HANNIBAL TAVARES
Mayor

CHRISTOPHER L. HART
Planning Director
RALPH N. MASUDA
Deputy Planning Director

COUNTY OF MAUI
PLANNING DEPARTMENT
200 S. HIGH STREET
WAILUKU, MAUI, HAWAII 96793

FILE COPY

November 30, 1987

Dr. Marvin Miura
Director
Office of Environmental Quality Control
465 South King Street, Rm. 104
Honolulu, HI 96813

Dear Dr. Miura:

Re: Application for Acceptance of a Final Environmental Impact Statement - North Beach resort development, TMK 4-4-01: portions of 2, 3, 6, 8 and 68; TMK 4-4-02:24; TMK 4-4-06:5, Kaanapali, Maui.

At its regular meeting of November 24, 1987, the Maui County Planning Commission reviewed the above request by Applicant, Kaanapali North Beach Joint Venture, and after due deliberation, determined that the subject North Beach Final EIS met the requirements of Section 11-200-23(b), EIS Rules, and accordingly, the Commission voted to accept the subject Final EIS.

The Director's Report and departmental Memorandum dated November 24, 1987 are enclosed herewith as the Commission's findings on this matter.

Should further clarification be necessary, please contact John Min of our office at 244-7735.

Very truly yours,

Christopher L. Hart

CHRISTOPHER L. HART
Planning Director

encl.
JM:cm
cc: Mr. B. Martin Luna, Attorney,
on behalf of applicant

November 24, 1987

MEMORANDUM

TO: Maui County Planning Commission

FROM: Planning Staff

SUBJECT: Application for Acceptance of a Final Environmental Impact Statement ("Final EIS") by **Kaanapali North Beach Joint Venture**, a partnership of Amfac Property Development Corporation and Tobishima Pacific, Inc. (Mr. B. Martin Luna, Attorney)-- **North Beach Resort**, TMK 4-4-01: portions of 2,3,6,8, and 68; TMK 4-4-02:24; and TMK 4-4-06:5, Kaanapali, Maui.

A. Conclusions

Pursuant to Section 11-200-23 (b), Chapter 200 of Title 11, Environmental Impact Statement Rules, Department of Health, State of Hawaii (""EIS Rules") and based on a review of the subject North Beach Final EIS filed on October 27, 1987, as contained in the Director's Report dated November 24, 1987, the following are conclusions:

1. The procedures for assessment, consultation process, a review responsive to comments, and the preparation and submission of the statement have been completed satisfactorily, in accordance with the provisions of the EIS Rules.

2. The EIS content requirements have been satisfied, in accordance with Sections 11-200-16, 17, and 18, EIS Rules.

3. Comments submitted during the EIS review process have been satisfactorily received and responded to and have been incorporated or appended to the statement

4. Unresolved or partially resolved issues are satisfactorily addressed in the Final EIS and will be resolved in the context of subsequent Federal, State and County regulatory approvals, as follows:

a. Storm Water Drainage-- The revised drainage improvement plan, consisting of temporary and permanent sedimentation basins and a single drainage outlet at the northern-side of the site, represents a "substantial improvement" over the original plan in the Draft EIS, based on comments from various reviewing agencies.

This revised plan will be subject to subsequent public agency reviews and approvals, including but not limited to, a **Special Management Area ("SMA") Permit application** for subdivision infrastructural and utility improvements (Planning Commission); **Shoreline Setback Variance ("SSV") application** for construction of drainage improvements within the 40-foot shoreline setback, pursuant to Part II, Chapter 205, HRS (Planning Commission); **subdivision and construction plan approval** (Department of Public Works or "DPW"); **Coastal Zone Management ("CZM") Federal Consistency Review** (Office of State Planning/CZM branch); and

Department of the Army Permit (U.S. Army Corps of Engineers or "COE").

In conjunction with these subsequent public agency reviews and approvals, issues, involving impacts on agricultural production and archaeological remains, if any, in the areas proposed for the sedimentation basins should be addressed.

b. Transportation/Circulation-- The Final EIS addresses the traffic impacts associated with the proposed development and mitigative measures, including both infrastructural improvements and a transportation system management ("TSM") program, that could be implemented to minimize these impacts. Reviewing agencies and in particular, the State Department of Transportation ("SDOT"), have not raised objections to the "concept" of highway infrastructural improvements recommended in the project's traffic impact study. Also, the proposed implementation of a TSM program could significantly reduce resort vehicle trips and thereby in the long-term, reduce the need for new investments in roadway infrastructure.

The proposal for a *mauka* bypass highway is slated for public hearing in February 1988 and as such, roadway infrastructural issues cannot be resolved at this time. These issues, however, can be resolved in the context of subsequent **SMA Permit applications** for phases of the North Beach development, including the initial subdivision infrastructural improvements and the first hotel project, and through ongoing discussions with the SDOT and County of Maui.

Related issues relative to impacts on agricultural uses and the costs, timing and participation in roadway improvements, should be addressed during this review process.

c. Employee Housing-- Currently, there are ongoing discussions between the Applicant and AMFAC and the State and County to target and develop areas for future residential housing in the West Maui area. In terms of the Lahaina Community Plan, there are areas available for residential development to accomodate the needs of the North Beach development. For example, in the Wainee Village area alone, it is estimated that between 600 to 800 multi-familty and single-family housing units could be developed in this area. The projected housing demand for the North Beach development is 629 units or at a ratio of 1:5 employee housing units per hotel room.

A conceptual program for employee housing should be presented in conjunction with the **SMA Permit applications** for the initial subdivision phase and/or the first hotel project. This plan should identify areas for residential housing development; impacts on agricultural uses, infrastructure and traffic; the range of housing types; and development timetable. Since the North Beach development will be implemented over a 10 year time frame, this program will necessarily be subject to ongoing review.

d. Public Recreational Facilities-- As previously noted, the Applicant is currently preparing a community recreational facilities needs study and will be presenting this to the County Council and the Department of Parks and Recreation for review. This study will include proposals for on-site and off-site public recreation improvements. This proposed plan should be reviewed in the context of the **SMA Permit application** for the initial subdivision infrastructural improvements.

e. Development Standards-- As previously noted, the Applicant is proposing to establish development and design standards and an architectual review process through CC&Rs that will be binding on all future hotel developers. A draft of development standards should be reviewed in conjunction with the initial subdivision **SMA Permit application** and formalized prior to the **SMA Permit application** for the first hotel project at North Beach. The development standards should address the items identified in Sub-section 3.2 of the *North Beach Final EIS* and also include specific provisions for ample shoreline setbacks; public shoreline walkway system; and employee parking. In terms of the latter item, the Applicant has indicated that an off-site area *mauka* of the North Beach is under consideration for employee parking and that this facility will be serviced by a shuttle bus/van system.

B. Recommendation

Based on the foregoing comments and conclusions, the Planning Deaprtment finds that the requirements of Section 11-200-23 (b), EIS Rules have been essentially met and therefore recommends acceptance of the subject *North Beach Final EIS*.

N O R T H · B E A C H

Kaanapali, Maui

FINAL
ENVIRONMENTAL IMPACT STATEMENT

Prepared for:
A Joint Venture Development of
Amfac Property Development Corporation
and
Tobishima Pacific, Inc.

Prepared by:
Helber, Hastert, & Kimura, Planners

For Submittal to:
Planning Department, County of Maui

October 1987

NORTH BEACH KAANAPALI

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Planning Department, County of Maui

Submitted by:

Glenn T. Kimura

October 1987

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CHAPTER I

SUMMARY

I. SUMMARY

Development Summary

Applicant:	Kaanapali North Beach Joint Venture
Property Owner:	Amfac Property Investment Corporation and Tobishima Pacific, Inc.
Property Location:	Lahaina Judicial District, County of Maui, north of and adjacent to Kaanapali Beach Resort.
Tax Map Key:	2nd Division, 4-4-01:por. 02, 03, 06, 08, 09, and 68, 4-4-02:24, and 4-4-06:5
Size:	95 acres
Existing Land Use Regulation:	State Land Use District: Urban Lahaina Community Plan: Hotel, public use, open space County Zoning: H-M (hotel), H-2 (hotel), portions R-3 (residential) Special Management Area: Entire Site Shoreline Setback: 40' Coastal Setback
Existing Land Uses:	Vacant and unimproved. Former site of Kaanapali Airport. Existing land use is limited to sugarcane cultivation.
Proposed Action and Land Uses:	Project proposes to subdivide property into eleven lots and to construct a roadway and infrastructure improvements. Subsequent phases of the project will involve construction of up to six hotels. Two sites will be dedicated to County for public park use.
EIS Approving Agency:	Maui County Planning Department

1.1 Intended Uses of this Document

This (draft) environmental impact statement (EIS) has been prepared for consideration by the County of Maui in conjunction with a Special Management Area (SMA) Use Permit and a Shoreline Setback Variance (SSV) application. On December 19, 1986, North Beach Kaanapali Joint Venture filed an application for an SMA Use Permit with the County.

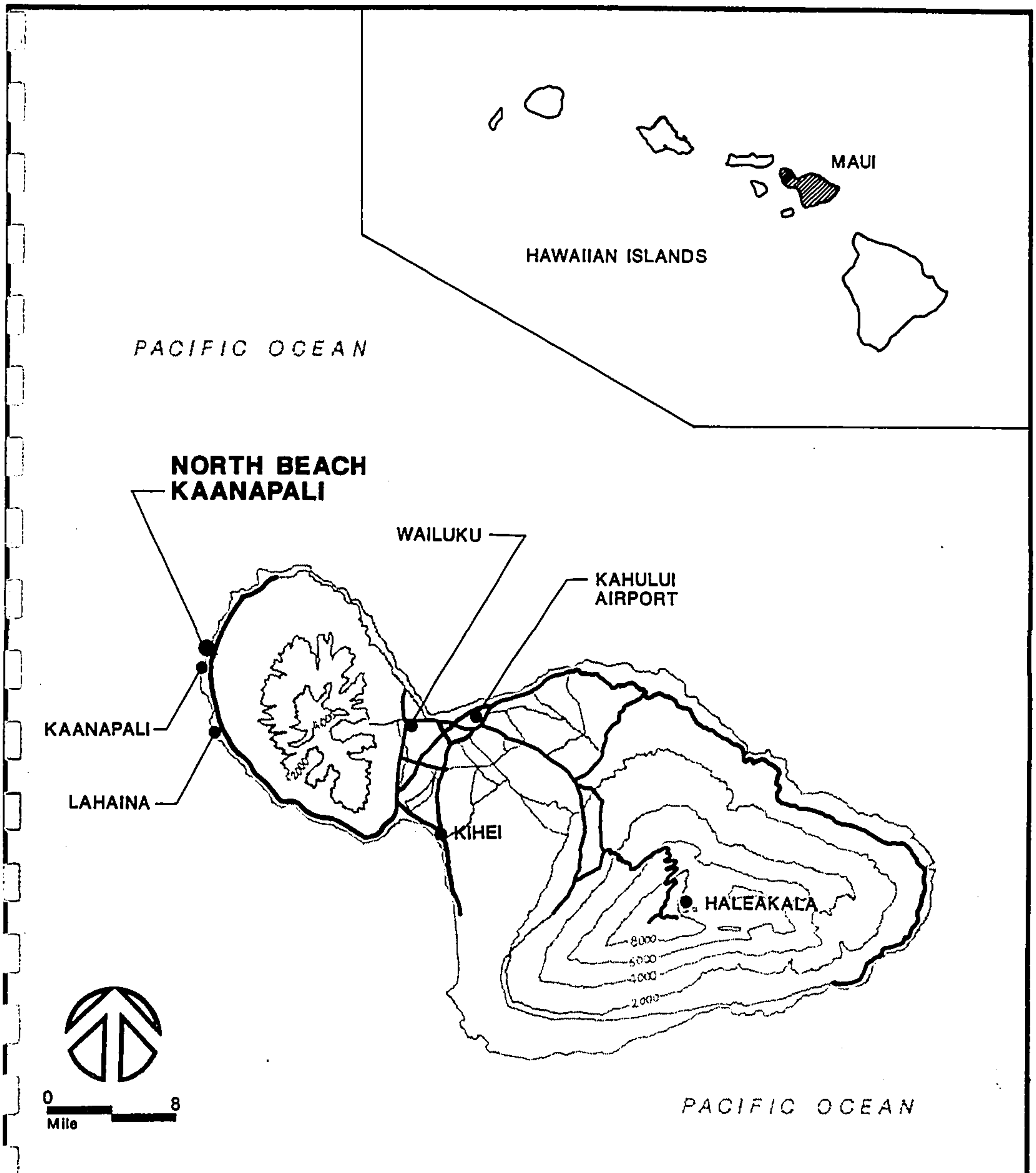
Given the potentially significant consequences of the project, the Maui County Planning Commission, at its March 10, 1987 meeting, voted to require the preparation of a full environmental impact statement pursuant to Chapter 343, Hawaii Revised Statutes (HRS), and the Environmental Impact Statement Rules, Chapter 200, Title II, Department of Health, State of Hawaii. An EIS Preparation Notice (EISPN) was subsequently published in the April 8, 1987 issue of the Office of Environmental Quality Control (OEQC) Bulletin. Twenty-two responses were received during the 30-day comment period. The concerns raised have been addressed and/or comments incorporated into this document to ensure an evaluation that is as comprehensive as possible.

The purposes of this draft EIS are to provide information to public officials and members of the community about the nature of the subject action; to assess the existing environmental conditions of the property and surrounding areas; to evaluate potential impacts of the proposed North Beach development and to present mitigative actions for those impacts; and to consider alternatives to the subject action.

1.2 Project Profile

The Kaanapali North Beach Joint Venture ("Joint Venture") is a partnership of Amfac Property Development Corporation and Tobishima Pacific, Inc. The Joint Venture is planning to subdivide and improve a 95 acre parcel of ocean-front property at North Beach, directly north of and adjacent to the Kaanapali Resort (see Figures 1 and 2). The property is owned in fee by Amfac Property Investment Corporation and Tobishima Pacific, Inc. who have entered into a development agreement with the Joint Venture to develop and improve the property as deemed to be in the best interest of the fee owners. The parcel, formerly the site of the Kaanapali Airport, is presently cultivated in sugarcane except for areas formerly used by the airport runway and structures. The developers intend to create eleven lots which may be consolidated into a maximum of six hotel sites and two park sites. They will also construct the major parkway (roadway) and utility systems. The proposed hotel sites range in size from 7.6 to 21.5 acres.

The first phase of development will include layout and construction of the internal parkway and site preparation in accordance with the subdivision plan, construction of the drainage system and other public utilities and dedication of land for the public beach parks. Hotel construction is expected to occur during subsequent phases extending up to a ten year period. Existing zoning designations would allow up to 4,900 hotel units, but a maximum of 3,200 units is anticipated.



N O R T H · B E A C H

Kaanapali, Maui

Project Location

Figure: 1

Amfac Property Development Corp/ Tobishima Pacific, Inc.

HH&K Planners

NORTH · BEACH
Kaanapali, Maui

Site Photograph

Figure: 2

Amfac Property Development Corp/Tobishima Pacific, Inc.

HH&K Planners

1.3 Summary of Impacts and Mitigative Measures

Coastal and Marine Environments

A coastal engineering evaluation and marine biological assessment were conducted to determine existing marine conditions, wave and current action, water quality and marine biology. Alternative locations for the proposed drainage structures were examined in light of these conditions. Findings indicate that because of low wave action during the summer months, nearshore current patterns must be considered in decisions concerning placement of drainage structures. In general, nearshore water quality is good. The marine biological assessment indicates the southern portions of the project area have much better benthic communities than the northern portions, and that any proposed drainage discharge should be located toward the northern end to minimize adverse impacts on the marine environment.

Flora and Fauna

No rare, threatened or endangered flora or fauna are known to inhabit the site. While the proposed development will result in the loss of vegetation, primarily sugarcane, kiawe and koa-haole scrub, it is not expected to have a major negative impact on the total island populations of the plant and animal species involved.

Archaeological and Historic Resources

There are no surface indications of either historic or prehistoric remains on the site. Recent subsurface archaeological tests found no significant subsurface archaeological remains. The project will have no effect on significant historic sites.

Visual Resources

The proposed hotel development will alter the existing vacant landscape and unobstructed view corridors. Proposed mitigative measures will include aesthetically pleasing design and placement of structures, low density development, attractive on-site landscaping, and the provision of public beach park resources and public beach accesses.

Transportation/Circulation

The addition of up to six hotels with up to 3,200 rooms will impact local traffic, especially along Honoapiilani Highway, already experiencing heavy traffic demands. Various infrastructure improvements are recommended along Honoapiilani Highway for three project phases: pre-development (approximately 1990), Phase I (mid-point of development, approximately 1992), and Phase II (full build out, approximately 1994). The State-proposed by-pass highway, which will divert traffic around Lahaina and Kaanapali, along with the recommended improvements, should mitigate the traffic impacts resulting from the North Beach project and overall growth of West Maui. Finally, a Transportation System Management program has been recommended to further reduce traffic congestion in the vicinity. This program includes the use of trolley and shuttle bus service, employee car-pooling, motor pools, park and ride service, and staggered work hours.

Land Use

Development of the project would convert the site from its present use as sugarcane land to hotel and resort use. However, the project site represents less than one percent of the total sugarcane land in the area. Pioneer Mill Company, owner of the area's cane land, ~~is currently~~ was implementing a reduction of field acres devoted to sugarcane because of its high irrigation requirements, and investigating the feasibility of alternative crops or uses which could be more profitable than sugar.

Air Quality

Short term air quality in the area could be affected by construction activity at the site. Adequate dust control measures, such as frequent watering of exposed soil during construction and early landscaping, should be utilized to keep these temporary impacts to a minimum. Long term impacts are indirectly caused by increases in motor vehicle traffic in the area and, on a regional basis, by additional power generation requirements. The air quality analysis indicates that despite the additional traffic projected throughout the development period, air quality in the vicinity is expected to meet federal and state air quality standards. Over the long run, increased diesel emissions from the Maui Electric Company's Maalaea facility as a result of this project would be approximately 11.6 percent above existing emissions.

Noise

Short term on-site construction noise is unavoidable during the planned project construction period. A noise study has recommended the use of quiet equipment and construction curfew periods to keep these impacts at a minimum. Longer term traffic noise on-site is expected to be minimal, due to the 200+ foot setback distances planned for the hotels. Off-site traffic noise impacts resulting from increased traffic on Honoapiilani Highway may occur by the Year 2007. Mitigative measures could be undertaken by private property owners along the highway right-of-way, or by public agencies in conjunction with roadway improvement projects.

Public Services

The addition of up to 3,200 hotel units will increase demand on the County's fire and police protection services, already operating at capacity. However, the cost of funding additional public services will be more than compensated by increased County and State tax revenues generated by the project. The developers will provide infrastructure improvements necessary for the project. No public funds will be used in the development.

1.4 Summary of Alternatives Considered

Three major alternatives to the proposed project were examined. These included a "no action" alternative, a "single major resort" alternative, and a "tourist class hotel development" alternative. The no action alternative, which would leave the property as is, was rejected primarily because it would deny realization of the economic benefits (jobs, public revenues, increased private revenues) associated with the proposal, with few apparent advantages. The single major resort alternative, whereby one large comprehensive resort would be constructed, may not provide the community with the same level of economic and fiscal benefits as four to six moderate-size hotels. In addition, financing a single major resort may be more difficult than several smaller hotels. However, there are definite advantages to a single major resort, and this option remains a viable alternative. The final alternative was for construction of a tourist class oriented development, targeted at the moderate income rather than upper income visitor. This alternative was determined to have little or no environmental advantage over the proposal, and it was likely to generate less revenue and be less aesthetically pleasing.

1.5 Unresolved Issues

The Special Management Area (SMA) Use Permit and Shoreline Setback Variance (SSV) applications are the initial stages of approvals needed by the proposed North Beach development. Some issues, therefore, remain unresolved at this initial phase in the planning process and will be resolved in the context of the subsequent regulatory approvals listed below in Section 1.7. Significant unresolved issues are as follows:

- Proposed infrastructure improvements to Honoapiilani Highway will require coordination with the State Department of Transportation and the County Public Works Department.

- Implementation of the proposed Transportation System Management programs will require coordination with and the cooperation of the Kaanapali Beach Operator's Association, North Beach hotel operators, the local business community, County government, and employees within the West Maui region.

- Plans for the North Beach development do not include specific plans for provision of employee housing, which will be required of the individual hotel developers in accordance with Maui County's new Council Resolution #2. This resolution requires construction of one housing unit per six hotel units constructed. The individual hotel developers will work with the County to meet employee housing needs generated by their individual projects. On a broader scale, there are ongoing discussions being held with the County regarding dedication of land in the Wainee Village and other areas for housing development.

1.6 Compatibility with Land Use Plans and Policies

Chapter 4 contains a detailed discussion of the relationship between government plans and policies and the proposed action. The proposed project is compatible with existing land use plans and policies at the State and local levels. The State Land Use Commission has designated the majority of the project site an Urban district, which allows for the proposed development. A Conservation District Use Application, which is required for development along the shoreline Conservation district, will be submitted in conjunction with the SMA and SSV applications.

The Lahaina Community Plan, which contains the local plans and policies for the area, has designated the site for hotel use, park use and open space development as proposed by the Joint Venture. The Community Plan calls for the creation of employment in existing visitor centers such as Kaanapali. The project site is zoned H-M and H-2 by the County, which allows for both hotel developments and their accessory uses. A few remnant parcels zoned R-3 will require rezoning, but even these parcels are designated for hotel uses in the Community Plan.

Overall, the proposed resort hotel developments are consistent with existing land use regulations and with long range policies set for the area.

1.7 List of Permits or Approvals

The following lists the Federal, State, and County permits that are required prior to implementation of the project. Other permits may be required for specific construction activity.

Federal Government

U.S. Army Corps of Engineers, Department of the Army Permit

State of Hawaii

Conservation District Use Application (CDUA)
Coastal Zone Management Consistency Review
401 Water Quality Certification (WQC)

County of Maui

Subdivision Plat Map Approval
Special Management Area Use Permit (SMA)
Shoreline Setback Variance (SSV)
Planning Department, Zone Change Approval (for remnant parcels)
Construction Permits

CHAPTER II

INTRODUCTION

II. INTRODUCTION

2.1 Purpose

This draft environmental impact statement is intended to fulfill the environmental requirements for the SMA, SSV and other discretionary development approvals by the County, State and Federal governments. It provides public officials and the general public with information about the nature of the project, assesses existing environmental conditions of the property and surrounding areas, evaluates potential impacts of the proposed North Beach development, and presents mitigative actions and alternatives for these impacts. As an informational document, the draft environmental impact statement should assist public officials in making decisions regarding this project and its relationship to the physical environment and to the quality of life for Maui County residents.

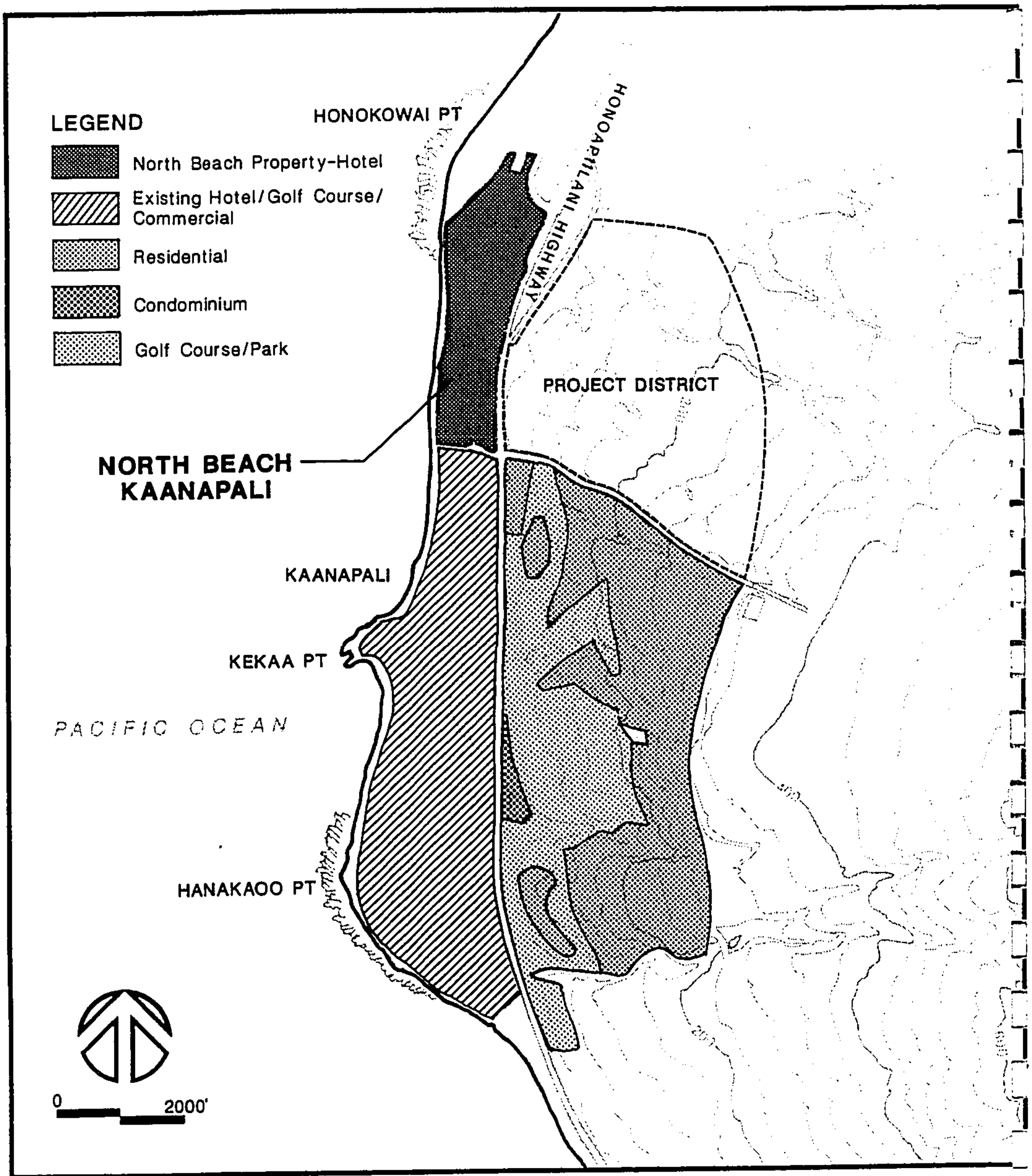
2.2 Property Description

The proposed project site of approximately 95 acres is located on the leeward coast of West Maui, Lahaina Judicial District. The proposed site is on the tax map key 2nd Division, 4-4-01:por. 02, 03, 06, 08, 09, and 68, and 4-4-02:24 and 4-4-06:5. The Amfac Property Investment Corporation and Tobishima Pacific, Inc. own the property in fee. This area is the last remaining beachfront hotel area of the Kaanapali Master Plan (see Figure 3).

The proposed project site falls entirely within the County of Maui Special Management Area (SMA). Consequently, an application to the County for an SMA Use Permit is required. The property also lies within the boundary of the State Land Use Commission's Urban district, and is zoned by the County H-M and H-2 (hotel), except for remnant parcels which are zoned R-3.

2.3 Existing Site Conditions

The unimproved 95-acre ocean-front property was formerly the site of the Kaanapali Airport, and still contains the remnants of the abandoned runway, vacant terminal area and parking lot (see Figure 4). Sugar cane fields cover approximately three-fourths of the project area. Also present are limited areas of kiawe forest (along makai and northern boundaries), strand vegetation (in the loose sandy beach areas), and koa-haole scrub (along the highway). All airport structures (terminal building, etc.) have been removed, and the old runway has been broken-up. The parcel runs north-south along the shoreline, on the makai side of the Honoapiilani Highway. The site is gently sloping from north to south and from the highway to the beachline, with an average slope of one percent. Access to the site is provided by Kai Ala Drive, the old airport driveway off the Honoapiilani Highway.



NORTH · BEACH

Kaanapali, Maui

Kaanapali Master Plan

Figure: 3

Amfac Property Development Corp/Tobishima Pacific, Inc.

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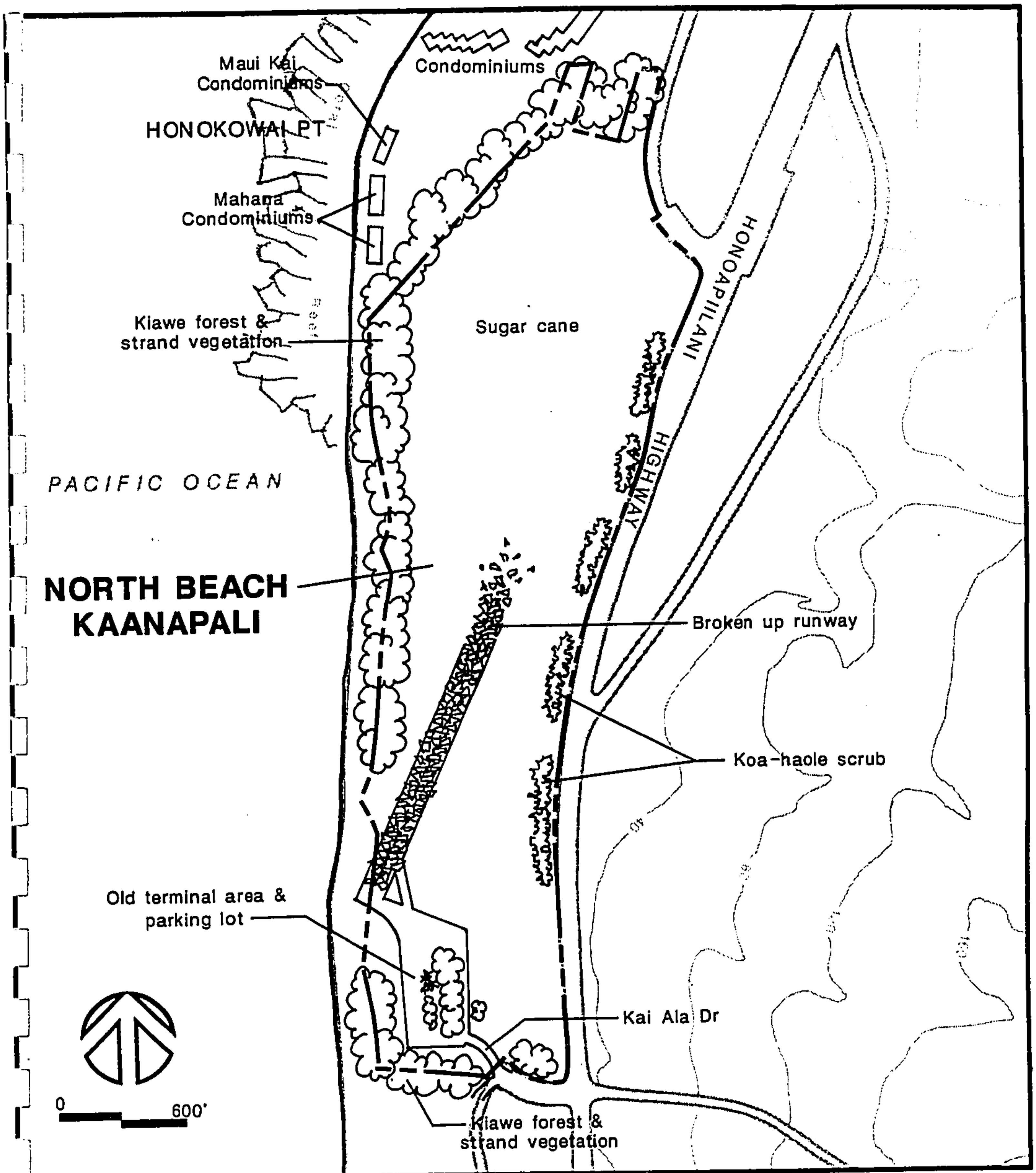


NORTH · BEACH
Kaanapali, Maui

Existing Site Conditions

Figure: 4

Amfac Property Development Corp/Tobishima Pacific, Inc.

HH&K Planners

2.4 Adjacent Land Uses

The southern boundary of the proposed site is adjacent to the established Kaanapali Beach Resort, specifically the Maui Kaanapali Villas condominiums and the Royal Lahaina Hotel. The northern boundary of the site abuts the 12-story Mahana condominium in the resort area of Honokowai. The property contains approximately 3,400 feet of ocean frontage to the west. The eastern edge of the site (mauka portion) abuts the Honoapiilani Highway. Uses directly mauka of the highway include sugarcane fields, a cluster of rental car outlets and the Lahaina Wastewater Treatment Plant.

2.5 Historical Perspective/Kaanapali Master Plan

The subject property is identified as Land Commission Award 76, Royal Patent 7661, Apana 2 to William Shaw issued in 1849. Upon Shaw's death, the land was conveyed by his heirs to Henry Turton, Paul Isenberg and Walter Horner and Lahaina Agricultural Company and conveyed to Pioneer Mill Company in 1884. All previous uses of the site were for growing sugarcane and as a cattle pasture.

✓ In the early 1950's, Amfac conducted land use evaluations and feasibility studies on the use of the Kaanapali property as a visitor destination resort. A Master Plan for Kaanapali was developed, encompassing 1,200 acres, including the subject site incorporated hotel, commercial, recreational and residential uses. In 1959, development of the Kaanapali Beach Resort directly south of and adjacent to the subject site was begun with the construction of a water system, sewage treatment plant, drainage system and a network of roadways. Today, nearly 30 years later, approximately half of the original 1,200-acre master plan area has been developed.

The current Kaanapali Master Plan, shown in Figure 3, calls for hotel uses on the site (makai of the Honoapiilani Highway, north of the Puukolii Road intersection). The surrounding undeveloped areas mauka of Honoapiilani are planned for a mix of commercial, golf course, resort condominium and residential uses. The state-proposed mauka by-pass highway would run east of and roughly parallel to Honoapiilani Highway. The proposed development is consistent with Amfac's original plans for the Kaanapali area.

CHAPTER III

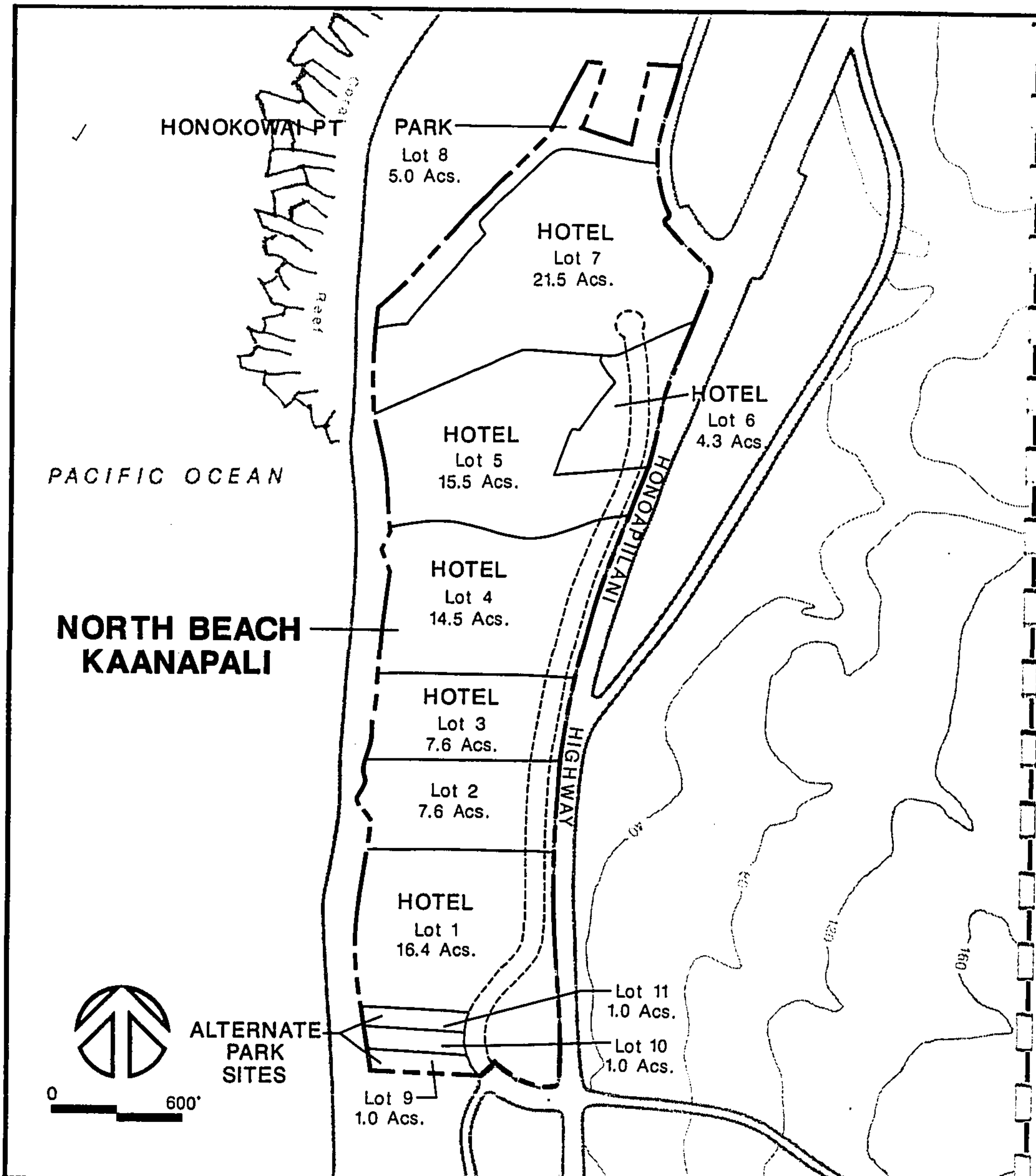
PROJECT DESCRIPTION

III. PROJECT DESCRIPTION

3.1 Development Plan

The Kaanapali North Beach Joint Venture ("Joint Venture") is planning to subdivide and improve a 95-acre parcel of ocean-front property at North Beach, directly north of and adjacent to the Kaanapali Beach Resort. The developers intend to create eleven lots which may be consolidated into a maximum of six hotel sites and two park sites. There is also the possibility that fewer but larger hotel sites will be developed. The proposed subdivision plan (see Figure 5) illustrates the eleven lots. Lot 8 at the northern end of the property and either Lot 9 or 11 at the southern end are earmarked for public park use. Lots 5 and 6 will be consolidated into a single hotel site. The remaining 1-acre lots (9 and 10 or 11) could either be combined into a single, small 2-acre parcel, or incorporated into the larger parcels to the north or south. Lots 2 and 3 could be combined into one 15.2 acre hotel site, or split and consolidated with lots 1 and 4, respectively. The proposed subdivision plan provides the flexibility to accommodate a variety of site configurations. In any case, two park sites will be identified. All utilities and a major parkway will be constructed to service each parcel. The first phase of development will include layout and construction of the internal parkway and site preparation in accordance with the subdivision plan, construction of the drainage system, and other public utilities.

Upon completion of the project, the Joint Venture will sell or lease the hotel sites to hotel developers. All hotel projects will be subject to the Kaanapali North Beach Resort covenants and fees. Additionally, each hotel will become a member of the Kaanapali Beach Operator's Association (KBOA), a non-profit organization created to maintain the marketability of the Kaanapali resort. Hotel construction is expected to occur during subsequent phases extending up to a ten year period. The projected maximum hotel room counts are shown on the following table. It should be noted that these projected maximum room counts are lower than the allowable densities under existing zoning regulations. H-M zoned property could allow from 35 to 50 hotel units per acre; H-2 could allow from 45 to 70 units per acre. The actual number of rooms may differ from that indicated in the table, depending upon the individual hotel design and the operational preferences of each hotel developer.



NORTH · BEACH

Kaanapali, Maui

Proposed Subdivision Plan Figure: 5

Amfac Property Development Corp/Tobishima Pacific, Inc. HH&K Planners

Table 1: POTENTIAL MAXIMUM ROOM COUNT

Lot	Acreage	Zone	Projected Rm. Count
1	16.4	H-M	574
2	7.6	H-M	258
3	7.6	H-M	258
4	14.5	H-M	508
5 & 6	19.8	H-M*	693
7	21.5	H-M, H-2	909
10**	1.0	H-M	
11**	1.0	H-M	
	89.4		3200

* Lot 6 to be rezoned to H-M
** May be incorporated into Site 1.

3.2 *Objectives of the Development Program*

The Joint Venture intends to create the opportunity for construction of a major, planned quality resort area in the tradition of the Kaanapali Beach Resort. The Kaanapali Beach Resort is considered by many to be the first and one of the more successful destination resorts in the world. The North Beach development is envisioned to include upscale hotels, shops and other recreational facilities.

In keeping with the adjacent Kaanapali Beach Resort, a Declaration of Conditions, Covenants, and Restrictions (CC&Rs) will govern the overall development of the property and assure a fair and consistent handling of all resort operators. The Joint Venture will also establish architectural design standards and a design review process for all hotel development at North Beach. The purpose of the declaration and the design review process will be: 1) to assure that North Beach is developed and maintained as a well designed, first-class destination resort with an efficient and well integrated complex of recreational facilities, tourist accommodations and related support facilities; and 2) to advance the value of the North Beach resort.

To aid in the evaluation of development, an architectural advisory review committee will be established. Members will consist of professionals from the fields of planning, architecture, landscape architecture, engineering or related fields.

The advisory committee's design review process will take into consideration the following components for all improvements.

1) Maintenance of views and view paths

2) Building entries

3) Building heights

4) Building massing and configuration

5) Building elevations

6) Building setbacks

7) Quality of building materials

8) Building colors

9) Roofs (design and materials)

10) Energy efficient building openings and orientations

11) Adequate and aesthetic parking facilities

12) Vehicular entrances

13) Access to beachfront areas

14) Lighting

15) Signage

16) Landscaping

The North Beach development is intended to be compatible with and complimentary to resident lifestyles. Park and beach access lands will be provided. In addition, the creation of long-term employment, short-term construction jobs, and greatly increased visitor expenditures are expected to generate significant revenues to the County and State economies.

3.3 Phasing and Timing of Action

The first phase of development will include layout and construction of the internal roadway, site preparation in accordance with the subdivision plan, and construction of the drainage system and other public utilities. Hotel construction is expected to occur during subsequent phases extending up to a ten year period.

3.4 Necessary Permits and Approvals

Federal Government

U.S. Army Corps of Engineers, Department of the Army Permit. In an effort to protect navigable waters and water resources, the U.S. Army Corps of Engineers requires a permit for any development activity or work involving dredging, filling, excavation or modification of navigable waters. Because of the project's proximity to the shoreline and planned work beyond the mean tide line (e.g., drainage structures), a Department of the Army permit is required.

A Department of the Army permit was submitted on June 16, 1987 and has a minimum 60-day processing period. Issuance of this permit is contingent upon a Coastal Zone Management consistency review by the State of Hawaii, Department of Planning and Economic Development, and a 401 Water Quality Certification (WQC) by the State of Hawaii, Department of Health. These two State permits are discussed below.

State of Hawaii

Conservation District Use Application (CDUA). A CDUA must be filed with the State Department of Land and Natural Resources (DLNR). DLNR will not act on a CDUA until the County's Special Management Area permit and Shoreline Setback Variance are granted. There is a 180 day processing time limit for the CDUA.

Coastal Zone Management (CZM) Consistency Review. The National Coastal Zone Management Act of 1972, as amended, requires Federal agencies to conduct their activities in a manner consistent with the State CZM programs. Because this project requires a Federal permit through the Army Corps of Engineers, a "consistency determination" must be made by the State Department of Planning and Economic Development (DPED). The consistency review submission to DPED was made on June 26, 1987, and a copy of the submission was forwarded to the Maui County Planning Department. The status of this application is pending.

401 Water Quality Certification (WQC). As a requirement of Section 401, Water Quality Certification (WQC) of the Clean Water Act of 1977, any applicant for a Federal license or permit to conduct activities resulting in discharge into navigable waters must obtain a 401 WQC from the State. The requirement for a Department of the Army permit triggers the need for a WQC from the Department of Health. An application for a WQC was submitted to the Department of Health concurrently with submission of the Department of the Army permit on June 16, 1987. The status of this application is pending.

Approvals for Development or Modification of Potable Water Systems. The State of Hawaii Department of Health Chapter 20, Title 11, Administrative Rules, requires various approvals from the Director of Health for the development or modification of potable water systems. Section 11-20-29 of Chapter 20 requires that all new sources of potable water serving public water systems be approved by the Director of Health prior to their use. Section 11-29-30 requires that new or substantially modified public water distribution systems also be approved by the Director of Health. In addition, the State Department of Land and Natural Resources has overall responsibility for approval of new well locations. All required approvals from the Department of Health and Department of Land and Natural Resources for improvements to the Kaanapali Water System and construction of new wells will be obtained.

<u>County of Maui</u>

Subdivision Plat Map Approval. On January 14, 1987, the County of Maui Department of Public Works granted preliminary subdivision approval for the North Beach project. The approval is contingent upon approval of a Special Management Area Use Permit by the County Planning Department. The preliminary subdivision approval includes a list of required improvements and conditions imposed by the Department of Water Supply and State Highways Division.

Special Management Area Use Permit (SMA) and Shoreline Setback Variance (SSV). An application for the Special Management Area Use Permit was filed with the County on December 19, 1986. An application for a Shoreline Setback Variance will be submitted in the near future. At the recommendation of the Planning Department staff, the Maui County Planning Commission on March 10, 1987 voted to require the preparation of an environmental impact statement prior to granting the SMA and SSV. This EIS is intended to comply with the Planning Commission's stipulation.

Community Plan Amendment. Although the Lahaina Community Plan calls for hotel and resort development on the majority of the project site, there are small portions designated for open space and public use. A Community Plan Amendment would be required if development were planned for these portions of the site.

Zone Change Approval. The majority of the site is zoned H-M and H-2 (hotel) by the County, though small portions of the site are designated for residential uses (R-3) and will require a zoning change.. The Community Plan designates hotel use in these areas.

Construction Permits. Necessary construction permits include grading and building permits, issued by the County Department of Public Works, Land Use and Codes Administration. Submittal of an erosion control plan and construction plans will be required. These permits will be obtained prior to the initiation of site work and construction.

3.5 Need for Project

A market assessment was conducted for the Joint Venture by John Child & Company, Inc. (see Appendix A). The study looked at the projected demand for hotel rooms from the present to 1995, compared to the existing and planned room inventory. The planned inventory consisted of all units currently planned for construction. The market assessment indicated that based on average hotel occupancies of 80 to 85 percent (supported by historical trends), Maui would still require about 3,500 to 5,000 additional hotel rooms by 1995. This demand would be met by the development of North Beach.

The study also indicates that Maui visitors are typically independent travelers of upper income, as opposed to group tourists which tend to be of average income. Additionally, the market assessment indicated that as of July 1986, hotels in West Maui had the highest achieved room rates in the State. The adjacent Kaanapali Beach Resort has consistently maintained higher occupancy rates and significantly higher average room rates than all other travel industry areas in the state, including Waikiki. Kaanapali's average hotel occupancy rate for 1985 was 88.3 percent, compared with 80.8 percent for Waikiki and 78.5 percent for the island of Maui (Amfac and Hawaii Visitor's Bureau). Over the past decade, Kaanapali's average hotel occupancy rate has been 86 percent.

Overall, the market study indicated very clearly that there will be a continuing large, unmet demand for higher priced accommodations, which North Beach could fill.

The project will also create construction and long-term employment (see Appendix B, Fiscal and Economic Impact Assessment). The 1983 Lahaina Community Plan has identified the need for an increase in employment opportunities. The Lahaina Community Plan's recommendations call for the creation of employment in the visitor industry, particularly in proximity to existing visitor centers such as Kaanapali. The increase in visitor industry jobs is particularly important in light of Amfac's recent decision to reduce its Lahaina Pioneer Mill Sugar Company operations. The reductions are necessitated by the presently high production costs, low sugar prices, and the lack of sufficient amounts of high quality, low cost water for irrigation.

Finally, the project will create a net increase in County revenues of about $1.9 million annually and in State revenues of over $21.0 million annually by 1996.

3.6 Use of Public Resources

There will be no use of public funds or public lands in the proposed project.

CHAPTER IV

RELATIONSHIP TO PUBLIC LAND USE POLICIES AND CONTROLS

IV. RELATIONSHIP TO PUBLIC LAND USE POLICIES AND CONTROLS

4.1 State Land Use

All lands within the State have been placed in one of four land use districts (Urban, Rural, Agriculture, Conservation) by the State Land Use Commission (LUC) in accordance with the 1961 State Land Use Law (Chapter 201, HRS). All but a small portion of the site is located within the Urban district, which allows for the proposed hotel developments (see Figure 6). As is the case throughout the State, the shoreline area is designated a Conservation district, and as such, requires a Special Management Area (SMA) use permit from the County and a Conservation District Use Application (CDUA) from the State Department of Land and Natural Resources.

4.2 Hawaii State Plan

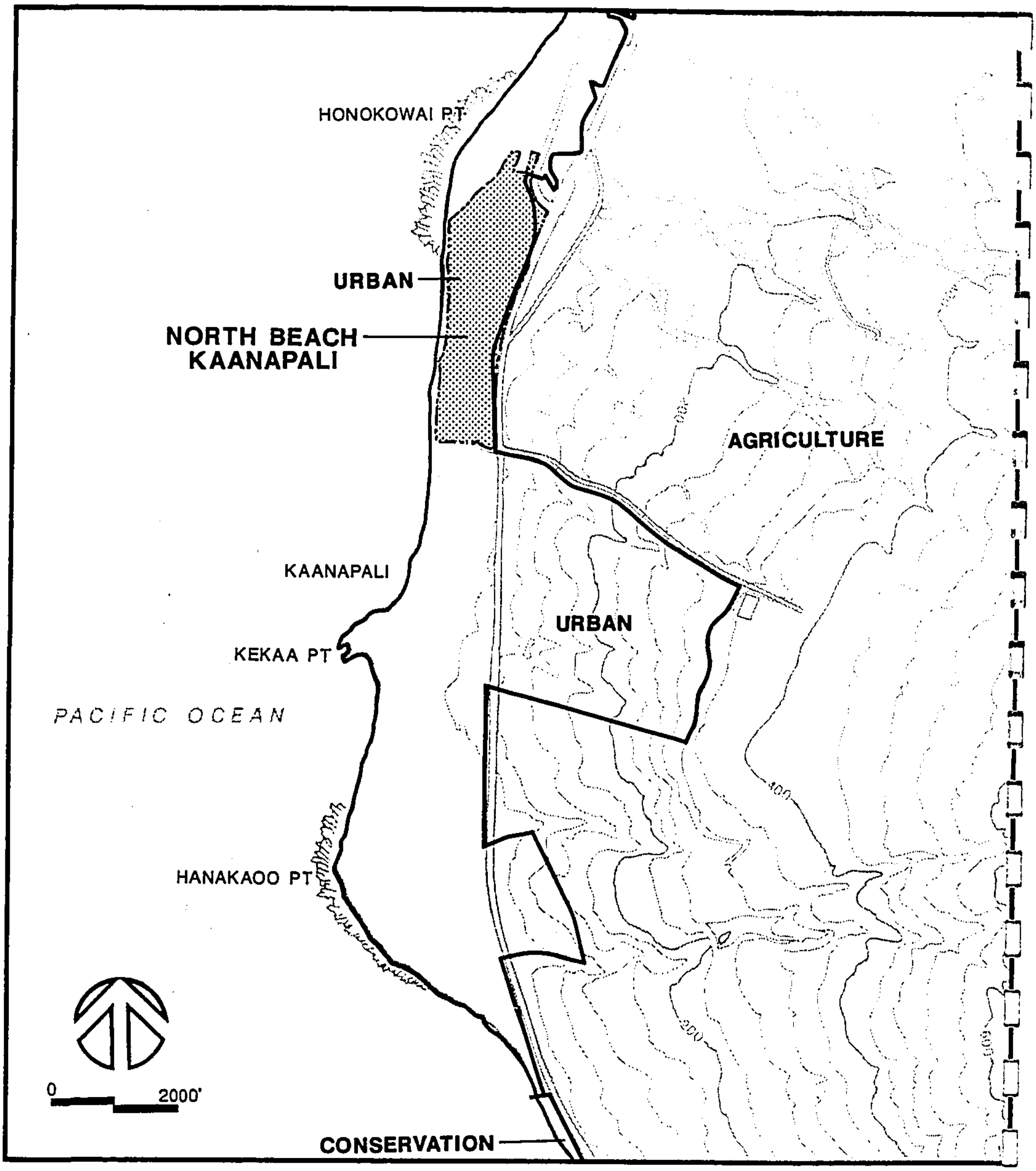
The Hawaii State Plan, established through the State's legislative process, represents public consensus regarding expectations for Hawaii's future. Chapter 226, Hawaii Revised Statutes (as amended) describes the purpose of the State Plan as follows:

> "...[it] shall serve as a guide for the future long-range development of the state; identify the goals, objectives, policies and priorities for the State of Hawaii; provide the basis for determining priorities and allocating limited resources, such as public funds, services, manpower, land, energy, water, and other resources; improve coordination of state and county plans, policies, programs, projects, and regulatory activities; and to establish a system for plan formulation and program coordination to provide for an integration of all major state and county activities" (Chapter 226-1: Findings and Purpose, HRS).

The proposed project is basically consistent with the goals, objectives, policies and priority directions of the Hawaii State Plan. The following section analyzes the impacts of the project with respect to three substantive areas of the Hawaii State Plan: the economy, the population, and the physical environment.

Economy. Relevant objectives and policies focus on two areas of the State's economy: the general economy and the visitor industry. The major thrust of the plan in these two areas is twofold: the increased employment opportunities, income, and job choice; and, to support the continued growth of the State's major industry - tourism. The project proposed by the Joint Venture will contribute to the attainment of these economic objectives by creating permanent jobs within the visitor industry, creating short-term construction jobs, and by expanding the tourism industry in the Kaanapali area.

Population. The essential thrust of the population element of the Hawaii State Plan is to encourage an increase in economic activities and employment opportunities on the neighbor islands consistent with community needs and desires,



NORTH · BEACH
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State Land Use Designations

Figure: 6

Amfac Property Development Corp/Tobishima Pacific, Inc.

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and to ensure that adequate support services and facilities are provided to accommodate the expansion. Direct and indirect jobs and economic opportunities created by the proposed hotel developments will contribute to population growth in West Maui, to the extent that families move to, or decide to remain in, the area in order to sustain a desired standard of living. The Joint Venture, in coordination with public agencies, will seek to expand existing infrastructure as necessary to accommodate increases in the local population that are attributable to the project.

Physical Environment. Objectives and policies for the physical environment relate to the enhancement of terrestrial, aquatic, shoreline and marine resources and scenic, aesthetic and historic resources. Essentially, these objectives seek to encourage the prudent use of Hawaii's natural resources.

Public access to the shoreline and coastal recreational activities will be enhanced by two proposed public park sites.

A biological study (flora and fauna), marine biological study, and surface archaeological reconnaissance have been conducted for the property. Subsurface archaeological testing is presently being conducted. The results of these investigations are discussed further in Sections 5.4, 5.5 and 5.6 of this document. Recommended mitigative measures are being incorporated into proposed project activities, (e.g., drainage improvements) in an effort to minimize negative impacts on the physical environment.

4.3 State Functional Plans

The Hawaii State Plan directs the appropriate State agencies to prepare functional plans for their respective program areas including: agriculture, transportation, conservation lands, housing, tourism, water resources, historic preservation, energy, recreation, education, higher education and health. These functional plans serve as the primary implementing vehicle for the goals, objectives and policies of the Hawaii State Plan. The following functional plans were found to have the most relevance to the proposed North Beach development.

4.3.1 State Agriculture Functional Plan

The State Agriculture Functional Plan (prepared by the State Department of Agriculture) applies to lands "suitable and used (or potentially usable) for agricultural production." The subject property is presently utilized for sugarcane production, although it is designated an Urban district by the State Land Use Commission, zoned for hotel use by Maui County and designated for hotel, park and open space by the Lahaina Community Plan. These public land use designations for the site would appear to indicate that the property has been determined to be more suitable for non-agricultural uses.

4.3.2 State Conservation Lands Functional Plan

The State Conservation Lands Functional Plan (prepared by the State Department of Land and Natural Resources) defines and addresses state-wide concerns for environmentally sensitive areas such as watersheds, terrestrial habitat, ocean habitat, areas with endangered species, natural streams, shoreline, open space, natural areas, air and water quality sensitive areas, and scenic, historic and cultural sites.

The shoreline portion of the subject property is classified as part of the State Conservation district. The planned hotel developments will be setback from the shoreline to ensure public access and use, and the creation of public parks and beach accesses on the property will provide recreational opportunities which presently are non-existent. A Conservation District Use Application (CDUA) permit will be filed with the State Department of Land and Natural Resources.

4.3.3 State Tourism Functional Plan

The State Tourism Functional Plan is prepared and maintained by the Tourism Office of the State Department of Planning and Economic Development. The overall theme of the State Tourism Functional Plan is steady growth of the visitor industry in a manner which enhances the quality of life for Hawaii's people. The general objectives and policies of the Tourism Functional Plan provide guidelines for resort development in Hawaii. The envisioned North Beach Kaanapali resort area will be a *high quality, self-contained*, planned destination resort, similar to the existing Kaanapali Beach Resort. It is projected to be a major employer in the area, providing a number of long-term primary jobs as well as short-term construction employment. Shoreline setbacks and proposed public parks/beach access will facilitate public use of the shoreline area.

4.3.4 State Health Functional Plan

The State Health Functional Plan (prepared and maintained by the State Department of Health) seeks to: (1) prevent disease and promote healthful lifestyles and environmental conditions; (2) ensure and promote appropriate provision and access to health care for the total community; (3) protect society from potential dangers (e.g., epidemics, hazardous environmental conditions or violent persons); and (4) prevent environmental degradation and enhance the quality of the air, land and water.

The proposed North Beach development is not expected to pose a significant risk to public safety or health. All supporting services including provision of water, sewerage systems, and solid waste disposal will comply with all applicable Federal, State and County regulations. As discussed in Chapter V, the project is not expected to have a significant adverse impact on air or water quality.

4.3.5 State Historic Preservation Functional Plan

The State Department of Land and Natural Resources (DLNR) is responsible for the State Historic Preservation Functional Plan. This plan identifies major priorities for such diverse activities as the collection and conservation of oral histories, historic records and artifacts, the perpetuation of traditional arts and skills, the preservation of historic properties, and the education of the public with regard to Hawaii's past.

Results of a surface archaeological reconnaissance (Chiniago, Inc., 1986) and a subsurface archaeological reconnaissance (Paul H. Rosendahl, Ph.D., Inc., 1987) conducted for the project indicate no surface or subsurface historic or prehistoric remains.

4.3.6 State Recreation Functional Plan

The State Recreation Functional Plan (prepared and maintained by the Department of Land and Natural Resources) seeks: (1) to assess the present and potential demand and supply of outdoor recreation resources and to guide State and County agencies in acquiring or preserving lands of recreational value; (2) to provide adequate recreation facilities and programs; and (3) to ensure public access to *recreation* areas.

Development of the proposed project will have a positive effect on the recreational resources of the area. The project includes the provision of two public park sites and beach access ways which currently do not exist. Public access to the shoreline areas will be enhanced.

4.3.7 State Transportation Plan

The State Transportation Plan (prepared and maintained by the State Department of Transportation) covers three transportation systems: airport, highways, and harbors. A policy of the state-wide highway system is to "[p]romote the planning for and improvement of the primary, secondary, and urban highway and street systems consistent with State and County plans to control growth." Even without the North Beach development, the two and three lane Honoapiilani Highway is expected to be operating over or near capacity by 1994. As further development in the West Maui area continues, the need for roadway improvements and other mitigative measures becomes more critical. Highway traffic issues are discussed further in Section V of this document.

4.4 Maui County General Plan

The Maui County General Plan, adopted in 1980, is a county-wide, comprehensive document setting long range development policies. It contains "statements of the general, social, economic, environmental and design objectives to be achieved for the general welfare and prosperity of the people of the county through government action, County, State or Federal." (Maui County Charter, Section 8-8.4) The County General Plan contains objectives and policies for the County, in order to provide a framework for decision making. The objectives and policies cover the areas of (1) population, land use and the environments; (2) economic activity; (3) housing and urban design; (4) utility and facility systems; (5) human services; (6) government; and (7) the islands of Kahoolawe and Molokai. The actual implementation program for the County General Plan policies are contained in the district-specific Community Plans. The subject development falls under the jurisdiction of the Lahaina Community Plan District.

4.5 Lahaina Community Plan

The Lahaina Community Plan (1983), mandated by the Maui County Charter and the Maui County General Plan, sets forth a relatively detailed scheme for General Plan implementation in the Lahaina region. The Community Plan sets the desired sequence, patterns and characteristics of future development in the Lahaina region. The intent of the Community Plan is to serve as a guide for decisions regarding development until the Year 2000.

Community Plan recommendations are organized into five major areas: a) socio-economic aspects, b) physical aspects, c) support systems: utilities and facilities, d) support systems: human services, and e) government. The interaction between the proposed project and these recommendation areas are discussed below.

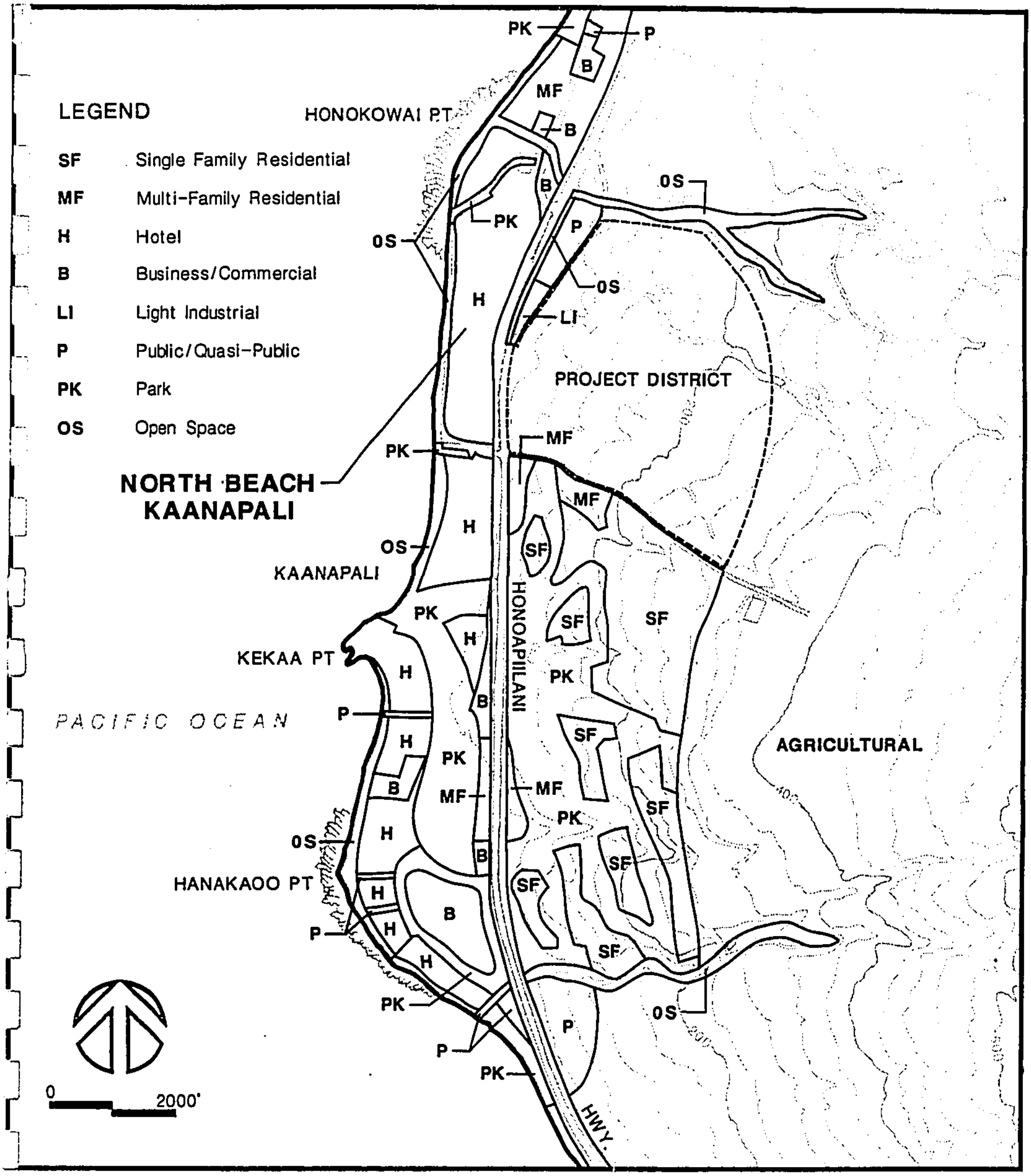
a. Socio-economic aspects

The development is consistent with recommendations in this area, which call for creation of employment in the visitor industry, particularly in proximity to existing visitor centers such as Kaanapali. The public (tax) revenues generated by the project will more than offset any public expenditures resulting from visitor demands on public services. Because the area is currently designated for urban use and zoned for hotel development, there will be little or no intrusion into critical agricultural areas.

b. Physical aspects

Specific recommendations include the importance of land management techniques involving use of natural drainageways and protection of nearshore environments and water quality. The proposed drainage structures for the project will restore the natural drainage outlet for Hanakaoo Gulch, mauka of the Honoapiilani Highway, thereby reducing the likelihood of flooding in the highway area. The proposed stormwater drainage structures have been designed and located to minimize adverse impacts to water quality and to marine biology.

The Lahaina Community Plan's detailed land use map designates the project site for hotel, public use and open space uses (see Figure 7).



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Kaanapali, Maui

Community Plan
Land Use Designations

Figure: 7

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c. Support systems: utilities and facilities

The Community Plan recommends improvements to the Honoapiilani Highway, the primary thoroughfare through the Lahaina and West Maui area. These include the establishment of turning lanes and coordinated traffic signals, highway widening, construction of bikeways and walkways, etc. The addition of up to 3,200 hotel units at North Beach could have significant impact on traffic and transportation systems in the area. These issues are addressed in Section 5.8. Recommended infrastructure improvements along Honoapiilani Highway in conjunction with this project, and Transportation System Management Programs are discussed.

d. Support systems: human services

The Community Plan calls for the improvement of public recreation facilities and shoreline access. The Joint Venture plans to provide land for two public parks on either side of the development, creating public recreational opportunities which presently do not exist.

The project is expected to generate a substantial net increase in County and State revenues, through enhancement of the local tax base. These revenues will enhance the ability to provide public support services. In addition, the project will create both temporary construction jobs and direct full time employment.

e. Government

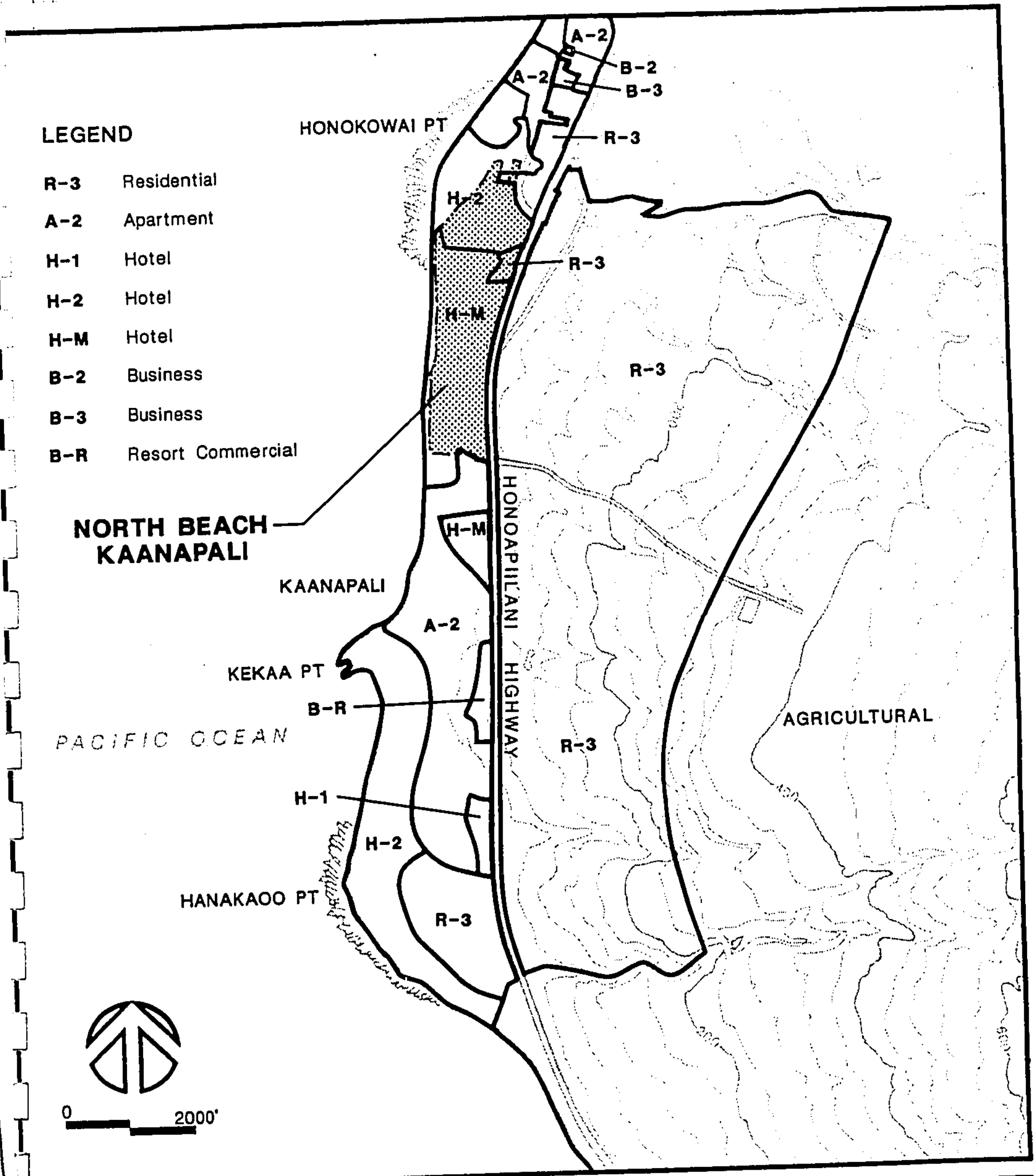
This section includes administrative recommendations for public agencies and is not applicable to this development.

4.6 County Zoning

As illustrated in Figure 8, the majority of the parcel is zoned H-M (hotel) allowing for both hotel developments and their accessory uses (gift shops, restaurants, newstands, etc.). The minimum lot area allowed is 15,000 square feet, and maximum building height is six stories. The lot coverage by buildings cannot exceed 30 percent of the lot area, and gross floor area of all buildings is limited to 100 percent of the lot area. A portion of the extreme north end of the property is zoned H-2 (hotel) which allows twelve story buildings, 35 percent lot coverage, and a floor area-lot ratio of 150 percent. Other small portions of the site such as Lot 6, zoned R-3, may need to be rezoned for hotel use.

4.7 Coastal Zone Management/Special Management Area (SMA)

In an effort by the State of Hawaii to preserve and protect the natural resources of the coastal zones, special controls on development along the shoreline have been implemented. The entire property falls within the designated "Special Management Area" (SMA) and is therefore subject to SMA rules and regulations of the County of Maui.



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Zoning Map

Figure: 8

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An application for a SMA Use Permit was filed with the Division of Land Use and Codes of the Department of Public Works, County of Maui ("Central Coordinating Agency") on December 19, 1986. The completed application was then referred to the County Planning Commission, who, based on Planning Department recommendations, determined that preparation of a full EIS was warranted. This document has been prepared in compliance with this requirement, pursuant to Chapter 343 HRS and the EIS Rules, Chapter 200, Title II, Department of Health, State of Hawaii.

Shoreline Setback Variance (SSV)

Guidelines for development within the "shoreline" area have been established pursuant to Chapter 205, Hawaii Revised Statutes. These regulations apply to all lots within the "shoreline setback", defined as 40 feet inland from the upper reaches of the wash of waves (usually evidenced by the edge of vegetative growth or the upper line of debris left by the wash of the waves). The proposed development falls within the Maui County shoreline setback area.

As such, a shoreline setback variance from the County Planning Department is required for drainage or other site improvements in the setback area. An application for a shoreline setback variance will be submitted in the near future.

Coastal Zone Management Consistency Review

The Hawaii Coastal Zone Management program is an expression of State policy to guide the use, protection, and development of land and ocean resources within Hawaii's coastal zone. The National Coastal Zone Management (CZM) Act of 1972 (as amended) requires Federal agencies to conduct their planning, management, development and regulatory activities in a manner consistent with the State CZM programs. As the CZM lead agency in Hawaii, the Department of Planning and Economic Development (DPED) requires a consistency review for coastal zone projects requiring federal approvals. The U.S. Army Corps of Engineers, Department of the Army permit required for the North Beach development will require a State consistency review by DPED. An application for a consistency review was submitted to DPED on June 26, 1987. The status of this review is pending.

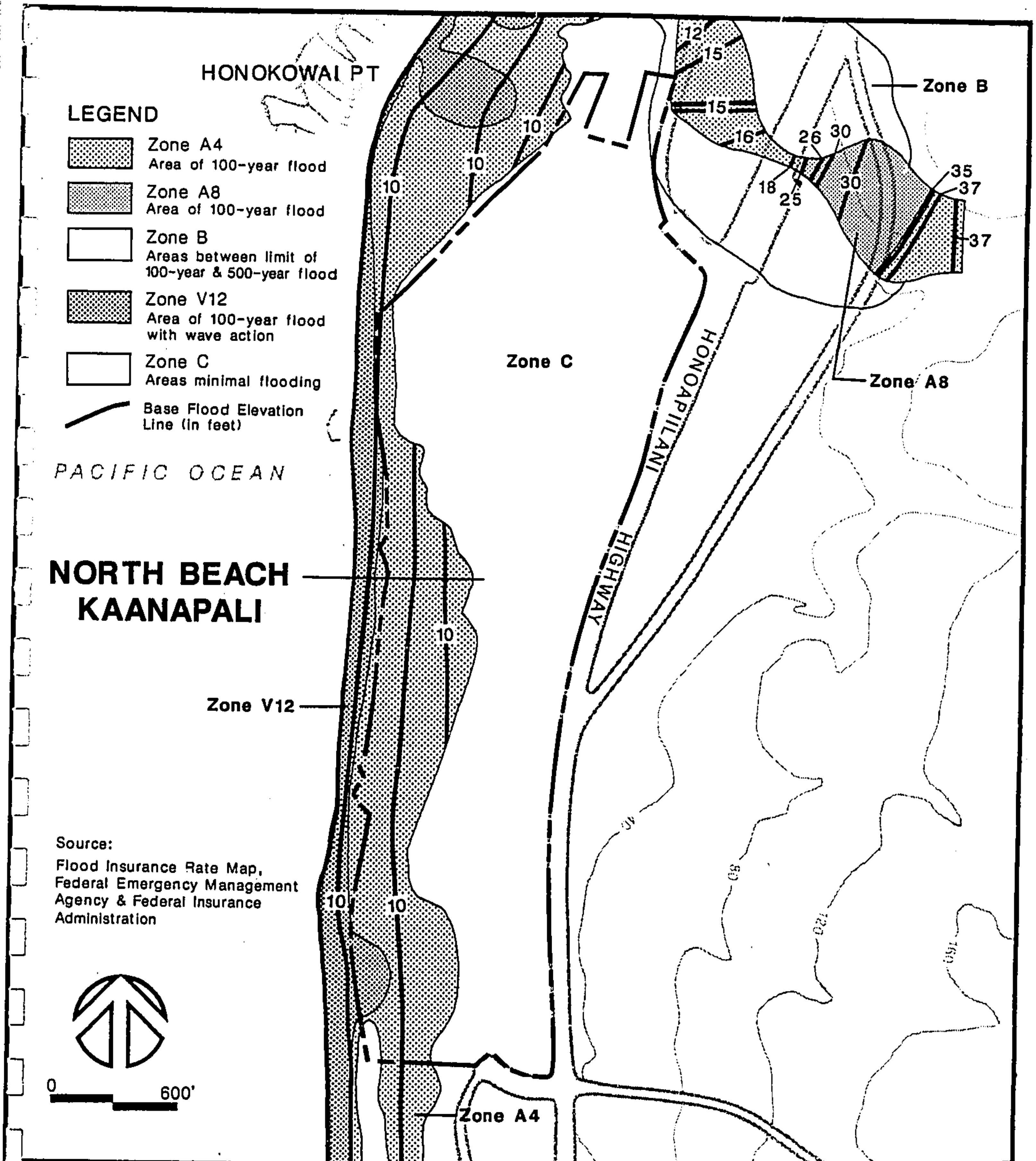
4.8 Federal Controls - U.S. Army Corps of Engineers

Under the laws of the United States, Congress has assigned the U.S. Army Corps of Engineers certain regulatory responsibilities for work in the waters of the U.S. The reasons for this include protection of navigation channels and harbors against destruction and encroachments, and to restore and maintain environmental quality by regulating the discharge of dredged or fill material, and construction and dredging in coastal and inland waters. Any individual, firm or agency who plans to do work in U.S. waters must obtain a permit from the U.S. Army Corps of Engineers.

Because the North Beach project will involve development activities which impact the shoreline or extend beyond the mean tide line (e.g., drainage structures), a Department of the Army permit is required. A permit application was submitted on June 16, 1987. The status of the permit application is pending.

CHAPTER V

ENVIRONMENTAL IMPACT ANALYSIS



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Flood Zone Map

Figure: 9

Amfac Property Development Corp/Tobishima Pacific, Inc.

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slow dispersion of stormwater drainage near the shore. The study pointed out the need to incorporate nearshore current patterns and area net current flow in decisions concerning the placement of land drainage discharge points.

Water Quality

The nearshore waters along the Kaanapali coast are designated as Class A Open Coastal Waters by the State of Hawaii, Department of Health. The waters are also classified as seasonally "wet," thus "wet" water quality criteria apply during the winter rainy season, and "dry" criteria apply during the summer. Several streams drain the West Maui mountains into the Honokowai/Kaanapali/Lahaina coastal region, none of which directly enter the project area. The discharge from streams are episodic, with little or no discharge most of the time.

Baseline water quality measurements were taken over a six month period (March to August 1986) to assess possible water quality impacts. Temperature, salinity, dissolved oxygen and turbidity were measured in-situ, and water samples were laboratory analyzed for nutrients (nitrogen and phosphorus), pH, suspended solids and chlorophyll-A. Existing information on general water quality characteristics in the Kaanapali area was also reviewed and summarized. Only nitrogen and phosphorus levels were greater than normal readings, which is possibly due to agricultural fertilizers from existing nearshore sugarcane fields.

Although prior studies and reports on water quality are limited, overall water clarity and quality are high most of the time, with episodic degradation of nearshore waters following periods of high rainfall in the uplands.

Marine Biology

A quantitative marine biological survey was conducted at four nearshore locations which were considered potential drainage discharge points, including possible drainage outfall routes. The survey concentrated on coral abundance and diversity, fish populations, and macroinvertebrates. A detailed description of the survey results is included in the Coastal and Oceanographic Engineering Study by Dames and Moore (Appendix C).

The biological survey revealed diverse coral bottom and fish populations offshore along much of Kaanapali Beach. Observations indicate that the southern portions of the site contain much better nearshore benthic communities than the northerly portions. The presence of well developed benthic coral communities in close proximity to Kaanapali Beach suggests the need for caution in placement of stormwater discharges. The information suggests that any proposed discharge locations should be located toward the northern areas of the site in order to minimize negative impacts on the marine environment. The findings of the marine biological survey have been taken into consideration in locating proposed drainage structures, described as follows and in Section 5.14.

Drainage Structures

Drainage, primarily from areas mauka of Honoapiilani Highway, will be carried to or into the North Beach nearshore waters by an open channel. The open channel was placed in an area of little coral growth, which may have been the original discharge point from Hanakaoo Gulch prior to construction of the Kaanapali airstrip. The open channel will result in restoring a direct outlet to the ocean for the Hanakaoo Gulch and areas mauka of Honoapiilani Highway. The restoration of the direct outlet to the ocean will greatly reduce the likelihood of flooding of the area below the gulch and the highway.

Mitigative Measures

Several alternate designs and locations for the drainage structures were investigated, including an originally proposed plan for an open channel and drainage outfall. This drainage plan, however, was revised in favor of the currently proposed channel outlet. A detailed discussion of these alternatives is presented in Section 5.14, Storm Water Drainage.

Initially, there is expected to be little change in the quality of drainage waters. Sedimentation/infiltration basins will be constructed and are expected to retain all flows except for the highest storm flows. For higher storm flows, the sedimentation basin will remove some of the coarser fraction of the sediment load from the storm flow. With further development of the area mauka of the Honoapiilani Highway, a reduction in erosion and sediment load and an increase in water quality is expected, as agricultural lands are converted to condominium and golf course use.

5.5 Flora and Fauna

A biological survey was conducted for this development in May 1986 by Char and Associates, botanical and environmental consultants, and is included as Appendix E. A walk-through survey inventory of the terrestrial plant and vertebrate animal communities on the project site was conducted in April 1986. A discussion of the findings is presented below.

Flora

The vegetation in the project area can be divided into five different vegetation types based upon differences in species composition and structure. Sugarcane fields currently cover about three-fourths of the project site. Grasslands and the landscaped area associated with the abandoned airport facilities make up the second largest vegetation type. Three other small vegetation types--the kiawe forest, the strand vegetation, and the koa-haole scrub-- are also recognized. All these vegetation types are dominated by the introduced plant species. Introduced species accounted for 90.3 percent of the plants inventoried during the April 1986 survey.

Fauna

The vertebrate fauna survey of the site observed thirteen species of birds in the project area, eleven of them introduced species common to lowland habitats on most of the Hawaiian Islands. The two native species, the black-crowned night heron and the golden plover, are both indigenous rather than endemic and are widespread throughout the Pacific basin. Neither species is considered endangered. The biological survey noted that it is likely that a number of other bird species would utilize the site during different times of the year, but added that nearly all of these would be introduced species.

No mammals were encountered during the biological survey, but the study noted that the following species are likely to be found on the site: (1) the small Indian mongoose (Herpestes auropunctatus); (2) the roof rat (Rattus rattus); (3) the Norway rat (Rattus norvegicus); (4) the Polynesian rat (Rattus exulans); (5) the feral cat (Felis catus); and (6) the feral dog (Canis familiaris). Since these are all introduced species, none is classified as endangered. The Hawaiian hoary bat (Lasiurus cinerius semotus) is the only terrestrial mammal native to the Hawaiian Islands, and the study noted it may be present in the area during the evenings, feeding along the coastal areas. There were no native or introduced species of terrestrial reptiles or amphibians observed during the survey. However, the study noted it is likely that geckos such as the mourning gecko (Lepidodactylus lugubris) and skinks occur on the site, particularly in the areas with trees.

Impacts

The proposed project will have no major impacts on flora or fauna. Overall, the survey of the on-site flora and fauna concluded that the area is "largely disturbed with sugarcane cultivation occupying three-fourths of the site . . . As a result, introduced plant and animal species dominate the biological communities." The report concluded that the proposed project is not expected to have a major negative impact on the total island population of the plant and animal species. None of the existing flora or fauna is considered rare, threatened or endangered.

5.6 Archaeological & Historical Resources

An archaeological reconnaissance of the project area was conducted in May 1986 by Chiniago, Inc., and is included herein as Appendix F. The purpose of the study was to determine the presence or absence of significant archaeological or historical remains on the property and to make recommendations for any further work which might be necessary prior to development. A literature search and visual reconnaissance resulted in no surface indications of either historic or prehistoric remains. The only surface remains found consisted of two fragments of a bottle, probably in the neighborhood of one hundred years old.

Despite the lack of surface remains on site, the archaeological reconnaissance by Chiniago, Inc. noted this was not conclusive evidence that there were no significant remains on the property for two reasons. First, prehistoric Hawaiian utilization of beach areas typically would not leave surface indications to be found. Second, the many years of sugarcane production on the site would have removed any surface features (e.g., platforms, terraces, walls, etc.) that might have been present at one time, while leaving deposits below the plow zone intact. The study therefore recommended that subsurface archaeological testing be conducted in any areas to be disturbed by construction.

Subsurface Reconnaissance Survey

In accordance with these recommendations, a subsurface archaeological reconnaissance survey was conducted by Paul H. Rosendahl, Ph.D., Inc. (PHRI) in June 1987. This report is included as Appendix G. The purpose of the survey was to identify any potentially significant subsurface remains within the project area, to evaluate its significance, to determine possible impacts of the proposed development upon the remains, and to identify mitigative measures which might be necessary.

The scope of work for the subsurface survey was developed based on a review of background literature, the 1986 Chiniago, Inc. surface reconnaissance, and discussions with Department of Land and Natural Resources (DLNR) Historic Sites staff. The field work completed involved sixty test cores along the sand dune (ocean-front) areas, conducted with hand-powered corers. In addition to the cores, ten backhoe trenches were excavated; two in the sand dunes and the remainder in the inland portion of the site. Two sections of the sand dune were faced and the soil profiles fully recorded. The detailed information obtained from the field work is included in Appendix G.

In summary, the subsurface coring of the coastal dune did not identify any subsurface prehistoric cultural deposit or any human skeletal remains. The backhoe trenches and the soil profiles found no evidence of any cultural activities other than present cultivation of the land. One surface archaeological site, an L-shaped wall, was identified. However, this site has been evaluated as having minimal significance, and no further work is recommended for this feature. The findings suggest either there was little to no prehistoric use of the area, or that the evidence of prehistoric use is no longer present.

Despite the lack of subsurface findings, PHRI noted that there was still a possibility of isolated burials and/or remnants within the project area. Therefore, the study recommended that there be monitoring of land modification of the dune, or a stop work policy with immediate archaeological consultation be established, should any remains be discovered during hotel construction. In a June 12, 1987 letter, the DLNR State Parks Administrator concurred with PHRI's findings that the project will have "no effect" on significant historic sites, but concured with the recommendation for some kind of monitoring or stop work provision.

In response to DLNR's concerns and a request by the U.S. Army Corps of Engineers in conjunction with a Department of the Army permit, a plan for archaeological monitoring of shoreline construction was completed. This plan, completed by PHRI, is included as Appendix L. The plan has been submitted to the Army Corps of Engineers and will be fully reviewed and approved by the Corps and the DLNR Historic Sites Section.

5.7 Visual Resources

Because the site is presently vacant, there are unobstructed view corridors running mauka-makai and north-south between Kaanapali Beach Resort and the Mahana Condominiums in Honokowai. In the long term, the visual character of the site will be irretrievably altered. The site is one of the last large, ocean-front parcels in the Kaanapali area which remains vacant, despite the presence of resort and condominium development on adjoining parcels. The anticipated six-story hotel developments will alter both the mauka-makai and north-south view corridors. From an off-shore vantage point, the mountains will still be unobstructed because of the relatively low building heights. However, from certain points on the shore, particularly on-site, the mauka view will be modified. The line of site looking makai from Honoapiilani Highway will be altered, although the shoreline is not presently visible from the highway because of the natural slope on-site. The presently unobstructed north-south view between Kaanapali and Honokowai will also be slightly modified.

Mitigative Measures

The development will conform to all County ordinances regulating building heights, bulk, and setbacks. Mitigative measures to minimize visual impacts resulting from the project include aesthetically pleasing architectural design and landscaping, and placement of structures to maintain a low density ambience. Mauka to makai visual corridors between structures will be maintained, and ocean views from the public park sites will be preserved. Although the specific design of the hotels will depend upon the individual hotel developers, low-rise, low-density construction is envisioned by the Joint Venture to retain the open, unrestricted character of the Kaanapali area and to maintain makai-mauka view corridors to the greatest extent possible.

5.8 Transportation/Circulation

The main thoroughfare connecting Lahaina and the Kaanapali area is the three-lane Honoapiilani Highway. A traffic impact assessment for the proposed development was conducted by Austin, Tsutsumi & Associates, Inc. (see Appendix H). The purpose of the study was to assess existing traffic conditions, to project the traffic impacts resulting from the North Beach development and to recommend measures to mitigate those impacts.

An evaluation of existing conditions was conducted through use of the State Department of Transportation traffic counts and additional manual counts. Total traffic between Lahaina and Kaanapali ranges from 26,800 to 37,500 vehicles per day. The data indicated that the afternoon peak hours, from 4:00 to 5:00 PM, are the most critical traffic periods during the day. The impact analysis therefore focused on this time period. The traffic assessment is discussed in terms of "capacity analysis". "Under capacity" indicates that traffic flow would virtually always be below capacity; "near capacity" indicates that capacity could be exceeded at times; and "over capacity" at a signalized intersection indicates that traffic demand exceeds the capacity of the intersection. A "volume-to-capacity ratio" (V/C) over 1.00 on a continuous highway segment indicates that traffic demand per lane exceeds the lane carrying capacity.

Impacts

The traffic analysis first projected afternoon peak traffic without the proposed project for the year 1994. (These projections are shown in Appendix H.) This year was selected because it is the anticipated date of completion for the North Beach resort. Findings indicate that growth in regional traffic will continue even without the North Beach project and that areas along Honoapiilani Highway will be operating over or near capacity. By 1994, given present highway conditions, Honoapiilani Highway is expected to carry 40,985 vehicles per day total in both directions.

Traffic as a direct result of the North Beach development was then projected for three project phases: Pre-development (approximately 1990), Phase I (mid-point of development; approximately 1992), and Phase II (at full build out; approximately 1994). Recommended infrastructure improvements for each of these project phases were then made.

Pre-Development

By 1990, prior to the opening of the first hotel, the northbound lane of Honoapiilani Highway, south of Kaanapali, will be operating at a V/C ratio of 1.06. The intersection of Honoapiilani Highway and Kaanapali Parkway will be over capacity, in a worsening of existing capacity conditions. This will be due to the heavy left turn demand from Honoapiilani Highway, northbound into Kaanapali Parkway, conflicting with through traffic on Honoapiilani Highway, southbound. Similarly, the intersections of Honoapiilani Highway with Kekaa Drive will be over capacity, and the Puukolii Road intersection will be near capacity, due primarily to heavy mainline traffic.

Pre-Development Mitigative Measures

Recommended mitigative measures for the pre-development phase include:

a. Add a second northbound lane to Honoapiilani Highway between Lahaina and Kaanapali, as proposed by the State Department of Transportation.

b. Widen the southbound approach of Honoapiilani Highway to two through lanes at Kaanapali Parkway.

c. Provide double left turn lanes from Honoapiilani Highway, northbound, to Kaanapali Parkway.

The second northbound lane between Lahaina and Kaanapali, currently proposed by the State Department of Transportation, will upgrade Honoapiilani Highway to a four-lane facility, and reduce both north and southbound directions to below capacity conditions. The upgrade of the Kaanapali Parkway intersection to two through lanes southbound, and double left turn lanes will improve operations to near capacity conditions.

Phase I: Mid-Point of Development

Phase I represents the estimated mid-point of the North Beach development plan, approximately 1992, with two to four of the hotels open. The intersection of Honoapiilani Highway and Honoapiilani Road will be near capacity due to development north of Kaanapali. The intersection of Honoapiilani Highway and Puukolii Road will be over capacity, with the increase in southbound traffic on Honoapiilani Highway conflicting with the traffic generated by the proposed North Beach project. Honoapiilani Highway at Kaanapali Parkway will be over capacity due to the increase in through traffic. The V/C ratio north of Kaanapali Parkway will be 1.05.

Phase I: Mitigative Measures

The following infrastructure improvements are recommended in Phase I:

a. Construct the two lane, high quality, mauka by-pass highway, beginning at Puamana, south of Lahaina, to Honokowai, north of Kaanapali.

b. Construct a connector roadway between Honoapiilani Highway and the by-pass highway, in the vicinity of the Lahaina Civic Center. Signalize the intersection at Honoapiilani Highway.

The by-pass highway would divert through traffic around Kaanapali and Lahaina, thereby reducing the traffic demand on Honoapiilani Highway. A well planned system of collector-distributor roads between the by-pass highway and Honoapiilani Highway should attract Kaanapali and Lahaina traffic, further reducing the traffic load on Honoapiilani Highway.

Phase II: Complete Build-out

Phase II represents the full build-out of the North Beach project, approximately 1994. All hotels will be completed and operational. By this time, the intersections of Honoapiilani Highway with Puukolii Road/Kai Ala Drive will be over capacity.

Phase II: Mitigative Measures

The following improvements are recommended for Phase II:

Upgrade the Puukolii Road and Kai Ala Drive approaches at Honoapiilani Highway, to provide exclusive left turn, through, and right turn lanes.

The improvement of the Puukolii Road and Kai Ala Drive approaches would facilitate North Beach access to Honoapiilani Highwy and the by-pass highway, via Puukolii Road.

Conclusions and Recommendations

The traffic study by Austin, Tsutsumi & Associates concludes that growth in regional traffic is expected to continue even without development of North Beach. The recommended improvements are designed to accommodate traffic generated by the North Beach resort, as well as regional growth. The State Department of Transportation proposed by-pass highway and four lane widening of Honoapiilani Highway, implemented in a timely manner, together with the improvements recommended above should mitigate traffic impacts resulting from this project and overall growth of West Maui.

Transportation System Management

The recommendations discussed above are infrastructure type improvements, requiring the expenditure of significant capital outlays. Transportation System Management (TSM) is a process by which alternatives to additional roadway infrastructure are sought. The goal of TSM is to make more efficient use of existing transportation facilities, thereby reducing the need for new infrastructure investments. To achieve this goal in the West Maui area, TSM actions are aimed at reducing automobile use within traffic congested areas, especially during peak-hour time periods. This may include decreasing actual numbers of vehicles on roadways and/or increasing the number of passengers per vehicle. A full description of TSM actions and associated costs are contained in Transportation Study (Helber, Hastert and Kimura, Planners 1987), Appendix I.

Existing Conditions

Currently, there are transportation systems already being implemented in West and Central Maui which help reduce traffic congestion. TSM measures for the North

Beach development include expansion of some of these existing systems, as well as implementation of other appropriate TSM actions.

The Kaanapali Beach Resort, adjacent to North Beach, is currently providing three types of shuttle service for their guests. The internal resort service consists of two buses, with one bus running at any one time. This service transports guests throughout the resort area with stops conveniently located near hotels, golf course, the LK&P Train Depot, and the Whaler's Village shopping area. Current ridership of the internal shuttle is approximately 900 passengers per day.

A second shuttle service is being provided on a contractual basis between the resort and the new West Maui Airport. Two buses are used in this airport shuttle service with a passenger capacity of 20 persons per bus along with luggage storage space. It is estimated that approximately 600 passengers use this service daily.

The third shuttle transporting guests between the resort and Lahaina was instituted in March 1987 on contract with the Wharf Shops in Lahaina. At present, this service provides one bus with a passenger capacity of approximately 28 persons. The shuttle circuit runs from the Whaler's Village shopping center inside the resort to the Wharf Shops in Lahaina. Daily ridership is estimated at 300 passengers.

The Lahaina-Kaanapali and Pacific Railroad provides an alternative tour-oriented rail transport service between Kaanapali and Lahaina. Eight to ten round trips are made per day, and estimated annual ridership is 225,000 passengers.

Bus transportation carriers servicing the Kaanapali area include the Shoreline Bus, Grayline Maui, Trans Hawaiian, and Robert's Hawaii. Shoreline is the authorized (PUC) common carrier for the West Maui region, but receives no public subsidy. Shoreline service runs approximately every two hours. Robert's Hawaii and Grayline Maui provide similar transportation services between Kaanapali and Kahului Airport with buses running every one-and-a-half hours. Trans Hawaiian charges a slightly higher fare for transit between Kaanapali and Kahului Airport, with buses scheduled approximately every hour.

Air transportation between the Kahului and West Maui Airports is available on Princeville Airways. At present, the flights originate in Honolulu and, as an additional leg, continue on to the West Maui Airport from Kahului. Flight time between the two airports is approximately fifteen minutes.

An employee bus pool for the Kaanapali area was started in 1973 during the gasoline shortage, operating between Wailuku and Kaanapali. At one time, the bus pool ridership reached a peak of approximately 200 passengers per day. At present, one bus is in service with a passenger capacity of 50 persons. The transit service is supported by fares. However, the Maui War Memorial parking lot in Wailuku is used for a free-of-charge, park-and-ride location in support of the bus pool service.

Mitigative Measures/Action Plan

The Transportation Study (Appendix I) presents an action plan in the form of preliminary package of TSM proposals. There are many applicable TSM actions that may be implemented to reduce existing and future traffic congestion within the West Maui area. These TSM actions range from mitigative measures on a regional scale to measures relating directly to the North Beach development. Additionally, expanding existing TSM actions could further reduce traffic congestion.

As a first step, the formation of a Transportation Management Association (TMA), with members representing the major resort employers, is recommended. The TMA will be responsible for discussing policy and ensuring a coordinated effort. In addition, a full-time program manager should be in charge of overall coordination and promotion of the transportation program. TSM actions appropriate for reducing traffic congestion include implementing a water shuttle route between Kaanapali and Lahaina, providing in-house motor pools for resort guests, arranging resort employee carpool schedules, implementing vanpools for guest arrivals and departures from Kahului Airport, and modifying employee work schedules. Expansion of existing TSM programs include increasing employee bus pool ridership, extending resort shuttle service to accommodate the North Beach development and other commercial centers, and increasing existing bus transit services between Kaanapali and Kahului Airport.

The total annual cost of the TSM proposals presented in the Transportation Study is $2,771,000, plus 25 percent to cover contingency, promotion and resort-level coordination. An overall reduction of 6109 vehicle trips, or 32 percent of the projected daily trips, is estimated.

Although TSM actions can significantly reduce traffic congestion, it should be noted that greater success in reducing congestion could be achieved by combining TSM programs and infrastructure improvements. Changing transport characteristics along with additional roadway will provide an even greater roadway capacity. Additionally, TSM actions can lower traffic demand to better cope with restrictions imposed by roadway construction.

5.9 Land Use

Both the Lahaina Community Plan and Maui County General Plan address the sometimes inherent conflict between the desire to preserve agricultural land uses with providing areas for urban expansion. Given the finite amount of existing land, the issue becomes one of deciding which areas can be urbanized with the least threat to overall agricultural operations. Agricultural loss in the Kaanapali area is considered to have less overall impact than other agricultural areas, and therefore have been identified for urban development by the State Land Use Commission, and for resort development in the Community Plan and by County zoning ordinances.

Impacts

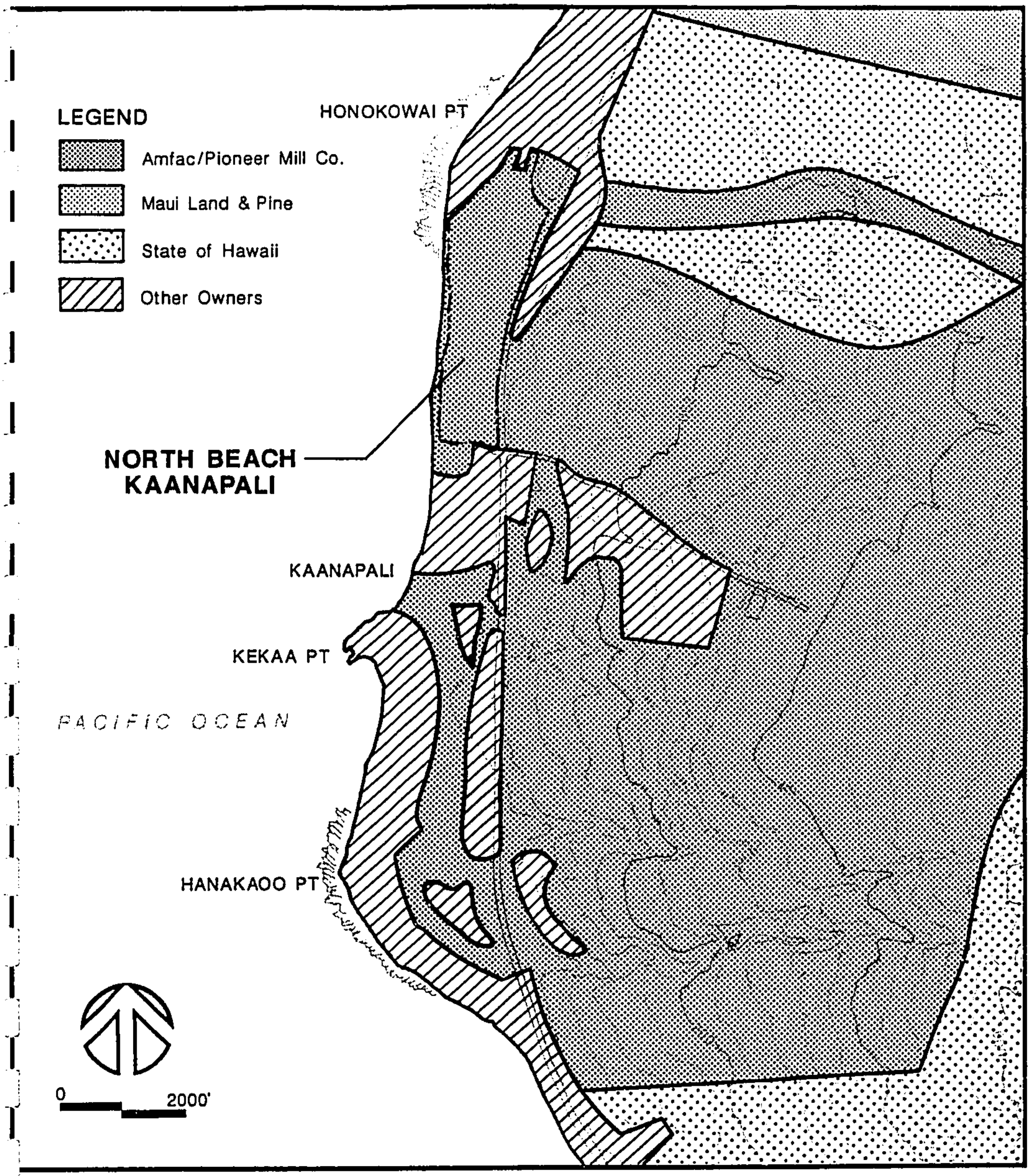
The proposed development will result in the conversion of the existing sugarcane fields on the property to hotel/resort use. Pioneer Mill Company, an Amfac subsidiary, currently farms approximately 7,900 acres of sugarcane and the resultant loss in cane land because of the North Beach project will mean a reduction of less than one percent of the land used for the production of sugar. This is illustrated in Figure 10 which shows land ownership in the area.

The North Beach property is not considered to be a prime site for agricultural use, due to its proximity to the ocean and salt-laden breezes. In addition, the high salinity of well irrigation water has historically produced poor yields on the property. The parcel's non-contiguous locations with other agricultural land makes it difficult to manage, and the proximity of nearby resort uses creates undesirable impacts on the adjacent users, including smoke, dust and rodents.

Recently, Pioneer Mill Company announced plans to consolidate its operations from 7,900 acres to approximately 4,000 to 6,000 acres at an approximate rate of 500 acres per year, starting in 1987. The planned consolidation reflects a major effort on Amfac's part to bring the cost of production in line with current sugar market conditions. One of the major components of this effort is aimed at maximizing the plantation's use of less expensive surface water sources and to minimize the current necessity to rely on the energy intensive pumping of irrigation water from basal sources. By maximizing use of surface water, reducing total acreage and rescheduling factory and field operations, Pioneer hopes to achieve an ongoing, economically viable operation with approximately 4,000 to 6,000 cultivated acres by approximately 1990.

Mitigative Measures

In an effort to retain the agricultural base in West Maui, Pioneer Mill Company has begun efforts at cultivating new replacement crops such as cacao, and has established a 300 acre cacao farm. Cacao is less water intensive than sugarcane and is a potentially profitable crop. The company is also exploring the cultivation of pineapple and other crops. Overall, the removal of sugarcane from North Beach acreage will not have a negative impact on sugar operations. In fact, the reductions fit well into Pioneer Mill Company's future operational strategy to improve overall cost efficiency.



NORTH · BEACH Land Ownership Figure: 10

Kaanapali, Maui

Amfac Property Development Corp/Tobishima Pacific, Inc. HH&K Planners

5.10 Air Quality

An Air Quality Impact Analysis (May 1987) has been conducted by J.W. Morrow and is included as Appendix J. Despite the absence of continuous air monitoring stations in the project area, the analysis assumes that present air quality is good most of the time since the area is neither highly industrialized nor highly urbanized. Major factors affecting air quality in the West Maui area include agricultural activities such as sugarcane field burning, bagasse and fossil fuel burning at sugar mills, pesticide spraying, and dust from fallow cane fields. Resort activity in West Maui with its concomitant motor vehicle traffic can also affect local air quality. Pollutants from automobile emissions include carbon monoxide (CO), oxides of nitrogen (NOx), and photochemical oxidants (Ox). Finally, construction activity results in short-term impacts to air quality.

Mobile Source Impacts

Hotel development is not normally considered a direct source of air pollution unless there is on-site generation of steam or electrical power. However, it is an "indirect" source of pollution as defined in the Federal Clean Air Act because of its inherent ability to attract motor vehicle traffic.

There will be significant traffic generation associated with the operation of five hotels, due to visitor movements, employee arrivals and departures, and the various commercial operations necessary to provide material and services to the hotels. The air quality study utilized traffic projections through 1994 (Austin, Tsutsumi & Associates, 1986) and federal air quality modeling techniques to predict air quality at various intersections of Honoapiilani Highway throughout the project development period. Estimates of maximum carbon monoxide concentrations were made for the intersections of Honoapiilani Highway with Honoapiilani Road, Puukolii Road, and Kaanapali Parkway. Results indicate that even with the project, the Honoapiilani Highway intersections with Honoapiilani Road and Puukolii Road will meet federal air quality standards. Although the area in proximity to the Kaanapali Parkway intersection could exceed federal standards in 1990 without the project, and in 1992/1994 with the project, local meteorological data suggests that the probability of this occuring is very low. The frequency of the worst case wind condition is on the order of 0 to 1 percent, or four times per year.

Electrical Generation Impacts

The estimated 3,200 hotel units anticipated at North Beach will create an additional demand for electrical power, on the order of 54 million kilowatt-hours per year. This in turn creates off-site impacts due to increased diesel fuel combustion to meet the electrical demand. Increased combustion then results in additional pollutant emissions to the air in the vicinity of the power plant. The nearest power generation station to North Beach is Maui Electric Company's Maalaea facility. Estimates of the annual emissions resulting from diesel fuel combustion to meet the demand of 3,200 hotel units are included in the air quality impact analysis. Based on the assumption of an 80 percent load factor on the existing Maalaea plant, these emissions would represent an 11.6 percent increase over existing emissions. Emissions can be reduced somewhat by reducing the electrical demand of the user (e.g., use of solar water heating, on-site co-generation, etc.).

Impacts of increased emissions as a result of additional electricity being generated at Maalaea were also examined. (See Addendum to Air Quality Impact Report, Appendix J). As part of its ongoing energy planning process, Maui Electric Company, Ltd. reviews and projects growth in electrical demand. In order to provide some indication of the ambient air quality impact resulting from the project's electrical demand, a recent air permit application for the Maalaea Generating Station was reviewed. That particular application addressed two 12.5 MW diesel units, the approximate size that would be required to meet the North Beach peak demand. The data indicated that while there will be additional air quality impact, compliance with both State and federal ambient air quality standards will still be maintained.

A resort also generates solid waste which must be disposed of. Although at present there is no municipal incinerator on Maui, the County has recently explored the possibility of constructing a resource recovery facility which would utilize solid waste to generate steam and/or electricity. If, during the project development period, the County were to proceed with such a facility, the project's solid waste would contribute to additional air emissions, although not at the project site itself.

Short-Term (Construction) Impacts

In the short term, construction activity such as site preparation, building and on-site road construction will generate an increase in particulate emissions. This is due to the dry climate and fine soils in the West Maui area. Adequate dust control measures during construction, such as twice daily watering of exposed areas and early landscaping, will be important to prevent violations of state and federal fugitive dust standards. During the second phase of development, there will be occupied units which will at times be downwind of construction activity. Again, frequent watering of unpaved roads and areas of exposed soil and early landscaping are effective mitigative measures. During later phases, dust barriers upwind of existing hotels might be considered if problems from wind-driven dust continue.

The Addendum to the Air Quality Impact Report for North Beach in Appendix J included an analysis of off-site, short term impacts from stationary sources such as concrete batching and asphalt plants. An estimated 450 cubic yards of concrete and 2,400 tons of asphalt concrete will be required for construction of project roads. Because at present there are no specific plans for the individual hotels, no estimate of concrete and asphalt required for hotel construction can be made. Since it is also too early to identify specific facilities that will be providing the concrete and asphalt, the discussion of air quality impacts is necessarily generic.

The analysis of impacts from stationary sources utilized information on the design and operating features of a typical concrete batching plant on Maui. It assumed eight hour per day operations and EPA emission factors for both direct plant emissions and fugitive dust emissions to obtain estimates of worst case ambient impact. The worst case concentration of total suspended particulates (TSP) due to the plant operation was estimated to be 105 micrograms/cubic meter. The plant's location and the area's background concentration of TSP will determine whether this worst case concentration will exceed State standards. In addition, the plant will be reviewed by the Department of Health to insure compliance with ambient air quality standards before it would be permitted to operate.

Design and operating data for a typical asphalt concrete batch plant was also reviewed. The two primary emission sources associated with such a plant are the drum mix asphalt plant and a 600 Kw diesel generator.. Estimated impacts from TSP, sulfur dioxide, nitrogen dioxide, carbon monoxide, and volatile organic compounds were analyzed. The results indicate TSP as the only possible problem pollutant. However, as with the conclusions for concrete batching, the plant location and area background TSP concentration will determine actual overall impact. Department of Health review of the asphalt plant will also be required.

5.11 Noise

A noise study has been conducted by Y. Ebisu and Associates (1986) for the proposed development, and is included as Appendix K. The existing and future noise levels in the vicinity of the proposed project were evaluated for their potential impact on existing residents and future visitors. The study projected future traffic noise levels for the Year 2007 on Honoapiilani Highway, Puukolii Road, and on the internal roadway to the project hotels. A specific objective of the study was to determine setback requirements for the proposed hotel units in order to minimize noise impacts from the project and non-project traffic. The study also assessed future noise impacts from aircraft operating at the new West Maui Airport and short-term, on-site construction noise.

The study utilizes two noise descriptors to relate traffic noise levels to land use compatibility and to assess environmental noise in general. These are the Equivalent Noise Level (Leq) and the Day-Night Average Sound Level (Ldn). In traffic noise evaluations, the averaging period for the Leq descriptor is usually an hour, more specifically the peak hour of traffic. The minimum averaging period for the Ldn descriptor is 24 hours. The federal government has established acceptable Leq and Ldn noise levels for residential and non-residential land uses.

Off-Site Traffic Noise

As shown in Table 2, the study predicts that along Honoapiilani Highway, between Puukolii Road and Honoapiilani Road, total increases in traffic noise of 1.2 to 3.2 Ldn are predicted to occur between now and the Year 2007. These increases are due to both project and non-project traffic. Along Puukolii Road and the entrance road to the project, larger increases of 8.2 to 9.3 Ldn are predicted to occur. The large increases are not unusual, due to the low volumes of existing traffic on the two roadways. The majority of total traffic noise increases in the immediate environs of the project will be project related. To the north of the site, approximately 33 percent of the predicted noise level increases are the result of project traffic.

Table 2: ESTIMATED NOISE INCREASES FROM PROJECT & NON-PROJECT TRAFFIC

Location	Existing Ldn	2007 Ldn	Total Increase	Project Increase
Honoapiilani Hwy (North)	64.9	68.1	3.2	1.0
Honoapiilani Road @ Hwy	57.3	57.5	0.2	0.2
Honoapiilani Hwy (Front)	67.4	68.9	1.5	1.0
Resort Entrance Rd @ Hwy	50.5	58.7	8.2	8.2
Honoapiilani Hwy (South)	67.7	69.0	1.2	1.2
Puukolii Road @ Hwy	52.1	61.4	9.3	9.3

Note: All Ldn values are at 50 foot distance from roadways' centerlines.

Source: Y. Ebisu & Associates, Noise Study for Proposed Development at North Beach Kaanapali

Off-Site Mitigative Measure

For residences along the Honoapiilani Highway right-of-way, the combination of project and non-project noise increases are expected to raise traffic noise levels beyond acceptable federal standards by the Year 2007. Future noise mitigation measures by the County or State may be required in conjunction with roadway improvements along Honoapiilani Highway, particularly if federal funding is involved. In addition, off-site noise mitigation measures could be taken by private property owners along the highway, at their discretion. These public and private noise mitigation measures generally include sound attenuating walls or window air conditioning units for existing structures, and/or large setback distances from the roadway for new structures. The noise study finds that "Due to the use of

Honoapiilani Highway by the general public, and the contributory (rather than total) nature of project-related traffic noise to the future traffic noise impacts along the highway, additional traffic noise mitigation measures are not considered warranted." (Y. Ebisu & Associates 1986).

On-Site Traffic Noise

Because adequate setback distances appear to be available between the highway and the proposed hotel units, adverse on-site traffic noise impacts are expected to be minimal. Possible mitigative measures to minimize noise from external or internal roadway traffic at the site include the use of buffer zones, construction of sound attenuation berms (where adequate setbacks cannot be achieved), enforcement of 25 mph speed limits and the use of air conditioners. The study states that the applicability of each of these mitigative measures depends on other considerations besides noise, such as economic cost, thermal comfort, aesthetics and technical feasibility.

Aircraft Noise

The proposed project is approximately 1.5 miles south of the new West Maui Airport. Because the airport restricts jet aircraft from landing, aircraft noise levels at the project site are predicted to be moderate over the medium to long term.

Short Term (Construction) Noise

The noise study states that temporary, unavoidable noise impacts will occur during the construction period. It is anticipated that the actual construction work (and noise) will be moving from one location of the site to another throughout the construction period, as each hotel is developed. Distances at which outdoor construction noise will be audible (levels as low as 45 to 50 dB) range from 500 to 2,000 feet. The more intense (90 to 70 dB) noise levels, however, are expected to be limited to receptor distances of 50 to 500 feet. Although these impacts will be temporary, measures to reduce construction noise to inaudible levels will not always be practical. Therefore, the use of quiet equipment and construction curfew periods is recommended.

5.12 Water Supply

A private water system owned and operated by the Kaanapali Water Corporation provides potable water for the Kaanapali area. The potable water source for Kaanapali is basal groundwater pumped from four deepwells located in Mahinahina and Honokowai at approximate ground elevations of 1,000 feet mean sea level (MSL). Each well has a pumping capacity of approximately one million gallons per day (MGD) for a total system capacity of four MGD. Water drawn from these wells is transmitted, via buried piping, to a series of totally enclosed tanks and reservoirs and, ultimately, to developed areas within Kaanapali. Treatment of the water is limited to chlorination.

Impacts

Based on the Kaanapali Master Plan's per capita water usage factor of 500 gallons per hotel unit per day, the North Beach project's estimated water demand will be 1.6 million gallons per day (MGD). This is at full build-out (3,200 hotel units), assuming 100 percent hotel occupancy. In order to accommodate the anticipated North Beach water demand, improvements to the existing water system, as well as construction of several new wells will be necessary.

The proposed storage improvements to the existing water system to accommodate North Beach will involve construction of two reservoirs: (1) an upper level 2.5 million gallon (MG) reservoir at the top of Puukolii Road, approximately 7,000 feet (1.3 miles) mauka of Honoapiilani Highway and adjacent to an existing 1.5 MG reservoir, and (2) a lower level 4+ MG reservoir along Puukolii Road, approximately 2,600 feet (0.5 mile) mauka of Honoapiilani Highway and adjacent to an existing small headbreaker water tank. The overflow elevation of the upper level reservoir would be 450 feet MSL to match that of its adjacent reservoir. The lower level reservoir overflow elevation would be 254 feet MSL to match that of the existing 1.5 MG concrete reservoir, mauka of the Kaanapali Beach resort area. Existing and new interconnecting piping between these new and existing reservoirs would result in an integrated water system whereby the stored water in any one of these reservoirs could be utilized by both North Beach and the Kaanapali Beach resort area. Construction of the additional reservoirs will probably be a joint effort between Kaanapali North Beach Joint Venture and Kaanapali Water Corporation.

The proposed waterline improvements required to accommodate North Beach from this integrated water system will be comprised of waterlines connecting to a recently installed 16-inch waterline along Puukolii Road, which crosses under Honoapiilani Highway with terminus points approximately 100 feet mauka and 400 feet makai of the highway. The mauka waterline would run along Puukolii Road from the mauka connection point up to the proposed upper level 2.5 MG reservoir. The makai waterline would run within the proposed North Beach access road from the makai connection point to the cul-de-sac of this access road. Laterals from this 16-inch makai waterline would service the proposed North Beach development.

Water demand from the North Beach project should have negligible impact on the area-wide basal aquifer. Salinity of water drawn from wells, however, may increase due to more frequent pumpage (i.e., fewer periods of non-pumpage for recovery) to meet increased water demand. The anticipated construction of new wells will alleviate this problem.

The new wells should not have any adverse impacts in terms of quality and quantity on the existing County wells. The County wells are in Alaeloa, approximately 5,000 feet north of the northernmost of the four existing Kaanapali wells. The existing Kaanapali wells themselves are spaced as close as 1,000 feet apart and have not exhibited any influence on each other. Furthermore, any new

Kaanapali wells will probably be south of the existing Kaanapali wells. Because the locations of any proposed County wells are not known, one cannot positively state the same conclusion. However, assuming that any proposed County wells are in the same general area as the existing County wells, or at least not significantly close to the existing and proposed Kaanapali wells, there should be no negative impact on these proposed County wells from the Kaanapali wells. The existing as well as proposed Kaanapali wells are probably within the same West Maui aquifer as the County's existing wells. However, these Kaanapali wells should have a negligible impact on the County wells due to the insignificant yield from all of these wells relative to the capacity of the vast aquifer.

The proposed water system improvements will be dedicated to the Kaanapali Water Corporation, a wholly-owned Amfac subsidiary. By State law, this company falls under the control and jurisdiction of the Public Utilities Commission, a State regulatory agency.

In the longer term, there will be an increased water demand based on increased residential growth in the area. Assuming that the North Beach Resort employees will require approximately 629 additional housing units in the Central and West Maui areas (see Section 5.20), and assuming a water demand of 500 gallons per housing unit per day, the projected water demand will be approximately 314,000 gallons per day.

5.13 Sewerage

The Kaanapali Sewer System was dedicated in its entirety to Maui County by Amfac Property Corporation in 1983. Amfac, under agreement with Maui County, expanded the County's Regional Lahaina Sewage Treatment Plant (STP) to increase the STP treatment capacity by 3.5 million gallons per day (mgd) to accommodate Amfac's present and future Kaanapali developments. Currently, Amfac has 2.06 MGD in available reserve capacity at existing facilities. The STP has the capacity to service the entire North Beach development. Amfac has agreed to provide the Joint Venture with a portion of its available reserve capacity. Amfac has the right to further increase the STP capacity, if necessary.

The proposed sewerage system for North Beach will consist of gravity sewer lines to convey sewage from the beach park and all proposed lots south of the drainage channel (as described in Section 5.14, Stormwater Drainage) to a sewage pump station (SPS) centrally located within the North Beach development. This SPS would pump to an adjacent existing sewer manhole on Honoapiilani Highway, part of a gravity sewer line leading to the County's SPS No. 1. This SPS No. 1, which pumps sewage to the Lahaina STP, can accommodate the estimated sewage generated from the beach park and proposed hotels. Sewage from proposed lots north of the drainage channel would flow by gravity to existing sewer manholes along Kaanapali Place. These sewer manholes are part of the recently constructed Maui County Napili Sewerage System gravity lines which lead to an SPS along Honoapiilani Road. The gravity sewer lines and SPS, which pumps sewage to the

Lahaina STP, were designed to accommodate the estimated sewage generated from North Beach.

The design of the proposed sewerage system will be based on the assumption that the total development to be served would include the North Beach hotels and the public park areas. Hotel development density will be assumed to be 35 units per acre, with estimated sewage generation at 400 gallons per day per unit.

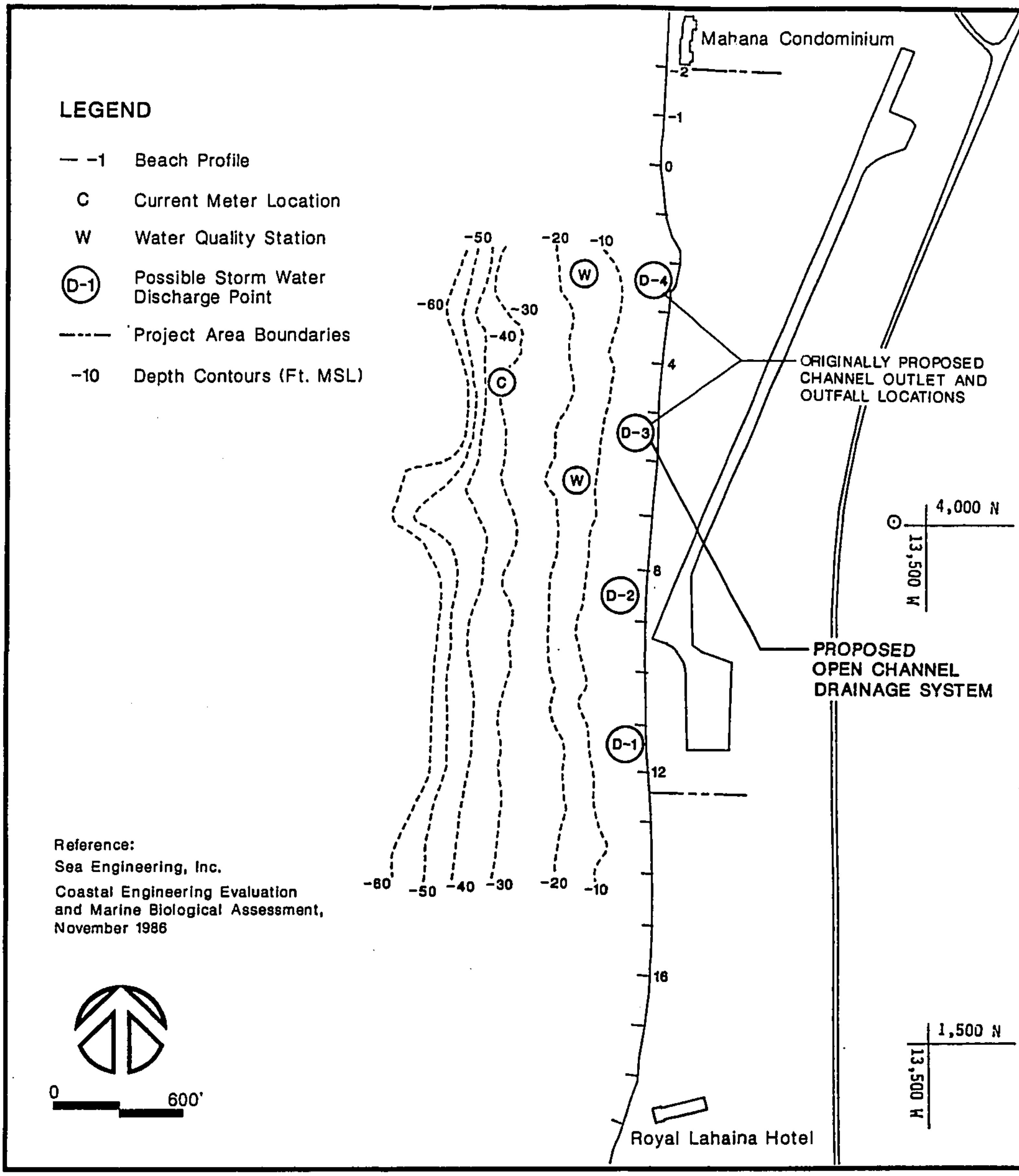
The sewerage system will be designed in accordance with the February 1984 Design Standards of the Division of Wastewater Management, Department of Public Works, City and County of Honolulu.

5.14 Storm Water Drainage

The Draft EIS described a proposed stormwater drainage system which included a trapezoidal channel discharging at the shoreline and an outfall pipeline terminating offshore. As illustrated in Figure 11, the trapezoidal channel was proposed at location D-4 and the outfall pipeline was to be offshore at location D-3. In reviewing the proposed drainage system for a Department of the Army permit, the Army Corps of Engineers expressed concern that the proposed outfall and resulting stormwater discharge would degrade coastal water quality and coral communities. The project engineers were requested to investigate alternatives to the proposed drainage outfall. Subsequent to publication of the Draft EIS, the project engineers, in consultation with the Corps of Engineers, redesigned the proposed drainage structures.

The new drainage plan combines storm runoff from Hanakaoo Gulch and the agricultural lands between Hanakaoo Gulch and Puukolii Road (area directly mauka of North Beach) into a single open trapezoidal channel discharging at the shoreline. This eliminates the need for the originally proposed outfall. The location of the new drainage channel is at location D-3, as shown in Figure 11. Permanent and temporary sedimentation basins are located within the mauka agricultural lands. An Environmental Assessment for the originally proposed drainage system, as well as an addendum for the new stormwater drainage system is included in Appendix D (Dames and Moore, May 1987 and September 1987).

The channel outlet has been designed as a buried revetment. The revetment would prevent excess erosion during high storm flow periods and would prevent undermining of the channel outlet during high wave action periods. The revetment would be buried and would not be visible during normal periods, and would become visible only after heavy storms or after high wave action. The revetment would be reburied by sand during the course of normal sand transport activity following the extreme events. Based on analysis of coral activity offshore, the channel outlet is located in an area of marginal coral growth, averaging about 10 percent coverage overall.



NORTH · BEACH
Kaanapali, Maui

Location of Proposed Drainage Structures

Figure: 11

Amfac Property Development Corp/Tobishima Pacific, Inc.

HH&K Planners

Impacts

The overall drainage impact resulting from elimination of the ocean outfall and relocation of the open channel should be positive. By removing the outfall, two impacts are eliminated: 1) the direct destruction of coral from outfall construction, and 2) the offshore discharge of freshwater and sediment near the ocean bottom. The open channel and channel outlet will restore the natural outlet for Hanakaoo Gulch, the natural drainageway on the mauka side of Honoapiilani Highway. There will be four 12-foot wide box culverts to carry the water underground across Honoapiilani Highway to the site. The restoration of the direct outlet to the ocean will greatly reduce the likelihood of flooding of the area immediately below the gulch and of Honoapiilani Highway. The channelization of the water will result in higher velocity inflow to the ocean, and the storm water and associated sediment load will be taken quickly offshore rather than diffusely entering the nearshore areas.

Negative impacts are primarily due to construction activity. Some coral directly seaward of the channel outlet may be destroyed over time by the freshwater plume. The extent of the damage is difficult to predict because outflow from the channel will be intermittent, and harm to corals will depend upon frequency and duration of the salinity depression, tidal stage at the time of discharge, and other factors.

However, in the long term, the sediment load will decrease as there is a shift from agricultural to urbanized use. Unlike the existing agricultural use where land is left open with bare unprotected soil, almost all of the resort will either be landscaped or golf course. Although urban uses of land can also provide pollutants, the relatively low quantities of oil, lead and other pollutants which may be found in the runoff from a resort is expected to be significantly less polluting than the high sediment loads, pesticides and fertilizers which run off from the existing agricultural land.

Mitigative Measures

Mitigative measures which were adopted during the planning phases of the project include the following:

1. Based on the presence of significant live coral activity at the southern end of the project area, the location of the proposed channel outlet was moved from an originally proposed position (D-1 on Figure 11) at the southern end of the site to the currently proposed position (D-3) towards the northern end. This is just south of the area which appears to be the original channel outlet (D-4), and due to hydraulic limitations, is the most northerly position at which the entire surface runoff from the site can be discharged.

2. A permanent sedimentation basin will be included at the end of Hanakaoo Gulch to prevent the entry of coarse sediments into the open channel and into the ocean. Temporary sediment basins will be constructed to intercept

flows from the areas presently in sugar cane cultivation before discharging into the major open channel drainage system.

3. To prevent significant beach erosion from occurring during high flows through the channel outlet, a revetment structure will be constructed under the beach at the channel outlet location. The revetment will also prevent undermining of the channel. The revetment will be buried under the beach to avoid interruption of natural beach processes and to preserve the aesthetics of the area.

Alternatives Considered

The project is not feasible without drainage structures. The investment in developed property could not be made, nor could building permits be obtained without adequately handling the storm flows from the areas mauka of the proposed development.

Three alternatives to the proposed stormwater drainage system were examined. The first alternative investigated was discharge of all stormwater at a location at the southern end of the project site, at location D-1. This is the most cost effective alternative since all storm flows can be easily and efficiently routed to this location, and a single channel and outlet would be required. However, upon review of the offshore marine biology, it became clear that the area offshore this alternative site D-1 contained significant coral growth which should be protected. As a result, this alternative was discarded.

The second alternative was the originally proposed drainage plan presented in the Draft EIS. This alternative involved a channel outlet at D-4 and an outfall pipeline terminating offshore at D-3, and is shown in Figure 11. The channel outlet for this alternative would be similar to the proposed alternative. The outfall would be designed to carry a small portion of the total storm flow which could not be hydraulically routed to the channel outlet. The outfall would carry the storm flow beyond the zone of coral activity. The advantage of this alternative is that the channel outlet would be located at D-4, which is an area of minimal coral growth and may be the original outlet for Hanakaoo Gulch. The major disadvantage of this alternative would be the direct destruction of coral during the construction of the submerged outfall. An additional negative impact would be the offshore discharge of freshwater and sediment near the ocean bottom. Upon review of this drainage plan in conjunction with a Department of the Army Permit, the U.S. Army Corps of Engineers recommended that the drainage plan be modified, because the negative impacts of this alternative appeared to outweigh the advantages.

The third alternative examined was a channel outlet at D-4, with two additional on-beach discharge sites at locations D-1 and D-3, just south of the outlet. The on-beach discharges would consist of two 42-inch pipes at location D-3 and an 8-foot by 4-foot box culvert at location D-1. In this alternative, the majority of the flow would be discharged by the channel outlet at location D-4, an area with little live coral activity. Flows which could not be hydraulically routed to the channel outlet would be discharged at the two on-beach locations. This alternative results in relatively direct routing of the open channel and on-beach locations. One primary disadvantage of this alternative is that the on-beach discharge flows (D-1 and D-3) would discharge onto areas of well developed biological communities. This is especially true at D-1. In addition, it was believed that on-beach discharge pipes and culverts would detract from the aesthetics at these locations. However, since the flows at locations D-1 and D-3 would be relatively small compared to flows at D-4, the impact on biological communities at these areas may be acceptable. Due to these considerations and the fact that aesthetic concerns could possibly be incorporated into the design of the discharge pipes and culverts, this third alternative remains a viable alternative.

5.15 Solid Waste

Presently, solid waste and construction waste are disposed at the Olowalu landfill site, south of Lahaina. However, the Olowalu landfill has reached capacity, and in July 1987, the County will begin plans to permanently close the facility. A new replacement landfill in Puunene, Central Maui, will open in the summer of 1987 and will accommodate solid waste from all of Maui except Hana. The new Puunene landfill is about 20 to 30 miles from Lahaina. There is currently a feasibility study being conducted for solid waste facilities in West Maui, possibly a transfer station or incinerator. However, it is expected to be at least two to five years before any West Maui facilities are constructed.

Impacts

The proposed Puunene landfill will be adequate to support solid waste generated by the North Beach project (Personal Communication, Joseph Krueger, Department of Public Works, Waste Management Division). There are several private contractors which will be able to haul North Beach refuse to the landfill site. No unusual or dangerous substances ~~are~~ expected to be generated during construction or over the long-term inhabitation of the resort.

5.16 Electrical Power and Communication

Electrical

Commercial electrical power service is supplied by Maui Electric Company, Ltd. The present system consists of a combined overhead and underground distribution system. The underground portion of the distribution system serves the existing resort areas as well as the more recent residential developments.

The North Beach site is currently without utilities. The projected peak demand for the project (at full build out) is estimated to be approximately 10 MVA. Based on the anticipated loading, Maui Electric Company, Ltd. requires that a new transformer be installed at their Puukolii Substation to serve the project. According to Maui Electric Company, the project's electrical power requirements necessitate bringing a minimum of two distribution circuits to the load center. The Puukolii Substation, which will serve the new loads, lies mauka of Honoapiilani Highway. Ducts will be required to cross the highway to bring the circuits into the area. The two circuits emanating from the Puukolii Substation to Honoapiilani Highway will require new right-of-ways for a new poleline.

Telephone

Telephone service is provided by Hawaiian Telephone Company. The distribution system consists of an overhead cable system from Lahaina along Honoapiilani Highway. An underground distribution system from the highway aerial system currently serves the resort area.

Hawaiian Telephone Company does not have any facilities within the project site at present. A telephone trunk line from Honoapiilani Highway is proposed. Telephone cross-connect pedestals will be provided by Hawaiian Telephone Company at various locations throughout the North Beach site to permit access and provide telephone service to the project facilities. In addition, a Remote Switching Station will be necessary to serve the project requirements. The Switching Station will require a lot approximately 5,400 square feet in area. Discussions on the necessary land acquisition and equipment procurement processing have already been held, so that a switching station can be in place and ready to serve the project as facilities are completed.

Cable Television

Cable television service is provided by Hawaiian Cablevision Company in Lahaina. An overhead distribution system originates from a satellite receiver station located mauka of the Hyatt Regency Maui. The resort is served by an underground system which branches off the overhead system.

5.17 Police Protection

The Lahaina Police Station, located at Wahikuli, provides police services for the entire Lahaina District. The facility was built in the early 1970's. The Lahaina District is divided into five beats, with five patrolmen on duty each watch per beat. The Police Department notes that in addition to residents, the large amount of visitors contribute to calls for service. Recently, the Police Department conducted a study calling for an additional beat in the Lahaina District, and the required personnel to man the beat. Should this become a reality in the near future, the Police Department will be better able to provide the necessary service to North Beach. However, the Police Department has noted that due to various circumstances and recruitment problems, provision of this sixth beat will be difficult, and that all six beats may not be manned daily on all watches. Extensive security will be maintained by each hotel at North Beach, as well as a security system serving the entire resort, as exists at the Kaanapali Beach Resort. This will reduce service demand on the County Police Department. However, eventual expansion of the police force is still needed.

A major concern expressed by the Police Department was the amount of traffic along Honoapiilani Highway which would be generated by the project. Traffic impacts of the project and proposed mitigative measures are covered in Section 5.8, Transportation/Circulation.

5.18 Fire Protection

Fire protection services for the Lahaina District are provided by the Lahaina Fire Station in the Lahaina Civic and Recreation Center. The facility, like the police station, was built in the early 1970's. Presently, the Lahaina Fire Station has one 1,250 GPM pumper truck with a crew of six fire fighters per 24 hour shift. As of July 1987, there will be a ladder truck (75' aerial ladder, 1,500 GPM apparatus) added to the station and an additional four fire fighters, resulting in nine fire fighters per shift.

Impacts

According to the Fire Department, the Lahaina Station is already operating at maximum capacity because of the large area it is required to serve (Telephone Communication, Capt. Jamie Parsons, Lt. Carl Kaupalolo). The Lahaina Fire Station serves the entire West Maui area, from Lahaina to Napili and Kapalua. The closest support station is in Wailuku, a 30 minute drive to Lahaina, even under favorable road conditions. Rush hour traffic on Honoapiilani Highway, traffic accidents or storm conditions forcing road closure could seriously jeopardize back-up fire fighting support.

Mitigative Measures

Mitigative measures on-site include additional and up-graded fire protection in the hotels, such as auto fire sprinkler and alarm systems. Currently, these systems are only required for structures 75 feet in height and higher. There is pending State Legislation which would require sprinklers and alarms for new and existing structures of lower heights. In the interest of safety, the individual North Beach hotels will be required to have fire sprinklers and alarm systems installed.

The Lahaina Fire Station is already operating near capacity and may not be able to meet overall demand caused by North Beach and other developments which will increase the population and number of structures in West Maui. This situation raises the prospect of constructing an additional fire sub-station in West Maui, possibly in Napili or Kapalua.

5.19 Medical Facilities

The Lahaina-Kaanapali area is served by two medical clinics: the Kaiser Foundation Health Plan's Lahaina Clinic and the Maui Medical Group, Inc., Lahaina Branch, as well as a number of private medical and dental care providers. The Kaiser Clinic provides medical services for participants of the Kaiser Health

Plan, and does not accept individuals not covered by the plan. Maui Medical Group's Lahaina Branch is a branch office of the group's Wailuku facility. There are no eligibility requirements, and they also provide services for HMSA's Community Health Program members. Both the Kaiser Clinic and the Maui Medical Group Clinic rely on the Maui Memorial Hospital in Wailuku for major surgery, illnesses and emergency services. Maui Memorial Hospital, a state-owned facility, is Maui's only hospital. The hospital contains sufficient space to accommodate health care needs through the Year 2000. Existing hospital facilities, medical clinics, private physicians and dentists are more than adequate to service the proposed development (Telephone Communication, Mr. Lance Lewis, Administrator, Maui Medical Group).

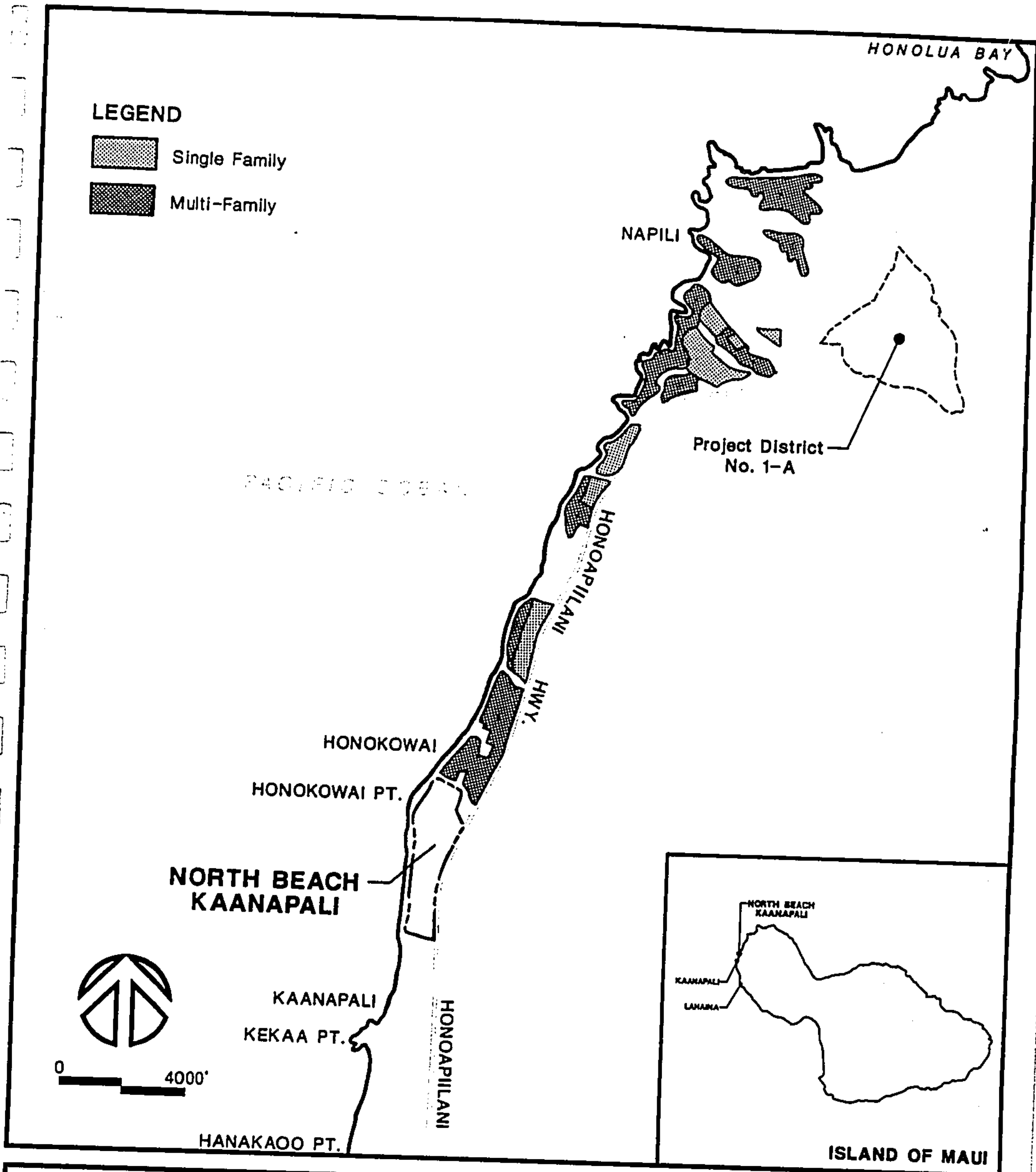
5.20 Housing

The Lahaina Community Plan, December 1983, identifies the availability of affordable housing in the West Maui region as one of the highest priority issues of concern. The Community Plan recommends adoption of a policy of slow, phased population growth, targeted in designated areas. In the short term (Phase I), a maximum limit of 2,300 additional residential units is recommended. The following areas in West Maui have been targeted for residential development in the first five years (1984 through 1989). They are shown in Figures 12 and 13:

- Infill at Honokowai-Napili
- Minor expansion mauka of Honoapiilani Highway at Napilihau
- Infill at Lahaina
- Residential development at Kapunakea
- Residential development in the vicinity of Wainee Village
- Residential development around Crater Reservoir
- Residential development adjacent to the Lahaina Civic Center
- Residential development within Project District 1A

In the mid-term (Phase II, 10 year period), targeted residential growth areas include Kaanapali North. The Community Plan also identifies long term residential growth areas (Phase III, 20 year period), should further housing be necessary.

The Maui County Housing Study, 1982 Housing Need Assessment (SMS Research 1982) provides housing unit statistics for the West Maui region, as well as for all of Maui County. Housing unit totals for West Maui were recorded at 7,756 units in 1980, with a projected demand for 6,342 additional units by the Year 2000. Also identified within this study is a housing vacancy rate of approximately 55 percent.



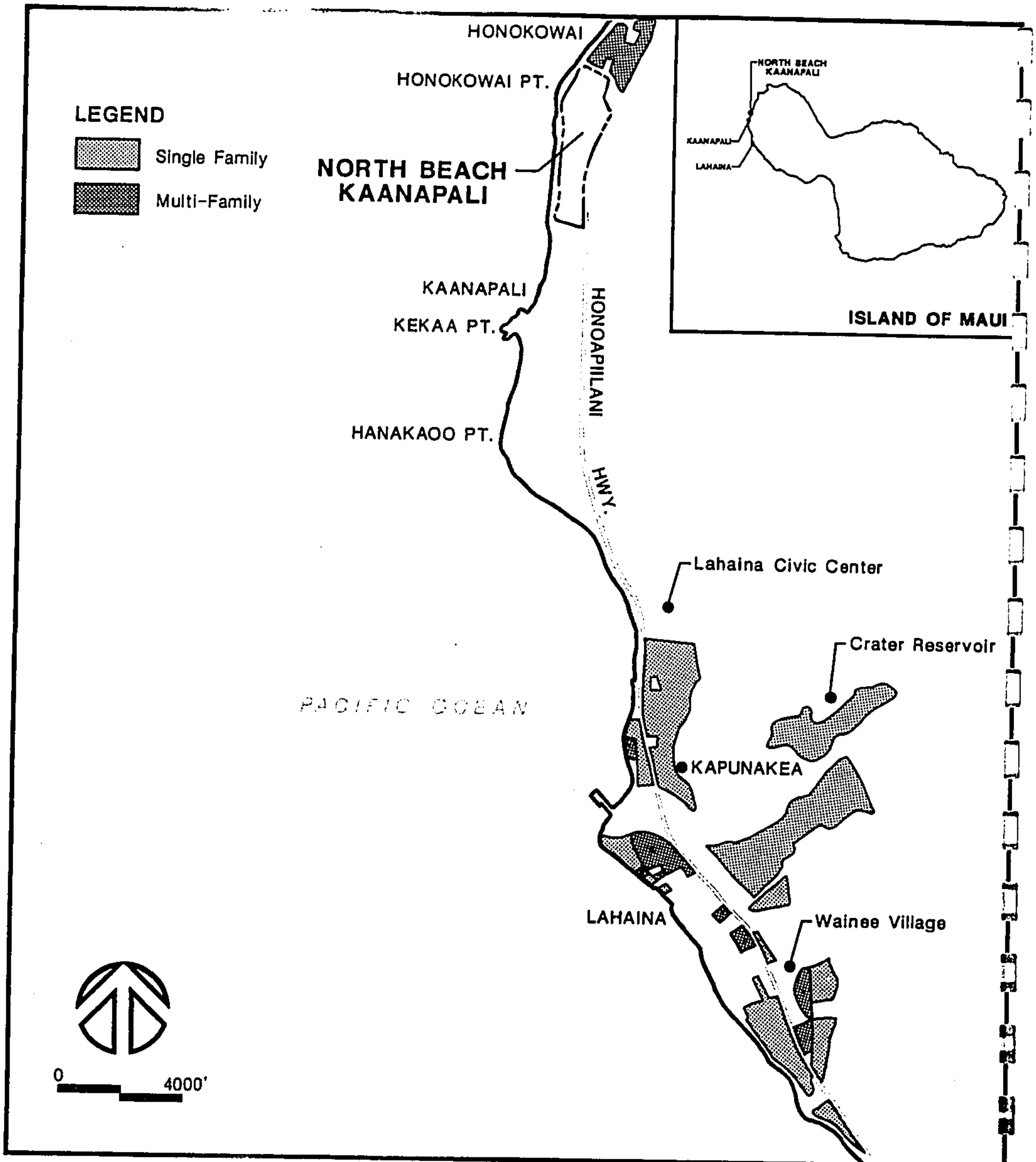
NORTH · BEACH
Kaanapali, Maui

Community Plan's
Targeted Housing Areas

Figure: 12

Amfac Property Development Corp/Tobishima Pacific, Inc.

HH&K Planners



NORTH · BEACH
Kaanapali, Maui

Community Plan's Targeted Housing Areas

Figure: 13

Amfac Property Development Corp/Tobishima Pacific, Inc.

HH&K Planners

This high vacancy rate is due to the large number of condominium rentals used by non-residents, and the large number of absentee owners. However, after subtracting housing units "held for occasional use," a true vacancy rate of 6.3 percent is obtained, well below the 12.8 percent vacancy rate for the County as a whole.

Impact

The projected number of North Beach employees could have a significant impact on the demand for housing in the Central and West Maui areas. To identify the projected housing demand, a preliminary housing impact analysis has been prepared utilizing some of the more commonly used assumptions on labor force composition and household size. This is not intended to be a definitive statement on employment-induced housing demand, which can only be determined at a later stage when there is a clearer picture of project needs.

Direct employment-induced housing demand is estimated by dividing the total number of full-time equivalent (FTE) positions by an average household size of 1.43 employees per household. (Managerial employees projected at 1.0 employees/household, other employees projected at 1.5 employees/household. Ten percent of the jobs are estimated to be managerial, 90 percent are all other jobs). As discussed further in Section 5.23, the North Beach development is expected to create over 3,600 direct FTE positions by 1996. The resulting figure (2,517) is then adjusted to reflect that segment of the labor force that is not currently housed in the community, here estimated at 25 percent based on studies of other resort developments in Hawaii. The projected demand is for approximately 629 additional housing units in the Central and West Maui regions.

Mitigative Measures

The County of Maui Planning Commission has recently adopted a new employee housing policy which requires developers to construct one housing unit for every six hotel or apartment-hotel rooms constructed. In the past, the County attempted to meet employee housing needs through exactions from private developers in one of three forms: (1) set dollar contributions ($1,500) per hotel unit planned; (2) dedication of land to the County/State for housing development; or (3) actual construction of residential units (one unit per six hotel rooms). The new County Council Resolution #2, which was adopted on October 6, 1987 will require North Beach hotel developers to construct housing units. Assuming that the North Beach resort has 3,200 hotel rooms, approximately 533 residential units will be required.

Although the proposed North Beach project is limited to subdivision of the site and infrastructure improvements, the Kaanapali North Beach Joint Venture, in conjunction with Amfac Property Investment Corporation, is also working closely with the County administration to develop appropriate housing for employees in accordance with County policies and the approved Lahaina Community Plan. To date, 30 acres have already been contributed for park and residential uses. Areas in the Community Plan also under consideration are:

- Residential development in the vicinity of Wainee Village (approximately 60 acres);
- Infill ares in Kelawea Mauka resulting from the Kahoma Stream flood control channelization project (Infill at Lahaina);
- Residential development around Crater Reservoir; and
- Residential development by the State or County around the Lahaina Civic Center.

In addition to projects on Amfac-owned lands, discussions have been initiated with the Hawaii Housing Authority (HHA) on potential projects by HHA for the West Maui area, which may extend over several hundred acres of residential development. The North Beach developers will continue to meet in good faith with County officials in order to provide resources to meet projected housing need.

5.21 Schools

West Maui is served by the Kamehameha III Elementary School, Lahaina Intermediate School and Lahainaluna High School. According to the State of Hawaii, Department of Education (DOE), present enrollment (as of September 1985) is approximately 818 students at Kamehameha III Elementary, 397 students at Lahaina Intermediate, and 753 at Lahainaluna High School. According to the DOE, the proposed project will have negligible impact on the surrounding schools. However, it should be noted that there may be secondary, long term impacts, due to the larger workforce and possible increase in residential development in the area.

5.22 Recreational Facilities/Attractions

The West Maui area has an abundance of coastal recreational areas, including 17 County parks and three state beach parks: Launiupoko, Wahikuli, and Papalaua. About one-third of the County parks are located along the shoreline, and include Honokowai and Fleming's Beach, north of the project site. Most of the West Maui beaches near the North Beach Kaanapali area are ideal for swimming, diving, or snorkeling, and include many popular surfing spots.

Kaanapali Beach, fronting the project site and the adjacent Kaanapali Beach Resort, is a large white sand beach with usually calm waters, good for swimming and snorkeling. A surfing spot known as "Rainbows" is located towards the southern end of the project site, as is another surfing area called "Osterizers," about 1/4 mile south of the site. A public beach access utilized by swimmers, divers and surfers is located at the southern end of the site.

Table 3 on the following page provides a profile of the beaches within a five mile radius of the project, the available public facilities and popular activities at the beaches.

Impacts and Mitigative Measures

Historically, there has been limited access to the North Beach site's ocean-front areas for recreational activity, due to the presence of the Kaanapali Airport and sugarcane cultivation. The North Beach project will improve public beach access, through dedication of land for two public parks on either side of the development. These parks will also include public parking for beach access. The net result is to create public recreational opportunities which presently do not exist. Improved access to the popular "Rainbows" surf spot will be available. This surf area will not be impacted by the project's proposed drainage structures. Local residents should be informed about the existence of the proposed facilities with appropriate signage and notations on County recreational maps. In addition to dedication of public park land, the possibility of actual developer design and construction of the facilities could be explored. These type of arrangements have been successfully accomplished at other Maui resort areas, including Kapalua and Wailea.

Each of the individual hotel developers will determine the type and extent of on-site recreational facilities to provide, such as tennis courts, swimming pools, shops, restaurants, etc. The adjacent Kaanapali Beach Resort's Whaler's Village Shopping Center currently houses 33 shops and restaurants. Resort golf courses across the Honoapiilani Highway will be accessible from the project.

Finally, concerns have been raised recently over the increase in ocean recreational activities, such as jet skis and parasailing, which may infringe upon traditional recreational uses (e.g., swimming, fishing, surfing, diving). In response to growing public concern, the State Department of Transportation has been mandated by the Legislature to put together a master plan on ocean recreation management. This plan is expected to go into effect in July 1988. In addition, the State Department of Land and Natural Resources, which has jurisdiction over the State's shoreline areas, has recently begun regulating illegal beach activities in Waikiki on Oahu. There are plans to do the same for Maui's beaches.

5.23 Socio-Economic

The adjacent Kaanapali Beach Resort is considered by many to be the world's first master-planned destination resort. Originally conceived over thirty years ago, it has transformed an arid, scrub brush land into a successful world-class destination resort. Kaanapali Beach Resort is the single largest employer on Maui, and in 1985, had gross revenues of about $35 million for its 5,000 employees. The Kaanapali Beach Resort currently experiences the highest occupancy and the highest achieved room rates of the major multi-purpose resorts in the State.

Table 3: WEST MAUI COASTAL RECREATION RESOURCES

	BEACH ACTIVITIES				PUBLIC FACILITIES			ACCESS	
	Swimming	Snorkeling	Surfing	Body Surfing	Comfort Station	Picnic Equipment	Paved Parking	Public	Private
STATE BEACHES									
Papalaua State Wayside Park, Papalaua	x	x				x		x	
Launiupoko State Wayside Park, Launiupoko	x		x		x	x	x	x	
Wahikuli State Wayside Park, Wahikuli	x	x			x	x	x	x	
COUNTY									
Paumana Beach Park, Lahaina	x		x			x	x	x	
Lahaina Beach, Lahaina	x	x	x				x	x	
Pu'unoa Beach, Lahaina		x	x				x	x	
Hanaka'o'o Beach, Ka'anapali	x	x	x	x	x	x	x	x	
Ka'anapali Beach, Ka'anapali	x	x		x				x	
Honokowai Beach Park, Honokowai	x	x			x	x	x	x	
Kahana Beach, Kahana	x	x						x	
Keonenui Beach, 'Alaeloa	x	x						x	
'Alaeloa Beach, 'Alaeloa	x	x	x						x
Honokeana, Honokeana	x	x							x
Napili Bay, Napili	x	x	x	x				x	
Kapalua Beach, Kapalua	x	x		x	x		x	x	
Oneloa Beach, Kapalua	x	x		x				x	
D.T. Fleming Beach Park, Honokahua	x	x	x	x	x	x	x	x	

Source: Clark, The Beaches of Maui County

The proposed North Beach resort is likewise expected to have significant positive socio-economic impacts through job creation, visitor expenditures, and increased public (tax) revenues. An economic and fiscal impact study (John Child & Company, December 1986) projects economic and fiscal impacts on the local economy (public and private sectors) as a result of the project. This study is included as Appendix B.

For purposes of analysis, it was assumed that six hotels would be developed at North Beach. The hotels would include 258 to 909 rooms each, with a total of up to 3,200 rooms. The types of hotels used were three luxury hotels, one all-suite hotel, one first-class hotel, and one convention hotel, shown as follows on Table 4.

Table 4: ASSUMPTIONS FOR HOTEL DEVELOPMENT

Lot	1	2	3	4	5 & 6	7
Type of hotel	Luxury	Luxury	Luxury	All-Suites	First Class	Con-v'tion
Number of rooms	574	258	258	508	693	909
Year of completion	1991	1991	1992	1992	1993	1994
Occupancy level:						
Year 1	65%	65%	65%	65%	70%	70%
Year 2	70%	70%	70%	70%	75%	80%
Year 3 & later	75%	75%	75%	75%	80%	85%
Average party size	2.0	2.0	2.0	2.3	1.9	1.9
Av. achieved room rate	$175	$175	$175	$160	$110	$155

Source: Amfac Property Development and John Child & Company, Inc.

Economic Impacts

The economic impact analysis projected economic impacts of the North Beach development in terms of visitor population, visitor expenditures, employment and resident income in Maui County and State-wide. These economic impacts are discussed below:

Visitor Population. The average daily visitor population was projected based on the number of hotel rooms, average occupancy and party size assumptions. The visitor population estimates were used as the basis for projecting the economic impacts of the development. Based on anticipated hotel usage patterns, the average daily visitor census at North Beach was estimated to increase from over 1,000 persons in 1991 to over 5,000 by 1996.

Visitor Expenditures. The development is expected to result in direct, indirect and induced visitor expenditures for the County of Maui and State. It is estimated that direct expenditures could amount to over $178 million by 1996. The combination of direct, indirect and induced expenditures attributable to North Beach visitors are projected to total over $305 million annually by 1996.

Table 5: DIRECT, INDIRECT & INDUCED VISITOR EXPENDITURES
1989 - 1990
(1985 Dollars in Millions)

	Direct 1/	Indirect and Induced 2/	Total
1989	$ 0.0	$ 0.0	$ 0.0
1990	0.0	0.0	0.0
1991	38.4	27.3	65.7
1992	80.3	57.0	137.3
1993	119.0	84.5	203.6
1994	167.3	118.8	286.1
1995	175.8	124.8	300.6
1996	178.9	127.0	305.9

1/ Estimated based on average daily visitor census for 1985, as reported by the Hawaii Visitors Bureau, "1985 Research Report, Supplement," March 1986; and visitor expenditures for 1985, as reported by First Hawaiian Bank, "Economic Indicators," July/August 1986.

2/ Projected 0.71 per dollar of direct expenditure, as reported by the Department of Planning and Economic Development.

Source: John Child & Company, Inc.

Construction Employment. Direct construction employment will result from jobs directly related to the construction of the hotels. Such employment will include on-site laborers, operatives and craftsmen, as well as the professional, managerial, sales and clerical workers. Direct construction employment may be expected to amount to about 3,200 person-years throughout the project development period.

Table 6: DIRECT, INDIRECT AND INDUCED CONSTRUCTION EMPLOYMENT
(Annual Full-Time Equivalent Jobs)
1989-1996

	Hotel rooms under Construction	Direct employ- ment 1/	Indirect and induced 2/	Total construction employment
1989	832	416	582	998
1990	1,598	799	1,119	1,918
1991	1,459	730	1,022	1,752
1992	1,602	801	1,121	1,922
1993	909	455	637	1,092
1994	0	0	0	0
1995	0	0	0	0
1996	0	0	0	0
Total		3,201	4,481	7,682

1/ Estimated based on 0.5 full-time equivalent employees per room over a two-year construction period.
2/ Estimated as 1.4 indirect, induced and direct employees per direct employee. Department of Planning and Economic Development, Hawaii Construction Model: Further Developments, 1982.

Source: John Child & Company, Inc.

Operational Employment. Employment for hotel operations was estimated based on the type of facilities tentatively planned for the hotel sites. Based on assumptions on number of full time equivalent positions per occupied hotel room, the study estimates that about 3,600 direct, full-time equivalent (FTE) positions will be created by 1996. If indirect and induced employment were also included, total operational employment could exceed 6,900 FTE positions in the State by 1996.

Table 7: DIRECT, INDIRECT AND INDUCED OPERATION EMPLOYMENT
(Annual Full-Time Equivalent Jobs)
1989-1996

	Average occupied room	Direct Employ-ment	Indirect and induced 1/	Total operation employment 2/
1989	0	0	0	0
1990	0	0	0	0
1991	541	973	905	1,878
1992	1,080	1,615	1,502	3,117
1993	1,645	2,315	2,153	4,468
1994	2,355	3,354	3,119	6,473
1995	2,480	3,532	3,285	6,817
1996	2,525	3,600	3,348	6,948

1/ Estimate based on direct and total operation employment.
2/ Estimated as 1.93 total employment per direct employee. Department of Planning and Economic Development, The Economic Impacts of Tourism in Hawaii: 1970-1980, 1983.

Source: John Child & Company, Inc.

Resident Income. The North Beach development is expected to have a significant impact on personal and household income for residents of Maui County, due to employee wages, salaries, benefits and income to proprietors. According to the Department of Planning and Economic Development, each dollar spent by visitors to the State in 1983 is estimated to have generated about $0.63 in total income to households in the State. Based on this relationship, North Beach could contribute about $112 million to total household income in the State by 1996.

Fiscal Impacts

The fiscal impact analysis projected direct, indirect and induced fiscal impacts of the proposed development. The analysis compared additional State and County revenues created by the project to State and County expenditures that could result from the increase in visitors resulting from the project. The net fiscal impact is evaluated by comparing the total tax revenues generated by the resort with the public expenditures resulting from the increase in visitors. Fiscal impacts are discussed as follows:

Revenues. Additional County and State tax revenues will be generated by the proposed North Beach development. These include real property taxes to the County and unemployment, excise, gross income, personal income and (proposed) hotel room taxes.

County revenues resulting from real property taxes are expected to total over $3.7 million annually by 1994, or when all hotels are completed. State revenues are projected at about $23.0 million per year by 1996.

Table 8: ESTIMATED TAX REVENUE TO THE COUNTY AND STATE
1989-1996
(1985 Dollars in Millions)

		State Revenues		
	County revenues 1/	Excluding room tax 2/	Room tax 3/	Total
1989	$0.00	$ 0.00	$0.00	$ 0.00
1990	0.00	0.00	0.00	0.00
1991	1.16	3.07	1.73	4.80
1992	2.09	6.74	3.36	10.10
1993	2.72	10.37	4.58	14.95
1994	3.74	14.67	6.57	21.24
1995	3.74	15.60	6.89	22.49
1996	3.74	15.93	7.02	22.95

1/ Projected real property taxes.
2/ Includes general excise, unemployment tax, gross income and personal income tax estimated at $.11 per $1.00 of direct visitor expenditures less County revenues.
3/ Based on 5% of projected room revenues.

Source: John Child & Company, Inc.

Revenue/Expenditure Analysis. In addition to generating revenues, visitors benefit from public services such as police and fire protection, development and maintenance of public facilities (highways, recreational facilities), health and sanitation systems and capital improvements. The net fiscal impact of the North Beach development is estimated by comparing the projected State and County revenues to projected public expenditures. The revenue/expenditure analysis concluded that the County revenues, primarily real property tax assessments, generated by the project would exceed County expenditures by two times, or a $1.9

million net increase in annual revenues by 1996. The fiscal benefits to the State would be even greater, with $21.0 million per year in additional revenues by 1996 generated from general excise, unemployment, gross income, personal income and hotel room (beginning in 1987) tax sources. The projected increases in State revenues could exceed expenditures by 21 times.

Table 9: COUNTY GOVERNMENT REVENUE AND EXPENDITURE COMPARISON 1989-1996 (1985 Dollars in Millions)

	New revenues	New expenditures	Net additional revenues	Revenue/expenditure ratio
1989	$0.00	$0.00	$0.00	0.00
1990	0.00	0.00	0.00	0.00
1991	1.16	0.39	0.77	2.97
1992	2.09	0.81	1.28	2.58
1993	2.72	1.20	1.52	2.27
1994	3.74	1.68	2.06	2.22
1995	3.74	1.77	1.97	2.11
1996	3.74	1.80	1.94	2.08

Source: John Child & Company, Inc.

Table 10: STATE GOVERNMENT REVENUE AND EXPENDITURE COMPARISON 1989-1996 (1985 Dollars in Millions)

	New revenues	New expenditures	Net additional revenues	Revenue/ expenditure ratio
1989	$0.00	$0.00	$0.00	0.0
1990	0.00	0.00	0.00	0.0
1991	4.80	0.23	4.57	20.9
1992	10.10	0.49	9.61	20.6
1993	14.95	0.73	14.22	20.5
1994	21.22	1.02	20.20	20.8
1995	22.49	1.07	21.42	21.0
1996	22.95	1.09	21.86	21.1

Source: John Child & Company, Inc.

Agriculture Impacts. As discussed in Section 5.9 Land Use, the North Beach development will be converting soon to be unused sugarcane land to non-agricultural resort use. Coupled with Amfac's recent decision to cut its Pioneer Mill sugar producing acreage in half, these events could raise community concern over the perceived encroachment of the resort industry into agriculture. However, the project itself will have no direct impact on agricultural sector employment.

Pioneer Mill Company, however, is making every effort to be successful as a smaller sugar plantation. Amfac is vigorously pursuing alternative crops in an effort to seek a more profitable use for lands vacated by sugarcane. Amfac recently entered into a joint venture to explore the viability of producing cacao (cocoa beans) for Hershey Foods and has started a 300 acre farm. The potential for creating more jobs in agriculture through the pursuit of alternative crops is positive, albeit cautious.

CHAPTER VI

ALTERNATIVES TO THE PROPOSED PROJECT

VI. ALTERNATIVES TO THE PROPOSED PROJECT

6.1 Introduction

Chapter 200 of Title 11, Environmental Impact Statement Rules, requires a discussion of "any known alternatives . . . which could feasibly attain the objectives of the action." The rules further specify that the alternatives be explored and evaluated in light of enhancement to environmental quality or the avoidance or reduction of adverse environmental effects.

Three alternative actions that could reduce or eliminate environmental risks or costs were considered: (1) "no action," (2) "single major resort,", and (3) "tourist class" development.

6.2 No Action Alternative

The no action alternative would preserve the existing situation at North Beach for the present time. The undeveloped coastal property, now characterized by a relatively barren landscape, would remain largely underutilized.

Advantages: No further expenditure of resources by the developer would be required. Existing mauka-makai and north-south views may remain unobstructed, and sugarcane crops would possibly be undisturbed.

Disadvantages: The absence of land development would also preclude economic benefits that might accrue from the project, such as *additional employment*, increased tax revenues and increased economic activity in the region overall. Opportunities to implement State and County economic objectives and policies would be lost. This is especially critical in light of the fact that Amfac has recently decided to retire nearly one-half of its sugarcane lands in the area, thereby reducing jobs in that sector.

The market assessment prepared by John Child & Company has indicated that sometime between now and 1995 projected demand for hotel rooms on Maui will surpass current inventory. Given the property's current hotel zoning and Community Plan designation, it could be assumed that public officials and the community feel this site is appropriate for resort development. If this site were not developed, pressures to increase the County's hotel inventory would still exist, and could mount in less appropriate areas (i.e., areas not already zoned or designated for resort development).

Finally, because the area is already zoned for hotel development, there is no guarantee the site will remain undeveloped or that sugar uses would remain, even if the no action alternative were taken.

6.3 Single Major Resort

Rather than a planned community of hotels, one alternative is for a single major resort complex on the site. A single major resort could include complimentary uses and activities such as a golf resort, convention hotel etc., and be promoted as one comprehensive resort area. This option would eliminate the need for subdivision of the property and limit development under this action to infrastructure improvements.

Advantages: Because of the potential for a smaller scale and lower density development, this alternative could provide greater flexibility to minimize impacts on existing views and environmental features. Potentially fewer hotel units and fewer guests would reduce demands on public services and infrastructure, including public roadways. A single resort could be perceived to be a more exclusive development, enabling the resort to target the most affluent sector of the market.

Disadvantages: A single major resort complex, unlike a resort with separate hotel operators, will require the resort developer to have greater financial resources, and will probably require backing from a consortium of investors.

6.4 Tourist Class Hotel Development

Another development alternative is for the hotels to be downgraded to "tourist class" hotels, rather than the luxury "carriage trade" hotels envisioned.

Advantages: The advantages would be a potentially larger target population, possibly resulting in higher occupancy rates, and reduced construction costs for developers due to fewer necessary amenities.

Disadvantages: The market assessment prepared by John Child & Company, Inc. (see Appendix A), shows that upper income, independent travelers have steadily increased on Maui, and that there will be excess demand for higher priced hotel rooms in the coming years. Room rates, and therefore room revenues, will be lower at a tourist class hotel, generating less public (tax) revenue. The average income tourist will have less disposable income to spend at the area's shops and attractions than the upper income tourist. The net effect will be the need to attract more visitors to attain the same level of economic benefit to the community as North Beach. Because overall hotel revenues will be lower at a tourist class resort, the hotel developers will need to lower construction costs in order to make the developments feasible. This could compromise the quality of construction, design or aesthetics, and possibly necessitate greater density of development. This type of development in the area may also compromise the appeal of the Kaanapali Beach Resort's "luxury" reputation and atmosphere.

6.5 Analysis and Conclusions

The EIS rules concerning "rigorous exploration and objective evaluation" of feasible alternatives apply both to public and private actions. However, feasibility is evaluated differently in the two cases. The benefits of public actions are measured by their contribution to the public good, which is determined through an inherently political process. On the other hand, the feasibility of a private action is ultimately determined by expected future returns, including a return on investment, compensation for risk, and a margin of profit. The importance of a development project's economic feasibility, measured in these market terms, is underscored by the weight this factor is given in certain public decisions. Therefore, although the EIS rules state that alternatives be evaluated, "even though more costly," the consequences on a private action's bottom line set a minimum standard for establishing the feasibility of the alternative.

Given that the subject site is zoned for hotel development, the only alternatives examined were "no action," and two different variations of hotel projects.

The "no action" alternative would not materially degrade the environment beyond that which would otherwise occur in the absence of the project. However, this alternative has an opportunity cost, since economic benefits that might be established in conjuction with the resort are not realized.

While a "single major resort" would seek to provide economic benefits to the community not available in the "no action" alternative, the number of direct jobs and public revenues generated could be less than the proposal. In addition, due to the high infrastructure costs for the site, the single resort may be more difficult for a single developer to finance. However, there are definite advantages to a single major resort concept. Because all components of the resort would be complimentary, overlap of services or competition between hotels in the resort would be minimized. The single major resort remains a viable alternative for the North Beach site.

The "tourist class resort" concept is likely to generate less revenue than the proposed project with no foreseeable environmental advantages. In fact, negative environmental impacts could be greater, due to the need to reduce overall costs and perhaps increased density of development.

At the present time, the proposed project appears to be the most viable alternative. A planned community of hotels will establish an economically feasible resort that meets the developer's standard of quality, while fulfilling public policies and objectives. However, the single major resort alternative is still a viable option, provided that obstacles, such as financing, can be overcome.

CHAPTER VII

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

VII. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The proposed subdivision and infrastructure improvements, as well as subsequent construction and operation of the hotels at North Beach, will involve the irretrievable loss of certain environmental and fiscal resources. The cost of using these resources, however, should be evaluated in light of the recurring benefits to the residents of the region and the County, and the alternative of taking no action.

The proposed site improvements and eventual hotel construction will develop approximately 95 acres at North Beach. Construction of buildings and other man-made amenities will narrow the range of future non-urban uses for this site. However, the site is not well suited for continued agricultural use, due to its non-contiguous location with other agricultural land, and the proximity of incompatible resort and residential land uses. Adopted public policies and land use designations for the property (State Land Use, County zoning, Community Plan designations) appear to concur that the site is more appropriate for non-agricultural/resort activities.

Resort hotels and public park uses will remove most of the existing vegetation. While the ground level environment will be altered, the visual "resource" attached to the site, namely its coastal and open space vistas, will be preserved through the extent possible by low density development, on-site landscaping and the dedication of the two public park sites.

With the presence of other resort developments along the West Maui coastline, West Maui residents may perceive the public ocean-front in jeopardy of being committed to private uses. However, it is not the intent of the subject project to prohibit public use and enjoyment of the beaches or coastal resources. The resort development will comply with shoreline setback requirements and the two parks will create recreational resources which are not presently available.

The proposed action will not require a substantial new commitment of publically supported services and facilities, and in fact will contribute to the regional economy through direct employment and its multiplier effects, and increased County and State tax revenues.

CHAPTER VIII

RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

CORRECTION

THE PRECEDING DOCUMENT(S) HAS BEEN REPHOTOGRAPHED TO ASSURE LEGIBILITY
SEE FRAME(S)
IMMEDIATELY FOLLOWING

CHAPTER VIII

RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

VIII. RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Analyses of various on-site environmental features have found the North Beach property to be well endowed with physical attributes that are desirable both as amenities in a resort development and for their own sake. These attributes include the ocean-front location, marine recreational opportunities, pristine near-shore waters, and dry, warm climate. The studies have also indicated that the proposed development is compatible with the existing natural environment. Specific recommendations to mitigate adverse impacts are being formulated in the planning phase and would be followed in the design, construction, and operations phases of the project.

No short-term exploitation of resources that will have negative long-term consequences has been identified. The resort developments envisioned by the Joint Venture will be of high quality and designed to last for decades. If the later phases of the project (hotel construction) are implemented as planned, little environmental degradation is expected to occur nor would it pose a significant risk to the health and safety of residents or visitors in the West Maui area.

Improved public access to the shoreline will result from the project, enhancing the *recreational resources of the West Maui community.*

The project will result in the conversion of land used for sugarcane production to non-agricultural uses. In the short term, the result will be a slight decrease in existing agricultural activity. However, as the resort hotels are developed in subsequent phases of the project, significant socio-economic benefits to the community will result. Direct, full-time employment opportunities and temporary construction employment will be generated by the project, and these in turn will have benefits that ripple through the regional economy. Public revenues from excise, personal and property taxes are expected to more than offset any expenses associated with the expansion of public services to meet the requirements of the development and indirect population growth.

CHAPTER IX

CONSULTED PARTIES AND PARTICIPANTS IN THE DEIS PREPARATION PROCESS

IX. CONSULTED PARTIES AND PARTICIPANTS IN THE DEIS PREPARATION PROCESS

9.1 Consulted Parties

The Environmental Impact Statement Preparation Notice (EISPN) for the proposed North Beach project was published in the OEQC Bulletin on April 8, 1987. The thirty-day review period, announced in the OEQC Bulletin, ended on May 8, 1987. In addition, a more detailed EISPN, including maps of the project, was mailed directly to the agencies, organizations, and individuals listed below. The list contains parties believed to have an interest in the project or who requested consulted party status.

"*" indicates agencies or individuals who sent a written response to the EISPN.

"#" indicates agencies or individuals who did not respond in writing, but whose comments were solicited by telephone or in personal interviews.

Federal Agencies

- * Department of the Army, Army Corps of Engineers
- * Department of Agriculture, Soil Conservation Service
- * Department of the Interior, Fish & Wildlife Service

State Agencies

- * Department of Accounting & General Services, State Public Works Engineer
- * Department of Agriculture
- * Department of Education
- * Department of Health
- * Department of Land and Natural Resources
- * Department of Planning and Economic Development
- * Department of Transportation

Maui County

- * Office of the Mayor
- * Department of Human Concerns, Housing Division
- * Department of Parks and Recreation
- \# Department of Planning
- * Department of Public Works
- * Department of Water Supply
- * Fire Department
- * Police Department

Public Utilities

- * Maui Electric Company, Ltd.
- * Hawaiian Telephone Company

Other Groups and Individuals

- * University of Hawaii, Water Resources Research Center
- * University of Hawaii, Environmental Center
- Senator Rick Reed, State of Hawaii
- Representative Bill Pfeil, State of Hawaii
- Representative Joseph Souki, State of Hawaii
- Councilwoman Linda Crockett-Lingle, Maui County Council
- Councilman Goro Hokama, Maui County Council
- Councilman Howard Kihune, Maui County Council
- Councilman Bob Nakasone, Maui County Council
- * Councilwoman Velma Santos, Maui County Council
- * West Maui Taxpayers Association

9.2 Participants in the DEIS Preparation Process

The DEIS was prepared for Amfac Property Development Corporation and Tobishima Pacific, Inc. by Helber, Hastert, & Kimura, Planners. The following list identifies individuals and organizations who were involved in the preparation of the DEIS and their respective contributions.

Helber, Hastert, & Kimura, Planners

Principal-in-Charge and Project Manager	Glenn T. Kimura M.A. Urban Planning
Principal DEIS Author and Project Planner	Leslie Kurisaki M.A. Urban Planning
Graphic Artist	Toshiko Matsushita A.S. Commercial Art

Subconsultants

Market Assessment Economic and Fiscal Impact Assessment	John Child & Company Karen Char, MAI, Executive Vice President
Coastal and Oceanographic Engineering Study	Dames and Moore Masanobu R. Fujioka, P.E. Principal-in-Charge
Coastal Engineering Evaluation & Marine Biological Assessment	Sea Engineering, Inc. Scott P. Sullivan, Vice President M.S. Ocean Engineering

Biological Survey	Char & Associates (Botanical/environmental consultants) Winona P. Char Art Whistler
Archaeological Reconnaissance	Chiniago, Inc. William Barrera, Jr. M.A. Anthropology
Subsurface Archaeological Reconnaissance Survey	Paul H. Rosendahl, Ph.D., Inc. (Archaeological/historical/culture resource management studies and services) Paul H. Rosendahl, Ph.D. Ph.D. Anthropology
Traffic Study	Austin Tsutsumi & Associates Randall S. Okaneku, P.E.
Air Quality Impact Analysis	J.W. Morrow (Environmental management consultant) M. Environment Health
Noise Study	Y. Ebisu & Associates (Acoustical & electronic engineers) Y. Ebisu, P.E.

CHAPTER X

COMMENTS AND RESPONSES RECEIVED DURING PREPARATION OF THE DEIS

X. COMMENTS RECEIVED DURING PREPARATION OF THE DRAFT EIS

Twenty-three letters were received in response to the Environmental Impact Statement Preparation Notice (EISPN); the individuals and agencies are listed below.

The following pages contain a copy of the EISPN and the cover letter requesting review of the proposed development with respect to issues that should be addressed in the DEIS. The comments we received and our follow-up responses are also reproduced.

<u>Federal Agencies</u>

Department of the Army, Army Corps of Engineers
Department of Agriculture, Soil Conservation Service
Department of the Interior, Fish & Wildlife Service

<u>State Agencies</u>

Department of Accounting and General Services,
State Public Works Engineer
Department of Agriculture
Department of Education
Department of Health
Department of Land and Natural Resources
Department of Planning and Economic Development
Department of Transportation

<u>Maui County Agencies</u>

Office of the Mayor
Department of Human Concerns, Housing Division
Department of Parks and Recreation
Department of Public Works
Department of Water Supply
Fire Department
Police Department

Public Utilities

Maui Electric Company, Ltd.
Hawaiian Telephone Company

Other Groups and Individuals

University of Hawaii, Water Resources Research Center
University of Hawaii, Environmental Center
Councilwoman Velma Santos, Maui County Council
West Maui Taxpayers Association

465 SOUTH KING STREET · KEKUANAOA BUILDING, #104 · HONOLULU, HAWAII 96813 · TELEPHONE (808) 548-6915

OEQC BULLETIN

OFFICE OF ENVIRONMENTAL QUALITY CONTROL

JOHN WAIHEE
GOVERNOR

DIRECTOR

Volume IV | April 8, 1987 | No. 07

REGISTER OF CHAPTER 343, HRS DOCUMENTS

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All Chapter 343, HRS documents submitted for publication in the OEQC Bulletin must be addressed to the Office of Environmental Quality Control, 465 South King Street, Room 104, Honolulu, Hawaii 96813. Documents addressed otherwise will not be considered for publication.

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EIS PREPARATION NOTICE

The following proposed action has been determined to require an environmental impact statement. Anyone can be consulted in the preparation of the EIS by writing to the listed contacts. 30 days are allowed for requests to be a consulted party.

NORTH BEACH RESORT, KAANAPALI, MAUI, Kaanapali North Beach Joint Venture/Maui County Planning Commission

The proposed action involves the construction of drainage improvements (e.g. drainage outlet) within the shoreline setback area, pursuant to Section 205-31, HRS. This action requires a County Shoreline Setback Variance that is subject to approval by the Maui County Planning Commission. Although the proposed action is limited to the construction of drainage improvements, it is part of a larger development involving the subdivision and reconsolidation of a 95-acre ocean-front site into 11 lots, grading work, and the construction of related infrastructural improvements (e.g. internal roadway; utility lines). The Amfac Property Investment Corporation and Tobishima Pacific Inc. own the property in fee. The subject ocean-front properties (TMK: 4-4-01: por. of 2, 3, 6, 8, 9, and 68; 4-4-02: 24; and 4-4-06: 5) are situated north of and adjacent to the Kaanapali Resort and were formerly the site of the Kaanapali Airport. It is currently in sugar cane cultivation, except for areas formerly used for the airport runway and buildings. The subject properties are designated for Hotel use in the adopted Lahaina Community Plan, except for the portions designated for Park use and Open Space (along the beach fronting the property). The subject properties are zoned primarily as H-M Hotel and H-2 Hotel District, with a small portion in the R-3 Residential District. According to the applicant, the proposed 11 lots may be further consolidated into a maximum of 6 hotel sites and 2 park sites. The hotel sites would range in size from 7.6 acres to 21.5 acres. The park sites would range in size from 1.0 acre to 5.0 acres. Upon completion of the subdivision and related improvements, the undeveloped hotel parcels will be sold or leased to private developers.

The maximum number of hotel rooms to be developed at the North Beach Resort is 3,200 rooms.

Requests to be consulted and comments on the EIS preparation notice should be sent to:

Mr. Glen T. Kimura
Belber, Hastert & Kimura, Planners
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

With a copy to:

Mr. Christopher L. Hart, Director
Planning Department
County of Maui
200 South High Street
Wailuku, Hawaii 96793

Deadline: May 8, 1987.

NEGATIVE DECLARATIONS

The following are Negative Declarations or determinations made by proposing or approving agencies that certain proposed actions will not have significant effects on the environment and therefore do not require EISs (EIS Rules 11-200-11). Publication in the Bulletin of a Negative Declaration initiates a 60-day period during which litigation measures may be instituted. Copies are available at 25 cents per page upon request to the Office. Parties wishing to comment may submit written comments to the agency responsible for the determination (indicated in project title). The Office would appreciate a copy of your comments.

OAHU

FARRINGTON HIGHWAY REPLACEMENT OF MAKAHA BRIDGE NO. 2, FEDERAL AID PROJECT NO. BR-093-1(10), MAKAHA, OAHU, State Dept. of Transportation, Highways Division

The proposed action consists of the replacement of the existing wooden Makaha Bridge No. 2, which is located approx. 550' east of Makaha Valley Rd., with a new wider concrete bridge. Roadway approach work at both ends of the structure will also be made to provide a smooth transition from the existing road to the new bridge. The alignment of the existing stream which runs under Makaha Bridge No. 2 will remain unchanged. The new concrete bridge will be 57.5' long and will provide the same navigational clearance as the existing wooden bridge (approx. 7' from bridge deck to the invert of the stream). The stream flow capacity will remain unchanged. New concrete abutments will be constructed as well as a new concrete center pier making the new bridge a 2-span structure. Precast concrete planks will be used for the new bridge deck. Metal railings and 10' wide concrete sidewalks will be provided on both sides of the bridge. Farrington Hwy. will remain a 2-lane facility upon completion of the new bridge. However, the bridge will be constructed wide enough to accommodate a proposed future widening of Farrington Hwy. to 4 lanes.

PROPOSED HONOLULU LANDFILL GAS TO ENERGY SYSTEM AT KAPAA/KALAHEO SANITARY LANDFILL, KAILUA, KOOLAUPOKO, OAHU, City and County of Honolulu Dept. of Public Works

The project proposes to extract, treat, and combust landfill gas for on-site electrical generation. The City and County of Honolulu has entered into a contractual agreement with Kapaa Energy Partners to accomplish these tasks. The city's Kapaa Sanitary Landfill is located on an approx. 85-acre site, along the western boundary of the Kawainui Marsh in Kailua, Koolaupoko, Oahu. Approx. 47 acres of this site are owned by the city, while the remaining 38 acres are leased from the Harold K. L. Castle Trust. Full scale operations are expected to continue through February 1987. When the Kalaheo Landfill site is opened by the City, only refuse brought in by homeowners will be allowed into the Kapaa site. The Kalaheo Sanitary Landfill is located on approx. 130 acres along the western boundary of the Kawainui Marsh, with approx. 22 acres to be used as a landfill. The proposed action includes the following:

Environmental Impact Statement Preparation Notice
North Beach, Kaanapali, Maui

I. Identification of Applicant

A. Applicant

Mr. B. Martin Luna, Esq.
Carlsmith, Wichman, Case, Mukai and Ichiki
Attorneys at Law
2145 Wells Street, Suite 201
Wailuku, HI 96793
Phone: 242-4535

B. Consultant for EIS

Helber, Hastert & Kimura, Planners
Grosvenor Center, PRI Tower
733 Bishop Street, Suite 2590
Honolulu, HI 96813
Phone: 545-2055

II. Identification of Approving Agency (Accepting Authority)

Mr. Christopher L. Hart, Director
Planning Department
County of Maui
200 South High Street
Wailuku, Maui, HI 96793
Phone: 244-7735

III. Project Description

A. Location and Ownership

The project site, comprised of approximately 95 acres, is located on the leeward coast of west Maui, Lahaina Judicial District. The property is comprised of those lands identified as tax map key 2nd Division, 4-4-01:por. 02, 03, 06, 08, 09, and 68, 4-4-02:24 and 4-4-06:5. The southern boundary of the project site abuts the established Kaanapali Beach Resort and specifically, the Maui Kaanapali Villas condominiums and Royal Lahaina Hotel. The northern boundary of the project site abuts the resort area of Honokowai, specifically the 12 story Mahana condominium. The subject property contains approximately 3400 feet of ocean frontage to the west. The eastern edge of the property (mauka portion) abuts the Honoapiilani Highway. Uses directly mauka of the highway include sugar cane fields, a cluster of car rental outlets, the abandoned Kaanapali Power Plant, and the Lahaina Wastewater Treatment Plant.

The subject property is owned in fee by Amfac Property Investment Corporation and Tobishima Pacific, Inc. By agreement with the land owners, Kaanapali North Beach Joint Venture, a registered Hawaii general partnership, has the authority to develop and improve the property as deemed to be in the best interests of the fee owners.

The property lies within the boundary of the State of Hawaii Urban land use district, and is zoned H-M and H-2 (hotel), except for remnant parcels.

B. Proposed Action

Kaanapali North Beach Joint Venture ("Joint Venture") is a partnership of Amfac Property Development Corporation and Tobishima Pacific, Inc. As the master developer, the Joint Venture is proposing to subdivide the ±95-acre property into a maximum of six hotel sites and two park sites which will be dedicated to the County. The basic road and utility systems will be constructed by the Joint Venture. These improvements are based on the master plan for the project area. The EIS addresses the proposed development in terms of conceptual land uses; it does not cover construction of individual hotels or other resort-oriented developments. If required by Maui County, the latter would prepare separate environmental analyses in conjunction with their respective permit applications.

1. Conceptual Land Use Plan

The development concept for the resort area would include a maximum of six hotel sites proposed on approximately 89 acres, with a potential room count up to 3200 units. Two public park sites totalling approximately 6 acres at either end of the development will be dedicated to the County.

2. Infrastructure

Resort development on the subject property will require infrastructure improvements, including the following:

(a) Water
(b) Wastewater
(c) Storm Water Drainage
(d) Roadways
(e) Electrical and Communications

C. Phasing

The first phase of development will include layout and construction of the internal roadway and site preparation in accordance with the subdivision plan, construction of the drainage system and other public utilities. Hotel construction is expected to occur during subsequent phases extending up to a ten year period.

IV. Description of Affected Environment

The 95-acre project area is makai of the Honoapiilani Highway, adjacent to the existing Kaanapali Beach Resort. The climate is relatively dry with rainfall averaging 15 to 18 inches per year. No streams are located on the site, however there is evidence of natural mauka-makai drainageways and there is a drainage ditch running parallel to the shore near the makai forest.

A large portion of the site was formerly used as an airstrip. The old airport site consists of the abandoned runway, the vacant terminal area (all structures have been removed) and a parking lot. Sugar cane fields cover approximately three-fourths of the project area. Also present are limited areas of kiawe forest (along the western and northern boundaries), strand vegetation (in the loose, sandy beach areas), and koa-haole scrub (along the highway). A recent flora and fauna survey of the site found no plant or animal species that are considered rare, threatened or endangered. An archaeological reconnaissance of the area did not find any significant surface indications of either historic or prehistoric remains.

V. Summary of Major Impacts & Mitigation Measures

A. Economic

1. Employment. According to an Economic and Fiscal Impacts Study for the proposed project, the project and subsequent hotel development is expected to create over 3200 person-years construction jobs and over 3500 direct full time equivalent positions by 1996.

2. Government Revenues (Taxes). County and State revenues generated by the project will exceed any expenditures resulting from increases in visitors to Maui and the State.

B. Coastal and Marine Environments

A coastal engineering evaluation and marine biological assessment was completed for the project. The findings were utilized by project engineers in siting and designing structures and the stormwater drainage system.

C. Transportation/Circulation

A traffic impact assessment was conducted for the project, which recommended mitigation measures for various phases of the hotel development. The EIS will include a more comprehensive traffic study which considers alternative transportation system management (TSM) programs, designed to reduce traffic demand.

D. Air Quality

A preliminary air quality analysis was completed for the project, and a more in-depth investigation will be prepared to examine indirect air quality impacts from vehicle emissions and the cumulative project impacts over time.

E. Noise

A noise study was completed for the project. Findings indicate that although an increase in traffic noise is expected between now and the Year 2007, the presence of adequate set back distances between the highway and hotel units will keep noise to a minimum. On the other hand, the study notes that future noise mitigation measures by the County may be required in conjuction with any highway improvements along Honoapiilani Highway.

F. Public Services

1. Water. The proposed water system for the project would be a new 16-inch waterline within the proposed access road, connecting to the existing 16-inch water line which terminates approximately 400 feet makai of Honoapiilani Highway.

2. Sewerage. Most of the sewage from the proposed development would be pumped to the County sewerage system along Honoapiilani Highway, with ultimate conveyance to the existing facilities at the Lahaina Wastewater Treatment Plant.

3. Drainage. The stormwater drainage for the project includes a closed culvert and an open channel. The design and location of the culvert, which terminates offshore, was based on findings in the coastal engineering evaluation and marine biological assessment.

4. Solid Waste. Solid waste will be hauled either by the County sanitation crews or private contractors.

5. Other Public Services. The Dept. of Education, and County police and fire departments will be consulted to assess the potential impacts on these services as a result of the project.

VI. Determination of Significance

An Environmental Impact Statement (EIS) will be required because of potentially significant impacts resulting from the proposed development. This determination is based on the criteria for significance in Section 12 of the Environmental Quality Commission EIS Regulations (Chapter 200 of Title 11, Administrative Rules), including the following:

- The proposed action may involve an irrevocable commitment or loss or destruction of resources.

- The proposed action may involve substantial secondary impacts, such as population changes or effects on public facilities.

- The proposed action is individually limited, but cumulatively may have an effect on the environment or involve a commitment for larger actions.

- The proposed action may affect coastal water quality.

VII. Agencies to be Consulted in the Preparation of the EIS

A. Federal Agencies

1. Army Corps of Engineers
2. Dept. of Agriculture, Soil Conservation Service
3. Dept. of Interior, Fish and Wildlife Services

B. State Agencies

1. Dept. of Accounting & General Services
2. Dept. of Agriculture
3. Dept. of Eduction
4. Dept. of Health
5. Dept. of Land and Natural Resources
6. Dept. of Planning & Economic Development
7. Dept. of Transportation, Highways Division
8. University of Hawaii, Environmental Center
9. University of Hawaii, Water Resources Research Center

C. County Agencies

1. Office of the Mayor
2. Dept. of Human Concerns
3. Dept. of Parks and Recreation
4. Dept. of Planning
5. Dept. of Public Works
6. Dept. of Water Supply
7. Economic Development Agency
8. Fire Department
9. Police Department

D. Public Utilities

1. Maui Electric Company
2. Hawaiian Telephone Company

E. Community Organizations

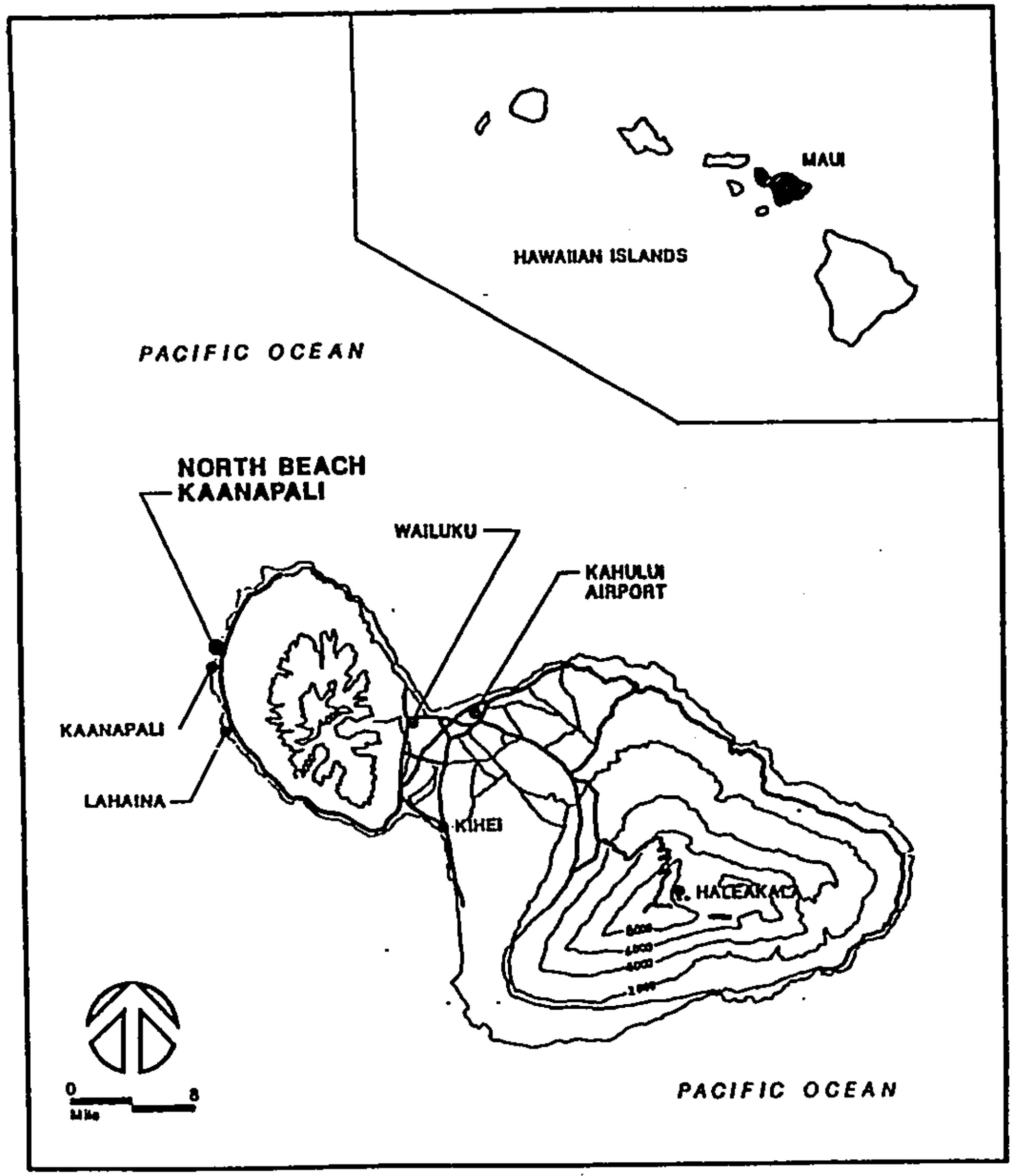
VIII. Description of the Assessment Process

The proposed action is subject to the EIS requirements, pursuant to Chapter 343, Hawaii Revised Statutes, because of a Special Management Area Use Permit request that has been initiated by a private applicant (Sec. 343-5(a)(6), HRS). The applicant has submitted an environmental assessment to assist the County in its evaluation of the proposed action. The environmental assessment document titled "North Beach, Kaanapali, Maui, Environmental Assessment" (Helber, Hastert, Van Horn & Kimura, Planners, December 1986) should be consulted for more detailed information on the project and associated impacts.

Since the County has determined that an EIS is required, this notice to prepare an environmental impact statement is being filed with the Office of Environmental Quality Control (OEQC).

After the OEQC publishes the EIS Preparation Notice in the OEQC Bulletin, the public has 30 days to respond to the notice. The respondent should indicate the types of issues that the EIS should address and whether he or she wishes to be notified when the Draft EIS is available. The response should be sent to the consultant for the EIS:

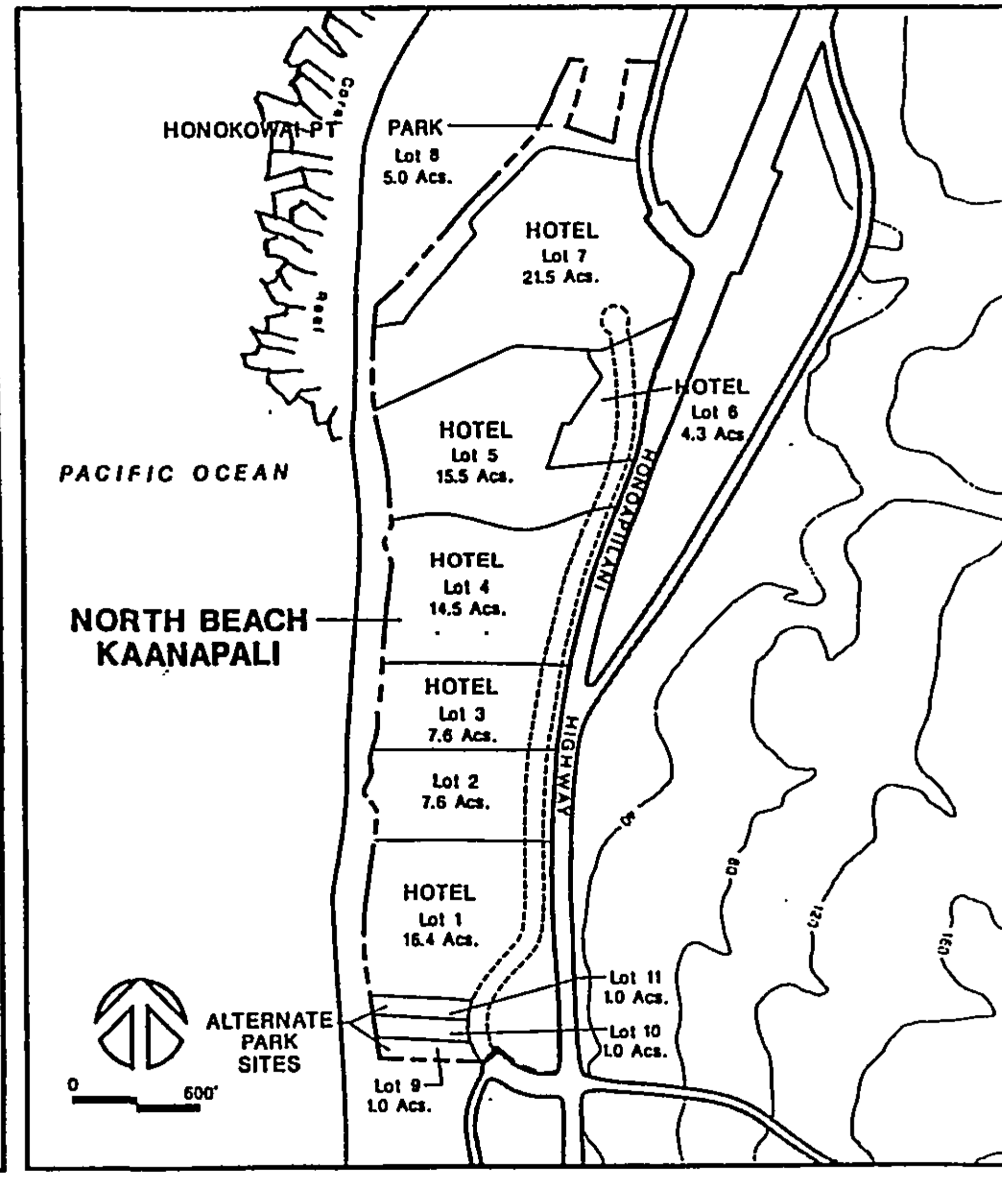
Mr. Glenn T. Kimura
Vice President
Helber, Hastert & Kimura, Planners
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813



N O R T H · B E A C H Project Location

Kaanapali, Maui

Amfac Property Development Corp/Tobishima Properties of Hawaii, Inc. HH&K Planners



N O R T H · B E A C H Proposed Subdivision Plan

Kaanapali, Maui

Amfac Property Development Corp/Tobishima Properties of Hawaii, Inc. HH&K Planners

HELBER
HASTERT
VAN HORN
& KIMURA
Planners

HHVH&K

Grosvenor
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AICP, AIA
Glenn T.
KIMURA

Associates
Nancy L.
NISHIKAWA
AICP
Thomas A.
FEE
AICP

April 15, 1987

<u>Environmental Impact Statement Preparation Notice</u>
<u>Resort Development, North Beach, Kaanapali, Maui</u>

Dear

Kaanapali North Beach Joint Venture ("Joint Venture"), a partnership of Amfac Property Development Corporation and Tobishima Pacific, Inc. is proposing to improve a 95-acre parcel north of the existing Kaanapali Beach Resort. The Joint Venture proposes to subdivide the property and to construct the basic roadway and utility systems for future resort development on the site. These improvements require a Special Management Area (SMA) Use Permit from the County of Maui. In processing the SMA permit application, the Maui Planning Department has determined that the applicant shall prepare an Environmental Impact Statement (EIS) in accordance with Chapter 343, Hawaii Revised Statutes (HRS). Our firm has been retained to assist the Joint Venture in this process.

The official preparation notice for the North Beach Kaanapali EIS was published in the April 8, 1987 issue of the <u>Office of Environmental Quality Control (OEQC) Bulletin</u>. A copy of that notice is enclosed. The publication in the OEQC Bulletin begins a 30-day public review period which has been set for May 8, 1987 by the OEQC. We hope you will respond with any comments within this time period.

To aid in your evaluation of potential project-related issues, we have also enclosed a more detailed EIS preparation notice. We would appreciate your assistance in this process by either sending us your written comments or by identifying an individual within your organization whom we may contact to discuss the project further.

Thank you for your cooperation.

Sincerely,

HELBER, HASTERT & KIMURA, PLANNERS

Leslie Kurisaki
Project Planner

DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
BUILDING 230
FT. SHAFTER, HAWAII 96858 -5440

REPLY TO
ATTENTION OF:

April 28, 1987

RECEIVED
MAY 1 1987
HELBER, HASTERT, VAN HORN & KIMURA PLANNERS

Mr. Leslie Kurisaki
Helber, Hastert and Kimura
733 Bishop Street
Suite 2590
Honolulu, Hawaii 96813

Dear Mr. Kurisaki:

Thank you for the opportunity to review and comment on the EIS Preparation Notice for Resort Development, North Beach, Kaanapali, Maui. The following comments are offered:

a. The developer should coordinate site plans with the Operations Branch (telephone: 438-9258) to determine the need for a Department of the Army permit.

b. The parcels identified by TMK 4-4-01:2, 3, 6, 8, 9, 68; 4-4-06:05, and 4-4-2:24 are shown on the enclosed tax maps for the Kaanapali area. According to the Flood Insurance Study for Maui County, the parcels are located in the following zones.

(1) Zone X. Area of minimal flooding.

(2) Zone A4. Areas within the limits of 100-year flood. Flood proofing is mandatory for development in regulatory flood plain areas. The base flood elevation is 10 feet mean sea level.

(3) Zone V12. V-numbered zones are special flood hazards areas along coasts inundated by the 100-year flood that have additional hazards due to wave

action. The base flood elevation is 10 feet mean sea level.

Sincerely,

Kisuk Cheung
Chief, Engineering Division

Enclosures

Copies Furnished:

PODED-PH (w/enclosures)

HELBER
HASTERT
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& KIMURA
Planners

HHVH&K

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733 Bishop Street
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Glenn T. KIMURA

Associates
Nancy I. NISHIKAWA A.I.C.P.
Thomas A. FEE A.I.C.P.

May 4, 1987

Mr. Kisuk Cheung
Chief, Engineering Division
Dept. of the Army
U.S. Army Engineering District, Honolulu
Bldg.230
Fort Shafter, Hawaii 96858-3440

Re: North Beach Kaanapali EIS Preparation Notice
Your Letter dated April 28, 1987

Dear Mr. Cheung:

Thank you for your comments in response to the EIS Preparation Notice for the proposed North Beach development. We have forwarded a copy of your letter to the project engineers for their use and information. As per your recommendation, the project engineers have been in contact with your Operations Branch regarding a Department of the Army Permit, which will be filed in the near future.

Once again, thank you for your prompt response and cooperation.

Sincerely,

Leslie Kurisaki
Planner

UNITED STATES DEPARTMENT AGRICULTURE

SOIL CONSERVATION SERVICE

P. BOX 50004
HONOLULU, HAWAII
96850

May 7, 1987

Mr. Glen T. Kimura
Helber, Hastert & Kimura, Planners
733 Bishop St, Suite 2590
Honolulu, HI 96813

RECEIVED
MAY 12 1987
HELBER, HASTERT, VAN HORN & KIMURA PLANNERS

Dear Mr. Kimura:

Subject: EIS Preparation Notice - Resort Development, North Beach Joint Venture for a 95-acre Parcel, Kaanapali, Maui, Hawaii

We reviewed the subject preparation notice and have no comments to offer.

Thank you for the opportunity to review the document.

Sincerely,

Herbert J. Sufford acting
RICHARD N. DUNCAN
State Conservationist

cc:
Mr. Christopher L. Hart, Director
Planning Department
County of Maui
200 South High St
Wailuku, HI 96793

United States Department of the Interior

FISH AND WILDLIFE SERVICE
300 ALA MOANA BOULEVARD
P O BOX 50167
HONOLULU, HAWAII 96850

ES
Room 6307

APR 21 1987

Ms. Leslie Kurisaki, Project Planner
Helber, Hastert and Kimura, Planners
Grosvenor Center, PRI Tower
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Re: Environmental Impact Statement Preparation Notice, Resort Development, North Beach, Kaanapali, Maui

Dear Ms. Kurisaki:

We have reviewed the referenced Environmental Impact Statement (EIS) Preparation Notice and offer the following comments for your consideration.

The Draft EIS should discuss the following topics:

a. The stormwater runoff drainage plan should be discussed. We recommend that stormwater runoff be contained on-site using sediment basins, dry wells, parks, and green areas.

b. Potential impacts to nearshore marine habitats from increased surface runoff should be discussed in the Draft EIS. If construction activities in coastal waters are proposed, we recommend the applicant contact the U.S. Army Corps of Engineers for permit requirements.

We appreciate the opportunity to comment.

Sincerely,

Ernest Kosaka

Ernest Kosaka
Project Leader
Office of Environmental Services

cc: DLNR
CE, Operations Branch

RECEIVED
APR 22 1987
HELBER, HASTERT, VAN HORN & KIMURA PLANNERS

CONSERVE AMERICA'S ENERGY

Save Energy and You Serve America!

HELBER HASTERT VAN HORN & KIMURA Planners

HHVH&K

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733 Bishop Street
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Glenn T. KIMURA

Associates
Nancy L. NISHIKAWA AICP
Thomas A. FEE AICP

April 22, 1987

Mr. Ernest Kosaka
Project Leader
Office of Environmental Services
Fish & Wildlife Service
300 Ala Moana Blvd.
P.O. Box 50167
Honolulu, Hawaii 96850

Re: North Beach Kaanapali EIS Preparation Notice; Your Letter dated April 21, 1987

Dear Mr. Kosaka:

Thank you for your comments regarding the EIS for the proposed North Beach Kaanapali development. Your letter has been forwarded to the project engineer who is conducting a detailed investigation of stormwater drainage and drainage impacts on the coastal environment for the EIS. The Army Corps of Engineers has been contacted regarding permit requirements, and we will continue to coordinate with their office.

Again, thank you for your input and prompt response.

Sincerely,

Leslie Kurisaki

Leslie Kurisaki
Planner

JOHN WAIHEE
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
DIVISION OF PUBLIC WORKS
P. O. BOX 119, HONOLULU, HAWAII 96810

RUSSEL S. NAGATA
COMPTROLLER

KEN KITABU
DEPUTY COMPTROLLER

LETTER NO. (P)1331.7

APR 14 1987

RECEIVED
APR 15 1987
HELBER, HASTERT, VAN HORN
& KIMURA PLANNERS

Mr. Leslie Kurisaki
Project Planner
Helber, Hastert, Van Horn
& Kimura, Planners
Grosvenor Center
PRI Tower
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear Mr. Kurisaki:

Subject: EIS Preparation Notice
Resort Development, North Beach
Kaanapali, Maui

We have reviewed the subject document and have no comments to offer.

Very truly yours,

TEUANE TOMINAGA
State Public Works Engineer

SS:jk

JOHN WAIHEE
GOVERNOR

State of Hawaii
DEPARTMENT OF AGRICULTURE
1428 So. King Street
Honolulu, Hawaii 96814-2512

SUZANNE D. PETERSON
CHAIRPERSON, BOARD OF AGRICULTURE

TADASHI TOJO
DEPUTY TO THE CHAIRPERSON

Mailing Address:
P. O. Box 22159
Honolulu, Hawaii 96822-0159

May 6, 1987

RECEIVED
MAY 7 1987
HELBER, HASTERT, VAN HORN & KIMURA PLANNERS

Helber, Hastert and Kimura, Planners
733 Bishop Street
Suite 2590
Honolulu, Hawaii 96813
Attention: Ms. Leslie Kurisaki

Subject: Environmental Impact Statement Preparation Notice (EISPN) for Resort Development, North Beach, Kaanapali, Maui
TMK: 4-4-01: por. 2, 3, 6, 8, 9, 68
4-4-02: 24
4-4-06: 5
Area: approximately 95 acres

Dear Ms. Kurisaki:

The Department of Agriculture has reviewed the subject EISPN and offers the following comments.

According to your information, an EIS is required for a Special Management Area Use Permit application involving the subdivision and improvement of the subject parcels for future resort development.

We note that the project site is within the State Urban District, iss designated Hotel, Park and Open Space according to the Lahaina Community Plan, and is zoned Hotel and Residential. Approximately 75 acres of the project site is in sugarcane cultivation by Pioneer Mill.

We have two concerns which should be discussed in the Draft EIS:

- What impact will the cessation of sugarcane cultivation on the subject property have on the economic viability of Pioneer Mill?

- Is this project related in any way to other proposed development in the vicinity (especially those

proposals involving agricultural-zoned lands mauka of the Kaanapali resort area)? If it is, a brief description of the area involved and magnitude of development should be provided.

We will provide further comment upon our receipt and review of the Draft EIS.

Sincerely,

Suzanne D. Peterson

SUZANNE D. PETERSON
Chairperson, Board of Agriculture

cc: Maui County Planning Department
OEQC
DPED

HELBER
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& KIMURA
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Glenn T. Kimura

Associates
Nancy L. Nishikawa A.I.C.P.
Thomas A. Fee A.I.C.P.

May 28, 1987

Ms. Suzanne D. Peterson
Chair, Board of Agriculture
Department of Agriculture
1428 S. King Street
Honolulu, Hawaii 96814-2512

Re: North Beach EIS Preparation Notice
Your Letter dated May 6, 1987

Dear Ms. Peterson:

Thank you for your comments in response to the EIS Preparation Notice for the North Beach Kaanapali project.

You noted two concerns which should be discussed in the Draft EIS. First, what is the impact of the cessation of sugarcane cultivation on the site on the economic viability of Pioneer Mill Company; and second, whether the North Beach project is related in any way to other proposed development in the vicinity, especially those involving agricultural zoned land mauka of the resort area. We will answer these in order.

Pioneer Mill Company currently farms approximately 7900 acres of sugar cane. Pioneer Mill Company is in the process of removing about 3900 acres from cultivation, reducing the size of the plantation to approximately 4000 acres. This effort is aimed at maximizing the plantation's use of of less expensive surface water sources and to minimize its reliance on energy intensive pumping of irrigation water from basal sources, especially those used for non-contiguous fields such as those in North Beach.

The North Beach project will affect less than one percent of the land currently used for the production of sugar. Pioneer Mill has stated that the reduction of North Beach acreage will not have a negative impact on sugar operations, and in fact, fits well into its future operational strategy to bring the costs of sugar cane production in line with current sugar market conditions.

In response to your second question, the proposed North Beach development is intended to be a self-contained resort, independent of any other proposed developments in the vicinity. This does not mean that there will not be any adjacent development.

As you know, the Lahaina Community Plan dated December 1983 has designated the area you refer to (directly mauka of North Beach) as a "Project District". These designated project districts are intended to represent major resort and residential expansion areas. The Community Plan notes that "a variety of residential housing types as well as open spaces, parks, and facilities are intended in accordance with specific project district descriptions." While the proposed North Beach project is not directly related to any other projects in this mauka project district, development in the area is invariably guided by the Community Plan's intent for overall land use.

Your comments and suggestions will be incorporated into the Draft EIS. Once again, thank you for your input and interest in this project.

Sincerely,

Leslie Kurisaki

Leslie Kurisaki
Planner

JOHN WAIHEE
GOVERNOR

CHARLES T. TOGUCHI
SUPERINTENDENT

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

OFFICE OF THE SUPERINTENDENT

April 23, 1987

RECEIVED
APR 28 1987
HELBER, HASTERT, VAN HORN & KIMURA PLANNERS

Mr. Leslie Kurisaki
Project Planner
HHMH&K
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear Mr. Kurisaki:

SUBJECT: Kaanapali Resort Development
EIS Preparation Notice

Our review of the proposed Kaanapali Resort Development indicates that it will have negligible impact on our surrounding schools.

Thank you for the opportunity to comment on the subject development.

Sincerely,

for Charles T. Toguchi
Superintendent

CTT:jl

cc Maui District
Office of Business Services

AN AFFIRMATIVE ACTION AND EQUAL OPPORTUNITY EMPLOYER

JOHN WAIHEE
GOVERNOR OF HAWAII

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

JOHN C. LEWIN, M.D.
DIRECTOR OF HEALTH

In reply, please refer to:
EPHSD

May 6, 1987

RECEIVED
MAY 11 1987
HELBER, HASTERT, VAN HORN & KIMURA PLANNERS

Mr. Leslie Kurisaki
Project Planner
Helber, Hastert & Kimura, Planners
733 Bishop St., Suite 2590
Honolulu, Hawaii 96813

Dear Mr. Kurisaki:

Subject: Environmental Impact Statement Preparation Notice (EISPN) for Resort Development, North Beach, Kaanapali, Maui

Thank you for allowing us to review and comment on the subject EISPN. We provide the following comments:

Air Pollution

The EIS should include the potential impact on the ambient air quality as a result of the increase in vehicular activity from the proposed project and all other projects which were previously approved but have not started construction. Projections on the increased traffic volume and the impact on the ambient air quality should be for the associated corridors, roadways, and highways. The results should be compared to the State and Federal ambient air quality standards. Should a potential violation be determined, the EIS should address the mitigating actions which shall be implemented.

Also, we did not receive a copy of the preliminary air quality analysis data for the project. We request a copy of the report for our review.

Wastewater Disposal

The report states that "Most of the Sewage..." - where will the rest of the sewage go if it does not go into the existing Lahaina Wastewater Treatment Plant.

Water Quality

A section 401 Water Quality Certification from the Department of Health will most likely be required.

Drinking Water

The Kaanapali North Beach Joint Venture proposes to subdivide and improve a 95-acre property for future resort development of a maximum of six hotel sites and two park sites. A new 16-inch waterline is proposed to connect the development sites with an existing 16-inch waterline.

The Environmental Impact Statement should fully describe proposed improvements to the water system. If additional water resources are required to support the resort, these sources will be subject to the required engineering review under Chapter 20, Title 11, Administrative Rules.

Section 11-20-29 of Chapter 20 requires all new sources of potable water serving public water systems to be approved by the Director of Health prior to their use to serve potable water. Such approval is based primarily upon the satisfactory submission of an engineering report which adequately addresses all concerns as set down in Section 11-20-29. The engineering report must be prepared by a registered professional engineer and bear his or her seal upon submittal.

Section 11-20-30 requires that new or substantially modified distribution systems for public water systems be approved by the Director of Health. Such approval depends upon the submission of plans and specifications for the project prior to construction and the demonstration that the new or modified portions of the system are capable of delivering potable water in compliance to all maximum contaminant levels as set down in Chapter 20 once the distribution system or modification is completed.

Should there be any questions regarding Chapter 20, Title 11, Administrative Rules, please contact the Drinking Water Program at 548-2235.

Sincerely,

JOHN C. LEWIN, M.D.
Director of Health

cc: DHO, Maui

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& KIMURA
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HHVH&K

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Glenn T.
KIMURA

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NISHIKAWA
AICP
Thomas A.
FEE
AICP

May 28, 1987

Dr. John C. Lewin
Director
Department of Health
P.O. Box 3378
Honolulu, Hawaii 96801

Re: North Beach EIS Preparation Notice
Your Letter dated May 6, 1987

Dear Dr. Lewin:

Thank you for your comments in response to the EIS Preparation Notice for the North Beach Kaanapali project.

In response to your comments on air pollution, the Draft EIS will contain a comprehensive air quality analysis. This analysis will include discussions of mobile source (traffic) impacts throughout the project development period, electrical generation impacts (resulting from the project's electrical demand) and short-term impacts resulting from construction of the project. Mitigation measures will be recommended. Projected air quality will also be compared to State and Federal ambient air quality standards. In response to your request for a copy of the preliminary air quality analysis, a copy of the preliminary analysis was sent to Mr. Kelvin Sunada of your Environmental Protection and Health Services Division on May 6, 1987.

The Draft EIS will also describe in detail the proposed wastewater disposal and and water system improvements. A copy of your letter has been sent to the project engineers who are planning these systems and who will be coordinating with the Department of Health for the required approvals.

The project engineers have also been in contact with your Environmental Permits Branch regarding a 401 Water Quality Certification. Application for this permit will be submitted shortly.

Thank you again for your input and interest in this project.

Sincerely

Leslie Kurisaki

Leslie Kurisaki
Planner

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P. O. BOX 621
HONOLULU, HAWAII 96809

MAY 28 1987

DOC. NO.: 3240B
FILE NO.: 87-135

RECEIVED
MAY 23 1987
HELBER, HASTERT, VAN HORN & KIMURA PLANNERS

Helber, Hastert & Kimura
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Attn: Ms. Leslie Kawasaki

Dear Ms. Kawasaki:

SUBJECT: Preparation Notice of Environmental Impact Statement for Kaanapali North Beach Joint Ventures Resort Development
THK: Maui 4-4-01: 2, 3, 6, 8, 9, 68; 4-4-02: 24; 4-4-06: 5

Thank you for the opportunity to review the document cited above. We offer the following comments:

AQUATIC RESOURCES CONCERNS:

A completed coastal engineering evaluation and marine biological assessment of the site has not been provided by the applicant. However, the Maui Coastal Zone Atlas indicates that considerable fishing and squidding occurs offshore. The recreational values of these resources should be preserved.

To safeguard the quality of the coastal environment which attracts public use, consideration should be given to possible impacts of drainage water, wastewater disposal and nutrient enrichment.

The applicants should provide reasonably convenient public access to, and reasonable amounts of free public parking near the shoreline for fishermen and other recreational users. In addition, the applicants should declare intentions regarding commercial activities on public beach lands (such as charging customers to windsurf, jet ski, participate in snorkel or boat tours, etc.) capable of interfering with public use.

Any planned shoreline improvements and/or beach modifications should be adequately described in the DEIS and the Department should have the opportunity to review all proposed activities within the Department's jurisdiction that may restrict, or discourage the present public's use of State shoreline land in this vicinity for fishing or other recreational use.

Precautions should be taken to prevent contamination of coastal waters and resources by eroded soils, construction materials and debris, pesticides, herbicides, and petroleum products.

HISTORIC SITES CONCERNS:

The proposed action is part of plans for improving a 95-acre parcel for resort development. Initially, infrastructure improvements (internal roads, utility lines, drainage improvements), subdivision and reconsolidation of the parcels, and grading work are planned. Eventually, the subdivided lots will be sold or leased to private developers. Thus, the action involves initial direct impacts in areas where infrastructure will be placed, with later direct impacts of lot developments.

The archaeology report included in the Environmental Assessment (William Barrera, Jr., 1986, "North Beach, Maui: Archaeological Reconnaissance") covers the entire project area. It located no surface historic sites in the project area. We agree that this finding is likely to be correct, because most of the project area has undergone ground disturbance related to the Kaanapali Airport construction and sugarcane cultivation.

However, we agree with the archaeological report that the absence of surface historic sites is not an indication of the absence of subsurface sites that may be significant. The presence of subsurface historic remains in the sand and soil areas of this project is highly likely. Sandy beach or dune areas often contain prehistoric human burials and/or remains of habitation areas. For example, human burials were uncovered during construction in a hotel site at Hanakao'o (Dobyns and Allen-Wheeler, 1982, "Archaeological Monitoring at the Site of the Kaanapali Alii Condominium, Island of Maui"). Soil areas often contain agricultural sites. For example, archaeological surveys along the two gulches at Honokowai and Hanakao'o located and identified several historic sites consisting mostly of agricultural terraces (Davis, 1977, "Archaeological Surface Survey, Honokowai Gulch, Kaanapali, Maui Island" and Hommon, 1982, "An Archaeological Reconnaissance Survey of the North Beach Mauka and South Beach Mauka Areas, Hanakao'o, West Maui"). While surface features of such sites may have been destroyed by past disturbances, it is quite possible that intact subsurface portions of such sites are present and that these portions are significant.

Clearly, we are concerned that the possible presence of significant subsurface historic sites be evaluated. We disagree with the consulting archaeologist that the testing can be deferred until after granting permits for infrastructure work. We believe that this problem should be evaluated in this EIS, as this project is the initial step in a large development. Such information is needed for governmental agencies that will consider any permits, as they undoubtedly will be concerned if significant historic sites are discovered later. Such information also would be vital for the applicant's planners.

Ultimately for the entire project area, we recommend that the following general historic preservation goals be adopted by the applicant:

1. Archaeological test excavations be dug in a representative fashion throughout the project area to determine if any subsurface historic sites are present. If sites are found, then sufficient information shall be gathered to assess their significance. For each site, this information should include size, location, nature of subsurface deposits (stratigraphy, features, artifact and midden content), function, and age. Initial significance assessments based on National Register or Hawaii Register of Historic Places criteria should be made. Such studies must be conducted by qualified archaeologists, and the results be submitted to the State's Historic Sites Section and the County Planning Department in report form for adequacy review and for final significance determinations.

2. If significant historic sites are present, acceptable mitigation plans shall be developed to handle any impacts to these sites. These plans shall be reviewed and approved by the Historic Sites Section ahd the County Planning Department to ensure their acceptability, and the execution of these plans should be verified by the same two offices.

Subsurface evaluation throughout the project area and identification of any significant sites at this EIS phase would be the ideal approach, as it will eliminate later surprises. However, to practically cover the nature of the proposed development, we believe that historic preservation review could also occur incrementally. For this EIS, as a minimum, we recommend that step 1 above be undertaken prior to initial infrastructure developments. Appropriate mitigation plans to handle any significant sites shall be developed in a general plan in this EIS with a commitment to specific plans and verification as in step 2 above. For the later infrastructure developments and for development of the lots, subsurface testing and complete historic preservation review can occur later, but a commitment to complete review must occur in this EIS. Thus, we agree with the consulting archaeologist that it would be desirable for the lease or sale agreements for the subdivided lots to include a condition that the above measures also be undertaken prior to development.

Should you have any questions, please contact Ms. Annie Griffin, staff archaeologist handling the island of Maui, at 548-6408.

RECREATION CONCERNS:

There are no state park concerns. While public access to the shoreline is provided by the two proposed county parks, lateral shoreline access along the entire subject area should also be provided.

WATER AND LAND DEVELOPMENT CONCERNS:

The Environmental Impact Statement should fully address the project's water requirements and any anticipated impact on the groundwater resources.

Thank you for your consideration of our concerns.

Very truly yours,

WILLIAM W. PATY, Chairperson
Board of Land and Natural Resources

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Glenn T. KIMURA

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Thomas A. FEE A.I.C.P.

June 11, 1987

Mr. William W. Paty
Chair, Board of Land & Natural Resources
Department of Land & Natural Resources
P.O. Box 621
Honolulu, Hawaii 96809

Re: North Beach EIS Preparation Notice
Your Letter Received May 28, 1987

Dear Mr. Paty:

Thank you for your comments in response to the EIS Preparation Notice for the North Beach project. In response to your comments on aquatic resources, the Draft EIS will contain the results of a completed coastal engineering evaluation and marine biological assessment for the project. The study will include a discussion of stormwater drainage impacts on the coastal environment. Coastal recreational resources will also be addressed.

In regards to your historic sites concerns, sub-surface archaeological testing was recently completed for the site. The testing, which included 60 cores and 10 backhoe trenches found no sub-surface remains. The archaeologist who conducted the tests has met with Dr. Ross Cordy of your Historic Sites Section to discuss these findings. The Draft EIS will include the complete archaeological report.

Your letter noted that lateral shoreline access along the subject area should be provided. The proposed project will conform to all required shoreline setbacks, facilitating public access along the entire subject area. In addition, two public park sites will be dedicated to the County, facilitating public shoreline access.

Finally, the Draft EIS will address the project's water requirements, describe the proposed water system and any impacts on groundwater resources.

Once again, thank you for your input and interest in this project.

Sincerely,

Leslie Kurisaki

Leslie Kurisaki
Planner

JOHN WAIHEE
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF STATE PARKS
P. O. BOX 621
HONOLULU, HAWAII 96809

WILLIAM W. PATY, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

LIBERT K. LANDGRAF
DEPUTY

AQUACULTURE DEVELOPMENT PROGRAM
AQUATIC RESOURCES
CONSERVATION AND ENVIRONMENTAL AFFAIRS
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

June 12, 1987

Ms. Leslie Kurisaki
Helber, Hastert and Kimura Planners
Grosvenor Center, PRI Tower
733 Bishop Street -- Suite 2590
Honolulu, Hawaii 96813

Dear Ms. Kurisaki:

SUBJECT: Comments on Findings of North Beach Subsurface Archaeological Survey
Kaanapali, Lahaina, Maui
TMK: 4-4-01: 2, 3, 6-9, 68; 4-4-02: 24; 4-4-06: 5

Thank you for your phone call last week and the follow-up map submitted by the PHRI archaeological firm. Ms. Peggy Rosendahl of the PHRI firm also called us regarding the findings, and we have talked briefly with Dr. Paul Rosendahl.

From the information supplied to us, it is our understanding that the result of all the subsurface coring and backhoe trenches were negative. No subsurface deposits were found. Considerable attention was paid to the sand dune areas, as the possible presence of habitation deposits and burials needed to be evaluated. A large number of cores and 5 backhoe trenches were placed in the dune areas with no deposits or skeletal remains found. Additionally, evaluation of the surface of the dunes and the beach faces found no remains.

These findings would indicate that your project will have "no effect" on significant historic sites. A final report of the archaeological subsurface study should be sent to us as soon as possible for placement in our files -- as complete evidence of this determination.

It does appear that PHRI will recommend as a precaution to cover the slight possibility that rare burials might be uncovered in the dune areas, some kind of stop work provision would be recommended, either under a monitoring or on-call basis. This provision does sound like a good safety precaution. The provision should allow for stoppage of work in the immediate area, rapid contact of an archaeologist, archaeological data recovery of the remains (to include burial features and osteology), disinterment and reinterment, report preparation.

If you have any questions, please feel free to call our Historic Sites Section (548-7460).

Sincerely yours,

RALSTON H. NAGATA
State Parks Administrator

cc: OCEA, DLNR
Planning Department, County of Maui
Paul H. Rosendahl, Inc.

DEPARTMENT OF PLANNING AND ECONOMIC DEVELOPMENT

KAMAMALU BUILDING, 250 SOUTH KING ST., HONOLULU, HAWAII
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Director
MURRAY E. TOWILL
Deputy Director
BARBARA KIM STANTON
Deputy Director

DIVISIONS
BUSINESS AND INDUSTRY DEVELOPMENT DIVISION
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ADMINISTRATIVE SERVICES OFFICE
INFORMATION OFFICE

Ref. No. P-6371

May 6, 1987

RECEIVED
MAY 11 1987
HELBER, HASTERT, VAN HORN & KIMURA PLANNERS

Mr. Glenn T. Kimura
Helber, Hastert and Kimura,
Planners
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear Mr. Kimura:

Subject: Environmental Impact Statement Preparation Notice (EISPN) for North Beach Resort, Kaanapali, Maui

We have reviewed the subject environmental impact statement preparation notice (EISPN) and have the following comments on the proposed project.

The environmental impact statement (EIS) should review relevant objectives and policies of the Hawaii CZM Program and the Hawaii State Plan. As part of this discussion, we recommend that special additional attention be given to the following areas of concern.

Recreational Resources

CZM policy calls for the provision of adequate, accessible, and diverse recreational opportunities in the coastal zone management area by protecting coastal resources uniquely suited for recreational activities that cannot be provided in other areas. The EIS for the project should discuss the potential impacts on public recreational access and use, including surfing at Honokawai, that might result from development of the proposed project. A description of the number and location of public accessways and associated facilities, such as comfort stations and parking spaces, should be provided. Also, the issue of continued public access to historic sites in the project area should be discussed.

Historic Resources

One of the objectives of the Hawaii CZM Program is to protect, preserve, and where desirable, restore those natural and man-made historic and prehistoric resources in the coastal zone management area that are significant in Hawaiian and American history and culture. The subject document makes no mention of the Puukolii Historic District. According to the State Historic Preservation Office (SHPO), the remains of an old plantation camp and village have been found in this area. The EIS for this project should include a thorough analysis of the historic resources of the area, in coordination with SHPO.

Coastal Ecosystems

Another objective of the Hawaii CZM Program is to protect valuable coastal ecosystems from disruption and minimize adverse impacts on all coastal ecosystems. The EIS for this project should discuss potential impacts of the project on marine fauna, including endangered species known to frequent the waters near the project area.

CZM policy provides for the promotion of water quantity and quality planning and management practices which reflect the tolerance of fresh water and marine ecosystems. The impact of water withdrawal for the North Beach Resort and other projects along the Kaanapali coast should be evaluated in terms of possible cumulative effects on the salinity of the aquifers in the area. Impacts of such salinity changes on other water users in the project area should also be discussed.

We are concerned that biocide use in the proposed resort may result in harmful effects on biota in the project area. A listing of the types and quantities of pesticides and herbicides to be used on the proposed project should be provided. An analysis of the potential impacts of these use patterns on water quality and on biota, including limu, fish and corals, in the near-shore and shoreline environments should also be done.

Hawaii State Plan

The EISPN contains an overview discussion of the relationship of the proposed project to the Hawaii State Plan areas of the economy, population and physical environment. However, the following should also be reviewed and important relationships specifically discussed in the EIS: Economy (Section 226-7, HRS), Facility Systems (Section 226-14 through 226-18, HRS) and Socio-Cultural Advancement (Sections 226-19 and 226-23, HRS). In addition, among the relevant Priority Guidelines, the following should be examined: Economic (Sections 226-103(b) and (c), HRS), Population Growth and Land Resources (Section 126-104(b), HRS) and Affordable Housing (Section 226-106, HRS). The State Functional Plans should be reviewed to determine relevance to your project and important relationships should be discussed in the EIS.

Mr. Glenn T. Kimura
Page 3
May 6, 1987

Thank you for allowing us the opportunity to comment.

Sincerely,

Roger A. Ulveling

cc: Mr. Christopher L. Hart
Planning Director, County of Maui
Office of Environmental Quality Control
Mr. B. Martin Luna
Carlsmith, Wichman, Case, Mukai and Ichiki

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Thomas A. FEE A.I.C.P.

May 29, 1987

Mr. Roger A. Ulveling
Director
Department of Planning & Economic Development
P.O. Box 2359
Honolulu, Hawaii 96804

Re: North Beach EIS Preparation Notice
Your Letter dated May 6, 1987

Dear Mr. Ulveling:

Thank you for your comments in response to the EIS Preparation Notice for the North Beach project. Your comments addressed four areas of concern: recreational resources, historic resources, coastal ecosystems, and the Hawaii State Plan.

In regards to your comments regarding recreational resources, the Draft EIS will contain a discussion of the existing recreational facilities in the area and any impact the project may have on these resources.

Second, you mentioned the Puukolii Historic District, located near North Beach. We have consulted the State Department of Land and Natural Resources Historic Sites Division and State Parks Division on this matter. According to these sources, the Puukolii Historic District, which contains the remains of the Pioneer Mill Company plantation camp, two churches, a collapsed school house and a few inhabited dwellings, is located approximately one mile inland of Honoapiilani Highway. They have indicated that such a great distance indicates that these historic structures will not be impacted by the North Beach project.

Your third area of concern was coastal ecosystems, including the project's use of water. The proposed water system will be discussed in detail in the Draft EIS.

In addition, you expressed concern over the impacts of biocide use in the project area. The current phase of the development will only involve subdivision and infrastructure improvements. The details of the proposed landscaping and biocide use, including the listing of types and quantities of pesticides and herbicides to be used, are not available at this time. In all likelihood, the individual hotel developers will be required to submit separate environmental assessments for each hotel. The detailed information you seek should be more readily available at that time, when landscaping plans have been developed.

It should be noted that the coastal engineering evaluation and marine biological assessment conducted for the North Beach project (Dames and Moore 1986) indicates that baseline water quality measurements (taken in nearshore waters over a six month period) indicated only nitrogen and phosphorus levels were greater than normal readings. The study attributed this to agricultural fertilizers from nearby cane fields. The conversion of the North Beach site from sugar cane cultivation to resort use should reduce these impacts to water quality. In addition, the project will not include large landscaped areas, such as a golf courses, which could involve continuous and heavy use of biocide.

Your final area of concern was the project's relationship to the Hawaii State Plan. The Draft EIS will include a discussion of the State Plan sections you mentioned, including the State Functional Plans.

Once again, we appreciate your input and interest in this project.

Sincerely,

Leslie Kurisaki

Leslie Kurisaki
Planner

JOHN WAIHEE
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF STATE PARKS
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AQUACULTURE DEVELOPMENT PROGRAM
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STATE PARKS
WATER AND LAND DEVELOPMENT

May 13, 1987

Ms. Leslie Kurasaki, Planner
Helber, Hastert & Kimura, Planners
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear Ms. Kurasaki:

SUBJECT: Request for information on Puukolii Historic Dictrict Hanakao'o, Kaanapali, Lahaina, Maui

In response to your telephone inquiry on May 13, 1987 regarding the description and location of the subject site in relation to your project area, we offer the following information.

Puukolii Historic District (Site 50-03-1595) is included in our inventory of historic places, but not listed on either the Hawaii or National Register of Historic Places. The site consists of the remains of the Pioneer Mill Co. plantation camp, consisting of two churches (Home Mission Church and St. Thomas Catholic Church), a collapsed school house, and a few inhabited dwellings. Site 1595 is located in Puukolii, which is approximately a mile inland of Honoapiilani Highway. Such a long distance indicates that these historic structures will not be impacted by your project, which is located along the coast.

Should you have further questions, please contact Ms. Annie Griffin, staff archaeologist handling the island of Maui, at 548-6408.

Sincerely,

RALSTON H. NAGATA
State Parks Administrator

JOHN WAIHEE
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

DIRECTOR
EDWARD Y. HIRATA

DEPUTY DIRECTORS
JOHN K. UCHIMA
RONALD N. HIRANO
DAN T. KOCHI

IN REPLY REFER TO
STP 8.2009

May 7, 1987

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MAY 11 1987
HELBER, HASTERT, VAN HORN & KIMURA PLANNERS

Ms. Leslie Kurisaki, Project Planner
HHVH and K
Grosvenor Center, PRI Tower
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear Ms. Kurisaki:

EIS Preparation Notice
Resort Development
North Beach, Kaanapali, Maui

The developer should prepare a Traffic Impact Analysis Report (TIAR) and submit it for our review. Among other things, the TIAR should identify any mitigation measures that may be necessary.

We shall be limiting direct individual access onto Honoapiilani Highway from the subdivided lots and it appears additional lanes may be required between Kaanapali and Honokowai.

Thank you for this opportunity to provide comments.

Very truly yours,

Edward Y. Hirata
Director of Transportation

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Thomas A. Fee AICP

May 12, 1987

Mr. Edward Y. Hirata
Director of Transportation
State of Hawaii
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Re: North Beach EIS Preparation Notice
Your Letter dated May 7, 1987

Dear Mr. Hirata:

Thank you for your letter in response to the North Beach EIS Preparation Notice. In regards to your comments, the Draft EIS will include a Traffic Impact Analysis Report for your review. The report will recommend mitigation measures for various timeframes throughout the life of the project, including any need for additional highway lanes. The issue of access between the hotel sites and Honoapiilani Highway will also be addressed.

Once again, we appreciate your interest and cooperation in this matter.

Sincerely,

Leslie Kurisaki
Leslie Kurisaki
Planner

HANNIBAL TAVARES
Mayor
TELEPHONE 244-7855

cmo

OFFICE OF THE MAYOR
COUNTY OF MAUI
WAILUKU, MAUI, HAWAII 96793

April 15, 1987

RECEIVED
APR 22 1987
HELBER, HASTERT, VAN HORN & KIMURA PLANNERS

Mr. Leslie Kurisaki, Project Planner
Helber, Hastert & Kimura, Planners
733 Bishop Street, Suite 2590
Honolulu, HI 96813

Dear Mr. Kurisaki:

Thank you for your letter dated April 10, 1987 informing me of the Environmental Impact Statement preparation notice for the Kaanapali North Beach Resort development.

I suggest that you contact my Planning Director, Christopher Hart, for further discussion of the project.

I appreciate your keeping me informed about this project.

Very truly yours,

Hannibal Tavares

HANNIBAL TAVARES
Mayor, County of Maui

cc: Planning Director

HELBER HASTERT VAN HORN & KIMURA Planners
HHVH&K

1 May 1987

The Honorable Mayor Hannibal Tavares
Office of the Mayor
County of Maui
Wailuku, Maui, Hawaii 96793

Re: North Beach Environmental Impact Statement
Your Letter dated April 15, 1987

Dear Mayor Tavares:

Thank you for your prompt response to the Preparation Notice sent to you for the North Beach Environmental Impact Statement.

As per your comments, we have been in close contact with Mr. Christopher Hart and the staff of the Planning Department, and will continue coordinate with their office as this development progresses.

Once again, thank you for your prompt response and your cooperation.

Sincerely,

Leslie Kurisaki

Leslie Kurisaki
Planner

HANNIBAL TAVARES
Mayor

ROBERT AGRES, JR.
Director

MARLENE MANEHA
Deputy Director

County of Maui
DEPARTMENT OF HUMAN CONCERNS
Housing Division
200 South High Street
Wailuku, Maui, Hawaii 96793
Telephone: 244-7752, 244-7849, 244-7822

May 29, 1987

RECEIVED
JUN 1 1987
HELBER, HASTERT, VAN HORN & KIMURA PLANNERS

Ms. Leslie Kurisaki
Project Planner
Helber, Hastert, Van Horn & Kimura, Planners
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear Ms. Kurisaki:

Subject: Environmental Impact Statement Preparation Notice-Resort Development, North Beach, Kaanapali, Maui

I would first of all like to apologize for the lateness of my response.

As I had indicated during our recent telephone conversation, the issue which I believe needs to be addressed by Kaanapali North Beach Joint Venture, is how they propose to address the need for affordable employee housing in the West Maui area.

When a specific employee housing proposal has been formulated by the project developer, we would like to have the opportunity to review and comment on the proposal.

Very truly yours,

Edwin T. Okubo

EDWIN T. OKUBO
Housing Administrator

ETO:jkh

HELBER HASTERT VAN HORN & KIMURA Planners

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June 11, 1987

Mr. Edwin T. Okubo
Housing Administrator
Department of Human Concerns
Housing Division
200 South High Street
Wailuku, Maui, HI 96793

Re: North Beach EIS Preparation Notice
Your Letter dated May 29, 1987

Dear Mr. Okubo:

Thank you for your comments in response to the EIS Preparation Notice for the North Beach Kaanapali project. The Draft EIS will address the projected housing demand generated by the project, and describe the developer's ongoing work with the County to provide land for residential development. Areas in the Lahaina Community Plan which are being considered for public dedication will be noted.

In addition to its work with Maui County, Amfac Property Investment Corporation has also initiated discussions with the Hawaii Housing Authority regarding potential projects in West Maui.

The North Beach developers will continue to work closely with the Department of Human Concerns and the Hawaii Housing Authority to address the need for affordable employee housing in West Maui.

Thank you again for your input and cooperation in this matter.

Sincerely,

Leslie Kurisaki

Leslie Kurisaki
Planner

HANNIBAL TAVARES
Mayor

MARILYN M. MONIZ
Director

KENJI KAWAGUCHI
Deputy Director

COUNTY OF MAUI
DEPARTMENT OF PARKS AND RECREATION

1580 Kaahumanu Avenue
Wailuku, Maui, Hawaii 96793

June 15, 1987

Mr. Leslie Kurisaki
Project Planner
Helber, Hastert & Kimura, Planners
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear Mr. Kurisaki:

Subject: Kaanapali North Beach Resort Development

Our apology for the delay in submitting our comments on the above project.

We concur with the proposed development located north of the existing Kaanapali Beach Resort. However, the placement of the proposed lots indicated as "park" is not acceptable.

Lot 8 configuration is not functional for beach park activities. It is more conducive as a beach access.

We recommend that Lot 2 be designated as beach park as long as the grade is appropriate. A beach access should be retained at the south end of the development. Lots 9, 10 or 11.

As an alternative, a beach park could be retained at the south end including Lots 9, 10, 11 and a portion of Lot 1, and beach accesses should be provided between Lots 3 and 4 and at Lot 8.

Beach accesses should be 6 feet wide with chain link fencing, lights along paved pathway, with adequate parking.

Should you have any questions, please call me at 244-9018.

Very truly yours,

Marilyn Moniz-Kahoohanohano

MARILYN MONIZ-KAHOOHANOHANO
Director

MMK:MA:jm

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FEE
A.I.C.P.

Kevin M.
YOUNG
A.S.L.A.

July 21, 1987

Ms. Marilyn Moniz-Kahoohanohano
Director
County of Maui
Department of Parks and Recreation
1580 Kaahumanu Avenue
Wailuku, Maui, Hawaii 96793

Re: North Beach Kaanapali EIS Preparation Notice
Your Letter dated June 15, 1987

Dear Ms. Moniz-Kahoohanohano:

Thank you for your response to the EIS Preparation Notice for the North Beach project. Your letter addressed the designation of Lot 8 and Lot 9 or 11 as public park sites, and you suggested several other alternative park and beach access sites.

While your suggestions are viable alternatives, some explanation is needed on why the proposed park sites were originally selected. The location of the two proposed park sites are designated on the Lahaina Community Plan, dated December 1983. As shown on the enclosed Land Use map (from the Lahaina Community Plan), the two lots at the north and south ends of the North Beach site have been identified for public park use. The location of these proposed park sites (Lots 8 and 9 or 11) represent the input of the community and public officials, as embodied in the Community Plan.

Secondly, the intent of the project is to create a single, high quality, self-contained destination resort, rather than a haphazard cluster of individual hotels. It was felt that heavy public access directly in and out of the resort could exacerbate traffic and parking problems, as well as create the public perception that the beach park "belongs" to the resort, rather than to the community. Thus, reasons for designating the five acre park on Lot 8 were to provide it with exclusive access and to provide the park with a certain degree of privacy for the local residents.

If you have any questions or would like to discuss the matter further, please feel free to call me.

Sincerely,

Leslie Kurisaki

Leslie Kurisaki
Planner

HANNIBAL TAVARES
Mayor

ALVIN K. FUKUNAGA
Director

BRIAN HASHIRO P.E.
Deputy Director

GEORGE KAYA
Highways Division

FRED ARAKI P.E.
Engineering Division

EDWIN KAGEHIRO P.E.
Waste Management Division

AARON SHINMOTO P.E.
Land Use and Codes Administration

COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS
200 SOUTH HIGH STREET
WAILUKU, MAUI, HAWAII 96793

May 6, 1987

RECEIVED
MAY 11 1987
HELBER, HASTERT, VAN HORN & KIMURA PLANNERS

Mr. Leslie Kurisaki
Helber, Hastert & Kimura, Planners
733 Bishop Street
Suite 2590
Honolulu, Hawaii 96813

Dear Mr. Kurisaki

Re: North Beach Resort Development
TMK: 4-4-01:por of 2, 3, 6, 8, 9, & 68
4-4-02:24 and 4-4-06:5

In response to your letter of April 13, 1987, we have no comments on your EIS Preparation Notice. We may have comments on the EIS and will conduct a detailed review upon receipt of said document.

You may contact Mr. Kenneth Kong, Acting Administrator of our Land Use and Codes Administration, at 244-7760 if you wish to discuss the project further.

Very truly yours,

For ALVIN K. FUKUNAGA
Director of Public Works

KK:jm

cc: Planning Director (Chris Hart)

X-30

HELBER HASTERT VAN HORN & KIMURA Planners

HHVH&K

Grosvenor Center
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Richard H. Van Horn AICP, AIA
Glenn T. Kimura

Associates
Nancy L. Nishikawa AICP
Thomas A. Fee AICP

May 12, 1987

Mr. Alvin K. Fukunaga
Director of Public Works
Dept. of Public Works
200 South High Street
Wailuku, Maui, HI 96793

Re: North Beach EIS Prep Notice
Your Letter dated May 6, 1987

Dear Mr. Fukunaga:

Thank you for your letter in response to the EIS Preparation Notice for the North Beach project.

At your suggestion, we will be contacting Mr. Kenneth Kong, Acting Administrator of Land Use and Codes Administration to discuss the project further.

Sincerely,

Leslie Kurisaki

Leslie Kurisaki
Planner

DEPARTMENT OF WATER SUPPLY
COUNTY OF MAUI
P. O. BOX 1109
WAILUKU, MAUI, HAWAII 96793

RECEIVED
APR 30 1987
HELBER, HASTERT, VAN HORN & KIMURA PLANNERS

April 23, 1987

Mr. Leslie Kurisaki
Project Planner
Helber, Hastert, Van Horn
& Kimura Planners
733 Bishop Street
Suite 2590
Honolulu, HI 96813

Subject: Environmental Impact Statement Preparation Notice Resort Development, North Beach Joint Venture Kaanapali, Maui

Dear Mr. Kurisaki:

Thank you for advising us of the EIS Preparation Notice.

Please contact Mr. Ed Kagehiro of our engineering division to discuss the project. Telephone 244-7836.

Thank you.

Sincerely,

For Vince G. Bagoyo, Jr.
Director

tm

"By Water All Things Find Life"

HELBER HASTERT VAN HORN & KIMURA Planners

HHVH&K

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Thomas A. FEE AICP

May 6, 1987

Mr. Vince G. Bagoyo, Jr.
Director
Dept. of Water Supply
County of Maui
P.O. Box 1109
Wailuku, Maui, Hawaii 96793

Re: North Beach Kaanapali EIS Preparation Notice
Your Letter dated April 23, 1987

Dear Mr. Bagoyo:

Thank you for your letter in response to the EIS Preparation Notice for the proposed North Beach project. At your suggestion, we have contacted Mr. Ed Kagehiro of your engineering division, and will be arranging meetings with Mr. Kagehiro and staff to discuss their concerns over the project water supply.

Once again, we appreciate your prompt response and cooperation in this matter.

Sincerely,

Leslie Kurisaki

Leslie Kurisaki
Planner

HANNIBAL TAVARES
MAYOR

COUNTY OF MAUI
DEPARTMENT OF FIRE CONTROL
WAILUKU, MAUI, HAWAII 96793

HERBERT A.K. CAMPOS, JR.
FIRE CHIEF
LEROY L. HOKOANA
DEPUTY FIRE CHIEF

May 6, 1987

RECEIVED
MAY 8 1987
HELBER, HASTERT, VAN HORN & KIMURA PLANNERS

Mr. Leslie Kurisaki
Project Planner
Helber, Hastert & Kimura,
Planners
Grosvenor Center
733 Bishop St., Suite 2590
Honolulu, HI 96813

Dear Mr. Kurisaki:

RE: ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE RESORT DEVELOPMENT, NORTH BEACH, KAANAPALI, MAUI

Thank you for the opportunity to express our comments regarding the above proposed project's Environmental Impact Statement.

It is our understanding that the Joint Venture is proposing to subdivide the 95+ acre property into a maximum of six hotel sites and two park sites; and that the Environmental Impact Statement addresses the proposed development in terms of conceptual land uses.

Please be advised that our comments are directed to the First Phase of the proposed project.

Our first comment concerns the dead end cul-de-sac situated at Hotel Lot #7, as shown on the proposed subdivision plan. We would like to propose that a second fire emergency access and egress roadway be provided at this location. Which will be used during emergency conditions only. This emergency access roadway may be used also, as an emergency egress road for other emergency situations as needed.

Our second comment deals with the adequacy of the onsite fire protection requirements for the proposed individual hotels or hotel oriented developments. i.e. onsite fire hydrants and water mains capable of supplying the required fire flows.

If you have any questions or require further assistance regarding the above comments, please contact me at 244-5250.

Sincerely,

H. K. Campos
HERBERT A.K. CAMPOS, JR.
Fire Chief

CC: Fire Prevention Bureau

HELBER
HASTERT
VAN HORN
& KIMURA
Planners

HHVH&K

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Associates
Nancy L. NISHIKAWA AICP
Thomas A. FEE AICP

May 29, 1987

Chief Herbert A.K. Campos
County of Maui
Department of Fire Control
Wailuku, Maui, Hawaii 96793

Re: North Beach EIS Preparation Notice
Your Letter dated May 6, 1987

Dear Chief Campos:

Thank you for your comments in response to the EIS Preparation Notice for the North Beach project. Your first comment concerned the dead end cul-de-sac at hotel lot #7, and you proposed an emergency access roadway be provided. After forwarding your concerns to the project engineers, they have agreed to provide an emergency access roadway at this location. The project engineers are currently meeting with State Highways representatives on Maui to determine the point at which this road will meet Honoapiilani Highway.

Your second comment dealt with the adequacy of on-site fire protection. The proposed hotels will conform to all applicable building and fire codes, and the individual hotel developers will be coordinating with the County Building Department in this regard. Should your department have specific concerns beyond what is required by current fire code, we have no doubt that the hotel developers will be amenable to your department's recommendations, and will be willing to do what is necessary to construct a safe development.

Once again, we appreciate your input and interest in this project.

Sincerely,

Leslie Kurisaki

Leslie Kurisaki
Planner

POLICE DEPARTMENT
COUNTY OF MAUI
P.O. BOX 1029
WAILUKU, HAWAII 96793
AREA CODE (808) 244-7811

JOSEPH CRAVALHO
CHIEF OF POLICE

HOWARD H. TAGOMORI
DEPUTY CHIEF OF POLICE

OUR REFERENCE
SL:yyc
YOUR REFERENCE

May 8, 1987

RECEIVED
MAY 19 1987
HELBER, HASTERT, VAN HORN & KIMURA PLANNERS

Ms. Leslie Kurisaki
Project Planner
HHVH & K PLANNERS
Grosvenor Center, PRI Tower
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear Ms. Kurisaki:

Please be informed that this office has reviewed the North Beach, Kaanapali Resort Development Environmental Impact Statement Preparation Notice.

A development such as the project described in your statement is sure to have an impact on calls for police service. Mr. Ronald Chong Kee, who is in charge of AMFAC Security at Kaanapali, informed us that they have plans to double the size of their current staff in order to service the North Beach Development. Regarding the hotels, it is fair to assume that each hotel will have their own in-house security similar to that of all the major hotels within the Kaanapali resort area.

Recently we did a study calling for an additional beat and the required manpower to man the beat. Should this become a reality in the near future, this will better enable us to provide the necessary services which is expected from this development.

A major concern regarding this project is the amount of traffic that will be generated on Honoapiilani Highway which is already a major concern as it is today. There is simply not enough lanes on the current highway to accommodate an even flow of traffic without causing a traffic congestion between Puamana and the intersection of Honoapiilani Highway and lower Honoapiilani Road.

In the EIS Preparation Notice, it was mentioned that the Department of Transportation, Highways Division, will be consulted. Hopefully, they will enlighten your office of the existing problems within the area mentioned above and the status concerning the means in which they plan to correct and/or alleviate the problems in the near future.

Very truly yours,

JOSEPH CRAVALHO
Chief of Police

HELBER
HASTERT
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& KIMURA
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Glenn T. KIMURA

Associates
Nancy L. NISHIKAWA A.I.C.P.
Thomas A. FEE A.I.C.P.

May 29, 1987

Chief Joseph Cravalho
Police Department
County of Maui
P.O. Box 1029
Wailuku, Maui, Hawaii 96793

Re: North Beach EIS Preparation Notice
Your Letter dated May 8, 1987

Dear Chief Cravalho:

Thank you for your comments in response to the EIS Preparation Notice for the North Beach Kaanapali project. As you discussed with Mr. Chong Kee, who is in charge of security at the Kaanapali Beach Resort, the proposed North Beach development will have a comparable level of resort-wide and in-house hotel security.

Another major concern you expressed was the amount of traffic that will be generated on Honoapiilani Highway. The project developers are aware of the current traffic situation and share your concern. The Draft EIS will contain a Traffic Impact Analysis, including traffic projections through the project development period and recommended mitigative measures (infrastructure improvements). The Draft EIS will also include a comprehensive discussion of a Traffic System Management (TSM) program, which would include shuttle services for hotel guests, and carpools, vanpools, and park-and-ride facilities for hotel employees. The developers will continue to work in good faith with County and State agencies to address this problem.

Thank you again for your input and interest in this project.

Sincerely,

Leslie Kurisaki

Leslie Kurisaki
Planner

MAUI ELECTRIC COMPANY, LTD. • 210 WEST KAMEHAMEHA AVENUE • PO BOX 398 • KAHULUI MAUI HI 96732-0398 • (808) 871-8461

CUST
M-W

HEI

RECEIVED
APR 30 1987
HELBER, HASTERT, VAN HORN & KIMURA PLANNERS

April 27, 1987

Mr. Leslie Kurisaki, Project Planner
Helber, Hastert & Kimura, Planners
Grosvenor Center
733 Bishop Street, Suite 2590
Honolulu, HI 96813

Dear Mr. Kurisaki:

Subject: Environmental Impact Statement Preparation Notice
Resort Development, North Beach, Kaanapali, Maui

This is in response to your letter dated April 13, 1987. Although Maui Electric Company, Ltd. does not have any comments directly pertaining to the Environmental Impact Statement preparation, we would be willing to assist your firm in any way that we can.

At this time, our concerns deal primarily with the electrical requirements for this project. The electrical power needs of the individual developments within the proposed subdivision will have to be determined. Furthermore, the initial phase of the development, which includes the installation of the infrastructure for electrical purposes, needs to be properly addressed.

Please contact Stephen Kealoha of our Company at 871-2360 for coordination and information.

Sincerely,

Calvin A. Kuwanoe
Calvin A. Kuwanoe
Manager, Engineering

SK:rt

A Hawaiian Electric Industries Company

HELBER HASTERT VAN HORN & KIMURA Planners

HHVH&K

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Thomas A. Fee AICP

May 1, 1987

Mr. Calvin A. Kuwanoe
Manager, Engineering
Maui Electric Company, Ltd.
210 West Kamehameha Ave.
P.O. Box 398
Kahului, Maui, HI 96732-0398

Re: Environmental Impact Statement Preparation Notice
North Beach, Kaanapali
Your Letter dated April 27, 1987

Dear Mr. Kuwanoe:

Thank you for your comments in response to the EIS Preparation Notice for the proposed North Beach project. We have forwarded a copy of your letter to the project engineers who will be planning the infrastructure improvements.

Once again, we appreciate your prompt response and cooperation in this matter.

Sincerely,

Leslie Kurisaki
Leslie Kurisaki
Planner

HAWAIIAN TEL GTE
Beyond the call

Interoffice
Correspondence

Reference

April 28, 1987

RECEIVED
APR 30 1987
HELBER, HASTERT, VAN HORN
& KIMURA PLANNERS

Helber, Hastert & Kimura Planners
733 Bishop St., Suite 2590
Honolulu, HI 96813

SUBJECT: EIS Preparation Notice
North Beach, Kaanapali, Maui

Gentlemen:

Thank you for informing us of your proposed plans to develop North Beach and giving us the opportunity to provide you with information concerning our future plans.

Our main concern would be the first phase of development, which includes underground ductline facilities, such as, manholes, pullboxes, conduits and possibly an area for electronic switching equipment to provide the best state-of-the-art service.

Joe Santos, Outside Plant Engineer, will be the person to contact should any questions arise relating to telephone infrastructure improvements. You may reach him at 242-5104.

Sincerely,

Ron Saito

Ron Saito
Supervising Engineer

Stk# 60 3003

G-3304 (Rev. 2/86)

HELBER
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& KIMURA
Planners

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Associates
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Thomas A. FEE AICP

May 1, 1987

Mr. Ron Saito
Supervising Engineer
Hawaiian Telephone Company
P.O. Box 370
Wailuku, Maui, Hawaii 96793

Re: EIS Preparation Notice, North Beach, Kaanapali
Your Letter dated April 28, 1987

Dear Mr. Saito:

Thank you for your comments in response to the EIS Preparation Notice for the proposed North Beach development. We have forwarded a copy of your letter to the project engineers who will be handling infrastructure improvements.

Once again, we appreciate your prompt response and cooperation on this matter.

Sincerely,

Leslie Kurisaki

Leslie Kurisaki
Planner

University of Hawaii at Manoa

Water Resources Research Center
Holmes Hall 283 • 2540 Dole Street
Honolulu, Hawaii 96822

RECEIVED
MAY 1987
HELBER, HASTERT, VAN HORN & KIMURA PLANNERS

4 May 1987

Mr. Glenn T. Kimura
Vice President
Helber Hastert Van Horn & Kimura
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear Mr. Kimura:

Subject: Environmental Impact Statement Preparation Notice, Resort Development, North Beach, Kaanapali, Maui, April 1987

We have reviewed the subject EISPN and have no comment to offer at this stage. We look forward to examining the Draft Environmental Impact Statement.

Thank you for the opportunity to comment. This material was reviewed by WRRC personnel.

Sincerely,

Edwin T. Murabayashi

Edwin T. Murabayashi
EIS Coordinator

ETM:jm

AN EQUAL OPPORTUNITY EMPLOYER

University of Hawaii at Manoa

Environmental Center
Crawford 317 • 2550 Campus Road
Honolulu, Hawaii 96822
Telephone (808) 948-7361

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HELBER, HASTERT, VAN HORN & KIMURA PLANNERS

June 4, 1987
PN:0052

Ms. Leslie Kurisaki
Project Planner
Helbert, Hastert and Kimura Planners
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear Ms. Kurisaki:

Environmental Impact Statement Preparation Notice
North Beach Resort
North Beach, Kaanapali, Maui

In response to your request for our input as to issues that should be addressed in the Environmental Impact Statement (EIS) on the North Beach Resort, we have briefly reviewed the information presented in the Preparation Notice. We assume that the usual issues associated with any similar resort development such as, but not limited to, traffic, water supplies, waste disposal, sewage treatment, and social issues will be fully addressed in the EIS. Some specific comments regarding the archaeological and historical concerns have been provided by Bion Griffin, Anthropology; and Pamela Bahnsen, Environmental Center.

Historical/Cultural Resources

Although surface remains were not found on the proposed project site, given the sand dune environment and the frequent presence of historical sites in such environments, it is highly likely that sub-surface deposits exist. We note that significant archaeological remains have been discovered in neighboring locations. For this reason, we suggest that extensive, representative sub-surface testing be undertaken at the proposed project site. The dunes should be cored or deep test pits dug. Test excavations should extend all the way to the highway. The results of these explorations should be included and addressed in the Draft EIS.

We appreciate the opportunity to comment at this preparation stage and hope that our comments will be useful in the preparation of the Draft Environmental Impact Statement.

A Unit of Water Resources Research Center
AN EQUAL OPPORTUNITY EMPLOYER

Yours truly,

Jacquelin N. Miller

Jacquelin Miller
Associate Environmental Coordinator

cc: OEQC
Christopher L. Hart
Maui Planning Department
L. Stephen Lau
P. Bion Griffin
Pamela Bahnsen

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Associates
Nancy L. NISHIKAWA AICP
Thomas A. FEE AICP

June 8, 1987

Ms. Jacquelin Miller
Associate Environmental Coordinator
Environmental Center
University of Hawaii
2550 Campus Road
Honolulu, Hawaii 96822

Re: North Beach EIS Preparation Notice
Your Letter dated June 4, 1987

Dear Ms. Miller:

Thank you for your comments in response to the EIS preparation notice for the North Beach Kaanapali project. As noted in your letter, issues such as traffic, water supply, solid waste disposal, sewage treatment, and social issues will be fully addressed in the Draft EIS.

In response to your specific comment regarding historical/cultural resources, sub-surface archaeological testing is currently being conducted at the project site. The archaeologist conducting the tests has been in contact with the Department of Land and Natural Resources Historic Sites Section, and the findings, plus any recommended mitigative measures will be presented in the Draft EIS.

Once again, we appreciate your input and interest in this project.

Sincerely,

Leslie Kurisaki

Leslie Kurisaki
Planner

COUNTY COUNCIL
COUNTY OF MAUI
WAILUKU, MAUI, HAWAII 96793

April 28, 1987

RECEIVED
MAY 1 1987
HELBER, HASTERT, VAN HORN & KIMURA PLANNERS

Mr. Glenn T. Kimura
Vice President
Helber, Hastert & Kimura, Planners
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear Mr. Kimura:

SUBJECT: NORTH BEACH DEVELOPMENT, KAANAPALI, MAUI

Thank you for the opportunity to review the Environmental Impact Statement (EIS) Preparation Notice for the subject project.

We have no comments to offer at this time. However, we would appreciate receiving a copy of the Draft EIS once it is available for review.

Sincerely,

Velma M. Santos

(Mrs.) VELMA M. SANTOS
Chairperson, Planning and Land
Use Committee

VMS:MM:po

cc: Mr. Chris Hart, Director
Department of Planning

April 15, 1987

Councilwoman Linda Crockett-Lingle
Maui County Council
200 South High Street
Wailuku, Maui, HI 96793

Dear Councilwoman Crockett-Lingle:

In accordance with your April 15 request, we are including you as a consulted party for the North Beach Environmental Impact Statement. It is our understanding that you already have a copy of the April 8 OEQC Bulletin, and a copy of the six page development summary on the project.

If you have any further questions or concerns about the development, please feel free to call. Should you so desire, we will be happy to meet with you or members of your staff at any time.

Sincerely,

Leslie Kurisaki

Leslie Kurisaki
Planner

WEST MAUI TAXPAYERS ASSOCIATION

April 28, 1987

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MAY 7 1987
HELBER, HASTERT, VAN HORN & KIMURA PLANNERS

Mr. Glen T. Kimura
Helber, Hastert & Kimura, Planners
733 Bishop St, Suite 2590
Honolulu, Hawaii 96813

Dear Mr. Kimura:

We are an organization of 2,300 taxpaying members here on the West Side of the island of Maui. We want to poll our membership with reference to such a major undertaking. We welcome the opportunity to evaluate the social-economic impact of such a project in the center of our community, but this prep notice gives us little to react to at this point. Needless to say, we are concerned in terms of impact.

We definitely want to be considered as a consulted party. We would certainly hope that a very thorough job would be required on the Environmental Impact Statement so that all impact areas are properly addressed.

To this matter could we please request a copy of the Master Plan and the December, 1986 Environmental Assessment.

Thank you for the opportunity to comment and please keep us informed of all additional information pertaining to this possible development.

Yours truly,

CHARLIE NALEPA
Executive Director

CN/dw

cc Chris Hart, Director
Maui County Planning Department

POST OFFICE BOX 10338 / LAHAINA / MAUI / HAWAII / 96761 / TELEPHONE (808) 661-3042

HELBER HASTERT VAN HORN & KIMURA Planners

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Glenn T. Kimura

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Nancy L. Nishikawa AICP
Thomas A. Fee AICP

May 11, 1987

Mr. Charlie Nalepa
Executive Director
West Maui Taxpayers Association
P.O. Box 10338
Lahaina, Maui, Hawaii 96761

Re: North Beach EIS Preparation Notice
Your Letter dated April 28, 1987

Dear Mr. Nalepa:

Thank you for your letter and your interest in the proposed North Beach project. As you have requested, the West Maui Taxpayers Association will be included as a consulted party to the EIS. As such, your organization will be sent a copy of the Draft EIS for review and comment. The Draft EIS is expected to be ready for distribution within the next several weeks. This document will contain all of the information in the December 1986 Environmental Assessment, in addition to further investigations conducted since that time. We expect that the Draft EIS will provide your members with a more thorough understanding of the project and provide the information necessary to evaluate the impacts of the development.

Thank you again for your concern. Please feel free to call if you have any questions or comments.

Sincerely,

Leslie Kurisaki

Leslie Kurisaki
Planner

CHAPTER XI

REFERENCES

XI. REFERENCES

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SMS Research, Inc. Maui County Housing Study 1982, Housing Needs Assessment. June 1983.

Sea Engineering, Inc. Coastal Engineering Evaluation and Marine Biological Assessment for Kaanapali North Beach, Maui, Hawaii. Prepared for Dames and Moore. November 1986.

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CHAPTER XII

COMMENTS AND RESPONSES RECEIVED DURING PREPARATION OF THE FEIS

XII. COMMENTS & RESPONSES RECEIVED DURING PREPARATION OF THE FEIS

12.1 Consulted Parties

The agencies, organizations, and individuals listed below were sent copies of the DEIS with a request for their comments on the project. Those believed to have an interest in the project or who requested consulted party status were mailed a copy of the report. Written comments from those agencies received during the 45-day public review period and responses to these comments are reproduced on the following pages.

"*" indicated agencies or individuals who sent a written response to the DEIS.

"^" indicated agencies or individuals who sent substantive written comments requiring written response.

Federal Agencies

Army-DAFE (Facilities Eng. - USASCH)
* Navy
* Soil Conservation Service
* U.S. Army Corps of Engineers
U.S. Coast Guard
^ U.S. Fish and Wildlife Service
* U.S. Geological Survey

State Agencies

* Dept. of Accounting and General Services
^ Dept. of Agriculture
Dept. of Defense
^ Dept. of Health
Dept. of Land and Natural Resources
DLNR State Historic Preservation Officer
^ Dept. of Business and Economic Development
DBED Library
Dept. of Social Services and Housing
Dept. of Transportation
^ Office of Environmental Quality Control
State Archives
State Energy Office

University of Hawaii

^ Environmental Center
Marine Programs
Water Resources Research Center

County of Maui

^ County Dept. of Human Concerns, Housing Division
County Fire Dept.
^ County Police Dept.
^ Dept. of Parks & Recreation
Dept. of Public Works
^ Dept. of Water Supply
Economic Development Agency
Maui Community College Library

News Media

Honolulu Star-Bulletin
Honolulu Advertiser

Non-Governmental Agencies

American Lung Association
Office of Hawaiian Affairs

Public Utilities

Hawaiian Telephone
^ Maui Electric Company

Libraries

U.H. Hamilton Library, Hawaiian Collection
Legislative Reference Bureau
State Main Library

REGIONALS

Hilo Regional Library
Kaimuki Regional Library
Kaneohe Regional Library
Lihue Regional Library
Pearl City Regional Library
Wailuku Regional Library

MAUI

Kahului Library
Lahaina Library
Makawao Library

Other Groups & Individuals

Councilman Robert Nakasone
Councilman Goro Hokama

Councilman Howard Kihune
Councilwoman Linda Crocket-Lingle
Councilwoman Velma Santos
Representative Bill Pfeil
Representative Joseph Souki
Senator Rick Reed
West Maui Taxpayers Association

DEPARTMENT OF THE NAVY
COMMANDER
NAVAL BASE PEARL HARBOR
BOX 110
PEARL HARBOR, HAWAII 96860-5020

IN REPLY REFER TO
5090
Ser N5B/1926
26 AUG 1987

RECEIVED
SEP 1 1987
HELBER, HASTERT, VAN HORN & KIMURA PLANNERS

Mr. Christopher L. Hart, Director
County of Maui Planning Department
200 South High Street
Wailuku, Hawaii 96793

Dear Mr. Hart:

DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS)
NORTH BEACH

The Draft EIS for North Beach, forwarded by your letter of August 18, 1987, has been reviewed and we have no comments. Since we have no further use for the EIS, it is being returned to the Office of Environmental Quality Control.

Thank you for the opportunity to review the Draft.

Sincerely,

T.L. FERRIER
Captain, U.S. Navy
Chief of Staff

Enclosure

Copy to:
Mr. Glenn T. Kimura, Vice President
Helber, Hastert & Kimura, Planners
Grosvenor Center, PRI Tower
733 Bishop Street, Suite 2590
Honolulu, HI 96813

Office of Environmental Quality Control

HELBER
HASTERT
VAN HORN
& KIMURA
Planners

HHVH&K

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Glenn T. KIMURA

Associates
Nancy I. NISHIKAWA AICP
Thomas A. FEE AICP

September 21, 1987

Captain T.L. Ferrier
Chief of Staff
Commander, Naval Base Pearl Harbor
P.O. Box 110
Pearl Harbor, Hawaii 96850-5020

Re: North Beach Kaanapali Draft EIS
Your Letter dated August 26, 1987
5090 Ser N5B/1926

Dear Captain Ferrier:

Thank you for your letter of August 26, 1987 in response to the North Beach Draft Environmental Impact Statement. We appreciate the time and effort you have spent in reviewing this document.

Sincerely,

Glenn T. Kimura
Glenn T. Kimura
Vice President

cc: Mr. Christopher Hart
County of Maui Planning Dept.

UNITED STATES DEPARTMENT OF AGRICULTURE — SOIL CONSERVATION SERVICE — P. O. BOX 50004, HONOLULU, HAWAII 96850

September 3, 1987

RECEIVED
SEP 8 1987
HELBER, HASTERT, VAN HORN & KIMURA PLANNERS

Mr. Christopher L. Hart, Director
County of Maui Planning Department
200 South High Street
Wailuku, HI 96793

Dear Mr. Hart:

Subject: Draft Environmental Impact Statement for North Beach, Kaanapali, Maui

We have no comments to offer at this time, but appreciate the opportunity to review the draft EIS on this project.

Sincerely,

Herbert J. Lyford acting
RICHARD N. DUNCAN
State Conservationist

cc:
Mr. Glenn T. Kimura, Vice President, Helber, Hastert & Kimura, Planners, Grosvenor Center, PRI Tower, 733 Bishop St., Suite 2590 Honolulu, HI 96813

HELBER HASTERT & KIMURA Planners
HH&K

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Kevin M. YOUNG ASLA

September 22, 1987

Mr. Richard N. Duncan
State Conservationist
U.S. Dept. of Agriculture
Soil Conservation Service
P.O. Box 50004
Honolulu, Hawaii 96850

Re: North Beach Kaanapali Draft EIS
Your Letter dated September 3, 1987

Dear Mr. Duncan:

Thank you for your letter of September 3, 1987 in response to the North Beach Draft Environmental Impact Statement. We appreciate the time and effort you have spent in reviewing this document.

Sincerely,

Glenn T. Kimura
Glenn T. Kimura
Vice President

cc: Christopher Hart
Maui County Planning Dept.

DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
BUILDING 230
FT. SHAFTER, HAWAII 96858-5440

REPLY TO ATTENTION OF:

August 27, 1987

RECEIVED
SEP 3 1987
HELBER, HASTERT, VAN HORN & KIMURA PLANNERS

Mr. Christopher L. Hart, Director
County of Maui Planning Department
200 South High Street
Wailuku, Hawaii 96793

Dear Mr. Hart:

We have reviewed the Draft Environmental Impact Statement for North Beach, Kaanapali, Maui. A Department of Army permit is being evaluated and processed for the two 66-inch outfall pipelines and revetted trapezoidal channel.

Thank you for the opportunity to review the document.

Sincerely,

CLARENCE S. FUJII
Deputy Chief, Engineering Division

Kisuk Cheung
Chief, Engineering Division

Copy Furnished:

Mr. Glenn T. Kimura, Vice President
Helber, Hastert & Kimura, Planners
Grosvenor Center, PRI Tower
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

HELBER HASTERT & KIMURA Planners

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September 22, 1987

Mr. Kisuk Cheung
Chief, Engineering Division
Dept. of the Army
U.S. Army Engineer District, Honolulu
Building 230
Fort Shafter, Hawaii 96858-5440

Re: North Beach Kaanapali Draft EIS
Your Letter dated August 27, 1987

Dear Mr. Cheung:

Thank you for your letter of August 27, 1987 in response to the North Beach Draft Environmental Impact Statement (EIS). The Kaanapali North Beach Joint Venture will continue to coordinate and cooperate with your staff in order to meet all requirements for the Department of Army permit. This includes submittal of the Department of Health 401 WQC application, completion of an archaeological monitoring plan for construction activity, and modifications to drainage structures to reduce runoff and sediment discharge.

We appreciate the time and effort you have spent in reviewing the Draft EIS.

Sincerely,

Glenn T. Kimura
Vice President

cc: Christopher Hart
Maui County Planning Dept.

STATE OF HAWAII
DEPARTMENT OF DEFENSE
OFFICE OF THE ADJUTANT GENERAL
3949 DIAMOND HEAD ROAD, HONOLULU, HAWAII 96816-4495

RECEIVED
AUG 27 1987
HELBER, HASTERT, VAN HORN
& KIMURA PLANNERS

HIENG

August 26, 1987

Mr. Christopher L. Hart, Director
County of Maui Planning Department
200 South High Street
Wailuku, Hawaii 96793

Dear Mr. Hart:

North Beach, Kaanapali, Maui

Thank you for providing us the opportunity to review the above subject project.

We have no comments to offer at this time regarding this project.

Yours truly,

signed

Jerry M. Matsuda
Major, Hawaii Air
National Guard
Contr & Engr Officer

cc: Helber, Hastert & Kimura
Planners
Env Quality Control w/EIS

HELBER
HASTERT
VAN HORN
& KIMURA
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Glenn T. KIMURA

Associates
Nancy L. NISHIKAWA A.I.C.P.
Thomas A. FEE A.I.C.P.

September 22, 1987

Major Jerry M. Matsuda
Department of Defense
Office of the Adjutant General
3949 Diamond Head Road
Honolulu, Hawaii 96816-4495

Re: North Beach Kaanapali Draft EIS
Your Letter dated August 26, 1987

Dear Major Matsuda:

Thank you for your letter of September 3, 1987 in response to the North Beach Draft Environmental Impact Statement. We appreciate the time and effort you have spent in reviewing this document.

Sincerely,

Glenn T. Kimura

Glenn T. Kimura
Vice President

cc: Christopher Hart
Maui County Planning Dept.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
300 ALA MOANA BOULEVARD
P.O. BOX 50167
HONOLULU, HAWAII 96850

IN REPLY REFER TO:
ES
Room 6307

OCT 7 1987

RECEIVED
OCT 9 1987
HELBER, HASTERT, VAN HORN & KIMURA PLANNERS

Mr. Christopher L. Hart, Director
County of Maui Planning Department
200 South High Street
Wailuku, Hawaii 96793

Re: Draft Environmental Impact Statement, North Beach, Kaanapali, Maui

Dear Mr. Hart,

We have reviewed the referenced document and offer the following comments for your consideration.

My staff reviewed the Department of Army permit application (Public Notice No. 2004) for the proposed construction of the open drainage channel and twin 66-inch diameter pipeline outfall (Enclosure 1). Our primary concerns with these proposed drainage improvements were the potential for degradation of coral reef habitats and nearshore water quality by increased sediment loading and turbidity resulting from stormwater runoff, and the loss of approximately 0.7 acres of reef habitat from the construction of the outfall pipeline. As an alternative to the outfall pipeline, we recommended that sedimentation basins be used to capture stormwater runoff. We reiterated these concerns to the applicant and consultants at a joint-agency meeting on August 14, 1987.

On October 1, 1987, we received from the U.S. Army Corps of Engineers an alternative stormwater drainage plan designed by Austin, Tsutsumi and Associates, Inc. This design consolidates both the open drainage channel and outfall pipeline into a single open drainage channel. This design incorporates two sediment/infiltration basins that would retain all flows below the one-year storm recurrence interval. This design is a substantial improvement over the previous drainage design. We will be meeting with the consultants, representatives from the National Marine Fisheries Service, and the U.S. Army Corps of Engineers to further discuss this proposal.

In view of these changes to the drainage design for the North Beach parcel, we have no additional comments to offer. For further information, please contact staff biologist Andy Yuen (541-2749).

We appreciate this opportunity to comment.

Sincerely,

Ernest Kosaka

Ernest Kosaka
Field Supervisor, Environmental Services
Pacific Islands Office

Enclosure

cc: ✓HHK, Mr. Glenn Kimura w/o encl
OEQC
DLNR
CZM
NMFS - WPPO
EPA, San Francisco
CE, Operations Branch

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HASTERT
& KIMURA
Planners
HH&K

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Kevin M. YOUNG ASLA

October 14, 1987

Mr. Ernest Kosaka
Field Supervisor
Environmental Services
U.S. Dept. of the Interior
Fish & Wildlife Service
300 Ala Moana Blvd.
P.O. Box 50167
Honolulu, Hawaii 96850

Re: North Beach Kaanapali Draft EIS
Your Letter dated October 7, 1987

Dear Mr. Kosaka:

Thank you for your letter in response to the North Beach Kaanapali Draft Environmental Impact Statement. As stated in your letter, at the request of the U.S. Army Corps of Engineers, the North Beach project engineers submitted a revised stormwater drainage plan which consolidates the open drainage channel and outfall pipeline into a single open drainage channel. This redesign was based on official comments from the Corps of Engineers, the U.S. Fish and Wildlife Service and the National Marine Fisheries Service, and has been found by all concerned parties to be a more acceptable alternative. The new drainage plan will be fully described in the Final EIS.

We appreciate the time and effort you have spent in reviewing this document.

Sincerely,

for Glenn T. Kimura
Vice President

cc: Christopher Hart
Maui County Planning Dept.

United States Department of the Interior
GEOLOGICAL SURVEY
Water Resources Division
P.O. Box 50166
Honolulu, Hawaii 96850

September 11, 1987

RECEIVED
SEP 15 1987
HELBER, HASTERT, VAN HORN & KIMURA PLANNERS

Mr. Christopher L. Hart, Director
County of Maui Planning Department
200 South High Street
Wailuku, Hawaii 96793

Dear Mr. Hart:

Thank you for allowing us to review the Draft Environmental Impact Statement (EIS) for the North Beach, Kaanapali, Maui project.

We have no comments regarding this EIS. We will send our copy of the Draft EIS to the Office of Environmental Quality Control as you requested.

Sincerely,

William Meyer
District Chief

cc: Mr. Glenn T. Kimura

HELBER HASTERT & KIMURA Planners
HH&K
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September 22, 1987

Mr. William Meyer
District Chief
U.S. Dept. of the Interior
Geological Survey
Water Resources Division
P.O. Box 50166
Honolulu, Hawaii 96850

Re: North Beach Kaanapali Draft EIS
Your Letter dated September 11, 1987

Dear Mr. Meyer:

Thank you for your letter of September 11, 1987 in response to the North Beach Draft Environmental Impact Statement. We appreciate the time and effort you have spent in reviewing this document.

Sincerely,

Glenn T. Kimura
Vice President

cc: Christopher Hart
Maui County Planning Dept.

RECEIVED
AUG 27 1987
HELBER, HASTERT, VAN HORN & KIMURA PLANNERS

(P)1686.7

AUG 24 1987

Mr. Christopher L. Hart
Director
County of Maui Planning Department
200 South High Street
Wailuku, Hawaii 96793

Dear Mr. Hart:

Subject: North Beach

We have reviewed the subject document and have no comments to offer.

Very truly yours,

T. Tominaga

TEUANE TOMINAGA
State Public Works Engineer

EM:jk
cc: Mr. Glenn T. Kimura

HELBER
HASTERT
VAN HORN
& KIMURA
Planners

HHVH&K

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Thomas A. FEE A.I.C.P.

September 22, 1987

Mr. Teuane Tominaga
State Public Works Engineer
Dept. of Accounting and General Services
Division of Public Works
P.O. Box 119
Honolulu, Hawaii 96810

Re: North Beach Kaanapali Draft EIS
Your Letter dated August 24, 1987

Dear Mr. Tominaga:

Thank you for your letter of August 24, 1987 in response to the North Beach Draft Environmental Impact Statement. We appreciate the time and effort you have spent in reviewing this document.

Sincerely,

Glenn T. Kimura

Glenn T. Kimura
Vice President

cc: Christopher Hart
Maui County Planning Dept.

JOHN WAIHEE
GOVERNOR

State of Hawaii
DEPARTMENT OF AGRICULTURE
1428 So. King Street
Honolulu, Hawaii 96814-2512

SUZANNE D. PETERSON
CHAIRPERSON, BOARD OF AGRICULTURE

TADASHI TOJO
DEPUTY TO THE CHAIRPERSON

Mailing Address:
P. O. Box 22159
Honolulu, Hawaii 96822-0159

September 29, 1987

RECEIVED
OCT 5 1987
HELBER, HASTERT, VAN HORN & KIMURA PLANNERS

MEMORANDUM

To: Mr. Christopher L. Hart, Director
Planning Department
County of Maui

Subject: Draft Environmental Impact Statement (DEIS) for
North Beach Kaanapali Resort
Kaanapali North Beach Joint Venture
TMK: 4-4-01: por. 02, 03, 06, 08, 09 and 68
4-4-02: 24
4-4-06: 05 Kaanapali, Maui
Acres: 95

The Department of Agriculture has reviewed the subject DEIS and offers the following comments.

During the EIS Preparation Notice review for the subject project, we had two concerns: (1) the impact on Pioneer Mill from the loss of approximately 75 acres of sugarcane land, and (2) whether this project was related to other proposed developments in the vicinity. The letter of response from Ms. Leslie Kurisaki of Helber, Hastert and Kimura stated that Pioneer Mill plans to remove acreage from sugarcane production to maximize the use of less expensive surface water, and minimize reliance on energy-intensive pumping. The answer to the second question was that the subject resort will be self-contained, although this does not mean that there will not be any adjacent development.

We would like to suggest that the Maui County Planning Department look at those proposed resorts which, from a

cumulative perspective, may adversely affect the amount of available and productive agricultural lands in the West Maui area.

Thank you for the opportunity to comment.

Suzanne D. Peterson

SUZANNE D. PETERSON
Chairperson, Board of Agriculture

cc: /Mr. Glenn T. Kimura, Helber, Hastert and Kimura
LUC
DBED
OEQC

HELBER
HASTERT
& KIMURA
Planners

HH&K

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AICP
Kevin M.
YOUNG
ASLA

October 19, 1987

Ms. Suzanne D. Peterson
Chairperson, Board of Agriculture
State of Hawaii Dept. of Agriculture
1428 S. King Street
Honolulu, HI 96814-2512

Re: North Beach Kaanapali Draft EIS
Your Letter dated September 29, 1987

Dear Ms. Peterson:

Thank you for your letter of September 29, 1987 in response to the North Beach Kaanapali Draft Environmental Impact Statement (EIS). We understand your concerns regarding the cumulative effects of converting agricultural lands to other urban uses and how this projects relates to other proposed developments in the area. As stated in our previous letter, the North Beach project is a single, self-contained development of the Kaanapali North Beach Joint Venture. This means that the Joint Venture's interest lie in the development of the project site and does not extend to other adjacent developments.

Nonetheless, in addressing the possibility of adjacent development, we note that under the Lahaina Community Plan, the area directly mauka of the North Beach site has been designated one of several "Project Districts". According to the Community Plan, a project district designation "indicates residential areas but allows a flexible approach for planning rather than specific land use designations...a variety of residential housing types as well as open spaces, parks and facilities are intended...". Because of this designation, we cannot deny that future development in this area is very probable. When that will occur and what impacts, if any, this future development has on the operations of Pioneer Mill would need to be studied at the appropriate time. The Joint Venture is unable to conduct any kind of definitive study at this time because no plans have been prepared for the development of this mauka area. However, if the North Beach project is found to have contributed to a cumulative effect on reduction of agricultural land in the immediate vicinity, the Joint Venture will attempt to locate replacement agricultural lands.

We appreciate the time and effort you have spent in reviewing this document.

Sincerely,

Glenn T. Kimura
Vice President

cc: Christopher Hart
Maui County Planning Dept.

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

RECEIVED
SEP 30 1987
HELBER, HASTERT, VAN HORN & KIMURA PLANNERS

In reply, please refer to:
EPHSO

September 24, 1987

MEMORANDUM

To: Mr. Christopher L. Hart, Director
Planning Department, County of Maui

From: Deputy Director for Environmental Health

Subject: Draft Environment Impact Statement for North Beach, Kaanapali, Maui

Drinking Water

The Kaanapali North Beach Joint Venture proposes to subdivide and improve a 95-acre property for future resort development of a maximum of six hotel sites and two park sites. Improvements to the existing Kaanapali Water System as well as construction of new wells will be necessary to accommodate the projected demand of 1.6 MG.

In response to the preparation notice for this project, the Department of Health sent a letter dated May 6, 1987 to Mr. Leslie Kurisaki, Project Planner. The letter advised of Department of Health approvals required for both new sources of water and major modifications to existing water systems. Please note that these approvals are not listed in Section 3.4, Necessary Permits and Approvals (page III-5) of the Environmental Impact Statement.

Section 11-20-29 of Chapter 20 requires all new sources of potable water serving public water systems to be approved by the Director of Health prior to their use to serve potable water. Such approval is based primarily upon the satisfactory submission of an engineering report which adequately addresses all concerns as set down in Section 11-20-29. The engineering report must be prepared by a registered professional engineer and bear his or her seal upon submittal.

Section 11-29-30 requires that new or substantially modified distribution systems for public water systems be approved by the Director of Health. Such approval depends upon the submission of plans and specifications for the project prior to construction and the demonstration that the new or modified portions of the system are capable of delivering potable water in compliance to all maximum contaminant levels as set down in Chapter 20 once the distribution system or modification is completed.

Should you have any questions regarding Chapter 20, Title 11, Administrative Rules, please contact the Drinking Water Program at 548-2235.

Air Pollution

1. Onsite fugitive dust due to construction is the only short-term impact addressed. Offsite short-time impacts from stationary sources (i.e., concrete batching, asphalt concrete) should also be included in the DEIS.

2. The increased emission as a result of additional electricity being generated at Maalaea is stated; however, the impact of it is not discussed (i.e., ambient air impact and generating capacity impact). A discussion should be included in the DEIS.

Water Pollution

We are presently processing a 401 Water Quality Certification for the project's stormwater drainage system.

BRUCE S. ANDERSON, Ph.D.

cc: ✓Mr. Glenn T. Kimura,
Helber, Hastert & Kimura

HELBER
HASTERT
& KIMURA
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HH&K

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Kevin M.
YOUNG
ASLA

October 16, 1987

Dr. Bruce S. Anderson
Deputy Director for Environmental Health
State of Hawaii
Department of Health
P.O. Box 3378
Honolulu, Hawaii 96801

Re: North Beach Kaanapali Draft EIS
Your Memorandum dated September 24, 1987

Dear Dr. Anderson:

Thank you for your memorandum of September 24, 1987 in response to the North Beach Draft Environmental Impact Statement (EIS). Your comments will be addressed below in order.

Drinking Water

In response to your comments on drinking water, the construction of new wells will be required for the North Beach project. The Final EIS will include a discussion of the required approvals by the Director of Health and Department of Land and Natural Resources for the development of new sources of potable water and for modifications in water distribution systems. A copy of your memorandum has been forwarded to the project engineers who will continue to coordinate with your department in planning the project's water system.

Air Pollution

In response to your comments, an addendum to the Air Quality Impact Report for North Beach has been prepared by J.W. Morrow. This addendum will be included in Appendix J of the final EIS.

1. Off-site short-term impacts: Your memorandum requested that offsite, short-time air pollution impacts from stationary sources (i.e., concrete batching, asphalt) be addressed. An estimated 450 cubic yards of concrete and 2,400 tons of asphalt concrete will be required for construction of project roads. However, because at present there are no specific plans for the individual hotels, no estimate of concrete and asphalt required for hotel construction can be made at this time. Since it is also too early to identify specific facilities that will be providing the concrete and asphalt, the discussion of air quality impacts is necessarily generic.

The analysis utilized information on the design and operating features of a typical concrete batching plant on Maui. It assumed 8 hour per day operations and EPA emission factors for both direct plant emissions and fugitive dust emissions to obtain estimates of worst case ambient impact. The worst case concentration of total suspended particulates (TSP) due to the plant operation was estimated to be 105 micrograms/cubic meter. The plant's location and the area's background concentration of TSP will determine whether this worst case concentration will exceed State standards. In addition, the plant will be reviewed by the Department of Health to insure compliance with ambient air quality standards before it would be permitted to operate.

Design and operating data for a typical asphalt concrete batch plant was also reviewed. The two primary emission sources associated with such a plant are the drum mix asphalt plant and a 600 Kw diesel generator. Estimated impacts from TSP, sulfur dioxide, nitrogen dioxide, carbon monoxide, and volatile organic compounds were analyzed. The results indicate TSP as the only possible problem pollutant. However, as with the conclusions for concrete batch plant, the plant location and area background TSP concentration will determine actual overall impact. Department of Health review of the asphalt plant will also be required.

2. Impact of increased emissions: Your memo noted that the increased emission as a result of additional electricity being generated at Maalaea is stated; however the impact (i.e., ambient air impact and generating capacity impact) is not discussed.

At full buildout, the North Beach project is expected to have 10 MVA peak electrical demand. As part of its ongoing energy planning process, Maui Electric Company, Ltd. reviews and projects growth in electrical demand. In order to provide some indication of the ambient-air quality impact resulting fom the project's electrical demand, a recent air permit application for the Maalaea Generating Station was reviewed. That particular application addressed two 12.5 MW diesel units, the approximate size that would be required to meet the North Beach peak demand. The data indicated that while there will be additional air quality impact, compliance with both State and federal ambient air quality standards will still be maintained.

We appreciate your comments and the time and effort you have spent in reviewing this document.

Sincerely,

Glenn T. Kimura
Vice President

cc: Christopher Hart
Maui County Planning Dept.

DEPARTMENT OF BUSINESS AND ECONOMIC DEVELOPMENT

JOHN WAIHEE, GOVERNOR
ROGER A. ULVELING, DIRECTOR
MURRAY E. TOWILL, DEPUTY DIRECTOR
BARBARA KIM STANTON, DEPUTY DIRECTOR

Ref. No. P-7405

October 7, 1987

RECEIVED
OCT 15 1987
HELBER, HASTERT, VAN HORN & KIMURA PLANNERS

The Honorable Christopher L. Hart
Planning Director
Planning Department
County of Maui
200 South High Street
Wailuku, Hawaii 96793

Dear Mr. Hart:

Subject: Kaanapali North Beach Resort Draft Environmental Statement

We have reviewed the subject Draft Environmental Statement (DEIS), and have the following comments to offer.

We note that the drainage plan shown in the DEIS is undergoing substantial revision to reduce impacts on offshore coral growth and endangered marine species. The proposed revision, which was submitted by the applicant in response to concerns expressed by the Fish and Wildlife Service and the National Marine Fisheries Service, is being coordinated through our department under Federal Consistency provisions of the Hawaii Coastal Zone Management (CZM) Program. Details of the revised drainage plans should be included in the Final EIS.

Thank you for the opportunity to comment.

Sincerely,

ORIGINAL SIGNED BY ROGER A. ULVELING
Roger A. Ulveling

cc: ✓Mr. Glenn T. Kimura, Vice President
Helber, Hastert & Kimura, Planners

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October 15, 1897

Mr. Roger A. Ulveling
Director
Department of Business & Economic Development
P.O. Box 2359
Honolulu, Hawaii 96804

Re: North Beach Kaanapali Draft EIS
Your Letter dated October 7, 1987

Dear Mr. Ulveling:

Thank you for your letter dated October 7, 1987 in response to the North Beach Kaanapali Draft Environmental Impact Statement (EIS). As you noted in your letter, the drainage plan for the project has been redesigned in response to concerns by the U.S. Army Corps of Engineers, Fish and Wildlife Service, and the National Marine Fisheries Service. Details of the revised plans will be included in the Final EIS.

Thank you for taking the time and effort to review this document.

Sincerely,

for Glenn T. Kimura
Vice President

cc: Christopher Hart
Maui County Planning Dept.

JOHN WAIHEE
GOVERNOR

STATE OF HAWAII
Department of Business and Economic Development
Housing Finance and Development Corporation
P. O. BOX 17907
HONOLULU, HAWAII 96817

RUSSELL N. FUKUMOTO
Acting Executive Director

IN REPLY REFER
TO:
87:PLNG/4144JT

September 23, 1987

RECEIVED
SEP 28 1987
HELBER, HASTERT, VAN HORN & KIMURA PLANNERS

Mr. Christopher L. Hart, Director
County of Maui Planning Department
200 South High Street
Wailuku, Hawaii 96793

Re: Draft Environment Impact Statement (EIS) for the Proposed North Beach, Kaanapali, Maui

Dear Mr. Hart:

The Housing Finance and Development Corporation (HFDC), which was formerly a part of the Hawaii Housing Authority, has reviewed the draft EIS for the proposed Kaanapali North Beach project and offers the following comment.

We note that the proposed project will have a significant impact on housing demand in Central and West Maui. Therefore, we request that the developers maintain discussions with the County and with HFDC to ensure that the housing needs are met.

Thank you for the opportunity to comment.

Sincerely,

RUSSELL N. FUKUMOTO
Acting Executive Director

cc: ✓Mr. Glenn T. Kimura, Vice President
Helber, Hastert & Kimura, Planners

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October 5, 1987

Mr. Russell N. Fukumoto
Acting Executive Director
Dept. of Business & Economic Development
Housing Finance & Development Corporation
P.O. Box 17907
Honolulu, Hawaii 96817

Re: North Beach Kaanapali Draft EIS
Your Letter dated September 23, 1987

Dear Mr. Fukumoto:

Thank you for your letter in response to the North Beach Kaanapali Draft Environmental Impact Statement (EIS). The Kaanapali North Beach Joint Venture acknowledges that the project will have a significant impact on housing demand in Central and West Maui. However, we would like to emphasize that this project is limited to subdivision of the North Beach property. The individual hotel developers will have the primary responsibility for meeting specific housing obligations, since the housing impacts will depend largely upon the number of their employees and the number of hotel units at their developments. At the same time, the Joint Venture is committed to working with all concerned agencies in order to address the impact of the additional employees needed for the North Beach development. The Joint Venture will continue to meet and cooperate with the County and HFDC on this matter.

We appreciate the time and effort you have spent in reviewing this Draft EIS.

Sincerely,

Glenn T. Kimura
Vice President

cc: Christopher Hart
Maui County Planning Dept.

HOUSING DIVISION
DEPARTMENT OF HUMAN CONCERNS
COUNTY OF MAUI
200 SOUTH HIGH STREET
WAILUKU, MAUI, HAWAII 96793

RECEIVED
OCT 2 1 1987
BELT, COLLINS & KIMURA
PLANNERS

October 15, 1987

TO: Mr. Christopher L. Hart
Director of Planning

FROM: Mr. Robert Agres, Jr.
Director of Human Concerns

SUBJECT: Draft Environmental Impact Statement (EIS)
North Beach

We have reviewed the draft environmental impact statement which was prepared for the North Beach development at Kaanapali, Maui, and would like to offer the following comments:

1. The draft EIS should be revised to incorporate the new employee housing policy for hotel developments which was adopted by the Maui County Planning Commission on October 6, 1987, wherein the applicant is required to develop, construct or otherwise provide for employee housing at a ratio of one (1) employee housing unit for every six (6) apartment-hotel, hotel or motel units or rooms under terms and conditions specified therein.

2. The draft EIS should specify how the requirements of the new employee housing policy will be satisfied.

We are returning the draft EIS for your use.

ROBERT AGRES, JR.

ETO:hs
Enclosure
cc: Mr. Edwin Okubo
Mr. Glenn Kimura

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October 21, 1987

Mr. Robert Agres, Jr.
Director of Human Concerns
Housing Division
Dept. of Human Concerns
County of Maui
200 South High Street
Wailuku, Maui, HI 96793

Re: North Beach Kaanapali Draft EIS
Your Letter dated October 15, 1987

Dear Mr. Agres:

Thank you for your letter dated October 15, 1987 in response to the North Beach Kaanapali Draft Environmental Impact Statement (EIS).

The final EIS will include a discussion of the County's new employee housing policy which requires hotel developers to provide housing at a ratio of one housing unit to six hotel units. Because the North Beach project involves only subdivision of the property and infrastructure improvements, it is not known at this time exactly how many hotel units (and thereby housing units) will be constructed. The responsibility for the provision of such housing will be placed squarely with the hotel developer. The Kaanapali North Beach Joint Venture does not anticipate construction of hotels for its own account at the present time.

We appreciate your input and the time and effort you have spent in reviewing this draft EIS.

Sincerely,

Glenn T. Kimura
Vice President

cc: Christopher Hart
Maui County Planning Dept.

JOHN WAIHEE
GOVERNOR

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
465 SOUTH KING STREET, ROOM 104
HONOLULU, HAWAII 96813

MARVIN T. MIURA, PH.D
DIRECTOR

TELEPHONE NO.
548-6915

October 7, 1987

RECEIVED
OCT 9 1987
HELBER, HASTERT, VAN HORN & KIMURA PLANNERS

Mr. Glenn Kimura
Helber, Hastert & Kimura, Planners
733 Bishop Street, Suite 2590
Honolulu, Hawaii 96813

Dear Mr. Kimura:

Subject: Comments on Draft EIS for North Beach Resort, Kaanapali, Maui

We have reviewed your environmental impact statement for this project and offer the following comments for your consideration.

1. Our understanding is that the requirement for fire sprinklers in buildings over 75 feet high is a City and County of Honolulu ordinance. The County of Maui presently does not have such a requirement. They are however considering an ordinance that requires sprinklers in buildings over 45 feet high. In any event, we suggest that all six hotels have fire sprinklers and alarm systems installed.

2. The EIS states that the Lahaina Fire Station is operating at near capacity and may not meet the increasing demands of North Beach and other developments. This is an unresolved issue that should be addressed by the County and the developer.

3. In discussing your project with other agencies, it has come to our attention that the drainage system you proposed in the Draft EIS has been replaced with another. It is our understanding that an alternative, which will direct all drainage into a single channel, will be built. This alternative was dismissed in the EIS because of its effect on marine biology.

4. We agree with the Department of Parks and Recreation that the parks, as proposed, are inadequate for public use. We suggest that the public park be situated in the middle of the development, parallel and adjacent to the beach and that public parking be provided. Public beach access could be provided at both the south and north ends of the project.

5. One condition of obtaining the Shoreline Management Area permit is the provision of affordable housing to employees of the proposed hotels. The EIS does not specify how much these homes will cost, how many will be available, and which employees will qualify for them. We would therefore appreciate discussion of these items in the EIS.

6. An alternative to this project that was not considered is the possibility of locating the proposed Hawaiian Sea Village on this site. The village will have significantly less impact that the proposed hotels.

Thank you for providing us with the opportunity to review your project.

Sincerely,

Marvin T. Miura, Ph.D.
Interim Director

Roy K. Sakamoto
Environmental Technical Specialist

cc: √Maui Planning Department

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October 20, 1987

Dr. Marvin Miura
Interim Director
Office of Environmental Quality Control
465 South King Street, Room 104
Honolulu, Hawaii 96813

Re: North Beach Kaanapali Draft EIS
Your Letter dated October 7, 1987

Dear Dr. Miura:

Thank you for your letter in response to the North Beach Kaanapali Draft Environmental Impact Statement (EIS). Your comments will be addressed in order.

1. Fire sprinklers: The developers are aware of the pending ordinance to require sprinklers in buildings over 45 feet high. In the interest of safety, the individual hotels will be required to have fire sprinklers and alarm systems installed.

2. Lahaina Fire Station: We agree that the existing situation with the Lahaina Fire Station operating at capacity requires attention. However, it should be emphasized that the need for this additional station already exists, and its construction has been under consideration by the County for some time. The Economic and Fiscal Impact Analysis completed for the North Beach project indicates that the County revenues generated by North Beach will exceed generated public expenditures by two times. This would indicate that the project will more than pay for any required increase in public services.

3. Drainage System: The original drainage system which consisted of a drainage channel and an outfall has been redesigned at the request of the U.S. Army Corps of Engineers. The design of the new drainage system was based on official comments from the Corps of Engineers, the U.S. Fish & Wildlife Service and National Marine Fisheries Service. The new drainage system consists of a single drainage channel and eliminates the negative impacts on coral due to construction of an outfall and the offshore discharge of freshwater and sediment. The revised system will be described fully in the Final EIS.

4. Parks: The originally proposed park locations were based upon park and open space designations in the Lahaina Community Plan, dated December 1983. However, the Department of Parks and Recreation and the County Planning and Land Use Committee have expressed concern regarding the size and location of the proposed parks. The project developers have met and continue to meet with the County to examine alternative park configurations which would mutually benefit all concerned.

5. Affordable Housing: The County has recently enacted a new housing policy requiring construction of one housing unit for every six hotel units built. Because the North Beach project involves only subdivision of the property and infrastructure improvements, it is not known at this time how many hotel units (and thereby housing units) will be constructed. The responsibility for the provision of such housing will be placed squarely with the hotel developer. The Kaanapali North Beach Joint Venture does not anticipate construction of hotels for its own account at the present time.

6. Hawaiian Sea Village: The Hawaiian Sea Village, a commercial entertainment attraction, is proposed for a site south of the Kaanapali Beach Resort, between Honoapiilani Highway and the Kaanapali Parkway. The project, which will require a commercial zoning designation, already has been granted a Shoreline Management Area (SMA) permit by the County. In addition, the Hawaiian Sea Village site is currently designated for business/commercial use in the Lahaina Community Plan. In contrast, the North Beach site is zoned for hotel use and designated for hotel development in the Community Plan. Location of the Hawaiian Sea Village on the North Beach site would require a new SMA permit as well as zoning and Community Plan amendments. Finally, the location of the proposed Hawaiian Sea Village is more convenient to the existing hotels and resort areas (Kaanapali Beach Resort) from which it draws its clientele, and would thereby reduce traffic.

We appreciate your comments and the time and effort you have spent in reviewing this document.

Sincerely,

Glenn T. Kimura
Vice President

cc: Christopher Hart
Maui County Planning Dept.

University of Hawaii at Manoa

Environmental Center
Crawford 317 • 2550 Campus Road
Honolulu, Hawaii 96822
Telephone (808) 948-7361

October 7, 1987
RE:0474

RECEIVED
OCT 8 1987
HELBER, HASTERT, VAN HORN & KIMURA PLANNERS

Mr. Christopher L. Hart, Director
Planning Department
County of Maui
200 South High Street
Wailuku, Hawaii 96793

Dear Mr. Hart:

Draft Environmental Impact Statement
Kaanapali-North Beach
Kaanapali, Maui

The Environmental Center has conducted a review of the above referenced Draft Environmental Impact Statement (EIS) with the assistance of Fredrick Collison, Chuck Gee, George Ikeda, Juanita Liu, and Pauline Sheldon, School of Travel Industry Management; Bion Griffin, Anthropology; Hans-Jurgen Krock, Ocean Engineering; Kem Lowry, Urban and Regional Planning; Jon Matsuoka, Sociology; Richard Mayer, Maui Community College; Ralph Moberly, Geology & Geophysics; and John Harrison and Jennifer Crummer, Environmental Center. The Kaanapali-North Beach project involves the development of a 95-acre parcel into 11 lots for the future establishment of 6 hotels and 2 parks. The Kaanapali region of Maui is an area of rapid and extensive growth. The following issues have been brought to our attention:

Socioeconomic Considerations

The discussion of social impacts is rather limited and fails to address a number of relevant issues in detail. The study states that the North Beach development will result in significant positive impacts through visitor expenditures, job creation, and increased public (tax) revenues but the information provided appears inadequate to draw that conclusion:

a. Daily counts are expected to incresae 5x between 1991 and 1996 but no annual figures are included (V-35).

b. Labor shortages are already anticipated for the visitor industry. Section V-37 estimates 3,600 direct full-time equivalent positions by 1996, or 6,900 FTE positions if indirect and induced employment were also included. Where will the employees come from? Aside from the housing problem, additional social problems are likely to arise from the importation of labor for a large number of low-paid, entry-level jobs.

c. General employment figures for the hotels in terms of FTE positions are provided, but no details on the type of employment (e.g. management positions, entry-level or occupations and extent of the recruitment and hiring to be done locally is included (V-37).

d. References to any resident attitude surveys should be included if any were conducted.

e. The economic section (V-36) might benefit by an assessment of the resort's imports and whether any attempt would be made to reduce leakages through purchase of local products for resort operations.

f. While the report mentions the increased tax revenues that will be generated by the resort area to cover the increased need for public services (e.g. fire and police protection), it is not clear whether such additional revenues can be "earmarked" in such a manner to ensure their use for public services. This is an area of concern considering the already heavy demand for public services (V-39). For example, the Lahaina Fire Station is already operating at near capacity. If an additional fire station is required, should the resort share some responsibility for funding and construction of a station (V-27)?

In terms of housing, the estimate of 25 percent for employees not currently housed in the community may be on the low side given the shortage of available housing in West Maui (V-31).

The impact of the development on schools may be greater than stated especially over the long run (V-32).

Transportation Considerations

The issues related to the increase in traffic are an imporant concern since the worsening congestion may ultimately reduce the attractiveness of West Maui as a resort destination. The responsibility while shared by both Maui County and State governments is tied to resources and timing, and whether developers should contribute to the costs. It is of serious concern that Maui's existing infrastructure may not be able to handle the additional development unless improvements are made. The degree to which the respective governments are willing or able to make the improvements needs to be addressed. The following comments are primarily related to transportation:

1. The by-pass highway appears to be critical to reducing the heavy traffic loads, yet its construction is not under the control of the resort. The mitigative measures if the by-pass were not built or its construction and completion were delayed need to be examined. The same concerns need to be addressed for the widening of Honoapiilani Highway (V-10, V-11).

2. The usages of current shuttle services in comparision with the total demand for tourist transportation within the West Maui and between West Maui and Kahului Airport need to be addressed--i.e. are they handling a relatively large or relatively small volume of the current tourist traffic? (V-1)

3. More information on the current level of demand for the employee buspool between Wailuku and Kaanapali needs to be developed. The report seems to indicate that it has declined from a peak of 200/day (one-way or round trip) (V-12).

4. Elsewhere, it seems that traffic on Honoapiilani Highway is found to be high for that type of road, yet in this section it says that traffic is low (V-18).

5. The conclusions on aircraft noise assume that jet aircraft are noisier than prop-driven aircraft, which might not necessarily be true (V-19).

6. If the by-pass and lane widening are not accomplished in time, the additional mitigative measures which would be required (App. H-3) should be discussed.

7. The shuttle service would need to be integrated with airline schedules, particularly when the direct mainland service flights arrive. This may mean a somewhat uneven schedule whereas the report seems to imply an even schedule throughout the day (App. I-12).

8. Although the option of Employee Shuttle/Park-and-Ride has possibilities, the declining ridership of the existing service to Kaanapali would have to be analyzed before an expanded service (with increased ridership, hopefully) could be promoted. Also, it is not known whether the hotels in North Beach would be willing to subsidize the service (App. I-15).

9. Staggered work hours could, in some cases, result in more autos on the road, although their effect would be spread out over a longer time period (App. I-16).

10. If the TSM plans are to be successful, it will require detailed plans for financing them and for marketing them. Early planning, as is found in the study, can help provide guidance for that process (I-19-20).

11. A related transportation issue is not discussed in the report but deserves analysis somewhere. The 3,200 new hotel units will generate 1,168,000 bed nights. The average length of stay for Hawaii is currently 10.1 days (but just over 4 days for Maui), this = 115,643 room nights X 1.8 average party size X 70% occupancy (actual is 81.5% for Maui - 1986) = 145,710 new visitors. This means every 10 days, there will be 1,619 new visitors (induced by the new rooms) on the average passing through Honolulu International or direct to Kahului Airport. What will be the impact of new visitors on existing airport facilities not only on Maui, but for Honolulu International Airport? What percent of visitors are expected to use Honolulu as a gateway and what percent of visitors are expected to fly to Maui directly?

Archaeology

The EIS states that two consultants recommended archaeological monitoring during land modifications. The applicant should furnish a procedural plan to be followed if archaeological remains are uncovered.

Coastal Hazards

Section 5.3 "Natural Hazards" (V-2) should include a discussion of the historic tsunami runup records for this coast. It is our understanding that runups ranging from 6 to 24 feet have been recorded in this general area. Historic records (1946) indicate that runup of 24 feet was recorded approximately two miles from the project site (Atlas of Hawaii). Runup at Kaanapali in the 1946, 1957, and 1960 tsunamis was 16, 12, and 10 feet respectively. An early record runup height of 30 feet for the northern coast of Maui at Honokahau was measured in the 1903 tsunami. The 10 feet base flood elevation cited (V-2) and the suggested 11 feet elevation for the ground floor lobby of the hotels seem low considering the measured tsunami runup heights. Were these figures based on an analysis of storm wave heights rather than tsunamis? A reference to the work should be provided. A ground floor elevation of 11 feet will require a design that will allow water flow-through as well as potential significant sand transport without jeopardizing the stability or structure of the buildings as the likelihood of significant tsunami inundation during the life of the structures is virtually certain.

A recent report presented by the National Academy ·f Sciences called attention to the long-term, world-wide, rise in sea level and cautioned that coastal structures may be endangered by this long-term sea-level change. The study indicated that structures being built to last more than

50 years should be designed with due consideration to probable sea-level changes during the service life of the structure.

Coastal and Marine Environments

Page V-5 states that off-shore water quality is expected to improve due to the shift from agricultural to urbanized usage. This may not be the case. A decrease in infiltration due to compacted or paved ground surfaces, as is characteristic of urbanized areas, may lead to increased runoff and hence increased sediment load to the coastal waters. Such runoff volumes can be estimated and should be included in the EIS. Furthermore, though agricultural uses of land can contribute pesticides and fertilizers to run-off, urban usage of land also can provide pollutants. Oil, lead, and various other chemical pollutants can be found in the run-off from a resort area.

Water Supply

Who will pay for additional reservoir construction? Will the collection of rainwater in these reservoirs have any negative impacts on areas that the water would have fed (if not captured)? (V-19)

Recreational Facilities

According to the Project Description (p. III-1,2 and fig. 5), Lot 8 at the northern end of the property and either Lot 9 or 11 at the southern end are designated for public park use. The length of the coastal area that may be effectively restricted from public access by the proposed developments (some half mile or so in length) suggests that a third park area in the middle of the complex should be considered. The text, (p. V-32 and Table 3) states that West Maui has an abundance of coastal recreation sites and lists some 17 Coastal Recreation Resources. However, the size of the parks listed in Table 3 is not given nor is their geographical relationship to the proposed project. Therefore, it is not possible to judge the adequacy of the park facilities relative to the location of the proposed resort development and thus the potential impacts to the local population of impaired access to the beaches. A discussion of how the development of the Kaanapali region will impact more traditional usage of the area would be appropriate. For example, will any type of recreational activities that may infringe upon multiple party local use, such as jet skis or wind surfers, be promoted at the beaches fronting the hotels?

We note in Table 3 that the parks cited for the Kaanapali area have no public facilities, ie. parking, comfort stations, or picnic equipment. Whether this lack of facilities reflects some basic deficiency in the location or quality of the presently designated parks or merely a lack of funds is not indicated.

Larger park areas seem needed. Given the size of the development, the quality of the coastal area, the likelihood of continued local community use of the coastal resources for surfing and fishing, and the need for parking to accomodate that use, larger parks would serve the general public better and would enhance the resort complex.

Alternatives to the Proposed Project

The study suggests that 4-6 small hotels are more desirable than one large resort but this is not adequately explained. The discussion in the report, (p. VI-2, 6.3), moreover, seems to indicate that the advantages, from an environmental standpoint, of a single resort outweigh the disadvantages. The comment about a large single resort being unable to draw on the network of resources for promotion does not seem to be substantiated.

We thank you for the opportunity to comment on this document and look forward to your response and consideration of our comments.

Yours truly,

Jacquelin N. Miller

Jacquelin N. Miller
Associate Environmental Coordinator

cc: OEQC
L. Stephen Lau
Fredrick Collison
Chuck Gee
George Ikeda
Juanita Liu
Pauline Sheldon
Bion Griffin
Hans-Jurgen Krock
Kem Lowry
Jon Matsuoka
Richard Mayer
Ralph Moberly
John Harrison
Jennifer Crummer
Glenn Kimura ✓

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October 20, 1987

Ms. Jacquelin N. Miller
Associate Environmental Coordinator
Environmental Center
Crawford 317
2550 Campus Road
Honolulu, Hawaii 96822

Re: North Beach Kaanapali Draft EIS
Your Letter dated October 7, 1987

Dear Ms. Miller:

Thank you for your letter in response to the North Beach Kaanapali Draft Environmental Impact Statement (DEIS). Your comments will be addressed below in order.

Socioeconomic Considerations

a. *"Daily counts are expected to increase five times between 1991 and 1996 but no annual figures are included (V-5)."*

The Economic and Fiscal Impacts Assessment completed for this project by John Child & Co. (December 1986) is included as Appendix B to the DEIS. Exhibit E of that study, "Projected Average Daily Visitor Census", provides the annual figures you are seeking. The table projects average daily visitor counts for each of the six hotels by year, from 1991 to 1996. Total daily visitor counts (for all six hotels) are projected to be 1,081 in 1991; 2,259 in 1992; 3,349 in 1993; 4,708 in 1994; and 5,032 in 1996.

b. *"Labor shortages are already anticipated for the visitor industry...Where will the employees come from? Aside from the housing problem, additional social problems are likely to arise from the importation of labor for a large number of low-paid, entry-level jobs."*

We agree with your concerns over growing labor shortages in the West Maui area. According to First Hawaiian Bank's Research Department, Maui County as a whole has experienced steady population growth over the last four years, with a 3.1 percent annual increase in the civilian labor force between 1985 and 1986. At the same time, the County is currently experiencing one of the lowest unemployment rates in recent years. The State Department of Labor and Industrial Relations State Tourism Training Council is currently preparing a report on visitor industry training needs and labor supply. The final report will discuss the labor supply problem and identify training needs for tourism workers.

Specific methods for recruitment of hotel employees (i.e., how and where employees will be recruited) are largely the domain of the individual hotel developers. However, the North Beach Kaanapali Joint Venture ("Joint Venture") has been working to address some of the sources of this problem. One option the Joint Venture will explore is working directly with Maui Community College's job training program (e.g., food services, hotel industry management etc.). According to a draft of the Tourism Training Council report, potential additional workers include about 130 graduates a year from Maui Community College. One Maui hotel operator has already approached Maui Community College to discuss participation in its job training program, and the participation of other hotels is critical to its success. In addition, Maui high schools graduate 880 students each year. According to the Department of Education, about one-third of the 1985 graduates went directly into the workforce. A proposed job training program could therefore include linkages with local high schools as well.

On a broader scale, much of the difficulty in attracting and retaining service employees in West Maui appears to be related to 1) access/transportation to the job site, and 2) the shortage of affordable housing in West Maui. The problem of access and transportation to the job site is of particular concern to lower income service personnel, many of whom are dependent upon public transportation. The implementation of a comprehensive employee transportation (TSM) program as discussed in the EIS will facilitate access to the job site for employees, helping to attract and retain service personnel. A related issue is a shortage of affordable housing in West Maui. As required by a new County housing policy, the individual hotel developers will be required to construct one housing unit for every six hotel units built.

Overall, the projected labor shortages and related problems of affordable housing and transportation are complex issues which demand a comprehensive effort by both the public and private sectors. The Joint Venture shares your concern over these issues and is committed to addressing them.

Finally, we would like to emphasize that the hotel and visitor industries create jobs at all levels, including managerial and professional positions, and are not limited to entry-level employment.

c. *"General employment figures for the hotels in terms of FTE positions are provided, but no details on the type of employment (e.g. management positions, entry-level or occupations and extent of the recruitment and hiring to be done locally is included). (V-37)"*

The North Beach development will directly provide all levels of employment, from entry-level to managerial positions. The exact numbers of employees in each job category will depend on the type of hotel(s). Based on other hotels in the State, the distribution should be approximately 10 percent managerial employees and 90 percent other employees, including professional, semi-professional and entry-level positions. More specific estimates of job categories and numbers will be available as the individual hotels are planned. In addition to direct employment, development of the hotels and related services will have multiplier effects on other tourist-related industries.

d. *"References to any resident attitude surveys should be included if any were conducted."*

No resident attitude surveys were conducted for this particular project as the North Beach property is already zoned for hotel development (H-M and H-2) and designated for resort use in the Lahaina Community Plan. It was assumed that the Lahaina Community Plan embodies the community's desires regarding the location and types of development in West Maui.

e. *"The economic section (V-36) might benefit by an assessment of the resort's imports and whether any attempt would be made to reduce leakages through purchase of local products for resort operations."*

Your suggestion is a good one, and a study of this kind might be beneficial to the visitor industry as a whole. Although hotel operators would probably be amenable to purchasing from local suppliers, one would have to realistically consider the extent to which local producers and products can compete with mainland and foreign goods in terms of quality and price.

f. *"While the report mentions the increased tax revenues that will be generated by the resort area to cover the increased need for public services (e.g. fire and police protection), it is not clear whether such additional revenues can be "earmarked" in such a manner to ensure their use for public services...If an additional fire station is required, should the resort share some responsibility for funding and construction of a station (V-27)?"*

As discussed in the Draft EIS Section 5.23, the County revenues generated by the North Beach project will exceed County expenditures resulting from the project by two times. There is an ongoing dilemma of whether or how to target tax revenues for specific public services. This situation is not unique to the North Beach project. Although it is a valid concern, the earmarking of general funds is a governmental policy decision, and is more appropriately addressed to the governmental entity which receives the funds.

g. *"In terms of housing, the estimate of 25 percent for employees not currently housed in the community may be on the low side given the shortage of available housing in West Maui (V-32)."*

The 25 percent figure was intended to indicate employees not currently housed in West or Central Maui areas. A 25 percent figure may be somewhat low for housing strictly in the West Maui area. According to a 1980 survey of Hyatt Regency Maui employees done by Public Affairs Advisory Services, Inc., just over 50 percent of employees lived in West Maui (Lahaina/Honokohau) area, and nearly 30 percent lived in the Central Maui (Wailuku/Kahului/Waiehu) area. A 1978 employee survey

conducted of the Amfac communities on Maui by SRI International came to a similar conclusion.

h. *"The impact of the development on schools may be greater than stated especially over the long run (V-32)."*

In reviewing the proposed North Beach development, the State of Hawaii Department of Education, in an April 23, 1987 letter, (X-16) noted that the project will have a negligible impact on school enrollment. We must assume that this represents the most accurate assessment available at the present.

Overall, we believe that the North Beach project will have significant positive socio-economic impacts in terms of job creation, visitor expenditures and their multiplier effects throughout the economy, and increased public revenues.

Transportation Considerations

1. *"The bypass highway appears to be critical to reducing the heavy traffic loads, yet its construction is not under the control of the resort. The mitigative measures if the bypass were not built or its construction and completion were delayed need to be examined. The same concerns need to be addressed for the widening of Honoapiilani Highway (V-10, V-11)."*

Traffic impact as discussed in the EIS is premised on the bypass highway being completed and in operation at the time the first hotel is occupied. For this reason, no mitigative measures were offered. However, should construction of the bypass highway be delayed, lane additions to Honoapiilani Highway between Kaanapali Parkway and Puukolii Road could be made in conjunction with the State's fourth lane addition, scheduled for completion in 1989. These additional lanes could accommodate a portion of the North Beach traffic until the bypass highway is completed.

2. *"The usages of current shuttle services in comparison with the total demand for tourist transportation within the West Maui and between West Maui and Kahului Airport need to be addressed--i.e., are they handling a relatively large or relatively small volume of the current tourist traffic? (V-1)"*

Currently, shuttle services between the West Maui and Kahului Airports handle a relatively small volume of current tourist traffic. The Transportation Study conducted by Helber, Hastert, and Kimura, Planners (Appendix I) estimates that 410 passengers or 50 percent of West Maui passengers are projected to use the West Maui Airport shuttle. Given the proximity of the West Maui Airport to North Beach, a fairly high proportion was not seen to be unreasonable. The study also estimated that up to 40 percent of Kahului arrivals/departures would be willing to use a shuttle.

3. *"More information on the current level of demand for the employee buspool between Wailuku and Kaanapali needs to be developed. The report seems to indicate that it has declined from a peak of 200/day (one-way or round trip) (V-12)."*

The Transportation Study by Helber, Hastert & Kimura Planners was intended to be an investigation and presentation of various Transportation System Management (TSM) proposals for North Beach. We concur that more information is needed on the current level of demand for the employee buspool, as well as on ways to promote increased use of the buspool and other TSM options. These issues will be addressed in greater detail as part of the proposed TSM program, which includes formation of a Transportation Management Association.

4. *"Elsewhere, it seems that traffic on Honoapiilani Highway is found to be high for that type of road, yet in this section it says that traffic is low (V-18)".*

The section you refer to, Section 5.11, Noise, Off-Site Traffic Noise, states that "Along Puukolii Road and the entrance road to the project, (emphasis added) larger increases of 8.2 to 9.3 are predicted to occur. The large increases are not unusual, due to the low volumes of existing traffic on the two roadways (emphasis added)." The reference to low volumes of existing traffic is to Puukolii Road and the entrance road to the project, not Honoapiilani Highway.

5. *"The conclusions on aircraft noise assume that jet aircraft are noisier that prop-driven aircraft, which might not necessarily be true (V-19)."*

The projected noise levels at the site from aircraft using the West Maui airport were based on certain airport use assumptions which exclude jet aircraft from the airport. However, the projections were not based on the relative noise levels of jet versus propeller aircraft, and there is no presumption of relative noise levels. Secondly, the larger propeller aircraft which use the West Maui Airport are limited by County operating agreements to maximum noise levels typical of a Dash 7 aircraft.

6. *"If the bypass and lane widening are not accomplished in time, the additional mitigative measures which would be required (Appendix H-3) should be discussed."*

This question is related to your question #1 above. As stated earlier, traffic impacts as discussed in the EIS are premised on the bypass highway being completed and in operation at the time the first hotel is occupied. However, as discussed under question #1, lane additions in conjunction with the State's fourth lane addition to Honoapiilani Highway could accommodate some North Beach traffic until the bypass is completed.

7. *"The shuttle service would need to be integrated with airline schedules, particularly when the direct mainland service flights arrive. This may mean somewhat uneven schedule whereas the report seems to imply an even schedule throughout the day (Appendix I-12)."*

We agree that any effective shuttle service would need to be integrated with airline schedules, particularly when the larger, direct mainland flights arrive. As you note, this may mean a somewhat uneven schedule. The report (Appendix I-12) cited an example of a possible schedule involving the use of three buses, each making three three-hour circuits at 45 minute intervals. This example was provided for illustrative purposes only. The actual timing and frequency of the shuttle buses will take airline schedules into consideration, and will be determined at the appropriate time.

8. *"Although the option of Employee Shuttle/Park-and-Ride has possibilities, the declining ridership of the existing service to Kaanapali would have to be analyzed before an expanded service (with increased ridership, hopefully) could be promoted. Also, it is not known whether the hotels in North Beach would be willing to subsidize the service (Appendix I-15)."*

We concur that ridership projections and an examination of all TSM alternatives presented in the Transportation Study must be made prior to expanding existing or initiating new services. With regard to the participation of individual hotels, because North Beach is an integrated resort development, participation in the Transportation Management Association can be made a requirement of each hotel's deed, in order to assure participation by all hotel operators. The draft of the North Beach covenants currently require an assessment of $3 per parking stall from each hotel developer. These funds are earmarked for TSM measures such as shuttle services.

9. *"Staggered work hours could, in some cases, result in more autos on the road, although their effect would be spread out over a longer time period (Appendix I-16)."*

Staggered work hours, particularly if not combined with other TSM proposals (e.g., shuttles, park and ride, carpooling) can in some cases result in more autos on the road, although they are spread out over a longer period of time. The North Beach TSM program is envisioned to be a comprehensive program, which would incorporate multiple components, and with the goal of an overall reduction in vehicles on the roads.

10. *"If the TSM plans are to be successful, it will require detailed plans for financing them and for marketing them. Early planning, as is found in the study, can help provide guidance for that process (I-19-20)."*

We concur that detailed plans for financing and marketing a TSM program are critical to its success. Formation of a Transportation Management Association with members representing each of the major resort employers, appointment of a program manager and designation of employer liaisons represent the initial steps in implementing the proposed program.

11. *"A related transportation issue is not discussed...What will be the impact of new visitors on existing airport facilities not only on Maui, but for Honolulu International Airport? What percent of visitors are expected to use Honolulu as a gateway and what percent of visitors are expected to fly to Maui directly?"*

The impact of new visitors on existing airport facilities has been incorporated in master plans prepared by the State Department of Transportation, Airports Division which is tasked with master planning of all State airports, including Honolulu International, Kahului and West Maui. These plans incorporate visitor growth projections and take into account their resulting increase in airport traffic. Because the North Beach site is currently designated by the County for hotel development, future North Beach visitors have already been incorporated into overall County/State planning projections.

A 1984 feasibility study conducted for Hawaiian Airlines projected demand for the West Maui airport. The study noted that interisland non-group visitors transiting to or from Oahu and other islands were responsible for approximately 2,000,000 departures and arrivals (enplanements and deplanements) on Maui as a whole. Of these, approximately 65 percent will be housed in West Maui. By 1990, this number is expected to stabilize at about 70 percent of all Maui visitors. The study then estimated West Maui's "capture rate" or passenger market share of these non-group West Maui visitors for the years 1987 to 1990.

It is projected that for all West Maui overseas visitors, the West Maui Airport will capture 27 percent of all arrivals and departures in 1987, 32 percent in 1988, 35 percent in 1989 and 40 percent of the total market by 1990. For non-overseas visitors (local residents, Hawaii resident visitors, business persons located in West Maui), there will be a 12.5 percent capture rate for 1987 through 1990 (Hastings, Martin, Conboy, Braig & Associates, Ltd., July 1984).

Archaeology

"The EIS states that two consultants recommend archaeological monitoring during land modifications. The applicant should furnish a procedural plan to be followed if archaeological remains are uncovered."

Since the publication of the Draft EIS, a plan for archaeological monitoring of shoreline construction has been completed by Paul H. Rosendahl, Inc. This plan was completed at the request of the U.S. Army Corps of Engineers in conjunction with granting of a Department of the

Army permit. The plan calls for two archaeologists to be present at all times during construction in the shoreline area, and who may stop work as necessary if any significant archaeological remains are found.

Coastal Hazards

"Section 5.3, Natural Hazards (V-2) should include a discussion of the historic tsunami runup records for this coast...The 10 feet base flood elevation cited and the suggested 11 feet elevation for the ground floor lobby of the hotels seem low considering the measured tsunami runup heights. Were these figures based on an analysis of storm wave heights rather than tsunamis?...A ground floor elevation of 11 feet will require a design that will allow water flow-through as well as potential significant sand transport without jeopardizing the stability or structure of the buildings as the likelihood of significant tsunami inundation during the life of the structures is virtually certain."

The base flood elevations are based on storm wave heights or tsunamis found in the federal flood insurance map, which is based on all sources of inundation including tsunami waves. The base flood elevation is a minimum and can be revised based on final design decisions. The design engineers for the individual hotel structures will design in accordance with applicable regulations regarding the various flood zones including the coastal high hazard areas, and will consider both design storm waves and tsunamis during design.

Appropriate measures can be taken to protect properties against long term, world-wide rises in sea level if and when they occur. Such an occurrence would be expected to be gradual, allowing for the construction of berms, dikes or walls as necessary.

Coastal and Marine Environments

"Page V-5 states that off-shore water quality is expected to improve due to the shift from agricultural to urbanized usage. This may not be the case. A decrease in infiltration due to compacted or paved ground surfaces, as is characteristic of urbanized areas, may lead to increased runoff and hence increased sediment load to the coastal waters. Such runoff volumes can be estimated and should be included in the EIS. Furthermore, though agricultural uses of land can contribute pesticides and fertilizers to run-off, urban usage of land also can provide pollutants. Oil, lead, and various other chemical pollutants can be found in the run-off from a resort area."

The existing agricultural land use clearly results in greater sedimentation and poorer off-shore water quality than would the shift to resort use. Almost all of the resort would either be landscaped or would be golf courses, with permanent vegetation. The present agricultural use results in the land being left as open land with bare unprotected soil and high sediment loads for a significant percentage of the time. An increase in runoff volume is not necessarily indicative of higher sediment loads, and in this case would not result in higher sediment loads.

The relatively low quantities of oil, lead and other pollutants which may be found in the runoff from a resort would be expected to be less polluting than the high sediment loads, pesticides and fertilizers which run off from the existing agricultural lands.

Water Supply

"Who will pay for additional reservoir construction? Will the collection of rainwater in these reservoirs have any negative impacts on areas that the water would have fed (if not captured)? (V-19)."

Construction of additional reservoirs--above ground, covered, concrete tanks--will probably be a joint effort between the Joint Venture and Kaanapali Water Corporation (KWC). The cost of all such water system improvements to accommodate the water demands of the North Beach development will be borne by the Joint Venture and the improvements will be dedicated to KWC.

The reservoirs will be enclosed tanks. Hence, rainwater intrusion is not a concern in terms either of potential for contamination of the stored water or deprivation of rainwater for areas adjacent to these reservoirs.

Recreational Facilities

1. *"According to the Project Description, Lot 8 at the northern end of the property and either Lot 9 or 11 at the southern end ar designated for public park use. The length of the coastal area that may be effectively restricted from public access by the proposed developments (some half a mile or so in length) suggest that a third park area in the middle of the complex should be considered...Larger park areas seem needed..."*

The proposed park sites were based on the areas designated for park and open space in the Lahaina Community Plan, dated December 1983. However, the County Council's Planning and Land Use Committee has also raised the issue that additional park areas may be needed in the area. The project developers have met several times and will continue to meet with the Planning and Land Use Committee to examine alternative park configurations which would mutually and equitably benefit all concerned. These issues are expected to be resolved in the near future.

2. *"A discussion of how the development of the Kaanapali region will impact more traditional useage of the area would be appropriate. For example, will any type of recreational activities that may infringe upon multiple party local use, such as jet skis or wind surfers, be promoted at the beaches fronting the hotels?"*

A public hearing sponsored by the State and County was recently held in West Maui to discuss the need to regulate ocean recreational activities. In an attempt to address this situation, the State Department of Transportation has been mandated by the Legislature to develop a master

plan on ocean recreation management. This plan is to go into effect next July. The State Department of Land and Natural Resources has begun to regulate beach activities in Waikiki, and is planning to do the same for Maui. Overall, the regulation of ocean recreation requires a joint State and County approach, and it appears that progress is being made in that direction.

As stated in the EIS, the dedication of park land and right-of-ways will improve public access to the Kaanapali Beach areas, enhancing traditional recreational uses (swimming, snorkeling, surfing etc.). Promotion of specific organized recreational activities such as boating, parasailing or jet skis will depend upon the individual hotel owners or other private interests. We agree that these recreational activities have a potential for infringement on other traditional uses (swimming, fishing diving, surfing etc.). However, regulation of these activities by the resorts has been difficult because many of the organizers of these activities are not affiliated with the hotels.

3. *"We note in Table 3 that the parks cited for the Kaanapali area have no public facilities, i.e., parking, comfort stations or picnic equipment. Whether this lack of facilities reflects some basic deficiency in the location or quality of the presently designated parks or merely a lack of funds is not indicated."*

The information in Table 3 of the Draft EIS was obtained from a publication entitled The Beaches of Maui County (Clark 1980). It has since come to our attention that some additional public facilities have been added, in particular, at Hanakaoo Beach in Kaanapali. This updated information will be included in the Final EIS. Your more general concerns over the location of State and County parks and their available facilities should be more appropriately addressed to the County and State Parks Departments.

Alternatives to the Proposed Project

"The study suggests that 4-6 small hotels are more desirable than one large resort but this is not adequately explained. The discussion in the report, moreover, seems to indicate that the advantages, from an environmental standpoint, of a single resort outweigh the disadvantages. The comment about a large single resort being unable to draw on the network of resources for promotion does not seem to be substantiated."

After discussion with our hotel market consultant, we would concur with you that it is misleading to state that a single large resort is unable to draw on a network of resources for promotion. This statement will be deleted from the final EIS. The Joint Venture would like to retain the possibility of a single major resort as a viable alternative, and the EIS will be revised to reflect this.

Once again, thank you for your input and for taking the time and effort to review the Draft EIS.

Sincerely,

Glenn T. Kimura
Vice President

cc: Christopher Hart
Maui County Planning Dept.

POLICE DEPARTMENT
COUNTY OF MAUI
P. O. BOX 1029
WAILUKU, HAWAII 96793
AREA CODE (808) 244-7811

JOSEPH CRAVALHO
CHIEF OF POLICE

HOWARD H. TAGOMORI
DEPUTY CHIEF OF POLICE

OUR REFERENCE
KD:tg
YOUR REFERENCE

September 1, 1987

RECEIVED
SEP 4 1987
HELBER, HASTERT, VAN HORN & KIMURA PLANNERS

Mr. Christopher Hart
Director
Department of Planning
County of Maui
200 So. High Street
Wailuku, HI 96793

Dear Mr. Hart:

My staff and I have reviewed the Environmental Impact Statement (EIS) dated August 1987 regarding the North Beach Project, Kaanapali, and have the following comments:

The traffic related improvements and recommendation appear to be satisfactory in coping with the anticipated traffic problems, some of which are already being done.

Concerning police manpower, we presently have a five-beat structure in Lahaina for every watch (shift), consisting of three watches daily. We find it difficult to man all five beats on each watch daily due to various circumstances. Providing sufficient manpower to cover another beat, totalling six beats, as authorized in Fiscal Year 87-88 for Lahaina District will be difficult due to recruitment problems. All six beats may not be manned daily on all watches; however, our endeavor is to maintain maximum authorized strength in all areas.

Very truly yours,

JOSEPH CRAVALHO
Chief of Police

cc: Mr. Glenn T. Kimura
Vice President
Helber, Hastert & Kimura, Planners

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September 25, 1987

Chief Joseph Cravalho
County of Maui Police Dept.
P.O. Box 1029
Wailuku, Maui, HI 96793

Re: North Beach Kaanapali Draft EIS
Your Letter dated September 1, 1987

Dear Chief Cravalho:

Thank you for your comments in response to the North Beach Kaanapali Draft Environmental Impact Statement (DEIS). The clarification you provided regarding the addition of a sixth police beat in the Lahaina District will be incorporated into the Final EIS. The North Beach resort will have its own internal security system similar to the one in existence at the Kaanapali Beach Resort. While the private security system should help to minimize the project's demand for public police protection; we agree that expansion of the police force will be needed as the hotels are developed.

We appreciate your input and your taking the time to review this document.

Sincerely,

Glenn T. Kimura
Vice President

cc: Mr. Christopher Hart
County of Maui Planning Dept.

HANNIBAL TAVARES
Mayor

MARILYN MONIZ-KAHOOHANOHANO
Director

KENJI KAWAGUCHI
Deputy Director

COUNTY OF MAUI
DEPARTMENT OF PARKS AND RECREATION
1580 Kaahumanu Avenue
Wailuku, Maui, Hawaii 96793

October 7, 1987

RECEIVED
OCT 14 1987

Mr. Christopher L. Hart
Director of Planning
County of Maui
Wailuku, Maui, Hawaii 96793

Dear Mr. Hart:

SUBJECT: NORTH BEACH PROJECT

We have reviewed the Environmental Impact Statement (EIS) for the North Beach Project in Kaanapali on Maui.

We have the following comments regarding the two sites that will be dedicated to the County of Maui for public park use.

The proposed park lots are not acceptable. Lot 8 configuration is not suitable for a park and Lots 9, 10, or 11 are too small.

We would prefer Lot 2 or Lot 3 be designated as the beach park as long as the grade is appropriate. Beach access should be retained at Lot 8 and at the South end.

As an alternative, Lots 9, 10, 11 and a portion of Lot 1 could be combined to form a beach park of 6 to 10 acres and beach accesses retained between Lot 3 and Lot 4 and at Lot 8.

We believe that the community will best be served with beach parks with adequate space requirements in a functional fashion.

We understand the community plan land use designations are set but we recommend that this designation be reviewed. Adequate beach front for public use should be retained.

-2-

Thank you for this opportunity to submit comments.

Sincerely,

Marilyn Moniz-Kahoohanohano

MARILYN MONIZ-KAHOOHANOHANO
Director of Parks & Recreation

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October 14, 1987

Ms. Marilyn Moniz-Kahoohanohano
Director
County of Maui
Department of Parks and Recreation
1580 Kaahumanu Avenue
Wailuku, Maui, Hawaii 96793

Re: North Beach Kaanapali Draft EIS
Your Letter dated October 7, 1987

Dear Ms. Moniz-Kahoohanohano:

Thank you for your comments in response to the North Beach Kaanapali Draft Environmental Impact Statement (EIS). As mentioned in our July 21, 1987 letter to you (in response to your June 15, 1987 comments on the EIS Preparation Notice), the proposed park sites were selected based on designated park areas in the Lahaina Community Plan. However, the issue has been raised that additional park areas may be needed in the Kaanapali area. In response to these concerns, the Kaanapali North Beach Joint Venture ("Joint Venture") has met several times with members of the County Council's Planning and Land Use Committee to discuss the issue. Alternative park configurations, including the ones you have suggested, are being considered. As of this date, the size and location of these park sites have not been finalized. However, the developer is committed to cooperating with the County to reach a compromise which will mutually and equitably benefit all concerned. We expect that these issues will be resolved in the near future.

Again, thank you for your comments. We appreciate the time and effort you have spent in reviewing this Draft EIS.

Sincerely,

Glenn T. Kimura
Vice President

cc: Christopher Hart
County of Maui Planning Dept.

TRANSMITTED FROM 8082444974 10.07.87 08:46 P.02 •CUCMI . MAUI

DEPARTMENT OF WATER SUPPLY
COUNTY OF MAUI
P.O. BOX 1109
WAILUKU, MAUI, HAWAII 96793

DATE: September 16, 1987

MEMO TO: Chris Hart, Director of Planning

FROM: Vince G. Bagoyo, Jr., Director of Water

SUBJECT: Draft ENVIRONMENTAL IMPACT STATEMENT (EIS) for the PROPOSED NORTH BEACH DEVELOPMENT

This is a followup to our earlier comments relative to the above subject matter.

In review of the draft EIS for the proposed North Beach project, we found that the estimated water demand for the approximately 3,200 units planned for the project is expected to be at a rate of 1.6 MGD. As stated in the draft EIS, in order to "accommodate the anticipated North Beach water demand, improvements to the existing water system, as well as construction of several new wells will be necessary. It is also stated in the report that the salinity of water drawn from wells may increase due to more frequent pumpage to meet increased water demand.

The following are our concerns regarding the proposed project:

1. Will the new wells planned to serve the water demand for the North Beach Project have an impact in terms of quality and quantity of the county's existing wells and proposed wells.

2. Are the proposed wells to serve the project within the same aquifer with the county's existing wells?

3. As noted in the EIS report, 629 additional housing units will be required. Will the water source and adequate transmission line and storage to serve the additional housing units be provided by the developer?

Again, we want to thank you for the opportunity to review and comment on the EIS for this project.

cc: Glenn T. Kimura, 733 Bishop Street, Suite 2590
Honolulu, HI 967813
DWS Eng.

"By Water All Things Find Life"

10. 7-87 WED 8:51 8082444974 P.02

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October 19, 1987

Mr. Vince G. Bagoyo, Jr.
Director of Water
Dept. of Water Supply
County of Maui
P.O. Box 1109
Wailuku, Maui, HI 96793

Re: North Beach Kaanapali Draft EIS
Your Memorandum dated September 16, 1987

Dear Mr. Bagoyo:

Thank you for your memorandum in response to the North Beach Kaanapali Draft Environmental Impact Statement (EIS). Your memo expressed several concerns which will be addressed in order.

1. "Will the new wells planned to serve the water demand for the North Beach Project have an impact in terms of quality and quantity of the County's existing wells and proposed wells?"

The existing County wells are in Alaeloa, approximately 5,000 feet north of the northernmost of the four existing Kaanapali wells. The existing Kaanapali wells themselves are spaced as close as 1,000 feet apart and have not exhibited any influence on each other. Furthermore, any new Kaanapali wells will probably be south of the existing Kaanapali wells. Therefore, the new wells should not have any impact in terms of quality and quantity on the County's existing wells in Alaeloa. We are not aware of the locations of any proposed County wells and, therefore, cannot confidently state the same conclusion. However, assuming that any proposed County wells will be in the same general area as the existing County wells, or at least not significantly close to the existing and proposed Kaanapali wells, there should be no negative impact on these proposed County wells from the Kaanapali wells.

2. "Are the proposed wells to serve the project within the same aquifer with the County's existing wells?"

The existing, as well as proposed Kaanapali wells are probably within the same West Maui aquifer as the County's existing wells. However, hydrologists consulted believe that these Kaanapali wells should have a negligible impact on the County wells due to the insignificant yield from all of these wells relative to the capacity of the vast aquifer.

3. "As noted in the EIS report, 629 additional housing units will be required. Will the water source and adequate transmission line and storage to serve the additional housing units be provided by the developer?"

Based on 500 gallons per day (gpd) per unit, the estimated average daily demand for the 629 housing units is 310,000 gpd. The source assessment or water hook-up fees will be provided by the housing developer as required by the County. We would assume that water for these housing units would be obtainable, whether it be from the County Department of Water Supply or Kaanapali Water Corporation, upon payment of service connection fees.

This information will be incorporated into the Final EIS. We appreciate your comments, and the time and effort you have spent in reviewing this Draft EIS.

Sincerely,

Glenn T. Kimura
Vice President

cc: Christopher Hart
Maui County Planning Dept.

Maui Electric Company, Ltd. • 210 West Kamehameha Avenue • PO Box 398 • Kahului, Maui, HI 96732-0398 • (808) 871-8461

RECEIVED
SEP 29 1987
HELBER, HASTERT, VAN HORN & KIMURA PLANNERS

September 25, 1987

Mr. Christopher L. Hart, Director
County of Maui, Planning Department
200 South High Street
Wailuku, Hawaii 96793

Dear Mr. Hart:

We have reviewed the Draft EIS for the North Beach development and offer the following comments:

A. Page V-25 & V-26, Electrical Power and Communication

1. The electrical power requirements necessitate bringing a minimum of two (2) distribution circuits to the load center. The Puukolii Substation, which will serve the new loads, lies mauka of Honoapiilani Highway. Ducts will be required to cross the highway to bring the circuits into the area.

2. The two (2) circuits emanating from Puukolii Substation to Honoapiilani Highway will require new right-of-ways for a new poleline.

If you have any questions or concerns, please call David Park at 871-2372.

Very truly yours,

Calvin A. Kuwanoe, Manager
Engineering Department

dp
cc: Mr. Glenn T. Kimura ✓

An HEI Company

HELBER HASTERT VAN HORN & KIMURA Planners

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Nancy L. NISHIKAWA AICP
Thomas A. FEE AICP

October 5, 1987

Mr. Calvin A. Kuwanoe, Manager
Engineering Department
Maui Electric Company, Ltd.
210 West Kamehameha Ave.
P.O. Box 398
Kahului, Maui, HI 96732-0398

Re: North Beach Kaanapali Draft EIS
Your Letter dated September 25, 1987

Dear Mr. Kuwanoe:

Thank you for your letter of September 25, 1987 in response to the North Beach Draft Environmental Impact Statement (EIS). Your comments regarding the necessary distribution circuits and possible right-of-ways for the new poleline will be included in the Final EIS. A copy of your letter has been forwarded to the project engineers who will continue to cooordinate with your office and comply with all requirements.

We appreciate the time and effort you have spent in reviewing this document.

Sincerely,

Glenn T. Kimura
Vice President

cc: Christopher Hart
Maui County Planning Dept.

COUNTY COUNCIL
COUNTY OF MAUI
WAILUKU, MAUI, HAWAII 96793

October 2, 1987

RECEIVED
OCT : 1987
BELT, COLLINS, HASTLERT, VAN HORN & KAMIKA PLANNERS

Honorable Hannibal Tavares
Mayor, County of Maui
Wailuku, Hawaii 96793

For transmittal to:

Mr. Chris Hart, Director
Department of Planning
County of Maui
Wailuku, Hawaii

Dear Mr. Hart:

SUBJECT: <u>DRAFT EIS FOR NORTH BEACH, KAANAPALI</u>

We have reviewed the subject document and offer the following information and comments for your consideration.

PARK AND OPEN SPACE DESIGNATIONS

As you know, the Planning and Land Use Committee has met with the developer to discuss the project's progress, and during the course of deliberations, the Committee has raised significant concerns regarding the delineation of park and open space areas as shown in the proposed subdivision plan.

The proposed development plan proposes a total of six acres for park use, with the remaining acreages to be used for hotel development purposes. The Committee feels that a substantially larger area, on the order of 20-30 acres, should be designated for park and open space use to provide for the following:

- additional park areas to service local residents; and
- additional open space to establish a buffer zone offering visual relief between the project site and the Honokowai and Kaanapali areas.

The present Lahaina Community Plan designations of "Open Space" and "Park" at the North Beach site, we believe, are intended to meet the above noted objectives. However, since the adoption of the

Community Plan in 1983, Committee members have noted growing community sentiment that additional park and open space areas are needed to meet residents' recreational needs and to protect valuable coastal viewplanes.

It is for these reasons that the Committee is considering initiating a Community Plan amendment pursuant to Section 2.80.060 of the Maui County Code, designed to significantly increase land areas designated for park and open space use. We intend to coordinate this effort with the County Administration to identify solutions having mutual benefit.

TRAFFIC/CIRCULATION

The nature of roadway improvements required to mitigate the impacts of traffic from the North Beach project, indicates the need for significant government investment to finance the proposed improvements. The role of the developer in implementing the mitigative measures, however, should also be addressed in the Draft EIS.

Inasmuch as an impact fee methodology is not expected to be in place for quite some time, it is important that the EIS be more specific in defining the manner in which implementation of roadway improvements is to be accomplished. The notion that roadway improvement requirements will be resolved "in the context of the subsequent regulatory approvals", as noted on page I-7 of the Draft EIS, does not represent a desireable approach to addressing this complex and highly sensitive issue.

PUBLIC PARKING FOR BEACH ACCESS

It has been brought to our attention that a lack of adequate parking at the existing Kaanapali Resort area discourages public use of beach areas fronting the Resort. This problem is a result of hotel employees and guests using stalls designated for public use.

Toward mitigating this conflict and to promote public access to beach areas fronting the North Beach area, appropriate measures and strategies for assuring adequate and appropriate use of employee, guest and public parking areas should be formulated. This issue should be addressed in the EIS.

Mr. Chris Hart, Director
October 2, 1987
Page 3

We appreciate the opportunity of submitting the foregoing comments.

Sincerely,

Velma M. Santos

(Mrs.) VELMA M. SANTOS
Chairperson, Planning and Land
Use Committee

VMS:MM:po

cc: Mr. Glenn T. Kimura

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Kevin M. YOUNG A.S.L.A.

October 16, 1987

Mrs. Velma M. Santos
Chairperson, Planning & Land Use Committee
County of Maui
County Council
Wailuku, Maui, HI 96793

Re: North Beach Kaanapali Draft EIS
Your Letter Dated October 2, 1987

Dear Mrs. Santos:

Thank you for your letter of October 2, 1987 in response to the North Beach Kaanapali Draft Environmental Impact Statement (EIS). We will respond to your comments in the order that they were presented.

Park and Open Space Designations

In regards to your comment on parks and open space, the Kaanapali North Beach Joint Venture ("Joint Venture"), having met with your committee many times, is aware of your committee's concerns regarding the size and location of the park sites delineated in the subdivision plan.

The Joint Venture is committed to continue to work with your committee to examine alternative park configurations at North Beach which would mutually and equitably benefit all concerned.

Traffic/Circulation

Regarding traffic and circulation, the Joint Venture is committed to working with the County and State to mitigate the traffic impacts from the project and to support construction of the bypass highway. However, it is felt that a more specific discussion of the Joint Venture's role in implementing mitigative measures is premature because the State Department of Transportation route study for the bypass highway has not been completed. Until the State has established a definitive alignment, cost projections and time frame for the bypass, it is difficult for the Joint Venture to make any reasonable commitment regarding its participation. The State Legislature has already approved funding for the bypass highway's design development phase. However, as you are aware, there has been very little progress to date by the State Highway Department because of disagreements with the Mayor's Ad Hoc Committee on the alignment of the bypass.

Public Parking for Beach Access

Regarding the issue of public parking for beach access, the proposed project will include public parking areas for beach users at the proposed park sites which should be more than adequate to handle beach access, and designed so as to mitigate competition for parking stalls. To address the issue of employee parking, the Joint Venture is currently investigating the feasibility of employee parking at an offsite location or locations. By providing designated employee parking offsite, the competition for the designated beach parking spaces should be alleviated.

Second, hotel guest's use of the parking designated for public use is related to the convenience and the proximity of the public parking stalls to the hotel. This is a problem that should be resolvable through better planning. The proposed location of the public parks at the ends of the North Beach site should alleviate this situation. The peripheral location of these public parking stalls would be less convenient to hotel guests and employees.

We sincerely appreciate the time and effort you have taken to review and comment on this document and look forward to your continued participation in this project.

Sincerely,

Glenn T. Kimura
Vice President

cc: Christopher Hart
Maui County Planning Dept.

APPENDICES

A

MARKET ASSESSMENT

Resort Hotel Market Assessment

For

NORTH BEACH KAANAPALI

Kaanapali Beach Resort, Maui

December 1986

john
child
& COMPANY INC

TABLE OF CONTENTS

RESORT HOTEL MARKET ASSESSMENT FOR NORTH BEACH KAANAPALI

This report summarizes the resort hotel market assessment for North Beach Kaanapali (North Beach) at Kaanapali Beach Resort.

STUDY BACKGROUND AND SCOPE OF ASSISTANCE

Amfac Properties, Inc. proposes to expand the existing Kaanapali Beach Resort to include the 95 acres on the former Kaanapali Airport site. The expansion would be identified as North Beach Kaanapali. Six proposed resort hotels would include a maximum of 3,200 hotel rooms to be built over 10 years. The proposed hotels would include: an all-suite hotel, a first-class resort hotel, a convention/meeting hotel, and three luxury resort hotels. All hotels would be first-class or luxury facilities. The typical room sizes would range from about 350 square feet in the first-class hotel and up to about 650 square feet in the all-suite hotel. The hotels would offer a wide range of facilities and amenities consistent with the expected guest mix.

You have asked John Child & Company, Inc. to assess the market support and economic and fiscal impacts of the planned development and to summarize our findings in two reports. This report summarizes the market assessments.

STUDY OBJECTIVE

The objective of our assistance is to assess the market support for the proposed resort hotel development at North Beach Kaanapali in terms of projected target markets, occupancy levels and room rates.

PROPOSED RESORT HOTEL DEVELOPMENT

North Beach is planned to be a major expansion to the existing Kaanapali Beach Resort. The site characteristics and the preliminary master plan for North Beach are briefly described.

Site Characteristics

The North Beach site includes 95 acres with 3,400 feet of prime white sand beach frontage. The site is immediately north of the existing Kaanapali Beach Resort at the former Kaanapali Airport site. Its boundaries are as follows:

North - Mahana condominium in Honokowai;
South - Maui Kaanapali Villas in Kaanapali Beach Resort;
West - Honoapiilani Highway;
East - Pacific Ocean.

The site is relatively level with an average 1% slope from north to south and from the highway to the beach. All development sites would enjoy ocean frontage and unobstructed views of the islands of Molokai and Lanai across the straits and the West Maui Mountains to the east.

Preliminary Master Plan

The preliminary master plan for North Beach includes six resort hotels and a one-acre and five-acre public park at either end of the site. The preliminary master plan for North Beach is shown in Exhibit A.

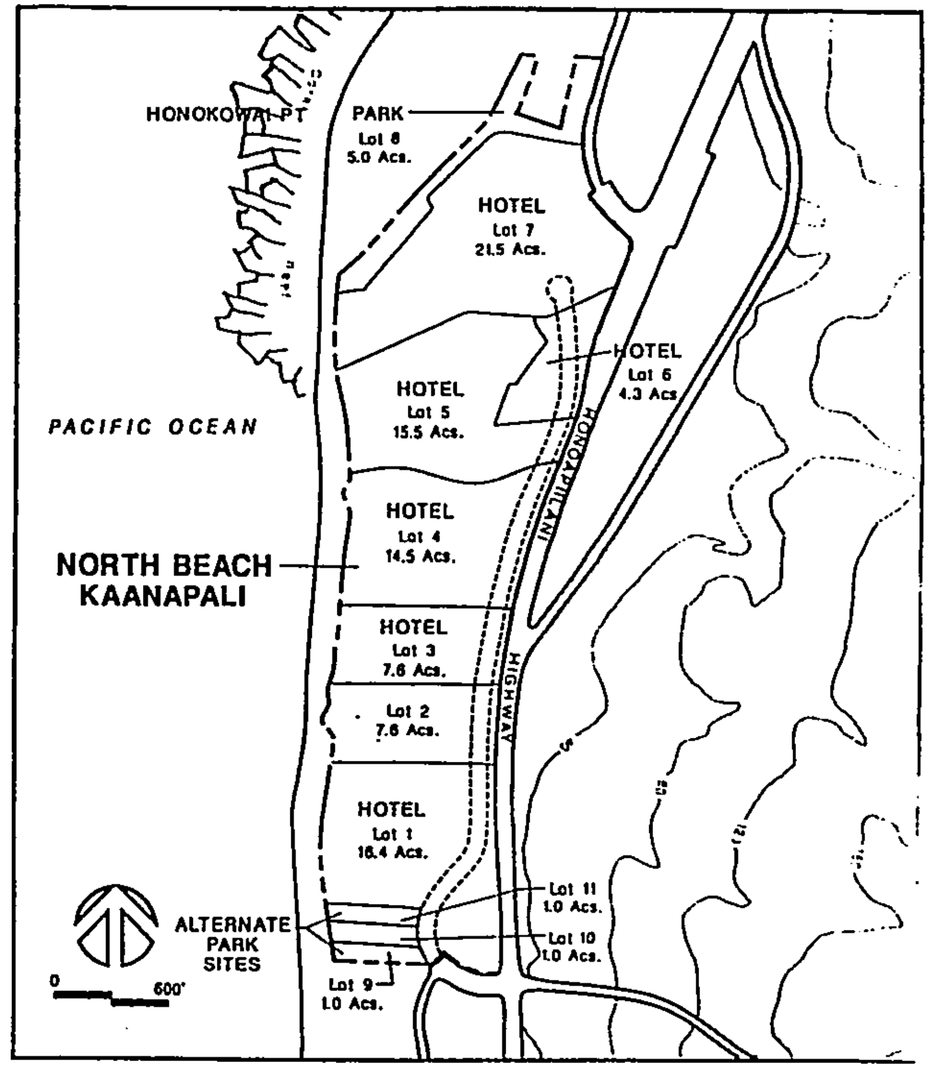
North Beach would include a maximum of about 3,200 hotel units. The hotel and park sites have been preliminarily subdivided as follows:

Preliminary Development Sites

Lot	Area (acres)	Hotel concept	Estimated hotel rooms	Rooms/acre
Hotel sites:				
1	16.4	Luxury	574	35
2	7.6	Luxury	258	34
3	7.6	Luxury	258	34
4	14.5	All-suite	508	35
5 & 6	19.8	First-class	693	35
7	21.5	Convention	909	42
Subtotal	87.4		3,200	37
Park sites:				
7	5.0			
8	1.0			
Subtotal	6.0		--	
Total	93.4			34

Exhibit A

NORTH BEACH KAANAPALI
North Beach Kaanapali Preliminary Master Plan



NORTH · BEACH Proposed Subdivision Plan Figure:
Kaanapali, Maui
Amfac Property Development Corp/Tobishima Properties of Hawaii, Inc. HHVH&K Planners

Proposed Hotel Development

Six hotels are preliminarily planned at North Beach. The hotels would include 258 to 909 rooms each with a total of about 3,200 rooms. The hotels are identified as:

- All-suite hotel
- First-class resort hotel
- Luxury hotels (3)
- Convention/meeting resort hotel.

The facility concept, examples of the type of hotel operators, quality, number and size of guest rooms, hotel facilities and amenities are described in Exhibit B.

KAANAPALI BEACH RESORT

Kaanapali Beach Resort is considered by many to be the world's first master-planned destination resort. It was originally conceived more than 30 years ago and has transformed an arid, scrub brush land into a successful world-class destination resort.

To date, about 500 to 600 acres of the original 1,200-acre master plan have been developed. North Beach represents a 95-acre expansion.
The resort is located at the base of the plains of the West Maui Mountains where the weather is generally sunny and the temperature a comfortable 70 to 80 degrees. Kaanapali Beach Resort is 40 minutes from the Maui airport. About five miles north of Kaanapali Beach Resort lies the up-scale Kapalua Resort. Wailea Resort and the planned Makena Resort are to the south.

Kaanapali Beach Resort is the single largest employer on Maui. In 1985, Kaanapali Beach Resort had gross revenues of about $210 million and a total payroll of about $35 million for its 5,000 employees. The current value of private investment in the resort is over $727 million.

NORTH BEACH KAANAPALI
Proposed North Beach Kaanapali Hotels

	All-suite hotel	First-class resort hotel	Luxury resort hotels	Convention/meeting resort hotel
Facility Concept	Relaxed and "residential" feeling hotel consisting of all-suite guest rooms. Limited facilities and amenities. Accent on amenities in suite rooms itself, including a bedroom, living room, bathroom and wetbar/kitchenette.	Ocean-oriented resort hotel offering a common theme in its atmosphere and facility amenities. Potential themes could include beach, tennis, health spa or golf resort.	Elegant, smaller resort facility offering a private and relaxing setting distinct from other Kaanapali or Hawaii hotels. Smaller facility size enables greater privacy and higher level of service.	Large, stand-alone hotel in a high-activity setting offering a broad range of meeting, dining, shopping and entertainment facilities. Features meeting spaces and related facilities specially designed to serve the large group.
Example Hotel Operators	Embassy Suites, Granada Royale	Hilton Hotels Corp., Inter-Continental Hotels, Marriott Corporation, Dunfey Hotels	Ritz Carlton Hotels, Rosewood Hotels, Four Seasons Hotels, Stouffer Hotels, Vista Hotels	Hyatt Hotels, Sheraton Hotels, Westin Hotels
Quality	First-class	First-class	Luxury	First-class
Guest Rooms:				
Number	508	693	258, 258, 574	909
Size	475-650 s.f.	350-425 s.f.	400-475 s.f.	350-425 s.f.
Hotel Facilities:				
Lobby area	Small	Moderate	Small	Large
Food and beverage areas	None or limited	Moderate	Moderate	Large
Retail shops	Small	Moderate	Moderate	Moderate to large
Banquet and meeting	Small	Small to moderate	Small to moderate	Large
Other Hotel Amenities	Limited facilities, including pool and health club.	Moderate facilities, including pool, tennis and water sports facilities.	Moderate facilities, including pool, health club, racquet club and water sports facilities.	Extensive facilities, including pool and deck, exercise health club, game room, racquet club, water sports facilities, jogging or walking trails.

Source: Amfac Property Development.

Exhibit B

The Kaanapali Beach Resort currently includes a wide variety of visitor units; dining, shopping, and entertainment facilities; recreational amenities and lush landscaped areas. The facilities are described as follows:

Existing Facilities
at Kaanapali Beach Resort

Visitor Units:	
Hotel rooms	3,770
Condominium units	1,300
Residential homes	60
Total	5,130
Convention seats	7,060
Commercial area (100 shops)	86,000 sq. ft.
Restaurants/bars	40
Tennis courts	36
Golf course holes (2 courses)	36

Source: Kaanapali Beach Resort

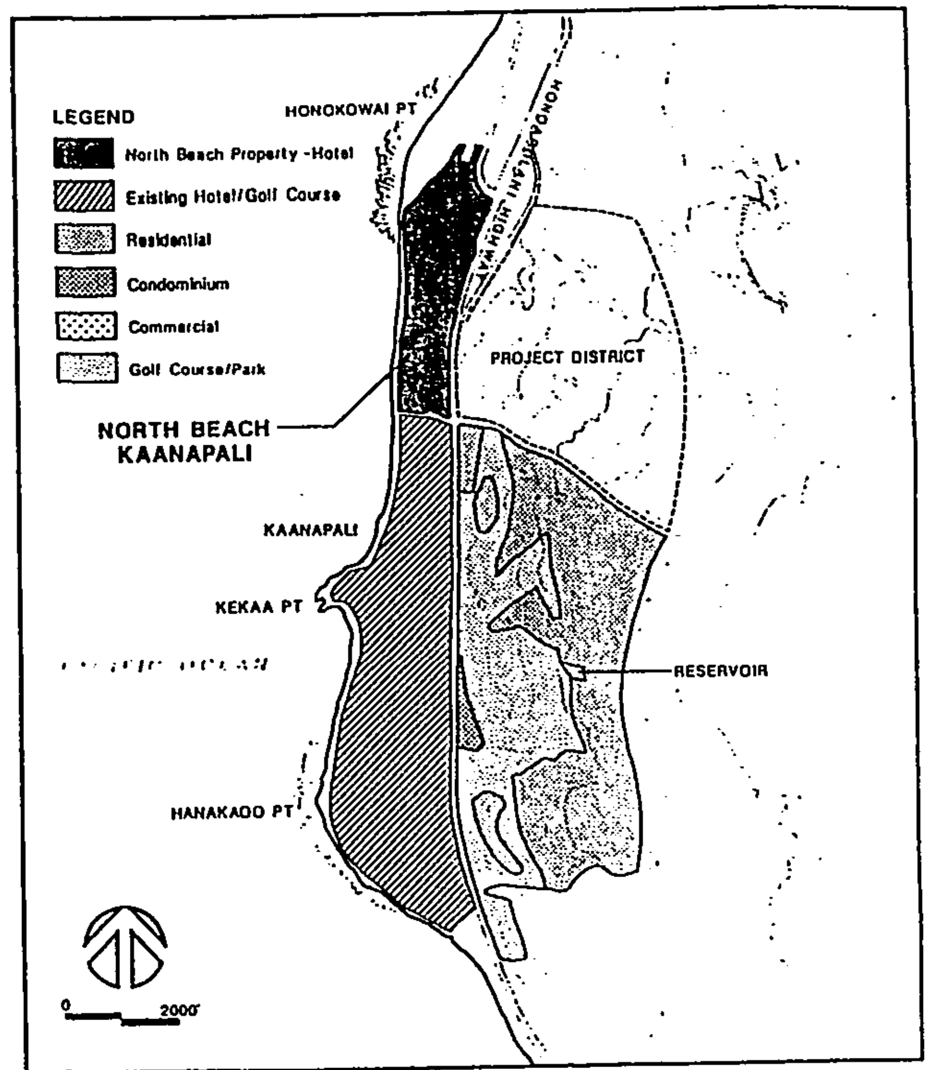
This mix of facilities in the integration of the various land uses is shown in the resort master plan which is presented in Exhibit C.

In addition, a number of projects are in the planning or early development stage. In construction are a single-family subdivision and a low-rise condominium which would add 300 residential homes to the resort. Hawaiian Sea Village, a 30-acre cultural center, is in the preliminary planning stage.

Kaanapali Beach Resort has achieved the critical mass necessary to be a fully self-contained destination resort. In 1985 a half million visitors, or approximately 13.5% of the State's total visitors, visited Kaanapali Beach Resort. Kaanapali Beach Resort currently experiences the highest occupancy and the highest achieved room rates of the major multi-hotel resorts in the State.

Exhibit C

NORTH BEACH KAANAPALI
Kaanapali Beach Resort Master Plan



NORTH · BEACH Kaanapali Master Plan
Kaanapali, Maui
Figure:
Amfac Property Development Corp/Tobishima Properties of Hawaii, Inc.
HHVH&K Planners

VISITOR INDUSTRY TRENDS

This section summarizes the trends in visitor arrivals to the State and to Maui in particular and discusses Maui visitor characteristics.

Visitor Arrivals to the State

Visitor arrivals to the State totaled nearly 4.9 million in 1985. Of these, 3.7 million were westbound visitors, primarily from the mainland United States, and 1.2 million were eastbound, primarily from Japan. The historical trends in westbound and eastbound visitor arrivals are summarized in Exhibit D.

The growth in visitors to the State has historically been strong with an average annual increase of 19.4% between 1960 and 1970, 8.5% between 1970 and 1980, and 4.4% between 1980 and 1985. The general decline in the rate of growth can be attributed to the increasing visitor base and the maturation of Hawaii as a visitor destination. Because of the 29-day United Airlines strike, 1985 showed minimal growth over 1984. However, as of June 1986, visitor arrivals were up 15.3% over the same period in 1985.

Oahu has been the State's perennial market share leader because of its extensive visitor facilities and Waikiki's established visitor appeal. In 1970, of all the westbound visitors to Hawaii, 94% visited Oahu. In the same year, between 30% to 35% of the westbound visitors to the State visited the islands of Hawaii, Maui and Kauai. The historical trend in westbound visitors to the neighbor islands is presented in Exhibit E.

Oahu's market share of the State's westbound visitors has steadily fallen from 94% in 1970 to about 76% in 1985. The market share for the islands of Hawaii and Kauai have also declined from 35.6% and 30.9% in 1970 to 19.0% and 23.4% in 1985. In contrast, Maui's market share increased from 33.8% in 1970 to 49.4% by 1985.

Exhibit D

NORTH BEACH KAANAPALI
Overnight Visitors to the State of Hawaii
1960 to 1986

Year	Westbound		Eastbound			
	Number	Annual growth	Number	Annual growth	Total	Average annual growth
1960	250,795	-%	45,722	-%	296,517	-%
1965 1/	567,218	17.7	119,710	22.3	686,928	18.6
1970	1,326,135	18.5	420,835	28.6	1,746,970	20.5
1975	2,207,417	12.1	621,688	15.4	2,829,105	13.0
1976	2,551,601	15.6	668,550	7.5	3,220,151	13.8
1977	2,763,312	8.3	670,355	.3	3,433,667	6.6
1978	3,030,999	9.7	639,310	4.6	3,670,309	6.9
1979	3,139,455	3.6	821,076	28.4	3,960,531	7.9
1980	3,046,132	(3.0)	888,372	4.4	3,934,504	(0.7)
1981	2,974,791	(2.3)	959,832	8.0	3,934,623	- 2/
1982	3,278,519	10.2	964,397	.5	4,242,916	7.8
1983	3,395,880	3.6	972,000	.8	4,367,880	2.9
1984	3,721,380	9.6	1,134,200	16.7	4,855,580	11.2
1985	3,708,610	(0.3)	1,175,500	3.6	4,884,110	.6
1986 (to June)	2,178,180	17.6	624,440	7.8	2,802,620	15.3
Compound annual percentage increase:						
1960 to 1970		18.1		24.9		19.4
1970 to 1980		8.7		7.8		8.5
1980 to 1985		4.0		5.8		4.4

1/ Visitor statistics collection system was revised in 1964.
2/ Not significant.

Source: Hawaii Visitors Bureau, Annual Research Report and updates.

Exhibit E

NORTH BEACH KAANAPALI
Westbound Visitor Arrivals by Islands 1/

Year	Oahu	Hawaii	Maui	Kauai	State
1970	1,246,970	445,401	447,985	410,075	1,326,135
1975	1,889,790	769,779	931,863	632,821	2,207,417
1980	2,398,740	761,103	1,378,189	781,409	3,046,132
1981	2,398,480	672,683	1,389,892	757,811	2,974,791
1982	2,589,190	678,170	1,550,080	733,295	3,278,519
1983	2,591,635	712,380	1,644,605	691,940	3,395,880
1984	2,901,320	756,890	1,849,800	806,620	3,721,380
1985	2,828,640	697,380	1,831,110	832,580	3,708,610
1986 (to June)	N/A	404,140	1,031,720	508,410	2,178,180
Compound Annual Growth					
1970-1985	5.6%	3.0%	9.8%	4.8%	7.1%
1970-1975	8.7	11.6	15.8	9.1	10.7
1975-1980	4.9	(0.2)	8.1	4.3	6.7
1980-1985	3.4	(1.7)	5.8	1.3	4.0
Market Share					
1970	94.0%	35.6%	33.8%	30.9%	100%
1980	78.7	25.0	45.2	25.7	100
1985	76.3	18.8	49.4	22.4	100

N/A = Not available.

1/ Includes westbound visitors to and beyond Hawaii. Percent of State figures reported represent percentage of the State's visitors who visited each island; most visitors visit more than one island during their stay in Hawaii.

Source: Hawaii Visitors Bureau, tabular release dated July 1984 and Annual Research Report, annual and records.

Visitor Arrivals to Maui

Maui's success in attracting a growing percentage of visitors to the State is attributed to:

- Maui's more recent development of master-planned resort destinations compared to Waikiki's older facilities in a less structured environment;
- Increasing number of repeat visitors to the State seeking new vacation locations and experiences;
- Increased air service including direct flights from major mainland cities to Maui;
- Aggressive marketing by the Maui County Visitor Association and the respective resorts;
- Maui's natural beauty, excellent beaches and weather which appeal to visitors' preconceptions of the "real Hawaii."

In 1985 visitor arrivals to Maui totaled 1,831,110 compared to 1,378,189 in 1980. This represents a 5.8% annual rate of increase. Of these arrivals, about 91% use visitor accommodations. The typical visitor to Maui arrives in a party size averaging about 1.9 persons and stays around 4 nights. The average number of hotel rooms occupied on a daily basis has increased from 6,716 to 10,609 from 1980 to 1985. This is a 9.6% annual rate of increase. According to the Hawaii Visitors Bureau, Maui exhibits the least seasonality among the major islands in visitor arrivals.

Maui Visitor Characteristics

A summary of selected Maui visitor characteristics is presented in Exhibit F. Compared to the other islands, Maui has a higher proportion of FIT and incentive visitors and a lower proportion of group visitors. Maui's visitors have a median age of 40.5; only Oahu's median visitor age of 40.4 is younger. Although Maui's visitors are relatively younger, they are more likely to be employed in white collar occupations. About 65% of Maui's visitors are engaged in professional, technical, managerial or official occupations, compared to 61.5% for the State.

Compared to the other islands, Maui attracts a lower proportion of visitors from Pacific coast states and a relatively higher proportion of visitors who reside in the Eastern and Atlantic states.

Exhibit F

NORTH BEACH KAANAPALI
Selected Characteristics of Westbound Visitors by Island
1984

	State of Hawaii	Oahu	Maui	Kauai	Hawaii	Molokai
Percentage of pleasure visitors	79.7%	80.4%	82.0%	84.1%	80.1%	83.6%
Travel status:						
FIT	75.0	73.1	73.5	71.6	70.4	62.0
Group	18.8	21.5	19.8	24.2	24.6	34.1
Incentive	5.7	4.7	6.6	4.0	4.8	3.6
Other	.5	.7	.1	.2	.2	.3
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Median age (years)	40.1	40.4	40.5	43.7	45.8	50.1
Percent higher level occupations 1/	61.5%	58.8%	65.1%	62.1%	60.5%	54.3%
Percent repeat visitors	47.3%	41.9%	43.1%	43.3%	48.3%	42.4%

1/ Professional, technical, business, managerial and official occupations.

Source: Hawaii Visitors Bureau, A Study of Westbound Visitors to the State of Hawaii and Islands of Oahu, Maui, Kauai, Hawaii and Molokai, 1984.

HOTEL INDUSTRY TRENDS

Visitor units in the State have grown from 27,519 in 1970 to 66,308 in 1986. This represents an average annual increase of 5.6% over the last 16 years. However, since 1980 visitor unit additions have declined dramatically; and inventory has grown at an annualized rate of 2.9%.

Trends in the visitor industry including existing and planned visitor accommodations, hotel occupancy levels and average room rates are discussed.

Existing Visitor Accommodations

In February 1986 the State's visitor industry inventory included 66,308 visitor units. The greatest growth in visitor units in recent years has occurred on the neighbor islands. In 1970 Maui had 2,743 visitor units, or 10.2% of the State's total visitor industry inventory. By 1986 Maui's visitor plant had increased to 14,096 units or 21.3% of the State's total visitor units.

Since 1970 visitor units on Maui have grown at an annualized rate of 10.8%. Since 1980 that rate of growth has slowed; however, Maui's growth rate of 5.1% is more than one and a half times the State's average growth rate of 2.9%. Average annual increases for Oahu, Kauai, and the island of Hawaii have been 2.1%, 3.4% and 1.0% respectively since 1980.

Not only has Maui's visitor unit production grown at a faster rate than any other island; Maui's visitor plant is also newer. Of the 14,096 visitor units on Maui, 25.6% have been built since 1980. This compares to only 11.8% for Oahu. The growth in visitor units on the respective islands and the percentage of total units built since 1980 are summarized in the table below:

Visitor Units by County

	Oahu	Hawaii	Kauai	Maui	State total
Total visitor units	39,010	7,280	5,922	14,096	66,308
Growth Rate:					
1970-1986	4.9%	5.3%	5.4%	10.8%	5.6%
1980-1986	2.1	1.0	3.4	5.1	2.9
Units built since 1980:					
Number	4,617	1,020	1,487	3,613	10,467
Percent	11.8%	14.0%	25.1%	25.6%	15.8%

Source: Hawaii Visitors Bureau, Visitor Plant Inventory.

About 23,000, or 34.7% of the State's visitor accommodations are condominium apartment units. Maui's 8,220 condominium units represents 35.7% of the condominium units in the State and 61.1% of the visitor units on Maui.

Kaanapali Beach Resort's 5,070 visitor units represent 37.7% of visitor units on Maui and 7.6% in the State. Of these units, 1,300, or 25.6%, are condominium apartment units.

Planned Visitor Units

Excluding the visitor units being proposed at North Beach, about 34,000 visitor units are planned in the State. About 6,000 are planned on Maui. The major projects planned for completion by 1991 on Maui include:

Project	Planned rooms
Renovation of the Westin Maui (formerly the Maui Surf), Kaanapali Beach Resort	760
Princess Iolani Hotel, Kihei	275
Village Hotel, Kapalua	450
Hotel and condominium units, Wailea Resort	1,250
Total	2,735

About 3,000 additional units are tentatively planned and have indefinite completion dates. A summary of the planned developments on Maui is presented in Exhibit G.

Hotel Occupancy

Occupancy levels measure the demand for visitor accommodations relative to room supply. Hotel occupancy levels are surveyed monthly by Pannel Kerr Forster. The survey excludes several major hotel chains, most notably the Hilton and Sheraton hotels. However, the reported occupancy levels do reflect the general occupancy trends experienced by Hawaii visitor facilities. The trend in occupancy levels at various resort areas in the State is presented in Exhibit H.

As shown in the exhibit, Oahu has traditionally experienced the highest occupancies in the State. However, occupancy levels on Maui have approached those of Oahu in the first half of 1986.

Exhibit G

NORTH BEACH KAANAPALI
Planned Visitor Units on Maui

		Estimated Completion Date						
Name/Location	Units	1986	1987	1988	1989	1990	1991	Indefinite
Hotel Hana Maui, Hana	37		37					
Cascades, Kihei	52							52
Princess Iolani Hotel, Kihei	275			275				
Village Hotel, Kapalua	450				450			
Unnamed condominium, Wailea	208				208			
Unnamed hotel, Wailea	700						700	
Unnamed hotel, Wailea	350				350			
Wailea Point I, Wailea	21	21						
Wailea Point II & III, Wailea	109			109				
Wailea Resort Area, Wailea	3,000							3,000
Embassy Suite, Kaanapali	415			415				
Westin Maui, Kaanapali	766		766					
Total	6,383	21	803	799	1,008	0	700	3,052

Source: Hawaii Visitor Plant Inventory and discussions with hotel operators and developers.

Exhibit H

NORTH BEACH KAANAPALI
Occupancy Levels of
Hawaii Visitor Accommodations
1980-1986

Location	1980	1981	1982	1983	1984	1985	1986 1/
Waikiki:							
On beach	73.9%	72.1%	72.7%	74.7%	81.6%	79.3%	82.6%
Off beach (w/restaurant)	73.2	73.8	80.6	79.1	85.7	83.7	88.2
Off beach (w/o restaurant)	66.5	76.1	80.1	74.4	80.4	80.4	87.7
Other Oahu	74.6	75.3	79.4	73.3	85.0	84.5	87.2
Oahu	72.3%	74.1%	77.8%	75.8%	83.3%	81.5%	86.1%
Hilo	34.4%	35.3%	37.7%	39.2%	58.2%	57.8%	54.7%
Kona	59.0	49.5	46.9	47.0	54.9	57.4	64.6
Hawaii	51.0%	44.9%	44.0%	44.7%	55.6%	57.6%	62.6%
West Maui 2/	74.8	73.7	78.0	77.8	84.1	82.5	88.0
Other Maui	67.4	58.1	61.4	67.0	70.3	69.6	78.6
Maui	73.0%	70.3%	73.9%	75.2%	80.5%	78.5%	85.4%
East Kauai	75.1%	68.5%	63.4%	59.3%	63.0%	62.1%	75.8%
South Kauai	52.5	46.2	44.2	50.2	63.0	70.1	84.2
Kauai	69.6%	62.7%	57.5%	57.2%	63.0%	64.8%	78.5%
State 3/	69.3%	68.3%	70.4%	69.7%	76.0%	76.1%	82.2%

N/A = Not available.

1/ Represents average through July 1986.
2/ Includes the Kaanapali, Kapalua, Napili, Kahana and Maalaea resort areas.
3/ Data presented excludes several major hotels which are not surveyed.

Source: Pannell Kerr Forster, Trends in the Hotel Industry, monthly; and interviews with selected hotel operators.

Kaanapali Beach Resort occupancy level has averaged 5% to 10% higher than any other area in the State. Its average occupancy is compared to the State, Oahu, Maui and West Maui in the following table.

Location	Average Occupancy Rate 1980-1983	Average Occupancy Rate 1984-May 1986
Kaanapali Beach Resort	80.5%	90.0+%
State	69.4	78.6
Island of Oahu	75.0	83.7
Island of Maui	73.1	82.2
West Maui	76.1	85.4

Source: Hawaii Visitors Bureau and John Child & Company, Inc.

Demand for visitor rooms as measured by visitor room nights, vary significantly by island and destination. As indicated in Exhibit I, Waikiki is both the State's and Oahu's market share leader with 59% and 94% market share, respectively. Kaanapali Beach Resort is the market share leader on Maui with 42% of visitor room nights. Kaanapali ranks second in the State with 9%.

Average Room Rates

Average achieved room rates by Hawaii hotels vary significantly by island and area. As of July 1986, the average achieved hotel room rate was the lowest on Oahu at about $63 and highest on Maui at about $118. A summary of the trend in achieved room rates by island and area is presented in Exhibit J.

Hotels in West Maui had the highest achieved room rates in the State and averaged $130.52. The next highest room rates in the State were beachfront hotels in Waikiki which received an average of $94.18.

The difference in achieved room rates reflects the relative proportion of newer and high-quality visitor units on the neighbor islands and the occupancy levels achieved at different locations.

Average room rates for the State have increased by about 9% annually since 1980. The fastest rate of increase was experience by Maui with an annual rate of 12.5%. The annual percentage increase in average room rates for Oahu, Kauai, and the island of Hawaii were 7.2%, 4.9% and 9.2% respectively for the same period. Average room rates for West Maui increased 13.8% annually since 1980.

Exhibit I

NORTH BEACH KAANAPALI
Estimated Market Share of Visitor
Room Nights at Selected Hawaii Resorts
1985

	Estimated visitor room nights	Market Share 1/ Island	State
Oahu:			
Waikiki/Kahala	29,792	94%	59%
West Beach/Leeward	844	3	2
North Shore	535	2	1
Other (Airport/Downtown)	634	2	1
Subtotal	31,805	100%	63%
Hawaii:			
Keauhou resort	1,216	29%	2%
Kailua-Kona	1,295	31	3
Mauna Kea/Mauna Lani/ Waikoloa	927	22	2
Hilo/Ka'u/Volcano	803	19	2
Subtotal	4,241	100%	8%
Maui:			
Kaanapali	4,490	42%	9%
Napili/Honokowai/Lahaina	1,819	17	4
Kapalua	319	3	1
Wailea	904	9	2
Kihei/Maalaea	2,659	25	5
Kahului/Wailuku/Hana/Kula	398	4	1
Subtotal	10,589	100%	21%
Kauai:			
Princeville	647	17%	1%
Poipu/Kalaheo/Kokee	1,387	36	3
Wailua/Kapaa/Lihue	1,797	47	4
Subtotal	3,831	100%	8%
Total	50,466		100%

1/ Percentages may not add to 100% because of rounding.

Source: John Child & Company, Inc.

Exhibit J

NORTH BEACH KAANAPALI
Average Room Rates of Hawaii
Visitor Accommodations
1980-1986

Location	1980	1981	1982	1983	1984	1985	July 1986	Compound annual increase 1980-July 1986
Waikiki:								
On beach	$59.01	61.05	61.15	62.69	69.15	84.13	94.18	8.7%
Off beach (w/ restaurant)	34.78	33.90	35.69	36.32	39.56	44.31	46.90	5.5
Off beach (w/o restaurant)	27.67	27.40	28.70	30.21	31.10	35.41	40.55	7.1
Other Oahu	45.45	49.26	51.89	56.42	55.26	59.31	65.35	6.7
Oahu	$42.70	43.05	44.88	46.93	50.06	57.70	63.01	7.2%
Hilo	$33.71	30.53	30.01	30.41	32.30	34.88	37.66	2.0%
Kona	49.96	52.81	53.49	55.42	65.22	71.39	83.81	9.7
Hawaii	$46.40	47.16	47.25	48.84	58.13	64.06	75.78	9.2%
West Maui 1/	$63.19	77.82	81.19	89.52	97.12	107.17	130.52	13.8%
Other Maui	55.30	53.49	51.50	52.82	61.26	75.61	81.92	7.3
Maui	$61.34	73.27	75.02	81.60	88.89	98.51	118.47	12.5%
East Kauai	$52.66	54.67	55.65	56.54	57.85	59.28	58.44	1.9%
South Kauai	66.36	61.90	67.53	72.41	82.88	93.55	97.74	7.2
Kauai	$55.16	56.06	58.51	59.78	65.09	70.06	72.08	4.9%
State	$47.37	49.73	51.87	54.78	59.84	68.84	77.40	9.2%

w/ = with
w/o = without

1/ Includes the Kaanapali, Kapalua, Napili, Kahana and Maalaea resort areas.

Source: Pannell Kerr Forster, Trends in the Hotel Industry, monthly.

Taking into account an average annual inflation rate of 5% (based on the Consumer Price Index for 1980 and 1985), the real rate of increase in average room rates for West Maui has been about 6% from 1980 to 1985. This compares with the real average room rate increases of about 1%, 1.5% and 0% for Oahu, Hawaii and Kauai, respectively.

HISTORICAL MARKET SUPPORT
FOR HOTELS ON MAUI AND
MAJOR DESTINATION RESORTS

Maui hotels have experienced strong market support as indicated by the following:

- Highest occupancy levels and increase in visitor units in the State;
- Highest average daily room rates in the State;
- Highest real rate of increase in average room rates.

PROJECTED NORTH BEACH
MARKET SUPPORT

The projected market support for the proposed resort development of North Beach is assessed. The market support for North Beach is assumed to be the room demand which would not be met by existing and planned inventory. Additionally, the market performance of each of the five proposed hotels is estimated based on the level of service, quality and competitive position of the facility as compared to alternative existing and planned hotels.

Projected Room Demand

Demand for visitor accommodations on Maui are projected are based on the following assumptions:

1. Visitor arrivals to Maui would be estimated based on the number of westbound visitors estimated for 1986 and the average annual increase in Department of Planning and Economic Development Series M-P projections for visitor arrivals to Maui:

Period	Increase
1986 - 1990	6.6%
1991 - 1995	4.7%

2. Visitors using hotels would be the percentage of visitors using transient visitor accommodations, including both hotels and condominiums. About 91% of visitors to Maui use visitor accommodations. The remainder stay with friends and relatives or use other accommodations. This relationship is expected to be constant.

3. Average room nights would be 4.2 nights per party from 1986 to 1990 increasing to be about 4.4 nights per party from 1991 to 1995. These projections are consistent with the historical trend for Maui.

4. Average persons per room would remain constant at 1.9 people per party as currently estimated by the Hawaii Visitors Bureau.

5. Targeted island-wide occupancy levels would average 80% to 85%.

Typically, hotel occupancy levels of 75% to 85% would permit visitors greater choices and allow hotels to efficiently maintain and operate their facilities. Because of Maui's historical success in maintaining relatively high occupancy levels, a range of 80% to 85% would be used to estimate future room requirements.

Average daily room nights, or daily hotel room demand is based on the number of visitors requiring hotel accommodations, the length of stay and average party size. Average daily room demand on Maui is projected to almost double from 10,609 rooms in 1985 to about 20,100 by 1995, as shown in Exhibit K.

Projected Visitor
Unit Inventory

Visitor unit inventory is estimated based on the existing and planned visitor units. The proposed visitor units for North Beach are excluded from the planned inventory. The 3,000 indefinite units are assumed to be completed at a rate of 750 annually from 1992 to 1995. The existing and planned inventory would increase from 13,515 units in 1985 to over 20,000 units by 1995.

Estimated Additional
Room Requirements

The projected room requirements are compared to existing and planned inventory to estimate additional room requirements. Based on average annual hotel occupancies of 80% to 85%, Maui would require about 3,500 to 5,000 additional hotel rooms by 1995, as shown in Exhibit L. This demand would be met by the development of North Beach.

Exhibit K

NORTH BEACH KAANAPALI
Historical and Projected Occupancy Levels on Maui
1980-1995

	Visitor arrivals to Maui 1/	Average room nights per party 2/	Percent requiring hotel accommodations 3/	Persons per unit 3/	Average daily room nights 4/
Historical:					
1980	1,378,189	3.6	92.9%	1.90	6,716
1981	1,389,892	4.0	92.9	1.90	7,495
1982	1,550,080	4.1	93.2	1.90	8,585
1983	1,644,605	4.0	93.2	1.90	8,829
1984	1,849,800	3.9	91.3	1.90	9,485
1985	1,831,110	4.4	91.3	1.90	10,609
Projected:					
1986	2,063,000	4.2	91.0	1.90	11,830
1987	2,199,158	4.2	91.0	1.90	12,120
1988	2,344,302	4.2	91.0	1.90	12,920
1989	2,499,026	4.2	91.0	1.90	13,773
1990	2,663,962	4.2	91.0	1.90	14,682
1991	2,789,168	4.4	91.0	1.90	16,104
1992	2,948,151	4.4	91.0	1.90	17,021
1993	3,116,196	4.4	91.0	1.90	17,992
1994	3,293,819	4.4	91.0	1.90	19,017
1995	3,481,566	4.4	91.0	1.90	20,101

1/ Historical westbound visitor arrivals are as reported by the Hawaii Visitors Bureau. Visitor arrivals in 1986 are estimated based on arrivals from January through June 1986. Projected arrivals for 1987-1990 and 1991-1995 are estimated to increase 6.6% and 4.7% annually based on DPED M-F projections.
2/ Average room nights per visitor estimated based on percent of visitor arrivals requiring accommodations, persons per unit, daily room nights, inventory and occupancy levels.
3/ Reported by the Hawaii Visitors Bureau for 1980, 1982 and 1984.
4/ Estimated based on visitor arrivals, average length of stay, percent requiring hotel accommodations and persons per unit.

Exhibit L

NORTH BEACH KAANAPALI
Estimated Additional Room Requirements on Maui

Year	Projected visitor room demand	Total room requirement: At 80% occupancy	Total room requirement: At 85% occupancy	Projected visitor plant inventory	Additional room requirement: At 80% occupancy	Additional room requirement: At 85% occupancy
1986	11,830	14,787	13,917	13,836	951	81
1987	12,120	15,150	14,259	14,639	511	(380)
1988	12,920	16,150	15,200	15,438	712	(238)
1989	13,773	17,216	16,203	16,446	770	(243)
1990	14,682	18,352	17,272	16,446	1,906	826
1991	16,104	20,129	18,945	17,146	2,983	1,799
1992	17,021	21,277	20,025	17,896	3,381	2,129
1993	17,992	22,490	21,167	18,646	3,844	2,521
1994	19,017	23,772	22,373	19,396	4,376	2,977
1995	20,101	25,127	23,648	20,146	4,981	3,502

Source: John Child & Company, Inc.

NORTH BEACH KAANAPALI
Projected Market Performance for the
Proposed North Beach Kaanapali Hotels

	All-suite hotel	First-class resort hotel	Luxury resort hotel	Luxury resort hotel	Luxury resort hotel	Convention/meeting resort hotel
Number of Rooms	508	693	574	258	258	909
Guest Markets (Percent of Total Hotel Guests):						
FIT/package	80%-85%	65%-70%	75%-80%	75%-80%	75%-80%	55%-60%
Group	3 - 5	15 -20	5 - 8	5 - 8	5 - 8	20 -25
Incentive groups	10 -15	15 -20	15 -20	15 -20	15 -20	20 -25
Total	100%	100%	100%	100%	100%	100%
Estimated Room Rates (1986 dollars): Published room rates						
Standard view	$170-$225	$105-$140	$185-$220	$185-$220	$185-$220	$140-$165
Superior view	250- 325	160- 180	250- 300	250- 300	250- 300	170- 190
Suite	450- 600	250- 300	375- 450	375- 450	375- 450	250- 325
Average Achieved Room Rate	$160	$110	$175	$175	$175	$155
Projected Occupancy Levels:						
Year 1	65%	70%	65%	65%	65%	70%
Year 2	70	75	70	70	70	80
Year 3	75	80	75	75	75	85
Year 4	75	80	75	75	75	85
Year 5	75	80	75	75	75	85
Primary Guest Markets	Longer-staying, affluent visitors and families seeking more spacious rooms and more conveniences within the rooms than typically found in first-class hotels.	Upscale FIT and group visitors. Able to also attract families because of extensive project and resort activities within Kaanapali Beach Resort.	Appeal to the repeat Maui visitor, including the corporate executives and younger two-wage earner professionals. Limited emphasis on corporate incentive and meeting groups.	Similar to the previous luxury hotel but distinguished by a guest mix as influenced by the hotel's facilities and management philosophies.	Similar to previous luxury hotel (most likely an expansion).	Corporate incentive and meeting groups and other group visitors.

Exhibit M

NORTH BEACH MARKET PERFORMANCE

The estimated market support for North Beach depends on the market share Kaanapali Beach Resort and the individual hotels can attract compared to the rest of the island. Market performance would be related to the following:

- Perceived attractiveness of the hotels and resort and the quality and range of facilities provided;
- Competitive strength of alternate hotels and resorts;
- Maturity of the resort development and the reputation it has earned;
- Demand for visitor rooms on Maui.

Kaanapali Beach Resort's hotels have historically lead in market share of Maui's visitor room nights. As Kapalua, Wailea, and Makena Resorts expand, Kaanapali Beach Resort is expected to remain competitive.

The projected market performance of each of the proposed North Beach hotels is described in terms of target markets, average room rates and occupancy levels. The projected performance of each hotel is summarized in Exhibit M and briefly described as follows:

Target Markets

The primary target markets for the proposed hotels would include FIT and incentive groups. The potential guest mix would be influenced by the level and quality of service, size and amenities in rooms and type and extent of hotel facilities.

The guest mix in the all-suite and two luxury hotels would be expected to be about 75% to 80% FIT's, 15% to 20% incentive groups and about 5% tour group visitors. The high-activity resort hotel would have a higher proportion of group and incentive visitors because of its convention facilities. The first-class hotel, because of its broader market appeal would expect to have fewer, about 65% to 70%, FIT's and an even distribution of group and incentive visitors of about 15% to 20%.

Average Room Rates

The projected published and achieved room rates for each hotel are estimated in comparison to published and achieved room rates for selected comparable luxury and first-class hotels in Hawaii.

The achieved room rates would reflect the quality of the hotel, its guest mix and the relative competitive strength of the Kaanapali Beach Resort. The achieved room rates could range from a low of $110 for the first-class resort hotel to $175 for the luxury resort hotels. The high-activity hotel and the all-suite hotel could achieve an average room rate of about $155 and $160, respectively.

Occupancy Rates

The projected occupancy levels for the hotels are estimated based on occupancies currently experienced by comparable first-class and luxury resort hotels on Maui and in destination resorts on Kauai and Hawaii. The initial "start-up" occupancies are based on recently completed projects.

Due primarily to the competitive strength of the Kaanapali Beach Resort, initial start-up occupancy levels would be about 65% to 70% for all the hotels. In about three years, occupancy levels would stabilize at 80% to 85% for the first-class and convention hotels and at about 75% for the luxury and all-suite hotels.

CERTIFICATION

We certify, to the best of our knowledge and belief:

1. Statements of fact in this report are true and correct.
2. Reported analyses, opinions and conclusions are limited only by the reported assumptions and limiting conditions and are our unbiased professional analyses, opinions and conclusions.
3. We have no present or prospective interest in the property which is the subject of this report, and we have no personal interest or bias with respect to the parties involved or the subject matter of this report.
4. Our fees are not contingent upon an action or event resulting from the conclusion in or use of this report.
5. Our analyses, opinions and conclusions were developed and this report conforms with the requirements of the Code of Professional Practice of the American Institute of Real Estate Appraisers (Appraisal Institute) and the use of this report is subject to the requirements of these professional organizations relating to review by its duly authorized representatives.
6. The Appraisal Institute has a voluntary continuing education program. Karen Char, MAI is currently certified under this program.
7. The undersigned made a personal inspection of the property which is the subject of this report.
8. No one other than the undersigned prepared the analysis, opinions and conclusions in this report.

JOHN CHILD & COMPANY, INC.

Karen Char, MAI
Executive Vice President

QUALIFICATIONS OF JOHN CHILD & COMPANY, INC.

John Child & Company, Inc. is a professional real estate service corporation which specializes in real estate appraisal and consulting. Founded in 1937, John Child & Company, Inc. is one of the largest and oldest real estate appraisal and consulting companies in Hawaii.

PROFESSIONAL STAFF

The Company's professional staff has a wide range of real estate experience and hold designations earned from the major professional organizations. Our professional staff members include:

Robert J. Vernon, MAI, CRE, Chairman
Theodore Wrobel, SREA, ASA, President
Karen Char, MAI, Executive Vice President
Craig T. Smith, ASA, Appraiser
Uson Y. Ewart, ASA, Appraiser
Paul D. Cool, Appraiser
Darlene Ariola, Research Assistant
Cheryl Emery, Research Assistant
Dan Schouten, Research Assistant

SCOPE OF PROFESSIONAL SERVICES

The Company's real estate appraisal and consulting practice includes:

- Appraisal of real estate
- Highest and best use studies
- Market and financial feasibility analyses
- Arbitration.

Our studies cover a variety of real estate properties and interests such as:

- Mixed use developments
- Office buildings
- Shopping centers and retail facilities
- Hotels and resort facilities
- Industrial properties
- Residential rental apartments
- Residential condominium apartments
- Single-family subdivisions
- Special purpose properties.

We have assisted both private and public clients in Hawaii, the mainland states, Guam, American Samoa, and Singapore.

Our professional services are used to assist clients in internal management and decision making, negotiations with other parties, and for obtaining financing.

TYPICAL CLIENTS

Our clients include both private and public organizations. Typical clients are:

Amfac Financial Corp.
Amfac, Inc.
Bank of America
Bank of Hawaii
B.P. Bishop Estate
Estate of James Campbell
Castle & Cooke, Inc.
  Mililani Town, Inc.
  Oceanic Properties
Chaminade College
Citibank, N.A.
City & County of Honolulu
  Department of Housing & Community Development
The Equitable Life Assurance Society of the United States of America
Federal Home Loan Bank Board
Finance Realty
First Federal Savings and Loan Association
First Hawaiian Bank
Hawaiian Electric
Hawaiian Telephone
Honolulu Federal Savings and Loan Association
KACOR Development Company
Loyalty Development
Loyalty Enterprises
Loyalty Finance Co.
Pacific Construction Co., Ltd.
Realty Mortgage Investors of the Pacific (RAMPAC)
Security Pacific Mortgage Corp.
Servco Pacific Inc.
Stark Development Company, Ltd.
State of Hawaii
  Department of Land & Natural Resources
  Department of Transportation
U.S. Army
U.S. Navy

KAREN CHAR, MAI
Executive Vice President

Education

M.B.A., University of Hawaii, 1972.
B.B.A., University of Hawaii, 1970.
Punahou School, 1967.
Various courses sponsored by the American Institute of Real Estate Appraisers.

Professional Associations

Member, American Institute of Real Estate Appraisers (MAI designation).

- Governing Councillor (1986-1988).
- Vice Chairman, National By Laws Committee (1986-1987).
- Member, National By Laws Committee (1985); National Admissions Committee (1982-1984).
- Chairman, National Evaluation Report Subcommittee (1982) - Responsible for establishing grading criteria for business reports submitted for demonstration report credit and reviewing failing business reports.
- President (1986), Vice President (1985), Secretary (1984), Honolulu Chapter No. 15.
- Grader, National Board of Examiners (1982-1983) - Responsible for grading business reports and demonstration appraisal reports submitted for credit towards MAI designation.
- Admissions Chairman, Southwest Region (1983).
- Vice Chairman, Thirteenth Pan Pacific Congress of Real Estate Appraisers, Valuers and Counselors (1985-1986).

Member, Panel of Arbitrators of the American Arbitration Association.

Professional Experience

Executive Vice President, John Child & Company, Inc. (1984 to present).
Senior Manager, Peat, Marwick, Mitchell & Co. (1979-1984).
Appraiser, John Child & Company, Inc. (1972-1978).

Court Testimony

Qualified as an expert witness in the valuation of real property in the Courts of the State of Hawaii.

Certification

The American Institute of Real Estate Appraisers conducts a voluntary program of continuing education for its designated members. MAIs and RMs who meet the minimum standards of this program are awarded periodic educational certification. Karen Char, MAI is certified under this program.

B

ECONOMIC AND FISCAL IMPACT ASSESSMENT

Economic and Fiscal Impacts Assessments

For

NORTH BEACH KAANAPALI

Kaanapali Beach Resort, Maui

December 1986

john child & COMPANY, INC.

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RESORT HOTEL MARKET ASSESSMENT FOR NORTH BEACH KAANAPALI

This report summarizes the analysis of the economic and fiscal impacts for North Beach Kaanapali (North Beach) at Kaanapali Beach Resort.

STUDY BACKGROUND AND SCOPE OF ASSISTANCE

Amfac Properties, Inc. proposes to expand the existing Kaanapali Beach Resort to include the 95 acres on the former Kaanapali Airport site. The expansion would be identified as North Beach Kaanapali. Six proposed resort hotels would include a maximum of 3,200 hotel rooms to be built over 10 years. The proposed hotels would include: an all-suite hotel, a first-class resort hotel, a convention/meeting hotel, and three luxury resort hotels. All hotels would be first-class or luxury facilities. The typical room sizes would range from about 350 square feet in the first-class hotel and up to about 650 square feet in the all-suite hotel. The hotels would offer a wide range of facilities and amenities consistent with the expected guest mix.

You have asked John Child & Company, Inc. to assess the market support and economic and fiscal impacts of the planned development and to summarize our findings in two reports. This report summarizes the economic and fiscal impacts of the planned development.

STUDY OBJECTIVES

The objectives of our assistance are to:

1. Project the direct, indirect and induced economic impacts of the proposed development in terms of:

   - Visitor population
   - Visitor expenditures
   - Employment
   - Resident income.

2. Project the direct, indirect and induced fiscal impacts of the proposed development in terms of:

   - State and County government revenues
   - State and County government expenditures.

PROPOSED RESORT
HOTEL DEVELOPMENT

North Beach is planned to be a major expansion to the existing Kaanapali Beach Resort. The site characteristics and the preliminary master plan for North Beach are briefly described.

Site Characteristics

The North Beach site includes 95 acres with 3,400 feet of prime white sand beach frontage. The site is immediately north of the existing Kaanapali Beach Resort at the former Kaanapali Airport site. Its boundaries are as follows:

- North - Mahana condominium in Honokowai;
- South - Maui Kaanapali Villas in Kaanapali Beach Resort;
- West - Honoapiilani Highway;
- East - Pacific Ocean.

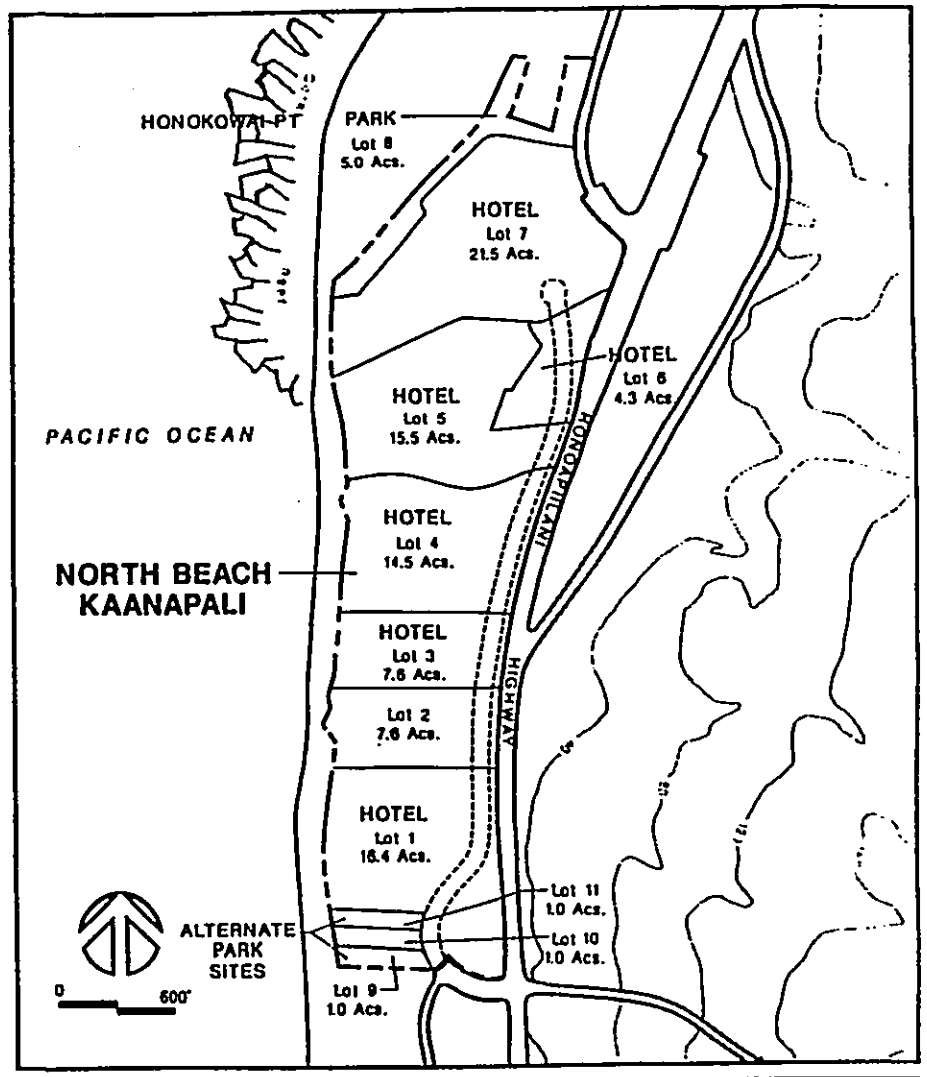
The site is relatively level with an average 1% slope from north to south and from the highway to the beach. All development sites would enjoy ocean frontage and unobstructed views of the islands of Molokai and Lanai across the straits and the West Maui Mountains to the east.

Preliminary Master Plan

The preliminary master plan for North Beach includes six resort hotels and a one-acre and five-acre public park at either end of the site. The preliminary master plan for North Beach is shown in Exhibit A.

Exhibit A

NORTH BEACH KAANAPALI
North Beach Kaanapali Preliminary Master Plan



NORTH · BEACH Proposed Subdivision Plan Figure:
Kaanapali, Maui
Amfac Property Development Corp/Tobishima Properties of Hawaii, Inc. HHVH&K Planners

North Beach would include a maximum of about 3,200 hotel units. The hotel and park sites have been preliminarily subdivided as follows:

Preliminary Development Sites

Lot	Area (acres)	Hotel concept	Estimated hotel rooms	Rooms per acre
Hotel sites:				
1	16.4	Luxury	574	35
2	7.6	Luxury	258	34
3	7.6	Luxury	258	34
4	14.5	All-suite	508	35
5 & 6	19.8	First-class	693	35
7	21.5	Convention	909	42
Subtotal	87.4		3,200	37
Park sites:				
7	5.0			
8	1.0			
Subtotal	6.0		--	
Total	93.4			34

Proposed Hotel Development

Six hotels are preliminarily planned at North Beach. The hotels would include 258 to 909 rooms each with a total of about 3,200 rooms. The hotels are identified as:

- All-suite hotel
- First-class resort hotel
- Luxury hotels (3)
- Convention/meeting resort hotel.

The facility concept, examples of the type of hotel operators, quality, number and size of guest rooms, hotel facilities and amenities are described in Exhibit B.

NORTH BEACH KAANAPALI
Proposed North Beach Kaanapali Hotels

	All-suite hotel	First-class resort hotel	Luxury resort hotels	Convention/meeting resort hotel
Facility Concept	Relaxed and "residential" feeling hotel consisting of all-suite guest rooms. Limited facilities and amenities. Accent on amenities in suite rooms itself, including a bedroom, living room, bathroom and wetbar/kitchenette.	Ocean-oriented resort hotel offering a common theme in its atmosphere and facility amenities. Potential themes could include beach, tennis, health spa or golf resort.	Elegant, smaller resort facility offering a private and relaxing setting distinct from other Kaanapali or Hawaii hotels. Smaller facility size enables greater privacy and higher level of service.	Large, stand-alone hotel in a high-activity setting offering a broad range of meeting, dining, shopping and entertainment facilities. Features meeting spaces and related facilities specially designed to serve the large group.
Example Hotel Operators	Embassy Suites, Granada Royale	Hilton Hotels Corp., Inter-Continental Hotels, Marriott Corporation, Dunfey Hotels	Ritz Carlton Hotels, Rosewood Hotels, Four Seasons Hotels, Stouffer Hotels, Vista Hotels	Hyatt Hotels, Sheraton Hotels, Westin Hotels
Quality	First-class	First-class	Luxury	First-class
Guest Rooms: Number	508	693	258, 258, 574	909
Size	475-650 s.f.	350-425 s.f.	400-475 s.f.	350-425 s.f.
Hotel Facilities: Lobby area	Small	Moderate	Small	Large
Food and beverage areas	None or limited	Moderate	Moderate	Large
Retail shops	Small	Moderate	Moderate	Moderate to large
Banquet and meeting	Small	Small to moderate	Small to moderate	Large
Other Hotel Amenities	Limited facilities, including pool and health club.	Moderate facilities, including pool, tennis and water sports facilities.	Moderate facilities, including pool, health club, racquet club and water sports facilities.	Extensive facilities, including pool and deck, exercise health club, game room, racquet club, water sports facilities, jogging or walking trails.

Source: Amfac Property Development.

Exhibit B

The completion of the proposed hotels is estimated as follows:

Year of completion	Lot	Hotel concept	Hotel rooms
1991	1	Luxury	574
1991	2	Luxury	258
1992	3	Luxury	258
1992	4	All-suite	508
1993	5 & 6	First-class	693
1994	7	Convention	909
			3,200

KAANAPALI BEACH RESORT

Kaanapali Beach Resort is considered by many to be the world's first master-planned destination resort. It was originally conceived more than 30 years ago and has transformed an arid, scrub brush land into a successful world-class destination resort.

To date, about 500 to 600 acres of the original 1,200-acre master plan have been developed. North Beach represents a 95-acre expansion.

The resort is located at the base of the plains of the West Maui Mountains where the weather is generally sunny and the temperature a comfortable 70 to 80 degrees. Kaanapali Beach Resort is 40 minutes from the Maui airport. About five miles north of Kaanapali Beach Resort lies the up-scale Kapalua Resort. Wailea Resort and the planned Makena Resort are to the south.

Kaanapali Beach Resort is the single largest employer on Maui. In 1985, Kaanapali Beach Resort had gross revenues of about $210 million and a total payroll of about $35 million for its 5,000 employees. The current value of private investment in the resort is over $727 million.

The Kaanapali Beach Resort currently includes a wide variety of visitor units; dining, shopping, and entertainment facilities; recreational amenities and lush landscaped areas. The facilities are described as follows:

Existing Facilities
at Kaanapali Beach Resort

Visitor Units:	
Hotel rooms	3,770
Condominium units	1,300
Residential homes	60
Total	5,130
Convention seats	7,060
Commercial area (100 shops)	86,000 sq. ft.
Restaurants/bars	40
Tennis courts	36
Golf course holes (2 courses)	36

Source: Kaanapali Beach Resort

This mix of facilities in the integration of the various land uses is shown in the resort master plan which is presented in Exhibit C.

In addition, a number of projects are in the planning or early development stage. In construction are a single-family subdivision and a low-rise condominium which would add 300 residential homes to the resort. Hawaiian Sea Village, a 30-acre cultural center, is in the preliminary planning stage..

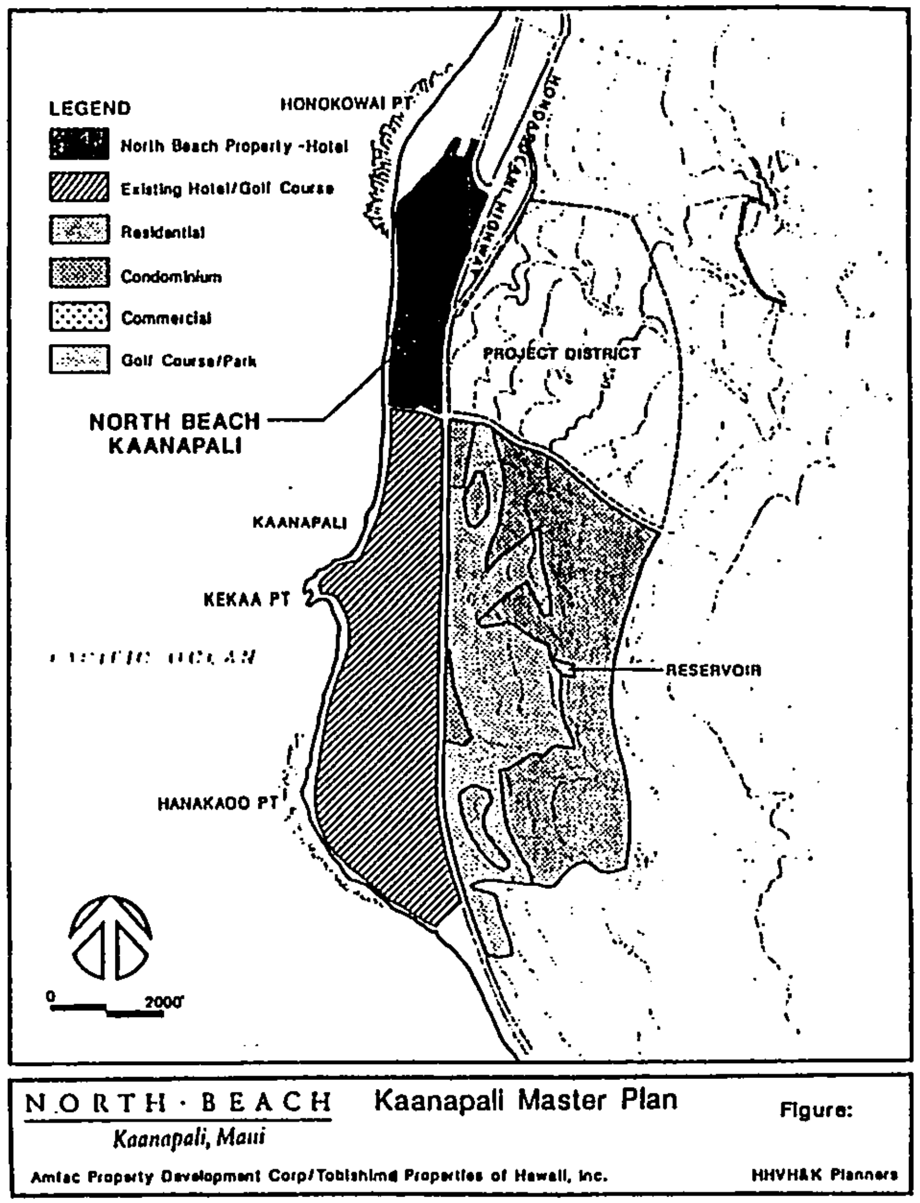
Kaanapali Beach Resort has achieved the critical mass necessary to be a fully self-contained destination resort. In 1985 a half million visitors, or approximately 13.5% of the State's total visitors, visited Kaanapali Beach Resort. Kaanapali Beach Resort currently experiences the highest occupancy and the highest achieved room rates of the major multi-hotel resorts in the State.

ECONOMIC IMPACTS

This section summarizes the projected economic impacts of hotel development at North Beach in terms of visitor expenditures, employment and resident income in the County of Maui and State of Hawaii.

Exhibit C

NORTH BEACH KAANAPALI
Kaanapali Beach Resort Master Plan



Visitor Population

The average daily visitor population at North Beach is estimated as a basis for projecting the economic impacts of the North Beach development. The average daily visitor population is projected based on the proposed hotel rooms, average occupancy and party size assumptions for the hotels. These assumptions are estimated based on the market performance of comparable properties in the State and are presented in Exhibit D.

Based on the anticipated hotel room usage patterns, the average daily visitor census at North Beach may be expected to increase from over 1,000 persons in 1991 to more than 5,000 by 1996, as shown in Exhibit E.

Visitor Expenditures

North Beach will generate direct, indirect and induced visitor expenditures for the County of Maui and State of Hawaii. Visitors to North Beach will make direct expenditures for food, accommodations, gift items and other goods and services. These expenditures will, in turn, generate indirect and induced expenditures throughout the State through respending or multiplier effects.

Direct visitor expenditures are estimated based on visitor expenditures and average daily census for Maui County in 1985 as reported by First Hawaiian Bank and Hawaii Visitors Bureau, respectively. Direct daily expenditures are estimated to be about $97.38 per visitor in 1985. This expenditure estimate is likely to be conservative since Kaanapali Beach Resort has the reputation for attracting the more affluent visitor relative to Maui County as a whole.

Direct visitor expenditures by guests at North Beach could amount to over $178 million by 1996 based on the estimated 1985 daily visitor expenditures and the projected 1996 average visitor census.

Considering direct, indirect and induced effects, additional expenditures attributed to visitors to North Beach are projected to total over $305 million by 1996, as shown in Exhibit F.

Construction Employment

North Beach would generate short-term employment during the construction of the new hotels and long-term employment in the operation and maintenance of those facilities. Similar to visitor expenditures, employment effects may also be classified as being direct, indirect or induced.

Exhibit D

NORTH BEACH KAANAPALI
Assumptions for Hotel Development at North Beach

Lot	1	2	3	4	5 & 6	7
Type of hotel	Luxury	Luxury	Luxury	All-suite	First-class	Convention
Number of rooms	574	258	258	508	693	909
Year of completion	1991	1991	1992	1992	1993	1994
Occupancy level:						
Year 1	65%	65%	65%	65%	70%	70%
Year 2	70	70	70	70	75	80
Year 3 and later	75	75	75	75	80	85
Average party size	2.0	2.0	2.0	2.3	1.9	1.9
Average achieved room rate	$175	$175	$175	$160	$110	$155

Source: Amfac Property Development and John Child & Company, Inc.

Exhibit E

NORTH BEACH KAANAPALI
Projected Average Daily Visitor Census 1/

	Lot 1 Luxury	Lot 2 Luxury	Lot 3 Luxury	Lot 4 All-suite	Lot 5&6 First-class	Lot 7 Convention	Total
1989	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0
1991	746	335	0	0	0	0	1,081
1992	804	361	335	759	0	0	2,259
1993	861	387	361	818	922	0	3,349
1994	861	387	387	876	988	1,209	4,708
1995	861	387	387	876	1,053	1,382	4,946
1996	861	387	387	876	1,053	1,468	5,032

1/ Estimated based on room count, occupancy level and average party size assumptions as presented in Exhibit D.

Source: John Child & Company, Inc.

Exhibit F

NORTH BEACH KAANAPALI
Direct, Indirect and Induced Visitor Expenditures
1989-1990
(1985 Dollars in Millions)

	Direct 1/	Indirect and induced 2/	Total
1989	$ 0.0	$ 0.0	$ 0.0
1990	0.0	0.0	0.0
1991	38.4	27.3	65.7
1992	80.3	57.0	137.3
1993	119.0	84.5	203.6
1994	167.3	118.8	286.1
1995	175.8	124.8	300.6
1996	178.9	127.0	305.9

1/ Estimated based on average daily visitor census for 1985, as reported by the Hawaii Visitors Bureau, "1985 Research Report, Supplement," March 1986; and visitor expenditures for 1985, as reported by First Hawaiian Bank, "Economic Indicators," July/August 1986.

2/ Projected 0.71 per dollar of direct expenditure, as reported by the Department of Planning and Economic Development.

Source: John Child & Company, Inc.

Direct construction employment results from jobs directly related to the construction of the hotels. Such employment would include the onsite laborers, operatives and craftsmen, as well as the professional, managerial, sales and clerical workers.

The direct construction employment for North Beach is estimated based on the employment experiences of comparable projects in the State. Direct construction employment demand may be expected to amount to about 3,200 person-years between project commencement and completion.

Based on State multipliers derived from the State of Hawaii, Department of Planning and Economic Development's (DPED) model of the construction industry in Hawaii, the direct labor requirements projected would, in turn, generate a total demand for about 7,680 annual full-time equivalent jobs between 1989 and 1993, as shown in Exhibit G.

Operational Employment

Employment for hotel operations would vary according to the type of facility. Based on surveys of comparable hotels in the State, the number of hotel workers per first-class and luxury hotel room ranges from about 0.8 to 2.5 workers per occupied room. The range reflects the higher level of service common to luxury hotels, the extensive food and beverage facilities in convention-like hotels and the limited offering of common amenities in all-suite hotels.

Equivalent full-time operational employment at the North Beach hotels is projected based on the hotel occupancy as follows:

	Equivalent full-time employees per occupied room
Luxury	1.8
Convention	1.5
First-class	1.2
All-suite	0.8

Through indirect and induced effects, the direct operation positions created would generate additional employment in the State. According to recent studies on the economic impacts of tourism by the DPED, North Beach could be expected to support about 3,600 direct full-time equivalent positions by 1996 when all hotels are projected to reach stabilized occupancy levels. Total operational employment could amount to over 6,900 full-time equivalent positions in the State by 1996, as shown in Exhibit H.

Exhibit G

NORTH BEACH KAANAPALI
Direct, Indirect and Induced Construction Employment
(Annual Full-Time Equivalent Jobs)
1989-1996

	Hotel rooms under construction	Direct employment 1/	Indirect and induced 2/	Total construction employment
1989	832	416	582	998
1990	1,598	799	1,119	1,918
1991	1,459	730	1,022	1,752
1992	1,602	801	1,121	1,922
1993	909	455	637	1,092
1994	0	0	0	0
1995	0	0	0	0
1996	0	0	0	0
Total		3,201	4,481	7,682

1/ Estimated based on 0.5 full-time equivalent employees per room over a two-year construction period.
2/ Estimated as 1.4 indirect, induced and direct employees per direct employee. Department of Planning and Economic Development, Hawaii Construction Model: Further Developments, 1982.

Source: John Child & Company, Inc.

Exhibit H

NORTH BEACH KAANAPALI
Direct, Indirect and Induced Operation Employment
(Annual Full-Time Equivalent Jobs)
1989-1996

	Average occupied room	Direct employment	Indirect and induced 1/	Total operation employment 2/
1989	0	0	0	0
1990	0	0	0	0
1991	541	973	905	1,878
1992	1,080	1,615	1,502	3,117
1993	1,645	2,315	2,153	4,468
1994	2,355	3,354	3,119	6,473
1995	2,480	3,532	3,285	6,817
1996	2,525	3,600	3,348	6,948

1/ Estimated based on direct and total operation employment.
2/ Estimated as 1.93 total employment per direct employee. Department of Planning and Economic Development, The Economic Impacts of Tourism in Hawaii: 1970-1980, 1983.

Source: John Child & Company, Inc.

Resident Income

North Beach could be expected to have a significant impact on personal and household income for residents of the County and State. The development would generate resident income resulting from employee wages, salaries and fringe benefits and as income to proprietors.

Personal income is defined as the wages and salaries paid to the construction and operation employees. Personal income is projected on the basis of average industry wages and salaries as reported by the Department of Labor and Industrial Relations.

Annual personal income paid to Hawaii residents in the form of wages and salaries earned directly from establishments at North Beach or from its visitors may be expected to reach over $94 million by 1996, as shown in Exhibit I.

Total household income generated by visitor expenditures for goods and services would include employment wages and salaries, fringe benefits and proprietor's income. In addition, household income includes income generated through the multiplier effects of indirect and induced visitor expenditures.

Each dollar spent by visitors to the State in 1983 is estimated to have generated about $0.63 in total income to households in the State, according to reports from the DPED. Based on this relationship, North Beach could contribute about $112 million to total household income in the State by 1996, also shown in Exhibit I.

FISCAL IMPACTS

This section describes the expected fiscal impacts of the proposed development in terms of additional revenues and expenditures to the County and the State. The net fiscal impact of the proposed hotels at North Beach may be evaluated by comparing the additional tax revenues that could be expected to be generated by the resort and the government expenditures that could result from the increase in visitors to Maui and the State.

Revenues

Development at North Beach would bring additional tax revenues to the County and State. County revenues would result from real property taxes from the hotels. State revenues would include unemployment taxes, excise taxes, gross income tax, personal income taxes and the proposed hotel room tax.

Exhibit I

NORTH BEACH KAANAPALI
Projected Annual Personal and Household Income
1989-1996
(1985 Dollars in Millions)

	Total Employment		Direct visitor	Personal Income 1/		Total	
	Construction	Operations	expenditure	Construction	Operation	personal income	Household income 2/
1989	998	0	$ 0.0	$25.6	$ 0.0	$25.6	$ 0.0
1990	1,918	0	0.0	49.2	0.0	49.2	0.0
1991	1,752	1,878	38.4	44.9	25.4	70.3	24.1
1992	1,922	3,117	80.3	49.3	42.2	91.5	50.3
1993	1,092	4,468	119.0	28.0	60.5	88.5	74.5
1994	0	6,473	167.3	0.0	87.7	87.7	104.8
1995	0	6,817	175.8	0.0	92.3	92.3	110.1
1996	0	6,948	178.9	0.0	94.1	94.1	112.0

1/ Based on an average annual salary of $25,631 and $13,543 for construction and hotel workers, respectively; as reported by the Department of Labor and Industrial Relations for 1984 and adjusted to 1985 dollars by the rise in the consumer price index of about 3% from 1984 to 1985.
2/ Estimated based on .626 times direct expenditures, as reported by the Department of Planning and Economic Development.

Source: John Child & Company, Inc.

County Revenue

County revenue is generated from real property tax assessments based on the value of the hotels. The assessed value of the hotels are estimated to range from $130,000 to $200,000 per room, depending on the type of hotel.

Real property taxes on Maui are currently $7.00 per $1,000 of total assessed value for hotels. The proposed hotels at North Beach could be expected to generate more than $3.7 million in real property tax revenues by 1994, when all hotels are expected to be completed, as shown in Exhibit J. The annual County tax revenues associated with the North Beach development are from real property taxes as shown in Exhibit K.

State Revenue

State revenue is generated from tax revenues which include general excise, unemployment, gross income and personal income taxes. In addition, beginning in 1987, the State will receive a 5% tax on room revenues for all transient facilities.

DPED's Input/Output Model indicates that the ratio of total tax revenues to visitor expenditures in Hawaii has ranged from 0.106 to 0.111 in recent years. Thus, for every $1.00 spent by visitors to the State, an additional $0.11 was generated in the form of State and County government taxes.

State revenue is estimated as the difference between total revenue and County revenue, before the proposed hotel room tax, plus the hotel room tax. Based on a ratio of 0.11 total revenues per visitor dollar, total tax revenues attributable to the development and operation of North Beach would amount to about $23.0 million per year by 1996.

Of this total, revenues to the State attributable to visitor expenditures would be about $15.9 million per year by 1996. Hotel room taxes would be about $7.0 million, as shown in Exhibit L.

Expenditures

Visitors benefit from public services such as:

- Public safety (police and fire protection);
- Development and upkeep of highways, recreational facilities and natural resources;
- Health and sanitation systems;
- Capital improvements.

Exhibit J

NORTH BEACH KAANAPALI
Estimated Real Property Assessed Values
and Taxes by Hotel

Lot	Hotel	Rooms	Estimated assessed value per room 1/	Total (millions)	Real property tax rate per $1,000	Real property tax (millions)
1	Luxury	574	$200,000	$114.8	$7.00	$0.80
2	Luxury	258	200,000	51.6	7.00	0.36
3	Luxury	258	200,000	51.6	7.00	0.36
4	All-suite	508	160,000	81.3	7.00	0.57
5 & 6	First-class	693	130,000	90.1	7.00	0.63
7	Convention	909	160,000	145.4	7.00	1.02
	Total	3,200		$534.8		$3.74

1/ Estimated by Amfac Property Development Corporation.

Source: John Child & Company, Inc.

Exhibit K

NORTH BEACH KAANAPALI
Projected Real Property Tax Revenue
1989-1996
(1985 Dollars in Millions)

	Lot 1 Luxury	Lot 2 Luxury	Lot 3 Luxury	Lot 4 All-suite	Lot 5&6 First-class	Lot 7 Convention	Total
1989	$0.00	0.00	0.00	0.00	0.00	0.00	0.00
1990	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1991	0.80	0.36	0.00	0.00	0.00	0.00	1.16
1992	0.80	0.36	0.36	0.57	0.00	0.00	2.09
1993	0.80	0.36	0.36	0.57	0.63	0.00	2.72
1994	0.80	0.36	0.36	0.57	0.63	1.02	3.74
1995	0.80	0.36	0.36	0.57	0.63	1.02	3.74
1996	0.80	0.36	0.36	0.57	0.63	1.02	3.74

Source: John Child & Company, Inc.

Exhibit L

NORTH BEACH KAANAPALI
Estimated Tax Revenue to the County and State
1989-1996
(1985 Dollars in Millions)

		State Revenues		
	County revenues 1/	Excluding room tax 2/	Room tax 3/	Total
1989	$0.00	$ 0.00	$0.00	$ 0.00
1990	0.00	0.00	0.00	0.00
1991	1.16	3.07	1.73	4.80
1992	2.09	6.74	3.36	10.10
1993	2.72	10.37	4.58	14.95
1994	3.74	14.67	6.57	21.24
1995	3.74	15.60	6.89	22.49
1996	3.74	15.93	7.02	22.95

1/ Projected real property taxes.
2/ Includes general excise, unemployment tax, gross income and personal income tax estimated at $.11 per $1.00 of direct visitor expenditures less County revenues.
3/ Based on 5% of projected room revenues.

Source: John Child & Company, Inc.

State and County expenditures per visitor are estimated as follows.

County Expenditures

The various County expenditures were analyzed with respect to the relevant service population for each government function. The County spent about $345 per average daily visitor in 1984. Adjusting this amount by the rise in the consumer price index, visitor expenditures would average about $357 per daily visitor in 1985 dollars.

County expenditures on the behalf of visitors to North Beach could be expected to total about $1.8 million per year by 1996, as shown in Exhibit M.

State Expenditures

A similar analysis of State government expenditures for its services indicates that expenditures averaged about $217 per average daily visitor in 1985 dollars.

The State's expenditures on behalf of visitors to North Beach could be expected to total about $1.1 million per year in 1996, also shown in Exhibit M.

REVENUE/EXPENDITURE ANALYSIS

The net fiscal impact of the North Beach development are estimated by comparing the projected State and County revenues and expenditures. Net revenues and benefit ratios show the relative effect of the development.

County

The comparison of the projected County revenues and expenditures indicates that the County government may expect to net about $1.9 million in additional annual revenues by 1996. The analysis also indicates that additional County revenues generated by North Beach would be about twice the expenditures incurred by the County, as shown in Exhibit N.

State

Fiscal benefits to the State are projected to be greater than those to the County government because the number of revenue sources gives the State greater tax revenue.

The comparison of State revenues and expenditures indicates that the State could be expected to gain more than $21.0 million per year in additional tax revenues by 1996, as shown in Exhibit O.

Exhibit M

NORTH BEACH KAANAPALI
Estimated State and County Government Expenditures
1989-1996
(1985 Dollars in Millions)

	Average visitor population	Expenditures: State 1/	Expenditures: County 2/
1989	0	$0.00	$0.00
1990	0	0.00	0.00
1991	1,081	0.23	0.39
1992	2,259	0.49	0.81
1993	3,349	0.73	1.20
1994	4,708	1.02	1.68
1995	4,946	1.07	1.77
1996	5,032	1.09	1.80

1/ State expenditures estimated to average about $217 per daily visitor, based on 1984 State expenditures and inflated to 1985 dollars by the rise in consumer price index of about 3% from 1984 to 1985.

2/ County expenditures estimated to average about $357 per average daily visitor, based on 1984 Maui County expenditures and inflated to 1985 dollars by the rise in the consumer price index of about 3% from 1984 to 1985.

Source: John Child & Company, Inc.

Exhibit N

NORTH BEACH KAANAPALI
County Government Revenue and Expenditure Comparison
1989-1996
(1985 Dollars in Millions)

	New revenues	New expendi-tures	Net additional revenues	Revenue/expendi-ture ratio
1989	$0.00	$0.00	$0.00	0.00
1990	0.00	0.00	0.00	0.00
1991	1.16	0.39	0.77	2.97
1992	2.09	0.81	1.28	2.58
1993	2.72	1.20	1.52	2.27
1994	3.74	1.68	2.06	2.22
1995	3.74	1.77	1.97	2.11
1996	3.74	1.80	1.94	2.08

Source: John Child & Company, Inc.

Exhibit O

NORTH BEACH KAANAPALI
State Government Revenue and Expenditure Comparison
1989-1996
(1985 Dollars in Millions)

	New revenues	New expendi-tures	Net additional revenues	Revenue/expendi-ture ratio
1989	--	--	--	--
1990	--	--	--	--
1991	$ 4.80	$0.23	$ 4.57	20.9
1992	10.10	0.49	9.61	20.6
1993	14.95	0.73	14.22	20.5
1994	21.22	1.02	20.20	20.8
1995	22.49	1.07	21.42	21.0
1996	22.95	1.09	21.86	21.1

Source: John Child & Company, Inc.

Based on the proposed development plan and anticipated market performance of the hotels, State revenues could exceed expenditures by 21 times.

CERTIFICATION

We certify, to the best of our knowledge and belief:

1. Statements of fact in this report are true and correct.

2. Reported analyses, opinions and conclusions are limited only by the reported assumptions and limiting conditions and are our unbiased professional analyses, opinions and conclusions.

3. We have no present or prospective interest in the property which is the subject of this report, and we have no personal interest or bias with respect to the parties involved or the subject matter of this report.

4. Our fees are not contingent upon an action or event resulting from the conclusion in or use of this report.

5. Our analyses, opinions and conclusions were developed and this report conforms with the requirements of the Code of Professional Practice of the American Institute of Real Estate Appraisers (Appraisal Institute) and the use of this report is subject to the requirements of these professional organizations relating to review by its duly authorized representatives.

6. The Appraisal Institute has a voluntary continuing education program. Karen Char, MAI is currently certified under this program.

7. The undersigned made a personal inspection of the property which is the subject of this report.

8. No one other than the undersigned prepared the analysis, opinions and conclusions in this report.

JOHN CHILD & COMPANY, INC.

Karen Char, MAI
Executive Vice President

QUALIFICATIONS OF JOHN CHILD & COMPANY, INC.

John Child & Company, Inc. is a professional real estate service corporation which specializes in real estate appraisal and consulting. Founded in 1937, John Child & Company, Inc. is one of the largest and oldest real estate appraisal and consulting companies in Hawaii.

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The Company's professional staff has a wide range of real estate experience and hold designations earned from the major professional organizations. Our professional staff members include:

- Robert J. Vernon, MAI, CRE, Chairman
- Theodore Wrobel, SREA, ASA, President
- Karen Char, MAI, Executive Vice President
- Craig T. Smith, ASA, Appraiser
- Uson Y. Ewart, ASA, Appraiser
- Paul D. Cool, Appraiser
- Darlene Ariola, Research Assistant
- Cheryl Emery, Research Assistant
- Dan Schouten, Research Assistant

SCOPE OF PROFESSIONAL SERVICES

The Company's real estate appraisal and consulting practice includes:

- Appraisal of real estate
- Highest and best use studies
- Market and financial feasibility analyses
- Arbitration.

Our studies cover a variety of real estate properties and interests such as:

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- Hotels and resort facilities
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- Bank of Hawaii
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- Estate of James Campbell
- Castle & Cooke, Inc.
  - Mililani Town, Inc.
  - Oceanic Properties
- Chaminade College
- Citibank, N.A.
- City & County of Honolulu
  - Department of Housing & Community Development
- The Equitable Life Assurance Society of the United States of America
- Federal Home Loan Bank Board
- Finance Realty
- First Federal Savings and Loan Association
- First Hawaiian Bank
- Hawaiian Electric
- Hawaiian Telephone
- Honolulu Federal Savings and Loan Association
- KACOR Development Company
- Loyalty Development
- Loyalty Enterprises
- Loyalty Finance Co.
- Pacific Construction Co., Ltd.
- Realty Mortgage Investors of the Pacific (RAMPAC)
- Security Pacific Mortgage Corp.
- Servco Pacific Inc.
- Stark Development Company, Ltd.
- State of Hawaii
  - Department of Land & Natural Resources
  - Department of Transportation
- U.S. Army
- U.S. Navy

KAREN CHAR, MAI
Executive Vice President

Education

M.B.A., University of Hawaii, 1972.
B.B.A., University of Hawaii, 1970.
Punahou School, 1967.
Various courses sponsored by the American Institute of Real Estate Appraisers.

Professional Associations

Member, American Institute of Real Estate Appraisers (MAI designation).

- Governing Councillor (1986-1988).
- Vice Chairman, National By Laws Committee (1986-1987).
- Member, National By Laws Committee (1985); National Admissions Committee (1982-1984).
- Chairman, National Evaluation Report Subcommittee (1982) - Responsible for establishing grading criteria for business reports submitted for demonstration report credit and reviewing failing business reports.
- President (1986), Vice President (1985), Secretary (1984), Honolulu Chapter No. 15.
- Grader, National Board of Examiners (1982-1983) - Responsible for grading business reports and demonstration appraisal reports submitted for credit towards MAI designation.
- Admissions Chairman, Southwest Region (1983).
- Vice Chairman, Thirteenth Pan Pacific Congress of Real Estate Appraisers, Valuers and Counselors (1985-1986).

Member, Panel of Arbitrators of the American Arbitration Association.

Professional Experience

Executive Vice President, John Child & Company, Inc. (1984 to present).
Senior Manager, Peat, Marwick, Mitchell & Co. (1979-1984).
Appraiser, John Child & Company, Inc. (1972-1978).

Court Testimony

Qualified as an expert witness in the valuation of real property in the Courts of the State of Hawaii.

Certification

The American Institute of Real Estate Appraisers conducts a voluntary program of continuing education for its designated members. MAIs and RMs who meet the minimum standards of this program are awarded periodic educational certification. Karen Char, MAI is certified under this program.

CORRECTION

THE PRECEDING DOCUMENT(S) HAS
BEEN REPHOTOGRAPHED TO ASSURE
LEGIBILITY
SEE FRAME(S)
IMMEDIATELY FOLLOWING

KAREN CHAR, MAI
<u>Executive Vice President</u>

Education

M.B.A., University of Hawaii, 1972.
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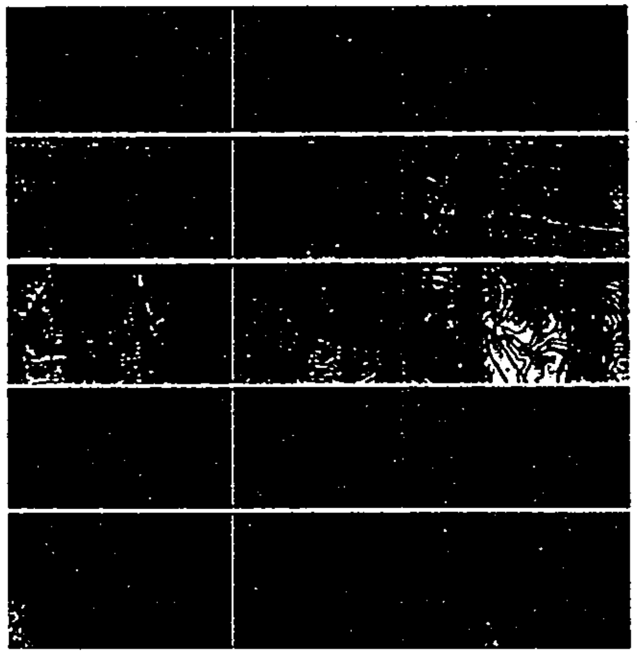
C

COASTAL ENGINEERING EVALUATION AND MARINE BIOLOGICAL ASSESSMENT

&

COASTAL AND OCEANOGRAPHIC ENGINEERING STUDY



VOLUME 1
REPORT
COASTAL AND OCEANOGRAPHIC ENGINEERING SERVICES
PROPOSED KAANAPALI NORTH BEACH DEVELOPMENT
KAANAPALI, MAUI, HAWAII

DAMES & MOORE JOB NO. 04431-034-11

Dames & Moore

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Cable Address: DAMEMORE

November 26, 1986
4431-034-11

Austin, Tsutsumi & Associates, Inc.
501 Sumner St., Suite 521
Honolulu, Hawaii 96817-5031

Attention: Mr. Ted Kawahigashi

Gentlemen:

Report Transmittal
Coastal and Oceanographic Engineering Services
Proposed Kaanapali North Beach Development
Kaanapali, Maui, Hawaii

We are pleased to submit this report on coastal and oceanographic services for the subject development. Our work was performed in general conformance with our proposal dated February 26, 1986, as revised by our revised proposal dated July 23, 1986. The scope of our work was further revised in subsequent meetings to include investigations of soil conditions at the location of the proposed desilting basin, and investigations of soil and oceanographic conditions at alternative coastal discharge sites.

The results of our soils and foundation investigations were provided in a separate report. This report provides the results of coastal and oceanographic services for use in the environmental analyses, and the data in this report will be utilized in our ongoing design work for the coastal structures.

If there are any questions regarding this submittal, please do not hesitate to contact the undersigned.

Respectfully submitted,

DAMES & MOORE

Masanobu R. Fujioka, P.E.
Principal-in-Charge

MRF:omb(3455A/303A)4431-034-11
(Five Copies Submitted)

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REPORT

COASTAL AND OCEANOGRAPHIC ENGINEERING SERVICES

PROPOSED KAANAPALI NORTH BEACH DEVELOPMENT

KAANAPALI, MAUI, HAWAII

1.0 PROJECT CONSIDERATIONS

Dames & Moore has previously provided services in the general area, and has produced the following reports.

1. Letter report dated August 20, 1979, Preliminary Hydrogeological Assessment, Proposed Hawaiian Sea Village Development
2. Report dated November 30, 1979, Soils and Ground Water Study, proposed Hawaiian Sea Village Development
3. Letter Report dated July 30, 1982, Consultation Services, Preliminary Evaluation of Proposed Channel Outlet
4. Report dated May 26, 1983, Field Investigation and Consultation Services, Proposed North Beach Site Drainage, Kaanapali Master Plan

Our scope of work was developed based on a review of work completed previously and our assessment of required services.

2.0 SCOPE OF WORK

The following coastal and oceanographic engineering services were performed.

1. Field Coastal Studies and Development of Coastal Design Parameters

a. Assessment of general coastal processes including beach erosion - An analysis of historic shoreline changes was made based on existing available information, including previous studies, old surveys and aerial photographs.

A shoreline monitoring program was conducted in order to assess the volume/rate of seasonal beach changes. Shoreline profile surveys were made at approximate 45-day intervals (5 surveys total), and at 27 locations between Kekaa Point and Honokowai Point. Each profile extended from the backshore area to the approximate -5-foot contour. Sand samples were obtained at three locations following the winter and summer seasons and analyzed for grain size in order to help define the sand transport characteristics.

b. Current and circulation studies - Detailed current and circulation studies were accomplished in the project area using both an in-situ recording current meter and current drift drogues. A digital recording current meter was deployed offshore at the approximate 30-foot depth contour (meter depth approximately 25 feet), and centered between the two previously proposed discharge points. The meter was deployed for approximately 90 days, and recorded current speed and direction at 15-minute intervals. The current meter data was computer analyzed for speed and direction histograms; net transport; average, minimum, and maximum current speeds; and persistence of flow.

The long-term current meter data was supplemented by drogue studies conducted four times during the study period (at the times of beach profiles) to provide information on circulation patterns, vertical and horizontal current gradients, and wind-driven surface flow, as well as to note seasonal variations, if any. Dye studies were conducted along the shore in the vicinity of the proposed discharge points.

c. Drainline outfall route surveys - Detailed bathymetric survey and underwater bottom reconnaissance were conducted along two alternative drainline outfall routes. The bathymetry along the selected routes and 100-foot offsets were surveyed at 25-foot range intervals from the shoreline to the 30-foot depth contour. A diver reconnaissance was made along each pipeline route to assess the bottom surface condition and characteristics. Results were documented by underwater photographs and detailed logs. The beach and sand deposits seaward of the beach were jet-probed to determine the approximate sand thickness along the route.

d. Analysis of coastal engineering design parameters - The wave climate in the project area was evaluated for both prevailing and storm conditions in order to determine the design wave conditions for construction of the drainage channel outlet and the drainline outfall. The analysis included assessment of the deepwater wave climate, analysis of wave refraction in the project area, and determination of the nearshore water levels, breaker heights, and wave velocities appropriate for design of the shoreline drainage channel outlet structure and the drainline outfall pipelines.

2. Detailed Marine Biology and Water Quality at Proposed Discharge Points

a. Baseline water quality assessment - The existing water quality in the project area was measured and baseline conditions established for assessment of possible water quality impacts. The water quality was measured at two nearshore stations in the vicinity of the proposed discharges, and at one offshore control station. Temperature, salinity, dissolved oxygen, and turbidity was measured in-situ, and water samples were laboratory analyzed for nutrients (nitrogen and phosphorus), pH, suspended solids and chlorophyll-A. Water quality was measured four times during the study period (concurrent with beach profiles and current drogue studies). Available information on general

water quality characteristics in the Kaanapali, Maui area was also reviewed and summarized. Temperature/salinity profiles were made in order to determine any density stratification in the water column at the proposed pipeline discharge point.

b. Marine biological survey - A quantitative marine biological survey was conducted along the proposed drainage outfall pipeline routes and seaward of the proposed drainage channel outlets. The survey primarily concentrated on coral abundance and diversity, fish populations, and macroinvertebrates.

3. Analysis of the Effects of Discharge

The storm water discharges were described using combined near, intermediate, and farfield plume model(s).

The results of the nearfield model served as the primary input to the intermediate/farfield model. The site-specific current data gathered in this study was used in the simulation to describe the fate of the plume as it is advected in the ocean environment. The output from this model provides the area of impact of the discharged plume, graphically as a function of plume concentration with different time and intervals after discharge. This information was then utilized to assess the offshore region impacted by the stormwater discharge.

3.0 PROJECT DESCRIPTION

Expansion of the Kaanapali Resort area is proposed for the coastal area in the vicinity of the present Kaanapali Airstrip at Honokowai Beach. In conjunction with the resort expansion, stormwater drainage improvements would be constructed to facilitate drainage of the relatively low-lying coastal area.

The project includes the shoreline and nearshore waters in the vicinity of Honokowai Beach (North Beach) on the Kaanapali Coast of the Island of Maui, Hawaii (Map of Area, Plate 1). The project area is bounded by Kekaa Point to the south and Honokowai Point to the north.

Discharge at the shoreline or offshore was considered at four separate locations (D-1 through D-4), indicated on the Plot Plan, Plate 2. Based on environmental and hydraulic considerations, the stormwater discharges will consist of the following:

- a trapezoidal channel discharging at the shoreline near the north end of the project (location D-4, coordinate 5,220 N)
- an outfall pipeline terminating offshore at location D-3 (coordinate 4,500 N)

Because of uncertainty during the course of our work, studies were also conducted at locations D-1 and D-2, before they were finally deleted from further consideration.

4.0 FINDINGS AND DISCUSSIONS

4.1 GENERAL COASTAL PROCESSES INCLUDING BEACH EROSION

An analysis of historic shoreline changes was made based on existing available information, including previous studies, old surveys, and aerial photographs.

A shoreline monitoring program was conducted in order to assess the volume/rate of seasonal beach changes. Shoreline profile surveys were made at approximate 45-day intervals (5 surveys total), and at 27 locations between Kekaa Point and Honokowai Point. Each profile extended from the backshore area to the approximate -5-foot contour. Sand samples were obtained at three

locations following the winter and summer seasons and analyzed for grain size in order to help define the sand transport characteristics. A detailed description of the shoreline monitoring program and results is presented in Annex A.

The Kaanapali coast has a history of considerable sand movement, with sand being transported along the shoreline by wave generated longshore currents. The shoreline history of the area and the field investigations conducted for this study indicate that the dominant south swell in the summer moves sand northward; and in the winter the trend reverses as the south swell becomes less frequent and the north swell occurs to move sand southward again.

Kekaa Point likely acts as an almost complete barrier to sand transport along the beach, with little sand moving north or south past it. Thus, in the winter it blocks the south movement of sand and the beach just north of the point rapidly accretes. During the summer, when the predominant sand movements is to the north, the point prevents sand movement from the south to replace that being moved north away from the point and, consequently, the beach immediately north of the point becomes narrower due to a net sand loss.

The beach fronting the project area is subject to seasonal changes due to the north-south longshore transport, however the changes are much less than are experienced at the ends of the beach. Seasonal gains and losses of sand in the project area generally results in beach toe movement of +/-10 to 20 feet around the average long term beach position. Aerial photographs over a 35-year period from 1949 to 1984 show the seasonal beach changes, and an apparent net long term recession of the shoreline of about 20 feet. This estimate of long term recession is very approximate however, as it is the same order of magnitude as the estimated confidence limits of the analytical techniques used.

While the coastal processes in the project area appear to result in a relatively stable shoreline over the long term, significant short-term beach changes can occur due to unusual seasonal wave climate changes or severe local storms.

The sand transport rates indicate that sand plugging of drainage channels terminating at the shoreline will be a problem in the project area. The rate of sand plugging appears to be less, however, at the north end of the project area than at the south end.

The beach profiles indicate that the solid reef rock is continuous along the shore in the project area, and extends some distance inland under the beach sand. The elevation of the rock along the shore varies from 0 MSL (mean sea level) to -6 feet.

A large trapezoidal drainage channel is proposed at location D-4, with sloping rock revetment constructed to stabilize the mouth of the channel. The beach slope at this location averaged about 1V:4H to 1V:6H, with reef rock at -3 feet to -6 feet. It is recommended that the revetment slope be 1V:5H and that the toe be constructed to rest on the solid, non-erodable reef rock, or where a sand foundation is encountered, to a minimum depth of -6 feet MSL in order to be below the anticipated scour depth. The revetment should also be located 20 feet landward of the end of winter beach profile, in order that it not be exposed during normal seasonal beach changes. Should it become exposed, either due to heavy stormwater discharge eroding the beach at the channel mouth or by severe storm wave attack, the relatively flat 1V:5H slope

will reduce its adverse impact on normal beach processes, and the revetment would likely quickly be covered again by the beach once normal sand transport resumed.

An ocean outfall constructed across the beach should have a slope no steeper than the existing beach slope, about 1V:6H, and should be a minimum of 20 feet landward of the end of winter beach profile. The pipe should be trenched through the rock along the shore, both to remove it from having any influence on the beach processes and to protect it from wave attack.

4.2 CURRENT AND CIRCULATION STUDIES

Detailed current and circulation studies were accomplished in the project area using both an in-situ recording current meter and current drift drogues. A digital recording current meter was deployed offshore at the approximate 30-foot depth contour (meter depth approximately 25 feet), and centered between the two previously proposed discharge points. The meter was deployed for approximately 90 days, and recorded current speed and direction at 15-minute intervals. The current meter data was computer analyzed for speed and direction histograms; net transport; average, minimum, and maximum current speeds; and persistence of flow.

The long-term current meter data was supplemented by drogue studies conducted four times during the study period (at the times of beach profiles) to provide information on circulation patterns, vertical and horizontal current gradients, and wind-driven surface flow, as well as to note seasonal variations, if any. Dye studies were conducted along the shore in the vicinity of the proposed discharge points. Current data was used in modeling the results of discharge and will be used in design of the outfall. The data are presented in Annex A.

4.3 DRAINLINE OUTFALL ROUTE SURVEYS

Detailed bathymetric survey and underwater bottom reconnaissance were conducted along two alternative drainline outfall routes. The bathymetry along the selected routes and 100-foot offsets were surveyed at 25-foot range intervals from the shoreline to the 30-foot depth contour. A diver reconnaissance was made along each pipeline route to assess the bottom surface condition and characteristics. Results were documented by underwater photographs and detailed logs. The beach and sand deposits seaward of the beach were jet-probed to determine the approximate sand thickness along the route.

4.3.1 Alignment D-3

The general bottom characteristics along alternative outfall alignment D-3 and a summary of the divers' route reconnaissance log are found in Annex A.

The nearshore area from the shoreline to approximately 100 feet offshore at the 5-foot depth is composed of well scoured rock. From the 5-foot to the 10-foot depth, a distance of 100 feet, the bottom is composed of rock and coral with a vertical relief of 1 to 3 feet. At the 10-foot depth, approximately 200 feet from shore, the rock and coral transitions to a primarily sand bottom. Probes showed sand to be 6 to 28 inches thick, overlaying rock and coral rubble. Approximately 470 feet from shore, at the 23-foot depth, a band of solid rock and coral, about 80 feet wide and running parallel to shore, emerges from the sand bottom. The least depth on this band

of rock and coral is about -20 feet. At a distance of about 550 feet from shore the bottom again becomes sandy with considerable rock and coral rubble.

4.3.2 Alignment D-4

The general bottom characteristics along alternative outfall alignment D-4 and a summary of the divers' route reconnaissance log are found in Annex A.

The nearshore area from the shoreline to about 200 feet offshore at the 10-foot depth is primarily well scoured rock, with some sand pockets. From the 10-foot to the 12-foot depth, approximately 300 to 350 feet from the shoreline the bottom becomes sandy with occasional rock patches and rubble for a distance of at least 650 feet from shore. The sand thickness varies from 3 to 26 inches, again overlaying rock and coral rubble.

4.4 COASTAL ENGINEERING DESIGN PARAMETERS

The wave climate in the project area was evaluated for both prevailing and storm conditions in order to determine the design wave conditions for construction of the drainage channel outlet and the drainline outfall. The analysis included assessment of the deepwater wave climate, analysis of wave refraction in the project area, and determination of the nearshore water levels, breaker heights, and wave velocities appropriate for design of the shoreline drainage channel outlet structure and the drainline outfall pipelines.

Results of the analysis and recommended design parameters are found in Annex A. The data will be used in design of planned coastal structures.

4.5 BASELINE WATER QUALITY

The existing water quality in the project area was measured and baseline conditions established for assessment of possible water quality impacts. The water quality was measured at two nearshore stations in the vicinity of the proposed discharges, and at one offshore control station. Temperature, salinity, dissolved oxygen, and turbidity was measured in-situ, and water samples were laboratory analyzed for nutrients (nitrogen and phosphorus), pH, suspended solids, and chlorophyll-A. Water quality was measured four times during the study period (concurrent with beach profiles and current drogue studies). Existing information on general water quality characteristics in the Kaanapali, Maui area was also reviewed and summarized. Temperature/salinity profiles were made in order to determine any density stratification in the water column at the proposed pipeline discharge point.

Nearshore waters along the Kaanapali coast area are designated Class A, Open Coastal Waters by the State of Hawaii, Department of Health. The waters are also classified as seasonally wet, thus "wet" water quality criteria apply during the winter rainy season and "dry" criteria apply during the summer. The quality of these waters is generally good, although problems sometimes arise from land drainage and/or cesspool seepage into nearshore waters. However, now that a wastewater treatment plant has been constructed adjacent to Honoapiilani Highway directly inland from Kaanapali Beach, the impact from cesspools and injection wells in the Honokowai/Kaanapali area is expected to diminish.

Several streams drain the west Maui mountains into the Honokowai/Kaanapali/Lahaina coastal region, none of which directly enter the

project area. The nearest stream to the north is Honolowai Stream, entering the ocean about one mile north of the project area. Wahikuli Stream enters the sea about two and one-half miles south of the project area.

Although prior studies and reports on water quality are limited, the general impression obtained is one of generally high water clarity and quality most of the time with episodic degradation of nearshore waters following periods of high rainfall in the up-lands.

Water quality data obtained for this study are summarized and discussed in Annex A.

4.6 MARINE BIOLOGY

A quantitative marine biological survey was conducted along the proposed drainage outfall pipeline routes and seaward of the proposed drainage channel outlets. The survey primarily concentrated on coral abundance and diversity, fish populations, and macroinvertebrates. A detailed description of the survey results is presented in Annex A.

The results of the biological survey reveal diverse coral bottom and fish assemblages offshore along much of Kaanapali Beach. Biological communities are best developed off Site D-2. In the northern section (off Site D-4), benthic community development is poor nearshore and the bottom is mostly sand offshore. Although the shallow fringing reef north of Site D-4 (around Honolowai Point) was only partially surveyed in this study, this area also appears to harbor a poorly developed or stressed marine bottom community. South of Site D-1, the bottom is mostly sand, and live corals are scarce.

Off Site D-4 the extent of limestone bottom decreases, and the water depth over this substratum is less than to the south. Coral communities are poorly developed nearshore in the northern part of the survey area as compared with the central and southern portions. The overall appearance of the massive limestone formation off Site D-4 is suggestive of a former stream outlet at this location.

Nearshore benthic communities are well developed in the southern three-fourths of the study area. This information suggests that the proposed discharge(s) should be located as far to the north end of the Kaanapali Airstrip site as practicable. The presence of well developed benthic coral communities in close proximity to Kaanapali Beach suggests the need for caution on the placement of storm water discharges relative to these communities. This survey points out the need to incorporate nearshore current patterns and net current flow in the area in decisions concerning the placement of land drainage discharge points.

During the course of the field work we noted that snorkel and SCUBA dive tours operate in the southern part of the study area. This is consistent with our observations that reef development in this area is exceptional and suggests that this area may be one of the better accessible dive areas in the vicinity of Kaanapali or Lahaina.

4.7 MODELING OF EFFECTS OF MARINE DISCHARGE

In order to evaluate potential offshore impacts due to discharge of suspended sediments carried by stormwater drainage, numerical modeling of the discharges was accomplished. The nearfield plumes and farfield transport of

stormwater discharges were analyzed.

Site drainage is proposed to be discharged through an open channel outlet at the shore, located at the northern portion of the site. The proposed trapezoidal grass-lined channel would be 75 feet wide with 1V:2H side slopes, +10 feet MSL elevation at the top of bank, and +2.5 feet MSL invert elevation at the vegetation line. The invert has a 1/2 percent slope up channel.

Also proposed is a twin 66-inch CMP pipe outfall to handle flows to the low southern portion of the site.

The channel outlet would discharge the majority of the storm runoff and would have the greatest offshore impacts. Thus, both a 100-year storm condition and a 10-year condition were modeled for the channel outlet. The outfall was modeled with a 10-year storm condition.

The discharge characteristics and sediment loads were based on the analysis performed by Austin Tsutsumi & Associates as contained in Annex B. The oceanographic parameters were based on data obtained by Sea Engineering, Inc., Annex A.

4.7.1 Nearfield Plume Modeling

The nearfield plumes from the channel outlet and outfall are momentum-driven and thus are dependent on the discharge characteristics, such as velocity, effective area of discharge, density of the discharged effluent and angle of discharge. The behavior of the plume as it interacts with the ambient receiving waters is dependent on the density of the receiving water and ambient velocity. The numerical models are described in more detail in Annex C.

For the 10-year storm event, the plume depth is shallower due to the smaller discharge rate and lesser momentum. The maximum plume depth ranges from 3 to 7 feet at offshore distances of 140 to 230 feet. The excess speed at this point is quite high, between 1.4 and 2.2 ft/sec. The plume velocity remains above 1 ft/sec to offshore distances of about 1,000 feet or so for Case 2a and Case 2b, and to offshore distance of about 300 feet for Case 2c and Case 2d. Due to the longer duration of discharge, the maximum offshore extent of the plume is relatively greater than for the Case 1 simulations. For Case 2c, the plume travels 4.3 miles offshore in the 15.5-mile duration of discharge. Since this is for a "no current" simulation, the results are not entirely realistic. The maximum alongshore extent of the plume occurs for Case 2b, where the plume travels about 2.2 miles alongshore in the 5.14-hour duration of discharge. Dilutions at the endpoints range from 5.86 to 10.90 for the various simulations, resulting in suspended solids concentrations of 2,000 to 1,070 ppm by volume which are of the same order of magnitude as the 100-year storm simulations.

The plume characteristics for Case 2b have the greatest potential for offshore impacts of the Case 2 simulations. Compared to Case 1b, this simulated plume has a lesser potential for impacting the high density coral areas south of the channel outlet in both the horizontal and vertical extent. Unlike the Case 1 simulations where the plume can be expected to scour the nearshore areas, the Case 2 simulations indicate much shallower plume depths. Thus, it is expected that the discharge will flow offshore in a shallow surface layer at sufficient velocities to prevent any significant quantity of sediment from falling out of the plume.

4.7.3 Outfall Discharge

The discharge, as well as offshore impacts, from the outfall are considerably less than from the open channel. The outfall plume model was run for only the 10-year storm event, since the outfall is expected to handle only on-site runoff. The simulation conditions included two discharge depths, each with two combinations of dischrge and ambient current characteristics.

Case 1: 25-foot depth of discharge
Case 2: 35-foot depth of discharge

(a) High discharge, no ambient current
(b) High discharge, strong ambient current

Since the outfall plume rises to the surface rather quickly, the extent of the nearfield plume is not dependent on duration of discharge as in the case of the channel surface discharge. Thus, the peak discharge rate for a 10-year storm event (no retention basin) was simulated. An ambient current speed corresponding to the typical maximum tidal currents was used to simulate the extreme alongshore extent of the outfall plume.

Tables and graphic displays presenting results of the modeling are contained in Annex C. The differences are not great for the four simulated conditions. In general, discharge into an ambient current increases the dilution. Discharge into deeper water depths also increases dilution.

The plume rises to the surface about 100 feet from the outlet. For this horizontal discharge, the plume is expected to impact the ocean bottom for a distance of about 120 feet from the outlet. After the plume surfaces, there is still a great deal of momentum. The plume surfaces within 20 seconds and has a speed of 4 ft/sec which is about 4 to 5 times higher than typical tidal currents. The dilution at the surface is 3.09, resulting in suspended solids concentration of 0.436 lb/cf or 2,400 ppm by volume. The surface concentrations for all simulations are of the same order of magnitude as the endpoint concentrations in the surface channel discharge plume. Once at the surface, the plume can be expected to behave as a surface discharge. Due to the relatively small extent of the outfall plume, the potential offshore impacts are insignificant compared to the channel discharge plume.

4.7.4 Farfield Plume Modeling

The extent of impact of the channel discharge plume is substantially greater than the outfall plume due to the much higher discharge rates and total discharge volumes. Therefore, the farfield model was run for the channel discharge simulations. All of the Case 1 simulations and the Case 2 high discharge simulations were modeled in the farfield. The input variables at the start of the farfield simulations are based on the endpoint characteristics of the nearfield plumes. The concentration is based on the total amount of suspended sediment discharged at the outlet. This is a conservative assumption since there will be some fallout of particles from the plume over time.

The farfield model results provide a probabilistic representation of the potential areas of impact of the discharge after periods of many hours or days subsequent to release of the discharge water into the ocean. Contours representative of concentrations provide estimates of the probability that the discharged materials will impact the location at time (t) after release. It is unlikely that the concentrations would actually be as shown by the contour plots on any given day. However, for many repeated instances of discharge, then on the average the discharge would impact the areas in the given concentrations. The farfield model is described in more detail in Annex C.

The model results indicate a slightly greater potential for alongshore dispersion than offshore, which is expected based on the current data which reflects a net northward transport. The plume disperses over large areas, resulting in small concentrations after 48 hours. As the plume disperses the concentrations within the plume decrease as reflected by the decrease. Graphical displays of the plume area are presented in Annex C.

- oOo -

The following plates and annexes are attached and complete this report.

Plate 1	-	Map of Area
Plate 2	-	Plot Plan
Annex A	-	Coastal Engineering Evaluation and Marne Biological Assessments; by Sea Engineering, Inc.
Annex B	-	Runoff and Sediment Load Analysis; by Austin, Tsutsumi, & Associates, Inc.
Annex C	-	Transport Modeling of Drainage Discharge

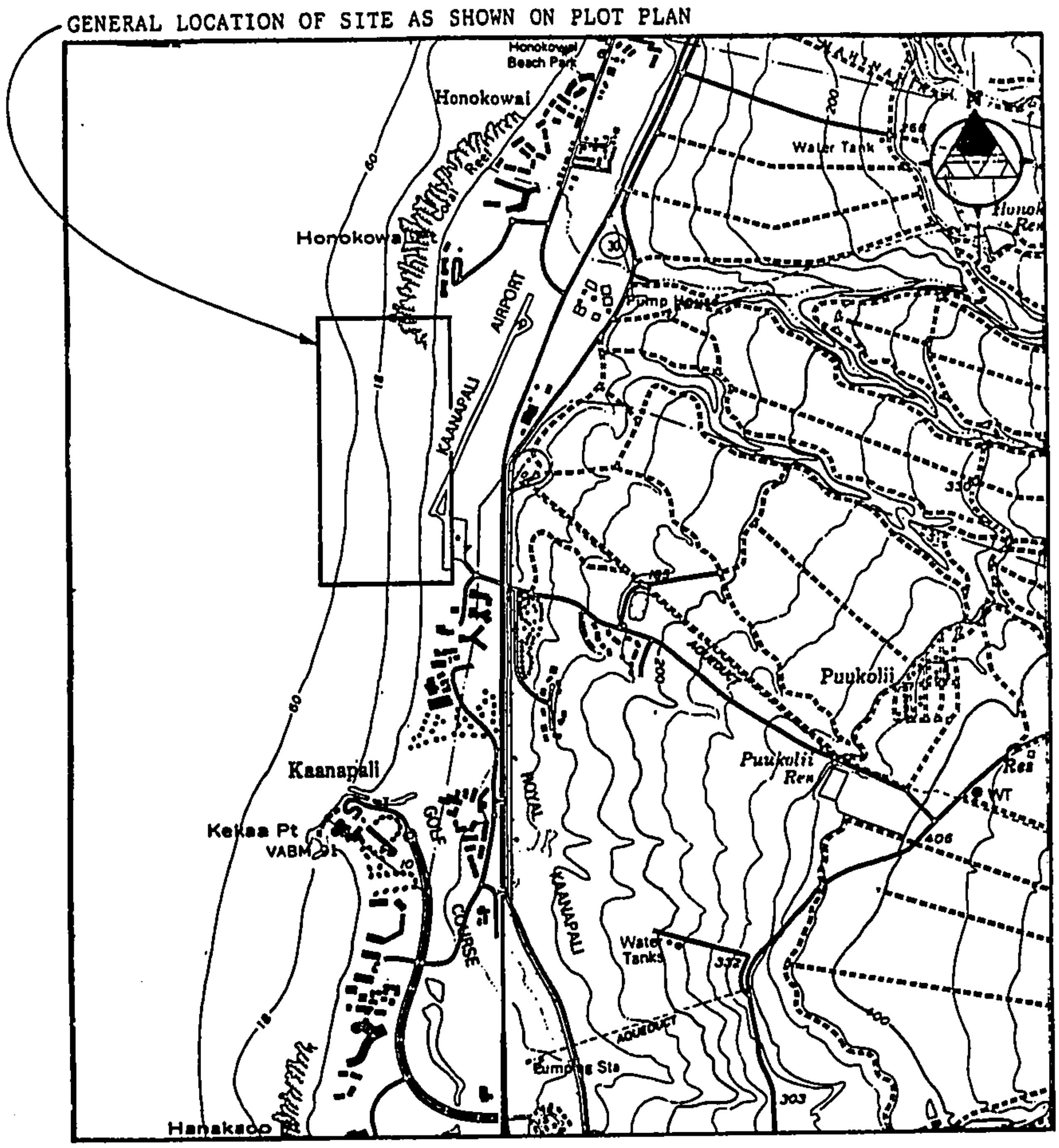
- oOo -

Respectfully submitted,

DAMES & MOORE

Masanobu R. Fujioka, P.E.
Principal-in-Charge

MRF:lml(3521A/304A)4431-034-11
(Five copies submitted)



MAP OF AREA

SCALE 1:24 000

1 ½ 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

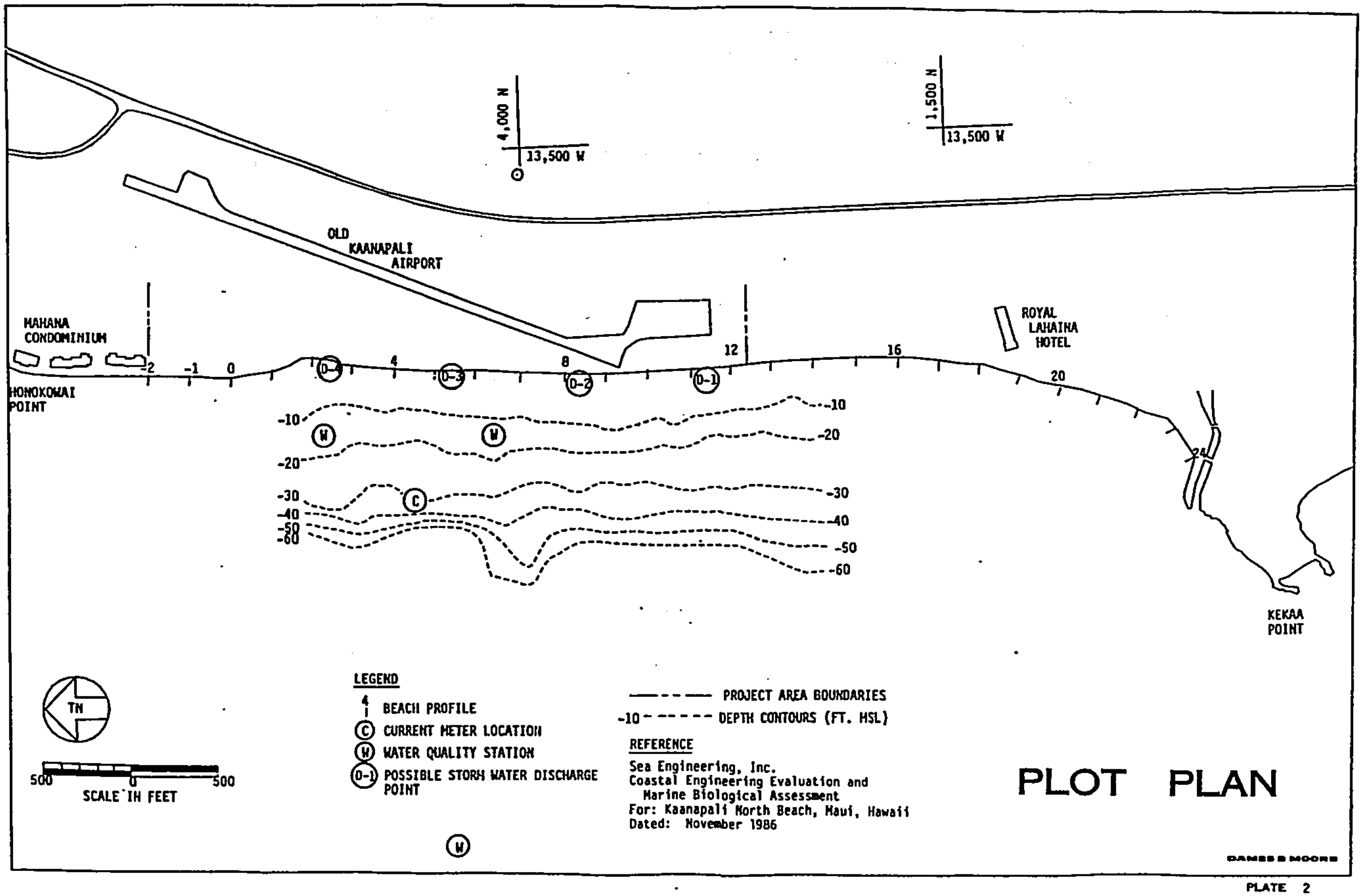
1 .5 0 1 KILOMETER

CONTOUR INTERVAL 20 FEET

Reference:
U.S.G.S. Topographic Map
Lahaina, Maui, Hawaii
Dated 1983

DAMES & MOORE

PLATE 1


4,000 N
13,500 W
1,500 N
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OLD KAANAPALI AIRPORT
MAHANA CONDOMINIUM
HONOKOWAI POINT
ROYAL LAHAINA HOTEL
KEKAA POINT
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-1
0
4
8
12
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D-1
D-2
D-3
D-4
-10
-20
-30
-40
-50
-60
TN
500
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500
SCALE IN FEET
LEGEND
BEACH PROFILE
CURRENT METER LOCATION
WATER QUALITY STATION
POSSIBLE STORM WATER DISCHARGE POINT
PROJECT AREA BOUNDARIES
-10 DEPTH CONTOURS (FT. MSL)
REFERENCE
Sea Engineering, Inc.
Coastal Engineering Evaluation and Marine Biological Assessment
For: Kaanapali North Beach, Maui, Hawaii
Dated: November 1986
PLOT PLAN
DAMES & MOORE
PLATE 2

COASTAL ENGINEERING EVALUATION

AND

MARINE BIOLOGICAL ASSESSMENT

FOR

KAANAPALI NORTH BEACH, MAUI, HAWAII

Sea Engineering, Inc.

COASTAL ENGINEERING EVALUATION

AND

MARINE BIOLOGICAL ASSESSMENT

FOR

KAANAPALI NORTH BEACH, MAUI, HAWAII

CONTENTS

INTRODUCTION

STUDY PURPOSE

Expansion of the existing resort at Kaanapali, Maui, is proposed for the coastal area in the vicinity of Kaanapali Beach (Kaanapali North Beach), site of the former Kaanapali Airport. The expansion would consist primarily of additional resort hotels and/or condominiums and their associated infrastructure and ancillary facilities, including stormwater drainage improvements for the relatively low-lying coastal area. It is presently proposed to collect, channelize, and ultimately discharge stormwater (rainfall) to the ocean through drainage channels terminating at the shoreline and an outfall terminating offshore.

The purpose of this study is to provide coastal engineering and marine environmental information for planning and design of the resort expansion and the proposed drainage improvements including: (1) assessment of general coastal processes in the project area; (2) analysis of design wave parameters; (3) current and circulation studies; (4) baseline water quality assessment; (5) a detailed ocean outfall route survey, and; (6) a marine biological assessment.

The coastal engineering studies and preparation of Part A of this report were accomplished by Sea Engineering, Inc. The firm of AECOS, Inc. conducted the marine biological assessment and prepared Part B of the report.

SCOPE OF WORK

Assessment of General Coastal Processes in the Project Area

An analysis of historical shoreline changes is made based on existing available aerial photographs to assess the long term shoreline stability, and a shoreline monitoring program has been conducted in order to assess the volume/rate of seasonal beach changes. Shoreline profile surveys were made at approximate 45 day intervals (5 surveys total), at 27 locations between Kekaa Point and Honokowai Point, with each profile extending from the backshore area to the approximate -5 foot contour. Sand samples were also obtained at three locations and analyzed for grain size in order to help define the beach characteristics.

Analysis of Design Wave Parameters

The wave climate in the project area has been evaluated for both prevailing and storm conditions in order to determine the design wave conditions for construction of the drainage channel outlet and the drainline outfall. The analysis includes assessment of the deepwater wave climate, transformation of deepwater waves to the shoreline in the project area, and determination of nearshore water levels, breaker heights and wave runup at the shore. The analysis is based on existing available wave data.

Current and Circulation Studies

Detailed current and circulation studies have been accomplished in the study area using both an in situ recording current meter and current drift drogues. A General Oceanics Model 6011-T digital recording current meter was deployed offshore at the approximate 30-foot depth contour (meter depth approximately 25 feet) for 90 days, and recorded current speed and direction at 7.5 minute intervals. The current meter data was computer analyzed for speed and direction histograms; net transport; average, minimum and maximum current speeds; and persistence of flow.

The long-term current meter data was supplemented by drogue studies conducted four times during the study period to provide information on circulation patterns, vertical and horizontal current gradients, and wind-driven surface flow, as well as to note seasonal variations, if any. Dye was used along the shore in the vicinity of the proposed discharge points to measure longshore (littoral) currents.

Baseline Water Quality Assessment

The existing water quality in the project area was measured and baseline conditions established for assessment of possible water quality impacts. Water quality parameters were measured at two nearshore stations in the vicinity of the proposed discharges, and at one offshore control station. Temperature, salinity, and dissolved oxygen were measured in situ, and water samples were laboratory analyzed for nutrients (total nitrogen and total phosphorus), pH, suspended solids, turbidity, and chlorophyll-a. Water quality was measured four times during the study period (concurrent with current drogue studies). Temperature/salinity profiles were made in order to determine any density stratification in the water column. Existing available information on general water quality characteristics in the Kaanapali, Maui area has also been reviewed and summarized.

Ocean Outfall Route Survey

A detailed bathymetric survey and underwater bottom reconnaissance was conducted along alternative drainline outfall routes. The bathymetry along the selected routes and 100-foot offsets was surveyed at 25-foot range intervals from the shoreline to the 30-foot depth contour, and a diver reconnaissance was made along the pipeline route to assess the bottom surface condition and characteristics. The offshore sand thickness was determined by jet probing.

Marine Biological Assessment

Quantitative marine biological surveys were conducted at four nearshore locations being considered as possible stormwater discharge points, including the possible outfall routes. The surveys primarily concentrated on coral abundance and diversity, fish populations and macroinvertebrates.

EXECUTIVE SUMMARY

A review of previous studies and reports, historical aerial photographs, and the beach studies accomplished during preparation of this report indicates that while the shoreline in the project area is relatively stable over the long term, significant seasonal changes to the beach do occur. The winter season north swell waves move sand southward, and the summer south swell moves the sand north. There appears to be very little net loss to the beach system due to the seasonal sand transport, however the seasonal gains and losses of sand in the project area generally results in beach excursions of +/- 10 to 20 feet around the average long term beach position. Typical sand transport rates vary from 1 to 3 cubic yards of sand per day per 100 feet of beach thus sand plugging of drainage channels which terminate at the shoreline will likely be rapid and occur year round.

Shoreline structures, such as a revetment or outfall pipeline, should be constructed well behind the existing beach profile in order to not impact on the normal coastal processes and sand transport. A revetment or pipeline should be kept a minimum of 20 feet behind the end of winter beach profile (see the April 1986 beach profiles in Appendix B), and a revetment toe should extend to an elevation of -6 feet msl. Pipelines should be trenched through the reef rock which borders the shore at elevations of 0 to -6 feet msl.

The project site is exposed to the prevailing sea and swell from the south clockwise to the north, and to infrequent, but possibly severe, storm wave attack. The existing shoreline elevations of 8 to 10 feet msl at the beach crest/vegetation line provide good storm wave runup protection, and this shoreline elevation should be maintained.

The prevailing coastal currents are governed by the semi-diurnal tide, with a strong ebb tide flow to the north and a weaker flood tide flow to the south. The overall net transport away from the project site is to the north at about 3 cm/sec. The coastal current sets primarily parallel to the shore, with little on-shore/offshore movement except for the wind-induced surface currents which generally have an offshore component during prevailing tradewind conditions. During Kona (westerly) winds the surface waters can be expected to be held against the shore. Currents nearshore along the beach are dependant on the wave height and angle of approach to the beach, and overall are relatively weak. Thus dispersion of storm water runoff near the shore would generally be slow.

The existing water quality in the project area is typical of Hawaiian coastal waters, with generally high water quality and clarity most of the time. Episodic degradation of the nearshore waters can occur following periods of high rainfall in the uplands. The existing water quality generally meets the criteria set by the State Water Quality Standards, with the exception of somewhat high total nitrogen and chlorophyll-a values. The high nitrogen content likely reflects the use of agricultural fertilizers on the existing nearshore surgar cane fields. The high chlorophyll-a values indicate high phytoplankton biomass in the coastal waters. High turbidity (brown water) was noted in a narrow band along the shore during several of the site visits. The turbidity appears to be a function of higher wave heights at the shore churning up and temporarily suspending fine sediments, and not a function of rainfall runoff.

A scoured limestone bottom predominates immediately offshore in the project area. At depths between 1 and 4 meters (3 to 12 feet) the limestone bottom harbors well-developed assemblages of corals and fishes, particularly in the middle and southern portions of the project area. At the northern end in this depth range the limestone platform is narrow and coral growth is generally poor. Farther offshore, at depths exceeding 4 meters (12 feet), the bottom is either sand, or a mixture of sand, rubble, and limestone outcrops. The latter harbor corals whose cover value varies greatly from place to place. However, at depths exceeding about 8

meters (26 feet), these outcrops harbor a dense growth of the finer coral, Porites compressa, which forms a discontinuous band of rich coral bottom generally at distances in excess of 180 meters (600 feet) from shore. The distribution of coral assemblages and other bottom types suggests that placement of shoreline and nearshore discharges of storm water would have the least detrimental impact on the natural resources of the marine environment if directed into predominantly sand bottom areas at the north end of the project area.

D

ENVIRONMENTAL ASSESSMENT, COASTAL INFRASTRUCTURE

&

ENVIRONMENTAL IMPACT, ELIMINATION OF OUTFALL & RELOCATION OF OPEN CHANNEL

4431-C05

ENVIRONMENTAL ASSESSMENT
FOR
DEPARTMENT OF THE ARMY PERMIT APPLICATION

NORTH BEACH KAANAPALI

Prepared for:
Kaanapali North Beach Joint Venture

A Joint Venture Development of
Amfac Property Development Corporation
and
Tobishima Pacific, Inc.

Prepared by:
Dames & Moore

June 10, 1987

EXECUTIVE SUMMARY

ENVIRONMENTAL ASSESSMENT
COASTAL INFRASTRUCTURE
KAANAPALI NORTH BEACH RESORT

by Dames and Moore
June 10, 1987

PROJECT DESCRIPTION

The stormwater discharge structures would consist of a trapezoidal channel discharging at the shoreline and an outfall pipeline terminating offshore.

The channel outlet has been designed as a buried revetment. The revetment would prevent excess erosion during high storm flow periods and would prevent undermining of the channel outlet during high wave action periods. The revetment would be buried and would not be visible during normal periods, and would become visible only after heavy storms or after high wave action. The revetment would be reburied by sand during the course of normal sand transport activity following the extreme events. Sand blockage at the channel revetment would be cleared periodically to maintain the hydraulic integrity of the channel. Based on analysis of coral activity offshore, the channel outlet is located in an area of little or no coral growth.

The outfall is designed to carry a small portion of the total storm flow which cannot be routed to the channel outlet because of hydraulic reasons. The outfall is located in an area where coral activity is significant, although not the best areas of coral growth. The outfall will carry the storm flow beyond the zone of coral activity.

IMPACTS

The overall drainage impact will be positive. The open channel and channel outlet will restore the natural outlet for Hanakaoo Gulch, the natural drainageway on the mauka side of Honoapiilani Highway. There will be twin 12-foot wide box culverts to carry the water underground across the Highway to the site. The restoration of the direct outlet to the ocean will greatly reduce the likelihood of flooding of the area immediately below the gulch and of Honoapiilani Highway. The channelization of the water will result in higher velocity inflow to the ocean, and the storm water and associated sediment load will be taken quickly offshore rather than diffusely entering the nearshore areas. The outfall will discharge storm water beyond the near shore areas of high quality coral growth, within a sandy bottom area.

Negative impacts are primarily due to construction activity, including removal of some coral during construction of the outfall. Sedimentation will increase in offshore areas, corresponding to the decrease in sedimentation in nearshore areas and on land. In the long term, the sediment load will decrease as sugar cane cultivation is reduced.

MITIGATION MEASURES

Based on the environmental analyses performed for this project, a number of mitigative measures were adapted during the planning phases of the project. These include the following:

1. Based on the presence of significant live coral activity to the southern end of the project area, the location of the proposed channel outlet was moved from the originally proposed position D1 to the proposed position D4. Position D4 has indications of being the original channel outlet location prior to construction of the Kaanapali Airstrip, and has little live coral activity.

2. Because it was not possible hydraulically to route all of the storm discharge to the proposed channel outlet at position D4, a small portion of the storm drainage will be routed to position D3. At this location, an outfall will be constructed to carry the discharge beyond the zone of significant live coral activity.

3. A sedimentation basin will be included at the end of Hanakaoo Gulch, to prevent the entry of coarse sediments into the open channel and into the ocean. A smaller sediment trap will prevent the entry of coarse sediments into the outfall.

4. To prevent significant beach erosion from occurring during high flows through the channel outlet, a revetment structure will be constructed under the beach at the channel outlet location. The revetment will also prevent undermining of the channel.

5. Both the revetment and the outfall will be buried under the beach to avoid interruption of natural beach processes and to preserve the esthethics of the area.

ALTERNATIVES

1. NO DRAINAGE STRUCTURES

The project is not feasible without the drainage structures. The investment in developed property could not be made, nor could building permits be obtained without adequately handling the storm flows from areas mauka of the proposed development.

2. ALTERNATVE 1

The first alternative investigated was discharge of all storm water at location D1. This is the most cost effective alternative since all storm flows can be hydraulically routed to this single location, and a single channel and outlet would be required. Because the flows could be combined, an outfall would not be required.

Upon review of the offshore marine biology, it became clear that the area offshore of D1 was an area of significant coral growth which should be protected. As a result, this alternative was discarded.

3. ALTERNATIVE 2

The second alternative examined was a channel outlet at location D4, with on-beach discharges at locations D1 and D3. The on-beach discharges would consist of two 42-inch pipes at location D3 and an 8 ft x 4 ft box culvert at location D1. In this alternative, the majority of the flow would be discharged by the channel outlet at location D4, an area with little live coral activity. Flows which could not be hydraulically routed to D4 would be discharged on the beach at D1 and D3.

This alternative results in relatively direct routing of the open channel to a discharge at D4. The flows to D1 and D3 would also be routed relatively directly. Due to the direct routing, and the avoidance of an outfall, this alternative has some cost advantages. In addition, avoidance of an outfall would eliminate the direct removal of coral along the outfall alignment.

The main disadvantages are that the flows at D1 and D3 would discharge onto areas of well-developed biological communities, and that on-beach discharge pipes and culverts may detract from the aesthetics at these locations. However, since the flows at D1 and D3 would be relatively small compared to flows at D4, the impact on biological communities at these areas may be comparable to the impact resulting from construction of the proposed outfall, which would involve removal of coral along the outfall alignment at location D3. Due to these considerations and the fact that aesthetical concerns could possibly be incorporated into the design of the discharge pipes and culverts, Alternative 2 is still a viable alternative.

D-3

TABLE OF CONTENTS

1.0 SUMMARY

1.1 DESCRIPTION OF THE ENTIRE PROJECT

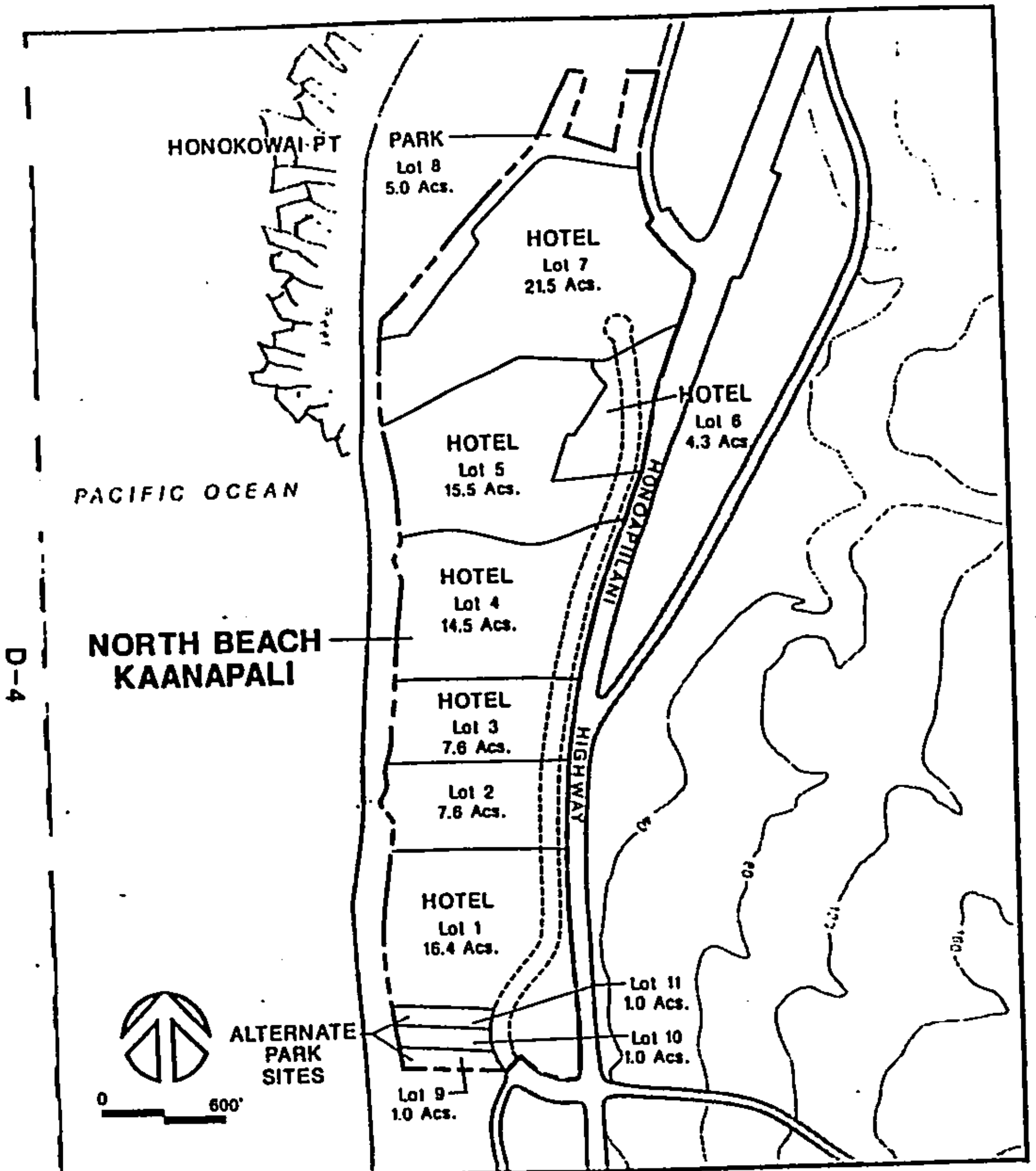
The Kaanapali North Beach Joint Venture ("Joint Venture") is planning to subdivide and improve a 95-acre piece of ocean front property at North Beach, directly north of and adjacent to the Kaanapali Beach Resort. The developers intend to create eleven lots which may be consolidated in a maximum of six hotel sites and two park sites. There is also the possibility that fewer but larger hotel sites will be developed. The proposed subdivision plan (see Figure 1) illustrates the eleven lots. Lot 8 at the northern end of the property and either Lot 9 or 11 at the southern end would be dedicated for public park use. Lots 5 and 6 will be consolidated into a single hotel site. The remaining 1-acre Lots (9 and 10 or 11) could either be combined into a single small 2-acre parcel, or incorporated into the larger parcels to the north or south. Lots 2 and 3 could be combined into one 15.2 acre hotel site, or split and consolidated with Lots 1 or 4, respectively. The proposed subdivision plan provides the flexibility to accommodate a variety of site configurations. In any case, two park sites will be dedicated to the County. All utilities and a major parkway will be constructed to service each parcel. The first phase of development will include layout and construction of the internal parkway and site preparation in accordance with the subdivision plan, construction of the drainage system, and other public utilities.

Upon completion of the project, the Joint Venture will sell or lease the hotel sites to hotel developers. All hotel projects will be subject to the Kaanapali North Beach Resort covenants and fees. Additionally, each hotel will become a member of the Kaanapali Beach Operator's Association, a non-profit organization created to maintain the marketability of the Kaanapali area. Hotel construction is expected to occur during subsequent phases extending up to a ten-year period. The projected hotel room counts are shown on the following table. It should be noted that these projected room counts are lower than the allowable densities under existing zoning regulations. H-M zoned property would allow up to 50 hotel units per acre; H-2 would allow up to 70 units per acre. The actual number of rooms may be less than indicated in the table, depending upon the individual hotel design and the operational preferences of each hotel developer.

PROJECTED HOTEL ROOM COUNT

Lot	Acreage	Zone	Projected Room Count
1	16.4	H-M	574
2	7.6	H-M	258
3	7.6	H-M	258
4	14.5	H-M	508
5 & 6	19.8	H-M	693
7	21.5	H-M, H-2	909
10**	1.0	H-M	
11**	1.0	H-M	
	89.4		3,200

*Lot 6 to be rezoned to H-M
**May be incorporated into Site 1.



NORTH · BEACH Proposed Subdivision Plan Figure: 1

Kaanapali, Maui

Amfac Property Development Corp/Tobishima Pacific, Inc. HH&K Planners

1.2 INTENDED USE OF THIS ENVIRONMENTAL ASSESSMENT

This Environmental Assessment has been prepared for the Army Corps of Engineers as part of the Department of the Army Permit for construction of the proposed drainage structures. An Environmental Assessment of the entire Kaanapali North Beach project was prepared in December 1986 by Helber, Hastert, Van Horn & Kimura (HHV&K, 1986). This Assessment incorporates information from the 1986 Assessment but focuses primarily on the proposed drainage structures for the project and their impact on the marine and coastal environment.

1.3 BRIEF DESCRIPTION OF THE PROJECT AREA COVERED IN THIS ENVIRONMENTAL ASSESSMENT

The unimproved 95-acre ocean-front property was formerly the site of the Kaanapali Airport, and still contains the remnants of the abandoned runway, vacant terminal area and parking lot (see Figure 2). Sugar cane fields cover approximately three-fourths of the project area. Also present are limited areas of kiawe forest (along makai and northern boundaries), strand vegetation (in the loose sandy beach areas), and koa-haole scrub (along the highway). All airport structures (terminal building, etc.) have been removed and the old runway has been broken up. The parcel runs north-south along the shoreline, on the makai side of the Honoapiilani Highway. The site is gently sloping from north to south and from highway to the beachline, with an average slope of one percent. Access to the site is provided by Kai Ala Drive, the old airport driveway off the Honoapiilani Highway.

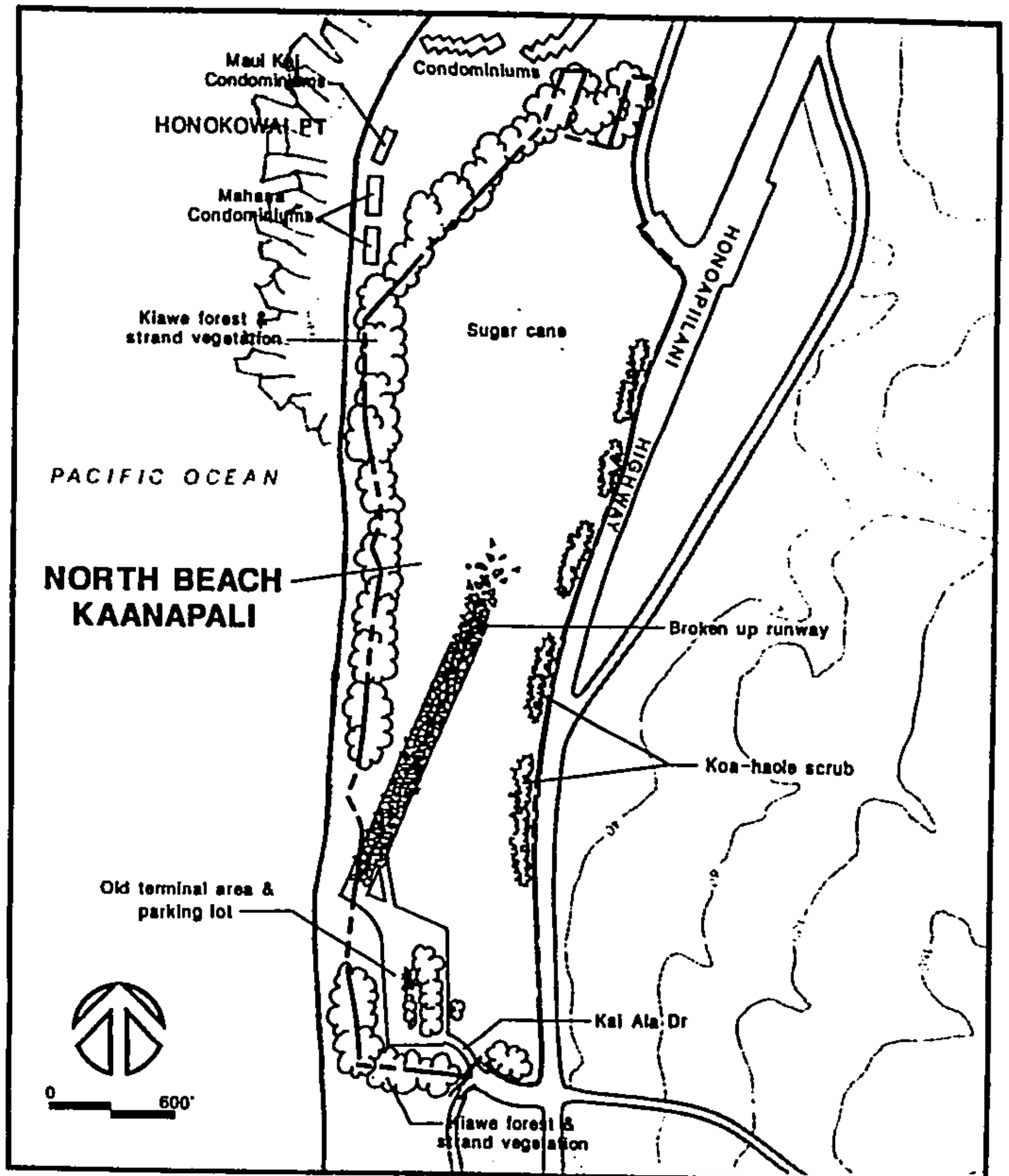
The southern boundary of the proposed site is adjacent to the established Kaanapali Beach Resort, specifically the Maui Kaanapali Villas condominiums and the Royal Lahaina Hotel. The northern boundary of the site abuts the 12-story Mahana condominium in the resort area of Honokowai. The property contains approximately 3,400 feet of ocean frontage to the west. The eastern edge of the site (mauka portion) abuts the Honoapiilani Highway. Uses directly mauka of the highway include sugar cane fields, a cluster of rental car outlets and the Lahaina Wastewater Treatment Plant.

2.0 <u>PROJECT DESCRIPTION</u>

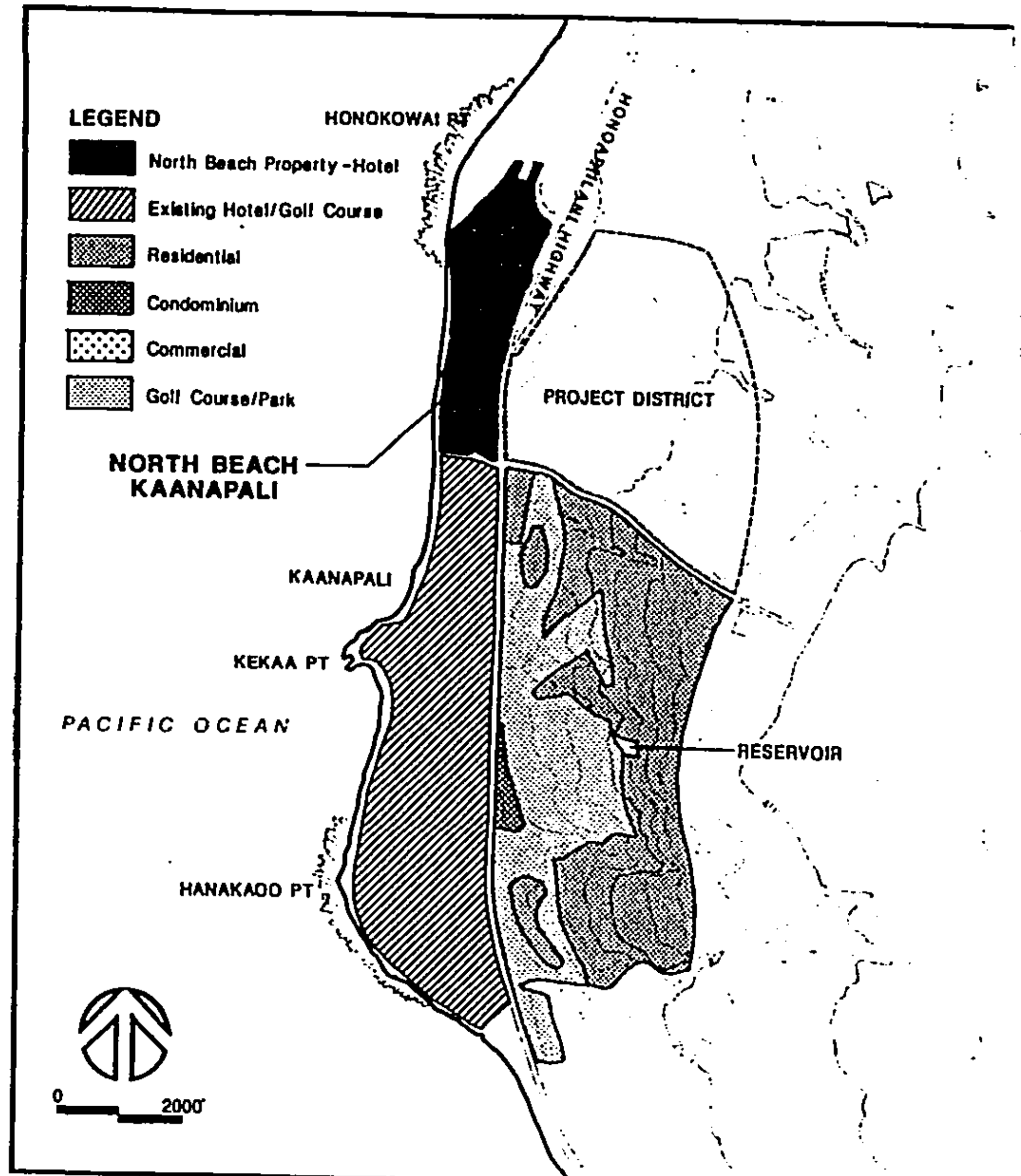
2.1 SITE LOCATION

The proposed project site of approximately 95 acres is located on the leeward coast of west Maui, Lahaina Judicial District. The proposed site is on the tax map key 2nd Division, 4-4-01:por. 02, 03, 06, 08, 09, and 68, and 4-4-02:24 and 4-4-06.5. The Amfac Property Investment Corporation and Tobishima Pacific Inc. own the property in fee. According to Amfac's Kaanapali Master plan, the North Beach area is the last remaining beachfront hotel area (see Figure 3).

The offshore areas of interest include the shoreline and nearshore waters in the vicinity of Honokowai Beach (North Beach). The area is bounded by Kekaa Point to the south and Honokowai Point to the north.



NORTH · BEACH Existing Site Conditions
Kaanapali, Maui
Amfac Property Development Corp/Tobishima Pacific, Inc.
Figure: 2
HH&K Planners



NORTH · BEACH Kaanapali Master Plan
Kaanapali, Maui
Amfac Property Development Corp/Tobishima Pacific, Inc.
Figure: 3
HH&K Planners

2.2 PROPOSED STRUCTURES

Discharge structures at the shoreline or offshore were considered at four separate locations (D-1 through D-4), indicated on the Plot Plan, Figure 4. Based on analysis of discharge areas of minimum environmental effect and based on hydraulic considerations in handling the stormwater runoff, the stormwater discharge structures would consist of the following:

- a trapezoidal channel discharging at the shoreline near the north end of the project (location D-4, coordinate 5,220 N)

- an outfall pipeline terminating offshore at location D-3 (coordinate 4,500 N)

2.3 CONSTRUCTION PLANS AND SPECIFICATIONS

See attached construction plans and specifications (Appendix A).

2.4 GOALS AND OBJECTIVES OF STRUCTURES

An analysis of historic shoreline changes was made based on existing available information, including previous studies, old surveys, and aerial photographs. A shoreline monitoring program was conducted in order to assess the volume/rate of seasonal beach changes. Detailed studies were also made to provide data on currents and circulation and to develop coastal engineering design parameters. The results of these studies are presented in Dames and Moore's report "Coastal and Oceanographic Engineering Services, Proposed Kaanapali North Beach Development, Kaanapali, Maui, Hawaii (Dames and Moore, 1986).

Based on these studies, the channel outlet has been designed as a buried revetment. The revetment would prevent excess erosion during high storm flow periods and would prevent undermining of the channel outlet during high wave action periods. The revetment would be buried and would not be visible during normal periods, and would become visible only after heavy storms or after high wave action. The revetment would be reburied by sand during the course of normal sand transport activity following the extreme events. Sand blockage at the channel revetment would be cleared periodically to maintain the hydraulic integrity of the channel. Based on analysis of coral activity offshore, the channel outlet is located in an area of little or no coral growth.

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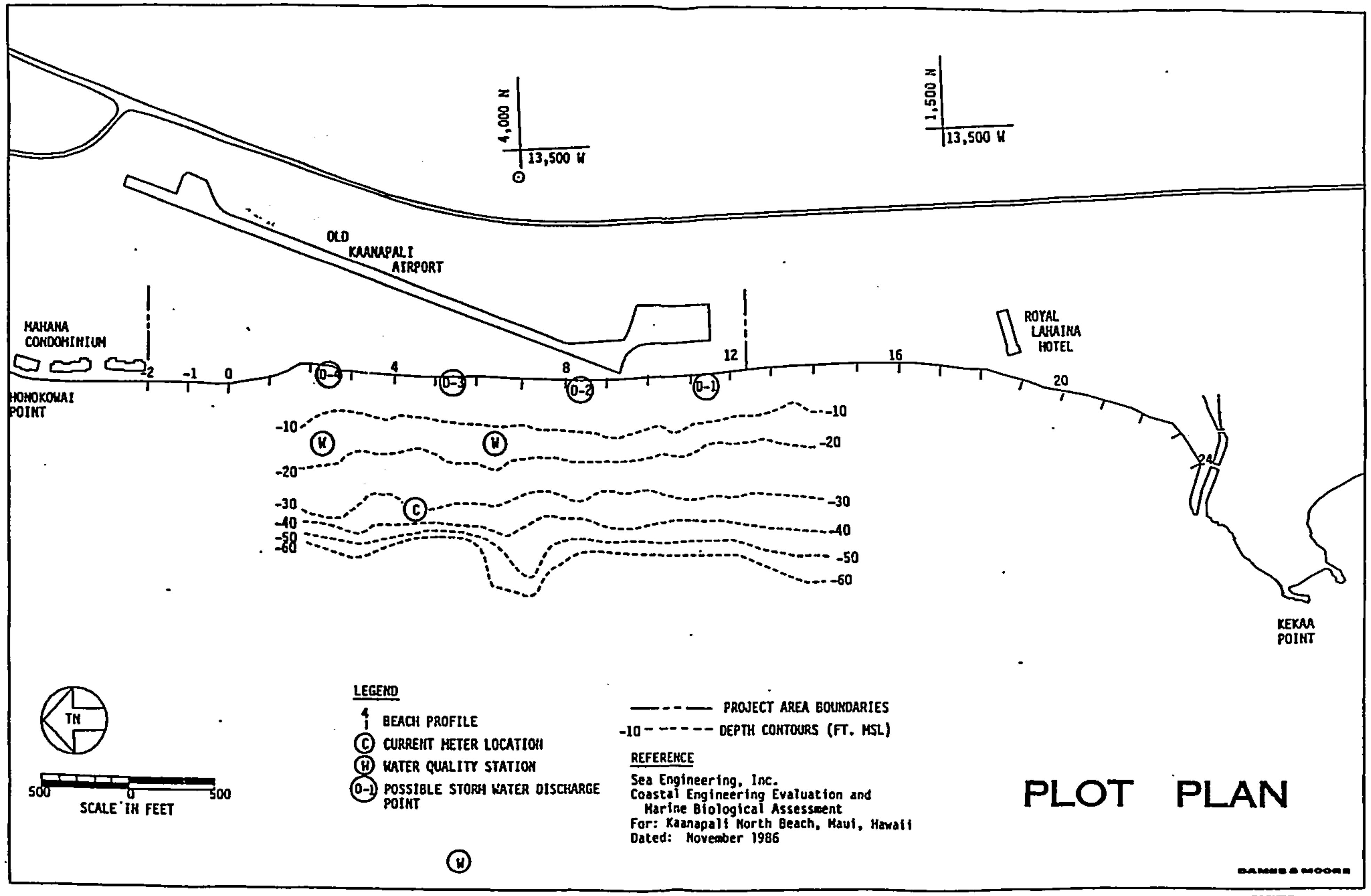

4,000 N
13,500 W
1,500 N
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OLD KAANAPALI AIRPORT
MAHANA CONDOMINIUM
HONOKOWAI POINT
ROYAL LAHAINA HOTEL
KEKAA POINT
-2 -1 0 4 8 12 16 20 24
D-4 D-3 D-2 D-1
-10 -20 -30 -40 -50 -60
TN
500 0 500
SCALE IN FEET
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WATER QUALITY STATION
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-10 DEPTH CONTOURS (FT. MSL)
REFERENCE
Sea Engineering, Inc.
Coastal Engineering Evaluation and
Marine Biological Assessment
For: Kaanapali North Beach, Maui, Hawaii
Dated: November 1986
PLOT PLAN
DAMES & MOORE

FIGURE 4

3.0 ENVIRONMENTAL SETTING WITHOUT THE PROJECT

3.1 GENERAL DESCRIPTION

The shoreline in the project area is relatively stable over the long term, with significant seasonal changes to the beach. The winter season north swell waves move sand southward, and the summer south swell moves the sand north. There appears to be very little net loss to the beach system due to the seasonal sand transport, however the seasonal gains and losses of sand in the project area generally results in beach excursions of ± 10 to 20 feet around the average long term beach position. Typical sand transport rates vary from 1 to 3 cubic yards of sand per day per 100 feet of beach.

The project site is exposed to the prevailing sea and swell from the south clockwise to the north, and to infrequent, but possibly severe, storm wave attack. The existing shoreline elevations of +8 to +10 feet MSL (Mean Sea Level, all elevations refer to this datum) at the beach crest/vegetation line provide good storm wave runup protection.

The existing water quality in the project area is typical of Hawaiian coastal waters, with generally high water quality and clarity most of the time. Episodic degradation of the nearshore waters can occur following periods of high rainfall in the uplands. The existing water quality generally meets the criteria set by the State Water Quality Standards, with the exception of somewhat high total nitrogen and chlorophyll-a values. The high nitrogen content likely reflects the use of agricultural fertilizers on the existing nearshore sugar cane fields. The high chlorophyll-a values indicate high phytoplankton biomass in the coastal waters. High turbidity (brown water) was noted in a narrow band along the shore during several of the site visits. The turbidity appears to be a function of higher wave heights at the shore churning up and temporarily suspending fine sediments, and not a function of rainfall runoff.

A scoured limestone bottom predominates immediately offshore in the project area. At depths between 1 and 4 meters (3 to 12 feet) the limestone bottom harbors well-developed assemblages of corals and fishes, particularly in the middle and southern portions of the project area. At the northern end in this depth range the limestone platform is narrow and coral growth is generally poor. Farther offshore, at depths exceeding 4 meters (12 feet), the bottom is either sand, or a mixture of sand, rubble, and limestone outcrops. The latter harbor corals whose cover value varies greatly from place to place. However, at depths exceeding about 8 meters (26 feet), these outcrops harbor a dense growth of the finer coral, <u>Porites compressa</u>, which forms a discontinuous band of rich coral bottom generally at distances in excess of 180 meters (600 feet) from shore. The distribution of coral assemblages and other bottom types suggest that placement of shoreline and nearshore discharges of storm water would have the least detrimental impact on the natural resources of the marine environment if directed into predominantly sand bottom areas at the north end of the project area.

3.2 EXISTING LAND AND WATER USE

The unimproved 95-acre ocean-front property was formerly the site of the Kaanapali Airport, and still contains the remnants of the abandoned runway, vacant terminal area and parking lot (see Figure 2). Sugar cane fields cover approximately three-fourths of the project area. Also present are limited areas of kiawe forest (along makai and northern boundaries), strand vegetation (in the loose sandy beach areas), and koa-haole scrub (along the highway). All airport structures (terminal building, etc.) have been removed and the old runway has been broken up. The parcel runs north-south along the shoreline, on the makai side of the Honoapiilani Highway. The site is gently sloping from north to south and from highway to the beachline, with an average slope of one percent. Access to the site is provided by Kai Ala Drive, the old airport driveway off the Honoapiilani Highway.

The southern boundary of the proposed site is adjacent to the established Kaanapali Beach Resort, specifically the Maui Kaanapali Villas condominiums and the Royal Lahaina Hotel. The northern boundary of the site abuts the 12-story Mahana condominium in the resort area of Honokowai. The property contains approximately 3,400 feet of ocean frontage to the west. The eastern edge of the site (mauka portion) abuts the Honoapiilani Highway. Uses directly mauka of the highway include sugar cane fields, a cluster of rental car outlets and the Lahaina Wastewater Treatment Plant.

During the course of field work, we noted that snorkel and SCUBA dive tours operate in the waters offshore of the southern part of the project area. This is consistent with our observations that reef development in the southern area is exceptional and suggests that this area may be one of the better accessible dive areas in the vicinity of Kaanapali or Lahaina.

3.3 EXISTING ATMOSPHERIC CONDITIONS

3.3.1 Meteorology

The 95-acre project site is located on the dry leeward coast of west Maui, in the Lahaina Judicial District. The average annual rainfall in the area is between 15-18 inches. No streams are located on the site. However, there is evidence of natural mauka-makai drainageways and there is a drainage ditch parallel to the shore near the makai forest. There is offshore evidence that the proposed channel outlet location was formerly the natural outlet for a stream which was filled in during construction of the existing airstrip.

The average annual temperature in the nearby Lahaina area ranges from 71.5 to 78 degrees Fahrenheit (1985 State Data Book). Tradewinds blow from the north-east.

3.3.2 Air Quality

An Air Quality Analysis was conducted by J. W. Morrow and is included as Appendix G of HHV&K (1986). Despite the absence of continuous air monitoring stations in the project area, the analysis assumes that present air quality is good most of the time. Major activities affecting air quality include agricultural activities such as sugar cane field burning, bagasse and fossil fuel burning at sugar mills, pesticide spraying, and dust from fallow cane fields. Pollutants from automobile emissions include carbon monoxide (CO), oxides of nitrogen (NOx), and photochemical oxidants (Ox).

3.4 EXISTING DRAINAGE

Several streams drain the west Maui mountains into the general Honokowai/Kaanapali/Lahaina coastal region, none of which directly enter the project area. The nearest stream to the north is Honokowai Stream, entering the ocean about one mile north of the project area. Wahikuli Stream enters the sea about two and one-half miles south of the project area. The Hanakaoo Gulch is a natural drainageway which terminates mauka of the project. During major storms, storm runoff overtops Honoapiilani Highway and floods the project site, and eventually sheet flows out to sea.

Off Site D-4, the proposed location of the channel outlet, the extent of limestone bottom decreases, and the water depth over this substratum is less than to the south. Coral communities are poorly developed nearshore in the northern part of the survey area as compared with the central and southern portions. The overall appearance of the massive limestone formation off Site D-4 is suggestive of a former stream outlet at this location.

The presence of the airstrip results in the existing drainage in this area flowing as sheet flow over the airstrip. The water tends to pond behind the beach berms and breaks through at several points onto the beach.

3.5 EXISTING COASTAL PROCESSES

3.5.1 Existing Ocean Currents and Circulation

Detailed current and circulation studies were accomplished in the project area using both an in-situ recording current meter and current drift drogues. A digital recording current meter was deployed offshore at the approximate 30-foot depth contour (current meter depth approximately 25 feet), and centered between two previously proposed discharge points. The current meter was deployed for approximately 90 days, and recorded current speed and direction at 15-minute intervals. The current meter data was computer analyzed for speed and direction histograms; net transport; average, minimum, and maximum current speeds; and persistence of flow.

The long-term current meter data was supplemented by drogue studies conducted four times during the study period to provide information on circulation patterns, vertical and horizontal current gradients, and wind-driven surface flow, as well as to note seasonal variations, if any. Dye studies were conducted along the shore in the vicinity of the proposed discharge points. Current data was used in modeling the results of discharge and in design of the outfall. The data are presented in Dames and Moore (1986).

The prevailing coastal currents are governed by the semi-diurnal tide, with a strong ebb tide flow to the north and a weaker flood tide flow to the south. The overall net transport away from the project site is to the north

at about 3 cm/sec. The coastal current sets primarily parallel to the shore, with little onshore/offshore movement except for the wind-induced surface currents which generally have an offshore component during prevailing tradewind conditions. During Kona (westerly) winds the surface waters can be expected to be held against the shore. Currents nearshore along the beach are dependant on the wave height and angle of approach to the beach and, overall, are relatively weak. Thus dispersion of storm water runoff near the shore would generally be slow.

3.5.2 Existing Beach Erosion

The Kaanapali coast has a history of considerable sand movement, with sand being transported along the shoreline by wave generated longshore currents. The shoreline history of the area and the field investigations conducted for this study indicate that the dominant south swell in the summer moves sand northward; and in the winter the trend reverses as the south swell becomes less frequent and the north swell occurs to move sand southward again.

Kekaa Point likely acts as an almost complete barrier to sand transport along the beach, with little sand moving north or south past it. Thus, in the winter it blocks the south movement of sand and the beach just north of the point rapidly accretes. During the summer, when the predominant sand movements is to the north, the point prevents sand movement from the south to replace that being moved north away from the point and, consequently, the beach immediately north of the point becomes narrower due to a net sand loss.

The beach fronting the project area is subject to seasonal changes due to the north-south longshore transport, however the changes are much less than are experienced at the ends of the beach. Seasonal gains and losses of sand in the project area generally results in beach toe movement of ± 10 to 20 feet around the average long term beach position. Aerial photographs over a 35-year period from 1949 to 1984 show the seasonal beach changes, and an apparent net long term recession of the shoreline of about 20 feet. This estimate of long term recession is very approximate however, as it is the same order of magnitude as the estimated confidence limits of the analytical techniques used.

While the coastal processes in the project area appear to result in a relatively stable shoreline over the long term, significant short-term beach changes can occur due to unusual seasonal wave climate changes or severe local storms.

The sand transport rates indicate that sand plugging of drainage channels terminating at the shoreline will be a problem in the project area. The rate of sand plugging appears to be less, however, at the north end of the project area than at the south end.

The beach profiles indicate that the solid reef rock is continuous along the shore in the project area, and extends some distance inland under the beach sand. The elevation of the rock along the shore varies from 0 to -6 feet MSL.

3.6 EXISTING OCEAN WATER QUALITY

The existing water quality in the project area was measured and baseline conditions established for assessment of possible water quality impacts. The water quality was measured at two nearshore stations in the vicinity of the proposed discharges, and at one offshore control station. Temperature, salinity, dissolved oxygen, and turbidity was measured in-situ, and water samples were laboratory analyzed for nutrients (nitrogen and phosphorus), pH, suspended solids, and chlorophyll-A. Water quality was measured four times during the study period. Existing information on general water quality characteristics in the Kaanapali, Maui area was also reviewed and summarized. Temperature/salinity profiles were made in order to determine any density stratification in the water column at the proposed pipeline discharge point.

Nearshore waters along the Kaanapali coast area are designated Class A, Open Coastal Waters by the State of Hawaii, Department of Health. The waters are also classified as seasonally wet, thus "wet" water quality criteria apply during the winter rainy season and "dry" criteria apply during the summer. The quality of these waters is generally good, although problems sometimes arise from land drainage and/or cesspool seepage into nearshore waters. However, now that a wastewater treatment plant has been constructed adjacent to Honoapiilani Highway directly inland from Kaanapali Beach, the impact from cesspools in the Honokowai/Kaanapali area is expected to diminish.

Although prior studies and reports on water quality are limited, the general impression obtained is one of generally high water clarity and quality most of the time with episodic degradation of nearshore waters following periods of high rainfall in the up-lands.

Water quality data obtained for this study are summarized and discussed in Dames and Moore (1986).

3.7 EXISTING MARINE BIOLOGY

A quantitative marine biological survey was conducted along the proposed drainage outfall pipeline routes and seaward of the proposed drainage channel outlets. The survey primarily concentrated on coral abundance and diversity, fish populations, and macroinvertebrates. A detailed description of the survey results is presented in Dames and Moore (1986).

The results of the biological survey reveal diverse coral bottom and fish assemblages offshore along much of Kaanapali Beach. Biological communities are best developed off Site D-2. In the northern section (off Site D-4), benthic community development is poor nearshore and the bottom is mostly sand offshore. Although the shallow fringing reef north of Site D-4 (around Honolowai Point) was only partially surveyed in this study, this area also appears to harbor a poorly-developed or stressed marine bottom community. South of Site D-1, the bottom is mostly sand, and live corals are scarce.

Off Site D-4 the extent of limestone bottom decreases, and the water depth over this substratum is less than to the south. Coral communities are poorly developed nearshore in the northern part of the survey area as compared with the central and southern portions. The overall appearance of the massive

limestone formation off Site D-4 is suggestive of a former stream outlet at this location.

Nearshore benthic communities are well developed in the southern three-fourths of the study area. This information suggests that the proposed discharge(s) should be located as far to the north end of the Kaanapali Airstrip site as practicable. The presence of well-developed benthic coral communities in close proximity to Kaanapali Beach suggests the need for caution on the placement of storm water discharges relative to these communities. This survey points out the need to incorporate nearshore current patterns and net current flow in the area in decisions concerning the placement of land drainage discharge points.

4.0 ENVIRONMENTAL IMPACT OF THE PROPOSED PROJECT

4.1 GENERAL IMPACTS

General impacts were presented in the EA for the entire project (HHV&K, 1986). These include some visual, traffic, land use, indirect air quality, noise, water use, sewage and solid waste increase, and increased usage of electric power, communications, police, fire protection, medical, and school facilities. Positive impacts include increased recreational facilities and socioeconomic impacts.

The overall drainage impact will be positive. The open channel and channel outlet will restore the natural outlet for Hanakaoo Gulch, the natural drainageway on the mauka side of Honoapiilani Highway. There will be twin 12-foot wide box culverts to carry the water underground across the Highway to the site. The restoration of the direct outlet to the ocean will greatly reduce the likelihood of flooding of the area immediately below the gulch and of Honoapiilani Highway. The channelization of the water will result in higher velocity inflow to the ocean, and the storm water and associated sediment load will be taken quickly offshore rather than diffusely entering the nearshore areas. The outfall will discharge storm water beyond the nearshore areas of high quality coral growth, within a sandy bottom area.

Negative impacts are primarily due to construction activity, including removal of some coral during construction of the outfall. Sedimentation will increase in offshore areas, corresponding to the decrease in sedimentation in nearshore areas and on land. In the long term, the sediment load will decrease as sugar cane cultivation is reduced.

4.2 IMPACT ON LAND AND WATER USE

The proposed development will result in the conversion of the existing sugar cane fields on the property to hotel/resort use. Pioneer Mill Company, an Amfac subsidiary, currently farms approximately 7,900 acres of sugar cane and the resultant loss in cane land because of the North Beach project will mean a reduction of less than 1 per cent of the land used for the production of sugar.

Recently Pioneer Mill Company announced plans to consolidate its operations from 7,900 acres to approximately 4,000 acres. The planned consolidation reflects a major effort on Amfac's part to bring the cost of production in line with current sugar market conditions. One of the major components of this effort is aimed at maximizing the plantation's use of less expensive surface water sources and to minimize the current necessity to rely on the energy intensive pumping of irrigation water from basal sources. By maximizing use of surface water, reducing total acreage and rescheduling factory and field operations, Pioneer hopes to achieve an ongoing, economically viable operation with approximately 4,000 cultivated acres by approximately 1990.

According to Pioneer Mill Company, planning for new replacement crops such as cacao is underway. Cacao is a less water intensive crop than sugar cane and is a potentially profitable crop. The company is also exploring the cultivation of pineapple and other agricultural uses. Overall, the removal of sugar cane from North Beach acreage will not have a negative impact on sugar operations. In fact, the reductions fit well into Pioneer Mill Company's future operational strategy.

The sources of the Kaanapali area's existing water are groundwater from the Honokowai and Mahinahina deepwells. The proposed water system for North Beach would be comprised of a new 16-inch waterline within the proposed Kaanapali North Beach access road, connecting to the existing 16-inch water line which terminates approximately 400 feet makai of Honoapiilani Highway.

The development will provide for its storage, pumpage and transmission needs as required by the Kaanapali Water Corporation. The project's water system will be dedicated to the Kaanapali Water Corporation, a wholly-owned Amfac subsidiary. By state law, this company falls under the control and jurisdiction of the Public Utilities Commission, a state regulatory agency.

4.3 IMPACT ON ATMOSHERIC CONDITIONS

Positive impacts on air quality are related to the removal of land from sugar cane production. The effects of sugar cane field burning, bagasse and fossil fuel burning at sugar mills, pesticide spraying, and dust from fallow cane fields would be reduced.

The increased vehicular traffic has the potential for having significant cumulative impacts on local air quality, particularly in the vicinity of intersections with Honoapiilani Highway. Other indirect negative impacts include additional pollutant emissions at the power plant due to increased energy demand, and possible increased air emissions due to incineration of solid waste produced by the development. Construction activity will generate a short term increase in particulate emissions. Adequate dust control measures during construction (such as twice daily watering of exposed areas and early landscaping) will be utilized to prevent violations of state fugitive dust standards.

4.4 IMPACT ON DRAINAGE

4.4.1 Impact on Drainage Configuration

Drainage, primarily from areas mauka of the Honoapiilani Highway will be carried to or into the ocean by an open channel and a twin 66-inch outfall. The open channel carries the majority of the flow and was placed in an area of little coral growth, an area which may have been the point of the original discharge from Hanakaoo Gulch prior to construction of the existing airstrip. The twin 66-inch outfall carries smaller quantities of flow which cannot be routed to the open channel because of hydraulic limitations. The open channel will result in restoring a direct outlet to the ocean for Hanakaoo Gulch, where presently there is none. Storm water currently tends to flow over the existing airstrip, ponding behind the beach berms and breaking through at several points onto the beach. The restoration of the direct outlet to the ocean will greatly reduce the likelihood of flooding of the area immediately below the gulch and of Honoapiilani Highway.

4.4.2 Impact on Quality of Drainage Waters

Initially, there is expected to be little change in the quality of drainage waters. A sedimentation/infiltration basin will be constructed at the end of Hanakaoo Gulch, which is expected to retain all flows except for the highest storm flows . For higher storm flows, the sedimentation basin will remove some of the coarser fraction of the sediment load from the storm flow.

With further development of the area mauka of the Honoapiilani highway, a reduction in erosion and sediment load and an increase in water quality is expected as agricultural lands are converted to condominium and golf course use.

4.5 IMPACT ON COASTAL PROCESSES

The sand transport rates indicate that sand plugging of drainage channels terminating at the shoreline will be a problem in the project area. The rate of sand plugging appears to be less, however, at the north end of the project area than at the south end. Sand plugging will require periodic maintenance for removal of sand from the channel outlet.

A large trapezoidal drainage channel is proposed, with sloping rock revetment constructed to stabilize the mouth of the channel. The beach slope averages about 1V:4H to 1V:6H, with reef rock at -3 to -6 feet. The planned revetment slope will be 1V:5H and the toe will be constructed to rest on the solid, non-erodable reef rock, or where a sand foundation is encountered, to a minimum depth of -6 feet MSL in order to be below the anticipated scour depth. The revetment will also be located 20 feet landward of the end of winter beach profile, in order that it not be exposed during normal seasonal beach changes. Should it become exposed, either due to heavy stormwater discharge eroding the beach at the channel mouth or by severe storm wave attack, the relatively flat 1V:5H slope will reduce its adverse impact on normal beach processes, and the revetment would likely quickly be covered again by the beach once normal sand transport resumed.

The ocean outfall constructed across the beach will have a slope no steeper than the existing beach slope, about 1V:6H, and will be a minimum of 20 feet landward of the end of winter beach profile. The pipe will be trenched through the rock along the shore, both to remove it from having any influence on the beach processes and to protect it from wave attack.

4.6 IMPACT ON OCEAN WATER QUALITY

In order to evaluate potential offshore impacts due to discharge of suspended sediments carried by stormwater drainage, numerical modeling of the discharges was accomplished. The nearfield plumes and farfield transport of stormwater discharges were analyzed.

4.6.1 Open Channel Discharge

The channel outlet would discharge the majority of the storm runoff and would have the greatest offshore impacts. Thus, both a 100-year storm condition and a 10-year condition were modeled for the channel outlet. The outfall was modeled with a 10-year storm condition.

The open channel plume model was run for two storm conditions, each with four combinations of discharge and ambient current characteristics:

Case 1: 100-year storm event (no retention basin)
Case 2: 10-year storm event (with retention basin)

(a) High discharge, no ambient current
(b) High discharge, strong ambient current
(c) Average discharge, no ambient current
(d) Average discharge, average ambient current

Since the model cannot accommodate variable discharges or variable ambient conditions, the four simulations for each case event would bracket the limits of plume impact in the offshore and alongshore directions.

For the 100-year storm event, discharge into an ambient current increases dilution at the endpoint of the plume at time = duration of discharge. Dilution is increased by a factor of 2 for the high discharge rate into a strong current. The excess speed of the plume at the endpoints in all cases is less than typical maximum tidal currents. The excess speed is the plume speed above ambient in the vector direction of the plume. The maximum offshore extent of the plume occurs for Case 1c, where the plume travels about 2.5 miles offshore in the 8.41-hour duration of discharge. The maximum alongshore extent of the plume occurs for Case 1d, where the plume travels 1.8 miles alongshore in the 8.41-hour duration of discharge. Dilutions at the endpoints are 13.32 and 18.14, respectively, resulting in suspended solids concentrations of 1,640 and 1,200 ppm by volume. For the 3.24-hour duration-high discharge rate, the Case 1b alongshore extent is almost as far as Case 1d at 1.7 miles. However, the offshore extent is only about 1 mile, resulting in greater potential for nearshore plume impacts. Fortunately, dilution is higher at 24.43, resulting in suspended solids concentration of 890 ppm by volume.

The current data indicates that the ebb tide current flows northerly while the flood tide current reverses towards the south. Even during a flood tide (mirror image of the plume), the high density coral coverage areas located south of the channel outlet would not be significantly impacted by the discharge since the momentum carries the plume beyond these sensitive nearshore areas. The plume speed decreases quickly as the discharge momentum initially drives the plume to a depth of 24 feet within 700 feet from shore. The plume then starts to collapse as it spreads laterally. For the various Case 1 simulations, the maximum plume depth ranges from 15 to 26 feet at offshore distances of 520 to 940 feet. The velocity of the plume at this point is still quite high, between 1.3 and 1.6 ft/sec for the various simulations. Thus little, if any, sedimentation would occur in nearshore water depths less than 25 feet deep. In fact, the plume could be expected to scour the bottom in this nearshore area.

For the 10-year storm event, the plume depth is shallower due to the smaller discharge rate and lesser momentum. The maximum plume depth ranges from 3 to 7 feet at offshore distances of 140 to 230 feet. The excess speed at this point is quite high, between 1.4 and 2.2 ft/sec. The plume velocity remains above 1 ft/sec to offshore distances of about 1,000 feet or so for Case 2a and Case 2b, and to offshore distance of about 300 feet for Case 2c and Case 2d. Due to the longer duration of discharge, the maximum offshore extent of the plume is relatively greater than for the Case 1 simulations. For Case 2c, the plume travels 4.3 miles offshore in the 15.5-mile duration of discharge. Since this is for a "no current" simulation, the results are not entirely realistic. The maximum alongshore extent of the plume occurs for Case 2b, where the plume travels about 2.2 miles alongshore in the 5.14-hour duration of discharge. Dilutions at the endpoints range from 5.86 to 10.90 for the various simulations, resulting in suspended solids concentrations of 2,000 to 1,070 ppm by volume which are of the same order of magnitude as the 100-year storm simulations.

The plume characteristics for Case 2b have the greatest potential for offshore impacts of the Case 2 simulations. Compared to Case 1b, this simulated plume has a lesser potential for impacting the high density coral areas south of the channel outlet in both the horizontal and vertical extent. Unlike the Case 1 simulations where the plume can be expected to scour the nearshore areas, the Case 2 simulations indicate much shallower plume depths. Thus, it is expected that the discharge will flow offshore in a shallow surface layer at sufficient velocities to prevent any significant quantity of sediment from falling out of the plume.

4.6.2 Outfall Discharge

The discharge, as well as offshore impacts, from the outfall are considerably less than from the open channel. The outfall plume model was run for only the 10-year storm event. The simulation conditions included two discharge depths, each with two combinations of discharge and ambient current characteristics.

Case 1: 25-foot depth of discharge
Case 2: 35-foot depth of discharge

(a) High discharge, no ambient current
(b) High discharge, strong ambient current

Since the outfall plume rises to the surface rather quickly, the extent of the nearfield plume is not dependent on duration of discharge as in the case of the channel surface discharge. Thus, the peak discharge rate for a 10-year storm event (no retention basin) was simulated. An ambient current speed corresponding to the typical maximum tidal currents was used to simulate the extreme alongshore extent of the outfall plume.

The differences are not great for the four simulated conditions. In general, discharge into an ambient current increases the dilution. Discharge into deeper water depths also increases dilution.

The plume rises to the surface about 100 feet from the outlet. For this horizontal discharge, the plume is expected to impact the ocean bottom for a distance of about 120 feet from the outlet. After the plume surfaces, there is still a great deal of momentum. The plume surfaces within 20 seconds and has a speed of 4 ft/sec which is about 4 to 5 times higher than typical tidal currents. The dilution at the surface is 3.09, resulting in suspended solids concentration of 0.436 lb/cf or 2,400 ppm by volume. The surface concentrations for all simulations are of the same order of magnitude as the endpoint concentrations in the surface channel discharge plume. Once at the surface, the plume can be expected to behave as a surface discharge. Due to the relatively small extent of the outfall plume, the potential offshore impacts are insignificant compared to the channel discharge plume.

4.6.3 Farfield Impacts

The extent of impact of the channel discharge plume is substantially greater than the outfall plume due to the much higher discharge rates and total discharge volumes. Therefore, the farfield model was run for the channel discharge simulations. All of the Case 1 simulations and the Case 2 high discharge simulations were modeled in the farfield. The input variables at the start of the farfield simulations are based on the endpoint characteristics of the nearfield plumes. The concentration is based on the total amount of suspended sediment discharged at the outlet. This is a conservative assumption since there will be some fallout of particles from the plume over time.

The farfield model results provide a probabilistic representation of the potential areas of impact of the discharge after periods of many hours or days subsequent to release of the discharge water into the ocean. Contours representative of concentrations provide estimates of the probability that the discharged materials will impact the location at time (t) after release. It is unlikely that the concentrations would actually be as shown by the contour plots on any given day. However, for many repeated instances of discharge, on the average, the discharge would impact the areas in the given concentrations.

The model results indicate a slightly greater potential for alongshore dispersion than offshore, which is expected based on the current data which reflects a net northward transport. The plume disperses over large areas, resulting in small concentrations after 48 hours. As the plume disperses, the concentrations within the plume decrease.

4.7 IMPACT ON MARINE BIOLOGY

The results of the biological survey reveal diverse coral bottom and fish assemblages offshore along much of Kaanapali Beach. Biological communities are best developed off Site D-2. In the northern section (off Site D-4), benthic community development is poor nearshore and the bottom is mostly sand offshore. Although the shallow fringing reef north of Site D-4 (around Honolowai Point) was only partially surveyed in this study, this area also appears to harbor a poorly-developed or stressed marine bottom community. South of Site D-1, the bottom is mostly sand, and live corals are scarce.

Off Site D-4, the extent of limestone bottom decreases, and the water depth over this substratum is less than to the south. Coral communities are poorly developed nearshore in the northern part of the survey area as compared with the central and southern portions. The overall appearance of the massive limestone formation off Site D-4 is suggestive of a former stream outlet at this location.

The current data indicates that the ebb tide current flows northerly while the flood tide current reverses towards the south. Even during a flood tide, the high density coral coverage areas located south of the channel outlet would not be significantly impacted by the discharge since the momentum carries the plume beyond these sensitive nearshore areas. Little if any sedimentation would occur in nearshore water depths less than 25 feet deep. In fact, the plume could be expected to scour the bottom in this nearshore area, for the 100 year storm. For more frequent storms, much shallower plume depths will occur. The discharge will flow offshore in a shallow surface layer at sufficient velocities to prevent any significant quantity of sediment from falling out of the plume.

For the outfall, the plume rises to the surface about 100 feet from the outlet. For this horizontal discharge, the plume is expected to impact the ocean bottom for a distance of about 120 feet from the outlet. However, the outfall waters are discharged beyond the zone of active coral growth, minimizing impacts.

After the plume surfaces, there is still a great deal of momentum. Once at the surface, the plume can be expected to behave as a surface discharge, moving relatively quickly beyond the nearshore area.

During construction of the outfall, the coral immediately above the outfall alignment will be removed during trenching for the outfall.

For farfield areas, the computer modeling results indicate a slightly greater potential for alongshore dispersion than offshore, which is expected based on the current data which reflects a net northward transport. The plume disperses over large areas, resulting in small concentrations after 48 hours. As the plume disperses the concentrations within the plume decrease. The sediments are not expected to cause significant impact to farfield areas due to low concentrations.

Overall, a positive impact is projected, as sediments are moved quickly out of the more sensitive nearshore areas, in return for a slight increase in sediment concentrations in the farfield areas.

4.8 MITIGATION MEASURES

Based on the environmental analyses performed for this project, a number of mitigative measures were adopted during the planning phases of the project. These include the following:

1. Based on the presence of significant live coral activity to the southern end of the project area, the location of the proposed channel outlet was moved from the originally proposed position D1 to the proposed position D4. Position D4 has indications of being the original channel outlet location prior to construction of the Kaanapali Airstrip, and has little live coral activity.

2. Because it was not possible hydraulically to route all of the storm discharge to the proposed channel outlet at position D4, a small portion of the storm drainage will be routed to position D3. At this location, an outfall will be constructed to carry the discharge beyond the zone of significant live coral activity.

3. A sedimentation basin will be included at the end of Hanakaoo Gulch, to prevent the entry of coarse sediments into the open channel and into the ocean. A smaller sediment trap will prevent the entry of coarse sediments into the outfall.

4. To prevent significant beach erosion from occurring during high flows through the channel outlet, a revetment structure will be constructed under the beach at the channel outlet location. The revetment will also prevent undermining of the channel.

5. Both the revetment and the outfall will be buried under the beach to avoid interruption of natural beach processes and to preserve the aesthetics of the area.

5.0 ALTERNATIVES TO THE PROPOSED PROJECT

5.1 ALTERNATIVES FOR THE ENTIRE PROJECT

The alternatives for the entire project were discussed by HHV&K (1986). The alternatives examined were "no-action", and different variations of hotel projects. The "no action" alternative would not materially degrade the environment beyond that which would otherwise occur in the absence of the project. However, this alternative has an opportunity cost, since economic benefits that might be established in conjunction with the resort are not realized. Neither the "no-action" alternative or other development alternatives appears to compare favorably to the proposed project.

5.2 NO DRAINAGE STRUCTURES

The project is not feasible without the drainage structures. The investment in developed property could not be made, nor could building permits be obtained without adequately handling the storm flows from areas mauka of the proposed development.

5.3 ALTERNATVE 1

The first alternative investigated was discharge of all storm water at location D1. This is the most cost effective alternative since all storm flows can be hydraulically routed to this single location, and a single channel and outlet would be required. Because the flows could be combined, an outfall would not be required.

Upon review of the offshore marine biology, it became clear that the area offshore of D1 was an area of significant coral growth which should be protected. As a result, this alternative was discarded.

5.4 ALTERNATIVE 2

The second alternative examined was a channel outlet at location D4, with on-beach discharges at locations D1 and D3. The on-beach discharges would consist of two 42-inch pipes at location D3 and an 8 ft x 4 ft box culvert at location D1. In this alternative, the majority of the flow would be discharged by the channel outlet at location D4, an area with little live coral activity. Flows which could not be hydraulically routed to D4 would be discharged on the beach at D1 and D3.

This alternative results in relatively direct routing of the open channel to a discharge at D4. The flows to D1 and D3 would also be routed relatively directly. Due to the direct routing, and the avoidance of an outfall, this alternative has some cost advantages. In addition, avoidance of an outfall would eliminate the direct removal of coral along the outfall alignment.

The main disadvantages are that the flows at D1 and D3 would discharge onto areas of well-developed biological communities, and that on-beach discharge pipes and culverts may detract from the aesthetics at these locations. However, since the flows at D1 and D3 would be relatively small compared to flows at D4, the impact on biological communities at these areas may be comparable to the impact resulting from construction of the proposed outfall, which would involve removal of coral along the outfall alignment at location D3. Due to these considerations and the fact that aesthetical concerns could possibly be incorporated into the design of the discharge pipes and culverts, Alternative 2 is still a viable alternative.

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Helbert, Hastert, Van Horn & Kimura, Planners. North Beach Kaanapali Environment Assessment. Prepared for Kaanapali North Beach Joint Venture. December 1986.

7.0 APPENDICES

APPENDIX A — Preliminary Construction Plans and Specifications - Channel Outlet Revetment and Twin 66-Inch Pipe Outfall

APPENDIX B — Dames and Moore. Coastal and Oceanographic Engineering Services, Proposed Kaanapali North Beach Development. Prepared for Kaanapali North Beach Joint Venture. November 1986.

- ANNEX A — Sea Engineering, Inc. Coastal Engineering Evaluation and Marine Biological Assessment. Kaanapali North Beach, Maui, Hawaii. November 1986.
- ANNEX B — Austin, Tsutsumi & Associates. Runoff and Sediment Load Analysis. February 1983.
- ANNEX C — Dames and Moore. Transport Modeling of Drainage Discharge. November 1986.

APPENDIX C — Helbert, Hastert, Van Horn & Kimura, Planners. North Beach Kaanapali Environment Assessment. Prepared for Kaanapali North Beach Joint Venture. December 1986.

Market Assessment; John Child & Co., Inc.

Economic and Fiscal Impact Assessment; John Child & Company, Inc.

Biological Survey; Char & Associates

Archeological Reconnaissance; Chiniago, Inc.

Traffic Study; Austin Tsutsumi & Associates, Inc.

Air Quality Impact Analysis; J. W. Morrow

Noise Study; Y. Ebisu and Associates

DAMES & MOORE

September 24, 1987

Austin, Tsutsumi & Associates, Inc.
501 Sumner Street, Suite 521
Honolulu, Hawaii 96817-5031

RECEIVED
SEP 24 1987
AUSTIN, TSUTSUMI & ASSOCIATES, INC.

Attention: Mr. Ted Kawahigashi

Dear Mr. Kawahagashi:

Environmental Impact
Elimination of Outfall and
Relocation of Open Channel
Kaanapali North Beach Project

As you requested, we have evaluated the environmental impact resulting from an elimination of the storm drainage outfall and a relocation of the open channel to an area south of D-3 (Figure 1). We understand that this newly proposed open channel will be the only drainage structure required and that its discharge rate, as compared to the former open channel at D-4, will increase from 4000 to 4800 cubic feet per second (cfs).

In this letter we present a revision of Chapter 4.0 of the Environmental Assessment (Dames & Moore, June 1987) entitled "Environmental Impact of the Proposed Project" to reflect the change in drainage structures. The sub-sections of Chapter 4.0 that we revised include General Impacts, Impact on Drainage, Impact on Ocean Water Quality, and Impact on Marine Biology. The other impacts discussed in Chapter 4.0, such as Impact on Land and Water Use, Impact on Atmospheric Conditions, and Impact on Coastal Processes do not require a revision, except for deletion of all reference to the ocean outfall.

GENERAL IMPACTS

The overall drainage impact resulting from elimination of the ocean outfall and relocation of the open channel should have a positive impact. By removing the outfall, two impacts are eliminated: 1) the direct destruction of coral from outfall construction, and 2) the offshore discharge of freshwater and sediment near the ocean bottom. The open channel and channel outlet will restore the natural outlet for Hanakaoo Gulch, the natural drainageway on the mauka side of Honoapiilani Highway. There will be twin 12-foot wide box culverts to carry the water underground across the Highway to the site. The restoration of the direct outlet to the ocean will greatly reduce the likelihood of flooding of the area immediately below the gulch and of Honoapiilani Highway. The channelization of the water will result in higher velocity inflow to the ocean, and the storm water and associated sediment load will be taken quickly offshore rather than diffusely entering the nearshore areas.

DAMES & MOORE

Austin, Tsutsumi, & Associates, Inc.
September 24, 1987
Page 2

Negative impacts are primarily due to construction activity and to possible destruction of coral directly seaward of the open channel. The previous channel location was in an area of a poorly developed coral community (D-4). The new channel location is in a similar area (D-3), but it is closer to the area of high coral coverage. The extent of damage to coral is difficult to predict because of variations in sediment loads and other factors; however, in the long term, the sediment load will decrease as sugar cane cultivation is reduced.

IMPACT ON DRAINAGE

Impact on Drainage Configuration

Drainage, primarily from areas mauka of the Honoapiilani Highway will be carried to or into the ocean by the open channel. The open channel carries the entire flow and is located in an area of relatively little coral growth. Directly north of this location is an area which may have been the point of the original discharge from Hanakaoo Gulch prior to construction of the existing airstrip. The open channel will result in restoring a direct outlet to the ocean for Hanakaoo Gulch, where presently there is none. Storm water currently tends to flow over the existing airstrip, ponding behind the beach berms and breaking through at several points onto the beach. The restoration of the direct outlet to the ocean will greatly reduce the likelihood of flooding of the area immediately below the gulch and of Honoapiilani Highway.

Impact on Quality of Drainage Waters

Initially, there is expected to be little change in the quality of drainage waters. Sedimentation/infiltration basins will be constructed and are expected to retain all flows except for the highest storm flows . For higher storm flows, the sedimentation basin will remove some of the coarser fraction of the sediment load from the storm flow.

With further development of the area mauka of the Honoapiilani highway, a reduction in erosion and sediment load and an increase in water quality is expected as agricultural lands are converted to condominium and golf course use.

IMPACT ON OCEAN WATER QUALITY

In order to evaluate potential offshore impacts due to discharge of suspended sediments carried by stormwater drainage, numerical modeling of the discharges was accomplished. The nearfield plumes and farfield transport of stormwater discharges were analyzed for the previous open channel and for the outfall discharge. Although computer modeling was not performed to analyze the new open channel, the plume distribution should be similar to the one modeled previously because the total discharge quantity is the same and the discharge rate for the channel is increased by only 20 percent (from 4000 to

4800 cfs). The farfield computer modeling results would be almost the same as the previous results. Therefore, the impact on ocean water quality should be similar to what was presented in the Environmental Assessment.

IMPACT ON MARINE BIOLOGY

The results of the biological survey reveal diverse coral bottom and fish assemblages offshore along much of Kaanapali Beach. Biological communities are best developed off Site D-2 as shown in Figure 1. In the northern section benthic community development is mostly poor nearshore. Offshore, a large sand body and sand channel characterize the bottom between about -8 and beyond -30 feet deep. Although the shallow fringing reef north of Site D-4 (around Honokowai Point) was only partially surveyed in this study, this area also harbors a poorly-developed or stressed marine bottom community nearshore. South of Site D-1, the bottom is mostly sand, and live corals are scarce.

From midway between D-2 and D-3 to just north of D-4, the width of the nearshore limestone bottom decreases, with only the shallow portion remaining. Coral communities are poorly developed nearshore in the northern part of the survey area as compared with the central and southern portions. This shallow massive limestone is cut by sand channels off D-4 giving the overall appearance of a former stream outlet at this location.

The proposed alignment corresponds to biological transect locations "7" and "A" (AECOS, 1986). This area is characterized by a massive limestone bottom which is barren and scoured (Biotope 2). Corals occur on this massive limestone about 75 feet from shore where the depth mostly exceeds 3 feet (Biotope 3). Coral cover, predominated by Porites lobata and Pocillopora meandrina, may reach 30 to 40 percent in very localized areas, but averages less than 12 percent. This limestone formation extends seaward only about 170 feet from the beach, ending abruptly in escarpment and sand bottom. The zone or biotope of high coral cover (Biotope 4) is not found off of the proposed alignment (D-3).

It can be expected that over time, discharge from the open channel may destroy some or all of the coral directly seaward on the nearshore limestone bottom. The extent of this damage would be difficult to predict because outflow from the channel will be intermittant, and harm to corals will depend upon such factors as duration of the salinity depression, frequency of storms, tidal stage at the time of discharge, and other factors. Current data indicates that the ebb tide current flows northerly while the flood tide current reverses towards the south. However, even during a flood tide, the high density coral coverage areas located south of D-3 (Biotope 4) would not be significantly impacted by the discharge since the momentum carries the plume beyond these sensitive nearshore areas. Little if any sedimentation would occur in nearshore water depths less than 25 feet deep. In fact, the plume could be expected to scour the bottom in this nearshore area, for the 100 year storm. For more frequent storms, much shallower plume depths will occur. The discharge will flow offshore in a shallow surface layer at

sufficient velocities to prevent any significant quantity of sediment from falling out of the plume.

Although computer modeling was not performed to analyze the new channel location, the increase in discharge rate (from 4000 cfs to 4800 cfs) should result in a plume distribution similar to the one modeled previously. The farfield computer modeling results would be almost the same as the previous results. For the farfield areas, the computer modeling results indicate a slightly greater potential for alongshore dispersion than offshore, which is expected based on the current data which reflects a net northward transport. The plume disperses over large areas, resulting in small concentrations after 48 hours. As the plume disperses the concentrations within the plume decrease. The sediments are not expected to cause significant impact to farfield areas due to low concentrations.

-oOo-

Yours very truly,

DAMES & MOORE
A Professional Limited Partnership

Masanobu R. Fujioka, P.E.
Consultant

MRF:jjk (4208A/326A):04431-035-11

Attachments: Figure 1

BIOTOPES:

1 - Beach

2 - Scoured limestone at and just off the shoreline

3 - Massive limestone with _Porites_/_Pocillopora_ shallow water coral assemblage

4 - _Porites compressa_/_lobata_ community on massive limestone

5 - Sand/rubble bottom with isolated _P. compressa_ mounds

6 - Sand bottom

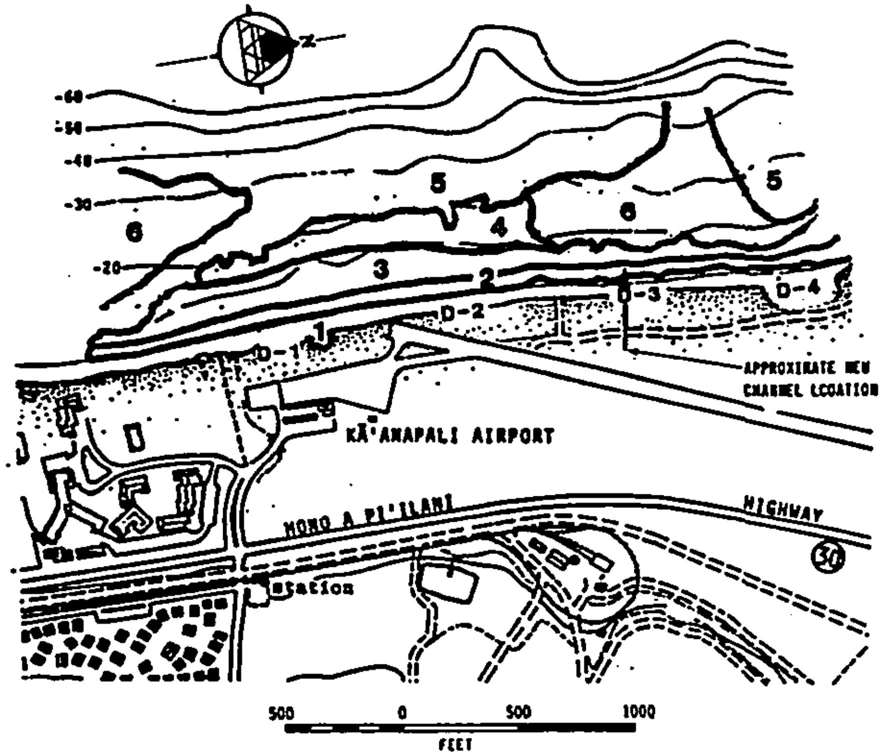

FIGURE.1. APPROXIMATE DISTRIBUTION OF BIOTOPES IN THE SURVEY AREA.

Reference: AECOS, Inc.; November 1986
Biological Surveys in the Marine Benthic Environment Off the Old Kaanapali Airstrip, Kaanapali, Maui, Hawaii.

Dames & Moore

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BIOLOGICAL SURVEY

BIOLOGICAL SURVEY

NORTH BEACH JOINT VENTURE PROJECT

KA'ANAPALI, MAUI

by

Winona P. Char
Art Whistler

CHAR & ASSOCIATES
Botanical/Environmental Consultants
Honolulu, Hawaii

Prepared for: HALBER, HASTERT, VAN HORN & KIMURA
Planners

May 1986

BIOLOGICAL SURVEY
NORTH BEACH JOINT VENTURE PROJECT
KA'ANAPALI, MAUI

INTRODUCTION

The proposed North Beach Joint Venture Project covers approximately 95 acres, located on the island of Maui. It includes all of the site formerly occupied by the Ka'anapali Airport as well as sugar cane fields. The old airport site consists of the abandoned runway, a small terminal area, and a parking lot. The project area is bound on the west (makai) by the ocean, on the south by the Royal Lahaina Hotel and a small beach park, on the east (mauka) by the Hono-a-Pi'ilani Highway, and on the north by a hotel complex and cane fields.

The soil on the project area is principally "Ewa silty clay loam (EaA)", a dark reddish-brown soil with 0 to 3% slopes (Foote et al. 1972). Runoff is very slow, and the erosion hazard is slight. The soil on the northern tip of the project area has been classified as "Pulehu silt loam (PpA)," a dark brown to dark grayish-brown colored soil. It is geographically associated with soils in the Ewa series. Like the Ewa silty clay loam, the slopes are gentle (0 to 3%), and erosion hazard is slight. Bordering the highway is a stony soil, "Wahikuli stony silty loam (WcC)," which is difficult to cultivate; slopes on this soil type are 7 to 15%.

Rainfall in the area is about 15 to 18 inches per year (State of Hawaii 1973).

A survey to inventory and describe the terrestrial plant and vertebrate animal communities found on the project area was conducted on 27 April 1986. A walk-through survey method was employed. Particular

attention was paid to uncultivated areas such as the kiawe forests, as these areas are more likely to harbor a greater diversity of plant and animal species. A total of 3 person-days were required to gather the technical data contained in this report.

FLORA SURVEY

The vegetation on the project area can be divided into 5 different vegetation types based upon differences in species composition and structure. Sugar cane fields cover about three-fourths of the project area. Grasslands and the landscaped area associated with the airport facilities make up the second largest vegetation type. Three other small vegetation types--the kiawe forest, the strand vegetation, and the koa-haole scrub--are also recognized.

All these vegetation types are dominated by the introduced plant species. Introduced species accounted for 90.3% of the plants inventoried during this survey (See Appendix I. Plant Species List.).

(1) Cane fields

The cane fields and their associated network of unpaved cane haul roads and irrigation systems covers the largest area on the project site. Sugar cane (*Saccharum officinarum*) forms monodominant stands which quickly crowd out nearly all weedy species. Agricultural lands are dynamic systems, changing with different stages or practices of cultivation. Weedy plant species appear and disappear with the various stages of cultivation. These species have evolved so that they are well adapted to frequent disturbances.

During this survey none of the fields had been harvested, and they all appeared to be of about the same age with stands ranging in height from 3 to 4 meters. Weedy species are associated with the margins of the fields and with the roadsides. In some places, spiny amaranth (Amaranthus spinosus), swollen fingergrass (Chloris inflata), and Guinea grass (Panicum maximum) have almost completely grown over the unpaved roads. Low-lying, moist margins are dominated by moisture-loving species such as leptochloa (Leptochloa uninervia) and barnyard grass (Echinochloa crusgalli).

(2) Grasslands and landscaped area

Long grassy strips border both sides of the abandoned runway. Bermuda grass (Cynodon dactylon) and buffelgrass (Cenchrus ciliaris) are the most abundant grasses, forming extensive mats. Locally common are Andropogon pertusus, Hilo grass (Paspalum conjugatum), and swollen fingergrass (Chloris inflata).

Since the airport was abandoned, these grassy areas have not been mowed, and most of the grasses have flowered and produced abundant seed. Grain-eating birds such as finches are frequently observed here. A few weedy shrubs and saplings of tree species have invaded these areas. These include castor bean (Ricinus communis), pluchea (Pluchea odorata), koa-haole (Leucaena leucocephala), kiawe (Prosopis pallida), klu (Acacia farnesiana), and Christmas berry (Schinus terebinthifolius).

In some places the ground cover has been disturbed; as a result, there is much exposed soil, and the vegetation consists of a mixture of weedy herbaceous species and grasses. In these areas spiny amaranth

(Amaranthus spinosus), several Euphorbia species, and common purslane (Portulaca oleracea) are common.

The abandoned landscaped area around the parking lot is included in this vegetation type. Landscape plantings include monkeypod (Samanea saman) and tiger's claw (Erythrina variegata) trees as well as hibiscus (Hibiscus hybrid) and mock orange (Murraya paniculata) shrubs. The ground cover is primarily Hilo grass and Bermuda grass.

(3) Kiawe forests

Kiawe (Prosopis pallida) forests are found along the eastern (makai) and northern boundaries of the project area. In some places the trees come down along the beach, just above the high-tide line. Kiawe forests are common in leeward lowland areas on all of the Hawaiian Islands.

On the project area the kiawe forests are dense with a closed canopy (crowns touching) and are 10 to 15 meters tall. The forest floor is rather open with only a few koa-haole (Leucaena leucocephala) shrubs. Because of the shade, ground cover is usually sparse with scattered clumps of nettle-leaved goosefoot (Chenopodium murale), bristly foxtail (Setaria verticillata), spiny sow thistle (Sonchus asper), and hairy abutilon (Abutilon grandifolium). Along the margins of the forest where there is more light or where the canopy is thinner, buffelgrass (Cenchrus ciliaris), green panicgrass (Panicum maximum var. trichoglume) or Guinea grass (Panicum maximum) may be abundant.

A drainage ditch, running parallel to the shore, is found under the makai forest. Several small clumps of mangrove (Rhizophora mangle) trees, about 10 to 15 meters tall, are found growing in the ditch where there is standing water. Mosquito fish (Gambusia sp.) is found in one of the larger ponds of water.

In the forest along the northern periphery of the project area, large trees of 'opiuma (Pithecellobium dulce), 10 to 17 meters tall, are common, and the subcanopy layer of koa-haole shrubs becomes dense.

(4) Strand vegetation

The strand vegetation occupies only a small portion of the project area. It occurs on the loose, sandy areas along the shore. This vegetation type is dominated by two native species, the beach morning-glory or pohuehue (Ipomoea brasiliensis) and 'aki'aki or beach dropseed (Sporobolus virginicus). The strand is open and low in stature. A few weedy species found here include Australian saltbush (Atriplex semibaccata), swollen fingergrass (Chloris inflata), buffelgrass (Cenchrus ciliaris), golden crownbeard (Verbesina encelioides), and sow thistle (Sonchus oleraceus).

(5) Koa-haole scrub

Along the Hono-a-Pi'ilani Highway boundary of the project area is an open to closed scrub of koa-haole (Leucaena leucocephala), 4 to 5 meters tall. Where the scrub is open, the ground cover beneath is dominated by buffelgrass (Cenchrus ciliaris). Where the cover is closed, it is a mixture of Guinea grass (Panicum maximum) and weedy species such as lion's ear (Leonotis nepetaefolia) and spiny amaranth (Amaranthus spinosus). Clumps of castor bean (Ricinus communis) are occasional. Vines such as wild bitter melon (Momordica charantia var. pavel),

koali-'awania (Ipomoea congesta), little bell (Ipomoea triloba), and hairy merremia (Merremia aegyptia) are frequently seen.

Piles of boulders can be seen under the koa-haole.

The upper portions of some of the koa-haole plants have died back due to attack from a recently introduced insect, Heteropsylla possibly incisa.

VERTEBRATE FAUNA SURVEY

The vegetation on the project area is very disturbed, with only a very small vestige of native species or plant communities. The main types of vegetation encountered on the site are as follows: (1) sugar cane fields; (2) ruderal areas, dominated by grasses and weedy species, and, on the south side of the site, by the abandoned airport terminal and parking lot with a mixture of cultivated plants and weedy species; (3) kiawe forest, dominated by kiawe trees; (4) littoral or sand strand, dominated by native grasses and vines; and (5) koa-haole scrub with buffelgrass. These vegetation types are discussed in detail in the flora survey.

Thirteen species of birds were observed in the project area, eleven of them introduced species common to lowland habitats on most of the Hawaiian Islands. The two native species, the black-crowned night heron and the golden plover, are both indigenous rather than endemic and are widespread throughout the Pacific basin. The former species is a resident, and the later is a migrant that flies to Siberia and arctic America in the late spring to breed (Berger 1972). Neither species is considered endangered in the Hawaiian Islands or over their whole range.

The following is an annotated checklist of the birds encountered at the Ka'anapali Airport, Maui.

Species observed on the project area

Family ARDEIDAE

Nycticorax nycticorax hoactli

The black-crowned night heron is an indigenous, resident species which is not subspecifically distinct from the populations in America. It usually nests in trees in coastal areas and feeds in ponds, marshes, lagoons, and tidepools. A single individual was seen in the small area of mangrove.

Family PHASIANIDAE

Francolinus sp.

The francolins are introduced game birds found on all the main islands. Two birds flushed from the grassy areas at the edge of the sugar cane fields were francolins, but it could not be determined with certainty to which of the three most common francolin species in Hawaii they belonged.

Family CHARADRIIDAE

Pluvialis dominica

The golden plover (called kolea in Hawai'i) is an indigenous migratory species which winters in the islands. It is found in various open habitats from sea level to 10,000 ft. elevation (Berger 1972). On the project area, several individuals were seen feeding in open areas around the old airport terminal.

Family COLUMBIDAE

Streptopelia chinensis

The spotted dove or lace-necked dove is an introduced species which is common in cultivated and habitated areas throughout the islands and is also sometimes found feeding in dry to mesic forests. On the site, it was seen in small flocks feeding on the ground in the kiawe forest.

Geopelia striata

The barred dove is an introduced species which is very common in cultivated and habitated areas throughout the islands, often congregating in flocks. On the project area, small flocks of these birds were observed feeding in disturbed areas along the old runway and along the network of cane haul roads where there was weedy growth.

Family ZOSTEROPIDAE

Zosterops japonica

The Japanese white-eye is an introduced species which is common on all the islands from the lowlands up to treeline. On the site it was common in the trees around the parking lot and in the kiawe forest along the coast.

Family STURNIDAE

Acridotheres tristis

The common myna is an introduced species which is very common in habitated and agricultural areas, only occasionally found in forest areas. On the project area, large numbers of mynas were observed in the trees around the parking lot and occasionally in the kiawe forest.

Family PLOCEIDAE

Lonchura punctulata

The nutmeg mannikin or ricebird is an introduced species which is found in the lowlands of all the main islands, often congregating in large flocks. On the site, it was common in the grassy areas along the edges of the old runway where it was observed feeding on grasses and especially on Amaranthus spinosus seeds.

Lonchura malabarica

The warbling silverbill is an introduced species occasional in the lowlands. It has become established on Maui since 1978 (Hawaii Audubon Society 1981). On the site, it was found in small flocks in the grassy areas along the old runway and along the edges of the kiawe forest.

Passer domesticus

The house sparrow is an introduced species associated with residential and disturbed places in the lowlands of all the main islands. On the site, it was common, particularly in the kiawe forest and on the beach adjacent to it.

Family FRINGILLIDAE

Cardinalis cardinalis

The northern cardinal is an introduced species occasional to common in the lowlands of the larger main islands. On the project area, it was occasional in the kiawe forest.

Paroaria coronata

The Brazilian cardinal or red-crested cardinal is an introduced species found in urban and disturbed areas in the lowlands of all the larger main islands, but is common only on O'ahu. On the site, a few individuals were seen in the trees around the old airport terminal.

Carpodacus mexicanus

The house finch, sometimes locally called papayabird because of its fondness for the fruit, is an introduced species common in urban areas and forests on all the main islands. On the site, only a few of them were seen in the trees around the old airport terminal.

During different times of the year, it is likely that a number of other bird species would utilize the site, but nearly all of these would be introduced species. Two small areas with standing water are the small patch of mangrove forest and a drainage area near the old terminal. The golden plover and black-crowned night heron may occasionally use these areas. Native birds, other than migratory sea birds, are unlikely to ever visit the site. Sea birds not seen during the survey but which may at times utilize the habitat are the wandering tattler (Heteroscelus incanus) and the sanderling (Calidris alba). Both of these are indigenous migrant species which winter in the Hawaiian Islands and leave for the Arctic in the spring.

No mammals were encountered during the survey, but the following species are likely to be found on the site: (1) the small Indian mongoose (Herpestes auropunctatus); (2) the roof rat (Rattus rattus); (3) the Norway rat (Rattus norvegicus); (4) the Polynesian rat (Rattus exulans); (5) the feral cat (Felis catus); and (6) the feral dog (Canis familiaris). Since these are all introduced species, none of them would be classified as endangered. The Hawaiian hoary bat (Lasiurus cinerius semotus) is the only terrestrial mammal native to the Hawaiian Islands. It may be present in the area during the evenings, feeding along the coastal areas; however, very little is known about its habit and range.

There are no native species of terrestrial reptiles or amphibians, and no introduced species were observed during the survey. It is likely, however, that geckos such as the mourning gecko (Lepidodactylus lugubris) and skinks occur on the site, particularly in the areas with trees.

In summary, 13 species of birds were encountered during the survey of the old Ka'anapali Airport site. Only 2 species are native; neither of them is endemic, nor are they considered endangered.

DISCUSSION AND RECOMMENDATIONS

The project area is largely disturbed with sugar cane cultivation occupying about three-fourths of the site. The abandoned Ka'anapali Airport also covers extensive portions of the site. As a result, introduced plant and animal species dominate the biological communities.

Flora

Of a total of 124 plant species inventoried during the survey, 112 (90.3%) are introduced (or exotic) species, 10 (8.1%) are native, and 2 (1.6%) are of Polynesian introduction.

All of the 10 native species are indigenous, that is, they occur naturally in the Hawaiian Islands and elsewhere throughout the Pacific. They are widespread throughout our islands in similar lowland habitats.

None are considered rare, threatened, or endangered (Fosberg and Herbst 1975, U. S. Fish and Wildlife Service 1980). A biological survey (Whistler 1982) of the lands mauka of the highway also came up with similar results and conclusions.

Fauna

The vertebrate fauna is composed largely of introduced species. The two native bird species observed on the project area are not considered endangered. The kolea (Pluvialis dominica) is a migratory native, wintering over in the islands. The black-crowned night heron (Nycticorax nycticorax hoactli), an indigenous species, is found in coastal wetlands throughout the islands.

The proposed project is not expected to have a major negative impact on the total island populations of the plant and animal species involved. None of the species encountered is considered rare, threatened, or endangered.

Parts of the kiawe forest along the shore could be left intact or modified. The forest would act as a buffer zone between the sea and hotel complexes, reducing salt spray damage and preventing sand loss through storm wave action.

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APPENDIX I. PLANT SPECIES LIST

In the plant species list, families are arranged alphabetically within each of two groups: Monocotyledons and Dicotyledons. Taxonomy and nomenclature of the flowering plants (Monocotyledons and Dicotyledons) follow St. John (1973) except where more recently accepted names are used. Hawaiian names used are in accordance with Porter (1972) or St. John (1973). The following information is given:

1. Botanical name with author citation.
2. Common English or Hawaiian name, when known.
3. Biogeographic status of the species. The following symbols are used:

   I = indigenous = native to the Hawaiian Islands and also to one or more other geographic areas

   P = Polynesian = plants of Polynesian introduction; all those plants brought by the Polynesian immigrants prior to contact with the Western world

   X = introduced or exotic = not native to the Hawaiian Islands; brought here intentionally or accidentally after Western contact.

4. Vegetation types. Five vegetation types are recognized on the project area and are discussed in detail in the text. The number heading each of the columns refers to the following vegetation types:

   1 = cane fields

   2 = grasslands and landscaped area

   3 = kiawe forests

   4 = strand vegetation

   5 = koa-haole scrub

5. Within each of the vegetation types, the relative abundance of each species or its absence (-) is given. These ratings reflect the abundance of the particular species within the project area and are not applicable to areas outside the project. The following symbols are used:

Scientific Name	Common Name	Status	Vegetation Types 1	2	3	4	5
MONOCOTYLEDONS							
COMMELINACEAE (spiderwort family)							
Rhoeo spathacea (Sw.) Stearn	tradescantia, oyster plant	X	-	-	R	-	-
CYPERACEAE (sedge family)							
Cyperus rotundus L.	nutgrass, kili'o'opu	X	O	U	-	-	-
Pycreus polystachyos (Rottb.) Beauv.		I	-	-	R	-	-
GRAMINEAE (grass family)							
Andropogon pertusus (L.) Willd.		X	-	Lc	-	-	-
Brachiaria reptans (L.) Gard. & C. E. Hubb.		X	O	U	-	-	-
Cenchrus ciliaris L.	buffelgrass	X	O	A	Lc	O	A
Cenchrus echinatus L.	common sandbur, 'ume'alu	X					
Chloris inflata Link	swollen fingergrass, mau'ulei	X	C	Lc	O	O	-
Chloris virgata Sw.	feather fingergrass	X	-	U	-	-	-
Cynodon dactylon (L.) Pers.	Bermuda grass, manienie	X	O	A	O	-	-
Digitaria ciliaris (Retz.) Koeler		X	U	U	-	-	-
Digitaria setigera Roth ex R. & S.	itchy crabgrass, kukaipua'a	X	U	U	-	-	-
Echinochloa crusgalli (L.) Beauv.	barnyard grass	X	Lc	U	-	-	-
Eleusine indica (L.) Gaertn.	wiregrass, manienie-ali'i	X	O	O	-	-	-
Eragrostis cilianensis (All.) Vignolo-Lutati	stinkgrass	X	-	R	-	-	-
Eragrostis tenella (L.) Beauv. ex R. & S.	lovegrass	X	-	O	R	-	-
Leptochloa uninervia (Presl) Hitchc. & Chase	leptochloa	X	Lc	O	-	-	-
Panicum maximum Jacq. var. maximum	Guinea grass	X	O	O	Lc	-	A
Panicum maximum var. trichoglume Eyles ex Robyns	green panicgrass	X	U	O	A	-	R
Paspalum conjugatum Berg.	Hilo grass, mau'u-malihini	X	-	Lc	-	-	-
Paspalum orbiculare Forst. f.	ricegrass, mau'u-laiki	X	O	R	-	-	-
Paspalum urvillei Steud.	Vaseygrass	X	O	U	-	-	-
Rhynchelytrum repens (Willd.) C. E. Hubb.	Natal redtop	X	-	O	-	U	-
Setaria verticillata (L.) Beauv.	bristly foxtail	X	U	O	O	-	-
Sporobolus virginicus (L.) Kunth	beach dropseed, 'aki'aki	I	-	-	O	A	-
Tragus berteronianus Schult.	burgrass, goatgrass	X	-	R	-	-	-
Tricachne insularis (L.) Nees	sourgrass	X	-	O	O	-	-

A = abundant = the major or dominant species in a given vegetation type

C = common = distributed throughout a given vegetation type in large numbers

Lc = locally common = found in localized patches where it may occur in large numbers in a given vegetation type

O = occasional = distributed throughout a given vegetation type in moderate numbers

U = uncommon = observed infrequently but not more than 10 times in a given vegetation type

R = rare = observed 1 to 10 times in a given vegetation type

Scientific Name	Common Name	Status	Vegetation Types 1	2	3	4	5
PALMAE (palm family)							
Cocos nucifera L.	coconut, niu	P	-	U	U	-	R
DICOTYLEDONS							
AMARANTHACEAE (amaranth family)							
Amaranthus spinosus L.	spiny amaranth, pakai-kuku	X	C	O	O	-	O
Amaranthus viridis L.	slender amaranth. pakai	X	U	U	R	-	-
ANACARDIACEAE							
Mangifera indica L.	mango, manako	X	-	R	-	-	-
Schinus terebinthifolius Raddi	Christmas berry, wilelaiki	X	U	R	O	-	-
APOCYNACEAE (periwinkle family)							
Thevetia peruviana (Pers.) K. Schum.	be-still tree, noho-malie	X	-	A	U	-	-
ARALIACEAE (ginseng family)							
Brassaia actinophylla Endl.	octopus tree	X	R	-	-	-	-
CHENOPODIACEAE (goosefoot family)							
Atriplex muelleri Benth.		X	O	O	U	-	-
Atriplex semibaccata R. Br.	Australian saltbush	X	O	O	U	O	-
Chenopodium ambrosioides L.	Mexican tea	x	-	-	U	-	-
Chenopodium murale L.	nettle-leaved goosefoot	X	O	O	O	O	-
COMPOSITAE (sunflower family)							
Ageratum conyzoides L.	ageratum, maile-hohono	X	R	-	-	-	-
Bidens pilosa L.	Spanish needle, beggar's tick, ko'oko'olau	X	R	U	R	-	-
Crassocephalum crepidioides (Benth.) S. Moore		X	R	U	-	-	-
Eclipta alba (L.) Hassk.	false daisy	X	R	R	-	-	-
Emilia fosbergii Nicolson	red pua-lele	X	R	O	-	-	-
Erechtites valerianaefolia (Wolf) DC.		X	U	-	-	-	-
Erigeron bonariensis L.	horseweed, ilioha	X	O	O	-	-	-
Erigeron canadensis L.	Canada fleabane	X	R	R	-	-	-
Eupatorium adenophorum Spreng.	Maui pa-makani	X	R	-	-	-	-

Scientific Name	Common Name	Status	Vegetation Types 1	2	3	4	5
Gnaphalium purpureum L.	purple cudweed	X	-	R	-	-	-
Lactuca scariola L.	wild lettuce	X	O	-	-	O	-
Pluchea indica (L.) Less.	Indian pluchea	X	R	-	-	-	-
Pluchea odorata (L.) Cass.	pluchea, sour bush	X	U	U	O	-	-
Sonchus asper (L.) Hill.	spiny sow thistle	X	-	O	U	-	-
Sonchus oleraceus L.	sow thistle, pua-lele	X	O	-	-	O	-
Synedrella nodiflora (L.) Gaertn.	synedrella	X	-	U	-	-	-
Tridax procumbens L.	coat buttons	X	O	O	-	-	-
Verbesina encelioides (Cav.) B. & H. ex Gray	golden crown-beard	X	R	O	U	O	-
Wedelia trilobata (L.)Hitchc.	wedelia	X	U	O	R	-	-
Xanthium saccharatum Wallr.	cocklebur, kikania	X	-	O	U	U	-
Zinnia pauciflora L.	wild zinnia, pua-pihi	X	-	-	-	-	R
CONVOLVULACEAE (morning-glory family)							
Ipomoea alba L.	moon flower, koali-pehu	X	-	-	U	-	-
Ipomoea brasiliensis (L.) Sweet	beach morning glory, pohuehue	I	-	-	-	C	-
Ipomoea congesta R. Br.	koali-'awania	I	-	-	-	-	O
Ipomoea obscura (L.) Ker-Gawl		X	-	-	R	-	-
Ipomoea triloba L.	little bell	X	U	U	O	-	O
Merremia aegyptia (L.) Urban	hairy merremia, koali-kua-hulu	I	-	R	R	-	C
CRUCIFERAE (mustard family)							
Lepidium virginicum L.	wild peppergrass	X	-	R	-	-	-
CUCURBITACEAE (squash family)							
Cucumis dipsaceus Ehrenb. ex Spach	wild cucumber	X	-	-	U	-	-
Cucurbita pepo L.	pumpkin, pala'ai	X	-	R	-	-	U
Momordica charantia var. pavel Crantz	wild bitter melon	X	U	R	R	-	C
EUPHORBIACEAE (spurge family)							
Euphorbia glomerifera (Millsp.) L. C. Wheeler		X	O	O	U	U	-
Euphorbia heterophylla L. var. heterophylla	Mexican fire plant	X	R	-	-	-	-
Euphorbia heterophylla L. var. cyathophora (Murr.) Griseb.	fire plant, painted leaf	X	-	R	R	-	-
Euphorbia hirta L.	garden spurge	X	O	O	U	O	-
Euphorbia hyssopifolia (L.) Sm.		X	U	O	-	-	-
Euphorbia prostratata Ait.	prostrate spurge	X	-	O	-	-	-
Ricinus communis L.	castor bean, koli	X	O	O	O	-	O

Scientific Name	Common Name	Status	Vegetation Types 1	2	3	4	5
GOODENIACEAE (naupaka family)							
Scaevola taccada (Gaertn.) Roxb.	naupaka-kahakai	I	-	R	-	-	-
LABIATAE (mint family)							
Leonotis nepetaefolia (L.) Ait. f.	lion's-ear	X	-	U	U	-	O
LEGUMINOSAE (pea family)							
Acacia farnesiana (L.) Willd.	klu	X	-	R	U	-	-
Canavalia cathartica Thouars	mauna-loa	X	-	-	R	-	-
Crotalaria incana L.	fuzzy rattlepod, kukae-hoki	X	U	U	-	-	-
Desmanthus virgatus (L.) Willd.	virgate mimosa	X	U	R	U	U	-
Erythrina variegata Stickm.	tiger's claw	X	-	O	R	-	-
Leucaena leucocephala (Lam.) de Wit	koa-haole, ekoa	X	R	U	C	R	A
Medicago polymorpha L.	bur clover	X	-	R	-	-	-
Phaseolus lathyroides L.	cow pea, wild bush bean	X	-	U	-	-	-
Pithecellobium dulce (Roxb.) Benth.	'opiuma	x	R	R	Lc	-	-
Prosopis pallida (Humb. & Bonpl. ex Willd.) HBK.	kiawe	X	R	U	A	O	O
Samanea saman (Jacq.) Merr.	monkeypod	X	R	O	-	-	-
LOGANIACEAE (strychnine family)							
Buddleja asiatica Lour.	Asiatic butterfly bush, dogtail, huelo-'ilio	X	U	U	-	-	U
MALVACEAE (mallow family)							
Abutilon grandifolium (Willd.) Sweet	hairy abutilon, ma'o	X	-	U	U	-	-
Hibiscus hybrid	hibiscus	X	-	Lc	-	-	-
Malva parviflora L.	little mallow, cheeseweed	X	-	O	U	-	O
Malvastrum coromandelianum (L.) Garcke	false mallow, hauuoi	X	R	U	-	-	-
Sida acuta Burm.		X	-	O	-	-	O
Sida fallax Walp.	'ilima	I	-	-	R	-	-
Sida rhombifolia L.	Cuba jute	X	R	R	-	U	-
Sida spinosa L.	prickly sida	X	-	U	-	-	-
Thespesia populnea (L.) Soland. ex Correa	milo	P	R	R	R	-	-

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Scientific Name	Common Name	Status	Vegetation Types 1	2	3	4	5
MORACEAE (mulberry family)							
Ficus microcarpa L. f.	Chinese banyan	X	-	R	-	-	-
MORINGACEAE (moringa family)							
Moringa oleifera Lam.	horseradish tree, kalamungai	X	-	R	-	-	-
MYRTACEAE (myrtle family)							
Syzygium cuminii (L.) Skeels	Java plum, palama	X	-	-	R	-	-
NYCTAGINACEAE (four o'clock family)							
Boerhavia coccinea Mill.		X	-	U	-	-	-
Mirabilis jalapa L.	common four o'clock	X	-	-	R	-	-
OXALIDACEAE (wood sorrel family)							
Oxalis corniculata L.	yellow wood sorrel, 'ihi	I	R	O	-	-	-
PASSIFLORACEAE (passion flower family)							
Passiflora edulis Sims	liliko'i	X	R	-	-	-	-
Passiflora foetida L.	scarlet-fruited passionflower, pohapoha	X	-	U	U	-	-
PLANTAGINACEAE (plantain family)							
Plantago major L.	common plantain, lau-kahi	X	O	O	-	-	-
PORTULACACEAE (purslane family)							
Portulaca oleracea L.	common purslane, 'ihi	X	O	O	U	-	-
PRIMULACEAE (primrose family)							
Anagallis arvensis L.	scarlet pimpernel	X	-	R	-	-	-
RHIZOPHORACEAE (mangrove family)							
Rhizophora mangle L.	American mangrove	X	-	-	Lc	-	-
RUBIACEAE (coffee family)							
Spermacoce assurgens R. & P.	buttonweed, spermacoce	X	-	R	-	-	-
RUTACEAE (orange family)							
Murraya paniculata (L.) Jack	mock orange, alahe'e-haole	X	-	Lc	-	-	-

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Scientific Name	Common Name	Status	Vegetation Types 1	2	3	4	5
SOLANACEAE (tomato family)							
Datura stramonium L.	jimson weed, kikania-haole	X	-	R	R	-	-
Lycopersicon pimpinellifolium Mill.	currant tomato, 'ohi'a-ma-kananhele	X	-	-	R	-	-
Nicotiana glauca Grah.	tree tobacco, paka	X	-	-	R	-	-
Solanum nigrum L.	popolo	I	U	R	-	-	-
STERCULIACEAE (cocoa family)							
Waltheria indica var. americana (L.) R. Brown ex Hosaka	hi'aloa, 'uhaloa	I	O	O	U	O	-
UMBELLIFERAE (carrot family)							
Centella asiatica (L.) Urban	Asiatic pennywort, pohekula	X	-	O	-	-	-
VERBENACEAE (verbena family)							
Citharexylum caudatum L.		X	R	-	-	-	-
Lippia nodiflora (L.) Michx.	turkey tanglefoot	X	-	U	-	-	-
Stachytarpheta jamaicensis (L.) Vahl	Jamaica vervain, owi, oi	X	U	U	-	-	-
Verbena litoralis HBK.	weed verbena, ha'uowi	X	U	U	-	-	O
ZYGOPHYLLACEAE (tribulus family)							
Tribulus terrestris L.	puncture vine	X	-	U	-	-	-

F

ARCHAEOLOGICAL RECONNAISSANCE

NORTH BEACH, MAUI: ARCHAEOLOGICAL RECONNAISSANCE

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MAY 1986

I. INTRODUCTION

This report presents the results of an archaeological reconnaissance of approximately 90 acres at North Beach, Maui. The purpose of this work was to determine the presence or absence of significant archaeological or historical remains on the property, and to make recommendations for any further work which might be necessary prior to development. A literature search, consisting of an inspection of site records and maps on file at the State Historic Preservation Office, was also conducted.

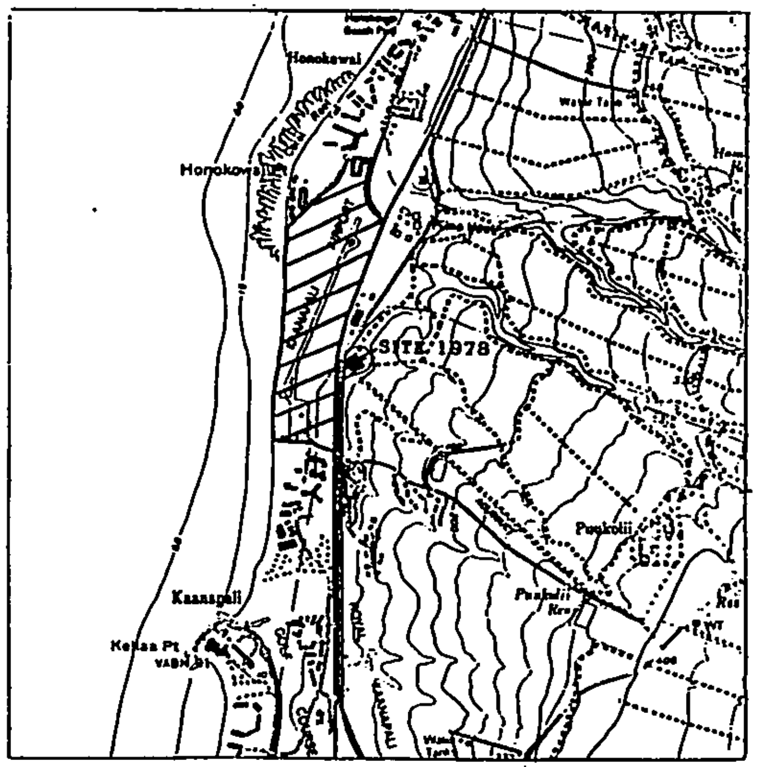

Figure 1. Location of Project Area

II. DESCRIPTION OF SURVEY AREA

The approximately 90 acre parcel measures about 1000 by 4200 feet, and includes about 3200 feet of ocean frontage. At the ocean is a narrow sand beach and dune with a moderately thick stand of kiawe [*Prosopis pallida*] trees. The remainder of the project area consists of sugarcane fields broken only by the runway of the former airport and a parking lot and small open area along the south boundary.

Figure 2. View of Survey Area, Looking North
Dune on Left, Runway at Center

III. LITERATURE SEARCH

The literature search revealed no archaeological or historical sites on the property. The Kaanapali Power Plant [part of Hawaii Register of Historic Places Site #1973], which was built in 1915, is located immediately adjacent to the property across Honoapiilani Highway on the east. This site had been placed on the Hawaii Register of Historic Places, but was removed because improper procedures were followed during its nomination.

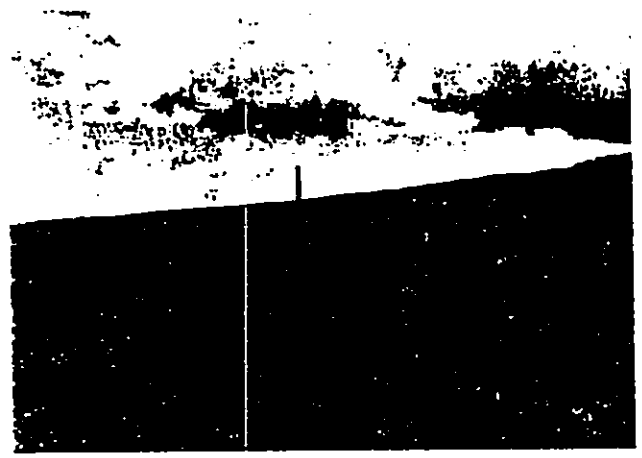

Figure 3. View of Survey Area, Looking Northeast
Smokestack of Site 1978 at Center

IV. RECONNAISSANCE RESULTS

As most of the parcel is presently in sugarcane, it was not possible to cover the entire property with equal intensity. The sand dune located between the canefields and the ocean was inspected carefully, and each cane road or path through the cane was walked while searching for remains. In addition, a drainage channel adjacent to the south boundary of the property was carefully inspected to see if any sub-surface deposits were exposed in its banks.

The result of these efforts was that virtually no surface indications of either historic or prehistoric remains were found. The single exception consists of two fragments of a bottle, probably in the neighborhood of one hundred years old, found opposite Site 1918.

V. RECOMMENDATIONS

The scarcity of surface remains is not conclusive evidence that there are no significant remains on the property, for two reasons. First, prehistoric Hawaiian utilization of beach areas typically would not leave surface indications to be found. It is always possible, and perhaps even likely, that

sand dunes and sand beaches will contain buried archaeological deposits in the form of such features as cultural layers, fire-pits, and graves. Second, the many years of sugarcane production would have removed any surface features (platforms, terraces, walls, and so on) that might have been present at one time, while leaving deposits below the plow zone intact.

It is therefore recommended that sub-surface archaeological testing be conducted in any areas that are to be disturbed by construction. Such investigations should consist of 1 meter square test pits excavated to the culturally sterile subsoil. It is only on the basis of such test pits that a clear understanding of the nature of the archaeological or historical remains on the property can be had. It is unlikely that any materials found would be of such significance that they would have to be preserved, but archaeological excavations to preserve the information contained in them would almost certainly be necessary before construction could proceed.

As this work can be done at any time before construction, it will not be necessary for it to be accomplished prior to sub-division of the property. Requirements for further archaeological work can be made a condition of the leases that are agreed to between the land owner and the individual developers of each separate parcel.

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SUBSURFACE ARCHAEOLOGICAL RECONNAISSANCE SURVEY

PAUL H. ROSENDAHL, Ph.D., Inc.
Consulting Archaeologist

Report 321-061587

SUBSURFACE ARCHAEOLOGICAL RECONNAISSANCE SURVEY
NORTH BEACH DEVELOPMENT SITE

Land of Hanakaoo

Lahaina District, Island of Maui

June 1987

305 Mohouli Street • Hilo, Hawaii 96720 • (808) 969-1763 or 966-8038

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SUBSURFACE ARCHAEOLOGICAL RECONNAISSANCE SURVEY
NORTH BEACH DEVELOPMENT SITE

Land of Hanakaoo
Lahaina District, Island of Maui
(TMK:4-4-01:2,3,6,8,9,68; 4-4-02:24; 4-4-06:5)

by

Margaret L.K. Rosendahl, B.A., S.O.P.A.
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Prepared for

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INTRODUCTION

BACKGROUND

A subsurface archaeological reconnaissance survey of the North Beach Development Site (Old Kaanapali Airport area), in the Land of Hanakaoo, Lahaina District, Island of Maui, was conducted by Paul H. Rosendahl, Ph.D., Inc. (PHRI) at the request of Glenn T. Kimura, of the firm Helber, Hastert & Kimura, Planners, on behalf of their client, Amfac, Inc. The overall objective of the survey was to provide information appropriate to and sufficient for the preparation of an Environmental Impact Statement (EIS) being prepared for submission to the County of Maui. Field investigations were conducted May 31-June 5, 1987, by a crew of five to six persons, under the direction of Project Directors Theresa Donham and Margaret L.K. Rosendahl. Approximately 22 1/2 man-days were expended in conducting the subsurface archaeological reconnaissance field work.

A total of 60 cores and ten backhoe trenches was excavated within the project area. Two sections of the dune were faced and fully recorded, and one archaeological site was identified. An oral report of the survey findings was made to Leslie Kurisaki of Helber, Hastert & Kimura, Planners, on June 9, 1987. An oral report was also made to Dr. Ross Cordy of the Historic Sites Section of the Hawaii State Department of Land and Natural Resources (HSS-DLNR) on June 9, 1987. At the request of Ms. Kurisaki, a project area map showing the core and trench locations was submitted directly to HSS-DLNR. The present report comprises the final report for the subsurface archaeological reconnaissance survey undertaken at North Beach Development Site.

SCOPE OF WORK

The basic purpose of an archaeological reconnaissance survey is to identify--to discover and locate on available maps--sites or features of possible archaeological significance. A reconnaissance survey is simply a pedestrian, or walk-through, survey--extensive rather than intensive in scope--conducted to determine the presence or absence of archaeological resources within a specified project area. A reconnaissance survey indicates the general nature and variety of archaeological remains present, and the general distribution and density of such remains. A reconnaissance survey permits a preliminary evaluation of the archaeological resources, and facilitates formulation of realistic recommendations and estimates for such further archaeological work as might be necessary or appropriate. Such further work could include intensive survey--detailed recording of sites and features, and selected test excavations; and possibly subsequent mitigation--salvage research excavations, interpretive planning and development, and/or preservation of sites and features with significant scientific research, interpretive, and/or cultural values.

The specific objectives of the North Beach Development Site subsurface reconnaissance survey were four-fold: (a) to identify (find and locate) any potentially significant subsurface archaeological remains present within the project area; (b) to evaluate the potential general significance of all identified subsurface remains; (c) to determine the possible impacts of proposed development upon the identified subsurface remains; and (d) to define the general scope of any subsequent data collection and/or mitigation work that might be necessary or appropriate.

Based on a review of readily available background literature, and on a review of a surface reconnaissance survey report of the development site (Barrera 1986), and on discussion with Agnes Estioko-Griffin, staff archaeologist for the HSS-DLNR, the following specific tasks were determined to constitute an adequate scope of work for the subsurface reconnaissance survey of North Beach Development Site:

1. Review available archaeological and historical literature relevant to the immediate project area
2. Conduct a subsurface reconnaissance survey, using hand coring tools, of the sand dune area along the c. 3,200 ft ocean frontage of the development site
3. Conduct a limited subsurface reconnaissance survey, using a mechanical backhoe, of the inland portion of the development area—the area most recently under sugar cane cultivation, and
4. Analyze background and field data, and prepare appropriate reports

The subsurface reconnaissance survey was carried out in accordance with the minimum requirements for reconnaissance-level survey recommended as standard by the Society of Hawaiian Archaeology (SHA). These standards are currently being used by DLNR-HSS as guidelines for the review and evaluation of archaeological reconnaissance survey reports submitted in conjunction with various development permit applications.

PROJECT AREA DESCRIPTION

The project area consists of c. 93 ac in the Land of Hanakaoo, Lahaina District, Island of Maui (TMK:4-4-01:2,3,6,8,9,68; 4-4-02:24; 4-4-06:5) (Figure 1). The project area measures c. 4,600 ft (N-S) with a maximum width of 1,350 ft, and is bound by Honoapiilani Highway to the east, resort developments to the north and south, and the Pacific Ocean to the west. Remnants of the Old Kaanapali Airport are still visible within the project area. The bulldozed runways are presently defined by asphalt piles. It appears that the airport support area to the south has not been impacted other than by the removal of all structures. In addition to the airport remnants, the project area is comprised of a narrow strand of

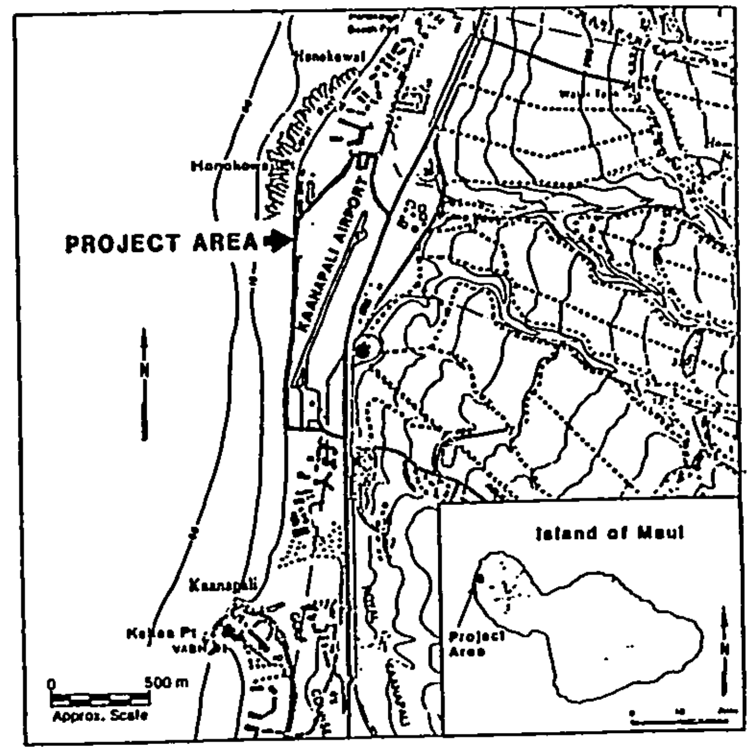


Figure 1. PROJECT LOCATION MAP

SUBSURFACE ARCHAEOLOGICAL RECONNAISSANCE SURVEY
NORTH BEACH DEVELOPMENT SITE

Land of Hanakaoo
Lahaina District, Island of Maui

PHRI Project 87-321 June 1987

beach and cane fields. The beach measures a maximum 65 ft (20.0 m) wide, with much of the dune measuring only 30 ft (9.0 m) wide, and extends along 3,200 ft (975.0 m) of ocean frontage. The property is defined on one side by the high-water mark, which is at the crest of the dune, 9-10 ft above sea level. Immediately inland of the dune, the elevation drops to 5-6 ft above sea level. At the inland base of the dune is a slough or ditch that runs nearly the entire length of the northern portion of the dune. The ditch looks artificial in most places, and could have been dug for cane field drainage. Standing water is present in several places along the ditch. Much of the eastern slope of the dune has been severely disturbed by dozing, filling, and brush-piling.

At the south end of the project area is a swamp or pond. This swamp/pond feature is identified on the map provided by Helber, Hastert & Kimura (RMTC Project Number 1-13901-0-P., Topographic Mapping at Kaanapali, Island of Maui; prepared by R.M. Towill Corporation in cooperation with Brock and Associates; scale 1"=100').

The area inland of the sandy beach, excluding the old airport infrastructure, is presently in cane cultivation. The cane fields are dissected by dirt roads which intersect the old runway. An estimated 75% of the land in the project area is under cultivation, and an additional 15% is part of the Old Kaanapali Airport. The remaining 10% comprises the coastal section; this area, like the eastern slope of the dune, appears modified along its eastern limits.

The sand dune vegetation within the project area consists primarily of mature <u>kiawe</u> (<u>Prosopis pallida</u> [Humb. and Bonpl. ex Willd.] HBK.), scattered <u>milo</u> (<u>Thespesia populnea</u> L.), and various grasses. The inland portion of the project area is used for sugar cane (<u>Saccharum officinarum</u> L.) cultivation. Annual rainfall in the project area is estimated to be about 15-20 in (Armstrong 1973:56).

According to Foote et al. (1972: Sheet 93), the project area is comprised of three major soil classifications. The beach strand consists of "mainly light-colored sands derived from coral and seashells" (Foote et al. 1972:28). The northern interior third of the project area is comprised of Pulehu silt loam, and the remaining area is comprised of Ewa silty clay loam (Foote et al. 1972:29, 116).

Leslie Kuloloio, a longtime Maui resident, described the sand dune as being much wider before the 1980s storms washed part of it away. Mr. Kuloloio worked on a water drilling project located just inland of the highway during the 1960s, and remembers the area being in <u>kiawe</u>, with swamp areas along the inland side of the dune. At that time there apparently was, in the sourthern portion of the project area, an outflow from the pond to the ocean. Another note concerning the dune: a Maui resident and backhoe operator described using a backhoe to excavate pits in the dune to bury trash. The parcel in which the dune is situated is a portion of a 3,853-ac land award of Hanakaoo to Lot Kamehameha (King Kamehameha V). Historical Researcher Carol Silva examined the Land Commission Awards (LCA) and identified a minimum of nine awards within

TMK:4-4-01:2, 6, and 68. No awards were granted in the other parcels of the project area. The awards granted appeared to be primarily for agricultural purposes. Several awards are transected by Honoapiilani Highway.

PREVIOUS ARCHAEOLOGICAL WORK

In 1986, Barrera (1986) conducted an archaeological reconnaissance survey of the North Beach project area. No surface structures were identified during the survey; the survey recommended a subsurface reconnaissance of the sand dune area be made (Barrera 1986:3-4). Prior to Barrera, Hommon (1982) surveyed 240 ac immediately inland of Honoapiilani Highway and identified three sites, including an agricultural complex and two walls. In their studies, both Barrera (1986) and Hommon (1982) provide summaries of previous archaeological work in the general area.

Projects that have taken place in the general vicinity document the use of sand dunes as burial interment sites. Review comments in the preparation notice of an environmental impact statement for the Kaanapali North Beach Joint Ventures Resort Development (Letter from Hawaii State Department of Land and Natural Resources to Leslie Kurisake of Helber, Hastert & Kimura, identified as Doc. No.:324B, File No.:87-135) noted "human burials were uncovered during construction in a hotel site at Hanakao'o (Dobyns and Allen-Wheeler, 1982) 'Archaeological Monitoring at the Site of the Kaanapali Alii Condominium, Island of Maui'." An archaeological survey with test excavations of the Kapalua Hotel Development Site 2-H at Honokahua Bay conducted by PHRI confirmed the presence of numerous burials within the site's sand dune (Donham 1986).

FIELD METHODS AND PROCEDURES

A pedestrian survey of the sand dune area was conducted prior to the initiation of subsurface reconnaissance. The survey's purposes were: (a) to locate the project boundary; (b) to check the dune for exposed subsurface deposits; (c) to locate surface archaeological sites; and (d) to determine placement of cores.

The first field task undertaken within the project area was systematic coring of the area along the dune. Cores were excavated at 30.0 m intervals, beginning at the south end of the project area and continuing northward. Thirty-three cores were placed along the coastal stretch. A second line of cores (N=21) was located along the inland edge of the dune, and six more cores were oriented in easterly transects through the cane field.

Coring was conducted with hand-powered corers, which extract from the earth soil cores 20 cm long and 10 cm in diameter. Corers are equipped with handle extensions and are capable of reaching depths beyond 10.0 m.

Systematic coring was executed by two teams of two persons each, and a single-person team. Detailed soil descriptions indicating location, microenvironmental setting, and adjacent vegetation were recorded for each core. Soil layers were differentiated on the basis of color change, texture, structure, and/or consistence. Information including beginning and ending depths, dry and moist color (Munsell), texture, structure, consistence, and root density was recorded for each soil layer, as the layer was encountered in the core. All soil descriptions follow standard definitions and abbreviations as outlined in the USDA Soil Survey Manual (Soil Survey Staff 1951).

Cores were either terminated on solid coral (N=31), or were terminated beyond the water table (N=24) (when no solid base was encountered) or were terminated when obstructions and/or core sidewall slumpage prohibited further excavation (N=5). Soil removed from the cores was screened through 1/8-inch screens, and all artifacts recovered were retained and bagged by provenience. The ecofacts were examined and noted. Upon completion of data recovery cores were backfilled to original ground surface and a surveyor's flag with a core number was left at the core site.

Two sections (Profile A and B) of the dune were faced and drawn, and their detailed stratigraphies were recorded. In addition to the cores and the profiled areas, ten backhoe trenches were excavated. Don Fujimoto of Amfac arranged for the backhoe to excavate the trenches. Trenches (BT-) were placed along cane roads that extend from the dune to the highway. A transect crossing the southern portion of the project area was comprised of BT-1 thru -5, and the northern transect was made up of BT-8 thru -10 and Cores 55-59. Two backhoe trenches were placed immediately inland of the northern section of the sand dune. Stratigraphic information was recorded for each trench; all trenches were backfilled.

During the inspection of the dune one surface feature was identified. The site was given a PHRI temporary site number (T-101), was described and photographed, and was tagged with an aluminum tag denoting site number, PHRI project number (87-321), and date. Site information was also written on a strip of flagging tape, which was wrapped around a cobble-sized stone and placed on the feature.

The locations of all cores, soil profiles, and backhoe trenches were plotted on a blueline map (RMTC Project Number 1-13901-0-P., Topographic Mapping at Kaanapali, Island of Maui; prepared by R.M. Towill Corporation in cooperation with Brock and Associates; scale 1"=100') provided by Helber, Hastert & Kimura, Planners. Backhoe trenches, soil profiles, Site T-101, and general views of the project area were photographed using 35 mm black-and-white film (PHRI Roll No.591) and color slide film (PHRI Roll No.597).

FINDINGS

Sixty cores and ten backhoe trenches were excavated within the North Beach Development project area. Two sections of the project area sand dune were faced and recorded, and one archaeological feature (Site T-101) was newly identified.

SUBSURFACE RECONNAISSANCE

Soil Coring

A program of systematic soil coring was conducted at the North Beach Development project area in order to determine the presence or absence of any subsurface cultural deposits and/or human skeletal remains (Figure 2, at end, and Figure 3). Soil cores (N=33) were excavated at 30 m intervals along the western limits of the project area (the western limits correspond to the inland crest of the sand dune). A second row of cores (N=21) was placed along the inland extent of the dune, near the dune's base. Additional cores (N=6) were located in the cane fields and adjacent to the abandoned runway. A total of 60 cores of various depths was excavated. Depths and number of layers are summarized by core in Table 1. The cores were predominantly excavated through a sand matrix; other soils present in the project area are noted in Table 1.

The average core depth, within a range of 15 to 327 cm below surface (bs), was 194.1 cm. Thirty-one of the 60 cores (51.7%) were terminated on a solid base of coral, which was interpreted as an underlying coral reef. This coral substrate was encountered as far inland as Core 57, located just inland of the old runway. Twenty-four cores (40%) did not hit the coral substrate and were excavated to or beyond the water level. Only five cores (8.3%) were terminated due to obstructions (asphalt, rock fill, vegetation) or collapse.

Three major soil profiles which correspond with the soils described by Foote et al. (1972) were encountered in the project area. Core 10, located within the sand dune, is representative of the beach sands, and is described as follows:

LAYER	DESCRIPTION
I	88 cm thick; dark yellowish-brown (10YR 3/6 dry) to very pale brown (10YR 7/4 dry); sand; structureless, very fine, single grain; loose, very friable, nonsticky, nonplastic; few roots
II	52 cm thick; strong brown (7.5YR 4/6 dry); sand; structureless, very fine, single grain; loose, nonsticky, nonplastic; very few roots

Figure 3. GENERAL VIEW OF DUNE SHOWING UNVEGETATED SECTION. LOCATIONS OF CORES 4 THROUGH 8. (PHRI Neg.598-2a)

Table 1.

SUMMARY OF CORING RESULTS

Core Number	Number of Layers	Depth Below Surface (cm)	Comments
1	9	320	Charcoal fragments on surface, metal fragments at 0-30 and 85-120 cm below surface (bs); clay intrusions at 120-140 cm bs; water at 320 cm bs
2	1	28	Glass fragment present; mottled sand and clay; base on rock fill
3	2	196	Clay intrusions at 120 cm bs; coral at 196 cm bs
4	8	186	Clay sand at 6-90 cm bs; sandy clay at 90-110 cm bs; clay sand at 110-140 cm bs; water at 186 cm bs; coral at 186 cm bs
5	6	220	Sparse charcoal fragments at 60-86 cm bs; pockets of sand clay mix at 86 cm bs; coral at 220 cm bs
6	9	230	Glass fragment at 0-25 cm bs; clay sand at 110-125 cm bs; clay intrusions and glass fragments at 125-200 cm bs; water at 230 cm bs
7	7	243	Water at 243 cm bs
8	7	263	Metal fragments at 0-65 cm bs; clay intrusions at 85-120 cm bs and 250 cm bs; water at 263 cm bs
9	8	190	Glass fragments at 45-60 cm bs; coral at 190 cm bs
10	4	210	Coral at 210 cm bs
11	6	180	Coral at 180 cm bs
12	4	208	Metal fragment at 0-92 cm bs; coral at 208 cm bs
13	2	285	Collapse near base; water at 285 cm bs

Table 1. (Cont.)

Core Number	Number of Layers	Depth Below Surface (cm)	Comments
14	6	262	Silty clay loam at 88-100 cm bs; coral at 262 cm bs
15	7	280	Clay intrusions at 55 cm bs; coral at 280 cm bs
16	4	290	Clay intrusions at 40-55 cm bs; coral at 290 cm bs
17	5	270	Loamy fine sand at 24-65 cm bs; coral at 270 cm bs
18	8	270	Clay intrusions at 112 cm bs; coral at 270 cm bs
19	4	305	Water at 305 cm bs
20	7	280	Loamy sand at 85-90 and 195-220 cm bs; water at 280 cm bs
21	8	285	Coral at 285 cm bs
22	8	285	Water at 285 cm bs
23	3	254	Water and coral at 254 cm bs
24	4	296	Glass and sparse charcoal at 0-70 cm bs; water at 296 cm bs
25	3	260	Kukui and recent trash at 0-190 cm bs; collapse near base, water at 260 cm bs
26	5	160	Silty clay at 92-98 cm bs; sandy clay at 123-130 cm bs; water at 160 cm bs
27	6	270	Kukui and sparse charcoal fragments at 35-70 cm bs; loamy sand at 0-35 cm bs; silty clay at 235-250 cm bs; water at 270 cm bs
28	2	148	Sparse charcoal fragment at 0-117 cm bs; water at 148 cm bs
29	6	250	Loamy sand at 35-120 and 155-210 cm bs; coral at 250 cm bs

Table 1. (Cont.)

Core Number	Number of Layers	Depth Below Surface (cm)	Comments
30	5	276	Sparse charcoal fragments at 0-37 cm bs; kukui at 37-154 cm bs; water at 276 cm bs
31	3	193	Loamy sand at 25-75 cm bs; apparent root obstruction at 193 cm bs
32	13	327	Sandy loam at 0-33 and 90-135 bs cm; clay loam at 135-155 cm bs; sandy clay at 155-165 cm bs; clay sand at 1165-175 cm bs; sparse charcoal fragments at 195-205 cm bs; sandy clay at 195-235 cm bs; clay at 235-327+ cm bs; water at 285 cm bs
33	9	248	Glass fragments at 0-33 and 57-77 cm bs; sparse charcoal fragments at 57-77 cm bs; very fine loamy sand at 57-95 cm bs; sandy clay at 95-110 cm bs; sandy clay loam at 110-140 and 160-228 cm bs; water at 248 cm bs
34	5	204	Loamy sand at 0-55 cm bs; sandy clay loam at 55-110 cm bs; sandy loam at 110-123 cm bs; water at 204 cm bs
35	10	255	Sandy loam at 0-25 and 40-60 cm bs; loamy sand at 60-70 cm bs; sandy loam at 70-85 cm bs; clay at 85-145 cm bs; sandy clay at 145-160 cm bs; clay sand at 160-180 cm bs; gley at 180-245 cm bs; clay sand at 245-255 cm bs; water at 160 cm bs; collapse near base
36	4	102	Sandy loam at 0-30 cm bs; clay loam at 30-54 cm bs; sandy clay at 54-94 cm bs; water at 102 cm bs
37	4	170	Loamy sand at 0-94 cm bs; water, and coral at 170 cm bs

Table 1. (Cont.)

Core Number	Number of Layers	Depth Below Surface (cm)	Comments
38	9	135	Sandy loam at 0-8 cm bs; loamy sand at 8-17, 53-80, and 90-102 cm bs; sandy clay at 17-43 and 80-90 cm bs; clay loam at 43-53 cm bs; water at 130 cm bs; coral at 135 cm bs
39	8	159	Sandy clay loam at 0-25 cm bs; loamy sand at 25-49 and 86-95 cm bs; silty clay loam at 49-57 cm bs; clay sand at 57-86 cm bs; silty clay at 95-125 cm bs; coral at 159 cm bs
40	6	95	Sandy clay at 6-24 and 35-45 cm bs; coral at 95 cm bs
41	8	157	Sandy clay at 0-70 cm bs; clay sand at 70-110 and 150-157 cm bs; loamy sand at 110-130 cm bs; water at 140 cm bs; collapse near base
42	5	157	Sandy clay at 0-58 and 100-157 cm bs; clay sand at 58-79 cm bs; water at 157 cm bs
43	4	125	Sandy clay loam at 0-19 cm bs; coral at 125 cm bs
44	4	145	Sandy clay at 0-27 cm bs; clay sand at 27-40 cm bs; loamy sand at 40-60 cm bs; clay sand/sand at 60-145 cm bs; coral at 145 cm bs
45	4	144	Loamy sand at 0-10 cm bs; coral at 144 cm bs
46	3	70	Sandy clay loam at 0-20 cm bs; loamy sand at 20-35 cm bs; coral at 70 cm bs
47	3	145	Sandy clay at 0-60 cm bs; coral at 145 cm bs

Table 1. (Cont.)

Core Number	Number of Layers	Depth Below Surface (cm)	Comments
48	5	164	Loamy sand at 0-58 cm bs; coral at 164 cm bs
49	3	117	Sandy clay at 0-26 cm bs; loamy sand at 26-46 cm bs; glass fragment at 90 cm bs; terminated on brush pile
50	5	130	Clay loam at 0-54 cm bs; water at 130 cm bs
51	5	150	Sandy clay at 0-80 cm bs; clay sand at 50-110 cm bs; coral at 150 cm bs
52	5	102	Sparse charcoal fragments at 0-32 cm bs; sandy clay loam at 0-72 cm bs; coral at 102 cm bs
53	9	210	Loamy sand at 0-88 cm bs; sparse charcoal fragments at 53-70, 88-112, and 134-167 cm bs; water at 210 cm bs
54	1	15	Sandy clay at 0-15 cm bs; runway fill at 15 cm bs
55	5	137	Loamy sand at 0-26 cm bs; silty clay loam at 26-85 cm bs; silty clay at 85-134 cm bs; coral at 137 cm bs
56	4	208	Sandy loam at 0-90 cm bs; sandy clay at 90-169 cm bs; coral at 208 cm bs
57	6	218	Clay at 0-195 cm bs; coral at 218 cm bs
58	2	245	Silty clay at 0-245 cm bs; water at 245 cm bs
59	2	238	Silty clay at 0-238 cm bs; water at 238 cm bs

Table 1. (Cont.)

Core Number	Number of Layers	Depth Below Surface (cm)	Comments
60	3	88	Loamy sand at 63-73 cm bs; silty clay at 73-88 cm bs; water at 88 cm bs

III 40 cm thick; brown (7.5YR 5/4 dry) to pinkish-white (7.5YR 8/2); sand; structureless, very fine, single grain; loose, nonsticky, nonplastic; very few roots

IV 58 cm thick; reddish-brown (5YR 5/4 dry) to white (5YR 8/1 dry); sand; structureless, very fine, single grain; loose, nonsticky, nonplastic, very few roots

Core 36 was situated at the north end of the project area, at the inland edge of the dune. Foote et al. (1972) identified this area as Pulehu silt loam. The stratigraphy of Core 36 is as follows:

LAYER	DESCRIPTION
I	30 cm thick; dark brown (7.5YR 3/4 dry); very fine sandy loam; structureless, very fine, single grain; loose, very friable, nonsticky, nonplastic; few roots
II	24 cm thick; dark brown (7.5YR 3/2 dry); clay loam; weak, very fine, single grain; loose, friable, slightly sticky, nonplastic; few roots
III	40 cm thick; dark reddish-brown (5YR 3/2 moist); sandy clay; weak, very fine, single grain; soft, friable, slightly sticky, slightly plastic; very few roots
IV	8 cm thick; brown (7.5YR 4/4 moist) to pink (7.5YR 8/4 moist); coarse sand; structureless, very fine, single grain; loose, nonsticky, nonplastic, very few roots

Core 58 was situated at the edge of a cane field, adjacent to the old runway. The field is irrigated, which accounts for the very wet soil conditions. Foote et al. (1972) identified the area's soil as Ewa silty clay loam. The stratigraphy of Core 58 is as follows:

LAYER	DESCRIPTION
I	225 cm thick; dark reddish-brown (5YR 3/2 moist); silty clay loam; structureless, very fine, single grain; loose, very friable, slightly sticky, slightly plastic; very few roots

G-10

LAYER	DESCRIPTION
II	20 cm thick; dark reddish-brown (5YR 3/4 moist); silty clay loam; structureless, very fine, single grain; loose, very friable, slightly sticky, slightly plastic; very few roots

Backhoe Trenches

Ten backhoe trenches located throughout the project area were excavated. The dimensions of the trenches and a general description of their stratigraphy are presented in Table 2. A total of 46.6 linear meters was excavated. Two transects of cores and backhoe trenches were excavated to sample the subsurface deposits that extend inland from the dune to the highway. The southern transect was comprised of BT-1 thru -5, and the northern transect was made up of BT-8 thru -10 and Cores 55-59. Two trenches, BT-6 and -7, were excavated on the inland edge of the dune.

The soils present in the backhoe trenches placed in the cane field roughly correlated with Foote et al.'s (1972) description of Ewa silty clay loam. The soils were homogeneous and relatively thick (110 to 200 cm). No cultural material was recovered in any of the trenches. The trenches excavated at the dune edge displayed stratigraphy comparable to that in adjacent cores.

Soil Profiles

Two sections of the sand dune were faced and described. Profile B was located approximately midway along the west face of the dune. Profile A was located immediately seaward of a possible pond, which is located at the south end of the project area. There appears to be an outflow which extends from the inland low area to the ocean. Profile A (Figures 4 and 5) is located on the south face of this possible channel leading seaward.

SURFACE RECONNAISSANCE

A surface reconnaissance of the project area was conducted by Chiniago Inc. in May 1986 (Barrera 1986), and at that time no surface features were identified. During PHRI's subsurface reconnaissance, an L-shaped wall was identified; its description follows:

Site T-101

Site T-101 is located at the north end of the dune, and is identified as an L-shaped wall (Figure 6). Its long leg measures 18.5 m and its shorter leg measures 13.0 m, for an overall length of 31.5 m. The wall is c. 90 cm high and, due to its partially collapsed condition, 2.0 m wide. Large, rounded waterworn boulders were used to construct it. The wall is situated parallel to and immediately seaward of the cane road, with the

Figure 5. PROFILE A, SOUTH FACE OF DUNE. View to northeast. (PHRI Neg.598-6a)

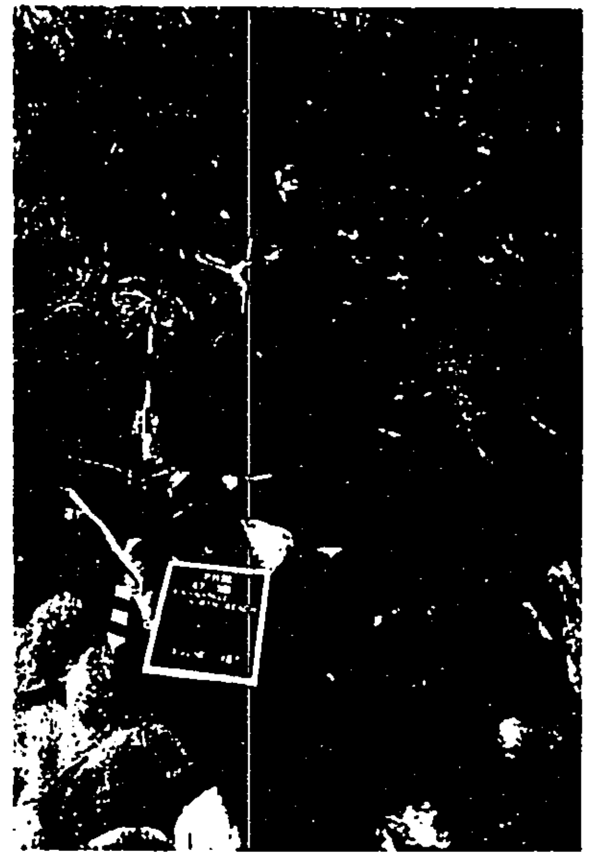
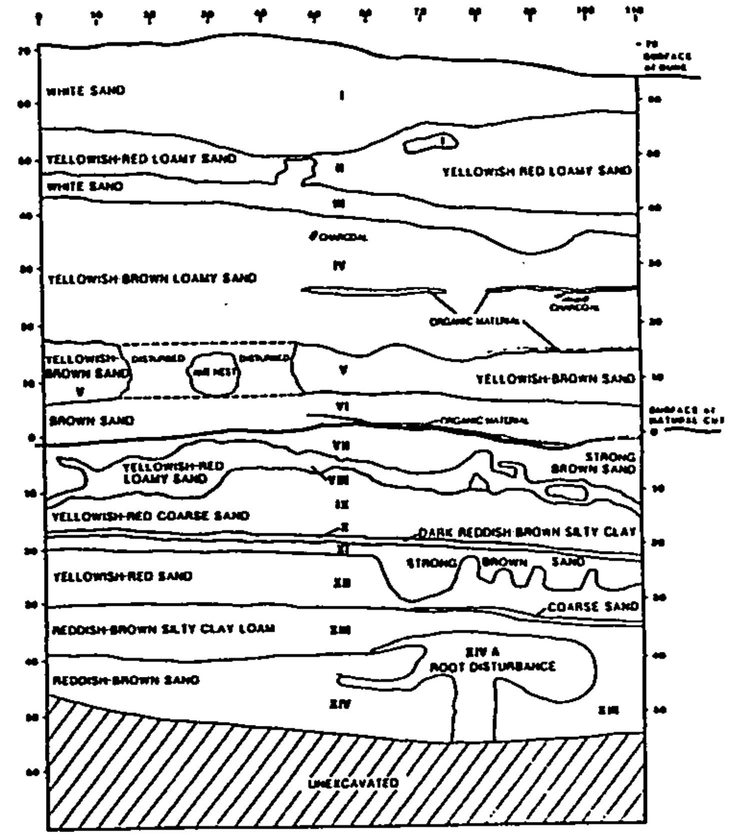


Figure 6. SITE T-101. View to south. (PHRI Neg.598-33a)

Table 2.

SUMMARY OF BACKHOE TRENCHES

Trench Number	Number of Layers	Length (m)	Depth (m)	Comments
1	2	17.7	1.5	Sandy clay loam at 0-110 cm bs; sand at 110-150 cm bs; water at 110 cm bs
2	2	3.0	1.5	Sandy clay loam at 0-130 cm bs; coarse sand at 130-150 cm bs; water at 140 cm bs
3	2	4.0	2.5	Silty clay loam at 10-230 cm bs; sandy clay loam at 230-250 cm bs; water at 250 cm bs
4	1	3.0	0.75	Silty clay loam at 0-75 cm bs; terminated on rock fill, probably deposited from highway construction
5	1	4.5	0.9	Silty clay loam at 0-90 cm bs; terminated on large boulder fill, possibly from cane road construction
6	8	3.6	2.1	Inland of dune; sand at 0-10, 45-70, 130-132, and 160-210 cm bs; silty clay loam at 10-45 and 70-110 cm bs; loamy sand at 110-130 and 132-160 cm bs; water at 210 cm bs
7	4	2.6	2.3	Inland of dune; sandy clay loam at 0-120 cm bs; silty clay loam at 120-160 cm bs; clay at 160-200 cm bs; sand at 200-230 cm bs; water at 160 cm bs
8	2	3.0	1.9	Silty clay at 0-180 cm bs; sand at 180-190 cm bs; water at 190 cm bs
9	2	2.8	2.1	Silty clay at 0-195 cm bs; loamy coarse sand at 195-210 cm bs
10	2	2.4	2.9	Sandy clay at 0-200 cm bs; silty clay at 200-290 cm bs



NOTE: All numbers are recorded in centimeters.

Figure 4. PROFILE A

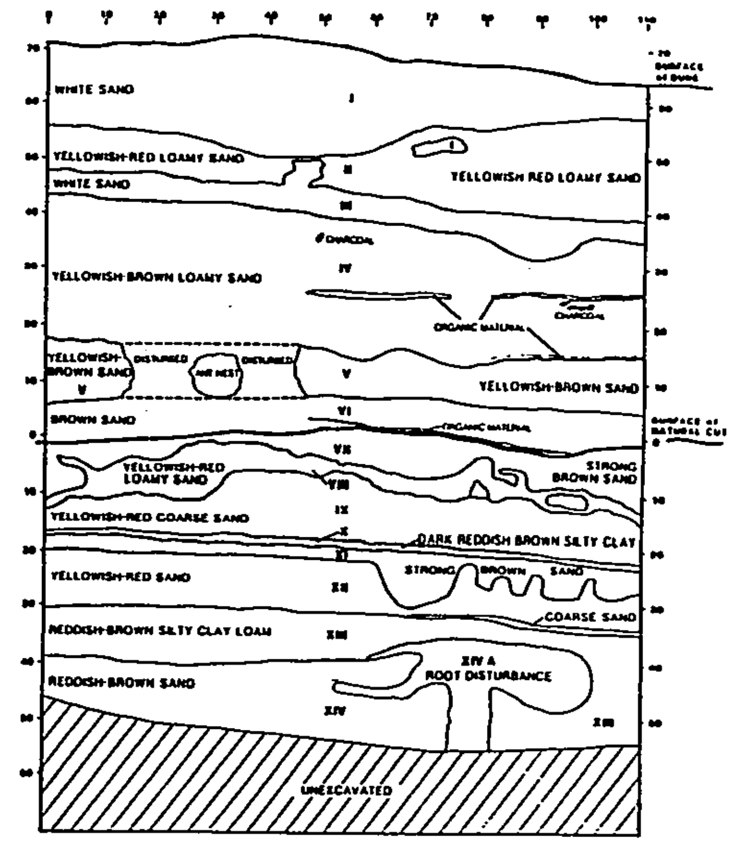
CORRECTION

THE PRECEDING DOCUMENT(S) HAS
BEEN REPHOTOGRAPHED TO ASSURE
LEGIBILITY
SEE FRAME(S)
IMMEDIATELY FOLLOWING

Table 2.

SUMMARY OF BACKHOE TRENCHES

Trench Number	Number of Layers	Length (m)	Depth (m)	Comments
1	2	17.7	1.5	Sandy clay loam at 0-110 cm bs; sand at 110-150 cm bs; water at 110 cm bs
2	2	3.0	1.5	Sandy clay loam at 0-130 cm bs; coarse sand at 130-150 cm bs; water at 140 cm bs
3	2	4.0	2.5	Silty clay loam at 10-230 cm bs; sandy clay loam at 230-250 cm bs; water at 250 cm bs
4	1	3.0	0.75	Silty clay loam at 0-75 cm bs; terminated on rock fill, probably deposited from highway construction
5	1	4.5	0.9	Silty clay loam at 0-90 cm bs; terminated on large boulder fill, possibly from cane road construction
6	8	3.6	2.1	Inland of dune; sand at 0-10, 45-70, 130-132, and 160-210 cm bs; silty clay loam at 10-45 and 70-110 cm bs; loamy sand at 110-130 and 132-160 cm bs; water at 210 cm bs
7	4	2.6	2.3	Inland of dune; sandy clay loam at 0-120 cm bs; silty clay loam at 120-160 cm bs; clay at 160-200 cm bs; sand at 200-230 cm bs; water at 160 cm bs
8	2	3.0	1.9	Silty clay at 0-180 cm bs; sand at 180-190 cm bs; water at 190 cm bs
9	2	2.8	2.1	Silty clay at 0-195 cm bs; loamy coarse sand at 195-210 cm bs
10	2	2.4	2.9	Sandy clay at 0-200 cm bs; silty clay at 200-290 cm bs



NOTE: All numbers are recorded in centimeters.

Figure 4. PROFILE A

shorter segment extending west (toward the ocean) off the south end of the longer segment. Roughly half of the shorter segment contains soil and sand within the boulder pile, which gives the segment the appearance of being pushed into place. A beach road perpendicular to the cane road truncates the north end of the wall. A pile of loose boulders is located on the north side of the beach road. The general area of the L-shape wall is greatly disturbed. Piles of partially burned kiawe, as well as beach rubbish and downed kiawe trees are in the area.

The negative results of Core 34, excavated within the walled area, and Core 33, located west of the feature, appear to indicate no associated subsurface deposit. The feature is in poor condition.

CONCLUSIONS

DISCUSSION

Systematic subsurface coring of the coastal dune did not identify any subsurface prehistoric cultural deposit or any human skeletal remains. Fragments of glass and/or metal fragments were present in eight of the 54 cores. These fragments, generally present in the upper strata, were determined to be of recent origin. However, two cores (6 and 49) excavated to lower strata depth of 125-200 cm bs and 90 cm bs, respectively, also contained glass fragments. Core 6 contained clay intrusions associated with its glass fragments.

Sparse charcoal fragments were present in ten cores. In one core the fragments were on the surface; in two cores the fragments were in a context with glass fragments; in three cores the fragments were within the uppermost layer; and in the remaining four cores the fragments were associated with disturbed layers. Generally, the charcoal fragments were isolated and small—perhaps they were associated with (as documented in the dune stratigraphy) the dune's periodic flooding and disturbance. The charcoal fragments appeared to be recently deposited; they may have been derived from sugar cane burning, recent kiawe clearing fires, and/or picnics on the dune surface.

Two soil profiles were recorded and two backhoe trenches were excavated in the dune area. This extensive testing did not yield any indication of indigenous use of the area.

Six cores and eight backhoe trenches were excavated to test the interior portion of the project area. No cultural material was recovered from these excavations. The soil strata of this interior portion did not appear to be associated with any cultural activities other than present cultivation of the land.

The negative findings suggest either there was little to no prehistoric use of the area, or that the evidence of prehistoric use is no longer present. The present field work findings appear to provide evidence for the latter explanation.

An examination of the 1980 map used during field work, and an examination of the the existing dune itself, indicates a reduction of the dune. Mr. Kulolio observed that the dune extended much farther seaward in the 1960s, and also speculated the dune extended farther inland. The dune also appears disturbed. The presence of modern glass and metal in the deposits indicates recent activity within the dune. The clay intrusions and extensive banding (Profile A) suggest intermittent flooding. Occasional flooding may account for the lack of cultural deposits.

The construction of Kaanapali Airport and subsequent use of the general area for sugar cane cultivation have impacted the surface area inland of the dune. No subsurface cultural deposits were identified in the inland area. The generally homogeneous nature of the inland deposits suggests the present use of the area has not appreciably changed the soil stratigraphy.

The emphasis of the present field work was subsurface testing within the North Beach Development project area. However, one surface archaeological site, an L-shaped wall, was identified and described. The wall is in poor condition and has been partially covered by vegetation-clearing debris and loose sand. Coring within and adjacent to the feature did not identify any associated subsurface deposit.

EVALUATIONS

The general significance of the archaeological resources identified during a surface and subsurface archaeological reconnaissance is evaluated in terms of potential scientific research, interpretive, and/or cultural values. Research value refers to the potential of archaeological resources for producing information useful in the understanding of culture history, past lifeways, and cultural processes at the local, regional, and interregional levels of organization. Interpretive value refers to the potential of archaeological resources for public education and recreation. Cultural value, within the framework of significance evaluation used here, refers to the potential of archaeological resources to preserve and promote cultural and ethnic identity and values.

The only archaeological feature identified within the project area is Site T-101. This L-shaped wall is evaluated as having minimal research, interpretive, and cultural value. No further work is recommended for this feature.

RECOMMENDATIONS

Based on the negative results of the subsurface archaeological reconnaissance, "these findings would indicate...'no effect' on significant historic sites" (Letter dated June 12, 1987 from State Parks Administrator Ralston H. Nagata, HSS-DLNR to Leslie Kurisaki of Helber, Hastert & Kimura, Planners). This assessment is given with the provision that any land modification of the dune be monitored, or that a stop work and immediate archaeological consultation policy be established. There is still a possibility of isolated burials and/or remnants of buried cultural deposits within the project area.

The monitoring option would require an on-site archaeologist to be present during excavation of the dune. The archaeologist would then be able to attend to any cultural materials uncovered during excavation.

Monitoring would be conducted under guidelines established by the SHA. A stop work policy would require all work in the immediate area to be suspended until a qualified archaeologist inspects and evaluates the significance of any newly discovered remains.

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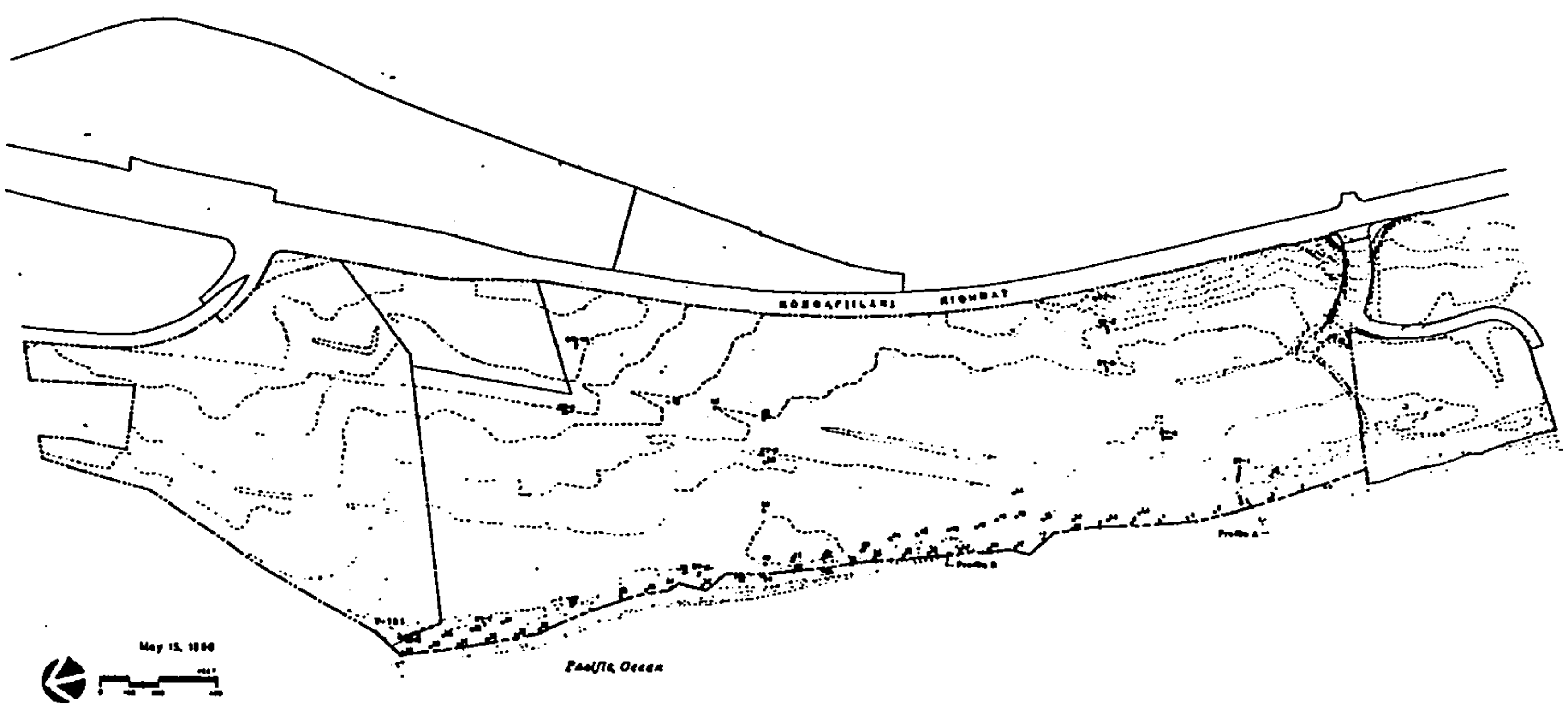

North Beach Kaanapali

Amfac Property Development Corp/
Tobishima Pacific, Inc.

Figure 2

PROJECT AREA MAP
SHOWING LOCATION OF CORES
TRENCHES, SOIL PROFILES
AND ARCHAEOLOGICAL SITE

LAND OF HANAKAOO
LAHAINA, ISLAND OF MAUI
PHRI PROJECT 87-321 JUNE 1987

H

TRAFFIC STUDY

TRAFFIC IMPACT REPORT

FOR THE PROPOSED

NORTH BEACH KAANAPALI RESORT DEVELOPMENT

PREPARED FOR

KAANAPALI NORTH BEACH JOINT VENTURE

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No. 4922-C
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BY

AUSTIN, TSUTSUMI & ASSOCIATES, INC.

ENGINEERS * SURVEYORS

HONOLULU, HAWAII

AUGUST 1987

H-1

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EXHIBITS

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(CONTD.)

EXECUTIVE SUMMARY

This report presents the findings and recommendations of the traffic impact assessment conducted for the North Beach Kaanapali Resort Development, proposed by the Kaanapali North Beach Joint Venture. First hotel occupancy would be scheduled for 1991 and full build-out to 3200 hotel rooms is expected by 1994. The study analyzes the existing conditions, assesses the traffic impacts resulting from the trips generated by the proposed development superimposed over projected traffic conditions, and recommends improvements to mitigate those impacts identified.

The existing traffic conditions between Lahaina and Kaanapali are heavy throughout the afternoon, with the total daily traffic ranging from 26,800 vehicles per day to 37,500 vehicles per day. The peak hour of traffic occurs between 4:00 PM and 5:00 PM. The impact assessment is focused on this critical time period.

The traffic assessment is discussed in terms of various capacity analysis techniques. "Over capacity" at a signalized intersection means that traffic demand exceeds the capacity of the intersection. A "volume-to-capacity ratio" (V/C) over 1.00 on a continuous highway segment indicates that the traffic demand per lane exceeds the lane carrying capacity. Level of Service "F" at an unsignalized intersection occurs when side street movements experience excessive delays and queuing causes severe congestion on other traffic movements within the intersection. Each of these criteria indicates that highway improvements may be warranted and are, therefore, recommended in this study.

The target years for projected traffic developed in this study are 1990, pre-development condition before the first hotel is occupied; 1992, Phase I of the project with 1598 hotel rooms; and 1994, at full build-out with a total of 3200 hotel rooms.

Pre-Development

By 1990, the northbound lane on Honoapiilani Highway would operate at a V/C ratio of 1.06. The intersection of Honoapiilani Highway and Kaanapali Parkway would be over capacity. The mitigative measures recommended prior to the proposed development include:

1. Construct a second northbound lane to Honoapiilani Highway between Lahaina and Kaanapali as proposed by the State Department of Transportation (SDOT).
2. Widen the southbound approach of Honoapiilani Highway at Kaanapali Parkway to two through lanes.
3. Provide double left turn lanes from Honoapiilani Highway, northbound to Kaanapali Parkway.

Honoapiilani Highway would be upgraded to a full four-lane facility, reducing the V/C ratio to 0.58. Upgrading the intersections of Honoapiilani Highway and Kaanapali Parkway would improve traffic operation to near capacity conditions.

Phase I (1598 hotel rooms)

By 1992, Honoapiilani Highway would reach capacity conditions: over capacity at Kaanapali Parkway and at Puukolii Road/Kai Ala Drive intersections; and a V/C ratio of 1.05 north of Kaanapali Parkway. The recommended mitigative measures for Phase I development include:

1. Construction of the two lane, high quality mauka Bypass Highway, beginning at Puamana, south of Lahaina, to Honokowai, north of Kaanapali.

2. Construct a connector roadway between Honoapiilani Highway and the Bypass Highway in the vicinity of the Lahaina Civic Center. Signalize the intersection at Honoapiilani Highway.

The Bypass Highway would divert through traffic around Kaanapali and Lahaina, thereby reducing the traffic demand on Honoapiilani Highway. A well-planned system of collector-distributor roads between the Bypass Highway and Honoapiilani Highway should attract Kaanapali and Lahaina traffic, further reducing the traffic load on Honoapiilani Highway.

Phase II (1602 hotel rooms)

By 1994, the intersection of Honoapiilani Highway and Puukolii Road/Kai Ala Drive would be over capacity. In order to mitigate this impact, it is recommended that both side street approaches be widened to provide exclusive left turn, through and right turn lanes. This improvement would facilitate North Beach access to Honoapiilani Highway and the Bypass Highway, via Puukolii Road.

Conclusion

The SDOT-proposed Bypass Highway and four lane widening of Honoapiilani Highway, implemented in a timely manner, and the proposed improvements recommended in this study, should mitigate the traffic impacts resulting from this project and the overall growth of West Maui.

Transportation system management alternatives such as the airport shuttle bus service, jitney service, park-and-ride program and ride-sharing program would further mitigate traffic congestion.

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TRAFFIC IMPACT REPORT
FOR THE PROPOSED
NORTH BEACH KAANAPALI RESORT DEVELOPMENT

I. INTRODUCTION

A. Purpose and Scope of Study

The purpose of this study is to assess the traffic impacts resulting from the proposed development known as North Beach Kaanapali Resort. North Beach Kaanapali would be a destination resort development at the Kaanapali Beach Resort.

This report presents the findings and recommendations of this study, the scope of which includes:

1. A description of the proposed project.
2. An assessment of the existing conditions.
3. Development of trip generation characteristics for the proposed project.
4. Development of traffic projections.
5. Identification and assessment of the traffic impacts resulting from the trips generated by the proposed project superimposed over the projected traffic conditions.
6. Recommendation of improvements which would mitigate the traffic impacts identified in this study.

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WAILUKU, MAUI, HAWAII • HILO, HAWAII

North Beach Kaanapali development is expected to occur over a 4 to 8 year period, with the completion of the first three hotels expected by 1992. Full build-out is expected between 1994 and 1998, with a total of 2500 to 3200 hotel rooms. This traffic assessment will be based upon full build-out at 3200 rooms by 1994.

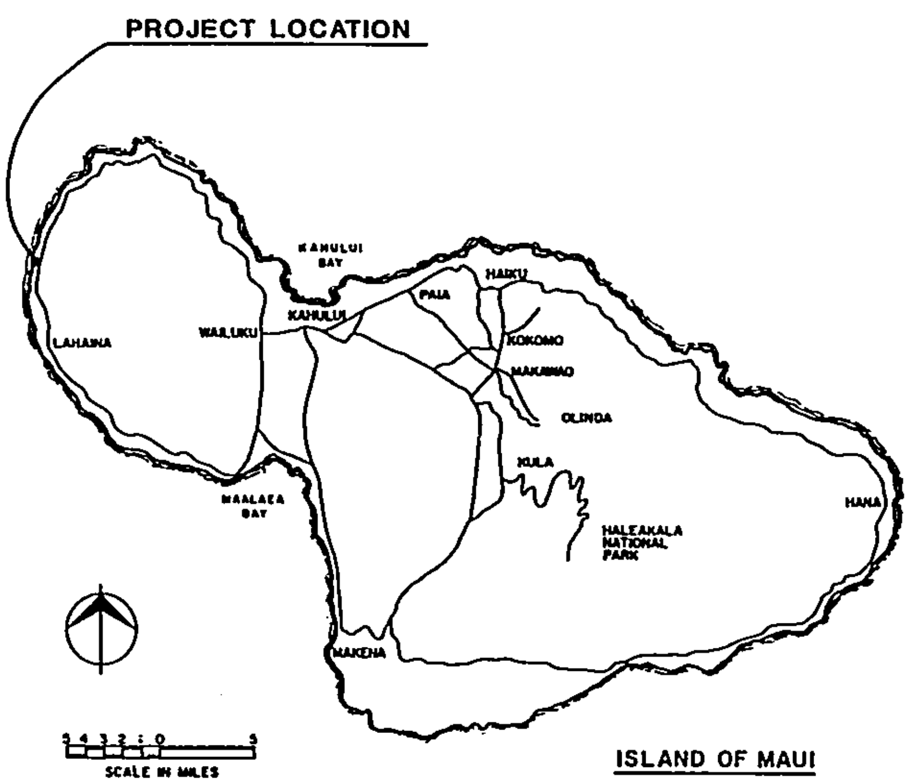
B. Location

The Kaanapali Beach Resort is located at the westernmost point on the island of Maui. The North Beach site is located immediately north of the existing resort. The 95 acre site is identified as Tax Map Keys: 4-4-01:2, 3, 6, 8, 9, & 68, 4-4-02:24, and 4-4-06:5. Exhibits 1 and 2 show the project location and vicinity. The project site is bounded by Honoapiilani Highway to the east, the ocean to the west, Honoapiilani Road to the north, and the existing Kaanapali Beach Resort to the south.

C. Project Description

Kaanapali North Beach Joint Venture is proposing to develop the 95 acre ocean front property immediately north of the existing Kaanapali Beach Resort. The North Beach Kaanapali Resort concept is intended to provide a world-class destination resort, targeting the "carriage trade" or upper income clientele.

North Beach Kaanapali Resort is made up of 9 hotel lots which will be consolidated to 3 to 6 hotels ranging in density from 35 rooms per acre to 45 rooms per acre. Two park sites, totaling 6 acres, are also included in the development plan at the northernmost point and southern end of the project site.



KAANAPALI NORTH BEACH JOINT VENTURE TRAFFIC IMPACT REPORT FOR THE PROPOSED NORTH BEACH KAANAPALI RESORT DEVELOPMENT KAANAPALI, LAHAINA, MAUI, HAWAII	ATA AUSTIN, TSUTSUMI, & ASSOC., INC. LOCATION MAP	EXHIBIT 1

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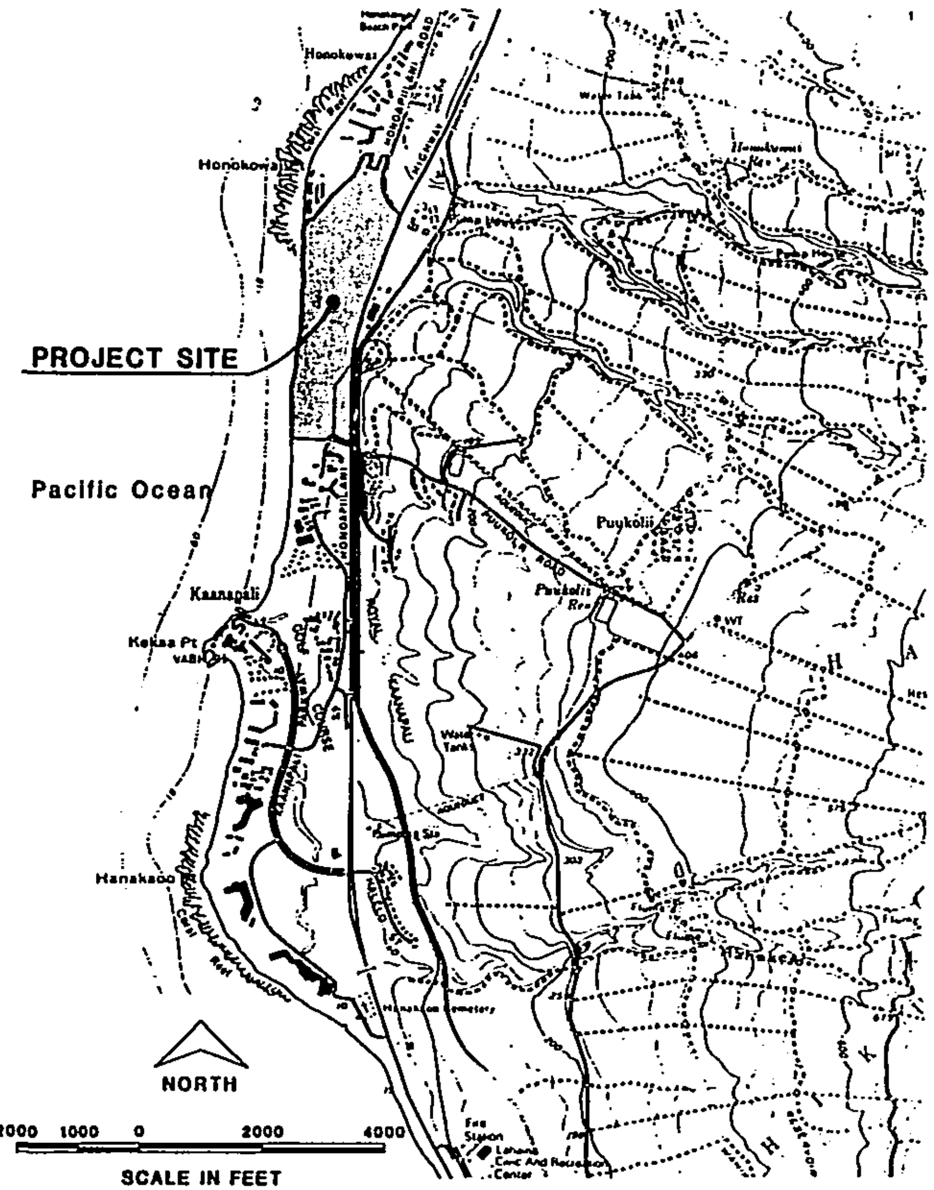

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Access to the resort development would be provided by the extension of Kai Ala Drive (located across Puukolii Road) northward, parallel to Honoapiilani Highway. Exhibit 3 shows the proposed North Beach Kaanapali development plan. The proposed development plan schedule is as follows:

Phase I

1991 -	2 hotel,	832 rooms
1992 -	2 hotels,	766 rooms
Sub-total		1598 rooms

Phase II

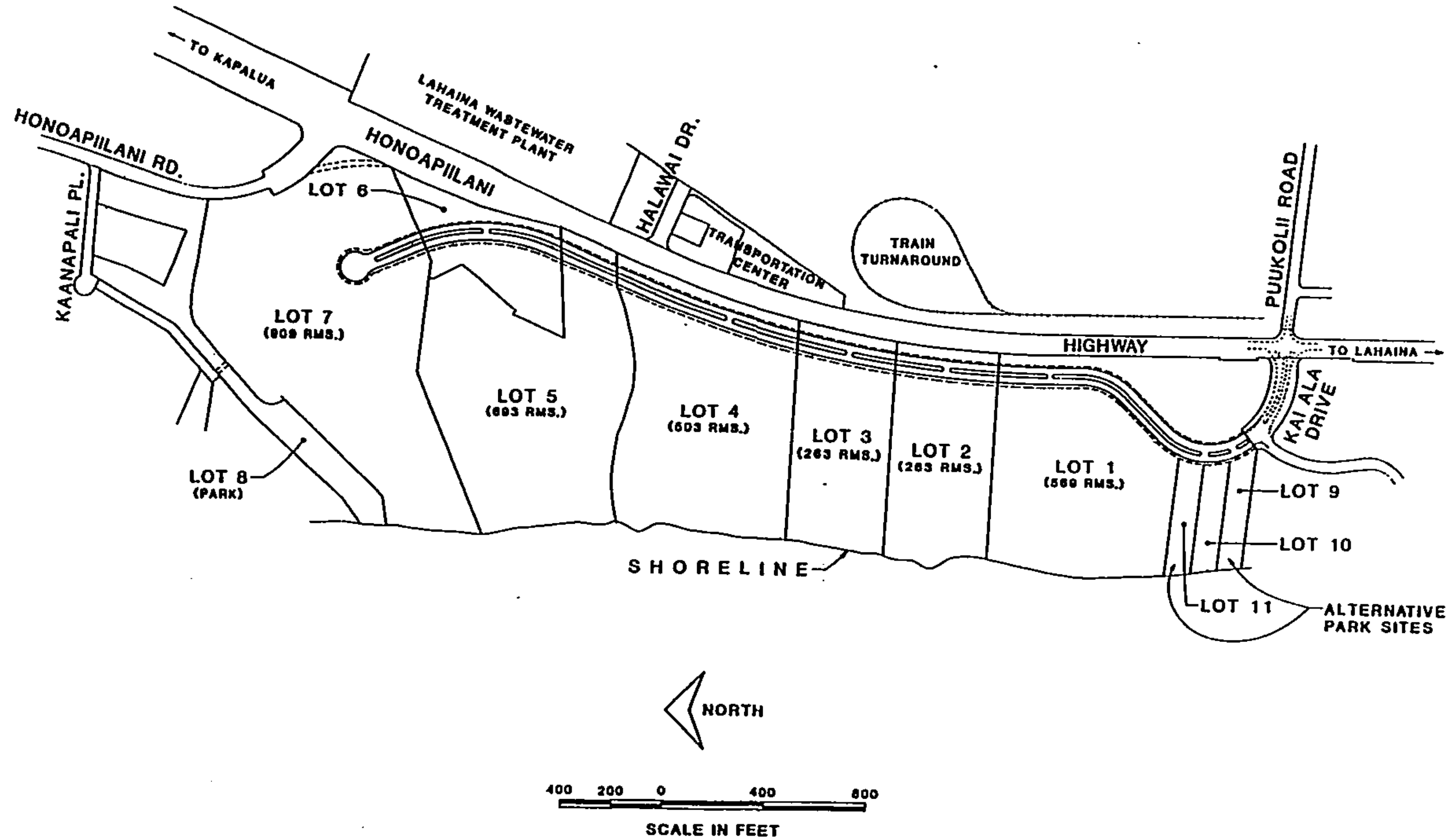
1993 -	1 hotel,	693 rooms
1994 -	1 hotel,	909 rooms
Sub-total		1602 rooms
North Beach Total		3200 rooms

II. EXISTING CONDITIONS

A. Roads

Honoapiilani Highway is a three-lane (two lanes southbound and one lane northbound), two-way, rural arterial providing the only link between the Kaanapali and Lahaina areas. North of Kaanapali Parkway, Honoapiilani Highway becomes a two-lane highway to Napili. South of Shaw Street in Lahaina, Honoapiilani Highway becomes a two-lane highway to Wailuku.

At the Kaanapali Parkway, Honoapiilani Highway forms a signalized, four-way, channelized intersection providing left turn and right turn lanes and one through lane in each direction.



KAANAPALI NORTH BEACH JOINT VENTURE TRAFFIC IMPACT REPORT FOR THE PROPOSED NORTH BEACH KAANAPALI RESORT DEVELOPMENT KAANAPALI, LAHAINA, MAUI, HAWAII	ATA AUSTIN, TSUTSUMI, & ASSOC., INC. ENGINEERS SURVEYORS · HAWAII DEVELOPMENT PLAN	EXHIBIT 3

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The mauka leg of the intersection is a two-lane roadway providing access to the Kaanapali Vista. The Kaanapali Parkway is a divided roadway providing access to the Kaanapali Beach Resort.

Kekaa Drive is a two-lane roadway makai of Honoapiilani Highway beginning at the Kaanapali Parkway opposite The Whaler, and leading to the Royal Lahaina Resort. A short connecting roadway between Kekaa Drive and Honoapiilani Highway is located at the Maui Eldorado Condominium. Here Kekaa Drive forms an unsignalized T-intersection with Honoapiilani Highway between Kaanapali Parkway and Puukolii Road/Kai Ala Drive. The State Department of Transportation is planning to construct a left turn lane on Honoapiilani Highway, northbound at Kekaa Drive, and prohibit the left turn from Kekaa Drive to Honoapiilani Highway, northbound.

At Puukolii Road/Kai Ala Drive, Honoapiilani Highway forms a four-legged intersection; the mauka leg provides access to the International Colony Club, Kaanapali Plantation and the Kaanapali Hillside; and Kai Ala Drive is the makai leg which leads to the project site as well as providing access to the Maui Kaanapali Villas Condominium. Amfac, in conjunction with Ohbayashi, has installed a traffic signal system at this intersection.

At the north end of the North Beach Kaanapali area is Honoapiilani Road, which forms a stop-controlled, three-way intersection with Honoapiilani Highway. Acceleration and deceleration lanes are provided in both directions for turning

movements on and off the highway. Honoapiilani Road provides access to the beach front development in the Honokowai area.

B. Traffic

1. Traffic Count Data

The evaluation of existing conditions of traffic flow in Kaanapali is based upon mechanical traffic counts taken at various locations along Honoapiilani Highway, including the State Department of Transportation's continuous traffic count station, south of the Kaanapali Beach Resort. Additional manual traffic counts were taken specifically for this study and adapted from previous studies done in the area.

The traffic count data show a small well-defined peak period during the early morning; however, from mid-morning, the traffic flow gradually increases to a broad afternoon peak period. The afternoon peak hour occurs between 4:00 PM and 5:00 PM. The PM peak hour is the most critical period during the day; therefore, the traffic impact analysis will focus on this time period.

Traffic counts south of Kaanapali, taken on July 16, 1986, indicate traffic volumes of 1408 vehicles per hour (vph), southbound, and 1329 vph, northbound, during the PM peak hour, and 32,804 vehicles for the 24-hour period, total for both directions.

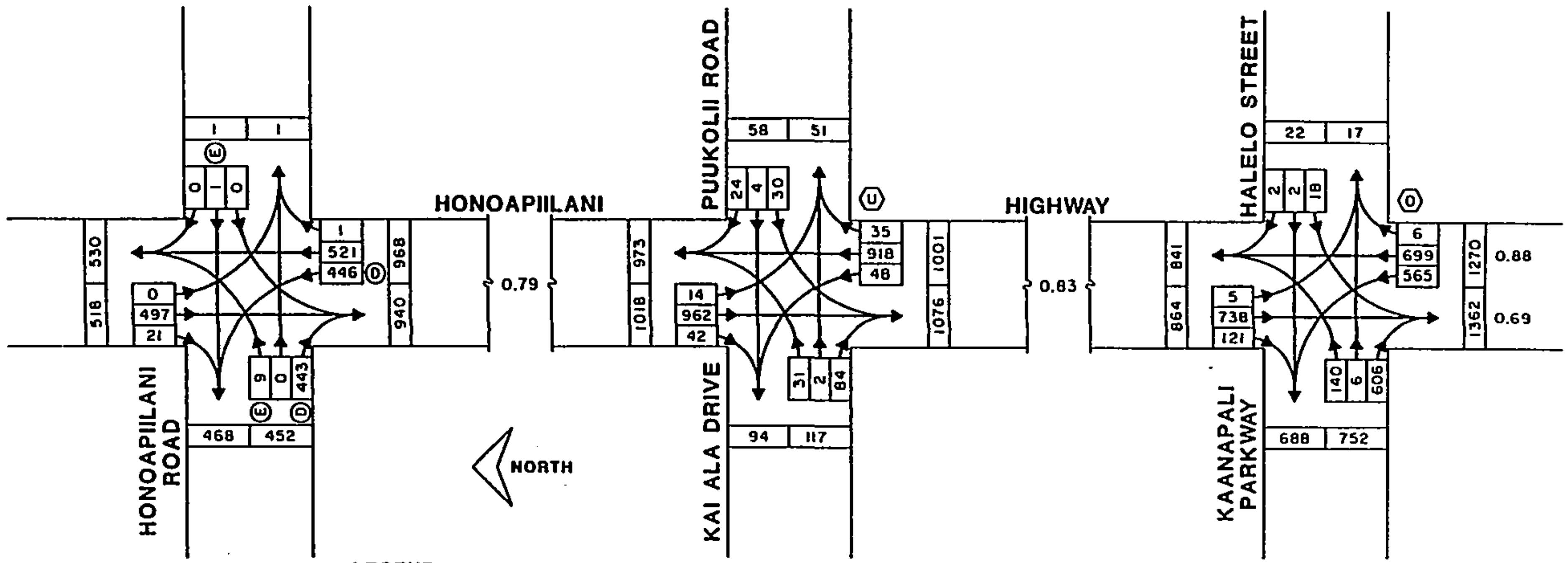
Intersection traffic counts were taken on July 15-16, 1986 during the PM peak period on Honoapiilani Highway at

Kaanapali Parkway, Puukolii Road/Kai Ala Drive, and at Honoapiilani Road. The traffic signals on Honoapiilani Highway and Kaanapali Parkway were not yet operational during the traffic count period, however capacity analysis was based upon signalized conditions. Exhibit 4 shows the existing PM peak hour traffic count data.

2. Capacity Analysis

Capacity analysis, throughout this report, is performed utilizing the procedures presented in the "Highway Capacity Manual, 1985" (HCM), Transportation Research Board Special Report 209, with the assistance of the Highway Capacity Software, developed by the Federal Highway Administration. The continuous highway segments are evaluated based upon HCM procedures for "two-lane", "three-lane", and "multi-lane" highways. Capacity analysis for continuous highway segments will be defined in terms of volume-to-capacity (V/C) ratios, which is defined by the rate of traffic flow divided by the capacity of the highway.

Intersection analysis is based upon HCM procedures for "signalized intersections, planning analysis" and "unsignalized intersections". Signalized intersection capacity analysis is defined in broad terms: "under capacity", indicating that the intersection traffic demand would virtually always be below capacity; "near capacity", indicating that traffic demand could exceed the intersection capacity depending on prevailing conditions; and "over capacity", indicating that the traffic demand would most likely exceed



LEGEND

1000 PEAK HOUR TRAFFIC VOLUME (VPH)

CAPACITY LEVEL (SIGNALIZED CONDITION)

U UNDER CAPACITY

N NEAR CAPACITY

O OVER CAPACITY

0.70 V/C RATIO

A LEVEL OF SERVICE (UNSIGNALIZED CONDITION)

EXISTING P.M. PEAK HOUR (4:00 P.M. – 5:00 P.M.)

KAANAPALI NORTH BEACH JOINT VENTURE TRAFFIC IMPACT REPORT FOR THE PROPOSED NORTH BEACH KAANAPALI RESORT DEVELOPMENT KAANAPALI, LAHAINA, MAUI, HAWAII	ATA AUSTIN, TSUTSUMI, & ASSOC., INC. ENGINEERS SURVEYORS · HAWAII EXISTING P.M. PEAK HOUR TRAFFIC	EXHIBIT 4

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the intersection capacity and would require geometric improvements.

Unsignalized intersection operation is measured in terms of Levels of Service (LOS). LOS for unsignalized intersections have no relationship to LOS for signalized intersections or continuous roadway segments. LOS for an unsignalized intersection is based upon the delay experienced by side street traffic, specifically the left turn, through, and right turn movements from the side street to the main highway and left turns off the main highway. The LOS range from LOS "A" for little or no delay to LOS "E" for very long traffic delays. LOS "F" indicates that the capacity of the lane has been exceeded and the queuing may cause severe congestion on other traffic movements in the intersections. This condition usually warrants intersection improvements. It is assumed that the through and right turn movements on the main highway have the right-of-way and, therefore, are not impeded by side street movements.

3. Existing Traffic Assessment

Honoapiilani Highway from Kaanapali through Lahaina is heavily utilized throughout the afternoon. The second southbound lane, constructed by SDOT in cooperation with Amfac, alleviates much of the southbound traffic congestion; however the northbound lane remains congested. During the PM peak hour of traffic, the northbound lane of Honoapiilani Highway, south of Kaanapali, operates at a V/C ratio of

0.88. The southbound lanes operate at a V/C ratio of 0.69. The traffic signal, installed at the intersection of Honoapiilani Highway and Kaanapali Parkway by Amfac, improves traffic safety for access to and egress from the Kaanapali Parkway, however the intersection still operates at over capacity.

Honoapiilani Highway, between Kaanapali Parkway and Puukolii Road/Kai Ala Drive, operates at a V/C ratio of 0.83. Honoapiilani Highway, between Puukolii Road/Kai Ala Drive and Honoapiilani Road, operates at a V/C ratio of 0.79. The intersection of Honoapiilani Highway at Puukolii Road/Kai Ala Drive is under capacity. The left turn movement from Honoapiilani Road to Honoapiilani Highway northbound is at LOS "E"; however, the left turn demand is small and does not adversely affect the other traffic movements.

III. TRIP GENERATION CHARACTERISTICS

A. General

The trip generation characteristics is based upon generally accepted techniques developed by the Institute of Transportation Engineers (ITE) and published in the "Informational Report on Trip Generation, Third Edition - 1982". These empirically derived rates correlate independent variables defining land use intensity with traffic count data.

B. Trip Generation Characteristics

Trip generation rates for "hotel" land use developed for other studies at the Kaanapali Beach Resort indicated a lower overall trip rate than those developed by ITE. Trip generation rates developed for the Hyatt Maui and the Marriott Hotels were 6.0 trip ends per room per day as compared to 10.5 trip ends per room per day developed by ITE. A trip generation study of the entire Kaanapali Beach Resort showed similar results.

The ITE rates are based upon a general "hotel" classification which in some cases may provide strictly lodging accommodations. The Kaanapali Beach Resort, on the other hand, is a destination resort which provides many visitor activities within the resort complex, thereby reducing off site trips. The 6.0 trips ends per room per day rate was adopted for use in this study.

Table 1 shows the summary of trip generation rates used in this study. The proposed project is expected to generate 19,200 trip ends per day and 1,335 vph during the PM peak hour.

IV. TRAFFIC PROJECTIONS

A. General

Traffic projections were developed from linear regression techniques using historical traffic count data over the past twenty years. Although the traffic projections developed in this study do not address specific development outside the scope of this project, it does take into account the overall growth in the region at a rate similar to that experienced over the past twenty years. It may be reasonable to assume that, since the development of Kaanapali Beach Resort in the past is included in the historically-derived traffic projection growth rate, North Beach

TABLE 1. SUMMARY OF TRIP GENERATION RATES

Land Use or Bldg. Type: HOTEL
Location: KAANAPALI, LAHAINA, MAUI
Independent Variable: ROOM — Units 3200

			TRIP RATE	VOLUME
AVERAGE WEEKDAY VEHICLE TRIP ENDS			6.00	19200
PEAK	A.M.	Enter	0.32	1036
HOUR	Between	Exit	0.16	518
OF	7 and 9	Total	0.49	1554
ADJACENT	P.M.	Enter	0.21	658
STREET	Between	Exit	0.21	677
TRAFFIC	4 and 6	Total	0.42	1335
PEAK	A.M.	Enter	0.34	1097
HOUR		Exit	0.17	549
OF		Total	0.51	1646
GENERATOR	P.M.	Enter	0.25	785
		Exit	0.25	806
		Total	0.50	1591
SATURDAY VEHICLE TRIP ENDS			4.63	14811
PEAK		Enter	0.19	604
HOUR OF		Exit	0.19	621
GENERATOR		Total	0.38	1225
SUNDAY VEHICLE TRIP ENDS			5.03	16091
PEAK		Enter	0.17	550
HOUR OF		Exit	0.18	565
GENERATOR		Total	0.35	1115

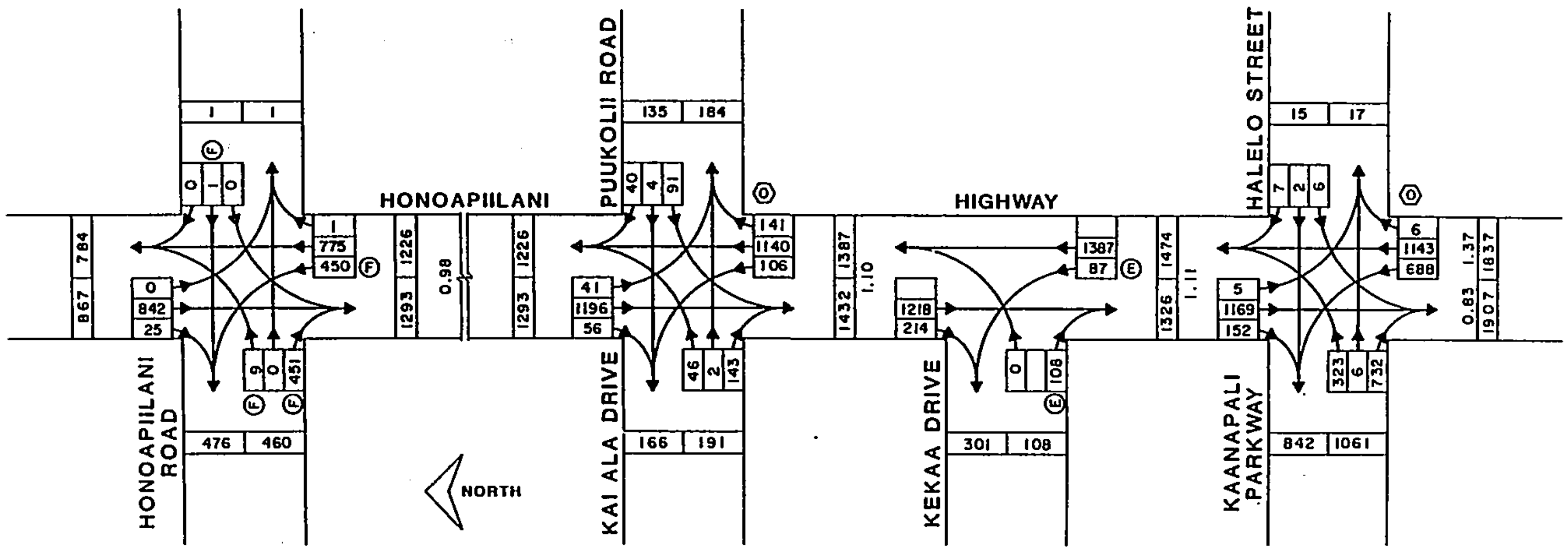
Kaanapali Resort should also be included in the overall future growth in traffic as a continuation of the past expansion of the Kaanapali Beach Resort. However the purpose of this report is to assess the impact of the proposed project on future conditions. The traffic generated by the North Beach project is assumed to be independent of the overall development of West Maui and is superimposed over the projected traffic conditions. Therefore the traffic assessment can be considered as conservative.

B. Traffic Projections Without the Project

The traffic projections without the proposed project were developed for the target year 1994 which would have been the date of completion for the North Beach Kaanapali Resort. Exhibit 5 shows the projected traffic volumes and capacity conditions for the PM peak hour of traffic, without the proposed project, under existing highway conditions.

South of Kaanapali, the northbound lane of Honoapiilani Highway would be over capacity with a V/C ratio of 1.37. The southbound lanes operate at a V/C ratio of 0.83. The intersection of Honoapiilani Highway and Kaanapali Parkway would be over capacity. Honoapiilani Highway, north of Kaanapali Parkway, would be over capacity with a V/C ratio of 1.1.

The intersection of Honoapiilani Highway and Puukolii Road/ Kai Ala Drive would be over capacity due to the increase in through traffic on Honoapiilani Highway. North of Puukolii Road/ Kai Ala Drive, Honoapiilani Highway would be near capacity with a



LEGEND

1000 PEAK HOUR TRAFFIC VOLUME (VPH)

CAPACITY LEVEL (SIGNALIZED CONDITION)

U UNDER CAPACITY

N NEAR CAPACITY

O OVER CAPACITY

0.70 V/C RATIO

A LEVEL OF SERVICE (UNSIGNALIZED CONDITION)

1994 P.M. PEAK HOUR PROJECTIONS (W/O PROJECT)

KAANAPALI NORTH BEACH JOINT VENTURE TRAFFIC IMPACT REPORT FOR THE PROPOSED NORTH BEACH KAANAPALI RESORT DEVELOPMENT KAANAPALI, LAHAINA, MAUI, HAWAII	ATA AUSTIN, TSUTSUMI, & ASSOC., INC. ENGINEERS SURVEYORS • HAWAII 1994 P.M. PEAK HOUR TRAFFIC (WITHOUT PROJECT)	EXHIBIT 5

V/C ratio of 0.98. The intersection of Honoapiilani Highway and Honoapiilani Road would be AT LOS "F".

V. TRAFFIC IMPACTS

A. General

The traffic impacts resulting from the proposed project, during the PM peak hour, is assessed for three target years: the Year 1990 is intended to show the pre-development conditions; the Year 1992 represents Phase I; and the Year 1994 represents Phase II at full build-out. The traffic impacts under the prevailing highway conditions are discussed herein. "Over capacity" (signalized intersections), LOS "F" (unsignalized intersections), and volume-to-capacity ratio greater than 1.00 (continuous highway segments) are used as the criteria for determining whether or not highway improvements are warranted. Highway improvements are recommended to mitigate the traffic impacts identified in the following sections. Capacity analysis is performed assuming implementation of the recommended improvements. These results are shown on the following exhibits.

Other developments expected to occur within the Kaanapali Beach Resort include (1) the Westin Maui in 1987, (2) a 350-unit resort condominium located immediately south of the North Beach site by 1992, and (3) the Kaanapali Hillside, expected to be fully occupied within 5 years.

B. Pre-Development Condition (Exhibit 6)

1. Traffic Assessment

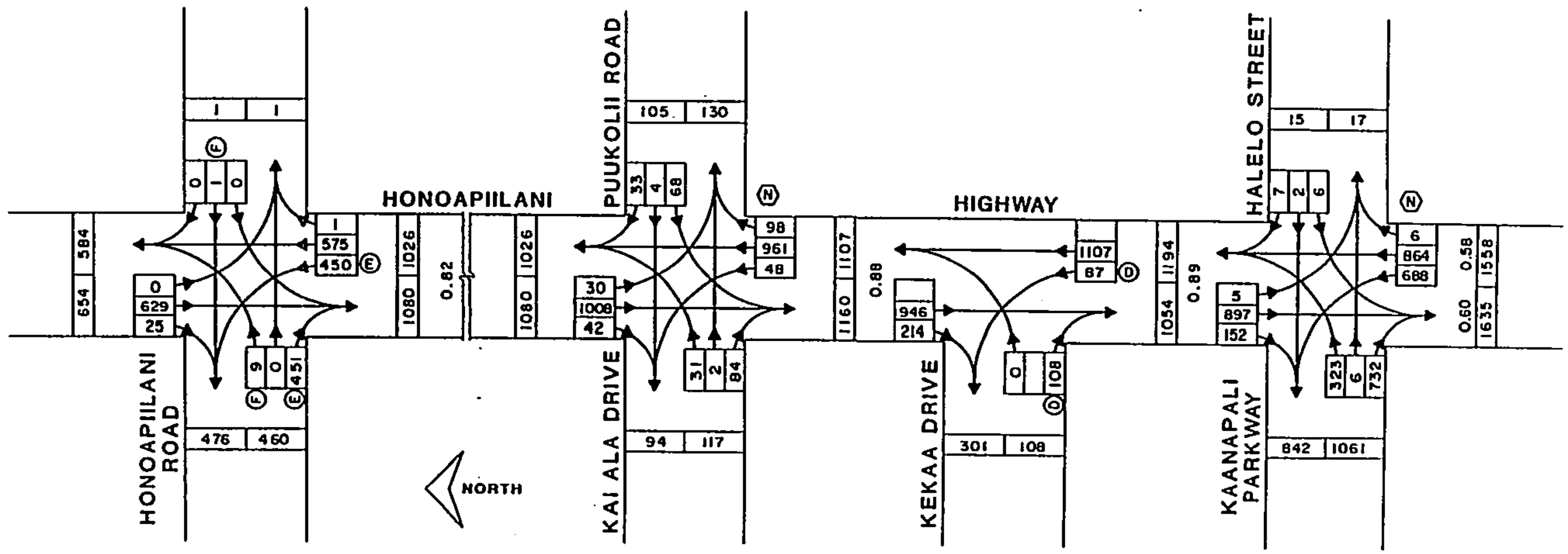
By the Year 1990, the northbound lane of Honoapiilani Highway, south of Kaanapali, would be over capacity with a V/C ratio of 1.06. The southbound lanes would operate at a V/C ratio of 0.82. The intersection of Honoapiilani Highway and Kaanapali Parkway would be over capacity, primarily due to the heavy left turn demand from Honoapiilani Highway, northbound, to Kaanapali Parkway conflicting with through traffic on Honoapiilani Highway, southbound. This would be a worsening of the existing capacity conditions.

North of Kaanapali Parkway, Honoapiilani Highway would be near capacity with a V/C ratio of 0.88. The left turn lane on Honoapiilani Highway, northbound, at Kekaa Drive would be at LOS "C". The intersection of Honoapiilani Highway and Puukolii Road/Kai Ala Drive would be near capacity due to the increase in mainline traffic.

Honoapiilani Highway, between Puukolii Road/Kai Ala Drive and Honoapiilani Road, would operate at a V/C ratio of 0.83. The intersection of Honoapiilani Highway and Lower Honoapiilani Road continues to operate at LOS "E".

2. Proposed Improvements

a. Add a second northbound lane to Honoapiilani Highway between Lahaina and Kaanapali as proposed by the State Department of Transportation (SDOT). SDOT has indicated that this improvement could be implemented by late 1989.



LEGEND

- 1000 — PEAK HOUR TRAFFIC VOLUME (VPH)
- CAPACITY LEVEL (SIGNALIZED CONDITION)
- (U) UNDER CAPACITY
- (N) NEAR CAPACITY
- (O) OVER CAPACITY
- 0.70 V/C RATIO
- (A) LEVEL OF SERVICE (UNSIGNALIZED CONDITION)

PRE-DEVELOPMENT (1990) P.M. PEAK HOUR PROJECTIONS

KAANAPALI NORTH BEACH JOINT VENTURE TRAFFIC IMPACT REPORT FOR THE PROPOSED NORTH BEACH KAANAPALI RESORT DEVELOPMENT KAANAPALI, LAHAINA, MAUI, HAWAII	ATA AUSTIN, TSUTSUMI, & ASSOC., INC. ENGINEERS SURVEYORS · HAWAII PRE-DEVELOPMENT P.M. PEAK HOUR TRAFFIC	EXHIBIT 6

b. Widen the southbound approach of Honoapiilani Highway at Kaanapali Parkway to two through lanes. Provide double left turn lanes from Honoapiilani Highway, northbound, to Kaanapali Parkway.

3. Mitigative Effects

The second northbound lane on Honoapiilani Highway between Lahaina and Kaanapali would upgrade it to a full four-lane facility, reducing the V/C ratios to 0.58 and 0.60 in the northbound direction and the southbound direction, respectively.

Upgrading the intersection of Honoapiilani Highway to two through lanes, southbound, and double left turn lanes, northbound to Kaanapali Parkway, would improve the operation to near capacity conditions.

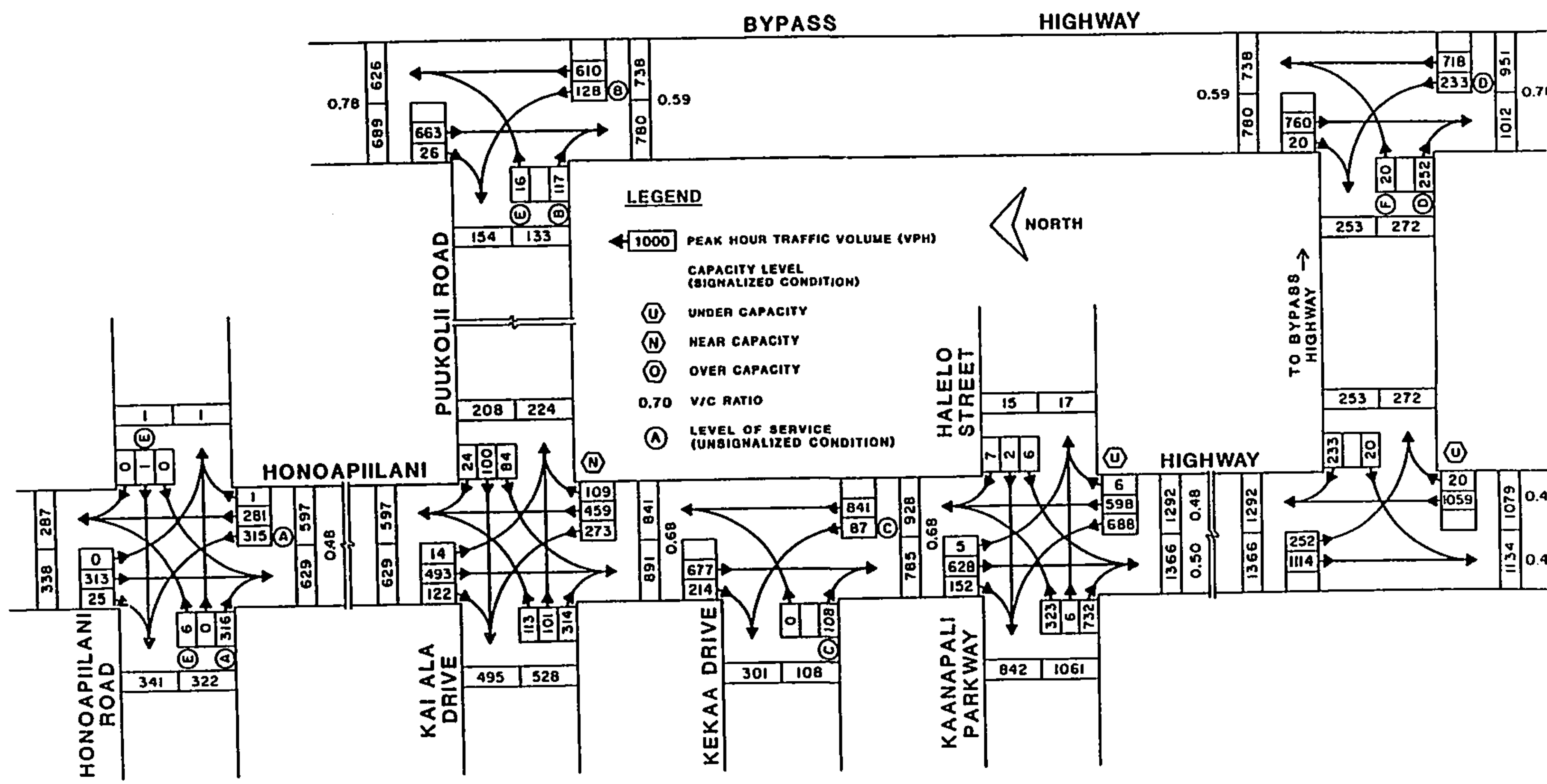
C. Phase I - 1992 (Exhibit 7)

1. Traffic Assessment

By Phase I (1598 rooms), the intersection of Honoapiilani Highway and Lower Honoapiilani Road would be near capacity due to development north of Kaanapali.

The intersection of Honoapiilani Highway and Puukolii Road/Kai Ala Drive would be over capacity, with the increase in southbound traffic on Honoapiilani Highway, conflicting with the traffic generated by the proposed North Beach Kaanapali project.

North of Kaanapali Parkway, Honoapiilani Highway would be over capacity with a V/C ratio of 1.05.



PHASE I (1992) P.M. PEAK HOUR

KAANAPALI NORTH BEACH JOINT VENTURE TRAFFIC IMPACT REPORT FOR THE PROPOSED NORTH BEACH KAANAPALI RESORT DEVELOPMENT KAANAPALI, LAHAINA, MAUI, HAWAII	ATA AUSTIN, TSUTSUMI, & ASSOC., INC. ENGINEERS SURVEYORS • HAWAII PHASE I P.M. PEAK HOUR TRAFFIC	EXHIBIT 7

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Honoapiilani Highway at Kaanapali Parkway would be over capacity due to the increase in through traffic.

2. Proposed Improvements

The traffic conditions projected for 1992 would require the construction of a two-lane, high quality Bypass Highway beginning at Puamana, south of Lahaina, to Honokowai, north of Kaanapali. The Bypass Highway is being planned by the State DOT at this writing. Although the alignment and financing have not been determined at this writing, a "fast-track" 1992 completion date is considered feasible. The Bypass Highway should also include connector roads leading down to Honoapiilani Highway to collect and distribute local traffic as well as allow through traffic to bypass Lahaina and Kaanapali. The connector road south of Kaanapali, in the vicinity of the Lahaina Civic Center, would require signalization at Honoapiilani Highway.

3. Mitigative Effects

Bypass Highway, proposed by SDOT, would be a two lane, high quality, rural arterial highway bypassing Lahaina Town and ultimately Kaanapali Beach Resort. The Bypass route has not been established at the time of this writing.

The Bypass Highway would divert through traffic around Kaanapali and Lahaina thereby reducing the traffic demand on Honoapiilani Highway. A well-planned system of collector-distributor roads between the Bypass Highway and Honoapiilani Highway should attract Kaanapali and Lahaina traffic,

further reducing the traffic load on Honoapiilani Highway. The reduction of main line traffic would facilitate side street traffic to both Kaanapali Parkway and the North Beach Project.

D. Phase II (Exhibit 8)

1. Traffic Assessment

By 1994, at the full build-out of North Beach Kaanapali (3200 rooms), the intersection of Honoapiilani Highway and Puukolii Road/Kai Ala Drive would reach capacity.

2. Proposed Improvements

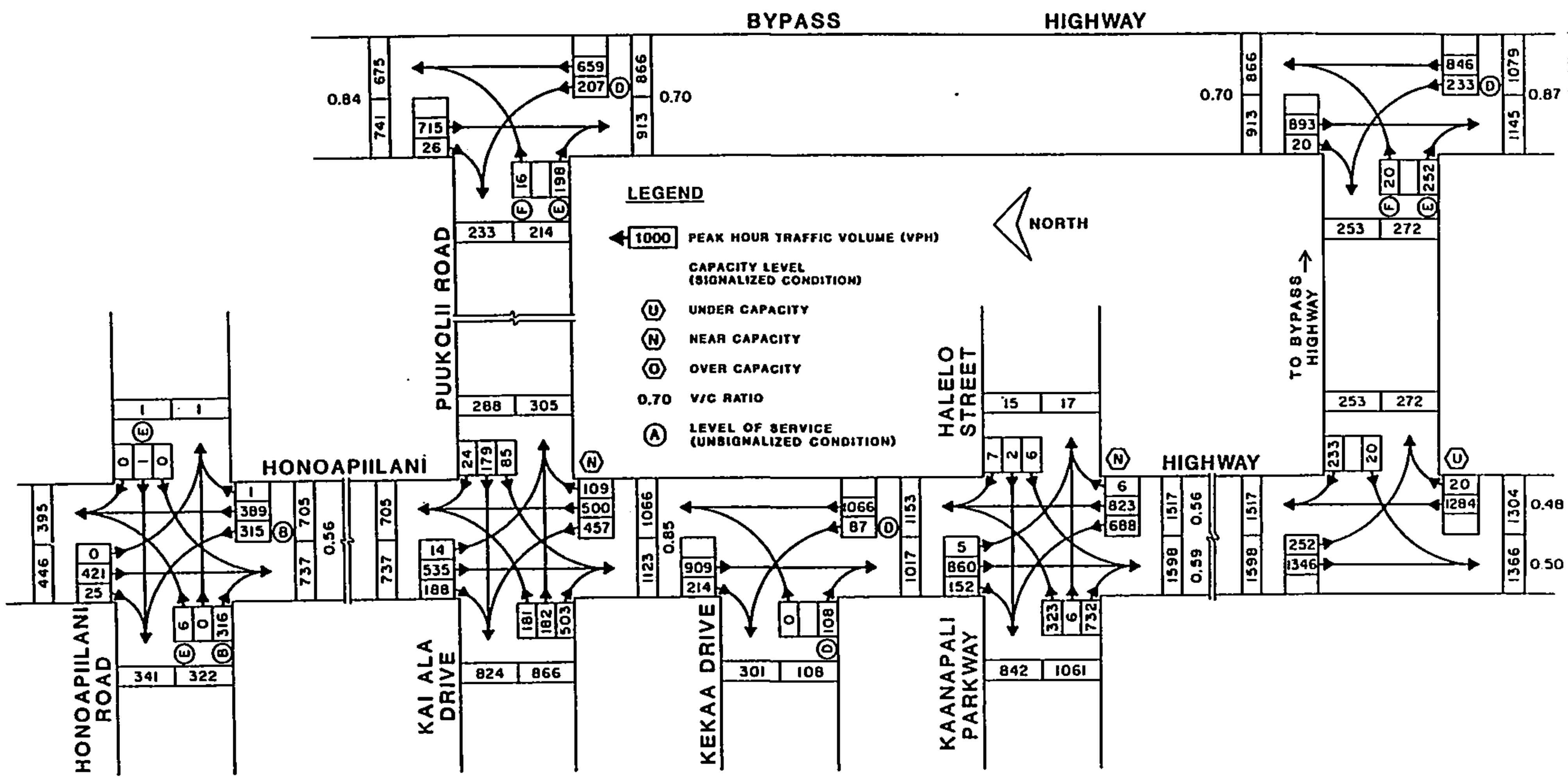
Upgrade the Puukolii Road and Kai Ala Drive approaches at Honoapiilani Highway to provide exclusive left turn, through, and right turn lanes.

3. Mitigative Effects

The improvement of the Puukolii Road and Ka Ala Drive approaches would facilitate North Beach access to Honoapiilani Highway.

VI. OTHER MITIGATING MEASURES

The recommendations, discussed previously, are infrastructure type improvements, requiring the expenditure of significant capital outlays and therefore extensive lead times for implementation. Other transportation system management (TSM) improvements are less capital intensive and easier to implement, but require changes in travel behavior by both visitors and residents alike. Because the effectiveness of these programs, individually and collectively, cannot be easily quantified, their impact on traffic was not included in the



PHASE II (1994) P.M. PEAK HOUR

KAANAPALI NORTH BEACH JOINT VENTURE TRAFFIC IMPACT REPORT FOR THE PROPOSED NORTH BEACH KAANAPALI RESORT DEVELOPMENT KAANAPALI, LAHAINA, MAUI, HAWAII	ATA AUSTIN, TSUTSUMI, & ASSOC., INC. ENGINEERS · SURVEYORS · HAWAII PHASE II P.M. PEAK HOUR TRAFFIC	EXHIBIT 8

previous section. However, successful implementation would certainly reduce traffic demand in the vicinity. A more comprehensive discussion and economic analysis of a transportation system management program is presented in "North Beach Kaanapali Transportation Study", prepared by Helber, Hastert and Kimura, Planners, July 1987.

VII. REGIONAL ANALYSIS

The regional analysis of West Maui would include both Kaanapali and Lahaina. However the the specific impacts of the Bypass Highway in Lahaina are difficult to assess because the alignment has not been determined at this writing and the connector road network between Honoapiilani Highway and the Bypass Highway has not been established.

VIII. CONCLUSIONS AND RECOMMENDATIONS

A. Conclusions

1. Honoapiilani Highway from Kaanapali through Lahaina is heavily utilized throughout the afternoon. The second southbound lane constructed by SDOT alleviates much of the southbound traffic congestion, however, the northbound lane remains congested.
2. The traffic signal installed by the Kaanapali Resort improves traffic safety for access to and from the Kaanapali Parkway, however the intersection still operates at capacity.
3. The growth in regional traffic is expected to continue even without the development of the proposed project. According to the 1994 traffic projections without the project, the

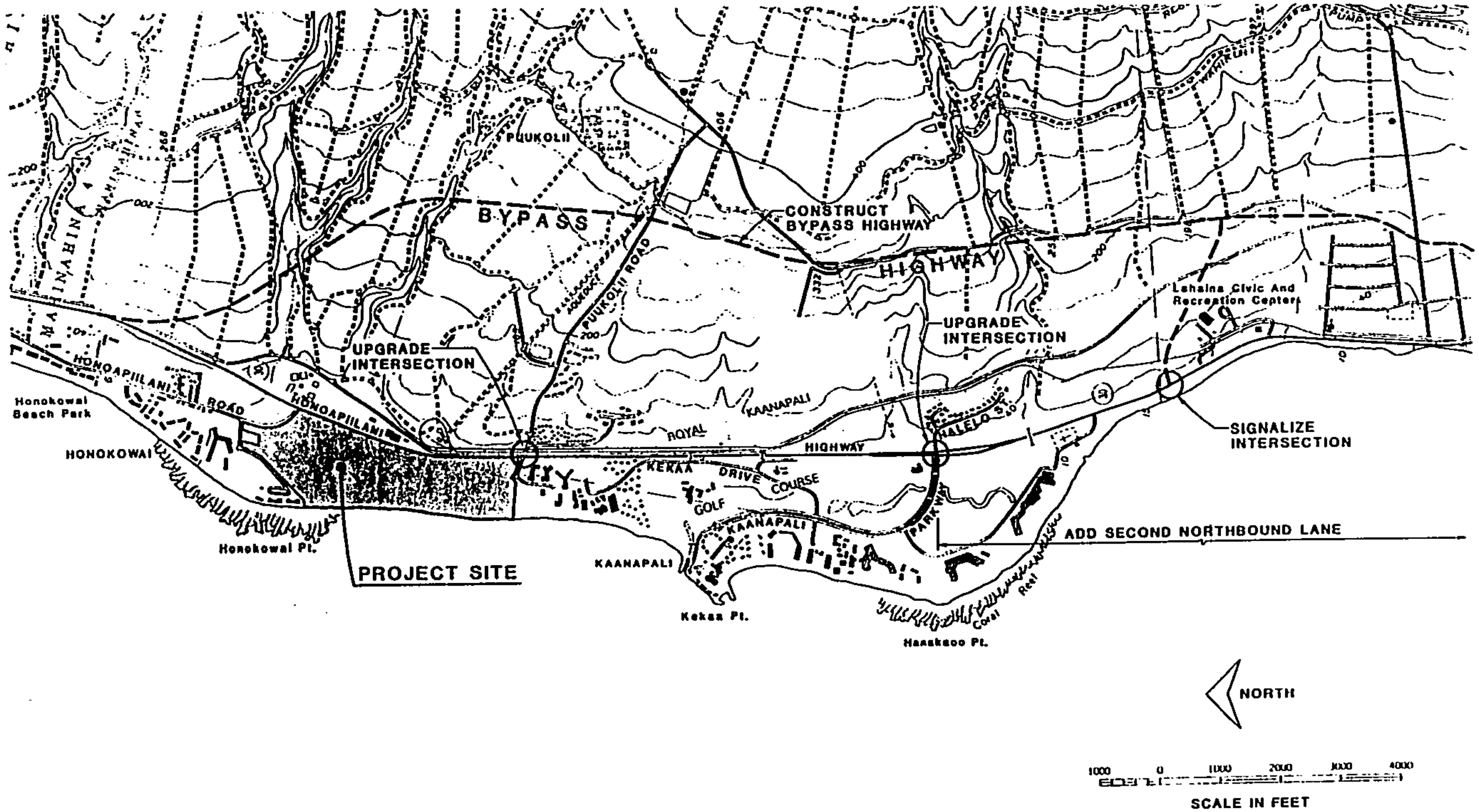
traffic demand during the PM peak hour would exceed the capacity of the existing highway facilities.

4. The recommended highway improvements proposed herein are designed to accommodate traffic generated by the North Beach Kaanapali Resort in addition to the regional growth in traffic, by maintaining the operating traffic conditions below the capacity level.
5. The TSM alternatives can further reduce traffic congestion projected for the vicinity.

B. Recommendations

A summary of the proposed highway improvements, discussed in Section V, is shown on Exhibit 9. The SDOT-proposed Bypass Highway and four lane widening of Honoapiilani Highway are also shown. The proposed improvements, implemented in a timely manner, should mitigate the traffic impacts resulting from this project and the overall growth of West Maui.

TSM alternatives such as the airport shuttle bus service, jitney service, park-and-ride program, and ride-sharing program would further mitigate traffic congestion. Efforts should be coordinated with all parties involved.



KAANAPALI NORTH BEACH JOINT VENTURE TRAFFIC IMPACT REPORT FOR THE PROPOSED NORTH BEACH KAANAPALI RESORT DEVELOPMENT KAANAPALI, LAHAINA, MAUI, HAWAII	ATA AUSTIN, TSUTSUMI, & ASSOC., INC. SUMMARY OF PROPOSED HIGHWAY IMPROVEMENTS	EXHIBIT 9

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I

TRANSPORTATION STUDY

N O R T H · B E A C H

Kaanapali, Maui

TRANSPORTATION STUDY

Prepared for:
A Joint Venture Development of
Amfac Property Investment Corporation
and
Tobishima Pacific, Inc.

Prepared by:
Helber, Hastert & Kimura, Planners

July 1987

I-1

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I. INTRODUCTION

Purpose of the Study

This document focuses on transportation proposals to mitigate traffic congestion in West Maui, specifically in the area from Kaanapali to Lahaina. A traffic impact report for the proposed North Beach Kaanapali Resort prepared by Austin, Tsutsumi & Associates, Inc. in July 1987 (herein called "ATA Traffic Impact Report"), provides baseline data on existing volumes of vehicular traffic and roadway capacities, as well as projections of trips that will be generated by the proposed development. The present transportation study expands on the relative benefits and costs of wide-ranging actions intended to mitigate adverse traffic impacts. As an informational document, its purpose is to assist in decision-making for an effective and comprehensive transportation program to support development at North Beach Kaanapali.

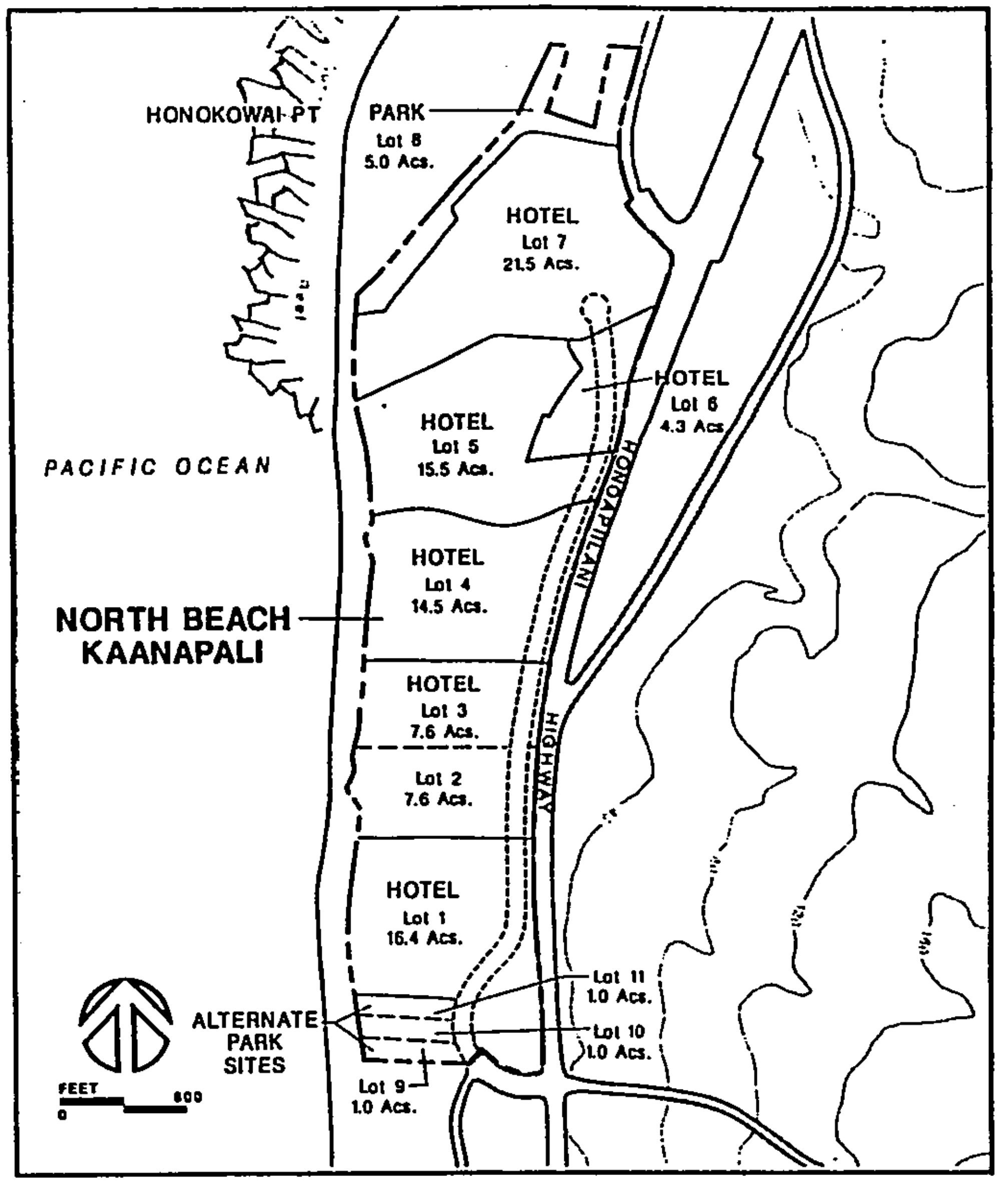
Project Description

The proposed North Beach Kaanapali development is situated on 95 acres of oceanfront land located on the leeward coast of Maui, Lahaina Judicial District. The site is identified by tax map keys: 4-4-01: por. 02, 03, 06, 08, 09, and 68; 4-4-02: 24; and 4-4-06: 5. It is located directly north of and adjacent to the Kaanapali Beach Resort (also called "South Beach" in this study). As described in the North Beach Kaanapali Environmental Assessment dated October 1986, the developers, a Joint Venture of Amfac Property Development Corporation and Tobishima Properties of Hawaii, Inc., propose to subdivide the property into eleven lots which may be consolidated into a maximum of six hotel and two park sites. Contingent upon market conditions, there is a possibility that fewer, but larger, hotel sites will be developed.

Figure 1 illustrates the eleven lots in the North Beach Kaanapali development plan. Lot 8 at the northern end of the property and either Lot 9 or Lot 11 at the southern end will be dedicated for public park use. Lots 5 and 6 will be consolidated into a single hotel site. The remaining one-acre lots (9 and 10 or 11) could either be combined into a single two-acre parcel, or incorporated into the larger parcels to the north or south. Lots 2 and 3 could be combined into one 15.2-acre hotel site, or split and consolidated with Lots 1 and 4, respectively.

All utilities and a major parkway will be constructed to service the individual lots. The first phase of development will include layout and construction of the internal parkway, site preparation in accordance with the subdivision plan, and construction of the drainage system and other public utilities.

Upon completion of the project, the developers will sell or lease sites to hotel developers. These projects will be subject to covenants and fees to be established for the North Beach Kaanapali Resort. Additionally, each hotel will become a member of an operator's association, a non-profit organization created to coordinate and maintain the overall marketability of the Kaanapali area. Hotel construction is expected to occur in phases extending up to ten years. The projected maximum hotel room count is 3,200 rooms for the entire resort area. The



NORTH · BEACH
Kaanapali, Maui
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North Beach Kaanapali Development Plan

Figure: 1

HELBER, HASTERT & KIMURA PLANNERS

projected number of rooms is less than the allowable density under existing zoning regulations and the actual number of rooms may be less than the planning estimate, depending upon the individual hotel design and the operational preferences of each hotel developer.

Study Area

The subject area of this study is the western region of Maui, where two primary population centers are located: Lahaina and Kaanapali. Vehicular transportation to these areas is served by the Honoapiilani Highway (Hwy. 30). It is the only arterial between Kaanapali and Lahaina, and also the only link between west and central Maui. The highway is heavily traveled, especially during peak periods of commuter travel. Major intersections along the highway that have or are expected to have considerable impact on congestion include Shaw Street, Dickenson Street, and Lahainaluna Road in Lahaina; Kaanapali Parkway at the entrance to Kaanapali Beach Resort; Puukolii Road/Kai Ala Drive at the entrance to North Beach Kaanapali; and Honoapiilani Road north of the proposed development (see Figure 2).

With increased urban development in west Maui, there has been a corresponding increase in vehicle miles traveled (VMT) on Honoapiilani Highway. The transportation issue is of concern to the community, state and local officials, and resort developers and operators, as evidenced by their joint participation in the Mayor's Ad Hoc Committee on Traffic in West Maui. The proposed North Beach Kaanapali Resort will increase traffic volumes and further tax the existing roadway system. At the same time, however, the development creates a prime opportunity to implement a package of mitigation measures that will expand and optimize the use of transportation facilities with overarching benefits for the community at large.

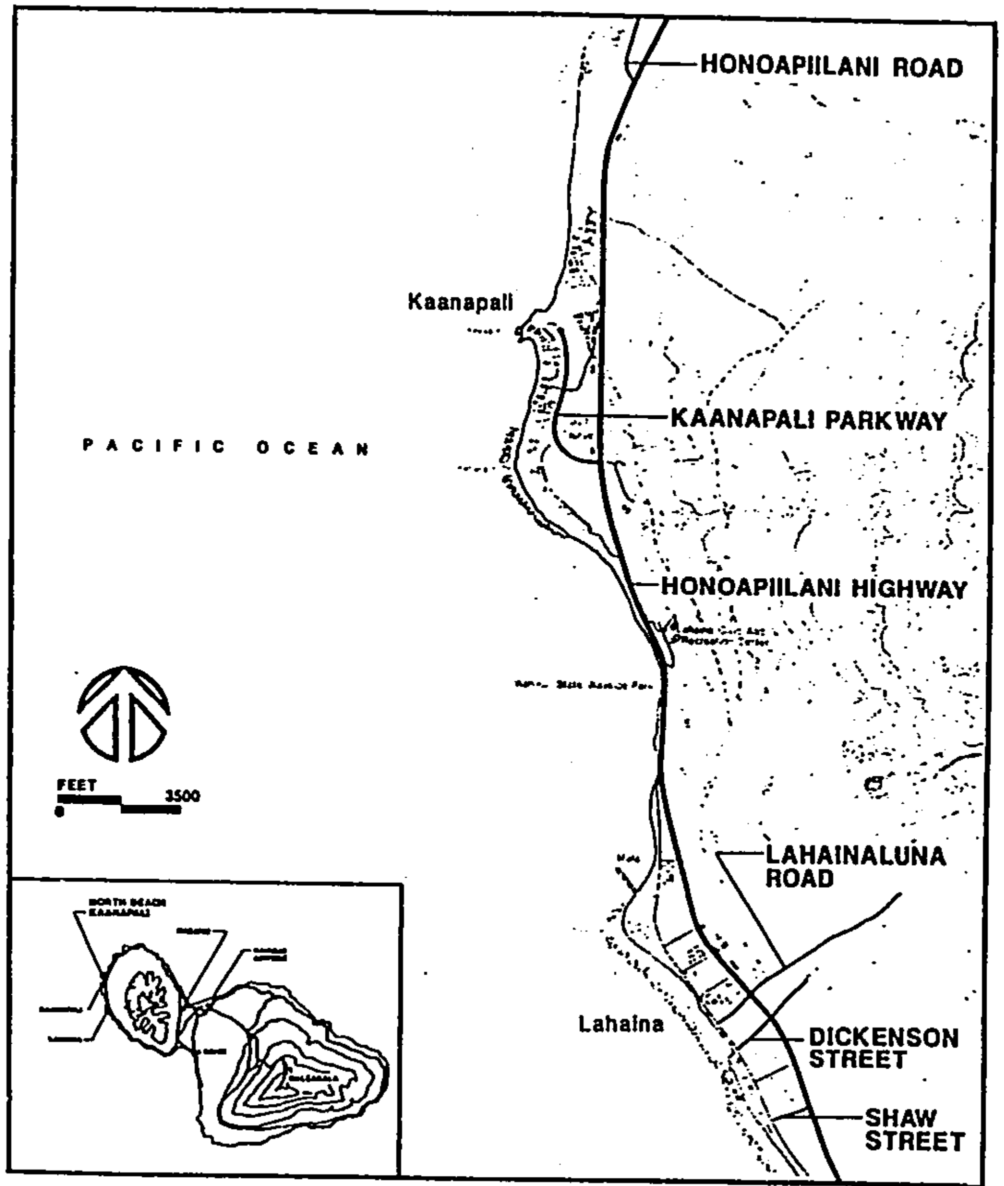
Methodology

This study is based on a model of transportation services which contains supply and demand components. Provision of an effective transportation system, like other consumer services, is achieved by balancing the two.

On the demand side, we consider major categories of users, i.e., visitors and employees, and their respective transportation requirements. Other user groups, such as non-employee residents and commercial traffic, are not addressed specifically, but are incorporated in the trip generation factors used in the ATA Traffic Impact Report.

Existing infrastructure, measured in terms of roadway capacity, is on the supply side. Transit is another component of supply; however, because it is not a significant part of the existing transportation system, we have considered alternative modes of transit as mitigation measures.

The study begins by reviewing relevant data and analyses which identify an existing or future transportation problem, essentially situations where traffic volumes exceed roadway capacity. Several actions are proposed to mitigate traffic



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Highlight Major Roadway System

Figure: 2

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congestion. These proposals approach the problem in two ways: first, by increasing supply through infrastructure improvements that expand roadway capacity, and second, by decreasing demand through changes in travel behavior that promote the use of high-occupancy vehicles (HOVs) and reduce the absolute number of vehicles required to transport people and goods.

Transportation proposals should be evaluated by several criteria, including equity of public benefits, political feasibility, and cost effectiveness. While recognizing the importance of the first two criteria, they belong to the public arena where policies can evolve through community discussion. The primary criterion used in this study is cost effectiveness, which is more amenable to quantification. To the extent possible, the various mitigation measures are broken down into unit costs to assist in comparative analysis. The costs and participation figures are "order of magnitude" estimates based on historical information from the South Beach resort area and mainland examples reported in the transportation literature. The analysis provides general parameters for linking program costs and reasonable expectations of accomplishment.

II. TRANSPORTATION SYSTEM COMPONENTS

Transportation System Users

Visitor Traffic

Among guests currently arriving at the Kaanapali Beach Resort from Kahului Airport, it is estimated that 70 to 80 percent arrive in rental cars. The balance is comprised of travelers arriving by some form of pre-arranged group conveyance, taxi, or limousine. Kaanapali's upscale accommodations are attract a large proportion of return visitors familiar with the area, traditionally a market of car renters. The price of rental cars ranges from $25.00 to $50.00 per day, depending on the type of vehicle. The price of gasoline is considered a minor expense. For example, a one-way trip from Kaanapali to Kahului costs approximately $1.40 for most cars. With many car rental agencies offering competitive rates, car rental is an option which provides flexibility and mobility.

The majority of guests check out of hotels at approximately 12 p.m. with new arrivals checking into hotels from 3 p.m. to 5 p.m. One of the largest contributors to north-bound traffic congestion is the influx of visitors disembarking from direct mainland flights onboard jumbo air carriers. The result is a motor cavalcade to major resort areas in west Maui with just one lane of traffic over most of the route. Arrival in Kaanapali dovetails with hotel check-in times, but contributes significantly to the traffic volume on Honoapiilani Highway during the late afternoon hours. Shuttle service is available from a few private transit companies, but their last run from the Kahului Airport to the Kaanapali area leaves at 4:15 p.m.

Employee Traffic

According to the ATA Traffic Impact Report, traffic count data show a small, well-defined peak during the early morning hour which corresponds to employee arrival times at the resort. The afternoon peak hour between 4:00 p.m. and 5:00 p.m. is broader and more pronounced, reflecting both the end of the work day for the majority of employees, as well as the larger number of visitors who are on the road at that time. There is, in fact, a *de facto* staggering of work hours since starting times throughout the resort vary among administrative, housekeeping and maintenance, food and beverage, and retail personnel. However, the predominant work cycle is still based on the 5-day, 40-hour work week.

Parking

To the extent possible, the policy of major employers in the South Beach resort area is to provide sufficient parking for guests and employees. Guest parking is considered a necessary amenity. Simply restricting the availability of parking is not likely to deter people from renting cars, but would lower the attractiveness of the accommodations. To increase on-site parking, the Marriott Hotel and Whaler's Village are constructing parking structures. Construction activity at these two locations has led to the use of off-site parking lots. The Hyatt Hotel is also using

an off-site parking area to satisfy parking deficiencies. Based on favorable experience with the interim lots, some employers have become interested in permanent off-site parking facilities.

Traffic Engineering Concepts

Roadway capacity is one of the key concepts in determining impacts on traffic flow. Capacity is expressed in the same units as volume, vehicles per hour (VPH), since both are measures of traffic flow. However, volume represents an actual rate of flow, while capacity indicates a maximum rate of flow that can be carried by the roadway under prevailing conditions.

The need for estimating the capacity of both existing and proposed roadways is two-fold. First, in the design of roadway improvements, a capacity analysis indicates the ability of the improvement to carry the expected traffic under satisfactory operating conditions. Second, evaluation of existing roadway networks is used to determine inadequacies and priority of needs. Although we focus on capacity, it is important to note that it is not the sole criterion by which infrastructure is deemed adequate. Safety, economics, public policy, level of service, land use considerations, and other factors must also be considered.

The maximum volume or volume/capacity (V/C) ratio that is considered acceptable will vary with each type of route and its prevailing roadway characteristics. The type of environment also enters into this judgment, since drivers are generally assumed to tolerate more delay in urban than in rural areas.

Operating conditions within a roadway section are seldom uniform; they generally fluctuate from lower speeds and inter-vehicular conflicts at certain critical points to a less congested condition in the stretches between these points. Wherever they occur on a highway, intersections and access points are potential areas of conflict because of changes in volume, delays, and back ups. Operating conditions at these critical points must also be investigated to determine whether they have operational characteristics that are compatible with the rest of the roadway.

Existing Roadway Capacities

At present, Honoapiilani Highway consists of three lanes (two lanes south-bound and one lane north-bound) between the Lahaina and Kaanapali areas. North of Kaanapali Parkway, the highway becomes a two-lane roadway extending to Napili. South of Dickenson Street, the highway becomes a two-lane roadway to Wailuku. At Kaanapali Parkway, Honoapiilani Highway forms a signalized, four-way, channelized intersection providing ingress and egress lanes along with one through lane in each direction. Kaanapali Parkway is a divided roadway providing access to the Kaanapali Beach Resort. At Puukolii Road and Honoapiilani Highway, it is a signalized, four legged intersection; the makai leg (Kai Ala Drive) providing access to the proposed North Beach Kaanapali Resort as well as the existing Maui Kaanapali Villas condominiums. To the north of North Beach is Honoapiilani Road, which forms a stop-controlled, four-way intersection with the highway. Acceleration and deceleration lanes are provided in both directions for turning movements on and off the highway. Honoapiilani Road provides access to the beachfront developments in Honokowai.

Utilizing generally accepted procedures contained in the "Highway Capacity Manual, 1985," Transportation Research Board Special Report 209, the ATA Traffic Impact Report provides the following assessment of roadway capacity:

> Honoapiilani Highway from Kaanapali through Lahaina is heavily utilized throughout the afternoon. The second south-bound lane, constructed by the State Dept. of Transportation (SDOT) in cooperation with Amfac, alleviates much of the south-bound traffic congestion; however, the north-bound lane remains congested. During the p.m. peak hour of traffic, the north-bound lane of Honoapiilani Highway, south of Kaanapali, operates at a V/C ratio of 0.88. The south-bound lanes operate at a V/C ratio of 0.69. The traffic signal, installed at the intersection of Honoapiilani Highway and Kaanapali Parkway by Amfac and KBOA, improves traffic safety for access to and egress from the Kaanapali Parkway, however the intersection still operates at over capacity.
>
> Honoapiilani Highway, between Kaanapali Parkway and Puukolii Road, operates at a V/C ratio of 0.83. Honoapiilani Highway, between Puukolii Road/Kai Ala Drive and Honoapiilani Road, operates at a V/C ratio of 0.79 The intersection of Honoapiilani Highway at Puukolii Road/Kai Ala Drive is under capacity.

North Beach Kaanapali Traffic Impacts

The first column of Table 1 shows existing afternoon peak period traffic based on intersection traffic counts taken on July 15-16, 1986 by Austin, Tsutsumi & Assoc. The next three columns show the afternoon peak hour projections for three target years: Year 1990 shows pre-development conditions, Year 1992 represents Phase 1 or the approximate mid-point of the development plan, and Year 1994 represents Phase 2 at full build-out.

Table 1

**North Beach Kaanapali Traffic Impacts
(Number of Vehicles)**

Direction/Intersection	1986	1990	W/ By-pass Hwy. 1992	W/ By-pass Hwy. 1994
North-bound Honoapiilani Highway				
South of Kaanapali Pkwy.	1,270	1,558	1,292	1,517
South of Puukolii Rd.	1,001	1,174	841	1,066
South of Honoapiilani Rd.	968	1,026	597	705
South-bound Honoapiilani Highway				
South of Honoapiilani Rd.	940	1,635	629	737
South of Puukolii Rd.	1,076	1,160	891	1,123
South of Kaanapali Pkwy.	1,362	1,080	1,366	1,598

III. MITIGATION MEASURES

Two general types of mitigation measures are proposed: infrastructure improvements and Transportation System Management (TSM) programs. Infrastructure improvements involve expenditures of funds to make physical changes in the roadway system. These range from minor alteration (restriping, signage, and curbing modification) to new highway construction. Major roadway improvements are not only costly, but may require extensive lead times for implementation. In contrast, the main objective of TSM is to make more efficient use of existing transportation facilities, thereby reducing the need for new investments in infrastructure. Although widely touted as a low-capital investment strategy, TSM programs can involve the acquisition of significant amounts of capital in the form of buses, vans, and other types of HOVs. Furthermore, unless they are supported totally by user fees, TSM programs must be subsidized on a recurring basis. For the purpose of this study, the cost of highway maintenance and repair is not considered.

Infrastructure Improvements

The infrastructure improvements recommended below are based on the ATA Traffic Impact Report. The need for specific roadway improvements are triggered by projected traffic volumes generated by the resort development. Implementation of the following improvements is expected to support roadway and intersection operations at or below capacity.

Pre-development Phase (1990):

Figure 3 shows proposed traffic improvements in the pre-development phase.

(1) Add a second north-bound lane to Honoapiilani Highway between Lahaina and Kaanapali.

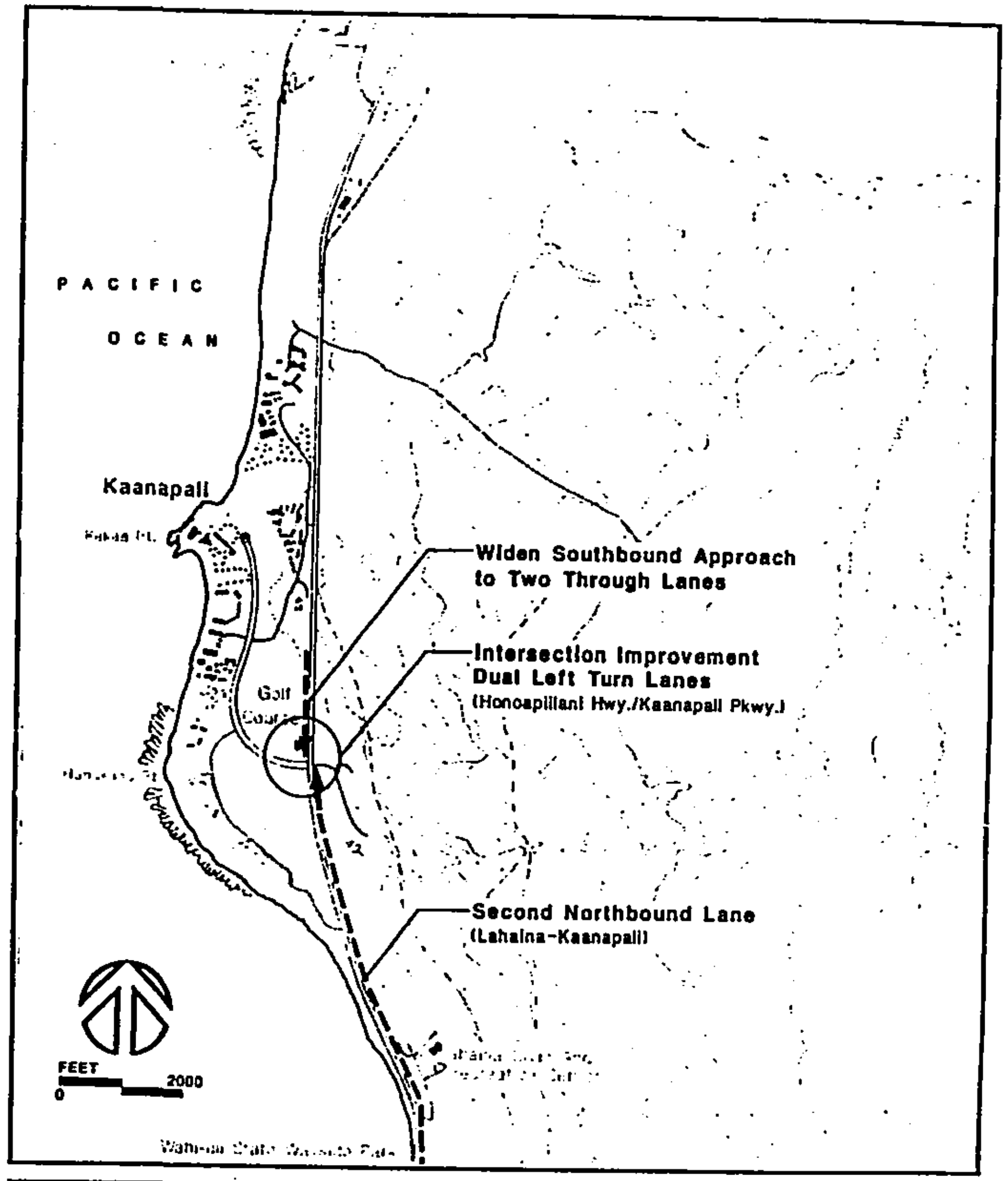
Expected Benefits: Roadway capacity will increase from 1,538 vph to 2,558 vph. The V/C ratio will be reduced to 0.58 and 0.60 in the north-bound and south-bound directions, respectively.

Estimated Costs: Total capital cost is $2,800,000. The cost per added capacity is $2,745.

(2) Widen the south-bound approach of Honoapiilani Highway to two through lanes at Kaanapali Parkway. Provide double left-turn lanes from Honoapiilani Highway, north-bound, to Kaanapali Parkway.

Expected Benefits: Roadway capacity will increase from 1,406 vph to 2,469 vph. Traffic at the Kaanapali Parkway intersection which currently operates at "over-capacity" conditions will subsequently operate at "near-capacity" conditions.

Estimated Cost: Total capital cost is $195,000. The cost per added capacity is $183.



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Kaanapali, Maui
Transportation Study

Infrastructure Improvements
Pre-Development (1990)

Figure: 3

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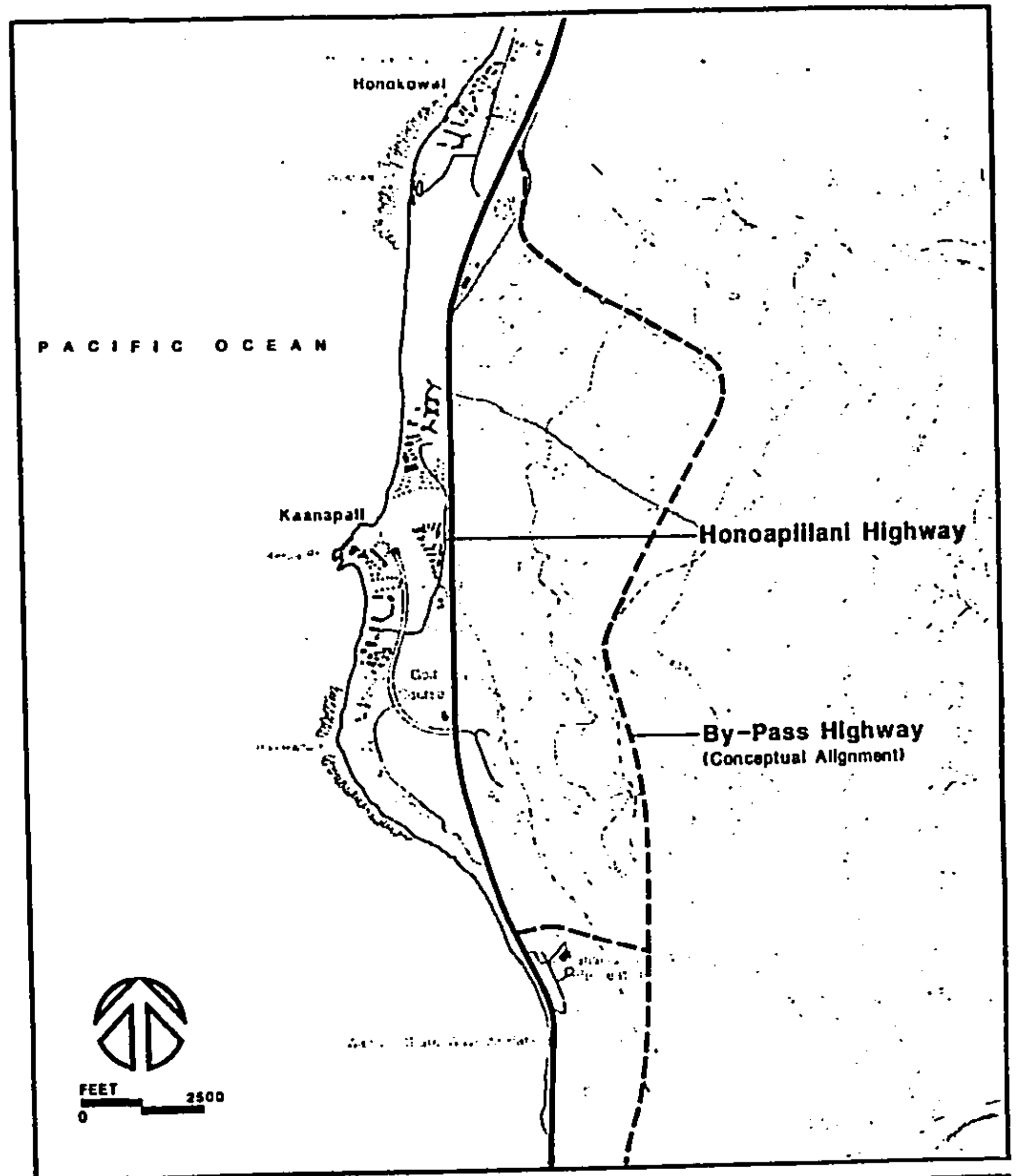
Phase I (1992): By-pass Highway

Traffic conditions projected for 1992 would require construction of a two-lane by-pass highway and associated collector roads mauka of the Lahaina and Kaanapali (Figure 4). Diversion of traffic around these areas should greatly reduce traffic demand on the Honoapiilani Highway and the attendant congestion problems.

Expected Benefits: The by-pass highway is expected to have a capacity of 3,852 vph. This is a net addition to the existing roadway system.

Estimated Costs: Total capital cost is $32,00,000. The cost per added capacity is $8,307.



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Kaanapali, Maui
Transportation Study

By-Pass Highway
Phase I (1992)

Figure: 4

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Phase 2 (1994):

Figure 5 shows proposed traffic improvements in Phase 2.

(1) Upgrade the Puukolii Road and Kai Ala Drive approaches at Honoapiilani Highway to provide exclusive left turn, through, and right turn lanes.

Expected Benefits: Intersection operations would be improved to near capacity conditions.

Estimated Cost: The capital cost of this improvement is $120,000.

Table 2 compares afternoon peak period traffic projections for 1994 under two scenarios: (1) without the project and (2) with the project and completion of the by-pass highway. As seen in the comparison, significant long-term benefits would be derived from construction of the by-pass highway in accommodating traffic generated by the project, as well as future vehicular increases independent of the project.

Table 2

Comparison of 1994 Traffic Projections
(Number of Vehicles)

Direction/Intersection	W/O Project 1994	W/ Project 1994	By-pass Hwy. 1994
North-bound			
South of Kaanapali Pkwy.	1,837	1,517	
South of Puukolii Rd.	1,387	1,066	866
South of Honoapiilani Rd.	1,226	705	
South-bound			
South of Honoapiilani Rd.	1,293	737	
South of Puukolii Rd.	1,432	1,123	913
South of Kaanapali Pkwy.	1,907	1,598	

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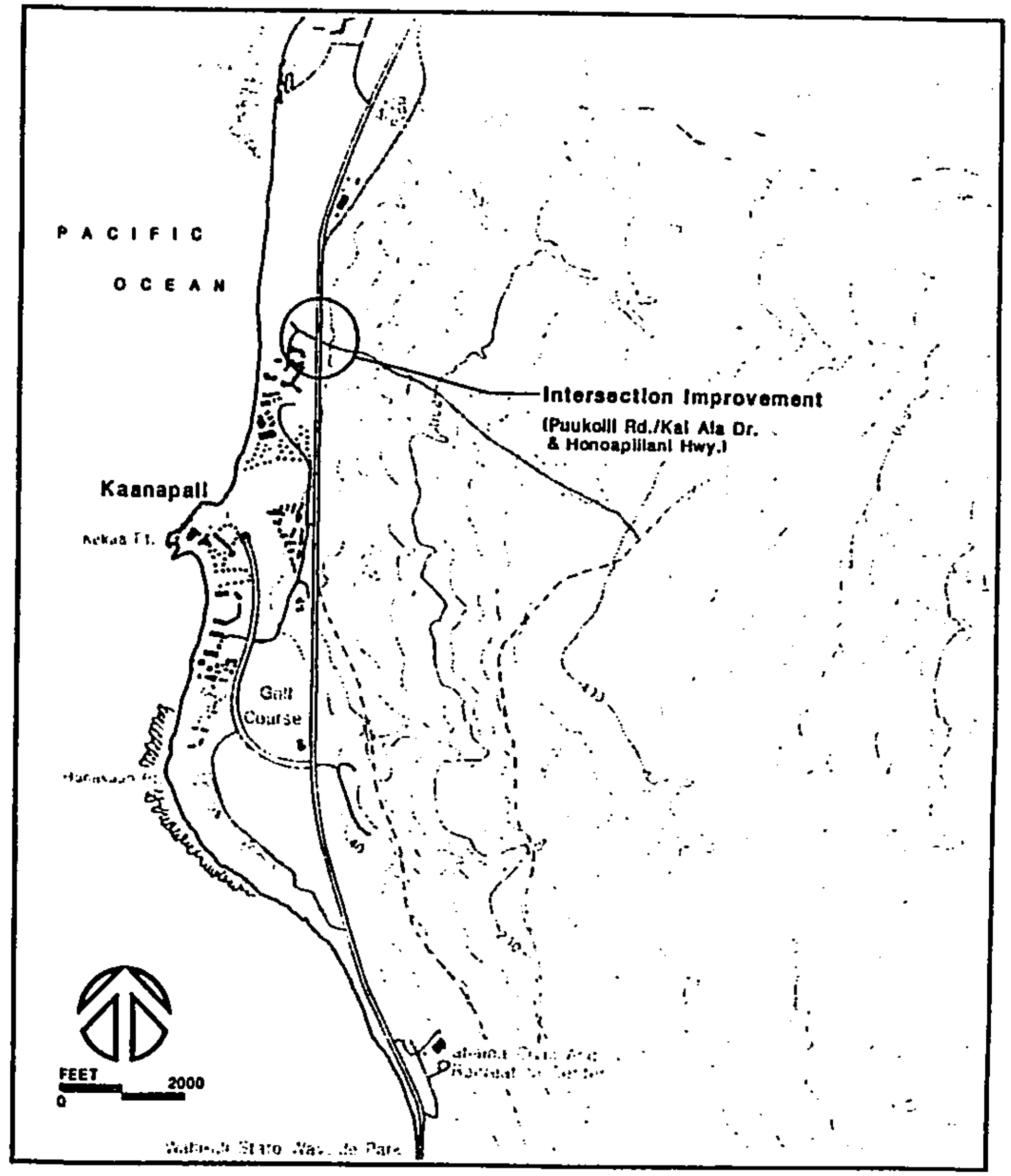

NORTH · BEACH
Kaanapali, Maui
Transportation Study

Infrastructure Improvements
Phase 2 (1994)

Figure: 5

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Transportation System Management Programs

A wide range of actions is considered under the category of Transportation System Management, including the following:

- Ensure efficient use of existing road space by: (1) altering traffic operations based on traffic engineering methods; (2) providing preferential treatment for transit and other HOVs; (3) incorporating appropriate provisions for pedestrians and bicycles; (4) managing and controlling parking; and (5) encouraging off-peak travel through staggered work hours, lower fares, etc.
- Reduce vehicle use in congested areas through encouragement of carpooling, metering of automobile access to specific areas, congestion pricing, and development of car-free streets or areas.
- Improve transit service and encourage para-transit systems.
- Increase internal transit management efficiency.

Several TSM programs have been implemented already within the Kaanapali Beach Resort to relieve traffic congestion. TSM mitigation measures for North Beach include expansion of some of these programs and implementation of other appropriate TSM actions.

TSM proposals require changes in people's behavior, i.e., encouraging HOV use and discouraging single-person driving. Target levels of participation have been developed for various TSM proposals to estimate cost. However, the targets and the specifics of the programs themselves may need revision as feedback is received from participants and, more importantly, people who choose not to participate. Any TSM program should include an active assessment and adjustment component.

Land Planning

Efficient land planning is a significant factor in minimizing the number of vehicle trips generated. The standard trip generation rate for the "hotel" category developed by the Institute of Traffic Engineering (ITE) is 10.5 trip ends per room per day. In comparison, the ATA Traffic Impact Report states that, based on historical data, the Kaanapali Beach Resort experiences 6.0 trip ends per room per day. With a "savings" of 4.5 trip ends per room per day, North Beach Kaanapali is expected to generate 14,400 trips *less* than a development with 3,200 typical hotel rooms.

To further encourage auto-less transportation, the development should incorporate a scale of urban and landscaping design compatible with safe and enjoyable pedestrian and bicycle movement. Other amenities could be provided, such as a transportation terminal or passenger staging area, thereby giving HOV requirements as much precedence as, say, automobile parking.

Visitor-Oriented Transportation Services

Internal Resort Trolley

As mentioned above, the need for transportation services can be minimized to the extent that related functions are clustered and guests can conveniently walk to them or an efficient transit system can be provided. Kaanapali Beach Resort is an amenity rich environment, where shopping, dining, and recreation opportunities are within easy reach of room accommodations. Provision of a wide variety of visitor amenities and their convenient location are further enhanced by the availability of an internally circulating trolley service.

Existing Service at South Beach: Two double buses are used to transport guests throughout the resort area, with one bus running at any one time. The hours of operation for the "Kaanapali Trolley" are from 7 a.m. to 11 p.m. The trolley route includes stops at hotels, golf courses, the Whaler's Village shopping area, and the train station. One circuit of the trolley takes approximately 35 minutes to complete and the service is free of charge.

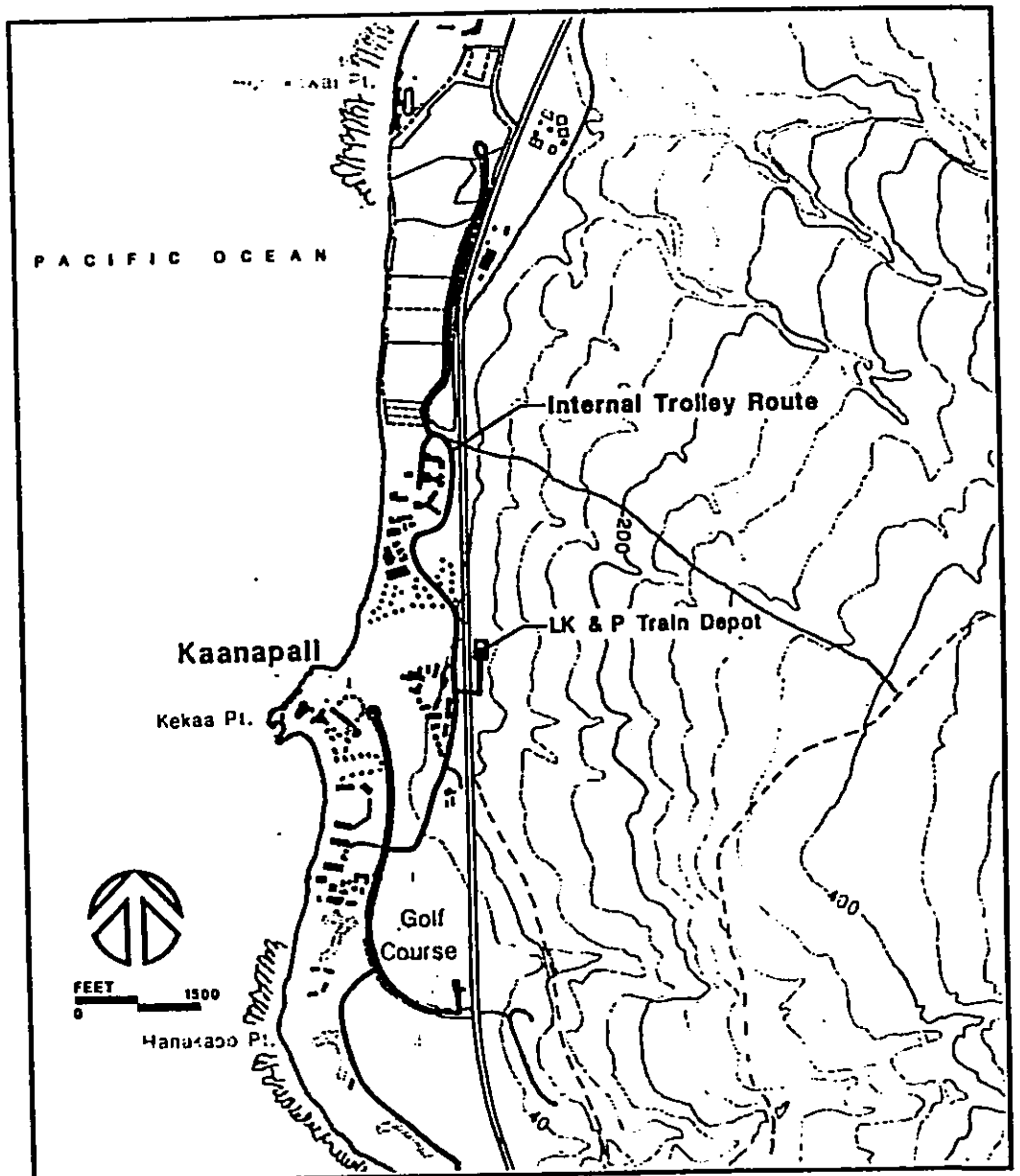
Current Benefits: Average ridership of the trolley is approximately 900 passengers per day and is expected to increase to 1,000 passengers when it serves to aggregate riders. Assuming an average of 2.0 persons per automobile, diverting 900 persons to the trolley represents 500 trips that are avoided or saved daily; a reduction of 182,500 vehicle trips annually.

Current Costs: The estimated cost for the trolley service is approximately $165,000 per year. Based on 328,500 passengers per year, the average cost per passenger trip is $0.50.

Expanded Service: The development plan for North Beach does not include a separate shopping center or golf course, but is meant to tie into the existing attractions at South Beach. There is no roadway connection between the two resort areas; however, there will be a limited-use right-of-way for the trolley. Figure 6 shows a proposed internal trolley route. Given the projected passenger count and distances to be covered, expanding the trolley service to North Beach would require another full-time vehicle.

Projected Benefits: Although North Beach will have fewer rooms than South Beach (approximately 63 percent), we have projected 1,000 passengers per day to account for fewer amenities located within walking distance of North Beach hotels and the extensive aggregation function the internal trolley will serve in the future. Again, attributing 2.0 persons per private automobile, the overall passenger count represents 500 trips saved daily; 182,500 trips saved annually. At South Beach, a significant number of these trips would have occurred within the grounds of the resort area; however, in the case of North Beach, a larger proportion of trips would involve use of the public roads, since there is no direct link between North and South Beach. Therefore, trolley service at North Beach will have a relatively higher beneficiary impact on traffic congestion.

Projected Costs: The annual cost of the North Beach trolley program is estimated at $275,000. The higher cost of the North Beach service reflects purchase of one trolley in addition to operations and maintenance costs. The cost per passenger trip is approximately $.75.



NORTH · BEACH Internal Resort Trolley Figure: 6

Kaanapali, Maui

Transportation Study

HELBER, HASTERT & KIMURA PLANNERS

Airport Shuttle: West Maui Airport to Kaanapali Resort

Figure 7 shows North Beach Kaanapali in relation to the West Maui and Kahului Airports.

Existing Service: Shuttle buses are contracted to provide transportation for guests of Kaanapali Beach Resort arriving at and departing from the West Maui Airport. Two shuttle buses are used, each with a passenger capacity of 20 persons in addition to luggage storage space. The airport shuttles operate between 9 a.m. and 5 p.m. with a total circuit time of approximately 30 minutes from the resort area to the airport. Eventually, depending on demand, a third shuttle bus and/or extended hours of operation will be considered.

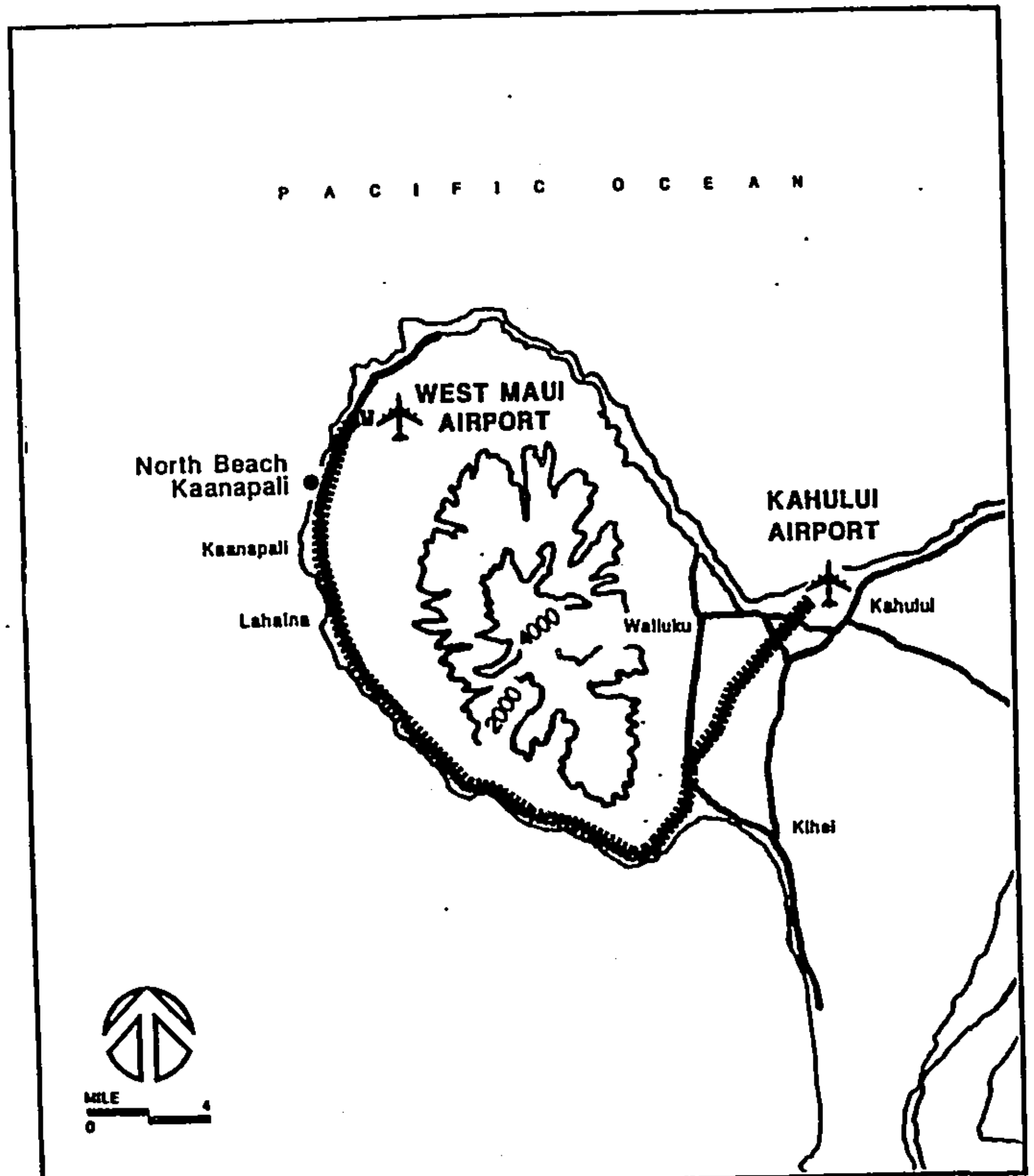
Current Benefits: Initial planning for this service was calculated on a projected count of 600 passenger daily.

Current Costs: Estimated cost for the West Maui Airport shuttle service is approximately $115,000 per year.

Expanded Service: To pick up passengers at up to six North Beach hotels and still maintain a 30-minute circuit, the West Maui Airport shuttle service at South Beach would have to be duplicated at North Beach. Some efficiencies could be achieved if there is an auxiliary means of aggregating all passengers at a central staging area.

Projected Benefits: Approximately 410 persons are projected to ride the West Maui Airport shuttle from North Beach. This calculation is based on 1,640 North Beach guests arriving or departing by air daily. Of this number, 50 percent are estimated to use West Maui Airport and 50 percent Kahului Airport. [Resort officials estimate that 59 percent of all arrivals at the Kaanapali Beach Resort currently originate at one of the neighboring islands--59 percent being the *theoretical maximum* that would use the West Maui Airport. The 50 percent figure is based on active promotion of the West Maui Airport for guests arriving via interisland flights. It represents optimal, future use of the West Maui Airport, rather than current utilization rates.] The 410-passenger projection is based on 50 percent of West Maui Airport arriving and departing passengers using the shuttle. Given the proximity of the airport to the resort, a fairly high proportion is not unreasonable. At 2.0 persons per automobile, 410 passengers represents a reduction of 205 vehicle trips daily and 74,825 vehicle trips annually. We also note that a significant number of guests are likely to take U-drive shuttles since rental cars are not issued at the airport but at the Transportation Center, located across from the proposed North Beach Kaanapali resort; U-drive shuttles are another mode of HOV transportation.

Proposed Cost: The annual cost of the West Maui Airport shuttle program is estimated at $283,270, which includes purchase of two buses designed with luggage-carrying capability, in addition to operations and maintenance. The average cost per passenger trip, assuming no user fee, is $1.89.



NORTH · BEACH Airport Shuttles Figure: 7

Kaanapali, Maui

Transportation Study HELBER, HASTERT & KIMURA PLANNERS

Airport Shuttle: Kahului Airport to Kaanapali Resort

Existing Service: At present, there is no resort-sponsored shuttle service between Kahului Airport and Kaanapali Beach Resort. There are, however, several private carriers that offer this service. Robert's Hawaii buses leave from the airport approximately once every 90 minutes with the last bus leaving Kahului Airport at 4:15 p.m. Bus fare between Kaanapali and Kahului Airport is $8.30 for adults one way. Grayline Maui has a service similar to Robert's Hawaii with the same bus fares and schedules. Reservations are required for this bus service. Trans Hawaiian charges its passengers an $8.50 fare between Kaanapali and Kahului Airport on regularly scheduled routes departing approximately every hour. Reservations are required for this service. Additionally, with two-hour notice, special shuttle service is available for parties of three or more at a fare of $14.50 per person.

Shoreline Bus, the authorized Public Utilities Commission (PUC) carrier for west Maui does not have a direct route from Kahului Airport to Kaanapali; however, there is a service between Maui Mall and Kaanapali once every two hours with 8 trips made per day. Bus fare is $4.00 one way. Taxi service between the Maui Mall and Kahului Airport is estimated at an additional $4.00 one way.

Proposed Service: If a subsidized resort shuttle service is offered, a possible schedule would involve the use of three buses, each making 3 3-hour circuits between the resort and the airport at 45-minute intervals for a total of 9 round trips daily.

Projected Benefits: Approximately 328 North Beach guests are projected to ride the shuttle daily between the resort and Kahului Airport. This calculation is based on an average of 1,640 arrivals and departures by air daily. Of this number, 50 percent are estimated to use West Maui Airport and 50 percent Kahului Airport. We estimate that 40 percent of the Kahului Airport arrivals/departures would be willing to use the shuttle. The 328-rider projection represents 164 trips saved daily and 59,860 trips saved annually.

Proposed Cost: The annual cost of the Kahului Airport shuttle program is estimated at $212,450. In this case, the cost estimate was based on joint sponsorship of the program between North Beach and South Beach. Because of the longer circuit (3 hours) and expected lower rate of subscription, greater efficiency can be achieved by aggregating passengers from both resort areas and using fewer, but larger buses. If the service is not defrayed by any charge to the passenger, the cost per passenger trip is $1.77.

Additional Amenity: Shuttle services, particularly the one to the Kahului Airport, could be improved by providing a central staging area for departing visitors. The waiting lounge could be a separate facility, possibly developed into a more extensive passenger terminal, or integrated into an existing commercial area like the Whaler's Village. The advantages of the passenger terminal are: (1) it would serve to aggregate passengers so that fewer, but larger vehicles can be used; (2) it would eliminate the need for pick-ups at each hotel, thereby minimizing inconveniences to fellow passengers; (3) it would give visitors flexibility in checking out, the alternative is for shuttle riders use the cloak room services of the individual hotels; and (4) it would provide a market for commercial operations, for example, a gift shop attached to the waiting lounge or last-minute shopping at the

Whaler's Village. The transportation terminal could also be used to aggregate riders on other shuttle services for visitors, as well as employees.

Promoting Car Rentals in Kaanapali

The airport shuttles accomplish two objectives. The most obvious one is to eliminate the number of visitors who drive themselves between the airport and the resort. A second, related benefit, is that cars would then be rented in Kaanapali thereby helping to alleviate north-bound traffic congestion in the afternoon. The key is selling the idea that visitors do not have to pick up a car straight away because alternative means of transportation are available. If the convenience and quality of the shuttle service is given adequate *advance* notice, some people will make use of it--we have estimated 40 percent of the passengers arriving at Kahului Airport. For others, it may be necessary to provide additional incentive to delay car rental until the visitor reaches Kaanapali; the fall out being increased ridership on the airport shuttle. Two possibilities for encouraging car rental in Kaanapali are: (1) working with packaged "fly-drive" offers so that car rental is only good at Kaanapali and (2) providing a rebate for renting in Kaanapali (coupons can be given out when boarding the airport shuttle).

It should be noted that an incentive is required only for Kahului Airport arrivals since rental cars are not immediately available at the West Maui Airport.

To raise ridership on the Kahului Airport shuttle by an additional 15 percent, we considered a hypothetical program of issuing coupons worth $5.00 off the first day's car rental. For processing the coupon, car rental agencies would receive a handling fee of $2.50, so that the total cost would be $7.50 for each coupon used. Although the program is aimed at the 15 percent who need an additional inducement to take the shuttle, the coupon would have to be given to all riders. Therefore gaining the marginal riders also requires payment to those willing to use the service even without the extra benefit. The annual cost of raising the Kahului Airport-to-North Beach ridership from 328 passengers to 377 passengers daily is $350,400. Dividing this cost among the marginal 49 passengers (17,885 passengers annually), yields a per-passenger cost of $19.59.

In light of the high unit cost of the incentive program, more cost-effective avenues to pursue are: (1) promote maximum use of the West Maui Airport, and (2) work through car rental agencies to promote rental in Kaanapali. The latter recommendation is of economic value to the agencies also since it would eliminate the 60-mile Kaanapali-Kahului round trip for each vehicle rented which is usually not offset by a mileage charge. The resort shuttle could provide drop-off at the Transportation Center where many of the car rental agencies are located.

Lahaina Shuttle

Existing Service: Since March 15, 1987, Kaanapali Beach Resort has instituted a shuttle service to Lahaina. Initially one bus is being used with a passenger capacity of approximately 28 persons. Daily ridership is estimated at 300 persons. The shuttle runs from Whaler's Village to the Wharf Shops in Lahaina. The shuttle circuit takes approximately 40 minutes to complete. The Kaanapali Beach Operator's Association (KBOA) leases the bus to the Wharf Shops for $50,000

annually. KBOA provides maintenance while the Wharf Shops pays for the driver and insurance.

Expanded Service: It is recommended that similar arrangements be made with other major commercial developments in Lahaina; The Cannery and 505 Front Street being two suitable candidates. Ideally, Lahaina businesses will coordinate in the provision of this service so that the shuttle circuit will include drop-offs at these establishments, rather than requiring operation of single-destination shuttle services. A single loop will allow more frequent circulation between Kaanapali and Lahaina. The internal Kaanapali Trolley can continue to aggregate passengers from the North Beach and South Beach areas. North Beach's share of ridership on the expanded Kaanapali-Lahaina shuttle is projected at 700 passengers per day or 255,500 passengers annually. This level of service represents 350 trips saved daily or 127,750 trips saved annually.

Projected Cost: The resort's cost for this service is expected to be $50,000 per shuttle with costs being shared by participating Lahaina merchants. For two additional shuttle circuits, the cost would be $100,000. Based on an annual ridership of 255,500 persons, the cost per passenger trip is $.40.

Other Modes of Visitor-Oriented Transportation

Besides TSM programs that would be sponsored by North Beach Kaanapali, there are other forms of existing and proposed common carrier services. It is recommended that the resort support services that will enhance visitors' vacation experience. The level of support should be compatible with existing and proposed Kaanapali TSM programs and can range from joint promotional campaigns through the use of the internal trolley system to provide a passenger aggregation function with appropriate drop-off points. Direct subsidy support for any particular service offered by a private enterprise would not be warranted if the resort implements TSM programs; however, contractual arrangements for the provision of transportation services may be a feasible management option.

Lahaina-Kaanapali & Pacific Railroad

The Lahaina-Kaanapali & Pacific (LK&P) Railroad currently provides a rail service from Kaanapali to Lahaina. Eight to ten round trips are made per day, with the round-trip adult fare of $6.00. The LK&P Railroad is developed as a visitor attraction; however, with an estimated annual ridership of 225,000 passengers, it constitutes a significant transit service between Kaanapali and Lahaina. Ridership may be improved to accommodate approximately 300,000 persons per year by upgrading the trip to include a tour of Pioneer Sugar Mill.

Water Shuttle

In addition to rail, a water route between Kaanapali and Lahaina offers the potential for reducing roadway congestion. A water shuttle would also be recreation oriented, providing a novel view of the coastline from the water while traveling between Kaanapali and Lahaina. In the late afternoon, a sunset cruise with meal service would be a natural extension of the service. The water shuttle could operate between the abandoned wharf adjacent to the Sheraton Hotel (which would have to be upgraded) or an open pier off the coast of North Beach and the Lahaina Small Boat Harbor. Providers of this service could also combine the water shuttle with return by some other means, such as the train or shuttle bus.

Air Shuttle

Princeville Airways offers air service between the West Maui and Kahului airports. At present, the flights originate in Honolulu and, as an additional leg, continue on to the West Maui Airport. Flight time between the two airports is approximately fifteen minutes one way.

The air shuttle may expand to seven flights per day as demand grows. Princeville hopes to attract a greater number of passengers on direct mainland flights to and from Kahului Airport.

In-house Motor Pool

There are two general tactics for reducing the number of cars used by visitors. One is to penalize car use by instituting a tax on car rental. The other tactic, the one that is favored in this study, is to minimize visitor's *perceived need* to rent cars. As mentioned earlier, pedestrian-oriented urban design and the availability of a wide range of amenities within walking distance can reduce vehicle trips. Outside the walking range, convenient transit service is recommended, as proposed by the internal resort trolley and the Lahaina and airport shuttles. There are areas, however, where the traveler wants to go, but fixed-route shuttles do not. At this point, access to a private vehicle is still required; however, there are several options in how these vehicles are supplied. Car rental through U-Drive agencies is by far the most popular option, followed by taxi and limousine hire. Other options are hotel or resort motor pools.

With the in-house motor pool concept, the visitor would go through a general check-in process, but rather than getting a car for a 24-hour period, he or she would check-out cars only as needed, say, one hour or 12 hours at a time, and charged accordingly. The advantages of this system are: (1) conceivably lower cost to the consumer who pays for actual use, rather than periods when the car is simply parked, (2) lower parking requirement within the resort since a motor pool means that many users could be serviced efficiently with a smaller number of vehicles, and (3) potential reduction in personal driving and more use of transit services since there would be no pressure to use a vehicle "that's on hand anyway." The cost of providing this service would include investment in a fleet of cars that is large enough to accommodate peak demand since patronage would be dependent on comparable ease of access to a private vehicle. A car that is not available on demand will lower marketability of the program.

Cars for the motor pool could be leased or purchased. A resort-wide motor reserve appears more economical because of the larger pool of renters and the availability of central motor transport services for the other shuttle programs. However, each hotel should have its own check-out desk, that could also handle other types of equipment, such as bicycles. Alternatively, visitors could go to a resort transportation terminal for pick-up.

Secondary justification for an in-house motor pool is its value as a guest amenity. However, given the expense of maintaining an extensive fleet of cars and uncertainty about its effectiveness from a traffic mitigation standpoint, a compromise recommendation is to contract with one or more car rental firms to provide very short-term car rental.

Public Transit System

The City and County of Honolulu's bus service, contracted to MTL, Inc., is the only extensive public transit system in Hawaii. For the period July 1985 to June 1986, the operating budget of the bus system was $62.2 million. During this period, there were approximately 75 million riders, averaging 6.2 million riders per month. User fees or bus collections contributed 31 percent to the cost of the service; the remaining expenses were subsidized through public funds.

The County of Maui has no public transit system. Shoreline Bus is an authorized PUC fixed-route carrier for west Maui; however, it receives no governmental subsidy and is currently going through Chapter 11 procedures. For comparison only, we developed hypothetical costs for a Maui public transit system. Ridership figures and costs from the Honolulu bus system were applied to Maui based on the size of their respective *de facto* populations. A county-wide bus system, operating at similar levels of service and receiving similar levels of usage as the Honolulu system, would have the following characteristics: Operating budget of approximately $7.7 million of which $5.3 million would be subsidized. Assuming a de facto population of 107,300 persons on Maui, the average per capita cost of the service would be $71.90. Ridership of 25,685 passengers per day or 9.375 million per year. The average cost per ride would be $.82. Again, assuming 2.0 passengers per private automobile, 9.375 million bus riders would represents a reduction of more than 4.6 million vehicle trips each year at a cost per trip of less than one dollar.

Employee-Oriented Transportation Services

Promotion of HOV transportation among employees should be supported by two sets of policies. First, the elimination of fares (or substantial fare reduction) and emphasis on the value of major non-taxable cost savings. The Federal Highway Administration of the U.S. Department of Transportation estimates that the cost of driving alone to work can run in excess of $1,062 per year for a 20-mile commute round trip.

Second, a resort-wide policy of discouraging the use of single-occupancy vehicles by instituting a hefty parking fee on the order of $3.00 per day. Collections from parking fees can, in turn, be used to subsidize the employee TSM programs. The parking charge effects a more equitable distribution of costs among roadway users since persons who choose to drive in low-occupant vehicles would indirectly compensate those who utilize more efficient modes of transportation.

Employee Shuttle/Park-and-Ride

Existing Service: An employee shuttle bus was started in 1973 during the gas crisis and operates between Wailuku and Kaanapali. Bus ridership peaked at about 200 persons per day and now stands at approximately 50 persons or one busload. The shuttle service is supported by fares; however, parking is provided free of charge by the County of Maui at the Maui War Memorial, a park-and-ride location.

Proposed Service: Ridership on the employee shuttle bus could be increased by implementing one or more of the following service improvements: (1) reducing or eliminating the fare, with costs absorbed by employers, (2) increasing the level of service by providing more frequent service to better accommodate differences in employee schedules, and (3) increasing the level of service by providing bus service to other residential areas with sizeable populations of resort employees.

Park-and-Ride: As collection points for passengers, park-and-ride lots can be developed as new facilities or collocated with existing lots that are underutilized during normal work hours. In the latter case, facility improvements, such as fencing and lighting, may be desirable to increase the safety and security of long-term parking. Park-and-ride facilities are appropriate where the line-haul portion of the shuttle ride is lengthy so that passengers can be discharged as soon as possible. Employee shuttle bus service to nearby vicinities, such as Lahaina or Napili, could afford to make more stops without serious degradation in service.

Off-site Parking: Another variation of park-and-ride is the use of off-site parking lots with shuttle service to the workplace. One definite advantage is the reduction of employee parking from the resort premises which can be reserved for guests and patrons instead. However, from a TSM viewpoint, this proposal is less desirable since it does not reduce employee traffic. A determination of whether off-site parking lots are needed for North Beach Kaanapali should be deferred until the full effects of TSM programs are evaluated.

Proposed Benefits: Sensitivity of shuttle bus ridership to changes in price and level of service is unknown. However, we do know that under the right set of circumstances, ridership has reached the 200 person-mark, indicating that this level of participation is a reasonable target. Assuming an average ridership of 200 persons, the round trip would result in a savings of 400 automobile trips daily or 146,000 trips saved annually.

Proposed Costs: With 200 riders, four buses would be required, each with seating capacity of at least 50 persons. The annual cost of operating and maintaining the shuttle buses, with capital costs pro-rated over the life of the vehicles, is estimated at $253,000. If the service is not defrayed by any charge to the passenger, the cost of each passenger trip is $1.73.

The cost of the program includes a "parking voucher" concept. Each month, regular bus riders would receive two parking vouchers worth $3.00 each to allow the option of driving to work on a very limited basis. Nevertheless the bonus gives the system greater flexibility by accommodating inevitable special cases when employees need to drive their own car.

Carpool/Priority Parking

Proposed Service: Carpool programs involve prearranged rides for people traveling at similar times from approximately the same origin to approximately the same destination. In lightly populated areas especially, this type of ridesharing is more flexible and efficient than shuttle buses.

To facilitate matches among potential carpoolers, the program should be organized on a resort-wide basis. In the most common carpool arrangement, participants use their own cars and rotate driving duties. Usually such an arrangement does not involve a cash exchange because participants exchange a driving service for a ride.

Proposed Benefits: A proposed target for the carpool program is 25 percent of the 6,900 estimated full-time equivalent employees or 1,725 participants. With a minimum of three people per car, 575 cars would be required to transport 1,725 persons; while as many as 1,150 cars could be left at home. On an annual basis, 419,750 trips would be avoided through the program.

Proposed Costs: The yearly cost of the program is estimated at $313,400, including funding for a ridesharing coordinator, computer equipment and software (pro-rated over a three-year period), and parking vouchers (two $3.00 vouchers per month) for all ridesharing participants. Official carpool vehicles should be given preferential parking and exempted from the $3.00 parking fee, a loss of revenues that is not included in the program cost. However, we have included the cost of additional security to enforce more stringent parking regulations. The cost of this program is $.50 per passenger trip.

Resort-sponsored Vanpool Program

Proposed Service: In vanpool arrangements, the van is owned by the driver, an employer, or a paratransit company. Participants normally pay a fee for the cost of the service; however, the service considered in this study would be free of charge. Vanpools would generally be reserved for one-way trip distances over 10 miles in which case vans carrying 10-12 passengers would be efficient since the vehicle-miles saved on the "line-haul" portion of the trip exceeds the additional vehicle-miles that must be traveled to pick up and deliver the passengers.

The vanpool proposal includes 170 vans that would be owned, maintained, and insured by the resort. Operating expenses would also be paid by the resort, although the driver would be an employee assigned this responsibility. As compensation, the van driver could be allowed after-hour use of the van.

With a fleet of 170 vans, each carrying 12 persons, some 2,040 employees or approximately 30 percent of the projected work force would be involved in a vanpool. There would be a daily reduction of 3,740 vehicle trips and an annual reduction of 1,365,100 vehicle trips.

Proposed Costs: The estimated annual cost of this program is $1,586,880, including operations and maintenance, purchase of 170 vans (pro-rated over a 5-year vehicle life), and parking vouchers (two $3.00 vouchers monthly) for vanpool participants. The cost of each passenger trip is estimated at $2.13.

Temporary Roadway Modifications

TSM includes roadway modifications that do not require major capital investment. Given existing roadway conditions in the Kaanapali area and the particular characteristics of roadway use, these actions are not considered appropriate mitigation options.

Reversible Lanes

Reversible lanes are used during peak periods to increase the capacity of the roadway in the peak direction. One of the key criteria for determining the applicability of lane reversal is a 65-35 directional split between traffic volumes in either direction. At Kaanapali, the afternoon peak-period experiences high traffic volumes in both directions, rather than any appreciable imbalance in traffic flow. Lane reversal would also create greater confusion among tourist drivers, many of whom are already unfamiliar with the road system.

Interestingly, the cost of maintaining and enforcing the system is not insignificant. Signs must be changed and cones placed to designate lane reversals, a labor-intensive process generating costs in the range of $4,000 to $12,000 per month. The annual cost of maintaining a 3.5-mile segment in Atlanta is $195,000 and a 2.8-mile segment in Arlington costs $150,000.

Preferential HOV Lane(s)

A variation of the reversible lanes concept is to designate a separate lane which is then reserved for buses and HOV traffic during peak periods. HOV lanes can be with-flow or contra-flow. As a general rule preferential HOV lanes are appropriate if the number of person-minutes saved by bus and HOV riders is greater than the number of person-minutes lost by general traffic. HOVs constitute a small percentage of the total number of vehicles on the road and with the absence of a public transit system, a dedicated HOV lane would be unacceptable.

Bus Preemption of Traffic Signals

In order to reduce the amount of travel time spent for buses to proceed through congested areas, signal control devices have been placed on buses and traffic control signals to either lengthen or shorten the signal intervals to allow for faster passage of buses. After the bus has passed, the traffic signal returns to normal phasing operation. The absence of a public transit system again diminishes any clear beneficiary of this action. Furthermore, because key stretches of the highway contain just one lane, this type of system is likely to benefit many more cars than buses in the queue.

Modifications in Work Patterns

Staggered Work Hours

Staggering or rearranging employee starting and quitting times can sometimes achieve a more even distribution of arrivals and departures over a longer period of time. In a flex-time program, employees are permitted to adjust their work schedules according to personal preference, as long as the hours worked are included in a specified block of time during which all employees must be present. Also, the total hours worked weekly must remain as previously agreed.

In general, employers have found that the cost of implementing this type of program is negligible, and that once the planning stage is completed the program can be put into effect quickly. Some costs may be incurred for data collection and analysis if surveys are included in planning or evaluation.

The type of scheduling modification that can be implemented and the extent to which differences among employee starting and quitting times can be tolerated depend largely on the work performed by the organization. Although this judgment must be made on a case-by-case basis, in general, work that requires little interaction among employees or with customers is adaptable to work rescheduling programs. Organizations that have instituted work schedule changes generally have not experienced difficulty in varying starting and quitting times by roughly 15 minutes.

Flexible work scheduling is a significant TSM proposal. In the much-heralded example of Pleasanton, California, where employers are required to achieve quotas of up to 45 percent reduction in peak-period traffic, most have been succeeded by changing employees' shifts so that they no longer arrive or depart during peak periods. Actual trip reductions, a more difficult accomplishment, has had a more conservative impact on traffic congestion.

Shortened Work Week

Traffic mitigation could also be realized by reducing the work week to four days at ten hours per day or nine days over a two-week period. Employees usually start work one hour earlier and leave one hour later, thereby avoiding the peak traffic period. In addition, fewer work days translates into fewer work trips.

Some businesses can adapt fairly easily to a shortened work week, while others may find it difficult or almost impossible, such as businesses that cater to customers' hours or are tied to delivery schedules or interindustry requirements. Visitor-oriented businesses may have an advantage in scheduling flexibility to the extent that a fairly consistent level of service is provided seven days a week as opposed to a marked weekday/weekend cycle.

Besides transportation benefits, the shortened work week has been credited with increased employee and management morale, increased productivity, reduced absenteeism, decreased overtime requirements, and increased leisure time. Experience indicates that 85-95 percent of the firms that have instituted the 4-10 plan have retained it. On the other hand, problems may surface with managerial scheduling, employee fatigue, and child care hardships for working mothers.

Altering the standard work week may require changes in legislation and should take into account the position of organized labor.

Potential impacts associated with modifications in work patterns should be examined carefully as indicated below. In particular, they should be compatible with ridesharing efforts or mutual adjustments in the programs may be required.

Item	Positive Impact	Negative Impact	Potential Adjust.
Weekly household travel			
Reduced work travel	X		
Induced non-work travel on day off		X	
Consolidation of non-work travel	X		
Commuting			
Existing carpools			X
Transit use			X
Reduced traffic congestion			
Flattened peak traffic	X		
Improved traffic flow	X		

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Comparative Evaluation of Traffic Mitigation Measures

Table 3 shows a summary of possible traffic mitigation measures. The first set of proposals are infrastructure improvements. "Total cost" refers to the capital cost of funding the specified improvement.

The second set of proposals are TSM programs. "Trips saved" is derived from the number of participants. In the case of visitor-oriented services, we estimate one vehicle trip reduction for every 2.0 passengers using the shuttle services. [This ratio corresponds to the average number of occupants per hotel room at Kaanapali Beach Resort.] For employee-oriented services, each employee is assumed to drive alone if not participating in a TSM program.

Unit cost is based on annual trips saved, rather than annual ridership. These unit costs range from a low of $.78 for the Lahaina shuttle to a high of $31.48 for the Kaanapali car rental incentive. Programs with the lowest costs are those with shared costs. For example, the Lahaina shuttle is proposed as a joint venture with Lahaina merchants and carpool ridesharing involves the use of personal automobiles.

Operating and maintaining resort-owned vehicles is relatively expensive. Theoretically, there is no cost for increasing the number of riders as long as there is excess capacity: operational costs are the same whether there is a full load or one person aboard. However, attracting a new "market segment" may require significant service upgrades, such as more frequent service, new routes, or other incentives. The cost effectiveness of changing the program scope to increase ridership will have to be judged by experience.

For reference, Table 3 also includes land planning and a public transit system, both of which have significant impacts on trip reductions. Although we have not identified a cost for land use planning, development of an integrated destination area carries the attendant costs of large-scale development planning, coordination, and management that might not be experienced by a smaller, single-purpose project.

Table 3

Summary of Traffic Mitigation Proposals

Infrastructure Improvements

Proposal	Total Cost ($)
2nd NB Lane (Lahaina-Kaanapali)	2,800,000
Intersection Improvement (Kaanapali Pkwy & Honoapiilani Hwy)	106,000
By-Pass Highway	33,000,000
Intersection Improvement (Puukolii Rd & Honoapiilani Hwy)	120,000

TSM Proposals

	Annual Cost ($)	Riders (Daily)	Riders (Annual)	Trips Saved (Daily)	Trips Saved (Annual)	Unit Cost $ (Trips Saved)
Internal Resort Trolley	275,000	1,000	365,000	500	182,500	1.51
Airport Shuttle-West Maui Airport	283,270	410	149,650	205	74,825	3.79
Airport Shuttle-Kahului Airport	212,450	328	119,720	164	59,860	3.55
Kaanapali "Car Rental Incentive"	350,400	61	22,265	30	10,950	32.00
Lahaina Shuttle	100,000	700	255,500	350	127,750	0.78
Employee Bus/Park-and-Ride	253,000	200	73,000	392	143,080	1.77
Carpool	313,400	1,725	629,625	1,150	419,750	0.75
Vanpool	1,586,880	2,040	744,600	3,740	1,365,100	1.16
Land Use: Destination Resort				14,400	5,256,000	
Public Transit	5,300,000	25,685	9,375,000	14,677	5,357,143	0.99

IV. IMPLEMENTATION STRATEGIES

Management Alternatives

Formation of a Transportation Management Association: To provide an effective and workable transportation program, it is recommended that a Transportation Management Association (TMA) be formed with members representing each of the major resort employers. This organization could be a committee within the resort operator's association. The TMA should meet regularly and discuss pertinent policy issues. A typical set of objectives for the TMA includes the following:

- Assure an acceptable level of internal mobility and work to alleviate traffic congestion outside the resort area.
- Improve employee accessibility and facilitate alternative modes of commuting.
- Assist in discharging traffic mitigation obligations through a common transportation management program.
- Engage in public information and educational activities concerning transportation conditions in the area.
- Serve as a voice in local transportation decision making through policy leadership and advocacy, monitoring local traffic and transportation conditions, alerting public officials to emerging transportation problems, and lobbying with County and State governments for capital improvements.
- Provide other shared services to be decided by members.

Appointment of a Program Manager: Overall coordination and promotion of the resort's transportation program should be assigned to a full-time program manager with a support staff as required. The coordinator would work with vehicle maintenance personnel and operators. He or she would also work with transportation liaisons from each major employer to establish budgets and target levels of participation.

Employer Liaisons: Liaison personnel should be tasked with active TSM promotion within their respective organizations. As employer-sponsored programs, this can be carried out at relatively low cost by using company newsletters, staff meetings, intra-office memoranda, and so forth.

Financing Alternatives

Financing of infrastructure improvements and TSM programs can be accomplished through one or a combination of alternatives listed below:

- Upfront payment by the resort developer with costs worked into the project's *pro forma* as a cost of development.

- Linkage of transportation program expenses to proceeds from the sale and/or development of property.
- Development fees or impact fees, which have become an attractive means of funding capital facilities for new development. Governmental regulations usually specify the appropriateness of fees as a funding mechanism and methods for calculating, collecting, "earmarking," and using the funds. The Maui County Council is currently studying impact fees. The "fair share" costs attributed to the developer should proportional to the roadway needs created by the proposed development.
- Funding of transportation services through a common area maintenance fund similar to the existing Net Unreimbursable Resort Cost (NURC) Fund for Kaanapali Beach Resort.
- Assessment of parking fees, of which all or a portion would be dedicated to supporting the resort transportation program. Based on zoning code requirements, approximately 4,050 parking stalls will be constructed at build-out. With parking fees equal to $3.00 per stall per day, total revenues would exceed $4.4 million. Subtracting approximately 600 exempt carpool stalls, parking fees would still generate some $3.7 million for a transportation program budget. In comparison, a tentative TSM package for North Beach (see Table 4) carries a cumulative price tag of approximately $3.4 million. The parking surcharge policy could be established with a clause allowing suspension of fees if surplus funds exceed a certain level. Even prior to build-out, programs can initiated and scaled to available revenues and the current level of demand. The programs could be extensions of existing South Beach services or separate services, as deemed desirable.

V. CONCLUSIONS AND RECOMMENDATIONS

Action Plan: Preliminary TSM Package

Table 4 shows a preliminary package of TSM proposals suggested for adoption under the umbrella of North Beach's transportation program. Two proposals listed in Table 3 have been dropped: the Kaanapali car rental incentive because of high costs, and the employee shuttle bus service. In the latter case, the existing bus service, which is supported by user fees, should continue as long as it remains viable and meets the needs of its subscribers. However, to avoid spreading its resources too thinly, it is recommended that resort funds be concentrated in programs that appear most cost effective. At the same time, in order to provide employees with some flexibility, it is recommended that both the carpool and vanpool alternatives be pursued.

Total annual cost for the TSM proposals is $2,771,000. To this amount, we have added 25 percent ($692,750), which could be divided into 10 percent for contingency, 10 percent for promotion, and 5 percent for resort-level coordination of the entire transportation program. Additional costs may be incurred for facility improvements, such as a passenger terminal and vehicle maintenance shop and garage.

Table 4

Preliminary TSM Package for North Beach Kaanapali

	Annual Cost	Riders (Daily)	Trips Saved (Daily)	% Daily Trip Reduc*	Unit Cost $ (Trips Saved)
Internal Resort Trolley	275,000	2,000	500	2.6	1.51
Airport Shuttle-West Maui Airport	283,370	410	306	1.1	2.79
Airport Shuttle-Kahului Airport	312,450	338	164	0.9	5.55
Lahaina Shuttle	100,000	700	350	1.8	0.78
Carpool	313,400	1,725	1,150	6.0	0.75
Vanpool	1,586,880	3,040	3,740	19.5	1.16
Subtotal	$2,771,000	8,203	6,109	31.8	$1.24 (avg.)
+ 25% (Contingency, Promotion, Mgt)	$3,463,750				

* Based on 19,200 trips generated per day.

Overall reduction of 6,109 vehicle trips has been estimated; approximately 32 percent of the 19,200 daily trip ends projected for North Beach Kaanapali by the ATA Traffic Impact Report. As many as 3,765 employees or 54 percent of the projected work force, are targeted for participation in two different home-to-work commuting programs. Because many of the TSM programs are tailored to alleviate peak-hour traffic, the overall trip reduction estimate of 32 percent probably underestimates the impact of TSM actions during critical traffic periods. Additional relief in traffic congestion could be gained by altering work schedules (shift staggering, flex-time, and compressed work week)--the impacts of which have not been quantified by the study.

Although West Maui experiences serious congestion during peak traffic periods, there are a variety of solutions to mitigate this situation. Action should be taken along two fronts: infrastructure improvement and TSM programs. While constructing new highways and widening existing roads will form the first line of defense against mounting traffic congestion, the "supply-oriented" approach provides only partial solutions in the long term. There are limits to the number of new lanes that can be added to existing corridors without creating unacceptable levels of disruption and delay, and experience has shown that new roads tend to fill up quickly with traffic. One-sided expansion of capacity without a systematic program to lower dependence on low-occupancy automobiles will perpetuate a pattern of inefficient roadway usage. Demand management also has the advantages of faster implementation, immediate impact, program control by resort management, and customized applications for critical traffic situations. For example, TSM programs can lower traffic demand to better cope with restrictions imposed by roadway construction. The pitfall of pursuing both tactics concurrently is the difficulty of maintaining high levels of participation in TSM programs once free-flowing traffic conditions are achieved. The success of any transportation program will depend on a compatible mix of infrastructure improvements and TSM actions.

Within the TSM framework proposed for North Beach Kaanapali, a significant amount of money will be required to keep cars off the road. A 32 percent reduction in vehicle trips, is estimated to cost more than $3.4 million each year--approximately $1.55 per trip. North Beach's participation in infrastructure improvements would involve additional investment in transportation services.

Planning for a major new resort area offers a prime opportunity to implement an ambitious transportation program. North Beach Kaanapali Resort can establish a distinct transportation character in which high-occupancy modes of travel enhance the vacation experience in terms of convenience, economics, and enjoyment.

For future resort employees, the transportation program is flexible and equitable. The imposition of parking fees is counter-balanced by access to two major options. By providing parking vouchers the occasional need to drive to work would not stand as an obstacle to the overall viability of the ridesharing concept. From an economic development viewpoint, employee transit services will facilitate access to jobs for low-income service personnel who do not own cars. By the same token, they would help employers cope with difficulties in attracting and retaining lower paid service employees.

By incorporating transportation planning at the outset of resort development, North Beach Kaanapali has an opportunity to structure policies and program guidelines that will maximize cooperation among member organizations and minimize future objections that some are unfairly escaping the shared obligation to mitigate traffic impacts. Key advantages at North Beach are the limited number of major employers whose commitments would be specified in covenants that are attached to the land. Moreover, they would be under the umbrella of resort-level coordination and "peer pressure" to maintain standards.

In the future, West Maui could see scores of buses, vans, and trolleys all displaying the North Beach Kaanapali logo as they shuttle employees and guests alike. Building on gradual changes in transportation habits, TSM may gain greater acceptance as the *modus operandi*, rather than set a *post hoc* solutions to traffic congestion. Just as the recommendation for North Beach is to expand successful visitor shuttle services initiated by South Beach, we can expect transferral of successful employee transit services originating at North Beach to South Beach. Economies of scale will yield advantages such as shared overhead, aggregation of users for more efficient service, and a larger resource base to provide services that are too costly for a few properties to sponsor. Local government monitoring and enforcement of trip-reduction requirements would benefit from streamlining. Rather than monitoring a number of individual sites, the resort program can be held accountable for demonstrating overall compliance with traffic mitigation requirements. The combined effort of all interests will result in the development of more effective transportation networks hand-in-hand with prudent land development.

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Automobile Club of Southern California Processing Center, Costa Mesa, CA
Pacific Square, Costa Mesa, CA
South Coast Metro Center, Costa Mesa, CA

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AIR QUALITY IMPACT ANALYSIS

&

ADDENDUM

AIR QUALITY IMPACT ANALYSIS
NORTH BEACH KAANAPALI RESORT
May 11, 1987

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AIR QUALITY IMPACT ANALYSIS
NORTH BEACH KAANAPALI RESORT

1. INTRODUCTION

Amfac Property Development Corporation and Tobishima Properties of Hawaii, Inc. propose to develop five hotels sites on an approximately 90-acre parcel in the vicinity of the old Kaanapali Airport in West Maui. The total capacity of these hotels will be approximately 3,200 rooms.

Hotel development is not normally considered a direct source of air pollution unless there is onsite generation of steam or electrical power. It is, however, an "indirect" source of air pollution as defined in the federal Clean Air Act [1] because of its inherent ability to attract motor vehicle traffic.

There will be significant traffic generation associated with the operation of five hotels due to movement of tourists in rental cars, vans, and buses as well as the various commercial vehicles necessary to provide materiel and services to the hotels. Employee arrivals and departures will also be an important component of the additional traffic. This growth in traffic associated with the project has the potential for having significant cumulative impacts on local air quality, particularly in the vicinity of intersections with the 2-lane Honoapiilani Highway which serves the area.

The purpose of this report is to assess the impact of the proposed development on air quality both on a local and regional basis. Because it is primarily an "indirect source", much of the focus of this analysis is on the project's ability to generate traffic and the resultant impact on air quality. Air quality impact was evaluated for existing (1986) and future (1990, 1992, and 1994) conditions.

A resort project such as this also has off-site impacts due to increased demand for electrical energy which must be met through the combustion of some type of fuel. This combustion process also results in pollutant emissions to the air which have been addressed.

Finally, during construction of the various buildings and facilities air pollutant emissions will be generated due to vehicular movement, grading and general dust-generating construction activities. These impacts have also been addressed.

2. AIR QUALITY STANDARDS

A summary of State of Hawaii and national ambient air quality standards is presented in Table 1 [2, 3]. Note that not all of

Hawaii's standards are divided into primary and secondary standards as are the federal standards.

Since the early 1970's, the State's standards have been substantially more stringent than their federal counterparts and were absolute values not to be exceeded at all. In 1986, the Department of Health promulgated amendments to these standards making the total suspended particulate (TSP) and sulfur dioxide (SO_2) values the same as the federal standards and permitting one exceedance per year.

Primary standards are intended to protect public health with an adequate margin of safety while secondary standards are intended to protect public welfare through the prevention of damage to soils, water, vegetation, man-made materials, animals, wildlife, visibility, climate, and economic values [4].

In the case of the automotive pollutants [carbon monoxide (CO), oxides of nitrogen (NOx), and photochemical oxidants (Ox), there are only primary standards. Until 1983, there was also a hydrocarbons standard which was based on the precursor role hydrocarbons play in the formation of photochemical oxidants rather than any unique toxicological effect they had at ambient levels. The hydrocarbons standard was formally eliminated in January, 1983 [5].

The U.S. Environmental Protection Agency (EPA) is mandated by Congress to periodically review and re-evaluate the federal standards in light of new research findings [6]. The last review resulted in the relaxation of the oxidant standard from 160 to 240 micrograms/cubic meter (ug/m3) [7]. The carbon monoxide (CO), particulate matter, sulfur dioxide (SO_2), and nitrogen dioxide (NO_2) standards are currently under review, but final action has not been taken yet [8].

Finally, the State of Hawaii also has fugitive dust regulations for particulate matter (PM) emanating from construction activities [9]. There simply can be no visible emissions from fugitive dust sources.

3. EXISTING AIR QUALITY

While they are not a direct indicator of ambient air quality, emissions inventories do provide some insight into the magnitude of pollutant emissions as well as highlighting the major source categories. The 1980 emissions inventory for Maui County can serve these purposes and has therefore been presented in Table 2. It is quite evident from the table that motor vehicles are the principal source of air pollution on Maui and that the most abundant pollutant is carbon monoxide.

What is of greater importance than raw emissions, however, are ambient pollutant concentrations. While there are no continuous air monitoring stations in the project area, it seems safe to assume that present air quality is good most of the time since the area is neither highly industrialized nor highly urbanized; thus, stationary and mobile source activity is not yet a serious problem. There are, however, activities which do affect air quality in the West Maui area. Agricultural activities including sugar cane field burning [10], bagasse and fossil fuel burning at sugar mills, and pesticide spraying all have the potential for affecting air quality in the project area. Resort activity in West Maui with its concomitant motor vehicle traffic can also affect local air quality. A recent study in nearby Lahaina, for example, revealed carbon monoxide concentrations which exceeded State standards [11].

The nearest State Department of Health air monitoring stations are located some 15 miles southeast and 17 miles south-southeast at Kahului and Kihei, respectively. Recent data from those stations are summarized in Tables 3 and 4. Note also that these stations have been shut down by the Department of Health and no data have been reported since October, 1985. The Department has plans to establish a new monitoring station at Lahaina which is only about four miles south of Kaanapali.

The 1985 data suggest that the State's standards for sulfur dioxide are being met but that there are occasional violations of the recently amended total suspended particulates standard. Unfortunately, the two principal automotive pollutants, carbon monoxide and nitrogen dioxide (NO_2), are not monitored on the Island of Maui. NO_2 was last measured in 1976 and at that time ranged <0 - 39 ug/m3 with an average of 18 ug/m3 in Kahului (see Table 5).

4. CLIMATE & METEOROLOGY

The project area is typical of Hawaii's climate with little seasonal or diurnal temperature variation. Monthly temperature averages vary by only a few degrees from the warmest months (July and August) to the coolest (January and February) [12]. The area is relatively dry with annual rainfall of about 20 inches. Table 6 provides 1985 temperature and precipitation data.

Local terrain in West Maui plays an extremely important role in determining both wind direction and speed at any particular location. Areas within the "wind shadow" of the highest elevations of the West Maui Mountains (Puu Kukui) are shielded from all but the strongest tradewinds and experience a very pronounced land-seabreeze regime. The Kaanapali resort area is near the boundary of the normal tradewind limits (50 - 70 degrees) and winds in that area display frequent shifts from tradewind to sea-breeze [13]. A wind rose for the nearby Kaanapali Airport is presented in Table 7 [14].

5. SHORT-TERM IMPACTS

The principal source of short-term air quality impact will be construction activity. Construction vehicle activity will increase automotive pollutant concentrations along Honoapiilani Highway as well as in the vicinity of the project site itself.

Because of the moderate level of existing traffic volumes, the additional construction vehicle traffic should not exceed road capacities although the presence of large trucks can reduce a roadway's capacity as well as lower average travel speeds.

The site preparation and earth moving will create particulate emissions as will building and on-site road construction. Construction vehicles movement on unpaved on-site roads will also generate particulate emissions. EPA studies on fugitive dust emissions from construction sites indicate that about 1.2 tons/acre per month of activity may be expected under conditions of medium activity, moderate soil silt content (30%), and a precipitation/evaporation (P/E) index of 50 [15,16].

In this case, the predominant soil on the project site is an "Ewa silty clay loam" (silt content about 55%). The soil on the northern tip of the site is classified as a "Pulehu silt loam" (silt content about 60%). With this soil composition and a P/E Index of 28.4 (semi-arid) as determined by the temperature/rainfall conditions indicated in Table 6, one must conclude that there is a significant potential for fugitive dust generation.

6. MOBILE SOURCE IMPACT

6.1 Mobile Source Activity. A traffic impact report (TIR) was prepared for the proposed North Beach Kaanapali Resort and served as the basis for this mobile source impact analysis [17]. Existing traffic volumes and projections for 1990, 1992, and 1994 at the following intersections with Honoapiilani Highway were provided.

- Honoapiilani Road
- Puukolii Road
- Kaanapali Parkway

The TIR identified the p.m. peak-hour (4:00 - 5:00 p.m.) as the most critical period during the day and thus focused on that period. This is typical of resort areas where traffic gradually builds up from mid-morning throughout the day, and the late afternoon often experiences the peak-hour. A small a.m. peak-hour is usually identifiable but not nearly as significant as in more urbanized areas such as Honolulu. This air quality impact analysis therefore also focused on the p.m. peak-hour.

It should be noted that mitigative measures and highway improvements assumed in the TIR were also assumed for the purposes of this air quality impact report.

6.2 Emission Factors. Automotive emission factors for carbon monoxide (CO) were generated for calendar years 1986, 1990, 1992, and 1994 using the Mobile Source Emissions Model (MOBILE-3) [18]. To localize the emission factors as much as possible, the September, 1986 age distribution for registered vehicles in the City & County of Honolulu [19] was input in lieu of national statistics. That same age distribution was the basis for the distribution of vehicle miles travelled as well.

6.3 Modeling Methodology. Due to the present state-of-the-art in air quality modeling, analyses such as this generally focus on estimating concentrations of non-reactive pollutants. For projects involving mobile sources as the principal source, carbon monoxide is normally selected for modeling because it has a relatively long half-life in the atmosphere (ca. 1 month)[20], and it comprises the largest fraction of automotive emissions.

In this instance, modeling was performed for each of the specified years at each of the aforementioned intersections with Honoapiilani Highway.

Because of the time of day of the analysis and the generally low level of urbanization in the area which would otherwise contribute to a "heat island" effect and increased turbulence, a neutral atmosphere (Category "D") [21] and 1 meter per second (m/sec) wind speed were assumed as worst case meteorological conditions. Preliminary modeling with 0, 10, 20, and 45-degree wind-road angles indicated that the 45-degree angle would produce the maximum pollutant concentrations. Review of the traffic data, and the potential for queuing in particular, indicated that a northwest wind direction was most likely to produce the maximum CO concentrations near the intersections; thus, this wind direction was for all initial modeling.

The EPA guideline model CALINE-3 [22, 23] was employed to estimate near-intersection carbon monoxide concentrations. An array of receptor sites at distances of 10 to 30 meters from the road edge were input to the model. Because of the generally low level of urbanization in the area, a background CO concentration of 0.1 milligram per cubic meter (mg/m3) was assumed.

6.4 Results. The results of this modeling are presented in Figures 1 through 12. For each intersection, maximum concentrations for the four years of interest are displayed in sketch maps followed by a graph depicting the trend at the receptor site of maximum concentration.

The trend at the Honoapiilani Road intersection is downward over the 1986 - 1994 period despite the additional development (Figures 1 - 5). CO levels are all below the state and federal, 1-hour standards. In this instance, the projected increase in traffic volume is more than offset by the projected decline in per vehicle emissions as a result of federal motor vehicle emission standards.

At the Puukolii Road intersection, an initial downward trend is followed by an increase in CO levels as the proposed resort is developed (Figures 6 -10). In this case, the projected increase in traffic and concomitant queuing at the intersection overcome the reduction in average vehicle emissions resulting from the federal standards. CO levels are within state and federal 1-hour standards.

At the Kaanapali Parkway intersection, the 1986 maximum CO level occurs at 10 meters from the highway and exceeds the state 1-hour standard but is within the federal standard (Figures 11 - 15). The trend appears to be upward to 1990 and then downward to 1994 with the 1994 maximum value still being over the state 1-hour standard.

Estimates of 8-hour concentrations can be derived by applying a "persistence" factor of 0.6 to the 1-hour concentrations. This "persistence" factor is recommended in an EPA publication on indirect source analysis [24] and has been further corroborated by analysis of carbon monoxide monitoring data in Honolulu which yielded the same 8-hour-to-1-hour ratio [25].

Applying this factor to the 1-hour results indicates compliance with federal and state 8-hour standards at the Honoapiilani Road and Puukolii Road intersections, but potential exceedances of both standards at the Kaanapali Parkway intersection.

6.5 Correlation with Meteorological Data. In light of the high CO levels predicted for the Kaanapali Parkway intersection, a more detailed analysis of the 1981 meteorological data was undertaken in order to estimate the frequency of occurrence of those high concentrations.

First, in order to better characterize the extent of the high concentrations, another modeling run was made with additional receptors out to 50 meters from the roadway and with wind directions of northeast (45 ^{o}), southeast (135 ^{o}), southwest (225^{o}), and northwest (315^{o}). The results of this modeling confirmed that the northwest wind direction produced the highest CO (22.7 mg/m^3) at a distance of 10 meters from the roadway. The results also showed potential violations with each of the other wind directions.

Also of interest was determination of the critical windspeed at which exceedance of the state 1-hour standard would occur. Based on the maximum of 22.7 mg/m^3 CO level at 1 m/sec wind speed this critical wind speed was determined to be 2.3 m/sec.

With this information, the 1981 meteorological data file was searched to find all the days in which those wind directions and critical wind speeds occurred during the period of 4:00 - 5:00 p.m. The results of this analysis are summarized in Table 8. The probability of violations of either the state or federal standards appears very small in light of these data. The only caveat that should be noted is that this conclusion is based on one year of meteorological data. Analysis of more years might indicate a slight deviation from these results, but would not be expected to produce major differences.

7. ELECTRICAL GENERATION IMPACT

The estimated 3,200 hotel units anticipated in the proposed resort will create a substantial additional demand for electrical power, i.e., on the order of 54 million kilowatt-hours per year. The nearest power generating station to the proposed project is Maui Electric Company's Maalaea facility. It is currently comprised of 11 diesel units ranging in size from 2.75 to 12.5 megawatts. Emissions from this facility would eventually

Increase as a result of the project's electrical demand. Estimates of the annual emissions resulting from diesel fuel combustion to meet the project's electrical demand are presented in Table 9. Based on the assumption of an 80% load factor on the existing Maalaea plant, these emissions would represent an 11.6% increase over existing emissions.

8. DISCUSSION AND CONCLUSIONS

8.1 Short-Term Impacts. Since as noted in Section 5, there is a significant potential for fugitive dust due to the dry climate and fine soils, it will be very important for adequate dust control measures to be employed during the construction period. During the second phase of development there will be occupied units which will at times be downwind of construction activity. Fugitive dust, particularly true during the drier, windier summer months, could be a source of complaints not to mention possible violations of the state or federal standards.

Dust control could be accomplished through frequent watering of unpaved roads and areas of exposed soil. The EPA estimates that twice daily watering can reduce fugitive dust emissions by as much as 50%. During later phases, dust barriers upwind of existing hotels might be considered if problems arise from wind-driven dust. The soonest possible landscaping of completed areas will also help.

8.2 Mobile Source Impacts. As noted in Section 6, the highest carbon monoxide levels in the vicinity of intersections with Honoapiilani Highway were generally in compliance with both state and federal air quality standards. Only in close proximity to the Kaanapali Parkway intersection were possible exceedances indicated in 1990 without the project and in 1992/1994 with the project. The peak level occurred in 1990 followed by declining levels through 1994. More detailed correlation with local meteorological data, however, suggested that the probability of such events occurring was very low. The frequency of the worst case wind directions and speeds was on the order of 0 - 1% or four times per year.

8.3 Electrical Generation Impacts.

As noted in Section 7, the proposed resort project will increase electrical demand which in turn will cause more fuel to be burned and more pollutants to be emitted into Maui's air. This increase in emissions was estimated to be approximately 11.6% occurring at the Maalaea Generating Plant. Until other nonpolluting means of generating electricity are developed, such increases in emissions are inevitable. Emissions can be reduced to some extent by reducing electrical demand by the user, e.g., use of solar water heating, on-site co-generation, etc.

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TABLES

TABLE 1: SUMMARY OF STATE OF HAWAII AND FEDERAL AMBIENT AIR QUALITY STANDARDS

POLLUTANT	SAMPLING PERIOD	FEDERAL STANDARDS PRIMARY	SECONDARY	STATE STANDARDS
1. Total Suspended Particulate Matter (TSP)	Annual Geometric Mean	75	60	60
(micrograms per cubic meter)	Maximum Average in Any 24 Hours	260	150	150
2. Sulfur Dioxide (SO2)	Annual Arithmetic Mean	80	—	80
(micrograms per cubic meter)	Maximum Average in Any 24 Hours	365	—	365
	Maximum Average in Any 3 Hours	—	1,300	1,300
3. Nitrogen Dioxide (NO2) (micrograms per cubic meter)	Annual Arithmetic Mean	100		70
4. Carbon Monoxide (CO)	Maximum Average in Any 8 Hours	10		5
(milligrams per cubic meter)	Maximum Average in Any 1 Hour	40		10
5. Photochemical Oxidants (as O3) (micrograms per cubic meter)	Maximum Average in Any 1 Hour	240		100
6. Lead (Pb) (micrograms per cubic meter)	Maximum Average in Any Calendar Quarter	1.5		1.5

SOURCES: State of Hawaii, Title 11, Chapter 59, Air Quality Standards
Title 40, Code of Federal Regulations, Part 50

TABLE 2: 1980 Emissions Inventory
County of Maui

Source Category	Percent of Total County Emissions				
	TSP	SOx	NOx	CO	HC
Steam Electric Power Plants	2.9	80.9	26.6	0.6	1.1
Gas Utilities	0.0	0.0	0.1	0.0	0.0
Fuel Combustion in Agriculture Industry	41.3	9.9	13.3	0.0	0.1
Mineral Products Industry	3.5	1.0	1.2	0.0	0.0
Municipal Incineration	0.0	0.0	0.0	0.0	0.0
Motor Vehicles	4.7	4.0	48.8	56.2	55.6
Construction, Farm and Industrial Vehicles	0.5	0.6	5.9	1.3	2.1
Aircraft	0.1	0.4	2.7	2.1	2.4
Vessels	0.3	3.2	1.4	0.1	0.4
Agricultural Field Burning	46.7	0.0	0.0	39.7	33.7
Total (percent)	100.0	100.0	100.0	100.0	100.0
Total (T/yr)	4,518	3,575	5,088	61,250	6,308

SOURCE: Department of Health
Environmental Permits Branch

TABLE 3: TSP & SO2 MONITORING DATA
KAHULUI MAUI, 1985

	Total Suspended Particulates (TSP) 24-Hour Concentrations (ug/m3)				Sulfur Dioxide (SO2) 24-Hour Concentrations (ug/m3)			
MONTH	SAMPLES	MIN.	MAX.	MEAN	SAMPLES	MIN.	MAX.	MEAN
Jan 85	6	49	105	67	6	<5	14	6
Feb 85	4	45	84	56	4	<5	14	8
Mar 85	2	63	64	64	3	<5	<5	<5
Apr 85	5	30	97	67	5	<5	15	7
May 85	6	35	80	56	5	<5	21	7
Jun 85	5	38	88	54	5	<5	38	18
Jul 85	4	37	63	50	4	<5	6	<5
Aug 85	3	26	52	38	0			
Sep 85	1	41	41	41	1	<5	<5	<5
Oct 85	Station Shut Down				Station Shut Down			
Nov 85	*	*	*		*	*	*	
Dec 85	*	*	*		*	*	*	
ANNUAL	36	41	105	57	33	0	38	8

SOURCE: Department of Health

TABLE 4: TSP MONITORING DATA
KIHEI MAUI, 1985

Total Suspended Particulate Matter 24-Hour Concentrations (ug/m3)				
MONTH	SAMPLES	MIN.	MAX.	MEAN
Jan 85	3	16	23	20
Feb 85	4	22	37	28
Mar 85	3	36	48	44
Apr 85	5	22	112	62
May 85	6	23	80	51
Jun 85	3	72	168	107
Jul 85	4	50	190	100
Aug 85	4	19	60	42
Sep 85	1	23	23	23
Oct 85	Station	Shut	Down	
Nov 85	"	"	"	
Dec 85	"	"	"	
ANNUAL	33	0	190	55

SOURCE: Department of Health

TABLE 5: NO2 MONITORING DATA
KAHULUI MAUI, 1975-76

Nitrogen Dioxide 24-Hour Concentrations (ug/m3)				
MONTH	SAMPLES	MIN.	MAX.	MEAN
Apr 75	2	13	25	19
May 75	5	11	24	16
Jun 75	5	14	22	18
Jul 75	6	10	22	15
Aug 75	6	10	25	17
Sep 75	7	10	19	13
Oct 75	4	16	19	17
Nov 75	6	12	30	21
Dec 75	4	6	32	19
Jan 76	8	0	27	15
Feb 76	7	11	28	19
Mar 76	6	14	39	24
ANNUAL	66	0	39	18

SOURCE: Department of Health

TABLE 6: Average Temperature & Rainfall
Kaanapali, Maui, 1985

MONTH	Temperature (deg F)	Precipitation (in)
Jan 85	71.0	2.0
Feb 85	72.0	1.8
Mar 85	72.0	2.8
Apr 85	72.9	0.58
May 85	74.6	0.87
Jun 85	77.8	0.00
Jul 85	79.3	0.55
Aug 85	80.1	0.10
Sep 85	79.2	0.13
Oct 85	78.0	7.31
Nov 85	74.5	3.49
Dec 85	72.	2.10

SOURCE: National Climatic Data Center

TABLE 7

DAYTIME WIND ROSE (0800-1700 HST)
KAANAPALI AIRPORT
1981

Speed (knots)

Direction	1 - 3	4 - 6	7 - 10	11 - 16	17 - 21	>21	TOTAL
N	0.00042	0.00380	0.01267	0.01732	0.00000	0.00000	0.03421
NNE	0.00000	0.00296	0.01352	0.03422	0.00000	0.00000	0.05070
NE	0.00127	0.00887	0.04140	0.23196	0.00000	0.00000	0.28350
ENE	0.00253	0.02156	0.03718	0.18505	0.00127	0.00211	0.24970
E	0.00127	0.01352	0.00845	0.00676	0.00000	0.00000	0.03000
ESE	0.00042	0.00718	0.00296	0.00084	0.00000	0.00000	0.01140
SE	0.00127	0.00803	0.00042	0.00042	0.00000	0.00000	0.01014
SSE	0.00424	0.01605	0.00634	0.00000	0.00000	0.00000	0.02663
S	0.00127	0.00634	0.00507	0.00084	0.00000	0.00000	0.01352
SSW	0.00042	0.01774	0.01605	0.00549	0.00000	0.00042	0.04012
SW	0.00084	0.04689	0.03042	0.00000	0.00000	0.00000	0.07815
WSW	0.00127	0.06379	0.02746	0.00253	0.00000	0.00000	0.09505
W	0.00084	0.00972	0.00169	0.00591	0.00000	0.00000	0.01816
WNW	0.00042	0.01141	0.00169	0.00042	0.00000	0.00000	0.01394
NW	0.00042	0.01225	0.00465	0.00000	0.00000	0.00000	0.01732
NNW	0.00084	0.01098	0.00718	0.00296	0.00000	0.00000	0.02196
Total:	0.01774	0.26109	0.21715	0.49472	0.00127	0.00253	0.99450

Fraction of calms: 0.00550
Total 1-hour periods: 2,367

TABLE 8

PROBABILITY OF WORST CASE METEOROLOGY
KAANAPALI PARKWAY - HONOAPIILANI HIGHWAY

Wind Direction	Critical Wind Speed (m/sec)	Frequency of Occurrence (da/yr)
Northeast	1.6	2
Southeast	1.5	0
Southwest	2.0	1
Northwest	2.3	1

Note: Based on 1981 daytime windrose, Kaanapali Airport

TABLE 9

ESTIMATED EMISSIONS FROM DIESEL FUEL COMBUSTION
TO MEET PROJECT ELECTRICAL DEMAND

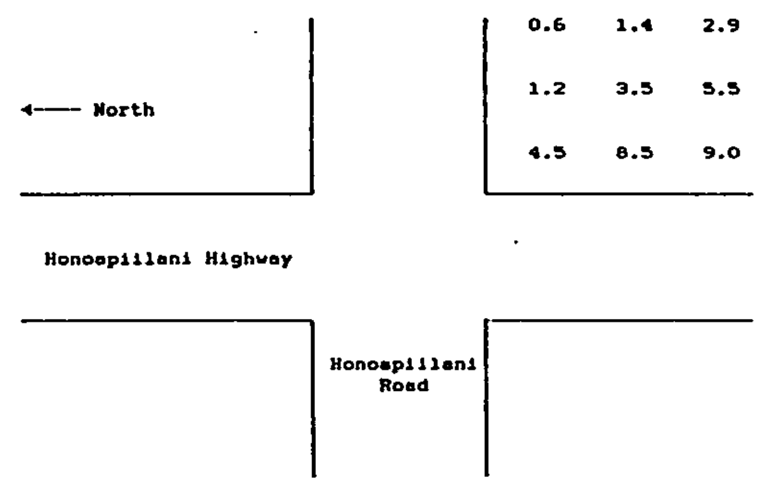
Pollutant	Emissions (T/yr)
Sulfur dioxide	122
Nitrogen oxides	1,047
Particulate matter	13
Carbon monoxide	199
Total Hydrocarbons	63

Note: Estimates based on average emission rate for diesel units at the Maalaea Generating Station.

FIGURES

FIGURE 1
ESTIMATES OF MAXIMUM 1-HOUR
CARBON MONOXIDE CONCENTRATIONS

HONOAPIILANI ROAD AT HONOAPIILANI HIGHWAY
PM-PEAK HOUR (1986)



NOTES

CO concentrations = milligrams per cubic meter (mg/m3)
Receptor spacing = 10 meters
Wind direction = 340 deg
Wind speed = 1 meter per second (m/s)
Atmospheric stability = neutral (P-G Class 4)
Background CO concentration = 0.1 mg/m3
Diffusion model: CALINE-3
Emissions model: MOBILE-3

FIGURE 2
ESTIMATES OF MAXIMUM 1-HOUR
CARBON MONOXIDE CONCENTRATIONS

HONOAPIILANI ROAD AT HONOAPIILANI HIGHWAY
PM-PEAK HOUR (1990)

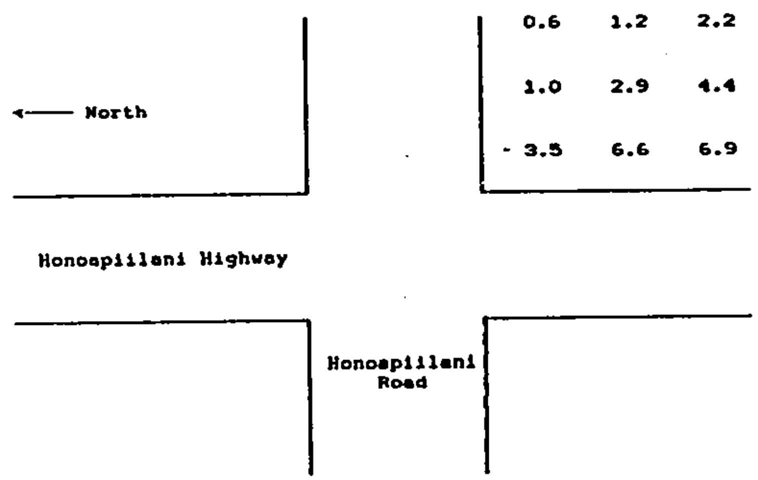


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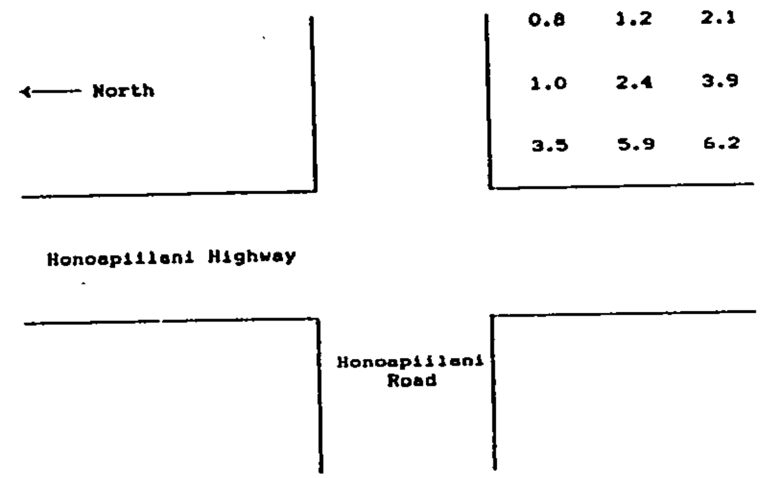
FIGURE 3
ESTIMATES OF MAXIMUM 1-HOUR
CARBON MONOXIDE CONCENTRATIONS

HONOAPIILANI ROAD AT HONOAPIILANI HIGHWAY
PM-PEAK HOUR (1992)
PROJECT PHASE I



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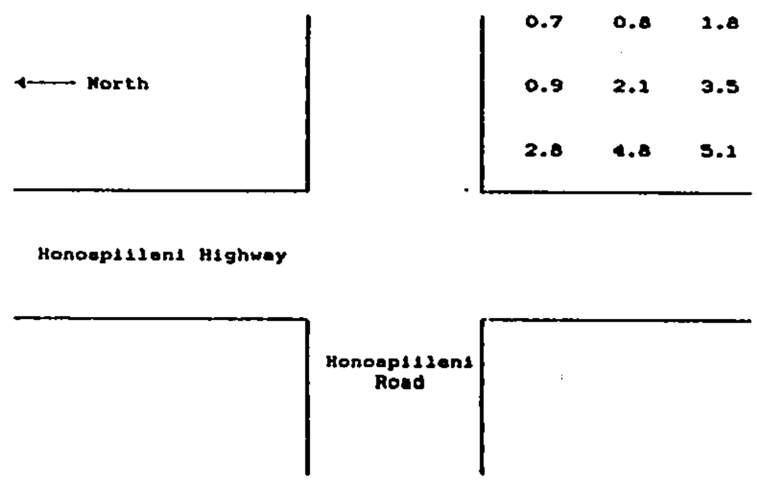
Receptor spacing = 10 meters
Wind direction = 340 deg
Wind speed = 1 meter per second (m/s)
Atmospheric stability = neutral (P-G Class 4)
Background CO concentration = 0.1 mg/m3
Diffusion model: CALINE-3
Emissions model: MOBILE-3

FIGURE 4
ESTIMATES OF MAXIMUM 1-HOUR
CARBON MONOXIDE CONCENTRATIONS

HONOAPIILANI ROAD AT HONOAPIILANI HIGHWAY
PM-PEAK HOUR (1994)
PROJECT PHASE II



NOTES

CO concentrations = milligrams per cubic meter (mg/m3)
Receptor spacing = 10 meters
Wind direction = 340 deg
Wind speed = 1 meter per second (m/s)
Atmospheric stability = neutral (P-G Class 4)
Background CO concentration = 0.1 mg/m3
Diffusion model: CALINE-3
Emissions model: MOBILE-3

Figure 5: Honoapiilani Road

WORST CASE 1-HOUR CO LEVEL

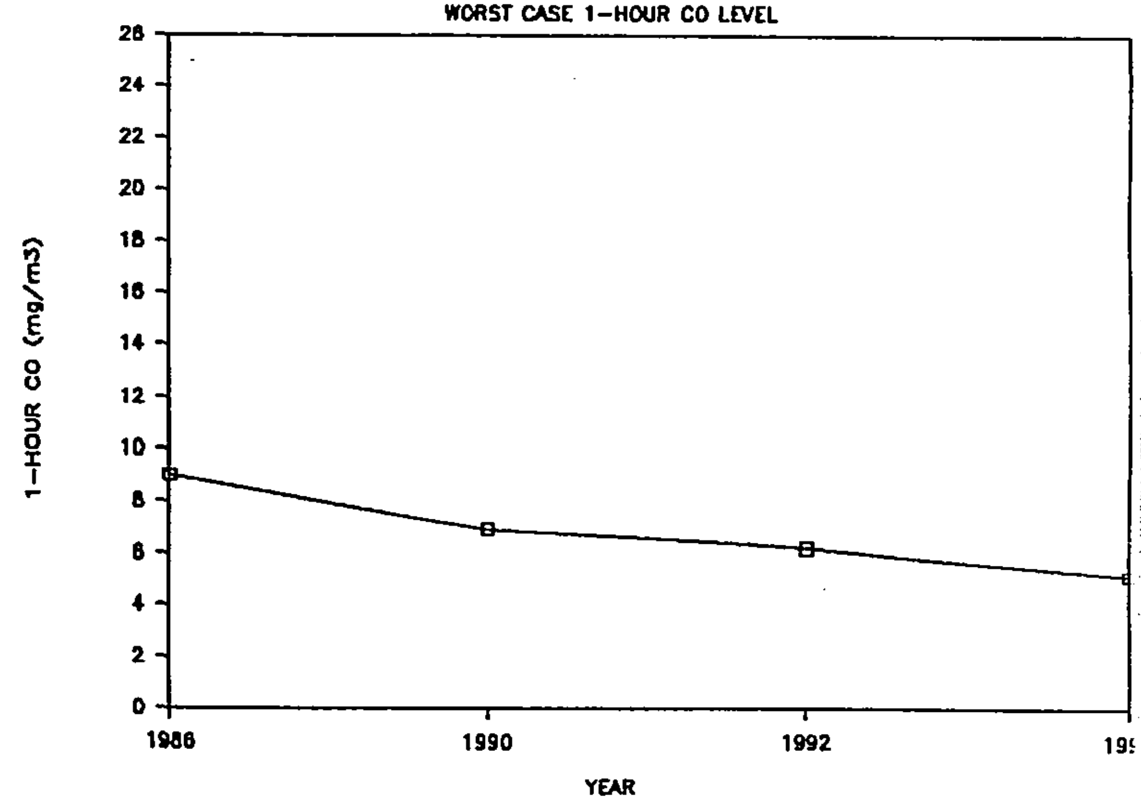
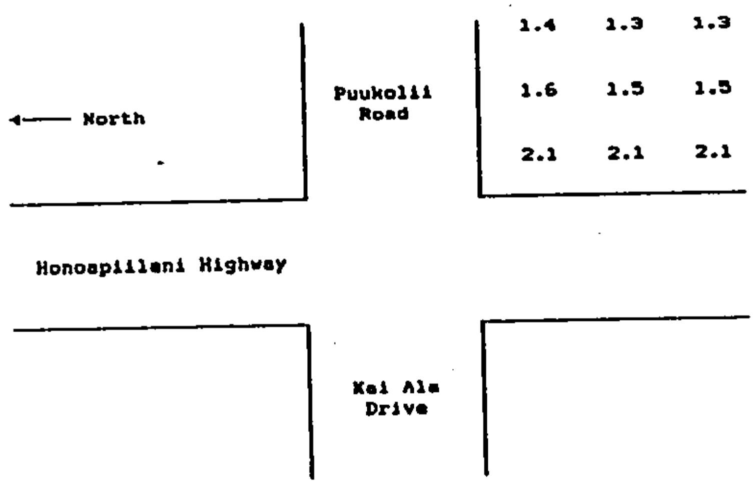


FIGURE 6
ESTIMATES OF MAXIMUM 1-HOUR
CARBON MONOXIDE CONCENTRATIONS

PUUKOLII ROAD AT HONOAPIILANI HIGHWAY
PM-PEAK HOUR (1986)

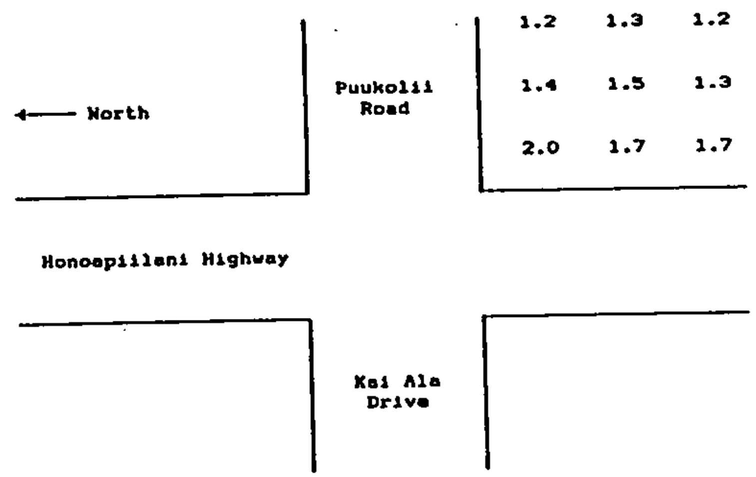


NOTES

CO concentrations = milligrams per cubic meter (mg/m3)
Receptor spacing = 10 meters
Wind direction = 315 deg
Wind speed = 1 meter per second (m/s)
Atmospheric stability = neutral (P-G Class 4)
Background CO concentration = 0.1 mg/m3
Diffusion model: CALINE-3
Emissions model: MOBILE-3

FIGURE 7
ESTIMATES OF MAXIMUM 1-HOUR
CARBON MONOXIDE CONCENTRATIONS

PUUKOLII ROAD AT HONOAPIILANI HIGHWAY
PM-PEAK HOUR (1990)

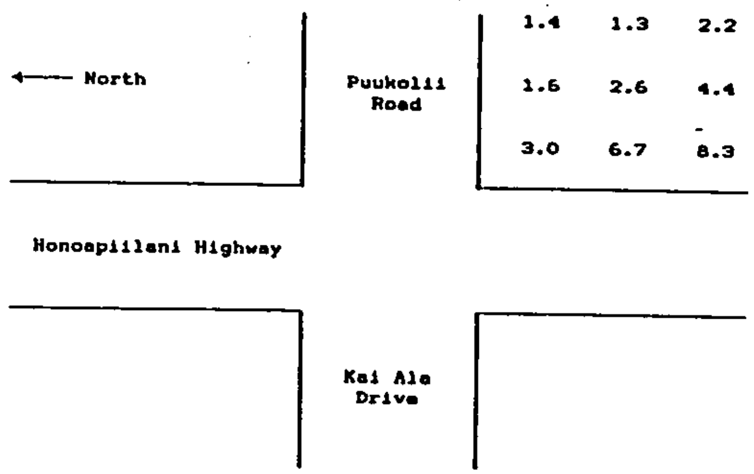


NOTES

CO concentrations = milligrams per cubic meter (mg/m3)
Receptor spacing = 10 meters
Wind direction = 315 deg
Wind speed = 1 meter per second (m/s)
Atmospheric stability = neutral (P-G Class 4)
Background CO concentration = 0.1 mg/m3
Diffusion model: CALINE-3
Emissions model: MOBILE-3

FIGURE 8
ESTIMATES OF MAXIMUM 1-HOUR
CARBON MONOXIDE CONCENTRATIONS

PUUKOLII ROAD AT HONOAPIILANI HIGHWAY
PM-PEAK HOUR (1992)
PROJECT PHASE, I



NOTES

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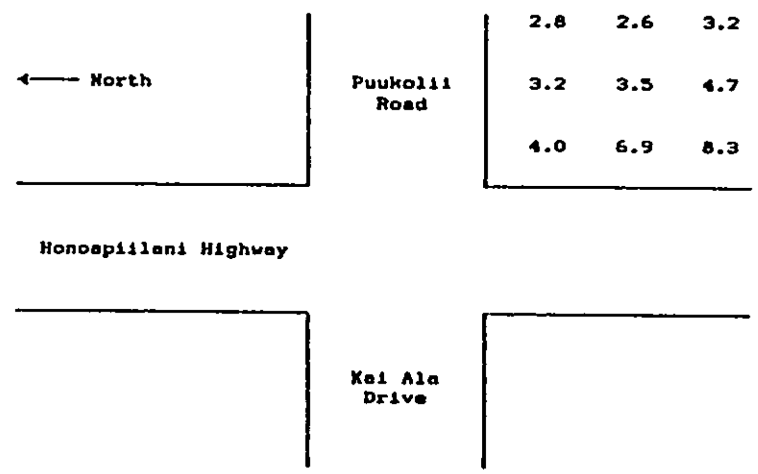
Receptor spacing = 10 meters
Wind direction = 315 deg
Wind speed = 1 meter per second (m/s)
Atmospheric stability = neutral (P-G Class 4)
Background CO concentration = 0.1 mg/m3
Diffusion model: CALINE-3
Emissions model: MOBILE-3

FIGURE 9
ESTIMATES OF MAXIMUM 1-HOUR
CARBON MONOXIDE CONCENTRATIONS

PUUKOLII ROAD AT HONOAPIILANI HIGHWAY
PM-PEAK HOUR (1994)
PROJECT PHASE II



NOTES

CO concentrations = milligrams per cubic meter (mg/m3)
Receptor spacing = 10 meters
Wind direction = 315 deg
Wind speed = 1 meter per second (m/s)
Atmospheric stability = neutral (P-G Class 4)
Background CO concentration = 0.1 mg/m3
Diffusion model: CALINE-3
Emissions model: MOBILE-3

Figure 10: Puukolii Road

WORST CASE 1-HOUR CO LEVEL

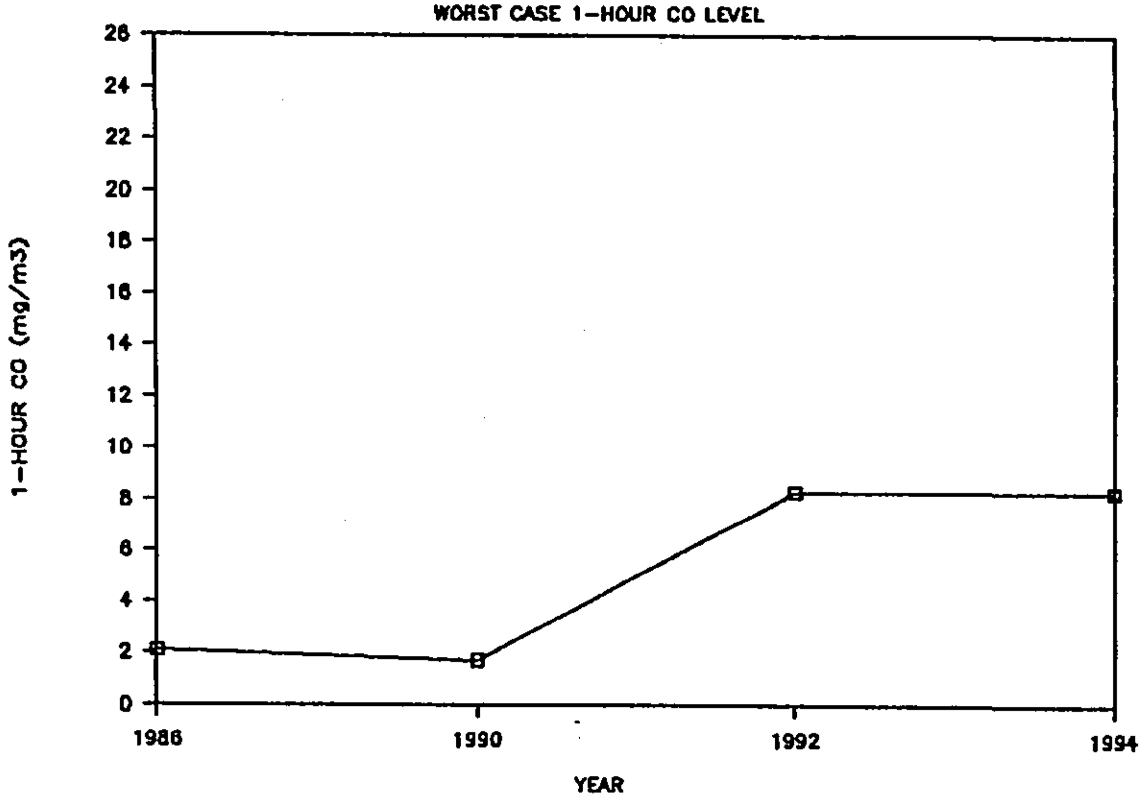
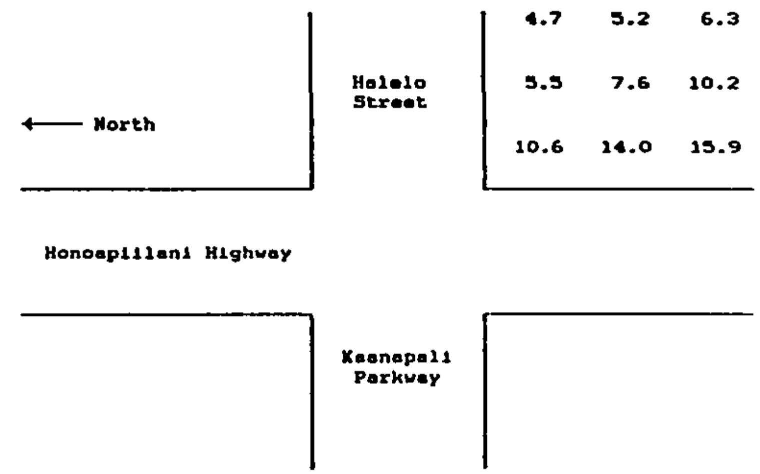


FIGURE 11
ESTIMATES OF MAXIMUM 1-HOUR
CARBON MONOXIDE CONCENTRATIONS

KAANAPALI PARKWAY AT HONOAPIILANI HIGHWAY
PM PEAK-HOUR (1986)

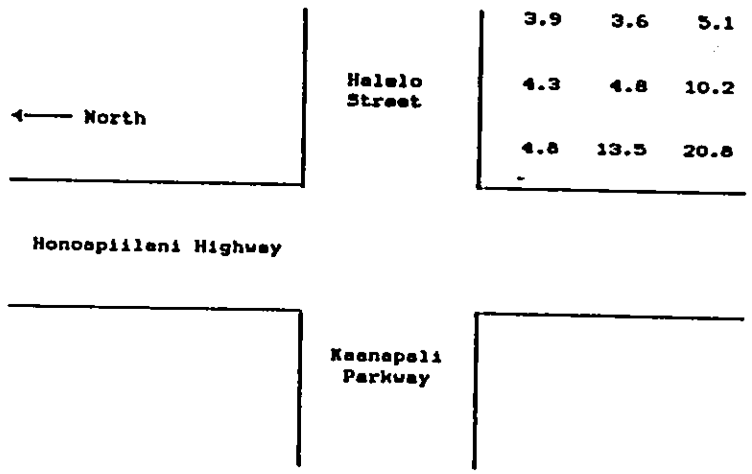


NOTES

CO concentrations = milligrams per cubic meter (mg/m3)
Receptor spacing = 10 meters
Wind direction = 315 deg
Wind speed = 1 meter per second (m/s)
Atmospheric stability = neutral (P-G Class 4)
Background CO concentration = 0.1 mg/m3
Diffusion model: CALINE-3
Emissions model: MOBILE-3

FIGURE 12
ESTIMATES OF MAXIMUM 1-HOUR
CARBON MONOXIDE CONCENTRATIONS

KAANAPALI PARKWAY AT HONOAPIILANI HIGHWAY
PM PEAK-HOUR (1990)

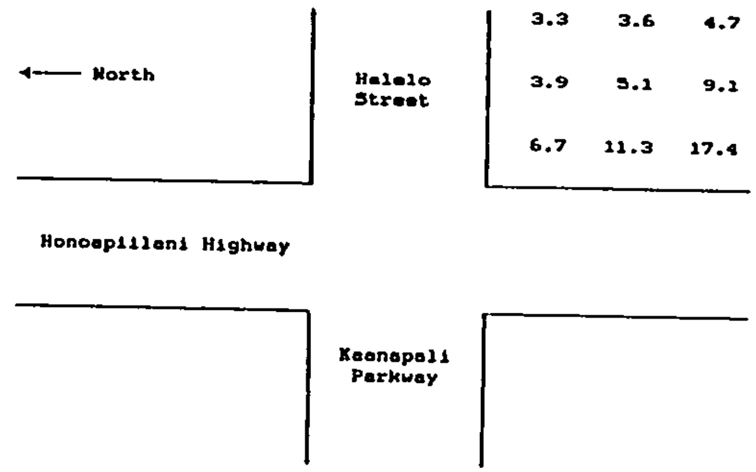


NOTES

CO concentrations = milligrams per cubic meter (mg/m3)
Receptor spacing = 10 meters
Wind direction = 315 deg
Wind speed = 1 meter per second (m/s)
Atmospheric stability = neutral (P-G Class 4)
Background CO concentration = 0.1 mg/m3
Diffusion model: CALINE-3
Emissions model: MOBILE-3

FIGURE 13
ESTIMATES OF MAXIMUM 1-HOUR
CARBON MONOXIDE CONCENTRATIONS

KAANAPALI PARKWAY AT HONOAPIILANI HIGHWAY
PM-PEAK HOUR (1992)
PROJECT PHASE 1



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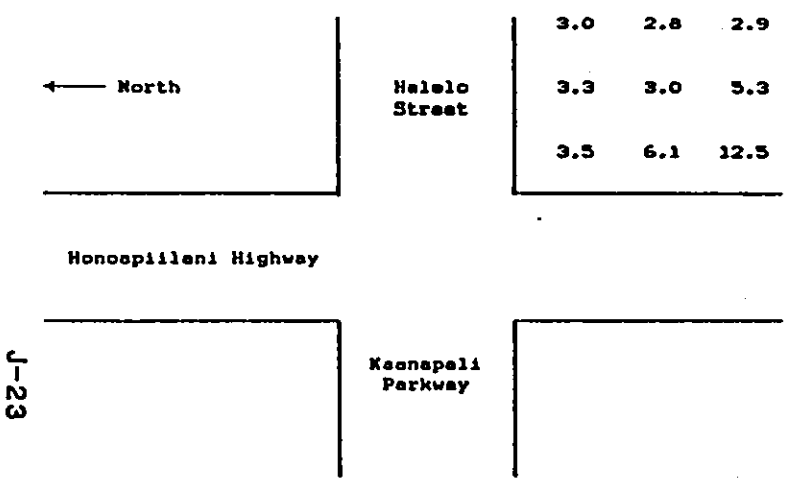
Receptor spacing = 10 meters
Wind direction = 315 deg
Wind speed = 1 meter per second (m/s)
Atmospheric stability = neutral (P-G Class 4)
Background CO concentration = 0.1 mg/m3
Diffusion model: CALINE-3
Emissions model: MOBILE-3

FIGURE 14
ESTIMATES OF MAXIMUM 1-HOUR
CARBON MONOXIDE CONCENTRATIONS

KAANAPALI PARKWAY AT HONOAPIILANI HIGHWAY
PM-PEAK HOUR (1994)
PROJECT PHASE II



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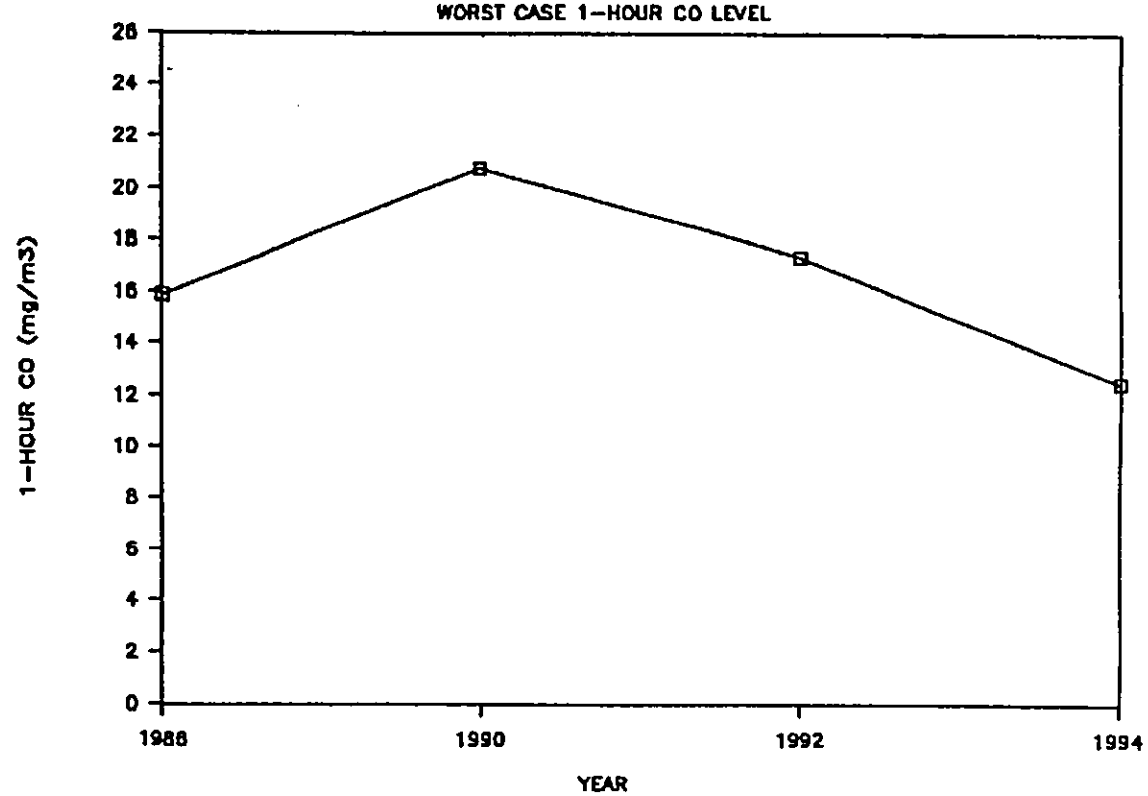
Background CO concentration = 0.1 mg/m3
Diffusion model: CALINE-3
Emissions model: MOBILE-3

Figure 15: Kaanapali Parkway

WORST CASE 1-HOUR CO LEVEL



ADDENDUM TO AIR QUALITY IMPACT REPORT

NORTH BEACH KAANAPALI RESORT

5. SHORT-TERM IMPACTS

In addition to the onsite impacts attributable to construction activity, there will also be offsite impacts due to the operation of concrete and asphalt concrete batching plants needed for construction. In this particular case, an estimated 450 cubic yards of concrete and 2,400 tons of asphalt concrete will be required for the construction of project roads. No estimate can be made at this time or the concrete requirement for future hotel construction. Since it is also too early to identify specific facilities that will be providing the concrete and asphalt, the discussion of air quality impacts is necessarily generic.

Design and operating features of a typical concrete batching plant on Maui were obtained for this analysis. This plant (Rex Transit Mix Batch Plant, Model LO GO 5) [1], is a portable unit capable of producing up to 100 cubic yards of concrete per hour. With this design capacity, it is obvious that the road-building concrete requirement (450 yd3) would require a very short-time operation of the batch plant. The later hotel construction, however, will require longer operation.

Assuming 8 hours/day operation and published EPA emission factors [2] for both direct plant emissions and fugitive dust emissions, estimates of worst case ambient impact were derived using the PTPLU screening model. Ninety percent control of particulate emissions from the plant itself and 60% control of fugitive dust emissions from the process were assumed. One-hour concentration estimates were adjusted to 8-hour averages using an EPA-recommended factor [3] and then to 24-hour averages based on a weighted averaging technique. The worst case concentration of total suspended particulates (TSP) was thus estimated to be 105 micrograms/cubic meter (ug/m3) due to the plant operation.

Since it is not known where exactly the plant will be located and thus what the background concentration of TSP will be, existing data from the Kihei and Kahului sites were reviewed. The latest full year of TSP data from these sites is 1985, and it indicates relatively high levels (see Tables 3 & 4 of the original report). If the batch plant's 105 ug/m3 were added to the second highest 24-hour concentration at either of those locations, the sum would indicate an exceedance of the State's 24-hour standard of 150 ug/m3. Since the temporary batch plant is not going to be necessarily located in an area with the same existing TSP levels as Kihei or Kahului, the apparent exceedance may not occur at all. Furthermore, the plant would be reviewed by the Department of Health to insure compliance with ambient air quality standards before it would be permitted to operate.

Design and operating data for a typical asphalt concrete batch plant (Astec Industries Model PDM-636-C) on Maui were also obtained and reviewed. This plant has a production capacity of 186 T/hour and thus could provide the required 2,400 tons of asphalt within a short period. The two primary emission sources associated with such a plant are the drum mix asphalt plant and a 600 Kw diesel generator.

The modeling technique employed for the concrete batch plant was again employed for the asphalt plant with the results as shown in the following table.

ESTIMATED IMPACT OF AN ASPHALT CONCRETE BATCH PLANT

Pollutant	24-hour Concen. (ug/m3)	Existing Concen. (ug/m3)	Total (ug/m3)
Total Suspended Particulate	34.9	97/168	132/203
Sulfur dioixde	13.6	21	34.6
Nitrogen dioxide	203	30	233
Carbon monoxide	44.2	n/a	44.2
Volatile organic compounds	16.2	n/a	16.2

The dual existing figures for TSP represent Kahului and Kihei, respectively. Existing levels for other pollutants are from the Kanului monitoring site (see Tables 3,4,5 in original report). The results indicate TSP as the only possible problem pollutant; however, the same caveats noted for the concrete batch plant also apply in this case, i.e., uncertain background concentration and requirement for DOH review and permit.

7. ELECTRICAL GENERATION IMPACT

At full buildout the proposed project is expected to have a 10 MVA peak electrical demand. As part of its ongoing energy planning process, the Maui Electric Company, Ltd. (MECO) maintains a forecast committee which meets annually to review growth in electrical demand and refine its plan for meeting that demand [4]. The company recently installed two 2.5 MW units at Maalaea and is currently seeking permits for two additional 12.5 MW diesels. As the North Beach resort and other projects on Maui proceed, MECO will continue to evaluate the increasing demand and plan for new generating capacity as required.

In order to provide some indication of the ambient air quality impact resulting from that electrical demand, a recent air permit application for the Maalaea Generating Station was reviewed [5]. That particular application addressed two 12.5 MW diesel units, the approximate size that would be required to meet the North Beach peak demand. The estimated individual impact of a single 12.5 MW unit as derived from that application is shown in the following table.

IMPACT OF A SINGLE 12.5 MW DIESEL GENERATOR

Pollutant	Concentration (ug/m3) 1-Hour	3-Hour	8-Hour	24-Hour	Annual
SO2	--	40.8	--	5.2	0.53
NO2	--	--	--	--	6.3
TSP	--	--	--	3.6	0.2
CO	112	--	15	--	--

The cumulative impact of all the existing and proposed new units is depicted in the following table.

PROJECTED CUMULATIVE IMPACT OF THE MAALAEA GENERATING STATION

	Concentration (ug/m3)		
Pollutant	3-Hour	24-Hour	Annual
SO2	463.6	158	22.5
NO2	--	--	50.3

The above data from the permit application indicate that while there will be additional air quality impact, compliance with both state and federal ambient air quality standards will still be maintained.

<u>REFERENCES</u>

1. Rexworks, Inc. LO GO 5 Transit Mix Batch Plant, Bulletin No. 1017-283

2. U.S. Environmental Protection Agency. Compilation of Air Pollutant Emissions Factors (Third Edition) with Supplements 1 - 15 (1984).

3. U.S. Environmental Protection Agency. Guidelines for Air Quality Maintenance Planning and Analysis, Volume 10 (Revised): Procedures for Evaluating Air Quality Impact of New Stationary Sources, EPA-450/4-77-001, October 1977.

4. Maui Electric Company, Ltd., personal communication with Mr. Paul Shinyama, October 9, 1987.

5. Maui Electric Company, Ltd. PSD Permit Application for Two Medium Speed Diesel Generators at the Maalaea, Maui Generating Station, February, 1987.

K

NOISE STUDY

NOISE STUDY FOR
PROPOSED DEVELOPMENT AT
NORTH BEACH KAANAPALI, MAUI

PREPARED FOR
HELBER HASTERT VAN HORN & KIMURA

BY
Y. EBISU & ASSOCIATES

OCTOBER, 1986

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I. SUMMARY

The existing and future noise levels in the vicinity of the proposed project at North Beach Kaanapali were evaluated for their potential impact on existing residents and future visitors. The future traffic noise levels on Honoapiilani Highway, Puukolii Road, and on the internal roadway to the project hotels were calculated for the Year 2007. Along the highway, total increases in traffic noise of 3.2 to 1.2 Ldn are predicted to occur between now and the Year 2007. Along Puukolii Road and the entrance road to the project, larger increases of 8.2 to 9.3 Ldn are predicted to occur, due to the low volumes of existing traffic on the two roadways. Approximately 100 percent of these predicted increases are associated with project traffic. To the north of the project, approximately 33 percent of the predicted noise level increases are associated with project traffic.

Because adequate setback distances seem to be available between the highway and the proposed hotel units, risks of adverse on-site traffic noise impacts are anticipated to be minimal. Future on-site traffic noise impacts will be minimized by the use of buffer zones of 200+ FT depth along Honoapiilani Highway.

The North Beach Kaanapali site is sufficiently removed from the future West Maui Airport such that aircraft noise is predicted to be below 50 Ldn in the medium to long term, until total enplanements plus deplanements exceed 2 million passengers annually. This level of 50 Ldn is in the "Unconditionally Acceptable" category, with minimal risks of adverse noise impacts expected from aircraft operating to/from the future West Maui Airport.

Traffic noise impacts associated with increased off-site traffic on the highway may occur by the Year 2007. The projected traffic noise increases are considered to be moderate, and will probably not be perceptible during the project development period. Off-site noise mitigation measures could be undertaken by private property owners (at their discretion) along the highway.

If improvements to the existing highway are implemented, noise mitigation measures along the improved sections may be undertaken in accordance with existing FHWA noise abatement criteria.

Unavoidable, but temporary, noise impacts may occur during the construction period. Because noise from construction activities are predicted to be audible at adjoining properties, the quality of the acoustic environment may be degraded to unacceptable levels during periods of construction. Mitigation measures to reduce construction noise to inaudible levels will not be practical in all cases. For this reason, the use of quiet equipment and construction curfew periods should be considered to minimize construction noise impacts.

II. PURPOSE AND METHODOLOGY

The objectives of this study were to describe the existing and future noise environment in the vicinity of the proposed hotel development at North Beach Kaanapali, Maui. Traffic noise level increases and impacts associated with the proposal were to be determined within the site as well as along Honoapiilani Highway. A specific objective was to determine setback requirements of proposed hotel units for minimizing future noise impacts from the future volumes of project and non-project traffic. Assessments of future noise impacts from aircraft operating at the planned West Maui Airport; and from construction activities at the project site were also included in the noise study objectives.

Traffic noise predictions were performed using the Federal Highway Administration (FHWA) Noise Prediction Model (Reference 1). Historical traffic counts obtained by the State Department of Transportation at stations north and south of the project along Honoapiilani Highway (References 2 thru 4), and more recent traffic counts obtained in front of the project (Reference 5) were used to develop the relationship between hourly (Leq) and daily (Ldn) traffic noise levels, and to estimate the traffic mix for highway noise modeling purposes. Existing traffic volume data and Year 2007 traffic assignments used as inputs to the traffic noise prediction model were obtained from References 5 and 6, respectively.

Existing traffic noise measurements along Honoapiilani Highway were made in July, 1986 to calibrate the FHWA Noise Prediction Model and to refine predictions of future traffic noise levels. Noise measurements of other sources in the area, such as the railroad train, were also obtained. Background ambient noise measurements at the existing beachfront condominiums were also made to determine existing ambient noise levels at large setback distances from the highway, and to estimate future background noise levels within the North Beach Kaanapali site.

For the Base Year (1986) and future years to the ultimate project development (estimated at the Year 2007), traffic noise vs. distance tables were developed to numerically depict the increases in traffic noise along internal and external roadways. Setback distances from the roadways' centerlines to the 65, 60, and 55 Ldn iso-noise contour lines were calculated and presented in table format for the worst case condition of unobstructed line-of-sight between the receptor and the highway. Additionally, noise contours for the Base Year were constructed to reflect existing traffic noise on the project site (with the sugar cane cut) for receptor elevations of 5 FT above ground level.

For the future condition in the Year 2007, traffic noise contours were also constructed using the FHWA traffic noise model. Major improvements (such as widening and adding more lanes) to the existing Honoapiilani Highway in the immediate vicinity of the project were not assumed to occur by the Year 2007. Inputs to the noise model included: future traffic volumes, vehicle mix, and speeds; highway as-built plans and elevation profile; and locations and elevations of natural topographic features (depressions, mounds, etc.) along the highway. Receptor elevation was assumed to be 5 FT above existing ground elevation on the project site. Traffic noise level contours, identified by the 55, 60, and 65 Ldn contours for the Year 2007, were constructed along Honoapiilani Highway and along the internal roadway of the project. For planned noise sensitive developments within the traffic noise contours, possible noise mitigation measures are described. These measures included the use of minimum building setback distances, sound attenuating berms to reduce future traffic noise, makai orientation of hotel units, and the use of total closure and air conditioning.

III. NOISE DESCRIPTORS AND THEIR RELATIONSHIP TO LAND USE COMPATIBILITY

Two noise descriptors currently used to relate traffic noise levels to land use compatibility, and to assess environmental noise in general, are the Equivalent Noise Level (Leq) and the Day-Night Average Sound Level (Ldn). Both of these descriptors are averages of instantaneous A-Weighted Sound Levels as read on a standard Sound Level Meter. In traffic noise evaluations, the averaging period for the Leq descriptor is usually an hour, and more specifically, the peak hour of traffic. In all evaluations, the minimum averaging period for the Ldn descriptor is 24 hours (by definition). Additionally, sound levels which occur during the nighttime hours of 10:00 PM to 7:00 AM are increased by 10 decibels (dB) prior to computing the 24-hour average by the Ldn descriptor. A more complete list of noise descriptors is provided in APPENDIX B of this report.

TABLE 1, derived from Reference 7, presents current federal standards and acceptability criteria for residential land uses exposed to various levels of environmental noise. FIGURE 1, extracted from Reference 8, presents suggested land use compatibility guidelines for residential and nonresidential land uses. As a general rule, noise levels of 55 Ldn or less occur in rural areas, or urbanized areas which are shielded from high volume streets. In urbanized areas, Ldn levels generally range from 55 to 65 Ldn, and are usually controlled by motor vehicle traffic noise. Residences which front major roadways are generally exposed to levels of 65 Ldn, and as high as 72 Ldn when the roadway is a high speed freeway. Due to noise shielding effects from intervening structures, residences which are located within interior lots are exposed to lower noise levels of 55 Ldn or less.

For the purposes of determining noise acceptability for funding assistance from federal agencies (FHA/HUD and VA), an exterior noise level of 65 Ldn or lower is considered acceptable. This standard is applied nationally (see Reference 9), including

TABLE 1

EXTERIOR NOISE EXPOSURE CLASSIFICATION
(RESIDENTIAL LAND USE)

Noise Exposure Class	Day-Night Sound Level	Equivalent Sound Level	Federal Standard (1)
Minimal Exposure	Not Exceeding 55 Ldn	Not Exceeding 55 Leq	Unconditionally Acceptable
Moderate Exposure	Above 55 Ldn But Not Above 65 Ldn	Above 55 Leq But Not Above 65 Leq	Acceptable (2)
Significant Exposure	Above 65 Ldn But Not Above 75 Ldn	Above 65 Leq But Not Above 75 Leq	Normally Unacceptable
Severe Exposure	Above 75 Ldn	Above 75 Leq	Unacceptable

Notes: (1) Federal Housing Administration, Veterans Administration, Department of Defense, and Department of Transportation.

(2) FHWA uses the Leq instead of the Ldn descriptor. For planning purposes, both are equivalent if: (a) heavy trucks do not exceed 10 percent of total traffic flow in vehicles per 24 hours, and (b) traffic between 10:00 PM and 7:00 AM does not exceed 15 percent of average daily traffic flow in vehicles per 24 hours.

Source: Reference 7.

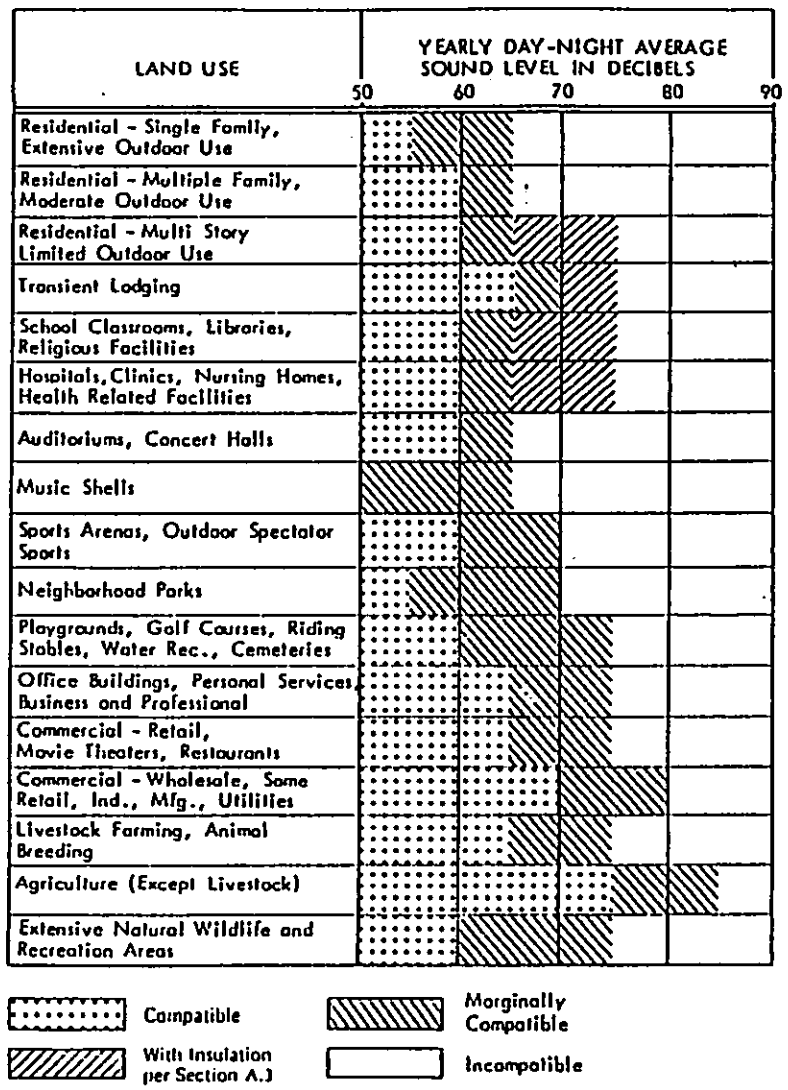

FIG. 1. Land use compatibility with yearly day-night average sound level at a site for buildings as commonly constructed. [For information only; not a part of American National Standard for Sound Level Descriptors for Determination of Compatible Land Use S3.23-1980.]

Hawaii. Because of our open living conditions, the predominant use of naturally ventilated dwellings, and the relatively low exterior to interior sound attenuation afforded by these naturally ventilated structures, an exterior noise level of 65 Ldn does not eliminate all risks of noise impacts. For these reasons, and as recommended in Reference 10, a lower level of 55 Ldn is considered as the "Unconditionally Acceptable" (or "Near Zero Risk") level of exterior noise. However, after considering the cost and feasibility of applying the lower level of 55 Ldn, government agencies such as FHA/HUD and VA have selected 65 Ldn as a more appropriate regulatory standard.

For commercial, industrial, and other non-noise sensitive land uses, exterior noise levels as high as 75 Ldn are generally considered acceptable. Exceptions to this occur when naturally ventilated office and other commercial establishments are exposed to exterior levels which exceed 65 Ldn.

For the purposes of this study, the most conservative level of 55 Ldn was used to define the potential noise impact zones along the sides of a roadway, and to define the maximum acceptable level of noise from other potential noise sources (such as aircraft operating at the future West Maui Airport). This lower level was considered appropriate due to the potential resort aspects of the project, and due to the relatively low ambient noise levels in the area. Also, at an exterior noise level of 55 Ldn, the noise attenuation characteristics of typical naturally ventilated structures would produce acceptable interior noise levels of approximately 45 Ldn, without the use of air conditioning.

IV. EXISTING NOISE ENVIRONMENT

A. Traffic Noise. The existing noise environment along Honoapiilani Highway in the area of the proposed project is controlled by vehicular traffic. Noise levels are in the "Moderate Exposure, Acceptable" category, with traffic noise below 65 Ldn at 72 FT or greater setback distances from the highway's centerline.

The results of the July, 1986 traffic noise measurements are summarized in TABLE 2. Noise measurement Locations A thru F were on or in the immediate vicinity of the project site, and are shown in FIGURE 2. Measured traffic noise levels were in fair-to-good agreement with predicted values. The existing traffic noise contours (55 Ldn to 65 Ldn), representative of conditions at 5 FT above ground level, are shown superimposed on the project site map in FIGURE 2.

Results of calculations of existing PM peak hour traffic noise levels at 50 FT distance from the centerline of Honoapiilani Highway north and south of the proposed project are shown in TABLE 3. Calculated setback distances to the existing 65, 60, and 55 Ldn contours are shown in TABLE 4. The traffic noise levels and setback distances shown in the tables only apply when unobstructed line-of-sight conditions exist to the roadways. These conditions would generally occur at short (50 to 100 FT) distances to a roadway, within any flat, open space along the roadway, and at distant, but elevated locations above the roadway. The existing traffic noise levels shown in the tables should be reduced by 3 to 5 dB if partial shielding (line-of-sight obstruction) exists between the roadway and receptor location. If the receptor location is behind an obstruction (berm or hill), the noise levels in the tables should be reduced by 5 to 10 dB.

B. Other Background Noise. In areas removed from Honoapiilani Highway, existing ambient noise levels are controlled by wind and foliage, surf, birds, and/or intermittent flyby events of helicopters and aircraft. At Locations A and D, which were removed from the highway traffic, measured minimum background am-

TABLE 2

JULY 15, 1986 NOISE MEASUREMENT RESULTS

Measurement Location	Time of Day (HRS)	Ave. Speed (MPH)	Equivalent Hourly *** Traffic Volume (VPH) *** Auto	Med.Truck	Heavy Truck	Measured Leq (dB)	Predicted Leq (dB)
A. 50 FT from shoreline and at northern end of proposed development site.	0810 to 0905	43	1,188	20	20	52.0*	43.2
B. 50 FT from centerline of Honoapiilani Highway at northeast end of project.	0913 to 1040	43	1,268	0	20	63.4	65.2
C. 50 FT from centerline of Honoapiilani Highway and mauka of highway.	1054 to 1155	43	1,264	0	20	65.6	65.2
D. 500 FT from the centerline of Honoapiilani Hwy. at old airport parking lot.	1206 to 1215	43	1,260	0	20	48.8	50.2
E. 400 FT from the centerline of Honoapiilani Hwy. at old airport entrance road.	1220 to 1226	43	1,260	0	20	53.0	51.6
F. 200 FT from the centerline of Honoapiilani Hwy. at old airport entrance road.	1230 to 1326	43	1,249	0	20	57.4	56.2
G. 50 FT from centerline of Honoapiilani Highway and mauka of highway.	1403 to 1502	43	1,424	0	15	64.0	65.1

*Primarily surf noise; traffic not audible.

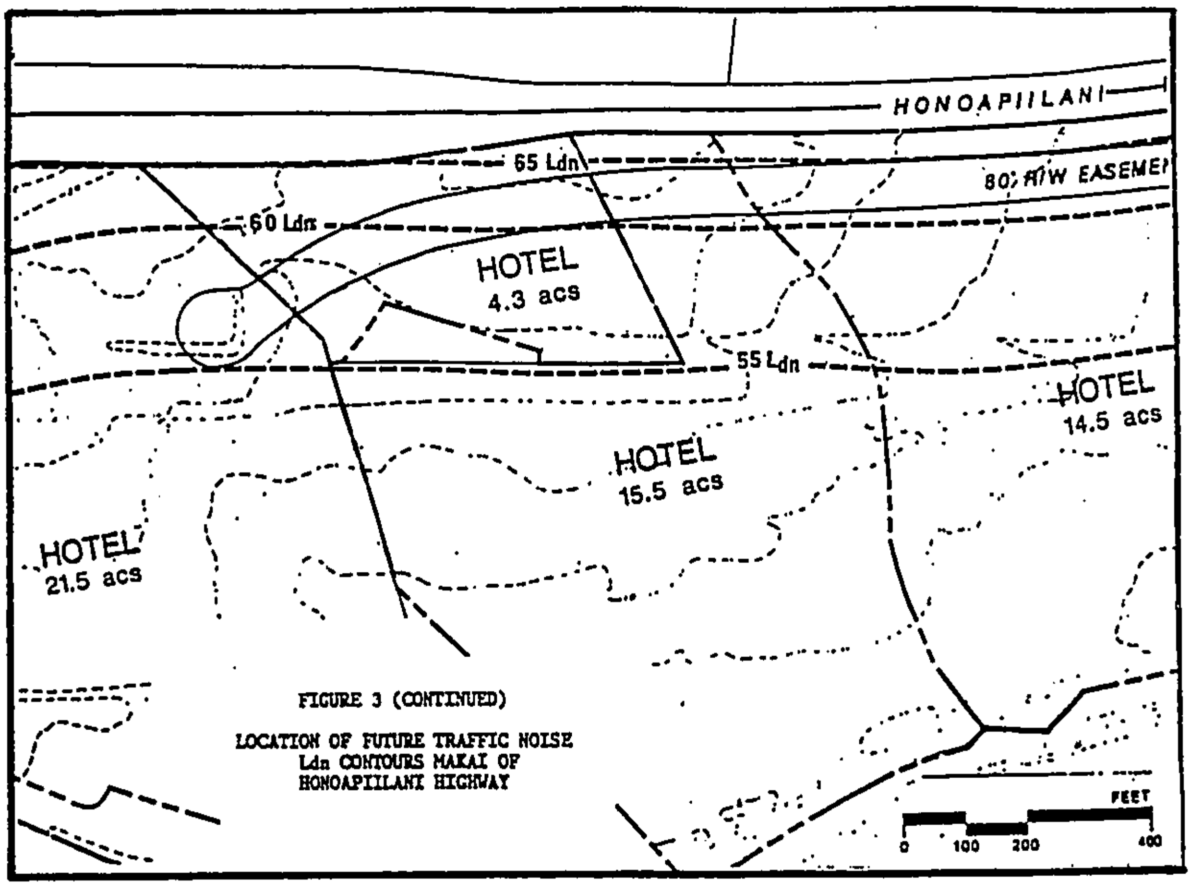

FIGURE 3 (CONTINUED)

LOCATION OF FUTURE TRAFFIC NOISE
Ldn CONTOURS MAKAI OF
HONOAPIILANI HIGHWAY

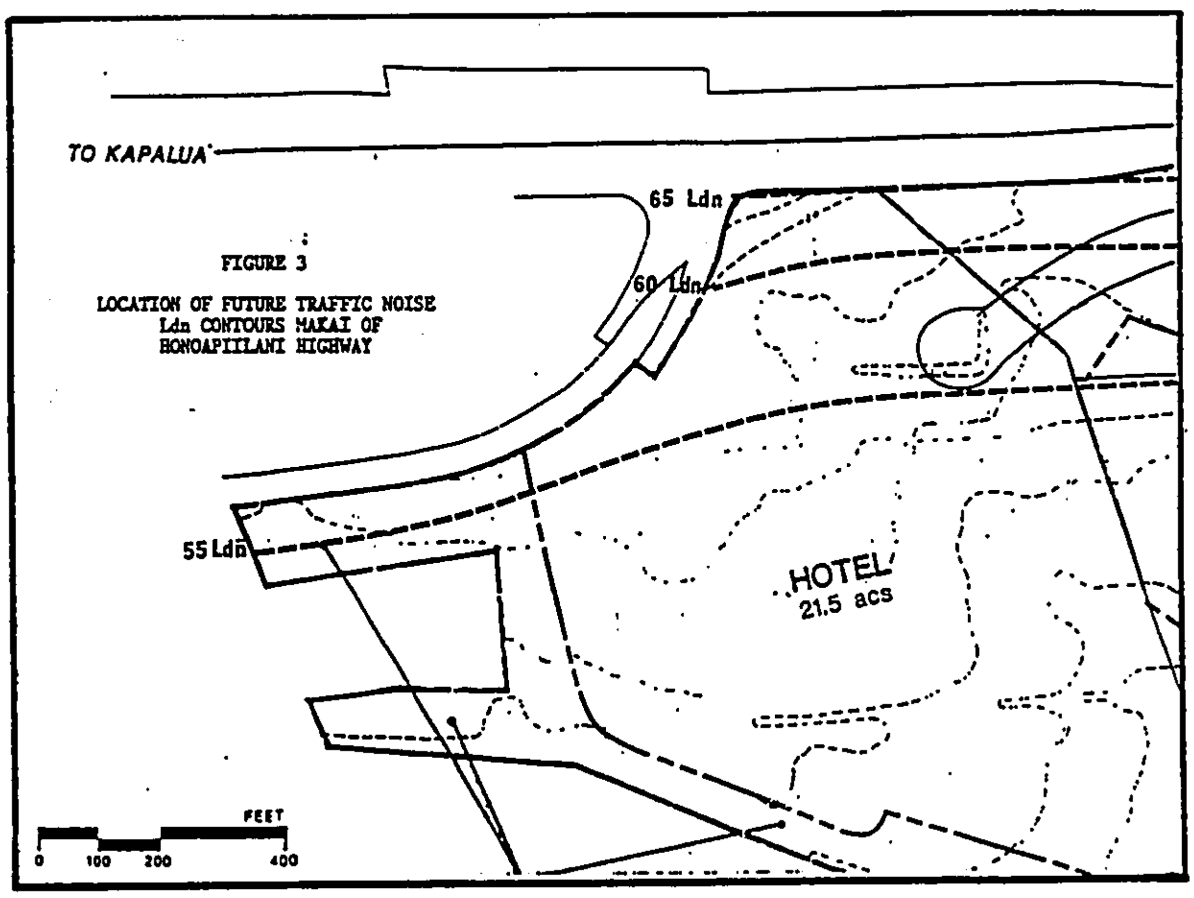

FIGURE 3

LOCATION OF FUTURE TRAFFIC NOISE
Ldn CONTOURS MAKAI OF
HONOAPIILANI HIGHWAY

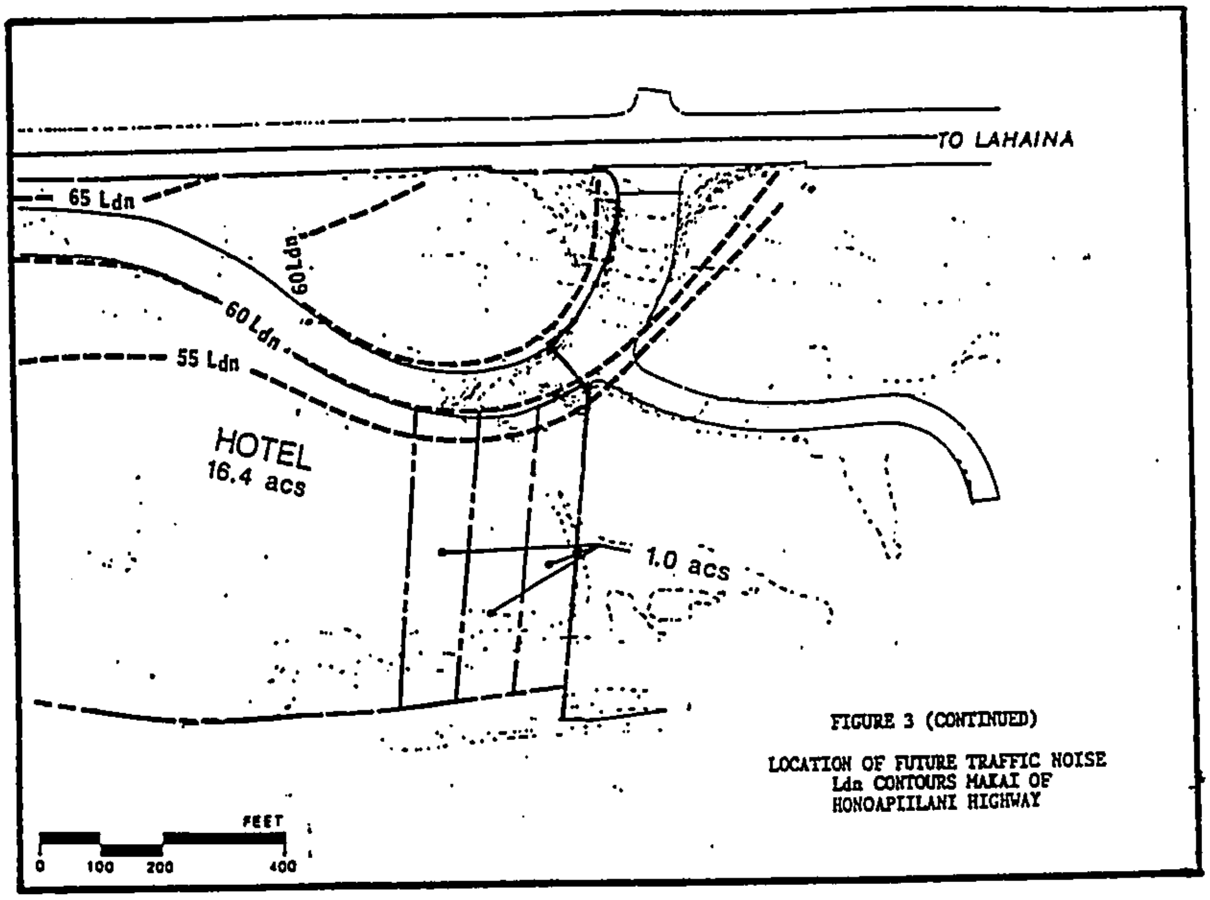

FIGURE 3 (CONTINUED)

LOCATION OF FUTURE TRAFFIC NOISE
Ldn CONTOURS MAKAI OF
HONOAPIILANI HIGHWAY

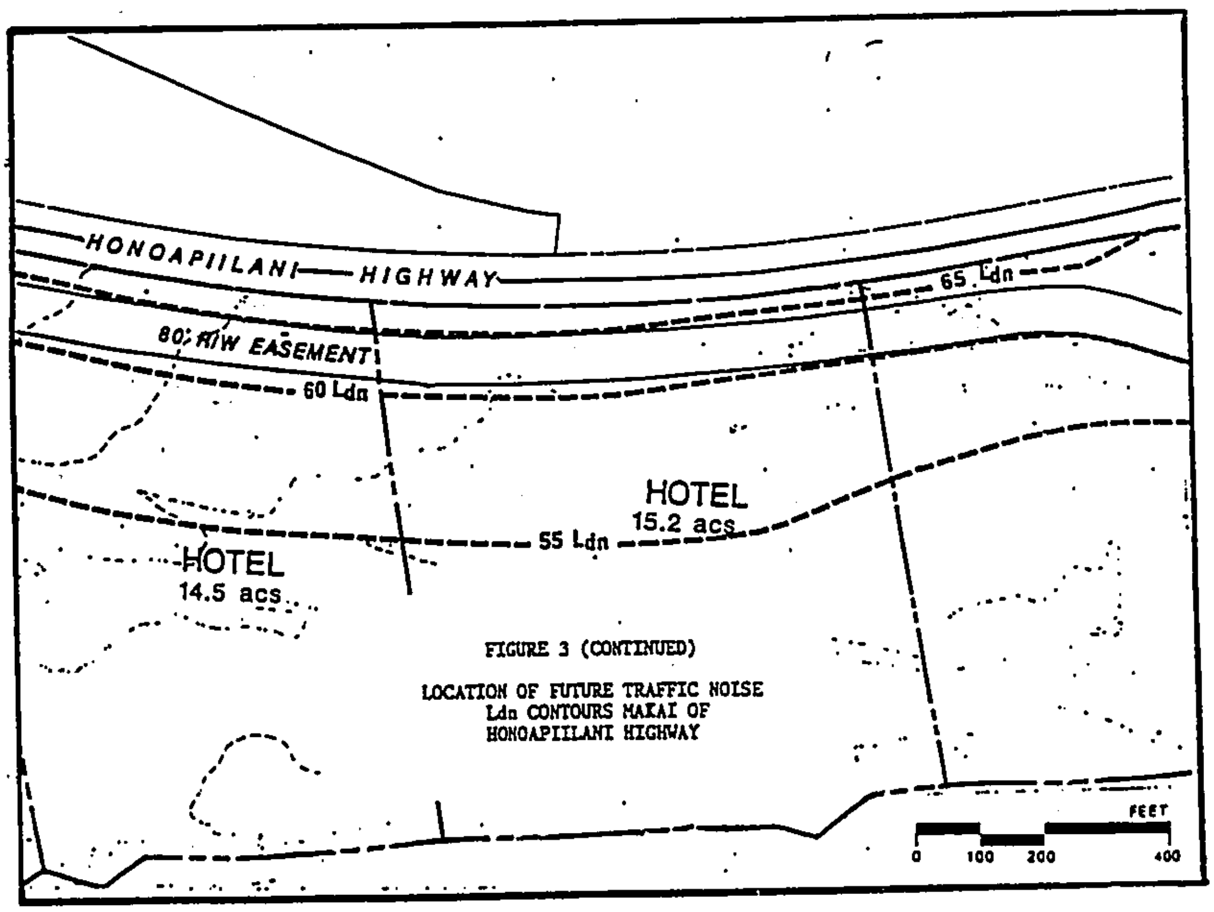

FIGURE 3 (CONTINUED)

LOCATION OF FUTURE TRAFFIC NOISE
Ldn CONTOURS MAKAI OF
HONOAPIILANI HIGHWAY

LOCATION	SPEED (MPH)	VPH	** HOURLY LEQ IN dB @ 50' *** AUTO	MT	HT	ALL VEH
EXISTING PM PEAK HOUR TRAFFIC:						
Honoapiilani Hwy.(North)	43	1,048	62.0	55.5	60.5	64.9
Honoapiilani Road @ Hwy.	25	1,019	53.0	47.4	54.5	57.3
Honoapiilani Hwy.(Front)	43	1,880	64.6	58.0	63.0	67.4
Resort Entrance Rd. @ Hwy	25	211	46.1	40.5	47.7	50.5
Honoapiilani Hwy.(South)	43	2,042	64.9	58.4	63.3	67.7
Puukolii Road @ Hwy.	35	109	48.8	42.6	48.4	52.1
YEAR 2007 PM PEAK HOUR TRAFFIC:						
Honoapiilani Hwy.(North)	43	2,195	65.2	58.7	63.7	68.1
Honoapiilani Road @ Hwy.	25	1,067	53.2	47.6	54.7	57.5
Honoapiilani Hwy.(Front)	40	3,332	65.9	59.4	64.7	68.9
Resort Entrance Rd. @ Hwy	25	1,397	54.3	48.7	55.9	58.7
Honoapiilani Hwy.(South)	38	4,029	65.8	59.5	65.0	69.0
Puukolii Road @ Hwy.	35	926	58.1	51.9	57.7	61.4

Note: Assumed traffic mix of 96.8% autos, 1.6% medium trucks, and 1.6% heavy vehicles on Honoapiilani Highway and on internal streets.

TABLE 3

COMPARISONS OF EXISTING AND FUTURE TRAFFIC NOISE LEVELS IN PROJECT ENVIRONS

TABLE 4

EXISTING AND FUTURE SETBACK DISTANCES (IN FEET)
TO 65, 60, AND 55 Ldn CONTOURS

ROADWAY SECTION	** 65 Ldn ** EXIST.	2007	** 60 Ldn ** EXIST.	2007	** 55 Ldn ** EXIST.	2007
Honoapiilani Hwy.(North)	49	80	106	172	227	371
Honoapiilani Road @ Hwy.	15	16	32	34	70	74
Honoapiilani Hwy.(Front)	72	90	155	194	334	418
Resort Entrance Rd. @ Hwy	5	19	11	41	23	88
Honoapiilani Hwy.(South)	76	92	164	198	353	427
Puukolii Road @ Hwy.	7	29	15	62	32	135

Notes: All setback distances are to the roadway centerlines. See TABLE 3 for traffic assumptions. Ldn assumed to be equal to PM Peak Hour Leq. See Worksheets in APPENDIX C for hourly traffic volumes and noise levels.

bient noise levels were very low and ranged from 39 to 40 dB. Helicopter and light aircraft flyby events ranged from 50 to 60 dB, which are not considered excessive. Distant jet aircraft noise (probably from transiting interisland aircraft) ranged from 50 to 65 dB. In the now vacant lands of the proposed project site, estimated background ambient noise levels are 45 to 50 Ldn in areas removed from surf and traffic noise, and from 55 to 65 Ldn within 50 FT of the surf. These levels are in the "Minimal Exposure, Unconditionally Acceptable" category (with the high surf noise levels excluded).

The loudest noise source measured on the project site was the whistle from the train of the Lahaina-Kaanapali Railroad, which passed the project site at approximately one hour intervals. At Location F, and approximately 320 FT from the train, its whistle was measured at 84.4 dB. At Location D, and approximately 620 FT from the train, its whistle was measured at 67 dB. The other sounds of the train engine and bell were approximately 22 dB lower than the whistle. The train's whistle is probably audible at all areas within the project site, and is considered to be an intrinsic and accepted part of the existing acoustic environment.

V. FUTURE NOISE ENVIRONMENT

A. Traffic Noise. Predictions of future traffic noise levels in the Year 2007 were made using the traffic assignments contained in Reference 6. TABLES 3 and 4 present the future traffic noise levels and noise contour setback distances which are predicted to be applicable by the Year 2007 under unobstructed visual line-of-sight conditions between the receptor and the roadway. For comparison with the future traffic noise levels, existing traffic noise levels were also included in the tables.

From TABLE 5, traffic noise increases of approximately 1.2 to 3.2 Ldn are predicted to occur along Honoapiilani Highway as a result of project and non-project traffic by the Year 2007. The largest increases are anticipated to occur along Puukolii Road and the entrance roadway to the proposed project. These large increases of 8.2 to 9.3 Ldn are not unusual due to the currently low traffic volumes on both roadways. Also from TABLE 5, the majority of the total traffic noise increases in the immediate environs of the proposed project are predicted to be attributable to project traffic. To the north of the project, lesser contributions (approximately 33 percent) by project traffic to the total traffic noise level increases are predicted.

The 55, 60, and 65 Ldn traffic noise contours applicable to the future conditions on the project site by the Year 2007 are shown in FIGURE 3. The contours were developed under the assumption that the existing terrain within 400 FT of the highway would not be significantly altered. If berms or elevated structures are constructed between the receptor and the highway, Year 2007 traffic noise levels may be less than those depicted in FIGURE 3. By 2007, traffic noise levels within 90 FT of the centerline of Honoapiilani Highway are predicted to be in the "Significant Exposure, Normally Unacceptable" category. From TABLE 4 and FIGURE 3, a setback distance of approximately 400 FT is required to remain outside the 55 Ldn, or "Minimal Exposure,

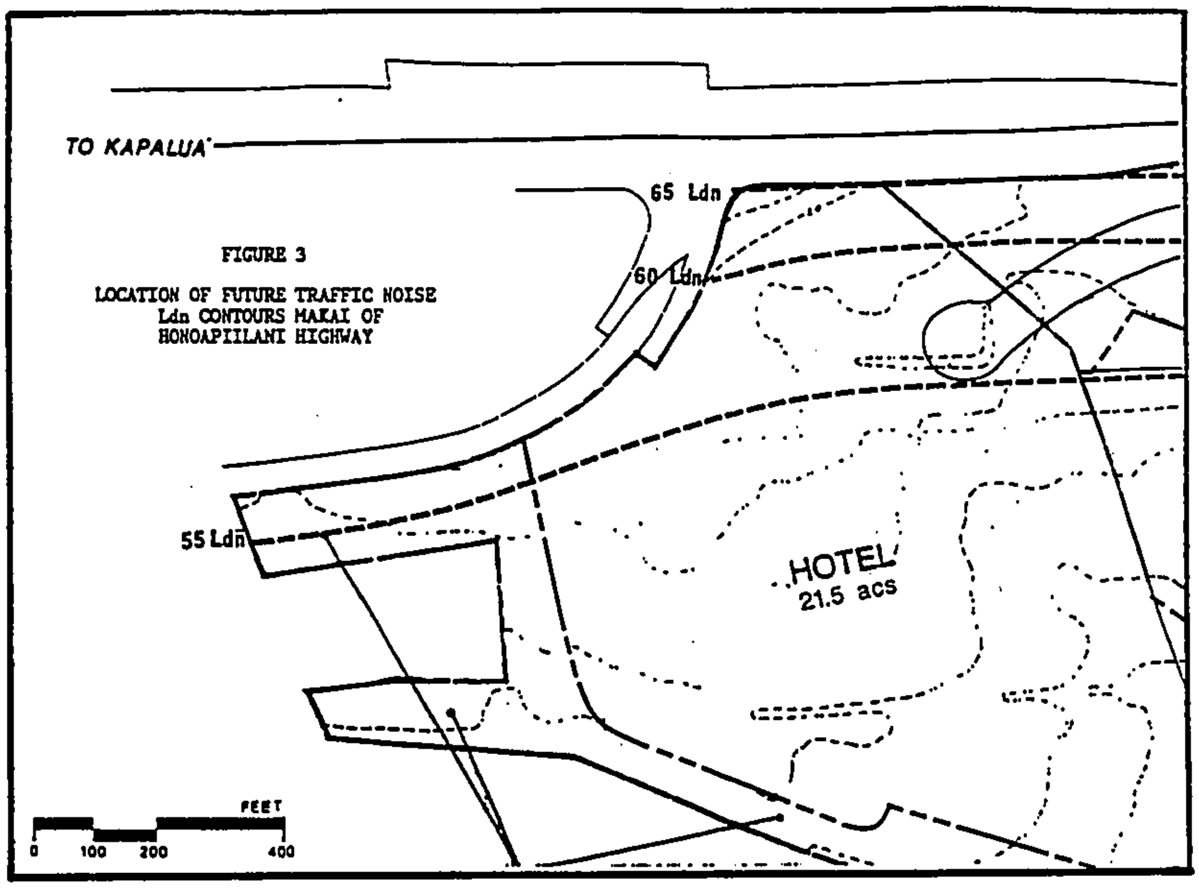

FIGURE 3

LOCATION OF FUTURE TRAFFIC NOISE
Ldn CONTOURS MAKAI OF
HONOAPIILANI HIGHWAY

TABLE 5

TRAFFIC NOISE INCREASES (IN Ldn) RESULTING FROM
PROJECT AND NON-PROJECT TRAFFIC

LOCATION	EXISTING LDN	2007 LDN	TOTAL INCREASE	PROJECT INCREASE
Honoapiilani Hwy.(North)	64.9	68.1	3.2	1.0
Honoapiilani Road @ Hwy.	57.3	57.5	0.2	0.2
Honoapiilani Hwy.(Front)	67.4	68.9	1.5	1.0
Resort Entrance Rd. @ Hwy	50.5	58.7	8.2	8.2
Honoapiilani Hwy.(South)	67.7	69.0	1.2	1.2
Puukolii Road @ Hwy.	52.1	61.4	9.3	9.3

Note: All Ldn values are at 50 FT distance from roadways' centerlines.

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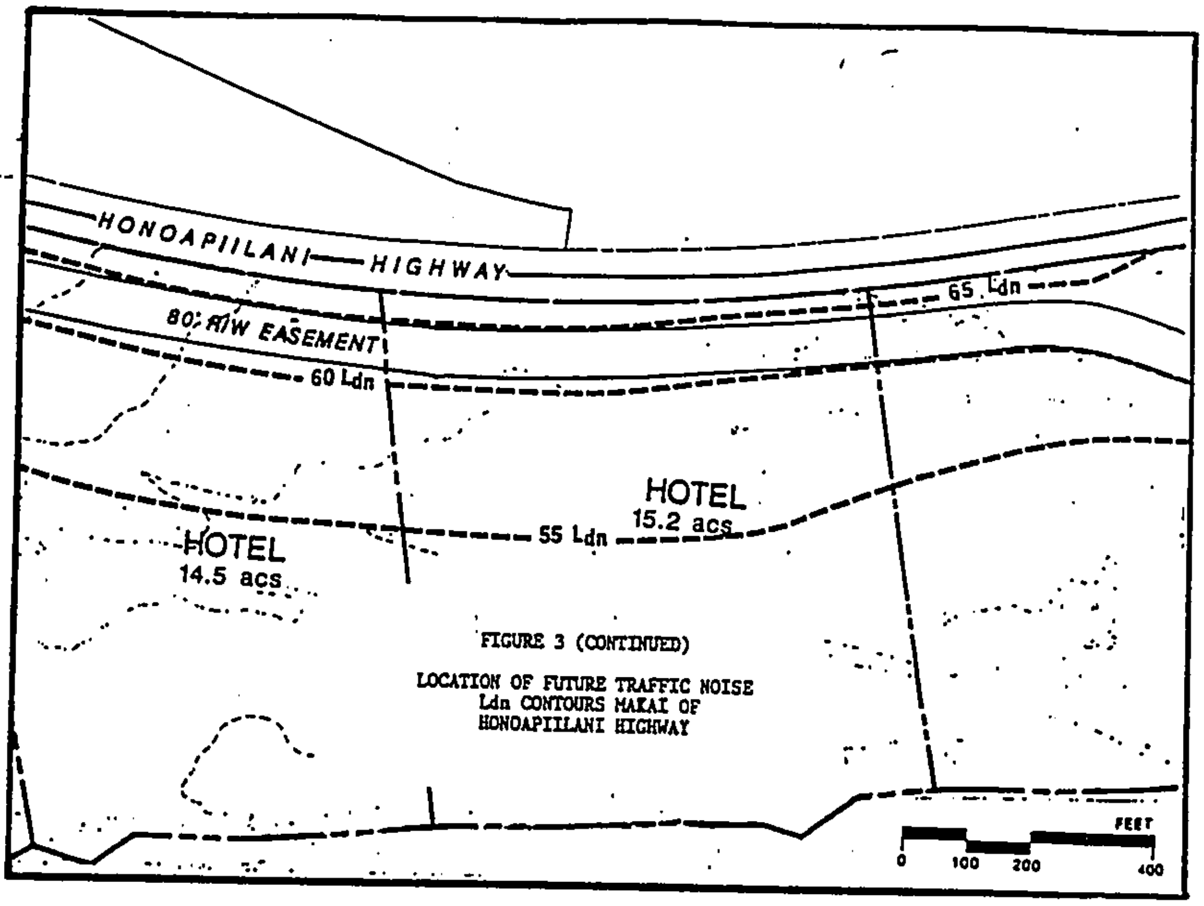

FIGURE 3 (CONTINUED)

LOCATION OF FUTURE TRAFFIC NOISE
Ldn CONTOURS MAKAI OF
HONOAPIILANI HIGHWAY

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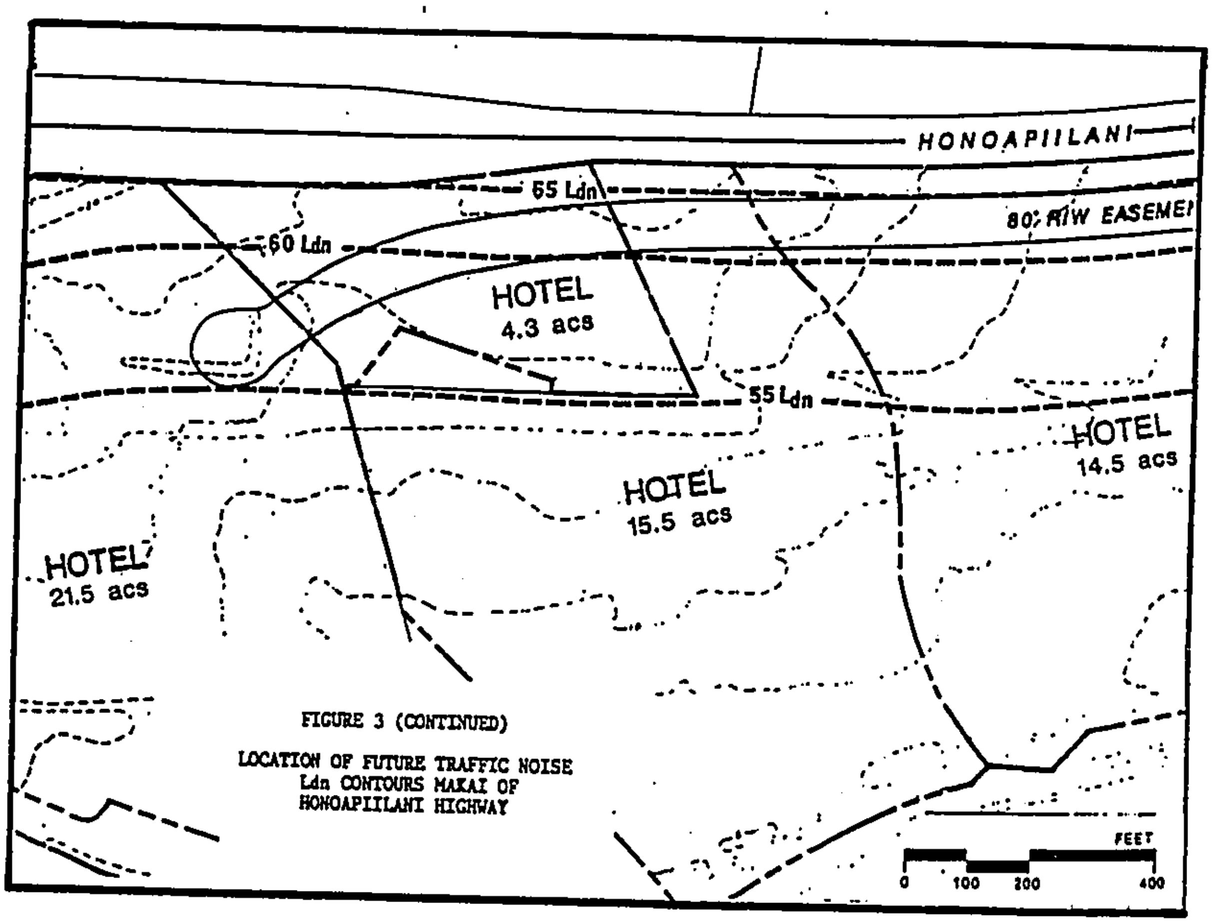

FIGURE 3 (CONTINUED)

LOCATION OF FUTURE TRAFFIC NOISE
Ldn CONTOURS MAKAI OF
HONOAPIILANI HIGHWAY

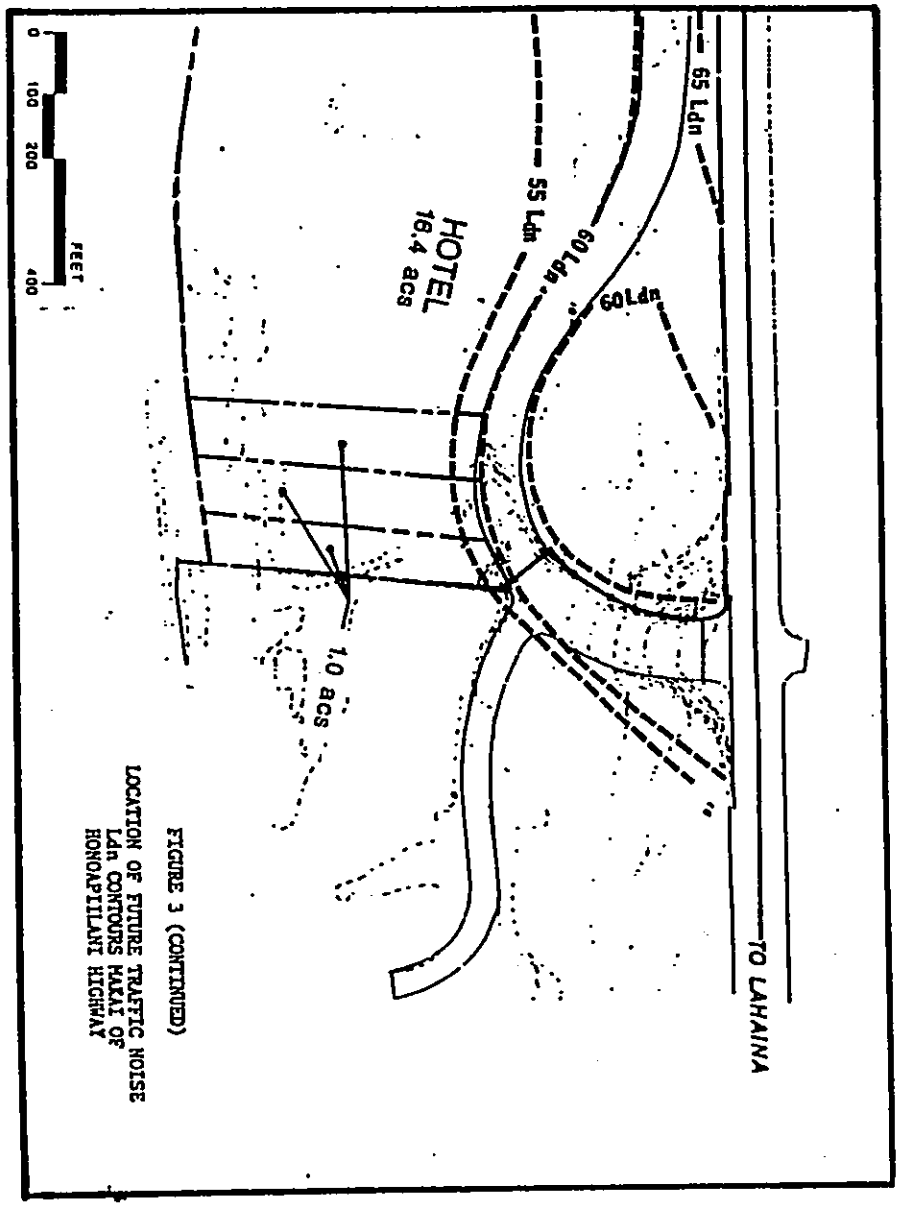

FIGURE 3 (CONTINUED)

LOCATION OF FUTURE TRAFFIC NOISE
Ldn CONTOURS MAKAI OF
HONOAPIILANI HIGHWAY

Unconditionally Acceptable" noise contour.

Along the entrance roadway to the project, and in particular along the makai Right-of-Way, traffic noise levels are predicted to be in the "Moderate Exposure, Acceptable" category. TABLE 4 indicates the setback distances from the centerline of the entrance roadway at the highway intersection, which is considered to be the worst case condition for the internal roadway under unobstructed line-of-sight conditions. In the direction north of the intersection, internal traffic and noise levels are expected to diminish slightly due to the influence of project traffic on the access roadway. Traffic noise levels on the project site are anticipated to be controlled by highway rather than internal roadway traffic sources.

B. Other Background Noise. With the development of the project site, background ambient noise levels will naturally rise due to the introduction of visitors, employees, mechanical support equipment, and transportation vehicles. However, in order to maintain the desired natural characteristics of the site, it is expected that background ambient noise levels will be controlled to levels in the 50 to 55 Ldn range by site planning and engineering controls. Overall, minimum background ambient noise levels are predicted to remain in the 39 dB to 40 dB range, and the loudest noise source is expected to continue to be the train.

C. Aircraft Noise. The proposed project is approximately 1.5 miles south of the planned West Maui Airport, and under the flight tracks of aircraft arriving to and departing from the airport under trade and kona wind conditions, respectively. Jet aircraft will not be allowed to land at the new airport. Also, propeller-driven aircraft weighing above 12,500 pounds will not be allowed to land at the new airport unless their noise levels are at or below those certified by the Federal Aviation Administration for the DASH 7 aircraft. As a result of these restrictions, aircraft flyover noise is predicted to not exceed maximum single event levels of 70 dB at the proposed North Beach Kaanapali site. DASH 7 flyover noise levels of 61 and 66 dB (Lmax) were measured by this writer at the former Kaanapali Airport during December, 1985 simulations of operations at the planned airport, and are indicative of the future single event noise levels over the project site.

Cumulative noise exposure from aircraft operations to/from the planned airport are predicted to be less than 50 Ldn at the proposed North Beach Kaanapali site for the medium to long term. This conclusion is valid for DASH 7 flyover frequencies as high as 83 flyovers (at 66 percent average load factor) per day, or approximately 2 million passenger enplanements plus deplanements per year at the new airport. The forecasted annual utilization of the airport after the first 5 years of operation (Reference 11) was 602,000 enplanements plus deplanements, or approximately 70 percent less than the 2 million level of utilization required to cause aircraft noise to exceed 50 Ldn at the proposed project. For these reasons, aircraft noise levels were predicted to be below 50 Ldn at the proposed North Beach Kaanapali site over the medium to long term.

VI. DISCUSSION OF FUTURE NOISE IMPACTS

A. <u>Traffic Noise</u>. The primary noise impacts associated with the proposed North Beach Kaanapali project are those attributable to project related traffic increases along Honoapiilani Highway to the north and south of the project site. Traffic noise increases associated with project traffic along the highway are predicted to be in the order of 1 to 2 Ldn, which are considered to be moderate and unavoidable. This degree of increase may not be perceptible to existing receptors along the highway, but it, in conjunction with non-project noise level increases, are anticipated to raise existing traffic noise levels to or above FHWA and FHA/HUD standards for residences along the highway Right-of-Way by the Year 2007. Future noise mitigation measures may be required in conjunction with any highway improvement project related to increasing the capacity of the existing highway sections servicing the Kaanapali area, particularly if FHWA funding assistance is involved.

Future on-site traffic noise impacts are expected to be minimal to moderate due to the setback distances of 200+ FT planned for the hotel units. Under these conditions, predicted traffic noise levels are anticipated to be less than 60 Ldn, and in the "Moderate Exposure, Acceptable" category. The on-site distances between the future 55 Ldn contour line and the coastline are sufficiently large (in excess of 500 FT) that it may be possible to locate the majority of the hotel units outside the 55 Ldn traffic noise contour, and into the "Minimal Exposure, Unconditionally Acceptable" region. Because of these factors, the commercial nature of the project, and the temporary nature of the hotel accommodations, the risks of adverse health and welfare impacts on the hotel guests are considered to be minimal.

B. <u>Aircraft Noise</u>. Noise impacts from operations at the future West Maui Airport are predicted to be minimal, with levels below 50 Ldn. The noise from transiting rotary and fixed wing aircraft may be audible above background ambient noise on the North Beach Kaanapali site. However, these aircraft flyovers should not generate serious adverse noise impacts, as long as planned minimum altitudes of 1,500 FT are maintained during the shoreline crossing over the proposed project site.

C. Construction Noise: Audible construction noise will probably be unavoidable during the planned project construction period. The total time period for construction is unknown, but it is anticipated that the actual work will be moving from one location of the site to another during that period, as each hotel parcel is developed. Actual length of exposure to construction noise at any receptor location will probably be less than the total construction period for the entire North Beach Kaanapali project. Depending on the type of construction activity, distances at which outdoor construction noise are predicted to be audible (levels as low as 45 to 50 dB) range from 500 to 2,000 FT. The more intense (90 to 70 dB) noise levels, however, are expected to be limited to receptor distances of 50 to 500 FT. 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 proposed site.

VII. POSSIBLE NOISE MITIGATION MEASURES

Possible noise mitigation measures which would minimize noise impacts from external or internal roadway traffic at the North Beach Kaanapali site include measures such as: the use of buffer zones of sufficient depth as indicated in FIGURE 3 and/or TABLE 4; construction of sound attenuation berms where adequate setbacks cannot be achieved at noise sensitive locations; the enforcement of speed limits of 25 MPH within the proposed project site; and the use of air conditioning. The applicability of each mitigation measure depends upon other considerations besides noise, such as economic cost, thermal comfort, aesthetics, and technical feasibility.

The use of buffer zones along Honoapiilani Highway and along the internal roadway have been incorporated into the proposed site plan for the project. FIGURE 3 or TABLE 4 may be used as a guide to adjust setback distances as desired should changes in the site plan occur. Additional noise mitigation measures are not considered mandatory by federal or local standards and guidelines, but can be implemented as desired to minimize audible traffic noise from the area roadways.

The orientation of hotel guest rooms toward the ocean (with ocean views) will reduce or eliminate audible noise sources such as traffic, or the existing train. Although not considered necessary, this mitigation measure is another option which can be considered during the design process.

Mitigation of off-site traffic noise impacts are generally performed by individual property owners along the highway Right-of-Way or by public agencies during roadway improvement projects. These mitigation measures generally take the form of sound attenuating walls or window air conditioning units when existing structures are involved, and/or the use of large setback distances from the roadway when new structures are involved. Due to the use of Honoapiilani Highway by the general public, and the contributory (rather than total) nature of project-related traffic noise to the future traffic noise impacts along the highway, additional traffic noise mitigation measures are not considered warranted.

Mitigation of construction noise to inaudible levels will not be practical in all cases due to the intensity of construction noise sources (80 to 90+ dB at 50 FT distance), and due to the exterior nature of the work (grading and earth moving, trenching, concrete pouring, etc.). The use of properly muffled construction equipment should be required on the job site. The incorporation of State Department of Health construction noise limits and curfew times (which are applicable on Oahu) during the construction phases of this project is another possible noise mitigation measure.

A. REFERENCES

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3. September 28-29, 1983 Traffic Counts, Station 12-A, Honoapiilani Highway at Kaanapali Road and Halelo Street; State Department of Transportation.

4. October 3-4, 1985 Vehicle Type Classification; Station 12-A, Honoapiilani Highway at Kaanapali Road and Halelo Street; State Department of Transportation.

5. August 8, 1986 transmittal of July 15-16, 1986 traffic counts in project environs; Helber Hastert Van Horn & Kimura.

6. September 25, 1986 transmittal of Year 2007 traffic volume assignments in project environs; Helber Hastert Van Horn & Kimura.

7. "Guidelines for Considering Noise in Land Use Planning and Control;" Federal Interagency Committee on Urban Noise; June 1980.

8. American National Standard; "Sound Level Descriptors for Determination of Compatible Land Use;" ANSI S3.23-1980; Acoustical Society of America.

9. "Environmental Criteria and Standards, Noise Abatement and Control, 24 CFR, Part 51, Subpart B;" U.S. Department of Housing and Urban Development; July 12, 1979.

10. "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety;" Environmental Protection Agency; EPA 550/9-74-004; March 1974.

11. Hastings, R. C., Jr.; "Feasibility Analysis for Kapalua-West Maui Airstrip;" August, 1984.

TEXT

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 $L_{C}dn$ with the LAdn.

Although not included in the tables, it is also recommended that "L_{PN}" and "L_{EPN}" be used as symbols for perceived noise levels and effective perceived noise level, 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, L_{eq}, is designated the "equivalent sound level". For L_d, L_n, and L_{dn}, "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 characteristic 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 (L_{PN} was found to be 75 dB, L_{PN} = 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 Weighted Loss of Hearing" (PHL) shall be used consistent with CHABA Working Group 69 Report Guidelines for Preparing Environmental Impact Statements (1977).

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.)

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APPENDIX B (CONTINUED)

TABLE II: Recommended Descriptor List

TERM	A-WEIGHTING	ALTERNATIVE(1) A-WEIGHTING	OTHER WEIGHTING	(2) 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 Over Time(T) (4)	$L_{eq(T)}$	$L_{Aeq(T)}$	$L_{Beq(T)}$	$L_{peq(T)}$
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 $L_{eq(1)}$). Time may be specified in non-quantitative terms (e.g., could be specified as $L_{eq(WASH)}$ to mean the washing cycle noise for a washing machine)).

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HOUR	SPEED (MPH)	VPH	% AUTOS	% MT	% HT	**** LEQ(H) IN dB @ 50' **** AUTO	MT	HT	ALL VEH
0000-0100	42	123	97	1.5	1.5	52.3	45.5	50.6	55.1
0100-0200	42	105	97	1.5	1.5	51.7	44.9	49.9	54.4
0200-0300	42	52	97	1.5	1.5	48.6	41.8	46.9	51.4
0300-0400	42	55	97	1.5	1.5	48.9	42.0	47.1	51.6
0400-0500	42	50	97	1.5	1.5	48.4	41.6	46.7	51.2
0500-0600	42	155	97	1.5	1.5	53.4	46.5	51.6	56.1
0600-0700	42	465	97	1.5	1.5	58.1	51.3	56.4	60.9
0700-0800	42	939	97	1.5	1.5	61.2	54.4	59.4	63.9
0800-0900	42	977	97	1.5	1.5	61.3	54.5	59.6	64.1
0900-1000	42	1,076	97	1.5	1.5	61.8	55.0	60.0	64.5
1000-1100	42	1,037	97	1.5	1.5	61.6	54.8	59.9	64.3
1100-1200	42	984	97	1.5	1.5	61.4	54.6	59.7	64.1
1200-1300	42	1,089	97	1.5	1.5	61.8	55.0	60.1	64.6
1300-1400	42	1,148	97	1.5	1.5	62.0	55.2	60.3	64.8
1400-1500	42	1,190	97	1.5	1.5	62.2	55.4	60.5	64.9
1500-1600	42	1,287	97	1.5	1.5	62.5	55.7	60.8	65.3
1600-1700	42	1,386	97	1.5	1.5	62.9	56.1	61.1	65.6
1700-1800	42	1,128	97	1.5	1.5	62.0	55.2	60.2	64.7
1800-1900	42	893	97	1.5	1.5	61.0	54.1	59.2	63.7
1900-2000	42	718	97	1.5	1.5	60.0	53.2	58.3	62.8
2000-2100	42	574	97	1.5	1.5	59.0	52.2	57.3	61.8
2100-2200	42	561	97	1.5	1.5	58.9	52.1	57.2	61.7
2200-2300	42	418	97	1.5	1.5	57.7	50.9	55.9	60.4
2300-2400	42	250	97	1.5	1.5	55.4	48.6	53.7	58.2

12-A, HONOAPIILANI HIGHWAY AT KAANAPALI ROAD AND HALELO STREET (9/28-29/83)

TOTAL VPD: 16,660 LDN @ 50 FT: 62.7 55.9 60.9 65.4

C. WORKSHEETS

HOUR	SPEED (MPH)	VPH	% AUTOS	% MT	% HT	**** LEQ(H) IN dB @ 50' **** AUTO	MT	HT	ALL VEH
0000-0100	45	99	97	2.5	0.5	52.5	47.8	45.6	54.4
0100-0200	45	53	97	2.5	0.5	49.8	45.1	42.9	51.7
0200-0300	45	41	97	2.5	0.5	48.7	44.0	41.8	50.6
0300-0400	45	31	97	2.5	0.5	47.5	42.8	40.6	49.4
0400-0500	45	36	97	2.5	0.5	48.2	43.4	41.3	50.0
0500-0600	45	114	97	2.5	0.5	53.2	48.4	46.3	55.0
0600-0700	45	301	97	1.5	1.5	57.4	50.4	55.2	60.0
0700-0800	45	703	97	1.5	1.5	61.1	54.1	58.9	63.6
0800-0900	45	750	97	1.5	1.5	61.3	54.4	59.2	63.9
0900-1000	45	705	97	1.5	1.5	61.1	54.1	58.9	63.7
1000-1100	45	840	97	1.5	1.5	61.8	54.9	59.7	64.4
1100-1200	45	817	97	1.5	1.5	61.7	54.8	59.6	64.3
1200-1300	45	769	97	1.5	1.5	61.4	54.5	59.3	64.0
1300-1400	45	841	97	1.5	1.5	61.8	54.9	59.7	64.4
1400-1500	45	911	97	1.5	1.5	62.2	55.3	60.1	64.8
1500-1600	45	871	97	1.5	1.5	62.0	55.1	59.9	64.6
1600-1700	45	867	97	1.5	1.5	62.0	55.0	59.8	64.6
1700-1800	45	764	97	1.5	1.5	61.4	54.5	59.3	64.0
1800-1900	45	638	97	1.5	1.5	60.6	53.7	58.5	63.2
1900-2000	45	479	97	1.5	1.5	59.4	52.5	57.3	62.0
2000-2100	45	364	97	1.5	1.5	58.2	51.3	56.1	60.8
2100-2200	45	335	97	1.5	1.5	57.8	50.9	55.7	60.4
2200-2300	45	288	97	1.5	1.5	57.2	50.3	55.1	59.8
2300-2400	45	183	97	1.5	1.5	55.2	48.3	53.1	57.8

C-12-D, NEW HONOAPIILANI HIGHWAY AT HONOKOWAI BRIDGE (9/26-27/83)

TOTAL VPD: 11,800 LDN @ 50 FT: 62.2 55.8 59.6 64.7

C. WORKSHEETS (CONTINUED)

HOUR	SPEED (MPH)	VPH	% AUTOS	% MT	% HT	**** LEQ(H) IN dB @ 50' **** AUTO	MT	HT	ALL VEH
0000-0100	30	44	97	1.5	1.5	42.3	36.1	42.6	45.9
0100-0200	30	25	97	1.5	1.5	39.9	33.7	40.1	43.5
0200-0300	30	35	97	1.5	1.5	41.3	35.1	41.6	44.9
0300-0400	30	14	97	1.5	1.5	37.4	31.1	37.6	41.0
0400-0500	30	16	97	1.5	1.5	37.9	31.7	38.2	41.5
0500-0600	30	53	97	1.5	1.5	43.1	36.9	43.4	46.7
0600-0700	30	152	97	1.5	1.5	47.7	41.5	47.9	51.3
0700-0800	30	132	97	1.5	1.5	47.1	40.9	47.3	50.7
0800-0900	30	121	97	1.5	1.5	46.7	40.5	47.0	50.3
0900-1000	30	143	97	1.5	1.5	47.4	41.2	47.7	51.1
1000-1100	30	169	97	1.5	1.5	48.2	42.0	48.4	51.8
1100-1200	30	177	97	1.5	1.5	48.4	42.2	48.6	52.0
1200-1300	30	178	97	1.5	1.5	48.4	42.2	48.6	52.0
1300-1400	30	198	97	1.5	1.5	48.9	42.7	49.1	52.5
1400-1500	30	179	97	1.5	1.5	48.4	42.2	48.7	52.0
1500-1600	30	357	97	1.5	1.5	51.4	45.2	51.7	55.0
1600-1700	30	420	97	1.5	1.5	52.1	45.9	52.4	55.7
1700-1800	30	409	97	1.5	1.5	52.0	45.8	52.2	55.6
1800-1900	30	327	97	1.5	1.5	51.0	44.8	51.3	54.7
1900-2000	30	240	97	1.5	1.5	49.7	43.5	49.9	53.3
2000-2100	30	150	97	1.5	1.5	47.7	41.4	47.9	51.3
2100-2200	30	181	97	1.5	1.5	48.5	42.3	48.7	52.1
2200-2300	30	153	97	1.5	1.5	47.7	41.5	48.0	51.4
2300-2400	30	81	97	1.5	1.5	45.0	38.8	45.2	48.6

C-12-A, OLD HONOAPIILANI ROAD AT HONOKOWAI BRIDGE (9/17-18/83)

TOTAL VPD: 3,954 LDN @ 50 FT: 51.7 45.5 51.9 55.3

C. WORKSHEETS (CONTINUED)

HOUR	SPEED (MPH)	VPH	% AUTOS	% MT	% HT	**** LEQ(H) IN dB @ 50' **** AUTO	MT	HT	ALL VEH
0000-0100	43	231	96.8	1.6	1.6	55.5	48.9	53.9	58.3
0100-0200	43	152	96.8	1.6	1.6	53.6	47.1	52.1	56.5
0200-0300	43	135	96.8	1.6	1.6	53.1	46.6	51.6	56.0
0300-0400	43	52	96.8	1.6	1.6	49.0	42.4	47.4	51.8
0400-0500	43	71	96.8	1.6	1.6	50.3	43.8	48.8	53.2
0500-0600	43	220	96.8	1.6	1.6	55.3	48.7	53.7	58.1
0600-0700	43	572	96.8	1.6	1.6	59.4	52.8	57.8	62.2
0700-0800	43	1,094	96.8	1.6	1.6	62.2	55.7	60.6	65.0
0800-0900	43	1,228	96.8	1.6	1.6	62.7	56.2	61.1	65.5
0900-1000	43	1,335	96.8	1.6	1.6	63.1	56.5	61.5	65.9
1000-1100	43	1,284	96.8	1.6	1.6	62.9	56.4	61.3	65.7
1100-1200	43	1,395	96.8	1.6	1.6	63.3	56.7	61.7	66.1
1200-1300	43	1,281	96.8	1.6	1.6	62.9	56.3	61.3	65.7
1300-1400	43	1,258	96.8	1.6	1.6	62.8	56.3	61.2	65.6
1400-1500	43	1,439	96.8	1.6	1.6	63.4	56.9	61.8	66.2
1500-1600	43	1,587	96.8	1.6	1.6	63.8	57.3	62.3	66.7
1600-1700	43	1,880	96.8	1.6	1.6	64.6	58.0	63.0	67.4
1700-1800	43	1,603	96.8	1.6	1.6	63.9	57.3	62.3	66.7
1800-1900	43	1,334	96.8	1.6	1.6	63.1	56.5	61.5	65.9
1900-2000	43	1,142	96.8	1.6	1.6	62.4	55.8	60.8	65.2
2000-2100	43	972	96.8	1.6	1.6	61.7	55.1	60.1	64.5
2100-2200	43	912	96.8	1.6	1.6	61.4	54.9	59.9	64.3
2200-2300	43	687	96.8	1.6	1.6	60.2	53.6	58.6	63.0
2300-2400	43	362	96.8	1.6	1.6	57.4	50.9	55.8	60.2

TOTAL VPD: 22,226 LDN @ 50 FT: 64.5 58.0 62.9 67.3

HONOAPIILANI HWY NORTH OF PUUKOLII ROAD; JULY 15-16, 1986.

C. WORKSHEETS (CONTINUED)

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PLAN FOR ARCHAEOLOGICAL MONITORING OF SHORELINE CONSTRUCTION

PAUL H. ROSENDAHL, Ph.D., I...
Consulting Archaeologist

Report 345-082487

PLAN FOR ARCHAEOLOGICAL MONITORING OF SHORELINE CONSTRUCTION KAANAPALI NORTH BEACH DEVELOPMENT SITE

Land of Hanakaoo
Lahaina District, Island of Maui

by

Paul H. Rosendahl, Ph.D.
Principal Archaeologist

Prepared for

Kaanapali North Beach Joint Venture
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August 1987

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INTRODUCTION

PURPOSE

This plan for archaeological monitoring of shoreline construction at the Kaanapali North Beach Development site (Old Kaanapali Airport area) in the Land of Hanakaoo, Lahaina District, Island of Maui, has been prepared at the request of Ms. Leslie Kurisaki, of the planning firm of Helber, Hastert & Kimura (HH&K), on behalf of their client, Kaanapali North Beach Joint Venture (KNBJV). It was prepared to satisfy a recommendation made by the Hawaii State Department of Land and Natural Resources--State Historic Preservation Office (DLNR-SHPO) and a subsequent request made by the US Army-Corps of Engineers (COE).

Monitoring is a form of archaeological mitigation that can be carried out to reduce or ameliorate the destructive impact of various development activities upon significant archaeological resources. As defined by the Society for Hawaiian Archaeology (SHA), monitoring "...is a set of procedures conducted during ground-disturbing activities for the purpose of identifying, describing, recovering, evaluating, and analyzing archaeological resources (SHA 1985:1). In order to comply with state and federal requirements and with generally accepted professional standards for archaeological work, the monitoring of shoreline construction at the Kaanapali North Beach Development site will be conducted under the guidelines provided by the archaeological monitoring requirements formulated and adopted by the Society for Hawaiian Archaeology. A copy of the SHA requirements is appended to this plan.

BACKGROUND

A subsurface archaeological reconnaissance survey of the North Beach Development site was conducted by Paul H. Rosendahl, Ph.D., Inc. (PHRI) during the period May 31-June 5, 1987 (M.L.K. Rosendahl 1987). The overall objective of the survey was to provide information appropriate to and sufficient for the preparation of an Environmental Impact Statement (EIS) being prepared for submission to the County of Maui. Field investigations were carried out by a crew of five to six persons, under the direction of Project Directors Theresa Donham and Margaret L.K. Rosendahl. Approximately 22-1/2 man-days were expended in conducting the field work. A total of 60 cores and ten backhoe trenches was excavated, two sections of the dune were faced and fully recorded, and one surface structural site was identified.

Systematic subsurface coring of the coastal dune did not identify any subsurface prehistoric cultural deposit or any human skeletal remains. Fragments of glass and/or metal fragments were present in eight of the 54 coastal dune cores; however, these fragments, generally present in the upper strata, were determined to be of recent origin. Sparse charcoal fragments were present in ten cores. Generally, the charcoal fragments were isolated and small--perhaps they were associated with periodic flooding and disturbance of the dune, as documented in the dune stratigraphy. The charcoal fragments appeared to be recently deposited; they may have been derived from sugar cane burning, recent kiawe clearing fires, and/or picnics on the dune surface.

The negative findings of the subsurface reconnaissance suggested either that there was little or no prehistoric use of the coastal dune area, or that any remains of prehistoric use were no longer present. In general, the field work findings appeared to provide evidence to support the latter interpretation. Comparison of the 1980 map used during field work to the existing dune itself indicated relatively recent reduction of the dune. A local informant, Mr. Leslie Kuloloio, stated that the dune had extended much farther seaward in the 1960s, and also speculated that the dune had also extended farther inland. The present dune also appeared extensively disturbed. The presence of modern glass and metal in the deposits indicated recent activity. The the clay intrusions and extensive banding observed in one of the faced profiles suggested intermittent flooding, and occasional flooding may also help account for the lack of subsurface cultural deposits. The only surface structural archaeological feature identified on the coastal dune was an L-shaped wall, which was evaluated as having minimal research, interpretive, and cultural value, and for which no further work was recommended.

Based on the negative results of the subsurface reconnaissance, it was determined by the Department of Land and Natural Resources--Historic Sites Section (DLNR-HSS) that "...these findings would indicate...'no effect' on significant historic sites" (letter of 12 June 1987 from R. Nagata of DLNR-HSS, to Planner L. Kurisaki of Helber, Hastert & Kimura). Because there was still a possibility of isolated burials and/or remnants of buried cultural deposits being present within the dune, this determination was given with the provision that any land modification of the dune be monitored, or that a policy of stop work and immediate archaeological consultation be established. The monitoring option would require an on-site archaeologist to be present during any construction work within the dune. The archaeologist would then be able to attend to any cultural remains encountered. A stop work policy would require all work in the immediate area to be suspended until a qualified archaeologist could inspect and evaluate the significance of any newly discovered remains.

SCOPE OF WORK

PHRI was subsequently requested to prepare a plan for archaeological monitoring of shoreline construction. Based on a SHPO recommendation (letter of 27 July 1987 from R. Nagata, Deputy SHPO, to Col. F.W. Wanner, COE), a subsequent COE request (letter of 29 July 1987 from J.G. Emmerson, COE, to K.T. Yamada, KNBJV), and discussion with DLNR-HSS staff archaeologist Ms. Agnes Estioko-Griffin, the plan for archaeological monitoring

of shoreline construction would apply to all excavation work within the sand dune and would provide for the following:

1. Stoppage of construction work in the immediate area of any identified human burials and/or remnants of buried cultural deposits;

2. Assessment of identified remains, and consultation with SHPO to determine significance and any appropriate mitigation;

3. Conduct of any archaeological/osteological data recovery determined to be appropriate;

4. Analysis of recovered data, and preparation of appropriate reports on findings; and

5. Provision for disinterment and reinterment of human remains.

MONITORING PLAN

GENERAL

Co-Principal Investigators responsible for the monitoring project overall will be PHRI Principal Archaeologist Dr. Paul H. Rosendahl and PHRI Senior Archaeologist Dr. Alan E. Haun. Monitoring field work will be done under the direct supervision of a PHRI Supervisory Archaeologist who meets the minimum professional qualifications in archaeology outlined in 36 CFR Part 66: Appendix C.1.b., and who will serve as Project Field Director. In order to further comply with state and federal requirements and with generally accepted professional standards for archaeological work, the monitoring of shoreline construction at the Kaanapali North Beach Development site will be conducted under the guidelines provided by the archaeological monitoring requirements formulated and adopted by the Society for Hawaiian Archaeology (see Appendix).

MONITORING AND STOPPAGE OF CONSTRUCTION WORK

The basic objectives of the archaeological monitoring field work would be three-fold:

1. To identify and evaluate the potential significance of any archaeological remains revealed by any construction work (clearing, grubbing, and excavations) undertaken within the shoreline area;

2. To carry out an appropriate level of data recovery work-consisting of detailed recording (including plan mapping and profiles, written descriptions, and photographs), collection of portable artifacts and appropriate samples of ecofactual remains and dating materials, and possibly mitigation excavations--in order to preserve the significant archaeological information contained within any identified remains; and

3. To disinter, according to Hawaii State Health Department rules and procedures, any human skeletal remains uncovered in the course of construction excavations.

The normal archaeological monitoring crew will consist of two archaeologists who will be present at all times that construction work is done within the shoreline area. In general, one archaeologist will monitor the on-going work, while the other will examine the excavated fill materials to recover and record any isolated portable cultural remains unearthed. In the event subsurface archaeological remains are identified within the shoreline area, the two archaeologists will work together to record and collect the exposed data as expeditiously as possible. If significant remains are revealed and should the scale of work involved in recording and data recovery be beyond the capacity of the normal two-man monitoring crew, additional archaeological field personnel will be provided as appropriate and necessary.

The Project Field Director shall be present on-site to observe all construction work. Whenever potentially significant archaeological remains are exposed, he shall suspend construction excavation as necessary to permit identification and tentative evaluation of such remains, and to determine and carry out appropriate archaeological data collection and recovery work such as deemed necessary.

Prior to the commencement of field work, Kaanapali North Beach Joint Venture (KNBJV) shall provide copies of (a) appropriate site grading plans and (b) grubbing, clearing, and excavation schedules. KNBJV shall also provide adequate and appropriate security to prevent vandals and other unauthorized persons from damaging or disturbing any archaeological remains that are exposed in the course of construction work.

ASSESSMENT OF IDENTIFIED REMAINS

Upon the identification of any buried cultural remains, inspection and data collection sufficient to evaluate tentatively the potential significance of the remain shall be carried out immediately. The potential significance of all identified remains shall be assessed in terms of the National Register criteria contained in 36 CFR Part 60, Section 6. DLNR--HSS uses these criteria to evaluate eligibility for both the Hawaii State and National Register of Historic Places. It is anticipated that the potential significance of any identified subsurface remains would most

likely relate to National Register criteria "(d)," which refers to remains "...that have yielded, or may be likely to yield, information important in prehistory or history". Once potential significance has been tentatively evaluated, DLNR-HSS shall be consulted in order (a) to determine and fix formally the significance of the remains, and (b) to determine appropriate mitigation actions to be undertaken.

DATA RECOVERY

If it is determined that significant remains have been identified, an appropriate program of mitigation will then be determined in consultation with DLNR-HSS. As it is most likely that any significant archaeological remains encountered during the monitoring will consist of either burials containing human skeletal remains or subsurface cultural deposits that are important entirely or principally for their information content, it is probable that appropriate mitigation will take the form of data recovery excavations. Data recovery excavations would be carried in accordance with (a) accepted professional archaeological methods and procedures, and (b) appropriate sections of 36 CFR Part 66 and the National Advisory Council's handbook on "Treatment of Archeological Properties" (ACHP 1980).

DATA ANALYSIS AND REPORTING

Appropriate analysis of all recovered archaeological data will be carried out upon completion of monitoring field work. The data base will include detailed field records (notes, maps, sections, and photographs) and recovered portable remains (artifacts, ecofactual remains, and dating samples). Any human skeletal remains that are encountered will also be considered to be part of the data base for the purposes of analysis. Upon completion of monitoring field work, DLNR-HSS will be contacted, and an appropriate specific scope for the analysis of the recovered data will be developed in consultation with DLNR-HSS staff.

Both Preliminary and Final Reports on the archaeological monitoring will be prepared. The Preliminary Report will be a short written progress report given upon completion of field work, and will summarize (a) field work completed and findings, (b) preliminary conclusions and evaluations of findings, and (c) the scope of work for data analysis developed in consultation with DLNR-HSS. The written Final Report will meet the standards provided by Section IV of the SHA monitoring requirement guidelines (see Appendix), and will include (a) the full descriptive account of project findings, and (b) appropriate interpretation and evaluation of the findings. The Final Report will be submitted to DLNR-HSS for review and approval.

TREATMENT OF HUMAN REMAINS

Any human skeletal remains encountered in the course of monitoring will be disinterred in accordance with (a) State Health Department regulations and procedures, and (b) accepted professional archaeological methods and procedures. In connection with the initial encounter of any human skeletal remains, disinterment will be delayed temporarily until an on-site blessing by an appropriate religious practitioner can be done. Appropriate detailed osteological analyses (metric and non-metric) will be carried out by qualified personnel on all recovered skeletal remains. Upon completion of analyses, all remains will be reinterred in a manner acceptable to the State Health Department. If at all possible, reinterment will be done within the project area; if this is not practical, reinterment will be done as close as to the project area.

If any skeletal remains encountered appear to be those of prehistoric native Hawaiians, the Office of Hawaiian Affairs (OHA) will be contacted, and a program for the appropriate reinterment of those remains will be developed in consultation with OHA and DLNR-HSS.

COORDINATION AND CONSULTATION

PHRI will keep KNBJV informed of monitoring progress, and will notify KNBJV of any problems encountered as soon as possible. With the approval of KNBJV, PHRI will maintain close contact and consult with appropriate personnel and specialists in the Hawaii State Department of Land and Natural Resources-Historic Sites Section/State Historic Preservation Office and the US Army-Corps of Engineers, and if appropriate, the Maui County Planning Department also, as part of the archaeological monitoring.

REFERENCES CITED

ACHP (Advisory Council on Historic Preservation)

1980 Treatment of Archaeological Properties: A Handbook. Washington, D.C.

CFR (Code of Federal Regulations)

36 CFR Part 60 National Register of Historic Places. Dept. Interior, National Park Service.

36 CFR Part 66 Recovery of Scientific, Prehistoric, Historic and Archaeological Data: Methods, Standards and Reporting Requirements (proposed guidelines). Dept. Interior, National Park Service. (1977)

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1987 Subsurface Archaeological Reconnaissance Survey, North Beach Development Site, Land of Hanakaoo, Lahaina District, Island of Maui (TMK:4-4-01:2,3,6,8,9,68; 4-4-02:24; 4-4-06:5). PHRI Report 321-061587. Prepared for Amfac, Inc. (June)

SHA (Society for Hawaiian Archaeology)

1985 Minimum Requirements for Archaeological Monitoring. (Adopted February 13, 1985)

APPENDIX

Adopted February 13, 1965

SOCIETY FOR HAWAIIAN ARCHAEOLOGY

MINIMUM REQUIREMENTS FOR ARCHAEOLOGICAL MONITORING

I. DEFINITION: Archaeological monitoring is a set of procedures conducted during ground-disturbing activities for the purpose of identifying, describing, recovering, evaluating, and analyzing archaeological resources.

A. "Ground-disturbing activities" include both events such as construction projects and continuous and/or intermittent processes such as erosion or pedestrian impact.

B. "Archaeological resources" include all material evidence relating to past human activity. The archaeological resources encountered during monitoring are usually underground and may or may not have been known to exist before ground disturbance. The nature, extent and distribution of the archaeological resources are usually obscured largely or totally by overburden.

C. "Archaeological monitoring" is proper when there is a reasonable expectation that destruction of significant archaeological resources by ground-disturbing activities can be mitigated or avoided thereby.

II. SCOPE: Archaeological monitoring projects should provide for:

A. A research design;

B. Archaeological data recovery during ground-disturbing activities;

C. The suspension of ground-disturbing activities, when the monitoring archaeologist determines it is necessary, so that proper archaeological studies of significant resources can be completed;

D. Consultation with the State Historic Preservation Officer, or authorized representative, and other appropriate agencies; and

E. Funding of appropriate laboratory analyses, curation of materials recovered, report preparation and distribution of the archaeological report to appropriate agencies and individuals.

III. PROCEDURES: Archaeological monitoring fieldwork should consist of:

A. The use of standard archaeological techniques;

B. The preparation of written and photographic records of archaeological features, artifacts, stratigraphy, and ground-disturbing activities;

C. The recovery of archaeological materials such as artifacts, dating samples, soil samples, human, faunal, and floral remains; and

D. Coordination between all parties involved--landowner, developer, project foreman, construction crew, government and other appropriate agencies and individuals, and the archaeologist.

IV. REPORTS: A report for an archaeological monitoring project should include:

A. An abstract, or summary of results;

B. The purpose of the archaeological monitoring;

C. A discussion of field procedures, including constraints on the project;

D. A description and analysis of collected field data, including, but not limited to, maps, drawings and photographs;

E. A discussion of the archaeological resources found at the project site in relation to the local, regional and archipelago wide archaeological record;

F. An evaluation of site significance;

G. A discussion of the project's contribution to Hawaiian archaeology;

H. Recommendations for future research, management and/or preservation, as appropriate;

I. The comments of the State Historic Preservation Officer, or his authorized representative, and other reviews; and

J. If conditions are such that certain requirements do not apply, they are waived provided an explanatory note is included in the report.