, *Growing Native Hawaiian Plants.* The easiest, and best way to obtain natives for the novice gardener is to get them from a reputable nursery (see appendix c). That way all you will have to do is know how to transplant (if necessary) and plant-out when you are ready. These are the two methods I have listed here.

Transplanting

1. Use pots that are one size bigger than the potted plant is in
2. Get your potting medium ready

Good potting medium is a ½, ½ mixture of peat moss and perlite. If the plant is from a dry or coastal area, add chunks of cinder or extra perlite. If it is a wet forest species, add more peat moss or compost. Be aware that peat moss is very acidic and certain plants react severely to acidity.

If the plant is to eventually be planted into the ground, make a mix of equal parts peat moss, perlite, and soil from the area in which the plant is to be planted. Slow-release fertilizer can be mixed into the potting medium.

3. Once pots, potting medium, fertilizer and water are ready, you can begin re-potting. Keep the plant stem at the same depth it was in the original pot. Avoid putting the plant in too large a pot, as the plant may not be able to soak up all the water in the soil and the roots may drown and rot.

Mix potting medium and add slow-release fertilizer at this time. Pre-wet the medium to keep dust down and lessen shock to the plant. Put medium in bottom of pot. Measure for the correct depth in the new pot. Make sure there is from ½ to 2 inches from the top of the pot so the plant can get adequate water. Try to stand the plant upright and center the stem in the middle of the pot.

Water the plant thoroughly after transplanting. A vitamin B-1 transplanting solution can help to lessen the transplant shock. Keep the plant in the same type of environment as it was before, sun or shade. If roots were broken, trimm off some of the leaves to compensate for the loss.[9]

Planting out

1. Plant most native Hawaiian plants in a sunny location in soil that is well-drained.
2. Make the planting hole twice as wide as the root ball or present pot, and just as deep.

If the soil is clay-like, and drains slowly, mix in some coarse red or bland cinder, coarse perlite or

---

[9] Bornhorst, p.20-21

coarse compost. Place some slow-release fertilizer at the bottom of the hole.

3. Carefully remove the plant from the container and place it in the hole.

The top of the soil should be at the same level as the top of the hole, if it is too high or too low, adjust the soil level so that the plant is at the right depth.

4. Water thoroughly after you transplant.

Mulch

Most natives cannot compete with weeds, and therefore must be weeded around constantly in order to thrive. Mulch is a practical alternative, which discourages and prevents weeds from growing.

Hawaii's hot, humid climate leads to the breaking down of organic mulches. Thick organic mulches such as wood chips and leaves, may also be hiding places for pests.

Stone mulches are attractive, permanent and can help to improve soil quality. Red or black cinder, blue rock chips, smooth river rocks and coral chips are some natural choices.[10] Macadamia nut hulls are also easy to find and can make a nice mulch.[11]

Never pile up mulch right next to the stem or trunk of a plant, keep it a few inches away.

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[10] Bornhorst, p. 24

[11] Nagata, p. 7

PLACES TO SEE NATIVES ON:

The following places propagate native Hawaiian plants from seeds and/or cuttings. Their purpose is to protect and preserve these native plants. Please contact them before going to view the sites, they can provide valuable information and referral to other sources.

Maui:

1. Hoolawa Farms, P.O. Box 731, Haiku, Hawaii, 96708	572-4835
2. The Hawaiian Collection, 1127 Manu St., Kula, Hawaii, 96790	878-1701
3. Kula Botanical Gardens, RR 4, Box 228, Kula, Hawaii, 96790	878-1715
4. Maui Botanical Gardens, Kanaloa Avenue across from stadium	243-7337
5. Kula Forest Reserve, access road at the end of Waipouli Rd. Call the Maui District Forester	984-8100
6. Wailea Point, Private Condominium residence, 4000 Wailea Alanui, public access points at Four Seasons Resort or Polo Beach	875-9557
7. Kahanu Gardens, National Tropical Botanical Garden, Alau Pl, Hana, Hawaii, 96713	248-8912
9. Kahului Library Courtyard, 20 School Street, Kahului, Hawaii	873-3097

ZONES

The Maui County Planting Plan has compiled a system of 5 zones of plant growth for Maui County. The descriptions of zones and maps for these zones are as follows:

Zone 1:

Wet areas on the windward side of the island. More than 40 inches of rain per year. Higher than 3,000 feet.

Zone 2:

Cool, dry areas in higher elevations (above 1,000 feet). 20 to 40 inches of rain per year.

Zone 3:

Low, drier areas, warm to hot. Less than 20 inches of rain per year. Sea level to 1,000 feet.

Zone 4:

Lower elevations which are wetter due to proximity of mountains. 1,000 to 3,000 feet.

Zone 5:

Salt spray zones in coastal areas on the windward side.

These zones are to be used as a general guide to planting for Maui County. In addition to looking at the maps, read the descriptions of the zones and decide which zone best fits your area. Plants can be listed in more than one zone and can be planted in a variety of conditions. For best results, take notes on the rainfall, wind, sun and salt conditions of your site. Use the zones as a general guide for selection and read about the plants to decide which best fits your needs as far as care and or function.

PLACES TO BUY NATIVES ON:

Maui:

1. **Hoolawa Farms** — **575-5099**
   P O Box 731
   Haiku HI 96708
   The largest and best collection of natives in the state. They will deliver, but it's worth the drive to go and see!
   Will propagate upon request

2. **Kula True Value Nursery** — **878-2551**
   Many natives in stock
   Get most of their plants from Hoolawa Farms
   They take special requests

3. **Kihei Garden and Landscape** — **244-3804**

4. **Kihana Nursery, Kihei** — **879-1165**

5. **The Hawaiian Collection** — **878-1701**
   Specialize in Sandalwood propagation
   Will propagate special requests

MUNEKIYO & HIRAGA, INC.

January 12, 2005

George Tengan, Director
Department of Water Supply
200 South High Street
Wailuku, Hawaii 96793

SUBJECT: Early Consultation Request for Towne Development of Hawaii's Proposed North-South Collector Road Extension from Walua Place to Keonekai Road, Kihei, Maui, Hawaii

Dear Mr. Tengan:

Thank you for your letter dated December 22, 2004, providing us with your comments on the subject project. On behalf of our client, Towne Development of Hawaii, Inc., (TDH), we would like to offer the following responses to your comments.

1. TDH will work with the Department of Public Works and Environmental Management, to determine if reclaimed water is available at the project site for use during construction.

2. The civil engineering consultant will contact your engineering division for review of the project's construction plans.

3. TDH will work with its civil engineering consultant to develop Best Management Practices (BMPs) for the construction of the project.

4. We note your comments with regards to landscaping and irrigation, and will implement water conservation measures to the extent. At this point in time, the extent of landscaping for the project calls for the grassing of swales.

environment
planning

305 High Street, Suite 104 · Wailuku, Hawaii 96793 · ph: (808)244-2015 · fax: (808)244-8729 · planning@mhinconline.com

Should you have any questions, please feel free to contact me at (808)244-2015.

Very truly yours,

Karlynn Kawahara, Planner

KK:yp
cc: Takeshi Matsukata, Towne Development of Hawaii, Inc.
Warren Unemori, Warren S. Unemori Engineering, Inc.
townedevlnscolltdws.res

JAN 0 3 2005

ALAN M. ARAKAWA
MAYOR

OUR REFERENCE
YOUR REFERENCE

POLICE DEPARTMENT
COUNTY OF MAUI

55 MAHALANI STREET
WAILUKU, HAWAII 96793
(808) 244-6400
FAX (808) 244-6411

THOMAS M. PHILLIPS
CHIEF OF POLICE

KEKUHAUPIO R. AKANA
DEPUTY CHIEF OF POLICE

December 27, 2004

Ms. Karlynn Kawahara
Plannner
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, HI 96793

Dear Ms. Kawahara:

SUBJECT: Early Consultation Request for Preparation of a Draft Environmental Assessment, Liloa Drive (a.k.a North-South Collector Road) Extension, Kihei, Hawaii

Thank you for your letter of November 30, 2004, requesting comments on the above subject.

We have reviewed the information submitted for this project and have enclosed a copy of our comments. As always, thank you for giving us the opportunity to comment on this project. We hope you and your staff have a safe and happy holiday season.

Very truly yours,

Assistant Chief Sydney Kikuchi
for: Thomas M. Phillips
Chief of Police

c: Michael Foley, Planning Department

Enclosure

COPY

Previously all recommendations are still valid. Submit to Munekiyo

TO : **THOMAS PHILLIPS, CHIEF OF POLICE, COUNTY OF MAUI**

VIA : **CHANNELS** 12/23/04

FROM : **BRAD HICKLE, POLICE OFFICER III, DISTRICT VI KIHEI**

SUBJECT : **EARLY CONSULTATION REQUEST FOR PREPARATION OF A DRAFT ENVIRONMENTAL ASSESSMENT, LILOA DRIVE (a.k.a. NORTH-SOUTH COLLECTOR ROAD) EXTENSION**

Sirs, on 12/09/04 this Officer received a copy of the Early Consultant Request submitted by Towne Development of Hawaii, Inc. (TDH).

The applicant is requesting early consultation for the construction of a section of roadway between the intersections of Keonekai road and Walua Place. This roadway is an extension for Liloa Drive and is commonly known as the North-South collector road.

The construction of the roadway extension is a condition of TDH'S Special Management Area (SMA) Use Permits for the Ke Alii Kai II Subdivision and the Ke Alii Villas Condominium projects that are now pending approvals.

REVIEW AND COMMENTS:

On 09/10/04 this Officer received a request for comments from Phillip ROWELL and Associates regarding a Traffic Impact Analysis Report (TIAR) regarding the North/South collector road at the above location.

On 09/15/04 this Officer also met with Mr. Phillip ROWELL at my office in Kihei where we further discussed the North/South Collector Road project. We discussed the possible benefits of the new roadway that may help to alleviate the current traffic problems in the area of Kamalii Elementary School by redirecting traffic. One of my biggest concerns is the safety of the children and crossing guards who frequently cross roadways in this area while working or on their way to and from the school.

I submitted my written comments and recommendations relating to the North/South Collector Road on 09/21/04. I stand by the comments I submitted at that time relating to the roadway project. I have no further comments or recommendations to add relating to this Early Consultant Request for the North/South Collector Road, Liloa Drive Extension project.

Hickle's Previous Report is attached Concern with his Recommendations

12-16-04

Respectfully Submitted,

Officer Brad Hickle
12/15/04 0930 hours

TO : **THOMAS PHILLIPS, CHIEF OF POLICE, COUNTY OF MAUI**

VIA : **CHANNELS**

FROM : **BRAD HICKLE, POLICE OFFICER III, DISTRICT VI KIHEI**

SUBJECT : **REQUEST FOR COMMENTS AND INFORMATION REGARDING THE NORTH/SOUTH COLLECTOR ROAD**

Sirs, on 09/10/04 this Officer received a copy of the Request for Comments and Information regarding the proposed North/South Collector Road.

The request for comments and information was made by Phillip ROWELL and Associates. This information will later be considered in preparation for a Traffic Impact Analysis Report (TIAR) for a section of the North/South Collector Road.

The description of the proposed project is a new two-lane, two way roadway which will connect Alanui Ke Alii Road to Keonekai Road. The proposed North/South Collector will be located midway between Piilani Highway and South Kihei Road.

REVIEW AND COMMENTS:

Phillip Rowell and Associates are requesting the following information;

1) The name and number of the Community Police Officer that can provide input relative to community concerns and issues.

2) Concerns and issues of the Maui Police Department that the traffic study should address.

3) Accident data for the streets and intersections within the study area.

COMMUNITY CONCERNS:

Having attended Kihei Community Association meetings and a meeting at the Maui Planning Commission Office. It is my understanding that the community would like to see the north/south collector road built with bikeways running parallel but separate from the roadway. Separating motor vehicles from bicyclist will minimize risk to bikers and motorist.

There is also community concerns regarding more traffic being drawn to the area of Kamalii Elementary School from Alanui Ke Alii Road. The north/south collector road will undoubtedly draw more traffic to the traffic light at Alanui Ke Alii Road and Piilani Highway intersection.

ADDITIONAL INFORMATION:

On 09/15/04 this Officer met with Mr. Phillip ROWELL at my Office in Kihei. We discussed the ideas on the future traffic situation surrounding the traffic study area.

Mr. ROWELL had some very good ideas and traffic calming suggestions that I believe the community and school would both benefit from.

RECOMMENDATIONS:

I would recommend that the suggestions made by Mr. ROWELL at our meeting be presented to the general public at a Kihei Community Association meeting. This will provide the best opportunity for any interested persons in the community to hear the issues regarding a new development and for the members of the communities to voice their communities traffic concerns. Mr. ROWELL will also have a better understanding of the communities concerns and needs for his traffic study.

TRAFFIC ACCIDENT INFORMATION:

The following information was obtained from the most current data relating to traffic accidents within the traffic study area. The information provided is from a five-year study between the dates of 01/01/99 to 08/31/04.

1) South Kihei Road @ Alanui Ke Alii Road	76 reported traffic accidents
2) Piilani Highway @ Alanui Ke Alii Road	24 reported traffic accidents
3) South Kihei Road @ Keonekai Road	62 reported traffic accidents
4) Piilani Highway @ Keonekai Road	15 reported traffic accidents

Respectfully Submitted,

Officer Brad Hickle E-9966
09/21/04 1600 hours

COPY

MUNEKIYO & HIRAGA, INC.

January 25, 2005

Thomas Phillips, Chief
Maui Police Department
55 Mahalani Street
Wailuku, Hawaii 96793

SUBJECT: Early Consultation Request for Towne Development of Hawaii's Proposed North-South Collector Road Extension from Walua Place to Keonekai Road, Kihei, Maui, Hawaii

Dear Chief Phillips:

We are in receipt of your letter dated December 27, 2004 with your comments on the subject project. On behalf of our client, Towne Development of Hawaii, Inc. (TDH) we would like to offer the following response.

We note your comments with regards to the meeting with Officer Hickle and TDH's traffic engineer to discuss the subject project. We note that since that meeting, the traffic engineer met with the State Department of Transportation (SDOT) to discuss the suggested improvements to the Ke Alii Alanui and Piilani Highway intersection. With respect to this intersection, TDH will be working with the SDOT to provide an additional left turn lane from Ke Alii Alanui onto Piilani Highway. In addition, TDH is working with the SDOT to provide a new right-turn deceleration lane on Piilani Highway, at its intersection with Keonekai Road. Both of these improvements are intended to improve traffic operations at these key locations.

Additionally, we note that the proposed extension to the North-South Collector Road should aid in the flow of traffic for the area, as well as provide an alternate route for emergency vehicles. Pedestrian and bicycle paths will also be provided along the roadway by TDH and other area landowners.

planning environment

305 High Street, Suite 104 · Wailuku, Hawaii 96793 · ph: (808)244-2015 · fax: (808)244-8729 · planning@mhinconline.com

We thank Officer Hickle and your department for taking the time to meet with the traffic engineer and share your thoughts and community concerns about the North-South Collector Road extension, as well as traffic accident data. A copy of the Draft EA, including an updated traffic report will be submitted to the Department for review and comment.

Should you have any further questions, please feel free to call me at 244-2015.

Very truly yours,

Karlynn Kawahara, Planner

KK:yp
cc: Takeshi Matsukata, Towne Development of Hawaii, Inc.
Warren Unemori, Warren S. Unemori Engineering, Inc.
Phillip Rowell, Phillip Rowell & Associates, Inc.

Maui Electric Company, Ltd. • 210 West Kamehameha Avenue • PO Box 398 • Kahului, Maui, HI 96733-6898 • (808) 871-8461

DEC 23 2004

December 21, 2004

Ms. Karlynn Kawahara
Munekiyo & Hiraga, Inc.
305 S. High Street, Suite 104
Wailuku, HI 96793

Dear Ms. Kawahara:

Subject: Early Consultation Request for Preparation of a Draft Environmental Assessment, Liloa Drive (a.k.a. North-South Collector Road) Extension, Kihei, Maui, Hawaii

Thank you for allowing us to comment on the subject project

In reviewing the information transmitted and our records, we have no objection to the subject project. We encourage the applicant's electrical consultant to meet with us as soon as practical to verify the project's electrical requirements so that service can be provided on a timely basis.

If you have any questions or concerns, please call Dan Takahata at 871-2385.

Sincerely,

Neal Shinyama
Manager, Engineering

NS/dt:lkh

Chapter XI

Letters Received During the Draft Environmental Assessment Public Comment Period and Responses to Substantive Comments

XI. LETTERS RECEIVED DURING THE DRAFT ENVIRONMENTAL ASSESSMENT PUBLIC COMMENT PERIOD AND RESPONSES TO SUBSTANTIVE COMMENTS

A Draft Environmental Assessment for the subject project was filed and published in the Office of Environmental Quality Control's The Environmental Notice on April 8, 2005.

Comments on the Draft EA were received during the 30-day public comment period. Comments, as well as responses to substantive comments, are included in this chapter. In addition to agency comments, the Draft EA was reviewed and discussed by the Maui Planning Commission at its meeting of April 26, 2005. The Planning Commission's comments and the applicant's response to those comments are also incorporated in this chapter.

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, HONOLULU
BUILDING 223
FORT SHAFTER, HAWAII 96858-5440

REPLY TO
ATTENTION OF: CEPOH-EC-T

'05 APR 14 P12:40

DEPT OF PLANNING
COUNTY OF MAUI
RECEIVED

April 12, 2005

Civil Works Technical Branch

Mr. Kivette A. Caigoy, Staff Planner
County of Maui
Department of Planning
250 South High Street
Wailuku, Maui, Hawaii 96793

Dear Mr. Caigoy:

Thank you for the opportunity to review and comment on the Draft Environmental Assessment (DEA) for the Proposed North-South Collector Road Extension, Walua Place to Keonekai Road, Kihei, Maui (TMKs 3-9-4: por. 5, 145; 3-9-19: 4; and, 3-9-20: 4, 7, 12, 16, 27). The following comments are provided in accordance with Corps of Engineers authorities to provide flood hazard information and to issue Department of the Army (DA) permits.

a. The flood hazard information provided on page 9 of the DEA is correct.

b. Based on the information provided, we have determined that the road extension will traverse two drainage channels which collect surface sheet water flow from the local area to ocean waters, and that the proposed crossings appear to involve the discharge of fill material for the road bed. The Corps asserts that if an Ordinary High Water Mark (OHWM) exists within these formations, the proposed crossings may require a DA permit. The lateral limits of this Corps jurisdictional determination is indicated on the profile survey map approximately at Stations 16+00 and 26+00 provided in the DEA. Ground disturbing activities in upland property areas which involve activities or structures which constitute excavation of sediments and placement of bedding material for the proposed road will not require a DA permit. This preliminary jurisdictional determination does not obviate the applicant, Towne Development of Hawaii, Inc. from complying with other federal, state, or county permits, certifications or requirements which may be required should they decide to proceed with activities for the proposed project.

The applicant should consult with Mr. Farley Watanabe of our Regulatory Branch at 438-7701 to determine if a DA permit may be required. Please refer to File Number POH-2004-1123 *if you need additional clarification or information.*

Sincerely,

James Pennaz

James Pennaz, P.E.
Chief, Civil Works
Technical Branch

MAY 0 6 2005

DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
FT. SHAFTER, HAWAII 96858-5440

REPLY TO
ATTENTION OF

May 3, 2005

Regulatory Branch

Ms. Karlynn Kawahara
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Kawahara:

This letter is written as a follow-up to a site visit conducted on April 28, 2005 by Ms. Lolly Silva and Ms. Connie Ramsey of my staff to determine whether the Corps would have jurisdiction in Liilioholo Gulch and an unnamed drainage way located within the proposed North-South Collector road extension (Walua Place to Keonekai Road), Kihei, Maui.

As shown on the USGS quad maps, Liilioholo Gulch is a tributary to the Pacific Ocean and is considered a water of the U.S. Further north, the unnamed gulch is densely vegetated throughout with no definite bed and bank within the gulch. This unnamed gulch is not shown on the USGS map and there is no indication that this drainage way is a tributary to other waters which exit into the ocean. The Corps jurisdiction is limited to the discharge of dredged or fill material below the ordinary high water mark and based on an inspection of the upper and lower portion of both drainage ways, there is no indication of an ordinary high water mark. Therefore, the Corps has no jurisdiction within this drainage way and a Department of the Army permit will not be required.

If you have questions, contact Farley Watanabe at 438-7701 or by fax at 438-4060. Please refer to file number POH 2004-1123 regarding this project.

Sincerely,

George P. Young, P.E.
Chief, Regulatory Branch

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO

June 13, 2005

Mr. George P. Young, P.E.
Chief, Regulatory Branch
Department of the Army
U.S. Army Engineer District, Honolulu
Building 230
Fort Shafter, Hawaii 96858-5440

SUBJECT: Early Consultation Request for Towne Development of Hawaii's Proposed North-South Collector Road Extension from Walua Place to Keonekai Road, Kihei, Maui, Hawaii - File No. POH-2004-1123

Dear Mr. Young:

Thank you for your letter dated May 3, 2005 providing us with the Corps' comments on the subject project following a site inspection on April 28, 2005. On behalf of our client, Towne Development of Hawaii, Inc. we would like to request clarification on the Corps' findings. It is our understanding, based on the May 3rd letter, that both the Liilioholo Gulch and the unnamed gulch which traverse the project corridor for the proposed North-South Collector Road extension on Maui, will not require any Department of the Army permits for the proposed project. We would greatly appreciate written confirmation of this conclusion or further comments from the Department on this matter.

Should you have any further questions, please feel free to call me at (808)244-2015.

Very truly yours,

Karlynn Kawahara, Planner

KK:yp
cc: Takeshi Matsukata, Towne Development of Hawaii, Inc.
Warren Unemori, Warren S. Unemori Engineering, Inc.
F:\DATA\TowneDev\NSColl\army.deares.wpd

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JUN 1 7 2005

DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
FT. SHAFTER, HAWAII 96858-5440

REPLY TO
ATTENTION OF

June 16, 2005

Regulatory Branch

Ms. Karlynn Kawahara
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Kawahara:

This responds to your letter dated June 13, 2005 regarding the Corps jurisdictional determination for proposed activities in Liilioholo Gulch and an unnamed drainage way associated with the proposed North-South Collector road extension (Walua Place to Keonekai Road), Kihei, Maui. That determination was contained in the letter dated May 3, 2005 that was sent you.

This confirms your understanding that the Corps will not require a Department of the Army (DA) permit for the crossings across Liilioholo Gulch and the unnamed drainage way. If you have additional questions, contact Farley Watanabe at 438-7701 or by fax at 438-4060. Please refer to file number **POH 2004-1123** regarding this project.

Sincerely,

George P. Young, P.E.
Chief, Regulatory Branch

KMC

United States Department of Agriculture

USDA

NRCS Natural Resources Conservation Service

Our People...Our Islands...In Harmony
2-2000 Kaia Street, Suite #209, Wailuku, HI 96793-2100

DEPT OF PLANNING
COUNTY OF MAUI
RECEIVED
2005 MAR 21 P1:23

March 17, 2005

Ms. Kivette Caigoy, Staff Planner
Department of Planning
County of Maui, Hawaii
250 South High Street
Wailuku, Hawaii 96793

Regarding: Draft Environmental Assessment and Application for Special Management Area Use Permit for the Proposed North-South Collector Road Extension – Walua Place to Keonekai Road
TMK (2) 3-9-004: 005 & 145; 3-9-019: 004; 3-9-020: 4, 7, 12, 16, 20, & 27

Dear Ms. Caigoy,

I have received a copy of the Draft Environmental Assessment and Application for Special Management Area Use Permit for the Proposed North-South Collector Road Extension – Walua Place to Keonekai Road. I have no comments on this project at this time.

Sincerely,

Diana L. Perry
Civil Engineer

Cc: Ranae Ganske-Cerizo, NRCS

LINDA LINGLE
GOVERNOR OF HAWAII

CHIYOME L. FUKINO, M. D.
DIRECTOR OF HEALTH

LORRIN W. PANG, M. D., M. P. H.
DISTRICT HEALTH OFFICER

STATE OF HAWAII
DEPARTMENT OF HEALTH
MAUI DISTRICT HEALTH OFFICE
54 HIGH STREET
WAILUKU, MAUI, HAWAII 96793-2102

'05 APR -4 A8:47

DEPT OF PLANNING
COUNTY OF MAUI
RECEIVED

March 31, 2005

Mr. Michael W. Foley
Director
Department of Planning
County of Maui
250 South High Street
Wailuku, Hawai'i 96793

Attention: Kivette A. Caigoy

Dear Mr. Foley:

Subject: **North-South Collector Road Extension**
TMK: (2) 3-9-004: 005 & 145; 3-9-019: 004; 3-9-020: 4, 7, 12, 16, 20, & 27
EA 2005/0007 and SM1 2005/0007

Thank you for the opportunity to comment on the North-South Collector Road Extension. We have no comments to offer at this time.

Should you have any questions, please call me at 984-8230.

Sincerely,

Herbert S. Matsubayashi
District Environmental Health Program Chief

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

HISTORIC PRESERVATION DIVISION
KAKUHIHEWA BUILDING, ROOM 555
601 KAMOKILA BOULEVARD
KAPOLEI, HAWAII 96707

May 3, 2005

Mr. Michael Foley, Planning Director
Department of Planning - County of Maui
250 South High Street
Wailuku, Hawaii 96793

LOG NO: 2005.0799
DOC NO: 0504CD43

Dear Mr. Foley,

SUBJECT: **Chapter 6E-42 Historic Preservation Review – Draft Environmental Assessment and Application for Special Management Use Permit For the Proposed North-South Collector Road Extension – Walua Place to Keonekai Road (Subject I.D.: EA 2005/0007 and SM1 2005/0007) [County/Planning] Kama`ole Ahupua`a, Wailuku District, Island of Maui TMK: (2) 3-9-004: 005 & 145; 3-9-019:004, 3-9-020:004, 007, 020& 027**

Thank you for the opportunity to review and comment on the Draft Environmental Assessment (Draft EA) and Application for Special Management Use Permit (SMA) for the proposed North-South Collector Road Extension - Walua Place to Keonekai Road, which was received by our staff on March 17, 2005. Our review is based on reports, maps, and aerial photographs maintained at the State Historic Preservation Division, no field inspection was conducted of the subject property.

Based on the submitted Draft EA and SMA, we understand the proposed undertaking consists of the construction of approximately 1,200 linear feet of roadway. The proposed roadway corridor will be constructed in two sections. The first section will be used for the portion of the roadway from Walua Place to the southern boundary of Ke Ali`i Kai II Subdivision. The second section will extend from the southern boundary of Ke Ali`i Kai II Subdivision to Keonekai Road.

Based on a letter from Lisa Rotunno-Hazuka, Archaeological Services Hawaii, to Dr. Melissa Kirkendall, SHPD Maui/Lana`i Island Archaeologist, dated November 20, 2004, we understand the section of North-South Collector Road extending from Ke Ali`i Alanui just past Walua Place had been developed. The next section of roadway, located just past Walua Place to Alaku Place is not improved, but has been graded. The graded surface appears to be comprised of a rocky silty clay deposit with evidence of "blue rock outcrop". Sand has been noted in the area, but appears to be the result of Aeolian deposition. In a subsequent letter from Ms. Rotunno-Hazuka to Dr. Kirkendall dated April 2, 2005; she reports that a new site has been identified

during archaeological monitoring. This temporary habitation site consists of a modified outcrop with terraces and/or remnant wall bases and is located near the western boundary of Ke Ali`i Kai II Subdivision. Subsurface testing yielded evidence of fire and sparse cultural material.

Given the above information, we believe it is likely historic sites may be present in the subsurface deposits of the proposed roadway corridor. Ground altering activities associated with the roadway construction may have an affect on any sites present in the subsurface deposits. A program of archaeological monitoring will mitigate any affect the proposed undertaking may have on historic sites.

Therefore, we recommend the following conditions be attached to the subject permit applications, should they be approved.

1) A qualified archaeological monitor shall be present during all ground-altering activities in order to document any historic properties which may be encountered during the proposed undertaking and to provide mitigation measures as necessary. An acceptable archaeological monitoring plan will need to be submitted to the State Historic Preservation Division for review, prior to the commencement of any ground-altering activities. An archaeological monitoring plan must contain the following nine specifications: (1) The kinds of remains that are anticipated and where in the construction area the remains are likely to be found; (2) How the remains and deposits will be documented; (3) How the expected types of remains will be treated; (4) The archaeologist conducting the monitoring has the authority to halt the construction in the immediate area of the find in order to carry out the plan; (5) A coordination meeting between the archaeologist and construction crew is scheduled, so that the construction team is aware of the plan; (6) What laboratory work will be done on remains that are collected; (7) A schedule of report preparation; (8) Details concerning the archiving of any collections that are made; and (9) An acceptable report documenting the findings of the monitoring activities shall be submitted to the State Historic Preservation Division for review upon 180 days following the completion of the proposed undertaking.

2) The State Historic Preservation Division (Maui and O`ahu offices) shall be notified via facsimile upon the on-set and completion of the proposed undertaking.

If you have any questions, please call Cathleen A. Dagher at 692-8023.

Aloha,

Melanie Chinen, Administrator
State Historic Preservation Division

CD:jen

c: Karlynn Kawahara, Munekiyo & Hiraga, Inc., 305 N. High St, Ste 104 Wailuku, HI 96793

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO

May 25, 2005

Ms. Melanie Chinen, Administrator
State of Hawaii
Historic Preservation Division
Kakuhihewa Building, Room 555
601 Kamokila Boulevard
Kapolei, Hawaii 96707

SUBJECT: Towne Development of Hawaii's Proposed North South Collector Road Extension, TMK Nos. 3-9-004:005 and 145; 3-9-020:4, 7, 12, 16, 20 and 27, Kihei, Maui, Hawaii, (LOG No. 2005.0799) (DOC No. 0504CD43)

Dear Ms. Chinen:

Thank you for your letter dated May 3, 2005, providing us with your comments on the subject project. On behalf of our client, Towne Development of Hawaii (TDH), we would like to offer the following responses.

1. An archaeological monitoring plan, containing the criteria outlined in your comment letter, will be drafted and submitted to the State Historic Preservation Division (SHPD) for review and approval.

2. The SHPD Maui and Oahu offices will be notified via facsimile at the onset and completion of the roadway.

Should you have any further questions, please feel free to call me at (808)244-2015.

Very truly yours,

Karlynn Kawahara, Planner

KK:yp
cc: Takeshi Matsukata, Towne Development of Hawaii, Inc.
Warren Unemori, Warren S. Unemori Engineering, Inc.
Michael Foley, Department of Planning
F:\DATA\TowneDev\NSColl\shpd.deares.wpd

LINDA LINGLE
GOVERNOR OF HAWAII

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
235 SOUTH BERETANIA STREET
SUITE 702
HONOLULU, HAWAII 96813
TELEPHONE (808) 586-4185
FACSIMILE (808) 586-4186
E-mail: oeqc@health.state.hi.us

GENEVIEVE SALMONSON
DIRECTOR

April 28, 2005

Mr. Michael Foley
County of Maui
Department of Planning
250 South High Street
Wailuku, Hawaii 96793

Dear Mr. Foley:

Subject: Draft EA for the Proposed North – South Collector Road Extension – Walua Place to Keonekai Road, MAui

Thank you for the opportunity to review the subject document. We have the following comments.

1. Please describe the secondary and cumulative impacts associated with this project. For example, will it encourage further growth and development?

2. How will air quality in the area change from the increase in vehicle-generated exhaust?

3. Please consult with adjacent landowners and community associations.

Should you have any questions, please call Jeyan Thirugnanam at 586-4185.

Sincerely,

Genevieve Salmonson
Director

c: Munekiyo and Arakawa

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO

May 10, 2005

Ms. Genevieve Salmonson, Director
State of Hawaii
Office of Environmental Quality Control
235 South Beretania Street, Suite 702
Honolulu, Hawaii 96813

SUBJECT: Draft Environmental Assessment and Special Management Area Use Permit Application for the Proposed Towne Development of Hawaii North-South Collector Road Extension, TMK Nos. 3-9-004:005 and 145; 3-9-020:4, 7, 12, 16, 20 and 27, Kihei, Maui, Hawaii

Dear Ms. Salmonson:

Thank you for your letter dated April 28, 2005, providing us with your comments on the Draft Environmental Assessment prepared for the proposed project. On behalf of our client, Towne Development of Hawaii, Inc. (TDH), we would like to offer the following responses.

1. We note your comments with regards to secondary and cumulative impacts associated with the project. The Final Environmental Assessment (FEA) will include a section that will discuss secondary and cumulative impacts.

2. We note your comment with regards to determining the change in air quality due to the increase in vehicle-generated exhaust. The proposed roadway project will not increase the number of vehicles in the area. The Traffic Impact Assessment Report (TIAR) that was prepared for the project concluded that the roadway extension will divert existing traffic from other area roads. Therefore, we do not foresee an increase in vehicle-generated exhaust.

3. We note your comment with regards to consultation with landowners and community associations. TDH held a workshop on the proposed road extension project with the Maui Planning Commission (Commission) in March 2004. The workshop was posted on the Commission agenda and open to the public. Further, TDH met with the Kihei Community Association's Planning Committee in March 2004 to present the project. Additionally, an informational meeting was held with the adjacent Kihei Alii Kai condominium. Lastly, we note that the project is located within the Special Management Area district for Maui and as such, will undergo

305 High Street, Suite 104 Wailuku, Hawaii 96793 ph: (808)244-2015 fax: (808)244-8729 planning@mhinconline.com

public review through the Commission. Owners and lessees within a 500 foot radius of the project will be notified of the public hearing when it is scheduled.

Please note that there are portions of the road that are currently existing, that roadway widening lots exist and that the roadway is included in the Kihei-Makena Community Plan. However, TDH realizes that the roadway construction will be in an area of existing development and as such, will communicate construction schedules with neighboring properties.

Should you have any questions, please feel free to contact me at (808)244-2015.

Very truly yours,

Karlynn Kawahara, Planner

KK:yp
cc: Takeshi Matsukata, Towne Development of Hawaii, Inc.
Warren Unemori, Warren S. Unemori Engineering, Inc.
Michael Foley, Department of Planning
TowneDev\NSCo\oeqc.res

ALAN M. ARAKAWA
MAYOR

OUR REFERENCE
YOUR REFERENCE

POLICE DEPARTMENT
COUNTY OF MAUI

55 MAHALANI STREET
WAILUKU, HAWAII 96793
(808) 244-6400
FAX (808) 244-6411

THOMAS M. PHILLIPS
CHIEF OF POLICE

KEKUHAUPIO R. AKANA
DEPUTY CHIEF OF POLICE

May 4, 2005

MEMORANDUM

TO : MICHAEL W. FOLEY, PLANNING DIRECTOR

FROM : THOMAS M. PHILLIPS, CHIEF OF POLICE

SUBJECT :

I.D.	:	EA 2005/0007 and SM1 2005/0007
TMK	:	(2) 3-9-004: 005 & 145; 3-9-019: 004; 3-9-020: 4, 7, 12, 16, 20, 27
Project Name	:	North-South Collector Road Extension – Walua Place to Keonekai Road
Applicant	:	Towne Development of Hawaii, Inc.

___ No recommendation or comment to offer.

_x_ Refer to enclosed comments and/or recommendations.

Thank you for giving us the opportunity to comment on this project. We apologize for the delay of notifying you of our comments.

Acting Assistant Chief George Fontaine
For: THOMAS M. PHILLIPS
Chief of Police

Enclosure

Request transmittal to Planning Dept.
Capt. Gomes

TO : **THOMAS PHILLIPS, CHIEF OF POLICE**

VIA : **CHANNELS**

FROM : **ALAN BROWN, P.O. III, VOP, DISTRICT 6**

SUBJECT : **SMA APPLICATION & DRAFT ENVIRONMENTAL ASSESSMENT FOR PROPOSED NORTH-SOUTH COLLECTOR ROAD WAILUA PL. TO KEONIKAI RD.**

This officer has reviewed the Application for Special Management Area Use Permit and Draft Environmental Assessment for the proposed north south collector road extention from Wailua Pl to Keonekai Rd.

This application and draft had already reviewed by Ofc. Brad HICKLE on 09/21/04 and 12/15/04. I've met with Ofc. HICKLE and gone over suggestions and comments that he made and were address by the applicant. Upon further review I'm concerned about how the project is going to be constructed namely as follows.

Under Appendix D (Preliminary Engineering Report) it shows that from Wailua Pl. to the end of the Keali'i Kai II subdivision the roadway would be constructed with *Typical Section A*. The drawings show that there will be a bike path and sidewalk along with defined curbs. The remainder of the road is to be constructed with *Typical Section B*. Now this construction design is less substantial ranging from actual road construction layers to the lack of curbing, sidewalk and bike path. I understand that as developers build that they are responsible to make upgrades along their roadway frontage and the developers frontage in this case does not go the full length to Keonekai Rd. But with the undeniable pedestrian use of this road when completed this *Typical Section B* construction would create a hazzard for those pedestrians.

It is my recommendation that the entire length for the roadway be constructed with the Typical Section A design. If that is not possible then a minimum of the sidewalk be installed along the entire length to insure the safety of the pedestrians who will use the roadway.

Alan BROWN E-1505
041805 @ 1833 HRS

CONCUR WITH OFC. A. BROWN
ROAD SHOULD BE CON-
STRUCTED FOR PEDESTRIANS,
BICYCLISTS AND VEHICLES
TO INSURE ROADWAY SAFETY.

4-20-05

CAPT. GOMES —
D.C.S. REVIEW ONLY
THIS AND TRANSMIT
SO CONCUR —

4/5/05

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO

May 25, 2005

Thomas Phillips, Chief
Maui Police Department
55 Mahalani Street
Wailuku, Hawaii 96793

SUBJECT: Towne Development of Hawaii's Proposed North South Collector Road Extension, TMK Nos. 3-9-004:005 and 145; 3-9-020:4, 7, 12, 16, 20 and 27, Kihei, Maui, Hawaii

Dear Chief Phillips:

We are in receipt of your memo dated May 4, 2005 with your comments on the subject project. On behalf of our client, Towne Development of Hawaii, Inc. (TDH) we would like to offer the following response.

We note Officer Brown's comment with regards to the proposed Typical Section B, from the southern boundary of the Ke Ali`i Kai II subdivision to Keonekai Road. We concur that the safety of pedestrians traveling along the roadway extension is important. Please note that Typical Section B will have two (2) 8-foot grassed swales constructed along the roadway. Until such time that the abutting owners develop their properties and install their required frontage improvements (i.e. sidewalks, curb and gutter), pedestrians may be able to utilize this area for access.

305 High Street, Suite 104 • Wailuku, Hawaii 96793 • ph: (808)244-2015 • fax: (808)244-8729 • planning@mhinconline.com

Should you have any further questions, please feel free to call me at 244-2015.

Very truly yours,

Karlynn Kawahara, Planner

KK:yp
cc: Takeshi Matsukata, Towne Development of Hawaii, Inc.
Warren Unemori, Warren S. Unemori Engineering, Inc.
Phillip Rowell, Phillip Rowell & Associates, Inc.
Milton Arakawa, Department of Public Works and Environmental Management
Michael Foley, Department of Planning
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ALAN M. ARAKAWA
Mayor

MILTON M. ARAKAWA, A.I.C.P.
Director

MICHAEL M. MIYAMOTO
Deputy Director

Telephone: (808) 270-7845
Fax: (808) 270-7955

COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS AND ENVIRONMENTAL MANAGEMENT
200 SOUTH HIGH STREET, ROOM 322
WAILUKU, MAUI, HAWAII 96793

RALPH NAGAMINE, L.S., P.E.
Development Services Administration

TRACY TAKAMINE, P.E.
Wastewater Reclamation Division

CARY YAMASHITA, P.E.
Engineering Division

BRIAN HASHIRO, P.E.
Highways Division

Solid Waste Division

April 20, 2005

MEMO TO: MICHAEL W. FOLEY, PLANNING DIRECTOR

FROM: /s/ MILTON M. ARAKAWA, A.I.C.P., DIRECTOR OF PUBLIC WORKS AND ENVIRONMENTAL MANAGEMENT

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT AND SPECIAL MANAGEMENT AREA USE PERMIT APPLICATIONS
NORTH-SOUTH COLLECTOR ROAD EXTENSION - WALAU PLACE TO KEONEKAI ROAD
TMK: (2) 3-9-004:005M 145
EA 2005/0007, SM1 2005/0007

We reviewed the subject application and have the following comments:

1. Figure 2 in Appendix D shows a three (3) foot minimum cover for the future sewer line, this should be a four (4) foot minimum cover.

2. The typical roadway cross section for the North-South Collector Road Extension shall incorporate the County Class "A" pavement section. This section consists of two and a half (2½) inch Asphalt Concrete, Mix V, five (5) inch Asphalt Treated Base and eight (8) inch Aggregate Subbase.

3. The traffic study recommends a four (4) way stop condition at the Ke Alii Alanui - North-South Collector road intersection. The study should assess the need for traffic signals at this location also.

4. A verification shall be provided by a Registered Civil Engineer that the grading and runoff water generated by the project will not have an adverse effect on the adjacent and downstream properties.

5. A detailed and final drainage report and a Best Management Practices (BMP) Plan shall be submitted with the grading plans for review and approval prior to issuance of grading permits. The drainage report shall include hydrologic and hydraulic calculations and the schemes for disposal of runoff waters. It must comply with the provisions of the "Rules and Design of Storm Drainage Facilities in the County of Maui" and must provide verification that the grading and runoff water generated by the project will not have an adverse effect on adjacent and downstream properties. The BMP plan shall show the location and details of structural and non-structural measures to control erosion and sedimentation to the maximum extent practicable.

6. Preliminary construction plan submittal shall include a completed technical assistance review performed by the Disability and Communication Access Board (DCAB) for compliance with the Americans with Disabilities Act Accessibility Guidelines (ADAAG) for all facilities. All technical and structural infeasible assessments shall be the responsibility of the developer and an agreement waiving the County of Maui of any future liability, including redesign and reconstruction, for said facility shall be recorded with the State Bureau of Conveyances.

7. Compliance with Title 18 (Subdivision Ordinance) of the Maui County Code is required for the creation of road-widening lots.

8. All grading/grubbing work for the subject project shall comply with Chapter 20.08 (Soil Erosion and Sedimentation Control) of the Maui County Code. Best Management Practices shall be implemented to the maximum extent practicable to prevent pollutants including dust and sediment from discharging off the project site.

If you have any questions regarding this memorandum, please call Michael Miyamoto at 270-7845.

MMA:MMM:da
S:\LUCA\CZM\Draft Comments\39004005_North_South_Coll_Rd_Ext_ea_sm1_da.wpd

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO

May 25, 2005

Mr. Milton Arakawa, Director
Department of Public Works and
Environmental Management
200 South High Street
Wailuku, Hawaii 96793

SUBJECT: Draft Environmental Assessment and Special Management Area Use Permit Application for the Proposed Towne Development of Hawaii North-South Collector Road Extension, TMK Nos. 3-9-004:005 and 145; 3-9-020:4, 7, 12, 16, 20 and 27, Kihei, Maui, Hawaii

Dear Mr. Arakawa:

Thank you for your memo dated April 20, 2005, regarding the proposed North-South Collector Road extension from Walua Place to Keonekai Road. On behalf of our client, Towne Development of Hawaii, Inc., (TDH), we would like to offer the following responses to your comments:

1. We will revise the amount of cover to a four (4) foot minimum for the future sewer line. Revised plans will be included in the Final Environmental Assessment (FEA).

2. We concur with your comment with regards to the pavement section and the asphalt mixture that should be used.

3. We note your comment with regards to the traffic study's recommendation of a four (4) way stop condition at the Ke Alii Alanui and North-South Collector Road intersection. The project's traffic engineer spoke with Michael Miyamoto of your office and a traffic signal warrant analysis was requested for the intersection. Please see attached traffic signal warrant worksheets for peak hour conditions. The traffic engineer concluded that based on the Year 2020 projections, a signal is not warranted at this time. Please also note that Condition No. 26 of the Special Management Area (SMA) Use Permit approvals for the Ke Alii Villas and Ke Alii Kai II subdivision, the applicant is required to initiate a traffic warrant study when 50 percent of both projects are occupied. Please see the attached SMA approval letter from the Department of Planning.

305 High Street, Suite 104 · Wailuku, Hawaii 96793 · ph: (808)244-2015 · fax: (808)244-8729 · planning@mhinconline.com

4. We concur with your comment. The civil engineering consultant will provide verification that grading and runoff water will not adversely affect adjacent or downstream properties.

5. We concur with your comment. A detailed and final drainage report and a Best Management Practices Plan (BMP) will be submitted with the grading plans for review and approval prior to the issuance of the grading permits.

6. Project plans will be submitted to the Disability and Communication Access Board (DCAB) for review and approval. Upon completion of the road extension, TDH intends to dedicate it to the County of Maui. In further discussion with the Engineering Division, it is our understanding that the agreement waiving the County of Maui of any future liability will not be required.

7. The North-South Collector Road extension alignment covers property owned by various interests. TDH is currently working with DPWEM to begin processing requests for condemnation for portions of the roadway extension. There are other parcels that have already been dedicated to the County. TDH and its affiliates are currently processing the subdivision requests for the Ke Alii Villas and Ke Alii Kai II projects which include respective roadway widening lots. Lastly, it is our understanding that there is a parcel, fronting the BOSA Hawaii property, that will be dedicated to the County on demand. Compliance with Title 18 of the Maui County Code will be undertaken by TDH for the portions of the roadway which cover the Ke Alii Villas and Ke Alii Kai II subdivision.

8. We acknowledge your comment with regards to grading/grubbing for the project and compliance with Chapter 20.08 (Soil Erosion and Sedimentation Control) of the Maui County Code (MCC). BMPs will also be implemented to mitigate pollutants from discharging off the project site.

Should you have any further comments or questions, please feel free to contact me at 244-2015.

Very truly yours,

Karlynn Kawahara, Planner

KK:yp
Enclosures
cc: Takeshi Matsukata, Towne Development of Hawaii, Inc. (w/out enclosures)
Warren Unemori, Warren S. Unemori Engineering, Inc. (w/out enclosures)
Phillp Rowell, Phillip Rowell & Associates (w/out enclosures)
Michael Foley, Department of Planning (w/out enclosures)

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TRAFFIC SIGNAL WARRANT WORKSHEET[1]
WARRANT 3 - PEAK HOUR

Major Street: Ke Alii Alanui Critical Approach Speed: 25 mph

Minor Street: NSCR Critical Approach Speed: 25 mph

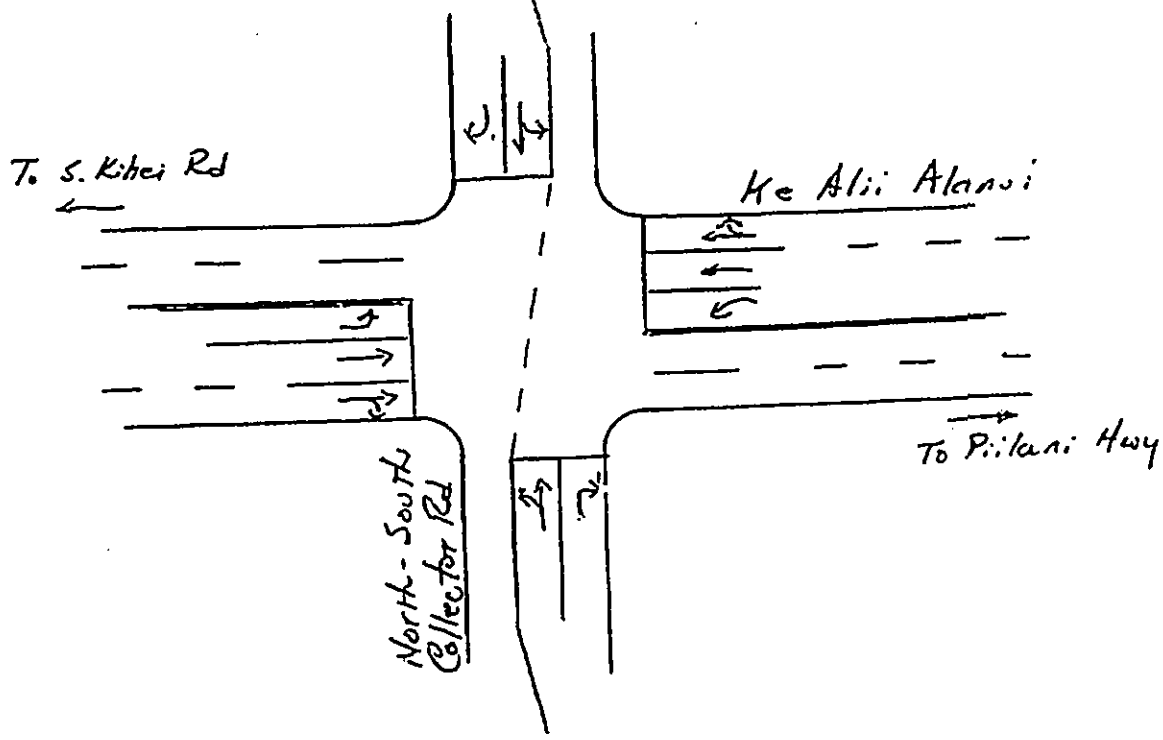
Critical speed of major street traffic ≥ 40 mph ☐
OR
In built up area of isolated community of < 10,000 population ☐

70% CONDITIONS

☑ 100% CONDITIONS

Conditions Analyzed: W/o L NSCR
Calculated By: RJR Date: 5-5-05

INTERSECTION DIAGRAM



NOTE: ***The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right-of-way assignment must be shown.***

---

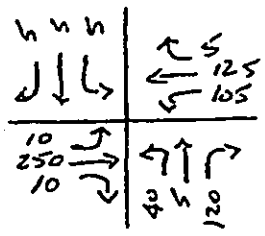
[1] Federal Highway Administration, *Manual of Uniform Traffic Control Devices*, 2003, Section 4C Warrants.

CONDITION A

Satisfied YES ☐ NO ☑

REQUIREMENT	FULFILLED
The total delay experienced for traffic on one minor street approach controlled by a STOP sign equals or exceeds four vehicle-hours (vph) for a one-lane approach and five vehicle-hours for a two-lane approach; **and**	YES ☐ NO ☑
The volume on the same minor street approach equals or exceeds 100 vph for one moving lane of traffic and 150 vph for two moving lanes; **and**	YES ☑ NO ☐
The total entering volumes serviced during the hour equals or exceeds 800 vph for intersections with four or more approaches and 650 vph for intersections with three approaches.	YES ☐ NO ☑

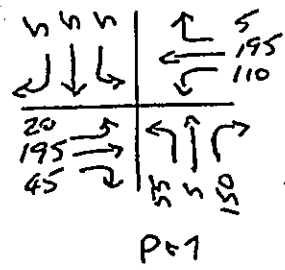
CALCULATIONS



TOTAL - 675

AM

(A) NB LT 45 x 20.4 = 918.0
NB R 120 x 11.2 = 1344.0
2262.0cc
0.6 HRS



TOTAL = 795

PM

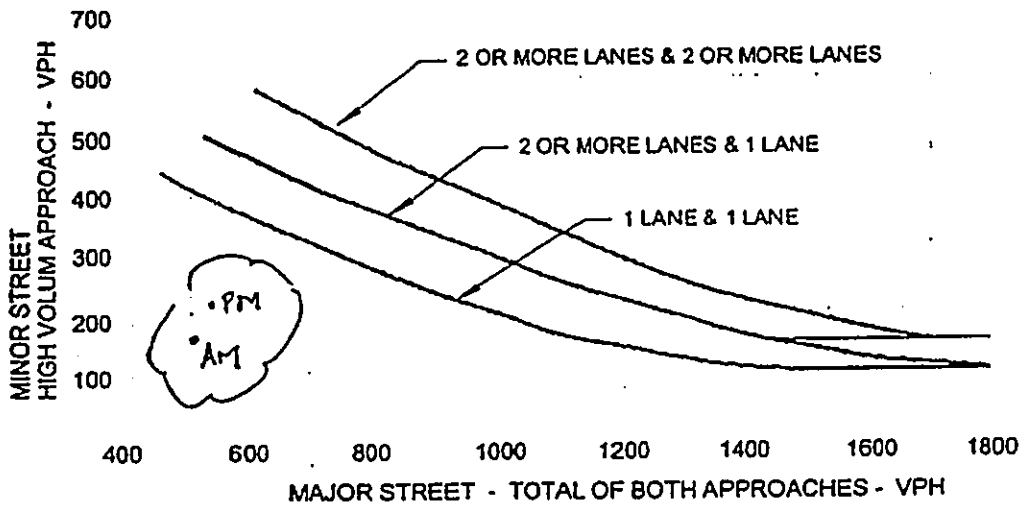
(A) NB LT 60 x 25.0 = 1500.0
NB R 150 x 11.1 = 1665.0
3165.0
0.9 HRS

CONDITION B

Satisfied YES ☐ NO ☑

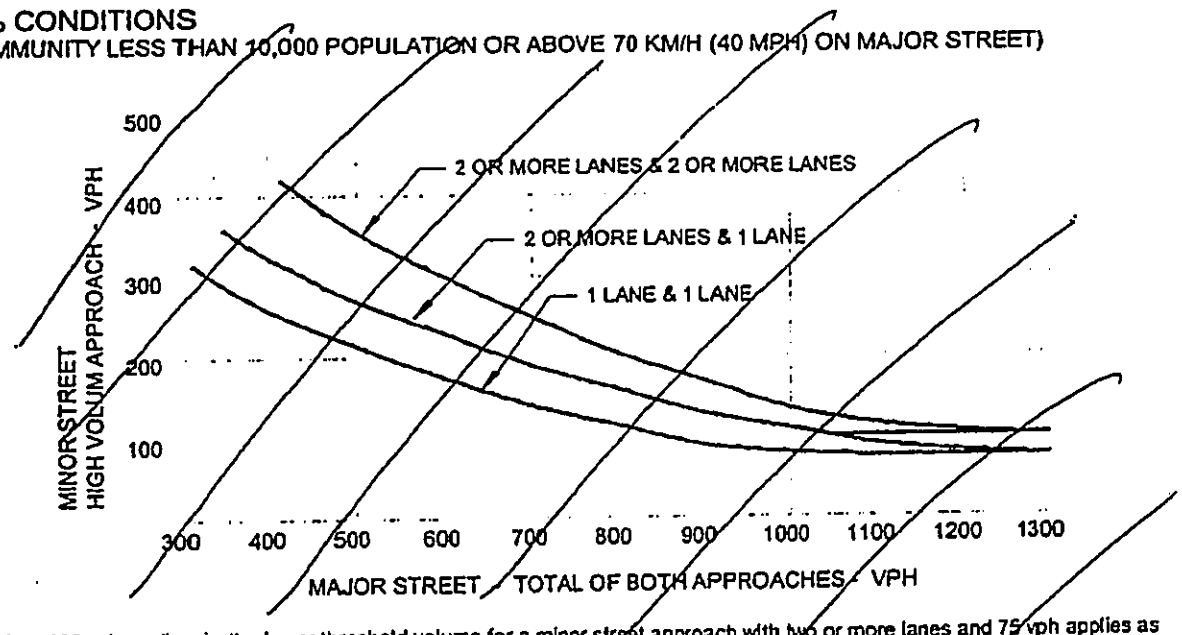
	APPROACH LANES	AM Peak Hour Volume	PM Peak Hour Volumes
Both approaches, Major Street	2	505	165
Highest approaches, Minor Street	2	570	210

100% CONDITIONS



NOTE: 150 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor street approaching with one lane.

70% CONDITIONS
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 70 KM/H (40 MPH) ON MAJOR STREET)



NOTE: 100 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor street approach with one lane.

ALAN M. ARAKAWA
Mayor

MICHAEL W. FOLEY
Director

WAYNE A. BOTEILHO
Deputy Director

SEP 2 2 2004

COUNTY OF MAUI
DEPARTMENT OF PLANNING

September 16, 2004

Mr. Takeshi Matsukata
Ke Ali'i Villas, LLC
95-1069 Wikao Rd.
Mililani, Hawaii 96789

Mr. Isaac Hall, Esq.
2087 Wells Street
Wailuku, Hawaii 96793

Dear Mr. Matsukata and Mr. Hall:

RE: Special Management Area (SMA) Permit for the Proposed 90-Lot Ke Ali'i Kai II Subdivision and Related Improvements at TMK: 3-9-019: 004, Kihei, Maui, Hawaii (SM1 2003/0013)

At its regular meeting on September 14, 2004, the Maui Planning Commission (Commission) received a copy of your Settlement Agreement and accepted the withdrawal of the Petition to Intervene filed on behalf of the Kamaole Heights Homeowners Association, Inc. for the above referenced application.

The Commission after due deliberation, voted to approve the SMA Permit for the above referenced project, subject to the following conditions:

STANDARD CONDITIONS:

1. That construction of the proposed project shall be initiated by **September 30, 2006.** Initiation of construction shall be determined as construction of offsite improvements or construction of the subdivision improvements, whichever occurs first. Failure to comply within this two (2) year period will automatically terminate this Special Management Area Use Permit unless a time extension is requested no later than ninety (90) days prior to the expiration of said two (2) year period. The Planning Director shall review and approve a time extension request but may forward said request to the Planning Commission for review and approval.

2. That the construction of the project shall be completed within five (5) years after the date of its initiation. Failure to complete construction of this project will automatically terminate the subject Special Management Area Use Permit. A time extension shall be requested no later than ninety (90) days prior to the completion deadline. The Planning Director shall review and approve a time-extension request but may forward said request to the Planning Commission for review and approval.

3. The permit holder or any aggrieved person may appeal to the Planning Commission any action taken by the Planning Director on the subject permit no later than ten (10) days from the date the Director's action is reported to the Commission.

4. That final construction shall be in accordance with preliminary plans submitted on **June 30, 2003** and a revised Preliminary subdivision plat dated **May 25, 2004**.

5. That appropriate measures shall be taken during construction to mitigate the short term impacts of the project relative to soil erosion from wind and water, ambient noise levels, traffic disruptions, and construction waste. (As amended by the Department)

6. That the subject Special Management Area Use Permit shall not be transferred without prior written approval in accordance with §12-202-17(d) of the Special Management Area Rules of the Maui Planning Commission. However, in the event that a contested case hearing preceded issuance of said Special Management Area Use Permit, a public hearing shall be held upon due published notice, including actual written notice to the last known addresses of parties to said contested case and their counsel.

7. That the applicant, its successors and permitted assigns shall exercise reasonable due care as to third parties with respect to all areas affected by subject Special Management Area Use Permit and shall procure at its own cost and expense, and shall maintain during the entire period of this Special Management Area Use Permit, a policy or policies of comprehensive liability insurance in the minimum amount of ONE MILLION AND NO/100 DOLLARS ($1,000,000.00) naming the County of Maui as an additional named insured, insuring and defending the applicant and County of Maui against any and all claims or demands for property damage, personal injury and/or death arising out of this permit,

including but not limited to: (1) claims from any accident in connection with the permitted use, or occasioned by any act or nuisance made or suffered in connection with the permitted use in the exercise by the applicant of said rights; and (2) all actions, suits, damages and claims by whomsoever brought or made by reason of the non-observance or non-performance of any of the terms and conditions of this permit. Proof of a policy naming County of Maui as an additional named insured shall be submitted to the Department within ninety (90) calendar days from the date of transmittal of the decision and order.

8. That full compliance with all applicable governmental requirements shall be rendered.

9. That the applicant shall submit plans regarding the location of any construction related structures such as, but not limited to trailers, sheds, equipment and storage areas and fencing to be used during the construction phase to the Maui Planning Department for review and approval.

10. That the applicant shall submit to the Planning Department five (5) copies of a detailed report addressing its compliance with the conditions established with the subject Special Management Area Use Permit. A preliminary report shall be reviewed and approved by the Planning Department prior to issuance of the grading permit. A final compliance report shall be submitted 30 days after the completion of the subdivision to the Planning Department for review and approval.

11. That the applicant shall develop the property in substantial compliance with the representations made to the Commission in obtaining the Special Management Area Use Permit. Failure to so develop the property may result in the revocation of the permit.

12. That appropriate energy conservation measures shall be incorporated into the project, including solar water heaters.

PROJECT SPECIFIC CONDITIONS:

13. That the applicant shall be responsible for all required infrastructural improvements, as required by Title 18, Maui County Code, and other County codes, rules and regulations, including but not limited to water source and system improvements for both domestic and fire protection, drainage improvements, traffic related improvements, wastewater system improvements, and utility upgrades. Said improvements shall

be constructed concurrently with the development and shall be completed prior to issuance of a certificate of occupancy or final subdivision approval unless improvements are bonded by the developer.

14. That the subdivision plans shall be revised to connect cul-de-sac Roads "B" and "C" into a through roadway.

15. That the applicant shall be responsible for its pro-rata share of the following improvements to Piilani Highway, as recommended by the Department of Transportation:

    a. That improvement be made to the Piilani Highway/Ke'Alii Alanui intersection to provide for a double left turn for eastbound traffic on Ke'Alii Alanui Drive to go northbound on Piilani Highway.

    b. A right-turn deceleration lane be constructed for traffic turning off Piilani Highway into Keonekai Road.

The pro-rata contribution shall be provided or agreed upon prior to issuance of the first building permit.

16. That the applicant shall coordinate the construction related traffic with other proposed developments (e.g. Ke Alii Villas, Aloha Villages) in the area. The applicant shall prepare a traffic control plan which identifies appropriate measures to be implemented during the construction of the project to minimize impacts to traffic flow and provide for the safe passage of vehicles and pedestrians. Said traffic control plan shall be filed and approved by the Department of Public Works and Environmental Management prior to the issuance of grading permit.

17. That during all ground altering construction activities archaeological monitoring shall be conducted in accordance with an archaeological monitoring plan reviewed and approved by the State Historic Preservation Division (SHPD). A copy of the archaeological monitoring plan and approval from SHPD shall be filed with the Planning Department prior to issuance of any grading permit. (Recomemdned by SHPD)

18. That the applicant shall use "best practices" in Crime Prevention Through Environmental Design (CPTED), whenever possible, in developing the project. In CPTED the design and building of structures, landscaping, and lighting are interwoven to increase surveillance, limit

accessibility, and increase opportunities for apprehension resulting in a decrease in the likelihood of crime. (Recommended by Police)

19. That a copy of the approved National Pollutant Discharge Elimination System (NPDES) permit shall be filed with the Planning Department and the Department of Public Works and Environmental Management prior to approval of the grading permit.

20. That the applicant shall contribute to the development, funding, and/or construction of school facilities, on a fair share basis, as determined by and to the satisfaction of the Department of Education. Terms of contribution shall be agreed upon in writing by the applicant and the department of Education prior to issuance of the first building permit. A copy of the agreement shall be filed with the Department of Planning and the Department of Public Works and Environmental Management. Said funds shall remain in school facilities in the South Maui District. (As amended by Commission)

21. That those homeowners of lots adjacent to the existing drainageway identified as a drainage reserve on the preliminary subdivision map shall be restricted from placing any fill materials, debris (e.g. yard cuttings, tree trimmings, etc.) or structures within the drainage reserve. Maintenance of the drainage reserve shall be the responsibility of the subdivision home owners. Said restrictions shall be identified in the deeds of each lot.

22. As represented by the applicant, a total of 50 percent of the lots (45 lots) shall be allowed ohana units. Each restricted lot which does not allow for an ohana unit shall include said restriction in the deed with the State Bureau of Conveyances. Those lots allowed ohana units shall be identified on a site map filed with the Planning Department and Department of Public Works and Environmental Management and shall be updated at least once every six (6) months. Once the maximum allowed ohana units have been met, a final site map of those lots allowed ohana dwellings shall be filed with the Planning Department and Department of Public Works and Environmental Management.

23. As represented, *upon approval of the Ke Ali'i Kai II Subdivision and the Ke Alii'i Villas Special Management area permits*, the applicant and its affiliates shall be responsible for the construction of the North-South Collector Roadway, as follows:

a. The applicant and its affiliates shall jointly pay for permitting, design, right-of-way acquisition and construction of the roadway to standards agreed upon by the Department of Public Works and Environmental Management (DPWEM). If condemnation proceedings by the County of Maui are required, the applicant will pay the cost of land acquisition under said proceedings. The North-South Collector roadway section between Walua Place and the southern boundary of the Ke Ali'i Kai II subdivision will be completed to full County standards, as determined by the DPWEM. The remaining section of the North-South Collector Road, from the southern boundary of Ke Ali'i Kai II Subdivision to Keonekai Road will involve the construction of two travel lanes only.

b. A phasing program for the implementation of the North-South Collector Road shall be prepared and approved by the Department of Public Works and Environmental Management (DPWEM). The phasing program shall address contingency implementation conditions in the event the Environmental Assessment or Special Management Area Permit for the North-South Collector Road (NSCR) is delayed or not approved or rights-of-way acquisition cannot be completed within the agreed upon time frames set forth in the phasing program. A copy of the approved phasing program shall be filed with the Department of Planning prior to the DPWEM's approval of the construction plans for the NSCR.

c. Provided that the North-South Collector Road Environmental Assessment and SMA permit processes, as well as the rights-of-way acquisition process are concluded in accordance with the approved phasing program referenced in Condition No. 23b, the applicant shall then complete construction of the road in accordance with the approved phasing program.

d. Should the SMA permit not be approved for the North-South Collector Road, the applicant shall then have no further obligation to construct the North-South Collector Road as set forth in this condition.

e. Said North-South Collector Road shall be constructed prior to final subdivision approval, unless the improvements are bonded by the applicant.

The terms and conditions for the construction of the North-South *Collector Roadway shall be set forth in an agreement* between the applicant and its affiliate and the County of Maui. A copy of the executed agreement shall be filed with the Department of Planning within ten days of finalization.

24. That pursuant to Section 18.16.320, Maui County Code, the applicant shall construct a park on the 2.7 acre retention basin site consisting of a landscaped and irrigated play field measuring 165 ft. by 300 ft, parking areas for 34 vehicles, comfort station, and security fencing to satisfy a portion of its park assessment. Only the usable areas of the park as determined by the Department of Parks and Recreation (DP&R) shall be credited for park assessment. The park shall be dedicated to the County of Maui but shall be maintained by the homeowners' association in accordance with terms and conditions as set forth by the DP&R.

25. Condition Nos. 21, 22, and 24 shall run with the land and shall be set forth in a unilateral agreement recorded by the applicant with the Bureau of Conveyances within 60 days from the date of receipt of this decision. A copy of the recorded unilateral agreement shall be filed with the Director of Planning, Director of Parks and Recreation, and the Director of Public Works and Environmental Management within 10 days of recordation.

26. That the applicant shall initiate a traffic warrant study of the Ke Ali'i Alanui Drive/North-South Collector Roadway intersection when 50 percent of the Ke Ali'i Villas and Ke Ali'i Kai II Subdivision are occupied. Said traffic warrant study shall be reviewed and approved by the Department of Public Works and Environmental Management (DPWEM). If warranted, the applicant shall pay its prorata share of a traffic signal or other traffic mitigative measures, as approved by the DPWEM. (As amended by Commission)

27. That appropriate filtration measures to separate petroleum products and other contaminants shall be incorporated in the percolation well design and shall be regularly maintained by the homeowners' association. (As amended by Commission)

28. That an appropriate Best Management Practices (BMPs) plan shall be reviewed and approved by the Department of Public Works and Environmental Management. Said plan shall address impacts associated with erosion, contaminants, and construction waste. The approved plan shall be filed with the Maui Planning Department.

29. That the applicant shall provide a mauka bike path within the mauka side of the North-South Collector Road between Walua Place and the southern boundary of the Ke Ali'i Kai II Subdivision, as approved by the Department of Public Works and Environmental Management. (As amended by Commission)

30. That the 30 ft. wide portion of the North-South Collector Roadway from Ke Ali'i Alanui Drive to the southern boundary of the Ke Ali'i Kai II Subdivision abutting and fronting the project site shall be completed prior to occupancy of the Ke Ali'i Kai II Subdivision. (As amended by Commission)

31. If the Special Management Area permit for the North-South Collector Road is not approved, then the applicant shall comply with the County's Affordable Housing Policy. (As amended by Commission)

Further, the Commission adopted the Planning Department's Report and Recommendation prepared for the September 14, 2004 meeting as its Findings of Fact, Conclusion of Law and Decision and Order. Parties to proceedings before the Commission may obtain judicial review of decision and orders issued by the Commission in the manner set forth in chapter 91-14, Hawaii Revised Statutes.

Thank you for your cooperation. If additional clarification is required, please contact Ms. Colleen Suyama, Staff Planner, of my office at 270-7735.

Sincerely,

MICHAEL W. FOLEY
Planning Director

MWF:CMS:do
cc: Wayne Boteilho, Deputy Planning Director
Clayton I. Yoshida, AICP, Planning Program Administrator
Aaron H. Shinmoto, P.E., Planning Program Administrator
Colleen M. Suyama, Staff Planner
Development Services Administration (2)
Department of Parks and Recreation
Department of Housing and Human Concerns
Police Department
Water Department
Department of Transportation
DLNR, SHPD
Department of Health
Michael Munekiyo, AICP, Munekiyo & Hiraga, Inc.
Edward Belway
Project File
General File
(K:\WP_DOCS\PLANNING\SM1\2003\13_KeAliiKaiiISubd\MPCApproval.wpd)

-11223

ALAN M. ARAKAWA
MAYOR

KYLE K. GINOZA
Director
DONALD A. MEDEIROS
Deputy Director
Telephone (808) 270-7511

DEPARTMENT OF TRANSPORTATION

COUNTY OF MAUI
200 South High Street
Wailuku, Hawaii, USA 96793-2155

INTERDEPARTMENTAL MEMORANDUM

TO: Kivette A. Caigoy, Staff Planner

FROM: Kyle K. Ginoza, Director of Transportation KKG

DATE: April 21, 2005

SUBJECT: Proposed North-South Collector Road Extension - Walua Place to Keonekai Road

Per your request, we have reviewed the above report and have no comments to offer at this time.

We recommend that you forward a copy of the report to Department of Public Works and Environmental Management for their review.

Please feel free to contact me at ext. 7511 if you have any questions. Thank you.

/dcy

ALAN M. ARAKAWA
Mayor

GEORGE Y. TENGAN
Director

JEFFREY T. PEARSON, P.E.
Deputy Director

DEPARTMENT OF WATER SUPPLY
COUNTY OF MAUI
200 SOUTH HIGH STREET
WAILUKU, MAUI, HAWAII 96793-2155
www.mauiwater.org

May 4, 2005

Ms. Kivette Caigoy
Department of Planning
County of Maui
250 South High Street
Wailuku HI 96793

Re: I.D.: EA 2005/0007 SM1 2005/0007
TMK: 3-9-04:005, 145, 3-9-19:04, 3-9-20:004, 07, 012, 016, 020 & 027
Project Name: North-South Collector Road Extension from Walua Place to Keonekai Road

Dear Ms. Caigoy:

Thank you for the opportunity to comment on this application.

Source Availability and Consumption
The project area is served by the Central Maui System. The main sources of water for this system are the designated Iao aquifer, the Waihee aquifer, the Iao tunnel and the Iao-Waikapu Ditch. The Department will not issue temporary construction meters for Central Maui projects. It should be noted that while reclaimed water distribution lines are not available at the project site, it is available for trucking from the Kihei Wastewater Treatment Plant for construction purposes.

System Infrastructure
The Department 16-inch water line runs along the North-South Collector Road of the project site. Construction plans need to be reviewed by the Department of Water Supply. Water valve covers must be lifted to match the finished grade of the roadway.

Pollution Prevention
The project overlies the Kamaole aquifer. The Department of Water Supply strives to protect the integrity of surface and groundwater resources by encouraging the applicant to adopt best management practices (BMPs) designed to minimize infiltration and runoff from all construction and vehicle operations. Sample BMPs provided with our December 22, 2004 letter are included in the application material. We note that the applicant will work with its civil engineering consultant to develop BMPs

for construction of this project.

Conservation
We note that the applicant will implement irrigation and landscaping conservation measures as recommended in our December 22, 2004 letter.

Should you have any questions, please contact our Water Resources and Planning Division at 270-7199.

Sincerely,

George Y. Tengan, Director
emb

c: Engineering Division
Applicant

C:\WPdocs\Permcomm\North south collector road ext EA SM1.wpd

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO

May 25, 2005

George Tengan, Director
Department of Water Supply
200 South High Street
Wailuku, Hawaii 96793

SUBJECT: Towne Development of Hawaii's Proposed North South Collector Road Extension, TMK Nos. 3-9-004:005 and 145; 3-9-020:4, 7, 12, 16, 20 and 27, Kihei, Maui, Hawaii

Dear Mr. Tengan:

Thank you for your letter dated May 4, 2005, providing us with your comments on the subject project. On behalf of our client, Towne Development of Hawaii (TDH), we would like to offer the following responses to your comments.

1. We acknowledge your comment with regards to reclaimed water sources. TDH will work with the contractor, once selected, to coordinate the use of non-potable water for construction.

2. Construction plans will be submitted to the Department for review and comment. Water valve covers will be lifted to match the finished grade of the roadway.

3. As previously indicated, the applicant will work with its civil engineering consultant to develop best management practices, designed to minimize infiltration and runoff from all construction and vehicle operations.

4. As previously noted in our response to the Department, the extent of landscaping for the project calls for the grassing of swales. Upon completion of the roadway extension, TDH intends to dedicate the road to the County of Maui, who will assume maintenance of landscaped areas.

305 High Street, Suite 104 ·Wailuku, Hawaii 96793 ·ph: (808)244-2015 ·fax: (808)244-8729 ·planning@mhinconline.com

Should you have any questions, please feel free to contact me at (808)244-2015.

Very truly yours,

Karlynn Kawahara, Planner

KK:yp
cc: Takeshi Matsukata, Towne Development of Hawaii, Inc.
Warren Unemori, Warren S. Unemori Engineering, Inc.
Michael Foley, Department of Planning
F:\DATA\TowneDev\NSCol\dws.deares.wpd

ALAN M. ARAKAWA
Mayor

MICHAEL W. FOLEY
Director

WAYNE A. BOTEILHO
Deputy Director

MAY 31 2005

COUNTY OF MAUI
DEPARTMENT OF PLANNING

May 27, 2005

Ms. Karlynn Kawahara
Munekiyo & Hiraga, Inc.
305 S. High Street, Suite 104
Wailuku, Hawaii 96793

Dear Ms. Kawahara:

RE: Draft Environmental Assessment (DEA) for the Proposed North-South Collector Road Extension - Walua Place to Keonekai Road, Located at TMK: 3-9-004: 005 & 145, 3-9-019: 004, 3-9-020: 004, 007, 012, 016, 020, & 027, Kihei, Island of Maui, Hawaii (EA 2005/0007) (SM1 2005/0007)

At the regular meeting on April 26, 2005, the Maui Planning Commission (Commission) reviewed the above-referenced document and provided the following comments:

1. Provide a status update for obtaining the necessary easements from the respective property owners for the roadway extension.

2. The width of roadways can be more of a problem than a benefit for pedestrians attempting to cross the road. Please discuss the reasons why this particular road is being expanded.

Thank you for your cooperation. Should you require additional clarification, please contact Ms. Kivette Caigoy, Environmental Planner, of this office at 270-7735.

Sincerely,

MICHAEL W. FOLEY
Planning Director

MWF:KAC:do
c: Wayne A. Boteilho, Deputy Planning Director
Clayton I. Yoshida, Planning Program Administrator
Kivette A. Caigoy, Environmental Planner
Paul Fasi, Staff Planner
EA Project File
General File
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MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO

June 8, 2005

Michael W. Foley, Director
Department of Planning
250 South High Street
Wailuku, Hawaii 96793

SUBJECT: Draft Environmental Assessment and Special Management Area Use Permit Application for the Proposed Towne Development of Hawaii North-South Collector Road Extension, TMK Nos. 3-9-004:005 and 145; 3-9-020:4, 7, 12, 16, 20 and 27, Kihei, Maui, Hawaii

Dear Mr. Foley:

Thank you for your letter dated May 27, 2005 regarding the subject project. The questions by the Maui Planning Commission (Commission) were addressed at the April 26, 2005 Commission meeting. The following is a summary of the responses made at the meeting on behalf of our client, Towne Development of Hawaii, Inc. (TDH).

1. TDH is currently working with the Department of Public Works and Environmental Management (DPWEM) to secure the outstanding portions of the North-South Collector Road right-of-way, in the Walua Place to Keonekai Road area. It is our understanding that the DPWEM will be proceeding with condemnation for some parcels, while others are in the process of being deeded to the County.

2. The proposed typical section for the North-South Collector Road extension was provided to TDH by the DPWEM. It is TDH's intent to turn the roadway extension over to the County once completed. It is our understanding that this typical section was used for portions of the North-South Collector Road that have been completed and will be used for future sections of the road. It is noted that the wider right-of-way width will allow for the provision of a typical section endorsed by the Kihei Community Association.

305 High Street, Suite 104 · Wailuku, Hawaii 96793 · ph: (808)244-2015 · fax: (808)244-8729 · planning@mhinconline.com

planning environment

Should you have any questions, please feel free to contact me at 244-2015.

Very truly yours,

Karlynn Kawahara, Planner

KK:yp
cc: Takeshi Matsukata, Towne Development of Hawaii, Inc.
Warren Unemori, Warren S. Unemori Engineering, Inc.
F:\DATA\TowneDev\NSCol\planning.deares.wpd

MUNEKIYO HIRAGA, INC.

July 13, 2005

Michael W. Foley, Director
Department of Planning
250 South High Street
Wailuku, Hawaii 96793

SUBJECT: Draft Environmental Assessment and Special Management Area Use Permit Application for the Proposed Towne Development of Hawaii North-South Collector Road Extension TMK Nos. 3-9-004:005 and 145; 3-9-020:4, 7, 12, 16, 20 and 27, Kihei, Maui, Hawaii

Dear Mr. Foley:

We are writing on behalf of our client, Towne Development of Hawaii, Inc.(TDH), to provide you with an update on the status of the proposed North-South Collector Road right-of-way. As previously noted, TDH is currently working with the Department of Public Works and Environmental Management (DPWEM) to secure the outstanding portions of the North-South Collector Road right-of-way, in the Walua Place to Keonekai Road area.

TDH is currently working in cooperation with the Department of Public Works and Environmental Management, County of Maui to secure the necessary road widening lots for the North-South Collector from Walua Place to Keonekai Road.

1. TMK (2) 3-9-020:020 is owned by TDH.

2. Parcel maps are being prepared for TMK (2) 3-9-020:016 and 004 to enable negotiations.

3. TDH is in negotiations with the owners of TMK (2) 3-9-020:012.

4. The owner of TMK (2) 3-9-020:007 is required by previously imposed SMA conditions to participate in the North-South Collector project.

5. The Department of Public and Environmental Management is currently reviewing an agreement that is with the Kihei Banyan, Inc., owner of TMK (2) 3-9-004:005 and 145, for the dedication of a road widening lot.

305 High Street, Suite 104 · Wailuku, Hawaii 96793 · ph: (808)244-2015 fax: (808)244-8729 planning@mhinconline.com

Should you have any questions, please feel free to contact me at 244-2015.

Very truly yours,

Karlynn Kawahara, Planner

KK:yp
cc: Takeshi Matsukata, Towne Development of Hawaii, Inc.
Warren Unemori, Warren S. Unemori Engineering, Inc.
Milton Arakawa, Department of Public Works and Environmental Management
F:\DATA\Towne\NSCol\statusplann.ltr.wpd

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DEPT OF PLANNING
COUNTY OF MAUI
RECEIVED

March 24, 2005

Ms. Kivette A. Caigoy
Staff Planner
County of Maui
Department of Planning
250 S. High Street
Wailuku, HI 96793

Dear Ms. Caigoy:

Subject: North-South Collector Road Extension – Walua Place to Keonekai Rd.
TMK: (2) 3-9-004:005 & 145; 3-9-019:004; 3-9-020: 4, 7, 12, 16, 20 & 27
I.D.: EA 2005/0007 and SM1 2005/0007

Thank you for allowing us to comment on the subject project.

Please refer to our letter dated December 21, 2004 to Munekiyo & Hiraga, Inc. for our comments about the subject project included in the Draft Environmental Assessment and Application for Special Management Area Use Permit. If you have any questions or concerns, please call Dan Takahata at 871-2385.

Sincerely,

Neal Shinyama
Manager, Engineering

NS/dt:lh

MUNEKIYO & HIRAGA, INC.

MICHAEL T. MUNEKIYO
GWEN OHASHI HIRAGA
MITSURU "MICH" HIRANO

May 10, 2005

Mr. Neal Shinyama
Manager, Engineering
Maui Electric Company, Ltd.
P. O. Box 398
Kahului, Hawaii 96733-6898

SUBJECT: Towne Development of Hawaii's Proposed North South Collector Road Extension, TMK Nos. 3-9-004:005 and 145; 3-9-020:4, 7, 12, 16, 20 and 27, Kihei, Maui, Hawaii

Dear Mr. Shinyama:

Thank you for your letter dated March 24, 2005, providing us with your comments on the proposed project. Our client, Towne Development of Hawaii, Inc., will have its electrical engineer contact your office to discuss electrical needs for the project, as noted in your previous comments.

Should you have any questions, please feel free to contact me at 244-2015.

Very truly yours,

Karlynn Kawahara, Planner

KK:yp
cc: Takeshi Matsukata, Towne Development of Hawaii, Inc.
Warren Unemori, Warren S. Unemori Engineering, Inc.
Michael Foley, Department of Planning
TowneDev\NSCollmeco.res

305 High Street, Suite 104 Wailuku, Hawaii 96793 ph: (808)244-2015 fax: (808)244-8729 planning@mhinconline.com

References

References

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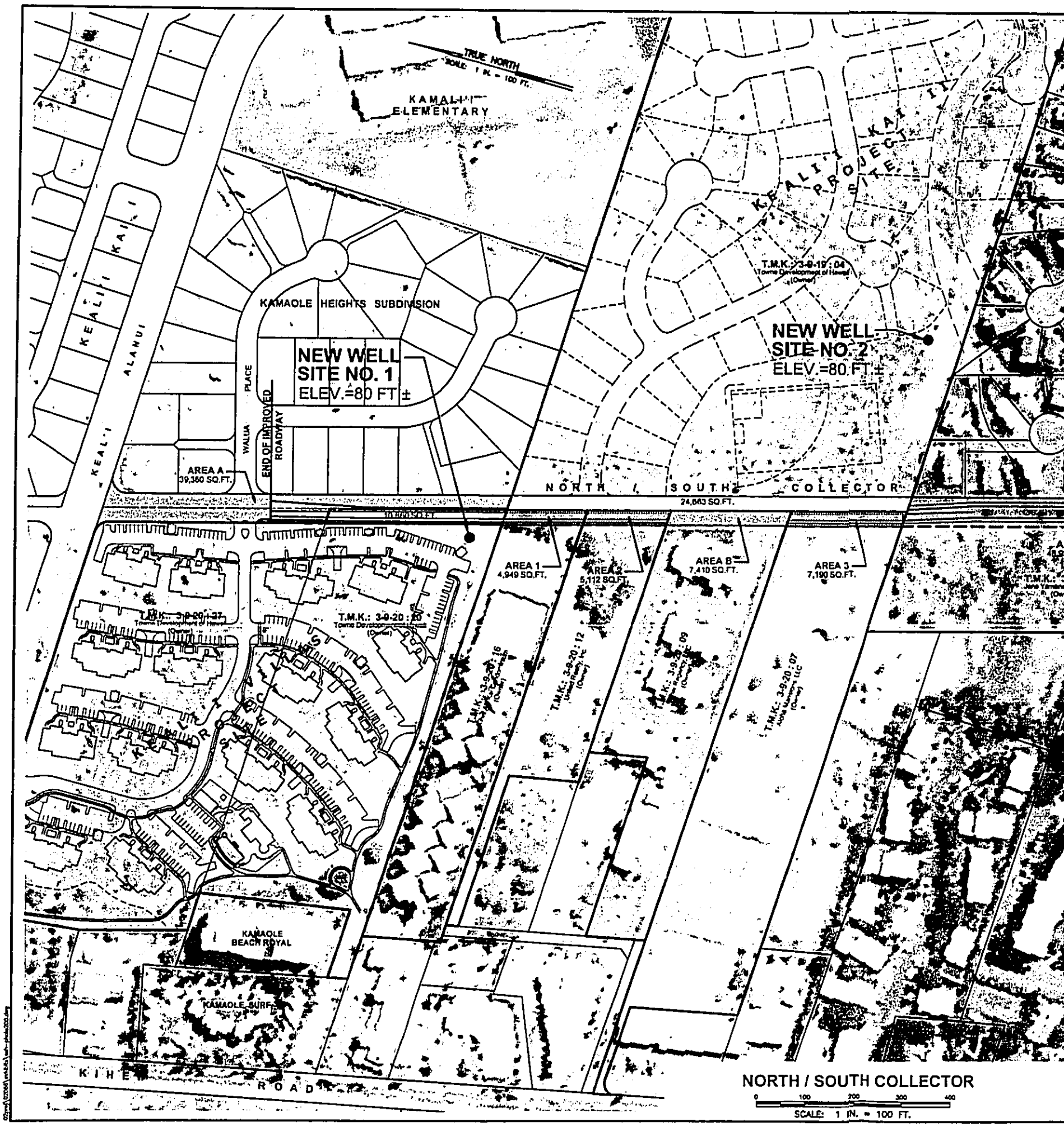
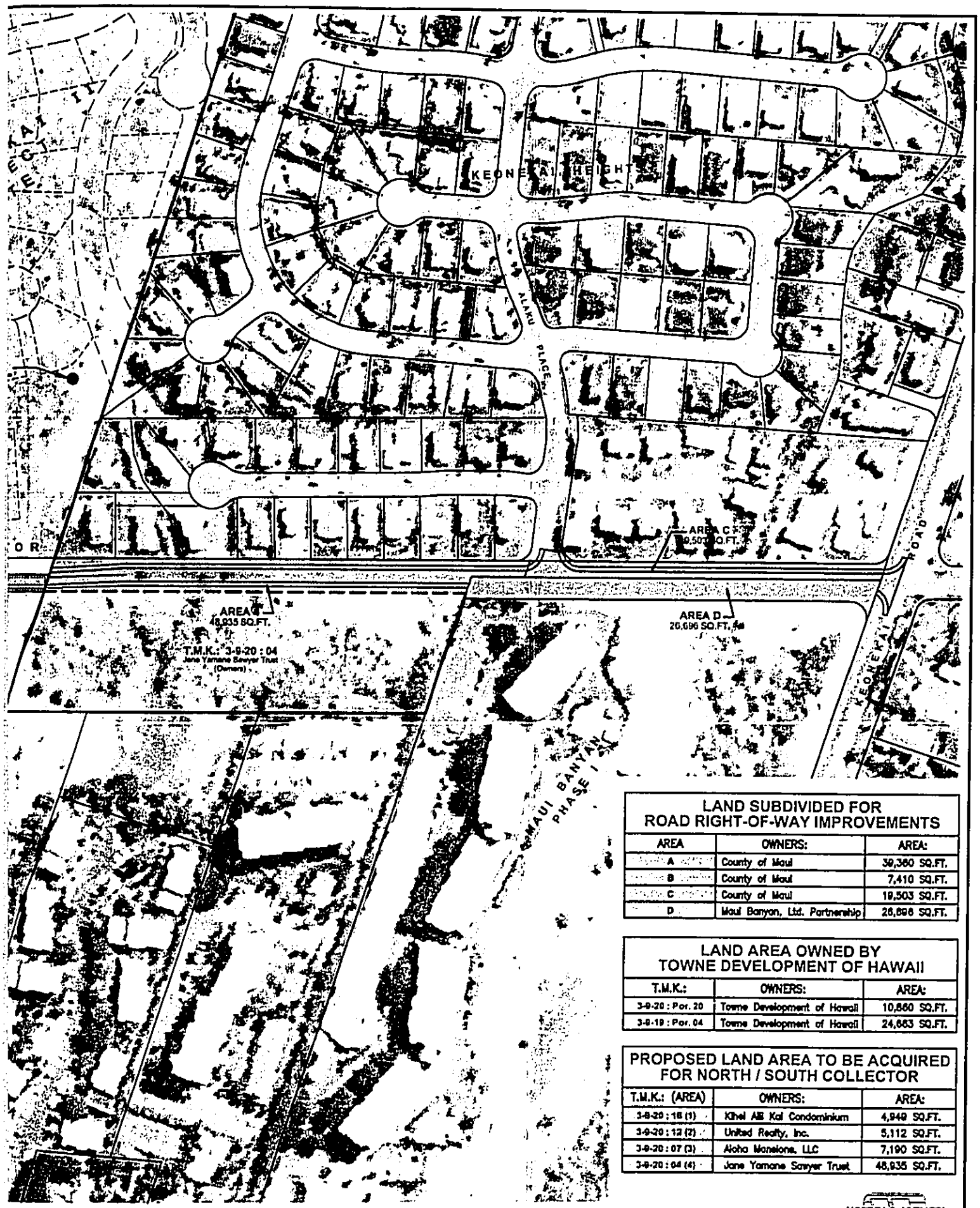
Appendices

Appendix A

Right-of-Way Concept Map


TRUE NORTH
SCALE: 1 IN. = 100 FT.
KAMALII ELEMENTARY
KEALII KAI
KEALII PROJECT SITE
KAMAOLE HEIGHTS SUBDIVISION
NEW WELL SITE NO. 1
ELEV.=80 FT ±
NEW WELL SITE NO. 2
ELEV.=80 FT ±
T.M.K.: 3-9-19 : 04
(Owner)
ALANUI
PLACE
WALUA
END OF IMPROVED ROADWAY
AREA A
39,360 SQ.FT.
NORTH / SOUTH COLLECTOR
24,663 SQ.FT.
AREA 1
4,949 SQ.FT.
AREA 2
5,112 SQ.FT.
AREA B
7,410 SQ.FT.
AREA 3
7,190 SQ.FT.
T.M.K.: 3-9-20 : 37
T.M.K.: 3-9-20 : 20
T.M.K.: 3-9-20 : 16
T.M.K.: 3-9-20 : 12
T.M.K.: 3-9-20 : 09
T.M.K.: 3-9-20 : 07
KAMAOLE BEACH ROYAL
KAMAOLE SURF
KIHEI ROAD
NORTH / SOUTH COLLECTOR
0 100 200 300 400
SCALE: 1 IN. = 100 FT.



LAND SUBDIVIDED FOR ROAD RIGHT-OF-WAY IMPROVEMENTS

AREA	OWNERS:	AREA:
A	County of Maui	39,360 SQ.FT.
B	County of Maui	7,410 SQ.FT.
C	County of Maui	19,503 SQ.FT.
D	Maui Banyan, Ltd. Partnership	26,696 SQ.FT.

LAND AREA OWNED BY TOWNE DEVELOPMENT OF HAWAII

T.M.K.:	OWNERS:	AREA:
3-9-20 : Por. 20	Towne Development of Hawaii	10,860 SQ.FT.
3-9-19 : Por. 04	Towne Development of Hawaii	24,883 SQ.FT.

PROPOSED LAND AREA TO BE ACQUIRED FOR NORTH / SOUTH COLLECTOR

T.M.K.: (AREA)	OWNERS:	AREA:
3-9-20 : 16 (1)	Kihei Alii Kai Condominium	4,949 SQ.FT.
3-9-20 : 12 (2)	United Realty, Inc.	5,112 SQ.FT.
3-9-20 : 07 (3)	Aloha Mansions, LLC	7,190 SQ.FT.
3-9-20 : 04 (4)	Jane Yamane Sawyer Trust	48,935 SQ.FT.

WARREN S. UNEMORI ENGINEERING, INC.

January 6, 2004

WSUE / 02068

Appendix B

Facsimile Memo to State Historic Preservation Division, Dated November 20, 2004

ARCHAEOLOGICAL SERVICES HAWAII, LLC.,
16 S. Market St. Ste. G; Wailuku, Hi; 96793
Ph.808-244-2012; Fx.808-244-9592

20 November 04

Dr. Melissa Kirkendall
SHPD-Maui Office

FASCIMILE TRANSMISSION

Subject: SHPD requirements for the North-South Collector Road between Keonekai Road and Ke Alii Alanui

Dear Melissa,

Please be advised that Towne Realty of Hawaii is trying to ascertain the archaeological requirements for the above section of road which bounds the future developments of Ke Alii Kai II Subdivision (TMK 3-9-19:4), and Ke Alii Kai Villas (3-9-20: 20 and 27) in central Kihei. The above referenced area has been previously graded and is improved in some sections. The entire route will be developed during the construction of the two housing developments, and Towne Realty is seeking direction on this route from SHPD.

Presently, the section of the north-south collector road from Ke Alii Alanui just past Walua Place (designated section 1) has been developed (see pink shading on attached map and photo). The next section (section 2) of road just past Walua Place to Alaku Place is not improved but graded (see blue shading on attached map and photos). The graded surface appears to be a very rocky silty clay with evidence of "blue rock outcrop". Sand has been noted in the area but appears to be primarily Aeolian deposited sand. Intact dune deposits if present should be much closer to the shoreline, perhaps within the Ke Alii Kai Villas project area. The last segment of road, (section 3) from Alaku Place to Keonekai Road has been graded and paved (see pink shading and photos).

Due to the above circumstances, the appropriate form of mitigation for the unimproved/graded portions of the north-south collector road would appear to be monitoring. Please advise in writing if SHPD would concur. For your information, a Monitoring Plan has been prepared and submitted to SHPD for the above referenced housing projects (Ke Alii Kai II and Ke Alii Kai Villas).

Thank you very much for your consideration, and please call me with any questions and or comments.

Sincerely

Lisa Rotunno-Hazuka
Consulting Archaeologist

Appendix C

Letters from State Historic Preservation Division Regarding Ke Ali`i Kai II Subdivision, Dated April 30, 2004 and December 7, 2004

3-9-19:4

LINDA LINGLE
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

HISTORIC PRESERVATION DIVISION
KAKUHIHEWA BUILDING, ROOM 555
601 KAMOKILA BOULEVARD
KAPOLEI, HAWAII 96707

April 30, 2004

Mr. Michael Foley, Planning Director
County of Maui
Department of Planning
250 South High Street
Wailuku, Hawaii 96793

LOG NO: 2004.1356
DOC NO: 0404CD73

Dear Mr. Foley,

SUBJECT: **Chapter 6E-42 Historic Preservation Review – Draft Environmental Assessment Prepared In Support of the Special Management Area Use Permit the Proposed Ke Alii Kai II Subdivision (Subject I.D.: EA 2004/0001 and SM1 2003/0013) [County/Planning]**
Kama`ole Ahupua`a, Wailuku District, Island of Maui
TMK: (2) 3-9-019:004

Thank you for the opportunity to review and comment on the Draft Environmental Assessment Prepared in Support of the Application for Special Management Area Use Permit (SMA) the proposed Ke Alii Kai II Subdivision, which was received by our staff March 22, 2004. Based on the submitted SMA, we understand the proposed undertaking consists of the development of a 90-lot subdivision on a 28.57-acre lot in Kihei which is currently vacant. Based on the description of the vegetation present on the lot (kiawe trees and scrub vegetation), it appears that the subject property has undergone previous grading and grubbing activities.

In 1991 the Bishop Museum conducted an archaeological inventory survey of the subject property (*Archaeological Inventory Survey of Proposed Kihei Elementary School Site Lots 1 and 2, Kama`ole, Wailuku, Maui Island.* Hurst et al. 1991). During the survey nine historic sites were identified including a platform, L-shape shelter, modified outcrop, rock mounds, terrace, an historic wooden structure, rock walls, and a shrine. While all sites were deemed significant, only the shrine (SIHP No. 50-50-14-2839) was recommended for preservation, and the report further recommended archaeological monitoring during any construction activities. To date, we have not received any preservation or monitoring plans pertaining to this property.

We have previously commented on the Special Management Area Use Permit for the proposed undertaking. At that time we recommend that no action be taken on the subject SMA application until an archaeological field inspection had been conducted of the proposed project area to determine whether the previously identified significant historic sites are still present and, if so, what their condition is (SHPD DOC NO.: 0309CD14/LOG NO.: 2003.1705).

On September 29, 2003, Archaeological Services Hawaii conducted the requested field inspection. Based on the findings of the field inspection we now understand there was no evidence of SIHP -2840 thru -2844 as these sites may have been impacted or removed within the last ten years. SIHP -2839, the shrine, appears to have been destroyed during the construction of Alanui Ke Alii Drive and/or Kamalii Elementary School. The remaining ground surface has been extensively disturbed.

Given the above information, we understand there are no historic sites currently located on the subject property nor is it likely that remnant historic sites are still present. Thus, we believe there will be "no historic properties affected" by the proposed undertaking.

If you have any questions, please call Cathleen A. Dagher at 692-8023.

Aloha,

P. Holly McEldowney

P. Holly McEldowney, Administrator
State Historic Preservation Division

CD:jan

c: Cultural Resources Commission, Planning Dept, 250 S. High Street, Wailuku, HI 96793

MAY - 3 2004

3-9-19:4

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

HISTORIC PRESERVATION DIVISION
KAKUHIHEWA BUILDING, ROOM 555
601 KAMOKILA BOULEVARD
KAPOLEI, HAWAII 96707

December 7, 2004

Jeffrey Pantaleo
Archaeological Services Hawai'i, LLC
16 South Market Street, Suite G
Wailuku, Hawai'i 96793

Log No: 2004.3532
Doc No: 0412MK07

Dear Mr. Pantaleo:

SUBJECT: **Chapter 6-E-42 Historic Preservation Review of an Archaeological Monitoring Plan in Support of an Environmental Assessment Prepared in Support of the Special Management Area Use Permit for the Proposed Ke Ali'i Kai Subdivision (Subject I.D.: EA 2004/0001 and SM1 2003/0013) [County/Planning]**
Kama'ole ahupua'a, Wailuku District, Island of Maui
TMK (2) 3-9-019: 004

Thank you for the opportunity to review this plan which was received at our office on October 18, 2004 (Rotunno-Hazuka and Pantaleo 2004, *Archaeological Monitoring Plan for the Development of Ke Ali'i Kai II Subdivision at TMK 3-9-019: 20 & 27, Kama'ole Ahupua'a; Wailuku District; Island of Maui.* Archaeological Services Hawaii, LLC, ms.). We have previously provided comments on the above action (Log 2004.1356/Doc 0404CD73) and recommended archaeological monitoring during all ground disturbing activities, as the parcel is located in an area known to contain sand deposits.

In 1991, Bishop Museum conducted an archaeological inventory survey on the subject property (Hurst *et al.* 1991). Nine historic properties were identified, including a platform, L-shape shelter, modified outcrop, rock mounds, terrace, a historic wooden structure, rock walls, and a shrine. The sites were given the Statewide Inventory of Historic Places (SIHP) numbers 50-50-10-2632, -2633, -2634, -2636, -2637, -2840 through -2844.

Archaeological Services Hawaii conducted a field inspection on September 29, 2003 and found no evidence of SIHP Nos. -2840-2844. These sites may have been impacted or removed within the last ten years. SIHP -2839, a shrine, initially recommended for preservation, also appears to have been destroyed during the construction of Alanui Ke Ali'i Drive and/or Kamali'i Elementary School. The remaining ground surface of the subject parcel has been extensively disturbed.

The submitted plan conforms with State Historic Preservation Division (SHPD) guidelines governing standards for monitoring and includes the following provisions. An archaeologist will be on site on a full-time basis and will have the authority to halt excavation in the event that cultural materials are identified. Consultation with Maui SHPD will occur in this event, to determine acceptable course of action. If human burials are identified, work will cease, the SHPD Burial Sites Program, Maui SHPD, O'ahu SHPD and the Maui/Lana'i Islands Burial Council will be notified, and compliance with procedures outlined in Chapter 6E-43.6, Hawaii Revised Statutes will be followed. Coordination meetings with the construction crew will be held prior to project initiation. The plan further indicates that an acceptable report will be submitted to this office within 180 days of project completion.

Please notify our Maui and O'ahu offices, via facsimile, at onset and completion of the project and monitoring program.

The plan is acceptable. If you have any questions, please contact Dr. Melissa Kirkendall at 243-5169.

Aloha,

Melanie A. Chinen, Administrator
State Historic Preservation Division

MK: slc

c: Bert Ratte, DPWEM, County of Maui
Michael Foley, Director, Dept of Planning, 250 S. High Street, Wailuku, HI 96793
Maui Cultural Resources Commission, Dept. of Plng, 250 S. High Street, Wailuku, HI 96793
Jeffrey Pantaleo, Principal Investigator, ASH, LLC, FAX 837-01313
Chair, Maui/Lana'i Islands Burial Council
Kana'i Kapeliela, Burial Sites Program

Appendix D

Preliminary Engineering Report

Established 1969

Preliminary Engineering Report

For the

Extension of North/South Collector Rd. Between Walua Place and Keonekai Rd.

Kihei, Maui, Hawaii

Prepared For:

Towne Development of Hawaii, Inc.
200 South King Street, Suite 1270
Honolulu, Hawaii 96813

WARREN S. UNEMORI
LICENSED PROFESSIONAL ENGINEER
NO. 1569-C
HAWAII, U.S.A.

Warren S. Unemori Engineering, Inc.
Civil and Structural Engineers - Land Surveyors
2145 Wells Street, Suite 403
Wailuku, Hawaii 96793

Date: February 2005

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TABLE OF CONTENTS

I. INTRODUCTION 1

II. DESCRIPTION OF PROJECT 1

III. EXISTING INFRASTRUCTURE

3.1 Water System 2

3.2 Sewer System 2

3.3 Drainage 2

3.4 Roadway 3

3.5 Electrical and Telephone 3

IV. PROBABLE INFRASTRUCTURAL IMPROVEMENTS

4.1 Water System 3

4.2 Sewer System 3

4.3 Drainage 4

4.4 Electrical and Telephone 4

4.5 Roadway 4

EXHIBITS

Figure 1 Location Map
Figure 2 Typical Roadway Section (Station 0+00 to 13+50)
Figure 3 Typical Roadway Section (Station 13+50 to 29+00)
Figure 4 Flood Insurance Rate Map

APPENDIX A: Preliminary Drainage Report

PRELIMINARY ENGINEERING REPORT
FOR THE
EXTENSION OF NORTH/SOUTH COLLECTOR ROAD
BETWEEN WALUA PLACE AND KEONEKAI ROAD

I. INTRODUCTION

Towne Development is developing a 90 lot single-family subdivision on TMK (2) 3-9-19:04 between Kanakanui Road and the N/S Collector Road corridor. They are also developing a 144 unit condominium project on TMK (2) 3-9-20:parcels 10 and 27 located west (makai) of the N/S Collector Road corridor.

In order to mitigate the traffic concerns expressed by the community, Towne has graciously agreed to construct the N/S Collector Road between Walua Place and Keonekai Road to the standards described in Section II, which follows (see Figure 1 – Location Map).

II. DESCRIPTION OF PROJECT

The proposed project will be approximately 2,900 feet in total length, generally running north to south. The first section between Walua Place (Station 0+00) and the south boundary of Ke Ali'i Subdivision No. 2 (Station 13+50±) will be constructed to the full width as indicated in Figure 2. The portion between Station 13+50 and Keonekai Road will be improved to a lesser standard as agreed to by the County and illustrated in Figure 3.

III. EXISTING INFRASTRUCTURE

3.1 Water System:

The 16-inch Kihei low-level transmission line for South Maui is located on the makai (west) side of the proposed 60 foot wide right-of-way for the project.

3.2 Sewer System:

A new 8-inch sewer gravity line will be installed between Walua Place and the northwest access point for Ke Ali'i Subdivision No. 2 to serve the latter. There also is an 8-inch sewer line between Alaku Place and Keonekai Road that serves the residences located above the North\South Roadway corridor.

3.3 Drainage:

There are two drainage gullies that presently convey offsite runoff across the proposed roadway corridor. The first gully crosses at Station 16+25± and has a 100-year runoff of around 600 cfs[6]. The second gully, referred to as Liilioholo Gulch, is located at Station 26+50, 250 feet north of Keonekai Road. This gully has a projected 100-year flow of 4,200 cfs[6]. There also is an existing 24 diameter drain line that conveys runoff from Alaku Road to Liilioholo Gulch.

3.4 Roadway:

Piilani Highway is the main north/south arterial linking Kihei and Wailea to other urban areas of Maui. This highway was recently widened to four lanes. Kihei Road, which follows a more coastal route, parallels Piilani Highway. Ke Ali'i Alanui and Keonekai Road serve as east/west connectors between these two north/south roads. The proposed project is also oriented in the north/south direction and is located approximately midway between Piilani Highway and Kihei Road. When completed, it will provide another north/south roadway link between Ke Ali'i Alanui and Keonekai Road. This road is expected to help mitigate traffic conditions through the commercial area on South Kihei Road.

3.5 Electrical and Telephone:

There are no electrical or telephone lines within project limits that we are aware of.

IV. PROBABLE INFRASTRUCTURAL IMPROVEMENTS

4.1 Water System:

Approximately 1,350 feet of existing 16-inch waterline will be affected by the project and will have to be replaced in order to make it conform to DWS construction standards.

4.2 Sewer System:

Since this is a roadway project, no sewer improvements will be required.

4.3 Drainage System:

Catch basins will be installed at the sag point of the roadway at Station 1+50 and connected to the existing storm drainage system on Walua Place.

A 71"x103" structural plate pipe culvert will be installed at Station 16+25± to convey offsite runoff in the unnamed gully across the new road. Catch basins and drain line will be installed between Stations 10+00 and 20+00 to convey road runoff into this gully to maintain its present pattern of flow. Runoff from the roadway north of Alaku Place will be intercepted by catch basins and directed into the existing drain line on Alaku Place.

A concrete ford, similar to the structure upstream on Kanakanui Road, will be constructed at the Liilioholo Gulch crossing. This will be a temporary structure. It will eventually be replaced by a box culvert or conspan to be installed by developers of the adjoining undeveloped parcels or the County of Maui.

4.4 Electrical and Telephone:

There will be no need for electrical or telephone lines to be installed by the developers for the project.

4.5 Roadway

As described in Section II above, the road improvements will consist of improvements shown on Figures 2 and 3.

EXHIBITS

1. Location Map
2. Typical Roadway Section (Sta. 0+00 to 13+50)
3. Typical Roadway Section (Sta. 13+50 to 29+00)
4. Flood Insurance Rate Map

02051/reports/drainage/loc-map00.dwg

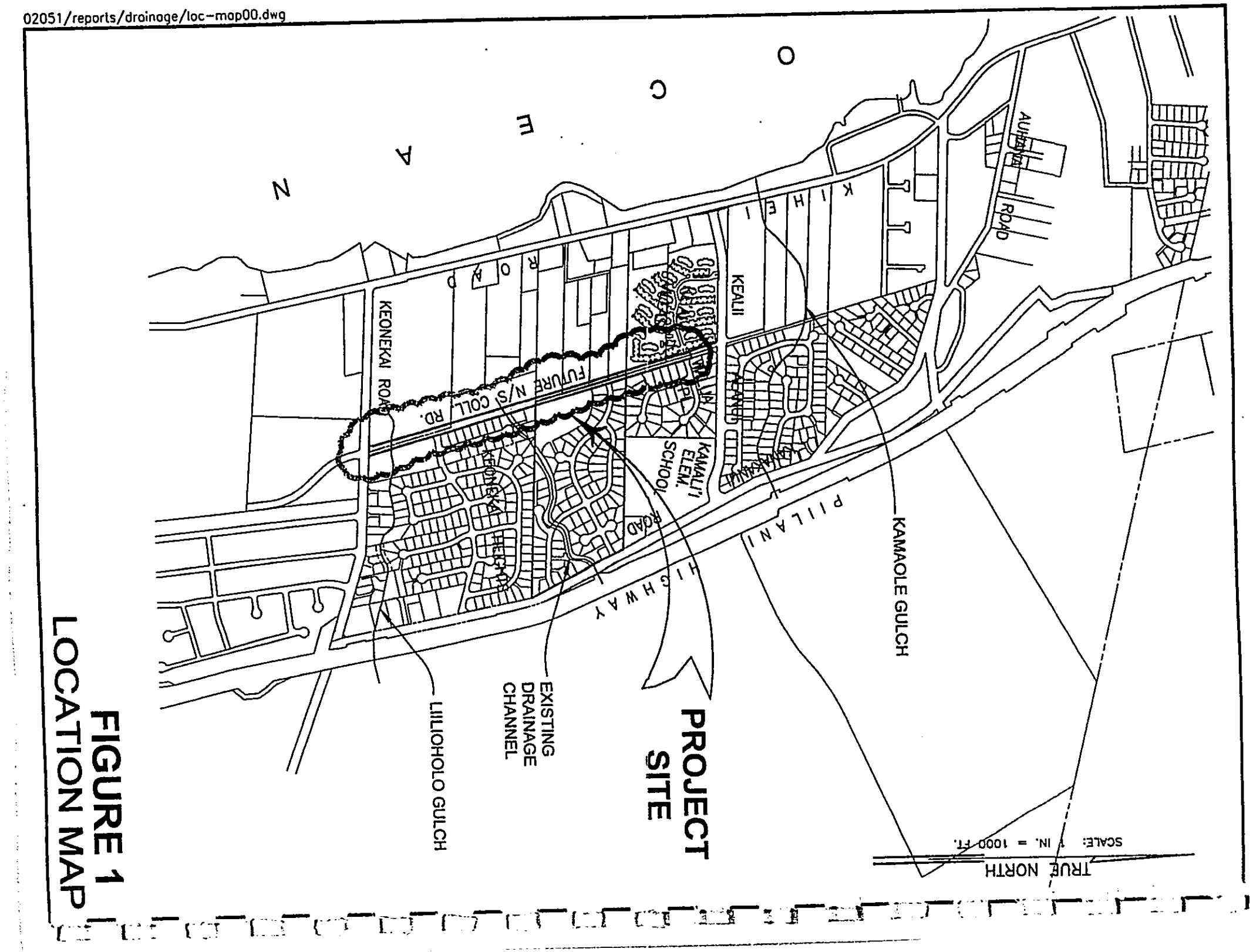
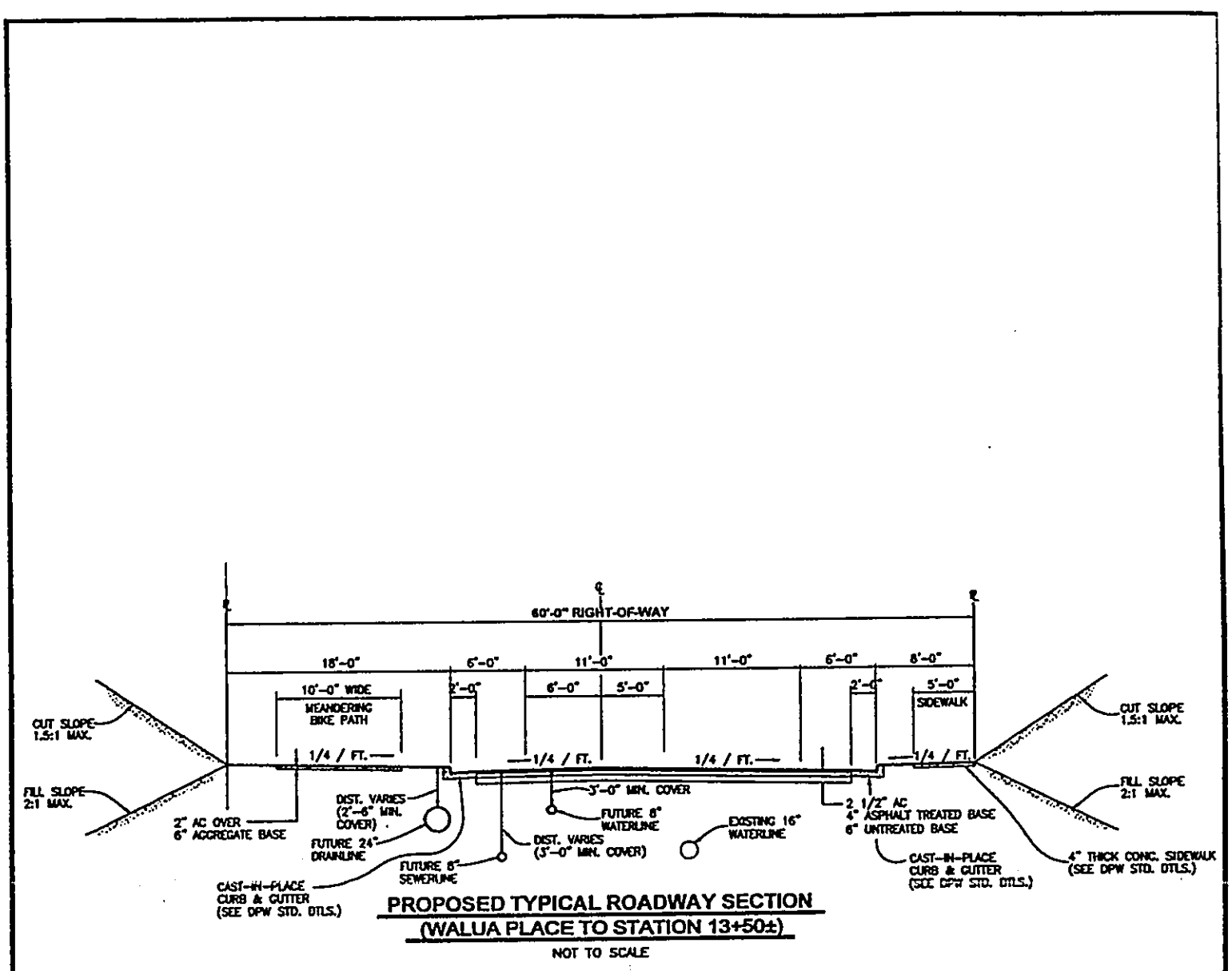


FIGURE 1
LOCATION MAP



PROPOSED TYPICAL ROADWAY SECTION
(WALUA PLACE TO STATION 13+50±)
NOT TO SCALE

FIGURE 2
TYPICAL ROADWAY SECTION
WALUA PLACE TO STATION 13+50

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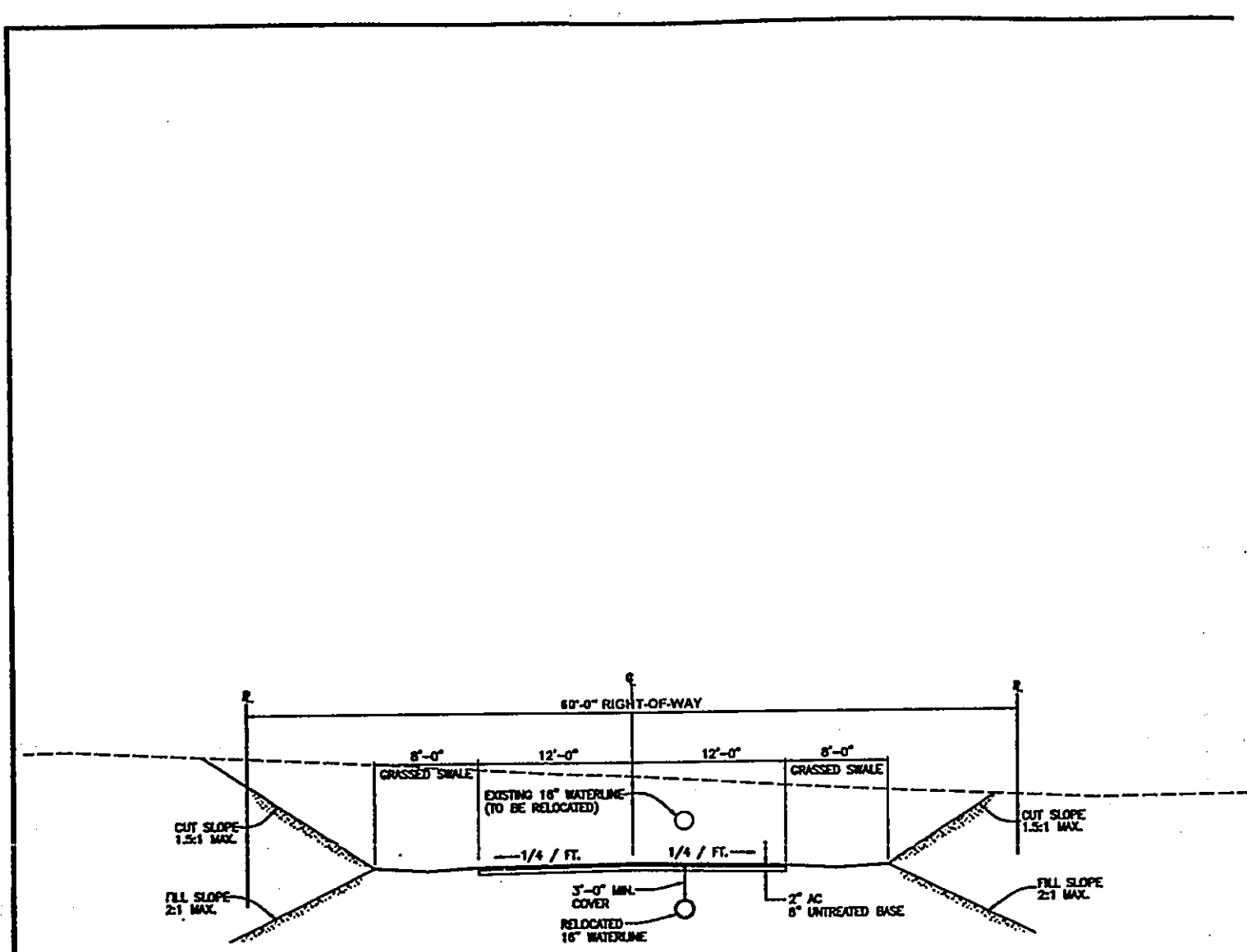

PROPOSED TYPICAL ROADWAY SECTION
(STATION 13+50± TO 29+00±)
NOT TO SCALE

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FIGURE 3
TYPICAL ROADWAY SECTION
STATION 13+50 TO 29+00

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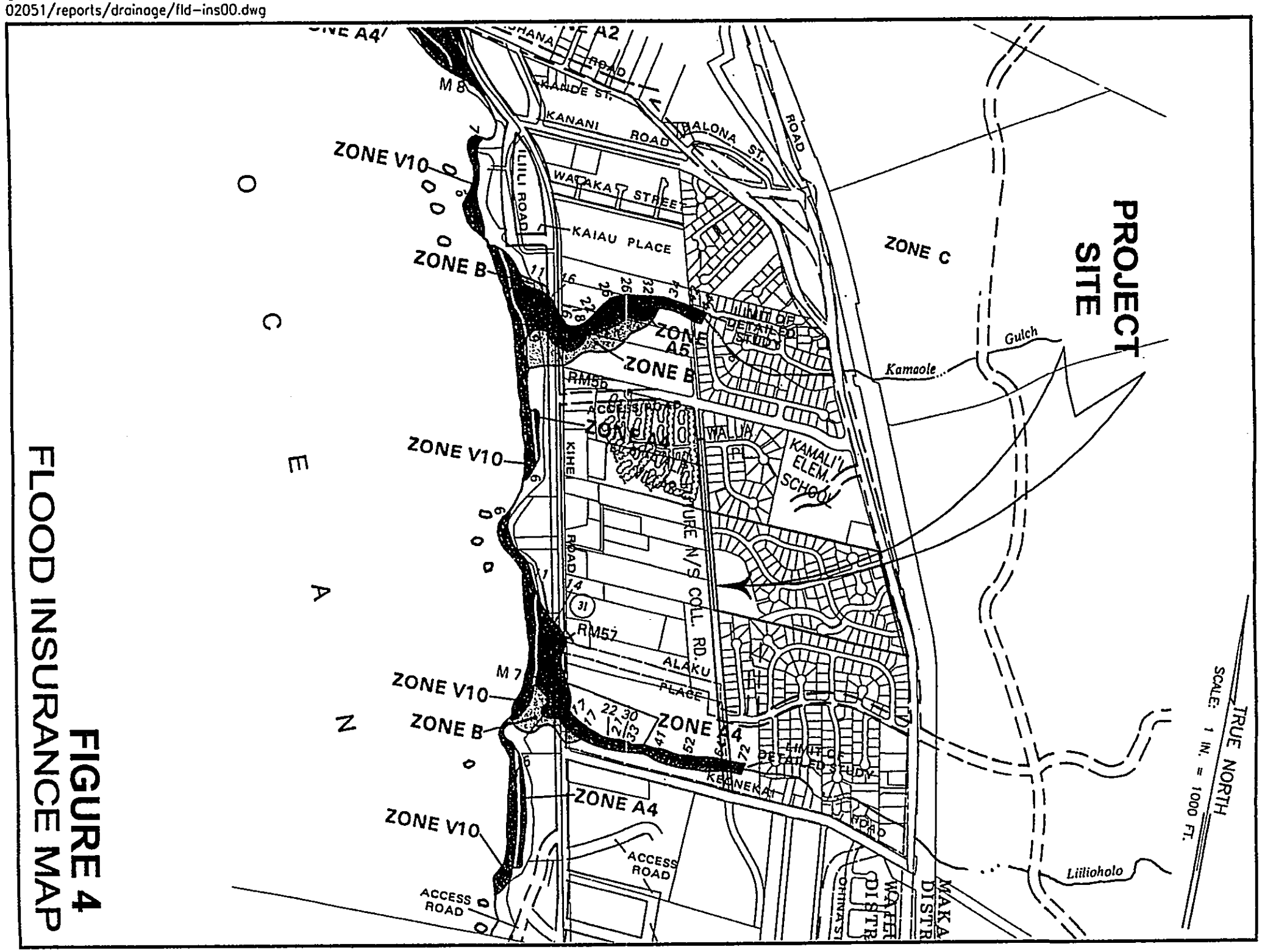


FLOOD INSURANCE MAP

FIGURE 4

APPENDIX A

Preliminary Drainage Report

Established 1969

Preliminary Drainage Report

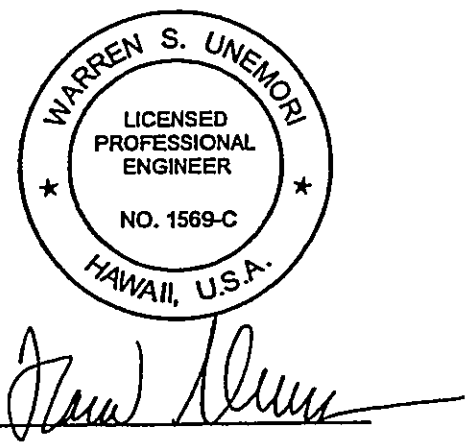
For the

Extension of North/South Collector Rd. Between Walua Place and Keonekai Rd.

Kihei, Maui, Hawaii

Prepared For:

Towne Development of Hawaii, Inc.
200 South King Street, Suite 1270
Honolulu, Hawaii 96813



Warren S. Unemori Engineering, Inc.
Civil and Structural Engineers - Land Surveyors
2145 Wells Street, Suite 403
Wailuku, Hawaii 96793

Date: February 2005

TABLE OF CONTENTS

		Page
I.	INTRODUCTION	1
II.	PROPOSED PROJECT	
	A. Project Location	1
	B. Project Description	1 - 2
III.	EXISTING CONDITIONS	
	A. Flood and Tsunami Hazards	2
	B. Topographic and Soil Conditions	2 - 3
	C. Existing Drainage Conditions	3
	D. Conclusion	4
IV.	REFERENCES	5

EXHIBITS

Figure 1 Location Map
Figure 2 Site Specific Soil Classification Map
Figure 3 Flood Insurance Rate Map
Figure 4 Map of Drainage Areas along Project Corridor

APPENDIX A: Pre- vs. Post-Development Onsite Runoff Calculations as shown on Table 1

Preliminary Drainage Report
for the
Extension of North/South Collector Road
Between Walua Place and Keonekai Road

I. INTRODUCTION

This report discusses existing drainage conditions and proposed drainage improvements for the proposed roadway project.

II. PROPOSED PROJECT

A. Project Location:

The project is located approximately midway between Piilani Highway and Kihei Road, beginning at Walua Place at the north end and terminating at Keonekai Road on the south side. The project right-of-way will be 60 feet wide and approximately 2,900 feet long or around 4.0 acres in total.

B. Project Description:

Roadway improvements will consist of grading, asphalt paving, concrete curb, concrete sidewalks, and landscaping. Utility improvements will consist of the relocation of an existing 16-inch water line and installation of drainage facilities.

The first 1,350 feet will be fully improved with curb to curb width of 32 feet comprised of Class B pavement, two 6 feet wide bike lanes which includes the gutter, two 11 feet wide travel lanes, 5 feet wide sidewalk on the makai side and a 10 feet wide meandering bike path on the 18 feet wide shoulder on the mauka side (as shown in Figure 2 of the PER). The section of the roadway between Station 13+50 and Keonekai Road will consist of two

12 feet wide travel lanes centered within the ROW with Class B pavement and 8 feet wide grassed shoulders on each side (see Figure 3 of the PER).

Drainage improvements will consist of the installation of catch basins and short section of drain lines to convey runoff from the roadway into existing drainage systems or drainage gullies. A drainage culvert will be installed at Station 16+25 to convey offsite runoff in an unnamed gully across the new roadway. A concrete ford crossing similar to the installation on Kanakanui Road will also be installed at the Liilioholo Gulch crossing at Station 26+50.

III. EXISTING CONDITIONS:

A. Flood and Tsunami Hazards:

The project corridor is located approximately 1,800 feet inland from the shoreline. According to FEMA's Flood Insurance map of September 6, 1989, the entire project site, with the exception of the Liilioholo Gulch crossing, is designated Flood Zone C. The Liilioholo Gulch crossing is designated A4 (see Figure 3).

B. Topographic and Soil Conditions:

The cross slope of the 60 feet wide corridor varies widely between 2.0 and 10.0%. In profile, the grade varies between 0.5 and 6.0% at 60 to 80 feet above mean sea level.

The project corridor is mostly vacant and unimproved. Vegetation consists of sparse growth of grass and low brush common to other areas in South Kihei.

According to the soil survey prepared by the United States

Department of Agriculture and the University of Hawaii, the predominant soil type within the project limits is Puuone Sand PZUE[1] (see Figure 2). However, soil investigation on the adjoining Ke Ali'i Kai II Subdivision site reveals a surface layer of wind blown sand and reddish brown silty gravel over basaltic boulders. Depth to bedrock varies between one to two feet. It is reasonable to assume that similar geologic conditions exist throughout the project limits.

C. Existing Drainage Conditions:

Except for runoff in the two existing gullies mentioned earlier, most of the runoff from the adjoining mauka properties seem to be sheet flowing across the project corridor to the downstream properties. However, this flow is insignificant because most of the runoff from the developed area mauka of the proposed project corridor have their own drainage system to intercept the flow and convey it into the existing gullies. For the purpose of this report, it is assumed that runoff from the proposed roadway consists of five (5) drainage sections as shown on Table 1 below.

TABLE 1

		Q=10 yr.-1 hr. Rainfall			
Area	Location (Stations)	Pre-Dev. (cfs)	Post-Dev. (cfs)	Net Increase (cfs)	Discharge Into
A	0+00 to 4+00	0.73	1.47	+0.74	Existing Drain on Walua Place
*B	4+00 to 10+00	0.81	2.17	0.00*	KAK II Retention Basin
**C	10+00 to 20+00	1.35	2.55	+0.39	Existing Gully
D_1	20+00 to 22+50	0.33	0.53	+0.20	Existing Drain on Alaku Place to Liilioholo Gulch
D_2	22+50 to 29+00	1.91	1.79	-0.12	D_2 to Liilioholo Gulch

*The post-development runoff from Area B will be directed in the retention basin within Ke Ali'i Kai Subdivision No. 2.

**2.55-(0.81+1.35) = 0.39

D. Conclusion:

Although the post-development runoff flowing into the existing gully at Station 16+25 will be slightly more than the pre-development runoff, it is our professional opinion that runoff from the extension of the North/South Collector Road will not adversely impact the downstream properties because the flow in the existing gully was reduced by approximately 29 cfs with the construction of the retention basin in Ke Ali'i Kai Subdivision No. 2 (KAK II). Onsite runoff that previously flowed into the gully from the KAK II site will be retained onsite. Construction of the retention basin in KAK II will precede construction of this roadway project.

V:\PROJDATA\04PROJ\04109\Reports\Drainage Report\drain001.wpd

IV. REFERENCES

1. *Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii.*_August 1972. United States Department of Agriculture, Soil Conservation Service.

2. *Flood Insurance Rate Map, Maui County, Hawaii.* Community-Panel Number 150003 0170B. June 1, 1981. Federal Emergency Management Agency, Federal Insurance Administration.

3. *Rainfall Frequency Atlas of the Hawaiian Islands, Technical Paper No. 43.* 1962. U.S. Department of Commerce, Weather Bureau.

4. *Rules for the Design of Storm Drainage Facilities in the County of Maui.* July 1995. Department of Public Works and Waste Management, County of Maui.

5. *Hydrology Report for Piilani Highway proposed for Highways Division Department of Transportation.* January 1978 by Transmeridian Engineers and Surveyors, Inc. Honolulu, Hawaii.

6. *Drainage Master Plan for Kihei, Maui, Hawaii.* Prepared for the County of Maui, Department of Public Works. September 1994 by Norman Saito Engineering Consultants, Inc.

EXHIBITS

1. Location Map
2. Site Specific Soil Classification Map
3. Flood Insurance Rate Map
4. Map of Drainage Areas along Project Corridor

02051/reports/drainage/loc-map00.dwg

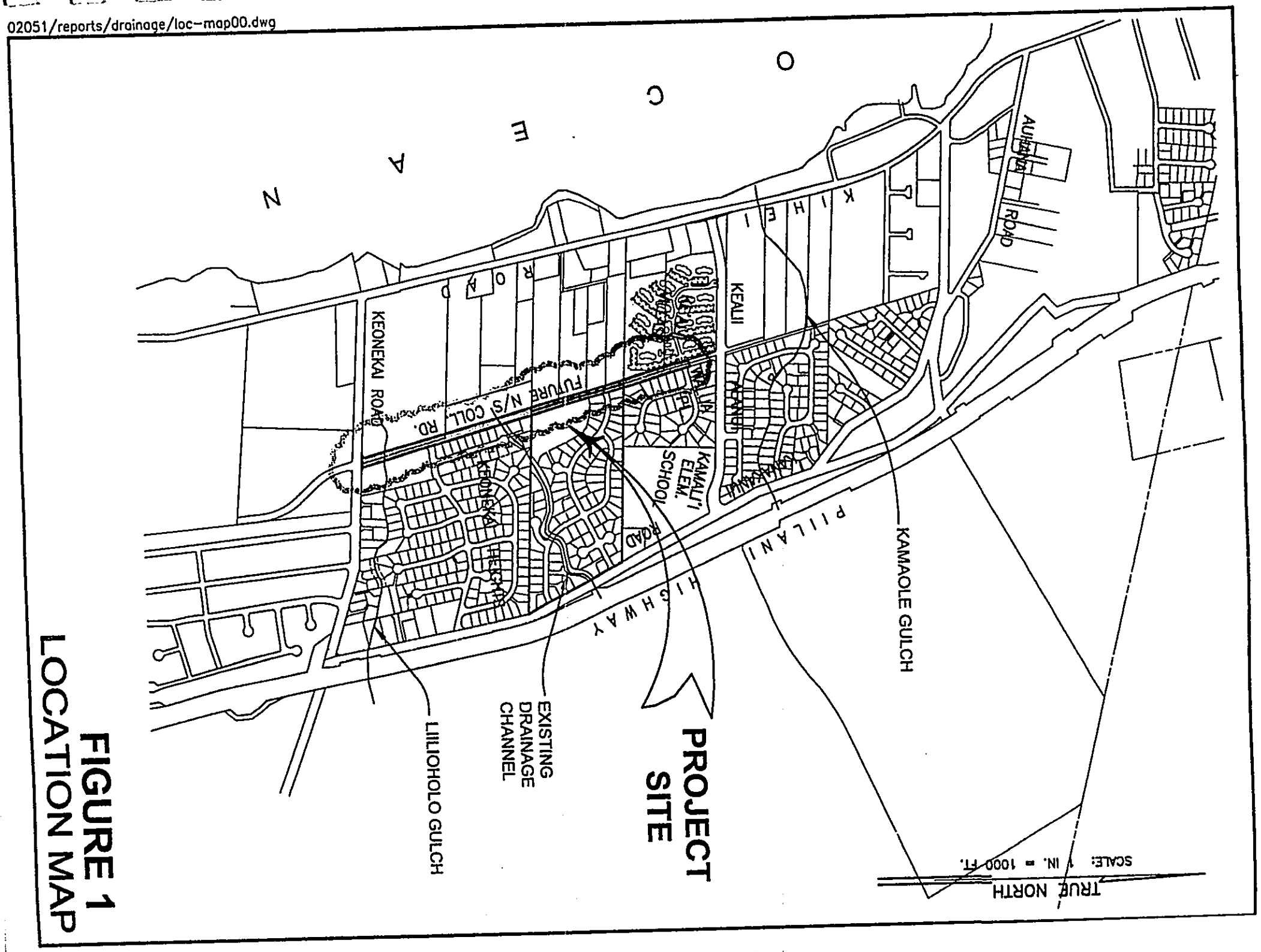


FIGURE 1
LOCATION MAP

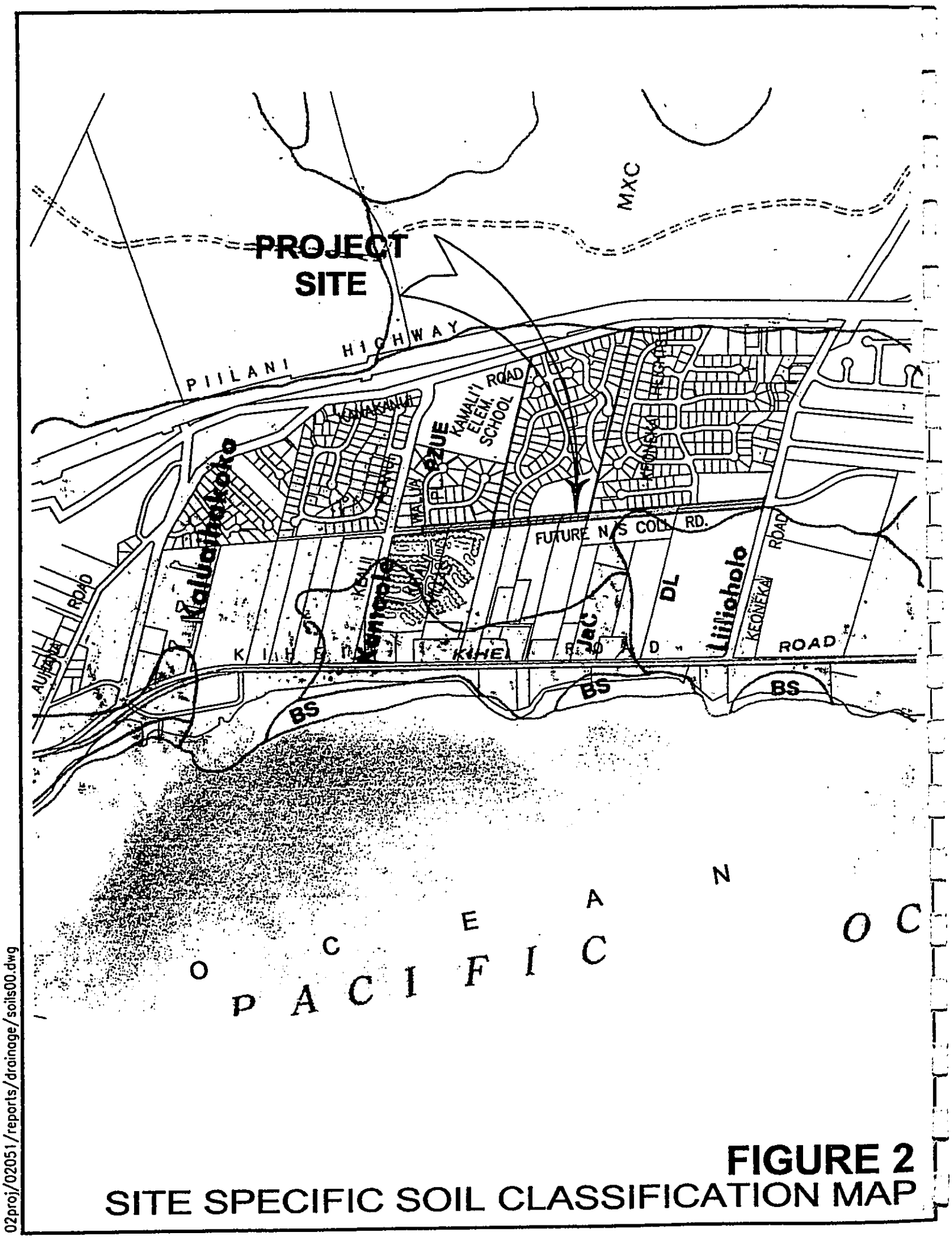


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FIGURE 2

SITE SPECIFIC SOIL CLASSIFICATION MAP

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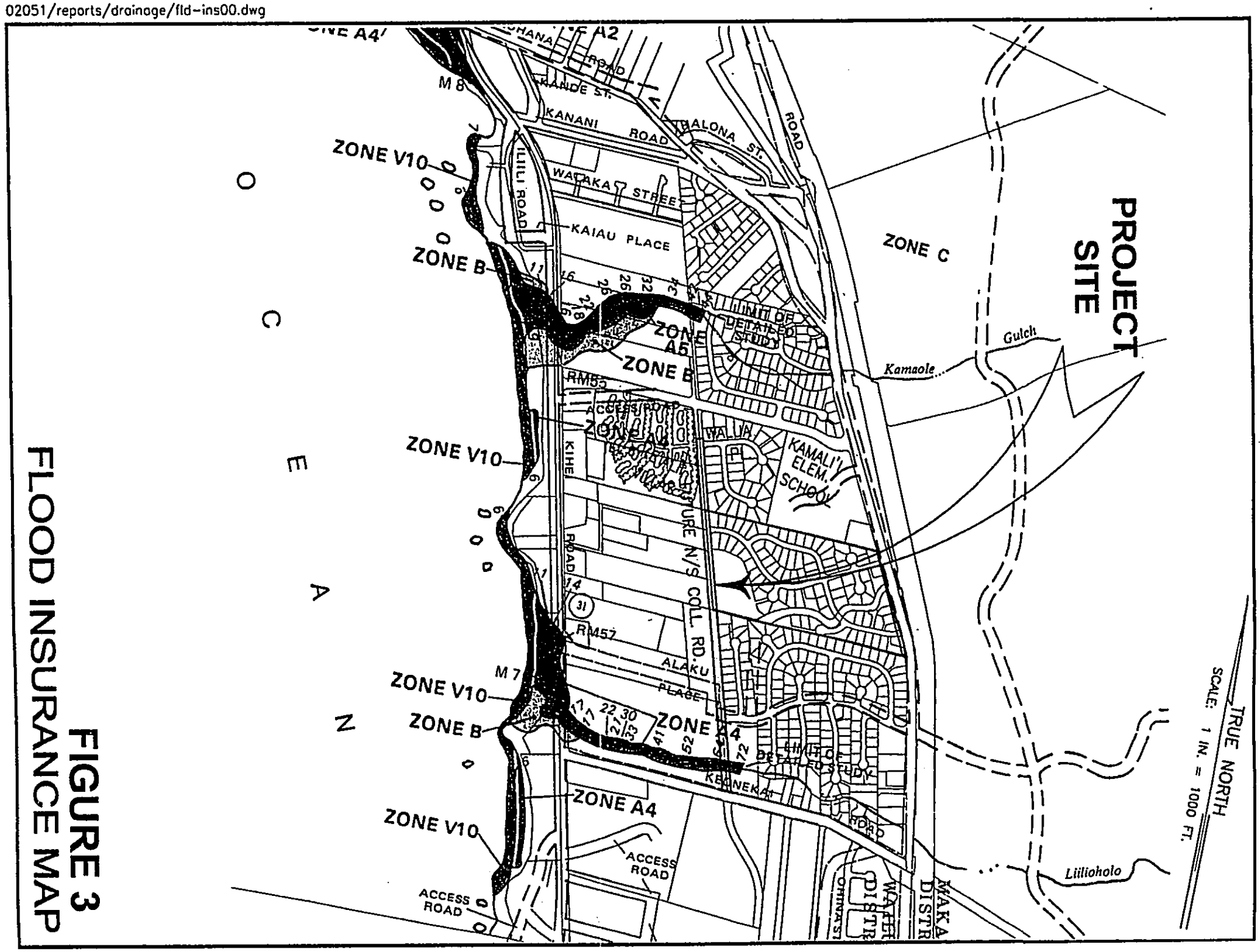
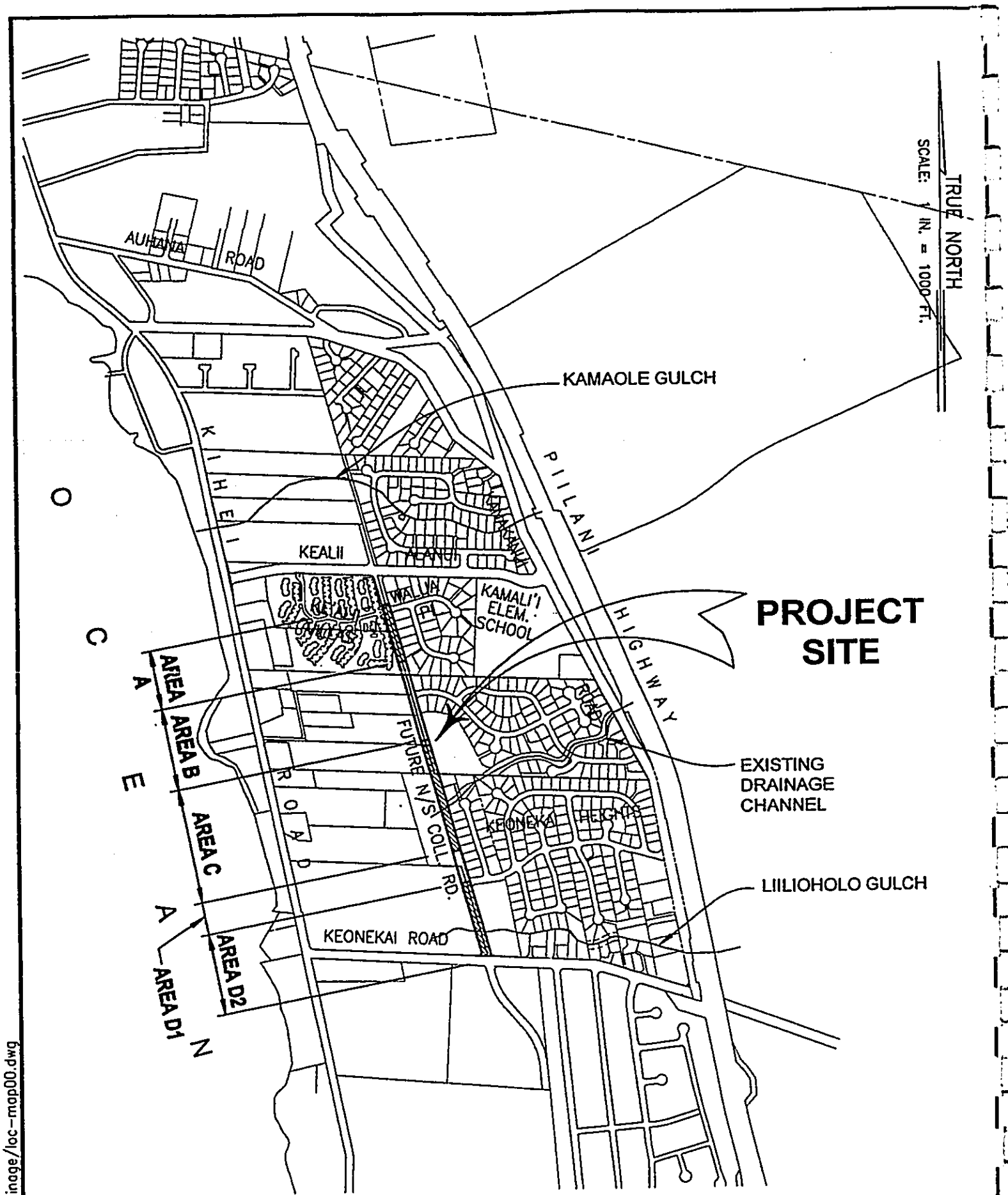


FIGURE 3
FLOOD INSURANCE MAP



02051/reports/drainage/loc-map00.dwg

FIGURE 4

MAP OF DRAINAGE AREAS ALONG PROJECT CORRIDOR

APPENDIX A

Pre- vs. Post-Development Onsite Runoff Calculations

Warren S. Unemori Engineering, Inc.
Wells Street Professional Center
2145 Wells Street , Suite 403
Wailuku, Maui , Hawaii 96793

Date: February 9, 2005

PRE-DEVELOPMENT AND POST-DEVELOPMENT ONSITE SURFACE RUNOFF

10-Yr. - 1 Hr. Rainfall:
From "Rainfall Frequency Atlas of the Hawaiian Islands", for Kihei, Maui,
R(10 Yr.-1Hr.) = 1.9 inches

Drainage Area	Pre-Development Q (cfs)	Post-Development Q (cfs)	Net Increase (cfs)
A	0.73	1.47	0.74
B	0.81	2.17	0.00*
C	1.35	2.55	1.2
D1	0.33	0.53	0.2
D2	1.91	1.79	-0.12

* Post Development Runoff between Sta 4+ 50 and Sta 10 + 50 will be directed into a retention basin located in the southwest corner of the Keali'i Kai II Subdivision.

Warren S. Unemori Engineering, Inc.
Wells Street Professional Center
2145 Wells Street , Suite 403
Wailuku, Maui , Hawaii 96793

Date: February 8, 2005

HYDROLOGIC CALCULATIONS: PRE-DEVELOPMENT

Objective: To determine the pre-development runoff for the proposed North/South Collector Road (Area A).

I. 10-Yr. - 1 Hr. Rainfall:

From "Rainfall Frequency Atlas of the Hawaiian Islands", for Kihei, Maui,
R(10 Yr.-1Hr.) = 1.9 inches

2. Total Area:

Area (Ac.):		0.58

3. Runoff Coefficents:

Infiltration:	Medium	0.07
Relief:	Rolling (5-15%)	0.03
Vegetal Cover:	High (50-90%)	0.03
Development Type:	Agricultural	0.15
Runoff Coeff't, C:		0.28

4. Time of Concentration:

Approx. Elev. Diff'l. (ft.):		6
Higher Elev. (ft.):	86	
Lower Elev. (ft.):	80	
Approx. Runoff Length (ft.):		69
Average Slope:		8.70%
Time of Concentration (min.):		7

5. Intensity:

Intensity (in./hr.):	4.5

6. Total Runoff:

Q = C x I x A (cfs):	**0.73**

Warren S. Unemori Engineering, Inc.
Wells Street Professional Center
2145 Wells Street , Suite 403
Wailuku, Maui , Hawaii 96793

Date: February 7, 2005

HYDROLOGIC CALCULATIONS: POST-DEVELOPMENT

Objective: To determine the post-development runoff for the proposed North/South Collector Road (Area A).

1. 10-Yr. - 1 Hr. Rainfall:

From "Rainfall Frequency Atlas of the Hawaiian Islands", for Kihei, Maui,
R(10 Yr.-1Hr.) = 1.9 inches

2. Total Area:

Area (Ac.):		0.58

3. Runoff Coefficents:

Area of Paved Road (Ac.):		0.47
Minimum Runoff Coeff't., C, for Asphalt Streets*:		0.95
Landscape Area (Ac.):		0.11
Infiltration:	Medium	0.07
Relief:	Rolling (5-15%)	0.03
Vegetal Cover:	High (50-90%)	0.00
Development Type:	Agricultural	0.15
Runoff Coeff't., C:		0.25
Weighted Runoff Coeff't., C:		0.82

4. Time of Concentration:

Approx. Elev. Diff'l. (ft.):		5
Higher Elev. (ft.):	83	
Lower Elev. (ft.):	78	
Approx. Runoff Length (ft.):		400
Average Slope:		1.27%
Time of Concentration (min.):		21

5. Intensity:

Intensity (in./hr.):	3.1

6. Total Runoff:

Q = C x I x A (cfs):	**1.47**

Warren S. Unemori Engineering, Inc.
Wells Street Professional Center
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Wailuku, Maui , Hawaii 96793

Date: February 8, 2005

HYDROLOGIC CALCULATIONS: PRE-DEVELOPMENT

Objective: To determine the pre-development runoff for the proposed North/South Collector Road (Area B).

I. 10-Yr. - 1 Hr. Rainfall:

From "Rainfall Frequency Atlas of the Hawaiian Islands", for Kihei, Maui,
R(10 Yr.-1Hr.) = 1.9 inches

2. Total Area:

Area (Ac.):		0.88

3. Runoff Coefficents:

Infiltration:	Medium	0.07
Relief:	Rolling (5-15%)	0.03
Vegetal Cover:	High (50-90%)	0.03
Development Type:	Agricultural	0.15
Runoff Coeff't., C:		0.28

4. Time of Concentration:

Approx. Elev. Diff'l. (ft.):		17
Higher Elev. (ft.):	91	
Lower Elev. (ft.):	74	
Approx. Runoff Length (ft.):		466
Average Slope:		3.65%
Time of Concentration (min.):		18

5. Intensity:

Intensity (in./hr.):	3.3

6. Total Runoff:

Q = C x I x A (cfs):	**0.81**

Warren S. Unemori Engineering, Inc.
Wells Street Professional Center
2145 Wells Street , Suite 403
Wailuku, Maui, Hawaii 96793

Date: February 7, 2005

HYDROLOGIC CALCULATIONS: POST-DEVELOPMENT

Objective: To determine the post-development runoff for the proposed North/South Collector Road (Area B).

1. 10-Yr. - 1 Hr. Rainfall:

From "Rainfall Frequency Atlas of the Hawaiian Islands", for Kihei, Maui,
R(10 Yr.-1Hr.) = 1.9 inches

2. Total Area:

Area (Ac.):		0.88

3. Runoff Coefficents:

Area of Paved Road (Ac.):		0.72
Minimum Runoff Coeff't., C, for Asphalt Streets*:		0.95
Landscape Area (Ac.):		0.16
Infiltration:	Medium	0.07
Relief:	Rolling (5-15%)	0.03
Vegetal Cover:	High (50-90%)	0.00
Development Type:	Agricultural	0.15
Runoff Coeff't., C:		0.25
Weighted Runoff Coeff't., C:		0.82

4. Time of Concentration:

Approx. Elev. Diff'l. (ft.):		13
Higher Elev. (ft.):	83	
Lower Elev. (ft.):	70	
Approx. Runoff Length (ft.):		586
Average Slope:		2.22%
Time of Concentration (min.):		21

5. Intensity:

Intensity (in./hr.):	3

6. Total Runoff:

Q = C x I x A (cfs):	**2.17**

Warren S. Unemori Engineering, Inc.
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2145 Wells Street , Suite 403
Wailuku, Maui , Hawaii 96793

Date: February 7, 2005

HYDROLOGIC CALCULATIONS: PRE-DEVELOPMENT

Objective: To determine the pre-development runoff for the proposed North/South Collector Road (Area C).

I. 10-Yr. - 1 Hr. Rainfall:

From "Rainfall Frequency Atlas of the Hawaiian Islands", for Kihei, Maui,
R(10 Yr.-1Hr.) = 1.9 inches

2. Total Area:

Area (Ac.):		1.38

3. Runoff Coefficents:

Infiltration:	Medium	0.07
Relief:	Rolling (5-15%)	0.03
Vegetal Cover:	High (50-90%)	0.03
Development Type:	Agricultural	0.15
Runoff Coeff't., C:		0.28

4. Time of Concentration:

Approx. Elev. Diff'l. (ft.):		16
Higher Elev. (ft.):	73	
Lower Elev. (ft.):	57	
Approx. Runoff Length (ft.):		335
Average Slope:		4.78%
Time of Concentration (min.):		15

5. Intensity:

Intensity (in./hr.):	3.5

6. Total Runoff:

Q = C x I x A (cfs):	**1.35**

Warren S. Unemori Engineering, Inc.
Wells Street Professional Center
2145 Wells Street , Suite 403
Wailuku, Maui , Hawaii 96793

Date: February 7, 2005

HYDROLOGIC CALCULATIONS: POST-DEVELOPMENT

Objective: To determine the post-development runoff for the proposed North/South Collector Road (Area C).

1. 10-Yr. - 1 Hr. Rainfall:
From "Rainfall Frequency Atlas of the Hawaiian Islands", for Kihei, Maui,
R(10 Yr.-1Hr.) = 1.9 inches

2. Total Area:

Area (Ac.):		1.38

3. Runoff Coefficents:

Area of Paved Road (Ac.):		0.72
Minimum Runoff Coeff't., C, for Asphalt Streets*:		0.95
Landscape Area (Ac.):		0.66
Infiltration:	Medium	0.07
Relief:	Rolling (5-15%)	0.03
Vegetal Cover:	High (50-90%)	0.00
Development Type:	Agricultural	0.15
Runoff Coeff't., C:		0.25
Weighted Runoff Coeff't., C:		0.62

4. Time of Concentration:

Approx. Elev. Diff'l. (ft.):		12
Higher Elev. (ft.):	70	
Lower Elev. (ft.):	59	
Approx. Runoff Length (ft.):		572
Average Slope:		2.04%
Time of Concentration (min.):		22

5. Intensity:

Intensity (in./hr.):	3

6. Total Runoff:

Q = C x I x A (cfs):	2.55

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Wailuku, Maui , Hawaii 96793

Date: February 7, 2005

HYDROLOGIC CALCULATIONS: PRE-DEVELOPMENT

Objective: To determine the pre-development runoff for the proposed North/South Collector Road (Area D1).

I. 10-Yr. - 1 Hr. Rainfall:

From "Rainfall Frequency Atlas of the Hawaiian Islands", for Kihei, Maui,
R(10 Yr.-1Hr.) = 1.9 inches

2. Total Area:

Area (Ac.):		0.28

3. Runoff Coefficents:

Infiltration:	Medium	0.07
Relief:	Rolling (5-15%)	0.03
Vegetal Cover:	High (50-90%)	0.03
Development Type:	Agricultural	0.15
Runoff Coeff't., C:		0.28

4. Time of Concentration:

Approx. Elev. Diff'l. (ft.):		6
Higher Elev. (ft.):	78	
Lower Elev. (ft.):	72	
Approx. Runoff Length (ft.):		85
Average Slope:		7.06%
Time of Concentration (min.):		8

5. Intensity:

Intensity (in./hr.):	4.2

6. Total Runoff:

Q = C x I x A (cfs):	**0.33**

Warren S. Unemori Engineering, Inc.
Wells Street Professional Center
2145 Wells Street , Suite 403
Wailuku, Maui , Hawaii 96793

Date: February 7, 2005

HYDROLOGIC CALCULATIONS: POST-DEVELOPMENT

Objective: To determine the post-development runoff for the proposed North/South Collector Road (Area D1).

1. 10-Yr. - 1 Hr. Rainfall:
From "Rainfall Frequency Atlas of the Hawaiian Islands", for Kihei, Maui,
R(10 Yr.-1Hr.) = 1.9 inches

2. Total Area:

Area (Ac.):		0.28

3. Runoff Coefficents:

Area of Paved Road (Ac.):		0.11
Minimum Runoff Coeff't., C, for Asphalt Streets*:		0.95
Landscape Area (Ac.):		0.17
Infiltration:	Medium	0.07
Relief:	Rolling (5-15%)	0.03
Vegetal Cover:	High (50-90%)	0.00
Development Type:	Agricultural	0.15
Runoff Coeff't., C:		0.25
Weighted Runoff Coeff't., C:		0.53

4. Time of Concentration:

Approx. Elev. Diff'l. (ft.):		4
Higher Elev. (ft.):	75	
Lower Elev. (ft.):	71	
Approx. Runoff Length (ft.):		170
Average Slope:		2.43%
Time of Concentration (min.):		13

5. Intensity:

Intensity (in./hr.):	3.6

6. Total Runoff:

Q = C x I x A (cfs):	**0.53**

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Wailuku, Maui , Hawaii 96793

Date: February 7, 2005

HYDROLOGIC CALCULATIONS: PRE-DEVELOPMENT

Objective: To determine the pre-development runoff for the proposed North/South Collector Road (Area D2)..

I. 10-Yr. - 1 Hr. Rainfall:

From "Rainfall Frequency Atlas of the Hawaiian Islands", for Kihei, Maui,
R(10 Yr.-1Hr.) = 1.9 inches

2. Total Area:

Area (Ac.):		1.28

3. Runoff Coefficents:

Area of Paved Road (Ac.):		0.26
Minimum Runoff Coeff't., C, for Asphalt Streets*:		0.95
Landscape Area (Ac.):		1.02
Infiltration:	Medium	0.07
Relief:	Rolling (5-15%)	0.03
Vegetal Cover:	High (50-90%)	0.00
Development Type:	Agricultural	0.15
Runoff Coeff't., C:		0.25
Weighted Runoff Coeff't., C:		0.39

4. Time of Concentration:

Approx. Elev. Diff'l. (ft.):		12
Higher Elev. (ft.):	78	
Lower Elev. (ft.):	66	
Approx. Runoff Length (ft.):		178
Average Slope:		6.74%
Time of Concentration (min.):		11

5. Intensity:

Intensity (in./hr.):	3.8

6. Total Runoff:

Q = C x I x A (cfs):	**1.91**

Warren S. Unemori Engineering, Inc.
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2145 Wells Street , Suite 403
Wailuku, Maui , Hawaii 96793

Date: February 7, 2005

HYDROLOGIC CALCULATIONS: POST-DEVELOPMENT

Objective: To determine the post-development runoff for the proposed North/South Collector Road (Area D2).

I. 10-Yr. - 1 Hr. Rainfall:

From "Rainfall Frequency Atlas of the Hawaiian Islands", for Kihei, Maui,
R(10 Yr.-1Hr.) = 1.9 inches

2. Total Area:

Area (Ac.):		1.28

3. Runoff Coefficents:

Area of Paved Road (Ac.):		0.34
Minimum Runoff Coeff't., C, for Asphalt Streets*:		0.95
Landscape Area (Ac.):		0.94
Infiltration:	Medium	0.07
Relief:	Rolling (5-15%)	0.03
Vegetal Cover:	High (50-90%)	0.00
Development Type:	Agricultural	0.15
Runoff Coeff't., C:		0.25
Weighted Runoff Coeff't., C:		0.44

4. Time of Concentration:

Approx. Elev. Diff'l. (ft.):		4
Higher Elev. (ft.):	71	
Lower Elev. (ft.):	67	
Approx. Runoff Length (ft.):		381
Average Slope:		0.99%
Time of Concentration (min.):		24

5. Intensity:

Intensity (in./hr.):	3.2

6. Total Runoff:

Q = C x I x A (cfs):	1.79

Appendix E

Acoustical Study

ACOUSTIC STUDY FOR THE NORTH-SOUTH COLLECTOR ROAD IMPROVEMENTS WALUA PLACE TO KEONEKAI ROAD KIHEI, MAUI, HAWAII

Prepared for:

TOWNE DEVELOPMENT OF HAWAII, INC.

Prepared by:

Y. EBISU & ASSOCIATES
1126 12th Avenue, Room 305
Honolulu, Hawaii 96816

FEBRUARY 2005

TABLE OF CONTENTS

CHAPTER	CHAPTER TITLE	PAGE NO.
	List of Figures	ii
	List of Tables	iv
I	SUMMARY	1
II	GENERAL STUDY METHODOLOGY	3
	Noise Measurements	3
	Traffic Noise Predictions	3
	Impact Assessments and Mitigation	12
III	EXISTING ACOUSTICAL ENVIRONMENT	14
IV	DESCRIPTION OF FUTURE TRAFFIC NOISE LEVELS	16
V	FUTURE TRAFFIC NOISE IMPACTS AND POSSIBLE NOISE MITIGATION MEASURES	19
VI	CONSTRUCTION NOISE IMPACTS	20
APPENDICES		
A	REFERENCES	23
B	EXCERPTS FROM EPA'S ACOUSTIC TERMINOLOGY GUIDE	24
C	SUMMARY OF YEAR 2003 AND YEAR 2020 TRAFFIC VOLUMES	27

LIST OF FIGURES

NUMBER	FIGURE TITLE	PAGE NO.
1	PROJECT LOCATION MAP AND NOISE MEASUREMENT LOCATIONS	2
2	NOISE RECEPTOR AND NOISE MEASUREMENT LOCATIONS	4
3	HOURLY VARIATIONS OF TRAFFIC NOISE AT 100 FT SETBACK DISTANCE FROM THE CENTERLINE OF PIILANI HIGHWAY BETWEEN KANANI AND ALANUI KE ALII ROAD (APRIL 14-15, 2003)	11
4	ANTICIPATED RANGE OF CONSTRUCTION NOISE LEVELS VS. DISTANCE	21
5	AVAILABLE WORK HOURS UNDER DOH PERMIT PROCEDURES FOR CONSTRUCTION NOISE	22

LIST OF TABLES

NUMBER	TABLE TITLE	PAGE NO.
1	TRAFFIC AND BACKGROUND NOISE MEASUREMENT RESULTS	7
2	FHWA & HDOT NOISE ABATEMENT CRITERIA	13
3	EXISTING AND FUTURE TRAFFIC NOISE LEVELS (4.92 FT RECEPTOR, PM PEAK HOUR)	15
4	FUTURE (CY 2020) TRAFFIC VOLUMES AND NOISE LEVELS ALONG VARIOUS ROADWAYS IN PROJECT ENVIRONS (PM PEAK HOUR, BUILD)	17

CHAPTER I. SUMMARY

The existing and future traffic noise levels in the environs of the proposed North-South Collector Road Project (between Walua Place and Keonekai Road) in Kihei on the island of Maui (see Figure 1) were studied to evaluate potential noise impacts associated with the Build Alternative. Noise measurements were obtained, traffic noise predictions developed, and noise mitigation measures provided as required.

Existing traffic and background ambient noise levels in the project area currently do not exceed the U.S. Federal Highway Administration (FHWA) and Hawaii State Department of Transportation, Highways Division (HDOT) noise abatement criteria. Future (CY 2020) traffic noise levels are not expected to exceed the "66 Leq" and "15 dB increase" HDOT noise abatement criteria at existing dwelling units, as well as at one planned ball field along the project corridor. No park lands or public use facilities are expected to be adversely impacted by future traffic noise levels from the proposed roadway. For these reasons, traffic noise mitigation measures should not be required.

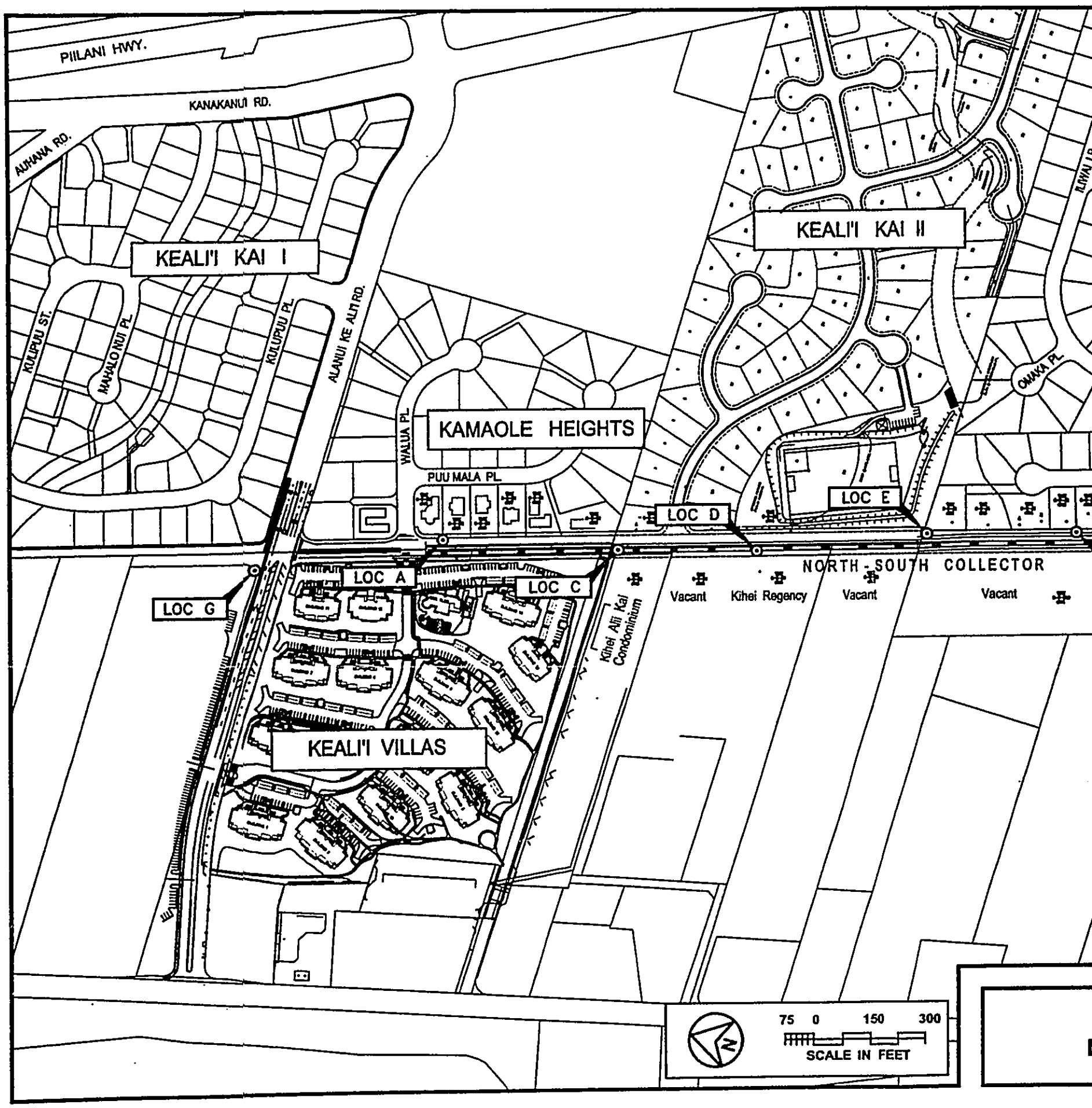
The following general conclusions can be made in respect to the number of impacted structures which can be expected by CY 2020 under the Build Alternative. These conclusions are valid for a future traffic mix of 98.8% automobiles, 1.0% medium trucks, and 0.2% heavy trucks and buses, and an average speed of 30 miles per hour.

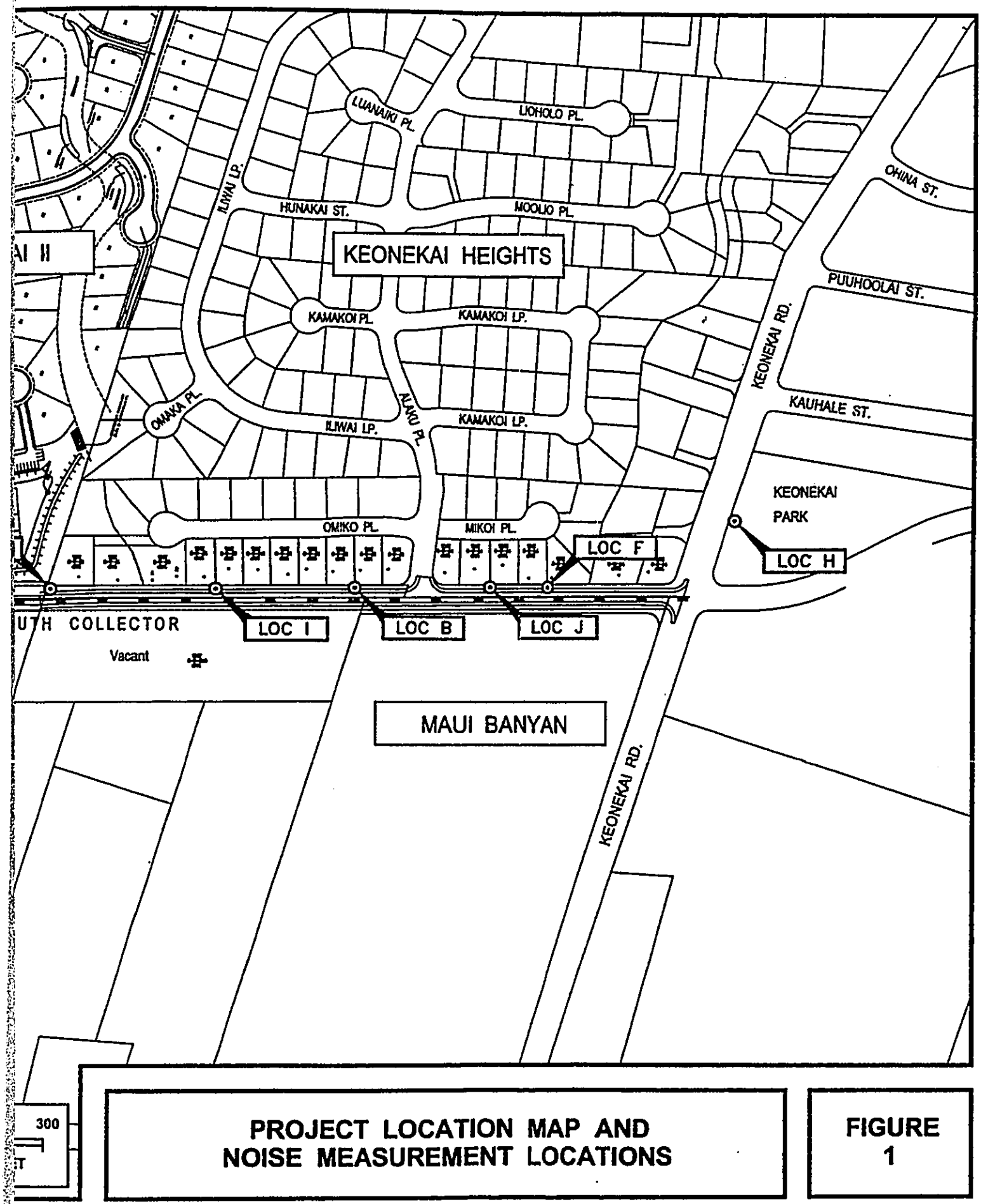
- The HDOT's "66 Leq(h)" and/or the "15 dB increase" criteria for substantial change in traffic noise levels will be not be exceeded at existing residential structures within the limits of project construction.

- No parks within the limits of project construction should be affected by the proposed project or require noise mitigation measures under the Build Alternative.

- No public use facility will experience traffic noise levels greater than 66 Leq(h) or experience increases in traffic noise levels greater than 15 dB under the Build Alternative.

- Potential short term construction noise impacts are possible during the project construction period along the project corridor where noise sensitive receptors are located. However, minimizing these types of noise impacts is possible using standard curfew periods, properly muffled equipment, administrative controls, and construction barriers as required.


PIILANI HWY.
KANAKANUI RD.
AUHANA RD.
KEALI'I KAI I
KEALI'I KAI II
KULUPUU ST.
MAHALONUI PL.
KULUPUU PL.
ALANUI KE ALII RD.
WALUA PL.
KAMAOLE HEIGHTS
PUU MALA PL.
OMAKA PL.
LOC A
LOC C
LOC D
LOC E
LOC G
NORTH-SOUTH COLLECTOR
Vacant
Kihei Regency
Vacant
Vacant
Kihei Alii Kai Condominium
KEALI'I VILLAS
75 0 150 300
SCALE IN FEET


LUANAIKI PL.
LIOHOLO PL.
ILIWAI LP.
HUNAKAI ST.
MOOLIO PL.
OHINA ST.
KEONEKAI HEIGHTS
PUUHOOLAI ST.
KAMAKOI PL.
KAMAKOI LP.
KEONEKAI RD.
OMAKA PL.
ILIWAI LP.
ALAKU PL.
KAMAKOI LP.
KAUHALE ST.
KEONEKAI
PARK
OMIKO PL.
MIKOI PL.
LOC F
LOC H
UTH COLLECTOR
LOC I
LOC B
LOC J
Vacant
MAUI BANYAN
KEONEKAI RD.
300
PROJECT LOCATION MAP AND
NOISE MEASUREMENT LOCATIONS
FIGURE
1

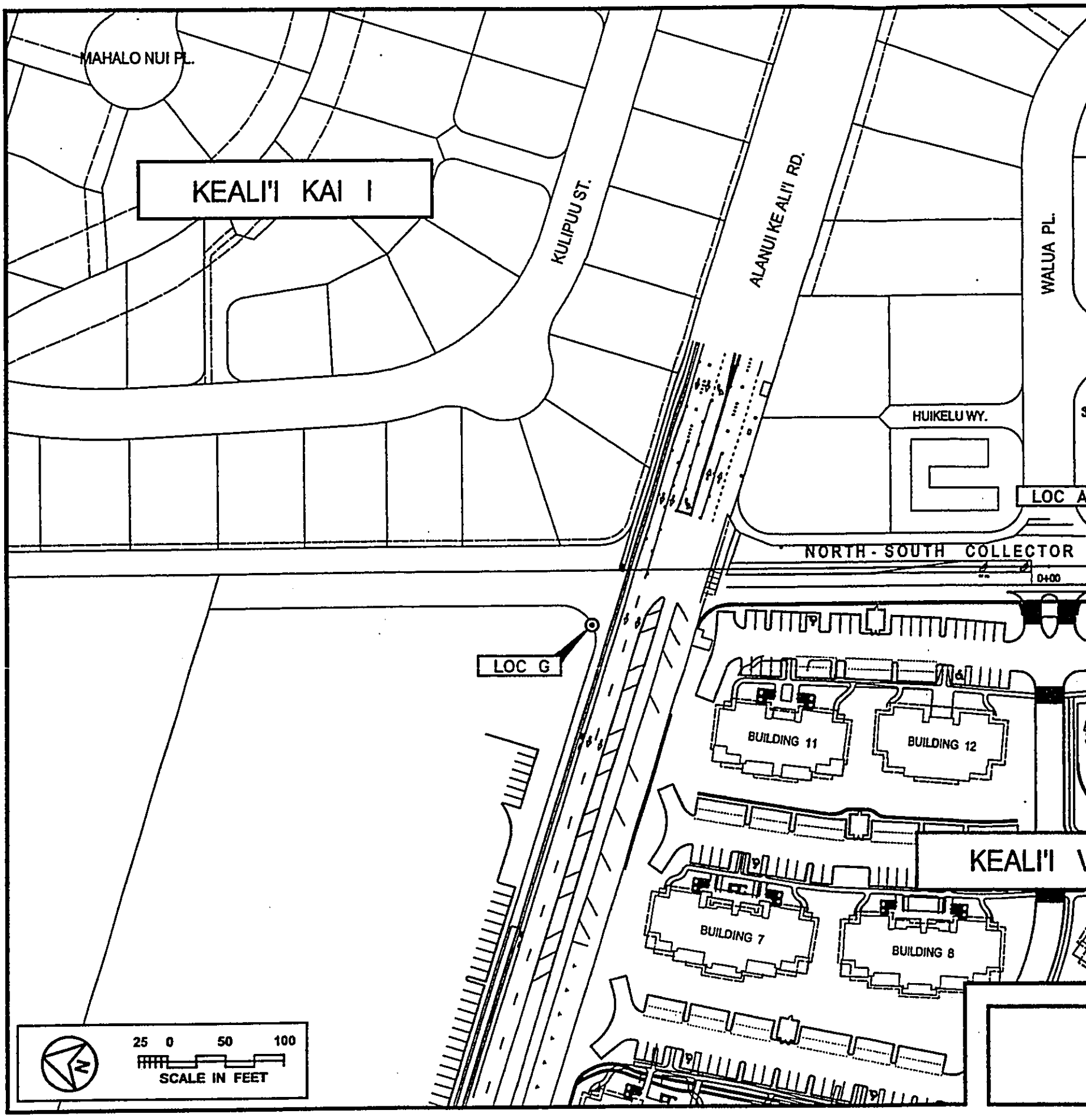
CHAPTER II. GENERAL STUDY METHODOLOGY

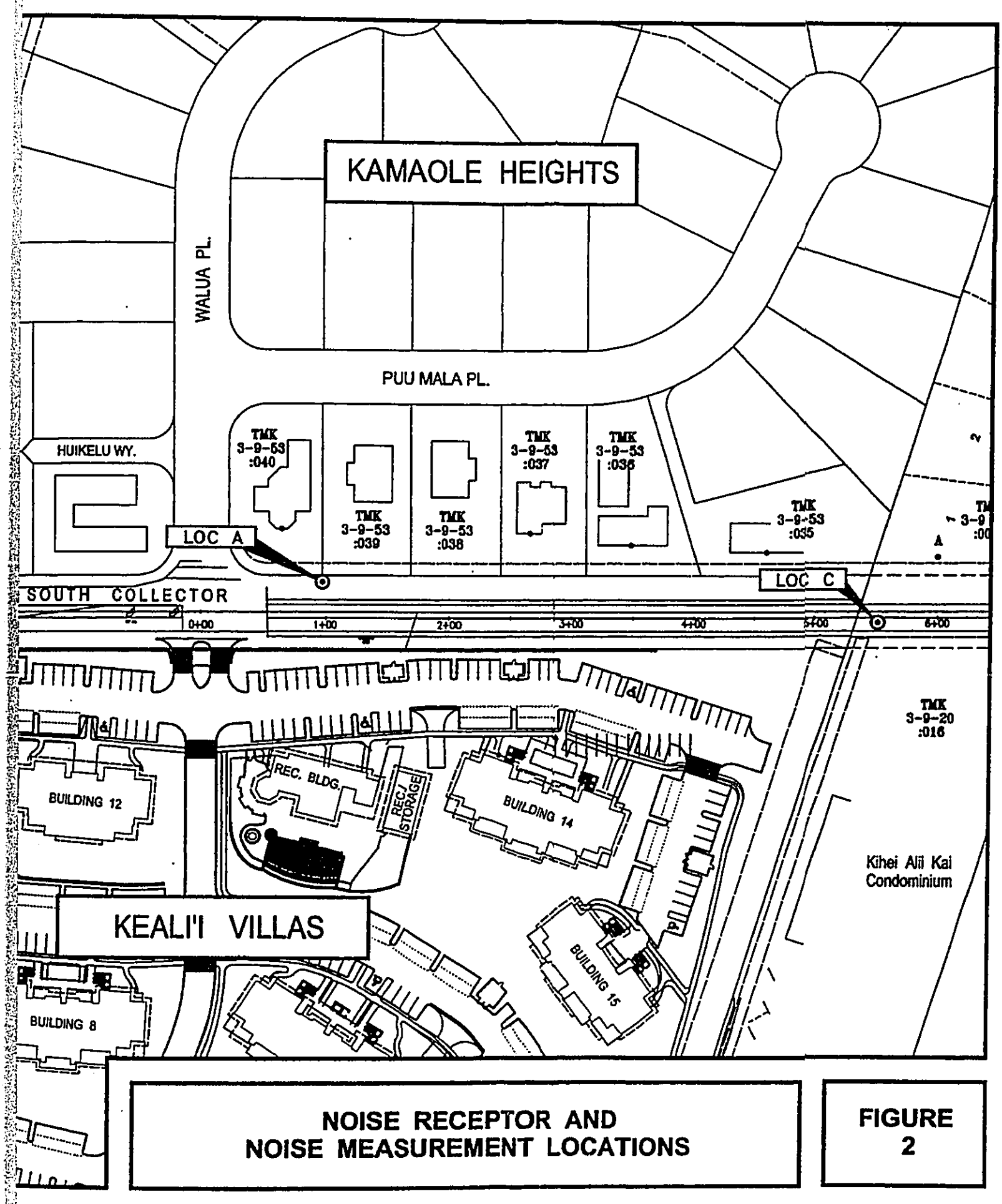
Noise Measurements. Existing traffic and background ambient noise levels at ten locations in the project area were measured in January 2005. The traffic noise measurements were used to calibrate the traffic noise model which was used to calculate the existing and future (CY 2020) traffic noise levels under the Build Alternative. The background ambient noise measurements were used to define existing noise levels at noise sensitive receptors which may be affected by the project. Also, the measurements were used in conjunction with forecast traffic noise levels to determine if future traffic noise levels are predicted to "substantially exceed" existing background ambient noise levels at these noise sensitive receptors, and therefore exceed FHWA and HDOT noise standards and criteria.

The noise measurement locations ("A" through "J") are shown in Figures 1 and 2. The results of the traffic and background ambient noise measurements are summarized in Table 1. In Table 1 and subsequent tables, Leq represents the average (or equivalent), A-Weighted, Sound Level. A list and description of the acoustical terminology used are contained in Appendix B.

Traffic Noise Predictions. The Federal Highway Administration (FHWA) Traffic Noise Model, Version 2.5 (or TNM, see Reference 1) was used as the primary method of calculating Base Year and future traffic noise levels, with model parameters adjusted to reflect terrain, ground cover, and local shielding conditions. The traffic noise measurement Locations "G" and "H" were located along existing roadways which will connect to the North-South Collector Road. At these two traffic noise measurement locations, the measured traffic noise levels were compared with TNM model predictions to insure that measured and calculated noise levels for the existing conditions were consistent and in general agreement. As indicated in Table 1, spot counts of traffic volumes were also obtained during the measurement periods and were used to generate the Equivalent Sound Level (Leq) predictions shown in the table. Traffic mix by vehicle types and average vehicle speeds for the various sections of the existing and future roadways were derived from observations during the noise monitoring periods and from Reference 2.

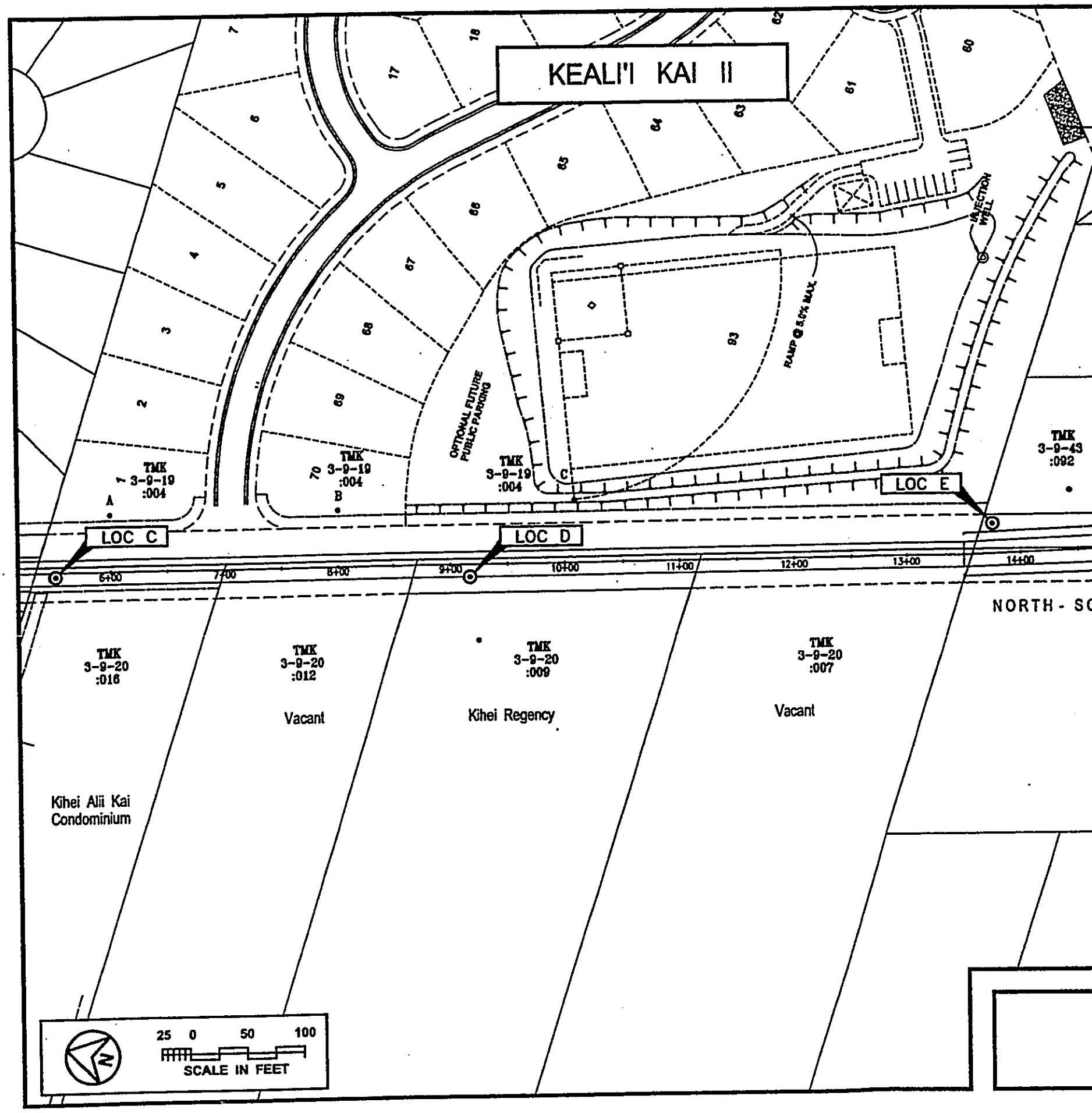
Base Year background ambient noise levels at existing noise sensitive properties along the project roadway alignment were estimated from the noise measurements shown in Table 1. Existing background ambient noise levels at these properties are controlled by the sounds of birds, aircraft, and motor vehicle traffic along Alanui Ke Alii Road, Walua Place, Alaku Place, and Keonekai Road. Determinations of the periods of highest hourly traffic volumes along the project corridor were made after reviewing the AM and PM peak hour traffic volumes from References 3 (see Figure 3) and 4 and the noise measurement results. Total two-way traffic volumes were generally highest during the PM peak hour. Predictions of future traffic noise levels were based on the 2020 forecast hourly volumes of 328 to 373 vehicles per hour along the North-South Collector Road (see Appendix C), and which were assumed to occur during the PM peak hour.

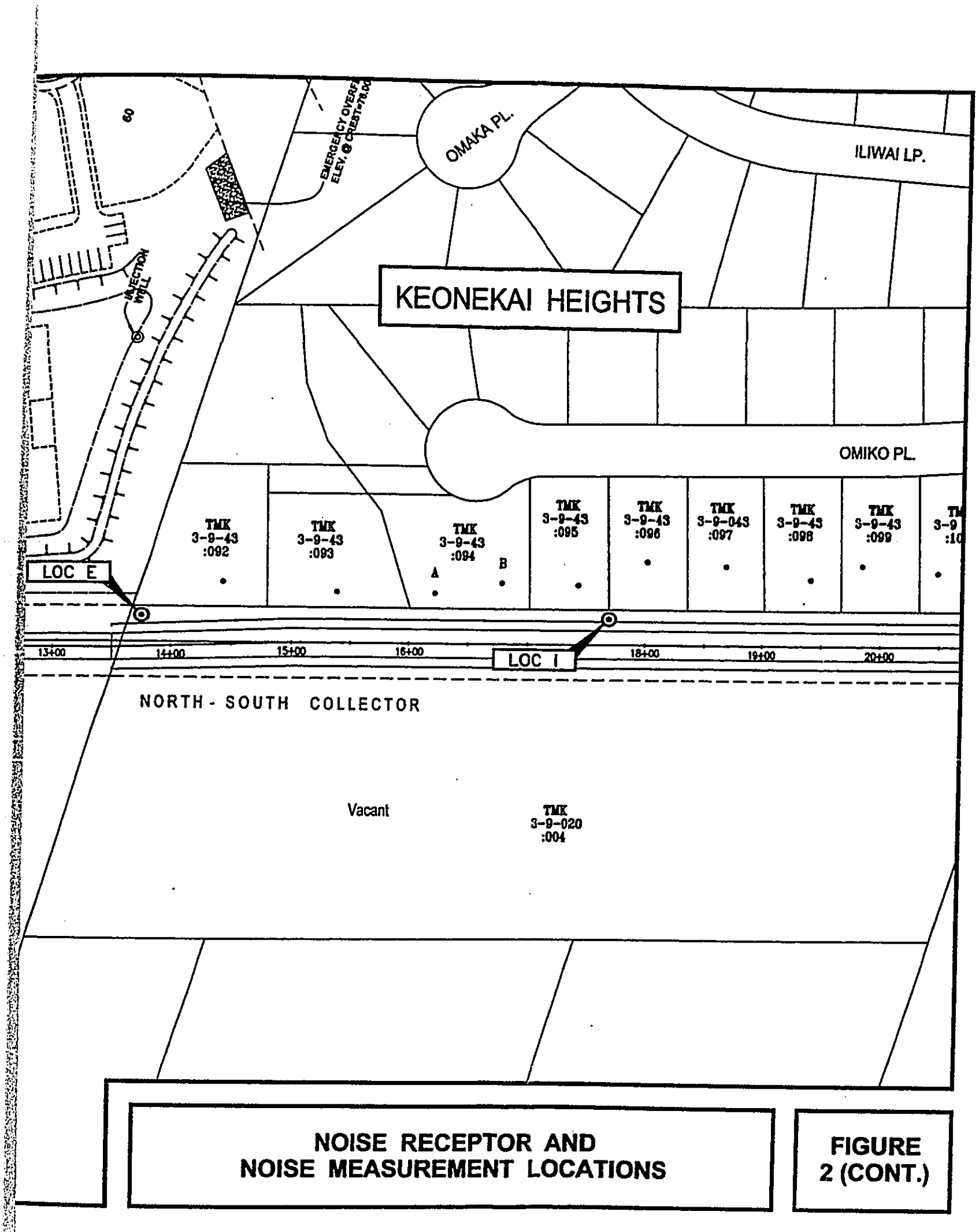

MAHALO NUI PL.
KEALI'I KAI I
KULIPUU ST.
ALANUI KE ALI'I RD.
WALUA PL.
HUIKELU WY.
LOC A
NORTH - SOUTH COLLECTOR
0+00
LOC G
BUILDING 11
BUILDING 12
KEALI'I V
BUILDING 7
BUILDING 8
25 0 50 100
SCALE IN FEET



NOISE RECEPTOR AND NOISE MEASUREMENT LOCATIONS

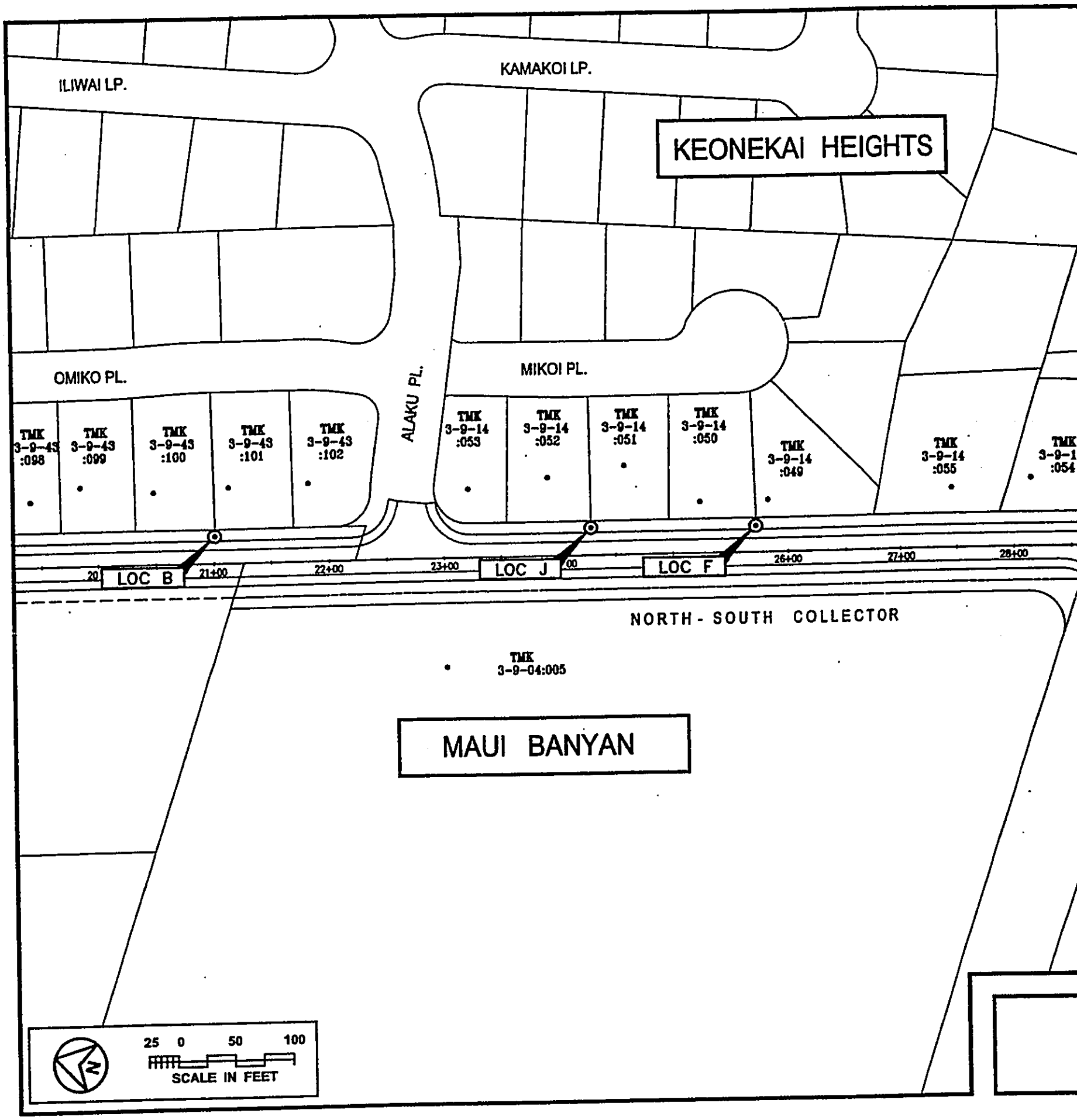
FIGURE 2

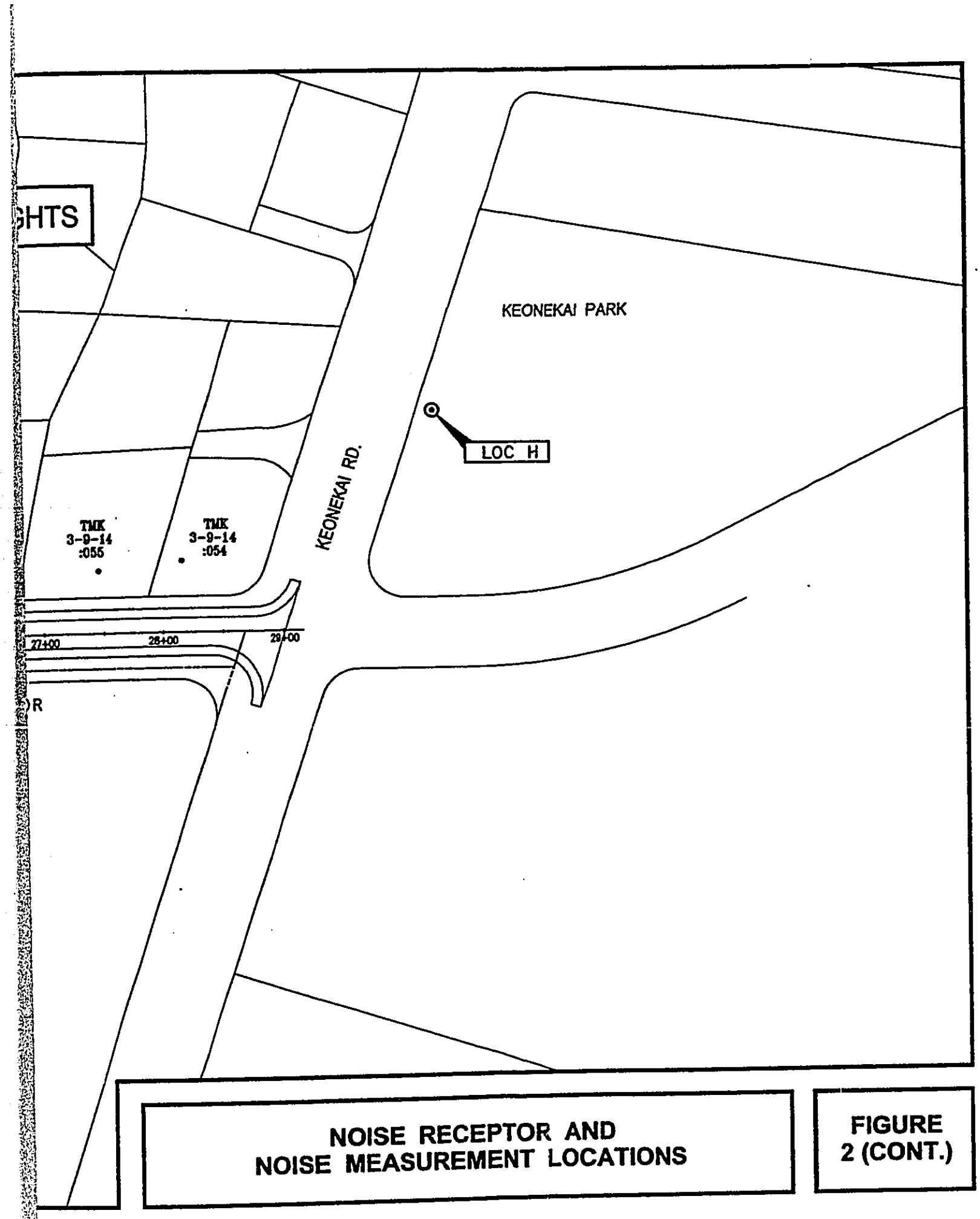

KEALI'I KAI II
TMK 3-9-19 :004
TMK 3-9-19 :004
TMK 3-9-19 :004
TMK 3-9-43 :092
LOC C
LOC D
LOC E
5+00
7+00
8+00
9+00
10+00
11+00
12+00
13+00
14+00
NORTH - SO
TMK 3-9-20 :016
TMK 3-9-20 :012
TMK 3-9-20 :009
TMK 3-9-20 :007
Vacant
Kihei Regency
Vacant
Kihei Alii Kai Condominium
INJECTION WELL
RAMP @ 8.0% MAX.
OPTIONAL FUTURE PUBLIC PARKING
25 0 50 100
SCALE IN FEET



NOISE RECEPTOR AND NOISE MEASUREMENT LOCATIONS

FIGURE 2 (CONT.)


ILIWAI LP.
KAMAKOI LP.
KEONEKAI HEIGHTS
OMIKO PL.
MIKOI PL.
ALAKU PL.
TMK 3-9-43 :098
TMK 3-9-43 :099
TMK 3-9-43 :100
TMK 3-9-43 :101
TMK 3-9-43 :102
TMK 3-9-14 :053
TMK 3-9-14 :052
TMK 3-9-14 :051
TMK 3-9-14 :050
TMK 3-9-14 :049
TMK 3-9-14 :055
TMK 3-9-14 :054
20
LOC B
21+00
22+00
23+00
LOC J
00
LOC F
26+00
27+00
28+00
NORTH - SOUTH COLLECTOR
TMK 3-9-04:005
MAUI BANYAN
25 0 50 100
SCALE IN FEET



NOISE RECEPTOR AND NOISE MEASUREMENT LOCATIONS

FIGURE 2 (CONT.)

TABLE 1
TRAFFIC AND BACKGROUND NOISE MEASUREMENT RESULTS

	LOCATION	Time of Day (HRS)	Ave. Speed (MPH)	Hourly Traffic Volume AUTO	M.TRUCK	H.TRUCK	Measured Leq (dB)	Predicted Leq (dB)
A	At Mauka ROW Fronting Kamaole Heights (1/23/05)	0938 TO 1017	N/A	N/A	N/A	N/A	40.8	N/A
B	At Mauka ROW Fronting Keonekai Heights (1/23/05)	1044 TO 1127	N/A	N/A	N/A	N/A	46.6	N/A
C	At Makai ROW Fronting Kihei Alii Kai Condominium (1/23/05)	1211 TO 1242	N/A	N/A	N/A	N/A	45.1	N/A
D	At Makai ROW Fronting Kihei Regency Condominium (1/23/05)	1246 TO 1316	N/A	N/A	N/A	N/A	49.6	N/A
E	At Mauka ROW Fronting Keonekai Heights (1/23/05)	1321 TO 1351	N/A	N/A	N/A	N/A	46.2	N/A
A	At Mauka ROW Fronting Kamaole Heights (1/23/05)	1401 TO 1432	N/A	N/A	N/A	N/A	46.0	N/A
F	At Mauka ROW Fronting Keonekai Heights (1/23/05)	1515 TO 1545	N/A	N/A	N/A	N/A	53.1	N/A

TABLE 1 (CONTINUED)
TRAFFIC AND BACKGROUND NOISE MEASUREMENT RESULTS

	LOCATION	Time of Day (HRS)	Ave. Speed (MPH)	Hourly Traffic Volume AUTO	M.TRUCK	H.TRUCK	Measured Leq (dB)	Predicted Leq (dB)
G	50 FT from the center-line of Alanui Ke Alii Road (Wet Roadway) (1/24/05)	0628 TO 0728	40	210	5	1	62.1	60.2
G	50 FT from the center-line of Alanui Ke Alii Road (Wet Roadway) (1/24/05)	0728 TO 0828	40	422	5	2	64.6	63.3
D	At Makai ROW Fronting Kihei Regency Condominium (1/24/05)	1040 TO 1110	N/A	N/A	N/A	N/A	42.8	N/A
C	At Makai ROW Fronting Kihei Alii Kai Condominium (1/24/05)	1116 TO 1146	N/A	N/A	N/A	N/A	44.3	N/A
A	At Mauka ROW Fronting Keonekai Heights (1/24/05)	1150 TO 1220	N/A	N/A	N/A	N/A	49.9	N/A
E	At Mauka ROW Fronting Keonekai Heights (1/24/05)	1239 TO 1309	N/A	N/A	N/A	N/A	48.9	N/A
I	At Mauka ROW Fronting Keonekai Heights (1/24/05)	1314 TO 1345	N/A	N/A	N/A	N/A	44.5	N/A

TABLE 1 (CONTINUED)
TRAFFIC AND BACKGROUND NOISE MEASUREMENT RESULTS

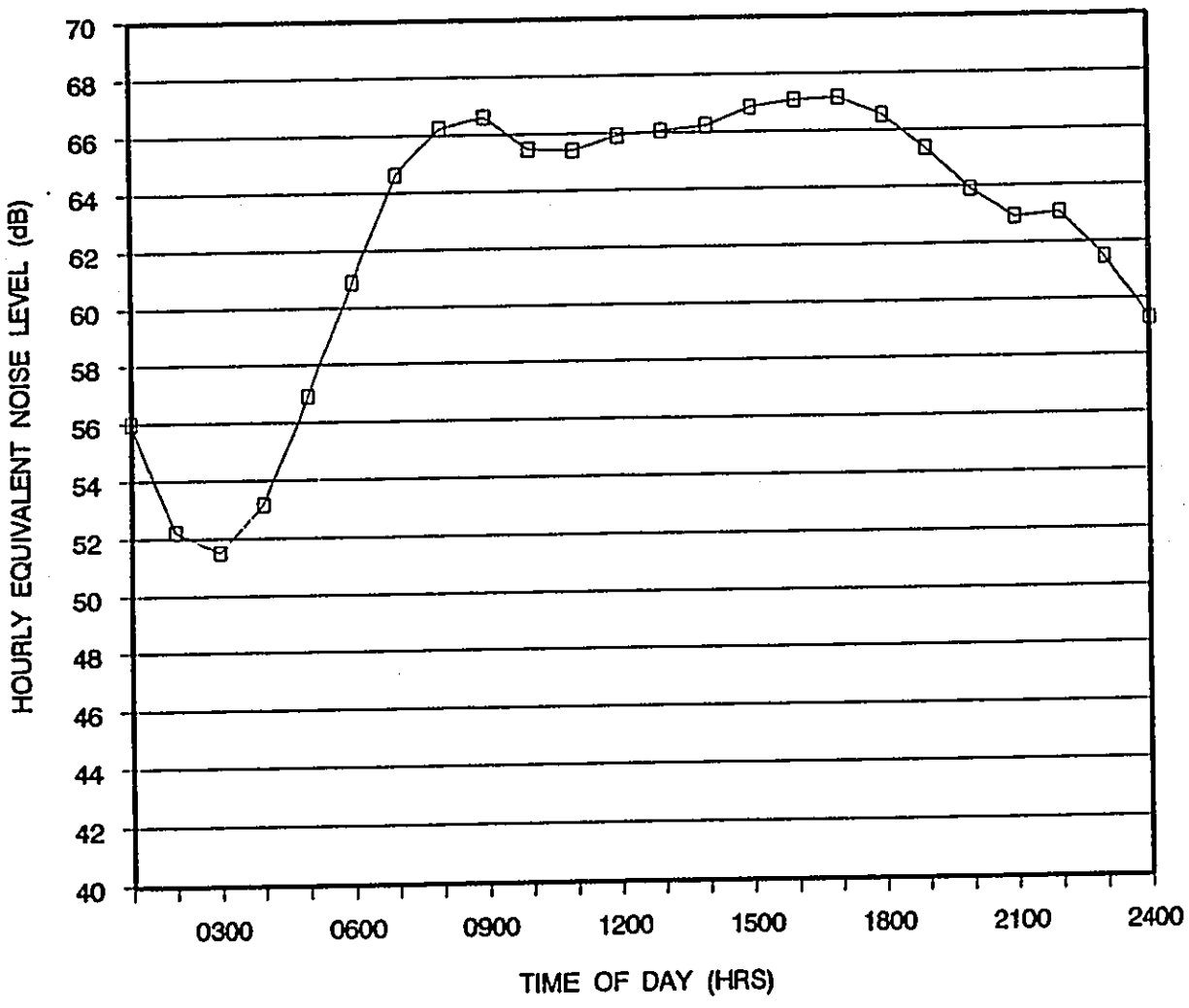
	LOCATION	Time of Day (HRS)	Ave. Speed (MPH)	Hourly Traffic Volume AUTO	M.TRUCK	H.TRUCK	Measured Leq (dB)	Predicted Leq (dB)
B	At Mauka ROW Fronting Keonekai Heights (1/24/05)	1348 TO 1418	N/A	N/A	N/A	N/A	45.2	N/A
J	At Mauka ROW Fronting Keonekai Heights (1/24/05)	1422 TO 1452	N/A	N/A	N/A	N/A	47.0	N/A
H	50 FT from the center-line of Keonekai Road (1/24/05)	1530 TO 1630	39	350	3	1	60.9	61.1
H	50 FT from the center-line of Keonekai Road (1/24/05)	1630 TO 1730	39	350	2	0	61.3	60.9
H	50 FT from the center-line of Keonekai Road (1/25/05)	0630 TO 0730	40	188	1	5	60.8	60.9
H	50 FT from the center-line of Keonekai Road (1/25/05)	0730 TO 0830	40	237	1	2	61.1	61.1
G	50 FT from the center-line of Alanui Ke Alii Road (1/25/05)	1500 TO 1600	40	457	5	1	62.2	62.8

TABLE 1 (CONTINUED)
TRAFFIC AND BACKGROUND NOISE MEASUREMENT RESULTS

	LOCATION	Time of Day (HRS)	Ave. Speed (MPH)	Hourly Traffic Volume AUTO	M.TRUCK	H.TRUCK	Measured Leq (dB)	Predicted Leq (dB)
G	50 FT from the center-line of Alanui Ke Alii Road (1/25/05)	1600 TO 1700	40	465	7	1	63.0	63.0

FIGURE 3

HOURLY VARIATIONS OF TRAFFIC NOISE AT 100 FT SETBACK DISTANCE FROM THE CENTERLINE OF PIILANI HWY. BETWEEN KANANI AND ALANUI KE ALII RD. (APRIL 14–15, 2003)



The Equivalent (or Average) Hourly Sound Level [Leq(h)] noise descriptor was used to calculate the Base Year and CY 2020 traffic noise levels as required by Reference 5. The project plans (where available) of the area, aerial photos, and visual survey of the area were used to determine terrain, ground cover, and local shielding effects and distances from building structures, which were entered into the noise prediction model. Complete topographic maps of the areas outside the Collector Road's Rights-of-Way were not available in all areas, so receptor elevations were estimated using existing plans and field observations.

Future year (2020) traffic noise levels were then developed for the Build (roadway improvement) Alternative using the forecasted 2020 hourly volumes of 328 to 373 vehicles per hour (see Appendix C) and design speed of 30 miles per hour (from Reference 2). Posted speed limit along the North-South Collector Road is planned to be 20 miles per hour. A future traffic mix of 98.8% automobiles, 1.0% medium trucks, and 0.2% heavy trucks and buses was used to calculate future traffic noise along the project corridor.

Impact Assessments and Mitigation. Following the calculation of the future traffic noise levels, evaluations were made of the future traffic noise levels and impacts at noise sensitive receptor locations along the North-South Collector Road within the limits of construction. Comparisons of predicted future traffic noise levels with FHWA and HDOT noise abatement criteria (see Table 2) were made to determine specific locations where the noise abatement criteria are expected to be exceeded.

The HDOT 66 Leq(h) noise abatement threshold criteria and the HDOT "15 dB increase" criteria were applied to all noise sensitive buildings along the project corridor. By Reference 6, the HDOT has replaced the FHWA 67 Leq(h) criteria with their 66 Leq(h) criteria. Along the project corridor, the locations of the 66 Leq(h) traffic noise contour, without the benefit of shielding from natural terrain or man-made sound barriers, were also used to identify noise sensitive receptor locations where the HDOT's 66 Leq(h) noise abatement criteria would not be exceeded, and which would not require more detailed evaluations. In addition, the HDOT's criteria of "15 dB increase or more above existing background noise levels" was also used as a noise abatement criteria for this project (from Reference 6). Where noise mitigation measures were indicated for this project, the effectiveness of sound attenuating barriers and other possible noise mitigation measures would need to be evaluated. The ability to meet the HDOT criteria of 5 dBA noise reduction would also need to be examined for various noise barrier heights. Based on these results, any reasonable and feasible traffic noise mitigation measures would need to be identified.

TABLE 2

FHWA & HDOT NOISE ABATEMENT CRITERIA
[Hourly A–Weighted Sound Level––Decibels (dBA)]

ACTIVITY CATEGORY	LEQ (h)*	DESCRIPTION OF ACTIVITY CATEGORY
A	57 (Exterior)	Lands on which serenity and quiet are of extra–ordinary significance and serve an important public need and where the preservation of those qualities is essential if the areas are to continue to serve their intended purpose.
B	67 (Exterior)	Picnic areas, recreation areas, playgrounds, activity sports areas, parks, residences, motels, hotels, churches, libraries, and hospitals.
C	72 (Exterior)	Developed lands, properties, or activities not included in Categories A or B above.
D	------	Undeveloped lands.
E	52 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

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* The Hawaii State Department of Transportation, Highways Division, utilizes Leq criteria levels which are 1 Leq unit less than the FHWA values shown.

CHAPTER III. EXISTING ACOUSTICAL ENVIRONMENT

For the purposes of this study, 2005 was used as the Base Year for calculating changes in traffic and background ambient noise levels between the Base Year and 2020 under the Build Alternative. The Base Year noise environment along the project corridor was described by measuring the Hourly Equivalent Sound Levels [Leq(h)] along the proposed roadway alignment for the 2005 period. The measured hourly sound levels, expressed in decibels, represent the average levels of background ambient or traffic noise during the study's Base Year. Table 1 contains the typical Base Year traffic and background ambient noise levels measured in January 2005. Measured background ambient noise levels were relatively low and ranged between 41 to 53 Leq(h) along the proposed roadway alignment.

Table 3 presents the Base Year traffic and background ambient noise levels at the various receptor locations on both sides of the proposed North-South Collector Road. The relationships of these receptor locations to the future North-South Collector Road are shown by the solid dots within the lots shown in Figure 2. Except for the two makai lots and future ball field of the Kealii Kai II Subdivision, receptor locations were not assigned to the vacant lots shown in Figure 2. Along the future North-South Collector Road alignment, the existing background ambient noise levels do not exceed the HDOT 66 Leq criteria, and are estimated to range from approximately 45 to 55 dB (Leq) during the Base Year.

TABLE 3

EXISTING AND FUTURE TRAFFIC NOISE LEVELS
(4.92 FT RECEPTOR, PM PEAK HOUR)

RECEPTOR LOCATION	EXISTING (CY 2005) Leq	FUTURE (CY 2020) Leq BUILD / CHANGE
KAMAOLE HEIGHTS (MAUKA):		
Receiver 3-9-53:040	45.6	54.1 / 8.5
Receiver 3-9-53:037	45.2	55.1 / 9.9
Receiver 3-9-53:036	45.2	55.8 / 10.6
Receiver 3-9-53:035	44.7	56.3 / 11.6
KEALI'I KAI II (MAUKA):		
Receiver 3-9-19:004 A	44.7	57.2 / 12.5
Receiver 3-9-19:004 B	45.4	56.7 / 11.3
Receiver 3-9-19:004 C	46.2	56.8 / 10.6
KEONEKAI HEIGHTS (MAUKA):		
Receiver 3-9-43:092	47.6	56.1 / 8.5
Receiver 3-9-43:093	46.6	56.9 / 10.3
Receiver 3-9-43:094 A	45.6	57.0 / 11.4
Receiver 3-9-43:094 B	45.6	56.4 / 10.8
Receiver 3-9-43:095	44.5	56.5 / 12.0
Receiver 3-9-43:096	44.5	55.3 / 10.8
Receiver 3-9-43:097	44.9	55.6 / 10.7
Receiver 3-9-43:098	45.2	56.0 / 10.8
Receiver 3-9-43:099	45.6	55.4 / 9.8
Receiver 3-9-43:100	45.9	55.1 / 9.2
Receiver 3-9-43:101	45.9	54.6 / 8.7
Receiver 3-9-43:102	45.9	55.5 / 9.6
Receiver 3-9-14:053	47.0	56.3 / 9.3
Receiver 3-9-14:052	47.0	54.8 / 7.8
Receiver 3-9-14:051	47.0	54.7 / 7.7
Receiver 3-9-14:050	53.1	55.9 / 2.8
Receiver 3-9-14:049	53.1	55.7 / 2.6
Receiver 3-9-14:055	52.1	55.6 / 3.5
Receiver 3-9-14:054	54.7	55.6 / 0.9
KEALI'I VILLAS (MAKAI):		
Receiver Building 14	45.2	53.5 / 8.3
KIHEI REGENCY (MAKAI):		
Receiver 3-9-20:009	46.2	55.4 / 9.2
MAUI BANYAN (MAKAI):		
Receiver 3-9-04:005	46.0	53.9 / 7.9

Note:

1. All receivers were assumed to be at 4.92 feet above ground level.

CHAPTER IV. DESCRIPTION OF FUTURE TRAFFIC NOISE LEVELS

The traffic noise levels along the proposed North-South Collector Road during CY 2020 were evaluated for the Build Alternative. The same methodology that was used to validate the measured Base Year traffic noise levels in Table 1 was also used to calculate the Year 2020 noise levels under the Build Alternative. Predictions of future traffic noise levels were based on forecast hourly volumes of 328 to 373 vehicles per hour and design speed of 30 miles per hour from References 2 and 4. A future traffic mix of 98.8% automobiles, 1.0% medium trucks, and 0.2% heavy trucks and buses was used to calculate future traffic noise along the project corridor. Table 4 presents the calculations of future traffic noise levels at distances of 50, 100, and 150 feet from the centerline of the various segments of the North-South Collector Road.

The predicted traffic noise levels at existing and potential receptor locations along the proposed North-South Collector Road are shown in Table 3 under the "Build/Change" column for the Build Alternative at 30 miles per hour design speed. A posted speed limit of 20 miles per hour is planned along the North-South Collector Road, so actual noise levels may be lower than those shown in Table 3. Also indicated in Table 3 are the increases in existing noise levels predicted under the Build Alternative. At all of the various existing and potential receptor locations along the Collector Road listed in Table 3, future traffic noise levels are not expected to exceed 66 Leq(h) or exceed existing background ambient noise levels by at least 15 dB. The traffic noise abatement criteria of HDOT and FHWA should not be exceeded along the North-South Collector Road in 2020.

The following general conclusions can be made in respect to the impacted structures and lands which can be expected by CY 2020 under the Build Alternative at 30 miles per hour Design Speed. These conclusions are valid as long as the future vehicle mixes and average speeds do not differ from the assumed values.

- The HDOT's "66 Leq(h)" and/or "15 dB increase" criteria for substantial change in traffic noise levels are not predicted to be exceeded at existing residential structures along the proposed North-South Collector Road and within the limits of project construction. In addition, receptor locations beyond 15 feet mauka (east) of the Right-of-Way at the Kealii Kai II Subdivision should be outside and clear of the 66 Leq(h) traffic noise contour.

- The future playground or ball field in the Kealii Kai II Subdivision mauka (east) of the North-South Collector Road Right-of-Way should also be outside and clear of the 66 Leq(h) traffic noise contour.

- Traffic noise mitigation measures should not be required along the project corridor since the HDOT and FHWA noise abatement criteria levels are not expected to be exceeded by 2020. Predicted traffic noise levels at noise sensitive receptor locations along the project corridor should not exceed 60 Leq(h) during the PM peak hour.

TABLE 4

FUTURE (CY 2020) TRAFFIC VOLUMES AND NOISE LEVELS ALONG VARIOUS ROADWAYS IN PROJECT ENVIRONS (PM PEAK HOUR, BUILD)

LOCATION	SPEED (MPH)	TOTAL VPH	****** VOLUMES (VPH) ********** AUTOS	M.TRUCKS	H.TRUCKS	50' Leq	100' Leq	150' Leq
NSCR Between Ke Alii Alanui & Walua (AM)	30	285	278	3	4	57.8	54.8	52.9
NSCR Between Ke Alii Alanui & Walua (PM)	30	373	368	4	1	58.1	55.1	53.2
NSCR Between Walua & Ke Alii 2 Rd. (AM)	30	285	278	3	4	57.8	54.8	52.9
NSCR Between Walua & Ke Alii 2 Rd. (PM)	30	365	360	4	1	58.0	55.0	53.1
NSCR Between Ke Alii 2 & Aloha Village Rd. (AM)	30	268	261	3	4	57.6	54.6	52.7
NSCR Between Ke Alii 2 & Aloha Village Rd. (PM)	30	328	324	3	1	57.5	54.5	52.6
NSCR Between Aloha Village & Keonekai Rd. (AM)	30	255	248	3	4	57.5	54.4	52.6
NSCR Between Aloha Village & Keonekai Rd. (PM)	30	333	329	3	1	57.6	54.5	52.7

Note:

1. Traffic mix of 98.8% autos, 1.0% medium trucks, and 0.2% heavy trucks and buses assumed along all roadways.

- Forecasted traffic noise levels should not exceed HDOT and FHWA noise abatement criteria at any public use structures or park lands along the project corridor.

CHAPTER V. FUTURE TRAFFIC NOISE IMPACTS AND POSSIBLE NOISE MITIGATION MEASURES

Future traffic noise levels are not predicted to exceed the HDOT "66 Leq(h)" and/or "15 dB increase" noise abatement criteria by CY 2020 under the Build Alternative along the proposed North-South Collector Road alignment between Walua Place and Keonekai Road. Therefore, traffic noise mitigation measures such as sound attenuating walls should not be required for this project.

It is anticipated that potential noise impacts at any future noise sensitive properties located in the project area may be mitigated through the inclusion of sound walls or other noise mitigation measures within the individual lot development plans as required. In addition, any future public use facilities or housing units which may be planned alongside the North-South Collector Road represent areas of potential adverse noise impacts if adequate setbacks or noise mitigation measures are not incorporated into the planning of these future projects. It is anticipated that the project's roadway improvements will be completed prior to any redevelopment of the presently open areas adjacent to a roadway, and that noise abatement measures such as adequate setbacks, sound attenuating walls or berms, or closure and air conditioning will be incorporated into these new developments along the North-South Collector Road as required. In any event, new structures whose building permits were obtained after the date of this noise study will not qualify for noise abatement measures under existing HDOT procedures.

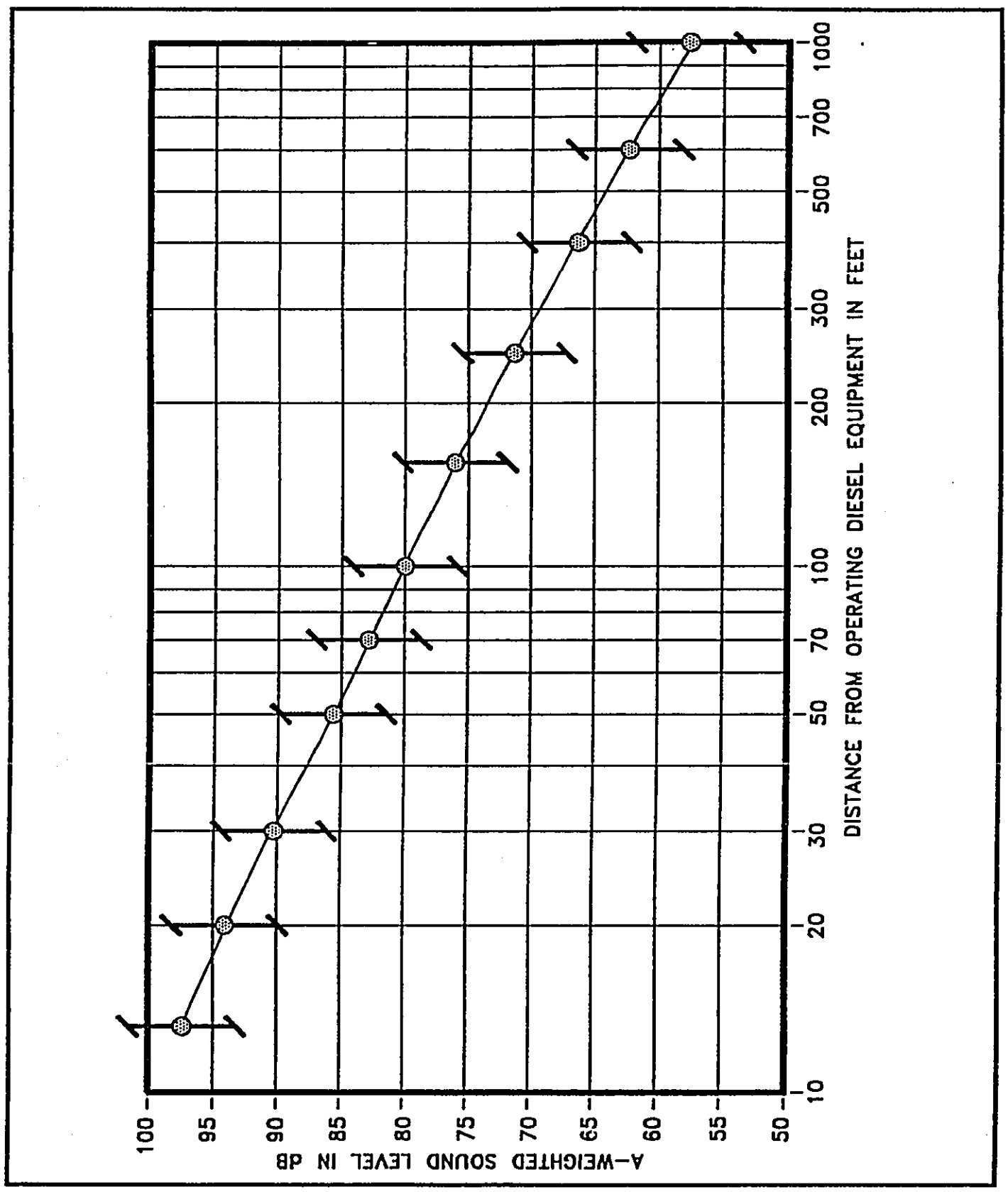
CHAPTER VI. CONSTRUCTION NOISE IMPACTS

Short-term noise impacts associated with construction activities along the proposed North-South Collector Road may occur. These impacts can occur as a result of the short distances (less than 50 FT) between existing dwelling units to the anticipated construction corridor. The total duration of the construction period for the proposed project is not known, but noise exposure from construction activities at any one receptor location is not expected to be continuous during the total construction period.

Noise levels of diesel powered construction equipment typically range from 80 to 90 dB at 50 FT distance. Typical levels of noise from construction activity (excluding pile driving activity) are shown in Figure 4. Adverse impacts from construction noise are not expected to be in the "public health and welfare" category due to the temporary nature of the work and due to the administrative controls available for its regulation. Instead, these impacts will probably be limited to the temporary degradation of the quality of the acoustic environment in the immediate vicinity of the project site.

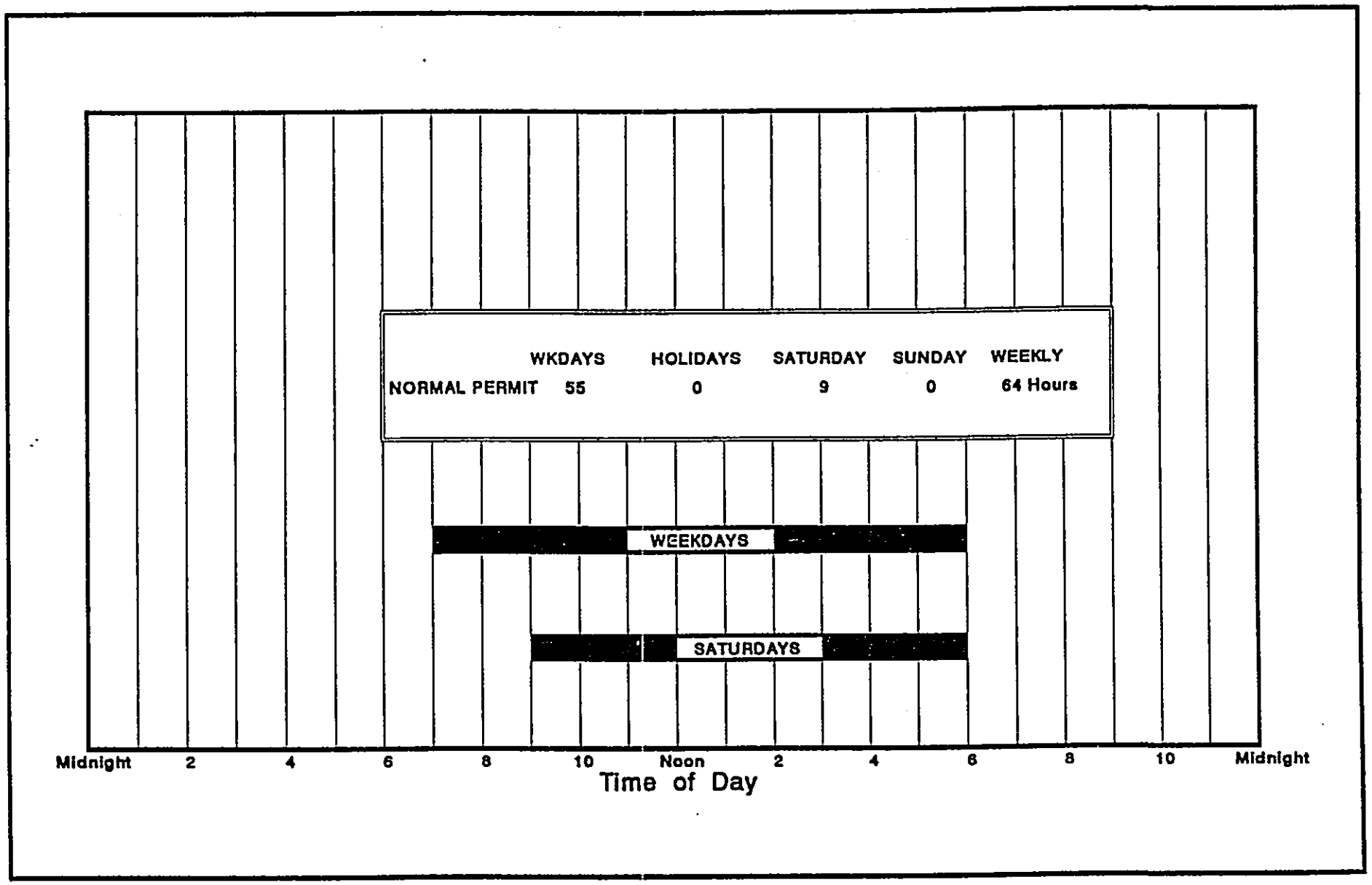
Construction noise levels at existing structures can intermittently exceed 90 dB when work is being performed at close distances in front of these structures. Along the roadway improvement project, distances between the construction sites and receptors are expected to be as close as 10 feet, and construction noise levels may intermittently exceed 90 dB. The State Department of Health currently regulates noise from construction activities under a permit system (Reference 7). Under current permit procedures (see Figure 5), noisy construction activities are restricted to hours between 7:00 AM and 6:00 PM, from Monday through Friday, and exclude certain holidays. Noisy construction activities are normally restricted to the hours of 9:00 AM to 6:00 PM on Saturdays, with construction not permitted on Sundays. These restrictions minimize construction noise impacts on noise sensitive receptors along the roadway project corridor, and have generally been successfully applied. In this way, construction noise impacts on noise sensitive receptors can be minimized.

In addition, the use of quieted portable engine generators and diesel equipment should be specified for use on this project. Heavy truck and equipment staging areas should also be located at areas which are as far from noise sensitive properties as feasible. Truck routes which avoid residential communities should be identified wherever possible. The use of 8 to 12 FT high construction noise barriers may also be used where close-in construction work to noise sensitive structures is unavoidable.



ANTICIPATED RANGE OF CONSTRUCTION NOISE LEVELS VS. DISTANCE

FIGURE 4



AVAILABLE WORK HOURS UNDER DOH PERMIT PROCEDURES FOR CONSTRUCTION NOISE

FIGURE 5

APPENDIX A. REFERENCES

(1) "FHWA Highway Traffic Noise Model User's Guide;" FHWA-PD-96-009, Federal Highway Administration; Washington, D.C.; January 1998 and Version 2.5 Upgrade (April 14, 2004).

(2) Transmittal from Warren S. Unemori Engineering, Inc. dated January 18, 2005.

(3) 24-Hour Traffic Counts, Station 13-C, Piilani Highway Between Kanani and Alanui Ke Alii Roads; April 14-15, 2003; Hawaii State Department of Transportation.

(4) "Draft Traffic Study for North-South Collector Road;" Phillip Rowell and Associates; October 1, 2004.

(5) Federal Highway Administration; "Procedures for Abatement of Highway Traffic Noise and Construction Noise;" 23 CFR Chapter I, Subchapter H, Part 772;" April 1, 1995.

(6) "Noise Analysis and Abatement Policy;" Hawaii State Department of Transportation, Highways Division, Materials Testing and Research Branch; June 1997.

(7) "Title 11, Administrative Rules, Chapter 46, Community Noise Control;" Hawaii State Department of Health; September 23, 1996.

APPENDIX B

EXCERPTS FROM EPA'S ACOUSTIC TERMINOLOGY GUIDE

Descriptor Symbol Usage

The recommended symbols for the commonly used acoustic descriptors based on A-weighting are contained in Table I. As most acoustic criteria and standards used by EPA are derived from the A-weighted sound level, almost all descriptor symbol usage guidance is contained in Table I.

Since acoustic nomenclature includes weighting networks other than "A" and measurements other than pressure, an expansion of Table I was developed (Table II). The group adopted the ANSI descriptor-symbol scheme which is structured into three stages. The first stage indicates that the descriptor is a level (i.e., based upon the logarithm of a ratio), the second stage indicates the type of quantity (power, pressure, or sound exposure), and the third stage indicates the weighting network (A, B, C, D, E.....). If no weighting network is specified, "A" weighting is understood. Exceptions are the A-weighted sound level and the A-weighted peak sound level which require that the "A" be specified. For convenience in those situations in which an A-weighted descriptor is being compared to that of another weighting, the alternative column in Table II permits the inclusion of the "A". For example, a report on blast noise might wish to contrast the LCdn with the LAdn.

Although not included in the tables, it is also recommended that "Lpn" and "LepN" be used as symbols for perceived noise levels and effective perceived noise levels, respectively.

It is recommended that in their initial use within a report, such terms be written in full, rather than abbreviated. An example of preferred usage is as follows:

The A-weighted sound level (LA) was measured before and after the installation of acoustical treatment. The measured LA values were 85 and 75 dB respectively.

Descriptor Nomenclature

With regard to energy averaging over time, the term "average" should be discouraged in favor of the term "equivalent". Hence, Leq, is designated the "equivalent sound level". For Ld, Ln, and Ldn, "equivalent" need not be stated since the concept of day, night, or day-night averaging is by definition understood. Therefore, the designations are "day sound level", "night sound level", and "day-night sound level", respectively.

The peak sound level is the logarithmic ratio of peak sound pressure to a reference pressure and not the maximum root mean square pressure. While the latter is the maximum sound pressure level, it is often incorrectly labelled peak. In that sound level meters have "peak" settings, this distinction is most important.

"Background ambient" should be used in lieu of "background", "ambient", "residual", or "indigenous" to describe the level characteristics of the general background noise due to the contribution of many unidentifiable noise sources near and far.

With regard to units, it is recommended that the unit decibel (abbreviated dB) be used without modification. Hence, DBA, PNdB, and EPNdB are not to be used. Examples of this preferred usage are: the Perceived Noise Level (Lpn was found to be 75 dB. Lpn = 75 dB). This decision was based upon the recommendation of the National Bureau of Standards, and the policies of ANSI and the Acoustical Society of America, all of which disallow any modification of bel except for prefixes indicating its multiples or submultiples (e.g., deci).

Noise Impact

In discussing noise impact, it is recommended that "Level Weighted Population" (LWP) replace "Equivalent Noise Impact" (ENI). The term "Relative Change of Impact" (RCI) shall be used for comparing the relative differences in LWP between two alternatives.

Further, when appropriate, "Noise Impact Index" (NII) and "Population Weighed Loss of Hearing" (PHL) shall be used consistent with CHABA Working Group 69 Report Guidelines for Preparing Environmental Impact Statements (1977).

APPENDIX B (CONTINUED)

TABLE I

A-WEIGHTED RECOMMENDED DESCRIPTOR LIST

TERM	SYMBOL
1. A-Weighted Sound Level	L_A
2. A-Weighted Sound Power Level	L_{WA}
3. Maximum A-Weighted Sound Level	L_{max}
4. Peak A-Weighted Sound Level	L_{Apk}
5. Level Exceeded x% of the Time	L_x
6. Equivalent Sound Level	L_{eq}
7. Equivalent Sound Level over Time (T) (1)	$L_{eq(T)}$
8. Day Sound Level	L_d
9. Night Sound Level	L_n
10. Day-Night Sound Level	L_{dn}
11. Yearly Day-Night Sound Level	$L_{dn(Y)}$
12. Sound Exposure Level	L_{SE}

(1) Unless otherwise specified, time is in hours (e.g. the hourly equivalent level is $L_{eq(1)}$). Time may be specified in non-quantitative terms (e.g., could be specified a $L_{eq(WASH)}$ to mean the washing cycle noise for a washing machine).

SOURCE: EPA ACOUSTIC TERMINOLOGY GUIDE, BNA 8-14-78,

APPENDIX B (CONTINUED)

TABLE II

RECOMMENDED DESCRIPTOR LIST

TERM	A-WEIGHTING	ALTERNATIVE[1] A-WEIGHTING	OTHER[2] WEIGHTING	UNWEIGHTED
1. Sound (Pressure)[3] Level	L_A	L_{pA}	L_B, L_{pB}	L_p
2. Sound Power Level	L_{WA}		L_{WB}	L_W
3. Max. Sound Level	L_{max}	L_{Amax}	L_{Bmax}	L_{pmax}
4. Peak Sound (Pressure) Level	L_{Apk}		L_{Bpk}	L_{pk}
5. Level Exceeded x% of the Time	L_x	L_{Ax}	L_{Bx}	L_{px}
6. Equivalent Sound Level	L_{eq}	L_{Aeq}	L_{Beq}	L_{peq}
7. Equivalent Sound Level[4] Over Time(T)	$L_{eq(T)}$	$L_{Aeq(T)}$	$L_{Beq(T)}$	$L_{peq(T)}$
8. Day Sound Level	L_d	L_{Ad}	L_{Bd}	L_{pd}
9. Night Sound Level	L_n	L_{An}	L_{Bn}	L_{pn}
10. Day-Night Sound Level	L_{dn}	L_{Adn}	L_{Bdn}	L_{pdn}
11. Yearly Day-Night Sound Level	$L_{dn(Y)}$	$L_{Adn(Y)}$	$L_{Bdn(Y)}$	$L_{pdn(Y)}$
12. Sound Exposure Level	L_S	L_{SA}	L_{SB}	L_{Sp}
13. Energy Average Value Over (Non-Time Domain) Set of Observations	$L_{eq(e)}$	$L_{Aeq(e)}$	$L_{Beq(e)}$	$L_{peq(e)}$
14. Level Exceeded x% of the Total Set of (Non-Time Domain) Observations	$L_{x(e)}$	$L_{Ax(e)}$	$L_{Bx(e)}$	$L_{px(e)}$
15. Average L_x Value	L_x	L_{Ax}	L_{Bx}	L_{px}

(1) "Alternative" symbols may be used to assure clarity or consistency.

(2) Only B-weighting shown. Applies also to C,D,E,.....weighting.

(3) The term "pressure" is used only for the unweighted level.

(4) Unless otherwise specified, time is in hours (e.g., the hourly equivalent level is Leq(1). Time may be specified in non-quantitative terms (e.g., could be specified as Leq(WASH) to mean the washing cycle noise for a washing machine.

APPENDIX C

SUMMARY OF YEAR 2003 AND YEAR 2020 TRAFFIC VOLUMES

ROADWAY LANES	**** CY 2003 ***** AM VPH	PM VPH	CY 2020 (NO BUILD) AM VPH	PM VPH	CY 2020 (BUILD) AM VPH	PM VPH
NSCR Between Ke Alii Alanui & Walua (NB)	20	13	85	65	163	208
NSCR Between Ke Alii Alanui & Walua (SB)	7	23	43	85	123	165
Two-Way	27	36	128	150	285	373
NSCR Between Walua & Ke Alii 2 Rd. (NB)	N/A	N/A	25	20	145	215
NSCR Between Walua & Ke Alii 2 Rd. (SB)	N/A	N/A	10	20	140	150
Two-Way	N/A	N/A	35	40	285	365
NSCR Between Ke Alii 2 & Aloha Village Rd. (NB)	N/A	N/A	N/A	N/A	125	210
NSCR Between Ke Alii 2 & Aloha Village Rd. (SB)	N/A	N/A	N/A	N/A	143	118
Two-Way	N/A	N/A	N/A	N/A	268	328
NSCR Between Aloha Village & Keonekai Rd. (NB)	N/A	N/A	N/A	N/A	128	228
NSCR Between Aloha Village & Keonekai Rd. (SB)	N/A	N/A	N/A	N/A	128	105
Two-Way	N/A	N/A	N/A	N/A	255	333

NOTE: NSCR is North-South Collector Road

Appendix F

Traffic Impact Analysis Report

TRAFFIC STUDY FOR

NORTH-SOUTH COLLECTOR ROAD

IN KIHEI, MAUI, HAWAII

FINAL REPORT

Prepared For

TOWNE DEVELOPMENT OF HAWAII, INC.
220 South King Street, Suite 2170
Honolulu, Hawaii 96813

Phillip Rowell and Associates
47-273 'D' Hui Iwa Street
Kaneohe, Hawai'i 96744
Tel: 808-239-8206 Fax: 808-239-4175
Email: prowell@gte.net

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TABLE OF CONTENTS

1. INTRODUCTION ..... Page 1
   - Project Location and Description ..... Page 1
   - Study Area ..... Page 3
   - Study Methodology and Order of Presentation ..... Page 3
   - Order ..... Page 5

2. ANALYSIS OF EXISTING CONDITIONS ..... Page 6
   - Description of Existing Streets and Intersection Controls ..... Page 6
   - Existing Peak Hour Traffic Volumes ..... Page 7
   - Level-of-Service Concept ..... Page 10
   - Level-of-Service Analysis of Existing Conditions ..... Page 12

3. 2020 TRAFFIC FORECASTS ..... Page 15
   - Background Traffic Growth ..... Page 16
   - Related Projects ..... Page 16
   - 2020 Traffic Forecasts ..... Page 17

4. ANALYSIS OF IMPACTS OF NSCR ..... Page 23
   - Changes in Peak Hour Traffic Volumes ..... Page 23
   - Changes in Level-of-Service ..... Page 26
   - New Intersections ..... Page 33
   - Conclusions ..... Page 35

5. SUMMARY AND RECOMMENDATIONS ..... Page 37

Appendix A Correspondence To and From Maui Police Department Regarding NSCR

LIST OF FIGURES

Figure 1	Project Location Map	Page 2
Figure 2	Existing (2003) AM Peak Hour Traffic Volumes	Page 8
Figure 3	Existing (2003) PM Peak Hour Traffic Volumes	Page 9
Figure 4	Locations of Related Projects	Page 18
Figure 5	2020 AM Peak Hour Traffic Projections Without NSCR	Page 19
Figure 6	2020 PM Peak Hour Traffic Projections Without NSCR	Page 20
Figure 7	2020 AM Peak Hour Traffic Projections With NSCR	Page 21
Figure 8	2020 PM Peak Hour Traffic Projections With NSCR	Page 22
Figure 9	Analysis of Peak Hour Volume Changes Along South Kihei Road	Page 24
Figure 10	Analysis of Peak Hour Volume Changes Along Piilani Highway	Page 25
Figure 11	Analysis of Traffic Composition Along North-South Collector Road	Page 36

LIST OF TABLES

Table 1	Study Intersections	Page 3
Table 2	Level-of-Service Definitions for Signalized Intersections	Page 10
Table 3	Level-of-Service Definitions for Unsignalized Intersections	Page 11
Table 4	Existing Levels-of-Service for Signalized Intersections	Page 12
Table 5	Existing Levels-of-Service for Unsignalized Intersections	Page 13
Table 6	Trip Generation Summary of Related Projects	Page 16
Table 7	Level-of-Service Analysis - Ke Alii Alanui Road at South Kihei Road	Page 27
Table 8	Level-of-Service Analysis - Ke Alii Alanui Road at Piilani Highway	Page 28
Table 9	Level-of-Service Analysis - Ke Alii Alanui at Kanakanui Road	Page 29
Table 10	Level-of-Service Analysis - Ke Alii Alanui at North-South Collector	Page 30
Table 11	Level-of-Service Analysis - Piilani Highway at Keonekai Road	Page 31
Table 12	Level-of-Service Analysis - Keonekai Road at Kanakanui Road	Page 31
Table 13	Level-of-Service Analysis - South Kihei Road at Keonekai Road	Page 32
Table 14	Level-of-Service Analysis - North-South Collector at Walua Place	Page 32
Table 15	Level-of-Service Analysis - South Kihei Road at Aloha Village	Page 33
Table 16	Level-of-Service Analysis - Keonekai Road at North-South Collector	Page 33
Table 17	Level-of-Service Analysis - North-South Collector Road at Ke Alii 2 Subdivision	Page 34
Table 18	Level-of-Service Analysis - North South Collector Road at Aloha Village Connector	Page 34

1. INTRODUCTION

Phillip Rowell and Associates has been retained by Towne Development of Hawaii, Inc. to prepare the following traffic study for the proposed North-South Collector Road (NSCR) in Kihei, Maui, Hawaii. This introductory chapter discusses the location of the project, describes the proposed project, the study area, the study methodology and order of presentation.

Project Location and Description

The project is the NSCR between Ke Alii Alanui and Keonekai Road in the South Kihei area of Maui. The location of the proposed roadway and the study area is shown in Figure 1.

The section between Ke Alii Alanui and Walua Place has been completed to the planned cross-section, including curbs, gutters, sidewalks and landscaping. The section between Walua Place and the Ke Alii 2 single-family subdivision will be completed as part of the Ke Alii 2 subdivision project. The section will be completed to the full planned cross-section.

The section between Ke Alii 2 subdivision and Keonekai Road is the subject of this study. Towne Development has offered to construct this section of roadway as their contribution to mitigate traffic conditions in South Kihei. The proposal is to construct two travel lanes only. Curbs, gutters, sidewalks and landscaping will be constructed by the developers of the remaining parcels as they are developed

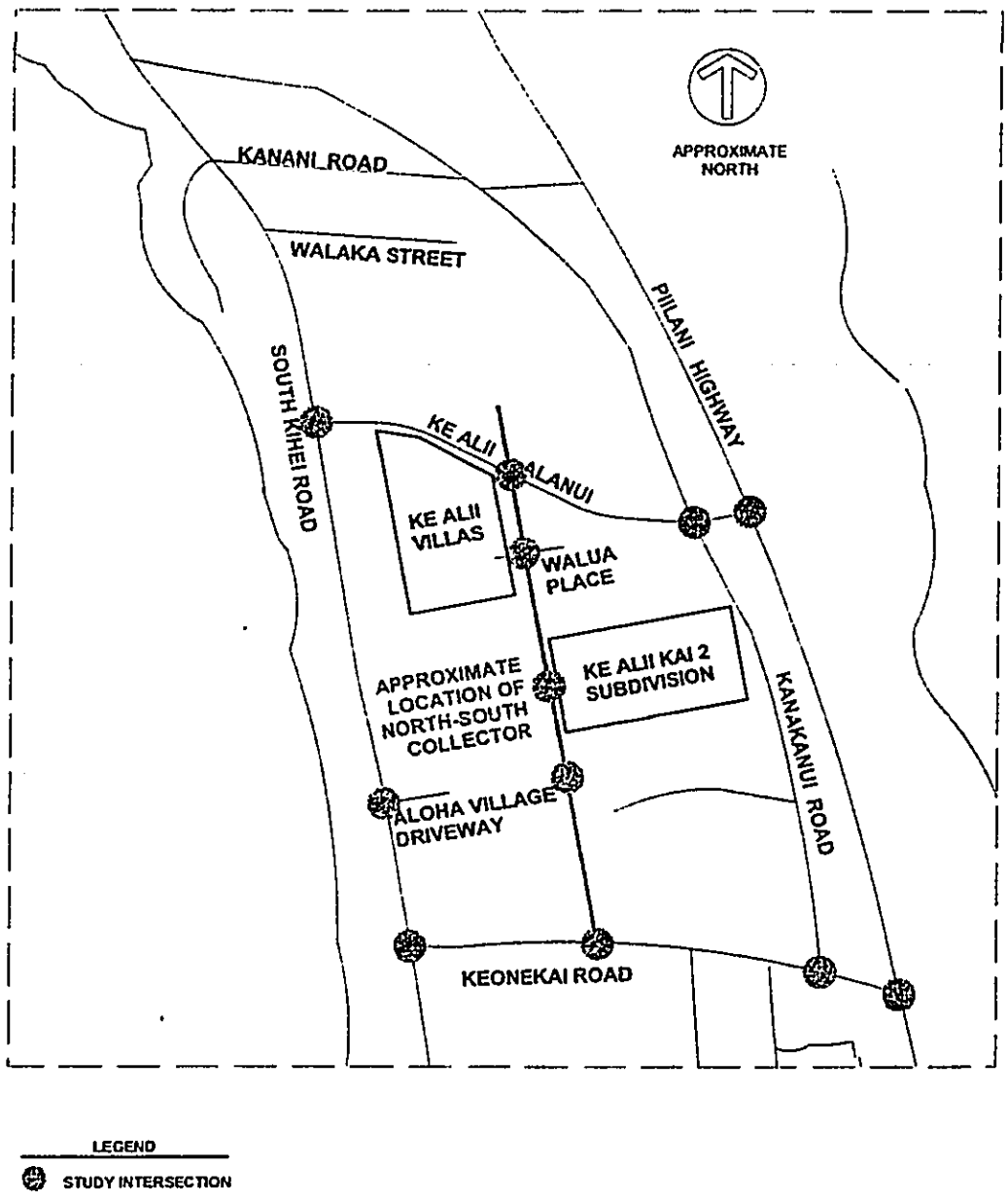

Figure 1
PROJECT LOCATION MAP

Study Area

The study area is the area bounded by Ke Alii Alanui along the north, Piilani Highway along the east, Keonekai Drive along the south, and South Kihei Road along the west. This area is shown in Figure 1.

The key intersections within the study area are also shown in Figure 1. These intersections are listed in Table 1 along with the characteristics of the intersection.

Table 1 Study Intersections

No.	Intersection	Right-of-Way Control	Jurisdiction
1	Ke Alii Alanui at South Kihei Road	Signalized	County
2	Ke Alii Alanui at North-South Collector Road	Unsignalized	County
3	Ke Alii Alanui at Piilani Highway	Signalized	State
4	Keonekai Road at South Kihei Road	Unsignalized	County
5	Keonekai Road at North-South Collector Road	Unsignalized	County
6	Keonekai Road at Piilani Highway	Unsignalized	State
7	South Kihei Road at Aloha Village Driveway	Unsignalized	County
8	North-South Collector Road at Walua Place	Unsignalized	County

Study Methodology and Order of Presentation

1. The first task was to collect and summarize background traffic data. The data collected consisted of existing peak hour traffic counts, intersection configurations, traffic control information and speed limits. Existing traffic volumes were obtained from the traffic studies for Ke Alii Villas[1] and Ke Alii 2 Subdivision[2].

   The Maui Police Department was also contacted to determine traffic issues they were concerned with and issues raised by the community. A copy of their correspondence is provided as Appendix A.

   Using the data collected, existing traffic operating conditions within the study area were quantified. The appropriate methodology for signalized and unsignalized intersections described in the 2000 *Highway Capacity Manual* (HCM) [3] was used to determine the levels-of-service of the study intersections.

[1] Phillip Rowell and Associates, TIAR for Ke Alii Villas, October 2002

[2] Phillip Rowell and Associates, TIAR for Ke Alii Kai 2 Subdivision, June 2003

[3] *Highway Capacity Manual*, Institute of Transportation Engineers, Washington, D.C., 2000

2. The second task was to select a horizon design year and estimate future traffic volumes without the NSCR. The year 2020 was selected as the design year. Using 2020 as the design year is consistent with the design year of the *Maui Long-Range Land Transportation Plan*[4] and the *Makena Resort Master Plan Traffic Study*[5], which will add traffic to the Kihei roadway network.

   Estimation of 2020 background traffic projections without the NSCR was accomplished with a two step process. The first was to expand existing traffic volumes by the appropriate growth factor, which is 1.6% per year for 17 years (2003 to 2020). Second, traffic generated by future developments, referred to as "related projects," within and adjacent to the study area was superimposed on the traffic forecasts. There were two components to related projects traffic. The first was the traffic generated by development projects which had a development plan. For these projects, traffic assignments were obtained from the traffic study for the project or traffic was estimated based on the project description. The second component was traffic generated by related projects for which no development plan was available. For these projects, future traffic was estimated based on the development allowed by the current zoning. The result was an estimate of future traffic projections upon build out of the area within and adjacent to the study area.

3. The next task was to estimate 2020 traffic forecasts for roadway conditions with the NSCR in place. This was done by estimating the amount of background traffic diverted from Piilani Highway and South Kihei Road to the NSCR and manually reassigning traffic generated by the related projects.

4. The impacts of the proposed NSCR were quantified by performing a level-of-service analysis of the study intersections for 2020 conditions without and with the NSCR. The results were then compared to identify the changes in the volumes and levels-of-service of the study intersections.

---

[4] *Maui Long-Range Land Transportation Plan*, Kaku Associate's, Inc., February 1997

[5] *Makena Resort Master Plan Traffic Study*, Phillip Rowell and Associates, April 2003

Order of Presentation

Chapter 2 describes existing traffic conditions, the level-of-service concept and the results of the level-of-service analysis for existing conditions.

Chapter 3 describes the process used to estimate 2020 traffic projections and presents the projections without and with the NSCR.

Chapter 4 presents the comparison of the levels-of-service without and with the NSCR.

Chapter 5 summarizes the study and conclusions.

2. ANALYSIS OF EXISTING CONDITIONS

This chapter presents the existing traffic conditions on the roadways adjacent to the proposed project. The level-of-service concept and the results of the level-of-service analysis for existing conditions are also presented.

Description of Existing Streets and Intersection Controls

Piilani Highway

Piilani Highway is a major State highway connecting Kihei and Wailea. In the vicinity of the proposed project, the highway is a two-lane, two-way facility with separate left turn lanes. The posted speed limit is 40 miles per hour (mph). The intersection of Piilani Highway at Ke Alii Alanui is signalized.

South Kihei Road

South Kihei Road is a two-lane, two-way north-south County road connecting Kihei with Wailea and Makena. The posted speed limit adjacent to the study area is 30 mph. There are separate turn lanes along South Kihei Road at the intersections with Ke Alii Alanui, the Aloha Village Entrance and Keonekai Road. The intersection with Ke Alii Alanui is signalized. The remaining intersections within the study area are unsignalized.

Ke Alii Alanui

Ke Alii Alanui is a two-lane, two-way roadway between Piilani Highway and South Kihei Road. There is parking along both sides of the roadway along most of the length.

Kanakanui Road

Kanakanui Road is generally a two-lane, two-way roadway parallel to Piilani Highway. There are separate turn lanes at the intersection with Ke Alii Alanui. The intersections of Kanakanui Road at Ke Alii Alanui and at Keonekai Road are STOP sign controlled.

North-South Collector

The North-South Collector has been constructed between Ke Alii Alanui and Walua Place. There is one lane in each direction and separate left turn lanes at the intersections. The intersection of Ke Alii Alanui and the North-South Collector is STOP sign controlled with the STOP sign along the North-South Collector.

Existing Peak Hour Traffic Volumes

The existing morning and afternoon peak hour traffic volumes are shown in Figures 2 and 3, respectively. The peak hour volumes were determined from traffic counts of the study intersections.

1. The traffic counts were performed after Piilani Highway was widened from two to four lanes.

2. Kamalii Elementary School was in session during the counts.

3. The counts shown include buses, large vehicles and motorcycles. They do not include bicycles and mopeds.

4. The total approach and departure volumes may not match those of adjacent intersections because the peak hour of one intersection may be different from that of an adjacent intersection and because there are driveways and on-street parking between intersections.

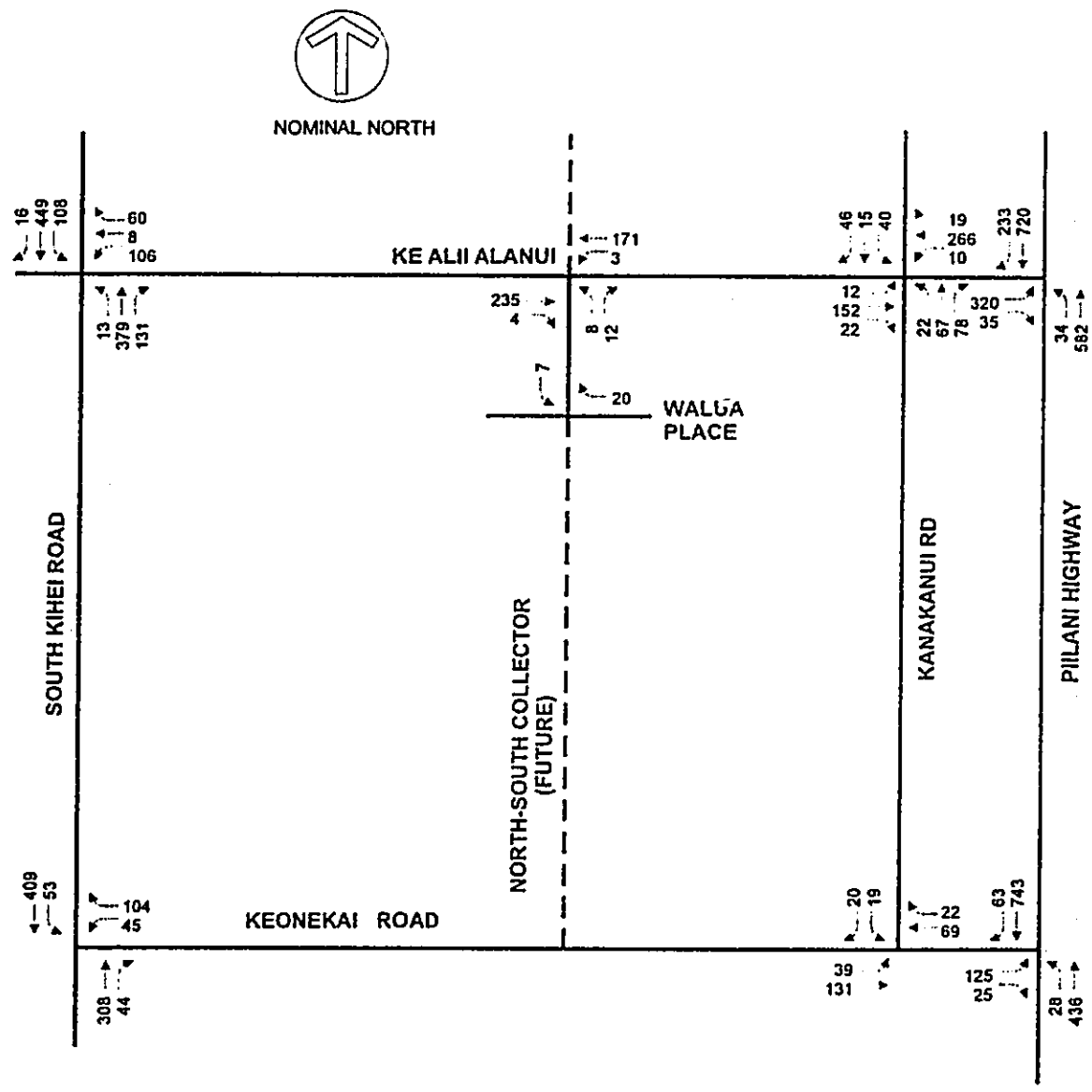

Figure 2
EXISTING (2003) AM PEAK HOUR TRAFFIC VOLUMES

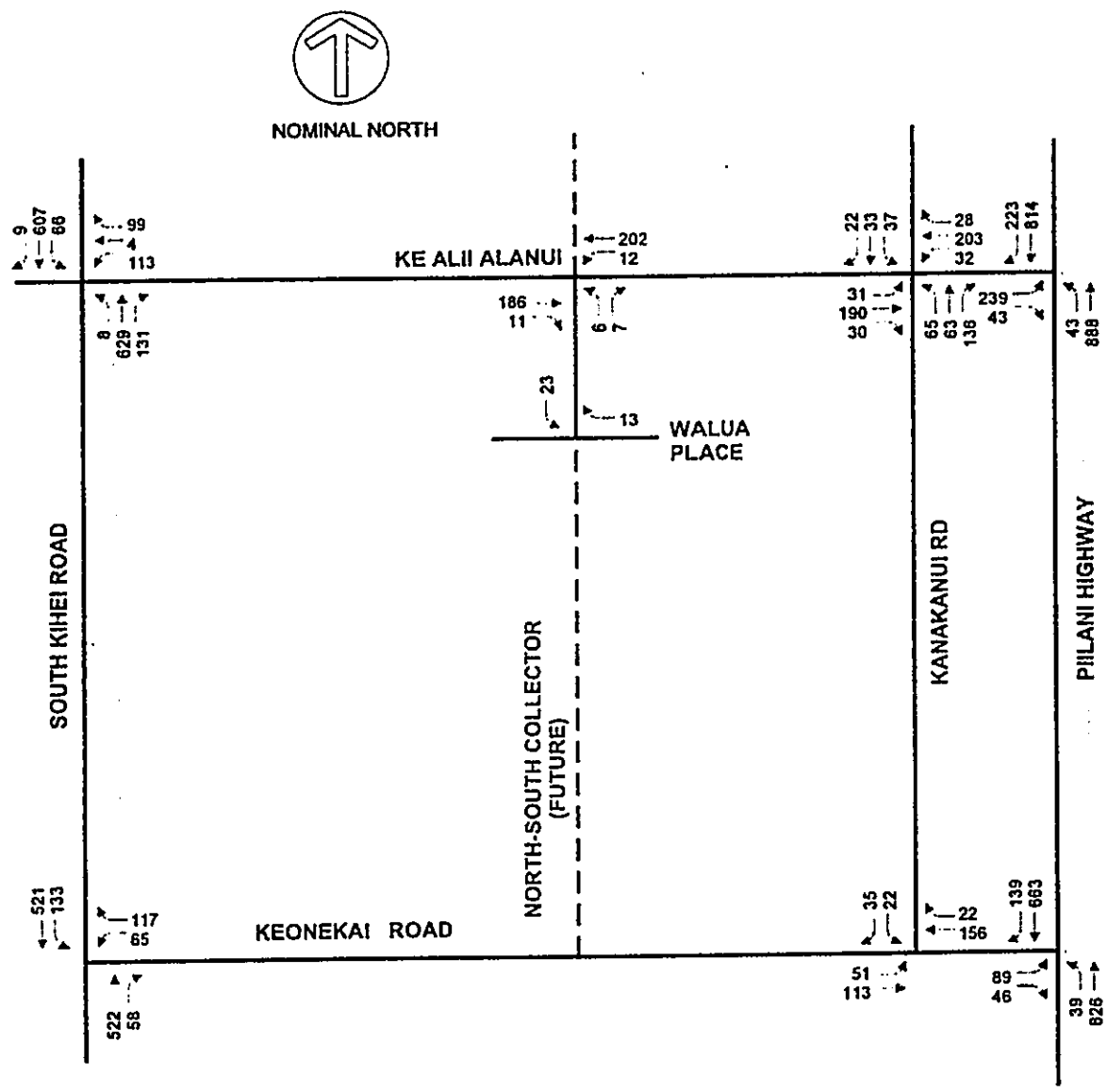

Figure 3
EXISTING (2003) PM PEAK HOUR TRAFFIC VOLUMES

CORRECTION

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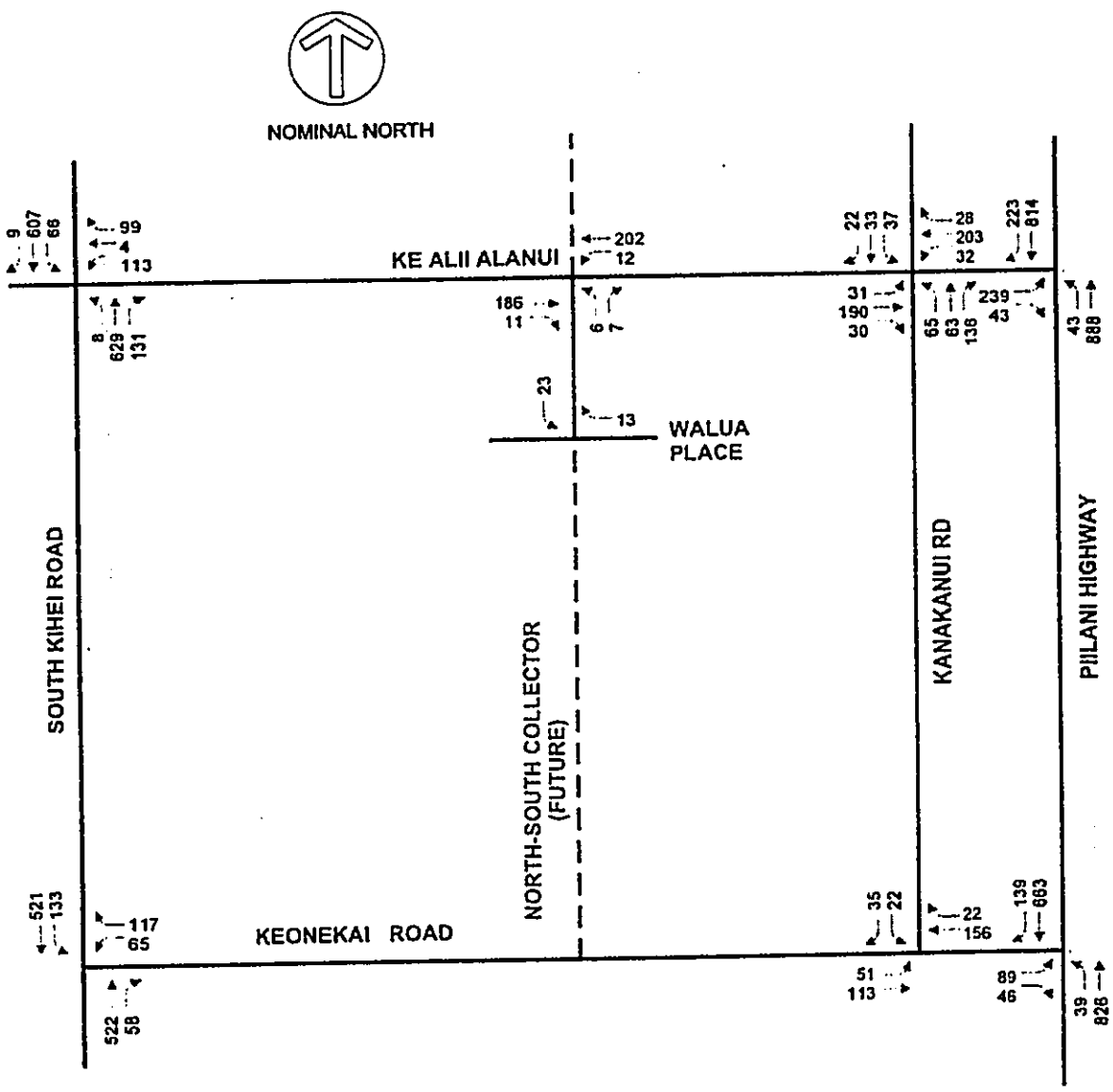


Figure 3
EXISTING (2003) PM PEAK HOUR TRAFFIC VOLUMES

Level-of-Service Concept

Signalized Intersections

The operations method described in the *2000 Highway Capacity Manual* (HCM) was used to analyze the operating efficiency of the signalized intersections.

"Level-of-Service" is a term which denotes any of an infinite number of combinations of traffic operating conditions that may occur on a given lane or roadway when it is subjected to various traffic volumes. Level-of-service (LOS) is a qualitative measure of the effect of a number of factors which include space, speed, travel time, traffic interruptions, freedom to maneuver, safety, driving comfort and convenience.

There are six levels-of-service, A through F, which relate to the driving conditions from best to worst, respectively. The characteristics of traffic operations for each level-of-service are summarized in Table 2. In general, LOS A represents free-flow conditions with no congestion. LOS F, on the other hand, represents severe congestion with stop-and-go conditions. Level-of-service D is typically considered acceptable for peak hour conditions in urban areas.

Corresponding to each level-of-service shown in the table is a volume/capacity ratio. This is the ratio of either existing or projected traffic volumes to the capacity of the intersection. Capacity is defined as the maximum number of vehicles that can be accommodated by the roadway during a specified period of time. The capacity of a particular roadway is dependent upon its physical characteristics such as the number of lanes, the operational characteristics of the roadway (one-way, two-way, turn prohibitions, bus stops, etc.), the type of traffic using the roadway (trucks, buses, etc.) and turning movements.

Table 2 Level-of-Service Definitions for Signalized Intersections[1]

Level of Service	Interpretation	Volume-to-Capacity Ratio[2]	Stopped Delay (Seconds)
A, B	Uncongested operations; all vehicles clear in a single cycle.	0.000-0.700	<20.0
C	Light congestion; occasional backups on critical approaches	0.701-0.800	20.1-35.0
D	Congestion on critical approaches but intersection functional. Vehicles must wait through more than one cycle during short periods. No long standing lines formed.	0.801-0.900	35.1-55.0
E	Severe congestion with some standing lines on critical approaches. Blockage of intersection may occur if signal does not provide protected turning movements.	0.901-1.000	55.1-80.0
F	Total breakdown with stop-and-go operation	>1.001	>80.0

Notes:
(1) Source: *Highway Capacity Manual*, 2000.
(2) This is the ratio of the calculated critical volume to Level-of-Service E Capacity.

Unsignalized Intersections

Like signalized intersections, the operating conditions of intersections controlled by stop signs can be classified by a level-of-service from A to F. However, the method for determining level-of-service for unsignalized intersections is based on the use of gaps in traffic on the major street by vehicles crossing or turning through that stream. Specifically, the capacity of the controlled legs of an intersection is based on two factors: 1) the distribution of gaps in the major street traffic stream, and 2) driver judgement in selecting gaps through which to execute a desired maneuver. The criteria for level-of-service at an unsignalized intersection is therefore based on delay of each turning movement. Table 3 summarizes the definitions for level-of-service and the corresponding delay. A subsequent calculation to determine an overall LOS was made, and these results are presented in tables to summarize traffic conditions using parameters similar to those used for signalized intersections.

Table 3 Level-of-Service Definitions for Unsignalized Intersections[1]

Level-of-Service	Expected Delay to Minor Street Traffic	Delay (Seconds)
A	Little or no delay	<10.0
B	Short traffic delays	10.1 to 15.0
C	Average traffic delays	15.1 to 25.0
D	Long traffic delays	25.1 to 35.0
E	Very long traffic delays	35.1 to 50.0
F	See note (2) below	>50.1

Notes:
(1) Source: *Highway Capacity Manual*, 2000.
(2) When demand volume exceeds the capacity of the lane, extreme delays will be encountered with queuing which may cause severe congestion affecting other traffic movements in the intersection. This condition usually warrants improvement of the intersection.

Level-of-Service Analysis of Existing Conditions

The results of the Level-of-Service analysis of the signalized intersections are shown in Table 4. Shown in the table are the volume-to-capacity ratio, the control delay and the Level-of-Service of overall intersection.

The intersection of Ke Alii Alanui at South Kihei Road operates at Level-of-Service B during the morning and afternoon peak hours.

The intersection of Ke Alii Alanui at Piilani Highway, operates at Level-of-Service B during both peak periods.

Table 4 Existing Levels-of-Service for Signalized Intersections[3]

Intersection and Movement	AM Peak Hour			PM Peak Hour		
	V/C	Delay [1]	LOS [2]	V/C	Delay [1]	LOS [2]
Ke Alii Alanui at South Kihei Road	0.44	13.7	B	0.70	14.3	B
Ke Alii Alanui at Piilani Highway	0.52	12.0	B	0.50	10.6	B

NOTES:
(1) Delay in seconds per vehicle.
(2) LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. Level-of-Service is based on delay.
(3) Source: TIAR for Ke Alii Kai 2 Subdivision, June 2003.

The results of the Level-of-Service analysis of the unsignalized intersections are summarized in Table 5. Shown are the control delays and Levels-of-Service of each controlled lane group. Volume-to-capacity ratios are not calculated for unsignalized intersections. As shown all movements operate at Level-of-Service C or better during both peak periods, except the left turn from eastbound Keonekai Road to northbound Piilani Highway which will operate at Level-of-Service D during the morning peak hour.

Table 5 Existing Levels-of-Service for Unsignalized Intersections[3]

Intersection and Movement	AM Peak Hour		PM Peak Hour	
	Delay[1]	LOS[2]	Delay	LOS
Ke Alii Alanui at Kanakanui Road				
Eastbound Left & Thru	7.9	A	7.8	A
Westbound Left & Thru	7.6	A	7.8	A
Northbound Left	12.5	B	15.9	C
Northbound Thru & Right	12.8	B	13.6	B
Southbound Left	15.9	C	18.5	C
Southbound Thru & Right	10.7	B	13.2	B
Ke Alii Alanui at North-South Collector				
Westbound Left	7.8	A	7.7	A
Northbound Left	12.0	B	12.0	B
Northbound Right	9.9	A	9.5	A
Piilani Highway at Keonekai Road				
Northbound Left	10.4	B	10.5	B
Eastbound Left	27.3	D	23.2	C
Eastbound Right	11.9	B	11.7	B
Keonekai Road at Kanakanui Road				
Eastbound Left & Thru	7.5	A	7.8	A
Southbound Left & Right	10.1	B	10.9	B
S. Kihei Road at Keonekai Road				
Southbound Left	8.4	A	10.0-	A
Westbound Left	12.4	B	20.1	C
Westbound Right	9.6	A	10.4	B
North-South Collector at Walua Place				
Northbound Left	7.2	A	7.2	A
Southbound Left	7.2	A	7.2	A
Westbound Left	8.9	A	8.9	A
Westbound Left & Thru	8.2	A	8.3	A
Eastbound Left	9.1	A	9.0	A
Eastbound Left & Thru	8.3	A	8.3	A

NOTES:
(1) Delay is in seconds per vehicle.
(2) LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. Level-of-Service is based on delay.
(3) Source: TIAR for Ke Alii Kai 2 Subdivision, June 2003.

The conclusions of the Level-of-Service analysis are:

1. There is sufficient capacity for all movements and levels-of-service are acceptable.

2. All movements operate at Level-of-Service C or better during both peak periods except the left turn from eastbound Keonekai Road to northbound Piilani Highway which will operate at Level-of-Service D during the morning peak hour.

3. 2020 TRAFFIC FORECASTS

The purpose of this chapter is to discuss the assumptions and data used to estimate 2020 traffic forecasts.

Basically, future traffic growth consists of two components. The first is ambient background growth that is a result of regional growth and cannot be attributed to a specific project. The second component is estimated traffic that will be generated by other development projects in the vicinity of the proposed project. This is consistent with the typical traffic impact study.

The difference between this study and a typical traffic impact study is in developing traffic forecasts for the related projects. In this study traffic generated by vacant parcels within the study area was estimated and added to the traffic forecast for planned development projects. The result is an estimate of future traffic upon build-out of the study area.

Background Traffic Growth

The *Maui Long Range Transportation Plan*[6] concluded that traffic in Maui would increase an average of 1.6% per year from 1990 to 2020. This growth rate was used to estimate the background traffic growth between 2003 and 2020, which is the design year for this project. The growth factor was calculated to be 1.31 using the following formula:

$$F = (1 + i)^n$$

where F = Growth Factor
i = Average annual growth rate, or 0.016
n = Growth period, or 17 years

This growth factor was applied to all traffic movements at the study intersections.

Related Projects

The projects that were identified as related projects and the estimated number of peak hour trips generated by each are summarized in Table 6. The locations of these projects are shown in Figure 4.

Table 6 Trip Generation Summary of Related Projects

			AM Peak Hour			PM Peak Hour		
	Related Project	Description	Total	In	Out	Total	In	Out
1	Ke Alii Condos	160 MF	124	98	26	42	27	15
2	Ke Alii Single-Family		89	21	68	116	75	41
3	Kamaole Hotel	250 Unit Hotel	187	115	72	215	143	72
4	Kamaole Condos		34	29	5	58	35	23
5	Aloha Village	78 MF	34	6	28	42	27	15
6	Paradise Ridge	32 MF	14	3	11	17	11	6
7	Cove Beach Villas	32 MF	21	5	16	27	15	12
8	Hale Kanani	72 MF	60	48	12	94	60	34
9	Kamaole Homesteads	7 SF	5	1	4	7	4	3
10	Kamaole Hts Senior Housing, Phase 2	40 Sr Housing Units	35	23	12	42	27	15
11	Vacant Parcel, NE corner South Kihei Rd at Keonekai Rd	150 MF	69	17	52	72	59	33
		TOTALS	603	349	254	660	424	236

[6] Kaku Associates, October 1996

2020 Traffic Forecasts

2020 traffic forecasts were calculated by expanding existing traffic volumes by the appropriate growth rate and then superimposing traffic generated by related projects. The resulting 2020 traffic projections for conditions without the NSCR are shown as Figures 5 and 6, respectively. The 2020 traffic projections with the NSCR in place are shown as Figures 7 and 8, respectively.

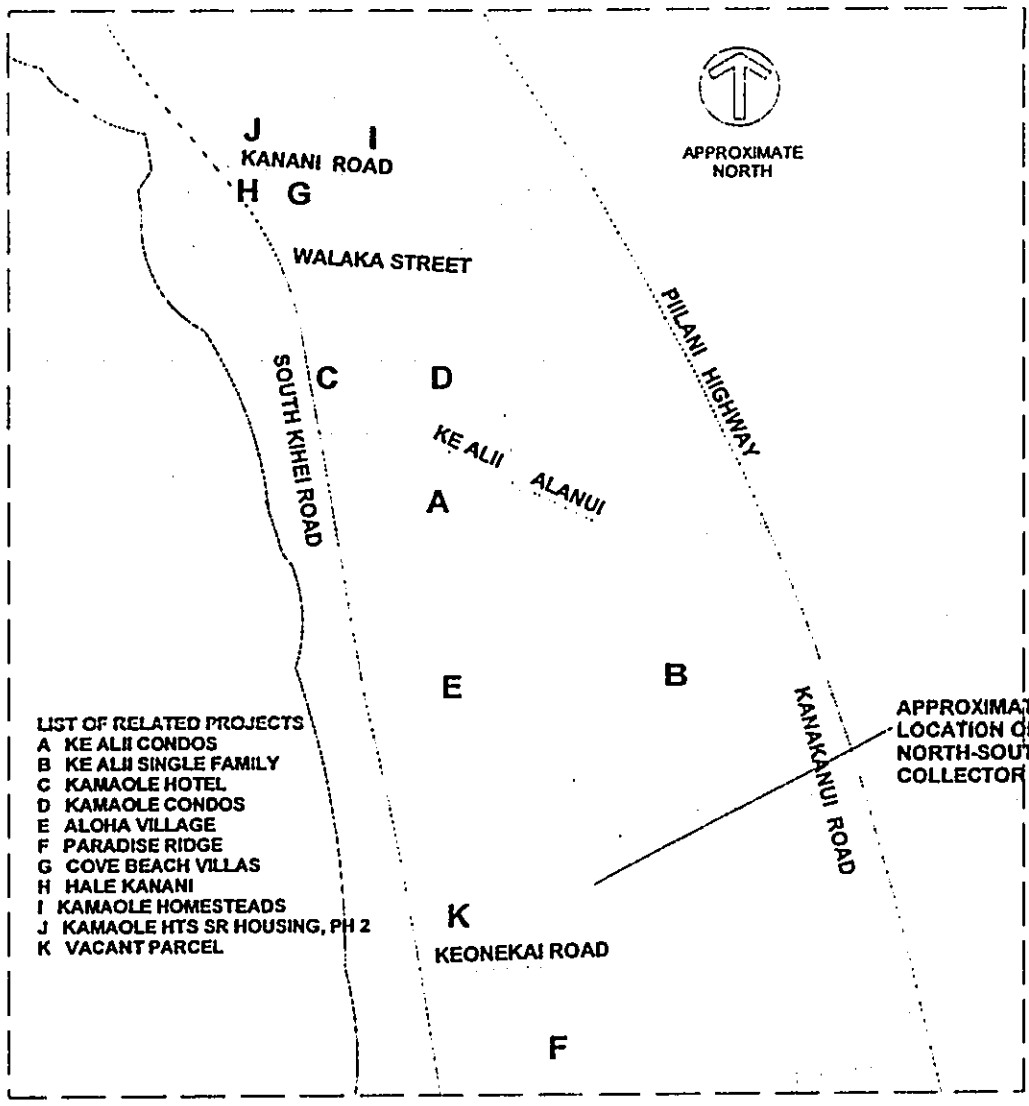


Figure 4
LOCATIONS OF RELATED PROJECTS

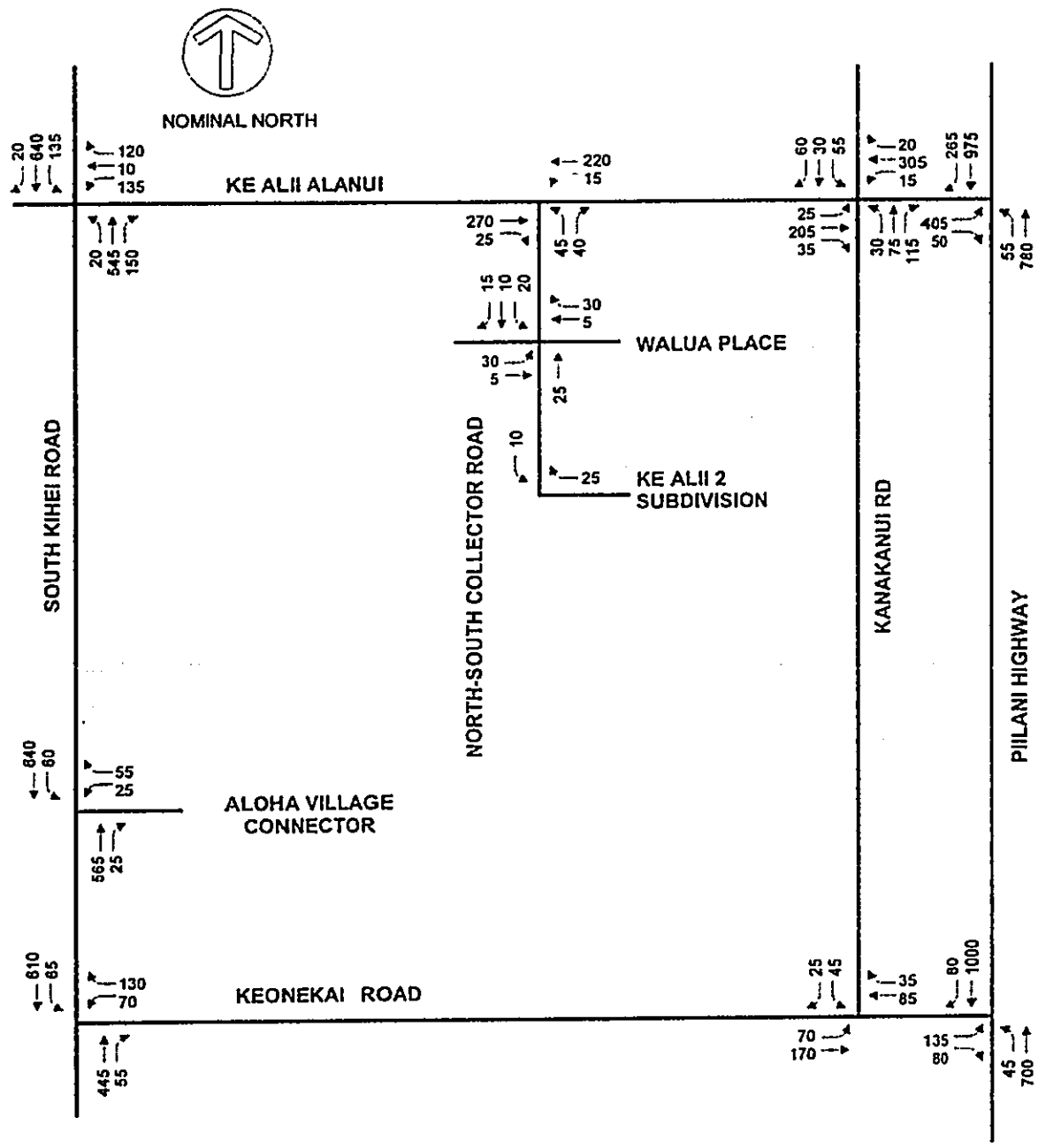


Figure 5
2020 AM PEAK HOUR TRAFFIC PROJECTIONS
WITHOUT NORTH-SOUTH COLLECTOR ROAD

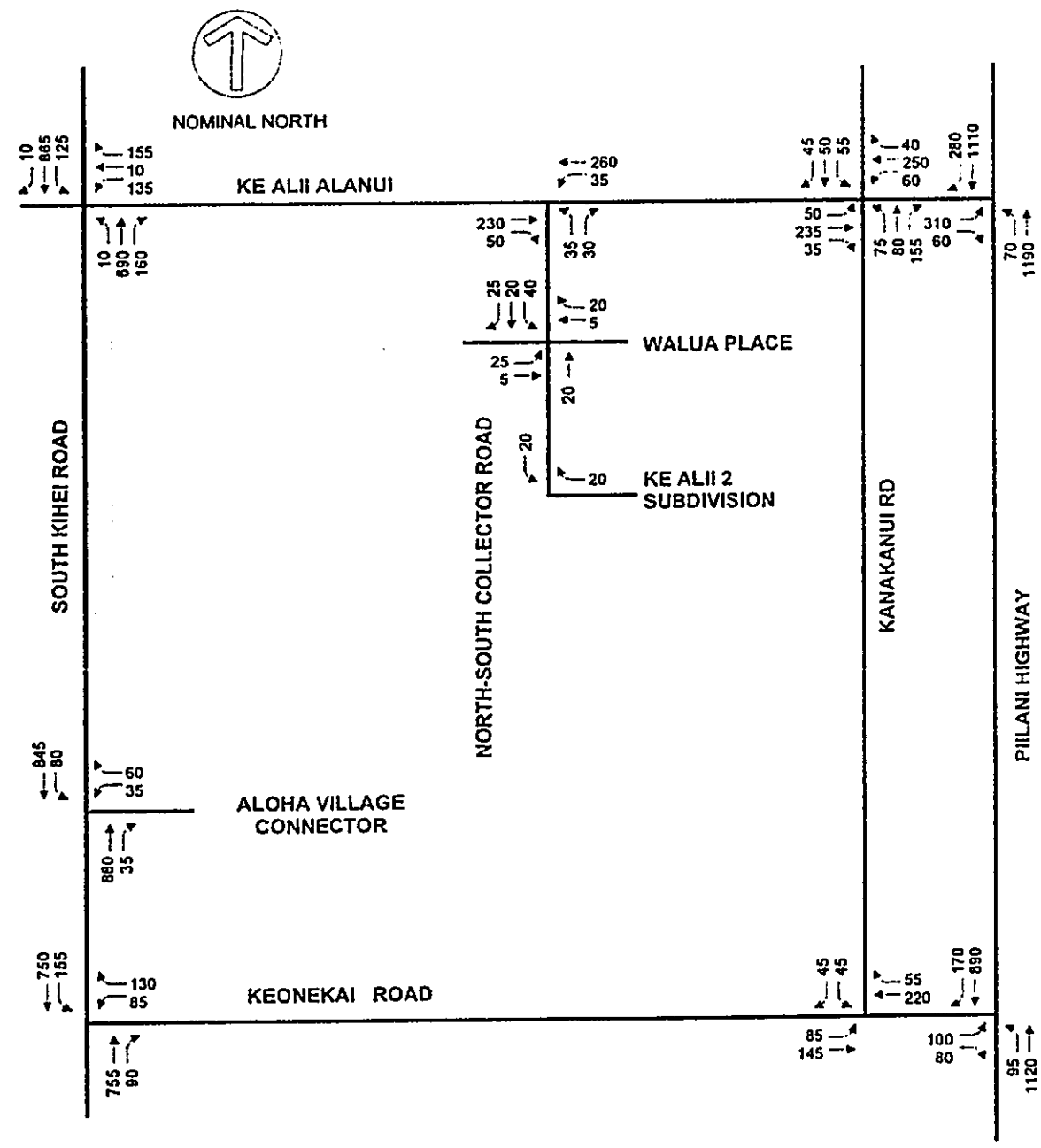


Figure 6
2020 PM PEAK HOUR TRAFFIC PROJECTIONS
WITHOUT NORTH-SOUTH COLLECTOR ROAD

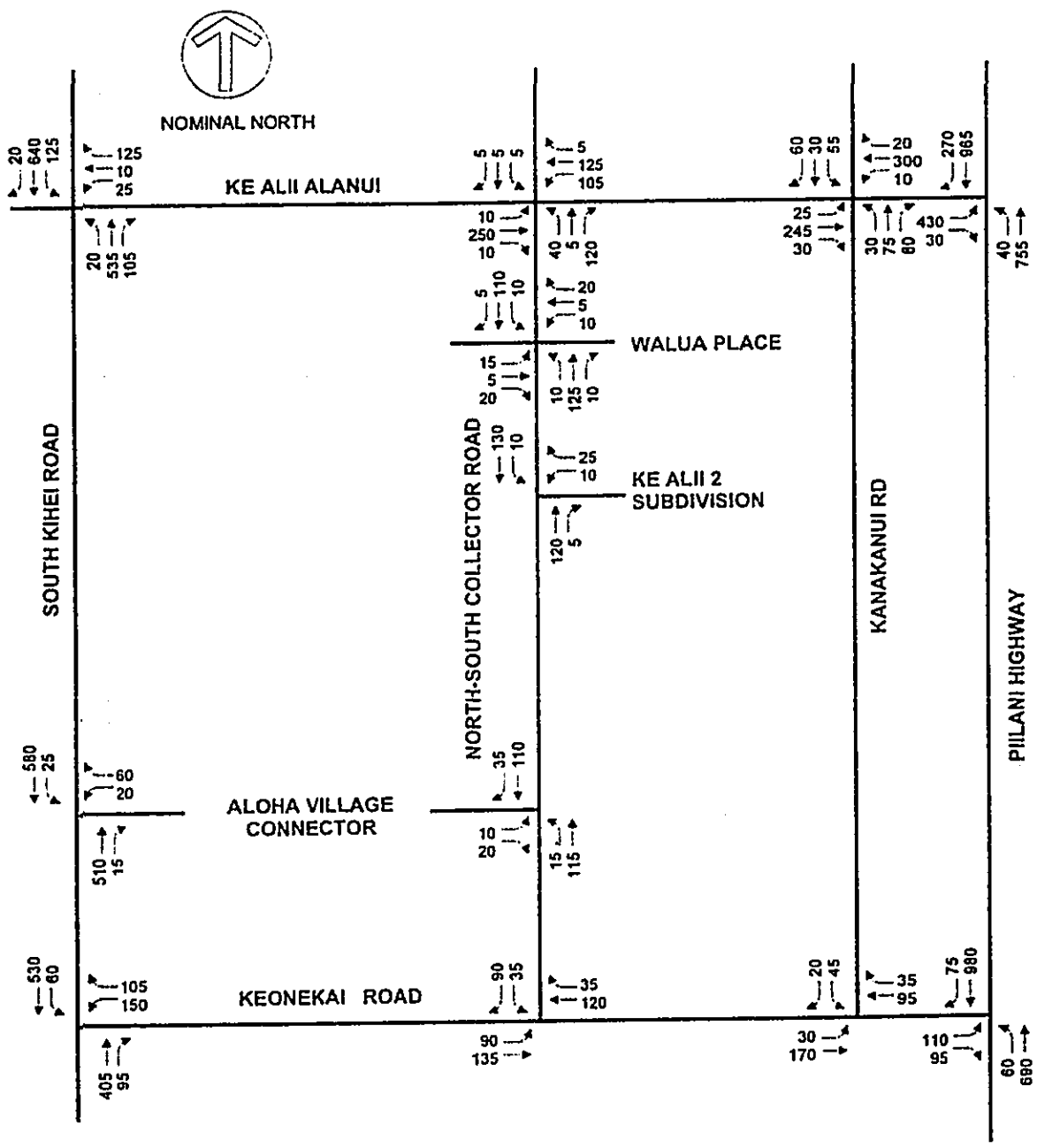


Figure 7
2020 AM PEAK HOUR TRAFFIC PROJECTIONS
WITH NORTH-SOUTH COLLECTOR ROAD

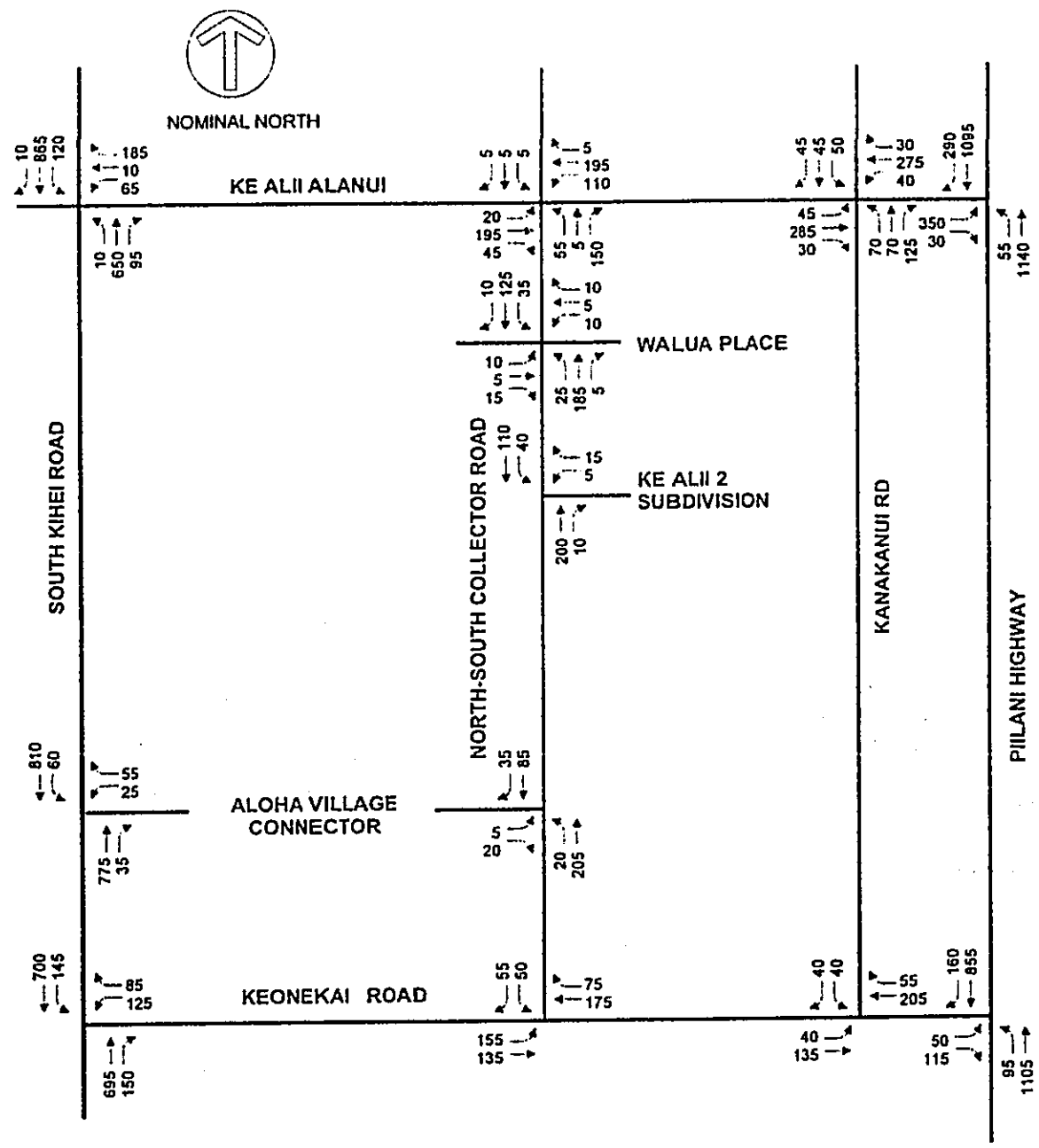


Figure 8
2020 PM PEAK HOUR TRAFFIC PROJECTIONS
WITH NORTH-SOUTH COLLECTOR ROAD

4. ANALYSIS OF IMPACTS OF NSCR

The purpose of this chapter is to summarize the results of the level-of-service analysis for conditions without and with the NSCR. The impacts of the NSCR were assessed by comparing before and after approach and departure volumes at the key intersections and comparing the levels-of-service of the study intersections without and with the NSCR. Lastly, an analysis of the traffic along the NSCR was performed to determine the generator of future traffic along the roadway.

Changes in Peak Hour Traffic Volumes

The changes in the peak hour traffic volumes along South Kihei Road and Piilani Highway are illustrated graphically in Figures 9 and 10, respectively. Shown are the morning and afternoon total approach volumes without and with the NSCR.

1. AM peak hour traffic volumes along South Kihei Road will decrease 11% south of Ke Alii Alanui and 12% north of Keonekai Road.

2. PM peak hour volumes along South Kihei Road will decrease approximately 9%.

3. AM peak hour volumes along Piilani Highway will decrease approximately 3%.

4. PM peak hour volumes along Piilani Highway will decrease approximately 5%.

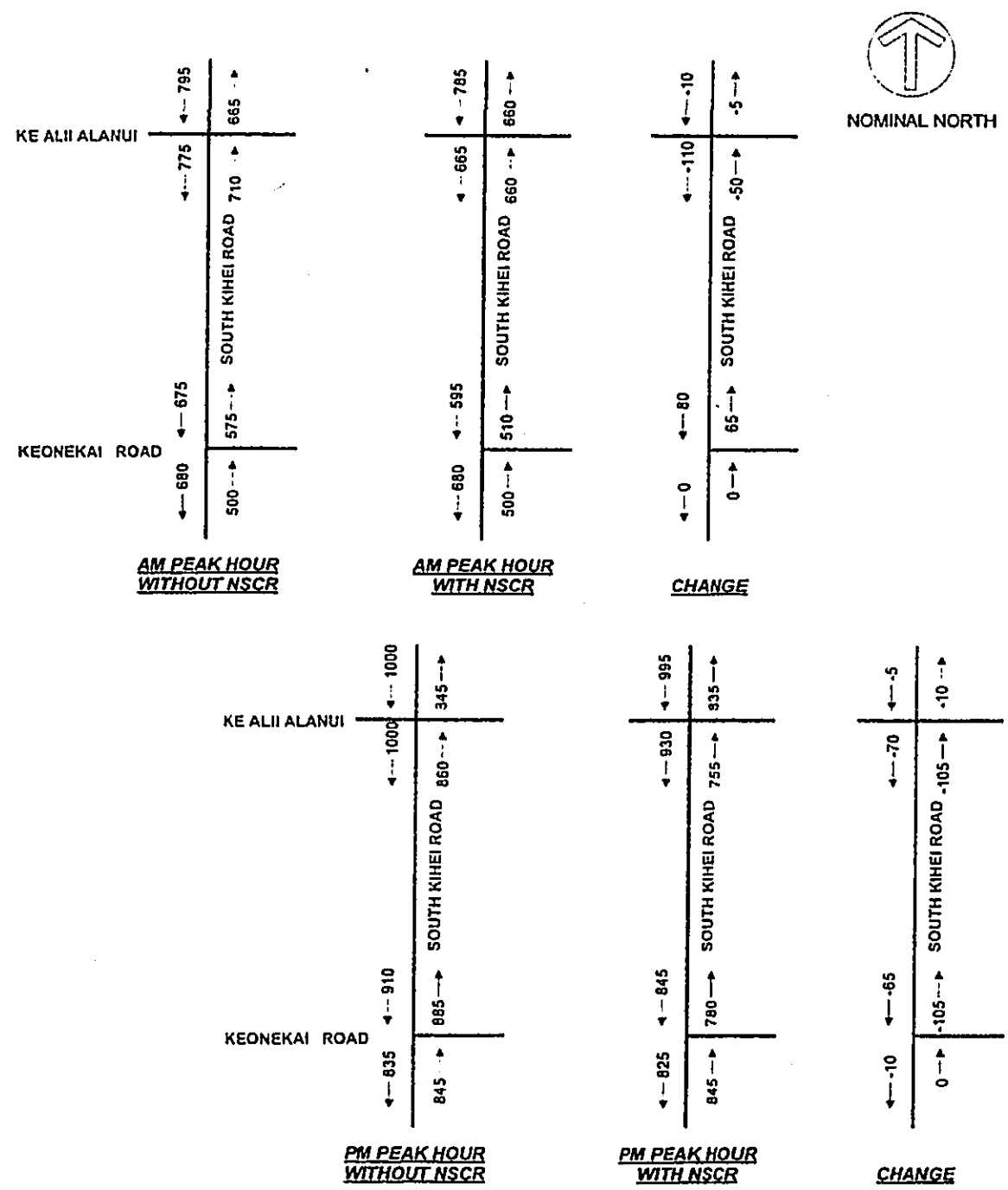


Figure 9
ANALYSIS OF PEAK HOUR VOLUME CHANGES ALONG SOUTH KIHEI ROAD

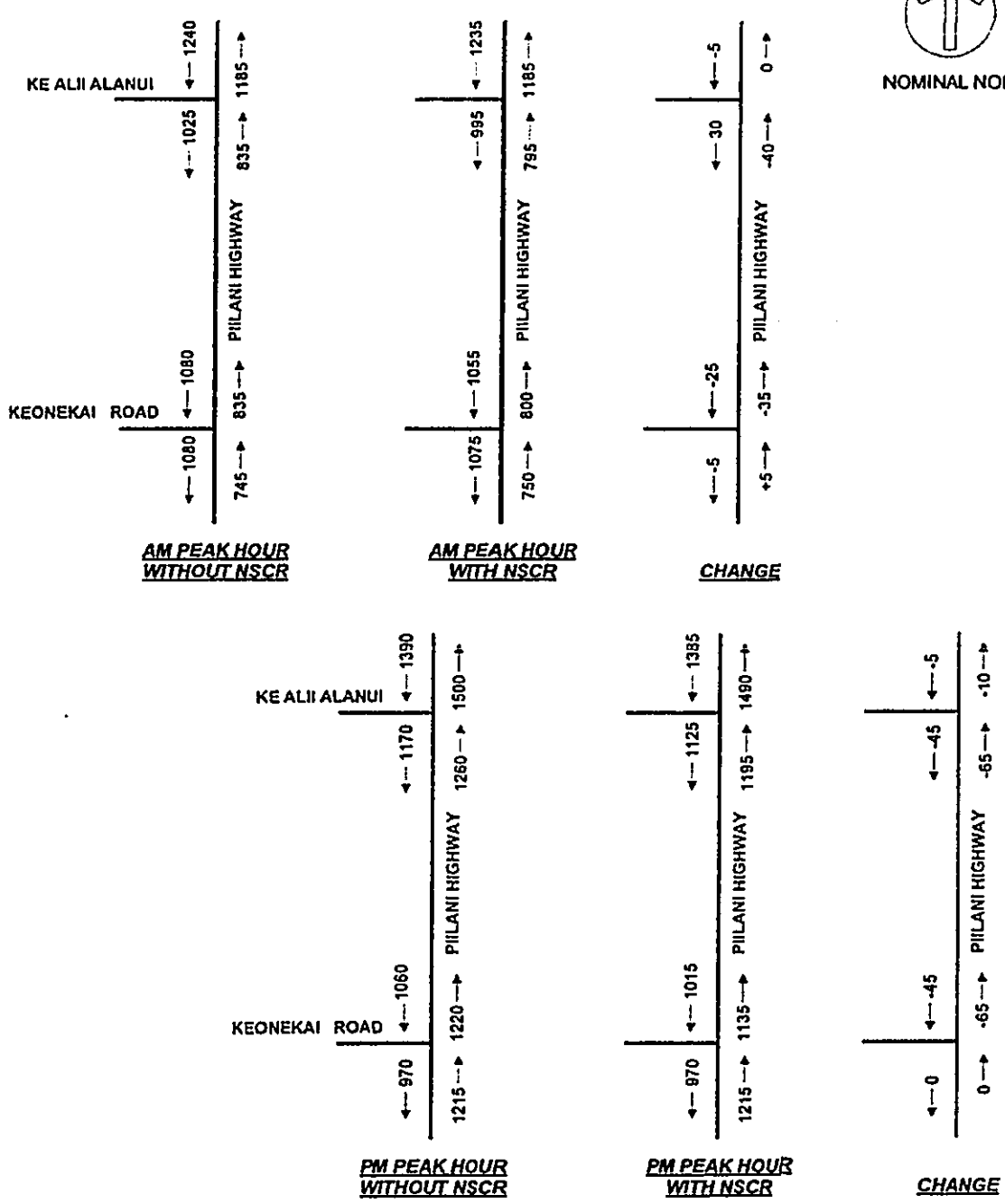


Figure 10
ANALYSIS OF PEAK HOUR VOLUME CHANGES ALONG PIILANI HIGHWAY

Changes in Level-of-Service

A level-of-service analysis was performed for conditions without and with the NSCR. The incremental difference between the two conditions is the impact of the project. The assumptions used for the level-of-service analysis are:

1. The NSCR is a two-lane, two-way roadway. Separate left turn lanes are provided at all intersections.

2. All new intersections are unsignalized.

The results of the level-of-service analysis is discussed separately for each study intersection and the project driveways.

Ke Alii Alanui at South Kihei Road

The results of the level-of-service analysis of the intersection of Ke Alii Alanui at South Kihei Road are summarized in Table 7. Shown are the volume-to-capacity ratios, delays and levels-of-service of the overall intersection and lane groups for morning and afternoon peak periods, without and with the NSCR.

Table 7 Level-of-Service Analysis - Ke Alii Alanui Road at South Kihei Road

Intersection and Movement	Without NSCR			With NSCR			Changes	
	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay
AM Peak Hour	0.71	28.4	C	0.65	27.8	C	-0.06	-0.6
Westbound Left & Thru	0.36	22.7	C	0.10	19.5	B	-0.26	-3.2
Westbound Right	0.21	20.8	C	0.22	20.9	C	0.01	0.1
Northbound Left	0.12	27.1	C	0.12	27.1	C	0.00	0.0
Northbound Thru	0.95	37.2	D	0.93	34.6	C	-0.02	-2.6
Northbound Right	0.16	11.1	B	0.09	10.5	B	-0.07	-0.6
Southbound Left	0.60	35.0	C	0.55	33.4	C	-0.05	-1.6
Southbound Thru & Right	0.81	22.3	C	0.81	22.3	C	0.00	0.0
PM Peak Hour	0.82	26.1	C	0.76	22.8	C	-0.06	-3.3
Westbound Left & Thru	0.62	41.9	D	0.33	33.7	C	-0.29	-8.2
Westbound Right	0.50	38.4	D	0.50	38.4	D	0.00	0.0
Northbound Left	0.08	33.5	C	0.08	33.5	C	0.00	0.0
Northbound Thru	0.95	31.9	C	0.89	27.9	C	-0.06	-4.0
Northbound Right	0.14	7.6	A	0.06	7.0	A	-0.08	-0.6
Southbound Left	0.55	38.1	D	0.53	37.5	D	-0.02	-0.6
Southbound Thru & Right	0.81	16.0	B	0.81	16.0	B	0.00	0.0

NOTES:
1. Peak hour conditions analyzed are "worst-case" conditions, which is the sum of the peak hour of the adjacent street plus the peak hour of the generator.
2. V/C denotes ratio of volume to capacity. V/C ratio is not calculated for unsignalized intersections.
3. Delay is in seconds per vehicle.
4. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay.

During the morning peak hour, the overall intersection volume-to-capacity ratio decreases from 0.71 (Level-of-Service C) without the NSCR to 0.65 (Level-of-Service C) with the NSCR. Based on delay, the intersection Level-of-Service will be C without and with the NSCR. With the NSCR, all movements improve except the westbound to northbound right turn. This volume increase slightly with the NSCR because traffic is diverted from the northbound through movement. The level-of-service does not change. The volume-to-capacity ratio increases only 0.01 and the delay increases only 0.1 second. These changes are negligible.

During the afternoon peak hour, the volume-to-capacity ratio decreases from 0.82 without the project to 0.76 with the project. All movements either improve or do not change, based on the volume-to-capacity ratio and average vehicle delay. The most significant change is to the northbound through movement. The volume-to-capacity ratio decreases from 0.95 to 0.89.

Ke Alii Alanui at Piilani Highway

The results of the Level-of-Service analysis for the intersection of Ke Alii Alanui at Piilani Highway are summarized on Table 8.

Table 8 Level-of-Service Analysis - Ke Alii Alanui Road at Piilani Highway

Intersection and Movement	Without NSCR			With NSCR			Changes	
	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay
AM Peak Hour	0.69	14.5	B	0.69	15.0	B	0.00	0.5
Eastbound Left	0.78	26.9	C	0.83	30.1	C	0.05	3.2
Eastbound Right	0.11	13.8	B	0.06	13.4	B	-0.05	-0.4
Northbound Left	0.42	34.1	C	0.31	30.5	C	-0.11	-3.6
Northbound Thru	0.45	8.4	A	0.44	8.3	A	-0.01	-0.1
Southbound Thru	0.67	14.0	B	0.66	13.9	B	-0.01	-0.1
Southbound Right	0.32	10.7	B	0.33	10.8	B	0.01	0.1
PM Peak Hour	0.68	14.7	B	0.69	14.6	B	0.01	-0.1
Eastbound Left	0.60	20.4	C	0.67	22.5	C	0.07	2.1
Eastbound Right	0.13	14.0	B	0.06	13.4	B	-0.07	-0.6
Northbound Left	0.54	38.7	D	0.42	34.1	C	-0.12	-4.6
Northbound Thru	0.69	11.3	B	0.66	10.9	B	-0.03	-0.4
Southbound Thru	0.76	16.0	B	0.75	15.8	B	-0.01	-0.2
Southbound Right	0.35	11.0	B	0.36	11.1	B	0.01	0.1

NOTES:
1. Peak hour conditions analyzed are "worst-case" conditions, which is the sum of the peak hour of the adjacent street plus the peak hour of the generator.
2. V/C denotes ratio of volume to capacity. V/C ratio is not calculated for unsignalized intersections.
3. Delay is in seconds per vehicle.
4. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay.

During the morning peak hour, there is no change in the overall intersection volume-to-capacity ratio and the average vehicle delay increases 0.5 second. The volume-to-capacity ratio of the eastbound to northbound left turn increases from 0.78 (Level-of-Service C) to 0.83 (Level-of-Service D). This is the result of traffic that currently uses Keonekai Drive being diverted to the NSCR.

During the afternoon peak hour, the overall intersection volume-to-capacity ratio increases from 0.68 to 0.69, which is equivalent to Level-of-Service B. However, the average vehicle delay decreases slightly by 0.1 second. The volume-to-capacity ratio of the eastbound to northbound left turn also increases by 0.07 for the same reason as the morning peak hour. The left turn still operates at Level-of-Service C without and with the NSCR.

As will be discussed in the following chapter, we have been informed by Hawaii Department of Transportation that a traffic signal will be installed at the intersection of Piilani Highway at Kanani Road within a year. This will divert traffic from the eastbound to northbound left turn and improve the level-of-service. Accordingly, no mitigation is recommended at this time.

Ke Alii Alanui at Kanakanui Road

The results of the Level-of-Service analysis of the intersection of Ke Alii Alanui at Kanakanui Road are summarized in Table 9. Since this intersection is unsignalized, only the delays and levels-of-service are shown.

Table 9 Level-of-Service Analysis - Ke Alii Alanui at Kanakanui Road

	AM Peak Hour				PM Peak Hour			
	Without NSCR		With NSCR		Without NSCR		With NSCR	
Intersection and Movement	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Eastbound Left	8.0	A	8.0	A	8.0	A	8.0	A
Westbound Left	7.8	A	7.9	A	8.0	A	8.1	A
Northbound Left	15.6	C	16.2	C	26.5	D	26.0	D
Northbound Thru & Right	15.2	C	15.8	C	19.5	C	18.2	C
Southbound Left	22.0	C	21.5	C	34.7	D	29.2	D
Southbound Thru & Right	12.6	B	12.7	B	16.9	C	16.4	C

NOTES:
1. Peak hour conditions analyzed are "worst-case" conditions, which is the sum of the peak hour of the adjacent street plus the peak hour of the generator.
2. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay

During the morning peak hour, all movements will operate at Level-of-Service C or better. The changes in delay to the northbound and southbound approaches are the result of increased eastbound and westbound traffic along Ke Alii Alanui. The higher traffic volumes cause traffic along the side street to wait longer to complete their maneuver.

During the afternoon peak hour, the northbound left turn and the southbound left turn will operate at Level-of-Service D, without and with the NSCR. There is a slight improvement with the NSCR, but not enough to improve the level-of-service.

Ke Alii Alanui at North-South Collector

The results of the Level-of-Service analysis of the intersection of Ke Alii Alanui at the North-South Collector is summarized in Table 10. Delays and levels-of-service are not shown for the eastbound left, the southbound left and through and the southbound right. These movements will not be allowed until the southbound approach of the NSCR at Ke Alii Alanui is constructed. The northbound left and through is currently a left turn only. The northbound through movement will not be allowed until the NSCR is constructed.

Table 10 Level-of-Service Analysis - Ke Alii Alanui at North-South Collector

	AM Peak Hour				PM Peak Hour			
	Without NSCR		With NSCR		Without NSCR		With NSCR	
Intersection and Movement	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Eastbound Left			7.5	A			7.8	A
Westbound Left	8.0	A	8.2	A	8.1	A	8.2	A
Northbound Left (& Thru)	14.8	B	20.4	C	15.7	C	25.0	D
Northbound Right	10.6	B	11.2	B	10.2	B	11.1	B
Southbound Left & Thru			20.7	C			23.9	C
Southbound Right			9.1	A			9.5	A

NOTES:
1. Peak hour conditions analyzed are "worst-case" conditions, which is the sum of the peak hour of the adjacent street plus the peak hour of the generator.
2. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay.

During the morning peak hour, all movements will operate at Level-of-Service C or better. During the afternoon peak hour, all movements will operate at Level-of-Service or better, except the northbound left and through. This movement will operate at Level-of-Service C without the NSCR and Level-of-Service D with the NSCR. Mitigation should be considered.

Piilani Highway at Keonekai Road

The results of the Level-of-Service analysis of the intersection of Piilani Highway at Keonekai Road is summarized in Table 11.

Table 11 Level-of-Service Analysis - Piilani Highway at Keonekai Road

	AM Peak Hour				PM Peak Hour			
	Without NSCR		With NSCR		Without NSCR		With NSCR	
Intersection and Movement	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Northbound Left	12.8	B	12.0	B	13.8	B	13.0	B
Eastbound Left	69.4	F	39.4	D	56.3	F	30.9	D
Eastbound Right	15.8	C	14.9	B	14.4	B	15.2	C

NOTES:
1. Peak hour conditions analyzed are "worst-case" conditions, which is the sum of the peak hour of the adjacent street plus the peak hour of the generator.
2 LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay

During the morning peak hour, the level-of-service of the eastbound to northbound left turn will improve from Level-of-Service F to Level-of-Service D. The average vehicle delay will decrease by 43%.

During the afternoon peak hour, the level-of-service of the eastbound to northbound left turn will improve from Level-of-Service F to Level-of-Service D. The average vehicle delay will decrease 45%.

Keonekai Road at Kanakanui Road

The results of the Level-of-Service analysis for the intersection of Keonekai Road at Kanakanui Road is summarized in Table 12.

Table 12 Level-of-Service Analysis - Keonekai Road at Kanakanui Road

	AM Peak Hour				PM Peak Hour			
	Without NSCR		With NSCR		Without NSCR		With NSCR	
Intersection and Movement	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Eastbound Left & Thru	7.7	A	7.6	A	8.2	A	8.0	A
Southbound Left & Right	12.1	B	11.4	B	14.4	B	12.4	B

NOTES:
1. Peak hour conditions analyzed are "worst-case" conditions, which is the sum of the peak hour of the adjacent street plus the peak hour of the generator.
2. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay.

There are no changes in the levels-of-service with the NSCR. All movements will operate at Level-of-Service A or B, without and with the NSCR.

South Kihei Road at Keonekai Road

The results of the Level-of-Service analysis for the intersection of South Kihei Road at Keonekai Road are summarized in Table 13.

Table 13 Level-of-Service Analysis - South Kihei Road at Keonekai Road

	AM Peak Hour				PM Peak Hour			
	Without NSCR		With NSCR		Without NSCR		With NSCR	
Intersection and Movement	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Southbound Left	9.1	A	9	A	12.6	B	12.4	B
Westbound Left	16.6	C	19.3	C	49.7	E	65.5	F
Westbound Right	10.2	B	9.9	A	11.6	B	10.9	B

NOTES:
1. Peak hour conditions analyzed are "worst-case" conditions, which is the sum of the peak hour of the adjacent street plus the peak hour of the generator.
2. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay.

During the morning peak hour, all movements will operate at Level-of-Service C or better. There are no changes in the levels-of-service as a result of the NSCR. During the afternoon peak hour, the Level-of-Service of the westbound to southbound left turn will decrease from Level-of-Service E to F. This is because southbound traffic along South Kihei Road will be diverted to the NSCR and Keonekai Road, which will make a left turn at the intersection.

North-South Collector at Walua Place

The results of the Level-of-Service analysis for the intersection of the North-South Collector at Walua Place is summarized in Table 14. All movements will operate at Level-of-Service B or better, without and with the NSCR.

Table 14 Level-of-Service Analysis - North-South Collector at Walua Place

	AM Peak Hour				PM Peak Hour			
	Without NSCR		With NSCR		Without NSCR		With NSCR	
Intersection and Movement	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Northbound Left	7.3	A	7.5	A	7.3	A	7.6	A
Southbound Left	7.3	A	7.2	A	7.3	A	7.8	A
Westbound Left	9.3	A	10.4	B	9.8	A	13.7	B
Westbound Thru & Right	8.8	A	8.9	A	8.9	A	10.9	B
Eastbound Left	9.8	A	10.4	B	10.2	B	13.9	B
Eastbound Thru & Right	9.1	A	9.4	A	9.4	A	10.3	B

NOTES:
1. Peak hour conditions analyzed are "worst-case" conditions, which is the sum of the peak hour of the adjacent street plus the peak hour of the generator.
2. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay.

South Kihei Road at Aloha Village

The results of the Level-of-Service analysis for the intersection of South Kihei Road at Aloha Village are summarized in Table 15. During the morning peak hour, the level-of-service of the westbound left and right turns will improve from Level-of-Service E to Level-of-Service C. The average vehicle delay decreases by 56%.

Table 15 Level-of-Service Analysis - South Kihei Road at Aloha Village

	AM Peak Hour				PM Peak Hour			
	Without NSCR		With NSCR		Without NSCR		With NSCR	
Intersection and Movement	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Southbound Left	9.5	A	9	A	11.9	B	10.8	B
Westbound Left & Right	35.3	E	15.5	C	384.8	F	110.1	F

NOTES:
1. Peak hour conditions analyzed are "worst-case" conditions, which is the sum of the peak hour of the adjacent street plus the peak hour of the generator.
2. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay

During the afternoon peak hour, the level-of-service of the westbound approach does not improve. The Level-of-Service will be F without and with the NSCR. However, the average vehicle delay decreases by 71%.

New Intersections

Three new intersections will be created by extending the NSCR from entrance to the Ke Alii 2 Single-Family subdivision to Keonekai Road. The intersection of the NSCR at the entrance to the Ke Alii 2 subdivision is included with these intersections because only two movements (southbound left and westbound right) will be allowed until the NSCR is constructed. Without the NSCR, these two movements are uncontrolled.

Keonekai Road at North-South Collector

The results of the Level-of-Service analysis for the intersection of the Keonekai Road at the North-South Collector is summarized in Table 16. During the morning peak hour, all movements will operate at Level-of-Service A or B. During the afternoon peak hour, the southbound left turn will operate at Level-of-Service C.

Table 16 Level-of-Service Analysis - Keonekai Road at North-South Collector

	AM Peak Hour				PM Peak Hour			
	Without NSCR		With NSCR		Without NSCR		With NSCR	
Intersection and Movement	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Eastbound Left			7.8	A			8.4	A
Southbound Left			13.8	B			20.4	C
Southbound Right			9.7	A			10.0	B

NOTES:
1. Peak hour conditions analyzed are "worst-case" conditions, which is the sum of the peak hour of the adjacent street plus the peak hour of the generator.
2. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay

North-South Collector Road at Ke Alii 2 Subdivision

The results of the Level-of-Service analysis for the intersection of the Keonekai Road at the North-South Collector is summarized in Table 17. All movements will operate at Level-of-Service B or better.

Table 17 Level-of-Service Analysis - North-South Collector Road at Ke Alii 2 Subdivision

	AM Peak Hour				PM Peak Hour			
	Without NSCR		With NSCR		Without NSCR		With NSCR	
Intersection and Movement	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Southbound Left			7.5	A			7.8	A
Westbound Left & Right			10.4	B			10.8	B

NOTES:
1. Peak hour conditions analyzed are "worst-case" conditions, which is the sum of the peak hour of the adjacent street plus the peak hour of the generator.
2. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay.

North-South Collector Road at Aloha Village Connector

The results of the Level-of-Service analysis for the intersection of the Keonekai Road at the North-South Collector is summarized in Table 18. All movements will operate at Level-of-Service A.

Table 18 Level-of-Service Analysis - North South Collector Road at Aloha Village Connector

	AM Peak Hour				PM Peak Hour			
	Without NSCR		With NSCR		Without NSCR		With NSCR	
Intersection and Movement	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Northbound Left			7.6	A			7.5	A
Eastbound Left & Right			9.5	A			9.3	A

NOTES:
1. Peak hour conditions analyzed are "worst-case" conditions, which is the sum of the peak hour of the adjacent street plus the peak hour of the generator.
2. LOS denotes Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. LOS is based on delay.

Conclusions

1. The proposed NSCR will divert 285 vehicles per hour from South Kihei Road and Piilani Highway during the morning peak hour. During the afternoon peak hour, approximately 370 vehicles will be diverted to the NSCR.

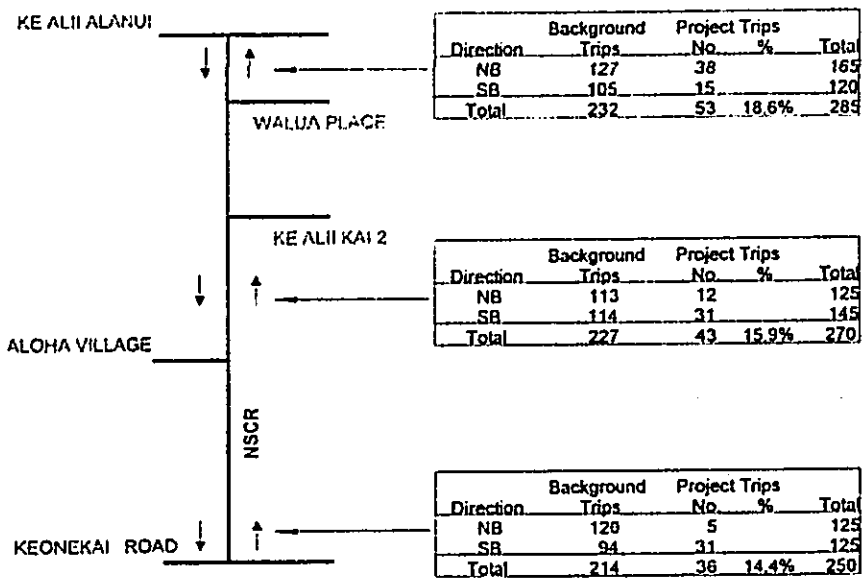
2. These volumes are sufficient to reduce the volume-to-capacity ratios of key movements along South Kihei Road. Peak hour traffic volumes along South Kihei Road will be reduced 11% to 12% during the morning peak hour and approximately 9% during the afternoon peak hour.

3. An analysis of the composition of traffic along the NSCR was performed to determine the percentage of traffic generated by Ke Alii Villas and the Ke Alii 2 Subdivision. The results of this analysis are summarized in Figure 11. During the morning peak hour, these two projects contribute between 14.4% and 18.6% of the total traffic along the NSCR. The remainder of the traffic is generated by other development projects within the study area or is traffic diverted from South Kihei Road or Piilani Highway. During the afternoon peak hour, traffic generated by the Ke Alii Villas and Ke Alii 2 Subdivision represents between 11.0% and 20.3% of the total traffic along the NSCR.

4. Because the proposed NSCR is only between Ke Alii Alanui and Keonekai Road, the impacts of the NSCR on regional traffic is limited. The result is that the impacts of the NSCR on traffic conditions along Piilani Highway will not be as significant as along South Kihei Road. This is because Piilani Highway serves more regional traffic than South Kihei Road.

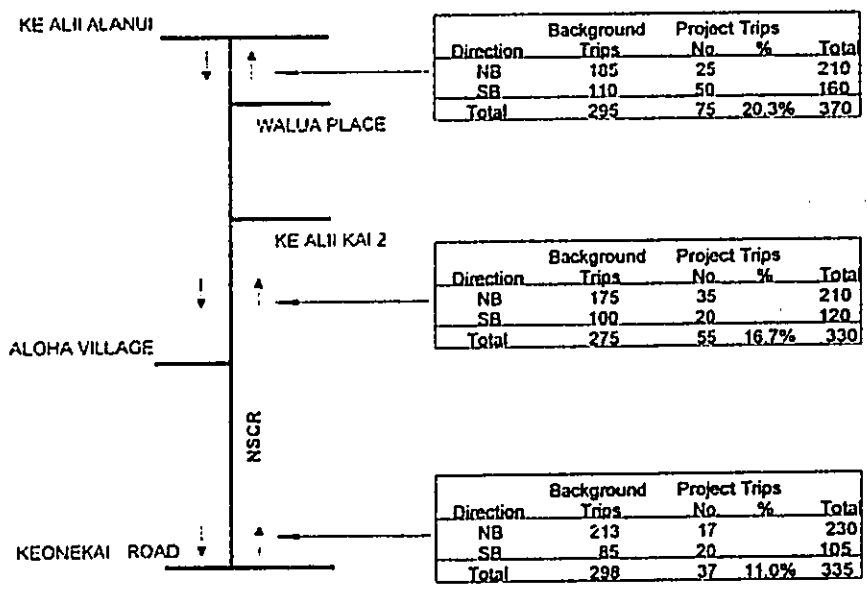
5. Total traffic approaching South Kihei Road along Keonekai Road will decrease slightly as a result of the NSCR. However, traffic making left and right turns will be redistributed such that a larger proportion of the traffic will make left turns rather that right turns. As the delay for left turning traffic is greater than for traffic making right turns, the delay to left turning traffic increases. A preliminary assessment of the peak hour warrant for a traffic signal concluded that the warrants for a signal are marginally satisfied without and with the NSCR. Accordingly, the warrants for a traffic signal should be assessed periodically until it is determined that the warrants are satisfied. This warrant analysis should include an assessment of all eight warrants in addition to the peak hour warrants.

6. Construction of the NSCR will result in increased traffic along the northbound approach of the NSCR at Ke Alii Alanui. Without mitigation, the northbound approach will operate at Level-of-Service D. This approach will operate at Level-of-Service C without the NSCR. Accordingly, the viability of an all-way STOP controlled intersection was assessed. The analysis determined that, as an all-way STOP controlled intersection, the eastbound approach would operate at Level-of-Service C during the afternoon peak hour and other movements would operate at Level-of-Service B or better. Conversion to an all-way STOP controlled intersection would have additional traffic calming effects to traffic along Ke Alii Alanui. This would be a positive impact considering the proximity of the intersection to Kamalii Elementary School.



NOMINAL NORTH

AM PEAK HOUR WITH NSCR



PM PEAK HOUR WITH NSCR

Figure 11
ANALYSIS OF TRAFFIC COMPOSITION ALONG NORTH-SOUTH COLLECTOR ROAD

5. SUMMARY AND RECOMMENDATIONS

Summary

The project is the NSCR between Ke Alii Alanui and Keonekai Road in the South Kihei area of Maui. The section between Ke Alii Alanui and Walua Place has been completed to the planned cross-section, including curbs, gutters, sidewalks and landscaping. The section between Walua Place and the Ke Alii 2 single-family subdivision will be completed as part of the Ke Alii 2 subdivision project. The section will be completed to the full planned cross-section.

The section between Ke Alii 2 subdivision and Keonekai Road is the subject of this study. Towne Development has offered to construct this section of roadway as their contribution to mitigate traffic conditions in South Kihei. The proposal is to construct two travel lanes only. Curbs, gutters, sidewalks and landscaping will be constructed by the developers of the remaining parcels as they are developed

Traffic projections were developed for a design year of 2020. This is consistent with the *Maui Long Range Land Transportation Plan*. The projections were estimated using the average annual growth rate determined in the *Maui Long Range Transportation Plan* and traffic projections resulting from build-out of the study area.

The difference between the study and typical traffic impact study in developing traffic forecasts for the related projects. In this study the traffic generated by vacant parcels within the study area was estimated and added to the traffic forecast for planned development projects. The result is an estimate of future traffic upon build-out of the study area.

Conclusions

1. The proposed NSCR will divert 285 vehicles per hour from South Kihei Road and Piilani Highway during the morning peak hour. During the afternoon peak hour, approximately 370 vehicles will be diverted to the NSCR.

2. These volumes are not sufficient to result in major improvement of the levels-of-service of the intersections within the study area. They are sufficient to reduce the volume-to-capacity ratios of key movements along South Kihei Road. Peak hour traffic volumes along South Kihei Road will be reduced 11% to 12% during the morning peak hour and approximately 9% during the afternoon peak hour.

3. An analysis of the composition of traffic along the NSCR was performed to determine the percentage of traffic generated by Ke Alii Villas and the Ke Alii 2 Subdivision. During the morning peak hour, these two projects contribute between 14.4% and 18.6% of the total traffic along the NSCR. The remainder of the traffic is generated by other development projects within the study area or is traffic diverted from South Kihei Road or Piilani Highway. During the afternoon peak hour, traffic generated by the Ke Alii Villas and Ke Alii 2 Subdivision represents between 11.0% and 20.3% of the total traffic along the NSCR.

4. Because the proposed NSCR is only between Ke Alii Alanui and Keonekai Road, the impacts of the NSCR on regional traffic is limited. The result is that the impacts of the NSCR on traffic conditions along Piilani Highway will not be as significant as along South Kihei Road. This is because Piilani Highway serves more regional traffic than South Kihei Road.

5. Total traffic approaching South Kihei Road along Keonekai Road will decrease slightly as a result of the NSCR. However, traffic making left and right turns will be redistributed such that a larger proportion of the traffic will make left turns rather that right turns. As the delay for left turning traffic is greater than for traffic making right turns, the delay to left turning traffic increases. A preliminary assessment of the peak hour warrant for a traffic signal concluded that the warrants for a signal are marginally satisfied without and with the NSCR. Accordingly, the warrants for a traffic signal should be assessed periodically until it is determined that the warrants are satisfied. This warrant analysis should include an assessment of all eight warrants.

Recommendations

1. The NSCR should be constructed between Ke Alii Alanui and Keonekai Road. Implementation will ease traffic congestion along South Kihei Road between Ke Alii Alanui and Keonekai Road.

2. This traffic study concluded that a two-lane cross section for the NSCR, along with separate turn lanes at intersections and major driveways, is sufficient to provide acceptable levels-of-service.

3. It is understood that the proposal from Towne Development to construct the NSCR between the Southern boundary of Ke Alii Kai 2 Subdivision and Keonekai Road includes only the roadway. Accordingly, this study considered only the NSCR roadway and did not consider curbs and gutters, sidewalks, bike lanes or landscaping. These roadway elements have a negligible impact of the level-of-service analysis performed and would not affect the conclusions and recommendations of this report.

4. The intersection of Ke Alii Alanui at the proposed NSCR should be converted to an all-way STOP sign controlled intersection upon completion of the NSCR between Ke Alii Alanui and Keonekai Road.

5. A *Safe-Route to School Plan* for Kamalii Elementary School should be developed. This program is described thoroughly in the *Manual of Uniform Traffic Control Devices* (MUTCD). The plan is typically systematically developed by school, law enforcement and traffic officials and consists of a plan showing the streets, the school, existing traffic controls, established school walk routes, and established school crossings.

APPENDIX A

CORRESPONDENCE TO AND FROM MAUI POLICE DEPARTMENT REGARDING NSCR

Phillip Rowell and Associates
47-273 'D' Hui Iwa Street Kaneohe, Hawaii 96744 Phone: (808) 239-8206 FAX: (808) 239-4175
Email:prowell@gte.net

August 30, 2004

Chief Thomas M. Phillips
Maui Police Department
55 Mahalani Street
Wailuku, Hawaii 96793

Re: Request for Comments and Information
North-South Collector Traffic Study
Kihei, Maui, Hawaii

Dear Chief Phillips:

This letter is a request for input from the Maui Police Department for the preparation of a Traffic Impact Analysis Report for the proposed North-South Collector Road between Kealii Alanui and Keonekai Road in Kihei. As you are aware, on July 26, 2004, the Maui County Department of Public Works and Environmental Management distributed a letter to traffic consultants doing work in the County of Maui directing that input be obtained from the Maui Police Department in response to direction from the Maui Planning Commission. This is an effort to understand what concerns have been expressed to the Maui Police Department by the community so the issues can be addressed by the Traffic Impact Study. We were subsequently advised that we should request accident statistics for the intersections within the study area in addition to comments.

The project and study area is described in the following paragraphs.

Description of Proposed Project

The proposed project is a new two-lane, two-way roadway between Kealii Alanui and Keonekai Road located approximately midway between Piilani Highway and South Kihei Road.

Study Area

The study area is the area bounded by South Kihei Road on the west, Ke Alii Alanui on the north, Piilani Highway on the east and Keonekai on the south.

Information Requested

In order to respond to the direction from the Maui Planning Commission, we are requesting the following:

1. The name and number of the Community police officer that can provide input relative to community concerns and issues that have been expressed to the Maui Police Department by the community and should be addressed by the traffic study.

2. Concerns and issues of the Maui Police Department that the traffic study should address.

3. Accident data for the streets and intersections within the study area.

The traffic study has already been initiated and the Client would like to have a draft report as soon as possible. Accordingly, we would appreciate a response to the letter at your earliest convenience. Please address your response to me at the address and phone number indicated in the letterhead.

Very truly yours,
PHILLIP ROWELL AND ASSOCIATES

Phillip J. Rowell

Phillip J. Rowell, P.E.
Principal

Appendix G

Letter from Kihei Community Association's Planning Committee, Dated March 11, 2004

KIHEI COMMUNITY ASSOCIATION

P.O. Box 662, Kihei, HI 96753 Phone/Fax: (808) 879-5890 E-Mail: kca@southmaui.org

March 11, 2004

Mr. Richard Lachmann
Towne Development of Hawaii, Inc
220 South king Street Suite 2170
Honolulu, Hawaii 96813

Dear Mr. Lachmann,

This letter is in response to your presentation to the Kihei Community Association Planning Committee meeting on March 8th at our offices. At that time you presented an outline of the efforts you are making to coordinate the developments along the North-South Collector road in Kihei. Your presentation included an assessment of the developments being planned along the North-South Collector road, and some of the issues remaining before a coordinated plan can be put into play.

On behalf of the Kihei Community Association, I would like to thank you and your staff for well-reasoned and well-documented presentation. We have written a letter to the Planning Department and the Department of Public Works supporting your coordinated efforts regarding this North-South Corridor, with some provisions attached as follows:

1. That the development of your properties along this Collector road follow the Kihei Community Association's right of way design criteria.

2. That the right of way show an eight foot planting strip at the shoulder

3. That the Walkway/Bicycle path change sides only at the Lipoa intersection.

I will send along a copy of the letter we sent to the County Planning Department and Department of Public Works, but it basically covers the same ground as this letter. We will be having meetings with these two Departments over the next several weeks, and will try to keep you informed of the developments as they pertain to the portion of the North-South Collector road that affects you future developments.

Sincerely,

Thomas Douma, Chairman, Planning Committee, Kihei Community Association

Appendix H

Letter to Kihei Community Association's Planning Committee, Dated April 13, 2005

Towne Development of Hawaii, Inc.
220 South King Street Suite 2170, Honolulu, Hawaii 96183

April 13, 2005

Mr. Thomas Douma, Chairman
Planning Committee
Kihei Community Association
P. O. Box 662
Kihei, Hawaii 96753

SUBJECT: Towne Development of Hawaii, Inc. Proposed North-South Collector Road Extension from Walua Place to Keonekai Road, Kihei, Maui, Hawaii

Dear Mr. Douma:

Thank you for your letter dated March 11, 2004 on the subject project. As you may know, Towne Development of Hawaii, Inc. (TDH) filed their Draft Environmental Assessment and Special Management Area Use Permit applications with the County of Maui, Department of Planning for the proposed extension of the North-South Collector Road (a.k.a. Liloa Drive) in February 2005, as required by the settlement agreement for the Ke Alii Villas and Ke Alii Kai II subdivision.

We note your comments on the proposed project based on our March 8, 2004 presentation to your committee. We would like to offer the following responses to your concerns.

1. The design for the proposed extension of the North-South Collector Road from Walua Place to Keonekai Road has been reviewed and approved by the Department of Public Works and Environmental Management (DPWEM). It is noted that portions of the project site are owned by the County of Maui and that TDH intends to dedicate the remaining portions of the road to the County once completed. Thus, TDH was required to design the road to County standards. However, DPWEM has incorporated some of the comments expressed by the Kihei Community Association (KCA) such as the meandering bicycle/pedestrian path on the mauka side of the proposed roadway.

2. TDH is affiliated with the developers for the Ke Alii Kai II subdivision and the Ke Alii Villas project. TDH and the DPWEM have executed a Memorandum of Understanding (MOU) regarding the proposed North-South Collector Road project in accordance with the SMA permit conditions. As part of the MOU, the County specified two (2) typical sections to be constructed for the North-South Collector Road extension. The first typical section includes a 60-foot right-of-way with two (2) 11-foot wide travel lanes, 6-foot shoulders, a 5-foot wide sidewalk on the west

(makai) side of the road. Additionally, an 18-foot wide graded strip along the east (mauka) side of the road will be designed to accommodate a separate 10-foot wide bicycle/pedestrian path. This typical section will be used from the intersection with Walua Place to the southern boundary of the Ke Alii Kai II subdivision (Typical Section A). The second typical section will include a 60-foot wide right-of-way, with two (2) 12-foot wide travel lanes and 8-foot wide grassed swales on both sides of the roadway. This second typical section will be used for the section of roadway from the southern boundary of the Ke Alii Kai II subdivision to the intersection with Keonekai Road (Typical Section B). See Exhibit AA@. It is TDH=s understanding that DPWEM will require frontage improvements for this section of road (i.e. curb, gutter, sidewalks, etc.) by the respective owners of lands abutting the roadway right-of-way in the future.

3. The typical sections for the North-South Collector Road were provided to TDH by the DPWEM for implementation. We understand that this typical section was used on previously constructed portions of the roadway and is being used for other future sections of the road.

   In the neighboring portion of the North-South Collector Road proposed by the DPWEM (Lokelani Intermediate to Auhana Road), the walkway/bicycle path will be on the east (mauka) side of the roadway. As such, the walkway/bicycle path for the TDH portion of the North-South Collector Road extension will be on the mauka side as well.

We thank you for your comments on the proposed project. Should you have any further questions, please feel free to contact me at (808) 537-5976 or our consultants, Munekiyo & Hiraga, Inc. at 244-2015.

Very truly yours,

Takeshi Matsukata, Vice President
TOWNE DEVELOPMENT OF HAWAII, INC.

TM
Enclosure
cc: Michael W. Foley, Department of Planning (w/enclosure)
Milton Arakawa, Department of Public Works and Environmental Management (w/enclosure)
Michael T. Munekiyo, Munekiyo & Hiraga, Inc. (w/enclosure)

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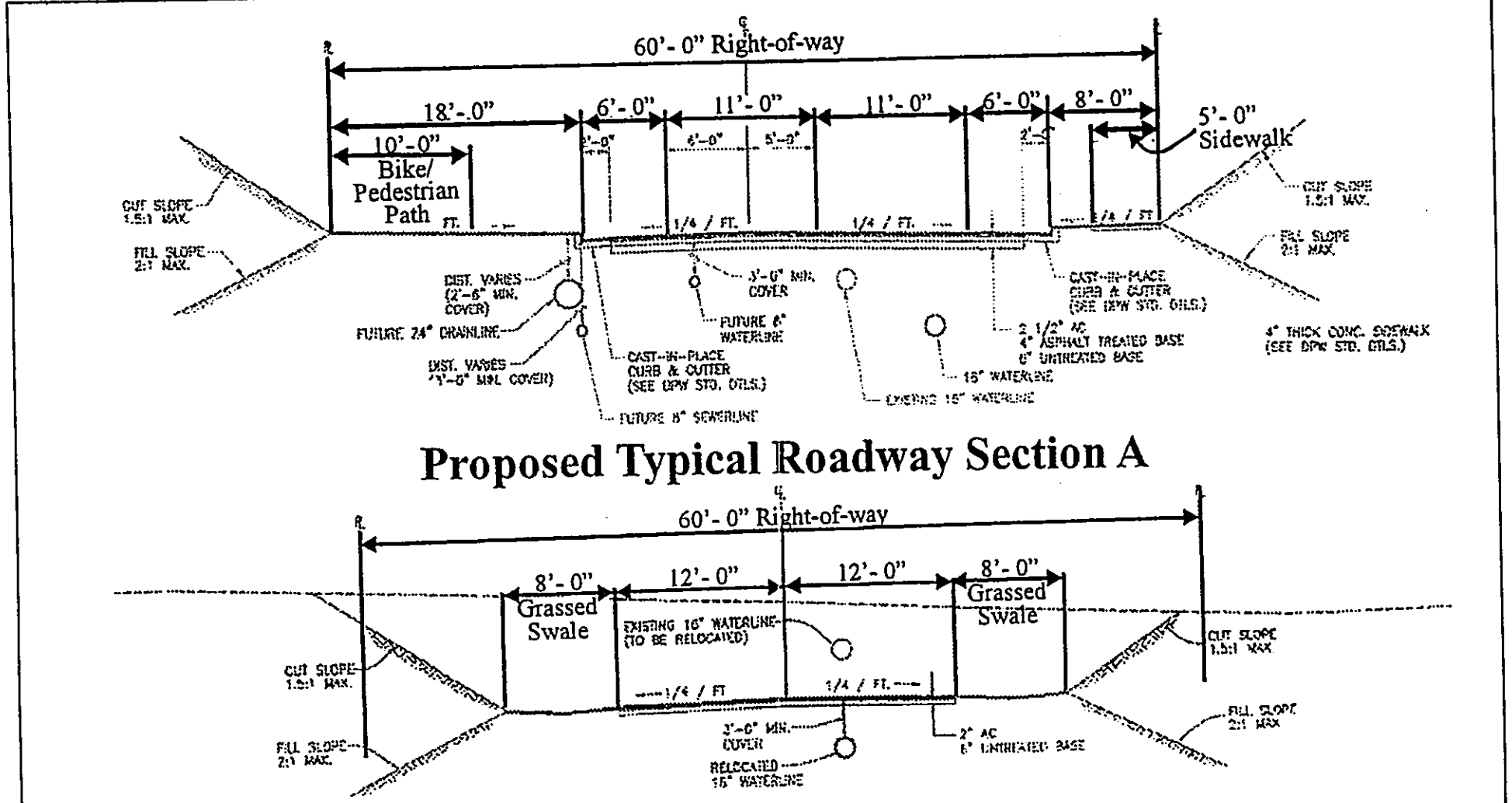

Proposed Typical Roadway Section A

Proposed Typical Roadway Section B

Source: Warren S. Unemori Engineering, Inc.

Exhibit "A" Proposed North-South Collector Road Extension
From Walua Place to Keonekai Road
Typical Section A and Section B

NOT TO SCALE

Prepared for: Towne Development of Hawaii, Inc.

MUNEKIYO & HIRAGA, INC.