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HWY-P
2.5591

TO: GENEVIEVE SALMONSON
DIRECTOR OF ENVIRONMENTAL QUALITY CONTROL

FROM: RODNEY K. HARAGA
DIRECTOR OF TRANSPORTATION

SUBJECT: FINDING OF NO SIGNIFICANT IMPACT FOR NORTH-SOUTH ROAD AND KAPOLEI PARKWAY, H-1 FREEWAY TO RENTON ROAD, EWA, OAHU, HAWAII
TMK: 9-1-016:108, 9-1-016:109, 9-1-017:004, 9-1-017:046, 9-1-017:068, 9-1-017:069, 9-1-017:071, 9-1-017:075, 9-1-018:004, 9-1-018:005, 9-2-002:001, 9-2-002:006, 9-1-017:86, 9-1-017:88, 9-1-16:129, 9-1-16:120, 9-1-16:127, 9-1-18:001, 9-1-18:007

The Hawaii Department of Transportation has reviewed the comments received during the public comment period that began on July 23, 2004 and extended through the development of the Final Environmental Assessment (EA) for the subject project. Based on this review, HDOT has determined that this project will not have significant social, economic and environmental effects and will be issuing a Finding of No Significant Impact (FONSI). Please publish a notice of the FONSI determination and availability of the Final EA for the subject project in the October 8, 2004 OEQC Environmental Notice.

We have enclosed a completed OEQC Publication Form, and four copies of the Final EA. Please call Nelson Sagum at 587-1834 if you have any questions.

Enclosures

2004-10-08 FONSI
NORTH-SOUTH ROAD & KAPOLEI PARKWAY.

OCT - 8 2004

NORTH-SOUTH ROAD and KAPOLEI PARKWAY

Ewa, Oahu, Hawaii

FINAL ENVIRONMENTAL ASSESSMENT
FINDING OF NO SIGNIFICANT IMPACT

SEPTEMBER 2004

NORTH-SOUTH ROAD and KAPOLEI PARKWAY
H-1 Freeway to Renton Road
Ewa, Oahu, Hawaii

Final Environmental Assessment / Finding of No Significant Impact

Submitted Pursuant to
Chapter 343, Hawaii Revised Statutes

State of Hawaii Department of Transportation
Highways Division
and
City and County of Honolulu
Department of Transportation Services

SEP 27 2004
Date of Approval

Rodney K. Haraga
Director of Transportation
Department of Transportation
State of Hawaii

9/23/04
Date of Approval

George "Keoki" Miyamoto, Director
Department of Transportation Services
City and County of Honolulu

The following persons may be contacted for additional information concerning this document:

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This Final Environmental Assessment / Finding of No Significant Impact documents the potential environmental impacts of a proposal to construct the North-South Road and to provide federal funding to support construction of a portion of Kapolei Parkway in Ewa, island of Oahu. The proposed project includes both the North-South Road, a principal arterial, which would extend from Interstate Route H-1 (H-1 Freeway) to the proposed Kapolei Parkway, and acceleration of the construction of a portion of Kapolei Parkway, from the North-South Road to Renton Road, such that this portion of Kapolei Parkway would be implemented within the same time frame as the North-South Road. North-South Road would be a State facility, and Kapolei Parkway would continue to be a City and County of Honolulu facility. The proposed Build Alternative also includes an interchange at its H-1 Freeway junction. The project would provide an alternative access to the Interstate System and would improve sub-regional mobility. With mitigation measures, the proposed project is not expected to result in any significant adverse impacts.

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FINAL ENVIRONMENTAL ASSESSMENT

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ACRONYMS

A.M.	morning
AASHTO	American Association of State Highway Transportation Officials
ACHP	Advisory Council on Historic Preservation
ACOE	U.S. Army Corps of Engineers
ADA	Americans with Disabilities Act
AG-1	land zoned as restricted agriculture
ALISH	Agricultural Lands of Importance to the State of Hawaii
APE	Area of Potential Effect
ASTM	American Society for Testing and Materials
BA	Biological Assessment
BLNR	State of Hawaii Board of Land and Natural Resources
BMPs	Best Management Practices
BO	Biological Opinion
BPNAS	Barbers Point Naval Air Station
BRT	Bus Rapid Transit
BWS	Board of Water Supply
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CO	carbon monoxide
COI	Certificate of Inclusion
CRA	contingency reserve area
CWA	Clean Water Act
CZM	Hawaii Coastal Zone Management Program
DA	U.S. Department of the Army
dB	decibel
dBA	A-weighted decibel
DBEDT	Department of Business, Economic Development and Tourism
DDC	City and County of Honolulu, Department of Design and Construction
DEA	Draft Environmental Assessment
DHHL	State of Hawaii, Department of Hawaiian Home Lands
DLNR	State of Hawaii, Department of Land and Natural Resources
DOFAW	State of Hawaii, Department of Land and Natural Resources, Division of Forestry and Wildlife
DP	Development Plan
DPM	Diesel Particulate Matter
DPP	City and County of Honolulu, Department of Planning and Permitting (formerly Department of Land Utilization)
DTS	City and County of Honolulu, Department of Transportation Services
EA	Environmental Assessment
EIS	Environmental Impact Statement

EJ	Environmental Justice
EJC	Estate of James Campbell
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ESRC	State of Hawaii Endangered Species Recovery Committee
Ewa DP	Ewa Development Plan
FHWA	Federal Highway Administration
FONSI	Finding of No Significant Impact
FPPA	Farmland Protection Policy Act
FTA	Federal Transit Administration
GPS	global positioning system
H-1 Freeway	Interstate Route H-1
HAR	Hawaii Administrative Rules
HC	hydrocarbons
HCDCH	Housing and Community Development Corporation of Hawaii (formerly Housing Finance and Development Corporation)
HCM	Highway Capacity Manual
HCP	Habitat Conservation Plan
HDOH	State of Hawaii Department of Health
HDOT	State of Hawaii Department of Transportation
HECO	Hawaiian Electric Company
HFDC	See HCDCH
HIA	Honolulu International Airport
HOV	High Occupancy Vehicle
HRHP	Hawaii Register of Historic Places
HRS	Hawaii Revised Statutes
HUD	Department of Housing and Urban Development
IMP	Interim Management Plan
ITL	Incidental Take License
ITS	Intelligent Transportation System
JCIP	James Campbell Industrial Park
kV	kilovolt
Leq	constant energy level equivalent noise level
L_{max}	maximum noise level
LOS	level-of-service
LOTMA	Leeward Oahu Transportation Management Association
LUO	Land Use Ordinance
MGD	million gallons per day
MOA	Memorandum of Agreement
mph	miles per hour
NAAQS	National Ambient Air Quality Standards
NAC	Noise Abatement Criteria
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NO_2	nitrogen dioxide
NO_x	nitrogen oxide

NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
O_3	ozone
OEQC	Office of Environmental Quality Control
OHA	Office of Hawaiian Affairs
OIBC	Oahu Island Burial Council
OMPO	Oahu Metropolitan Planning Organization
OR&L	Oahu Railway & Land Company
ORTP	Oahu Regional Transportation Plan
OTS	Oahu Transit Services
P.M.	afternoon
Pb	lead
PCBs	polychlorinated biphenyls
PM_{10}	particulate matter (smaller than or equal to 10 microns in size)
$PM_{2.5}$	particulate matter (smaller than or equal to 2.5 microns in size)
PUC	*Primary Urban Center*
ROW	Right-of-way
RTP	Regional Transportation Plan
SHPD	State Historic Preservation Division
SHPO	State Historic Preservation Officer
SLUDBA	State Land Use District Boundary Amendment
SMA	Special Management Area
SO_2	sulfur dioxide
SOBA	Southern Oahu Basal Aquifer
SO_x	sulfur oxide
SPUI	Single-Point Urban Intersection
SWPP	State Water Projects Plan
TBD	To be determined
TDM	Travel Demand Management
TIP	Transportation Improvement Program
TMAs	Travel Management Associations
TOP 2025	Transportation for Oahu Plan 2025
TSM	Transportation System Management
UH-West Oahu	University of Hawaii-West Oahu Campus
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
vph	vehicles per hour
WQC	Water Quality Certification

EXECUTIVE SUMMARY ■

NORTH-SOUTH ROAD and KAPOLEI PARKWAY
FINAL ENVIRONMENTAL ASSESSMENT

EXECUTIVE SUMMARY

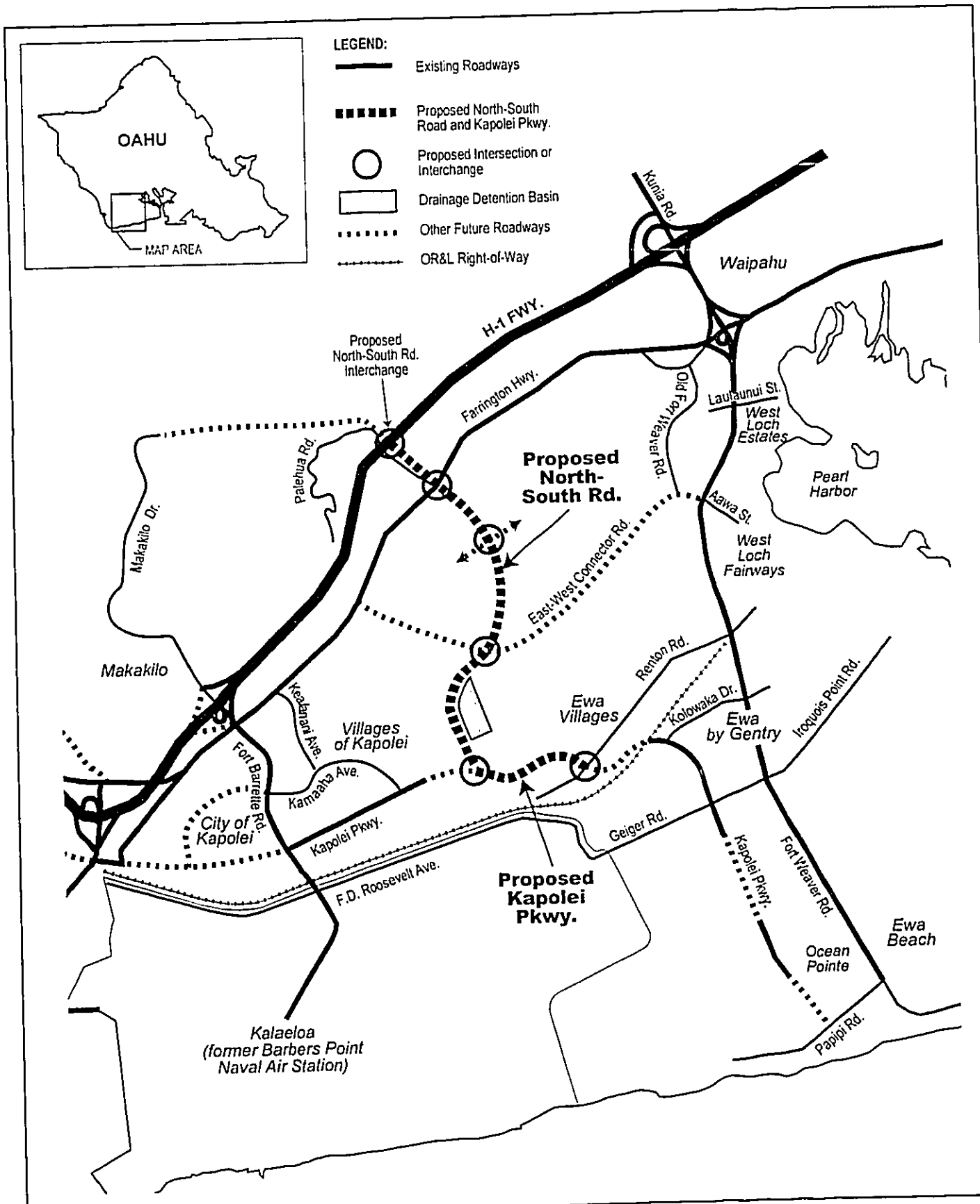
S.1 INTRODUCTION

S.1.1 APPLICANT AND PROJECT SUMMARY

The State of Hawaii Department of Transportation (HDOT) and City and County of Honolulu (City) Department of Transportation Services (DTS) are issuing this Final Environmental Assessment / Finding of No Significant Impact (FEA/FONSI) for the North-South Road and Kapolei Parkway project (formerly North-South Road project) in Ewa, Oahu, Hawaii (see Figure S-1), pursuant to Chapter 343 of the Hawaii Revised Statutes (HRS).

The North-South Road would be an approximately 2.2-mile federal-aid, limited-access, principal arterial highway, which would connect Interstate Route H-1 (H-1 Freeway) to the proposed Kapolei Parkway. The North-South Road project also includes the construction of: (1) a major interchange at its junction with the H-1 Freeway; (2) the North-South Road/Kapolei Parkway intersection; and (3) various drainage features, such as a drainage channel and detention basin associated with the proposed highway, as well as two crossings of Kaloi Gulch. The roadway section of concern for Kapolei Parkway is a segment approximately 0.7 mile in length from Renton Road to the City/State property line. This City section of Kapolei Parkway is a proposed federal-aid, arterial roadway, which would connect the proposed North-South Road to other existing, southerly portions of the Kapolei Parkway. North-South Road would be a State facility; the Kapolei Parkway section is proposed as a City facility, to be constructed by the City's Department of Design and Construction (DDC). Throughout this FEA/FONSI, the term "Kapolei Parkway" will generally be used to refer to the proposed segment of the roadway between North-South Road and Renton Road, unless otherwise specified. North-South Road would encompass the intersection at Kapolei Parkway, such that Kapolei Parkway is defined as actually starting at the City/State property line where the intersection constructed by HDOT would end.

In September 1998, HDOT, in collaboration with the Federal Highway Administration (FHWA), publicly released a joint HRS Chapter 343 and National Environmental Policy Act (NEPA) Draft Environmental Assessment (1998 Draft EA) for the North-South Road project, which would extend from the H-1 Freeway to its future intersection with Kapolei Parkway. Kapolei Parkway was not included as part of the project action; rather it assumed at that time that Kapolei Parkway would be constructed by others before North-South Road. The City section of Kapolei Parkway must be operational for North-South Road to function properly. While the City would otherwise complete its portion of Kapolei Parkway with local funds within roughly the next 20 years, the 0.7-mile section of Kapolei Parkway must be operational for the North-South Road to function optimally and in accordance with its intended purpose.



North-South Road and Kapolei Parkway Project Location

North-South Road and Kapolei Parkway Project
Final Environmental Assessment
Figure S-1

Consequently, in order to ensure that a major portion of the Kapolei Parkway is completed within a reasonable time period of the completion of the North-South Road, federal funds are anticipated for the construction of a 0.7-mile section of the Kapolei Parkway.

Due to changes in existing conditions and the project definition since 1998, HDOT released a Revised Draft EA, which replaced the 1998 Draft EA. The Revised Draft EA was noticed on July 23, 2004 in the Office of Environmental Quality Control's publication, The Environmental Notice. Following receipt and review of agency and public comments on the Revised Draft EA, HDOT rendered a decision that the proposed project will not result in a significant impact per criteria specified in HAR Section 11-200-12(b), and therefore, has issued this FEA/FONSI.

In its ultimate configuration, the North-South Road would include three vehicular lanes with shoulders in each direction, a median, and sidewalks on the both sides. An exclusive rapid transit corridor would be reserved within the 28-foot median of North-South Road. The east side of the roadway corridor within the roadway right-of-way (ROW) would be used for a shared bike path/access road to electric utility power lines and a drainage channel. The ultimate configuration of the City's portion of Kapolei Parkway would similarly be three vehicular lanes in each direction, a median, and sidewalks (see Figures S-2 and S-3).

The interim phase of the project would consist of only the North-South Road interchange ramps with the H-1 Freeway oriented to and from the east (westbound off ramp and eastbound on ramp), the east half of North-South Road from the H-1 Freeway to Kapolei Parkway and the southern (makai) portion of Kapolei Parkway between Renton Road and North-South Road. The ultimate phase would implement the full build-out of the North-South Road Interchange, North-South Road, and Kapolei Parkway.

The project would also require implementation of environmental mitigation measures, intended to result in a project with minimal adverse environmental and social impacts. One major environmental mitigation measure included in the proposed project is the implementation of a Habitat Conservation Plan (HCP) for an endangered plant, the Kooloaula, or *Abutilon menziesii*. The HCP stipulates propagation of existing plants in the proposed roadway ROW, establishment of at least three off-site outplanting sites for the plants, and creation of an 18-acre temporary Contingency Reserve Area where plants can be kept in their natural habitat until off-site planting sites achieve pre-determined success criteria. Additional information about the HCP is provided in Section 3.7.

Another major mitigation measure included as an integral part of the proposed project is a drainage system that includes a contribution towards the regional drainage system. A regional drainage system is required to support the urban development proposed for the area. The drainage elements included in this project are the following:

North-South Road and Kapolei Parkway Roadside Drainage Facilities

a. Roadside Drainage Facilities
b. Interchange and Roadway Portions over the SOBA Recharge Area

c. Roadway Portions below the SOBA Recharge Area
d. Interim Interceptor Ditches
e. Regional Drainage Channel
f. Drainage Retention / Detention Basin
g. Interface at Ewa Villages Golf Course
h. Drainage Channel Bridge Crossings
i. Kaloi Gulch Bridge Crossings
j. Kaloi Gulch Culvert Modification at H-1
k. Cross-Drains for Future Developments

The drainage system has been designed in consideration of two watershed build-out conditions, interim and ultimate. Interim watershed conditions assume that adjacent areas in East Kapolei are not developed. Ultimate watershed conditions assume that adjacent developments are built-out according to the Ewa DP. Design details for the drainage system for North South Road are different for the interim and ultimate watershed conditions. The primary difference between the interim and ultimate drainage plans for North-South Road is in the amount of flows being carried by the proposed drainage channel. Cross-drains are sized for ultimate build-out conditions to avoid reconstruction of the roadway pavement and disruption to traffic in the future. Under interim build-out conditions, these cross-drains will be used to convey existing sheet flows from the undeveloped areas west of the roadway to the drainage channel along the east side of the roadway.

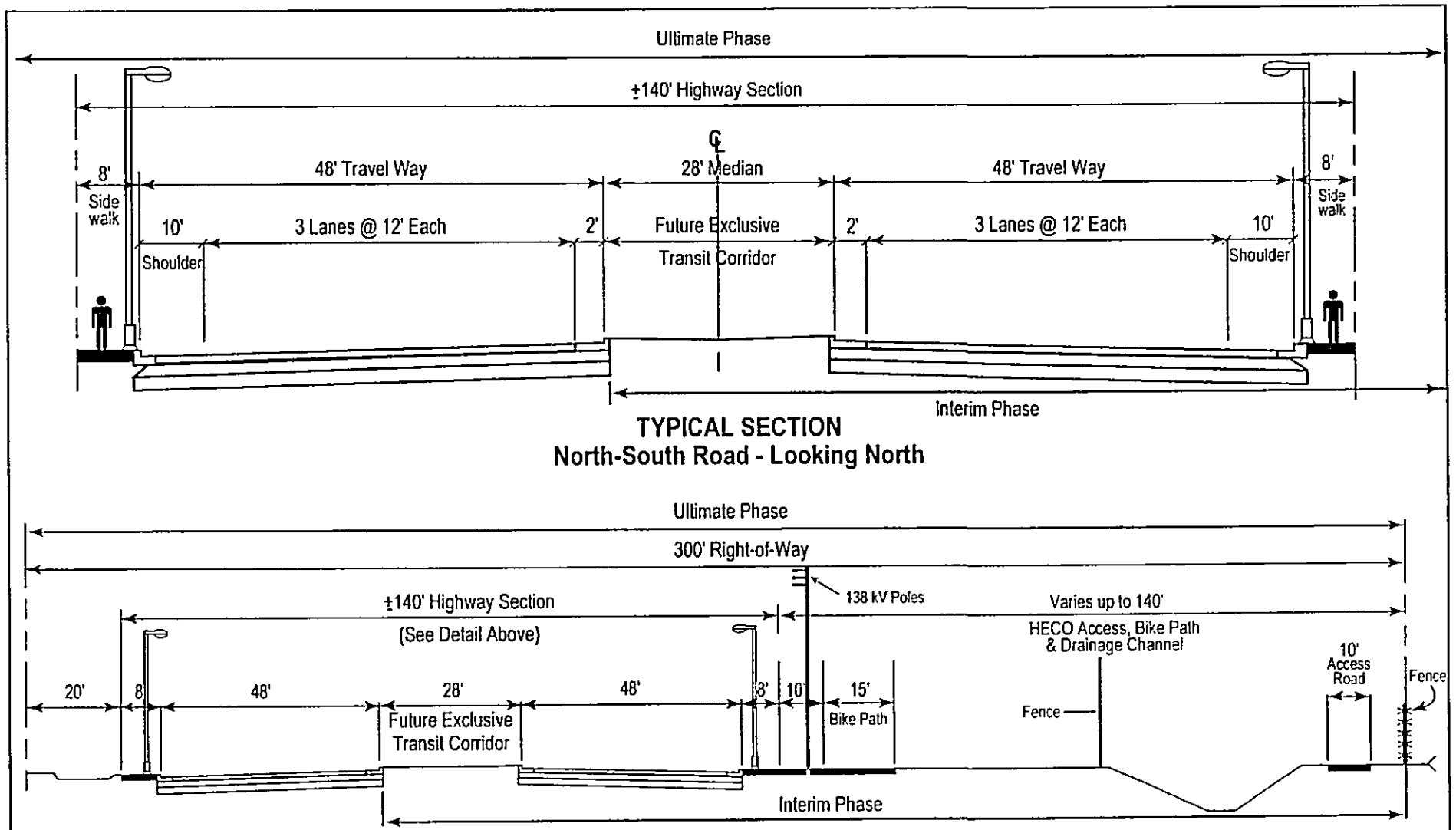
For Kapolei Parkway, one drainage system design accommodates both interim and ultimate watershed conditions.

Additional description of the drainage features is provided in Chapter 2, including the phasing of system capacity. Discussion of impacts on water resources and drainage patterns is included in Section 3.8. This project's contribution to the regional drainage system is discussed in Section 3.14, Secondary and Cumulative Impacts.

S.1.2 PURPOSE OF THIS DOCUMENT

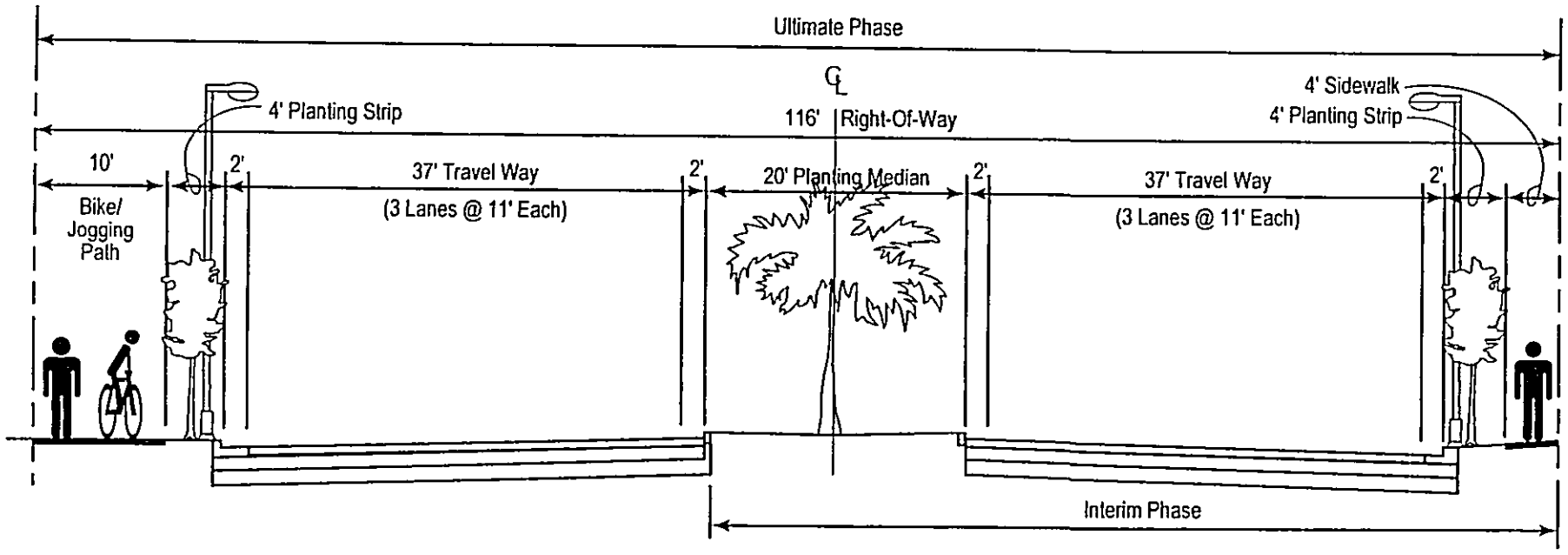
This FEA/FONSI has been prepared to comply with HRS Chapter 343 and the Hawaii Administrative Rules (HAR) [Title 11, Chapter 200, Environmental Impact Statement Rules (August 1996)]. This FEA/FONSI also documents compliance with other federal laws and regulations because of the proposed use of federal funds administered by the FHWA to help build the project. Environmental review pursuant to NEPA has not yet been completed.

This document identifies and assesses the environmental and social impacts that could result from development of the North-South Road and federalization of Kapolei Parkway. Potential impacts of the preferred Build Alternative are contrasted with the impacts that would likely occur in the future without the project (the future No-Build condition). This No-Build Alternative includes regional roadway improvements listed in the latest revision of the Oahu Regional Transportation Plan (ORTP), also called the Transportation for Oahu Plan (TOP 2025), including the construction of Kapolei Parkway between the



NOT TO SCALE

Typical Section of North-South Road
North-South Road and Kapolei Parkway Project
Final Environmental Assessment
Figure S-2



TYPICAL SECTION
Kapolei Parkway
Looking East

NOT TO SCALE

Typical Section of Kapolei Parkway
North-South Road and Kapolei Parkway Project
Final Environmental Assessment
Figure S-3

proposed North-South Road and Renton Road. However, the No-Build Alternative excludes North-South Road and its interchange with the H-1 Freeway, even though this project is identified in the TOP 2025. Potential impacts are assessed for the Year 2025. Construction-phase impacts are also assessed in Section 3.14.

S.2 PURPOSE OF AND NEED FOR ACTION

The purpose of this project is to address various types of transportation needs including:

- to meet roadway capacity need for existing travel demand;
- to respond to regional land use and economic development trends;
- to meet future transportation demand; and
- to improve sub-regional mobility.

S.2.1 ROADWAY CAPACITY NEED FOR EXISTING TRAVEL DEMAND

Traffic volumes on Ewa's arterial roadways reflect recent rapid urban development shown in Table S-1. From 1989 to 2001, growth in traffic volume on existing roadways ranged from 56 percent to 200 percent.

Table S-1:
Traffic Volume Trends

Facility	Location	Average Daily Traffic			
		1989	2001	Percent Increase	Percent Annual Increase
Fort Weaver Road	North of Farrington Highway	45,000	70,000	56%	4%
	South of Farrington Highway	34,000	61,000	79%	5%
	At Honouliuli Bridge	33,000	57,000	73%	5%
Fort Barrette Road	South of H-1 Freeway	12,000	36,000	200%	10%
H-1 Freeway	East of Kunia Interchange	74,000	140,000	89%	5%

Source: HDOT, Traffic Count Data.

Fort Weaver Road repeatedly exceeds its capacity during both the A.M. and P.M. peak hours. In the A.M. peak period, approximately 85 percent of northbound (mauka-bound) vehicles on Fort Weaver Road access the eastbound H-1 Freeway via Kunia Interchange, regularly causing queues from the freeway to the Fort Weaver Road/Farrington Highway Interchange. In the P.M. peak period, the existing traffic volumes on Fort Weaver Road create queues at key intersections. While plans to widen Fort Weaver Road from four to six lanes in the next three years will help, it will be insufficient to accommodate planned future development in the Ewa area.

At Fort Barrette Road, traffic operations are congested during both the A.M. and P.M. peak hours. Particularly notable is the congestion at the Fort Barrette Road/Farrington Highway intersection, causing mauka-bound queues during the A.M. peak hour and eastbound queues during the P.M. peak hour.

The H-1 Freeway in the study area is affected by downstream congestion during the A.M. peak period. Recent improvements at the Kunia Interchange have mitigated P.M. peak period vehicle queues that used to back up on the westbound to makai-bound loop off-ramp and extend onto the freeway. Similarly, at the Makakilo Interchange in the westbound direction, P.M. peak period queuing on the westbound off-ramp that, at times, extended onto the freeway has been mitigated by recent improvements to the ramp.

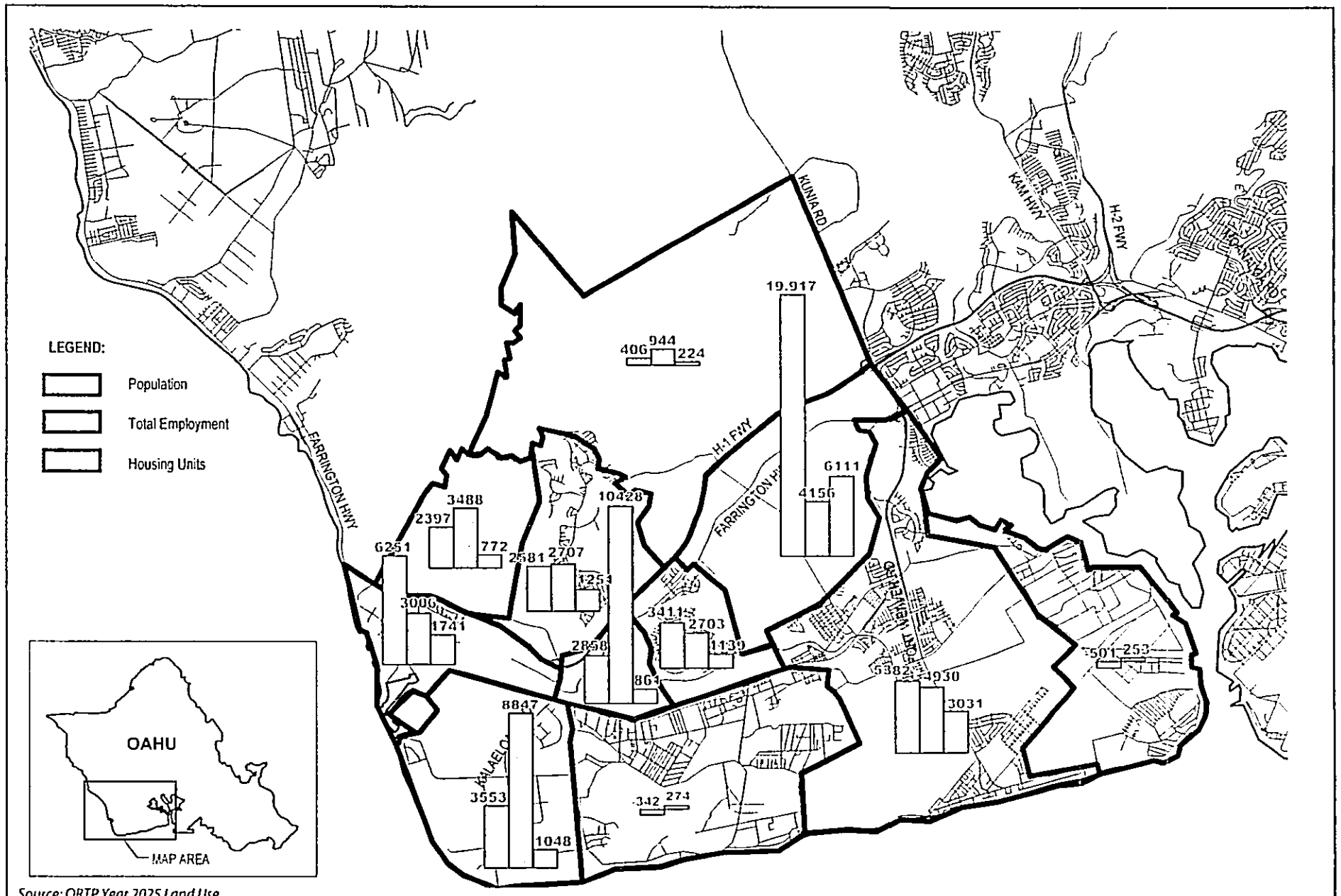
These recent improvements address only the existing traffic demand. It is projected that future travel demand at the Kunia and Makakilo Interchanges will exceed capacity, adversely affecting conditions on the H-1 Freeway. Therefore, construction of new roadways and interchanges, as well as improvements to existing roadways and interchanges, is needed to address continuing regional urban development, as directed by current State and City policy and described in Section 1.2.1.

The proposed North-South Road would attract mauka-makai traffic, which would otherwise flow on Fort Weaver and Fort Barrette Roads. Diverting traffic to North-South Road would improve operating conditions on Fort Weaver and Fort Barrette Roads, allowing these other roadways to serve their travel markets better. Similarly, the North-South Road Interchange would relieve projected congested operations on H-1 Freeway at the Kunia and Makakilo Interchanges.

S.2.2 REGIONAL LAND USE AND ECONOMIC DEVELOPMENT TRENDS

The Ewa region, as defined by the Ewa Development Plan (Ewa DP), had a population of 68,718 in 2000, approximately 8 percent of Oahu's total population. In contrast, the estimated population of the Ewa DP area in 1990 was approximately 42,960 persons, 5.1 percent of the island total. In 2025, the estimated population of Oahu would be approximately 1.03 million. According to the City and County of Honolulu General Plan's population guidelines, the Ewa DP area is intended to accommodate 13 percent of Oahu's 2025 population, or roughly 133,874 persons – an increase of 95 percent from 2000 (U.S. Census, 2000; Ewa DP, Revised 2000; State of Hawaii Department of Business, Economic Development and Tourism, Population And Economic Projections For The State Of Hawaii To 2025, 2000).

It is the objective of the State and City to create a "Second City" for Oahu in the Ewa area, by providing opportunities for residential and employment growth to supplement the Primary Urban Center (PUC). As shown in Figure S-4, the Ewa Plain would experience a substantial population, employment, and housing growth over the 25-year period between 2000 and 2025. By the year 2025, total population in the Ewa Plain would be over 116,000, up 66 percent from 2000, with a corresponding growth in



Source: ORTP Year 2025 Land Use.

SCALE:
0 2000 4000 FT.

N

Projected Growth in Population and Employment (2000-2025)

North-South Road and Kapolei Parkway Project
Final Environmental Assessment
Figure S-4

housing of 73 percent to over 38,000 units. Public and private developers have facilitated achievement of this objective, and a number of projects are completed, under construction, or planned, including several residential developments in Ewa, Kapolei, East Kapolei, Makakilo, and employment centers in areas such as the City of Kapolei, Campbell Industrial Park, East Kapolei, Ewa, and Ewa Beach.

Regional transportation improvements are needed to accommodate this anticipated growth in Ewa, and the North-South Road and Kapolei Parkway are components of the proposed regional improvements in the TOP 2025.

S.2.3 FUTURE TRANSPORTATION DEMAND

Many residents in the Ewa region travel to and from the PUC, with their primary route being the H-1 Freeway. In the base year 2000, there were approximately 150,000 daily production trips (trips originating from an area) and 114,000 daily attraction trips (trips ending in an area) in the Ewa region. Based on the City and County of Honolulu Department of Planning and Permitting's socio-economic forecasts, it was estimated that the region would generate approximately 802,800 daily production trips in the year 2025, an increase of 435 percent. The PUC is projected to receive approximately 60 percent of all attraction trips on Oahu in the year 2025. Socio-economic forecasts also indicate that approximately 646,900 attraction trips would be generated through employment growth in the Ewa region in 2025, an increase of 467 percent over 2000.

The TOP 2025 identified the need to increase access to the H-1 Freeway and transportation capacity in the North-South Road Corridor area. It also noted the need to establish transportation links between residences in Ewa and future employment centers in the City of Kapolei. Therefore, the TOP 2025 included the construction of North-South Road, a new interchange with H-1 Freeway, and the completion of Kapolei Parkway, among other future transportation improvements, such as widening Fort Barrette Road, Fort Weaver Road, and Farrington Highway.

Based on these transportation demand projections and the traffic volume trends described in Section 1.2, additional roadway and interchange capacity between existing and future residential communities and employment centers in the Ewa region and the H-1 Freeway is needed. Existing roadways and intersections connecting residential and employment areas with the H-1 Freeway are currently operating at or near their capacity and would not efficiently be able to accommodate the projected travel demand described above. Therefore, construction of North-South Road and Kapolei Parkway and a new interchange with the H-1 Freeway are needed to fully accommodate the policy-directed development in the Ewa Plain.

S.2.4 SUB-REGIONAL MOBILITY

Providing an alternative facility to Fort Weaver Road and Fort Barrette Road would reduce congestion on these roadways, improving transportation conditions for traffic in the Ewa Plain. Moreover, North-South Road and Kapolei Parkway would help improve

travel between activity centers within the Ewa Plain by providing alternative routes and improving overall system operation. Currently, travelers wanting to drive between points in Ewa have limited options, forcing mauka-makai roadways such as Fort Weaver Road and Fort Barrette Road to serve both mauka-makai demand and east-west demand. East-west connectivity is provided primarily by Farrington Highway and H-1 Freeway. Providing alternative roadway connections within the Ewa Plain would relieve both existing mauka-makai and east-west roadways, thereby providing better sub-regional mobility.

S.3 ALTERNATIVES

Project alternatives were identified through discussions with government agencies and input gathered at public meetings. Alignment, interchange, and roadway concept alternatives, including a Transportation System Management (TSM) alternative, were examined. These alternatives are described in Chapter 2. A preferred Build Alternative and a No-Build Alternative were selected for detailed examination in this FEA/FONSI, and are described below.

The preferred Build Alternative assumes the construction of the North-South Road and the federalization of a segment of Kapolei Parkway between North-South Road and Renton Road. North-South Road would ultimately be a six-lane, divided highway between the H-1 Freeway and Kapolei Parkway, consistent with the Kapolei Area Long-Range Master Plan (July 1993) and the TOP 2025. In order to ensure that the key 0.7-mile section of the Kapolei Parkway between Renton Road and North-South Road is completed within the same time frame as the opening of North-South Road, this segment is proposed to be "federalized." The proposed segment of Kapolei Parkway would ultimately be a six-lane arterial roadway, connecting the proposed North-South Road to existing, southerly portions of the Kapolei Parkway.

North-South Road would intersect Kapolei Parkway between the existing Varona and Tenney Villages in the Ewa Villages development, adjacent to the bridge over Kaloi Gulch. The roadway would proceed north to the proposed interchange at the H-1 Freeway following existing roadway lots and easements up to Farrington Highway. In the case of State land, a roadway lot exists; in the case of private lands, there is an existing roadway easement. Between Farrington Highway and H-1 Freeway, the proposed North-South Road would follow the property line between State and private lands. The Build Alternative would also include a new conventional diamond configuration interchange with the H-1 Freeway, as well as intersections with the existing Farrington Highway and proposed intersections with other future roadways that would be constructed between Farrington Highway and Kapolei Parkway. The preferred Build Alternative would provide regional access to the interstate system as well as local access and circulation. The proposed road would include three lanes in each direction, a median, and sidewalks.

The total ROW required for the North-South Road and Kapolei Parkway Project is 189.44 acres. Of that amount, the North-South Road requires 133.32 acres, the North-South Road Interchange 46.35 acres, and Kapolei Parkway 9.77 acres. While the City owns the 9.77 acres for the Kapolei Parkway ROW, the State would have to obtain the land for

the interchange and the North-South Road. A Governor's Executive Order (E.O.) to transfer the land to HDOT from the Department of Land and Natural Resources (DLNR) would be needed for 116.67 acres. Another 55.1 acres would be acquired from the Estate of James Campbell, and 7.9 acres would be acquired from the University of Hawaii.

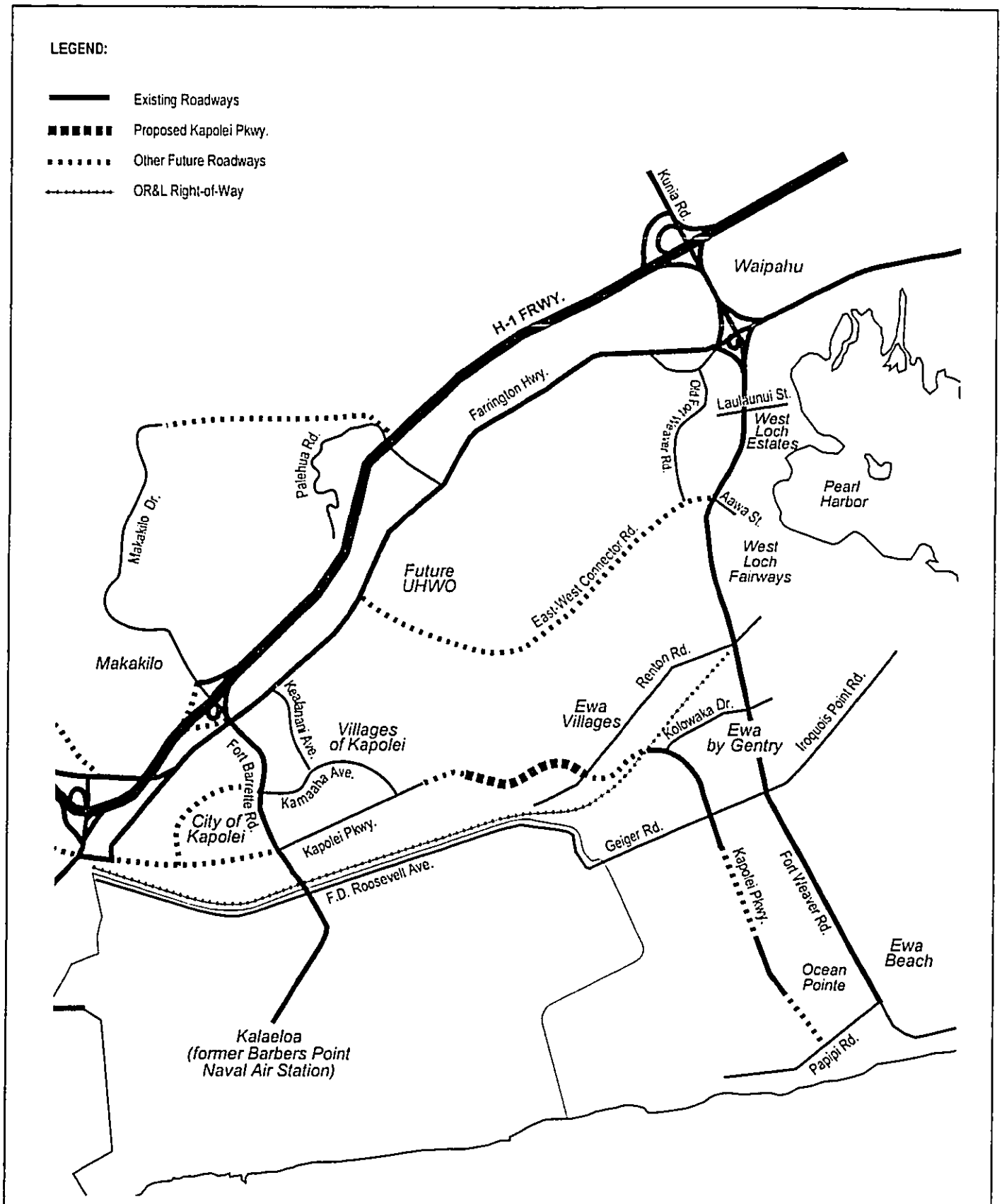
At the interchange, more land would be acquired than would be required solely for the conventional diamond interchange. The additional acreage would be acquired to preserve the option of a westbound to southbound loop ramp in the future, when warranted by traffic volumes. While acquisition of the additional acreage is part of the preferred alternative assessed in this FEA/FONSI, the possible construction of a loop ramp is not addressed in this document. The loop ramp would be constructed as part of a future project, when warranted by future travel demand.

In comparison, the future No-Build Alternative assumes the roadway improvements in the *TOP 2025, except the North-South Road Interchange and North-South Road, describing* a future roadway network that includes some improvements for the Ewa Plain. Figure S-5 illustrates the 2025 No-Build Alternative roadway network. The No-Build Alternative assumes that Kapolei Parkway is complete from Ewa Beach through the City of Kapolei by year 2025, including the City's segment between Renton Road and North-South Road, the City's segment between the old Oahu Railway & Land Co. (OR&L) ROW and Renton Road, and other segments to be developed by third parties. However, that segment of Kapolei Parkway may not be in place within the late 2007 to early 2008 time frame, to match initial implementation of the proposed North-South Road. The inclusion of this segment of the Kapolei Parkway in the No-Build definition is consistent with City plans for the future completion of Kapolei Parkway, but reflects current City budgetary constraints that make the timing of this project completion uncertain. Because the City owns the property on which Kapolei Parkway is proposed, the roughly 10-acre ROW for the Kapolei Parkway is being established by subdividing the parcel and changing its designation, which is currently AG-1 (restricted agriculture).

The No-Build Alternative assumes a 794-bus fleet by 2025. This fleet includes the Regional Bus Rapid Transit (BRT) system proposed as part of the Primary Corridor Transportation Project, which is in the TOP 2025. However, because North-South Road and its interchange would not exist in the No-Build Alternative, the proposed North-South Road Park-and-Ride is also assumed not to exist. In turn, the Regional BRT and local hub-and-spoke bus routes that would otherwise interact with the proposed North-South Road Park-and-Ride would need to be rerouted to other transfer facilities. This assumption lowers the efficiency of transit service to the Ewa Plain area.

S.4 POTENTIAL IMPACTS AND MITIGATION

Table S-2 is a matrix comparing the environmental impacts of the No-Build and Build Alternatives. A summary of mitigation measures for each adverse impact is also provided. In general, the adverse impacts associated with both alternatives will be mitigated and will be minimal.



SCALE:
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Year 2025 No-Build Roadway Network

North-South Road and Kapolei Parkway Project
Final Environmental Assessment
Figure S-5

Table S-2:
Summary of Environmental Impacts and Mitigation Measures

No-Build Alternative	Build Alternative
LAND USE	
Construction or Immediate Impacts. Construction of the City's portion of Kapolei Parkway would convert roughly 10 acres of vacant land owned by the City and currently zoned for agriculture into a transportation facility. Other surrounding properties would also be converted to urban uses under this alternative.	Construction or Immediate Impacts. In addition to the impacts of the No-Build Alternative, construction of North-South Road would convert roughly 190 acres of both active and inactive agricultural lands into a transportation facility. At least three diversified agriculture operations on relatively short-term leases with the Estate of James Campbell (EJC) and the State Department of Land and Natural Resources (DLNR) would lose some land from their fields due to right-of-way acquisition. These farms are Sugarland Farms, Inc., Aloun Farms, Inc., and A.M. Enterprise, Inc.
Operational or Long-Term Impacts. The Ewa Plain was master planned in the Ewa DP and Kapolei Area Long Range Master Plan for urban development. Completion of Kapolei Parkway from the Villages of Kapolei to Ocean Pointe would improve general circulation in Ewa, which would support development of vacant open space areas surrounding this road. The vacant North-South Road corridor would not be converted to a highway.	Operational or Long-Term Impacts. North-South Road is not anticipated to induce more development than what is currently considered and, therefore, would not intensify urban land uses planned for the Ewa Plain. It may accelerate planned development because of improved circulation notwithstanding budgetary and market conditions. Federalizing the portion of Kapolei Parkway would accelerate the timing for construction of the road, but otherwise, the roadway would be the same as under the No-Build Alternative.
Mitigation. None required.	Mitigation. The private landowner, EJC, will be compensated for right-of-way acquisition in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act. The DLNR property is being conveyed by a Governor's Executive Order to HDOT. HDOT will coordinate with stakeholders to maintain access to parcels currently dependent on Palehua Road.

Table S-2:
Summary of Environmental Impacts and Mitigation Measures
(continued)

No-Build Alternative	Build Alternative
GEOLOGY, SOILS, AND FARMLAND	
Construction or Immediate Impacts. The area affected by Kapolei Parkway and other development projects is classified as "prime" agricultural land. Planned roadway development projects would have little or no impact on existing farms. The area affected by Kapolei Parkway is not used for agriculture.	Construction or Immediate Impacts. The area affected by both Kapolei Parkway and North-South Road are classified as "prime" agricultural land. Only the construction of North-South Road would displace small portions of active farms, as described above.
Operational or Long-Term Impacts. The State of Hawaii, City, and private landowners are not planning to maintain agriculture in the Ewa Plain, except for spot locations, so in the long-run there would be no impacts on farmlands.	Operational or Long-Term Impacts. The area around North-South Road, as well as Kapolei Parkway, is not planned for long-term agricultural production. However, active farms on short-term leases in the area would continue to operate for the immediate future. Their access to their farmed lands and their irrigation lines would be maintained and/or replaced, as necessary. Per the Farmland Protection Policy Act, the Land Evaluation and Site Assessment score for the proposed action was calculated to be 149. Since this score is less than 160, alternatives that avoid farmland impacts do not need to be evaluated.
Mitigation. None required.	Mitigation. During the construction phase: Existing unlicensed agricultural vehicle crossings of North-South Road will be maintained during construction; Access between mauka and makai areas relative to the H-1 Freeway in the vicinity of Palehua Road will be maintained during construction, and unlicensed agricultural vehicles will be allowed to travel on Palehua Road; Irrigation lines within the project right-of-way will be maintained or relocated; Security will be provided during

Table S-2:
Summary of Environmental Impacts and Mitigation Measures
(continued)

No-Build Alternative	Build Alternative
GEOLOGY, SOILS, AND FARMLAND (Cont'd)	
Mitigation (cont'd). See above.	Mitigation (cont'd). construction to prevent trespassing. During the operational phase: Unlicensed agricultural vehicles will continue to be allowed to cross North-South Road and the H-1 Freeway with possible location and time restrictions. To minimize crop damage, farmers will be asked to harvest crops on affected lands before construction begins.
INFRASTRUCTURE	
Construction or Immediate Impacts. Traffic flow impacts such as motorist delays, may occur near construction sites for planned roadway projects. Construction of planned roadway projects may result in the displacement or relocation of some existing utilities.	Construction or Immediate Impacts. In addition to the impacts described under the No-Build Alternative, traffic flow impacts may occur at the ingress and egress for the North-South Road construction site, and where work is being conducted on Farrington Highway and on the Interstate H-1 Freeway. Construction of North-South Road would result in the relocation of one 138 kV power pole at the intersection of Farrington Highway. Other impacts would be the same as the No-Build.
Operational or Long-Term Impacts. Without the proposed North-South Road and its interchange, operating conditions on Fort Weaver and Fort Barrette Roads would continue to worsen. The severe traffic congestion projected at the Makakilo Interchange, the Kunia Interchange, the Farrington Highway/Fort Barrette Road intersection, and key intersections along Fort Weaver Road would not be relieved.	Operational or Long-Term Impacts. Heavy but acceptable traffic operations are projected throughout the study area. The construction of North-South Road and a new interchange on H-1 Freeway removes key Level-of-Service (LOS) F bottlenecks on Fort Barrette Road and Fort Weaver/Kunia Road. In addition to the ROW required under the No-Build Alternative, ROW for North-South

Table S-2:
Summary of Environmental Impacts and Mitigation Measures
(continued)

No-Build Alternative	Build Alternative
INFRASTRUCTURE (Cont'd)	
Operational or Long-Term Impacts (cont'd). Right-of-way for the City segment of Kapolei Parkway would be used for future utilities. A parallel bike/pedestrian path, which tends to be popular with recreational or novice cyclists, would be developed as part of Kapolei Parkway. No other designated bike facility would be provided. Other bike facilities associated with planned roadway improvements would be constructed throughout the region.	Operational or Long-Term Impacts (cont'd). Road would be used for future utilities. In addition to the bike path improvement in the No-Build Alternative, a bike path would be provided within the North-South Road ROW. HDOT will allow the Hawaiian Electric Company (HECO) to use this bike path to maintain their 138 kV power lines located within the North-South Road ROW.
Mitigation. It is assumed that construction-period mitigation measures will be implemented as a part of each project.	Mitigation. A maintenance of traffic plan will be prepared during the design phase to accommodate affected traffic flows during construction. The maintenance of traffic plan will include measures to minimize the impact of haul trucks removing material from the site. HDOT commits to coordination with HECO on the anticipated relocation of one 138 kV power pole.
SOCIAL, CULTURAL, AND ECONOMIC ACTIVITIES	
Construction or Immediate Impacts. Construction employment would be provided for Kapolei Parkway and other planned roadway projects. But jobs would be created at a later date than under the Build Alternative and would be fewer in number because North-South Road would not need to be built.	Construction or Immediate Impacts. Construction employment would be provided by North-South Road, in addition to other projects.
Operational or Long-Term Impacts. Completion of Kapolei Parkway would strengthen economic and social ties between the Ewa Beach/Ocean Pointe/Ewa by Gentry area and the City and Villages of Kapolei, and would	Operational or Long-Term Impacts. Impacts would be similar to the No-Build Alternative. In addition, communities in the Ewa Plain would benefit from even greater social, economic, and public services support than under the No-Build

Table S-2:
Summary of Environmental Impacts and Mitigation Measures
(continued)

No-Build Alternative	Build Alternative
SOCIAL, CULTURAL, AND ECONOMIC ACTIVITIES (Cont'd)	
Operational or Long-Term Impacts (cont'd). enhance emergency response services throughout the region. The market value of land surrounding Kapolei Parkway would rise because of improved transportation services and existing development plans. A recent traffic study completed by HCDCH to identify pedestrian safety enhancements on Kapolei Parkway in the Villages of Kapolei included recommendations such as signalization of existing pedestrian crossings, proposed new signalized pedestrian crossings, and relocation of bus stops. These pedestrian improvements are being implemented by HCDCH, enabling Kapolei Parkway to accommodate the additional traffic while maintaining pedestrian safety.	Operational or Long-Term Impacts (cont'd). Alternative, because the North-South Road would provide an additional link to the H-1 Freeway. Similar to the No-Build Alternative, property values surrounding North-South Road would rise and no adverse impact is expected on City property tax revenues, even though lands used for roadway right-of-way would be removed from the tax base. Varona Village in Ewa Villages has a relatively high percentage of ethnic minorities. Additional outreach was conducted in this neighborhood to identify and address residents' concerns, pursuant to the Executive Order on Environmental Justice. However, no long-term disproportionately high, adverse human health, economic, or environmental effects were identified. Varona Village residents would have to cross a new intersection when traveling on Renton Road where none exists today. Varona Village residents would gain traffic benefits, such as better access to Kapolei, the H-1 Freeway and Ewa Beach. While the completion of the segment of Kapolei Parkway between North-South Road and the Villages of Kapolei would be conducted by another project, it is anticipated that Kapolei Parkway would not be opened for through traffic to Kapolei until North-South Road is completed.
Mitigation. None required.	Mitigation. When warranted by traffic conditions, traffic signals will be installed

Table S-2:
Summary of Environmental Impacts and Mitigation Measures
(continued)

No-Build Alternative	Build Alternative
SOCIAL, CULTURAL, AND ECONOMIC ACTIVITIES (Cont'd)	
Mitigation (cont'd). See above.	Mitigation (cont'd). at Kapolei Parkway / Renton Road intersection.
AIR QUALITY	
Construction or Immediate Impacts. Fugitive dust and mobile source emissions from construction equipment and vehicles would be generated during the construction of Kapolei Parkway and other planned roadway projects.	Construction or Immediate Impacts. Similar to the impacts described under the No-Build Alternative, construction of North-South Road would produce additional fugitive dust and mobile source emissions.
Operational or Long-Term Impacts. No violations of federal or State one- or eight-hour carbon monoxide standards are predicted. The microscale analysis for the proposed project demonstrates that no violations of the National or State Ambient Air Quality Standards are predicted.	Operational or Long-Term Impacts. No violations of the federal or State carbon monoxide standards are predicted. The project meets these goals and would not affect the State of Hawaii's current attainment status.
Mitigation. None required.	Mitigation. Dust control measures will be implemented during construction, such as minimizing land disturbance, using watering trucks and windbreaks, limiting vehicular paths, and stabilizing temporary roads. Following construction, any disturbed land not permanently in use will be re-vegetated.
NOISE	
Construction or Immediate Impacts. All planned roadway projects would result in some noise from construction sites. High noise levels would be generated during construction of Kapolei Parkway. Activities near Renton Road may disturb Ewa Villages residences.	Construction or Immediate Impacts. In addition to the impacts described under the No-Build Alternative, construction of North-South Road would produce high noise levels, but the North-South Road corridor is located away from existing residences, and construction would occur mostly during daylight hours when loud noises are more tolerable. To minimize potential traffic disruption, night work is anticipated at the H-1 Freeway during the

Table S-2:
Summary of Environmental Impacts and Mitigation Measures
(continued)

No-Build Alternative	Build Alternative
Noise (Cont'd)	
	Construction or Immediate Impacts (cont'd). interchange construction.
Operational or Long-Term Impacts. Under the No-Build Alternative, predicted 2025 traffic noise levels at seven of the nine receptor sites analyzed are expected to be no different than their existing peak hour noise levels. Receptor sites near the H-1 Freeway and Farrington Highway are predicted to be higher than the noise abatement criteria (NAC) of Leq(h) 67 dBA under the No-Build Alternative, which is no different than current conditions. Noise impacts at receptor sites on or near existing and future sections of Kapolei Parkway are not expected.	Operational or Long-Term Impacts. Under the Build Alternative, predicted 2025 traffic noise levels at those sites near the H-1 Freeway, Farrington Highway and on or near existing and future sections of Kapolei Parkway will be similar to conditions under the No-Build Alternative. Although traffic noise from North-South Road could contribute to ambient noise levels of the receptors near the H-1 Freeway and Farrington Highway, there are no immediate planned developments in these areas. Similarly, no noise receptors immediately adjacent to North-South Road were used because there are no immediate planned developments in these areas.
Mitigation. None required.	Mitigation. None required.
ECOSYSTEMS	
Construction or Immediate Impacts. Construction of Kapolei Parkway would clear vegetation consisting of mostly koa haole, buffel grass, swollen fingergrass, kiawe, and other common weedy plants. Other planned roadway projects would also most likely clear similar vegetation. Three Kooloaula, an endangered plant species, would be displaced by the Kapolei Parkway.	Construction or Immediate Impacts. Construction of North-South Road would clear vegetation similar to the No-Build Alternative, consisting almost exclusively of introduced or alien species. In addition to the three Kooloaula plants displaced by the Kapolei Parkway, another 21 individuals of the endangered species would be affected by the North-South Road construction. There may also be increased risk to remaining endangered plants from fire and automobile emissions. Because the construction of North-South Road and Kapolei Parkway are federally-funded under the Build Alternative, and the FHWA has determined that there

Table S-2:
Summary of Environmental Impacts and Mitigation Measures
(continued)

No-Build Alternative	Build Alternative
ECOSYSTEMS (Cont'd)	
Construction or Immediate Impacts (cont'd). See above.	Construction or Immediate Impacts (cont'd). would be an adverse impact on endangered species, a formal Section 7 consultation with the U.S. Fish and Wildlife Service under the Endangered Species Act was triggered.
Operational or Long-Term Impacts. No additional impacts to botanical and zoological resources anticipated.	Operational or Long-Term Impacts. Increased risk to the endangered plants from fire and automobile emissions may not be limited to the construction period.
Mitigation. A Habitat Conservation Plan (HCP) for Kooloaula in Kapolei is already being implemented. In particular, a temporary 18-acre "Contingency Reserve Area" has been established prior to allowing the take of any plants, including the three plants in the Kapolei Parkway ROW. Otherwise, no construction-period mitigation measures are required because construction of Kapolei Parkway would be conducted by the City at a later time.	Mitigation. Similar to the No-Build conditions, the HCP governing impacts on the Kooloaula population will be implemented prior to allowing the take of the three plants in the Kapolei Parkway ROW and the additional 21 plants in the North-South Road ROW. In the unlikely event that other existing plants in the population do not survive fire, changes in air quality, or other unavoidable events, the genetic material of the population has been preserved by propagules of existing Kooloaula individuals and are already managed at three off-site locations, per the provisions of the HCP. The construction contractor will be required to take fire prevention measures. A Section 7 Biological Opinion (BO) was rendered by the Service on August 5, 2004, documenting that the project with mitigation measures specified in the HCP will not jeopardize the affected endangered species. The completion of the BO completed the formal Section 7 consultation process.

Table S-2:
Summary of Environmental Impacts and Mitigation Measures
(continued)

No-Build Alternative	Build Alternative
WATER RESOURCES	
Construction or Immediate Impacts. The construction of Kapolei Parkway and other planned projects would expose soil, which could cause sediment loading of storm water during heavy rains.	Construction or Immediate Impacts. In addition to the impacts described under the No-Build Alternative, construction of North-South Road would expose soil at excavation sites, stockpiles and haul roads, which could cause sediment loading of storm water during heavy rains.
Operational or Long-Term Impacts. No impacts to water resources anticipated.	Operational or Long-Term Impacts. The mauka portion of North-South Road overlies the recharge area of the Southern Oahu Basal Aquifer (SOBA). Other roadways, such as the H-1 Freeway and Farrington Highway, and other urban land uses also overlie SOBA recharge areas. North-South Road would alter the local drainage pattern by interrupting sheet flow across the Ewa Plain. However, the project proposes to construct a portion of the regional drainage system. One result of the drainage system would be to collect and channelize the sheet flows. The project also includes bridges to allow passage of those flows in Kaloi Gulch. A cross-drain system would also be provided to allow flows under the roadway berm. Excavation of a retention basin would accommodate the increase in flow that would be caused by the roadway's impervious surface. Those components of the regional drainage system being provided by this project would be sized for the ultimate capacity needed for full build-out of the watershed. However, the capacity may be brought on-line in a phased manner. Even in the initial phase, the proposed drainage system for the North-South Road

Table S-2:
Summary of Environmental Impacts and Mitigation Measures
(continued)

No-Build Alternative	Build Alternative
WATER RESOURCES (Cont'd)	
Operational or Long-Term Impacts (cont'd). See above.	Operational or Long-Term Impacts (cont'd). will be able to convey flows in excess of the FEMA 100-year flood safely. System capacity will be increased commensurate with the pace of development in the watershed. There is no regulatory FEMA floodway within the project limits. A small portion of the project proposes excavation within the regulatory FEMA flood plain. Because the floodwater storage capacity of the floodplain would be increased, the function of the flood plain would not be adversely affected. Encroachment on the regulatory floodway will require filing of flood plain certifications with the City and County to ensure compliance with the City's participation in the National Flood Insurance Program.
Mitigation. No construction-period mitigation measures are required because construction of Kapolei Parkway would be conducted by the City at a later time.	Mitigation. Storm water runoff and erosion during project construction will be mitigated through the use of Best Management Practices (BMPs) established before construction begins in coordination with the HDOH. As a precautionary measure to prevent roadway runoff from infiltrating into potable groundwater resources of the SOBA, the storm water system on the mauka section of North-South Road will convey roadway drainage to a discharge point approximately 1,500 feet south of Farrington Highway, away from the SOBA recharge area. Modification of the current regional drainage pattern (sheet flows and

Table S-2:
Summary of Environmental Impacts and Mitigation Measures
(continued)

No-Build Alternative	Build Alternative
WATER RESOURCES (Cont'd)	
Mitigation (cont'd). See above.	Mitigation (cont'd). intermittent streams) must occur to enable the urbanization planned for the region. This project will contribute towards the modification of the regional drainage system. Insofar as this project will decrease flood risk through the provision of improved drainage infrastructure and capacity to handle drainage, the impacts will be beneficial and no mitigation of impacts to drainage patterns is required. An ACOE 404 permit will be required for the Kaloi Gulch crossings. This permit, along with a Water Quality Certification from the State of Hawaii Department of Health, will contain specific mitigation measures for the stream crossings.
SOLID WASTE AND HAZARDOUS MATERIALS	
Construction or Immediate Impacts. It is unlikely that hazardous materials would be encountered during construction of Kapolei Parkway despite the existence of known hazardous materials sites associated with the Ewa Sugar Mill. These sites are located near the corridor but at sufficient distances from construction areas.	Construction or Immediate Impacts. Similar to the No-Build Alternative, it is unlikely that hazardous materials would be uncovered during construction of North-South Road. Construction activities would generate hazardous waste. The amount of project excavation may exceed the amount of fill material recycled for use on the project by approximately 500,000 cubic yards.
Operational or Long-Term Impacts. None are anticipated. The possibility always exists that vehicles carrying hazardous materials could be involved in an accident, which could release hazardous materials into the environment. Established incident response protocols are in place for such occurrences.	Operational or Long-Term Impacts. Same as the No-Build Alternative.

Table S-2:
Summary of Environmental Impacts and Mitigation Measures
(continued)

No-Build Alternative	Build Alternative
SOLID WASTE AND HAZARDOUS MATERIALS (Cont'd)	
Mitigation. None required.	Mitigation. Solid waste and/or hazardous materials generated during construction will be properly handled and disposed of per HDOH. Storage and disposal of any excess excavated material will be the responsibility of the contractor, and will be conducted in accordance with all applicable requirements on the storage and disposal of excavated material.
HISTORIC RESOURCES	
Construction or Immediate Impacts. Due to past agricultural activities, it is highly unlikely that archaeological resources would be uncovered during construction of Kapolei Parkway and other planned roadway projects in the Ewa Plain.	Construction or Immediate Impacts. Similar to the No-Build Alternative, it is highly unlikely that archaeological resources would be uncovered during construction of North-South Road.
Operational or Long-Term Impacts. The Kapolei Parkway intersection with Renton Road would be within the Ewa Sugar Plantation Villages Historic District. Because the intersection is in a relatively isolated area of the district, and not within areas of the district where most of the contributing and individual historic buildings are located, it would not adversely affect the historic integrity of the district. However, the intersection would likely warrant traffic signals, which may not be consistent with the district's historic characteristics.	Operational or Long-Term Impacts. Since construction of Kapolei Parkway is "federalized" under the Build Alternative, compliance with Section 106 of the National Historic Preservation Act (NHPA) is required. Because the intersection is in a relatively isolated area of the district, and not within areas of the district where most of the contributing and individual historic buildings are located, the FHWA rendered a "no adverse effect" determination. The State Historic Preservation Officer concurred with the "no adverse effect" determination, thereby completing the Section 106 process.
Mitigation. Pursuant to Section 6E-8 of the Hawaii Revised Statutes, the City will consult with the State Historic Preservation Division on the architectural design of the traffic signals at Kapolei Parkway and Renton Road.	Mitigation. When a traffic signal is warranted, the designers of the traffic signal will consider the traffic signal hardware and in developing the traffic signal timing plan. During the design phase, the City's Department of Design

Table S-2:
Summary of Environmental Impacts and Mitigation Measures
(continued)

No-Build Alternative	Build Alternative
HISTORIC RESOURCES (Cont'd)	
Mitigation (cont'd). See above.	Mitigation (cont'd). and Construction (DDC) will consult with the State Historic Preservation Division (SHPD) about potential measures to help maintain visual continuity along Renton Road.
PARKS AND RECREATION	
Construction or Immediate Impacts. Right-of-way from any existing or planned park or recreational facility would not be required for Kapolei Parkway.	Construction or Immediate Impacts. Similar to the No-Build Alternative, right-of-way from any existing or planned park or recreational facility would not be required for North-South Road.
Operational or Long-Term Impacts. Kapolei Parkway would facilitate public access to parks and recreational facilities by improving regional mobility in Ewa.	Operational or Long-Term Impacts. North-South Road would facilitate public access to parks and recreational facilities to a greater extent than under the No-Build Alternative by providing access to the H-1 Freeway.
Mitigation. None required.	Mitigation. None required.
VISUAL	
Construction or Immediate Impacts. None anticipated.	Construction or Immediate Impacts. None anticipated.
Operational or Long-Term Impacts. Kapolei Parkway would be designed as an urban "parkway", featuring ample landscaping and sidewalks. In the context of existing and planned urban development, Kapolei Parkway would not represent a visually obtrusive addition to Ewa's aesthetic environment, including the historic context of Ewa Villages.	Operational or Long-Term Impacts. Similar to the No-Build Alternative. In addition, motorists on the North-South Road would have access to views of the Ewa Plain, the Waianae Mountain Range and the rising central Oahu plateau, which they otherwise may not have. Future land uses, however, would likely affect some of these views, depending on the location of future developments.
Mitigation. None required.	Mitigation. None required, other than landscaping, which is part of the proposed action.

Table S-2:
Summary of Environmental Impacts and Mitigation Measures
(continued)

No-Build Alternative	Build Alternative
CUMULATIVE AND SECONDARY	
Potential Impacts. The Ewa Plain is anticipated for major development according to the Ewa DP, and proposed future development projects would occur regardless of which alternative is selected. Regional development and urbanization, including in the Ewa Sugar Plantation Villages Historic District; soil erosion from multiple construction projects; increased congestion of the transportation system corresponding to regional growth; some increased noise levels with regional development; eventual "take" of all endangered Kooloaula plants from the East Kapolei area due to planned development; existing regional drainage issues would persist; urbanization of regional/neighborhood parks and viewplanes. Beneficial impacts include increased utilities infrastructure regionally, and greater socio-economic ties between the Ewa and Kapolei communities.	Potential Impacts. Major development is anticipated in the Ewa Plain according to the Ewa DP, and proposed future development would occur regardless of which alternative is selected. Both Kapolei Parkway and North-South Road are part of this planned development. Therefore, potential impacts of the Build Alternative are the same as the No-Build Alternative, with the following changes: better roadway network, and therefore improved traffic conditions; increased traffic noise with regional development; North-South Road to improve regional drainage patterns by contributing to implementation of the regional drainage system; addition of a highway (North-South Road) in the regional viewplane. The Build Alternative will facilitate development of other planned projects, and project mitigation (*e.g.* noise, threatened and endangered species, drainage) has been designed to address impacts using a regional approach.
Mitigation. Increased traffic congestion and soil erosion would be addressed by other planned roadway projects and best management practices associated with those projects. Future developers would address noise impacts on currently undeveloped areas, as each new development is constructed. A Habitat Conservation Plan is being implemented to address the impact of regional development in East Kapolei. Existing regional drainage issues would be addressed by a regional drainage plan.	Mitigation. All mitigation measures that would be implemented under the No-Build Alternative will also be implemented under the Build Alternative. In addition, those portions of the regional drainage system being provided by this project (e.g., regional drainage channel, culverts) will be sized to accommodate full build-out of the watershed. However, full capacity may be brought on-line in a phased manner based on the pace of development in the watershed. No mitigation is necessary for improved traffic conditions.

S.5 PROJECT SCHEDULE AND COSTS

The proposed project would be designed and built in phases. The interim phase would consist of only the North-South Road interchange ramps oriented to and from the east (westbound off ramp and eastbound on ramp), the east half of North-South Road from H-1 Freeway to Kapolei Parkway and the makai portion of Kapolei Parkway between Renton Road and North-South Road. A connection would be established between H-1, Farrington Highway, and Kapolei Parkway only when the interim phase is completed. The ultimate phase would implement the full build out of the North-South Road Interchange, North-South Road, and Kapolei Parkway. This phasing plan is described in more detail in Chapter 2 of this FEA/FONSI. In addition, the section of Kapolei Parkway west of the intersection of Kapolei Parkway and North South Road would not be opened until North South Road is opened from Kapolei Parkway to H-1.

The current schedule and costs are shown in Table S-3. Completion of approval processes is anticipated in late 2004. Construction of North-South Road between Farrington Highway and Kapolei Parkway would begin in early 2005, and construction of Kapolei Parkway would begin in 2006. The interim phases of both North-South Road and Kapolei Parkway would be open for service in late 2007 to early 2008. The ultimate phases would be completed and open for service between 2012 and 2015.

The estimated construction cost of the interim phase of North-South Road is $76 million, with the ultimate phase costing an additional $65 million. The estimated total cost for the entire North-South Road is $141 million. The interim phase would include the construction of three highway lanes and a half-diamond interchange; three more lanes and a full interchange would be provided in the ultimate phase. Based on availability of funding, the State would be responsible for 20 percent of project costs, and FHWA would pay for 80 percent. These estimates include the roadway, landscaping, drainage, electrical, traffic control, and environmental mitigation. Right-of-way acquisition would cost roughly $16 million, in addition to the total construction cost of $141 million.

The estimated construction cost of the interim phase of Kapolei Parkway between Renton Road and North-South Road is $12 million. The estimated cost for the ultimate Renton to North-South Road segment is $22 million. The cost share for Kapolei Parkway would be 80 percent federal funds and 20 percent City funds, based on availability of funding.

Table S-3:
Proposed Project Construction Schedule and Costs

Activity	Period	Cost
North-South Road		
Interim Phase	early 2005 to late 2007	$76 million
Ultimate Phase	post 2007	$65 million
TOTAL		$141 million
Kapolei Parkway		
Interim Phase	2006 to 2007	$12 million
Ultimate Phase	post 2007	$10 million
TOTAL		$22 million

Source: HDOT and DTS, 2004.

CHAPTER 1 ▪

NORTH-SOUTH ROAD and KAPOLEI PARKWAY
FINAL ENVIRONMENTAL ASSESSMENT

CHAPTER 1
PURPOSE OF AND NEED FOR ACTION

1.1 PLANNING CONTEXT

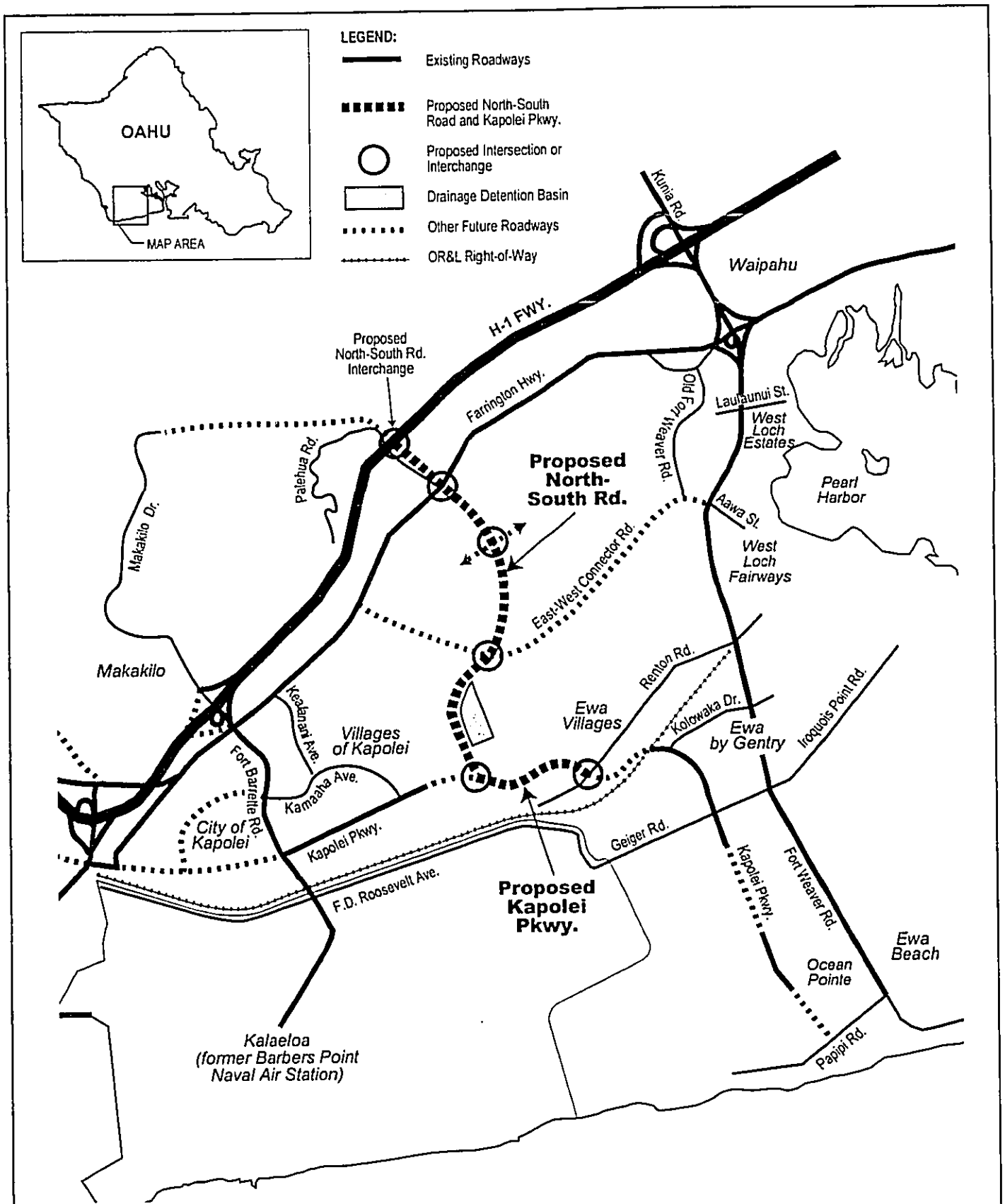
The State of Hawaii Department of Transportation (HDOT) and City and County of Honolulu Department of Transportation Services (DTS) are issuing this Final Environmental Assessment / Finding of No Significant Impact (FEA/FONSI) for the North-South Road and Kapolei Parkway project (formerly North-South Road project) in Ewa, Oahu, Hawaii, pursuant to Chapter 343 of the Hawaii Revised Statutes (HRS). The project will affect tax map keys (TMKs): 9-1-016:108, 9-1-016:109, 9-1-017:004, 9-1-017:046, 9-1-017:068, 9-1-017:069, 9-1-017:071, 9-1-017:075, 9-1-018:004, 9-1-018:005, 9-2-002:001, 9-2-002:006, 9-1-017:86, 9-1-017:88, 9-1-16:129, 9-1-16:120, 9-1-16:127, 9-1-18:001, 9-1-18:007. Figure 1.1-1 shows the proposed project location and key elements.

North-South Road is a proposed federal-aid, limited-access, principal arterial highway, that would connect the Interstate Route H-1 (H-1 Freeway) to the proposed Kapolei Parkway, and is approximately 2.2 miles in length. The North-South Road project includes the construction of: (1) a major interchange at its junction with the H-1 Freeway; (2) the North-South Road/Kapolei Parkway intersection; and (3) various drainage features, such as a detention basin, associated with the proposed highway. The roadway section of concern for the Kapolei Parkway is from the proposed North-South Road to Renton Road, is approximately 0.7-mile in length, and is a proposed federal-aid, arterial roadway which would connect the proposed North-South Road to the other existing, southerly portions of Kapolei Parkway.

While the City and County of Honolulu (City) would otherwise complete the portion of Kapolei Parkway between North-South Road and Renton Road with local funds within roughly the next 20 years, the 0.7-mile section of Kapolei Parkway must be operational for North-South Road to function in accordance with its intended purpose. Consequently, in order to ensure that a major portion of the Kapolei Parkway is completed within a reasonable time period of the completion of the North-South Road, the 0.7-mile section of the Kapolei Parkway, from North-South Road to Renton Road, would be "federalized", or federal funds would be made available for its construction.

1.1.1 PURPOSE OF THIS DOCUMENT

This FEA/FONSI has been prepared to comply with the HRS Chapter 343 and the Hawaii Administrative Rules (HAR) [Title 11, Chapter 200, Environmental Impact Statement Rules (August 1996)]. This FEA/FONSI also documents compliance with federal laws and regulations because of the proposed use of federal funds administered by the Federal Highway Administration (FHWA) for this project, which includes both the North-



North-South Road and Kapolei Parkway Project Location

North-South Road and Kapolei Parkway Project
Final Environmental Assessment
Figure 1.1-1

South Road and the portion of Kapolei Parkway between Renton Road and North-South Road. Environmental review pursuant to the National Environmental Policy Act has not been completed.

In September 1998, HDOT, in collaboration with the FHWA, publicly released a joint HRS Chapter 343 and NEPA Draft Environmental Assessment (1998 Draft EA) for the North-South Road project, which extends from the H-1 Freeway to its future intersection with Kapolei Parkway. The 1998 Draft EA was written based on existing conditions and plans known at that time. It was understood at the time that third parties would implement the proposed portion of Kapolei Parkway in advance of the completion of North-South Road. Consequently North-South Road was envisioned as providing a connection between the H-1 Freeway and a functioning Kapolei Parkway.

A FEA/FONSI was not issued for the project in large part due to complications arising from the proposed take of an endangered plant species, the Kooloaula (*Abutilon menziesii*), as identified in the 1998 Draft EA. Difficulties in completing the State's newly established Habitat Conservation Plan process (under HRS Chapter 195D) and federal consultation pursuant to the Endangered Species Act resulted in several years of delay. A HRS Chapter 343 FONSI was also not issued for the same reason.

Due to changes in existing conditions and the project definition since 1998, HDOT released a Revised Draft EA, which was noticed on July 23, 2004 in the Office of Environmental Quality Control's publication, The Environmental Notice. The Revised Draft EA updated the impact assessment for North-South Road, and disclosed the inclusion of the portion of Kapolei Parkway from North-South Road to Renton Road. The document also replaced the 1998 Draft EA in accordance with State requirements. Following receipt and review of agency and public comments on the Revised Draft EA, HDOT rendered a decision that the proposed project will not result in a significant impact per criteria specified in HAR Section 11-200-12(b), and therefore, has issued this FEA/FONSI.

The purpose of this FEA/FONSI is to assess the environmental and social impacts that could result from construction of the North-South Road project and the federalization of the Kapolei Parkway project. Chapter 2 contains a project description and a discussion of alternative actions considered. Chapter 3 is a detailed discussion of the potential project impacts. The potential impacts of this combined action are assessed for the design year, 2025, and are compared against an assumed future "No-Build" condition. Construction-phase impacts are also assessed. Chapter 3 also provides proposed mitigation measures for adverse impacts. Coordination with interested and affected parties, including those required pursuant to State and federal laws, is documented in Chapter 4 and includes a formal governmental agency scoping meeting and informational presentations to local neighborhood boards.

1.1.2 HISTORY AND CHANGES SINCE 1998 DRAFT EA

In 1977, the City and County of Honolulu approved a General Plan that designated the Ewa region to be the site of a secondary urban center on Oahu, which includes the City of Kapolei, Ko Olina Phases I and II, the Kalaeloa Barbers Point Harbor area, Kapolei

Business Park, and Campbell Industrial Park. This "second city" objective was reconfirmed in the latest General Plan (1992). In the Ewa Development Plan (August 1997; amended May 2000), the City and County of Honolulu envisioned close to 39,000 housing units and over 67,000 jobs in the Ewa region by the Year 2020. The City and County of Honolulu has facilitated achievement of this objective through its residential developments in West Loch and Ewa Villages, and other actions.

The State of Hawaii also designated this area for future growth. The Housing and Community Development Corporation of Hawaii (HCDCH), formerly Housing Finance and Development Corporation (HFDC), is developing the Villages of Kapolei. The State is also planning a University of Hawaii West Oahu Campus in this area.

Private development has also occurred in the Ewa region, partly because of the area's State and County designations as a secondary urban center. These developments include residences in Makakilo, the Villages of Kapolei, Ewa by Gentry, and Ocean Pointe (formerly Ewa Marina). Commercial, industrial, and resort developments in the City of Kapolei, Ko Olina, and Campbell Industrial Park are other examples of private development.

The State, City, and private developers have built the existing roadway infrastructure, in keeping with the network proposed in the Ewa DP. Crucial to the main network in the Ewa and Kapolei areas are the North-South Road and a complete Kapolei Parkway. Construction of these facilities would enable the Ewa area roadway network to provide the mobility as planned by creating a new connection between the Ewa and Kapolei areas, and an alternate access route to the H-1 Freeway from both communities.

The Oahu Metropolitan Planning Organization (OMPO) adopted the Transportation for Oahu Plan (TOP 2025) on April 6, 2001, replacing the previous Oahu Regional Transportation Plan (ORTP) adopted in November 1995. The TOP 2025 addresses Oahu's changing traffic conditions, and presents the planned spending needed on transportation facilities and programs through the horizon year of 2025. TOP 2025 includes the North-South Road with a new interchange at the H-1 Freeway, and the completion of Kapolei Parkway.

The original Draft EA published in 1998 addressed only the North-South Road, with the assumption that other projects would be completed in advance of North-South Road. For example, prior to 1998 the HFDC (now the HCDCH), committed to completing Kapolei Parkway as a part of its East Kapolei Development, but HCDCH subsequently dropped its East Kapolei proposal and with it, its commitment to complete Kapolei Parkway.

For North-South Road to fulfill its function to provide alternative regional access to the H-1 Freeway for the Ewa area, Kapolei Parkway would need to be completed from Renton Road to North-South Road. Kapolei Parkway is currently completed between Launahele Street and the Oahu Railway and Land Company (OR&L) right-of-way (ROW) and would soon be completed from OR&L right-of-way to Renton Road. The City plans to continue Kapolei Parkway from Renton Road to North-South Road, but budgetary constraints make the timing of this completion uncertain. To insure that the Renton Road to North-

South Road segment is connected to North-South Road within the same time frame as the opening of North-South Road, the City and the HDOT elected to combine both projects into a single project for review purposes, which would allow the portion of Kapolei Parkway, from Renton Road to North-South Road, to be built using federal assistance, thereby addressing the budgetary constraints.

In addition, impacts to an endangered plant disclosed in the 1998 Draft EA had to be analyzed and mitigated further, pursuant to the State's endangered species law, HRS Chapter 195D. Because the law was new at the time, and regulations for implementing its requirement to prepare an endangered species' habitat conservation plan (HCP) were not fully developed, substantial time was required to allow the state legislature to correct gaps in the law. The legislature completed its revisions to the law during its 2003 session, thereby allowing the HCP to proceed, and the Board of Land and Natural Resources (BLNR) approved the Habitat Conservation Plan for *Abutilon menziesii* at Kapolei in March 2004.

Moreover, the design effort has advanced since 1998, changing the project definition. For example, the original North-South Road design acknowledged an HCDCH proposal to redirect the existing Kaloi Gulch into a new channel that was to be located adjacent to and east of North-South Road. This rechannelization was part of East Kapolei actions to address regional drainage. When HCDCH withdrew the East Kapolei Development, the timing of the regional drainage improvements became more long range. This change means that North-South Road would precede instead of follow the regional drainage improvements. Therefore, design of North-South Road was changed to bridge the existing Kaloi Gulch. There is still a drainage channel and detention pond located adjacent to and east of the proposed North-South Road, but these will be designed to handle roadway drainage and effects of overland drainage affected by the roadway. These drainage elements are compatible with and would not preclude the ultimate regional drainage improvements that would be implemented with future development of the area.

Therefore, the actions evaluated in this FEA/FONSI are:

- the full construction of North-South Road, including roadway drainage features and the H-1 Freeway interchange; and
- federalization of the segment of Kapolei Parkway from North-South Road to Renton Road.

This FEA/FONSI assumes that the portion of Kapolei Parkway between Renton Road and North-South Road would otherwise be constructed with local funds under the No-Build Alternative, but with several years of delay. Therefore, federalization of the Kapolei Parkway portion of the project would result in accelerating that roadway's construction. Note that this FEA/FONSI assumes the actual construction of Kapolei Parkway within Ewa Villages was originally evaluated pursuant to the State's environmental impact law (Chapter 343, HRS), as part of the Ewa Villages Master Plan Environmental Impact Statement (EIS) (February 1991). The proposed portion of Kapolei Parkway from North-South Road to Renton Road would connect with another segment of Kapolei Parkway from Renton Road to the OR&L right-of-way, which the City is planning to construct soon,

independent of federal funding. The City evaluated both portions of Kapolei Parkway for environmental impacts in the Ewa Villages Master Plan EIS.

A second iteration of formal scoping was not performed prior to the release of the Revised Draft EA. The basis of this decision is as follows. Distribution of the HRS Chapter 343 Revised Draft EA to those filing for consulted party status in 1998 provides an opportunity for these parties to rejoin the discussion by commenting on the document. Any formal pre-consultation processes that were previously conducted have been incorporated into the current process. Where those comments were still applicable, the Revised Draft EA and this FEA/FONSI have also incorporated the public comments on the 1998 Draft EA. In cases where the comments were no longer directly relevant because project conditions have changed, effort was made to incorporate the spirit or intent of the comment.

1.1.3 NAMING CONVENTIONS USED IN THIS DOCUMENT

Over the years, Kapolei Parkway has been called by several different names - a portion of North-South Road, East-West Road, as well as Kapolei Parkway. This FEA/FONSI refers to the subject roadway as Kapolei Parkway. The term Kapolei Parkway also refers only to that proposed City segment of the roadway between North-South Road and Renton Road, unless otherwise specified. Because the North-South Road encompasses the intersection with Kapolei Parkway, the western terminus of Kapolei Parkway is at the City/State property line where the intersection technically ends.

This document generally uses the standard directional terms north, south, east, and west. Because the proposed action is located in the Ewa District, this document avoids commonly-used local conventions based on place names, such as Ewa or Waianae (a generally westerly direction), Diamond Head or Koko Head (a generally easterly direction), and mauka/makai (towards the mountains/ocean, or north/south, with respect to project area). However, in some cases, these terms may be the most convenient to describe a direction or location, and this FEA/FONSI uses them as necessary.

1.2 PROJECT PURPOSE AND NEED

This project would address the following purposes and needs:

- meet roadway capacity need for existing travel demand;
- respond to regional land use and economic development trends;
- meet future transportation demand; and
- improve sub-regional mobility.

1.2.1 ROADWAY CAPACITY NEED FOR EXISTING TRAVEL DEMAND

Traffic volumes on the arterial roadways of Ewa reflect recent rapid urban development as described in Section 1.2.2 (see Table 1.2-1). From 1989 to 2001, growth in traffic volume on existing roadways ranged from 56 percent to 200 percent.

Fort Weaver Road repeatedly reaches near capacity conditions during both the AM and PM peak hours. In the AM peak period, approximately 85 percent of northbound vehicles on Fort Weaver Road access the eastbound H-1 Freeway via Kunia Interchange. Consequently, the Fort Weaver Road lanes that accesses the eastbound H-1 Freeway regularly queue to the Fort Weaver Road/Farrington Highway Interchange. Fort Weaver Road also processes very large traffic volumes in the southbound direction in the PM peak period. Fort Weaver Road is planned to be widened from its existing four-lane cross-section to a six-lane cross-section within the next three years. This widening would help the current situation on Fort Weaver Road, but would be insufficient to accommodate planned future development in the Ewa area.

At Fort Barrette Road, traffic operations are congested during both the AM and PM peak hours. Particularly notable is the congestion at the Fort Barrette Road/Farrington Highway intersection, causing mauka-bound queues during the AM peak hour and eastbound queues during the PM peak hour. This intersection is a key intersection that regulates access to and from H-1 Freeway from the area located makai of H-1 Freeway.

The H-1 Freeway in the study area is affected by downstream congestion during the existing AM peak period. This downstream congestion can create traffic queues that extend back to the Kunia Interchange. During the PM peak period, recent improvements at the Kunia Interchange have mitigated vehicle queues that used to back up on the westbound to makai-bound loop off-ramp that used to extend onto the freeway. Similarly, at the Makakilo Interchange in the westbound direction, PM peak period queuing on the westbound off-ramp that, at times, extended onto the freeway has been mitigated by recent improvements to the ramp.

Recent interchange improvements, while helpful, only address the existing traffic demand. It is projected that future travel demand at the Kunia and Makakilo Interchanges would exceed their capacity, adversely affecting conditions on the H-1 Freeway. Therefore, construction of new roadways and interchanges, as well as improvements to existing roadways and interchanges, is needed to address continuing regional urban development, as directed by current State and City policy and described in Section 1.2.2.

The proposed North-South Road in particular would attract mauka-makai traffic, which would otherwise flow on Fort Weaver and Fort Barrette Roads. Diverting traffic to North-South Road would improve operating conditions on Fort Weaver and Fort Barrette Roads, allowing these other roadways to serve their travel markets better. Similarly, the North-South Road Interchange would relieve projected congested operations on the freeway at the Kunia and Makakilo Interchanges, protecting the H-1 Freeway's capacity to handle travel demand in this rapidly growing portion of the Ewa Plain.

Table 1.2-1:
Traffic Volume Trends

Facility	Location	Average Daily Traffic			
		1989	2001	Percent Increase	Percent Annual Increase
Fort Weaver Road	North of Farrington Highway	45,000	70,000	56%	4%
	South of Farrington Highway	34,000	61,000	79%	5%
	At Honouliuli Bridge	33,000	57,000	73%	5%
Fort Barrette Road	South of H-1 Freeway	12,000	36,000	200%	10%
H-1 Freeway	East of Kunia Interchange	74,000	140,000	89%	5%

Source: HDOT, Traffic Count Data.

1.2.2 REGIONAL LAND USE AND ECONOMIC DEVELOPMENT TRENDS

The Ewa region, as defined by the Ewa Development Plan (DP), had a population of 68,718 in 2000 (as defined by the City and County of Honolulu designated Ewa DP Area), approximately 8 percent of Oahu's total population. In contrast, the estimated population of the Ewa DP Area in 1990 was approximately 42,960 persons, 5.1 percent of the island total. In 2025, the estimated population of Oahu would be approximately 1.03 million. According to the City and County of Honolulu General Plan's population guidelines, the Ewa DP Area is intended to accommodate 13 percent of Oahu's 2025 population, or roughly 133,874 persons – an increase of 95 percent from 2000 (U.S. Census, 2000; Ewa Development Plan, Revised 2000; State of Hawaii Department of Business, Economic Development and Tourism, Population And Economic Projections For The State Of Hawaii To 2025, 2000).

It is the objective of the State and City to create a "Second City" for Oahu in the Ewa area, by providing opportunities for residential and employment growth to supplement the Primary Urban Center (PUC). Public and private developers have facilitated achievement of this objective, and a number of projects are completed, under construction or planned. Existing residential areas near the North-South Road Corridor include Ewa Villages, Ewa by Gentry, and the Villages of Kapolei. Future developments near the corridor include the proposed University of Hawaii – West Oahu campus (UH-West Oahu), Department of Hawaiian Home Lands (DHHL) residences for native Hawaiians south of UH-West Oahu, and Ocean Pointe subdivision on the coast between Ewa Beach and the former Barbers Point Naval Air Station (BPNAS), now referred to as Kalaeloa. Other unspecified but anticipated developments would occur in the vast tract east of the proposed North-South Road, and on City property surrounding the proposed Kapolei Parkway. DHHL has expressed interest in developing both areas and is currently in negotiations with the City and State to acquire these properties.

As shown in Table 1.2-2 and Figure 1.2-1, population, employment, and housing would all increase in the Ewa Plain over the 25-year period between 2000 and 2025. The largest population and housing growth is expected to occur in the Ewa Plain. By the year 2025, total population in the Ewa Plain would be over 116,000, up 66 percent from 2000, with a corresponding growth in housing of 73 percent to over 38,000 units. Most of the housing would be developed on the eastern and northern (mauka) portions of the Ewa Plain.

In accordance with the "Second City" concept espoused by the City's Ewa DP, employment would also increase in the Ewa region, particularly in the City of Kapolei. Employment would be centered at the City of Kapolei and Campbell Industrial Park, as well as East Kapolei, Ewa, and Ewa Beach.

The East Kapolei component would be comprised of at least the UH-West Oahu campus, DHHL residential development, and other as yet unspecified urban developments. UH-West Oahu would be located on the west side of the North-South Road Corridor, makai of the Farrington Highway Intersection. Its plans are to provide residential, commercial, and mixed use properties, in addition to the campus itself. One transportation benefit of the proposed UH-West Oahu campus is that commuting students, faculty, and staff would create trips in the outbound direction, thereby helping to balance peak traffic flow on H-1 Freeway and more fully utilize the freeway. DHHL plans to develop an adjoining portion of East Kapolei south of the proposed campus, creating additional traffic demands associated with residential subdivisions. DHHL may also acquire other portions of East Kapolei for residential development. It is anticipated that DHHL would complete Kapolei Parkway between North-South Road and the current terminus of existing Kapolei Parkway in the Villages of Kapolei within the 2025 time frame. With Kapolei Parkway completed from Ewa Beach to Kapolei, the regional transportation network would be able to improve sub-regional mobility between these major activity centers.

Other developments in the Ewa Plain area include the City of Kapolei, the expansion of Makakilo including Makaiwa Hills, industrial development in Campbell Industrial Park, and Ko Olina located on the western coast of the Ewa Plain.

Kalaeloa is the name currently used for the former BPNAS. Existing uses on Kalaeloa include the Coast Guard C-130 base, Hawaii National Guard, Barbers Point Elementary School, Barbers Point Golf Course (military), public beach parks, a flying school, residential uses, and some miscellaneous light industrial uses.

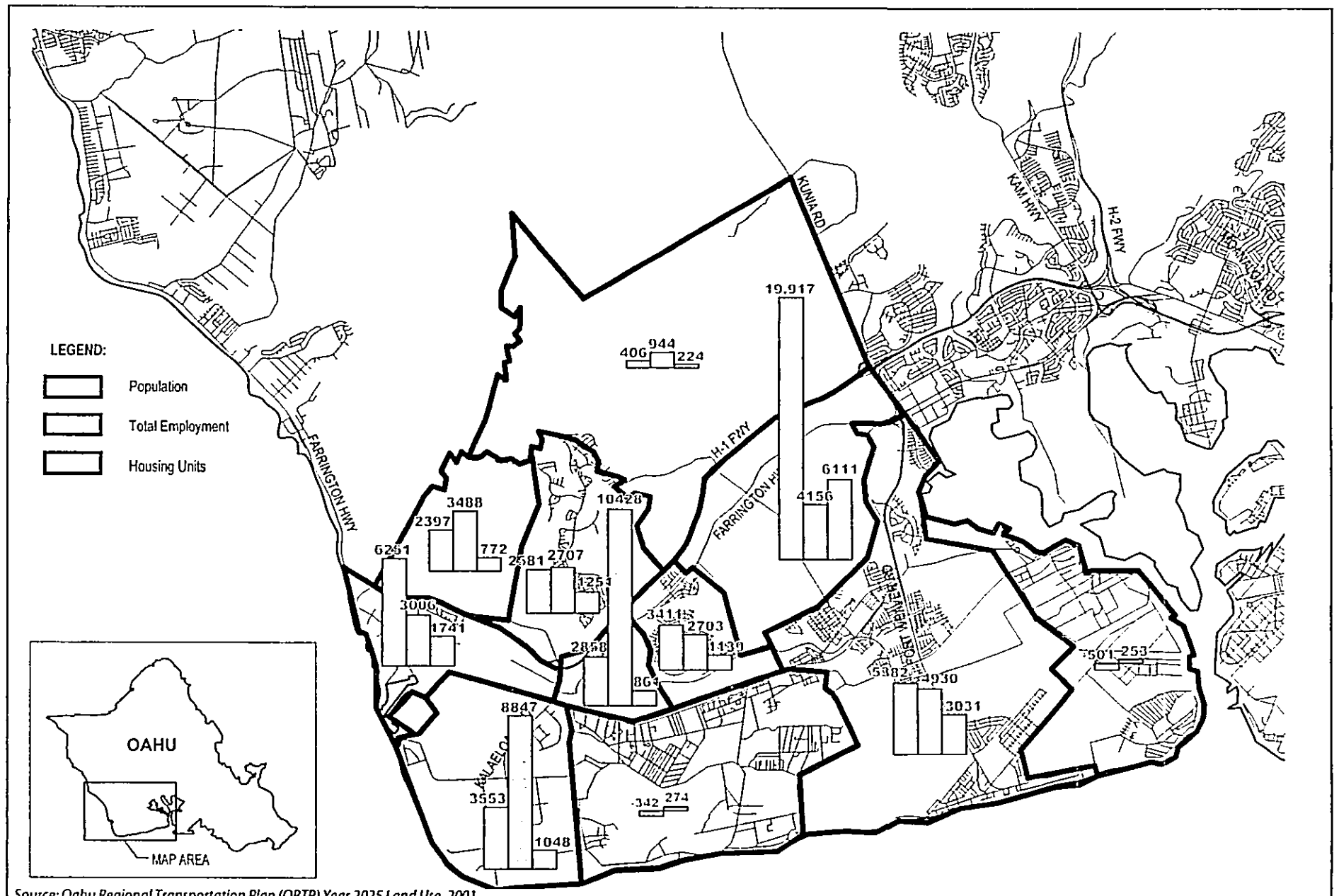
The Ewa DP indicates future land uses at Kalaeloa to be mostly park, agricultural, low- to medium-density residential, public facility, and some light industrial; the OMPO ORTP (TOP 2025) indicates growth for BPNAS that is consistent with the Ewa DP. Potential alternative development plans have been proposed, but none have been officially adopted.

Regional transportation improvements are needed to accommodate this anticipated growth in Ewa. The North-South Road and Kapolei Parkway are just two components of the proposed regional improvements in the TOP 2025.

Table 1.2-2:
Population and Employment Comparison
Year 2000 – Year 2025

Area	Population			Total Employment			Housing Units		
	2000	2025	Change	2000	2025	Change	2000	2025	Change
Makaiwa Hills	2,136	4,533	2,397	1	3,489	3,488	567	1,339	772
Ko Olina	2,450	8,701	6,251	305	3,311	3,006	581	2,322	1,741
Campbell Industrial Park	38	3,591	3,553	3,016	11,863	8,847	3	1,051	1,048
Mauka Campbell Lands	1,311	1,717	406	704	1,648	944	458	682	224
Makakilo	9,207	11,788	2,581	633	3,340	2,707	2,935	4,186	1,251
City of Kapolei	654	3,512	2,858	1,690	12,118	10,428	175	1,036	861
Kalaeloa	4,609	4,267	-342	4,493	4,767	274	1,446	1,446	0
Villages of Kapolei	3,301	6,712	3,411	53	2,756	2,703	888	2,027	1,139
East Kapolei	5,455	25,372	19,917	1,071	5,227	4,156	1,473	7,584	6,111
Ewa & Ewa Beach	33,500	38,882	5,382	2,708	7,638	4,930	10,163	13,194	3,031
Puuloa – Iroquois Pt.	5,431	4,930	-501	224	477	253	1,516	1,516	0
TOTAL	**70,092**	**116,030**	**45,913**	**16,898**	**58,659**	**41,736**	**22,205**	**38,408**	**16,178**

Source: Oahu Regional Transportation Plan (ORTP), Transportation for Oahu Plan TOP 2025, April 2001.



Source: Oahu Regional Transportation Plan (ORTP) Year 2025 Land Use, 2001.

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Projected Growth in Population and Employment (2000-2025)
North-South Road and Kapolei Parkway Project
Final Environmental Assessment
Figure 1.2-1

1.2.3 FUTURE TRANSPORTATION DEMAND

In the base year 2000, there were approximately 150,000 daily production trips (trips originating from an area) and 114,000 daily attraction trips (trips ending in an area) in the Ewa region. Based on the City and County of Honolulu Department of Planning and Permitting's socio-economic forecasts, used in the OMPO ORTP, it was estimated that the region would generate approximately 802,800 daily production trips in the year 2025, an increase of 435 percent. The PUC is projected to receive approximately 60 percent of all attraction trips on Oahu in the year 2025. Therefore, many residents in the Ewa region would travel to and from the PUC with their primary route being the H-1 Freeway.

Socio-economic forecasts also indicate that approximately 646,900 attraction trips would be generated through employment growth in the Ewa region in 2025, an increase of 467 percent over 2000.

The TOP 2025, adopted by the OMPO on April 6, 2001, updates the ORTP adopted in November 1995, and presents the planned spending needed for transportation facilities and programs through the horizon year of 2025. TOP 2025 identifies the need to increase access to the H-1 Freeway and transportation capacity in the North-South Road Corridor area. It also noted the need to establish transportation links between residences in Ewa and future employment centers in the City of Kapolei. Therefore, it includes the construction of North-South Road, a new interchange with the H-1 Freeway, and the completion of Kapolei Parkway, as well as other future transportation network improvements described in Section 2.2, such as the widening of Fort Barrette Road, Fort Weaver Road, and Farrington Highway.

Based on these transportation demand projections and the traffic volume trends described in Section 1.2, additional roadway and interchange capacity between existing and future residential communities and employment centers in the Ewa region and the H-1 Freeway is needed.

Existing roadways and intersections connecting residential and employment areas with the H-1 Freeway are currently operating at or near their capacity (see Section 1.2.1) and would not efficiently be able to accommodate the projected travel demand described above. Improvements to these roadways would serve only part of the projected travel demand. Therefore, construction of North-South Road and the portion of Kapolei Parkway from Renton Road to North-South Road and a new interchange with the H-1 Freeway are needed to fully accommodate the policy-directed development in the Ewa Plain.

1.2.4 SUB-REGIONAL MOBILITY

Providing an alternative facility to Fort Weaver Road and Fort Barrette Road would reduce congestion on these roadways, allowing them to better handle traffic that remains within the Ewa Plain.

In addition, North-South Road and Kapolei Parkway would help improve travel between activity centers within the Ewa Plain by providing alternative routes, which provides system redundancy within the roadway network and improves overall system operation.

Currently, travelers wanting to drive between points in Ewa have limited options, forcing mauka-makai roadways such as Fort Weaver Road and Fort Barrette Road to serve both mauka-makai demand and east-west demand. East-west connectivity is provided primarily by Farrington Highway and H-1 Freeway. Because planned roadways such as Kapolei Parkway are not complete, sub-standard roadways such as Roosevelt Avenue (located within Kalaeloa) are being used to supplement east-west roadway capacity. Providing alternative roadway connections within the Ewa Plain would relieve both existing mauka-makai and east-west roadways thereby providing better sub-regional mobility.

CHAPTER 2 ▪

NORTH-SOUTH ROAD and KAPOLEI PARKWAY
FINAL ENVIRONMENTAL ASSESSMENT

CHAPTER 2
ALTERNATIVES

This chapter describes the alternatives developed and evaluated to address the project purposes and needs described in Chapter 1. Alternatives were developed in these areas:

- roadway alignment;
- roadway concept - the combination of roadway facilities and transportation modes that would be accommodated within the alignment; and
- interchange configuration.

By screening the alternatives (as summarized in this chapter), a set of alternatives was identified for detailed impact analysis in Chapter 3 of this FEA/FONSI. The alternatives carried forward are the No-Build and Preferred Build (Build) Alternatives.

2.1 ALTERNATIVES ADDRESSED IN DETAIL IN THIS FEA/FONSI

2.1.1 ASSUMPTIONS COMMON TO BOTH ALTERNATIVES

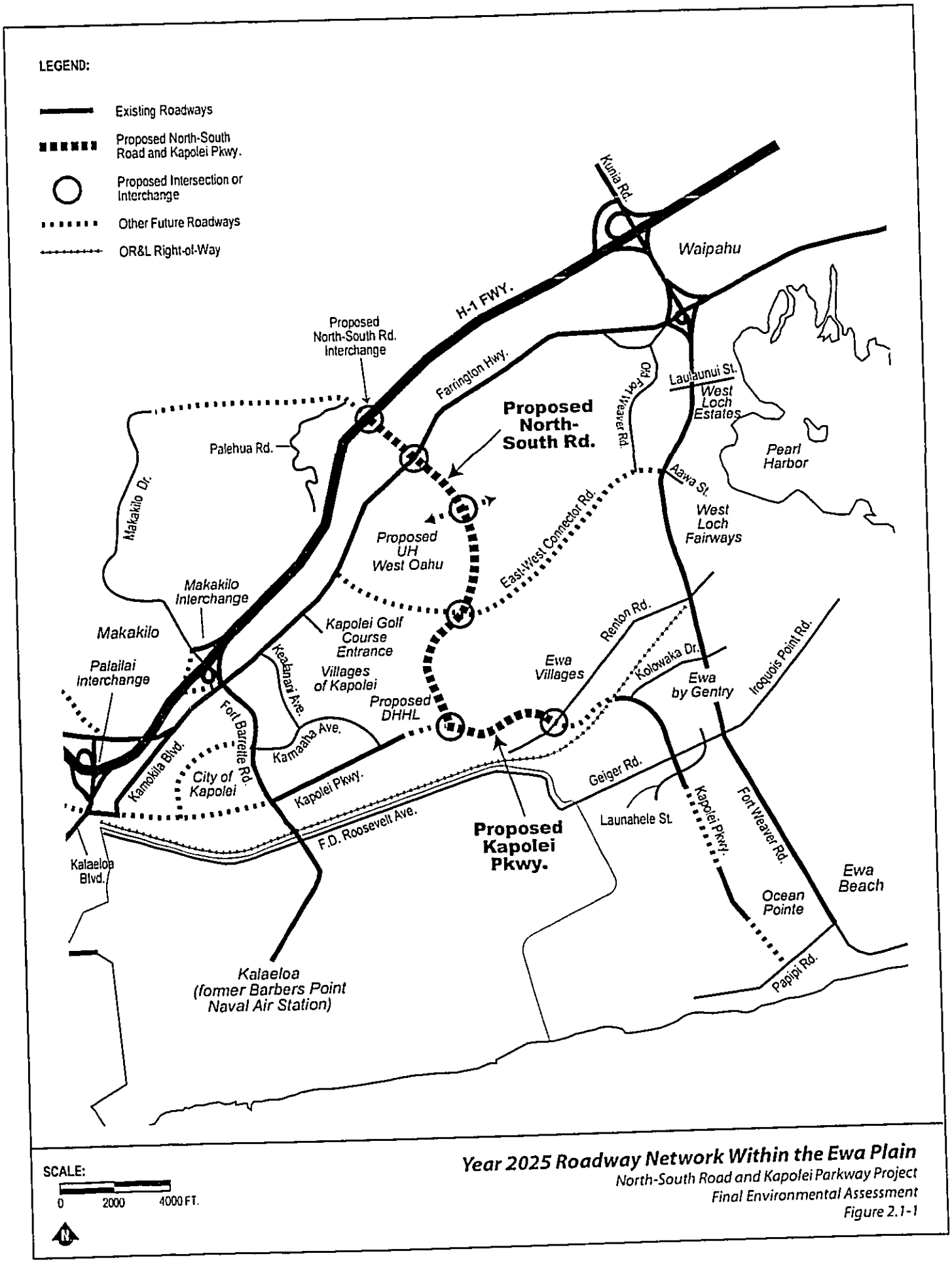
Both the No-Build and Build Alternatives are assumed to occur against the backdrop of a common future transportation system, as described in the TOP 2025 (April 2001). Using the TOP 2025 as the basis of all alternatives allows them to be analyzed within a consistent regional transportation framework that has been through an extensive public involvement process. The planning horizon used as the basis for future analyses in this FEA/FONSI is Year 2025, which is the time frame used for the TOP 2025.

Two sets of assumptions consistent with the TOP 2025 are inherent within all alternatives:

- roadway network assumptions; and
- travel demand management assumptions.

2.1.1.1 ROADWAY NETWORK ASSUMPTIONS

Future roadway improvement assumptions affect forecasts of travel patterns and traffic volumes. Except as noted, future (Year 2025) roadway improvements assumed are consistent with those included in the TOP 2025. Figure 2.1-1 illustrates the Year 2025 roadway facilities assumed within the City and County of Honolulu's Ewa Development Plan (Ewa DP) area. The following list and the Corridor Alternatives Report in Appendix B identify major roadway improvements assumed in the general vicinity of the project:



Year 2025 Roadway Network Within the Ewa Plain

North-South Road and Kapolei Parkway Project
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Figure 2.1-1

Kunia Road/Fort Weaver Road Corridor

- Widen Fort Weaver Road from 4 to 6 lanes between Farrington Highway and Geiger Road

Fort Barrette Road/Makakilo Drive Corridor

- Widen Fort Barrette Road from 2 to 4 lanes between Farrington Highway and F.D. Roosevelt Avenue
- Extend Makakilo Drive east to H-1 Freeway to provide second access point for Makakilo

Interstate H-1 - Interchange Improvements

- Makakilo Interchange – Construct new westbound on-ramp
- Kapolei Interchange – Construct new interchange between Makakilo and Palailai Interchanges
- Palailai Interchange – Improve existing interchange.

Farrington Highway Corridor

- Widen Farrington Highway from 2 to 4 lanes between Kapolei Golf Course Entrance and Fort Weaver Road
- Widen Farrington Highway from 2 to 4 lanes between Kamokila Boulevard and Kalaeloa Boulevard

Kapolei Parkway Corridor

- Complete various Kapolei Parkway segments between Kapolei and Ewa Beach

Other Roadway Improvements

- Construct new westbound Frontage Road between Makakilo Drive and Kalaeloa Boulevard

In addition to the improvements listed in the TOP 2025 (above), the following roadway improvements are also assumed:

- Existing Palehua Road is assumed to remain for the No-Build Alternative. It is a 2-lane roadway that currently crosses under the H-1 Freeway in the vicinity of the proposed North-South Road Interchange. It is also assumed that, as part of the build-out of the Makakilo subdivision, this roadway will be extended to provide secondary access to Makakilo from the H-1 Freeway.
- East-West Connector Road would be a new east-west roadway that intersects Farrington Highway in the vicinity of the existing Kapolei Golf Course Entrance at its western terminus, and Fort Weaver Road opposite of Aawa Drive at its eastern terminus (see Figure 2.1-1). Old Fort Weaver Road would be reconfigured to intersect the East-West Connector Road as a T-intersection. This roadway would provide access to future development in the East Kapolei area located between the "Villages of Kapolei" and Fort Weaver Road. This roadway would also provide sub-regional circulation for this area.
- Traffic Signals at the intersections of Kapolei Parkway and Renton Road, and Kapolei Parkway and North South Road, would be provided when warranted.

2.1.1.2 TRAVEL DEMAND MANAGEMENT ASSUMPTIONS

The TOP 2025 encourages and assumes the implementation of travel demand management (TDM) actions to reduce vehicular travel during peak traffic hours. Key TDM actions that are recommended in the TOP 2025 and assumed for all alternatives are:

- Ridesharing - The TOP 2025 recommends an integrated High Occupancy Vehicle (HOV) and park-and-ride system for the Ewa area. Incentive programs among private and public sector employees may also be implemented. An existing park-and-ride lot is located in Village Park, mauka of the Kunia Interchange. Park-and-ride lots are also planned in the City of Kapolei and near the makai-east corner of the H-1 Freeway/North-South Road Interchange as part of the Regional Bus Rapid Transit (BRT) system.
- Work Behavior Changes - The TOP 2025 recommends incentive programs that encourage work behavior changes such as telecommuting, flexible work hours, and compressed work weeks.
- Transportation Management Associations (TMAs) - TMAs are organizations that operate within specific geographical areas to implement Transportation Demand Management (TDM) measures. Examples of TMA services include computerized carpool/vanpool matching, guaranteed ride home programs, subscription bus services, and so forth. Currently, the Leeward Oahu Transportation Management Association (LOTMA) serves the project area.
- Alternative Transportation Modes - The TOP 2025 incorporates the recommendations of Bike Plan Hawaii, A State of Hawaii Master Plan (April 1994, revised September 2003). In addition, the Kapolei Area Long Range Master Plan Map (July 1993, revised July 2003) proposes bikeways along many of the future streets in the Ewa/Kapolei area.
- Parking Management Actions - In order to discourage driving alone, the TOP 2025 recommends that employers discontinue parking subsidies and instead provide direct cash reimbursement for work-related parking expenses only. Another recommendation is to reduce the parking requirements in the City's Land Use Ordinance. The intent is to encourage ridesharing or use of alternative travel modes by limiting on-site parking. The TOP 2025 also recommends a residential permit parking program to ensure that parking management does not result in employees parking on adjacent residential neighborhood streets.

In summary, these measures are designed to reduce travel demand during peak hours for all alternatives, and consequently, TDM will not be examined as a distinct project alternative.

2.1.2 PREFERRED BUILD ALTERNATIVE

The Build Alternative consists of:

- construction of North-South Road, and associated intersections and drainage features;
- federalization of Kapolei Parkway from North-South Road to Renton Road to coordinate its construction with North-South Road; and
- construction of a new interchange with the H-1 Freeway.

This section discusses the roadways. The interchange is discussed in Section 2.3.

2.1.2.1 DESCRIPTION

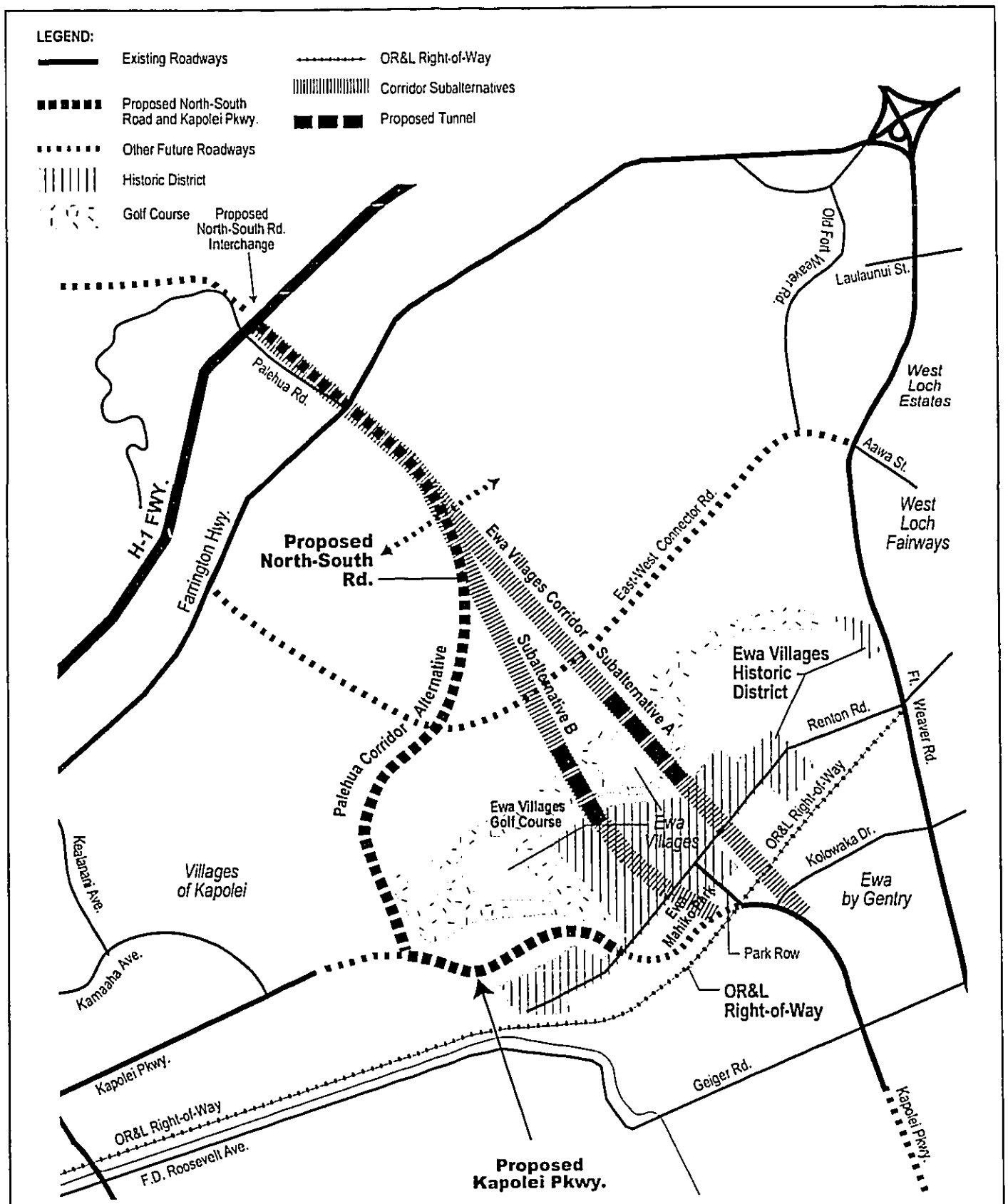
2.1.2.1a NORTH-SOUTH ROAD

As detailed in Appendix B, Corridor Alternatives Report (May 1998), three alignment alternatives were screened to determine the most appropriate alignment for North-South Road. Five roadway concepts were evaluated to resolve the type of roadway facility and modal accommodation to be provided within the alignment right-of-way (ROW). The Build Alternative described below presents the preferred alignment and roadway concept resulting from these evaluations.

The proposed 2.2-mile North-South Road would be a six-lane arterial roadway between the H-1 Freeway and future Kapolei Parkway. North-South Road would have a new interchange on the H-1 Freeway in the vicinity of the existing Palehua Road grade separation, and would intersect the future Kapolei Parkway between the existing Villages of Kapolei and Ewa Villages developments. Major intersections are proposed at Kapolei Parkway, a future east-west road, a potential UH-West Oahu access, and Farrington Highway. All major intersections will have exclusive left-turn lanes within the median. Right turns would be allowed from the outside lanes of the ultimate six-lane roadway. When warranted, all major intersections would be signalized. North-South Road would be constructed to State of Hawaii standards.

The preferred alignment would follow the Palehua Corridor similar to the existing Palehua Road, as illustrated in Figure 2.1-2. This North-South Road alignment alternative has been shown on many development plans. The Kapolei Long-Range Master Plan (July 2003), planning documents for the University of Hawaii West Oahu Campus (UH-West Oahu), and the Ewa Development Plan (Ewa DP) (August 1997, and amended on May 2000) consistently show this conceptual alignment for this proposed highway. The TOP 2025, while not specific with regard to alignment, also indicates a North-South Road, as well as a completed Kapolei Parkway, within this area.

This alignment would provide increased traffic circulation and access to the regional transportation system. It would provide alternative access to the H-1 Freeway, lessening the intensity of existing and projected traffic congestion at the Kunia and Makakilo



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0 1000 2000 FT.

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Corridor Alternatives
North-South Road and Kapolei Parkway Project
Final Environmental Assessment
Figure 2.1-2

Interchanges. Unlike other North-South Road alignment alternatives (see Section 2.2), it would have no direct community impacts. It would require the least amount of right-of-way (ROW) acquisition of all alignments considered, and it would be consistent with existing and future development plans. The North-South Road, originally called the Palehua Corridor, was assessed as being the least expensive alignment alternative (see Table 2.2-1) since it would be constructed on relatively flat topography with no major physical constraints. The Palehua Corridor was, therefore, selected as the preferred alignment for North-South Road.

The alignment would be within a proposed 300-foot ROW. The proposed typical cross-section of North-South Road is shown in Figure 2.1-3. North-South Road is proposed to be a divided roadway with the mauka-bound and makai-bound roadbeds separated by a 28-foot wide raised median. At intersections where double-left turns are anticipated, the median would be 6 feet wide.

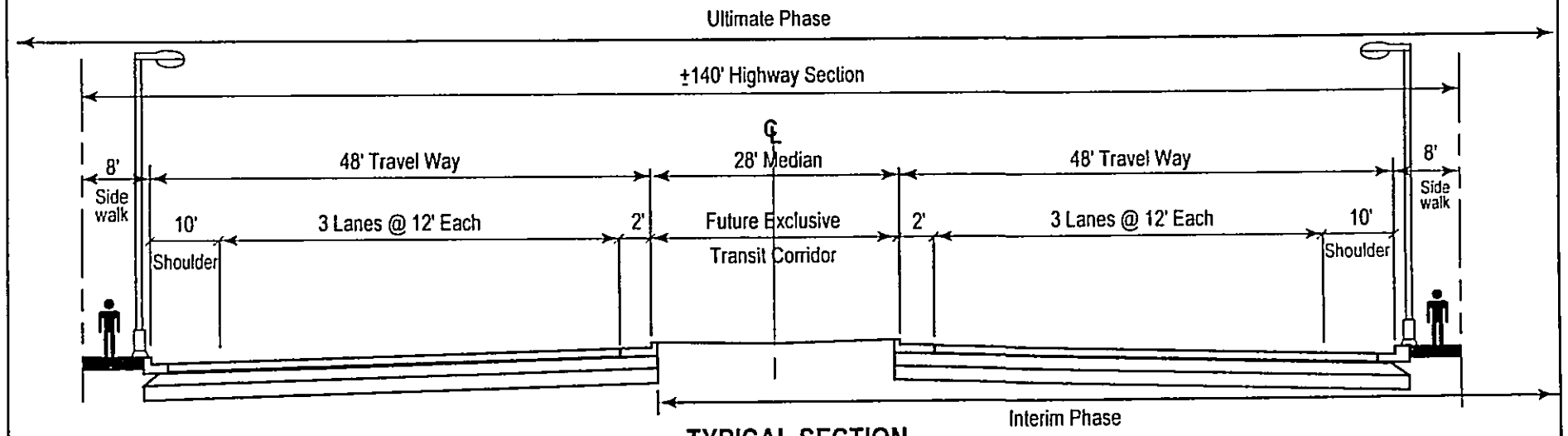
Each roadbed would be 48-feet wide from face of curb to face of curb, allowing an inside 2-foot shoulder, three 12-foot lanes, and a 10-foot outside shoulder. There would be 8-foot sidewalks on both sides of North-South Road. A drainage system, as described in Section 2.1.2.1c, is also part of the proposed project. East of the 138 kilovolt (kV) transmission towers would be a variable width area that would contain a two-way paved bike path, highway embankment slope, and a channel for regional and roadway-related drainage.

An exclusive rapid transit corridor would be reserved within the 28-foot median of North-South Road. This future transit corridor would begin at H-1 Freeway and proceed makai to Kapolei Parkway. At Kapolei Parkway, the transit corridor would connect to the existing east-west rapid transit corridor within the median of Kapolei Parkway. At selected locations along North-South Road, there may be the need for future widening of the median to provide for transit stops.

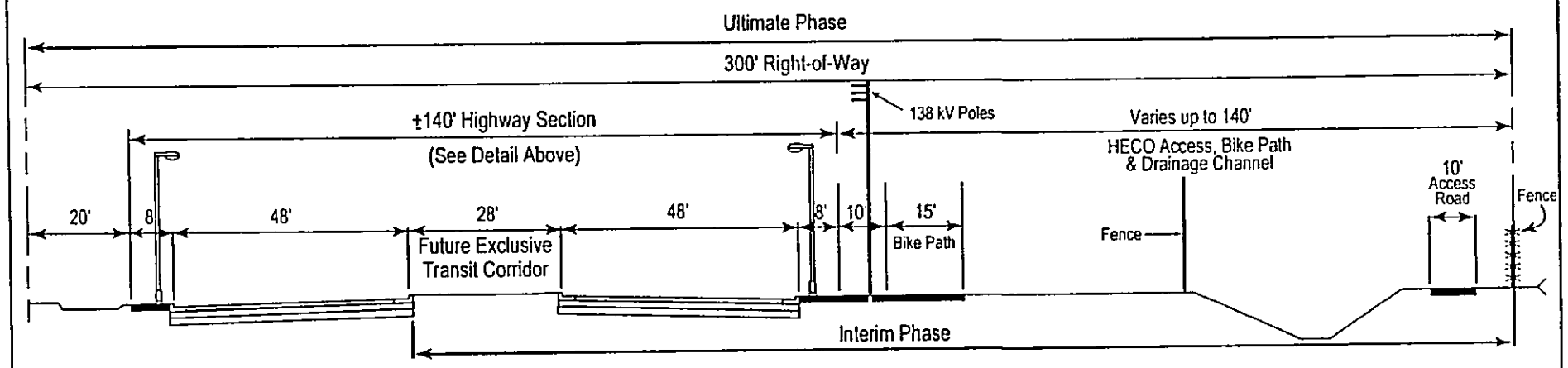
The North-South Road portion of the project also includes establishment of landscaping. Details of the landscaping will be developed in the project's design phase. Cultivated Kooloaula, the endangered species found in the roadway right-of-way, will be studied for inclusion in the project's landscaping, and will be included if reasonable. The use of plants that minimize water requirements will also be a goal of the landscaping plan.

2.1.2.1b KAPOLEI PARKWAY

The Build Alternative includes the "federalization" of Kapolei Parkway between Renton Road and North-South Road, meaning that this segment would be built using federal assistance. To insure that this segment is connected to North-South Road within the same time frame as the opening of North-South Road, the City and the HDOT recently elected to combine the two facilities into one EA document and request federal funds for the portion of Kapolei Parkway between North-South Road and Renton Road, thereby addressing the City's budgetary constraints and expediting construction of both projects.



TYPICAL SECTION
North-South Road - Looking North



TYPICAL SECTION
North-South Road ROW Corridor - Looking North

NOT TO SCALE

Typical Section of North-South Road
North-South Road and Kapolei Parkway Project
Final Environmental Assessment
Figure 2.1-3

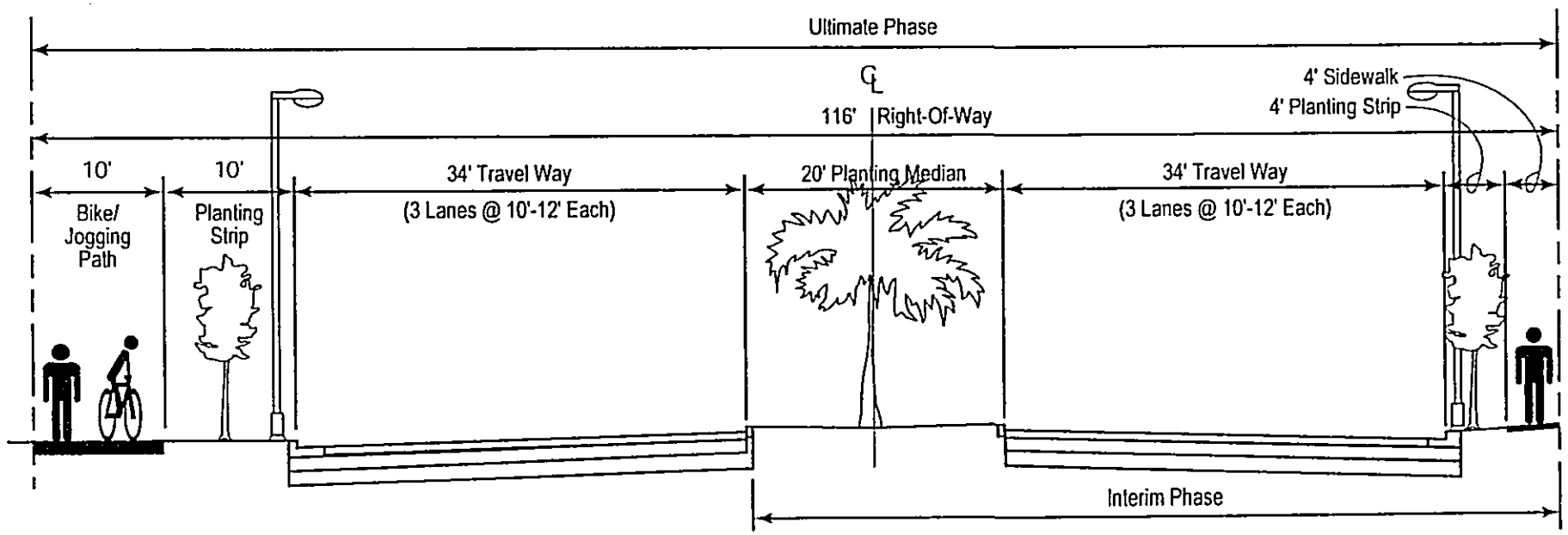
The federalized portion of Kapolei Parkway addressed by this FEA/FONSI would connect North-South Road to Renton Road, as shown in Figure 2.1-1. This segment is approximately 0.7 mile long and would also connect to the segment of Kapolei Parkway located between Renton Road and the OR&L ROW, which is planned for construction by the City soon. The segment under construction, in turn, provides connectivity to an existing segment of Kapolei Parkway located between the OR&L ROW and a point approximately 750 feet south of Geiger Road. This FEA/FONSI assumes that the segments of Kapolei Parkway soon to be constructed and proposed for future construction were evaluated by the City for environmental impacts in the Ewa Villages Master Plan EIS (February 1991). Construction of the Renton Road intersection will be undertaken by the City project for Kapolei Parkway, from the OR&L ROW to Renton Road.

The proposed portion of Kapolei Parkway, from Renton Road to North-South Road, would be contained within a 116-foot ROW that has already been set aside for a major roadway through prior sub-regional planning efforts in the Ewa Plain. The proposed portion of Kapolei Parkway would be configured as a divided, six-lane, arterial roadway with a raised median and at-grade intersections. Left-turn lanes would be provided in the median at intersections. In its ultimate configuration, right turns would be allowed from the outside lanes of Kapolei Parkway with the exception of the westbound approach at the North-South Road/Kapolei Parkway intersection. At this intersection, an additional right-turn lane would be provided for the westbound to mauka-bound right-turn movement. As in the No-Build, traffic signals would be installed at the intersections of Kapolei Parkway and North-South Road, and Kapolei Parkway and Renton Road, when warranted. The Kapolei Parkway segment from Renton Road to North-South Road would be constructed to be consistent with State of Hawaii Department of Transportation standards. The proposed typical cross-section for the proposed portion of Kapolei Parkway is shown in Figure 2.1-4.

The proposed project also includes the implementation of environmental mitigation measures. As described in more detail in Chapter 3, the inclusion of environmental mitigation would result in a project with minimal adverse environmental and social impacts. One major environmental mitigation measure included in the proposed project is the implementation of a Habitat Conservation Plan (HCP) for an endangered plant. The HCP stipulates propagation of existing individuals of an endangered plant species (Kooloaula, or *Abutilon menziesii*), located in the proposed roadway ROW; establishment of at least three off-site outplanting sites for the plants and creation of an 18-acre temporary Contingency Reserve Area where plants can be kept in their natural habitat until off-site planting sites achieve pre-determined success criteria. Additional details about the HCP are provided in Section 3.7.

2.1.2.1c DRAINAGE SYSTEM

In addition to drainage systems designed to handle roadway runoff, the North-South Road and Kapolei Parkway project will provide a portion of the regional drainage system that will support the long-range drainage plan and urban development of Ewa. The proposed project includes a drainage system consisting of the following elements (see Appendix J for more details):



TYPICAL SECTION
Kapolei Parkway
Looking East

NOT TO SCALE

Typical Section of Kapolei Parkway
North-South Road and Kapolei Parkway Project
Final Environmental Assessment
Figure 2.1-4

a. Roadside Drainage Facilities

Roadside drainage systems will serve to capture runoff from the roadway and will consist of a series of catch basins connected by pipe culverts.

b. Interchange and Roadway Portions overlying the SOBA Recharge Area

Roadway runoff from portions that lie above the Southern Oahu Basal Aquifer (SOBA) recharge line will be captured and piped down to a point downstream of the recharge line (approximately 1,500 feet south of Farrington Highway), so as to avoid contaminating the aquifer. The SOBA is discussed in Section 3.8.1.1.

c. Roadway Portions not overlying the SOBA Recharge Area

Roadway runoff from the roadway portions that do not overlie the SOBA recharge line will be collected and piped to the regional drainage channel (described below), with the exception of runoff from the lower portion of North-South Road (below the drainage basin, described below) will be piped into the Ewa Villages Golf Course for disposal into the Kaloi Gulch system.

d. Interim Interceptor Ditches

During the interim period, when areas adjacent to the roadway are undeveloped, sheetflows from these undeveloped off-site areas along the roadway segment will be intercepted by a series of temporary ditches and piped across the roadway through cross-drains for discharge into the drainage channel. All ditches and inlets will be located within the proposed road right-of-way.

e. Regional Drainage Channel

The drainage plan for North-South Road calls for the implementation of a portion of the regional drainage channel and storage basin to handle runoff. The channel will receive roadway runoff, as well as capture overflows from the Kaloi Gulch channel at its upper crossing of North-South Road (approximately 900 feet south of Farrington Highway). The channel will be located along the east side of the roadway and will be designed to convey ultimate watershed flows in accordance with City drainage standards.

f. Drainage Retention / Detention Basin

A drainage retention / detention basin is proposed at the downstream end of the regional drainage channel to handle runoff increases from the North-South Road project. It may also be used in the future to help reduce sediment transport from developments that occur in the watershed.

g. Interface at Ewa Villages Golf Course

The drainage basin will discharge into the Ewa Villages Golf Course. The existing box culvert at the Kaloi Gulch channel inlet into Ewa Villages will be enlarged to accommodate a flow of 2,500 cfs in accordance with the Interim Drainage Plan for North-South Road. Some minor improvements will be required within the Ewa Villages Golf Course to accommodate the added culvert structure.

h. Drainage Channel Bridge Crossings

Two future collector roadway connections are anticipated to occur along North-South Road. In order to maintain access to adjacent lands over the regional drainage channel, bridges at these future roadways are proposed as part of the project. Each of these roadways is assumed to have a right-of-way width of 150 feet.

i. Kaloi Gulch Bridge / Culvert Crossings

The North-South Road crosses Kaloi Gulch at two locations between Farrington Highway and Kapolei Parkway. The upper crossing occurs approximately 900 feet south of Farrington Highway. The lower crossing occurs approximately 500 feet north of Ewa Villages. At each crossing, 40-foot, single-span bridges will be used to carry the roadway over the Kaloi Gulch channel.

j. Kaloi Gulch Culvert Modification at H-1

The existing double box culverts at the Kaloi Gulch crossing of the H-1 Freeway will need to be lengthened at the inlet and outlet to accommodate freeway widening involved with the two eastern interchange ramps (westbound off-ramp and eastbound on-ramp).

k. Cross-Drains for Future Developments

Major cross-drains will be installed across North-South Road to accommodate runoff into the regional drainage channel from future developments situated to the west of the roadway. The sizes and locations of these culverts are generally as specified in the East Kapolei Drainage Master Plan. Cross-drains were designed to be relatively deep in order to provide sufficient clearance for future utilities that are planned within the utility corridor area next to the roadway.

The drainage system considers two watershed build-out conditions: interim and ultimate. Interim watershed conditions assume that adjacent areas in East Kapolei are in their current condition. Ultimate watershed conditions assume that adjacent developments in East Kapolei are built. The drainage system will be designed for both interim and ultimate flows. The primary difference between the interim and ultimate drainage plans for North-South Road is in the amount of flows being carried by the proposed drainage channel. Cross-drains are sized for ultimate build-out conditions to avoid reconstruction of the roadway pavement and disruption to traffic in the future. Under interim build-out conditions, these cross-drains will be used to convey existing sheet flows from the undeveloped areas west of the roadway to the drainage channel along the east side of the roadway.

The Kapolei Parkway drainage system will also be designed for both interim and ultimate watershed conditions.

Appendix J contains a Technical Memorandum describing the drainage systems for North South Road and Kapolei Parkway. Graphics showing the drainage plans are provided in Appendix J:

The North-South Road portion of the project includes construction of a drainage collection system around the proposed H-1 Freeway Interchange and along the segment of the roadway that lies above the infiltration area of the Southern Oahu Basal Aquifer, a designated sole-source aquifer (item (e) above). The discharge point of the drainage collection system would be located seaward of the potentially sensitive aquifer recharge area (see Section 3.8 for additional information). In addition to the collection system, a drainage basin is also proposed to handle drainage needs associated with the roadway, as shown in Figure 1.1-1 (item (f) above).

There are two possible scenarios for construction of the regional drainage channel (item (e) above) depending on availability of local funding. The first scenario entails phased construction of the channel. An interim channel, capable of conveying 2,500 cfs, would be established initially. This interim channel could be constructed either by excavating a channel with the cross-sectional area, or by excavating a channel to the ultimate cross sectional area, and installing flow constraints, such as reduced width sections, berms and/or culverts at roadway crossings, in the channel to restrict the flow to 2,500 cfs. The restriction of the initial flow to 2,500 cfs is based on an agreement among stakeholders within the watershed.

The ultimate channel would be 60 feet wide at the bottom and capable of conveying 6,000 cfs at Farrington Highway to 7,400 cfs at the top of Ewa Villages. The 60 feet wide channel would be provided either by additional excavation to widen the interim channel, or by removing the limiters placed in the channel which was initially excavated to ultimate width.

Should local funding be made available, the ultimate phase of the drainage channel could be provided during initial construction.

Both phases (interim and ultimate), and both options for implementing the phases (phased development or construction of ultimate condition initially), are being disclosed and assessed at this time to clear environmental review.

If the initial phase of the drainage channel is constructed, the North South Road profile would rise over Kaloi Gulch at two points. Should the ultimate phase be constructed initially, the roadway profile would not need to rise over Kaloi Gulch.

The project does not propose to change the gulch alignment. As disclosed in the 1998 Draft EA, the Housing and Community Development Corporation of Hawaii (HCDCH; formerly Housing Finance and Development Corporation, or HFDC) had planned to realign the Kaloi Gulch channel as part of its East Kapolei Master Plan development project. At the time of the 1998 Draft EA, HCDCH planned to have the regional drainage improvements in place prior to the construction of North-South Road. However, the HCDCH has since withdrawn its development plans in the area. A re-alignment of Kaloi Gulch is still under consideration and may occur in the future, but would be implemented by undetermined third parties. State of Hawaii Department of Transportation's (HDOT) North-South Road project will now precede these improvements. Because a future regional drainage project may require the flow from the nearby Hunehune Gulch to be re-directed to the re-aligned Kaloi Gulch in the future, project engineering for North-

South Road has considered this possibility and would not preclude future options for such potential regional drainage improvements.

2.1.2.2 RIGHT-OF-WAY REQUIREMENTS

Figure 2.1-5 illustrates land ownership along the preferred alignment. The North-South Road roadway would be roughly 140 feet wide, within a proposed 300-foot ROW currently being acquired by the HDOT. The proposed portion of Kapolei Parkway would fit within a 116-foot roadway width. See Figures 2.1-3 and 2.1-4.

The total ROW required for the North-South Road and Kapolei Parkway project is 189.44 acres. Of that amount, the North-South Road requires 133.32 acres, the North-South Road Interchange requires 46.35 acres, and the proposed portion of Kapolei Parkway from Renton Road to North-South Road requires 9.77 acres.

The amount of the ROW for the North-South Road and the North-South Road Interchange that would be obtained through an Executive Order (EO) is roughly 116.67 acres. That area is currently owned by the State of Hawaii and administered by the State of Hawaii Department of Land and Natural Resources (DLNR). Also, 7.9 acres in the north-east quadrant of the North-South Road Interchange would be acquired from the UH-West Oahu.

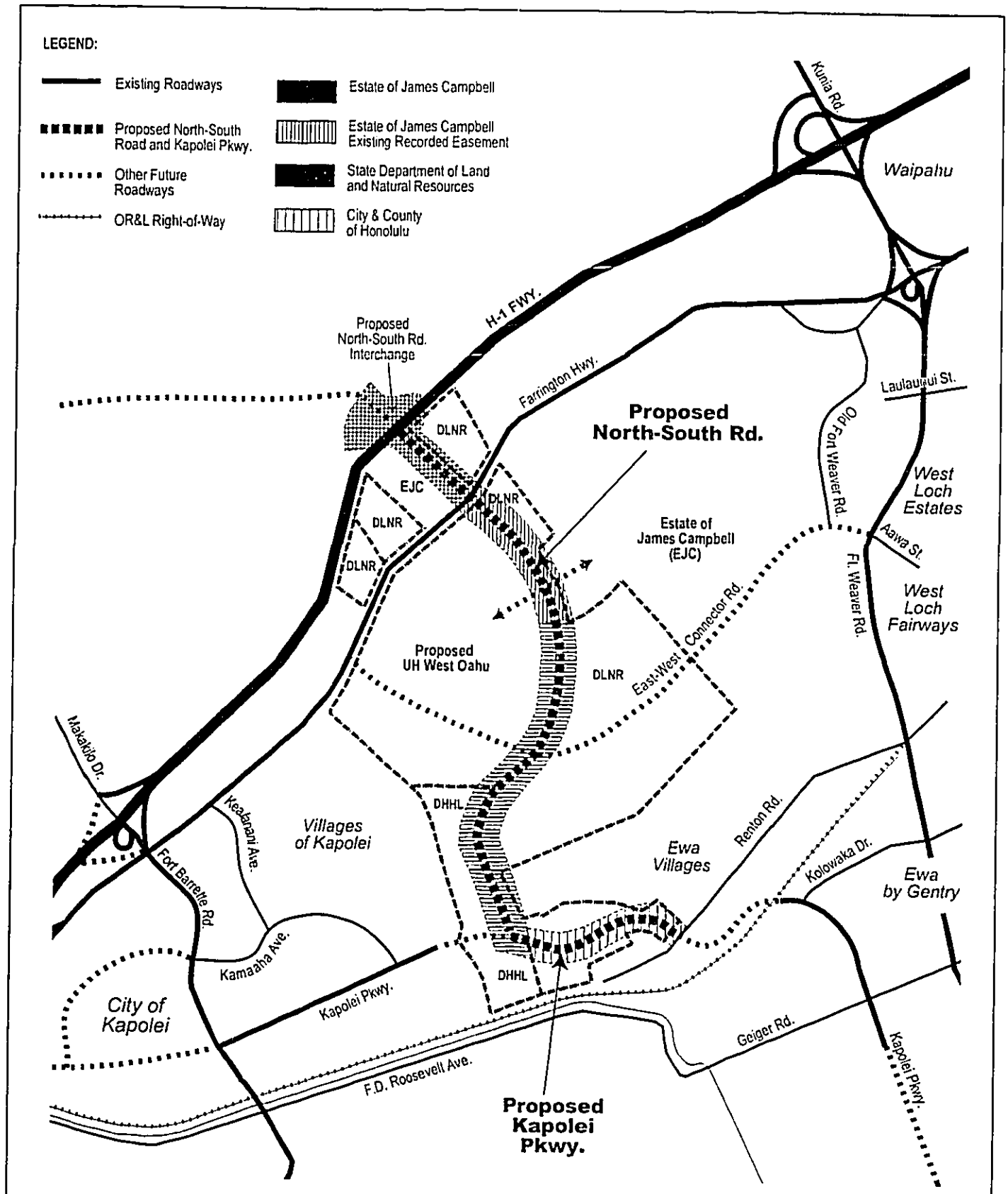
The mauka segment of North-South Road between H-1 Freeway and the northern boundary of the State-owned land traverses land owned by the Estate of James Campbell (EJC) (see Figure 2.1-5). The roadway ROW to be acquired from the EJC would be acquired in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970. The total acreage to be acquired from the EJC would be approximately 55.1 acres, including roadway and interchange footprints.

The proposed portion of Kapolei Parkway passes through land presently owned by the City and County of Honolulu (City). Land ownership will remain with the City and 9.77 acres would be designated to change to roadway ROW.

Of the total area to be acquired, the interchange with H-1 would require approximately 46.35 acres. This includes acquisition of additional land in the northwest quadrant of the interchange for a future loop ramp for the westbound to southbound movement to accommodate growing travel demands in the Ewa Plain.

2.1.2.3 PROJECT SCHEDULE, COSTS, AND PHASING

The proposed project would be designed and built in phases. The interim phase consists of only the North-South Road interchange ramps oriented to and from the east (westbound off ramp and eastbound on ramp), the east half of North-South Road from H-1 Freeway to Kapolei Parkway and the makai portion of Kapolei Parkway between Renton Road and North-South Road. The ultimate phase would implement the full build



Land Ownership

North-South Road and Kapolei Parkway Project
Final Environmental Assessment
Figure 2.1-5

out of the North-South Road Interchange, North-South Road, and the proposed portion of Kapolei Parkway. More specifically:

North-South Road:

- Interim Phase (Early 2005 to late 2007): Mass grading for six lanes and drainage improvements; construction of the north-bound half of the highway from Kapolei Parkway to H-1 Freeway and striped for two lanes in each direction; construction of interim intersections at Kapolei Parkway and Farrington Highway; construction of half diamond interchange at H-1 Freeway, construction of roadway drainage and retention / detention basin, and HCP mitigation measures.

- Ultimate Phase (construction project to be implemented anytime between the years 2007 to 2025): Construction of the south-bound half of the highway and restriping to three lanes in each direction; ultimate intersection configurations at Kapolei Parkway and Farrington Highway; and ultimate interchange configuration at H-1 Freeway.

Kapolei Parkway construction, from Renton Road to North-South Road:

- Interim Phase (2006 to 2007): Mass grading for six lanes and drainage improvements; construction of three makai travel lanes from North-South Road to Renton Road. Includes roadway and drainage grading, construction of a portion of underground utilities, storm drainage system, street lighting system, and landscaped median.

- Ultimate Phase (construction project to be implemented anytime between the years 2007 to 2025): Construction of additional three mauka lanes, the construction of which to be coordinated with completion of North-South Road. Includes construction of remaining underground utilities, storm drainage system, street lighting system, and landscape irrigation system.

The current schedule is shown in Table 2.1-1. Completion of the approval processes is anticipated by Fall 2004, and construction of the interim phase of North-South Road and associated interchange would begin in early 2005; construction of the proposed portion of Kapolei Parkway from Renton Road to North-South Road would begin in 2006.

Table 2.1-1:
Proposed Project Schedule

Activity	Period
Interim Phase: North-South Road, Interchange, and Kapolei Parkway Construction	Early 2005 – Late 2007 (Open for Service Late 2007)
Ultimate Phases: North-South Road, Interchange, and Kapolei Parkway Incrementally upgraded to Ultimate Configuration	Late 2007 – 2025

Two conditions pertaining to roadway openings have been established, as follows:

- The interim phase of North South Road will be opened only after connectivity between H-1, Farrington Highway, and Kapolei Parkway has been established; and
- The section of Kapolei Parkway west of the intersection of Kapolei Parkway and North South Road will not be opened until North South Road is opened from Kapolei Parkway to H-1.

The total estimated cost of the ultimate North-South Road from H-1 Freeway to Kapolei Parkway is $141 million in 2004 dollars. Of this total, the estimated cost of the interim phase is $76 million, with the ultimate phase costing an additional $65 million in 2004 dollars. These estimates include the roadway, landscaping, drainage, electrical, traffic control and environmental mitigation costs. Right-of-way acquisition would cost roughly $16 million, in addition to the total construction cost of $141 million. Based on availability of funding, The State will be responsible for the 20 percent of the costs, and FHWA will provide funding for 80 percent.

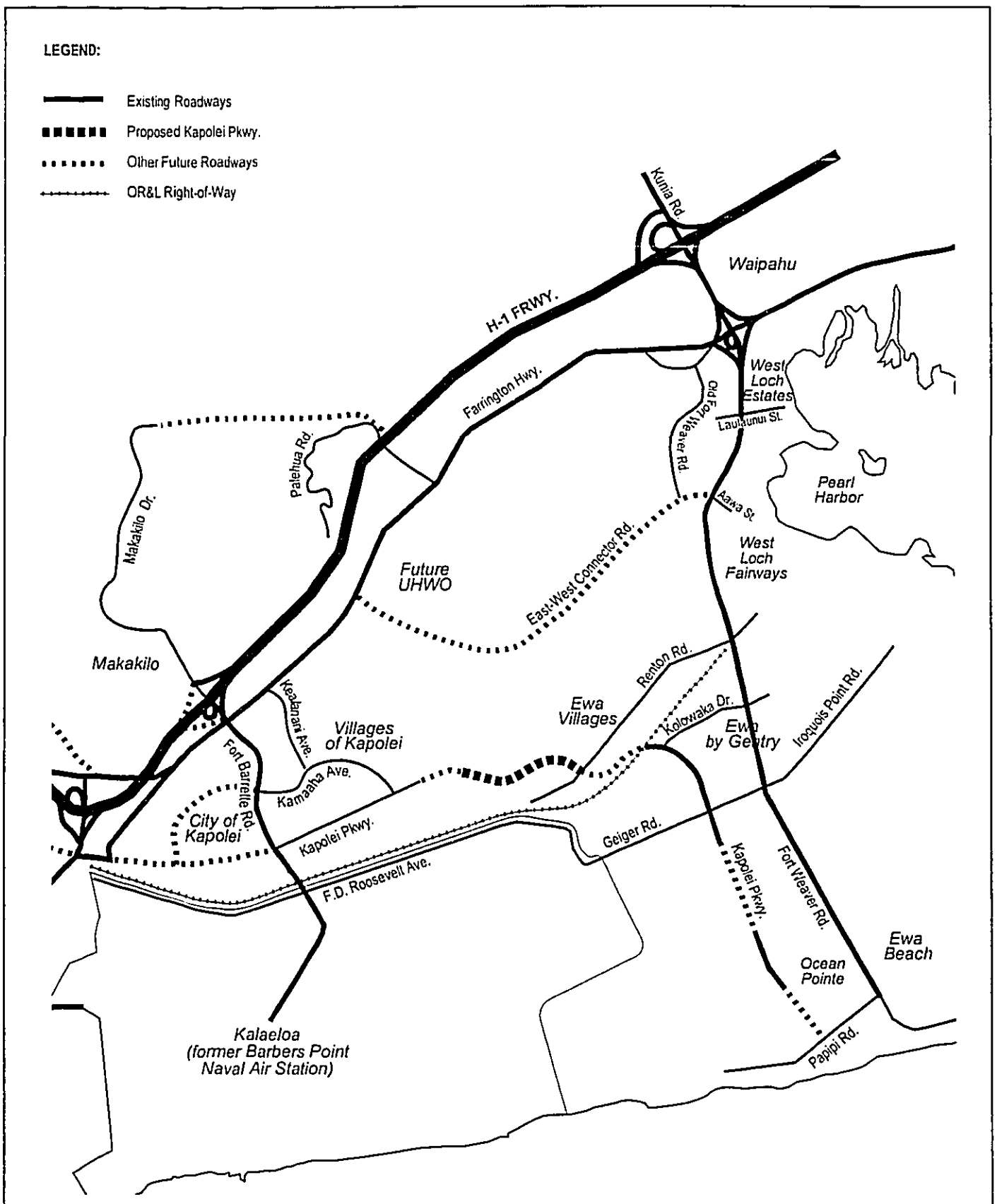
The segment of Kapolei Parkway between Renton Road and North-South Road is estimated to cost $22 million. The interim phase of the proposed portion of Kapolei Parkway would cost an estimated $12 million. The City will pay 20 percent of costs, and FHWA will provide 80 percent. Although this project is currently not listed on the Hawaii Statewide Transportation Improvement Program (STIP) for fiscal years 2004 through 2006, the STIP will be amended to include this project.

2.1.3 NO-BUILD ALTERNATIVE

The No-Build Alternative describes a future roadway network that includes improvements for the Ewa Plain area described in Section 2.1.1 without North-South Road Interchange and North-South Road between H-1 Freeway and Kapolei Parkway. Kapolei Parkway, from Ewa Beach through the City of Kapolei, is assumed to be complete by various private and public developers by year 2025, including the segment between Renton Road and North-South Road. The inclusion of the Renton Road to North-South Road segment of Kapolei Parkway in the No-Build Alternative is consistent with plans for the future completion of Kapolei Parkway. The commitment and need to implement the proposed Kapolei Parkway is evidenced by:

1. Oahu Regional Transportation Plan (ORTP);
2. Transportation for Oahu Plan 2025 (TOP 2025);
3. Oahu's Transportation Improvement Program (TIP); and the
4. Environmental Impact Statement for the Ewa Villages Master Plan.

City budgetary constraints make the timing of this completion uncertain. It should be noted that under the No-Build Alternative, funds for the construction of the portion of Kapolei Parkway, from Renton Road to the proposed North-South Road, will be solely provided by the City and County of Honolulu, and the completion of this facility is



Year 2025 No-Build Roadway Network

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Figure 2.1-6

anticipated prior to 2025, which corresponds to the planning horizon of the ORTP. Figure 2.1-6 illustrates the 2025 No-Build Alternative roadway network.

The future No-Build Alternative assumes a 794-bus fleet by 2025. This includes the Regional Bus Rapid Transit (BRT) proposed as part of the Primary Corridor Transportation Project, which is part of the TOP 2025. However, because North-South Road and its interchange with the H-1 Freeway does not exist in the No-Build Alternative, the proposed North-South Road Park-and-Ride is also assumed not to exist. In turn, the Regional BRT and local hub-and-spoke bus routes that would otherwise interact with the proposed North-South Road Park-and-Ride would need to be rerouted to other transfer facilities. This would lower the efficiency of transit service to the Ewa Plain area.

2.2 ALTERNATIVES CONSIDERED BUT ELIMINATED

The following is a discussion of the project alternatives that were considered but eliminated.

2.2.1 TRANSPORTATION SYSTEM MANAGEMENT (TSM) ALTERNATIVE

The TSM Alternative is defined as the application of construction, operational, and institutional actions to increase the effectiveness of the present transportation system without large capital expenditures. The roadway network assumptions for this alternative would be the same as those for the No-Build Alternative as shown in Figure 2.1-2.

Relatively minor modification of existing roadway facilities fall into this category. Since providing alternative access to the H-1 Freeway is a major purpose of the proposed North-South Road and Interchange, logical locations for these modifications would be at the existing Makakilo and Kunia Interchanges. Both interchanges have already been modified in the recent past. The Kunia Interchange was modified to provide an enhanced eastbound on-ramp that allowed traffic entering the H-1 Freeway to join the freeway traffic without merging. Both westbound off-ramps were improved to facilitate easier diverge traffic movements from the H-1 Freeway and more efficient traffic operations at the Kunia Road ramp terminal locations. The Makakilo Interchange westbound off-ramp was enhanced to improve its operational capacity at the ramp terminal intersection with Makakilo Drive and the eastbound on-ramp merges were improved. Already assumed in the No-Build Alternative was the addition of a westbound on-ramp at the Makakilo Interchange, thereby increasing the efficiency of the interchange. Therefore, most relatively minor roadway construction improvements have been already implemented or are planned to occur as part of the No-Build Alternative.

Traffic operational improvements are assumed for all alternatives. It is assumed that traffic signals will take advantage of future enhancements in Intelligent Transportation System (ITS) to optimize traffic operations.

TDM actions recommended by the TOP 2025 (see Section 2.1.1.2) help to improve traffic operations by reducing the traffic demand. These actions are consistent with the definition of TSM actions, but they are part of the base transportation assumptions for all alternatives.

The remaining area of potential improvement without large capital expenditures is the enhancement of transit operations in the Ewa Plain, so that the TSM Alternative would provide a higher level of transit service to the study area than the No-Build Alternative. As summarized in Section 2.1.2, the absence of a North-South Road and its interchange with H-1 Freeway reduces the usefulness of the proposed North-South Road Park-and-Ride. The North-South Road Park-and-Ride is, therefore, assumed not to exist in the No-Build Alternative, and, for the same reason, it is assumed not to exist in the TSM Alternative. A transit only connection to H-1 Freeway at the location of the proposed North-South Road interchange would be almost as costly and have similar environmental impacts as the proposed North-South Road and Interchange, disqualifying it as a TSM project. The TSM Alternative would, therefore, be limited to enhancement to the future transit system in the Ewa Plain to provide a higher level of transit service while utilizing the existing points of access to H-1 Freeway. Increasing the bus fleet would help, but it would experience diminishing returns as these transit vehicles would still need to funnel through the congestion bottlenecks at the existing Kunia and Makakilo Interchanges.

Because most of what would be considered TSM actions have been preempted by recent improvements, maintaining a TSM Alternative would either yield an alternative that resembled the No-Build Alternative or a variant of the Build Alternative. In either case the TSM Alternative is redundant and is, therefore, rejected.

2.2.2 ALIGNMENT ALTERNATIVES

Figure 2.1-3 shows the alignment alternatives considered. For detailed information on the alignment alternatives, see Appendix B, Corridor Alternatives Report (May 1998).

2.2.2.1 FORT WEAVER ROAD ALTERNATIVE

This alternative was developed in response to public and agency suggestions to maximize capacity within the Fort Weaver Road corridor as an alternative to constructing a new roadway. The Fort Weaver Road Alternative would upgrade the existing four-lane divided Fort Weaver Road to a four-lane freeway from Farrington Highway to Geiger Road. Grade-separated interchanges would be constructed at Geiger Road/Iroquois Point Road, Renton Road, the New East-West Road/Aawa Drive (West Loch Estates), and Laulaunui Street (West Loch).

The Fort Weaver Road alternative does not satisfy the purposes of North-South Road. While it increases the capacity of Fort Weaver Road, it does not address the considerable congestion that exists and is forecast to worsen at the Kunia Interchange. This alternative would not adequately relieve adjacent transportation corridors, and would not provide a new access to the H-1 Freeway. Also, it would not improve vehicle

circulation in the region, nor provide access to planned developments within the Ewa region.

Since Fort Weaver Road would not service anticipated land uses and economic growth in the Ewa region and would not meet future transportation demands or roadway capacity needs, the Fort Weaver Road alternative was eliminated from further consideration.

2.2.2.2 EWA VILLAGES ALTERNATIVE

The Ewa Villages Alternative (the "Straight Alignment") would lie closer to a straight line between Ewa Beach and the proposed interchange with the H-1 Freeway, but would extend only between the H-1 Freeway and Kapolei Parkway. It would be a six-lane arterial roadway with at-grade intersections. This alternative was developed and assessed in response to public input (see Chapter 4).

There are two sub-alternative alignments. As shown in Figure 2.1-3, Sub-alternative A would begin at the tangent portion of Kapolei Parkway between Geiger Road and Kolowaka Drive, continuing northwest through Ewa by Gentry, Ewa Mahiko Park, Ewa Villages Historic District, new housing lots, and the Ewa Villages Golf Course. Sub-alternative B would begin where the extension of Park Row will intersect Kapolei Parkway and would continue north along Park Row, cutting through the Ewa Villages Historic District and passing under the Golf Course within a tunnel. Both sub-alternatives would proceed toward the existing Palehua Road and the proposed interchange location on the H-1 Freeway.

Ewa Villages Sub-alternative A would displace at least 118 existing residences within the Ewa by Gentry subdivision and 11 residences in the Pepper Row area of the Ewa Villages Historic District. This sub-alternative would also affect a recreational center in the Ewa by Gentry development and two Section 4(f) resources: Ewa Mahiko Park and Ewa Villages Golf Course. [Section 4(f) of the U.S. Department of Transportation (DOT) Act prohibits the use of a publicly owned park for a DOT-supported transportation use unless there are no feasible and prudent avoidance alternatives.] A commercial building on the south side of Renton Road that houses the Friends of Ewa organization would also be affected.

Sub-alternative B would have fewer direct displacement impacts to the Ewa by Gentry and Ewa Villages developments, although it would still have impacts on six residences within the Ewa Villages Historic District along Pepper Row and affect one 4(f) resource (Ewa Villages Golf Course).

Both sub-alternatives would change the character of the Ewa Villages Historic District, which is on the State of Hawaii Register of Historic Places and has been nominated for the National Register of Historic Places (NRHP). Along with physical impacts to residences and buildings within this District, the Ewa Villages alignment alternatives would trigger additional review under Section 106 of the National Historic Preservation Act of 1966.

Both Sub-alternative A and Sub-alternative B would encroach upon the Ewa Villages Golf Course, a Section 4(f) resource that must be afforded protection. Mitigation to minimize the impact on the Ewa Villages Golf Course would require major modifications to the golf course, including placing North-South Road within a tunnel under the golf course fairways and reconfiguring the golf course layout. Construction of the North-South Road Tunnel would be expensive.

In addition, costly noise abatement walls would need to be constructed within Tenney Village to mitigate noise impacts to the existing homes.

In total, the Ewa Villages alignment would cost approximately $44 million more to construct than the Palehua Corridor alignment (the current Build alignment). Table 2.2-1 summarizes the costs of the alignment alternatives, which were developed in 1998 for comparison purposes only. These estimates included only major cost items, which are typically included in initial alternatives analyses.

Based on the severity of community impacts, the Section 106 and Section 4(f) impacts, high construction cost, and incompatibility with existing and proposed development, the Ewa Villages alignment alternatives were eliminated from further consideration.

Table 2.2-1:
Construction Cost of Alignment Alternatives

Alternative	Construction Cost
Ewa Villages Corridor	$83.1 million
Palehua Corridor	$39.4 million

Source: Parsons Brinckerhoff, May 1998.

2.2.3 ROADWAY CONCEPT ALTERNATIVES

Five roadway concepts were evaluated to resolve the type of roadway facility and modal accommodation to be provided within the alignment ROW.

2.2.3.1 TRANSIT ON EXCLUSIVE RIGHT-OF-WAY

This alternative would restrict use of the road to public transit vehicles.

Historically, a transit corridor had been identified west of and within a 300-foot roadway easement in the Palehua Corridor, effectively providing a roughly 166-foot transportation corridor containing both a roadway and a transit corridor (see Figure 2.1-4). Recent transit studies such as the Final Environmental Impact Statement for the Primary Corridor Transportation Project (July 2003) show a transit corridor oriented along H-1 Freeway from the City of Kapolei to the Primary Urban Center of Honolulu. The Ewa Development Plan (Revised 2000), however, designates a transit corridor within the Palehua Corridor,

but it also clearly indicates a need for a major roadway in this corridor. Making this corridor a pure transit corridor would be inconsistent with the intent of the Ewa Development Plan, the OMPO Top 2025 Plan, and the Ewa Master Plan. Therefore, in its updated concept, the 300-foot roadway easement would become a 300-foot ROW that includes North-South Road, a rapid transit corridor, and support features such as drainage and bikeways.

2.2.3.2 FREEWAY OR EXPRESSWAY

Under the freeway option, North-South Road would be constructed as a 4-lane freeway with grade-separated interchanges. An expressway is similar to a freeway except that grade-separated interchanges would be provided only at heavily used intersections. Additional ROW beyond the existing Palehua Corridor easement would need to be acquired at the interchange locations for the freeway and expressway alternatives.

The freeway and expressway alternatives would be difficult to implement given the one-mile minimum spacing requirement of interchanges recommended in A Policy on Geometric Design of Highways and Streets (2001) by the American Association of State Highway and Transportation Officials (AASHTO). For example, the intersection of Farrington Highway and the proposed North-South Road would be a logical interchange for both the freeway and expressway alternatives. However, it is only one-half mile away from the proposed interchange of the H-1 Freeway, less than the minimum spacing, and combining the Farrington Highway Interchange with the North-South Road/H-1 Freeway Interchange would be very expensive. Based on the expense and minimum spacing requirements, the freeway and expressway alternatives were eliminated.

2.2.3.3 ARTERIAL WITH HIGH OCCUPANCY VEHICLE (HOV) LANES

As an arterial with HOV lanes, North-South Road would provide six lanes which would include two lanes (one in each direction) reserved for HOV. The HOV lanes would be separated from general-purpose lanes by pavement striping, and intersections would be at-grade.

Due to the relatively short length of North-South Road (2.2 miles), these HOV lanes would need to be integrated with HOV facilities on the H-1 Freeway to be effective. Although this alternative is compatible with the long-range future transportation plan, the HOV lanes would only provide substantial travel benefits if dedicated HOV access to the H-1 Freeway was provided, necessitating a very expensive interchange configuration. Given that a regional HOV system will only be available in the vicinity of North-South Road in the long-range future, the high cost of providing the necessary connection to the H-1 Freeway eliminated the HOV alternative at this time.

2.3 INTERCHANGE ALTERNATIVES

2.3.1 PROPOSED INTERCHANGE

Appendix C, Draft Interstate Access Modification Request (May 2004) discusses the detailed interchange configuration screening, which determined the preferred North-South Road Interchange described below. At the time of this writing, FHWA has not yet approved the Interstate Access Modification Request.

The proposed North-South Road Interchange on the H-1 Freeway would be located approximately midway between the Makakilo and Kunia Interchanges. The distance between each interchange would be approximately 2.2 miles, consistent with Federal Highway Administration (FHWA) guidance for interchange spacing (FHWA policy statement "Additional Interchanges to the Interstate System", Federal Register, February 11, 1998). *Figure 2.3-1 illustrates the spacing between the proposed interchange and* the Kunia and Makakilo Interchanges.

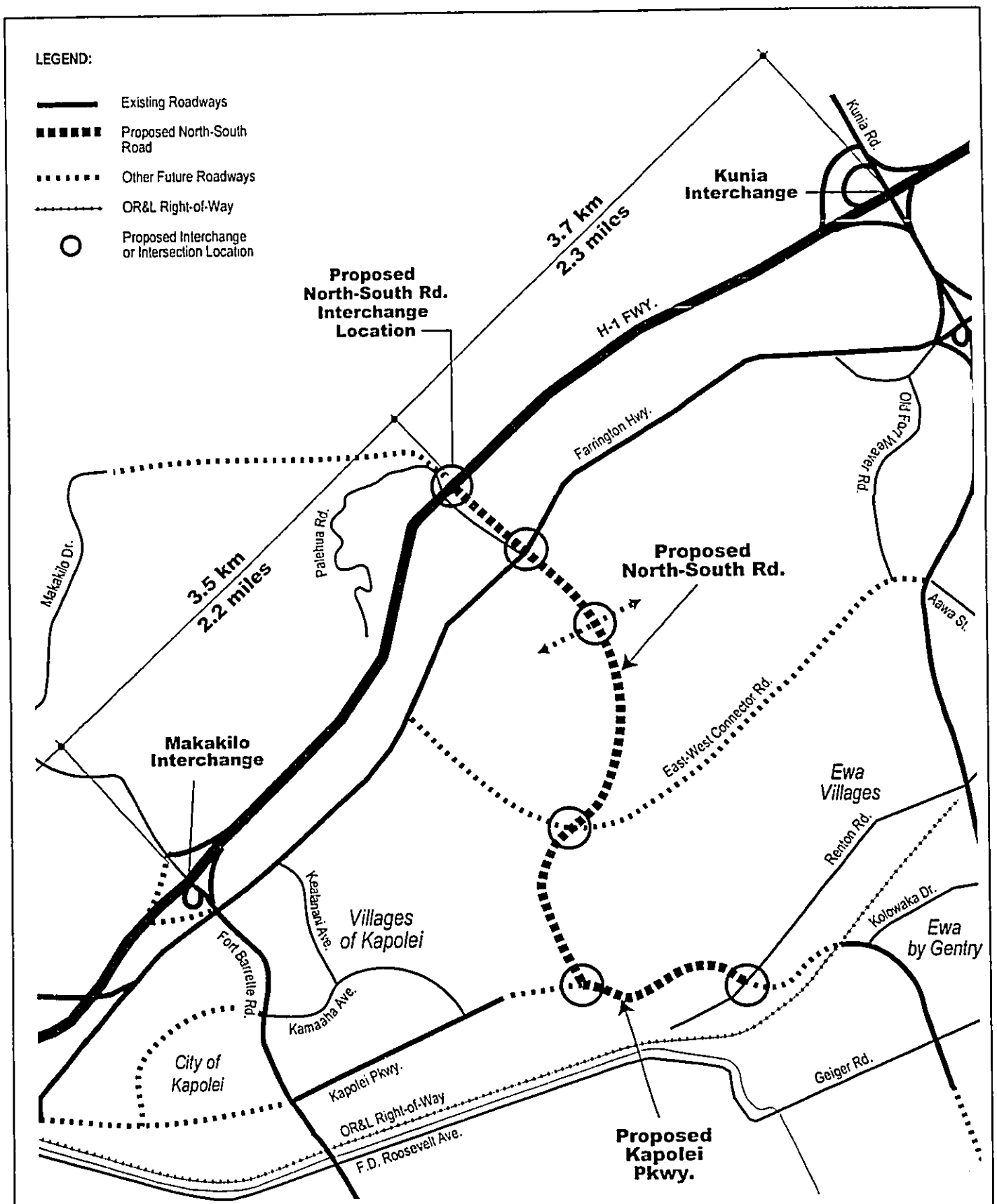
Since the preferred alternative would implement a principal arterial roadway, a freeway-to-arterial type interchange configuration of urban design is most appropriate. The proposed North-South Road would pass under the H-1 Freeway to take advantage of the existing grade difference between the H-1 Freeway and the surrounding land. The ultimate preferred interchange configuration would service four legs and accommodate all traffic movements. Signalization is proposed at the ramp terminal intersections. Figure 2.3-2 shows the different interchange alternatives considered.

To fulfill each of these requirements, the conventional diamond interchange configuration was selected because of flexibility in implementation, driver familiarity, ability for future expansion, and acceptable traffic operations (see Appendix C). To accommodate potential substantial traffic volumes of westbound to southbound movement, HDOT will reserve the ROW in the northwest quadrant of the North-South Road interchange as a part of this project. The future loop-ramp expansion will be a future project when traffic volumes warrant the expansion. Figure 2.3-3 shows the conventional Diamond Interchange configuration with the reserved future loop-ramp ROW.

An Interstate Access Modification Report has been prepared, and access to the H-1 Freeway will be permitted only upon formal acceptance of the report by the FHWA.

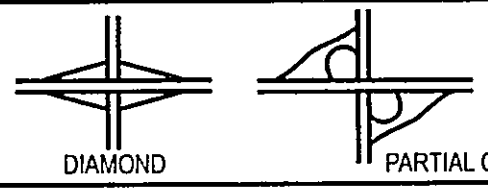
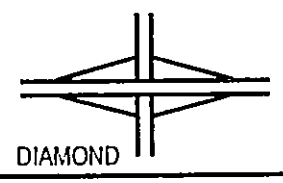
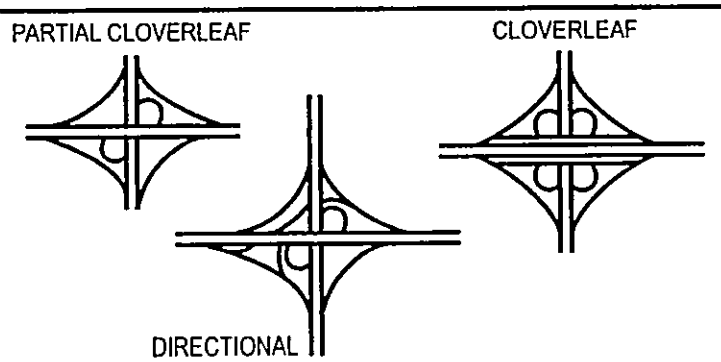
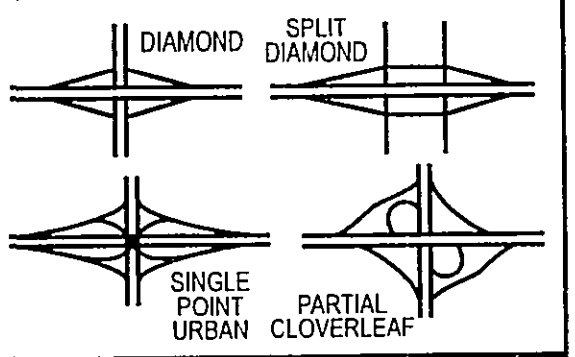
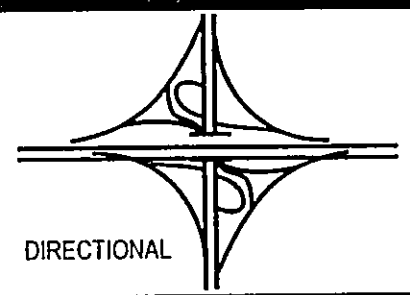
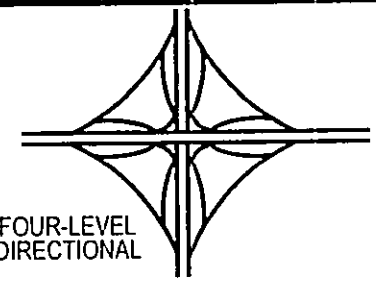
2.3.2 OTHER INTERCHANGE ALTERNATIVES

In addition to the conventional diamond interchange, other freeway-to-arterial type interchange configurations considered included the diamond/flyover interchange, the Single Point Urban Intersection (SPUI) interchange, and the partial cloverleaf interchange. Freeway-to-freeway interchanges, such as all-way directional and full-cloverleaf, were eliminated from further consideration because of cost and system appropriateness. The interchange alternatives were evaluated based on criteria such as

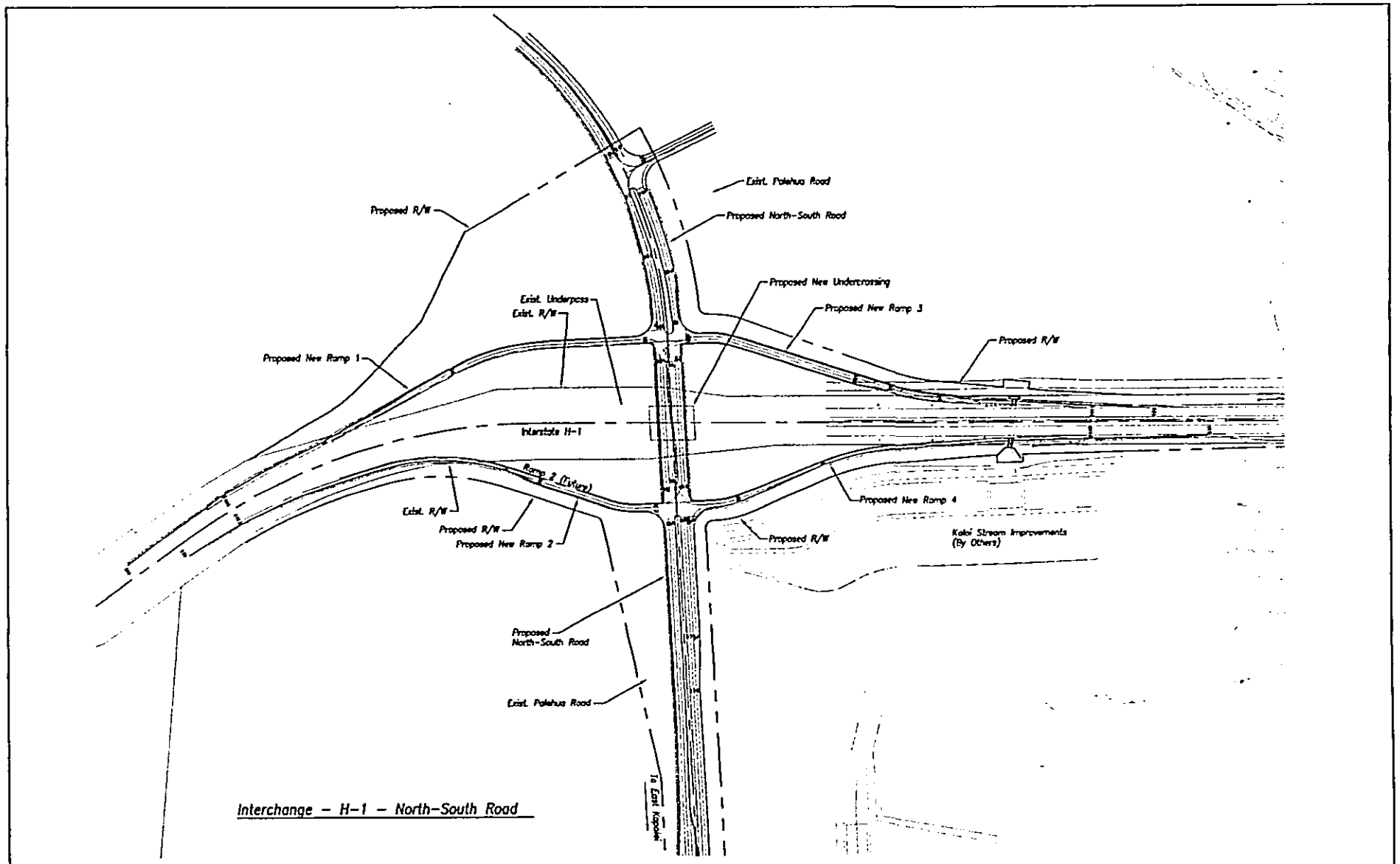


Interchange Spacing

North-South Road and Kapolei Parkway Project
Final Environmental Assessment
Figure 2.3-1

TYPE OF INTER-SECTING FACILITY	SUBURBAN	
SERVICE INTERCHANGES	**RURAL**	**URBAN**
LOCAL ROAD OR STREET		
COLLECTORS AND ARTERIALS		
SYSTEMS INTERCHANGES		
FREEWAYS		

Interchange Configuration Alternatives
North-South Road and Kapolei Parkway Project
Final Environmental Assessment
Figure 2.3-2



NTS

Diamond Interchange Configuration
North-South Road and Kapolei Parkway Project
Final Environmental Assessment
Figure 2.3-3

traffic operations, ROW requirements, cost, phasing options, and potential future expansion.

The combination diamond/flyover was eliminated because it would not increase interchange level-of-service (LOS) and would require the most ROW. Additionally, it would be the most expensive of the interchange alternatives. Its flyover ramp would have projected visual and noise impacts both to the future UH-West Oahu Campus and to developments within the Ewa Plain.

The SPUI alternative would provide acceptable interchange LOS while requiring similar ROW and construction costs as the conventional diamond interchange. This interchange would require less ROW and would be less costly than the partial cloverleaf configurations but is less flexible in accommodating changes in future traffic conditions. The SPUI alternative must be constructed all at once due to the clear-span structure and ramp configuration therefore phased construction of this type of interchange is not feasible. Once built, the SPUI interchange is not easily expanded. Based on these characteristics, the SPUI alternative was eliminated.

Two similar partial cloverleaf configurations were considered: the partial cloverleaf and the modified partial cloverleaf. The modified partial cloverleaf configuration is preferred over the partial cloverleaf for the following reasons:

- The modified partial cloverleaf results in one less intersection on North-South Road. Even though this road serves a right-turn movement only, it requires construction of a separate ramp. The partial cloverleaf consolidates all movements into one loop ramp.
- The modified partial cloverleaf alternative provides more integrated access into the mauka property. Although its use is not known at this time, the mauka property could generate considerable traffic. Having the modified partial cloverleaf interchange is more familiar to the driver population. The partial cloverleaf interchange configuration will require a learning curve before drivers are comfortable with the traffic operations in this configuration.

Based on the construction cost, flexibility in implementation, driver familiarity, expansion capabilities and acceptable traffic operation, the conventional diamond interchange configuration was selected and the ROW in the northwest quadrant of the North-South Road Interchange will be reserved by HDOT as a part of this project. The additional ROW will be for used for potential expansion of a westbound to southbound loop ramp as a part of a separate project when traffic volumes warrant.

CHAPTER 3 ■

NORTH-SOUTH ROAD and KAPOLEI PARKWAY
FINAL ENVIRONMENTAL ASSESSMENT

CHAPTER 3
AFFECTED ENVIRONMENT, IMPACTS, AND PROPOSED MITIGATION

This chapter describes the environment of the project area, potential impacts of the proposed action, and proposed mitigation. Sections in this chapter address the various environmental or social disciplines analyzed for the proposed action. In general, each section describes existing conditions, any existing regulatory requirements pertaining to the discipline, potential impacts of the action, and mitigation measures, if any.

The discussion of potential impacts compares those identified under the 2025 No-Build Alternative (without the proposed action) with the 2025 Build Alternative. As described in Section 2.1, all facilities including Kapolei Parkway that would be built under the base case established by the No-Build Alternative are also assumed to occur in the Build Alternative. The proposed action is the construction of North-South Road and the federalization of Kapolei Parkway, and the No-Build Alternative assumes that Kapolei Parkway would be constructed by the year 2025, regardless of federal participation. Despite the acceleration of the Kapolei Parkway portion as a result of federal participation, there would be no additional impacts in the 2025 Build Alternative condition, compared to the No-Build condition. However, where federal regulations apply because of the federalization of Kapolei Parkway, this chapter identifies specific construction impacts of Kapolei Parkway as part of the Build alternative, in order to disclose the impacts of federalizing the project.

In this Chapter, as well as throughout this FEA/FONSI, the term "Kapolei Parkway" refers to the proposed segment of the roadway between the proposed North-South Road (starting at the City/State property line) and Renton Road, unless otherwise specified.

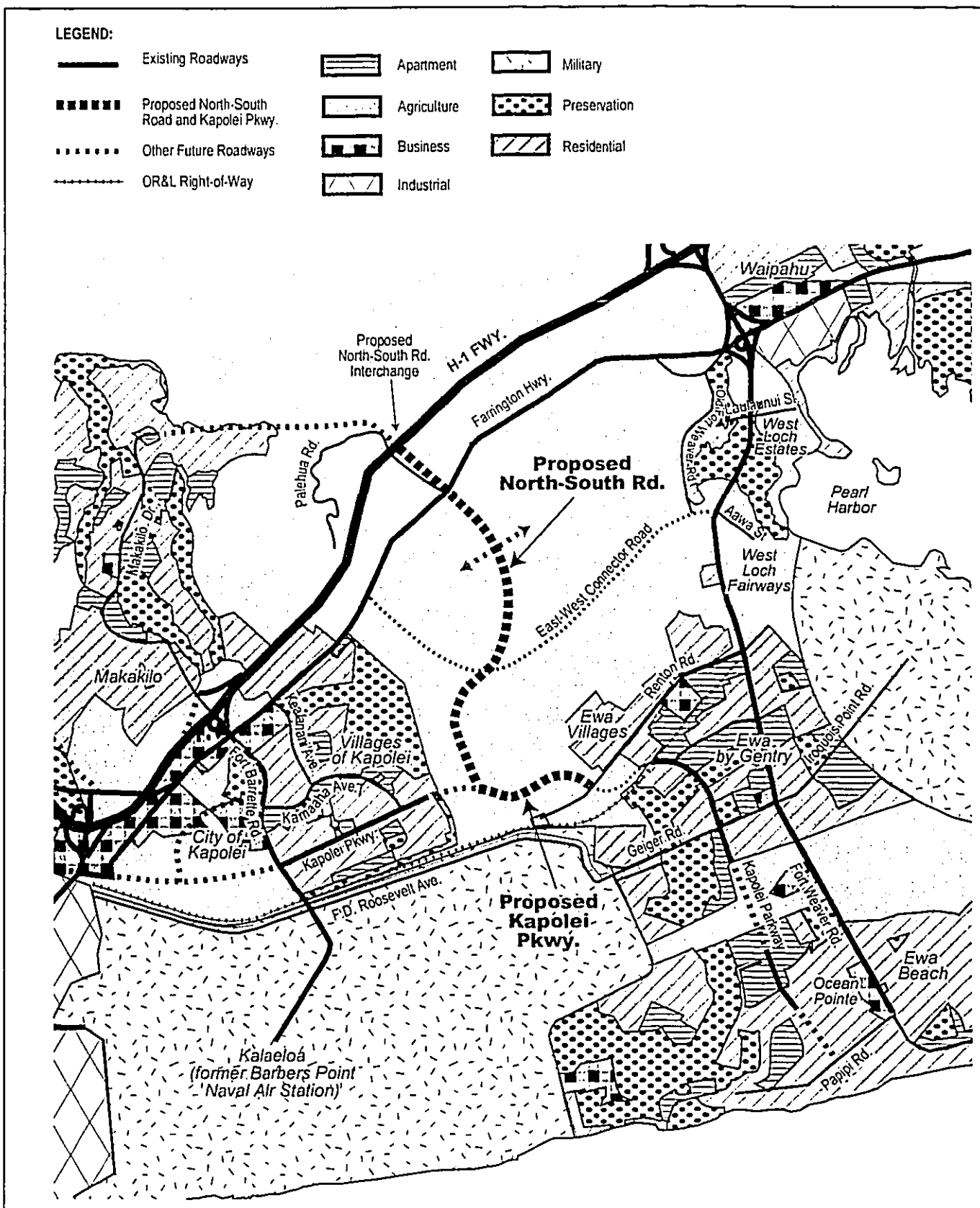
3.1 LAND USE AND PLAN CONSISTENCY

3.1.1 LAND USE

The proposed action is located in the Ewa region of Oahu. Ewa was once used primarily for sugarcane cultivation, but is now characterized by urban growth as the State of Hawaii and City and County of Honolulu develop the Ewa region as the "second city" of Oahu (see Section 1.1). Sugarcane is no longer cultivated on Oahu. Figure 3.1-1 displays existing zoning.

3.1.1.1 EXISTING LAND USES

The area surrounding the North-South Road and Kapolei Parkway Corridors is currently vacant and was used for sugarcane cultivation by the old Oahu Sugar Company. The existing residential suburban communities near the proposed project include Ewa by Gentry, Ewa Villages, and the Villages of Kapolei. Residential and other land uses



Source: City and County of Honolulu, Department of Planning and Permitting, January 2001.

SCALE:
0 2000 4000 FT.

N

Existing Zoning
North-South Road and Kapolei Parkway Project
Final Environmental Assessment
Figure 3.1-1

further away from the project site include West Loch Estates, Ewa Beach, the City of Kapolei, Makakilo, and Ocean Pointe (formerly Ewa Marina).

Ewa by Gentry was first developed in 1988, and includes a range of low-density suburban housing types from single-family to low-rise townhouses (i.e., duplexes). Ewa by Gentry also includes a private golf course (Coral Creek), a community park (Geiger Park), a neighborhood shopping center (Ewa Town Center), and an elementary school (Holomua Elementary).

Ewa Villages is the oldest community in the Ewa region. Built around the Ewa sugar mill in the 1890s, the villages grew over the next 60 years. At one time there were eight villages housing immigrant plantation workers. Now only Renton, Tenney, Varona, and Fernandez Villages remain. Renton and Fernandez Villages were redeveloped by the City and County of Honolulu (City) in the late 1970s and early 1980s, providing housing units on the Fort Weaver Road side of the community. Tenney Village was redeveloped in the 1990s for affordable housing, maintaining the plantation architecture of the community. Varona Village has not been redeveloped, but continues to be occupied by former plantation workers and their families. Ewa Villages also includes district and neighborhood parks, a municipal golf course, and a small commercial area on Fort Weaver Road.

The Villages of Kapolei are located west of the proposed North-South Road Corridor with the first homes completed in 1990. The community also includes an 18-hole golf course, parks, and elementary, middle, and high schools.

The City of Kapolei, located west of the Villages of Kapolei, is State-mandated as part of Honolulu's Secondary Urban Center, complementary to the Primary Urban Center of Honolulu (Pearl City to Waikiki). Existing land uses include a community shopping center; a 16-screen movie theater complex; a 73-acre regional park; Campbell Square, and a Bank of Hawaii building. In addition to the City of Kapolei, the Secondary Urban Center includes Ko Olina Phases I and II, the Kalaeloa Barbers Point Harbor area, Kapolei Business Park, and Campbell Industrial Park. Some of these areas are described below. Many government services have also been established in or near Kapolei to provide services to this Second City, including a State office building (Kakuhihewa Building), Kapolei Hale (a City civic center complex), two fire stations, a police station, and a transit center.

Much of Ewa to the south of the project area was taken up by the former Barbers Point Naval Air Station (BPNAS) (see Figure 3.1-1). BPNAS was established during World War II and used to support naval aviation activities and units. The base closed on July 2, 1999, and was rededicated by the State of Hawaii as the Kalaeloa Community Development District. The Kalaeloa Redevelopment Plan, which was adopted by the Honolulu City Council by Resolution 01-86, was developed to establish the policies, principles, and guidelines for redevelopment of the BPNAS Special Area. The former base is now open to the general public. For instance, the beach park is open for public use. However, the Navy still maintains some housing and recreational facilities, such as the Barbers Point Golf Course and beach cottages. Other existing land uses in the former base include Barbers Point Elementary School; Hawaii Army National Guard

base; U.S. Coast Guard C-130 Operations; general aviation airport, Honolulu Community College's Aviation Flight Training program, and support buildings; and some residential and miscellaneous light industrial uses.

Despite rapid urbanization of most of Ewa, agriculture still remains, but is different from the large-scale cultivation of years past. The Estate of James Campbell, a major landowner in Ewa along with the State of Hawaii, leases parcels near the project area to small-scale farms cultivating diversified agricultural crops, such as vegetables, fruits, and herbs.

Ewa Beach, West Loch Estates, West Loch Fairways, Ocean Pointe, and Makakilo are other residential communities within the vicinity of the project, which have a mix of single-family and multi-family units.

3.1.1.2 LAND USE DEVELOPMENT TRENDS

According to State of Hawaii and City and County of Honolulu plans and policies, the Ewa region is to be the site of a "second city" in order to provide opportunities for residential and employment growth. This second city assists in island development, while relieving urban development pressures in Waianae, North Shore, Koolauloa, and Koolaupoko. According to the Ewa DP (May 2000), it is projected that the Ewa region would accommodate 13 percent of Oahu's 2025 population, or roughly 133,874 persons and approximately 58,659 jobs by the Year 2025 (Interstate Access Modification Report, 2003). Refer to Table 1.2-1 for a summary of population, employment, and development trends in the Ewa region. The additional population would live primarily in master planned communities such as the Ewa Villages, Ewa by Gentry, City of Kapolei, Makakilo, Makaiwa Hills, a residential subdivision west of Makakilo, Villages of Kapolei, and Ocean Pointe. The growth anticipated for these and other existing residential and commercial/industrial developments include the following:

Ewa Villages – The Ewa DP estimates that there would be approximately 1,585 housing units in Ewa Villages in 2020, consisting of affordable housing, market-priced housing, and 200 units of rehabilitated housing. According to OMPO Forecasted Land Use Model's Population and Employment Comparison for Years 2000 and 2025 (OMPO's Land Use Model), population for "Ewa & Ewa Beach" (see Ewa Beach below) is expected to increase by 16 percent, the number of housing units is expected to increase by 182 percent, and total employment is expected to increase by 30 percent during that period.

Ewa Beach – As noted above, population, housing, and employment for Ewa and Ewa Beach are expected to increase substantially, although Ewa Beach has experience only limited growth in the past decade.

Ewa by Gentry – The Ewa DP notes that 7,678 housing units are anticipated in Ewa by Gentry by the year 2010.

Makakilo – According to the OMPO Land Use Model data comparisons between Year 2000 and Year 2025, population in Makakilo is expected to increase by 28 percent, the number of housing units is expected to increase by 43 percent, and total employment is expected to increase by 428 percent during that period.

Villages of Kapolei – The Villages of Kapolei, like the City of Kapolei, are a vital component of Oahu's Secondary Urban Center. According to the OMPO Land Use Model data, the Villages of Kapolei had a 2000 population of 3,301 people, and are projected to increase by approximately 103 percent to a total population of 6,712 by 2025. Housing units in Villages of Kapolei in 2000 were estimated at 888, and OMPO projects a total of 2,027 housing units by 2025, an increase of 128 percent. OMPO projects the largest growth to be in total employment, rising from 53 in 2000 to total employment of 2,756 in 2025, an increase of 510 percent.

West Loch Estates and West Loch Fairways – Phase I of the West Loch Estates included 600 single-family homes. West Loch Fairways includes 720 single-family homes and 120 townhouses.

James Campbell Industrial Park – The James Campbell Industrial Park is Hawaii's largest industrial park (1,367 acres) and Kapolei's largest job center, accounting for more than 4,500 jobs. According to the OMPO's Land Use Model, the area mauka of Joseph Campbell Industrial Park had a 2000 population of 38, which is projected to rise to 3,591 by the year 2025, a substantial increase of 9,350 percent. The number of housing units is projected to rise nearly 3,500 percent from 3 in 2000, to 1,051 in 2025; and the total employment is projected to increase from 3,016 in 2000 to 11,863 in 2025, an increase of approximately 293 percent.

Kalaeloa (formerly BPNAS) - The OMPO Land Use Model indicates that in the year 2000 Kalaeloa had a total population of 4,609, which is projected to decrease to a 2025 population total of 4,276, a decline of approximately seven percent. Housing units, according to the OMPO, would remain stable at 1,446 units from 2000 to 2025, while total employment is projected to increase by six percent, from 4,493 in 2000 to an anticipated 4,767 in 2025.

Kapolei Business Park – The Kapolei Business Park, which opened in 1994, is located next to James Campbell Industrial Park and Kalaeloa Harbor. A private investment firm recently agreed to buy all the undeveloped property at Kapolei Business Park, approximately 91 acres (The Honolulu Advertiser, April 6, 2004).

City of Kapolei – The Ewa DP projects that by 2020 the City of Kapolei would house more than 7,000 residents and provide work sites for 25,000 private jobs and 5,000 City and State jobs, much of which would be located at the City's Civic Center, and the State office building. This reflects the anticipated growth of the City of Kapolei as the heart of Oahu's Secondary Urban Center.

Honouliuli – Honouliuli is an older residential community east of and along Old Fort Weaver Road makai of Farrington Highway. It includes residences, shops and a ranch.

Ko Olina – The Ko Olina project includes the Ko Olina Resort & Marina, a 652-acre major resort approved for hotel (e.g., Marriott's Ihilani Resort & Spa); time-share; commercial; recreational development, including golf courses and a 43-acre marina with 270 full service slips; and private luxury residences. According to the OMPO's Land Use Model, Ko Olina had a population of 2,450 in 2000, which is projected to increase to 8,701 by 2025, an increase of 255 percent. The number of housing units is expected to increase from 581 in year 2000, to 2,322 units in 2025, or approximately 300 percent. Total employment is projected to increase 986 percent from 3,016 in 2000 to 11,863 in 2025.

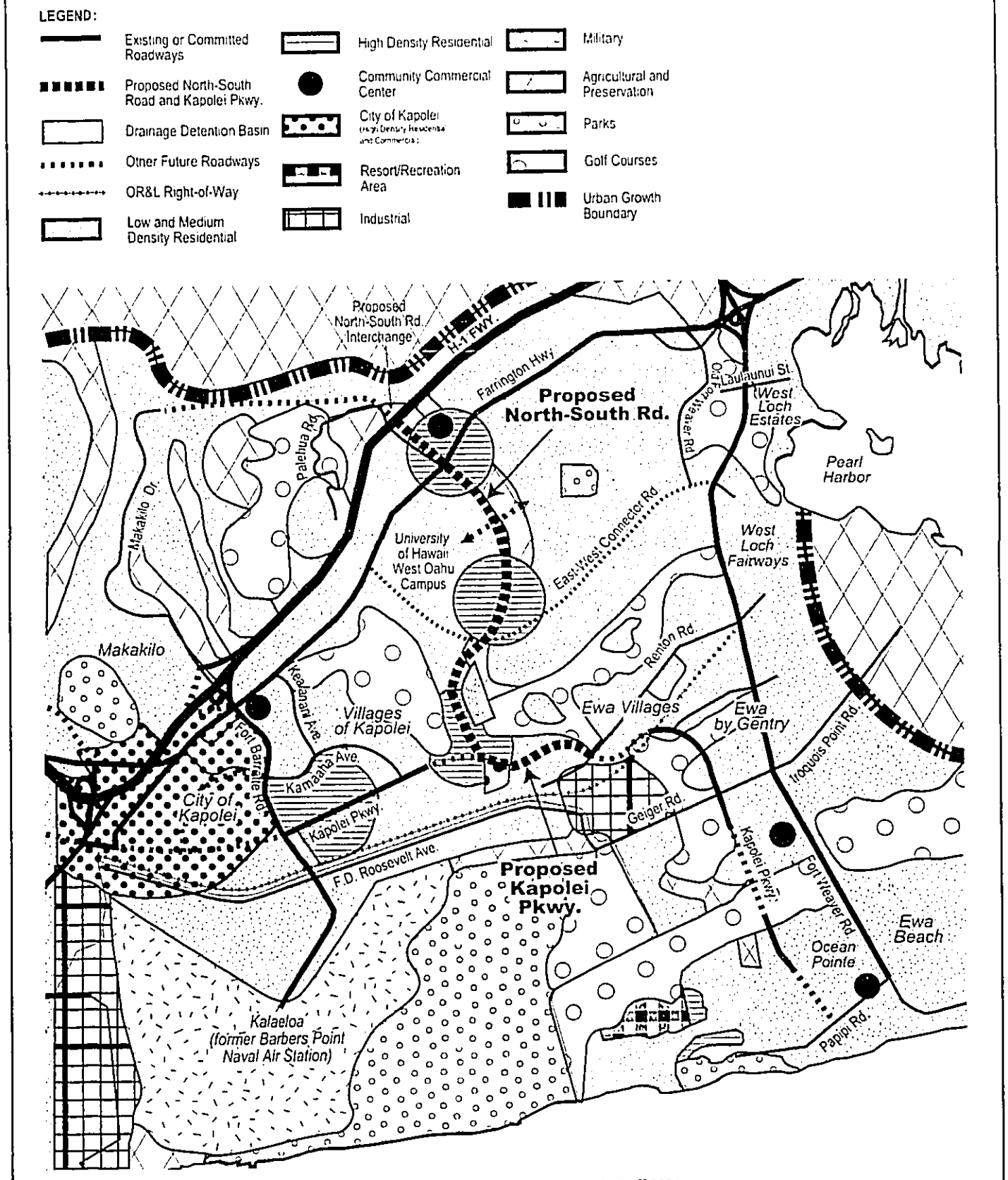
Ocean Pointe – In 1989, Haseko Homes, Inc. purchased the 1,100-acre parcel, then called the Ewa Marina Project. The parcel includes ¾-mile of oceanfront. Construction of Phase 1 homes began in 1997, when the project was renamed Ocean Pointe. Phase 2 began in 2001. As of May 2003, about 1,000 homes had been sold and built. Haseko plans to build another 960 homes in Ewa as part of Phase 3 of its Ocean Pointe development.

The City's Bus Rapid Transit (Regional BRT) would be constructing a park-and-ride on roughly four acres of land on North-South Road near the H-1 Freeway.

Figure 3.1-2 shows land uses proposed for the near future. Future developments near the corridor include the following planned projects:

DHHL – In November 2002, BLNR granted DHHL a right-of-entry to approximately 200 acres at the Kapolei property and began the process of transferring those parcels to DHHL. The acquisition of these parcels allows DHHL to plan and develop approximately 1,000 residential homesteads and potentially some commercial and community facility uses to serve the new subdivision over an 8 to 10 year period from 2006-2016. It is anticipated that DHHL would construct the final portion of Kapolei Parkway between the southern terminus of North-South Road and the existing cul-de-sac of Kapolei Parkway within the Villages of Kapolei. Therefore the DHHL project would complete the portion of Kapolei Parkway connecting Ewa and Kapolei, thus allowing traffic to flow between the two locales.

UH-West Oahu – The University of Hawaii is planning to build a new West Oahu campus makai of Farrington Highway, and west of the proposed North-South Road. At one time the proposed site for the new UH-West Oahu was mauka of the H-1 Freeway. Currently, it is planned for a site makai of Farrington Highway. The UH campus at the proposed location was approved by the UH Board of Regents on September 27, 2002, and in July 2004, the Board adopted the Long Range Development Plan (LRDP) for the UH West Oahu campus. The university would encompass roughly 500 acres currently being used by Aloun Farms and A.M. Enterprises for agriculture (State of Hawaii, Fee Conveyance, 2002). According to the LRDP, the initial phase of the campus is anticipated to be completed in the Fall of 2008, with populations of 1,520 students and 360 staff. The ultimate 97-acre campus would have 7,600 students and 1,040 staff. The University is also considering a public/private partnership to develop an additional 320 acres adjacent to the campus, including a mixed-use village and commercial and residential uses. UH has stated that this development could commence prior to, or about the same time as, the development of the initial campus. The remaining 83 acres of land would be



Source: City and County of Honolulu, Ewa Development Plan, Revised May 2000; Parsons Brinckerhoff, 2004.

SCALE:
0 2000 4000 FT

N

Future Land Uses Map

North-South Road and Kapolei Parkway Project
Final Environmental Assessment
Figure 3.1-2

used for roads, open space, parks, an elementary school, and other non-income generating land uses.

East Kapolei Area – According to the OMPO's Land Use Model, the 2000 population of the East Kapolei area was 5,455, which is projected to increase to 25,372 by 2025, an increase of approximately 365 percent. Housing units in East Kapolei numbered 1,473 in 2000 and are projected to increase to 7,584 housing units in 2025, an increase of approximately 415 percent, while total employment in 2000 was 1,071 and is projected to increase to 5,227 in 2025, for an increase of approximately 388 percent.

Mehana – Schuler Homes plans to build 1,150 homes on 120 acres on the edge of Kapolei's civic center, during the next 11 to 16 years. The community, called Mehana, is designed to have six parks, running and cycling paths, a recreation center, pool, commercial complex, and an approximately 50-50 mix of single-family and multi-family homes. Schuler and Campbell Estate plan to contribute a 12-acre adjacent site for a new elementary school (*The Honolulu Advertiser*, March 30, 2004).

3.1.1.3 POTENTIAL DISPLACEMENT AND RELOCATION IMPACTS

The proposed improvements would require acquisition of land that would be converted from vacant or agricultural use into a transportation facility. Currently, the State of Hawaii, the City and County of Honolulu, and EJC own the land along the North-South Road Corridor and the portion of Kapolei Parkway between Renton Road and North-South Road. Land would need to be acquired from the EJC in order to connect North-South Road from Kapolei Parkway to the H-1 Freeway. Property acquisition for those affected by the proposed project will be acquired pursuant to the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Federal Public Law 91-646), revised 1987.

3.1.1.3a No-Build Alternative

The City and County of Honolulu owns the roughly 9.8 acres of vacant property that would be used for Kapolei Parkway from Renton Road to the proposed North-South Road. The City will subdivide this property from an existing larger parcel owned by the City, in order to create the right-of-way (ROW) for its portion of Kapolei Parkway. Therefore, no land acquisitions or displacements would be required for the construction of Kapolei Parkway. Moreover, the No-Build Alternative assumes that the section of Kapolei Parkway would be built by 2025, regardless of the federalizing action.

3.1.1.3b Build Alternative

The Build Alternative would require acquisition of approximately 135 acres from portions of various parcels owned by the State of Hawaii, DLNR, the City and County of Honolulu, and approximately 55 acres from EJC. Parcels potentially affected include TMK: 9-1-016:108, 9-1-016:109, 9-1-017:004, 9-1-017:046, 9-1-017:068, 9-1-017:069, 9-1-017:071, 9-1-017:075, 9-1-018:004, 9-1-018:005, 9-2-002:001, 9-2-002:006, 9-1-017:86, 9-1-017:88, 9-1-16:129, 9-1-16:120, 9-1-16:127, 9-1-18:001, and 9-1-18:007. Some of the

parcels owned by the DLNR and EJC are currently used for diversified agriculture by A.M. Enterprises, Inc., Sugarland Farms, Inc., and Aloun Farms, Inc. under short-term revocable permits. These farms may potentially be affected by ROW acquisition and the loss of some of their agricultural fields. However, none of these farms would be fully displaced by the project. Relocation of farms will not be necessary, because the remaining fields would still be productive, and the farmers would be able to maintain their operations in the short term. In the long-run, these existing short-term farm leases would expire and/or would not be continued, because DLNR and EJC anticipate the conversion of these lands from agricultural use to urban use, such as the planned development of UH-West Oahu.

In addition to the displacement of some agricultural lands for the North-South Road ROW, farm land located north of the H-1 Freeway, which are accessed via the existing Palehua Road, may require alternate access options because the ultimate phase of the project would displace Palehua Road. Access to all agricultural properties would be maintained during and after construction (see Section 3.2). Grace Pacific Corporation, located north of the H-1 Freeway, utilizes Palehua Road to access their quarry and concrete batch plant. The State of Hawaii Department of Transportation (HDOT) would coordinate with Grace Pacific Corporation to maintain access between its quarry operations located makai and mauka of the H-1 Freeway.

3.1.1.4 POTENTIAL IMPACTS ON LAND USE DEVELOPMENT

This section describes potential impacts that North-South Road and the portion of Kapolei Parkway between Renton Road and North-South Road would have on current land use development trends.

As described in Sections 3.1.1.1 and 3.1.1.2, the Ewa region has experienced substantial development within the last couple of decades, and private and public developers are proceeding with planned residential, commercial, and institutional developments in areas surrounding North-South Road. Planned developments of particular note include UH-West Oahu that would be located adjacent to the proposed North-South Road alignment, DHHL homesteads next to North-South Road, and continuing residential, commercial, park and institutional (e.g., public schools) developments in the communities of Kapolei, Ewa Villages, and Ewa by Gentry. With the exception of the UH campus, these developments are consistent with the current General Plan of the City and County of Honolulu and the Ewa DP.

3.1.1.4a No-Build Alternative

Under the No-Build Alternative, the vacant North-South Road Corridor area would not be converted to a highway, but the portion of Kapolei Parkway between Renton Road and North-South Road would be constructed by the City between what would have been the North-South Road makai terminus and Renton Road. In addition, public agencies and private developers would construct other sections of Kapolei Parkway so that it becomes a continuous roadway from Ocean Pointe, through the Villages of Kapolei, and continuing to Kalaeloa Boulevard. This connection would improve general circulation for

the greater Ewa Plain that would support development of vacant open space areas surrounding Kapolei Parkway from the Villages of Kapolei to Ocean Pointe, which are planned to be converted to approved urban uses per the Ewa DP. However, these lands would still require a State Land Use District Boundary Amendment (SLUDBA) to reclassify them to urban use. The SLUDBA must occur prior to any zoning changes.

3.1.1.4b Build Alternative

Under the Build Alternative, North-South Road would add to the future No-Build roadway network in the Ewa Plain, which would include the completed Kapolei Parkway from Ocean Pointe to Kalaeloa Boulevard. The action federalizing the portion of Kapolei Parkway under the Build Alternative would accelerate the timing for constructing the City's portion of Kapolei Parkway, but otherwise, the roadway would be the same as under the No-Build Alternative. Developments and improvements planned in the area would gain even greater transportation access, because North-South Road would provide an alternative route for residents to access the H-1 Freeway, Farrington Highway, and adjacent areas.

Since the proposed project and surrounding area are master planned in the Ewa DP and in the Kapolei Area Long Range Master Plan, the project is not anticipated to induce more development than what is currently considered and, therefore, would not intensify the general land use conditions. It would, however, facilitate improved circulation for impending improvements, including the proposed UH-West Oahu. Therefore, the proposed project may accelerate the pace of planned development in the region notwithstanding market and governmental budgetary conditions and constraints.

It should be noted that some future development may be affected by colonies of the endangered plant, Kooloaula (*Abutilon menziesii*), which were found along North-South Road and the portion of Kapolei Parkway between Renton Road and North-South Road. As stated in Section 3.7, a Habitat Conservation Plan (HCP) was approved by the State of Hawaii Board of Land and Natural Resources, which would implement a temporary contingency reserve area to mitigate impacts to the species. The HCP was submitted to the Service on March 23, 2004, as the BA to initiate "formal consultation" with the Service under Section 7 of the Endangered Species Act (see Section 3.7 for further information).

3.1.2 CONSISTENCY WITH GOVERNMENTAL PLANS, POLICIES AND CONTROLS

3.1.2.1 STATE OF HAWAII PLANS AND CONTROLS

3.1.2.1a Hawaii State Plan

The Hawaii State Plan (June 1991) consists of comprehensive goals, objectives, policies and priorities for all areas of government functions. These functions include the protection of the physical environment, the provision of public facilities systems, and the promotion and assistance of socio-cultural advancement.

The State of Hawaii is encouraging population and employment growth in the Ewa region, which is designated as Oahu's "second urban center". With major employment centers to be located in the City of Kapolei, Kalaeloa Barbers Point Harbor, and Ko Olina resort, and residential developments to be located in planned communities such as Ocean Pointe, Ewa by Gentry, Ewa Villages, and the Villages of Kapolei, transportation infrastructure is needed to efficiently develop Ewa as a place where people can live and work. All project alternatives would provide additional transportation infrastructure to support these State of Hawaii objectives. The Build Alternative supports these objectives more than the No-Build Alternative by improving regional access to the H-1 Freeway, local circulation, and roadway levels of service to a greater degree (see Section 3.3.1).

The State Plan also promotes the continued viability of Hawaii's sugar and pineapple industries, as well as growth in diversified agriculture. Although the project corridor is located on land formerly used for growing sugarcane, cultivation in Ewa ceased in 1995 for reasons unrelated to the proposed project. There are no State or City plans to convert the affected former sugarcane land to diversified agriculture permanently, because there are ample and more productive lands elsewhere (see Section 3.1.1).

The State Plan seeks to promote federally supported activities in Hawaii that respect Statewide economic concerns, are sensitive to community needs, minimize adverse impacts on Hawaii's environment, and strengthen federal-state-county communication and coordination on federal activities affecting Hawaii. Under the Build Alternative, federal funds would be used in the construction of North-South Road and federalization of Kapolei Parkway, infusing federal money into the local economy. In comparison, the No-Build Alternative assuming the construction of only Kapolei Parkway with only local funds would not contribute additional federal money to Oahu's economy, because the City segment of Kapolei Parkway would not be built with federal funds.

Objectives and policies also support Hawaii's visitor attractions and facilities, and seek to increase accessibility and prudent use of inland and shoreline areas for public recreational, educational, and scientific purposes. The Build Alternative would improve access to and from the Ewa Plain as a whole. It would also improve access to future parks and recreational facilities throughout Ewa. The No-Build Alternative would also provide access improvements to future park and recreational resources, but not to the extent of the Build Alternative.

Under objectives for transportation facility systems, the State Plan has policies that: seek multi-modal system conformance with desired growth patterns and physical development; coordinate state, county, federal, and private transportation activities and programs; encourage a reasonable distribution of financial responsibilities for transportation among participating governmental and private parties; and encourage transportation systems that serve to accommodate present and future development needs of communities. The proposed project is being planned through a cooperative effort involving HDOT, the Federal Highway Administration (FHWA), and the City and County of Honolulu Department of Transportation Services (DTS).

3.1.2.1b Hawaii State Land Use Controls

Lands in the State are divided into four classifications: Urban, Agriculture, Rural, and Conservation. Each classification has specific land use objectives, development constraints, and administrative control. North-South Road and the portion Kapolei Parkway between Renton Road and North-South Road would traverse lands designated as Agriculture. In light of development policies set in the Ewa DP, it is expected that landowners would petition the State Land Use Commission to redesignate agriculture lands surrounding North-South Road and Kapolei to urban classifications.

3.1.2.1c Coastal Zone Management

The objectives and policies of the Hawaii Coastal Zone Management (CZM) Program are designed to protect and manage Hawaii's valuable coastal areas and resources. The proposed North-South Road and the portion of Kapolei Parkway between Renton Road and North-South Road are located within the State's CZM area. Pursuant to 15 CFR 930.32, federally-permitted, licensed or assisted activities undertaken in or affecting Hawaii's coastal zone must be consistent with the CZM objectives and policies.

The following discussion describes the project's consistency with the objectives and policies of the State's CZM Program. This assessment will be reviewed by the Department of Business, Economic Development and Tourism (DBEDT) Office of Planning, the agency administering the State's CZM program.

Recreation Resources

North-South Road and the portion of Kapolei Parkway between North-South Road and Renton Road would improve access to existing and future park and recreational facilities in Ewa, such as Ewa Mahiko District Park, and coastal areas (see Section 3.11). The No-Build Alternative would also provide improved access to these future park and recreational resources, but not as well as the Build Alternative, which provides an interchange connection to the H-1 Freeway.

Historic Resources

The project's Area of Potential Effect is highly unlikely to contain archaeological resources mainly because of past sugarcane cultivation activities (see Section 3.10). The only historic property that may be affected by the project is the Ewa Villages Historic District. The Kapolei Parkway/Renton Road intersection would be within the boundaries of the district, and the alignment of Kapolei Parkway was planned by the City with consideration of the historic properties in the Ewa Villages Historic District. Despite the intersection likely warranting traffic signals, the historic integrity of the district will be unaffected. See Section 3.10 for additional information.

Scenic and Open Space Resources

The Ewa DP recommends a network of green space and green ways to link urban and employment centers with new and established residential communities. The section of

Kapolei Parkway discussed in this document will be a roadway with a landscaped median and sidewalks. North-South Road will also include landscaped medians and sidewalks. Therefore, none of the alternatives compromise the green space objectives.

Coastal Ecosystems

The project area is not located within the Shoreline Setback Area or the Special Management Area (refer to Section 3.1.2.2d). Therefore, none of the alternatives would affect coastal ecosystems.

Economic Uses

To accomplish the economic objectives of the Ewa region (see Section 3.1.2.2b), suitable infrastructure must be developed. The Build Alternative would provide substantial roadway improvements, such as providing additional access to the H-1 Freeway, as well as improving local circulation and roadway levels of service. The No-Build Alternative would also provide transportation infrastructure to support the economic objectives of the region, but not to the extent of the Build Alternative.

Coastal Hazards

North-South Road and the portion of Kapolei Parkway between Renton Road and North-South Road are not located in a tsunami evacuation zone or other coastal hazard areas. Roadway improvements provided under the alternatives would facilitate emergency evacuation from nearby coastal areas in the event of a tsunami or other coastal hazard. The addition of North-South Road in the Build Alternative would provide the Ewa region with an additional linkage to the H-1 Freeway, as well as improve local circulation and roadway levels of service. The Build Alternative would therefore facilitate evacuation more efficiently than the No-Build Alternative.

Managing Development

The project would require State and City and County of Honolulu permits and approvals that include provisions for public participation and ensure protection of coastal resources. The project would also provide necessary roadway infrastructure to accommodate existing and planned future travel demand.

Public Participation

To date, project planning has included an agency pre-consultation meeting and presentations before the region's neighborhood boards. Consultations with federal and State, and County agencies were also conducted pursuant to other regulatory requirements. The public was provided a 30-day review period to provide comments on the project's Draft EA that was released on December 23, 1998. An additional 30-day review period began when the Revised Draft EA prepared pursuant to Hawaii Revised Statutes, Chapter 343, was published on July 23, 2004. A door-to-door public outreach effort was conducted in Varona Village in late July to early August of 2004. A public

hearing was held on September 1, 2004 to take public testimony regarding the project. For more details on public participation opportunities, see Chapter 4.

Beach Protection

North-South Road and the portion of Kapolei Parkway between North-South Road and Renton Road are not proposed near, adjacent to, or abutting a shoreline. Therefore, none of the alternatives would affect coastal erosion.

Marine Resources

The project would not affect marine or coastal resources because North-South Road and the portion of Kapolei Parkway between North-South Road and Renton Road would not be adjacent to or abutting the shoreline. Also see Coastal Ecosystems and Beach Protection above.

3.1.2.2 CITY AND COUNTY OF HONOLULU PLANS AND CONTROLS

3.1.2.2a General Plan of the City and County of Honolulu

The General Plan (revised 2002) provides broad statements on the objectives and policies of the City and County of Honolulu with regard to the overall physical and economic development of the island, as well as to the health and safety of the island's residents. Some of the policies advocate:

- Allocating funds from the City and County's capital improvement program for public projects that are needed to facilitate development of the secondary urban center;
- Encouraging the development of a major residential, commercial, and employment center within the secondary urban center; and
- Coordinating plans for the development of the secondary urban center at Kapolei with the State and Federal governments and with the sugar industry.

All of the alternatives would be consistent with the General Plan's objective to develop a secondary urban center in Ewa with its nucleus in Kapolei.

The Ewa Impact Fee Ordinance (Chapter 33A, Revised Ordinances of Honolulu) sets forth a regulatory scheme for the assessment and collection of impact fees to be borne on a pro-rata share basis by landowners, developers, home builders, and others who directly contribute to expanding the population and increasing economic activity in the Ewa region through new land development activities. The impact fee identifies six roadway facilities within the Ewa Plain targeted for improvement: new North-South Road from H-1 Freeway to Kapolei Parkway, new Kapolei Interchange, new westbound ramps at Makakilo Interchange, Fort Barrette Road widening from Farrington Highway to F.D. Roosevelt Avenue, Fort Weaver Road widening from Farrington Highway to North Road, and complete missing segments of Kapolei Parkway from Ko Olina Resort to Papipi Road. These State and City projects are described in Section 2.1.1.

Under the No-Build Alternative, the construction of the portion of Kapolei Parkway between North-South Road and Renton Road by the City would contribute the to the completion of Kapolei Parkway. A completed Kapolei Parkway would substantially improve linkages between commercial and office development in Kapolei and residential development in the eastern part of the Ewa region. Under the Build Alternative, North-South Road would provide additional system improvements by providing additional access between existing and new developments, and the H-1 Freeway.

All alternatives will also be consistent with policies seeking to develop transportation and utility systems on Oahu. Transportation improvements under the No-Build Alternative would be made and used to guide planned growth and desirable land use patterns in the Ewa region. Under the Build Alternative, North-South Road would provide additional system improvements by providing access to the H-1 Freeway.

3.1.2.2b Ewa Development Plan (Ewa DP)

The Ewa DP consists of vision statements; community design principles and guidelines; and conceptual mapping of open space networks, public facility networks, and urban land uses. The Ewa DP was the first to be updated using this new plan format. Previous DPs contained site specific land use and public facilities maps. The new Ewa DP was approved by the City Council in 1997 and revised in 2000.

The Ewa DP's vision for Ewa is the development of a "secondary urban center" on Oahu to provide opportunities for residential growth and urban development. The secondary urban center includes the City of Kapolei, Ko Olina, the Kalaeloa Barbers Point Harbor area, Kapolei Business Park, and Campbell Industrial Park. The Ewa DP projected that there would be close to 28,000 housing units in the Ewa area by the Year 2020, located primarily in master planned communities.

The Ewa DP also envisions substantial job growth, estimating that by 2020 there would be over 64,000 jobs in the Ewa DP area. The City of Kapolei would provide worksites for 25,000 private jobs and 5,000 City and State jobs. Many of the City of Kapolei jobs would be supported by development of the UH-West Oahu with 7,600 students and 800 staff and faculty members.

The Ewa DP Urban Future Land Uses Map (Figure 3.1-2) depicts substantial urban land uses throughout the Ewa Plain and shows North-South Road and Kapolei Parkway along generally the same alignment described in Section 2.1. All alternatives would be consistent with the Ewa DP because they provide transportation infrastructure to support planned land use development. However, the No-Build Alternative would not be as consistent with the Ewa DP as the Build Alternative, because it would not provide a new arterial roadway to the H-1 Freeway, which is needed to accommodate future regional growth.

Kalaeloa Redevelopment Plan

The BPNAS is the only area in the Ewa region with Special Plan Area status. The main goal of the Kalaeloa Redevelopment Plan (2000) is to integrate the BPNAS with land use

and infrastructure in the West Oahu area and to develop links with the regional transportation network to enhance accessibility among other West Oahu communities with activities on the BPNAS site. The circulation plan includes the extension of the proposed North-South Road to Coral Sea Road near the San Jacinto Road Intersection. In November 1998, the Redevelopment Commission revised the plan so that the Coral Sea Road extension was relocated to the east side of the navigational facility to more properly align with the North-South Road and avoid relocating the facility.

The No-Build and Build Alternatives would be consistent with the Ewa DP because they provide transportation infrastructure to support planned land use development. However, the No-Build Alternative would not be as consistent with the Ewa DP as the Build Alternative, because it would not provide a new arterial roadway to the H-1 Freeway, which is needed to accommodate future regional growth. The proposed North-South Road does not include extension to Coral Sea Road because it would be beyond the purposes and needs of the project. However, the project does not preclude such an extension in the future if warranted.

3.1.2.2c Zoning

City and County of Honolulu zoning is required to be in conformance with Development Plan designations of the Department of Planning and Permitting (DPP) and Land Use Ordinance (LUO). The LUO provides a list of zoning districts and precincts and the permitted uses and structures for each district and precinct. The purpose of the LUO is to regulate land use to encourage orderly development in accordance with adopted land use policies, including the Oahu General Plan and Ewa DP, and to promote and protect the public health, safety and welfare.

North-South Road and the portion of Kapolei Parkway between North-South Road and Renton Road would traverse lands currently zoned as AG-1 (restricted agriculture). In the near future, the land surrounding both roadways would be re-zoned to Residential, Commercial, Public Facility, Parks or other similar urban-related zones due to future developments (see Section 3.1.1.2).

3.1.2.2d Special Management Area (SMA)

HRS Chapter 205A outlines special controls, policies and guidelines for development within an area along the shoreline referred to as the Special Management Area (SMA), as designated by the 1975 Shoreline Protection Act. Under this Act, the City's DPP administers the SMA use permit program for Oahu with authority to issue permits for development activities proposed within the SMA.

No portion of the proposed project is within the SMA; therefore, no permit is required.

3.1.2.2e Transportation for Oahu Plan (TOP 2025)

TOP 2025 is the regional transportation plan (RTP) adopted by OMPO on April 6, 2001. It replaced the previous ORTP, adopted in November 1995. The TOP 2025 responds to the changing needs of Oahu and extends the horizon year to 2025. The purpose of TOP

2025 is to identify facilities and programs to meet increased travel demands through the Year 2025. Top 2025 Project number E-17 describes "North-South Road Kapolei Parkway to the H-1 Freeway (includes new interchange with the H-1 Freeway)" in Ewa, and Project number E-13 refers to the completion of Kapolei Parkway (Kapolei to Ewa Beach).

The No-Build Alternative would not be completely consistent with the TOP 2025 because it would not provide an arterial roadway connecting with the H-1 Freeway as recommended in the plan, while it does contribute to the completion of Kapolei Parkway. The Build Alternative would fulfill the recommendation of the TOP 2025 to construct North-South Road from Kapolei Parkway, including an interchange with the H-1 Freeway, and would contribute to the completion of Kapolei Parkway.

3.1.3 MITIGATION MEASURES

Once the proposed project is completed, land uses within the North-South Road Corridor would be converted from agricultural uses to a transportation facility. The Kapolei Parkway Corridor would also be converted to transportation use under the No-Build and Build Alternatives. However, these conversions are not considered a major or unforeseen impact because the change is anticipated in many approved planning documents as detailed above. Therefore, no mitigation measures are required. See Section 3.2.3 regarding mitigation measures for farmland displacements.

3.2 GEOLOGY, SOILS, AND FARMLAND

3.2.1 EXISTING CONDITIONS

3.2.1.1 PHYSIOGRAPHY, GEOLOGIC SETTING, AND SOILS

The project site is located on the relatively flat Ewa Plain of Oahu. From the coast in the area around Oneula Beach Park to Ewa Villages, a distance of approximately 2.5 miles, the elevation rises to 40 feet above sea level, for an average grade of 0.3 percent. From Ewa Villages to Farrington Highway, a distance of approximately 2.2 miles, the elevation rises to 160 feet, for an average grade of 1 percent. North (mauka) of Farrington Highway and the H-1 Freeway, the topography is steeper, as it rises to the Waianae Mountain Range.

The geology of the Ewa Plain consists of ancient coral-algal reefs interbedded with layers of alluvial and marine sedimentary deposits. These layers are built atop a basalt core of Pliocene-age Waianae Volcanics, and were formed as worldwide climatic changes and crustal adjustments led to large fluctuations in sea level. These layers start at approximately the middle of the Ewa Plain and also act as a "caprock" that prevents the seaward migration of potable groundwater in the Southern Oahu Basal Aquifer, a designated sole source aquifer (see Section 3.8). The geology of the north end of the Ewa Plain transitions to terrestrial alluvium over the underlying basalt core.

3.2.1.2 FARMLANDS

Soils as classified by the U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS) in the general vicinity of the project are shown in Figure 3.2-1. Table 3.2-1 describes the soils shown on Figure 3.2-1.

Table 3.2-1:
Soils Classified as Prime or of Statewide Importance in the Project Area

	Series	Soils
Prime		
	Ewa	EmA -- Ewa silty clay loam, moderately shallow, 0 to 2 percent slopes EmB -- Ewa silty clay loam, 3 to 6 percent slopes EwC -- Ewa stony silty clay, 6 to 12 percent slopes
	Honouliuli	HxA -- Honouliuli clay, 0 to 2 percent slopes HxB -- Honouliuli clay, 2 to 6 percent slopes
	Kawaihapai	KlB -- Kawaihapai clay loam, 2 to 6 percent slopes
	Waialua	WkA -- Waialua silty clay, 0 to 3 percent slopes
	Waipahu	WzA -- Waipahu silty clay, 0 to 2 percent slopes
	Molokai	MuC -- Molokai silty clay loam, 7 to 15 percent slopes
Statewide Importance		
	Kawaihapai	KlB -- Kawaihapai clay loam, 2 to 6 percent slopes
	Mamala	MnC -- Mamala stony silty clay loam, 0 to 12 percent slopes
	Molokai	MuD -- Molokai silty clay loam, 15 to 25 percent slopes

Source: National Resource Conservation Service and the United States Department of Agriculture, Soil Conservation Service, Soil Survey of Oahu, August 1972.

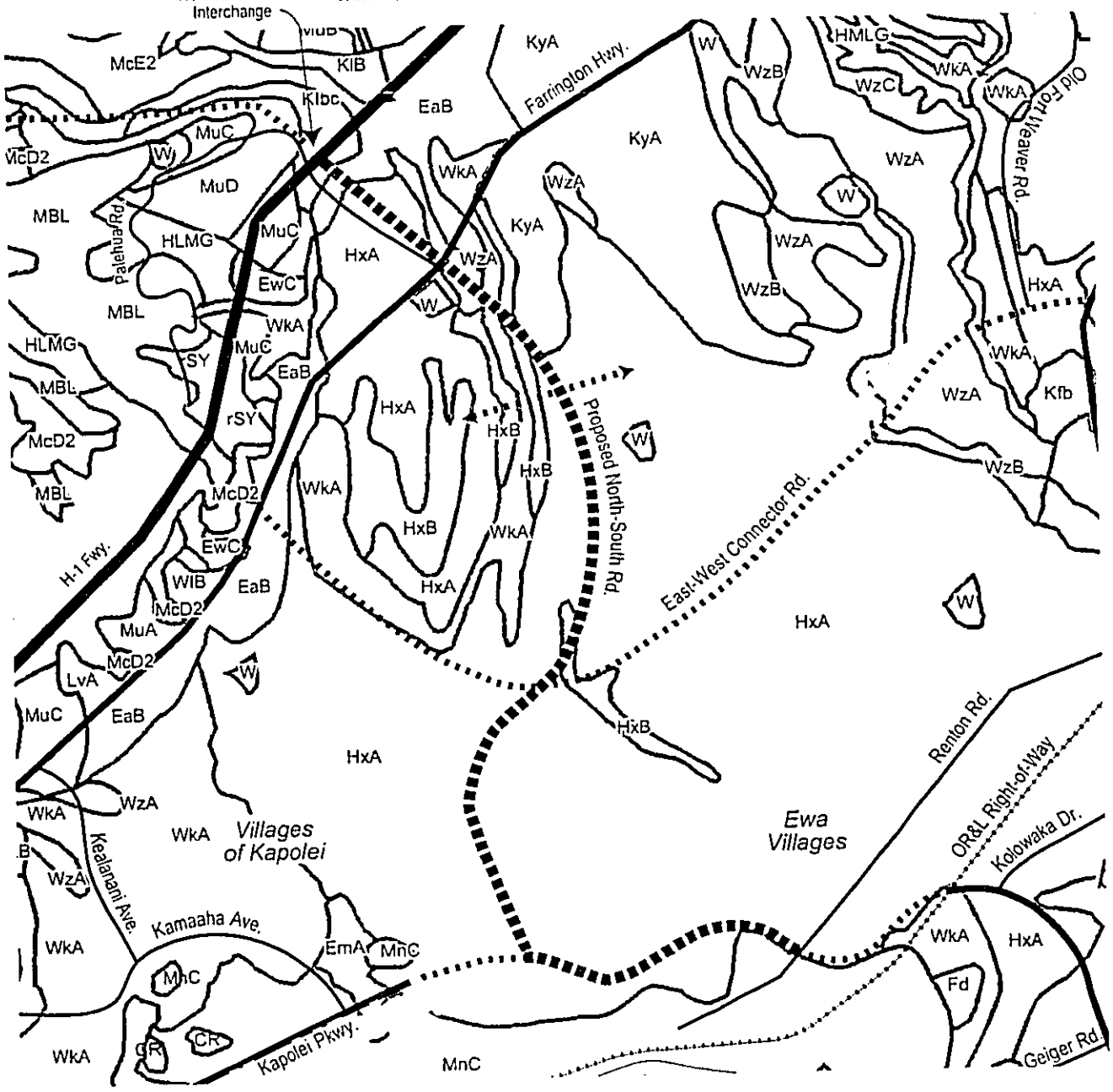
The Ewa Plain was once a major agricultural area primarily used to cultivate sugarcane. However, sugarcane has not been cultivated in Ewa since 1995. Despite recent rapid urbanization, much of the Ewa Plain is still classified and zoned for agricultural use by the State of Hawaii and City and County of Honolulu, respectively. In addition, much of Ewa that is not urbanized is classified as "Prime Agricultural Land" according to the Agricultural Lands of Importance to the State of Hawaii (ALISH) land classification system (1977). Figure 3.2-2 depicts the areas of prime and other agricultural lands of importance. There are no areas of unique agricultural lands of importance within the project vicinity. North-South Road and the portion of Kapolei Parkway between Renton Road and North-South Road alignments would be almost entirely within Prime Agricultural Land; the North-South Road interchange with H-1 Freeway would mostly cover Other Important Agricultural Lands.

Due to the availability and quality of the area for agriculture, some former sugarcane fields in the vicinity have been converted to small-scale, diversified agriculture farms, cultivating a variety of vegetables, fruits, and herbs (see Section 3.1.1). Active farms are in the area between the H-1 Freeway and Farrington Highway on both east and west sides of the existing Palehua Road, and south of Farrington Highway to the east and west of the proposed North-South Road Corridor. These farms have short-term leases

LEGEND:

- Existing Roadways
- Proposed North-South Road and Kapolei Pkwy.
- Other Future Roadways
- OR&L Right-of-Way

CR	Coral outcrop
EaB	EWA silty clay
EmA	EWA silty clay loam moderately shallow 0-2% slopes
EmB	EWA silty clay loam 3-6% slopes
EwC	EWA stony silty clay 6-12% slopes
Fd	Fill land
FL	Fill land, mixed
HMLG	Helemano silty clay, 30-90% slopes
HxA	Honouliuli clay, 0-2% slopes
HxB	Helemano silty clay, 30-90% slopes
KlA	Kawaihapai clay loam 0-2% slopes
KlB	Kawaihapai clay loam 2-6% slopes
KlbC	Kawaihapai very stony clay loam, 0-15% slope
KyA	Kunya silty clay 3-6% slope
KyB	Kunya silty clay 3-8% slope
KyC	Kunya silty clay 6-15% slope
MBL	Mahana bad land
McC2	Mahana silty clay loam, 6-12% slopes
McD2	Mahana silty clay loam, 12-20% slopes
McE2	Helemano silty clay, 20-35% slopes
MnC	Manana stony silty clay loam 0-12% slopes
MuB	Molokai silty clay loam 3-7% slopes
MuC	Molokai silty clay loam 7-15% slopes
MuD	Molokai silty clay loam 15-25% slopes
rSY	Stony steep land
rRk	Rock land
W	Water > 40 acres
WkA	Waialua silty clay, 0-3%
WzA	Wahiawa silty clay, 0-2% slopes
Quarry	



Source: City and County of Honolulu, Department of Planning and Permitting, January 2001, Parsons Brinckerhoff, 2004.

SCALE: 0 1000 2000 FT.

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Soils Map

North-South Road and Kapolei Parkway Project
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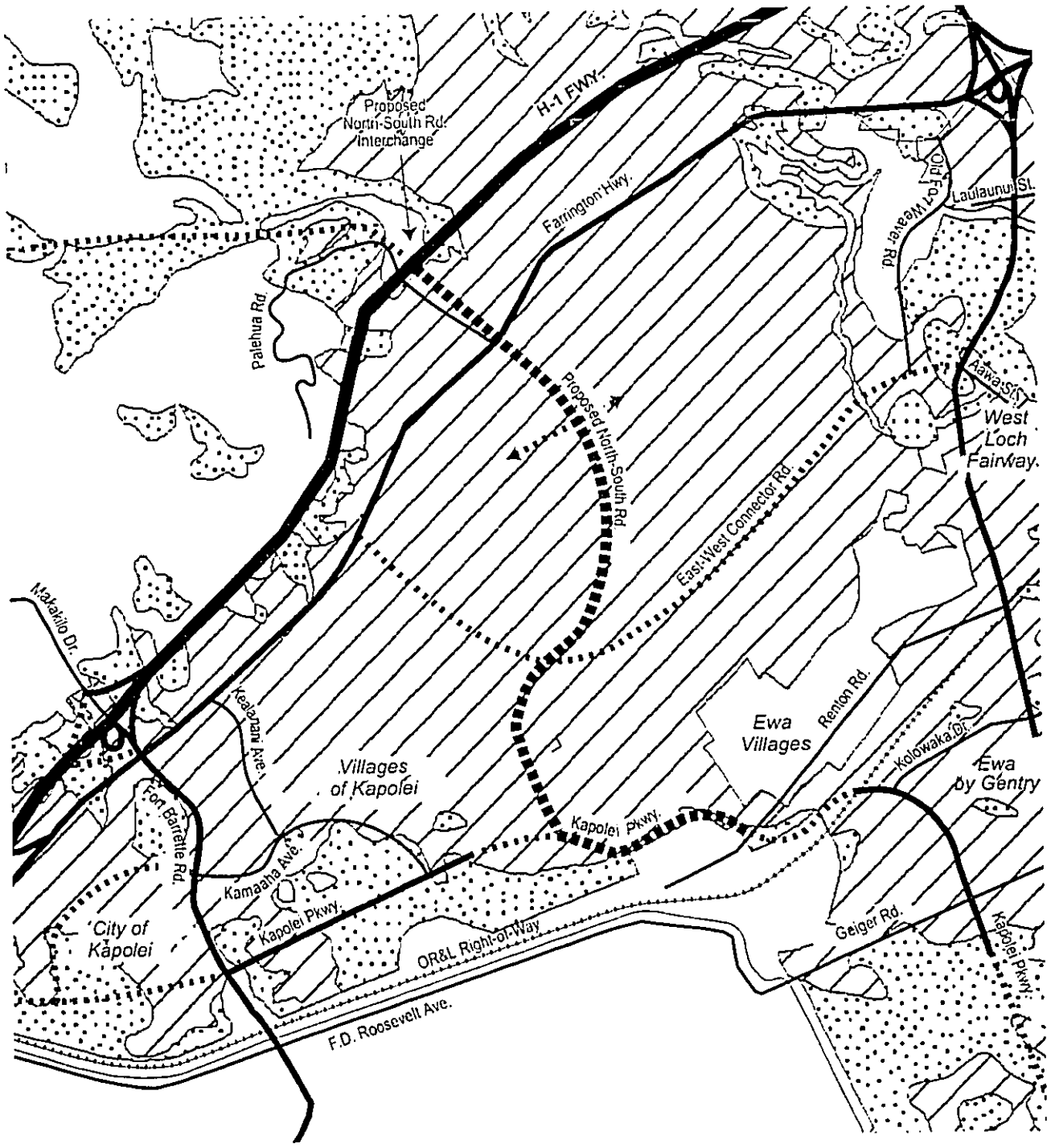
Figure 3.2-1

LEGEND:

- Existing or Committed Roadways
- Proposed North-South Road and Kapolei Pkwy.
- Other Future Roadways
- OR&L Right-of-Way
- Prime Agricultural Land
- Other Important Agricultural Land



Source: State of Hawaii, Office of Planning, Hawaii Statewide GIS Program, 2004.

SCALE: 0 2000 4000 FT.

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Agricultural Lands of Importance to the State of Hawaii (ALISH)

North-South Road and Kapolei Parkway Project
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Figure 3.2-2

with the Estate of James Campbell (EJC) or the State's Department of Land and Natural Resources (DLNR), the two major landowners in the area. Some actively farmed areas on the mauka side of H-1 Freeway rely on the Palehua Road underpass for access, and some farm operations cross the proposed North-South Road ROW in the course of their operations. The agricultural stakeholders in the project vicinity, in addition to the landowners, include Rocker G. Livestock (ranching), Sugarland Farms, Inc., Aloun Farms, Inc., and A.M. Enterprise, Inc. Figure 3.2-3 shows the location of these tenants. Remaining agricultural lands near the North-South Road Corridor and the section of Kapolei Parkway between Renton Road and North-South Road are fallow or not active. Grace Pacific Corporation is a non-agricultural tenant of EJC in the area mauka of H-1 Freeway, and is discussed further in Section 3.4.

3.2.2 POTENTIAL IMPACTS

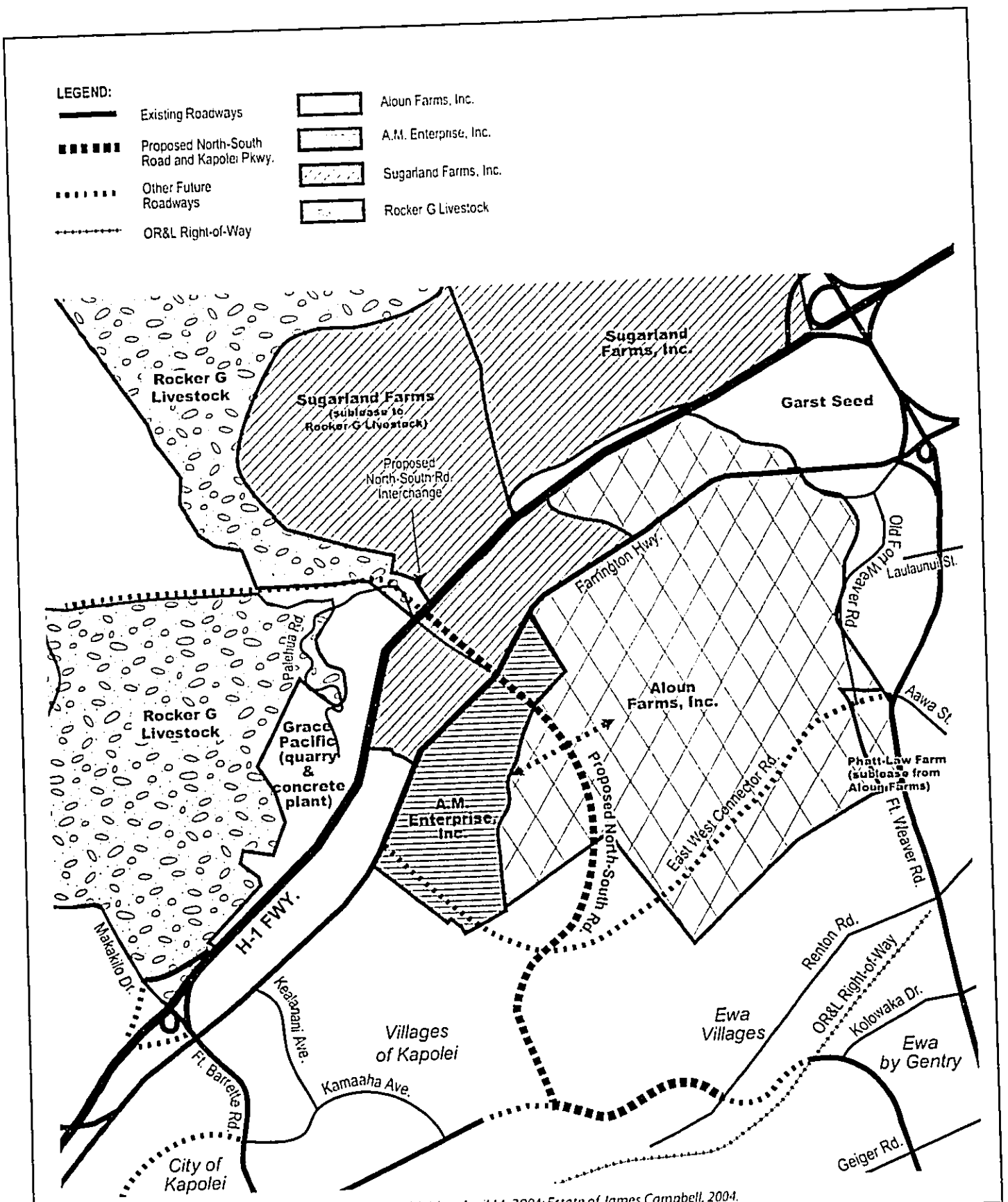
In the near future, much of the Ewa Plain would be changed from Agriculture to Urban State land use classifications, and would likely be re-zoned for urban uses, due to planned future developments (see Section 3.1). There are no State of Hawaii plans for diversified agriculture in Ewa; the Ewa DP does not recommend long-term use of the Ewa Plain for agriculture, except at selected locations, none of which would be on or near North-South Road.

Construction of the portion of Kapolei Parkway between North-South Road and Renton Road under the No-Build Alternative would affect approximately ten acres of City-owned vacant land currently zoned as restricted agriculture (AG-1). Other future roadway projects may also have little to no impact on active farms. Although the area affected is classified as "prime" agricultural land according to the ALISH system, the Ewa Plain is largely slated for urbanization, including the area surrounding the portion Kapolei Parkway. The City has had plans to urbanize this area, and DHHL has expressed an interest in developing homesteads on this land (see Section 3.1).

Similarly, under the Build Alternative, North-South Road would convert roughly 190 acres of "prime," AG-1 land, again not slated for long-term agricultural use. However, unlike the land surrounding the portion of Kapolei Parkway, some of this acreage is actively cultivated. Short-term lessees on State and EJC property would be affected by the North-South Road Corridor as described in Section 3.1.1.3.

On June 24. 2004, a meeting was held with some of the affected farmers to discuss potential interactions of the proposed project with EJC tenant operations. They expressed concern about potential damage to irrigation systems, and access between fields, in particular the area around Palehua Road and the H-1 Freeway.

During construction, irrigation lines associated with farming activities will be maintained and/or replaced with minimal disruption. During the interim phase, Palehua Road, and its underpass at the H-1 Freeway will be maintained, and will be available for vehicle access by tenants mauka of the H-1 Freeway, and. In the ultimate phase, North-South Road mauka of Farrington Highway and its interchange with the H-1 Freeway will displace Palehua Road and its underpass with the H-1 Freeway. Farm vehicles will be



Source: Personal Communication, Barry Cheung, DLNR-Land Division, April 14, 2004; Estate of James Campbell, 2004.

NOT TO SCALE

Tenant Farms Diagram

North-South Road and Kapolei Parkway Project
Final Environmental Assessment
Figure 3.2-3

allowed access on North-South Road mauka of Farrington Highway, and they will be provided access to agricultural fields on the mauka side of the freeway via the new North-South Road. Crossings of North-South Road by unlicensed agricultural vehicles will also be allowed, although time and location restrictions may be specified. Access for farm vehicles will be maintained during and after construction.

As stated above, there are no State of Hawaii or City plans for diversified agriculture in Ewa. The Ewa region is planned for substantial urbanization, including residences, commercial establishments, institutions, parks, and recreational resources. Urban development is normally incompatible with agriculture. Therefore, agriculture in Ewa is not viable in the long-run, except at limited specified locations, or as a means to preserve open space or urban buffers. For example, the Ewa DP recommends that diversified agriculture be protected on lands on the other side of the Urban Growth Boundary, north of the H-1 Freeway and west of Kunia Road.

Since the area affected by the project is classified as "prime agricultural" according to ALISH, the requirements of the federal Farmland Protection Policy Act (FPPA) apply. FPPA requires the federal agency to identify and consider the adverse effects of their programs on the preservation of farmland; consider alternative actions that could lessen adverse effects; and ensure that their programs, to the extent practicable, are compatible with State, local government, and private programs and policies to protect farmland. Per FPPA regulations (7 CFR 658), a Form NRCS-CPA-106, "Farmland Conversion Impact Rating," was submitted to the Natural Resources Conservation Service (NRCS) for a score on "relative value of farmland to be converted". FHWA completed the form by calculating a site assessment score. If this combined score (Land Evaluation and Site Assessment) equals or is greater than 160 points, alternatives that avoid farmland impacts must be evaluated. The combined score for North-South Road and the proposed portion of Kapolei Parkway between Renton Road and North-South Road is 149, which is below this threshold. Correspondence with NRCS and the FPPA form are included in Appendix A.

3.2.3 MITIGATION MEASURES

ROW acquisition, as discussed in Section 3.1 will be coordinated with the landowners and tenant farmers so that crop damage does not occur. Farmers will be asked to harvest crops on affected lands before construction begins. Land owners will be compensated in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (See Section 3.1).

The following measures will be applied during the construction and operational phases to ensure that agricultural fields remain active and productive, at least in the short-term, until this area is converted to urban land uses:

- Existing unlicensed agricultural vehicle crossings of North-South Road will be maintained during construction. Time and location restrictions may apply.
- Access between mauka and makai areas in the vicinity of Palehua Road will be maintained during construction. Also, in the operational phase, unlicensed

agricultural vehicles will be allowed on Palehua Road (during the interim phase) and on North-South Road (during the ultimate phase) to cross from the mauka to the makai side of H-1 Freeway. Time restrictions may be implemented for such travel/crossings.
- Irrigation lines within the project ROW will be maintained or relocated.
- Security will be provided during construction to prevent trespassing (construction phase only).

3.3 INFRASTRUCTURE

3.3.1 TRANSPORTATION

3.3.1.1 EXISTING CONDITIONS

3.3.1.1a Roadway System

The major east-west highways in the Ewa Plain of Oahu parallel the coastline and provide regional mobility and access for traffic oriented to and from the Primary Urban Center, which includes downtown Honolulu. The major roadways oriented in the mauka-makai or north-south direction provide the communities within the Ewa Plain access to the regional east-west roadways and also provide mauka-makai sub-regional mobility. In the vicinity of the North-South Road project, Interstate Route H-1 (H-1 Freeway) and Farrington Highway are the major west-east (Waianae-Koko Head) facilities. Kalaeloa Boulevard, Fort Barrette Road/Makakilo Drive, and Kunia Road/Fort Weaver Road are the major north-south (mauka-makai) facilities.

Figure 3.1-1 shows the existing roadway network in this area.

H-1 Freeway

H-1 Freeway is the primary facility connecting west Oahu with the Primary Urban Center (PUC). The western terminus of the H-1 Freeway is in the Ewa Plain at the Palailai Interchange where it merges into Farrington Highway, and the eastern terminus of H-1 Freeway is in east Honolulu where it merges into Kalanianaole Highway. Within the study area H-1 Freeway is a six-lane freeway with room to expand to an eight-lane facility. Access to H-1 Freeway occurs at the Makakilo Interchange and at the Kunia Interchange.

H-1 Freeway is posted at 60 miles per hour (mph) between the Kunia Interchange and the Makakilo Interchange. East of the Kunia Interchange and west of the Makakilo Interchange, the posted speed limit is 55 mph.

Farrington Highway

Farrington Highway is a major arterial roadway providing east-west regional and sub-regional mobility. Its eastern terminus is just east of the Waiawa Interchange in Pearl

City where it merges with Kamehameha Highway continuing east to Kalihi on the fringe of downtown Honolulu. Within the study area, Farrington Highway is mostly a two-lane, undivided roadway. West of the Kapolei Golf Course Driveway adjacent of the Villages of Kapolei and through the City of Kapolei, it is a four-lane, divided highway with curb, gutter and sidewalks with painted median. It becomes a four-lane, mostly undivided roadway after merging with H-1 Freeway. To the east, between the Fort Weaver Road and Pearl City, Farrington Highway is four-lane divided roadway. The posted speed limit is 35 mph between Fort Weaver Road and the Kapolei Golf Course Access, transitioning to 25 mph adjacent to the Villages of Kapolei and through the City of Kapolei. At the merge with H-1 Freeway, the posted speed increases to 45 mph.

Fort Weaver Road/Kunia Road

Currently, Fort Weaver Road/Kunia Road is the principal north-south arterial roadway serving the communities of Ewa and Ewa Beach. It provides these communities access to Farrington Highway and H-1 Freeway. This facility is named Fort Weaver Road south of Farrington Highway and Kunia Road north of Farrington Highway. Fort Weaver Road begins as a two-lane, undivided roadway at the entrance to the Iroquois Point Naval Housing, growing to a four-lane, divided roadway between North Road and Farrington Highway. Kunia Road is a six-lane expressway between Farrington Highway and H-1 Freeway and continues north of H-1 Freeway as a four-lane, divided roadway to the Royal Kunia development.

Fort Barrette Road/Makakilo Drive

Fort Barrette Road is a major north-south arterial, providing access to H-1 Freeway and Farrington Highway for the Villages of Kapolei, City of Kapolei, and Kalaeloa areas. North of Farrington Highway, Fort Barrette Road becomes Makakilo Drive, which provides access to the Makakilo community. South of Farrington Highway, Fort Barrette Road continues until it merges with Enterprise Avenue just south of F.D. Roosevelt Avenue in Kalaeloa. Fort Barrette Road is a two-lane, undivided roadway with a rural cross section south of Farrington Highway. Makakilo Drive is a four-lane, divided roadway with an urban cross section including curb and gutter. The posted speed limit is 40 mph.

Kapolei Parkway

Kapolei Parkway is a partially constructed arterial roadway. It is configured as a four-lane, divided roadway between Launahele Street and the Oahu Railway and Land Company (OR&L) ROW within the Ewa Gentry Development. The cross section of this facility has enough width to be configured as a six-lane, divided roadway when warranted. A part of Kapolei Parkway is also constructed within the Ocean Pointe Development as a four-lane undivided roadway. Within the Villages of Kapolei community, Kapolei Parkway is constructed as a six-lane, divided roadway between Fort Barrette Road and the drainage channel located east of the Kapolei Middle School. The posted speed limit is 30 mph and on-street parking is prohibited along most of Kapolei Parkway.

Kapolei Parkway between Renton Road and North-South Road would have an ultimate six-lane cross section, landscaped median and sidewalks on both sides. In the future, Kapolei Parkway would provide north-south mobility in the Ewa area and east-west mobility in the Kapolei area.

3.3.1.1b Traffic Conditions

Existing traffic conditions were inventoried and summarized within an area defined by the H-1 Freeway to the north, Fort Weaver Road/Kunia Road to the east, Fort Barrette Road/Makakilo Drive to the west, and Kapolei Parkway to the south. The Kapolei Parkway/Renton Road and Fort Weaver Road/Renton Road intersections are also included. Roadway analyses identify existing operations and establish a basis for comparison with future No-Build and Build scenarios.

Existing Traffic Volumes

Manual traffic turning movement counts were conducted from 2001 through 2002 during commuter peak periods. Counts were conducted at the ramp terminal intersections at the Kunia and Makakilo Interchanges and at major intersections along the Fort Weaver Road and Fort Barrette Road corridors.

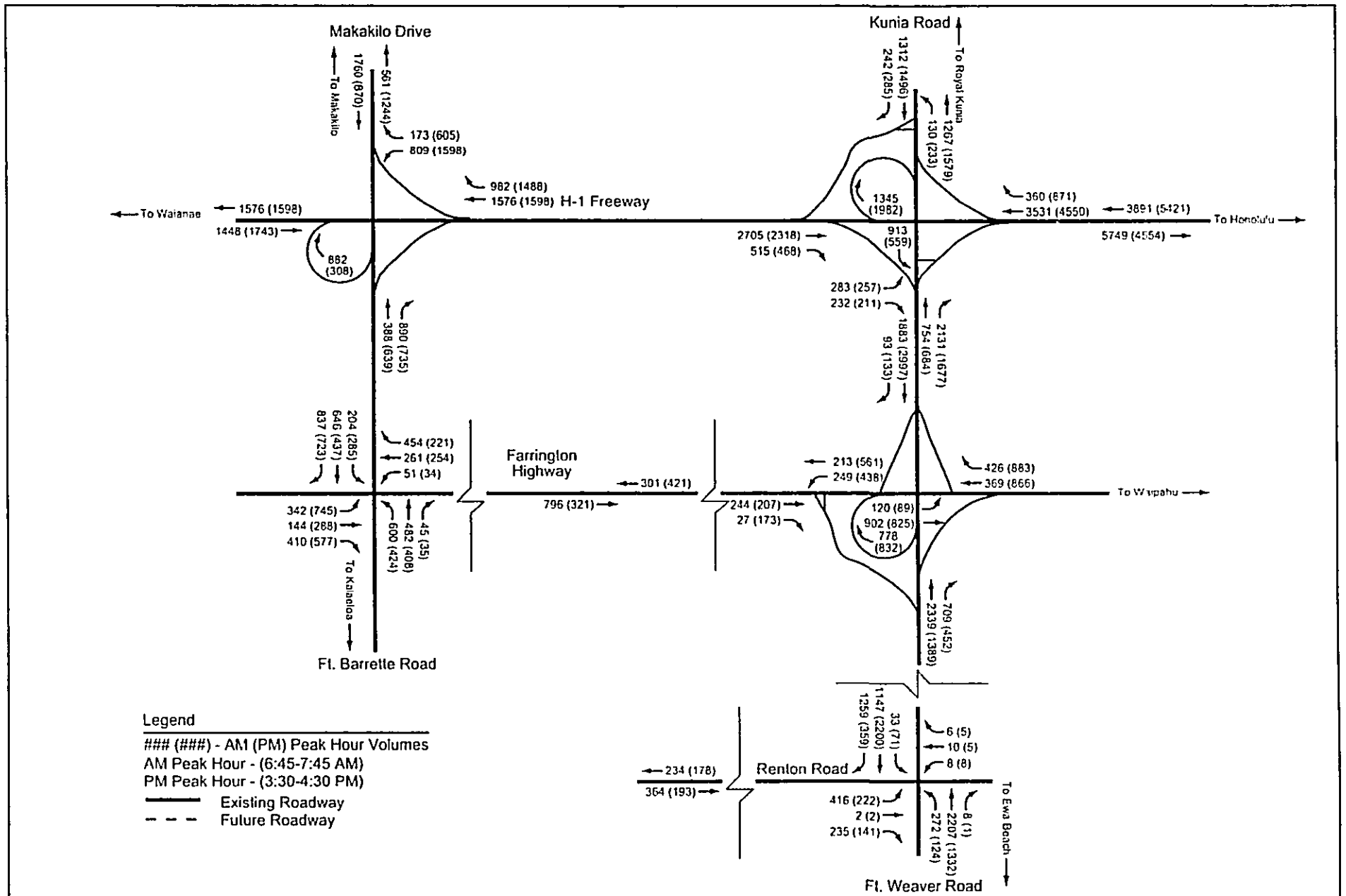
24-hour traffic volume data collected by the State of Hawaii Department of Transportation (HDOT) at their traffic count stations were obtained and reviewed. Table 3.3-1 lists these count stations and their respective locations. These data were augmented by 24-hour traffic volume data gathered by the project consultant.

Table 3.3-1:
HDOT Count Stations

Count Station	Description
C-10-L	Makakilo Dr. 0.1 Mile Northwest of H-1 Freeway Underpass
11-M	Intersection of Fort Barrette Rd. and Makakilo Dr. at Farrington Highway
C-10-W	Fort Weaver Road North of Laulaunui Street
C-10-K	H-1 Freeway 1.97 Miles West of Kunia Road
H-8-AA	H-1 Freeway 0.45 Mile East of Waikele Bridge
H-8-A	H-1 Freeway at Waikele Bridge
76-5	Ramp Volumes at the Fort Weaver Rd./Farrington Hwy. Interchange
H1-2	Ramp Volumes at the Makakilo Interchange
H1-5	Ramp Volumes at the Kunia Interchange

Source: Hawaii State Department of Transportation, Traffic Survey Data (Individual Stations), 2001

For the purposes of this study, data from 2001 and 2002 were considered the "existing" condition. The existing morning (A.M.) and afternoon (P.M.) peak hour volumes are illustrated in Figure 3.3-1.



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Existing Peak Hour Traffic Volumes

North-South Road and Kapolei Parkway Project

Final Environmental Assessment

Figure 3.3-1

Existing Interchange Configurations

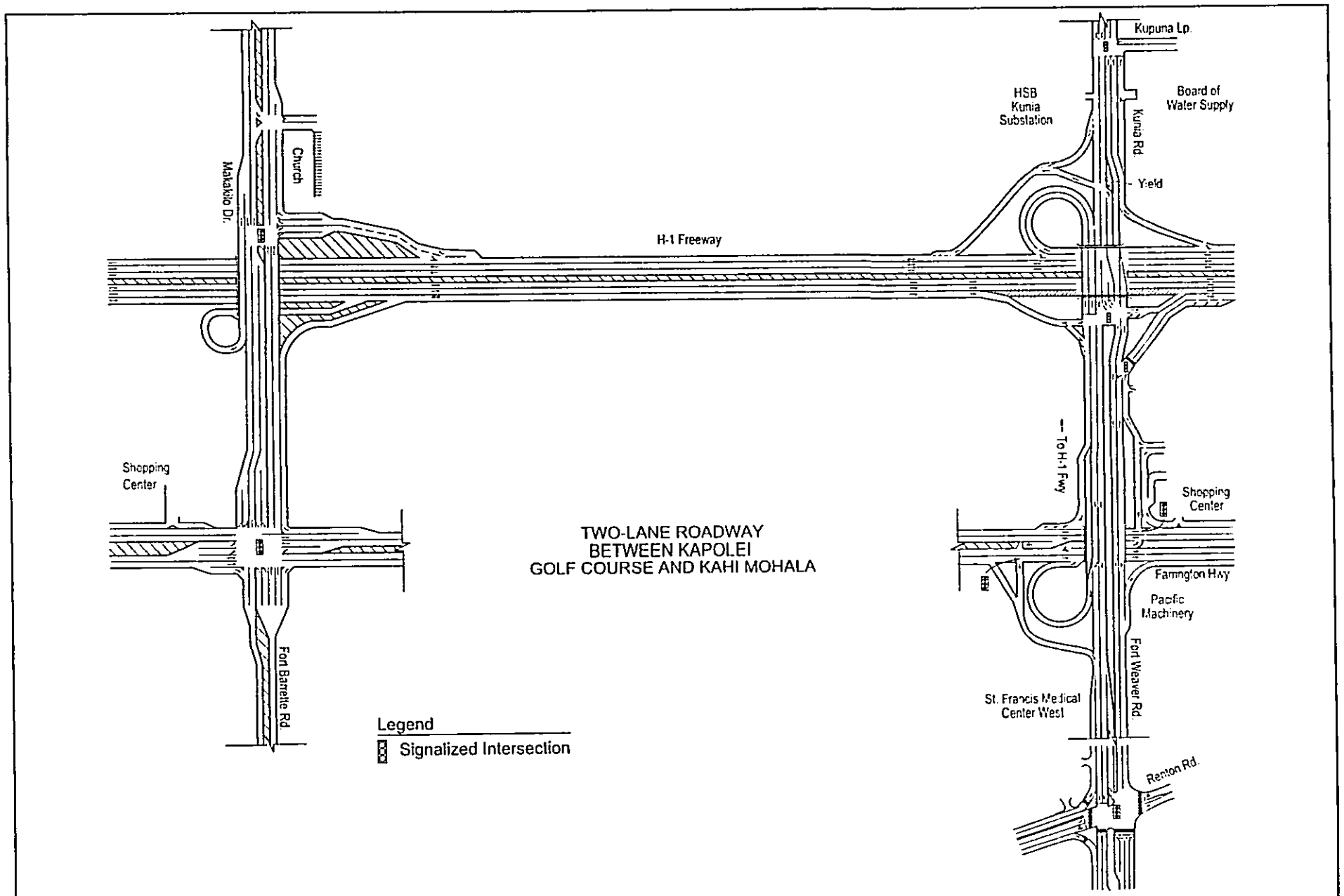
Current interchange plans for the Kunia, Makakilo, and Farrington Highway/Fort Weaver Road Interchanges were obtained from the HDOT. The plans were used to verify interchange configurations including interchange ramp terminal lane geometry and left-turn lane storage lengths.

The Kunia Interchange has been substantially modified in recent years into a high-capacity interchange. During the A.M. peak hour, traffic flow oriented to the east is considerable with over 3,000 vehicles per hour (vph) entering the H-1 Freeway. Double left-turn lanes are provided for the southbound to eastbound movement at the south ramp terminal intersection. Traffic executing this movement must merge from two lanes to one lane on the eastbound on-ramp, but the remaining lane enters H-1 Freeway without merging. Northbound traffic on Kunia Road also turns onto the eastbound on-ramp in two lanes. These two lanes do not merge with the southbound to eastbound traffic on the ramp. During the A.M. peak period, both lanes enter H-1 Freeway without merging with one lane becoming the normal outside lane and the other lane becoming the A.M. only shoulder lane. This configuration allows for three streams of traffic to simultaneously enter eastbound H-1 Freeway during the A.M. peak period. To allow this configuration to operate, one of the eastbound through lanes between the Makakilo and Kunia Interchanges terminates into the eastbound off-ramp at Kunia Interchange.

During the P.M. peak hour, the peak direction of flow reverses and the westbound off-ramps handle about 2,800 vph. A two-lane loop ramp provides for the more major westbound to makai-bound traffic movement. Both loop ramp lanes enter southbound Kunia Road without merging. The westbound to northbound traffic movement is accommodated through a "free right" at the ramp terminal intersection, allowing vehicles to turn onto northbound Kunia without stopping.

The Makakilo Interchange is configured with ramps oriented to and from the east. Currently, traffic cannot directly enter or exit H-1 Freeway to the west of the Makakilo Interchange. This interchange has also been modified in recent years to improve its capacity to handle traffic. During the A.M. peak hour, traffic oriented to the east totals almost 1,800 vph with traffic from north of the interchange and traffic from the south of the interchange about evenly split. The traffic from north of the interchange utilize a loop ramp to enter eastbound H-1 Freeway while traffic from the south of the interchange enter eastbound H-1 Freeway via a ramp that merges with the H-1 Freeway immediately after the loop ramp merge. Previously, during the P.M. peak hour lane geometry constraints at the Makakilo Interchange westbound off-ramp caused the off-ramp to queue onto the westbound H-1 Freeway lanes. About 2,200 vph exit at the Makakilo Interchange during the P.M. peak hour. Modifications to ramp geometry helped reduce the queuing, so that it no longer queues onto H-1 Freeway.

Figure 3.3-2 summarizes the existing roadway configurations of the interchanges, roadways and intersections within the study area.



Existing Roadway Configuration
North-South Road and Kapolei Parkway Project
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Figure 3.3-2

Freeway and Highway Level-of-Service

Roadway segment level-of-service was evaluated for segments of roadway with relatively uninterrupted traffic flow such as H-1 Freeway between interchanges, Farrington Highway between Fort Weaver Road and the Villages of Kapolei area, and Fort Weaver Road as it crosses Farrington Highway. Methodologies documented in the 2000 Highway Capacity Manual (HCM) were used for these evaluations. Operating conditions are expressed as levels-of-service (LOS) with letter designations from A to F, representing free-flow to over-capacity conditions. The LOS index indicates the roadway segment's ability to accommodate the traffic demand placed on it during the A.M. and P.M. peak periods. Figure 3.3-3 summarizes the existing A.M. and P.M. peak period roadway segment LOS.

H-1 Freeway

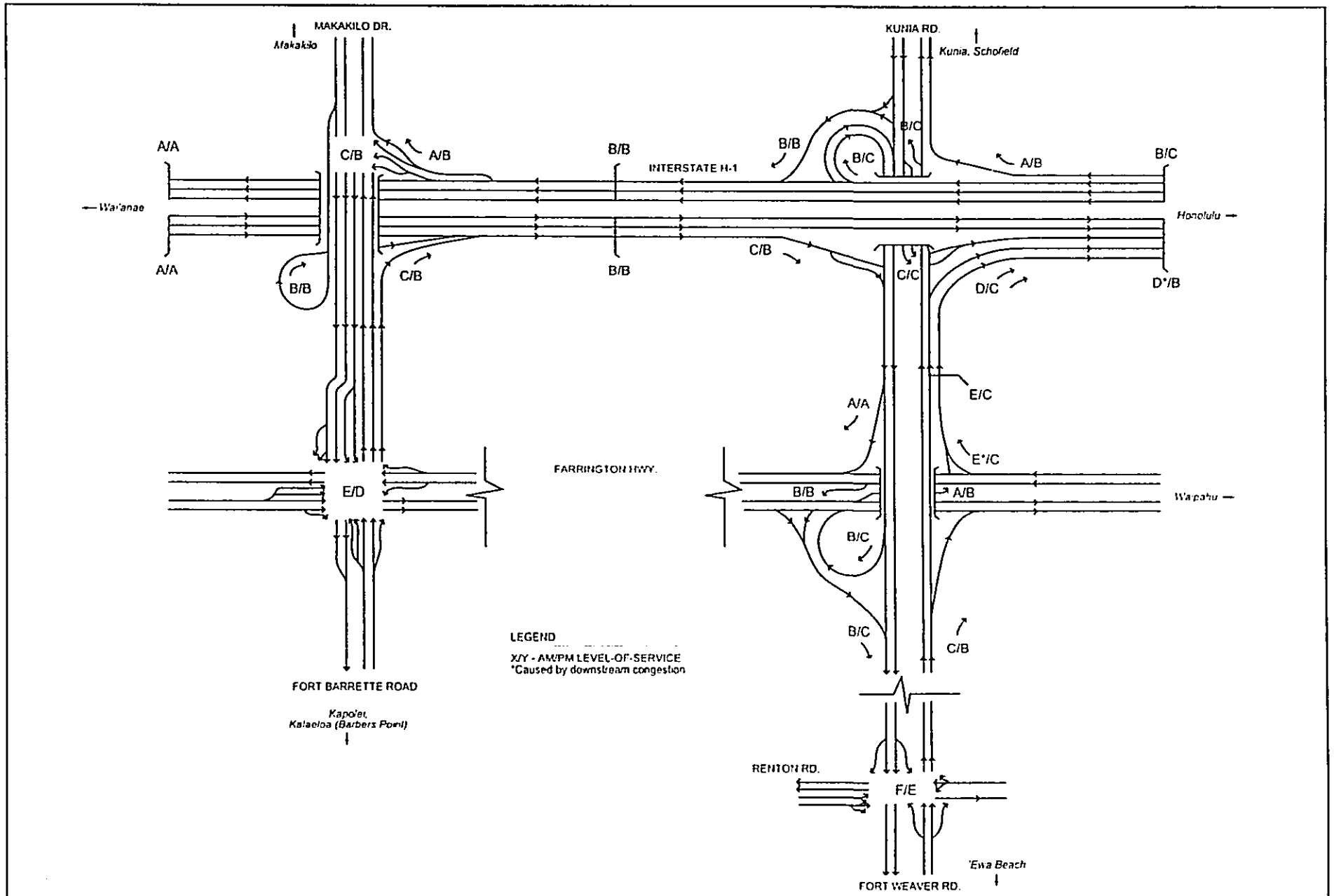
H-1 Freeway segments were evaluated starting east of the Kunia Interchange to west of the Makakilo Interchange. Table 3.3-2 summarizes the freeway LOS within the study area.

Table 3.3-2:
Existing (2001) H-1 Freeway Level-of-Service

Freeway Segment	Lanes A.M.(P.M.)	Direction	Existing LOS			
			A.M. Peak		P.M. Peak	
			LOS	Density	LOS	Density
Paiwa IC - Kunia IC	5 (5)	WB	B	14.9	C	20.8
Kunia IC - Makakilo IC	4 (4)	WB	B	13.4	B	16.2
Makakilo IC - Palailai IC	3 (3)	WB	A	8.3	A	8.4
Palailai IC - Makakilo IC	3 (3)	EB	A	7.6	A	9.1
Makakilo IC - Kunia IC	4 (4)	EB	B	16.9	B	14.6
Kunia IC - Paiwa IC	6 (5)	EB	D*	35.0	B	17.5

WB=westbound, EB=eastbound
*Caused by downstream congestion
Source: 2001 HDOT Traffic Counts

Analysis of the H-1 Freeway within the study area indicates it operates well, LOS C or better for most segments, during the A.M. and P.M. peak periods. Field observations identified some operational friction with the eastbound lane drop into the Kunia off-ramp. Drivers traveling in the eastbound makai lane merge with the through lanes at the very last-minute causing vehicles in the through lane to slow down and affecting this segment. Traffic originating west of the Kunia Interchange also experience delays as they travel east of the Kunia Interchange due to downstream congestion and the effect of drivers getting on at the Kunia Interchange and merging to the left-lane to get into the zipper lane.



Existing Roadway & Intersection Level-of-Service

North-South Road and Kapolei Parkway Project
Final Environmental Assessment
Figure 3.3-3

Farrington Highway

Farrington Highway west of Fort Weaver Road to the Kapolei Golf Course Access operates close to uninterrupted mode. Field observations of this segment of roadway during the A.M. and P.M. peak hours indicate that, on the average, Farrington Highway operates well even during the peak periods.

Fort Weaver Road

Analysis revealed that this segment of Fort Weaver Road in the northbound direction is affected by downstream congestion during the A.M. peak hour. Manual counts indicate that approximately 75 percent of the northbound vehicles at the Fort Weaver Road/Farrington Highway Interchange access the H-1 Freeway via the eastbound on-ramp at the Kunia Interchange. Fort Weaver Road also processes very large traffic volumes during the P.M. peak period in the southbound direction. Both observations indicate that Fort Weaver Road is constrained in its ability to handle additional traffic growth.

Interchange Ramp Merge-Diverge Level-of-Service

Freeway ramps of the following interchanges are located within the study area:

- Kunia Interchange
- Makakilo Interchange
- Fort Weaver Interchange

Levels-of-service for ramp merge-diverge operation were evaluated using the methodologies outlined in the HCM. Table 3.3-3 summarizes the interchange ramp LOS. As shown in Table 3.3-3, all interchange ramps operate at an acceptable LOS (LOS D or better). Recent geometric improvements allow the interchange to operate at the acceptable level-of-service.

Kunia Interchange

As a result of the recent improvements to the Kunia Interchange, the eastbound on-ramp is configured to provide independent lane additions for southbound Kunia to eastbound H-1 and northbound Kunia to eastbound H-1 Freeway traffic. The lane additions eliminate the need for these traffic streams to merge with H-1 Freeway through traffic, and as a result, the eastbound on-ramp operates acceptably (LOS D or better) for peak period conditions. The addition of an A.M. peak period only shoulder lane helps to accommodate traffic. Field observations indicate that very few vehicles utilize the shoulder lane, possibly due to this lane's poor roadway condition and its narrow width. Additionally, the shoulder lane is discontinuous, reducing its effectiveness.

During the P.M. peak period, improvements that implemented a free-flow right turn for the westbound H-1 Freeway to northbound Kunia Road traffic and enhanced the loop ramp for westbound H-1 Freeway to southbound Kunia Road traffic allow these ramps to

operate well (LOS C or better) during peak operations. Other ramps also operate well (LOS C or better) during peak period operations.

Table 3.3-3:
Existing (2001) Ramp Merge-Diverge Level-of-Service

Interchange	A.M.		P.M.	
	LOS	Density	LOS	Density
Kunia Interchange				
WB Kunia Off-Ramp Diverge	A	4.4	B	13.5
WB Ewa Off-Ramp Diverge	B	14.6	C	25.6
WB Kunia On-Ramp Merge	B	15.5	B	17.8
EB Off Ramp-Lane Drop	C	11.4	B	10.4
EB On Ramp-Lane Add	D	30.4	C	24.0
Makakilo Interchange				
EB Makakilo On-Ramp Merge	B	17.0	B	13.4
EB Kapolei On-Ramp Merge	C	21.5	B	16.5
WB Off-Ramp Diverge	A	9.3	B	10.6
Fort Weaver Interchange				
NB Off-Ramp Diverge	C	25.3	B	13.7
NB On-Ramp Lane Add	E*	36.5	C	26.3
SB Off-Ramp Lane Drop to WB	A	2.7	A	3.8
SB Off-Ramp Diverge to EB	B	13.2	C	23.9
SB On-Ramp Merge	B	13.5	C	25.5
NB Kunia/H-1 Weave	E	36.5	C	27.1

WB=westbound, EB=eastbound,NB=northbound SB=southbound
*Caused by downstream congestion
Source: 2001 HDOT Traffic Counts

Makakilo Interchange

Recent modifications to the Makakilo Interchange improved traffic operations. Previously, the westbound off-ramp operated in very congested mode during the P.M. peak hour. Congestion at the ramp terminal intersection created a queue that extended onto the H-1 Freeway, creating a safety hazard. The westbound off-ramp was lengthened and channelization at the ramp terminal intersection was improved. Lane balance was provided at the freeway exit, and the off-ramp now operates well during the peak periods. The on-ramps were also improved and the merge LOS during the A.M. peak hour is good.

Fort Weaver Interchange

Congestion on Kunia Road between the Kunia Interchange eastbound on-ramp and the Fort Weaver Interchange northbound on-ramp during the A.M. peak hour affects northbound traffic in this area. Approximately 75 percent of the traffic originating from Ewa and Ewa Beach during the A.M. peak period access H-1 Freeway via the Kunia

Interchange eastbound on-ramp. Northbound traffic originating from Waipahu and destined for westbound H-1 or northbound Kunia Road must execute a type B weave (vehicles originating from the Fort Weaver Interchange northbound onramp destined for northbound Kunia Road must complete a lane change, whereas other vehicles originating from Ewa and Ewa Beach destined for eastbound H-1 Freeway do not have to execute a lane change). Approximately 60 percent of the traffic originating from Waipahu executes a type-B weave during the A.M. peak period. Furthermore, the two southbound to eastbound left-turning movements are required to merge into a single lane on the on-ramp prior to entering the H-1 Freeway. Vehicles in the right lane of the on-ramp, which comprise approximately 70 percent of the total ramp traffic, tend to merge left as they enter the H-1 Freeway, despite the fact that a shoulder lane is provided for these drivers. During the P.M. peak hour, downstream congestion at the Fort Weaver Road and Laulaunui Street intersection affects the merge operation of the southbound on-ramp (LOS E), resulting in queuing on the ramp. The resultant queue has been observed to extend back to the Fort Weaver Road Interchange ramp junction. Other ramps of this interchange operate acceptably (LOS D or better) during all peak hours.

Intersection Level-of-Service

The signalized interchange terminals and adjacent intersections located within the study area were analyzed using the methodologies outlined in the HCM. LOS is shown for signalized intersections in terms of overall intersection operation. The levels-of-service for unsignalized intersections are expressed for each lane of minor streets and left-turn lanes for major streets. LOS definitions are provided in Appendix D. Table 3.3-4 summarizes the existing LOS for interchange terminals within the study area. Table 3.3-5 summarizes the adjacent intersections LOS within the study area. As shown in Table 3.3-4 the south terminal at Kunia Interchange is congested during peak operations. As shown in Table 3.3-5, the adjacent intersections are also congested during peak period operations (LOS F).

Makakilo Interchange North Ramp Terminal Intersection

During the morning peak hour, all turning movements onto Makakilo Drive operate acceptably at LOS D or better. Field observations indicate that the ability to process vehicles at the north terminal is hindered due to the Farrington Highway and Makakilo Drive/Fort Barrette Road intersection. During the P.M. peak hour, the queue at that intersection can extend north to the north terminal at Makakilo Interchange.

Kunia Interchange North Ramp Terminal Intersection

As earlier stated, recent modifications to the Kunia Interchange provided a "free right" at the end of the westbound to northbound off-ramp, allowing this movement to operate well during both the morning and afternoon peak hours. The northbound left-turn movement operates acceptably (LOS C) during the P.M. peak hour. Some delay at the north terminal is experienced because of a high volume of vehicles destined for

eastbound H-1 Freeway but this movement is regulated as a result of the traffic signal at Kupuna Loop north of the terminal.

Table 3.3-4:
Existing Interchange Terminal Level-of-Service

Interchange Terminals	A.M.		P.M.	
	LOS	Density	LOS	Density
Kunia Interchange	**110 sec cycle**		**110 sec cycle**	
H-1 EB On-Ramp/ Kunia Road	**C**	**33.2**	**C**	**27.7**
EB Left Turn	E	67.2	E	62.6
NB Through	D	41.6	D	40.1
SB Left Turn	E	60.4	D	44.9
SB Through	A	9.8	B	18.4
H-1 WB On-Ramp/ Kunia Road	**Unsignalized**		**Unsignalized**	
NB Left Turn	B	13.9	C	21.0
Makakilo Interchange	**60 sec cycle**		**60 sec cycle**	
H-1 WB Off-ramp/ Makakilo Road	**C**	**27.2**	**B**	**13.6**
WB Approach	A	6.3	A	6.7
NB Through	B	18.7	C	23.1
SB Through	D	54.4	C	21.0
Fort Weaver Interchange	**60 sec cycle**		**60 sec cycle**	
Farrington SB On-Ramp/ Fort Weaver Road	**B**	**13.1**	**B**	**13.9**
EB Through	A	5.2	A	9.7
WB Left-Turn	C	20.8	B	15.9
Farrington NB On-Ramp/ Fort Weaver Road	**A**	**8.5**	**B**	**12.8**
EB Left-Turn	B	17.7	B	10.9
WB Through	A	5.5	B	13.0

WB=westbound, EB=eastbound,NB=northbound,SB=southbound

Table 3.3-5:
Existing (2001) Adjacent Intersections Level-of-Service

Intersection	Existing			
	A.M.		P.M.	
	LOS	Delay	LOS	Delay
Farrington Hwy and Makakilo Dr/Fort Barrette Rd	**E**	**60.2**	**D**	**47.5**
Eastbound	C	33.0	C	30.2
Westbound	E	61.9	E	56.4
Northbound	E	71.7	E	66.0
Southbound	E	66.1	D	52.6
Ft Weaver Rd and Laulaunui St	**D**	**49.4**	**D**	**51.4**
Eastbound	F	98.3	F	108.6
Westbound	F	105.3	E	68.9
Northbound	E	58.7	C	26.6
Southbound	B	13.3	D	58
Ft Weaver Rd and Aawa Dr	**E**	**56.3**	**D**	**36.8**
Eastbound	F	85.1	F	93.5
Westbound	F	164	F	83.2
Northbound	E	59.9	C	23.6
Southbound	B	17.1	D	37.4
Ft Weaver Rd and Renton Rd	**F**	**80.2**	**E**	**55.6**
Eastbound	F	225.5	F	81
Westbound	F	107.7	F	106.3
Northbound	E	69.9	C	27.4
Southbound	C	31.6	E	68.3
Ft Weaver Rd and Kolowaka Dr	**E**	**58.3**	**D**	**39.3**
Eastbound	F	95.9	F	88.1
Westbound	F	203.5	F	83.9
Northbound	E*	69.9*	D	38.2
Southbound	D	37.4	C	30.5
Ft Weaver Rd and Geiger Rd	**F**	**84.8**	**E**	**60.7**
Eastbound	F	127.2	F	87.6
Westbound	F	163.6	F	106.2
Northbound	E	71.4	D	44.2
Southbound	D	39.2	D	52.5

Source: 2001 HDOT Traffic Counts
* LOS Manually adjusted to account for downstream congestion and reflect existing conditions.

Kunia Interchange South Ramp Terminal Intersection

The south ramp terminal intersection operates at LOS C during both the morning and afternoon peak hours. However, the results also show that individual movements within the intersection operate under congested conditions. These movements include the southbound to eastbound left-turns during the A.M. peak hour and the eastbound to northbound left-turns during both the A.M. and P.M. peak hours.

Fort Weaver Interchange East Ramp Terminal Intersection

The east ramp terminal intersection at the Fort Weaver Interchange operates acceptably at LOS B or better, with little delay during the morning and afternoon peak hours.

Fort Weaver Interchange West Ramp Terminal Intersection

Traffic operations at the west ramp terminal intersection of the Fort Weaver Road Interchange operates acceptably, with all turning movements experiencing little delay during both the A.M. and P.M. peak hours (LOS B and A, respectively). Adjacent intersections along the Fort Weaver Road corridor and Fort Barrette Road and Farrington Highway intersection were analyzed. Table 3.3-5 summarizes intersection LOS of key intersections along the Fort Weaver Road corridor. As shown, the Fort Weaver Road corridor is congested during the A.M. peak period. Through traffic volumes on Fort Weaver Road exceed its capacity. Long cycle lengths are used to maximize through traffic flow on Fort Weaver Road, but this results in long side street queue lengths and delays. Travel time runs in the corridor have shown delays approaching 14 minutes for northbound traffic. Future plans call for Fort Weaver Road to be widened from four to six lanes in the near future, in an effort to accommodate existing and projected traffic.

Makakilo Drive/Fort Barrette Road/Farrington Highway

Table 3.3-5 summarizes the intersection operations for the Fort Barrette Road/Makakilo Drive/Farrington Highway intersection. This intersection serves as a gateway to the City of Kapolei and to H-1 Freeway. It, therefore, is congested during both A.M. and P.M. peak hours (overall LOS E and D, respectively). As shown, key movements at the Fort Barrette Road/Farrington Highway intersection operate at LOS E. Long cycle lengths contribute to delays experienced at this intersection. A contributing factor to the heavy congestion is that Farrington Highway is the only east-west roadway in Kapolei. All traffic destined for Kapolei must enter the Fort Barrette Road/Makakilo Drive and Farrington Highway intersection.

A large portion of the green time is allotted to the eastbound to northbound left-turn movement. This results in long delays and queues on the other three approaches. Though a large portion of the green time is allotted to the eastbound to northbound left-turn movement, traffic wanting to complete this movement is hindered by the two traffic signals on Farrington Highway accessing Kapolei Shopping Center to the west of Fort Barrette Road, often holding back vehicles along the Farrington Highway corridor.

There is a considerable amount of traffic headed into Kapolei during both A.M. and P.M. peak periods and out of Kapolei during the P.M. peak. Field observations have shown that during the A.M. peak, the queue in the northbound to westbound left-turn movement can extend past the left-turn storage lane and into the through lanes blocking all northbound traffic. A large portion of the southbound traffic makes a right-turn onto Farrington Highway during both A.M. and P.M. peak periods. This movement is aided by the eastbound left-turn movement allowing them to overlap and process additional vehicles. Although this movement is allowed to overlap with the eastbound left-turn movement, queues on the southbound approach have been observed to reach the north terminal at Makakilo Interchange affecting its ability to process vehicles.

Summary of Results

Figure 3.3-3 illustrates the existing level-of-service for the roadways, freeways and interchanges within the study area.

The following issues were identified in the analyses of existing conditions:

- Recent westbound ramp modifications at the Kunia and Makakilo Interchange have improved traffic operations at each respective off ramp.
- The Kunia Interchange eastbound off ramp has been observed to queue to the top of the H-1 Freeway gorge.
- Fort Weaver Road has been observed to experience high travel time delays during both the A.M. and P.M. peak periods.
- Fort Barrette Road experiences high delays during the A.M. and P.M. peak periods and have been observed to affect the queue of adjacent intersection operations.

Recent interchange improvements to the Kunia Interchange and the Makakilo Interchange have helped alleviate congestion during the morning and afternoon peak commuter periods. Most improvements have already occurred and although the interchanges are now operating acceptably, both accesses from the arterial system to the Kunia Interchange and the Makakilo Interchange are operating at or over capacity. Currently, the weave section in the northbound direction between Fort Weaver Interchange and Kunia Interchange and selected movements at the south terminal at Kunia Interchange operate at a LOS E. Field observations have shown an increase in travel time for the eastbound through movement prior to the Kunia Interchange and a queue extending from the bottom of the eastbound off-ramp to the top of the H-1 Freeway gorge.

Makakilo Interchange operates acceptably but is affected by the Farrington Highway and Fort Barrette Road/Makakilo Drive Intersection queue extending north to the north interchange terminal.

Adjacent intersections along the Fort Barrette Road and Fort Weaver Road Corridor experience severe congestion during both morning and afternoon peak periods. Delays of up to 14 minutes and the cross-streets experiencing considerable delays due to a large portion of the green time allotted to the northbound through movement have been

observed along Fort Weaver Road. Because Farrington Highway is the only east-west roadway in Kapolei, all traffic entering Kapolei must enter the Farrington Highway and Makakilo Drive/Fort Barrette Road intersection resulting in delays at the north, south and westbound approaches.

3.3.1.1c Public Transit

The City and County of Honolulu operates an island-wide public bus transit system called TheBus. This system is a fixed-route, regularly scheduled public transit service operated by Oahu Transit Services (OTS), and is the backbone of basic transit services for the island of Oahu. In addition, the City provides transit services for semi-ambulatory and non-ambulatory persons with disabilities called TheHandi-Van.

With a fleet of 525 buses, TheBus provides 86 numbered bus routes and over 120 subroutes. The system carries over 70 million passengers annually. Figure 3.3-4 illustrates the existing public transit routes within the Ewa region. A full-range of transit service is provided for the Ewa Plain. Express buses provide peak hour commuter service to both Downtown and Waikiki. *There is also skip-stop and regular trunk service* along the major arterials with circulator bus service providing access to the neighborhoods.

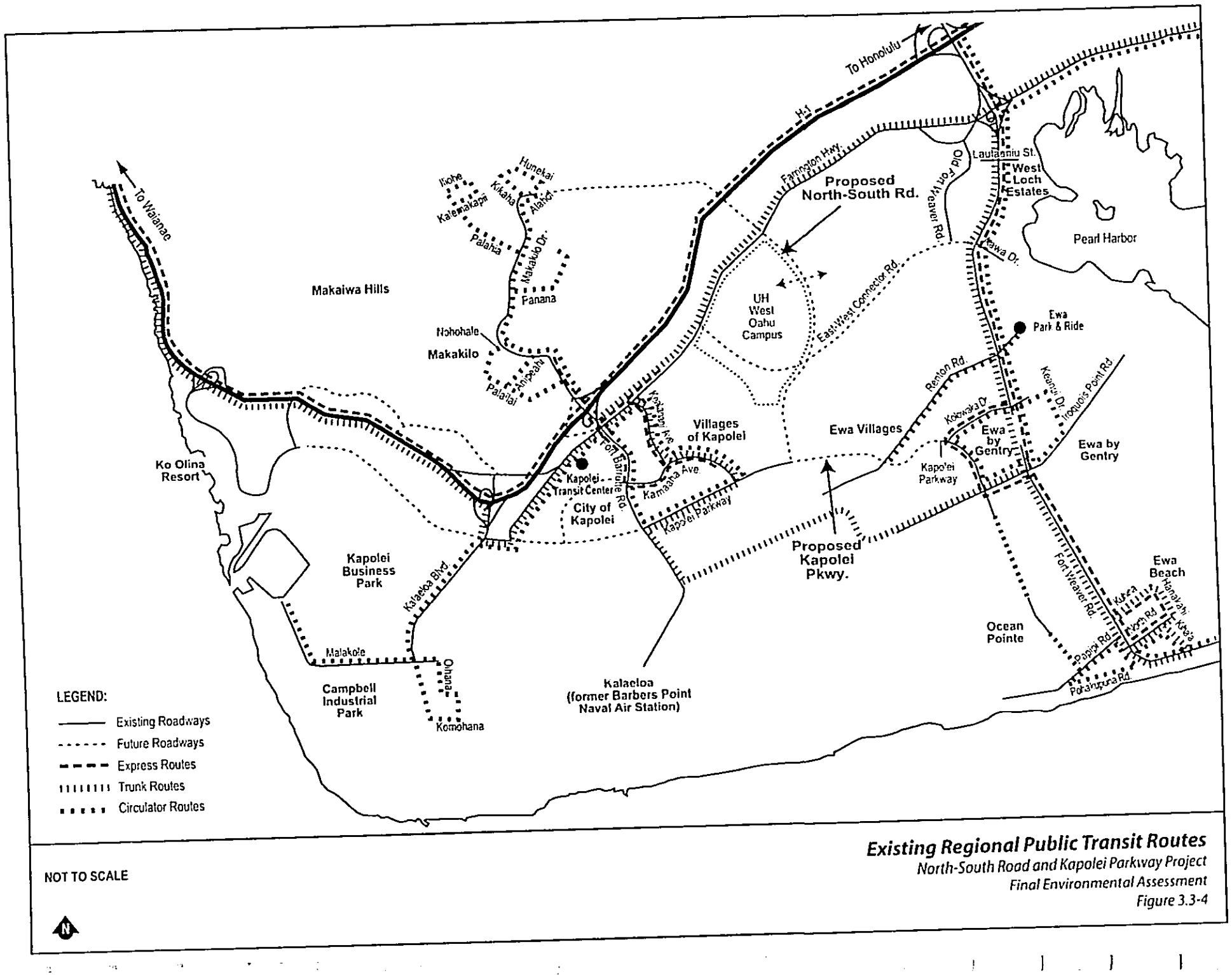
3.3.1.2 METHODOLOGY AND POTENTIAL IMPACTS

A detailed discussion of the traffic impacts of the proposed project is found in Appendix D, Traffic Study for the North-South Road and Kapolei Parkway Project Environmental Assessment (April 2004). The following information is based on that report.

The traffic impacts of the No-Build and Build Alternatives were assessed for the Year 2025 and are consistent with the ORTP 2025 (April 2001). The analysis is comprised of two sections. The first section includes level-of-service analysis for the study intersections, roadway segments, and freeway ramp junctions. The second section includes freeway mainline and weaving analyses to determine whether the proposed project would create operating problems on the H-1 Freeway.

The current Oahu Metropolitan Planning Organization (OMPO) travel demand forecasting model was used as a basis for developing forecasts of future traffic volumes for the alternatives. The No-Build Alternative was used as the baseline condition and served as the basis of comparison for the Build Alternatives. Future traffic volumes maintained consistency with interim year forecasts such as the Ewa Master Plan Impact Fee Project.

Alternatives were evaluated using the operational methodology contained in the 2000 Highway Capacity Manual (HCM), Special Report 209 (Transportation Research Board, 2000). Freeway mainline analysis, freeway/expressway ramp merge/diverge analysis, and intersection LOS analysis for projected year 2025 conditions were conducted.



Existing Regional Public Transit Routes

North-South Road and Kapolei Parkway Project
Final Environmental Assessment
Figure 3.3-4

3.3.1.2a Projected Year 2025 Traffic Operations

Figures 3.3-5 and 3.3-6 illustrate the proposed lane configurations used in the analyses for the No-Build and Build Alternatives. Projected Year 2025 No-Build, and Build intersection, freeway, highway and ramp volumes are shown in Figures 3.3-7 and 3.3-8. Figures 3.3-9 and 3.3-10 summarizes the year 2025 No-Build and Build Alternatives projected peak hour traffic operations, respectively.

Freeway Operations

Table 3.3-6 summarizes the results of the freeway segment analysis.

Table 3.3-6:
Year 2025 Freeway Segment Level-of-Service

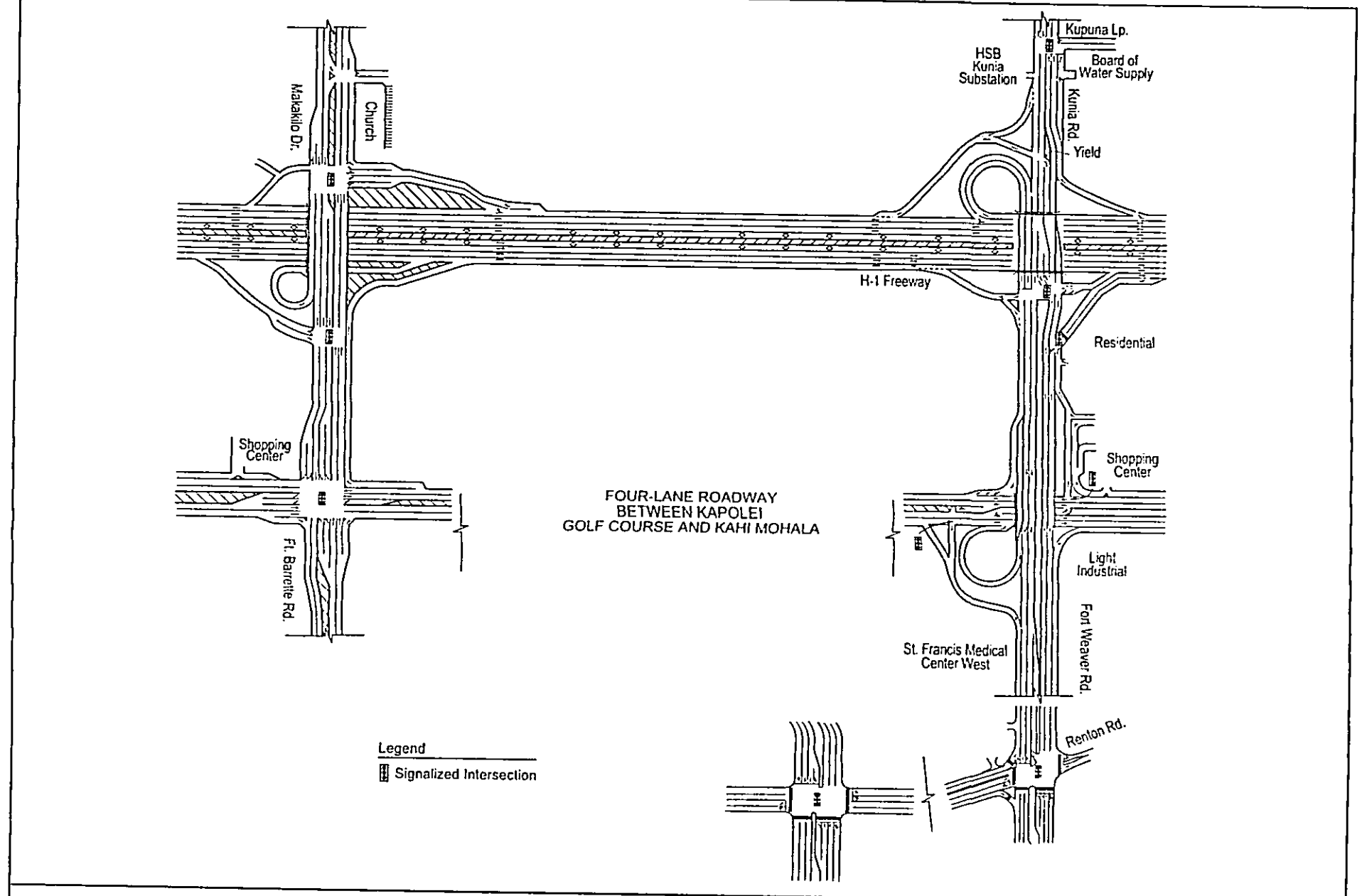
Freeway Segment	Lanes A.M. (P.M.)	Direction	A.M. Peak				P.M. Peak			
			No-Build		Build		No-Build		Build	
			LOS	Density	LOS	Density	LOS	Density	LOS	Density
Paiwa IC - Kunia IC	5 (5)	WB	C	20.1	C	20.1	C	19.4	C	19.4
Kunia IC – North-South Rd IC	4 (4)	WB	C	18.4	C	22.5	B	15.6	B	17.3
North-South Rd IC - Makakilo IC	4 (4)	WB	-	-	C	18.1	-	-	B	15.2
Makakilo IC - Palailai IC	3 (3)	WB	C	19.6	C	19.6	B	14.7	B	14.7
Palailai IC - Makakilo IC	3 (3)	EB	D	28.0	D	28.0	B	11.7	B	11.7
Makakilo IC – North-South Rd IC	4 (4)	EB	D	28.3	C	25.6	B	13.0	B	11.5
North-South Rd IC	3 (3)	EB	-	-	D	35.0	-	-	B	12.9
North-South Rd IC - Kunia IC	4 (4)	EB	-	-	D	33.8	-	-	B	15.3
Kunia IC - Paiwa IC	6 (5)	EB	D	27.8	D	27.8	B	16.2	B	17.3

WB=westbound, EB=eastbound, NB=northbound, SB=southbound, IC=Interchange

As shown in Table 3.3-6, the H-1 Freeway is projected to operate acceptably for peak hour conditions with and without the North-South Road Interchange at LOS C or better at every segment except for the eastbound segments during the A.M. peak period which operate at LOS D. This can be explained by the typical heavy morning traffic headed east for either work or school.

With the addition of the North-South Road Interchange, the freeway density is slightly higher on the segment between the North-South Road Interchange and the Kunia Interchange, in both directions, than the density on that same segment in the No-Build scenario. More vehicles are on this segment because they are using the North-South Road Interchange over the Kunia Interchange to get to their destination. However, the LOS is the same for that segment in both Build and No-Build scenarios.

Copies of the analysis worksheets are included in Appendix D.



Year 2025 No-Build Roadway Configuration

North-South Road and Kapolei Parkway Project
Final Environmental Assessment
Figure 3.3-5

CORRECTION

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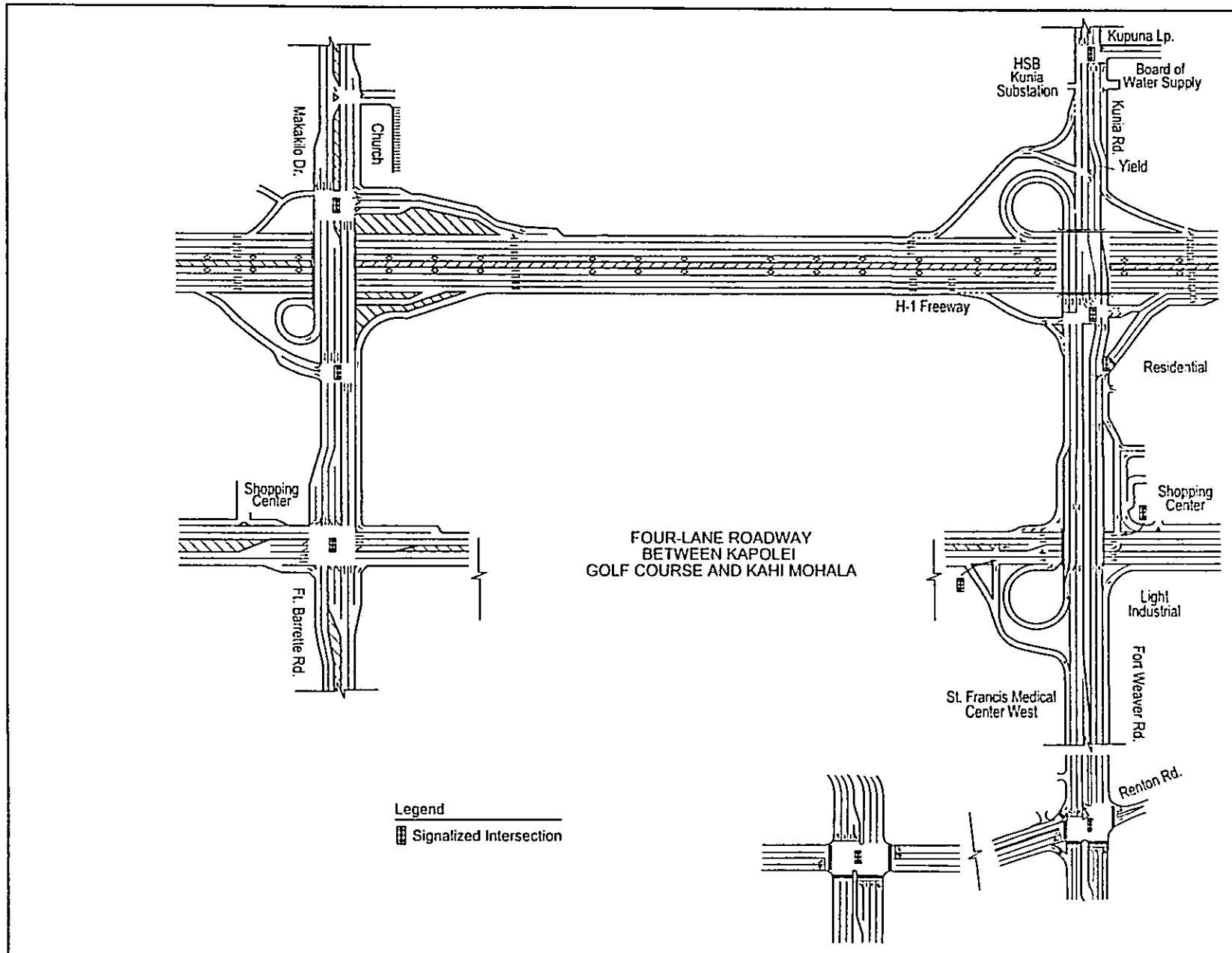
SEE FRAME(S)
IMMEDIATELY FOLLOWING



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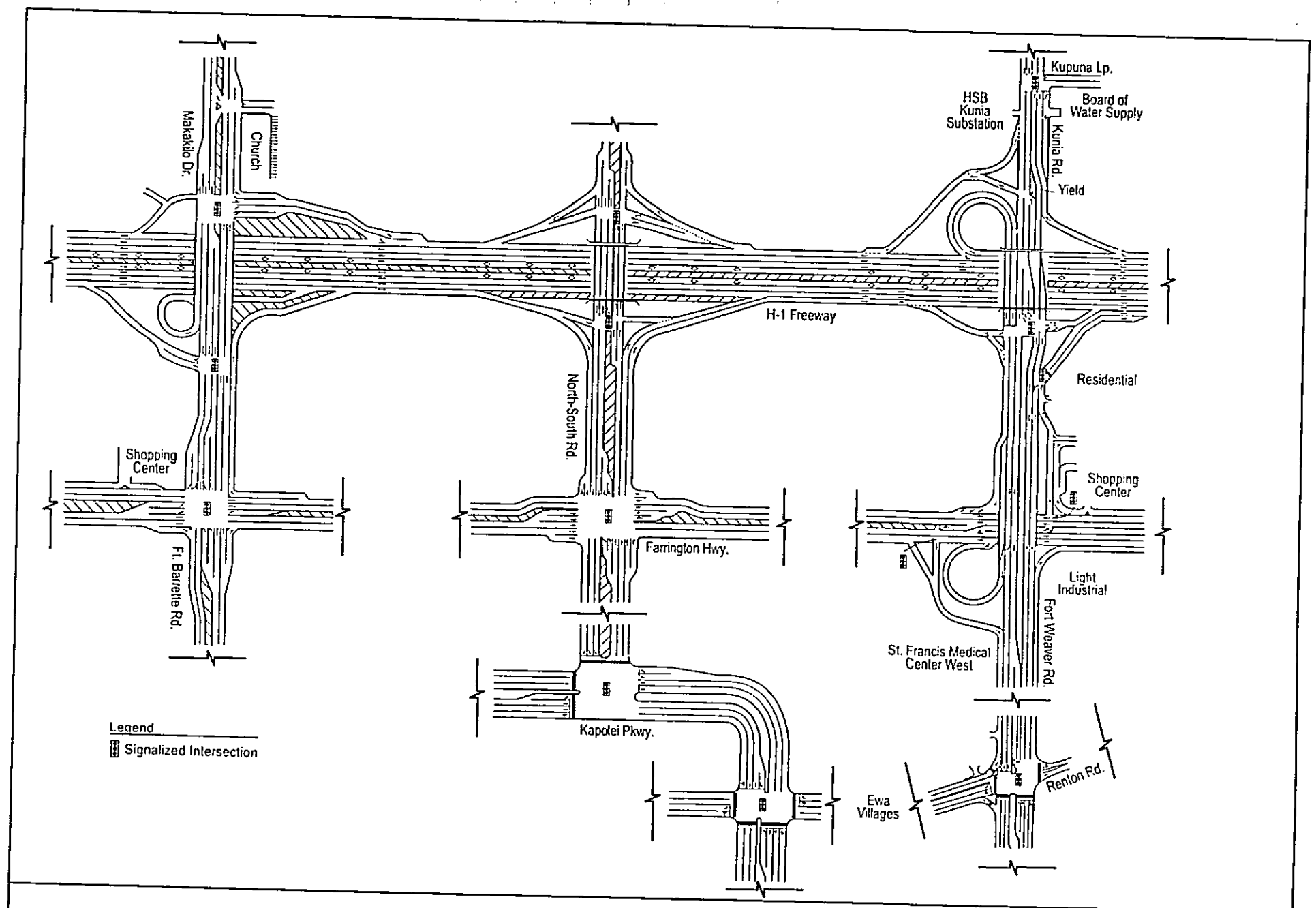
Year 2025 No-Build Roadway Configuration

North-South Road and Kapolei Parkway Project
Final Environmental Assessment
Figure 3.3-5

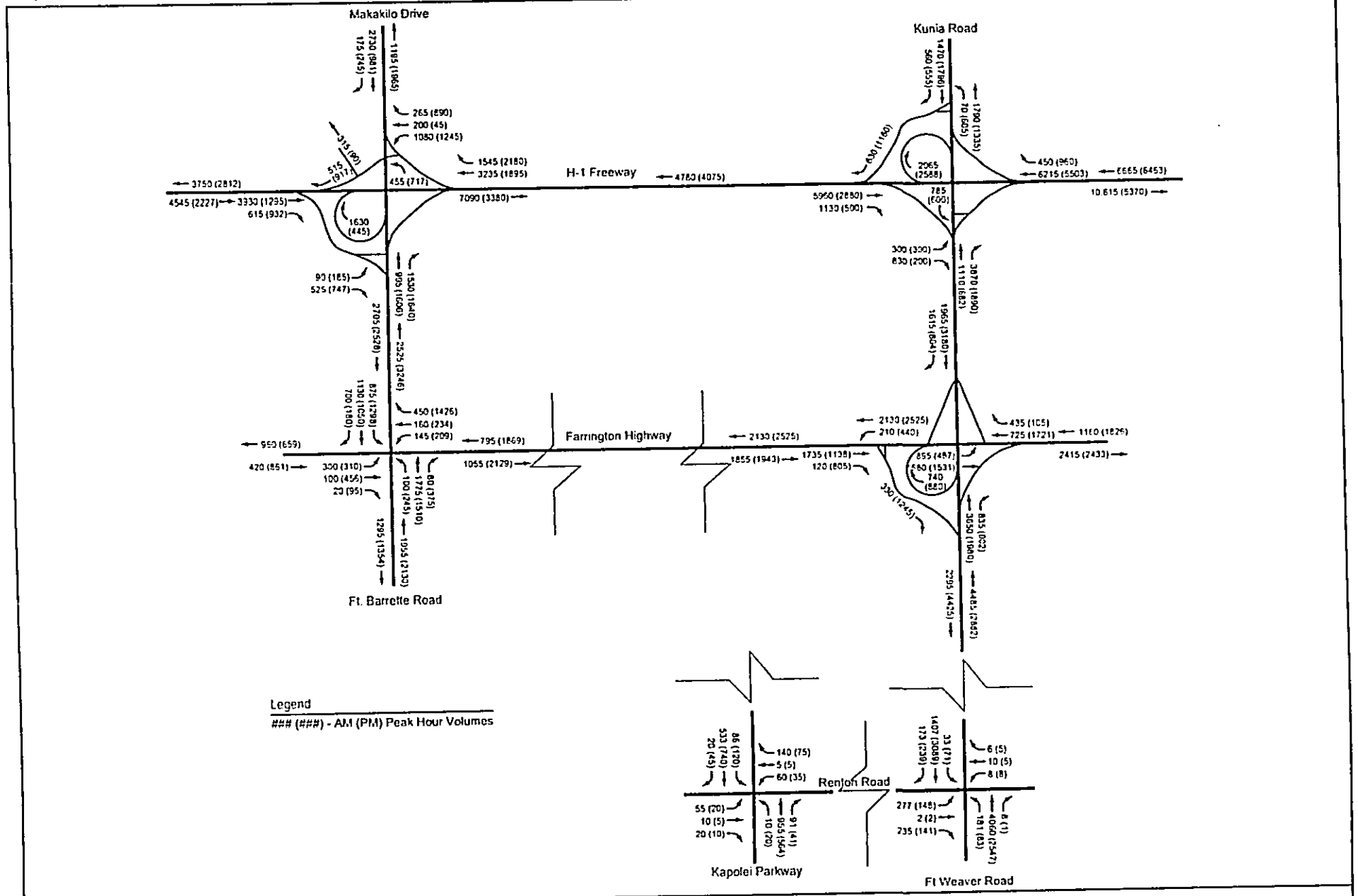


Year 2025 Build Roadway Configurations

North-South Road and Kapolei Parkway Project

Final Environmental Assessment

Figure 3.3-6



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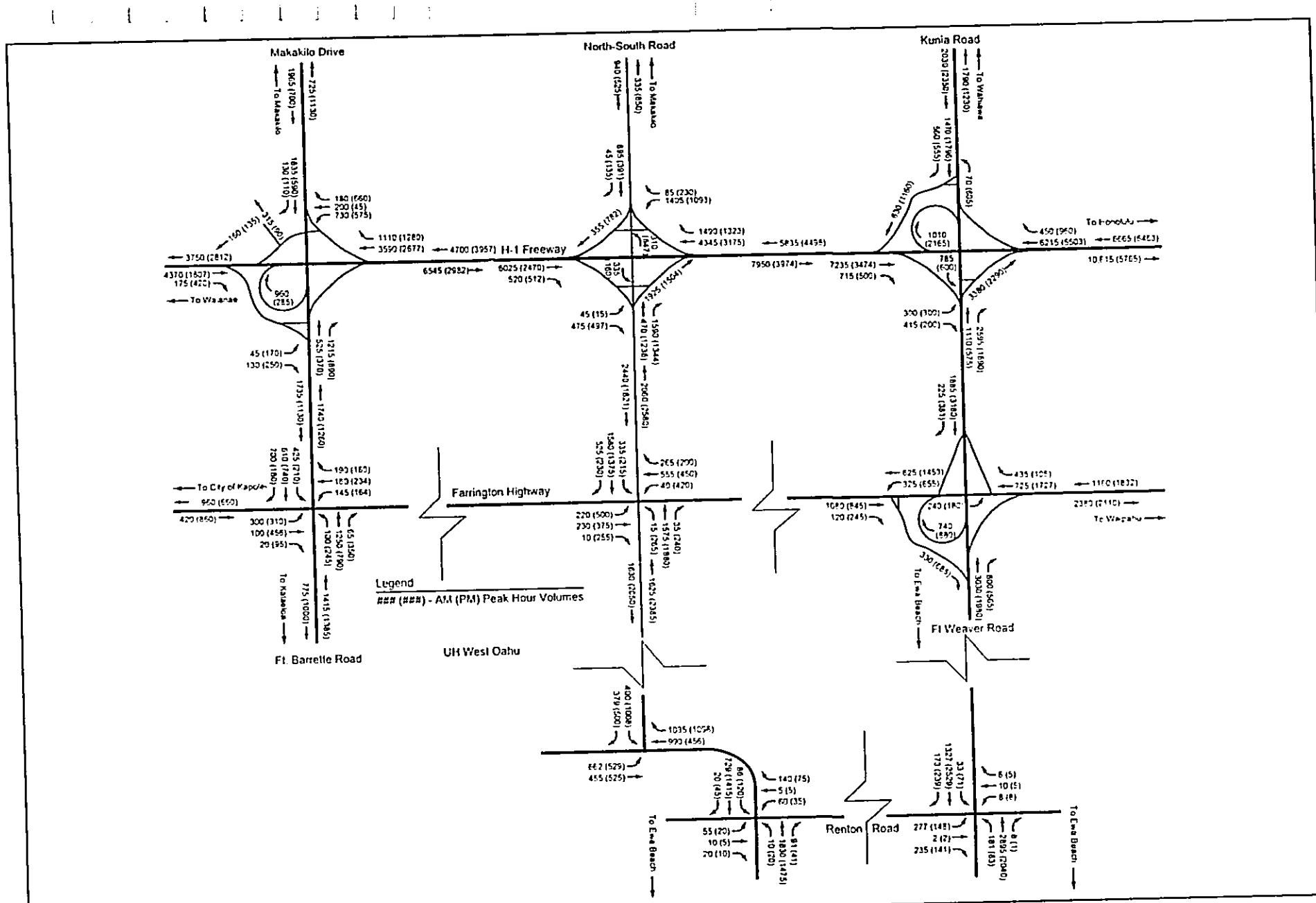
Year 2025 No-Build Peak Hour Traffic Volumes

North-South Road and Kapolei Parkway Project
Final Environmental Assessment
Figure 3.3-7



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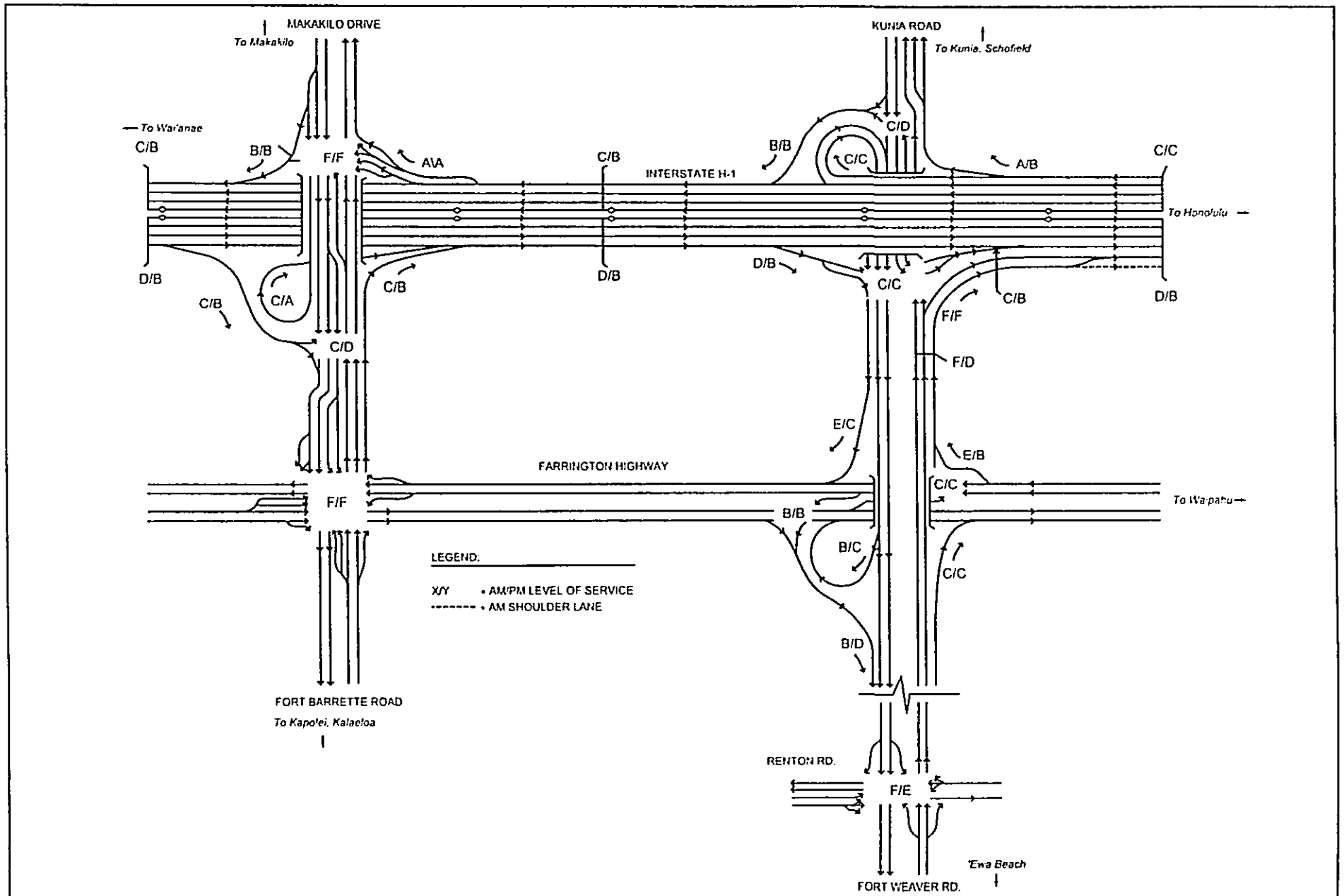
Year 2025 Build Peak Hour Traffic Volumes

North-South Road and Kapolei Parkway Project

Final Environmental Assessment

Figure 3.3-8



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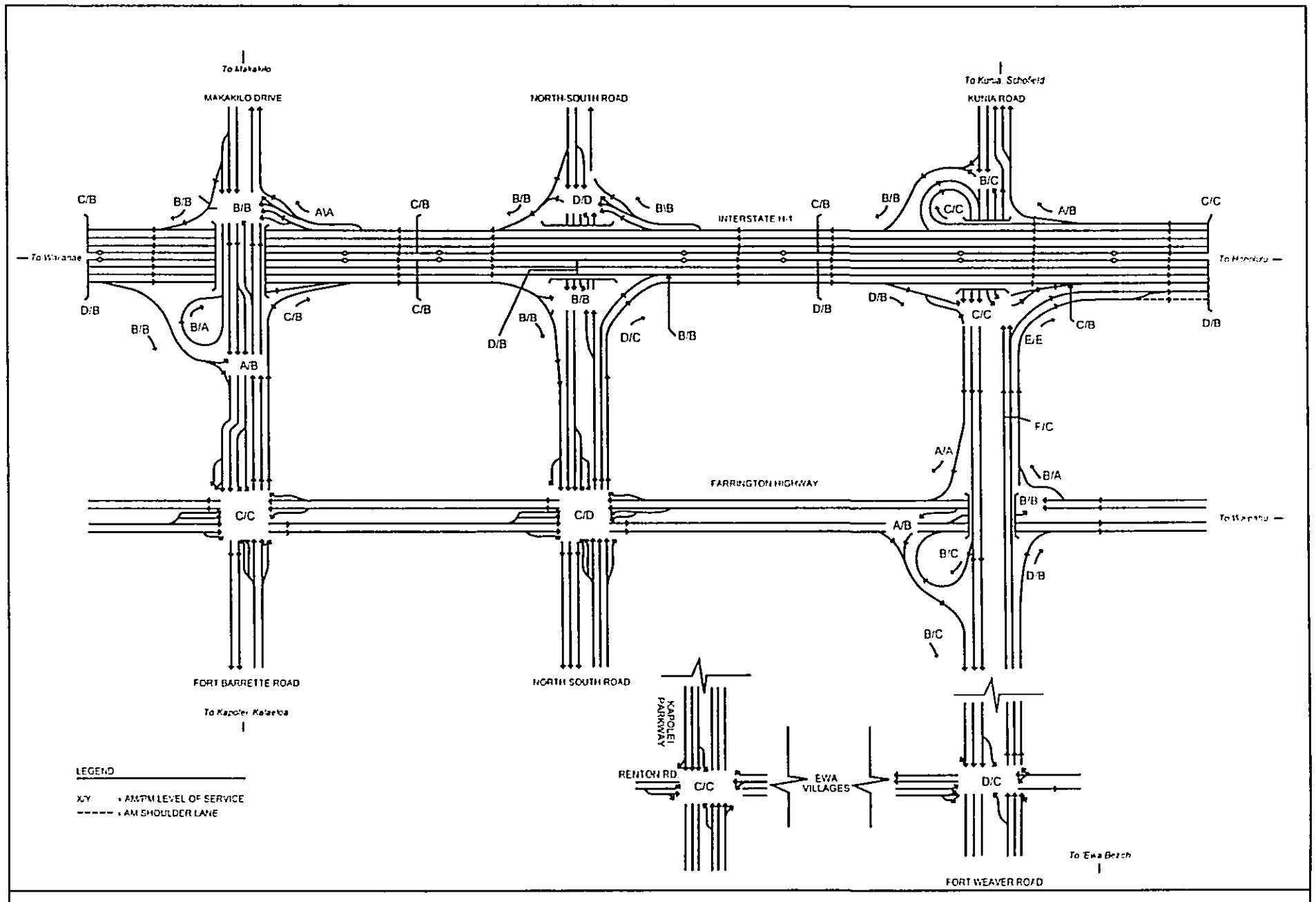
Year 2025 No-Build Roadway & Intersection Level-of-Service

North-South Road and Kapolei Parkway Project
Final Environmental Assessment
Figure 3.3-9



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Year 2025 Build Roadway & Intersection Level-of-Service

North-South Road and Kapolei Parkway Project
Final Environmental Assessment
Figure 3.3-10

Freeway Merge-Diverge Operations

Table 3.3-7 summarizes the results of the Freeway Merge-Diverge analyses. The results of the ramp analysis show that there are several problem areas in the No-Build scenario, with certain ramps operating at LOS E and F. The eastbound on-ramp at the Kunia Interchange off of Kunia Road operates at LOS F during both the A.M. and P.M. peak periods and the weave between Kunia Interchange and Farrington Highway operates at LOS F during the A.M. peak period. Both of these conditions are caused by increased traffic coming out of the Ewa and East Kapolei areas.

Table 3.3-7:
Year 2025 Freeway Merge-Diverge Level-of-Service

Intersection	A.M. Peak				P.M. Peak			
	No-Build		Build		No-Build		Build	
	LOS	Density	LOS	Density	LOS	Density	LOS	Density
Kunia Interchange								
EB Off-Ramp Diverge	D	29.0	D	30.3	B	11.1	B	11.9
EB On-Ramp Merge (from Kunia)	C	21.8	C	24.7	B	14.0	B	15.5
EB On-Ramp Lane Add (from Ewa)	F	55.5	E	37.1	F	54.0	E	48.3
WB Kunia Off-Ramp Diverge	A	9.6	A	9.6	B	12.8	B	12.8
WB Ewa Off-Ramp Diverge	C	22.5	C	21.3	C	20.3	C	22.3
WB On-Ramp Merge	B	17.2	B	19.8	B	16.7	B	16.6
North-South Interchange								
EB Off-Ramp Lane Drop	-	-	B	11.6	-	-	B	11.4
EB On-Ramp Merge	-	-	B	19.7	-	-	B	13.1
EB On-Ramp Lane Add	-	-	D	30.3	-	-	C	25.6
WB Off-Ramp Diverge	-	-	B	14.5	-	-	B	10.2
WB On-Ramp Merge	-	-	B	15.2	-	-	B	15.5
Makakilo Interchange								
EB Off-Ramp Diverge	C	20.8	B	18.6	B	13.3	B	10.7
EB Makakilo On-Ramp Merge	C	20.2	B	18.8	A	9.2	A	9.6
EB Kapolei On-Ramp Merge	C	22.2	C	21.2	B	17.3	B	13.7
WB Off-Ramp Diverge	A	2.5	A	1.2	A	5.0	A	0.5
WB On-Ramp Merge	B	14.5	B	14.1	B	12.7	B	10.2
Fort Weaver Interchange								
SB Off-Ramp Lane Drop to WB	E	46.1	A	6.4	C	23.0	A	10.9
SB Off-Ramp Diverge to EB	B	13.0	B	12.3	C	24.0	C	24.0
SB On-Ramp Merge	B	13.7	B	13.7	D	30.2	C	25.9
NB Off Ramp-Lane Drop	C	23.9	C	22.9	C	25.8	B	16.1
NB On-Ramp Lane Add	E	38.0	C	27.0	B	16.9	B	11.4
NB Kunia/H-1 Weave	F	62.8	F	45.0	D	28.2	C	25.6

WB=westbound, EB=eastbound,
NB=northbound,SB=southbound

For the No-Build Alternative, at the Fort Weaver Interchange, the southbound off-ramp to Farrington Highway operates at LOS E during the A.M. peak period, as this ramp would pick up the majority of the UH West Oahu traffic. The northbound on-ramp from Farrington Highway would also operate at LOS E due to growth in the Ewa and Ewa Beach areas.

The remaining ramps at the Kunia, Makakilo, and Fort Weaver Interchanges would operate reasonably well in the No-Build scenario during both the A.M. and P.M. peak periods. Operations at these ramps are at a low LOS D or better.

When the North-South Road Interchange and North-South Road are included in these analyses, overall ramp operations at every interchange improve as vehicles now have another way to access the H-1 Freeway. At the Fort Weaver Interchange, the two off-ramps operating at LOS E in the No-Build scenario, would both operate acceptably in the Build scenario. The southbound off-ramp to Farrington Highway would operate at LOS A in the Build scenario because North-South Road would provide easier access to those headed to the UH West Oahu Campus. The northbound on-ramp from Farrington Highway would operate at an acceptable LOS C.

The LOS F conditions at the Kunia Interchange in the No-Build scenario improve in the Build scenario, but drivers would still experience a lot of congestion in these areas. The eastbound on-ramp off of Kunia Road would operate at LOS E during both the A.M. and P.M. peak periods, and operations at the weave on Kunia Road between H-1 Freeway and Farrington Highway would improve to a lower LOS F. The addition of the North-South Road did relieve some of the congestion on Fort Weaver Road, but as explained earlier in this report, Fort Weaver Road is already operating over capacity. The fact that the Ewa and Ewa Beach areas are still growing/developing only adds to the problem.

Copies of the analysis worksheets are included in Appendix D.

Interchange Terminal Operations

Table 3.3-8 summarizes the results of the Interchange Terminal analysis.

As shown in Table 3.3-8, the interchange terminals at Makakilo Interchange would experience problems under the No-Build scenario. The H-1 Westbound Off-Ramp/Makakilo Drive terminal operates under a LOS of F during the A.M. peak period and the H-1 Eastbound Off-Ramp/Makakilo Drive terminal operates at LOS F during the P.M. peak period. These terminals cannot handle the increased traffic demand caused by all of the development in this area.

The interchange terminals at Kunia Interchange and Fort Weaver Interchange would operate reasonably well in Year 2025 without the North-South Road Interchange. The terminals at Fort Weaver Interchange would operate at an acceptable LOS C or better, while the terminals at Kunia Interchange would experience longer delays but still operate at LOS D or better.

Table 3.3-8:
Year 2025 Interchange Terminal Level-of-Service

Interchange Terminals	A.M. Peak				P.M. Peak			
	No-Build		Build		No-Build		Build	
	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
Kunia Interchange	110 sec cycle				110 sec cycle			
Mauka Terminal	**C**	**22.1**	**B**	**11.31**	**D**	**41.7**	**C**	**39.9**
Northbound Approach	C	22.0	C	32.8	D	46.4	D	50.8
Southbound Approach	C	22.1	B	10.3	D	40.1	C	36.2
Makai Terminal	**C**	**25.3**	**C**	**24.7**	**C**	**30.0**	**C**	**26.6**
Eastbound Approach	D	48.6	D	48.6	D	45.6	D	35.5
Northbound Approach	D	40.8	D	36.2	C	30.1	C	28.6
Southbound Through	B	12.5	A	7.7	C	28.7	C	25.0
Southbound Left-Turn	D	39.3	D	36.2	C	29.2	C	29.2
North-South Interchange			100 sec cycle				100 sec cycle	
Mauka Terminal	-	-	**D**	**49.1**	-	-	**D**	**36.2**
Westbound Approach	-	-	D	53.8	-	-	D	40.7
Northbound Approach	-	-	D	35.4	-	-	C	28.8
Southbound Approach	-	-	D	49.8	-	-	D	47.0
Makai Terminal	-	-	**B**	**15.4**	-	-	**B**	**15.6**
Eastbound Approach	-	-	C	33.0	-	-	C	28.4
Northbound Approach	-	-	B	19.6	-	-	B	18.3
Southbound Approach	-	-	B	14.2	-	-	B	13.3
Makakilo Interchange	90 sec cycle		60 sec cycle		90 sec cycle		60 sec cycle	
Mauka Terminal	**F**	**90.0**	**B**	**15.8**	**F**	**161.4**	**B**	**18.8**
Westbound Approach	F	92.3	B	19.2	F	273.8	B	18.3
Northbound Approach	E	65.0	B	11.1	C	24.3	B	14.5
Southbound Approach	F	186.3	B	17.3	F	136.2	C	23.2
Makai Terminal	**C**	**23.1**	**A**	**6.8**	**D**	**50.8**	**B**	**10.9**
Eastbound Approach	C	30.3	B	18.6	E	57.6	B	11.4
Northbound Approach	B	16.3	A	5.3	E	63.3	B	10.9
Southbound Approach	C	24.2	A	5.4	B	16.6	B	10.3
Fort Weaver Interchange	60 sec cycle				60 sec cycle			
Waianae Terminal	**B**	**13.6**	**A**	**9.2**	**B**	**16.0**	**B**	**13.6**
Eastbound Approach	B	12.9	A	7.2	B	16.8	B	13.3
Westbound Approach	B	19.1	B	19.1	B	14.2	B	14.2
Koko Head Terminal	**C**	**21.1**	**B**	**10.3**	**C**	**24.6**	**B**	**12.1**
Eastbound Approach	B	17.8	B	16.0	C	30.0	B	19.5
Westbound Approach	C	25.0	A	8.4	C	23.0	B	11.4

Kapolei Parkway, North-South Road and North-South Road Interchange would help the adjacent Interchanges, Makakilo Interchange and Kunia Interchange, by allowing an alternate location for traffic to access the H-1 Freeway. Most importantly, it would alleviate the traffic volume at the Makakilo Interchange terminals, which would all operate at LOS B or better under the Build scenario.

Adjacent Intersection Operations

Table 3.3-9 summarizes the results of the intersection analysis.

As shown in Table 3.3-9, traffic operations at the intersection of Farrington Highway and Makakilo Drive/Fort Barrette Road in the No-Build Alternative would experience heavy congestion and long delays on several approaches during both the A.M. and P.M. peak periods. The intersection experiences overcapacity conditions due to the large increase in traffic demand caused by the planned development of the City of Kapolei, the Villages of Kapolei, and the UH-West Oahu Campus.

Given the high-level of improvements already implemented at this intersection, further geometric changes and adjustments to signal timing are unlikely to be effective. During the A.M. peak period, the mauka-bound through movement and the makai-bound left-turn movement on Fort Barrette Road are the primary movements that are over-capacity. During the P.M. peak period, the same two movements plus the Waianae-bound right-turn movement on Farrington Highway are constrained.

The North-South Road Interchange provides another regional access into the Ewa Plain thereby sharing and lessening the demand placed on the Farrington Highway and Makakilo Drive/Fort Barrette Road intersection. With the North-South Road Interchange, the Farrington Highway and Makakilo Drive/Fort Barrette Road intersection would operate at an improved overall LOS C during both the A.M. and P.M. peak periods.

The Farrington Highway/North-South Road intersection is projected to operate at LOS C during the A.M. peak period and at a marginal LOS D during the P.M. peak period. These level-of-service determinations are considered acceptable for urban, peak hour operations.

The intersections along the Fort Weaver Road corridor are projected to operate at a much improved level-of-service due to the additional regional access to the H-1 Freeway.

Kapolei Parkway intersections at North-South Road and at Renton Road are projected to operate acceptably in both the No-Build and Build Alternatives. The Kapolei Parkway/North-South Road intersection is anticipated to warrant signalization for both the No-Build and Build alternatives. Likewise, the Kapolei Parkway / Renton Road intersection is also anticipated to warrant signalization in both the No-Build and Build Alternatives. traffic signals will be installed. The designers of the future traffic signal at the Kapolei Parkway/Renton Road intersection will consider comments received from the State Historic Preservation Division (SHPD) in designing the signal hardware and in developing the signal timing plan. See Section 3.10.3 for a description of SHPD comments.

Table 3.3-9:
Year 2025 Intersection Level-of-Service

Intersection	A.M.				P.M.			
	No-Build		Build		No-Build		Build	
	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)
Farrington Hwy and Makakilo Dr/ Ft. Barrette Rd	**(110 Sec Cycle)**				**(110 Sec Cycle)**			
	F	**122**	**C**	**34.5**	**F**	**414.7**	**C**	**33.3**
Farrington Hwy EB	D	45.9	D	45.9	C	34.9	C	34.9
Left	D	48.5	D	48.5	C	33.1	C	33.1
Through	D	42.5	D	42.5	D	38.9	D	38.9
Right	C	23.9	C	23.9	C	21.2	C	21.2
Farrington Hwy WB	D	45.7	D	39.1	F	835.9	D	45.1
Left	D	49.6	D	49.6	E	66.7	D	50.5
Through	D	43.4	D	43.4	D	50	D	50
Right	D	45.2	C	27.3	F	-	C	32.2
Fort Barrette Rd NB	F	213.9	D	36.3	F	125.7	C	30.4
Left	D	38.9	D	38.9	D	45.5	D	45.5
Through	F	245.2	D	37.4	F	165.8	C	32
Right	B	10.2	B	10.1	B	16.7	B	16.3
Makakilo Dr SB	F	112.6	C	28.9	F	475.9	C	29.9
Left	F	288.9	D	47.9	F	891.1	D	44.5
Through	C	32	C	23.6	D	42	C	31
Right	C	22.1	C	22.1	A	7.9	A	7.9
Farrington Hwy and North-South Road			**(110 Sec Cycle)**				**(110 Sec Cycle)**	
	-	**-**	**C**	**33.4**	**-**	**-**	**D**	**39**
Farrington Hwy EB	-	-	D	44.6	-	-	D	45.7
Left	-	-	D	52.4	-	-	D	52.1
Through	-	-	D	38	-	-	D	46.1
Right	-	-	C	25.8	-	-	C	32.6
Farrington Hwy WB	-	-	D	43.5	-	-	D	45.5
Left	-	-	D	45.2	-	-	D	45.4
Through	-	-	D	48.9	-	-	D	52.1
Right	-	-	C	32.1	-	-	C	30.8
North-South Rd NB	-	-	D	39.8	-	-	D	40.8
Left	-	-	D	46.7	-	-	D	54.4
Through	-	-	D	40.3	-	-	D	42.9
Right	-	-	B	14.6	-	-	A	9.6
North-South Rd SB	-	-	C	23.4	-	-	C	28.5
Left	-	-	D	39.7	-	-	D	49.1
Through	-	-	C	23.3	-	-	C	28.5
Right	-	-	B	13.5	-	-	A	9.6

EB=eastbound,WB=Westbound,NB=northbound,SB=southbound

Table 3.3-9: (Continued)
Year 2025 Intersection Level-of-Service

Intersection	A.M. Peak				P.M. Peak			
	No-Build		Build		No-Build		Build	
	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)
Kapolei Pkwy/ North-South Rd			(110 Sec Cycle)				(110 Sec Cycle)	
	-	-	C	24.9	-	-	C	23.5
EB Left	-	-	D	39.1	-	-	D	36.2
EB Through	-	-	A	7.3	-	-	B	12.6
WB Through	-	-	D	39.1	-	-	D	35.2
WB Right	-	-	B	11.0	-	-	B	11.0
SB Left	-	-	C	33.7	-	-	D	37.8
SB Right	-	-	B	13.3	-	-	A	9.4
Kapolei Pkwy/ Renton Rd	(110 Sec Cycle)				(110 Sec Cycle)			
	B	19.1	C	25.6	C	20.3	C	24.9
EB Left	D	39.8	D	39.8	C	34.3	C	34.3
EB Through & Right	D	37.7	D	37.7	C	34.0	C	34.0
WB Through & Left	D	39.5	D	39.5	C	34.8	C	34.8
WB Right	B	18.3	B	18.3	B	14.0	B	14.0
NB Left	D	41.3	D	41.3	D	37.4	D	37.4
NB Through & Right	B	19.2	C	28.5	C	20.8	C	28.4
SB Left	C	34.1	C	34.1	C	33.3	C	33.3
SB Through & Right	B	11.0	B	11.5	B	16.6	C	20.5
Ft Weaver Rd/ Renton Rd	(110 Sec Cycle)				(110 Sec Cycle)			
	F	131.1	D	38.7	E	62.4	C	26.4
EB Left	D	54.9	D	54.9	D	45.6	D	45.6
EB Through	D	35.2	D	35.2	D	39.4	D	39.4
EB Right	C	32.7	C	32.7	C	30.0	C	30.0
WB Left & Through	D	53.8	D	53.8	D	49.0	D	49.0
WB Right	D	44.8	D	44.8	D	37.8	D	37.8
NB Left	D	50.8	D	50.8	D	47.4	D	47.4
NB Through	F	222.8	D	46.9	C	31.4	C	20.6
NB Right	A	7.0	A	7.0	A	6.9	A	6.9
SB Left	D	50.7	D	50.7	D	46.8	D	46.8
SB Through	C	21.1	C	20.5	F	96.9	C	30.6
SB Right	A	6.3	A	6.3	A	6.0	A	6.0

EB=eastbound,WB=Westbound,NB=northbound,SB=southbound

The Fort Weaver Road and Renton Road intersection is projected to be very congested in the No-Build Alternative, operating at an overall LOS F. Fort Weaver Road would experience heavy congestion and long delays in the north-south direction during both A.M. and P.M. Peaks. The intersection experiences overcapacity conditions due to the large increase in traffic destined to the H-1 Freeway caused by the shift in travel patterns from North-South Road to Fort Weaver Road. Even the future six-lane widening, adjustments to signal timing or any further geometric improvements are unlikely to accommodate the future north-south demand.

In the Build Alternative, Fort Weaver Road is projected to operate acceptably (LOS D or better). With future improvements and alternative routes provided to H-1 Freeway, traffic in the Ewa area is able to distribute to North-South Road providing alleviation to Fort Weaver Road.

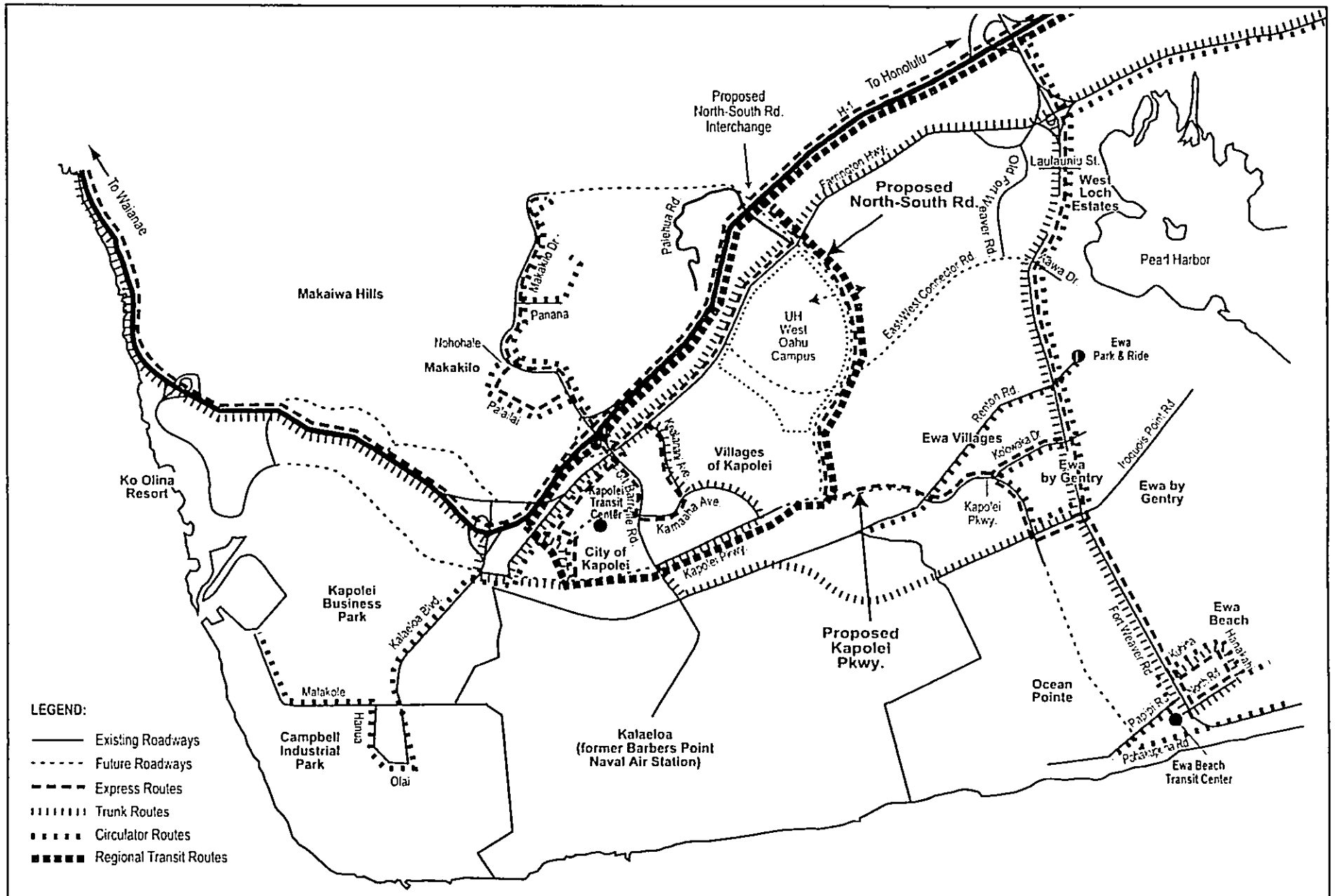
3.3.1.2b Public Transit

As described in Section 3.3.1.1c, the City and County of Honolulu was assumed to operate a 794-bus fleet by the Year 2025, which includes the regional BRT system. It currently operates a 525-bus fleet. Figure 3.3-11 shows the Year 2025 projected bus routes for the study area. The primary difference from the existing transit system is the assumed implementation of a high-capacity regional transit system that would serve the H-1 Freeway corridor.

Although, the No-Build and Build Alternatives assume similar transit systems, the Build Alternative allows the transit system to provide better service. The Build Alternative includes an exclusive rapid transit corridor that would be reserved within the 28-foot median of North-South Road. This future transit corridor would begin at H-1 Freeway and proceed makai to Kapolei Parkway. At Kapolei Parkway, the transit corridor would connect to the existing east-west rapid transit corridor located within the median of Kapolei Parkway. At select locations along North-South Road, there may be the need for future widening of the median to provide for transit stops. The City and County of Honolulu is proposing a future park–and-ride facility in the vicinity of North-South Road/ Farrington Highway intersection. A park-and-ride facility in this area would serve this growing area better and would provide transit vehicles better access to H-1 Freeway than the No-Build Alternative. The No-Build Alternative would lessen the effectiveness of a proposed North-South Road park-and-ride, requiring transit vehicles to use park-and-ride facilities targeted for other communities. The same number of transit vehicles would be provided in both alternatives, but the Build Alternative would allow more efficient service. Also, as described in Section 3.3.1.2, the Build Alternative would improve traffic conditions on certain roadways, intersections and ramps. Therefore, the Build Alternative would improve transit services if overall traffic operations improve, because transit vehicles would use the same roadways as other vehicles.

3.3.1.2c Conclusion

The traffic impact analysis conducted above indicates that implementation of the proposed North-South Road and Kapolei Parkway project would result in the following benefits:



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Projected Year 2025 Regional Public Transit Routes

North-South Road and Kapolei Parkway Project

Final Environmental Assessment

Figure 3.3-11

- Traffic conditions would be substantially improved along the congested Kunia Road/Fort Weaver Road corridor. Year 2025 volumes on Kunia Road between H-1 and Farrington Highway are projected to decrease by about 2,745 and 730 vph in both directions, during the A.M. and P.M. peak hours, respectively, when compared to the No-Build Alternative. In addition to improved highway operating conditions during both peak periods and in both directions of travel, each of the analyzed intersections along the Kunia Road/Fort Weaver Road corridor would benefit from the project.
  Similarly, traffic conditions would be improved along the Makakilo Drive/Fort Barrette Road corridor. With the project, Year 2025 volumes along Fort Barrette Road between H-1 Freeway and Farrington Highway are projected to decline by about 1,755 and 3,384 vph during the A.M. and P.M. peak hours, respectively, when compared to the No-Build Alternative. The intersection analysis indicated that this shift would result in improved level-of-service at the Makakilo Drive/H-1 Freeway westbound ramp terminal and Fort Barrette Road/Makakilo Drive and Farrington Highway intersection.

- With the project reductions in volume to capacity (v/c) ratios and average vehicle delays are projected for key intersections along the Kunia Road/Fort Weaver Road and Makakilo Drive/Fort Barrette Road corridors (see Appendix D).

North-South Road itself is projected to carry large traffic volumes, all of which would relieve other streets in the study area. Additionally, each of the future intersections along North-South Road and Kapolei Parkway, including those at the H-1 Freeway interchange, are projected to operate at acceptable level-of-service under the Year 2025 Build Alternative.

In summary, analyses indicate that existing freeway operations and ramp merge-diverge operations are good for peak hour conditions. Access to the interchanges, however, is constrained by the arterial intersections along the primary north-south corridors of Fort Weaver Road and Fort Barrette Road. Construction of North-South Road Interchange at the H-1 Freeway, North-South Road between the H-1 Freeway and Kapolei Parkway, and the construction of Kapolei Parkway between North-South Road and Renton Road would serve as an alternate route to access the greater Ewa area. The proposed project would provide additional roadway capacity in a high-growth area and would relieve congested key parallel corridors.

3.3.1.3 MITIGATION MEASURES

3.3.1.3a Traffic

The proposed North-South Road, North-South Road Interchange and the portion of Kapolei Parkway between Renton Road and North-South Road are expected to improve traffic operations at intersections along the Fort Weaver Road and Fort Barrette Road corridors. In general, the transportation improvements provided under the Build Alternative would provide better sub-regional mobility within the Ewa Plain than No-Build Alternative. Therefore, no mitigation measures are necessary.

a 3.3.1.3b Public Transit

Future transit planning in the Ewa Plain identifies a future park-and-ride bus facility near the intersection of Farrington Highway and North-South Road as part of the Regional BRT system and Hub-and-Spoke system. Implementation of the North-South Road and the portion of Kapolei Parkway between Renton Road and North-South Road would be consistent with this future transit enhancement for the Ewa Plain and would be beneficial for implementation of long-range transit plans in the Ewa Plain area. Therefore, no mitigation will be needed for transit.

3.3.1.3c Pedestrian Facilities

Currently, there are no pedestrian facilities within the study corridor. All future pedestrian facilities constructed as part of this project will comply with the Americans with Disabilities Act (ADA) regulations and guidelines. As shown in Figure 2.1-3 and 2.1-4, 8-foot sidewalks will be provided along both sides of the North-South Road corridor and a 4-foot sidewalk and a 10-foot shared bike/jogging path along the Kapolei Parkway segment. Therefore, no mitigation will be needed for pedestrian facilities.

3.3.2 UTILITIES

3.3.2.1 EXISTING CONDITIONS

Water, sewer, and drainage master plans were prepared for the East Kapolei EIS. These plans took into account the mauka University of Hawaii West Oahu (UH-West Oahu) campus and Kalaeloa (Barbers Point). DHHL would revise the plans for their lands and UH-West Oahu would revise the plans for the makai campus, should they proceed with the planning and entitlement process for development of the campus in its proposed location.

The project would cross existing 30-inch and 36-inch waterlines located within the Farrington Highway ROW. Coordination with the City will be required prior to construction for review and approval.

The Honouliuli Wastewater Treatment Plant, located on the corner of North Hanson and Geiger Roads, is the treatment facility serving the Ewa region.

An easement exists for the use of Hawaiian Electric Company (HECO), which operates the existing 138-kilovolt (kV) power line that cuts through the project area. This power corridor runs parallel to the proposed North-South Road alignment, and access to power poles is currently possible via a very rough and overgrown dirt road adjacent to farmland. There is also an energy corridor, which contains oil and fuel lines along Farrington Highway.

3.3.2.2 POTENTIAL IMPACTS

The No-Build Alternative assumes that the portion of Kapolei Parkway between Renton Road and Kapolei Parkway would be constructed, but at a later date than under the Build Alternative. Therefore, under the No-Build Alternative, the portion of Kapolei Parkway, as well as other planned roadway improvement projects would be developed, and utilities would be co-located with Kapolei Parkway and other roads as they are constructed.

In addition to the conditions described for the No-Build Alternative, under the Build Alternative, potable water, sewer, and non-potable water lines are planned to be co-located within the North-South Road ROW. Utilities would also be placed under the portion of Kapolei Parkway between Renton Road and North-South Road. Because the construction and installation of the transmission lines will be coordinated with the appropriate City agencies, and will conform to the water master plan for the eastern Kapolei area, no adverse impact on existing or future public utilities is anticipated. Water, sewer and drainage master plans were prepared for the East Kapolei EIS looking at the University of Hawaii West Oahu Campus (UH-West Oahu) mauka of H-1 Freeway. DHHL and UH-West Oahu would revise their plans, should they proceed with the planning and entitlement process for their developments.

The HECO easement will be maintained on the east side of North-South Road, between the roadway and the drainage channel. The roadway will match the alignment of the 138kV lines, because the area has been planned to accommodate both the road and the power lines within the same corridor. The proposed bike path (see Section 3.3.3) will be designed to not conflict with the HECO access road. Part of the ROW accommodating the transit easement, roadway, and the HECO easement has already been subdivided, from the proposed Kapolei Parkway to roughly halfway towards Farrington Highway. The remainder of the ROW is being obtained by HDOT.

No adverse impact on the HECO easement and its 138 kV poles is anticipated, with the exception of one pole at Farrington Highway which will need to be relocated. In general, HECO would benefit from the construction of the roadway, which would allow it to access its power lines more easily. HECO maintenance vehicles will also be allowed to use the roadway for regular and emergency work, if necessary, and upon coordination with HDOT.

3.3.2.3 MITIGATION MEASURES

HDOT commits to coordination with HECO on the anticipated relocation of one 138 kV power pole. Because no other adverse impacts to existing and future utilities are anticipated, no other mitigation measures are necessary.

3.3.3 CYCLING FACILITIES

3.3.3.1 EXISTING CONDITIONS

There are three basic types of bikeways: a "bike route" is a signed, shared roadway specifically designated as a preferred route for bicycling; a "bike lane" refers to a section of roadway designated for bicycling use by striping, signing, and/or pavement markings and a "bike path" is a bikeway physically separated from motorized vehicular traffic by an open space or barrier.

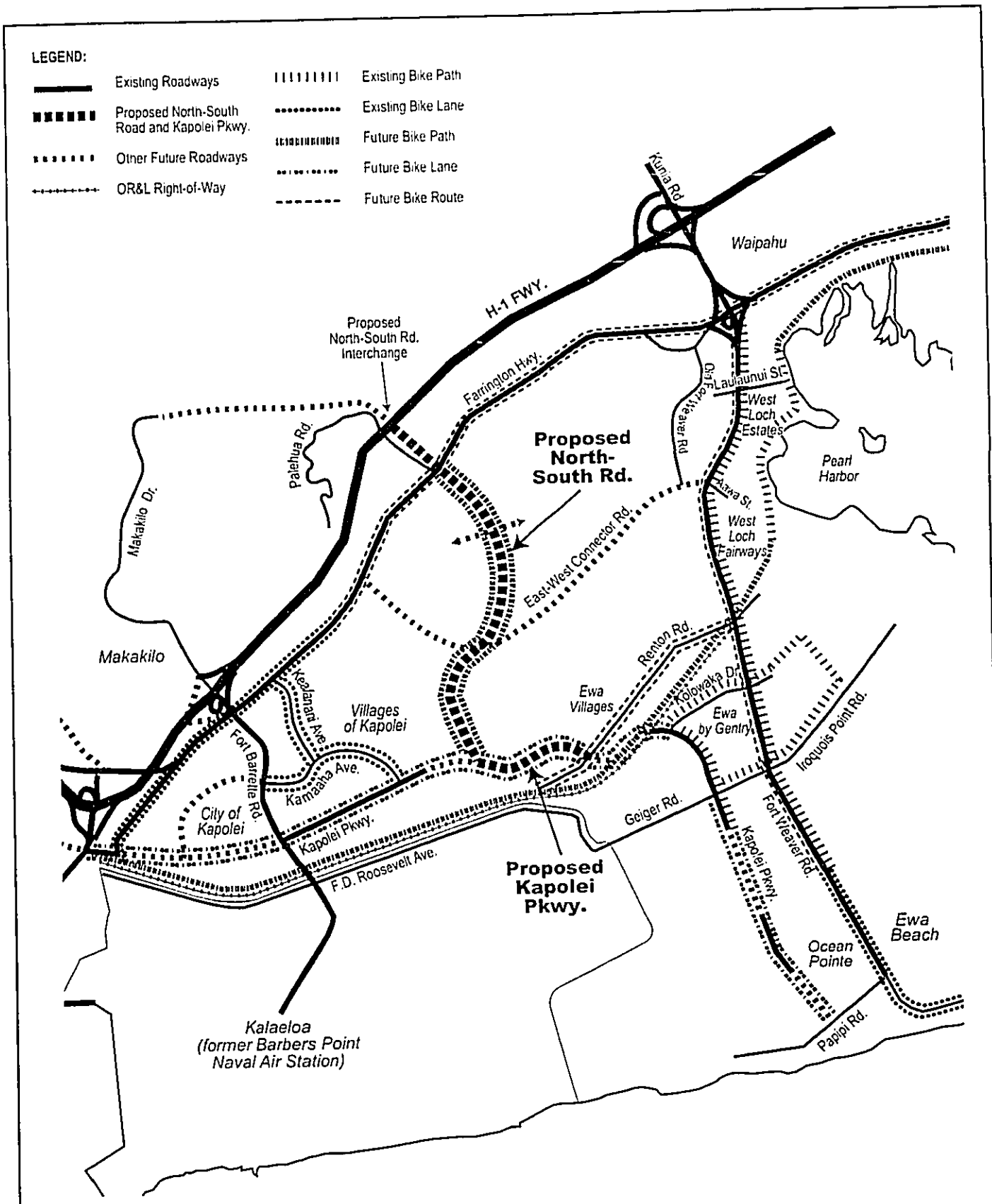
As shown on Figure 3.3-12, existing cycling facilities or bikeways (i.e., bike paths, lanes, or routes) in the general vicinity of the project area include a bike path along Fort Weaver Road from Farrington Highway to just north of Ewa Beach, and bike lanes on Fort Weaver Road in Ewa Beach. Fort Weaver Road has wide paved shoulders, which provide ample space for cycling outside of travel lanes. Fort Weaver Road may qualify as a bike route, if so designated, because of these paved shoulders. Bike paths are also provided in the Ewa Gentry community along Geiger Road, Kapolei Parkway, Kolowaka Drive, and Keaunui Road.

Bike Plan Hawaii, A State of Hawaii Master Plan (September 2003) (hereafter referred to as "State bike plan") prepared by HDOT provides recommendations for improving bikeway systems statewide. This plan serves as guidance to HDOT and county agencies when new roadway construction or improvements to existing roadways are considered. In addition to showing existing bikeways, Figure 3.3-12 displays some bikeways recommended for the Ewa region in the State bike plan, including the following:

- Future North-South Road: bike lanes
- Existing and future sections of Kapolei Parkway (Ocean Pointe to Villages of Kapolei): bike lanes
- Fort Weaver Road: bike route
- Renton Road: bike route
- Farrington Highway: bike route and bike path (North-South Road to Farrington Highway)
- OR&L ROW: bike path

3.3.3.2 POTENTIAL IMPACTS

As described in Section 2.1, the No-Build Alternative assumes that Kapolei Parkway would be constructed, but at a later date than under the Build Alternative. Under the No-Build Alternative, the portion of Kapolei Parkway from Renton Road to North-South Road would be developed, and would include a parallel bike/pedestrian path. It also may provide wide enough curb lanes that can be designated as a bike route if only two lanes are provided in both directions (Kapolei Parkway in Ewa Gentry is configured in such a manner). However, current plans call for three lanes in each direction. By providing a bike/pedestrian path, construction of Kapolei Parkway would go above and beyond what



Sources: Bike Plan Hawaii; State of Hawaii, Department of Transportation; September 2003.

Existing and Future Cycling Facilities
North-South Road and Kapolei Parkway Project
Final Environmental Assessment
Figure 3.3-12

is recommended in the State bike plan. However, bike lanes, which tend to be preferred by experienced cyclists and are recommended in the State bike plan for Kapolei Parkway, would not be provided. Bike paths tend to be more popular with recreational or novice cyclists.

Under the Build Alternative, North-South Road would be developed in addition to the portion of Kapolei Parkway between Renton Road and North-South Road. A bike path will be included within the North-South Road ROW, as shown in Figure 2.1-3. HDOT will allow the Hawaiian Electric Company (HECO) to use this bike path to maintain their 138 kV power lines which are located within the North-South Road ROW.

3.3.3.3 MITIGATION MEASURES

Because no adverse impacts to existing and future bikeways are anticipated, no mitigation measures are necessary.

3.4 SOCIAL, CULTURAL, AND ECONOMIC ACTIVITIES

3.4.1 EXISTING CONDITIONS

3.4.1.1 POPULATION

From 1990 to 2000, the population in the selected Ewa neighborhoods has increased substantially when compared to Oahu, with the exception of the Villages of Kapolei (see Table 3.4-1). The population of the Ewa region, defined by the City's designated Ewa DP area, was 68,718 in 2000, or 8 percent of the total Oahu population. However, because of the large residential development in the Ewa region since that year, the current population in the Ewa region exceeds the year 2000 count. Ewa by Gentry and Ewa Villages show the highest percent change in the Ewa DP area. Section 3.1 shows how considerable growth in the Ewa DP region has resulted from planned land use development trends.

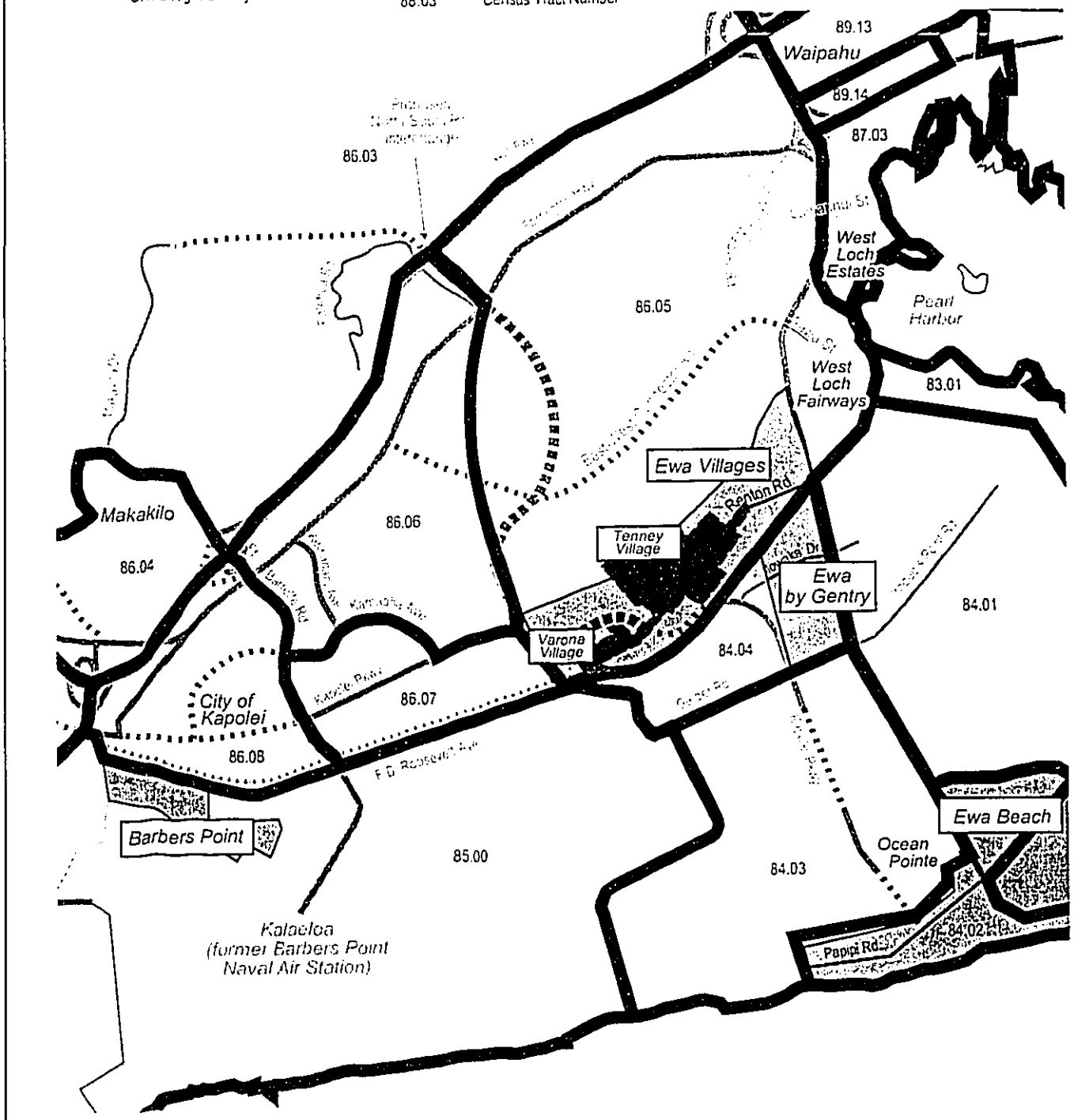
Table 3.4-2 exhibits demographic characteristics for Oahu, the Ewa DP area, selected neighborhoods in Ewa, and selected census tracts in the project vicinity. Figure 3.4-1 illustrates the census tract and incorporated place boundaries in the project area.

Rapid population growth in the Ewa DP area has balanced the ethnic characteristics of Ewa residents to be closer to that of the general population of Oahu and the State. In Hawaii, no one ethnic group exceeded 24 percent of the overall State population in 2000. In addition, those who classify themselves as "two or more races" made up 21 percent of the State population in 2000.

In comparison with demographic characteristics of the total Oahu population, Filipinos tended to be overrepresented and Japanese underrepresented in the Ewa DP area. The slightly larger percentage of Filipinos in the Ewa DP area as compared to the overall

LEGEND:

- Existing or Committed Roadways
- Proposed North-South Road and Kapolei Pkwy.
- Other Future Roadways
- OR&L Right-of-Way
- Census Tract Boundary
- Census Designated Place
- Historic District
- 88.03 Census Tract Number



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Census Tract Map
North South Road and Kapolei Parkway Project
Final Environmental Assessment
Figure 3.4-1

Oahu population is attributable to the larger percentage of Filipinos living in Ewa Beach and Ewa Villages, two of the older communities in Ewa. While data on detailed race is not available through the U.S. Census at the block level, public outreach efforts conducted in Varona Village (see Section 3.4.2) revealed that this neighborhood appears to consist predominantly of Filipino immigrant families with elderly family members with ties to the plantation days of the Ewa region. Varona Village, a portion of Ewa Villages adjacent to the proposed North-South Road and Kapolei Parkway intersection, was one of the plantation worker villages, and is the only village which has not yet been upgraded and remodeled by the City and County of Honolulu.

Table 3.4-1:
Year 1990 and 2000 Population of Selected Ewa Neighborhoods

	1990[1]	2000[2]	% Change
Oahu	836,231	876,156	4.7%
Ewa DP Area	42,960	68,718	60.0%
Ewa Beach	14,315	14,650	2.3%
Ewa by Gentry	1,992	4,939	147.9%
Ewa Villages	3,780	4,741	25.4%
Villages of Kapolei	8,832	8,834	0%

Source: [1] Community Resources, Inc. Socio-Economic Impact Assessment of East Kapolei Residential Project, November 1994. Original Sources: U.S. Bureau of Census, 1990 Census Population and Housing, Summary Tape File 3-A: Alaska, Hawaii, Oregon. CD90-3A-02, Washington D.C, 1992 and U.S. Bureau of Census, 1990 Census of Population and Housing, Summary Tape File 1-A: Pacific Division, Vol. 1. CD90-1A-9-1, Washington D.C, 1991.
[2] City and County of Honolulu, Department of Planning and Permitting. Community Profiles by Development Plan Area: 2000, May 2003.
U.S. Census Bureau, Census 2000 Summary Files 1 (SF 1) and 3 (SF 3). 2000. American Factfinder <http://factfinder.census.gov/servlet/ DatasetMainPageServlet?> Accessed March 31, 2004.

The newer, privately-developed communities of Ewa by Gentry and the Villages of Kapolei have demographic characteristics similar to the island as a whole, although Filipinos are still overrepresented, and Japanese and whites are underrepresented. Development of the Ocean Pointe neighborhood started after the 2000 census data was compiled.

As shown in Table 3.4-2, the median age of residents in the selected neighborhoods of the Ewa DP area is slightly lower than the median age for Oahu. As newer residents move into the Ewa region, the median age would be pushed downward as compared to Oahu overall, because more younger families tend to buy affordable housing in the region. On the other hand, the median age of Varona Village residents is notably higher than that of the Ewa DP area, due to the relatively high percentage of senior citizens and relatively lower percentage of children.

Table 3.4-2:
Year 2000 Demographic Characteristics of Selected Ewa Neighborhoods

	Selected Neighborhoods					Selected Census Tracts			
	Oahu	Ewa DP Area	Ewa Beach	Ewa by Gentry	Ewa Villages	86.05	86.06	86.07	Varona Village[1]
Population	876,156	68,718	14,650	4,939	4,741	8,607	7,290	1,544	136
Ethnicity									
White	21%	18%	11%	15%	4%	7%	12%	11%	1%
African American	3%	2%	1%	4%	1%	1%	1%	2%	4%
American Indian/Alaskan Native	0%	0%	0%	0%	0%	0%	0%	1%	5%
Japanese	18%	6%	5%	14%	6%	8%	9%	11%	N/A
Filipino	14%	27%	39%	28%	58%	47%	31%	29%	N/A
Native Hawaiian	6%	4%	6%	4%	3%	4%	6%	3%	N/A
Other	1%	1%	1%	1%	1%	1%	1%	1%	83%
Two or More Races	20%	24%	27%	23%	20%	21%	24%	27%	10%
Age									
Less Than 5 Years	7%	9%	7%	11%	7%	8%	9%	11%	3%
5 to 17 Years	17%	23%	22%	18%	21%	21%	27%	27%	18%
18 to 64 Years	63%	62%	60%	67%	58%	59%	60%	59%	56%
65 or More Years	13%	7%	11%	4%	14%	13%	4%	3%	23%
Median Age (Years)	35.7	31.2	32.7	31.9	33.3	34.0	30.5	29.6	40.5

Notes: [1] Varona Villages consists of: Census Tract 86.05 Blocks 2025, 2026, 2027, 2029, 2030, 2031, 2032, 2033, 3024, 3025, 3027, 3030, 3032, 3033.

Sources: City and County of Honolulu, Department of Planning and Permitting. Community Profiles by Development Plan Area: 2000, May 2003. U.S. Census Bureau, Census 2000 Summary Files 1 (SF 1) and 3 (SF 3). 2000. American Factfinder <http://factfinder.census.gov/servlet/DatasetMainPageServlet?> Accessed March 31, 2004.

3.4.1.2 EMPLOYMENT AND INCOME

Table 3.4-3 shows median household incomes for Oahu, the Ewa DP area, selected neighborhoods, and census tracts in 2000. Incomes as a whole were higher than the median household income for Oahu, with the exception of Ewa Villages. Similarly, a smaller or equal percentage of residents live below the poverty line. Income differences between the upper and lower income brackets in the Ewa DP area are greater than for Oahu overall. For example, in 2000 there was a lower percentage of residents in the Ewa DP area with incomes below $15,000 and a higher percentage above $75,000 compared with Oahu overall.

Also as shown in Table 3.4-3, a lower percentage of households in Ewa live on social security or retirement income in comparison to Oahu overall. However, certain neighborhoods, such as Ewa Beach, and Ewa Villages have slightly higher

percentages of households receiving social security or retirement income in comparison to the island-wide average. As expected, the newer neighborhoods, such as Ewa by Gentry and the Villages of Kapolei (census tracts 86.06 and 86.07), have substantially lower percentages of households living off of social security or retirement income than Oahu overall.

As shown in Table 3.4-4, unemployment in the selected neighborhoods and in the census tracts in the study area were similar to Oahu overall. The percentage of workers in Ewa Villages using public transportation to commute to work was higher when compared to Oahu overall.

3.4.1.3 HOUSING

In 2000, there were 64 percent owner-occupied housing units, compared to 27 percent renter-occupied housing units in the Ewa DP area. Oahu's island-wide percentages were more evenly split, with 49 percent owner-occupied and 41 percent renter-occupied. The larger proportion of owner-occupied to renter-occupied housing units in the Ewa DP area as compared to the overall Oahu situation is attributable to the large number of new single-family residential developments in the Ewa region. As shown in Table 3.4-5, in the selected neighborhoods of Ewa by Gentry and Ewa Villages, there were large proportions of owner-occupants. Census tracts in the project vicinity had a higher proportion of owner-occupants than most of the selected neighborhoods.

Also, Table 3.4-5 indicates that most of these selected neighborhoods in the Ewa DP area had a higher percentage of their housing stock as single-family compared to Oahu overall. The one exception was Ewa by Gentry, the majority of which are low-density, townhouse style multiple-family housing units.

Also indicated in Table 3.4-5, the Ewa DP area had a higher percentage of new housing as compared to Oahu overall. For all but Ewa Beach and Ewa Villages, the majority of homes in each of the selected neighborhoods were built within the last decade.

Table 3.4-3:
Year 2000 Income Characteristics of Selected Ewa Neighborhoods

	Selected Neighborhoods					Selected Census Tracts		
	Oahu	Ewa DP Area	Ewa Beach	Ewa by Gentry	Ewa Villages	86.05	86.06	86.07
Number of Households	286,731	19,082	3,312	1,678	1,121	2,237	1,945	441
Female householder[1] in families	17%	2%	18%	9%	12%	5%	5%	7%
Income by Household								
Median Income[2]	$51,914	$60,811	$57,073	$61,462	$51,451	$53,363	$67,370	$61,023
Lower Than $15,000	11%	5%	8%	3%	12%	10%	3%	4%
Higher Than $75,000	32%	34%	33%	33%	24%	28%	41%	34%
Selected Income Sources by Household								
Social Security Income	27%	17%	30%	9%	34%	28%	10%	9%
Retirement Income	22%	17%	28%	7%	30%	23%	11%	4%
Public Assistance Income	7%	7%	13%	2%	7%	7%	4%	3%
Persons Below Poverty Level	10%	5%	10%	3%	9%	6%	3%	2%
Below 125% Poverty Level	13%	7%	13%	3%	12%	9%	6%	2%

Notes: Varona Villages consists of: Census Tract 86.05 Blocks 2025, 2026, 2027, 2029, 2030, 2031, 2032, 2033, 3024, 3025, 3027, 3030, 3032, 3033. No census data was found for these blocks.
[1] No husband present.
[2] In 1999 dollars.

Source: City and County of Honolulu, Department of Planning and Permitting. Community Profiles by Development Plan Area: 2000. May 2003. U.S. Census Bureau, Census 2000 Summary Files 1 (SF 1) and 3 (SF 3). 2000. American Factfinder <http://factfinder.census.gov/servlet/DatasetMainPageServlet?> Accessed March 31, 2004.

Table 3.4-4:
Year 2000 Employment Characteristics of Selected Ewa Neighborhoods

	Selected Neighborhoods					Selected Census Tracts		
	Oahu	Ewa DP Area	Ewa Beach	Ewa by Gentry	Ewa Villages	86.05	86.06	86.07
Population 16 years and over	691,015	49,476	10,985	3,759	3,538	6,395	4,819	1,019
Employment Status								
Civilian:	59%	65%	61%	68%	56%	59%	77%	78%
Employed	55%	62%	57%	66%	52%	56%	73%	72%
Unemployed	4%	4%	4%	2%	4%	4%	3%	6%
Workers 16 Years and Over	412,250	32,316	6,196	2,619	1,780	3,522	3,595	736
Commuting to Work								
Car, truck, or van (drove alone)	61%	64%	63%	68%	61%	62%	62%	65%
Carpooled	19%	23%	21%	21%	20%	23%	26%	21%
Public Transportation	8%	8%	11%	8%	16%	12%	9%	9%
Walked	6%	1%	2%	1%	1%	1%	2%	1%
Other Means of Transportation	2%	1%	1%	1%	1%	1%	1%	0%

Notes: Varona Villages consists of: Census Tract 86.05 Blocks 2025, 2026, 2027, 2029, 2030, 2031, 2032, 2033, 3024, 3025, 3027, 3030, 3032, 3033. No census data was found for these blocks.

Source: City and County of Honolulu, Department of Planning and Permitting. Community Profiles by Development Plan Area: 2000, May 2003.
U.S. Census Bureau, Census 2000 Summary Files 1 (SF 1) and 3 (SF 3). 2000. American Factfinder
<http://factfinder.census.gov/servlet/DatasetMainPageServlet?> Accessed March 31, 2004.

Table 3.4-5:
Year 2000 Housing Characteristics of Selected Ewa Neighborhoods

	Selected Neighborhoods					Selected Census Tracts		
	Oahu	Ewa DP Area	Ewa Beach	Ewa by Gentry	Ewa Villages	86.05	86.06	86.07
Number of Housing Units	315,988	20,854	3,515	1,832	1,258	2,430	2,005	503
Tenure[2]								
Owner-Occupied	49%	64%	65%	63%	73%	71%	84%	82%
Renter-Occupied	41%	27%	29%	30%	19%	23%	13%	6%
Year Structure Built								
1 Year	2%	4%	1%	0%	11%	6%	4%	17%
2 to 10 Years	13%	45%	3%	77%	34%	60%	92%	83%
11 to 20 Years	13%	12%	5%	19%	24%	13%	3%	0%
21 Years or More	72%	39%	91%	4%	31%	20%	1%	0%
Units in Structure								
1 Unit	55%	73%	84%	42%	92%	80%	77%	72%
2 to 4 Units	7%	6%	5%	6%	0%	1%	1%	7%
5 or More Units	38%	21%	11%	52%	8%	18%	22%	20%
Trailer, Other	0%	0%	1%	0%	0%	1%	0%	0%

Notes: Varona Villages consists of: Census Tract 86.05 Blocks 2025, 2026, 2027, 2029, 2030, 2031, 2032, 2033, 3024, 3025, 3027, 3030, 3032, 3033. No census data was found for these blocks.
[2] Tenure does not add to 100% because some properties are vacant.

Source: City and County of Honolulu, Department of Planning and Permitting. Community Profiles by Development Plan Area: 2000, May 2003. U.S. Census Bureau, Census 2000 Summary Files 1 (SF 1) and 3 (SF 3). 2000. American Factfinder <http://factfinder.census.gov/servlet/DatasetMainPageServlet?> Accessed March 31, 2004.

3.4.1.4 EMPLOYMENT AND GENERAL ECONOMIC CONDITIONS

From the late 1800s to the 1980s, sugar cultivation and processing were the dominant economic activities in the Ewa region. Ewa Plantation Company, incorporated in 1890 by Castle and Cooke, was one of the major employers in the region for most of the 20th century. In 1970, Castle and Cooke sold the Ewa Plantation Company to AMFAC, and the company merged with Oahu Sugar Company. However, from the 1970s to the 1990s, the sugar industry on Oahu and throughout the State declined substantially, and sugar cultivation in Ewa ceased following the 1995 harvest. See Section 3.2 for a discussion of current farmland uses.

The economic base in Ewa shifted in the 1980s and 1990s to urban development of mostly residential and commercial uses, which encroached upon sugarcane land.

Major employment areas in Ewa include the following:

- The City of Kapolei, located approximately 2.2 miles west of the proposed corridor, is the center of civic, office, and commercial uses in Ewa, featuring private and government offices, and commercial establishments;
- The 1,367-acre James Campbell Industrial Park (JCIP), located approximately five miles southwest of the proposed corridor, is Hawaii's largest heavy industrial park and employs more than 4,500 people;
- Kalaeloa Barbers Point Harbor, located approximately 5.5 miles west of the proposed corridor, is Oahu's secondary commercial harbor, and would be supported by the 48-acre Kenai Industrial Park adjacent to the Harbor;
- The 890-acre Kapolei Business-Industrial Park, located northeast of JCIP, is currently being developed by EJC; and
- Ko Olina Resort, a planned resort community located northwest of JCIP, features four sandy beach lagoons, an 18-hole golf course, a 267-slip marina, and one hotel.

Beyond the Ewa DP's urban growth boundary, Grace Pacific Corporation employs 20 to 30 people at their Makakilo Basalt Quarry located above H-1 Freeway and accessed via Palehua Road off of Farrington Highway.

The former naval air station at Barbers Point used to be the leading employment center in Ewa with over 5,700 jobs. Since the base closure and transfer of lands to the State of Hawaii (see Section 3.1.1.1), most of these jobs no longer exist. New jobs may materialize over time as the base transitions to civilian uses, but no specific plans have been adopted.

Despite rapid urbanization in Ewa, agricultural businesses still exist (see Sections 3.1. and 3.2) and generate employment. However, many of the businesses lease from EJC and the State's DLNR on short-term leases (see Figure 3.2-3), and long-term agricultural activity is not planned under the Ewa DP.

In the future, the Ewa region is expected to generate a high rate of employment growth on Oahu according to the City and County of Honolulu Department of Planning and Permitting (DPP) (Ewa Development Plan, 2000). DPP estimates that the number of jobs in the Ewa DP area would increase from a 1997 total of approximately 17,000 to 64,000 in the Year 2020, a 276 percent increase (Ewa Development Plan, 2000). Most of this job growth would occur at the City of Kapolei, JCIP, Kapolei Business-Industrial Park, Kalaeloa Barbers Point Harbor and its surrounding industrial land uses, and the Ko Olina Resort. In comparison, Oahu is expected to see employment increase by 40 percent during the same period, or an average annual rate of about two percent.

3.4.1.5 COMMUNITY SERVICES AND FACILITIES

Figure 3.4-2 shows the following community services and public facilities in the vicinity of the project, which are listed below. Parks and recreational facilities are described in Section 3.11 (see Figure 3.11-1); bikeways are discussed in Section 3.3 (see Figure 3.3-10).

- Kapolei Police Station;
- Several public schools, including Kapolei High School, Kapolei Middle School, and Ewa Elementary School, Kapolei Elementary School, and Mauka Lani Elementary Schools;
- Several churches and private schools;
- Shopping centers in Kapolei and Makakilo;
- Kapolei Public Library;
- Saint Francis Medical Center-West and the Kapolei Medical Center; and
- U.S. Post Offices in Kapolei and Ewa Villages.

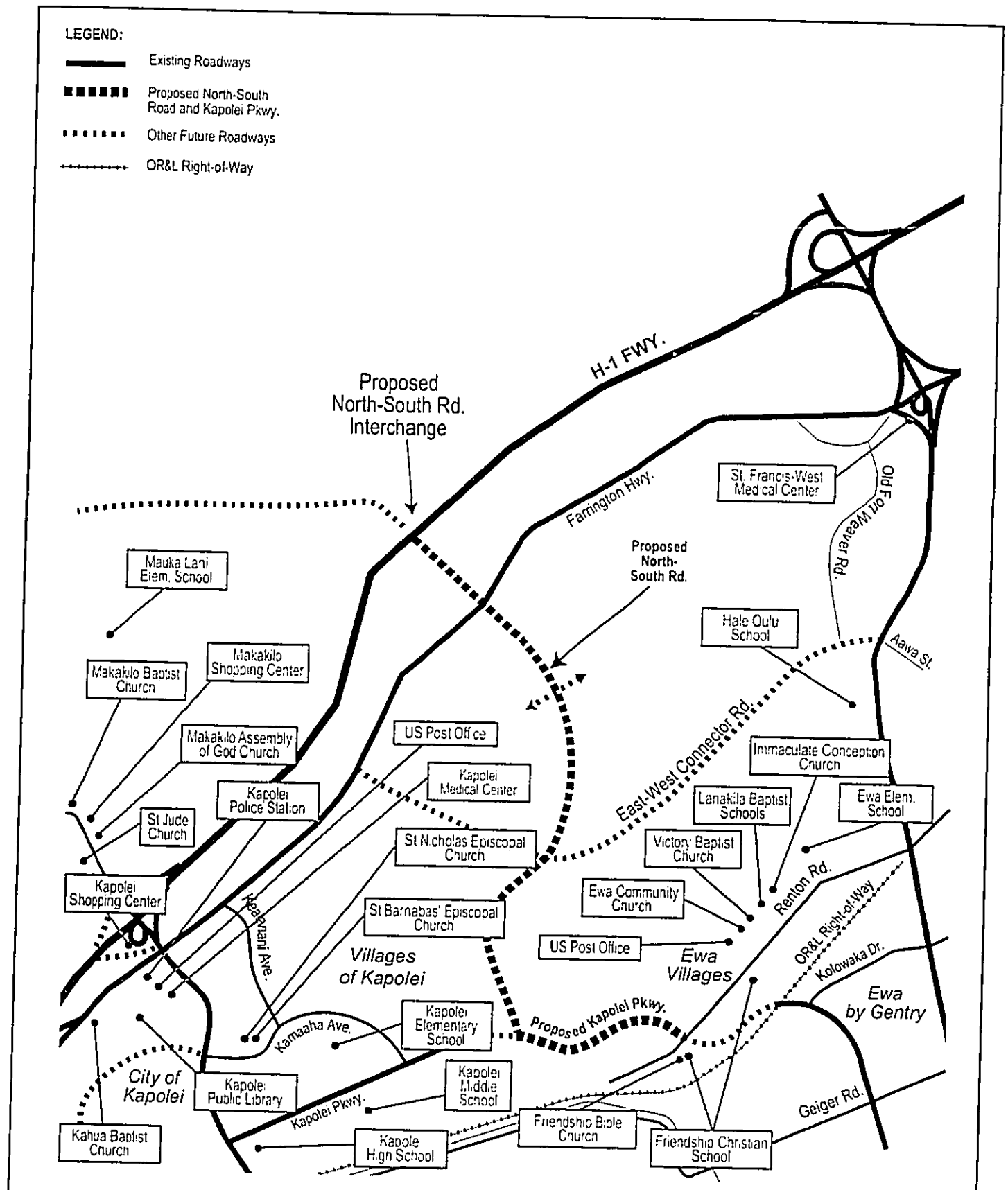
In addition to those services above, the community services and public facilities in the Ewa region, outside the project vicinity (not shown in Figure 3.4-2) include:

- Four fire stations in Makakilo, Waipahu, Ewa Beach, and Kapolei;
- Campbell High School, Ilima Middle school, and Ewa Beach, Pohakea, Kaimiloa, Holomua, Kapolei, Barbers Point, and Makakilo Elementary Schools;
- Ewa Beach Public Library

Traffic observations were conducted at Kapolei High School and Kapolei Middle School (see Section 3.3). Students walking to school must cross Kapolei Parkway. Many of the students cross Kapolei Parkway at Malu Ohai Street or Kamaaha Avenue. However, some students jay-walk at various other locations on Kapolei Parkway. There are no community or public facilities immediately adjacent to the project alignment.

3.4.1.6 CULTURAL ACTIVITIES

The project area – located in the broad, dry inland plain – is well outside the permanent habitation areas of pre-contact Hawaiians within the Honouliuli ahupuaa. The only preserved Hawaiian place name associated with any feature in the immediate vicinity of



Existing Community Services

North South Road and Kapolei Parkway Project
Final Environmental Assessment
Figure 3.4-2

the project area is Kaloi Gulch (see Section 3.8). However, there is evidence that the portion of Honouliuli to be used for the project was known in traditional Hawaiian times as "Waihuna" or "Punahuna", a hidden spring associated with Kaloi Gulch. Also, a traditional Hawaiian trail through Honouliuli between Puuloa and Puu Kapolei and Waimanalo may have followed the route of the present-day Farrington Highway (Ewa) (Ii 1983:97). However, no traces of this trail remain or have been documented. A cultural impact evaluation prepared by Cultural Surveys Hawaii (2004) is included as Appendix M.

Given the environmental constraints within the portion of the ahupuaa being used for the project, it is likely that the major traditional cultural practice associated with the region including the present project area would have been the gathering of native plant resources. However, the accessibility of Honouliuli lands to the Hawaiians for gathering or other cultural purposes was radically curtailed during the second half of the nineteenth century due initially to cattle grazing, and later commercial sugarcane cultivation (see Section 3.1). Evidence of any historic properties related to traditional Hawaiian culture have not been identified on the land surface during field investigations, due mainly to decades of sugar cultivation activities (see Section 3.10.2).

The Cultural Impact Evaluation (Appendix M) indicates that the project area does not appear to be used for contemporary or continuing cultural practices, however, upon further consultation, it was discovered that the Ewa Hongwanji Mission has been informally using the makai portion of Kapolei Parkway between Renton Road and the OR&L ROW as a parking area during their Bon dances, a Japanese and Okinawan cultural practice that occurs one night a year in the summer time.

3.4.2 POTENTIAL IMPACTS

Under the No-Build Alternative, construction of the portion of Kapolei Parkway between Renton Road and North-South Road would not bisect any existing community or neighborhood because the alignment was master planned as part of the City's Ewa Villages redevelopment project (see Section 3.1). Similarly, the construction of North-South Road under the Build Alternative would not occur within any existing community.

Social and economic activities associated with the Ewa communities would benefit from improved transportation infrastructure provided by either of the alternatives. For example, completion of Kapolei Parkway would strengthen economic and social ties between the Ewa Beach/Ocean Pointe/Ewa by Gentry area and the City and Villages of Kapolei, by improving access to schools, libraries, and commercial establishments. Improving transportation infrastructure would also enhance emergency response services (police, fire, ambulance, and natural hazard evacuation) throughout the region.

The Build Alternative would provide more social, economic, and public services support to Ewa communities than the No-Build Alternative because it would provide a roadway link to the H-1 Freeway, as well as between existing and future communities. As part of the Build Alternative, pedestrian and bicycle paths would be provided. As a result of the Build Alternative, access to existing and future communities would be enhanced through improved connectivity of pedestrian, bicycle, and vehicular linkages. Existing

accessways would not be impeded by the proposed project. Ewa Villages would have improved access to other nearby communities with the expansion and improvement of Kapolei Parkway between Renton Road and North-South Road. Additional discussion of Varona Village in particular is provided in Section 3.4.3 below.

Under the Build Alternative, a small portion of existing agricultural uses would be displaced by ROW requirements for North-South Road, which would not occur under the No-Build Alternative. (See Sections 3.1.1.3) HDOT will maintain access to and from agricultural operations in the area and Grace Pacific Corporation's quarry in the project vicinity currently accessed via Palehua Road and/or traversing the proposed North-South Road ROW, as described in Section 3.2. Therefore, no adverse effect is anticipated to these operations with mitigation.

No adverse impact is expected on City property tax revenues, even though lands used for roadway ROW would be removed from the tax base. The City does not collect property taxes on lands used for public transportation, such as roads. However, the ROW for part of North-South Road and the portion Kapolei Parkway between Renton Road and North-South Road are already owned by the City or State; conversion of these areas from open space to roadway uses would not affect property tax revenues. While other portions of the proposed North-South Road ROW are currently in private ownership and would be acquired and removed from the property tax base, both the No-Build and Build Alternatives are likely to result in increased overall property values surrounding the new roadways, because they are planned to be developed and would have access to improved transportation services (see Section 3.1).

Both alternatives would increase short-term employment resulting from construction activities. Neither of the alternatives would increase long-term employment opportunities other than the additional need for normal roadway maintenance, which would not be substantial given the scale of maintenance already conducted by the State and City.

With the proposed project, and the completion of other segments of Kapolei Parkway, such as those between North-South Road and the Villages of Kapolei and between Ewa by Gentry and Ocean Pointe, Kapolei Parkway would become a through route from Ocean Pointe to the Villages of Kapolei. Under the No-Build Alternative, these segments will also be constructed, but the City's segment would be delayed due to fiscal constraints. However, it anticipated under the No-Build Alternative that the City segment would be completed by the design year, 2025. The completion of Kapolei Parkway would enhance regional connectivity (see Section 3.3.1.2), and therefore, improve social interactions in Ewa. For example, Kapolei Parkway would eliminate the circuitous route via Fort Weaver Road some Ewa Elementary School parents have to use.

As a through route, Kapolei Parkway would carry higher traffic volumes than at present, which would be even higher under the Build Alternative because North-South Road would provide access to the H-1 Freeway (see Section 3.3.1.2). Higher traffic volumes could affect current pedestrian movements or social activities along existing segments of Kapolei Parkway. For example, middle and high school students currently cross Kapolei Parkway in the Villages of Kapolei, some of which cross in a haphazard manner because the road currently carries relatively low volumes given its size (divided six lanes). Also,

in Ewa by Gentry, Kapolei Parkway lack of pedestrian facilities, such as crosswalks or traffic signals. Similar to the situation in the Villages of Kapolei, this is currently not a major problem because of the limited use of Kapolei Parkway as a through route. With regards to potential safety concerns at Kapolei Middle School and Kapolei High School, HCDCH commissioned a traffic study to identify actions to enhance pedestrian crossing safety on Kapolei Parkway, which was presented to the Villages of Kapolei Association and the City and County of Honolulu. Recommended actions include signalization of existing pedestrian crossings, proposed new signalized pedestrian crossings, and relocation of bus stops. With these improvements, which would be implemented regardless of the alternative selected, Kapolei Parkway would be able to accommodate the additional traffic volumes while maintaining pedestrian safety. In Ewa Villages and Ewa by Gentry, many of the intersections along Kapolei Parkway would likely warrant traffic signals when traffic volumes increase due to system connectivity, such as intersections at Renton Road, Kolowaka Street, and Geiger Road. Gentry Homes is scheduled to install signals at the Geiger Road intersection in the near future subject to approval by the City.

The proposed project would not have any long or short term impacts on contemporary or continuing cultural practices. Although the Ewa Hongwanji Mission uses Kapolei Parkway for temporary event parking, the City owns the Kapolei Parkway ROW and that portion of Kapolei Parkway is not part of this proposed action. There are no other existing community or public services or facilities within the project alignment.

3.4.3 ENVIRONMENTAL JUSTICE

3.4.3.1 FEDERAL AND STATE GUIDANCE

- Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, signed by the President on February 11, 1994, directs Federal agencies to take the appropriate and necessary steps to identify and address disproportionately high and adverse effects of Federal projects on the health or environment of minority and low-income populations to the greatest extent practicable and permitted by law.

If minority and low-income populations are found in the project vicinity, additional public outreach to these groups is to be conducted. Pursuant to the EO, low-income means a household income at or below the U.S. Department of Health and Human Services poverty guidelines, which, for 2004 in Hawaii, was an income at or below $21,680 per year for a family of four for 100 percent of poverty, and at or below $27,100 per year for a family of four for 125 percent of poverty. The federal definition of minority includes the following groups:

- Black: a person having origins in any of the black racial groups of Africa.
- Hispanic: a person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race.

- Asian: a person having origins in any of the original peoples of the Far East, Southeast Asia or the Indian subcontinent.
- American Indian or Alaskan Native: a person having origins in any of the original people of North America and who maintains cultural identification through tribal affiliation or community recognition.
- Native Hawaiian or Other Pacific Islander: a person having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands.

HDOT also designed the Title VI Plan (2003) to comply with all of its responsibilities under Title VI of the Civil Rights Act of 1964, Executive Order 12898, US DOT Order 5610.2, and related regulations and directives. Title VI of the Civil Rights Act of 1964 prohibits discrimination based on national origin. Therefore, the Highways Division uses detailed race categories to attempt to treat people of different national origins equitably in its highway planning, programs, and activities. To insure that the benefits of the proposed project are distributed without discriminating against any of the detailed ethnicities in Hawaii, the collection, maintenance, and analysis of data (Tables 3.4-2 through 3.4-5) follows the HDOT Title VI Plan (2003). According to the Title VI Plan, 2000 U.S. Census Data will be used as the initial basis for demographic data. The racial category of Asian Americans was broken down into detailed ethnicities as shown in Table 3.4-2.

3.4.3.2 IDENTIFICATION OF MINORITY AND/OR LOW-INCOME POPULATIONS

Varona Village is the residential community nearest to North-South Road and Kapolei Parkway. It is immediately adjacent to the City's portion of Kapolei Parkway and within 2,000 feet of the intersection with North-South Road. Based on the publication Environmental Justice in the OMPO Planning Process (2004), Varona Village was not designated as a low income or minority population by the Oahu Metropolitan Planning Organization (OMPO). According to those OMPO guidelines, Ewa Villages including Varona Village was not identified as an EJ population area based on median income and per capita income comparisons in Oahu.

Despite the OMPO assessment, the information provided in Section 3.4.1 indicates that Ewa Villages has the highest proportion of Filipinos compared to other neighborhoods in the project area. Also, parts of Ewa Villages have higher rates of persons below poverty level than the Ewa DP area, while not exceeding the overall Oahu poverty percentage; however, census data for Varona Village alone could not be separated from Ewa Villages. Windshield surveys conducted in 2004 identified Varona Village as a potential low income and/or minority population. The other villages in Ewa Villages have been redeveloped by the City after being purchased from Oahu Sugar Company, and are now privately-owned, whereas Varona Village remains in its original condition, occupied by tenants associated with the sugar plantation days. As further observed during outreach efforts conducted in late July and early August, 2004, Varona Village residents appear to be predominantly Filipino immigrants. In addition, many residents are elderly, confirming conclusions made from Census data (see Table 3.4-2). For these reasons, HDOT has

identified Varona Village as both a minority and low-income population, as defined under EO 12898.

3.4.3.3 PUBLIC OUTREACH

Because of the potential of project impacts to Varona Village, a targeted community outreach program was conducted in this neighborhood. For the purposes of this outreach, a cluster of seven houses collectively called Hui Pupu A`o Ewa located makai of the OR&L ROW was included despite these houses not being officially part of Varona Village. Hui Pupu A`o Ewa residents are retired employees of the former Oahu Railway & Land Company, and their families, and are of Hawaiian descent. Between late July and early August, 2004, door-to-door interviews were conducted at 32 of 45 and four of seven occupied residences in Varona Village and Hui Pupu A`o Ewa, respectively. Project flyers were left at those residences in which interviews could not be conducted.

In general, residents interviewed did not view the project negatively, but nevertheless raised the following environmental concerns or questions:

- Concern about construction impacts, such as dust and traffic detours or delay;
- Asked whether traffic noise from Kapolei Parkway would affect the neighborhood;
- Asked how traffic on Renton Road would be affected, including access to Ewa Elementary School; and
- Asked whether the road connecting Renton Road with F.D. Roosevelt Avenue could be closed to eliminate through traffic in the neighborhood.

In addition to the above comments, some Varona Village residents who attended the project's public hearing expressed concern that Kapolei Parkway would isolate Varona Village from the rest of the Ewa Villages community.

3.4.3.4 POTENTIAL VARONA VILLAGE IMPACTS

As stated above, the EO on Environmental Justice requires that FHWA for this project avoid disproportionately high and adverse effects on Varona Village residents because they were identified as a minority and low-income population. Although the proposed project has the potential to cause impacts to traffic movements, traffic noise, and neighborhood isolation, these impacts were found not to be disproportionately high and adverse. The rationale for this assessment is provided below.

Varona Village residents use Renton Road when traveling in the eastbound direction. Under the No-Build or Build Alternative, a new intersection at Renton Road between Varona and Tenney Villages will be created when Kapolei Parkway is constructed through Ewa Villages. Despite the alternative selected, the new intersection will be designed with crosswalks and signals as necessary to maintain good traffic operations, and ensure pedestrian, and bicyclist safety. Varona Village residents would have to cross a new intersection when traveling on Renton Road where none exists today. However, they would gain traffic benefits, such as better access to Kapolei, the H-1

Freeway and Ewa Beach. Moreover, the current vehicular through traffic using Renton Road in Varona Village to access F.D. Roosevelt Avenue would be reduced because the completion of Kapolei Parkway would allow these users to travel to and from the Kapolei area more easily via the parkway. Residents' concerns about the connection between the west end of Renton Road and Roosevelt Avenue have been noted by the City, and the disposition of that connection will be determined at a later date.

Potential noise impacts in Varona Villages were evaluated, and the results of the analysis indicate that traffic noise impacts are not anticipated. See Section 3.6 for further information.

The alignment of Kapolei Parkway will be within an existing vacant open space area between Varona and Tenney Villages, which also contains a section of Kaloi Gulch. This alignment was identified in earlier planning documents, including the Master Plan for Ewa Villages. Therefore, construction of Kapolei Parkway is not anticipated to introduce any more of a gap than already exists.

3.4.4 MITIGATION MEASURES

HDOT will continue to coordinate with agricultural land users and Grace Pacific Corporation to minimize potential impacts to their operations.

As stated above, HDOT and the City continue to inform members of the public about construction activities and potential impacts, including Varona Village, the Department of Education, the school principals, and other community members. Dust screens and other construction-related impacts and mitigation are described in detail in Section 3.14.

During future project public involvement activities, public materials, such as flyers and handouts, will be made accessible to people with Limited English Proficiency upon request. Large font versions of the public involvement material will also be made available upon request.

3.5 AIR QUALITY

Because the proposed project alternatives would alter traffic conditions in the study area (see Section 3.3.1), the future ambient air quality conditions, which is a general term used to describe pollutant levels in the atmosphere, were analyzed. Changes in traffic volumes or patterns could result in air quality impacts, such as increases in the level of certain pollutants that in high quantities could affect public health.

This section summarizes the results of quantitative air quality impact analyses of proposed project alternatives. The air quality analyses estimated the potential impacts associated with increased traffic volumes or changes in traffic patterns at congested intersections. In addition, changes in vehicular emissions generated in the study area as a result of the proposed alternatives were estimated, and determinations were made as to whether these changes conform to air quality regulatory requirements.

3.5.1 APPLICABLE POLLUTANTS

3.5.1.1 CRITERIA POLLUTANTS

The following air pollutants have been identified by the U.S. Environmental Protection Agency (EPA) as being of concern nationwide: carbon monoxide (CO), hydrocarbons (HC), nitrogen oxides (NO_x), photochemical oxidants, lead (Pb), sulfur dioxide (SO_2), and particulate matter. In urban areas, ambient concentrations of CO, HC, and photochemical oxidants are predominantly influenced by motor vehicle activity; NO_x are emitted from both mobile and stationary sources; emissions of sulfur oxides (SO_x) are associated mainly with stationary sources; and emissions of particulate matter are associated with stationary sources, and to a lesser extent, diesel-fueled mobile sources (heavy trucks and buses). Lead emissions, which historically were principally influenced by motor vehicle activity, have been substantially reduced due to the elimination of lead from gasoline.

CO is a colorless and odorless gas that is generated in the urban environment primarily by the incomplete combustion of fossil fuels in motor vehicles. Prolonged exposure to high levels of CO can cause headaches, drowsiness, loss of equilibrium, or heart disease. CO concentrations can vary greatly over relatively short distances. Relatively high concentrations of CO are typically found near congested intersections, along heavily used roadways carrying slow-moving traffic, and in areas where atmospheric dispersion is inhibited by urban "street canyon" conditions. Consequently, CO concentrations must be predicted on a localized, or microscale, basis.

Hydrocarbons include a wide variety of volatile organic compounds, emitted principally from the storage, handling, and use of fossil fuels. NO_x constitute a class of compounds that include nitrogen dioxide (NO_2) and nitric oxide, both of which are emitted by motor vehicles and stationary sources. Both hydrocarbons and NO_x are of concern primarily because most of those compounds react in sunlight to form photochemical oxidants, including ozone. This reaction occurs comparatively slowly and ordinarily takes place far downwind from the site of actual pollutant emission. The effects of these pollutants are normally examined on an area wide, or mesoscale, basis.

Lead emissions are principally associated with industrial sources and motor vehicles using gasoline containing lead additives. As the availability of leaded gasoline has decreased, motor vehicle-related lead emissions have decreased resulting in a substantial decline of concentrations of lead. Lead concentrations are expected to continually decrease; therefore an analysis of lead from mobile sources is not warranted.

High concentrations of Sulfur Dioxide (SO_2) affect breathing and may aggravate existing respiratory and cardiovascular disease. SO_2 emissions are generated from the combustion of sulfur-containing fuels—oil and coal—largely from stationary sources such as coal and oil-fired power plants, steel mills, refineries, pulp and paper mills, and nonferrous smelters. Although diesel-fueled heavy-duty vehicles also emit SO_2, transportation sources are not considered by EPA (and other regulatory agencies) to be

significant sources of this pollutant that should be quantitatively evaluated in a mobile source impact analysis.

Particulate matter is a broad class of air pollutants that exist as liquid droplets or solids, with a wide range of sizes and chemical composition. Particulate matter is emitted by a variety of sources, both natural and man-made. Natural sources include the condensed and reacted forms of natural organic vapors, salt particles resulting from the evaporation of sea spray, wind-borne pollen, fungi, molds, algae, yeasts, rusts, bacteria, and debris from live and decaying plant and animal life, particles eroded from beaches, desert, soil and rock, particles from volcanic and geothermal eruptions and forest fires. Major man-made sources of particulate matter include the combustion of fossil fuels such as vehicular exhaust, power generation and home heating, chemical and manufacturing processes, all types of construction, agricultural activities and wood-burning fireplaces.

Of particular health concern are those particles that are smaller than or equal to 10 microns (PM_{10}) in size and 2.5 microns ($PM_{2.5}$) in size. The principal health effects of airborne particulate matter are on the respiratory system. Regional emissions of PM_{10} are considered for this analysis. However, since diesel fueled vehicles are the principal localized mobile source of PM_{10} emissions and the project alternatives would not measurably affect diesel emissions, localized PM_{10} impacts were not considered.

Because the $PM_{2.5}$ standards are relatively new (i.e., effective September 16, 1997), the EPA is allowing time to build a nationwide monitoring network—to collect and analyze the data needed to designate areas as to whether or not they meet these standards, as well as to develop implementation plans for areas that would be designated as not being in attainment for these standards. In addition, until a comprehensive $PM_{2.5}$ modeling system is promulgated by the EPA, compliance with national standards cannot be determined.

3.5.1.2 NON-CRITERIA POLLUTANTS

Toxic air pollutants, also called air toxics, are those pollutants that cause or may cause cancer or other serious health effects. The primary sources of air toxic contaminants are commercial and industrial facilities. Examples of toxic air pollutants include benzene, which is found in gasoline; perchloroethlyene, which is emitted from some dry cleaning facilities; and methylene chloride, which is used as a solvent and paint stripper by a number of industries. Examples of other air toxics include dioxin, asbestos, toluene, and metals such as cadmium, mercury, chromium, and lead compounds.

Diesel exhaust, which is produced when an engine burns diesel fuel and is commonly found throughout the environment, is emitted from a broad range of diesel engines: on-road diesel engines of trucks, buses and cars and off-road diesel engines that include locomotives, marine vessels and heavy duty equipment. Diesel Particulate Matter (DPM) is a complex mixture of thousands of gases and fine particles (commonly known as soot) that contains more than 40 toxic air contaminants. These include many known or suspected cancer-causing substances, such as benzene, arsenic, formaldehyde, and nickel. The sizes of DPM that are of greatest health concern are those that are in the

categories of fine and ultra fine particles. The composition of these particles may be composed of elemental carbon with adsorbed compounds such as organic compounds, sulfate, nitrate, metals and other trace elements.

As the project alternatives are not anticipated to measurably affect air toxic emissions on either a local or regional basis, an analysis of these emissions is not warranted.

3.5.1.3 POLLUTANTS FOR ANALYSIS

The air pollutants identified as being of concern, and therefore considered for this analysis are as follows:

- CO was identified as a pollutant of concern for the localized air quality analysis of emissions from motor vehicles; and
- CO, NO_x, hydrocarbon, and PM_{10} were studied for project-related changes in regional emissions. These pollutants were considered to determine whether the proposed project alternatives would adversely affect the region's compliance with the ozone standards.

3.5.2 AIR QUALITY STANDARDS AND REGULATIONS

National Ambient Air Quality Standards (NAAQS) have been established for the following air pollutants: CO, NO_2, ozone (O_3), particulate matter (PM_{10} and $PM_{2.5}$), SO_2, and lead (Pb). The State of Hawaii has also established its own standards for these pollutants. Both the National and State Ambient Air Quality Standards are summarized in Table 3.5-1. The "primary" standards have been established to protect the public health with an "adequate margin of safety." The "secondary" standards are intended to protect the nation's welfare and account for air pollutant effects on soil, water, visibility, materials, vegetation, and other aspects of the general welfare. The State of Hawaii issues its ambient air quality standards in terms of a single standard that is designed "to protect public health and welfare and to prevent the significant deterioration of air quality."

3.5.3 EXISTING CONDITIONS AND REGULATORY SETTING

Temperatures in Hawaii vary from the mid 20s degrees (°) Celsius (C) in winter to the high 20s C in summer. Thirty-four degrees C and 12° C are the record high and low temperatures recorded at the Honolulu International Airport (HIA). The average annual rainfall recorded at HIA is 59 centimeters (cm). The northeast tradewinds predominate with a frequency of more than 90 percent during the summer. However, light, variable wind conditions are experienced from fall through spring, which is when air quality standards are most likely to be exceeded.

Air pollutant levels in Hawaii are monitored by a network of sampling stations operated by the State of Hawaii Department of Health (HDOH) at various locations around Oahu.

The monitoring locations used for this study are listed in Table 3.5-2, with a summary of the most currently available monitoring results.

Table 3.5-1:
National and State Ambient Air Quality Standards

Pollutant	Standard		
	Hawaii State	**Federal Primary[a]**	**Federal Secondary[b]**
Carbon Monoxide			
1 Hour	10 mg/m^3 (9 ppm)	40 mg/m^3 (35 ppm)	40 mg/m^3 (35 ppm)
8 Hours	5 mg/m^3 (4.5 ppm)	10 mg/m^3 (9 ppm)	10 mg/m^3 (9 ppm)
Nitrogen Dioxide			
1 Hour	--	--	--
24 Hour	--	--	--
Annual (Arithmetic)	70 ug/m^3	100 ug/m^3	100 ug/m^3
Particulate Matter			
24 Hour	150 ug/m^3	--	--
Annual (Arithmetic)	50 ug/m^3	--	--
$PM_{2.5}$[c]			
24 Hour	--	65 ug/m^3	65 ug/m^3
Annual (Arithmetic)	--	15 ug/m^3	15 ug/m^3
PM_{10}[d]			
24 Hour	--	150 ug/m^3	150 ug/m^3
Annual (Arithmetic)	--	50 ug/m^3	50 ug/m^3
Ozone			
1 Hour	--	235 ug/m^3	235 ug/m^3
8 Hour	157 ug/m^3	157 ug/m^3	157 ug/m^3
Sulfur Dioxide			
3 Hour	1300 ug/m^3	--	1300 ug/m^3
24 Hour	365 ug/m^3	365 ug/m^3	--
Annual (Arithmetic)	80 ug/m^3	80 ug/m^3	--
Lead			
3 Months (Arithmetic)	1.5 ug/m^3	1.5 ug/m^3	1.5 ug/m^3

Notes: [a] Designated to prevent against adverse effects on public health.
[b] Designated to prevent against adverse effects on public welfare, including the effects on comfort, visibility, vegetation, animals, aesthetic values, and soiling and deterioration of materials.
[c] Particulate matter which is 2.5 microns or less in diameter.
[d] Particulate matter which is 10 microns or less in diameter.
mg/m^3 = milligrams per cubic meter
ug/m^3 = micrograms per cubic meter
ppm = parts per million

Source: State of Hawaii, Department of Health, Clean Air Branch, 2003

Table 3.5-2:
Air Quality Summary for Study Area Monitoring Stations – 2002

Air Pollutant	Standard/ Exceedance	Honolulu	Kapolei**	Sand Island	West Beach (Ko Olina Golf Course)
Carbon Monoxide (CO)	Percent Recovery*	98%	NM	NM	99.6%
	Max. 1-hour Concentration (mg/m^3)	3.99	2.05	NM	1.95
	Max. 8-hour Concentration (mg/m^3)	1.58	1.64	NM	0.4
	# Occurrences >Federal 1-hour Std. of > 40 mg/m^3	0	0	NM	0
	# Occurrences >Federal 8-hour Std. of > 10 mg/m^3	0	0	NM	0
	# Occurrences >Hawaii 8-hour Std. of > 5 mg/m^3	0	0	NM	0
Ozone (O_3)	Percent Recovery*	NM	NM	97%	NM
	Max. 1-hour Concentration ($\mu g/m^3$)	NM	NM	106	NM
	Max. 8-hour Concentration ($\mu g/m^3$)	NM	NM	89	NM
	# Occurrences >Federal 1-hour Std. of >235 $\mu g/m^3$	NM	NM	0	NM
	# Occurrences >Federal 8-hour Std. of >157 $\mu g/m^3$	NM	NM	0	NM
Nitrogen Dioxide (NO_2)	Percent Recovery*	NM	70%	NM	98%
	Annual Arithmetic Mean ($\mu g/m^3$)	NM	9	NM	8
	% AAM Exceeded (Federal)	NM	0	NM	0
Sulfur Dioxide (SO_2)	Percent Recovery*	97%	85%	NM	85%
	Max. 3-hour Concentration ($\mu g/m^3$)	30	7	NM	11
	Max. 24-hour Concentration ($\mu g/m^3$)	9	2	NM	2
	Annual Arithmetic Mean (ppm)	3	0	NM	0
	# Occurrences >Federal 3-hour Std. of >1300 $\mu g/m^3$	0	0	NM	0
	# Occurrences >Federal 24-hour Std. of >365 $\mu g/m^3$	0	0	NM	0
Suspended Particulates (PM_{10})	Percent Recovery*	96%	99%	NM	92%
	Max. 24-hour Concentration ($\mu g/m^3$)	90	44	NM	37
	# Occurrences >Fed. 24-hour Std. of>150 $\mu g/m^3$	0	0	NM	0
	Annual Mean ($\mu g/m^3$)	15	13	NM	13
Suspended Particulates ($PM_{2.5}$)	Percent Recovery*	95%	49%	100%	NM
	Max. 24-hour Concentration ($\mu g/m^3$)	53	15	11	NM
	# Occurrences >Fed. 24-hour Std. of>65 $\mu g/m^3$	0	0	0	NM
	Annual Mean ($\mu g/m^3$)	4	4	5	NM
Lead	Maximum Monthly Concentration ($\mu g/m^3$)	NM	NM	NM	NM
	# Months Exceeding Federal Std.	NM	NM	NM	NM
Sulfates	Max. 24-hour Concentration ($\mu g/m^3$)	NM	NM	NM	NM

*Percent Recovery represents the amount of air quality data reported.
**The Kapolei station was shut down on 7/15/02 and began operation at a new site on 7/26/02. The results in this table are from the new site, starting 7/26/02.
NM: Pollutant not monitored
mg/m^3 = milligrams per cubic meter
ug/m^3 = micrograms per cubic meter
Source: State of Hawaii, Department of Health, Clean Air Branch 2002.

The federal Clean Air Act (CAA) defines non-attainment areas as geographic regions that have been designated as not meeting one or more of the NAAQS. Air quality maintenance areas are regions that have recently attained compliance with the NAAQS. In the year 2002, the most recently available data, the State of Hawaii was in attainment for all federal ambient air quality standards.

3.5.4 METHODOLOGY

The following calculation methods and estimation models were utilized in estimating air quality concentration and project impacts: MOBILE emissions factor model, and the USEPA CAL3QHC dispersion model software.

Analyses were conducted for 2004 existing conditions and for 2025 under future conditions with and without the proposed alternatives. The existing year results are used in conjunction with the results of the future No-Build year to illustrate the predicted air quality trends at the study locations without the project.

Air quality modeling is used to predict pollutant concentrations resulting from emissions of motor vehicles using roadways immediately adjacent to the locations at which predictions are being made. Background levels must be added to these values to account for pollutants entering the area from other sources upwind of the receptors.

A one-hour CO background level of 1.1 parts per million (ppm) and an eight-hour background level of 0.4 ppm were added to the MOBILE source results at each analysis site. These values are the second-highest one-hour and eight-hour readings from the West (Ewa) Beach monitoring station in Honolulu County, for the years 2001 – 2003.

Traffic data for this analysis was derived from traffic counts and other information developed as part of an overall traffic analysis for the project. The microscale CO analysis was performed based on data from this analysis for the peak traffic periods. This is the period when maximum traffic volumes occur on local streets and when the greatest traffic and air quality impacts of the proposed project are expected. The worst case traffic volume was selected and used to represent the future air quality levels with the proposed project.

The microscale mobile source analysis was conducted using the following procedures and assumptions:

Vehicular emissions were estimated using EPA's latest emission factor program, MOBILE6.2.(EPAA420-R-02-08). MOBILE6.2 is a mobile source emission estimate program that provides current and future estimates of emissions from highway motor vehicles. The latest version of MOBILE incorporates updated information on basic emission rates, more realistic driving patterns, separation of start and running emissions, improved correction factors, and changing fleet composition. It also includes the effects of new regulations recently promulgated.

MOBILE source models are the basic analytical tools used to estimate CO concentrations expected under given traffic, roadway geometry, and meteorological conditions. The mathematical expressions and formulations that comprise the various models attempt to describe an extremely complex physical phenomenon as closely as possible. The dispersion modeling program used in this study for estimating pollutant concentrations near roadway intersections is the CAL3QHC (Version 2.0) dispersion model developed by the EPA and released in 1992.

CAL3QHC is a Gaussian model recommended in the *EPA Guidelines for Modeling Carbon Monoxide from Roadway Intersections* (EPA-454/R-92-005). Gaussian models assume that the dispersion of pollutants downwind of a pollution source follow a normal distribution from the center of the pollution source.

Different emission rates occur when vehicles are stopped (idling), accelerating, decelerating, and moving at different average speeds. CAL3QHC simplifies these different emission rates into two components:

- Emissions when vehicles are stopped (idling) during the red phase of a signalized intersection
- Emissions when vehicles are in motion during the green phase of a signalized intersection

The CAL3QHC (Version 2.0) air quality dispersion model has undergone extensive testing by the EPA and has been found to provide reliable estimates of inert (nonreactive) pollutant concentrations resulting from motor vehicle emissions. A complete description of the model is in the *User's Guide to CAL3QHC version 2.0: A Modeling Methodology for Predicting Pollutant Concentrations near Roadway Intersections* (EPA-454/R-92-006).

Analysis sites were selected through a screening analysis based on overall intersection volumes, changes in intersection volumes, and changes in Levels-Of-Service (LOS) estimates and community concerns

Based on the results of the screening analysis, CO levels were estimated at seven intersections including:

1. North-South Road / H-1 Interchange;
2. North-South Road / Farrington Highway;
3. Kapolei Parkway / Renton Road;
4. North-South Road / Kapolei Parkway;
5. Makakilo / H-1 Interchange;
6. Kunia / H-1 Interchange; and
7. Fort Barrette Road / Farrington Highway.

The receptors were chosen at these sites in accordance with the guidelines found in the EPA's *Guideline for Modeling Carbon Monoxide from Roadway Intersections* (EPA-454/R-92-005). Figure 3.5-1 shows the seven site locations.

3.5.5 POTENTIAL IMPACTS

Maximum 1-hour and 8-hour CO levels were predicted at the sensitive receptor sites located within the study area (see Figure 3.5-1). The results of this analysis are presented in Tables 3.5-3 and 3.5-4. In summary, no violations of the federal or State one- or eight-hour CO standards are predicted at any of the receptor sites for any of the alternatives.

Table 3.5-3:
Predicted Worst-Case 1-Hour Carbon Monoxide Levels
(parts per million)

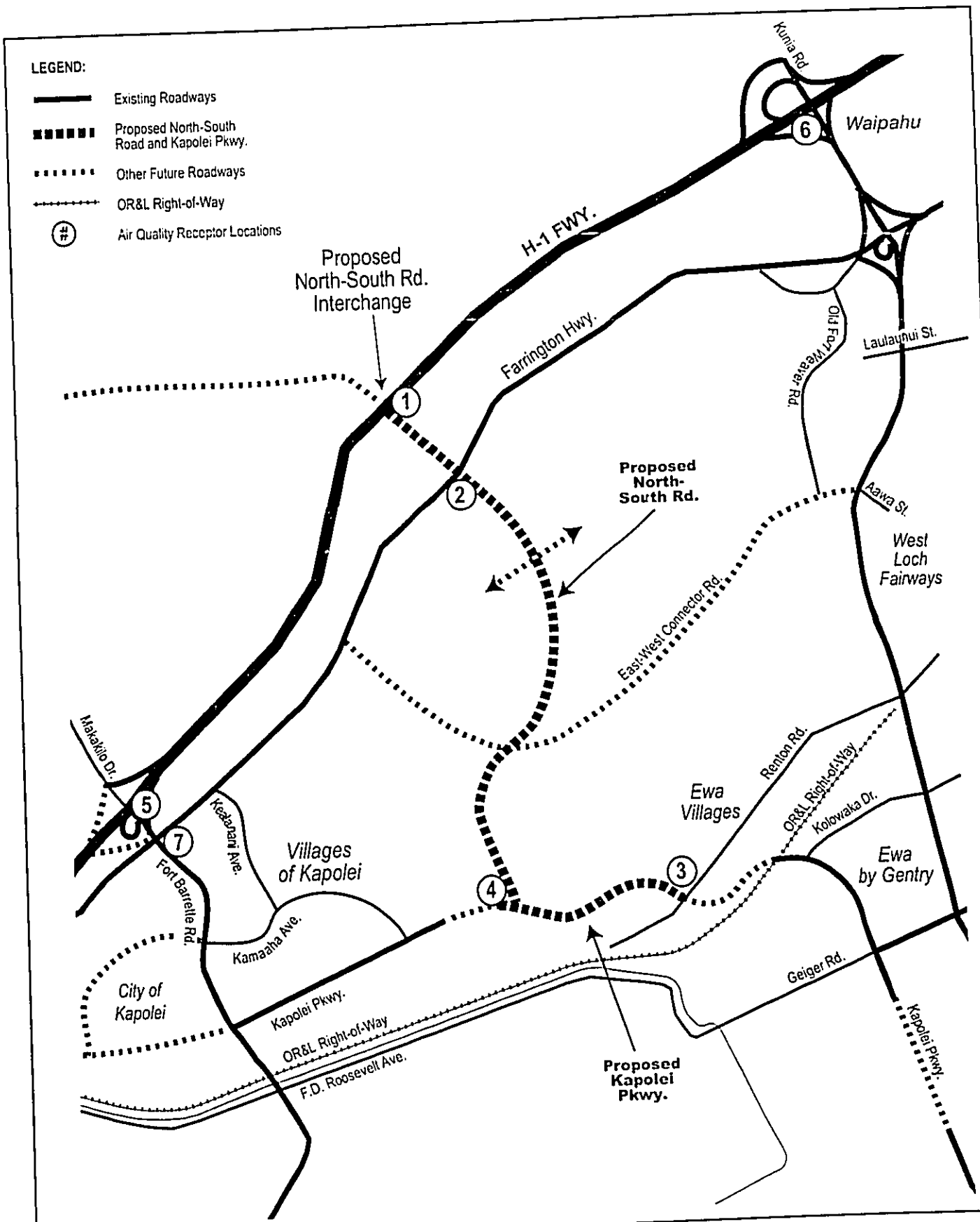
Site #	Description	Existing	Year 2025	
			No-Build	Build
1	North-South Road / H-1 Freeway Interchange	3.3	3.3	2.9
2	North-South Road / Farrington Highway	1.5	1.8	2.5
3	Kapolei Parkway / Renton Road	1.1	2.2	2.6
4	North-South Road / Kapolei Parkway	1.1	1.1	2.5
5	Makakilo Drive / H-1 Freeway Interchange	3.7	3.7	3.1
6	Kunia Road / H-1 Freeway Interchange	5.2	3.6	3.5
7	Fort Barrette Road / Farrington Highway	4.3	3.2	2.5

Note: State of Hawaii Standard: 9 ppm
Federal Standard: 35 ppm
Background level = 1.1 ppm
Source: Parsons Brinckerhoff, Air Quality Technical Report for the North-South Road and Kapolei Parkway Project, July 2004

The State of Hawaii has been classified an attainment area for ozone, PM_{10} and CO. As an attainment area, the State of Hawaii must demonstrate that the National Ambient Air Quality Standards (NAAQS) will continue to be observed. The microscale analysis for the proposed project demonstrates that no violations of the NAAQS are predicted. The goals set forth in the new Clean Air Act Amendments of 1990 specify that no violations of these standards are created or worsened. The project meets these goals and would not affect the State of Hawaii's current attainment status.

3.5.6 MITIGATION MEASURES

Since there would be no adverse air quality impacts, mitigation will not be necessary.



Air Quality Screening Locations
North-South Road and Kapolei Parkway Project
Final Environmental Assessment
Figure 3.5-1

Table 3.5-4:
Predicted Worst-Case 8-Hour Carbon Monoxide Levels
(parts per million)

Site #	Description	Existing	Year 2025	
			No-Build	Build
1	North-South Road / H-1 Freeway Interchange	1.9	1.9	1.7
2	North-South Road / Farrington Highway	0.7	0.9	1.4
3	Kapolei Parkway / Renton Road	0.4	1.2	1.5
4	North-South Road / Kapolei Parkway	0.4	0.4	1.2
5	Makakilo Drive / H-1 Freeway Interchange	1.8	1.7	1.3
6	Kunia Road / H-1 Freeway Interchange	3.3	2.2	2.1
7	Fort Barrette Road / Farrington Highway	2.6	1.9	1.4

Note: *State of Hawaii Standard: 4.5 ppm*
Federal Standard: 9 ppm
Background Level = 0.4 ppm
Source: Parsons Brinckerhoff, Air Quality Technical Report for the North-South Road and Kapolei Parkway Project, June 2004

3.6 NOISE

3.6.1 BACKGROUND

Noise is defined as any sound that is undesirable or interferes with normal human activities. The decibel (dB) scale is used to quantify sound intensity and represents the ratio between a given sound and the faintest sound detectable by human hearing. Because sound pressure levels vary widely within the range of human hearing, the dB scale is logarithmic. The human ear is not equally sensitive to all frequencies within the entire sound spectrum. Accordingly, noise measurements are made using an A-weighting (dBA) scale to correspond to human perceptions of noise. A-scale sound levels are in current use in many community and city noise ordinances, and many state and city highway or traffic noise codes.

Time variations in noise exposure are typically described as constant energy level equivalent (L_{eq}) for a given time period. L_{eq} is the constant noise level over some specified period of time that is equivalent in energy to a fluctuating (or brief) noise "averaged" over that period of time. L_{eq} is also a function of time and is expressed as L_{eq} (time period). For example, Leq(h), expressed in A-weighted decibels (dBA), is the calculated constant noise over one hour which is equivalent in total energy to the combination of noise levels which were actually measured during that one hour.

3.6.2 NOISE STANDARDS

The State of Hawaii Department of Transportation (HDOT) Noise Analysis and Abatement Policy implements the requirements of FHWA regulations on noise impacts (23 CFR 772) approved in December 1996. The policy requires that a noise analysis be performed whenever potentially affected receivers exist in the study area either as developed lands or lands that are planned, designed, or programmed for future use.

Under HDOT policy, a noise impact occurs when the predicted traffic noise levels approach or exceed FHWA's Noise Abatement Criteria (NAC) (see Table 3.6-1), or when the predicted traffic noise levels substantially exceed the existing noise levels.

Table 3.6-1:
Noise Abatement Criteria (NAC)

Activity Category	L_{eq} (h) for Noisiest Traffic Hour - dBA	Description of Activity Category
A	57 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 (Exterior)	Developed lands, properties, or activities not included in Categories A or B.
D	----	Undeveloped lands
E	52 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

Source: State of Hawaii Department of Transportation, "Noise Analysis and Abatement Policy," October 1996

Notes: $L_{eq}(h)$ is the one-hour energy equivalent sound level.
Interior noise level standards apply to:
1. Indoor activities for those parcels where no exterior noise sensitive land use or activities have been identified; and
2. Situations where the exterior activities are either remote from the highway or shielded so that while the exterior activities remain undisturbed, noise nevertheless affects interior activities.

Under the HDOT noise policy, "approach" is defined as at least 1 dBA less than the NAC, and "substantially exceed the existing noise levels" is defined as an increase of at least 15 dBA. As indicated on Table 3.6-1, the NAC categorizes different types of exterior and interior land use activities. Depending on the activity category, a different NAC would be applied.

3.6.3 EXISTING NOISE CONDITIONS

Existing and future noise sensitive land uses and activities adjacent to the proposed corridor and nearby major roadways were identified from site inspections and existing mapping. These land use activities include residences, recreation and park areas. All of these activities would be considered Category B, and have a NAC of 67 dBA.

Existing noise levels in the project corridor were measured in March of 2004. Noise measurements were taken for 15-minute periods at seven sites, between 11:00 p.m. and 3:00 p.m. and for 24-hours at two additional sites. These sites are representative of existing and future planned noise sensitive land uses in the project study area. The locations of these sites are shown in Figure 3.6-1 and their $L_{eq}(h)$ measurements are provided in Table 3.6-2.

The 15-minute sample is adjusted to peak hour by comparing the measured 15-minute noise level with the closest 24-hour monitoring site during the same hour. The difference is then added to the measured 15-minute level to determine the peak hour noise level. The existing peak hour noise levels at two of the nine receptor sites were above 66 dBA (Table 3.6-2), and therefore exceed the Category B NAC. The noise levels at sites 1 and 2 are due to their close proximity to the H-1 freeway and Palehua Road, which is heavily utilized by heavy trucks for hauling to and from the Grace Pacific quarry, located north of the H-1 freeway.

3.6.4 METHODOLOGY OF IMPACT ANALYSIS

A detailed discussion of the noise impacts of the proposed project is found in Appendix E, Noise Technical Report for the North-South Road and Kapolei Parkway Project (July, 2004). The following information is based on that report.

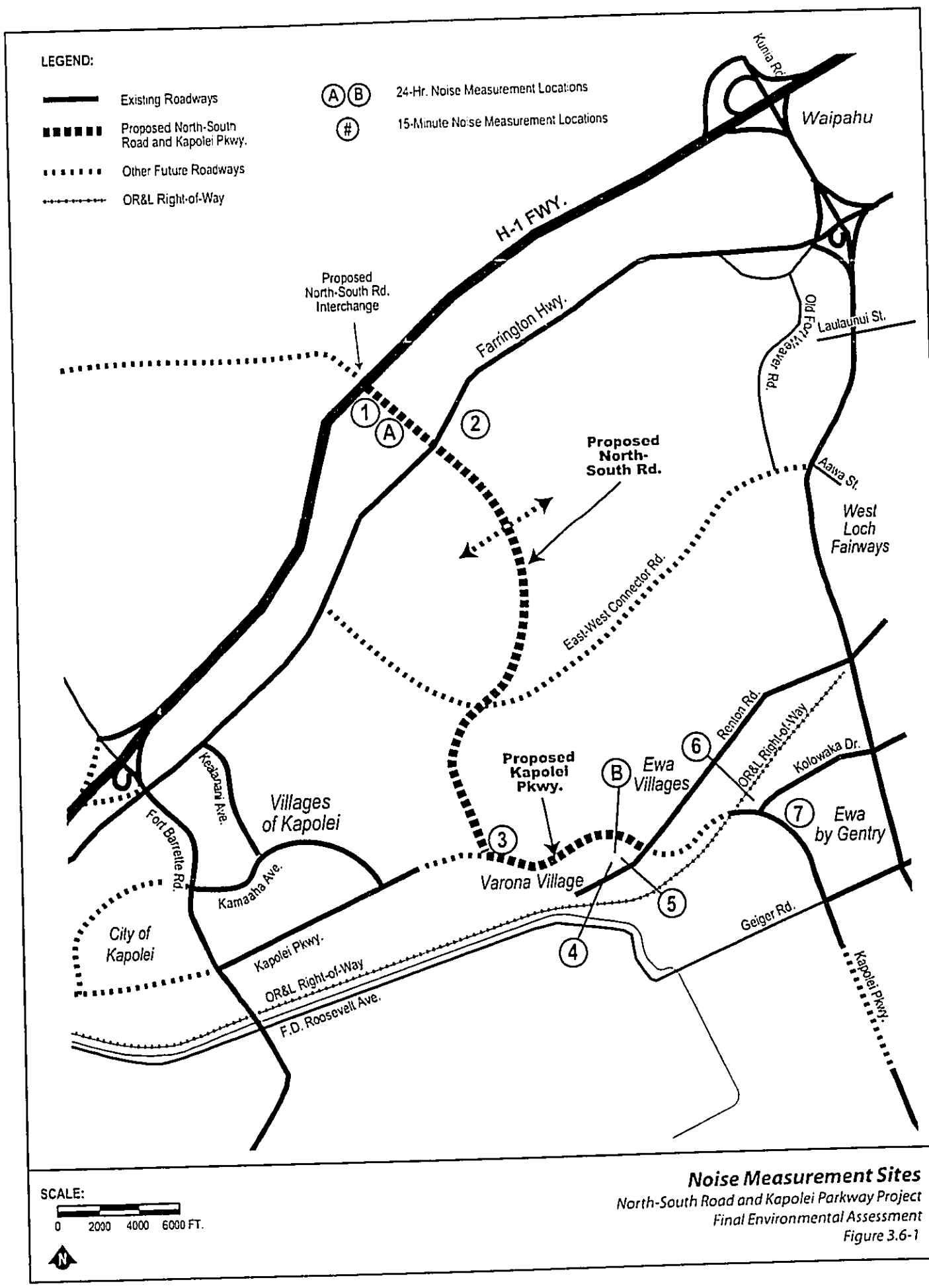
The noise impact analysis of the proposed project considered future traffic noise impacts for the traffic noise levels along North-South Road under the Build Alternative.

The noise measurement locations are shown in Figure 3.6-1. At those locations adjoining the proposed project, future noise levels with and without the project were predicted using the FHWA Traffic Noise Model - TNM 2.1 (FHWA, 2003).

Input variables to the noise modeling and analysis include traffic volumes, speeds and vehicle fleet mix (auto, medium truck, and heavy truck percentages). The noisiest hour of the day was considered to be when the traffic volume was at its highest, while still operating at the allowable speed limit (LOS C).

3.6.5 POTENTIAL IMPACTS

A noise impact, in terms of the one-hour Leq(h) noise descriptor, could potentially require mitigation when either of the following conditions is predicted to occur:



Noise Measurement Sites
North-South Road and Kapolei Parkway Project
Final Environmental Assessment
Figure 3.6-1

Table 3.6-2:
North South Road/Kapolei Parkway
2004 Noise Monitoring Schedule

Site No.	LOCATION	Date and Time	Measured Noise Level (Leq)	Adjusted Peak Hour Noise Level (Leq)*
15 minute monitoring				
1	Near H-1 and Palehua Rd. Future Commercial Property.	3/19 (1:35 p.m.)	68	72
2	Approximately 100 ft. from Farrington Hwy and Palehua Rd intersection. Taken on Farrington Hwy. Current Agriculture Property, Future Residential Area.	3/19 (2:19 p.m.)	70	72
3	Near Future Intersection of North-South Road and Kapolei Pkwy. Near Golf Course.	3/19 (12:30 p.m.)	44	54
4	Varona Village, in Front of Corner Residence facing Kapolei Pkwy on Kahi St.	3/24 (11:39 a.m.)	55	63
5	Varona Village Residence on Renton Rd., near Renton Rd and Kapolei Pkwy intersection	3/24 (11:03 a.m.)	56	62
6	In front of Town Homes on Kapolei Pkwy between OR&L and Kolowaka Dr	3/18 (11:18 a.m.)	50	58
7	In front of Town Homes and Golf Course on Kapolei Pkwy, near the Kolowaka Drive intersection.	3/18 (12:15 p.m.)	61	64
24 hour monitoring				
A	Near H-1 and Palehua Rd. Current Agriculture Property, Future Residential Area.	3/17 (6:00 a.m.)	NA	62
B	Varona Village. Vacant lot marked by corner of Kahi St. and Lei Aloalo Pl	4/27 (4:00 p.m.)	NA	64

* Peak hour Noise Level is based on comparing the 15 minute measured noise with the closest 24-hour monitoring location.
Source: Parsons Brinckerhoff, March 2004

- future year traffic noise level approaches or exceeds the FHWA Noise Abatement Criteria (NAC);
- future year traffic noise level substantially exceeds (15 dBA or more) the existing ambient noise level.

The predicted Year 2025 traffic noise levels at the noise measurement locations (see Figure 3.6-1) are presented in Table 3.6-3.

Table 3.6-3:
Predicted Year 2025 Noise Levels

Site	Location	Existing Peak Hour	LOS C Noise Levels (Leq (dBA)	
			No-Build	Build
A	Near H-1 and Palehua Rd. Current Agriculture Property, Future Residential Area.	69	69	69
1	Near H-1 and Palehua Rd. Future Commercial Property.	72	72	72
2	Approximately 100 ft. from Farrington Hwy and Palehua Rd intersection. Taken on Farrington Hwy. Current Agriculture Property, Future Residential Area.	72	72	73
3	Near Future Intersection of North-South Road and Kapolei Pkwy. Near Golf Course.	53	53	65
B	Varona Village. Vacant lot marked by corner of Kahi St. and Lei Aloalo Pl.	64	64	65
4	Varona Village, in Front of Corner Residence facing Kapolei Pkwy on Kahi St.	63	63	64
5	Varona Village Residence on Renton Rd., near Renton Rd and Kapolei Pkwy intersection	63	63	64
6	In front of Town Homes on Kapolei Pkwy between OR&L and Kolowaka Dr.	58	68	68
7	In front of Town Homes and Golf Course on Kapolei Pkwy, near the Kolowaka Dr. intersection.	64	68	68

Source: Parsons Brinckerhoff, 2004

Under the No-Build Alternative, predicted 2025 traffic noise levels at seven of the nine receptor sites are expected to be no different than their existing peak hour noise levels. Noise levels at Sites A, 1 and 2 will continue to be affected by traffic noise from the H-1 Freeway and Farrington Highway, and noise levels at Site 3 will not be affected by traffic on Kapolei Parkway. For those sites that could be affected by traffic noise emanating from Kapolei Parkway (Sites B, 4 and 5), the physical distance between these sites and the parkway provide enough noise attenuation that noise impacts are not anticipated. Noise impacts in accordance with the HDOT Noise Policy would occur at Sites 6 and 7 if Kapolei Parkway fronting these sites operates at a LOS C. However, Kapolei Parkway in Ewa Gentry is predicted to operate under the No-Build condition better than LOS C even during the peak periods despite the parkway being a contiguous roadway from Ocean

Pointe to the Villages of Kapolei. Therefore, noise impacts per HDOT Noise Policy would not occur at Sites 6 and 7 under the No-Build Alternative.

Under the Build Alternative, predicted 2025 traffic noise levels at eight of the nine receptor sites are expected to be the same or one decibel higher than the No-Build peak hour noise levels (see Table 3.6-3). Similar to the No-Build Alternative, five of the nine noise sensitive receptors are predicted to have ambient noise levels greater than 67 dBA (NAC for Activity Criterion B) under LOC C traffic conditions at the nearest roadways.

Noise levels at Sites A, 1 and 2 will continue to be affected by traffic noise from the H-1 Freeway and Farrington Highway similar to the conditions under the No-Build Alternative. However, some of these predicted ambient noise conditions might be affected by North-South Road and its interchange with the H-1 Freeway. Nevertheless, noise impacts per HDOT Noise Policy are not rendered because there are no immediate planned noise sensitive receptors (e.g., residences) in the areas represented by Sites A, 1 and 2. These areas are anticipated to contain urban land uses in the future according to the Ewa DP (see Section 3.1.2.2b)

Like the No-Build Alternative, noise impacts are not predicted at Sites B, 4 and 5 under the Build Alternative. The alignment of Kapolei Parkway would be the same under both alternatives. Therefore, the physical distance between Sites B, 4 and 5 and the parkway provide enough noise attenuation that noise levels are not expected to rise to a level that noise impacts are rendered.

Site 3 is the only noise sensitive receptor that would affected only be North-South Road, which is the reason its predicted noise level under LOC traffic conditions is 12 dBA greater than the predicted noise level under the No-Build Alternative and existing level. Nevertheless, noise impacts are not predicted at Site 3 because its predicted noise level is 65 dBA, which does not approach the Activity B NAC.

Noise impacts in accordance with the HDOT Noise Policy would not occur at Sites 6 and 7 because under the Build Alternative, Kapolei Parkway is not predicted to operate at LOS C during the peak periods.

Although only two sites were identified in the area surrounding North-South Road from Farrington Highway to the future Kapolei Parkway, planned land uses in the area include a U.H. West Oahu campus and DHHL homesteads (see Section 3.1.1.2). Without specific land use plans, noise sensitive receptors were not identified for most of these planned developments. Therefore, 66 dBA noise contours or setbacks were modeled for Build Alternative to serve as a guide for future residential development along the alignments of North-South Road and Kapolei Parkway. Table 3.6-4 provides the setbacks, which represent the distance from the roadway centerline where future residential development would not be subject to 66 dBA noise levels under LOS C conditions without noise abatement (e.g., walls or berms). The variations in distances shown on Table 3.6-4 are due to changes in topography. It is recommended that future residential developers consider noise abatement measures if noise sensitive activities, such as residences, are placed within these setback distances.

Table 3.6-4:
Recommended Minimum Highway Setbacks for Residential Developments

Roadway	Minimum Setback
H-1 Freeway	345 feet
Farrington Highway	145 to 155 feet
Kapolei Parkway	95 to 100 feet
North-South Road	200 to 220 feet

Source: Parsons Brinckerhoff, 2004

3.6.6 NOISE ABATEMENT MEASURES

If traffic noise impacts are identified, HDOT's Noise Analysis and Abatement Policy is used to determine whether noise abatement measures will be implemented, depending on whether these measures are reasonable and feasible based on the following criteria:

- Provide a minimum noise reduction of 5 dBA.
- Cost of noise abatement not to exceed $35,000 per residence benefited.
- Number of residences protected will include all dwelling units - owner occupied houses, rental units, mobile homes, etc. All units benefited by a 5 dBA or more noise reduction will be counted regardless of whether or not they were identified as impacted.
- Views from residences that would be affected by traffic noise are a major consideration in the reasonableness of noise abatement measures such as noise walls.
- Residential areas where future traffic noise levels are greater than 70 dBA or 20 dBA higher than existing noise levels will be given greater consideration.
- Residential areas along highways in a new location and residential areas constructed before an existing highway will be given greater consideration.

Noise barriers are considered at sites where noise levels approach or exceed the NAC of 67 dBA or if future year traffic noise substantially exceeds (15 dBA or more) the existing ambient noise level. Noise abatement would only be considered at existing residential or planned development sites where building permit approvals have been obtained, and would only apply to outdoor ground level areas (HDOT Noise Policy).

For the Build Alternative, noise impacts are not predicted at any of the noise sensitive receptors analyzed. Therefore noise abatement is not required.

3.7 ECOSYSTEMS

3.7.1 REGULATORY REQUIREMENTS

Section 7 of the Endangered Species Act of 1973 requires federal agencies to consider impacts on endangered or threatened species and critical habitat of such species. For terrestrial species, it requires that federal agencies consult with the U.S. Fish and Wildlife Service (Service) and prepare a Biological Assessment (BA) to address the effects of any major construction activity on a listed species or species proposed as endangered, or result in the destruction or adverse modification of designated critical habitat. Subsequently, a Biological Opinion (BO) is to be rendered by the Service stating whether or not the federal action is likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of critical habitat (40 CFR 402).

The State's counterpart law is Chapter 195D, Hawaii Revised Statutes (HRS), as amended, under which species are similarly protected. Chapter 195D stipulates that where there may be an incidental take of a listed species, a Habitat Conservation Plan (HCP) must be "designed to result in an *overall net gain* in the recovery of Hawaii's threatened and endangered species." (emphasis added)

The remainder of this section discusses the impact to biological resources in this regulatory context.

3.7.2 EXISTING CONDITIONS

3.7.2.1 ZOOLOGY

A zoological technical report prepared for this project (see Appendix G) reviewed several biological studies addressing housing developments in the area (East Kapolei Master Plan EIS, 1995; Ewa By Gentry EIS, 1988, 1995; Ewa Marina, Phase II EIS, 1991; and Ewa Villages Master Plan EIS, 1991). Habitats that would be crossed by the proposed North-South Road and portion of Kapolei Parkway between Renton Road and North-South Road are the same as or similar to the habitats surveyed for these developments. Therefore, given this project's proximity and similarity to areas that were surveyed, and findings of only relatively common animals adapted to urban conditions, a new faunal survey was not conducted for this project.

The studies concluded that the faunal community in the project area is typical of abandoned sugarcane fields near urban areas on Oahu. Common animals include mice, mongooses, rats, a variety of birds, feral cats, and dogs (see Table 3.7-1). The studies cited above concluded that the area has been extensively modified from its original state and has little value as native bird habitat. These studies did not report evidence of threatened or endangered faunal species. For a discussion of a potential listed insect in the project area, see Section 3.7.2.3.

Table 3.7-1:
Animals Observed During Zoological Surveys in the Project Vicinity

	Common name	Scientific name
Mammals		
	Brown Rat	*Rattus norvegicus*
	House Mouse	*Mus musculus domesticus*
	Feral Dog	*Canis familiaris*
	Feral Cat	*Felis catus*
	Mongoose	*Herpestes auropunctatus*
Birds		
	House Sparrow	*Passer domesticus*
	Red Avadavat or Strawberry Finch	*Amandava amandava*
	Warbling Silverbill	*Lonchura malabarica*
	Chestnut Mannikin	*Lonchura malacca*
	Nutmeg Mannikin	*Lonchura punctlata*
	Java Sparrow	*Padda oryzivora*
	Northern Cardinal	*Cardinalis cardinalis*
	Brazilian Cardinal	*Paroaria coronata*
	Red-Vented Bulbul	*Pycnonotus cafer*
	Cattle Egret	*Bubulcus ibis*
	House Finch	*Carpodacus mexicanus*
	Lesser or Pacific Golden Plover	*Puvialis dominica fulva*
	Spotted Dove	*Streptopelia chinensis*
	Rock Dove	*Columba livia*
	Zebra Dove	*Geopelia striata*
	Mockingbird	*Mimus polyglottos*
	Common Myna	*Acridotheres trisis*
	Ring-Necked Pheasant	*Phasianus colchicus*
	Common Waxbill	*Estrilda astrild*
	White-Rumped Shama	*Copsychus malabaricus*
	Eurasian Skylark	*Alauda arvensis*
	White-Eyes	*Zosterops japonicus*

Sources: East Kapolei Master Plan EIS, 1995; Ewa By Gentry EIS, 1988, 1995; Ewa Marina, Phase II EIS, 1991; Ewa Villages Master Plan EIS, 1991.

3.7.2.2 BOTANY

The following discussion is based on botanical surveys of the North-South Road Corridor area and the portion Kapolei Parkway between Renton Road and North-South Road Corridor area that were conducted by Kenneth Nagata (1996) and Char & Associates (1996, 1997, 2003, 2004). No wetlands occur in the proposed project footprint (see Section 3.8).

3.7.2.2a North-South Road Corridor

A botanical survey of about 1,300 acres of undeveloped land surrounding the North-South Road corridor was conducted in June 1996 (see Char & Associates, 1996, Appendix H). The primary objectives of the survey were to: 1) describe the vegetation; 2) inventory the flora; 3) search for threatened and endangered species as well as rare and vulnerable plants; and 4) identify areas of potential environmental problems or concerns and propose appropriate mitigation measures.

The survey found that all land within the corridor has been disturbed, and its vegetation consists almost exclusively of introduced or alien species. The corridor crosses primarily former sugarcane lands now overgrown with weedy plants, koa haole (*Leucaena leucocephala*) scrub, and mixed scrub typical of fallowed croplands. Several decades of large-scale sugar cultivation removed almost all native cover, as sugarcane fields replaced vast tracts of forest and shrubland. Vertical plowing and drainage ditches encouraged erosion from the lower Waianae slopes and soil deposition on the lower plains.

The survey inventoried a total of 72 plant species within the corridor, of which 68 (95 percent) were introduced, one (1 percent) originally of Polynesian introduction, and three (4 percent) native. The three native species—ilima (*Sida falax*), popolo (*Solanum americanum*), and uhaloa (*Waltheria indica*)—are all indigenous or presumably indigenous species, meaning they occur naturally in the Hawaiian Islands and also elsewhere throughout the Pacific and/or tropics. None of the plants initially inventoried in the November 1996 report is a listed, proposed, or candidate threatened or endangered species, nor a species of concern or a rare and vulnerable plant.

Other botanical studies on the Ewa Plain during the 1980's and 1990's recorded findings similar to those above (botanical surveys for Ewa Marina Community project site (September 1980), Ewa Gentry Residential Community (January 1988), and Laulani/Fairways Subdivision (August 1991)).

The results of the 1996 survey were amended in October 1997, after a population of endangered Kooloaula (*Abutilon menziesii*) was identified in the corridor during a subsequent survey for the East Kapolei Master Plan project by the State's HCDCH (Nagata, 1996). The HCDCH project is no longer planned. Kooloaula is discussed in more detail in Section 3.7.2.3.

Since the discovery of the Kooloaula, additional monitoring has been actively conducted in the project area by the State of Hawaii Department of Land and Natural Resources,

Division of Forestry and Wildlife (DLNR - DOFAW), while a HCP was prepared pursuant to the State's endangered species law. To date, no other listed, proposed, or candidate threatened or endangered plant has been discovered. Therefore, no further botanical surveys were conducted for the North-South Road corridor.

3.7.2.2b Kapolei Parkway Corridor

At the City's request that the Kapolei Parkway project from Renton Road to the North-South Road also be included in the HCP, a regional document covering development in the East Kapolei area, an additional botanical survey was conducted in January 2004 on the undeveloped City-owned property surrounding the portion of Kapolei Parkway from Renton Road to North-South Road. The 81-acre City property consists in large part of undeveloped land adjacent to the existing Ewa Villages Golf Course. This survey report (Char & Assoc., March 2004) is included in the HCP in Appendix H. The objectives of the study were primarily to inventory the Kooloaula on that property, characterize the overall vegetation, and determine if other listed species exist in the area.

Dominant vegetation consisted of koa haole, buffel grass (*Cenchrus ciliaris*), swollen fingergrass (*Chloris barbata*), kiawe (*Porsopis pallida*), and other common weedy plants. The edge of the Ewa Villages Golf Course is dense with woody plants including tall thickets of koa haole, with emergent stands of kiawe, monkeypod (*Samanea saman*), eucalyptus, and opiuma (*Pithecellobium dulce*) trees. The area closer to Varona Village is characterized by vegetation found at old house sites, such as mango (*Mangifera indica*) and kalamungai (*Moringa oleifera*) trees.

The survey identified a total of seven Kooloaula plants within the roughly 81-acre City property. The findings of the survey are discussed in more detail in Section 3.7.2.3. The survey did not identify any other listed threatened, endangered, or candidate species.

3.7.2.3 ENDANGERED AND THREATENED SPECIES

Initial attempts to identify potential endangered or threatened species in the project area involved the botanical surveys mentioned above and correspondence with resource agencies. Letters were sent to the Service and DOFAW (see Appendix A).

In a letter dated February 1, 1996 (see Appendix A), the Service noted that the proposed project area had been extensively modified by agricultural and development activities. However, the Service stated that there are historical records of the following Federal Trust Species in the vicinity of the proposed corridor, which could be affected by the North-South Road project:

- *Centaurium sebaeoides* (listed Endangered)
- *Marsillea villosa* (listed Endangered)
- *Portulaca villosa* (Species of Concern)
- *Torulinium odoratum ssp. auriculatum* (Species of Concern, very possibly extinct)
- *Pentarthrum obscurum* (Species of Concern)

A botanical survey conducted for the proposed project in 1996 (see Appendix H) did not find any of the plant species identified by the Service.

In a letter dated June 13, 1996, the Service stated that the *Pentarthrum obscurum*, a type of beetle, is more common than previously believed and may not even be native to the Hawaiian Islands. The Service recommended that no surveys for this beetle be performed in the project area during the environmental review process. In a letter dated October 10, 1997, the Service stated that *Centaurium sebaeoides*, *Marsillea villosa*, *Portulaca villosa*, and *Torulinium odoratum* "is not be subject to consultation" because botanical surveys did not find these species in the project area.

Therefore, none of the five Federal Trust Species initially identified by the Service in 1996 would be affected by the proposed project, because they do not occur on the project site. Therefore, they are not subject to Section 7 consultation nor any further regulatory action under HRS Chapter 195D.

In a letter dated March 3, 2004, the Service confirmed that the *Abutilon menziesii* (Kooloaula) is the only endangered species located within the proposed project footprint. There are no other species proposed for listing, or proposed or designated critical habitat within the project area.

Kooloaula (*Abutilon menziesii*) is a shrub of the mallow family, growing six to eight feet tall, with coarsely-toothed, silvery, heart-shaped leaves that are about one to three inches long. The flowers are medium red to dark red and less than an inch in diameter. Kooloaula has been sold as an ornamental plant at local nurseries in the past under the name "Red Ilima". Plants reportedly thrive and bloom regularly under nursery conditions and propagation by seed and cuttings is successful. Other populations of Kooloaula currently exist on Lanai and Maui.

During a late 1996 survey, a population of Kooloaula was found on former sugarcane land at Kapolei in Ewa on the subject property (Nagata, 1996). Hence, this population is hereafter referred to as the "Kapolei population", and the lands on which they have been identified are collectively called the "Kapolei property" in this discussion. The Kapolei property consists of 1,300-acres of State-owned property and an adjacent 81-acre City property, including the North-South Road and portion of Kapolei Parkway footprints. These former sugarcane fields are now overgrown with scattered clumps of sugarcane and weedy species commonly associated with fallowed agricultural lands. The known plant locations on the Kapolei property are shown in Figure 3.7-1.

Kooloaula is protected by both the federal Endangered Species Act of 1973, as amended, and Chapter 195D, HRS, as amended. Prior to the 1996 Nagata survey, the Kooloaula had not been identified in the Ewa area, and therefore was not noted by the Service during preceding coordination efforts (see Appendix A). Since the discovery of the plant on the Kapolei property, additional botanical surveys in this area have been conducted by Char & Associates (1996, 1997, 2003, 2004). These reports are contained in Appendix H, either individually or as appendices within the HCP, also provided in Appendix H. No other federal or state listed species was found during these surveys.

The discovery of the Kapolei population was unexpected because the Kapolei property was used for sugarcane cultivation for nearly a century, until the closure of Oahu Sugar Company in 1995. The cane harvesting process involved burning cane fields to reduce leaf bulk before the stalks were mechanically harvested; therefore, the Kapolei property was repeatedly exposed to cane fires during this period. Sugarcane was reportedly last harvested on the property in 1994, or about two years before the discovery of Kooloaula.

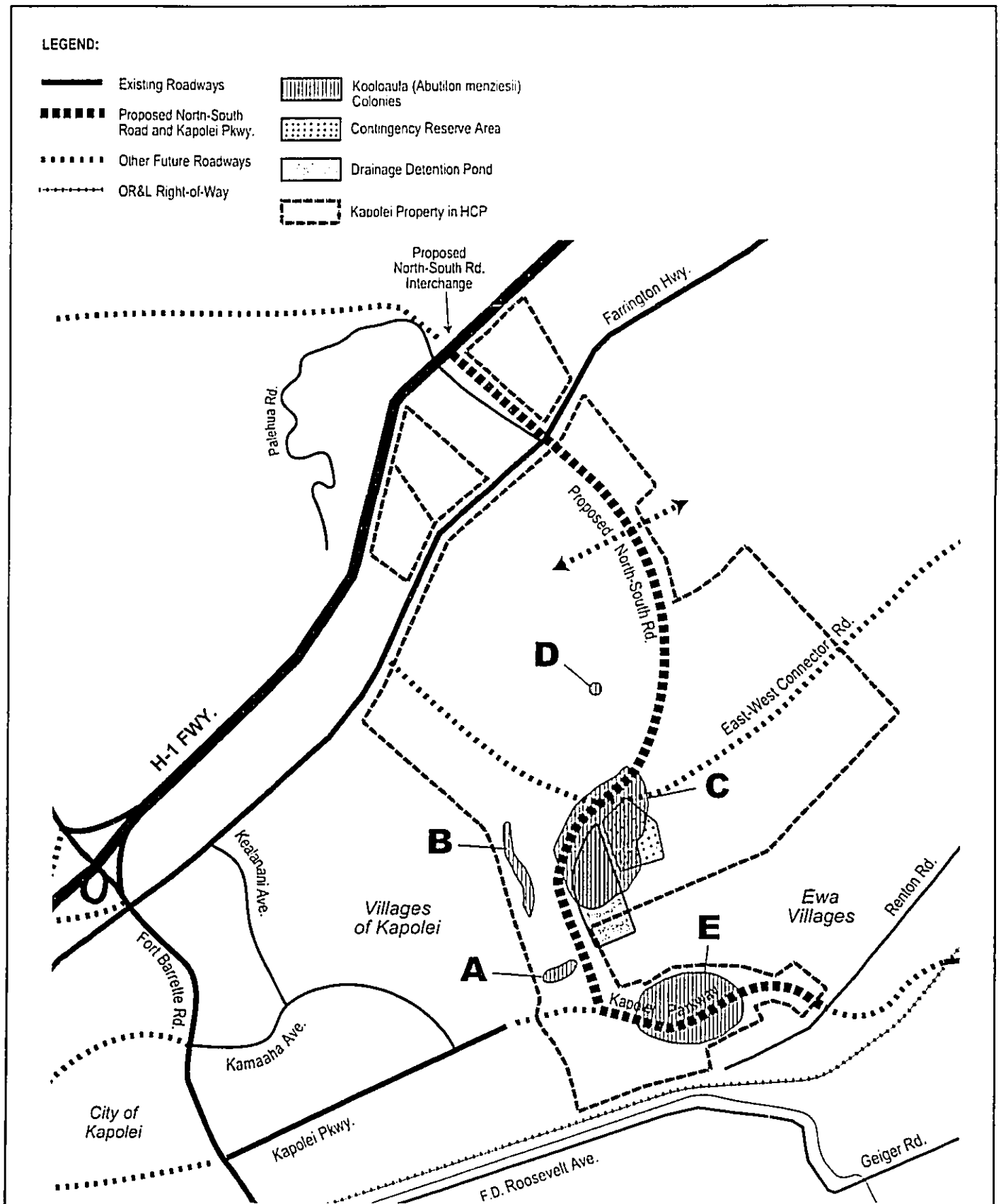
The Kooloaula plants at Kapolei are found in five clusters in the central and southern portions of the area: Clusters A, B, C, D, and E (Figure 3.7-1). According to DLNR, the present number of plants has been reduced to between 30 and 50 through attrition, but new seedlings have also recently been recorded. While the population size is dynamic, the generally accepted baseline number of plants in the Kapolei property, as reported in the HCP, is 93 individuals. Of these, 86 occur in the State-owned portion and seven in the City-owned portion of the Kapolei property. A December 1997 survey produced taxonomic data and precise mapping of the plants; DLNR subsequently mapped their locations using global positioning system (GPS) technology (see HCP in Appendix H).

Development of the HCP for the Kapolei population has been on-going since the first Draft EA for the North-South Road was published in 1996. Prepared pursuant to HRS Chapter 195D-21, the recently completed HCP describes the current status of the listed species, the development actions proposed on the Kapolei property, their impacts on the Kapolei population, and proposed mitigation strategies to further the recovery of the species. Further details about the HCP are provided in Sections 3.7.3.2 and in Appendix H.

While the HCP was being prepared, a pilot program to protect the species and prepare them for eventual relocation was implemented. On behalf of HDOT and former East Kapolei Master Plan developer HCDCH, DLNR-DOFAW initiated the Interim Management Plan (IMP) for the Kooloaula in 1998. The IMP tested whether new populations could be established from Kapolei stock of Kooloaula. A complete representation of 630 plant progeny were successfully propagated from the Kapolei population and outplanted at Koko Crater Botanical Gardens, Kaena Point State Park, and the Honouliuli Unit of the Pearl Harbor National Wildlife Refuge. As part of this IMP, DOFAW also updated the inventory of Kooloaula and mapped their locations. Therefore, the genetic material of all surviving Kapolei plants have been successfully preserved by DLNR for eventual outplanting at other sites. Draft and final IMP reports (dated 2001 and 2003, respectively) are included in the HCP in Appendix H.

Pursuant to the State Endangered Species Act (HRS Chapter 195D), a Habitat Conservation Plan for *Abutilon menziesii* at Kapolei (HCP) was finalized and approved by the State's Board of Land and Natural Resources (BLNR) in March 2004. The HCP was closely coordinated with the Service, and the HCP was submitted to the Service on March 23, 2004, as the BA to initiate "formal consultation" with the Service under Section 7 of the Endangered Species Act.

The primary objective of the HCP is the continued survival of the Kapolei genetic stock of the Kooloaula through the establishment of three offsite wild populations and one offsite repository site from the degraded canefield population at Kapolei. To achieve this goal,



Distribution of the Endangered Plant Kooloaula (Abutilon menziesii)

North-South Road and Kapolei Parkway Project
Final Environmental Assessment
Figure 3.7-1

more than three sites will be outplanted, managed, and monitored for a period of five years before a determination is made whether a site has met defined success criteria. The ultimate objective is to achieve three successful outplanting sites.

The short- and long-term goals are summarized in Table 3.7-2.

Table 3.7-2:
Short-term and Long-term Goals of the Habitat Conservation Plan

	Goals
Short-Term Goals	1) Propagate original Kapolei population of *Abutilon menziesii*. 2) Establish a cultivated repository of Kapolei *A. menziesii* at Koko Crater Botanical Garden. 3) Establish two test outplantings of *A. menziesii* at appropriate sites. 4) Represent complete genetic diversity of original population at all sites, 5) Establish and maintain an 18-acre contingency reserve area within the Kapolei population until the short-term success criteria are met at one wild outplant site.
Long-Term Goals	1) Maintain three new stable populations of *A. menziesii* by out-planting at several (more than three) appropriate sites. 2) Maintain an effective population of 120 flowering and seed producing plants (minimum of 100 mature individuals) over the term of the HCP. This number will assure an approximate 75 to 100 percent increase of the original population in each location and is five times that recommended by the Hawaii and Pacific Plants Recovery Coordinating Committee (as cited in USFWS 1998). 3) Monitoring of the populations will be conducted to determine progress toward attaining population stability. 4) The goal for seedling survival rate will be on average in the 10 - 25 percent range over a five year period taking into consideration the many variables related to achieving stability of reintroduced populations. "Survival rate" is defined as survival of individual plants for a minimum of one year. 5) Natural recruitment in all populations.

Source: Habitat Conservation Plan for Abutilon menziesii at Kapolei. March 2004.

3.7.3 POTENTIAL IMPACTS

3.7.3.1 ZOOLOGY

The No-Build Alternative would convert some habitat to the future Kapolei Parkway.

The Build Alternative would convert additional habitat into a roadway (habitat within the footprint of North-South Road). However, it would not threaten the relatively common faunal communities in this region because the animals present, such as cats, mongooses, and mice, are considered nuisances and easily adapt to the urban environment. The environmental documents prepared for proposed housing developments in the general vicinity of the proposed roadway reported similar findings. Future development adjacent to the corridor (see Section 3.1) would destroy existing faunal habitats but new habitats would be re-established within the development. Under

all the alternatives, it is anticipated that the number of animals killed on the roads in the area would increase due to urban development.

3.7.3.2 BOTANY

As described in Section 2.2, the No-Build Alternative assumes that Kapolei Parkway would be constructed, but at a later date than under the Build Alternative. The No-Build Alternative would necessitate clearing vegetational communities within the Kapolei Parkway Corridor.

The Build Alternative would clear vegetation in both the North-South Road Corridor and the Kapolei Parkway Corridor between Renton Road and North-South Road (see Chapter 2 for the areas affected).

With the exception of the endangered plant Kooloaula (*Abutilon menziesii*), the botanical surveys conducted for this project (see Appendix H) stated that the project corridor is overgrown with weedy plants, Koa haole scrub and mixed scrub, and is composed almost exclusively of introduced or alien species. Therefore, the vegetational communities that would be cleared by construction activities under any alternative are not considered regionally important.

The only listed threatened or endangered species known to occur on the project site is the endangered Kooloaula. The remainder of this section deals with the impacts to Kooloaula and the HCP prepared for the Kapolei population of this species.

3.7.3.2a Kooloaula

The endangered Kooloaula is the sole subject of federal Section 7 consultation and is also subject to the requirements of Chapter 195D because it occurs on the project site and the proposed project would result in an adverse impact to this species.

As described in Section 3.7.1, five clusters of the endangered plant Kooloaula (*Abutilon menziesii*) were identified at or near the proposed roadways (see Figure 3.7-1). The baseline size of the population is assumed to be 93 individuals.

The No-Build Alternative would require removal of three endangered Kooloaula plants on City property within the ROW of the Kapolei Parkway corridor from Renton Road to North-South Road.

The Build Alternative would have both direct and indirect impacts on the plant population. Direct impacts would consist of removal of a total of 24 plants in both the North-South Road Corridor and Kapolei Parkway Corridor between Renton Road and North-South Road. Of these, 21 plants would be affected by North-South Road and its drainage features, while the other three would be the same as those affected under the No-Build Alternative. The proposed North-South Road ROW is currently owned by the State and the Estate of James Campbell; Kooloaula is present only on the State-owned portion.

The remaining plants in Ewa and Kapolei would not be directly affected by the project. Potential indirect impacts to these remaining Kooloaula include wildfires and increased air pollution, which are associated with more urbanization and construction activities. In order to avoid these indirect impacts, propagules from these remaining plants will be grown and represented in three offsite locations, including the Koko Crater Botanical Garden, Kaena Point State Park and Honouliuli National Wildlife Refuge on Oahu (see HCP). In addition, the HCP foresees the removal of the entire Kapolei population of Kooloaula. These plants may be transplanted to other "wild" site locations. Section 3.7.4.2 describes mitigation measures in the HCP that will preserve the genetic composition of this endangered species.

Because take of Kooloaula was anticipated, informal Section 7 consultation was initiated in September 1997. Milestones identified through informal consultation included completion of the HCP, and its submittal as part of the BA, per 50 CFR 402.12. The State's Endangered Species Recovery Committee (ESRC) recommended approval of the HCP to the BLNR on March 12, 2004; BLNR then approved the HCP on April 8, 2004. The HCP could not have been approved by BLNR unless it demonstrated that the plan would result in a net gain for the species, per the requirement of HRS Chapter 195D.

FHWA submitted the HCP/BA to the Service and initiated formal consultation on March 23, 2004. Due to the close coordination with the Service during the development of the HCP, the Service has issued a biological opinion (BO) stating that the proposed project is not likely to jeopardize the continued existence of the Kooloaula. The BO is included in Appendix A.

While there would be an immediate adverse effect on individuals in the roadway ROW, implementation of the HCP, which has already begun, is an integral part of the proposed action. The HCP is anticipated to result in a net gain for the species. Therefore, the action, as mitigated per the HCP, should not result in substantial adverse impact to the species.

3.7.3.2b HCP Provisions

According to the HCP and the corresponding Incidental Take License (ITL) issued by DLNR-DOFAW, plants to be removed have been or will be propagated in a nursery and transplanted to another location. Three "wild" outplanting sites will be established and managed by DOFAW, on behalf of HDOT. Some plants may temporarily be placed in the 18-acre contingency reserve area (CRA), which is established along the southern end of the North-South Road Corridor. The CRA was selected because the highest concentration of Kooloaula occurs there. The CRA will be maintained until one outplanting site established under the HCP achieves defined short-term success criteria. Figure 3.7-1 shows the location of the CRA in relation to the proposed action.

The duration of the active management period specified in the HCP is 20 years. The plan is tied to the accomplishment of measurable goals including establishment of three successful outplant populations. The successful implementation of the HCP would increase the number of new plants on Oahu, and improve their setting in comparison to their current setting in a disturbed, abandoned canefield. DLNR-DOFAW is

implementing the HCP on behalf of HDOT, under the terms of a Memorandum of Agreement.

The following is a summary of some of the key HCP measures which the HDOT commits to implement through DLNR-DOFAW:

- Actively monitor, manage, and propagate the Kapolei population to protect the genetic resource over a 20-year period;
- Establish at least three "wild" or self-sustaining sites to preserve genetic material of all individuals;
- Provide $1 million in funding for management of the "wild" sites;
- Allow for long-term management of the Kooloaula beyond the 20-year period, if necessary;
- Establish a $200,000 contingency fund to pay for unforeseen expenses in Kooloaula management;
- Establish an 18-acre "CRA" where existing Kooloaula in their native habitat can remain undisturbed and protected, until a "wild" site meets pre-defined short-term success criteria; and
- Implement adaptive management measures, as necessary.

It should be noted that the HCP covers a broader geographic area than the footprint impacts of the North-South Road and the portion of Kapolei Parkway between Renton Road and North-South Road. HDOT decided to sponsor the HCP after the HCDCH elected not to pursue development in East Kapolei, but the Service stated during pre-consultation in 1998 that mitigation for the road should address impacts on the full Kapolei population. Future development abutting these roads (see Section 3.1) would clear similar vegetational communities, including the Kooloaula. Therefore, the HCP foresees and permits the entire Kapolei population to be removed eventually through the planned growth of Kapolei as the Second City.

The HCP outlines a Certificate of Inclusion (COI) process allowing third party developers, such as the City, UH-West Oahu, and DHHL, to participate in the provisions of the ITL when they are ready to construct their projects and will need to "take" Kooloaula. HDOT has committed to administering the ITL for the Kapolei population. HDOT has also committed to provide a contingency fund of $200,000. It is anticipated that other developers will participate in the contingency fund. For more details, see the HCP in Appendix H.

3.7.4 MITIGATION MEASURES

3.7.4.1 ZOOLOGY

No negative impact to zoological resources is expected as a result of the proposed action, so no mitigation measures are necessary.

3.7.4.2 BOTANY

No mitigation measures are necessary for the removal of vegetation, but the project action includes providing landscaping to replace some of the lost vegetation and improve the physical appearance of the roadway. The landscaping plan may include cultivated Kooloaula, where feasible. Details of the highway landscaping plan will be developed during the project's design phase. Use of plants that would minimize water requirements will be considered in the preparation of the landscaping plan.

Mitigation actions for the affected Kooloaula are described in detail in the HCP, as summarized in Section 3.7.3.2. HDOT commits to implementing the terms of the HCP over the course of 20 or more years, as necessary. These mitigation measures, summarized above and elaborated in the BA/HCP, would reduce the potential for adverse impacts on Kooloaula, would potentially help the overall recovery of the species, and would not compromise the continued existence or recovery of the listed species.

In addition, the construction contractor will be required to initiate fire prevention measures during roadway construction to minimize the indirect impact associated with fire risk. Measures will include the preparation of a specific Fire Control Plan by the contractor. The Fire Control Plan will address such topics as construction of a firebreak, presence of a water truck at all times, construction worker education, reporting, and response procedures in the event of a fire, and procedures for the storage and disposal of flammable materials, including matches and cigarettes.

On August 5, 2004, the Service notified FHWA of its biological opinion that the proposed project with mitigation measures specified in the HCP/BA is not likely to jeopardize the continued existence of the endangered Kooloaula. Even though the implementation of all proposed Kapolei projects (including but not limited to North-South Road and Kapolei Parkway) would remove the entire Kapolei population of Kooloaula, the Service determined that the population is unlikely to persist over time without management, due to habitat degradation, encroaching development, and the threat of fire. Therefore, the Service concluded that implementation of the HCP would result in a net conservation benefit for Kooloaula.

In addition, the Service made the following conservation recommendations:

- that research regarding the physical and biological needs, pests, and diseases of Kooloaula be conducted in order to gain better understanding of the Kooloaula, which will aid in the successful implementation and outcome of the proposed project;
- that efforts be made to collect the seed bank for use at outplanting sites; and
- that the Service be notified of the implementation of any conservation recommendations.

The FHWA will re-coordinate with the Service if an unforeseen event occurs that significantly changes the baseline of the species. The completion of the BO completes the formal Section 7 consultation process, as outlined in Chapter 4. The BO is included in Appendix A.

3.8 WATER RESOURCES

3.8.1 EXISTING CONDITIONS

3.8.1.1 GROUNDWATER

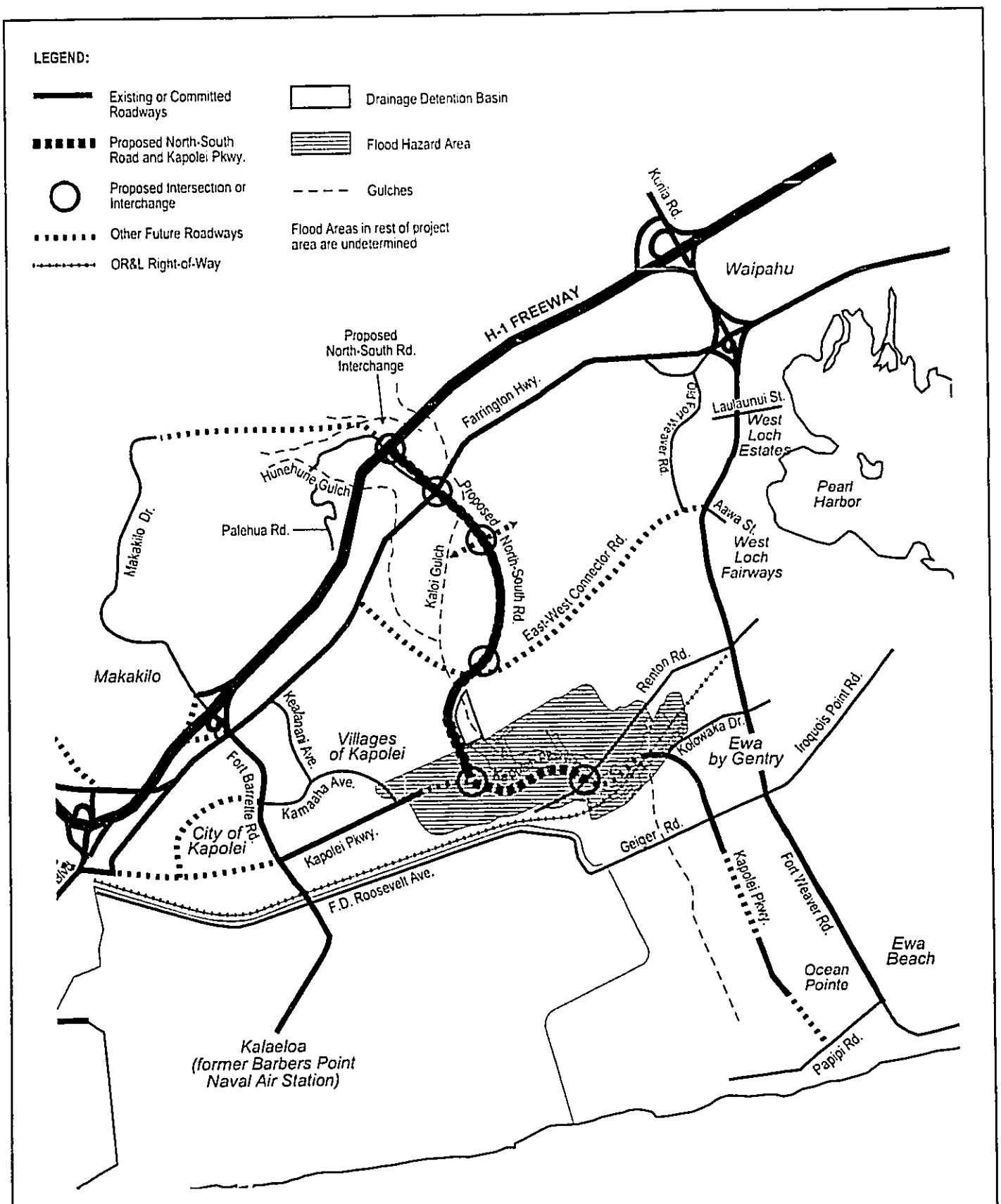
Groundwater in Oahu occurs in perched water tables, deep basalt aquifers, and shallow aquifers within the caprock. Potable, artesian groundwater underlying the project area occurs in the Southern Oahu Basal Aquifer (SOBA), which is a Sole Source Aquifer designated by the Environmental Protection Agency (EPA). The portion of the SOBA underlying the proposed project is part of the Pearl Harbor aquifer sector, which serves as one of the main sources of drinking water for Oahu's population. The fresh water in the basal aquifer is recharged in the Waianae Mountains and the central plain by direct rainfall, infiltration of stream runoff, and irrigation water.

The SOBA is under artesian pressure in the porous basalt below the caprock, a wedge of alluvial sediments and limestone. The limestone caprock aquifer is generally too saline for potable use and is used mainly for irrigation and industrial purposes. The caprock aquifer is recharged by rainfall, stream infiltration, seawater intrusion, irrigation return, and basaltic aquifer leakage. The caprock layer thins with distance from the shoreline, and at varying distances inland, the caprock layer ends, and the basalt layer, containing the potable aquifer, underlies surgical materials. The caprock boundary lies approximately 1,000 to 1,500 feet south of North-South Road's intersection with Farrington Highway.

3.8.1.2 SURFACE WATER AND FLOODPLAINS

The Ewa region is in the rain shadow of Oahu's mountain ranges and is therefore generally dry. Annual rainfall in the region averages about 20 inches. Most of the rainfall occurs during southerly (Kona) storms, which can be short, high intensity events.

There are no permanent surface water bodies within or near the proposed corridor. Intermittent streams carry some of the regional drainage. The largest intermittent stream in the roadway corridor is Kaloi Gulch. However, according to the DLNR Commission on Water Resource Management (correspondence dated July 28, 2004), Kaloi Gulch is not considered a "stream" in accordance with the Hawaii Water Code. The Kaloi Gulch watershed extends from the crest of the Waianae Range to the shoreline, and encompasses approximately 11 square miles (see Figure 3.8-1). Flows are contained within a natural channel above the H-1 Freeway. A box culvert under the H-1 Freeway is sized to contain runoff from the Federal Emergency Management Agency (FEMA) 100-year storm. (Two design storms have been considered in project planning: the FEMA 100-year design storm and the City Design Flow. The City Design Flow exceeds the FEMA 100-year storm. Zoning decisions are based on the City Design Flow.). Makai of the H-1 Freeway the flows are contained within constructed levees.



Source: Flood Insurance Rate Maps, Federal Emergency Management Agency, 2004.

Flood Zones and Kaloi Gulch

North-South Road and Kapolei Parkway Project
Final Environmental Assessment
Figure 3.8-1

Gulch channel prevent runoff that is generated outside the channel from entering the Hunehune Gulch, another intermittent stream, conveys drainage from northwest of the proposed roadway and joins Kaloi Gulch below Farrington Highway.

Because the capacity of these intermittent streams is limited, they overflow makai of Farrington Highway during high intensity rains. The broad flood plain makai of Farrington Highway is characterized by generally unimpeded sheet flows less than 1-foot in depth extending to Ewa Villages. There may be some depressed areas where sheet flow depths could exceed one foot. Additionally, the levees along the Kaloi channel, adding to the volume of sheet flow.

Since the reach of Kaloi Gulch between Farrington Highway and Ewa Villages extends across areas previously used for sugarcane cultivation, and this area is still vacant or used for other agricultural activities. Therefore, the risk of flood damage is small. Additionally, sheet flows in these areas helped to disperse flows and filter sediments from the storm water.

In Ewa Villages, however, flood control issues have been a concern. The OR&L railroad track berm acted as a dam, impounding sheet flows from mauka areas that overtopped the intermittent streams. The railroad track made Ewa Villages a retention basin and was the usual cause of flooding in Ewa Villages.

The OR&L impoundment also protected downstream landowners from smaller storm events.

After a declared federal flood disaster in 1996, a regional drainage plan for the Ewa Plain was reviewed by the State of Hawaii National Floodplain Insurance Program (NFIP) Coordinator and FEMA. Flood hazard mitigation proposals were submitted to FEMA by the City to improve regional drainage north of Ewa Villages. One of the proposals was construction of a basin similar to the one now proposed for the North-South Road drainage system (discussed later). Since FEMA did not provide grants to construct the flood hazard mitigation projects, mitigation was left to the landowners and the City.

To help catalyze Kapolei development, the State's East Kapolei Project, proposed by the State Housing Finance Development Corporation (HFDC) in 1997, was designed to develop the regional drainage system from H-1 Freeway to Ewa Villages. The need for housing was so great that the Housing and Community Development Corporation of Hawaii (HCDCH) (HFDC had been disbanded and replaced by HCDCH) intended to build the drainage system in association with home construction, prior to the construction of North-South Road. The conveyance spine was to be a re-aligned Kaloi Gulch adjacent to the future North-South Road that would link a series of retention/detention basins. Excavation from the realigned gulch and basins was to be used as fill to elevate the adjacent developments. The East Kapolei Environmental Impact Statement, which described the proposed drainage plan, was reviewed and approved by the City and State NFIP Coordinator. The State Land Use Change Petition approval for the East Kapolei project, granted by the Land Commission, was based on the East Kapolei Drainage Master Plan as disclosed in the EIS. Subsequently, the Drainage Master Plan for the East Kapolei Project was undergoing review by the City,

but the project stopped before it was approved because of changes in the housing market.

In the absence of the HCDCH to construct the regional drainage system, the Kaloi Gulch Technical Committee was reconvened to address regional storm water issues in a phased manner, thereby allowing the urbanization of the area to proceed. The Technical Committee consists of public and private interests. The City's Department of Planning and Permitting (DPP) represents the City on the Committee. As the agency with regulatory oversight of drainage on Oahu, DPP reviews and approves drainage master plans of area developments for compliance with the City's Flood Ordinance (Ordinance 99-12, effective May 10, 1999), Drainage Standards and the Interim and Ultimate regional drainage criteria of the Kaloi Gulch Technical Committee. The City's Flood Ordinance must be consistent with the flood plain management regulations of the NFIP for the City to remain a participant in the federal flood program.

The Kaloi Gulch Technical Committee has developed criteria for interim and ultimate regional drainage improvements in the Kaloi Gulch Basin. Phased implementation of the regional drainage system is necessary because development is occurring in a staged manner.

The primary criteria are flow limits on the drainage channels from one development to another. These function as performance standards that must be met at the fence line of each development. Drainage plans within unconstructed developments have not yet been designed, but each developer is responsible for providing a series of channels and basins within their development so that performance standards at the fence line are satisfied.

In partial implementation of the regional drainage plan, and to address the conditions leading to the federal flood disaster of 1996, the City constructed a bridge on the OR&L right of way to breach the levee created by the OR&L berm. The bridge was designed in compliance with requirements of FEMA, the NFIP Coordinator, the City's Drainage Standards and the Kaloi Gulch Technical Committee's criteria. The bridge is capable of conveying the City's design flow (8,800 cfs at that location) but is presently constrained to the FEMA 100-year flow of 2,500 cfs in accordance with the Technical Committee criteria.

In addition, the Ewa Village golf course was constructed during the Ewa Villages Revitalization Project. The golf course is designed as a flood control facility (detention pond). Between the construction of the OR&L bridge and the Ewa Villages golf course (detention basin), flood hazards in Ewa Villages have been substantially mitigated.

Floodplain mapping in the roadway corridor has not kept pace with development in the area. Mapping has covered the area from Ewa Villages to the shoreline. Flood limits in most of the area above Ewa Villages have not been delineated by FEMA and are there "undetermined". However, because of the 1996 flood event, a FEMA flood plain was defined from the OR&L tracks to Mango Tree Road at the top of Ewa Villages. The limits of the Special Flood Hazard Area shown on Figure 3.8-1 include the historical housing

areas of Varona Village, portions of Tenney and Renton Villages, and the southern tip of the North-South Road Corridor.

In the absence of complete regional mapping, a series of Letters of Map Revisions (LOMR) and Conditional Letters of Map Revision (CLOMR) have been approved by FEMA. The function of these LOMR and CLOMR is to extend flood hazard designations into areas that have not yet been mapped, but where development has occurred or is imminent. Ultimately regional mapping will be extended, and the regional maps will subsume the findings of the LOMRs and CLOMRs.

For example, the City filed a LOMR which was approved by FEMA in 2001 to reflect the construction of the OR&L bridge. The LOMR showed that the entire Kaloi Gulch regulatory flood plain was contained within the Ewa Villages drainage system (the Ewa Villages golf course and ancillary drainage features). The FEMA study limit extended slightly north of Ewa Villages in anticipation of the connection to the proposed East Kapolei Drainage System.

Some developers on the Technical Committee have proceeded to implement portions of the ultimate regional drainage system. These facilities are able to convey the full City design flow, while replacing sufficient storage along the Kaloi Gulch so as not to cause an increase in runoff and sediments from pre-development conditions. For example, the Ewa Villages Golf Course and the Coral Creek golf course combined provide over 160 acre feet of retention and over 400 acre feet of detention. The Ewa Villages and Coral Creek Golf Courses storage basins are located "in-line" with the Kaloi Gulch channel. Their "in-line" configuration allows silt from the upper watershed flows to be filtered and trapped to minimize the amount flowing into the ocean. These two basins would receive the silt-laden water from the upper Kaloi Gulch watershed prior to it crossing Geiger Road. This system allows large quantities of storm water runoff to flow to coastal waters from larger, infrequent storms but the silt-laden water must first flow through two very large silting basins before discharging into the ocean. Ocean Pointe has also planned a golf course to help intercept silt from the storm water runoff prior to its reaching the ocean.

3.8.1.3 WETLANDS

No wetlands were identified in the project area (see Appendix F, North-South Road Corridor Study, Phase I, Botanical Survey Technical Report, November, 1996). The ACOE reported in a letter dated March 21, 1996 that Kaloi Gulch is not considered a wetland. However, as it contains an intermittent stream, the ACOE has jurisdiction over Kaloi Gulch and will regulate the placement of any fill or dredged material.

3.8.2 POTENTIAL IMPACTS

3.8.2.1 GROUNDWATER

As described in Section 3.8.1, the project occurs over the SOBA, an EPA-designated Sole Source Aquifer. In accordance with the 1984 Sole Source Aquifer Memorandum of Understanding between FHWA and EPA, a water quality assessment (Appendix I) was prepared to meet the coordination requirements of Section 1424 (e) of the Safe Drinking Water Act.

Without mitigation, the Build Alternative could result in roadway drainage and inadvertent spills infiltrating the SOBA at the northern portion of North-South Road the H-1 Freeway interchange. The project area traverses the boundary between caprock and basalt approximately 1,000 to 1,500 feet south of North-South Road's intersection with Farrington Highway. Similar potential impacts could also occur under the No-Build Alternative because other existing and future roadways overlie the SOBA, and development projects and roadway improvements are planned in these areas, such as the widening of Farrington Highway and other transportation facilities.

Initially, in a letter dated September 18, 1997, the EPA approved the project under the provisions of the Safe Drinking Water Act, Section 1424(e), concluding the coordination process. The EPA stated that it is unlikely that the project would substantially affect the SOBA Sole Source Aquifer, especially with the proposed drainage system and incident response procedures in place (Appendix I). In a letter dated April 19, 2004, EPA re-approved the project.

3.8.2.2 SURFACE WATER AND FLOODPLAINS

The existing drainage pattern in the corridor, consisting of intermittent streams with insufficient capacity for extreme rainfall events, and overland sheet flow, would need to be modified to accommodate Kapolei's development as Oahu's second city. The Kaloi Gulch Technical Committee has developed a plan, emphasizing performance standards that provides for the phased implementation of a regional drainage system consistent with Kapolei's eventual urbanization.

Chapter 2 describes the drainage facilities included in this project. These drainage facilities are more fully described in Appendix J.

This project will provide a portion of the regional drainage system, with components ultimately sized for the capacity necessary for full build-out of the watershed. There are several scenarios by which this ultimate capacity would be established, discussed more fully in Chapter 2. For example, the regional drainage channel could be excavated with a 10 feet wide bottom initially, and then widened. Or, the ultimate channel, 60 feet wide at the bottom, could be excavated initially, with limiters installed to constrain the flow until additional development occurs and systems downstream are in place to handle larger flows. However, the ultimate configuration of the drainage features would be the same

regardless of the development scenario that is selected. Additionally, the ultimate environmental impact of the North South Road, Kapolei Parkway, and the associated drainage system would be the same regardless of the development scenario. Therefore, it is the intent of this document to clear through the environmental review process the ultimate configuration of the project's contribution to the regional drainage system, independently of the details of how that ultimate configuration is achieved.

In addition to the regional drainage channel, this project includes other features sized for ultimate regional requirements, such as a basin, culverts, and cross-drains. It is logical for the initial roadway construction to include the ultimate sizing of these features to avoid subsequent roadway disturbance when the capacity of these features would need to be enhanced.

FHWA regulations require an analysis of floodplain impacts in accordance with 23 CFR 650. These requirements include a risk analysis and location hydraulic studies. Elements of the location hydraulic studies are contained in Section 3.8.4 below; the risk analysis will be completed before FHWA renders a FONSI/EIS determination for the separately prepared NEPA EA. Pending this study, the following preliminary information is provided to disclose/discuss the project's floodplain impacts.

The project would not adversely affect any portion of the FEMA floodplain or floodway.

1. The drainage basin just above Ewa Villages will be excavated in the flood plain, but the excavation will increase floodwater storage capacity, a beneficial effect.

2. At the bridge crossings of Kaloi Gulch, the roadway profile will be sufficiently raised to convey the flows within the channel, avoiding an impoundment of floodwaters at the bridge crossings.

3. Because the flood hazard designations mauka of Ewa Villages are largely "undetermined", construction of the roadway berm may involve placement of fill material in the floodplain. However, the concept of a floodplain in an area characterized by sheet flows needs to be considered. As described below, measures will be included so that the berm's impact on sheet flows will not be adverse. Moreover, intercepting sheet flows is a beneficial impact necessary for the planned urbanization of the area.

North-South Road would alter the local drainage pattern by interrupting sheet flow between Farrington Highway and Ewa Villages. The roadway would be placed on a berm, and act as an impediment to sheet flows. However, channelized flows within Kaloi Gulch would flow under the road because North South Road would include two bridge crossings of Kaloi Gulch.

Sheet flow that would collect along the west side of the roadway berm would be captured by an interceptor ditch on the western base of the berm. Large roadway cross-drains would then carry flows beneath the roadway embankment to the primary drainage channel on the east side of the roadway.

North-South Road would pass over Kaloi Gulch in two places (Figure 3.8-1). The Kaloi Gulch crossings would be bridges allowing flow in Kaloi Gulch to pass under the roadway. Because the roadway profile would preclude a complete bridging of Kaloi Gulch, an ACOE permit will be required to alter the upper portion of the stream banks to support the bridge. The affected bank portions would be above the normal flow level.

At the upper crossing of Kaloi Gulch, North South Road would be higher than the banks of the Gulch so the water exceeding the 800 cfs capacity of the Gulch would remain on the east side of the road. This overflow, together with other runoff on the east side of the embankment, would enter the proposed flood control drainage channel that would be constructed with the project. The drainage channel would have sufficient capacity to contain the FEMA 100-year flood flow and convey it to the existing Ewa Villages flood control facility (Ewa Villages golf course).

The Kaloi Gulch channel crosses North-South Road a second time just upstream of Ewa Villages. Flows that occur within and along the east side of channel would pass beneath the roadway through a 40-foot wide bridge and enter the Ewa Villages flood control facility (Ewa Villages golf course).

An area north of Ewa Villages (Figure 3.8-1) would be excavated to create a detention basin. This basin would function as a storm water storage area for increased runoff caused by the impervious surfaces associated with North-South Road. This basin would mitigate the loss of beneficial floodplain values, such as storm water retention, settling of the sediment load, and groundwater recharge, that would be adversely affected by the roadway construction.

Overflows from this new detention basin would discharge into the Ewa Villages Golf Course along the Kaloi Gulch channel. The existing box culvert into the Ewa Villages golf course will be increased (as part of this project) to pass 2,500 cfs, in accordance with Kaloi Gulch Technical Committee criteria.

The added flood control capacity provided by the new drainage channel and storage basin has sufficient volume to contain the FEMA 100-year flow, including the sheet flows that would be collected by the interceptor ditch and drainage channel along the North South Road roadway berm. In the interim phase, the drainage channel would be capable of conveying 7,400 cfs when the water level reaches the top of the channel bank (no freeboard). This is three times the FEMA 100-year flow of 2,500 cfs. This allows the interim phase of the channel to conform to City Drainage Standards.

As discussed in Chapter 2, there are several ways to provide this interim capacity, such as reducing the initial excavation of the channel, or excavating the ultimate channel dimensions and installing limiters to restrict the flow to the initial allowable conveyance rate.

As abutting developments progress, additional runoff would be generated through the creation of additional impervious surface. These abutting developments will need to meet the fence line discharge performance standards of the regional drainage plan.

Enforcement of these standards will occur through the City's review of drainage studies or master plans as part of zoning review.

Developers will need to consider whether they prefer to discharge to the North South Road drainage channel; discharge to Kaloi Gulch; construct a new drainage channel discharging to the Ewa Villages Golf Course; or make other arrangements. The allowable flow along the Kaloi Gulch channel into Ewa Villages would increase to 5,000 cfs. When all downstream flood control measures are in place, the full design flow would range from 6,000 cfs at the Farrington Highway, to 7,400 cfs at the top of Ewa Villages, to over 11,500 cfs at the ocean.

Should these developers propose to discharge to the North South Road drainage channel, the capacity of the channel will need to be increased over time to allow sufficient freeboard when flows reach 7,400 cfs, which corresponds to full build out in the watershed. (The channel to be constructed in the interim phase will convey 7,400 cfs with no freeboard. As development occurs, it will be desirable to provide for freeboard when flows of 7,400 cfs are conveyed).

There are options for increasing the capacity of the drainage channel, including channel widening through excavation, or moving limiters installed initially within the ultimate channel.

The natural and beneficial floodplain values of storm water retention, sediment settling, and groundwater recharge would be enhanced by the new detention basin and by the grass-lined drainage channel.

Negative impacts on regional drainage would not be substantial, either because the actions are in support of and instrumental to the planned regional development for the area, or because the impacts would be addressed by features included in this or other project descriptions.

Efforts to modify the sheet flow patterns of the Ewa Plain would continue regardless of the status of North South Road and Kapolei Parkway. All of the housing areas can be accessed without North-South Road and Kapolei Parkway. Flood risk for developments along Kapolei Parkway will be mitigated by the detention capacity of the Ewa Villages Golf Course. Development that will occur along the North-South Road will collect storm runoff and direct it into the flood control drainage channel along North-South Road for conveyance to the Ewa Villages Golf Course.

Landowner members of the Kaloi Gulch Technical Committee continue to develop their portion of the ultimate regional drainage plan, which includes storm water retention areas, such as golf courses, at various locations. Projects in the area are in various stages of planning, design, and construction so interim solutions must be implemented along with the ultimate solutions until all of the ultimate drainage improvements are constructed. The Kaloi Gulch Technical Committee's drainage plan facilitates the City's approval of ongoing improvements and mitigation of the impact of upstream developments and the greater conveyance of surface runoff to low-lying areas.

Apart from this North South Road and Kapolei Parkway project, Kaloi Gulch would be realigned into golf courses and other drainage control features from Ewa Villages to the ocean. Because a future regional drainage project may require the flow from the nearby Hunehune Gulch to be re-directed to the re-aligned Kaloi Gulch, project engineering for North-South Road has considered this possibility and would not preclude future options for such potential regional drainage improvements. However, modifications of Hunehune Gulch are not part of this project.

3.8.2.3 WETLANDS

Although Kaloi Gulch may be the expected area to find wetlands, as described in Section 3.8.1.3, no wetlands were identified in the project area. The Kapolei Parkway portion of the proposed project would not affect the Kaloi Gulch crossing because a bridge already exists in this segment, and no new bridges would be required. Therefore, no wetlands impacts would occur for either the No-Build or Build Alternatives.

3.8.3 MITIGATION MEASURES

3.8.3.1 GROUNDWATER

The storm water system proposed for the northern section of North-South Road and its interchange with the H-1 Freeway will collect and convey roadway drainage and inadvertent spills along the roadway to a discharge point approximately 1,500 feet south of Farrington Highway. The discharge point will be south of the caprock boundary, and therefore would be located above caprock. In addition, hazardous spills will require immediate containment and clean up as required by State regulations. With the proposed drainage system and these incident response procedures in place, potential infiltration impacts of the new roadway on the SOBA would be minimal. EPA has concurred with the planned mitigation measures.

3.8.3.2 SURFACE WATER AND FLOODPLAINS

North-South Road would affect existing sheet flow patterns and generate increased runoff through the creation of new impervious surfaces. The project includes features to capture, detain and convey the intercepted sheet flows safely, and in a manner consistent with the Kaloi Gulch Technical Task Force regional drainage plan. New volumetric storage capacity is being provided to store the increased amount of runoff created by impervious surface. The interim drainage concept for North South Road allows for future modifications of the roadway drainage system by others as the volume of storm water discharges from abutting developments increase. The Kaloi Gulch Technical Task Force plan allocates responsibility for enlargement of the North South Road drainage features to abutting developers. Abutting developers would cause the need for enlargement of the North South Road drainage system.

Because the project's impacts on surface waters, floodplains and hydrology would not be substantial, because of features included in the project definition, and because the project's modifications to drainage coordinate with master plans for the area, no additional mitigation is necessary beyond elements already included in the project definition.

An ACOE 404 permit and a HDOH Water Quality Certification will be required for the two Kaloi Gulch crossings. These permits would contain specific mitigation measures for the steam crossings.

The proposed drainage system for the North-South Road and flood hazard district certifications will be submitted to the City during the design phase to certify that the project is in compliance with the City's requirements as a participant in the NFIP.

3.8.3.3 WETLANDS

No mitigation measures are necessary because no wetland impacts are anticipated.

3.8.4 FINDINGS OF LOCATION HYDRAULIC STUDIES

FHWA requires certain findings pursuant to 23 CFR 650, Subpart A. These findings are summarized in Section 650.11, Subpart C. These points are as follow:

1) The risks associated with the implementation of the action.

The North-South Road would extend down gradient from the H-1 Freeway to the Kapolei Parkway. The flood plain in this area is generally characterized as shallow flooding with sheet flows of less than one foot in depth. There is a FEMA floodplain defined to approximately 300 feet above Ewa Villages with no floodway. The remainder of the area to the H-1 Freeway is undefined by FEMA because, currently, the flood risk is low because there are presently no structures in this area.

The East Kapolei EIS described the regional improvements required to control flooding in the area based on the requirements of the City's Flood Ordinance which meets the requirements of the National Flood Insurance Program, as reviewed by the State NFIP Coordinator, the City's Drainage Standards and the Kaloi Gulch Technical Committee's criteria. The East Kapolei Drainage Master Plan included a drainage channel along the North-South Road with storage basins intermittently spaced to control the increase in runoff due to the proposed development. One basin was located immediately above the Ewa Villages Golf Course. The proposed action would implement the drainage channel and the storage basin above the Ewa Villages Golf Course described in the East Kapolei Drainage Master Plan.

The proposed action would reduce floodplain risk. The proposed drainage channel, even in its interim configuration, would have the capacity to convey the

FEMA 100-year flow with adequate freeboard to convey two to three times that flow within its banks. The flood risk would also be improved through the increase of flood water storage capacity, by the construction of the detention basin. Also, the conveyance capacity of Kaloi Gulch would be maintained, because North-South Road would be placed on bridge crossings, allowing current flows to be maintained. Additionally, the drainage channel would be able to collect floodwater that presently sheet-flows across the plain.

When the ultimate capacity of the drainage channel is established, flood risk would decline further.

2) *The impacts on natural and beneficial floodplain values.*
Proceeding with the proposed project would enhance the floodplain values of natural moderation of floods through a new floodwater storage basin that would promote groundwater recharge and reduce the volume of silt, which would improve the water quality of the receiving waters.

The storm runoff that does not sheet flow across the floodplain would flow in a new grass lined channel along the roadway that would convey the storm runoff to the new storage basin that would be constructed immediately above the Ewa Villages Golf Course. This grass-lined channel would work with the basin to moderate the floodwaters, improve water quality and foster groundwater recharge prior to discharging into the Ewa Villages Golf Course.

3) *The support of probable incompatible floodplain development.*
Government plans specifically direct development to the Kapolei Area. The current existing drainage conditions need to be modified to accommodate this growth. An interim and long-term plan to modify regional drainage has been developed by the Kaloi Gulch Technical Committee. Implementing this proposed project is consistent with the Technical Committee's plan. Therefore, this project supports the modifications of regional drainage that are necessary for urban development.

4) *The measures to minimize floodplain impacts associated with the action.*
Under proposed conditions, several improvements are being implemented to mitigate the encroachment effects of the North-South Road project. These improvements include:

a. Installation of a new grass lined channel with a capacity of 2,500 cfs along the east side of North-South Road. The channel would serve to capture overflow from the upper Kaloi Gulch crossing with North-South Road. It would also serve to collect runoff from the roadway and from areas west of the roadway.
b. Installation of a new storage basin at the downstream end of the new drainage channel, just upstream of the Kaloi Gulch inlet to Ewa Villages. The storage basin will be grass lined and would serve to contain runoff volume increases resulting from the

impervious surfaces of the roadway, moderate flood flows, promote groundwater recharge and improve water quality.

c. Installation of additional culverts at the Kaloi Gulch inlet to Ewa Villages to pass 2,500 cfs. The added culverts would serve to increase the capacity of the existing 20 feet by 8 feet box culvert from approximately 800 cfs to 2,500 cfs.
d. Installation of two bridges to allow the storm runoff that is contained within the Kaloi Gulch channel to flow unimpeded under the roadway.
e. Installation of cross drains to allow runoff from the west side of the North-South Road to flow into the drainage channel.

5) *The measures to restore and preserve the natural and beneficial floodplain values impacted by the action.*

The proposed storage basin would naturally retain and detain storm runoff to moderate flooding. The basin will be grassed to naturally maintain groundwater quality through filtration and sedimentation and facilitate groundwater recharge. The basin would provide a landscaped open space to the floodplain. The grass-lined channel would also provide landscaping and open space values to the floodplain along with natural filtration of the storm water and groundwater recharge as it conveys the floodwaters to the basin. The new channel and basin would increase the conveyance to existing flood control features such as Ewa Villages Golf Course, the OR&L Bridge, the Coral Creek Golf Course and one day the Ocean Pointe Golf Course on its way to the ocean. The roadway's drainage features will be integrated with abutting roadway features, so a system-wide approach to the preservation of the natural and beneficial floodplain values will be implemented.

Another component of the Location Hydraulic Studies required by 23 CFR 650.11 is an alternatives analysis. The following is a discussion of the roadway alternatives that were considered. Further detail of this alternatives analysis will be included in the risk analysis currently being prepared.

The North-South Road is aligned generally longitudinal to the existing Kaloi Gulch channel between the H-1 Freeway and Ewa Villages. This configuration constitutes a longitudinal encroachment of the Kaloi Gulch flood plain.

Longitudinal encroachment alternatives that were considered include the following:

- Use of a transverse (east-west) roadway alignment
- Use of an at-grade roadway that matches the existing grade of the flood plain
- Use of structural supports to elevate the roadway above the flood plain
- Use of fill and bridge crossings to elevate the roadway above the flood plain combined with drainage mitigation measures

Transverse Alignment

Transverse alignment alternatives, such as east-west alignments, would result in a long roadway and would not result in a direct connectivity between the lower Ewa plain area and the H-1 Freeway. The cost would be higher than a north-south road and with less functionality.

At-Grade Roadway

A roadway placed at-grade would be subjected to flooding. Since this project is considered a major urban arterial roadway, placing the roadway at-grade would not fulfill the transportation reliability needs of such a facility, especially during emergency situations. The low roadway profile would also add capacity constraints to the Kaloi Gulch channel at the two locations where the roadway crosses the channel. The cost of an at-grade roadway would not be significantly lower than an elevated roadway on fill.

Elevated Roadway using Structural Supports combined with Drainage Mitigation Measures

A bridge structure would be required to elevate the roadway above the existing flood plain. This alternative has some impact on the flood plain conveyance due to the many pier supports that would be required. A parallel drainage channel system would still be needed to counter the effects of loss conveyance. The cost of the elevated roadway using structural supports would be significantly higher than an at-grade roadway or an elevated roadway on fill, and access to this highway alternative would be more difficult and inefficient than with an at-grade roadway or an elevated roadway on fill, described below.

Elevated Roadway using Fill and Bridge Crossings combined with Drainage Mitigation Measures

Bridge structures over Kaloi Gulch in combination with fill would enable the roadway to be elevated above the existing flood plain. As in the previous alternative, this alternative will also require a parallel drainage channel system to counter the effects of loss conveyance.

The "Elevated Roadway using Fill and Bridge crossings combined with Drainage Mitigation Measures" was selected as the most practical and cost-effective alternative.

3.9 HAZARDOUS MATERIALS

3.9.1 EXISTING CONDITIONS

A Hazardous Materials Technical Report, included as Appendix K, was completed in 1997 to investigate the potential occurrence of hazardous materials along the proposed North-South Road alignment. The area studied for the assessment encompassed the proposed alignment and adjacent areas. Records at the State of Hawaii Department of

Health (HDOH) have since been reviewed to update the findings of the 1997 report and to evaluate the portion of Kapolei Parkway between Renton Road and North-South Road.

The 1997 database search included federal and state environmental databases, in accordance with the American Society for Testing and Materials (ASTM) standards for environmental site assessments (E1527-93). The sites identified from the database search were examined during a site reconnaissance and a review of files at the HDOH to identify and confirm the reported location, to assess the general "housekeeping" at the site, and to identify additional environmental concerns. In addition, the project area was surveyed to identify potential contaminant sites that were not listed in the databases, but presented a potential environmental concern based on observations during the site reconnaissance.

Data from the HDOH were obtained for sites identified in the databases. Data at HDOH generally consist of tank registration documents, documented environmental violations, general extent of contamination at the site, types of contaminants identified, contaminant concentrations detected, and status of remedial actions. Groundwater flow direction and depths were also obtained from HDOH files to further assess the migration potential of contaminants along the alignment.

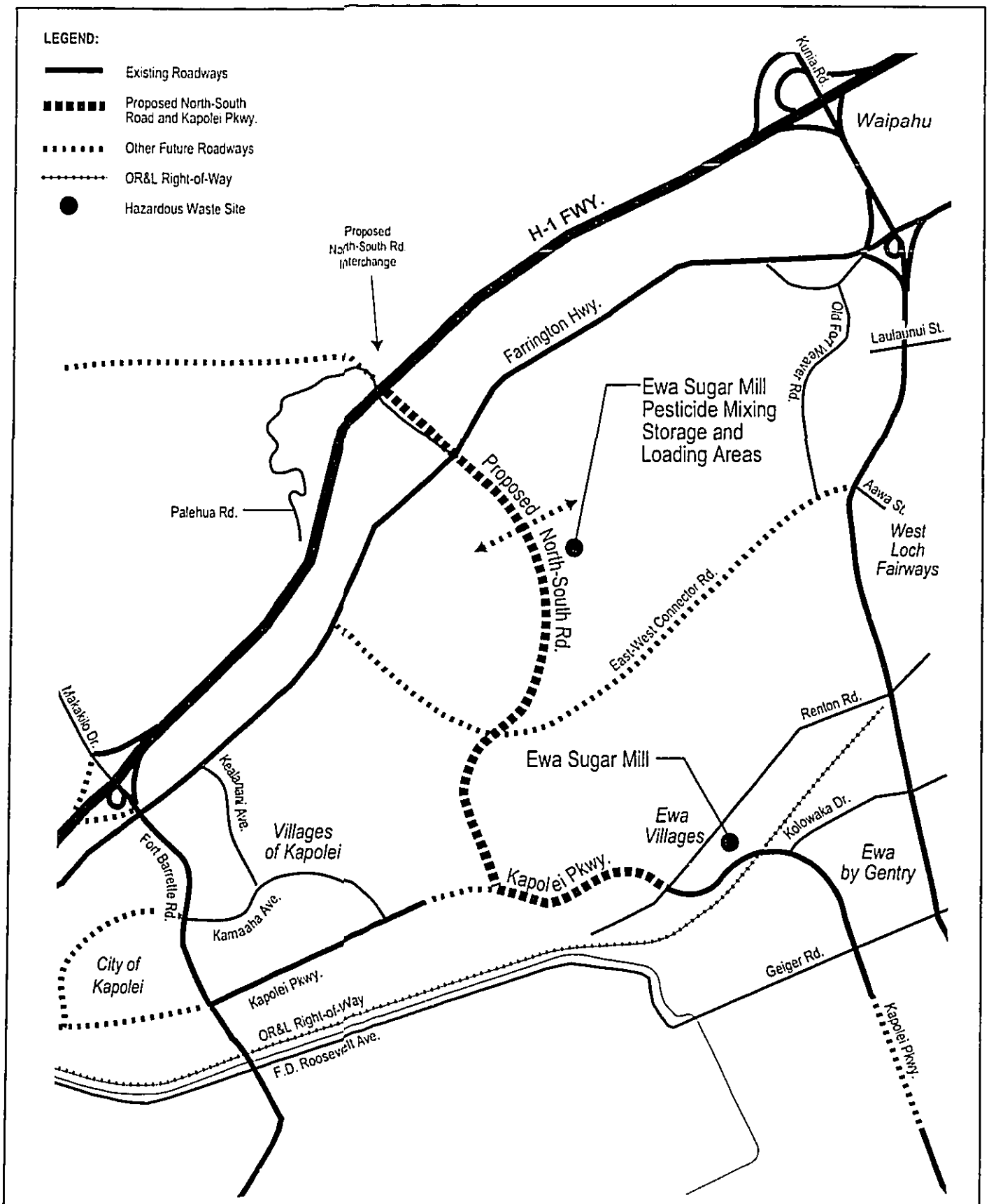
The intent of the assessment was to identify reported and obvious potential hazardous material conditions that would need to be addressed by the project. A definitive determination of the actual presence or absence of contamination has not been made. The assessment was not performed to meet "innocent landowner" provisions under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) that establish a defense for the purchase of real property. This assessment does not guarantee, imply, or assert that all potential contaminant sources have been located, due to the possible presence of an unlisted contaminant occurrence. The presence of asbestos-containing material, lead-based paint, and radon was not determined as part of this assessment.

The search of federal and state environmental databases identified an entry on the CERCLA list. The entry was the Ewa Sugar Mill/Oahu Sugar Company which consists of several sites. One of the sites, the pesticide mixing, storage, and loading area, is located approximately 1,000 feet to the east of the proposed North-South Road alignment in an abandoned sugarcane field (Figure 3.9-1). A second site, consisting of the sugar mill buildings, is located on Renton Road near its proposed intersection with Kapolei Parkway. It is approximately 20 acres. The other site is a coral pit located 1.8 miles south of the sugar mill.

No additional sites were identified from historical maps, aerial photography, and site reconnaissance.

3.9.2 POTENTIAL IMPACTS

Two potentially contaminated sites associated with the Ewa Sugar Mill/Oahu Sugar Company were identified near the North-South Road/Kapolei Parkway Corridor. The



Hazardous Waste Sites
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Figure 3.9-1

pesticide mixing, storage and loading area is located approximately 1,000 feet from the proposed North-South Road alignment. Soil in the pesticide mixing, storage and loading area is contaminated with dioxins, furans, herbicides and pesticides used by Oahu Sugar Company. Wells in the caprock aquifer in the pesticide mixing, storage and loading area have shown traces of pesticides such as altrazine.

The soils in the roadway ROW are not expected to be contaminated by groundwater containing pesticide residues because the groundwater gradient is south southeast toward the coastline. In addition, the excavation required to build the road would not be deep enough to encounter groundwater.

Although the mill property is near the proposed section of Kapolei Parkway, the main mill operations were located along Renton Road at least 1,000 feet from the alignment. Hydrocarbons, volatile organic compounds, heavy metals, pesticides, and polychlorinated biphenyls (PCBs) have been identified near Renton Road. Samples were not collected adjacent to Kapolei Parkway. Although the groundwater gradient could flow toward Kapolei Parkway, down gradient wells on the Ewa Sugar Mill/Oahu Sugar Company site did not indicate groundwater contamination near the Kapolei alignment (Environet, Inc., 2002).

The coral pit is located too far from the project to be of concern.

Although the sites identified are highly unlikely to affect the project, the contractor will be required to train their workers to be diligent in observing any potential indicators of hazardous materials in the construction area. In addition, illegal dumping, abandoned barrels, and other forms of waste not easily discerned through record searches and published reports should be cautiously approached.

3.9.3 MITIGATION MEASURES

No hazardous materials impacts are expected. However, workers will be aware of illegal dumping, odors, discoloration, and other indications of possible contamination.

3.10 HISTORIC RESOURCES

3.10.1 REGULATORY REQUIREMENTS

Section 106 of the National Historic Preservation Act (NHPA) requires that federal agencies consider the effect of their projects on any resource listed on or eligible for the National Register of Historic Places (NRHP). The Section 106 process involves coordination and consultation with the State Historic Preservation Officer (SHPO), and other agencies and organizations that have an interest in or are mandated to protect historic properties. In addition, the Advisory Council on Historic Preservation (ACHP) is afforded the opportunity to comment on actions that may potentially affect historic properties. The requirements of Section 6E-8 of the Hawaii Revised Statutes (HRS) place similar responsibilities on State agencies to evaluate their projects. Since the

project involves both federal and State agencies, both regulations apply to the project. Completion of the Section 106 process would normally satisfy the requirements of HRS Section 6E-8.

In accordance with regulations provided in 36 Code of Federal Regulations (CFR) 800, the federal sponsoring or regulating agency after initiating the Section 106 process, has the responsibility of conducting a good faith effort to identify whether there are any historic properties in the project's Area of Potential Effect (APE). If a historic property(ies) were identified within the APE, the federal agency would then assess whether it would be adversely affected by the proposed project. If the effect were "adverse", such an effect is resolved through a Memorandum of Agreement with the SHPO, which may include the ACHP. The HRS Section 6E-8 process, as described in regulations provided in Title 13, Chapter 275 of the Hawaii Administrative Rules, is similar to the Section 106 process.

3.10.2 EXISTING CONDITIONS

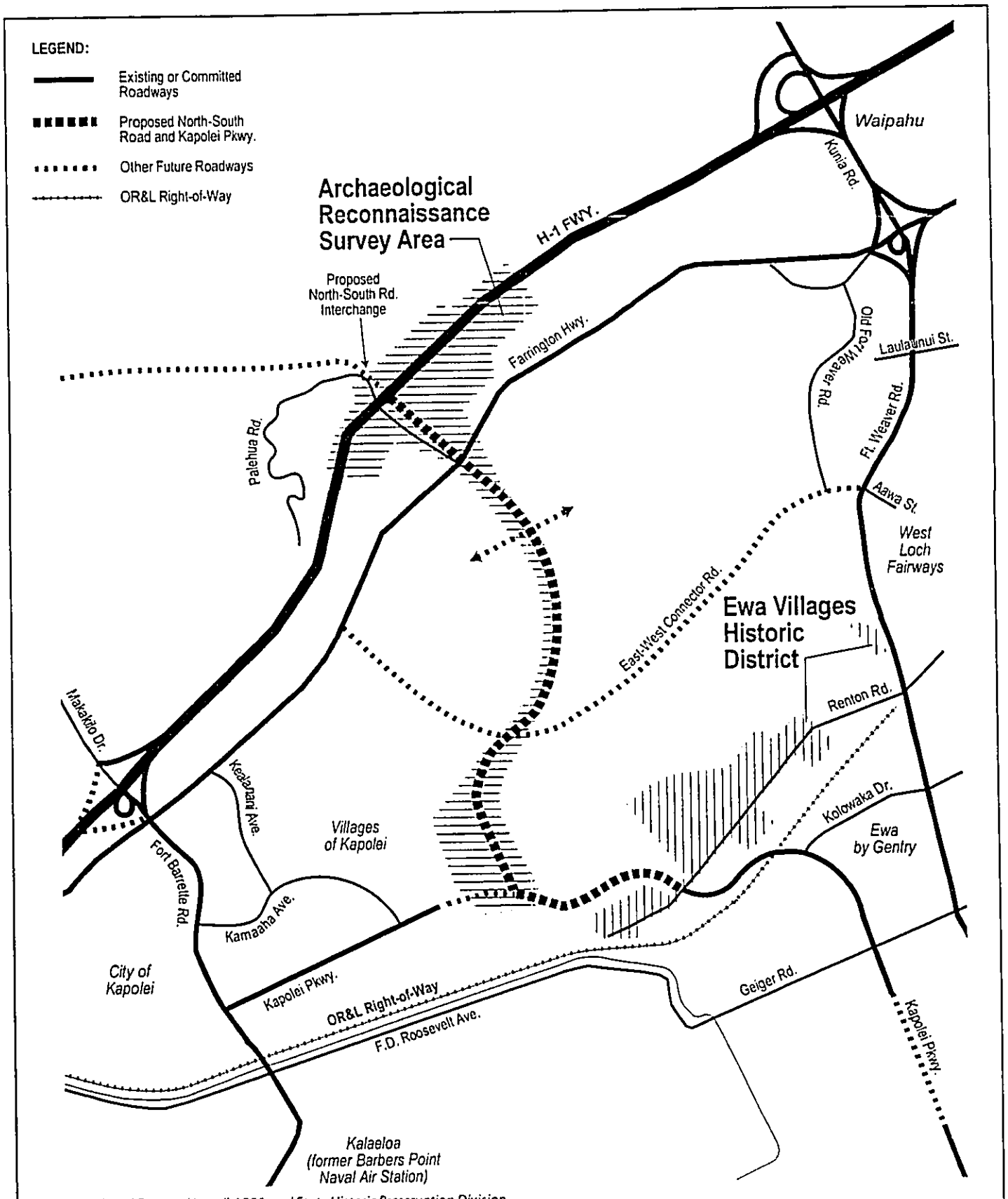
This section describes the actions taken to identify historic properties in the project's APE. A historic property is any district, site, building, structure, or object that is on or eligible for the NRHP. The APE is defined as the geographic areas within which an undertaking may directly or indirectly cause changes in the character of historic properties, if any such properties exist. For this project, FHWA has defined the APE as the area affected by construction, which includes:

- North-South Road, including an interchange with the H-1 Freeway;
- Kapolei Parkway from its intersection with North-South Road to its intersection with Renton Road; and
- Additional ROW needed for a drainage channel along North-South Road and a flood detention basin.

As part of the earlier environmental review process conducted for the North-South Road project, an archaeological reconnaissance survey was conducted along the North-South Road corridor (see Appendix V and Figure 3.10-1). No archaeological sites, such as prehistoric or early historic Hawaiian sites, were identified in the survey mainly because the corridor is within an area that was used for commercial sugarcane cultivation between the late 19th century and the early 1990s. Remnants of plantation infrastructure were observed during the survey, such as flumes, ditches, and roadways. These sites are not considered of historic value and would not be eligible for the NRHP.

An earlier archaeological assessment for the East Kapolei Development project, which encompassed the area surrounding the North-South Road corridor also concluded that the area is highly unlikely to contain archaeological sites because of past commercial sugarcane cultivation (November 6, 1996).

There are two well-known historic properties in the general vicinity of the segment of Kapolei Parkway, from the proposed North-South Road to Renton Road: Ewa Sugar Plantation Villages (Ewa Villages) Historic District (State Site 50-80-12-9786), and the



Sources: Cultural Surveys Hawaii, 1996; and State Historic Preservation Division.

SCALE:
0 1000 2000 3000 FT.

N

Archaeological Survey Area & Historic Properties in the Project Vicinity

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Figure 3.10-1

OR&L ROW (State Site 50-80-12-9714) (see Figure 3.10-1). FHWA has determined that a portion of the Ewa Villages Historic District is within the project's APE, but that the OR&L ROW is not within the APE (see Figure 3.10-1).

The City and County of Honolulu implemented a project to redevelop Ewa Villages, which included rehabilitation of certain houses, construction of new residences, and providing for parks, and roadway and other infrastructure, included establishing a portion of Ewa Villages as a historic district. The Ewa Villages Historic District was placed on the Hawaii Register of Historic Places (HRHP) in 1996, and was nominated to the NRHP in 1995. Ewa Villages is the oldest existing community in the Ewa region. Built around the Ewa Sugar Mill in the 1890s, the villages grew around the mill site over the next 60 years. At one time there were as many as eight "villages" housing immigrant plantation workers. Presently, only Renton, Tenney, Fernandez, and Varona Villages remain. These villages and other associated historic plantation structures, such as the Ewa Community Church, Ewa Hongwanji Mission, and the Ewa "J" Club, constitute this historic district.

The OR&L ROW, which is listed in the NRHP, is 13 miles long and has a width of 40 feet, running between Honouliuli to the east and Nanakuli to the west. The OR&L ROW contains narrow-gauge steel rails (36 inches) on a raised roadbed of mixed materials. The historical significance of the OR&L ROW is that it is a well preserved remnant of the 175 miles of track laid by this company that had a tremendous effect on the economic development of Oahu and the State of Hawaii in the early and mid 1900's. Another type of potential historic property is traditional cultural properties. A major traditional cultural property in the region may have been those associated with the gathering of native plant resources. However, such gathering activities currently do not appear to occur within the project area. See Section 3.4 for a discussion of this and other potential contemporary cultural activities.

3.10.3 POTENTIAL IMPACTS

Under NHPA Section 106, the federal agency – in this case, FHWA – is responsible for assessing the effects of the project (i.e., Build Alternative) on all historic properties within the APE. Pursuant to Section 106, FHWA can render one of the following three possible findings:

- no historic properties affected;
- no adverse effect; and
- adverse effect.

"No historic properties affected" means that either there are no historic properties present, or there are historic properties present but the undertaking would have no effect upon them of any kind (that is, neither harmful nor beneficial).

"No adverse effect" means that there could be an effect, but the effect would not be harmful to those characteristics that qualify the property for inclusion in the National Register.

An "adverse effect" means an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property.

As described in Section 2.2, the No-Build Alternative assumes that the portion of Kapolei Parkway between Renton Road and North-South Road would be constructed. As a City project under the No-Build Alternative, construction of Kapolei Parkway would be subject only to HRS Section 6E-8 review by the State Historic Preservation Division (SHPD). However, under the Build Alternative, construction of Kapolei Parkway would be "federalized", expediting its completion. Therefore, the HRS Section 6E-8 and NHPA review of this project includes the City's portion of Kapolei Parkway.

As described above, the project area was used for commercial sugarcane cultivation for many decades throughout the 20th Century. Sugarcane cultivation requires extensive grading and burning of crops, which would have destroyed any historic sites that may have been present. SHPD staff determined that the entire project area would be within former sugarcane land, and therefore, they would agree with a "no historic properties affected" determination with regards to archaeology (e-mail correspondence dated March 11, 2004).

Under all the alternatives, the portion of Kapolei Parkway from Renton Road and North-South Road would be constructed, and its intersection with Renton Road would be within the Ewa Villages Historic District, although most of the road would be outside of the district. The alignment of Kapolei Parkway was master planned as part of the City's effort to establish Ewa Villages as a historic district, and therefore, the roadway does not require the displacement of any structure within the district. The Kapolei Parkway/Renton Road intersection would be located in a relatively isolated area of the historic district, and not within the district proper, which contains many of the contributing or individually historic structures of the district.

The appearance of the proposed Kapolei Parkway will be designed to be continuous with the makai portion of Kapolei Parkway in the Ewa by Gentry neighborhood in order to provide a consistent look to the roadway. By the time the mauka portion of Kapolei Parkway is constructed, which is part of the proposed action, its intersection with Renton would already include an upgrade to the existing unimproved Renton Road. Construction of the makai portion of Kapohei Parkway will include extending the curbs, gutters and sidewalks that currently end at the Kaloi Gulch bridge. The appearance of the parkway will also be similar to Renton Road, which is within the historic district and was developed to be consistent with the district's historical integrity. The proposed portion of Kapolei Parkway will include a landscaped median with enough room for large shade trees, and landscaped sidewalks. The Kapolei Parkway/Renton Road intersection will likely warrant traffic signals regardless of the alternative selected (see Sections 2.1 and 2.2).

In addition to consulting with SHPD staff, FHWA invited the following organizations by mail to participate in consultation regarding the above effect determinations:

- Office of Hawaiian Affairs (OHA)

- Historic Hawaii Foundation
- Hui Malama I Na Kupuna O Hawaii Nei
- Oahu Island Burial Council (OIBC)
- Hawaiian Railway Society

In addition, other community organizations and individuals were also asked to participate in consultation (see Appendix A). Consultation letters were sent on May 7, 2004. Consultation with OIBC was intended to include an appearance at its June 9, 2004 meeting. However, OIBC was unable to have a quorum for this meeting, and the consultation was moved to July 14, 2004. No comments regarding historic properties or issues in the APE were received from the consulting parties.

Based on the information described above and in accordance with NHPA Section 106, FHWA rendered a "no historic properties affected" determination with regards to archaeology. With regards to the Ewa Villages Historic District, FHWA rendered a "no adverse effect" determination on August 20, 2004 (see Appendix A). In a letter dated September 8, 2004, the SHPO concurred with these effect determinations, thus completing the NHPA Section 106 process. In its letter, SHPO agreed that given the modern alterations to the portion of Renton Road crossed by the proposed project, the property affected is not a contributing property to the historic district, and that the project would have "no adverse effect" on the historic district as a whole or on its integrity. However, the SHPO requested that Renton Road remain "a framed view corridor" linking the distinct plantation villages within the historic district.

3.10.4 MITIGATION MEASURES

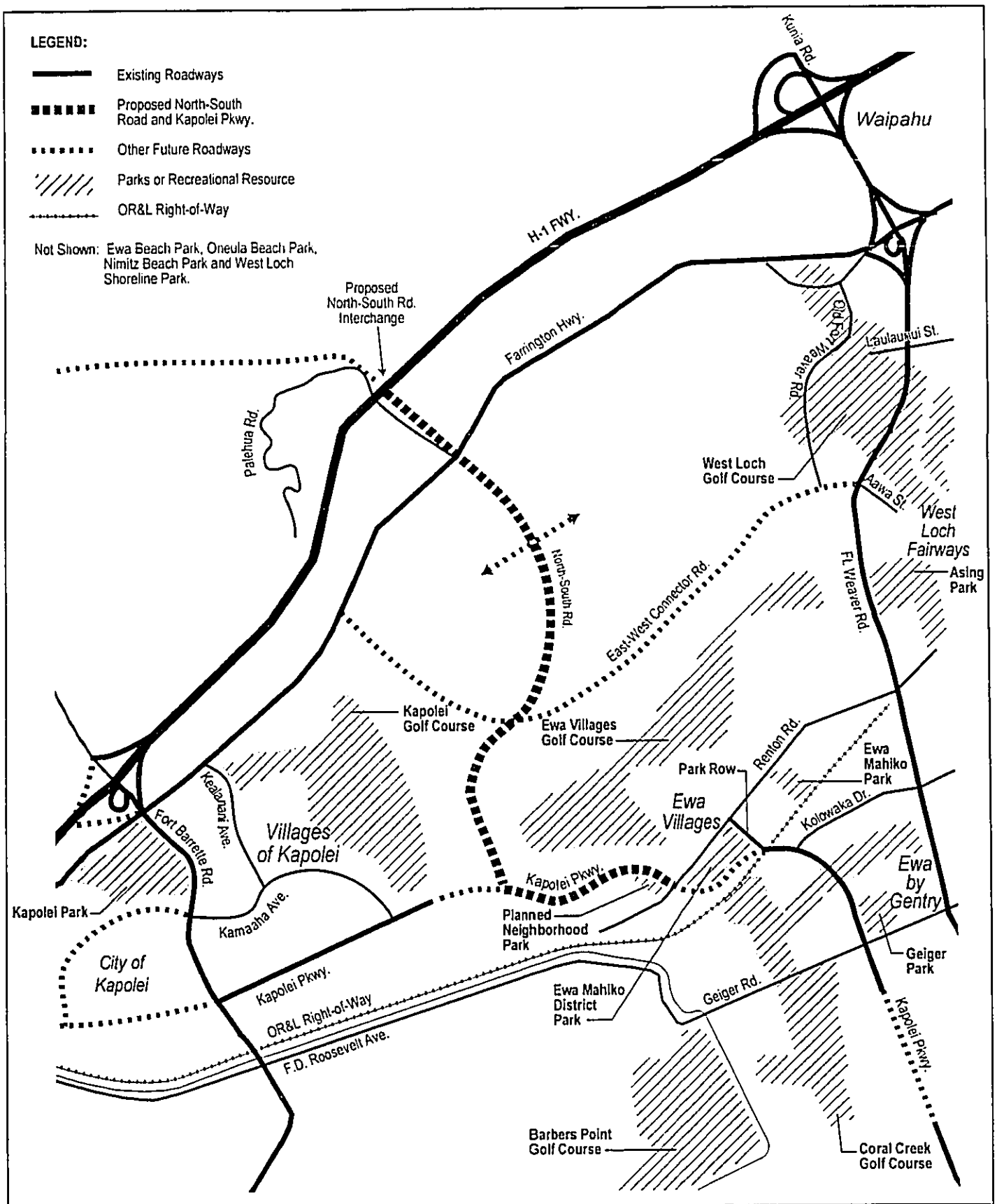
The City Department of Design and Construction (DDC) will be responsible for constructing the Kapolei Parkway/Renton Road intersection as part of a separate project. Despite the "no adverse effect" determination on the portion of Kapolei Parkway between Renton Road and North-South Road, DDC will include SHPD comments as input into the design of the traffic signal hardware. DDC will also discuss with SHPD potential treatments to maintain the visual continuity on Renton Road through this intersection. This mitigation measure applies to both the No Build and Build Alternatives because the traffic signals are anticipated to be warranted under both alternatives.

3.11 PARKS AND RECREATION

3.11.1 EXISTING CONDITIONS

The Ewa Plain contains a number of beach parks, golf courses and neighborhood or community parks and (see Figure 3.11-1).

Beach parks near the project area include Ewa Beach Park and Oneula Beach Park in Ewa Beach and Nimitz Beach Park in the former Barbers Point Naval Air Station.



Parks and Recreational Resources

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Figure 3.11-1

Municipal, private and military golf courses located next to the proposed project include the following (see Figure 3.11-1):

- Ewa Villages (municipal)
- West Loch (municipal)
- Kapolei (private)
- Coral Creek (private)
- Barbers Point (military)

There are no parks at or next to the proposed North-South Road and Kapolei Parkway from North-South Road to Renton Road (see Figure 3.11-1). However, Ewa Mahiko District Park is adjacent to the future segment of Kapolei Parkway between Renton Road and the OR&L ROW, and Geiger Park is adjacent to Kapolei Parkway in Ewa by Gentry (see Figure 3.11-1). Both parks are frequented primarily by residents of the surrounding Ewa by Gentry and Ewa Villages community.

Ewa Mahiko District Park is triangularly-shaped, bordered by Kapolei Parkway, Renton Road, and Park Row. The latter is a future roadway extension from Renton Road to Kapolei Parkway near the OR&L ROW. The park currently features large grassy fields, which include baseball/softball fields, a new comfort station, and parking off of Renton Road. The northwest corner of the park, adjacent to the future Kapolei Parkway and Renton Road intersection is designated for flood control since it is immediately downstream from a bridge on Renton Road (technically called "North-South Road Bridge" by the City and County) over Kaloi Gulch. Future plans for this park include a gymnasium; basketball, tennis, and volleyball courts; a swimming pool; and additional parking off of the future Park Row. A few buildings in association with the historic Ewa Mill site that are on park property may be re-developed for community and recreational purposes, but there are no confirmed development plans. Geiger Park is located at the corner of Kapolei Parkway and Geiger Road. It features a baseball diamond with backstop, a large grassy field, playground equipment, and comfort station.

Other notable parks in the general vicinity of the project include Ewa Mahiko Park (not to be confused with Ewa Mahiko District Park) located just east of Ewa Mill, Asing Park located on the east side of Fort Weaver Road near Renton Road, and West Loch Shoreline Park (see Figure 3.11-1). Access to Ewa Mahiko Park is off of Renton Road, and the park features basketball courts, a baseball/softball field, and a comfort station. Asing Park, a municipal facility, provides baseball/softball fields, basketball courts, and

a community center. West Loch Shoreline Park's major feature is its pedestrian/bike path that is also accessible from Asing Park.

The Hawaiian Railway Society currently oversees railroad operations as a tourist attraction on the OR&L ROW. Its main facility (railroad baseyard and museum) is located south of Varona Village across Renton Road, and its train runs between the museum and Kahe Point at the end of the Waianae Coast. According to its letter dated March 6, 1999 (see Appendix A), Hawaiian Railway Society plans to initiate railroad operations on the portion of the ROW east of the museum. In addition, HDOT is planning

to develop a bike path within the ROW from West Loch Shoreline Park to Kahe Point (see Section 3.3.1.3).

A neighborhood park is planned between Kapolei Parkway and Varona Village on the north side of Renton Road.

3.11.2 POTENTIAL IMPACTS

As described in Section 2.2, the No-Build Alternative assumes that Kapolei Parkway from Renton Road to North-South Road would be constructed, but at a later date than under the Build Alternative. Therefore, under the No-Build Alternative, Kapolei Parkway would be developed, but because its alignment was master planned during the Ewa Villages re-development project by the City and County of Honolulu, it would not require ROW from any existing park or recreational facility, such as Ewa Mahiko District Park. It would also not adversely affect development of any future park or recreational facility, such as the planned park next to Varona Village, and the OR&L bike path. Development of Kapolei Parkway would facilitate public access to parks and recreational facilities by improving regional mobility in Ewa.

Under the Build Alternative, development of North-South Road would also not require ROW from any existing park or recreational facility. In addition, the project would not affect development of any planned park or recreational facility. The addition of North-South Road to the roadway network would facilitate public access to parks and recreational facilities to a greater extent than under the No-Build Alternative by providing access to the H-1 Freeway.

3.11.3 MITIGATION MEASURES

Mitigation is not necessary because no adverse impacts to parks and recreational resources are anticipated.

3.12 SECTION 4(F)

Section 4(f) of the Department of Transportation Act, 49 U.S.C. 303 and 23 U.S.C. 138 (hereafter, "Section 4(f)"), permits transportation projects to use land from a significant publicly-owned public park, recreation area, wildlife and waterfowl refuge, or a historic site only when FHWA has determined that:

- There is no feasible and prudent alternative to use of that land; and
- The project includes all possible planning to minimize harm to the property resulting from such use.

The purpose of Section 4(f) is to preserve significant parkland, recreation areas, refuges, and historic/archaeological sites by limiting the circumstances under which such land can be used for transportation projects. The word "use" in this case means:

- Land is permanently incorporated into a transportation facility;
- There is a temporary occupancy of land that is adverse in terms of preservation of the resource; or
- The project's proximity to the site substantially impairs those functions that qualify the site as a Section 4(f) resource even though no land is permanently or temporarily acquired. This type of use is called "constructive use."

The proposed project would not require a Section 4(f) "use" for the following reasons:

The proposed project would not use lands from publicly-owned public parks or recreational facilities, or wildlife and waterfowl refuges because no such resources exist within the ROW needed for the project.

Although a portion of the proposed project would intersect Renton Road within the Ewa Villages Historic District, which is eligible for the NRHP (see Section 3.10), FHWA has determined that a Section 4(f) use would not occur, based on guidelines provided in FHWA's "Section 4(f) Policy Paper" (September 24, 1987, Revised June 7, 1989), because the property affected is not an integral part of the historic district, and the affected property is not a contributor to the historic character of the district. Renton Road has been modernized and has been re-constructed based on current standards; similarly, the Registration Form submitted by SHPD to the National Parks Service in order to nominate the Ewa Villages Historic District for the National Register has omitted Renton Road as one of the 17 specified contributing sites. As noted in Section 3.10, FHWA rendered a "no adverse effect" determination regarding the potential impact of this project on the historic district, pursuant to NHPA Section 106. In a letter dated September 8, 2004, the SHPO agreed that the affected area of the district does not contribute to the historic characteristics of the district.

Similarly, a "constructive use" would also not occur, because the proposed action would not impair the functions of those historic elements within the district that contribute to the district's historic characteristics, as stated in FHWA's Section 106 effect determination letter to SHPD, and as noted in the concurrence received from SHPO (see Section 3.10 and Appendix A). Copies of coordination letters exchanged with the SHPD and SHPO are in Appendix A.

3.13 VISUAL AND AESTHETIC RESOURCES

3.13.1 EXISTING CONDITIONS

Existing visual resources encompass a variety of physical features including landforms, scenic vistas, historic monuments, and vegetative communities. Adopted preservation policies signify the value of visual resources within a given community or local area. Policy documents and land use ordinances often identify sensitive visual resources within an area and develop policies for their preservation.

The project site is located in the Ewa Plain on the leeward side of Oahu. As described in Sections 3.1 and 3.2, the Ewa Plain was once used for sugarcane cultivation. It is now

undergoing substantial urbanization, but there are still areas used for agriculture. The undeveloped lands are characterized as fallow agricultural fields, supporting weedy plants, koa haole scrub, and mixed scrub.

The topography of the Ewa Plain, as described in Section 3.2, is relatively flat from the shoreline to the H-1 Freeway where the grade increases to the Central Oahu plateau. The southern slopes of the Waianae Mountain Range and Kalaeloa Barbers Point define the northwest and western boundaries of Ewa, respectively.

The Ewa Development Plan (Ewa DP; see Section 3.1.2.2b) identified the following visual landmarks and vistas that are to be preserved and enhanced:

- Shoreline and ocean;
- Waianae Mountain Range;
- Na puu at Kapolei;
- Makai views from Makakilo; and
- Views of Central Honolulu and Diamond Head.

The Ewa DP also identified the historic OR&L ROW and the Ewa Villages Historic District (see Section 3.10) as important visual resources.

3.13.2 POTENTIAL IMPACTS

3.13.2.1 METHODOLOGY

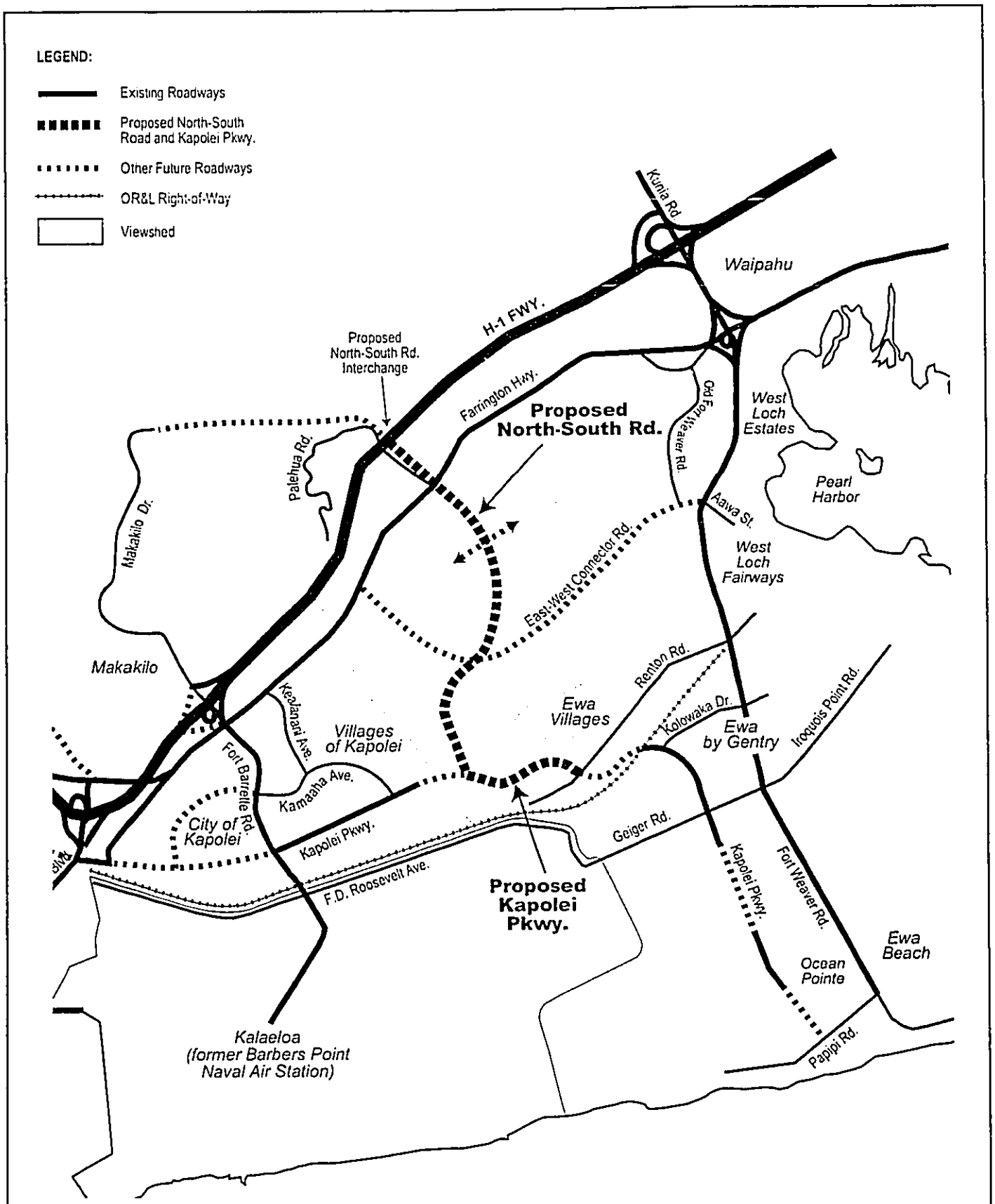
The analysis of visual impacts considers the following concepts and factors:

- Viewshed;
- Viewer groups;
- Landscape units; and
- Key views.

Viewshed. The viewshed is the surface area that is visible from a variety of viewpoints. The viewshed can be affected by topography, vegetation, and the built environment. The viewshed for the proposed project is shown in Figure 3.13-1.

Viewer Groups. A viewer group is a group of persons who, based on their location, activity, and length of exposure to a view, might be affected by the introduction of the project into the viewshed. The viewer groups identified for this analysis include residents, motorists, and those using recreational resources near the project.

Landscape Unit. A landscape unit is a subdivision of the viewshed's landscape setting. Each landscape unit is relatively homogeneous in physical and visual characteristics. Landscape units are used to evaluate physical changes within the viewshed and related visual impacts. The following landscape units were identified for the analysis and include the visual landmarks and vistas identified in the Ewa DP:



North-South Road and Kapolei Parkway Viewshed

North-South Road and Kapolei Parkway Project
Final Environmental Assessment
Figure 3.13-1

- Mauka landscape unit, which includes the Waianae Mountain Range and Central Oahu plateau;
- Makai landscape unit, which includes Kapolei and Ewa Village Golf Courses and the undeveloped area of the Ewa Plain; and
- Historic District landscape unit, which includes the Varona and Tenney Villages, and the Ewa Villages Historic District as a whole.

Key Views. Key views represent the range of visual resources within the study area, the landscape units, and the viewer groups. The key views identified for analysis are shown in Figure 3.13-2. The figure shows the location and direction of view for each key view. The key views include:

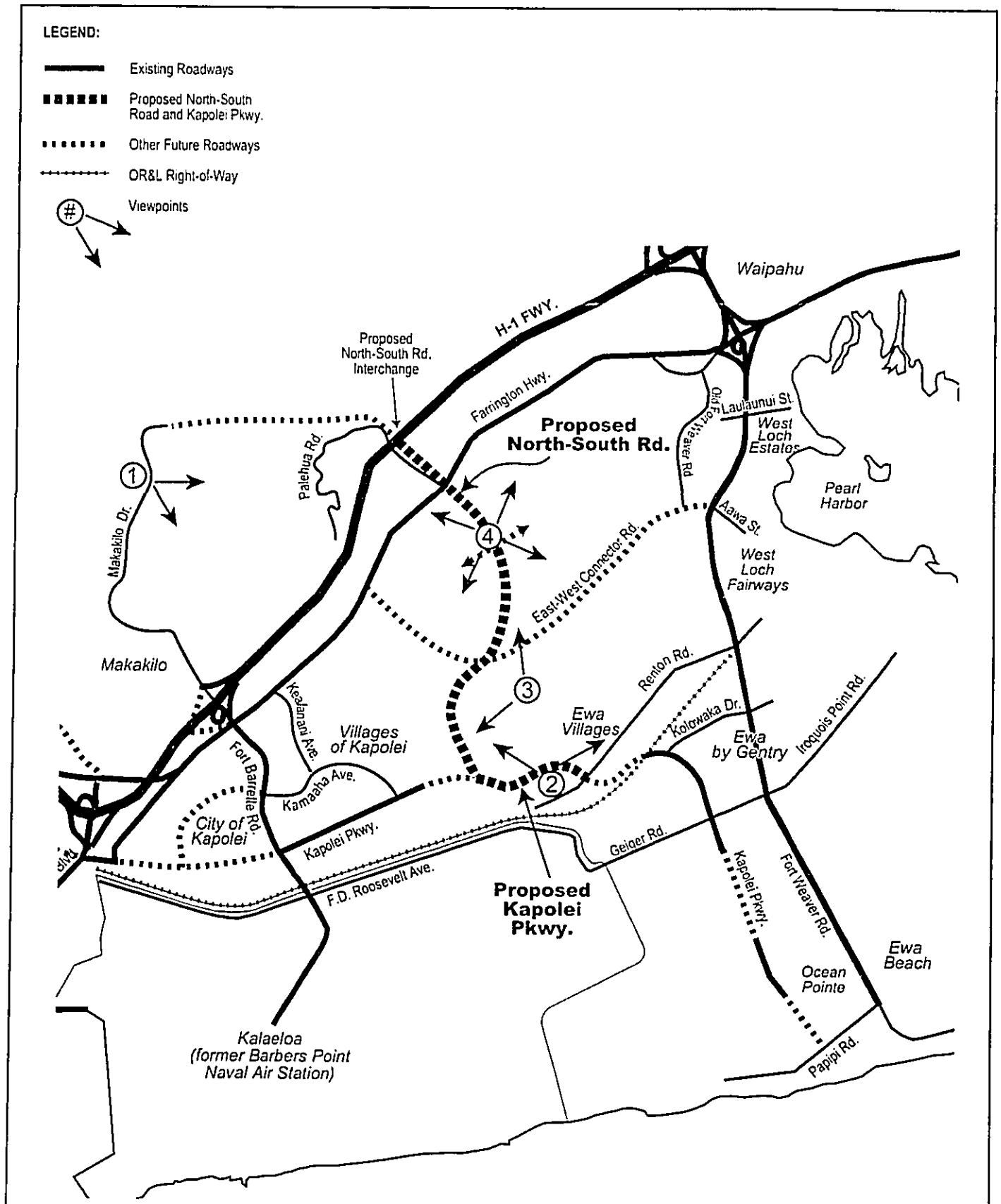
- Viewpoint 1: Upper part of Makakilo on the eastern side of the south ridge, looking southeast across the Ewa Plain towards the proposed project site. This key view represents the perspective of the residential viewer group within the mauka landscape unit.
- Viewpoint 2: Varona Village looking northwest towards the Waianae Mountain Range and northeast towards Tenney Village. This key view represents the perspective of the residential viewer group within the makai and historic district landscape units.
- Viewpoint 3: Ewa Villages Golf Course looking north towards the Waianae Mountain across the Ewa Plain. This key view represents the perspective of the recreational viewer within the makai landscape unit.
- Viewpoint 4: Future North-South Road looking north or south towards the Waianae Mountains or ocean respectively. This key view represents the perspective of the motorist viewer group within the makai landscape unit.

Evaluation of visual impacts considers the physical changes that would occur within the view-frame of the selected key views. Physical changes are evaluated based on how they would affect the existing visual environment in relation to its vividness, intactness, and unifying theme. It should be noted that viewer sensitivity to visual changes can vary, affecting the perceived impact of physical changes within a selected view-frame.

3.13.2.2 VISUAL IMPACTS

The No-Build Alternative would include construction of the portion of Kapolei Parkway between Renton Road and North-South Road, a roadway that would provide up to six travel lanes, a landscaped median and sidewalks, and a bike/pedestrian path. The physical appearance of the proposed portion of Kapolei Parkway would be similar to the section of Kapolei Parkway in Ewa by Gentry and Renton Road because of the opportunity to provide large shade trees in the median and smaller trees along sidewalks.

Under the Build Alternative, the physical appearance of North-South Road would be similar to portions of Fort Weaver Road as well as to Kapolei Parkway, and would include a landscaped median with large shade trees and landscaped sidewalks.



Viewpoints for Analysis

North-South Road and Kapolei Parkway Project
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Figure 3.13-2

Neither the proposed portion of Kapolei Parkway nor North-South Road would be elevated on a viaduct structure at any point along their alignments. However, North-South Road would be raised a few feet above the existing grade so that it would not be vulnerable to flooding (see Section 3.8).

Viewpoint 1

From Viewpoint 1, distant vistas of the island (e.g., Honolulu) and ocean are available. In addition, the Ewa Plain, with its substantial development of mostly low-density residences, is highly visible from this key view.

Under the No-Build Alternative, the proposed portion of Kapolei Parkway between North-South Road and Renton Road, located to the far southeast of this viewpoint, would be barely visible due to its distance from this vantage point within the context of the vast views available. Kapolei Parkway would be surrounded by existing and additional proposed urban uses (see Section 3.1). The surrounding and anticipated additional development would make it difficult to see the proposed roadway from Viewpoint 1. The introduction of the proposed portion of Kapolei Parkway into this key view would fit within the urban context of the views available from this vantage point.

Similarly, under the Build Alternative, the distance of this viewpoint from the proposed project and the vast views available from this vantage point would make the introduction of North-South Road less obtrusive within the context of overall views. More importantly, the proposed North-South Road would share the same corridor as the 138 kV power poles. These power poles are visible within this key view because of their size (built to hurricane standards and capacity), color (white), and their surroundings – a plain of relatively low vegetation or bare soil. It is anticipated that the 138 kV power poles would remain the more prominent feature. North-South Road's landscaping and night-time illumination would be visible from Viewpoint 1, but would be limited in scale due to the proposed road's distance from the viewpoint. In addition, the area surrounding North-South Road is planned for urban development (See Section 3.1). Future development within this area would provide an urban context for the proposed North-South Road, allowing it to blend into the surrounding development. Therefore, the Build Alternative would not result in an adverse impact with respect to Viewpoint 1.

Viewpoint 2

From Viewpoint 2, views are available of the distant Waianae Mountain Range and the adjacent Tenney Village, which is located north of the proposed Kapolei Parkway Corridor. Relatively flat topography, surrounding vegetation, and adjacent houses somewhat limit the views from this viewpoint to the immediate surrounding area.

Under the No-Build Alternative, the proposed portion of Kapolei Parkway would be in close proximity to this key view. The proposed portion of Kapolei Parkway would be an at-grade facility, but would feature large shade trees that could block views of the Waianae Mountain Range from certain vantage points within Varona Village. The proposed roadway also includes street lighting, which would increase night-time

illumination within the project vicinity, and vehicle headlights would also be a new source of glare within the area. Although, the perspective from Viewpoint 2 represents the historic district landscape unit, the introduction of Kapolei Parkway between Renton Road and North-South Road within this key view would not be out of character within this urbanized area of Ewa. The physical appearance of the proposed portion of Kapolei Parkway would be similar to Renton Road, a roadway that is consistent with this district's historic character. See Section 3.10 for an additional discussion of maintaining the view corridor along Renton Road in the Ewa Villages Historic District.

Under the Build Alternative, North-South Road would be constructed, but would not be visible from this viewpoint. Therefore, no visual impacts associated with the Build Alternative are anticipated within Viewpoint 2.

Viewpoint 3

Viewpoint 3 is located in the Ewa Villages Golf Course and represents the perspective of the recreational viewer group within the makai landscape unit. The Ewa Villages Golf Course is surrounded by a vegetative buffer that separates it from the adjacent Tenney Village and open Ewa Plain. Where the golf course fairway is elevated above the surrounding vegetation, extended views of the Ewa Plain, the Waianae Mountain Range, and the rising Central Oahu plateau are available. West, north, and northeast of this key view is the proposed North-South Road alignment. The Kapolei Parkway alignment is south of this viewpoint.

Under the No-Build Alternative, the proposed portion of Kapolei Parkway between Renton Road and North-South Road would be more or less visible depending on the amount of vegetation bordering the course, elevation of the fairway, and proximity of the golf course to the proposed roadway alignment at any given point. Under future conditions, additional urban development proposed for the areas surrounding the roadway would block views of the proposed roadway from this viewpoint. Moreover, introduction of the proposed portion of Kapolei Parkway within this key view would not be out of character with the surrounding urban environment and would have little impact on the recreational viewer group.

Under the Build Alternative, the proposed North-South Road would be more or less visible, again depending on the amount of vegetation bordering the course, elevation of the fairway, and proximity of the golf course to the proposed roadway alignment at any given point. It is anticipated that the 138 kV power poles would remain the most prominent visual feature within this key view. In addition, the area surrounding North-South Road is planned for urban development, which is anticipated to have more of an impact within the makai landscape unit than North-South Road from the perspective of Viewpoint 3. North-South Road would also represent a prominent element within the relatively flat terrain of the makai landscape unit. However, in the context of visual disruption already caused by the 138 kV power poles, the proposed road would not affect the overall visual context of this key view and would have little impact on the recreational viewer group.

Viewpoint 4

Viewpoint 4 represents future views from the proposed North-South Road. Motorists and other users traveling on the new roadway would have views of the surrounding Ewa Plain, shoreline, and mauka areas, including the Waianae Mountain Range and the rising Central Oahu plateau.

Since Viewpoint 4 depends on the completion of North-South Road, it would not be available under the No-Build Alternative.

Under the Build Alternative, motorists and other users of North-South Road would have views of the Ewa Plain and mauka and makai areas. Views east across the Ewa Plain would be periodically disrupted by the 138 kV power poles. Future development adjacent to the proposed North-South Road, including the Hawaiian Homesteads development and the UH-West Oahu campus (see Section 3.1), would change the makai landscape unit from mostly open space to an urban environment. Views of the surrounding Ewa Plain would become increasingly limited. Views of the distant Waianae Mountain Range are anticipated to remain available from the new North-South Road, but may be somewhat limited by future land uses and roadway landscaping. Views of the rising Central Oahu plateau would be blocked somewhat by the Interstate H-1 Freeway, which is built on top of an embankment. Also, future development on the north side of Farrington Highway, as provided in the Ewa DP, may also block views.

3.13.3 MITIGATION MEASURES

Both North-South Road and the portion of Kapolei Parkway, from Renton Road and North-South Road, will be designed urban "parkways", featuring ample landscaping and sidewalks. In the context of existing and planned urban development, neither the proposed portion of Kapolei Parkway nor North-South Road are anticipated to represent a visually obtrusive addition to the Ewa viewshed. Therefore, mitigation is not necessary.

3.14 CONSTRUCTION IMPACTS AND MITIGATION

This section describes the impacts and mitigation measures associated with construction of North-South Road, including its interchange with the H-1 Freeway and drainage appurtenances, and the federalization of the section of Kapolei Parkway between North-South Road and Renton Road, which are all part of the Build Alternative. The construction of the section of Kapolei Parkway between the proposed North-South Road and Renton Road by the City and County of Honolulu are assumed under the No-Build Alternative. Discussion of construction impacts of this and other projects assumed under the No-Build Alternative, such as the widening of Farrington Highway and Fort Weaver Road, is beyond the scope of this FEA/FONSI.

3.14.1 MAINTENANCE OF TRAFFIC

Construction of North-South Road would occur mostly on agricultural lands that are either fallow or active for cultivation of diversified crops (see Sections 3.1.1.3 and 3.2). Therefore, impacts to existing traffic flows would not occur during most construction activities. Traffic flow impacts would occur at certain construction site ingress and egress areas, and when work is being conducted on Farrington Highway and on the Interstate H-1 Freeway. Traffic impacts at these locations may include lane closures and/or detours, which would cause delay to motorists. During the project's design stage, a traffic plan will be developed, in order to maintain the traffic flow through the area during the project's construction.

A substantial amount of excavation will occur to construct the project's drainage features. It is estimated that the total volume of excavated material may exceed the project's requirements for fill material by approximately 500,000 cubic yards. Storage and disposal of the excess excavated material will be the responsibility of the contractor since no provision has been made for large-scale stockpiling in the project vicinity.

3.14.2 AIR QUALITY

3.14.2.1 POTENTIAL IMPACTS

Air quality impacts during roadway construction generally consist of fugitive dust and mobile source emissions from construction vehicles and equipment. The latter source is expected to cause minimal impacts because carbon monoxide (CO), the principal pollutant of construction vehicles, is most serious under localized (microscale) conditions. Most of the construction activities would occur away from sensitive receptors, such as residences.

Fugitive dust is airborne particulate matter and is usually relatively large in particle size. Fugitive dust would be generated by construction vehicles operating around the construction sites and material blown from uncovered haul trucks, stockpiles and exposed areas.

The dispersion of fugitive dust depends on particle size, emission height, and wind speed. Small particles (30 to 100 micron range) can travel several hundred feet before settling to the ground, depending on wind speed. However, most fugitive dust is made up of relatively large particles (i.e., particles greater than 100 microns in diameter). Given their relatively larger size, these particles tend to settle within 20 to 30 feet of their source.

Construction activities must comply with provisions of Hawaii Administrative Rules (HAR), Chapter 11-60.1, "Air Pollution Control," Section 11-60.1-33, Fugitive Dust. The contractor will provide adequate measures to control dust from all construction areas and during the various phases of construction. Wind screens have been used on previous projects in Ewa. Other measures include watering open areas.

3.14.2.2 MITIGATION MEASURES

The following particulate control measures related to construction activities will be followed:

1. Plan the different phases of construction, focusing on minimizing the amount of dust generating materials and activities, centralizing on-site vehicular traffic routes, and locating potentially dusty equipment in areas of the least impact.

   A. Site Preparation:
      - provide an adequate water source at the site prior to the start up of construction activities;
      - minimize land disturbance;
      - use watering trucks to minimize dust;
      - cover trucks when hauling dirt;
      - stabilize the surface of dirt piles if not removed immediately;
      - use dust screens effectively;
      - limit vehicular paths and stabilize temporary roads; and
      - to the maximum degree possible, pave all unpaved construction roads and parking areas to road grade for a length no less than 50 feet from where such roads and parking areas exit the construction site, to prevent dirt from washing onto paved roadways.

   B. Construction:
      - cover trucks when transferring materials;
      - use dust suppressants on traveled paths that are not paved;
      - minimize unnecessary vehicular and machinery activities; and
      - minimize dirt track-out by paving site exit road just before entering the public road.

   C. Post-Construction:
      - landscape and rapidly cover bare areas, including slopes, starting from the initial grading phase;
      - restore to original conditions any disturbed land not used;
      - remove unused material and dirt piles; and
      - restore to original condition all vehicular paths created during construction and prevent future off-road vehicular activities.

2. Provide adequate dust control measures during weekends, after hours, and prior to daily start-up of construction activities, and

3. Control dust from debris hauled away from project site.

3.14.3 NOISE AND VIBRATION

3.14.3.1 POTENTIAL IMPACTS

Because construction would involve the use of heavy machinery, there would be temporary noise impacts from construction activities. Table 3.14-1 presents maximum noise levels (Lmax) of heavy mobile construction equipment and compressors measured at a distance of 50 feet. These noise levels are estimates based on minimal site-specific data. Therefore, due to the preliminary nature of this analysis, specific impacts cannot be accurately determined without a detailed construction plan. However, construction would normally occur during daylight hours when occasional loud noises are more tolerable. Because of the relatively short-term exposure to any one receptor and because receptors are not located near the construction site, extended disruption of normal activities is not considered likely.

Table 3.14-1:
Construction Equipment Noise Levels

Source	Lmax(dBA) at 50 feet	Model Tested
Backhoe	85	John Deere 609A
Front Loader	84	Caterpillar 980
Dozer	84	Caterpillar D7e
Grader	91	Caterpillar 16
Scraper	92	Caterpillar 660
Compressor	80-89	Various Tested

Source: Federal Highway Administration, Highway Construction Noise: Measurement, Prediction, and Mitigation, 1976

Activities associated with the construction phase of the project must comply with Hawaii State Department of Health (HDOH) HAR, Chapter 11-46, "Community Noise Control." The general contractor will likely obtain a noise permit from the HDOH, which will allow him or her to exceed the Community Noise Control Standards during periods in which construction is allowed (i.e., 7 a.m. to 6 p.m. on weekdays and 9 a.m. to 6 p.m. on Saturdays).

Nighttime construction would lessen the overall construction duration. HDOT often chooses to conduct nighttime construction on its freeways to lessen impacts to traffic flow. There is likely to be some nighttime construction on this project. Night work is anticipated at H-1 Freeway during the interchange construction to minimize potential traffic disruption. If HDOT chooses to conduct nighttime construction, a noise variance from HDOH will be required. The noise variance will specify conditions, such as the use of certain construction equipment during certain periods of the evening (e.g., no jack hammering after 9 or 10 p.m.). The project will not exceed the stipulated noise limits unless a variance is granted by HDOH.

3.14.3.2 MITIGATION MEASURES

The following measures will be implemented to minimize adverse construction noise impacts:

- A noise permit will be obtained if the noise levels from the construction activities are expected to exceed the allowable levels of the rules as stated in HAR, Chapter 11-46-6(a), and/or obtaining a noise variance, if nighttime construction is planned;
- The contractor will be required to comply with the requirements pertaining to construction activities, as specified in the rules and the conditions issued with the noise permit and/or variance as stated in HAR, Chapter 11-46-7(d)(4); and
- Construction equipment and on-site vehicles with exhaust of gas or air will be equipped with mufflers in good working order as stated in HAR, Chapter 11-46-6(b)(1)(A).

3.14.4 WATER RESOURCES

3.14.4.1 POTENTIAL IMPACTS

During construction, there would be an increased potential for silt erosion and sediment transport due to grading and removal of vegetation. Sediment loading of stormwater could occur when unstabilized, exposed soil at excavations or stockpiles of excavated material experience heavy rains.

As described in Sections 2.1 and 3.8, North-South Road would cross Kaloi Gulch at two locations. Preliminary plans for the project show that the bridges would span the gulch. Culverts will be constructed where North-South Road would cross the Kaloi Gulch. The culverts would allow North-South Road to cross the Gulch while maintaining the Kaloi Gulch streambed and allow runoff to flow in its natural direction (Addendum To Technical Memorandum Kaloi Gulch Interim Drainage Plan, 2002).

3.14.4.2 MITIGATION MEASURES

The following measures will minimize adverse construction impacts on water resources:

To prevent sedimentation of stormwater flows from the construction site, a site-specific best management practices (BMP) plan will be prepared, which is required to obtain general permit coverage under the National Pollutant Discharge Elimination System (NPDES) permit for discharges associated with construction activities. The BMP plan will include specific erosion control measures, including provisions for construction staging, equipment maintenance and storage, and other such activities, subject to review and approval by HDOH.

North-South Road would cross Kaloi Gulch at two locations. These crossings are subject to U.S. Department of the Army (DA) authorization pursuant to Section 404 of the federal Clean Water Act (CWA). Support structures in the gulch are considered to be "dredge" or "fill" material within the "ordinary high water mark" of "waters of the U.S." and will require a DA Section 404 Nationwide permit. If DA authorization were required per CWA Section 404, the project will also require Water Quality Certification (WQC) from HDOH pursuant to CWA Section 401. The WQC requires an approved site-specific BMP plan, among other stipulations, to prevent water pollution in the gulch.

3.14.5 SOLID AND HAZARDOUS WASTE

3.14.5.1 POTENTIAL IMPACTS

Construction will require clearing land, and excavation. Resultant spoil, consisting of soil, vegetation, and other materials, will be transported to approved disposal sites; or, in the case of excavated materials, the resultant spoil will be used elsewhere on the project as fill. Areas to be used for spoil disposal will be identified during final design. A grading, grubbing, stockpile, and excavation permit will be obtained from the City and County of Honolulu Department of Planning and Permitting.

A substantial amount of excavation would occur to construct the project's drainage features. It is estimated that the total volume of excavated material may exceed the project's requirements for fill material by approximately 500,000 cubic yards. Storage and disposal of the excess excavated material will be the responsibility of the contractor since no provision has been made for large-scale stockpiling in the project vicinity. The contractor will meet all applicable requirements pertaining to the storage and disposal of the excavated material.

Construction would also generate solid waste, some of which would be considered hazardous or toxic if not properly handled or disposed of, such as detergents, paints, metal, tar, petroleum-based products and cleaning solvents.

3.14.5.2 MITIGATION MEASURES

During construction, all waste material will be collected and stored in a securely lidded metal dumpster that meets all State of Hawaii and City and County of Honolulu solid waste management regulations. All trash and construction debris from the site will be deposited in the dumpster. The dumpster will be transported to a HDOH approved solid waste disposal or recycling facility. No construction waste material will be buried on site. The contractor will be responsible for implementing the correct procedures for waste disposal. Notices stating these practices will be posted in the office trailer, and the contractor will be responsible for ensuring that these procedures are followed.

All sanitary waste generated during the construction phase will be collected from portable units as required.

The contractor will be instructed to recycle greenwaste.

The following material management practices addressing good housekeeping and hazardous products will be used to reduce the risk of spills or other accidental exposure of materials and substances to the environment. A Spill Prevention Plan will be proposed and followed by the contractor.

1. Good Housekeeping
   - An effort will be made to store only enough product required to complete the job;
   - All materials stored on site will be stored in a neat, orderly manner in their appropriate containers and, if possible, under a roof or other enclosure;
   - Products will be kept in their original containers with the original manufacturer's labels affixed;
   - Substances will not be mixed with one another unless recommended by the manufacturer;
   - Whenever possible, all of a product will be consumed before disposing of the container;
   - Manufacturer's recommendations for proper use and disposal will be strictly followed; and
   - The contractor will conduct a daily inspection to ensure proper use and disposal of materials on site.

2. Hazardous Products
   - Products will be kept in original containers unless they are not resealable;
   - Original labels and materials safety data will be retained; and
   - If surplus product must be disposed of, manufacturer's or local and State-recommended methods for proper disposal will be followed.

3. Petroleum Products
   - All on-site vehicles will be monitored for leaks and receive regular preventive maintenance to reduce the chance of leakage.
   - Petroleum products will be stored in tightly sealed, clearly labeled containers. Any asphalt substances used on site will be applied according to the manufacturer's recommendations.
   - Vehicle servicing and maintenance activities will not pollute the environment.

4. Paints
   - All containers will be tightly sealed and stored when not in use. Excess paint will not be discharged on-site but will be properly disposed of according to manufacturer's instructions or State and local regulations.

5. Spill-Control Practices

   In addition to the good housekeeping and material management practices discussed previously, the following practices will be implemented for spill prevention and clean-up:

- Manufacturer's recommended methods for spill clean-up will be clearly posted, and site personnel will be informed of the procedures and the location of the information and clean up supplies.
- Materials and equipment necessary for spill clean-up will be kept in the material storage area on site.
- All spills will be cleaned up immediately after discovery.
- The spill area will be kept well ventilated, and personnel will wear appropriate protective clothing to prevent injury due to contact with hazardous substances.
- Regardless of their size, spills of toxic or hazardous materials will be reported to the HDOH and the appropriate City and County of Honolulu agency.
- The spill prevention plan will be adjusted to include measures to prevent spills from re-occurring. A description of the spill, its cause, and the clean-up measures used will be included.
- The contractor will coordinate spill prevention and clean-up efforts. In addition, the contractor will designate at least three site personnel to receive spill prevention and clean-up training. These individuals will each be responsible for a specific phase of prevention and clean-up. The names of responsible spill personnel will be posted in the material storage area and in the office trailer on site.

Although hazardous materials sites are unlikely to be encountered during construction, the contractor will report to HDOT and HDOH any undiscovered undocumented storage sites, hazardous materials releases, or potential signs of contamination when soil is excavated. If any contaminants are encountered during construction, they will be handled according to applicable HDOH requirements.

3.14.6 HISTORIC AND ARCHAEOLOGICAL RESOURCES

As is described in Section 3.10.1, the project site, or the area affected by construction, is highly unlikely to contain archaeological resources mainly due to past agricultural activities. In the exceedingly unlikely event that a burial or other findings are unearthed during excavation, work in the vicinity will stop immediately and the SHPD will be notified in accordance with HRS Chapter 6E. Construction will resume only upon approval of the appropriate authorities.

3.14.7 THREATENED AND ENDANGERED SPECIES

3.14.7.1 POTENTIAL IMPACTS

As described in Section 3.7, five clusters of the endangered plant Kooloaula (*Abutilon menziesii*) were identified at or near the proposed roadways (see Figure 3.7-1). The construction of the No-Build Alternative would require removal of three endangered Kooloaula plants on City property within the ROW of the Kapolei Parkway corridor between Renton Road and North-South Road.

CORRECTION

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

The contractor will be instructed to recycle greenwaste.

The following material management practices addressing good housekeeping and hazardous products will be used to reduce the risk of spills or other accidental exposure of materials and substances to the environment. A Spill Prevention Plan will be proposed and followed by the contractor.

1. Good Housekeeping
   - An effort will be made to store only enough product required to complete the job;
   - All materials stored on site will be stored in a neat, orderly manner in their appropriate containers and, if possible, under a roof or other enclosure;
   - Products will be kept in their original containers with the original manufacturer's labels affixed;
   - Substances will not be mixed with one another unless recommended by the manufacturer;
   - Whenever possible, all of a product will be consumed before disposing of the container;
   - Manufacturer's recommendations for proper use and disposal will be strictly followed; and
   - The contractor will conduct a daily inspection to ensure proper use and disposal of materials on site.

2. Hazardous Products
   - Products will be kept in original containers unless they are not resealable;
   - Original labels and materials safety data will be retained; and
   - If surplus product must be disposed of, manufacturer's or local and State-recommended methods for proper disposal will be followed.

3. Petroleum Products
   - All on-site vehicles will be monitored for leaks and receive regular preventive maintenance to reduce the chance of leakage.
   - Petroleum products will be stored in tightly sealed, clearly labeled containers. Any asphalt substances used on site will be applied according to the manufacturer's recommendations.
   - Vehicle servicing and maintenance activities will not pollute the environment.

4. Paints
   - All containers will be tightly sealed and stored when not in use. Excess paint will not be discharged on-site but will be properly disposed of according to manufacturer's instructions or State and local regulations.

5. Spill-Control Practices

   In addition to the good housekeeping and material management practices discussed previously, the following practices will be implemented for spill prevention and clean-up:

- Manufacturer's recommended methods for spill clean-up will be clearly posted, and site personnel will be informed of the procedures and the location of the information and clean up supplies.
- Materials and equipment necessary for spill clean-up will be kept in the material storage area on site.
- All spills will be cleaned up immediately after discovery.
- The spill area will be kept well ventilated, and personnel will wear appropriate protective clothing to prevent injury due to contact with hazardous substances.
- Regardless of their size, spills of toxic or hazardous materials will be reported to the HDOH and the appropriate City and County of Honolulu agency.
- The spill prevention plan will be adjusted to include measures to prevent spills from re-occurring. A description of the spill, its cause, and the clean-up measures used will be included.
- The contractor will coordinate spill prevention and clean-up efforts. In addition, the contractor will designate at least three site personnel to receive spill prevention and clean-up training. These individuals will each be responsible for a specific phase of prevention and clean-up. The names of responsible spill personnel will be posted in the material storage area and in the office trailer on site.

Although hazardous materials sites are unlikely to be encountered during construction, the contractor will report to HDOT and HDOH any undiscovered undocumented storage sites, hazardous materials releases, or potential signs of contamination when soil is excavated. If any contaminants are encountered during construction, they will be handled according to applicable HDOH requirements.

3.14.6 HISTORIC AND ARCHAEOLOGICAL RESOURCES

As is described in Section 3.10.1, the project site, or the area affected by construction, is highly unlikely to contain archaeological resources mainly due to past agricultural activities. In the exceedingly unlikely event that a burial or other findings are unearthed during excavation, work in the vicinity will stop immediately and the SHPD will be notified in accordance with HRS Chapter 6E. Construction will resume only upon approval of the appropriate authorities.

3.14.7 THREATENED AND ENDANGERED SPECIES

3.14.7.1 POTENTIAL IMPACTS

As described in Section 3.7, five clusters of the endangered plant Kooloaula (*Abutilon menziesii*) were identified at or near the proposed roadways (see Figure 3.7-1). The construction of the No-Build Alternative would require removal of three endangered Kooloaula plants on City property within the ROW of the Kapolei Parkway corridor between Renton Road and North-South Road.

The construction of the Build Alternative would have both direct and indirect impacts on the plant population. Direct impacts would consist of removal of a total of 24 plants in both the North-South Road Corridor and the Kapolei Parkway Corridor between Renton Road and North-South Road. Of these, 21 plants would be affected by North-South Road and its drainage features, while the other three would be the same as those affected under the No-Build Alternative. The proposed North-South Road ROW is currently owned by the State and the Estate of James Campbell; Kooloaula is present only on the State-owned portion.

The remaining plants in Ewa and Kapolei would not be directly affected by the project. Potential indirect impacts to these remaining Kooloaula include wildfires and increased air pollution, which are associated with more urbanization and construction activities.

3.14.7.2 MITIGATION MEASURES

In accordance with the HCP (see Appendix H), the contractor will contact DLNR prior to clearing and grubbing activities. The contractor will assist DLNR regarding the removal of the endangered plants. Propagules from plants not directly impacted by the proposed project will be grown and represented in three offsite locations, including the Koko Crater Botanical Garden, Kaena Point State Park and Honouliuli National Wildlife Refuge on Oahu (see HCP). The contractor will coordinate with DLNR regarding the location/marking of the contingency reserve area. In addition, the Incidental Take License allows for the removal of the entire Kapolei population of Kooloaula. These plants may be transplanted to other "wild" site locations. A Certificate of Inclusion will be required for the proposed Kapolei Parkway segment between Renton Road and North-South Road.

The construction contractor will be required to initiate fire prevention measures during roadway construction to minimize the indirect impact associated with fire risk. Measures will include the preparation of a construction-specific Fire Control Plan by the contractor. The Fire Control Plan will address such topics as construction of a firebreak, presence of a water truck at all times, construction worker education, reporting, and response procedures in the event of a fire, and procedures for the storage and disposal of flammable materials, including matches and cigarettes.

3.14.8 AGRICULTURAL ACTIVITY

There would be construction-phase impacts on agricultural activities occurring on adjacent parcels. These impacts and proposed mitigation measures are discussed in Section 3.2.4.

3.15 CUMULATIVE AND SECONDARY IMPACTS

3.15.1 METHODOLOGY

According to FHWA's "Position Paper on Secondary and Cumulative Impact Assessment" (August 20, 1992), the 1978 regulations of the Council on Environmental Quality (CEQ) implementing NEPA (1969) require agencies to examine the indirect consequences of all proposed federal activities and programs. These consequences may occur in areas beyond the immediate influence of a proposed action and at some time in the future. CEQ guidelines for implementing NEPA broadly define both cumulative and secondary impacts as follows:

Cumulative effects are impacts which result from the incremental consequences of an action when added to other past and reasonably foreseeable future actions (40 CFR 1508.7). These impacts are less defined than secondary effects. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

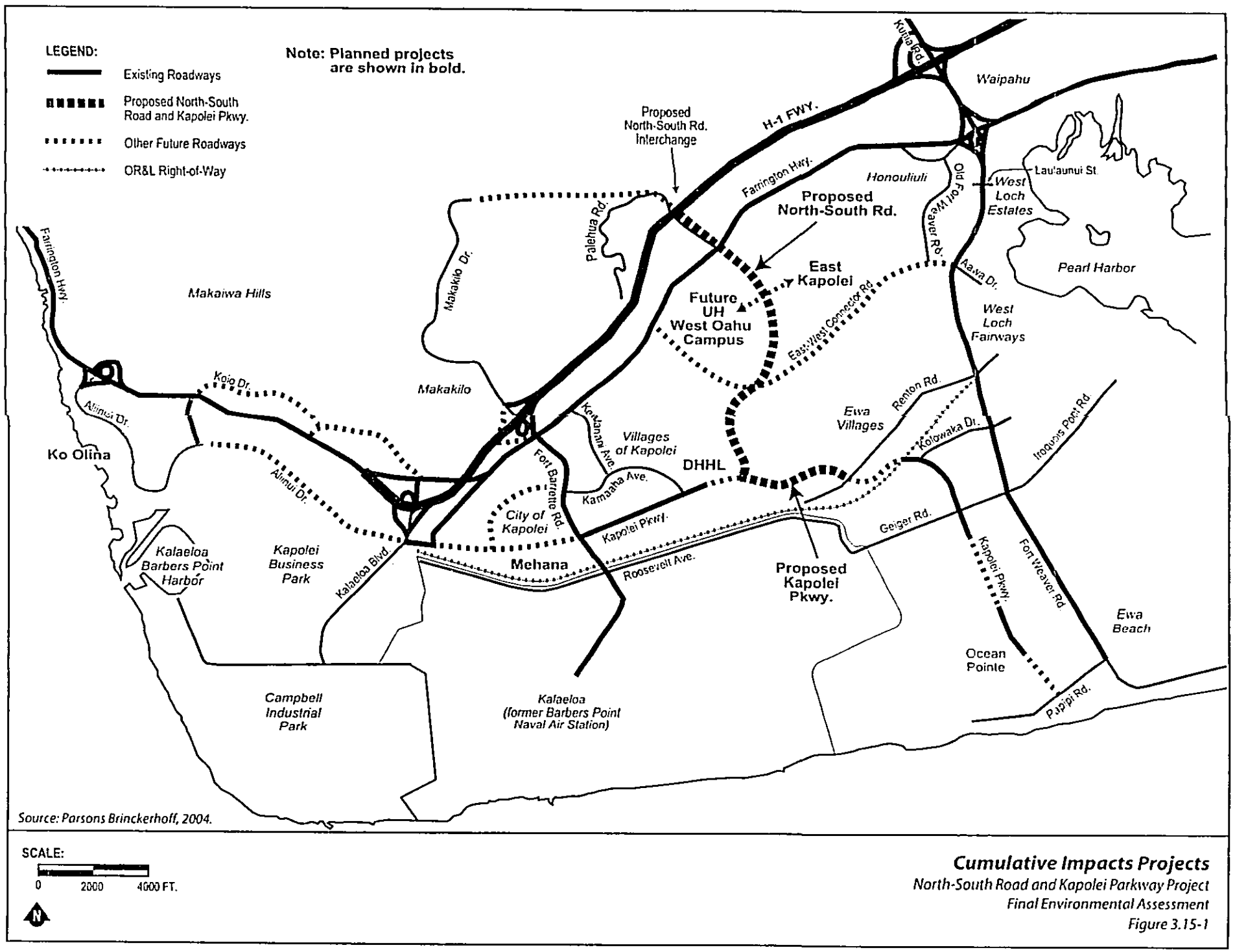
Secondary effects are those that are "caused by an action and are later in time or farther removed in distance but are still reasonably foreseeable" (40 CFR 1508.8). Generally, these impacts are induced by the initial action. They comprise a wide variety of secondary effects, such as changes in land use, water quality, economic vitality and population density. Effects and impacts as used in these regulations are synonymous.

The purpose of cumulative effects analysis is to ensure that federal agencies consider the full range of consequences of actions related to project activities. NEPA, the CEQ regulations, and Hawaii's environmental impact statement law (Hawaii Revised Statutes Chapter 343 [HRS 343]), require analysis of cumulative issues within the context of the action, alternatives, and effects. The context of cumulative analyses includes resources, ecosystems, and human communities considered over a meaningful geographic area and through time (past, present, and future).

The time frame for the cumulative analysis is the 20-year design life of the proposed project after construction. The 20-year time frame was selected, because it is the maximum period of time that a given transportation facility is typically assumed to remain effective and has a contributing influence on the regional transportation system.

A detailed methodology was prepared for analyzing cumulative impacts, as well as secondary impacts, in the *Cumulative and Secondary Impacts Report* (Parsons Brinckerhoff, 2004), which is included in Appendix N.

The geographic area encompassed by this cumulative impacts analysis is the Ewa Plain, as shown in Figure 3.15-1. This geographic area was determined by considering existing natural, physical, environmental, and socioeconomic conditions of the area, and examination of existing and planned development projects in the Ewa Plain that would potentially utilize or be affected by the proposed North-South Road and/or the portion of Kapolei Parkway between Renton Road and North-South Road. The geographic



Cumulative Impacts Projects

North-South Road and Kapolei Parkway Project
Final Environmental Assessment
Figure 3.15-1

boundaries encompassed by this cumulative impacts analysis include lands in the vicinity of the proposed project alignments, from the H-1 Freeway makai to the Pacific Ocean, and from Ft. Weaver Road west to Farrington Highway past Ko Olina. The existing and planned projects within this area were assumed as part of the baseline existing conditions for this cumulative impacts analysis. These projects are described in Section 3.1.

Depending on the status of a particular project, each of the projects included in this cumulative impacts analysis is supported by different levels of available information. Public documents, conceptual plans, documents or applications prepared as part of the environmental review or regulatory processes were the primary sources of information. When adequate information on specific aspects of other projects was not readily available, nor could be obtained through reasonable efforts, professional judgment was used to analyze potential impacts.

One of the primary sources of information about the future development of the Ewa Plain is the Ewa Development Plan (DP) issued by the City and County of Honolulu Department of Planning and Permitting (August 1997, Revised May 2000). The Ewa DP is based on the City's General Plan, which designated Ewa and specifically Kapolei as a Secondary Urban Center for Oahu. This "Second City" is the focus of major economic activity and housing development, and a center for government services, with residential development of fringe areas in Ewa and Central Oahu.

It should be noted that the Ewa DP includes the construction of the North-South Road and completion of Kapolei Parkway as integral components of the plan. Both roads are shown on figures in the Ewa DP, including the Open Space Map, the Urban Land Use Map, and the Phasing Map.

3.15.2 PROJECTS CONSIDERED FOR CUMULATIVE ANALYSIS

Substantial residential growth would occur primarily in master planned communities in the Ewa Plain. Almost 28,000 new residential units are anticipated by 2020, including the City of Kapolei, Ewa by Gentry, Ocean Pointe, Ewa Villages, Ko Olina, Laulani, Makaiwa Hills, Makakilo, the Villages of Kapolei, and an area some refer to as East Kapolei. The Ewa DP calls for these communities to be designed to meet a wide range of housing needs, including affordable units, starter homes, large multi-family and single family units, as well as housing for students going to school at the UH-West Oahu campus.

A key element of the vision put forth in the Ewa DP is the creation of the Secondary Urban Center, which would provide a wide range of jobs: visitor and activity centers in Ko Olina and Ocean Pointe (formerly called Ewa Marina); heavy and light industrial areas near the Kalaeloa Barbers Point Harbor; offices and retail centers in the City of Kapolei, and community and neighborhood centers. The Ewa DP anticipates that job growth would be as substantial as housing growth, increasing from 17,000 jobs to more than 64,000 jobs in 2020.

3.15.2.1 TRANSPORTATION PROJECTS

The following transportation projects described in Chapter 2 are planned for the Ewa Plain:

Kunia Road/Fort Weaver Road Corridor

- Widen Fort Weaver Road from 4 to 6 lanes between Farrington Highway and Geiger Road

Fort Barrette Road/Makakilo Drive Corridor

- Widen Fort Barrette Road from 2 to 4 lanes between Farrington Highway and F.D. Roosevelt Avenue
- Extend Makakilo Drive east to H-1 Freeway to provide second access point for Makakilo

Interstate H-1 - Interchange Improvements

- Makakilo Interchange – Construct new westbound on-ramp
- Kapolei Interchange – Construct new Interchange between Makakilo and Palailai Interchanges
- Palailai Interchange – Improve existing interchange

Farrington Highway Corridor

- Widen Farrington Highway from 2 to 4 lanes between Kapolei Golf Course Entrance and Fort Weaver Road
- Widen Farrington Highway from 2 to 4 lanes between Kamokila Boulevard and Kalaeloa Boulevard

Kapolei Parkway Corridor

- Completion of various Kapolei Parkway segments between Kapolei and Ewa Beach

Other Roadway Improvements

- Construct new westbound Frontage Road between Makakilo Drive and Kalaeloa Boulevard

In addition to the improvements listed in the TOP 2025 (above), the following roadway improvements are also assumed:

- Existing Palehua Road is assumed to remain for the No-Build Alternative. It is a 2-lane roadway that currently crosses under the H-1 Freeway in the vicinity of the proposed North-South Road Interchange. It is also assumed that, as part of the build-out of the Makakilo subdivision, this roadway would be extended to provide secondary access to Makakilo from the H-1 Freeway.
- East-West Connector Road would be a new east-west, major collector roadway that intersects Farrington Highway in the vicinity of the existing Kapolei Golf Course Entrance at its western terminus, and Fort Weaver Road opposite of Aawa Drive at its eastern terminus. Old Fort Weaver Road would be reconfigured to intersect the East-West Connector Road as a T-intersection. This roadway would

provide access to future development in the East Kapolei area located between the "Villages of Kapolei" and Fort Weaver Road. This roadway would also provide sub-regional circulation for this area.

The TOP 2025 encourages and assumes the implementation of TDM actions to reduce vehicular travel during peak traffic hours. Key TDM actions that are recommended in the TOP 2025 and assumed for all alternatives are ridesharing, work behavior changes, TMAs, alternative transportation modes, and parking management actions.

3.15.2.2 OTHER EXISTING AND PLANNED PROJECTS

The following existing development projects were included in this analysis. See Section 3.1 for descriptions of anticipated growth plans for these existing projects.

- Ewa Villages
- Ewa Beach
- Ewa by Gentry
- Makakilo
- Villages of Kapolei
- West Loch Estates and West Loch Fairways
- James Campbell Industrial Park
- Kalaeloa (formerly BPNAS)
- Kapolei Business Park
- City of Kapolei
- Honouliuli
- Ko Olina
- Ocean Pointe

The following projects are planned for the Ewa Plain area. See Section 3.1 for descriptions of these planned projects.

- DHHL
- UH-West Oahu Campus
- East Kapolei Area
- Mehana

3.15.3 POTENTIAL CUMULATIVE IMPACTS

3.15.3.1 TRANSPORTATION PROJECTS

Future traffic improvements within the Ewa Plain and Central Oahu region would be developed independently of the proposed project improvements. However, they provide linkages within the local and regional transportation system, as does the proposed project. With implementation of future transportation improvements, it is anticipated that all planned roadways and intersections would operate under improved conditions. The North-South Road and the proposed portion of Kapolei Parkway between Renton Road

and North-South Road would become a part of this improved system, and contribute to improving regional and sub-regional mobility, by improving network connectivity.

3.15.3.2 EXISTING PROJECTS

A number of existing projects in the Ewa Plain area, as noted above, include plans for expansion, which have been factored into the development of the Ewa DP and other related area community master plans. A key component of the Ewa DP as well as of various community master plans is the development of North-South Road, and the completion of the Kapolei Parkway segments. While the existing projects are not dependent upon the construction of North-South Road or the project segment of Kapolei Parkway, implementation of their expansion plans would be facilitated by the construction of the proposed project. In addition, if these projects were to continue to expand as planned, and the proposed project was not implemented, traffic conditions on area roadways, and the accompanying air quality impacts, would worsen.

3.15.3.3 PLANNED PROJECTS

Based on best available information, the cumulative impacts of planned projects, including North-South Road and the portion of Kapolei Parkway between Renton Road and North-South Road, were evaluated for each environmental resource and summarized in Table 3.15-1. Potential impacts of each development were evaluated in combination with the impacts from the proposed project and the other planned developments for each environmental resource, in order to determine the cumulative effects upon each resource.

The table indicates that some cumulative impacts would occur as a result of several planned projects, including North-South Road and the portion of Kapolei Parkway between North-South Road and Renton Road. However, none of these impacts would be unexpected, because of the widely anticipated effect of public policies and private enterprises to re-direct growth to the Ewa Plain and promote development of Kapolei as the Secondary Urban Center for Oahu. Table 3.15-1 indicates mitigation activities for anticipated cumulative impacts. Negative impacts would not be substantial, either because the actions are in support of and instrumental to the planned regional development for the area, or because the impacts would be addressed by mitigation proposed for this or other future projects.

3.15.4 SECONDARY IMPACTS

According to 40 CFR 1508.8, secondary impacts are impacts that have the potential to occur "later in time or farther removed in distance but are still reasonably foreseeable." For roadway projects, secondary impacts typically occur because urban development is induced by the project. Development is considered induced if it would not have occurred unless the roadway improvement was made. Induced development can cause additional environmental and social impacts than those directly associated with the road,

Table 3.15-1:
Cumulative Impacts of Planned Projects in the Area

DISCIPLINE	POTENTIAL/ANTICIPATED IMPACTS
Land Use	State and local policies have designated the development of the Ewa Plain as the Secondary Urban Center of Oahu. The area surrounding North-South Road was master planned in the Ewa DP and Kapolei Area Long Range Master Plan for urban development. All planned projects appear to be consistent with existing plans for development of the Ewa Plain, including the permanent conversion of vacant or agricultural lands for urban uses. These projects are consistent with City and County plans and policies for the development of the Ewa Plain as the Secondary Urban Center of Oahu. Both Kapolei Parkway and North-South Road are part of this planned development. Proposed future development projects would occur regardless of which alternative is selected. The North-South Road and Kapolei Parkway project is not anticipated to induce more, or more intensive, development than what is already planned or anticipated. The North-South Road and Kapolei Parkway project would facilitate the development of DHHL homesteads and future development of the area called East Kapolei, but additional transportation infrastructure is necessary to support the projected urbanization of the Ewa Plain and to avoid undesirable traffic conditions upon full-build out of the Ewa Plain. The Build Alternative would also accelerate the development of other planned projects, but is not anticipated to result in unforeseen or unmitigated impacts, as described in the remainder of this table.
Geology, Soils, Farmland	Construction of North-South Road would convert approximately 190 acres of prime farmland, some of which is being actively cultivated under short-term leases. The portion of Kapolei Parkway, from Renton Road and North-South Road, would affect approximately 10 acres of prime farmland. Farms located mauka of the H-1 Freeway would lose their existing roadway access, because their current access road (Palehua Road) would be displaced by North-South Road. However, in the long-term, the area surrounding the project is planned for non-agricultural uses, and the existing short-term leases would not be continued. All planned projects involve the conversion of fallow agricultural land to urban use. This conversion is consistent with the Ewa DP plans for the development of this area as the Secondary Urban Center for Oahu. Urban growth would be contained within a boundary which would protect prime agricultural lands along Kunia Road and within the West Loch Naval Magazine Blast Zone for diversified agriculture (Ewa DP). Potential environmental impacts would occur primarily during construction activities at all sites, due to soil erosion, which should be mitigated by best management practices (BMPs) implemented by each developer.

DISCIPLINE	POTENTIAL/ANTICIPATED IMPACTS
Transportation Infrastructure	Traffic congestion is an existing concern related to continued residential and commercial development in the area. The North-South Road and Kapolei Parkway project is included in a number of development plans (e.g., Ewa DP) in order to address and alleviate traffic congestion and improve access for the proposed developments in the Ewa Plain area. Although development would continue in the Ewa Plain with or without the North-South Road and Kapolei Parkway project, traffic conditions would be considerably worse without the project. Kapolei Parkway would also provide linkages between residential areas and employment centers, for both existing and planned developments. Traffic conditions would be substantially improved along the congested Kunia Rd./Ft Weaver Rd. Corridor. Similarly, traffic conditions would be improved along the Makakilo Dr./Ft. Barrette Rd. Corridor. North-South Road itself is projected to carry large traffic volumes, all of which would relieve other streets in the study area. Each of the future intersections along the North-South Road and the proposed portion of Kapolei Parkway, from Renton Road to North-South Road, including those at the H-1 Freeway interchange, are projected to operate at acceptable levels of service. Construction of North-South Road and the proposed portion of Kapolei Parkway would serve as an alternate route to access the greater Ewa area. The proposed project would provide additional roadway capacity in a high-growth area and would relieve key congested roads running parallel to it, such as Fort Weaver Road. The North-South Road and Kapolei Parkway project would also provide subregional and regional access to the UH-West Oahu campus. An access road would connect the adjacent DHHL residential area with the campus, thereby providing easy access to advanced education facilities for Hawaiian homesteaders.
Utilities Infrastructure	Utilities would be provided as a component of each of the proposed development projects. In addition, the City and County of Honolulu Board of Water Supply proposes to build a desalination facility at Kalaeloa that would produce 5 MGD of freshwater for Oahu (Draft Environmental Impact Statement for the Proposed Kalaeloa Desalination Facility, March 2003). The Honouliuli Water Recycling Facility and Honouliuli Wastewater and Sewage Treatment plants currently serve the area. Construction and installation of water transmission lines would be coordinated with appropriate City agencies, and would conform to the East Kapolei Water Master Plan, which was prepared to support the HCDCH East Kapolei project (SWPP, Volume 5 – Island of Oahu, February 2003). The East Kapolei development is currently working with the BWS to acquire a water source for the water system. The potable (drinking water) system would interconnect with the Villages of Kapolei water system. The water system would provide service connections to the UH-West Oahu campus and Kalaeloa Community District water systems. The Barbers Point Redevelopment Commission is coordinating source development with the BWS. (SWPP, Volume 5 – Island of Oahu, February 2003). Potable water, sewer, and non-potable water lines are planned to be co-located within North-South Road; utilities would also be placed under the proposed portion of Kapolei Parkway. Coordination of utilities with construction of the roadway would minimize long-term potential cumulative impacts, because such coordination would avoid repeated construction within the ROW and

DISCIPLINE	POTENTIAL/ANTICIPATED IMPACTS
	the need to disturb existing roadways and traffic.
Cycling Facilities	Existing cycling facilities in the general vicinity of the project area include a bike path along Fort Weaver Road from Farrington Highway to just north of Ewa Beach, and bike lanes on Fort Weaver Road in Ewa Beach. Bike paths are also provided in the Ewa Gentry community along Geiger Road, Kapolei Parkway, Kolowaka Drive, and Keaunui Drive. North-South Road and the proposed portion of Kapolei Parkway would be developed to include a parallel bike/pedestrian path and provide wide curb lanes that might be designated as a bike route. Therefore, no adverse cumulative impact is anticipated to cycling facilities. On the contrary, the proposed North-South Road and the proposed portion of Kapolei Parkway would contribute to the planned improvement of cycling facilities in the Ewa Plain.
Social, Cultural, Economic	The North-South Road and Kapolei Parkway project would improve linkages between residential areas and centers of employment in the Ewa Plain, as well as support its planned development as the Secondary Urban Center for Oahu. Construction of the North-South Road and Kapolei Parkway project would strengthen economic and social ties between the Ewa Beach/Ocean Pointe/Ewa by Gentry area and the City and Villages of Kapolei by improving access to schools, libraries, and commercial establishments. Improving transportation infrastructure would also enhance emergency response services throughout the region. North-South Road and the proposed portion of Kapolei Parkway would provide more social, economic, and public services support to Ewa communities by providing a link to H-1 Freeway, as well as between existing and future communities. The North-South Road and Kapolei Parkway project would support development of other projects, by providing increased access to jobs, services, shopping, and community facilities for area residents - a socioeconomic benefit. As part of its residential development, DHHL would construct the portion of Kapolei Parkway between North-South Road and the existing cul-de-sac of Kapolei Parkway by the Villages of Kapolei, completing Kapolei Parkway between Ewa and Kapolei. When this occurs, traffic would increase on Kapolei Parkway. Current pedestrian improvements being implemented by HCDCH would enable Kapolei Parkway to accommodate the additional traffic while maintaining pedestrian safety.
Air Quality	Air quality in the Ewa Plain area should improve with the development of the North-South Road and Kapolei Parkway project, as traffic congestion is relieved on alternative roadways. Potential air quality impacts from construction activities would be short-term, consisting of soil erosion, fugitive dust, and machinery exhaust emissions. BMPs would be implemented to reduce soil erosion, fugitive dust, and machinery exhaust emissions to a minimal level. The proposed project would have to comply with all National and State Ambient Air Quality Standards.

DISCIPLINE	POTENTIAL/ANTICIPATED IMPACTS
Noise	Planned residential communities would be constructed either after or roughly simultaneously with North-South Road and Kapolei Parkway, and ambient noise conditions in the region would change as a result of overall urbanization. Noise impacts on currently undeveloped areas would be addressed by future developers, as each new development occurs. Table 3.6-4 in Section 3.6 shows recommended minimum setbacks where future residential development could potentially be located without noise abatement. Some residents in existing residential communities may experience some increased ambient noise levels from new or improved roadways such as the North-South Road and Kapolei Parkway project, and increased traffic levels, as the region overall continues to experience growth. The proposed project will comply with FHWA regulations (23 CFR 772) and State of Hawaii Department of Transportation, "Noise Analysis and Abatement Policy" (October 1996) on noise impacts.
Zoology	The North-South Road and Kapolei Parkway project would convert faunal habitats within the corridor to a roadway. However, it would not threaten the relatively common faunal communities in this region because the original natural habitats which once existed on these former agricultural lands, including within the corridor, have already been disturbed and the animals now present (cats, mongooses, mice) are considered nuisances and easily adapt to urban environments. Environmental documents prepared for proposed housing developments in the general vicinity of the proposed roadways reported similar findings.
Botany	The proposed project would result in the clearing of vegetation in both the North-South Road Corridor and the Kapolei Parkway Corridor between Renton Road and North-South Road, roughly 217 acres. With the exception of the endangered plant Kooloaula (*Abutilon menziesii*), botanical surveys conducted for the project stated that the project corridor is overgrown with weedy plants, and is composed almost exclusively of introduced or alien species. Thus, vegetation communities that would be cleared by construction activities are not considered regionally important. Overall, proposed urban landscaping will replace the existing scrub vegetation and vacant properties. While anticipated regional development could have resulted in an adverse cumulative effect on Kooloaula, simultaneous implementation of the Habitat Conservation Plan for *A. menziesii* at Kapolei, an integral part of the proposed North-South Road and Kapolei Parkway action, proposed active management of this endangered species. As a result of the HCP, the U.S. Fish and Wildlife Service issued a "no jeopardy" determination pursuant to Section 7 of the Endangered Species Act (See Chapter 4 and Appendix A) and the provisions of the HCP are anticipated to yield a net gain for the species. The HCP will provide for the continued survival of the Kapolei plant population through the establishment of three offsite wild populations and one offsite repository site from the degraded canefield population at Kapolei. The HCP also established a temporary plant reserve area and provided funding for maintenance work, in conjunction with the issuance of the incidental take license for *A. menziesii*.

DISCIPLINE	POTENTIAL/ANTICIPATED IMPACTS
Water Resources	Groundwater: The EPA has stated that it is unlikely that the project would substantially affect the SOBA, which is a Sole Source Aquifer, especially with the proposed roadway drainage system and incident response procedures in place. The storm water system proposed for the northern section of North-South Road and its interchange with the H-1 Freeway would collect and convey roadway drainage and inadvertent spills along the roadway to a discharge point south of the caprock boundary. Surface Water/ Floodplains: The existing drainage in the area is characterized by intermittent streams and sheet flow. This drainage pattern is not consistent with regional plans for urban development. For the planned land use pattern to develop, the regional drainage will need to be modified so that drainage is retained, detained and channelized. These changes to regional drainage are needed to protect existing and future developments. Honolulu participates in the federal flood insurance program. Under that program, the County has the authority and obligation to review drainage plans. Approvals in this area are made in accordance with a MOU negotiated under the framework of a task force comprised of major stakeholders in the watershed, the Kaloi Gulch Task Force. Among other things, this MOU establishes fence line performance standards for drainage discharge. The MOU has been accepted by the County (Department of Planning and Permitting, DPP), and so is consistent with the requirements that the County must meet to remain in the federal flood insurance program. The MOU produced by the Kaloi Gulch Task Force establishes the mechanism by which the City can approve drainage master plans prepared by the Task Force members that describe how current drainage is to be modified to accommodate planned development. This mechanism is for each development to contribute to the implementation of the regional drainage plan. The cumulative effect of each development will be to change the current drainage pattern in the region to one that harmonizes with the planned development in the area. As a key piece of mauka-makai linear infrastructure in the region, the North South Road and Kapolei Parkway project plays a central role in the provision of the ultimate regional drainage system. For example, the drainage channel to be constructed along the east side of the North South Road berm will become the conveyance spine for abutting developments. As adjacent developments occur, they will be designed to discharge to the North South Road drainage channel. Discharge rates will be in accordance with performance standards established by the Kaloi Gulch Task Force and the City's Rules Relating to Storm Drainage Standards as approved by the DPP. Adjacent developments will need to include basins and other measures to ensure that their fence line performance standard is met. To avoid flooding, the capacity of the regional drainage channel will need to keep pace with the rate of development in the watershed. However, as described in Chapter 2, the proposed project disclosed and assessed in this document includes the drainage channel with ultimate capacity of 6,000 cfs at Farrington Highway and 7,400 cfs at the top of Ewa Villages. This is the appropriate capacity for full build-out in the watershed. There are several scenarios by which this ultimate capacity would be established, but those scenarios do not affect the ultimate configuration, or the ultimate

DISCIPLINE	POTENTIAL/ANTICIPATED IMPACTS
	environmental impact, of the regional drainage channel. It is the intent of this document to clear through the environmental review process the ultimate configuration of the project's contribution to the regional drainage system, independently of the details of how that ultimate configuration is achieved. In addition to the regional drainage channel, this project includes other features sized for ultimate regional requirements, such as culverts and cross-drains. It is logical for the initial roadway construction to include the ultimate sizing of these features to avoid subsequent roadway disturbance when the capacity of these features would need to be enhanced. This project also includes a retention/detention basin that is sized for accommodating roadway runoff increases. This basin may be increased or new basins may be added along the drainage channel by others as needed for accommodating runoff increases from their developments. The DPP review process will ensure that adjacent developments not occur until the necessary components of the regional drainage system function with adequate capacity. If DPP does not conduct its site plan reviews of adjacent developments in this manner, the County's participation in the federal flood insurance program would be jeopardized, an unlikely occurrence. The North South Road and Kapolei Parkway project will also have direct impacts on the current sheet flows in the area (see Chapter 3). North South Road will be placed on a berm that would alter the local drainage pattern by interrupting sheet flow across the Ewa Plain. An area north of Ewa Villages will be excavated to function as a storm water retention area for drainage from North-South Road. In summary, the cumulative effect of this project, in combination with other projects, will be to change the regional drainage system. However, this impact is not significant because it conforms with the regional drainage plan established by the Kaloi Gulch Task Force and approved by DPP. Implementation of the regional drainage plan must occur through the cumulative action of future developments in the region in order for the future land use planned for this area to transpire. Efforts to modify the floodplain would continue regardless of whether the North-South Road and Kapolei Parkway project is built. Floodplain modifications are required for the desired future land use to occur, and so future developments will contain features modifying the current drainage pattern.
Hazardous Materials	Two potentially contaminated sites associated with the Ewa Sugar Mill/Oahu Sugar Co. were identified near the North-South Road and Kapolei Parkway project alignments. Although the mill property is near Kapolei Parkway, the main mill operations were located at least 1,000 feet from the alignment. No interaction with hazardous materials is expected. The two sites should not affect nor be affected by planned projects. No additional hazardous materials sites would be affected or created because of any planned development projects, including North-South Road and Kapolei Parkway between Renton Road and North-South Road.

DISCIPLINE	POTENTIAL/ANTICIPATED IMPACTS
Historic Resources	SHPD determined that the entire North-South Road and Kapolei Parkway project area would be within former sugarcane land and feels that no historic properties would be affected with regard to archaeology. The intersection of Kapolei Parkway with Renton Road would be within the Ewa Villages Historic District, although most of the road would be outside of the district. The alignment of Kapolei Parkway was master planned as part of the City's efforts to re-develop the Ewa Villages Historic District, and the roadway does not require the displacement of any structure within the district. North-South Road and Kapolei Parkway from Renton Road to North-South Road, would be part of the roadway network contributing to increased traffic through the Ewa Villages Historic District and passing by other historic buildings in the area, such as the Ewa Hongwanji Mission. Other planned development projects would also contribute to the overall urbanization of the Ewa Plain, and increase traffic, including the intersection of Kapolei Parkway with Renton Road. However, these changes are not unexpected, because development in Ewa has been widely anticipated, and the approximate alignments of North-South Road and Kapolei Parkway between Renton Road and North-South Road are well known in the community. There should be no notable incremental impact on historic resources as a result of the North-South Road and Kapolei Parkway project.
Parks & Recreation	Development of North-South Road and Kapolei Parkway between Renton Road and North-South Road would not require right-of-way from any existing park or recreational facility. Conversely, development of North-South Road and Kapolei Parkway would facilitate public access to parks and recreational facilities by improving regional mobility in Ewa for area residents. Traffic may increase on Kapolei Parkway, which is adjacent to public parks such as Geiger Park in Ewa by Gentry and Ewa Mahiko District Park. However, this change cannot be avoided due to the planned urbanization of the Ewa Plain.
Visual & Aesthetic Resources	Both North-South Road and the proposed portion of Kapolei Parkway would be designed as urban "parkways," featuring ample landscaping and sidewalks. In the context of existing and planned urban development, neither North-South Road nor Kapolei Parkway between Renton Road and North-South Road are anticipated to represent a visually intrusive addition to the Ewa viewshed. Urbanization and development of the Ewa Plain in general and of the Secondary Urban Center at Kapolei in particular are major goals of the City and County of Honolulu. Construction of other planned development projects would alter visual resources by replacing the open, undeveloped views of the area with housing, commercial, and public facility developments. The North-South Road and Kapolei Parkway project would contribute only minimally to the change in the visual landscape, caused by the overall urbanization anticipated in the Ewa Plain. Both North-South Road and Kapolei Parkway are expected to be surrounded by new developments, and would become only one element of an urbanized landscape.

such as adversely affecting endangered and threatened species and taxing public infrastructure.

In contrast, the proposed developments identified in Section 3.1 would occur regardless of which alternative is selected. The North-South Road and Kapolei Parkway project would facilitate the development of DHHL homesteads and future development in East Kapolei, but would not induce secondary impacts separate from the previously planned development. The Ewa region, as previously discussed, has been planned as a Secondary Urban Center for Oahu, with the expansion of the City of Kapolei and area as the focal point of the development activity. Therefore, the Build Alternative would not induce additional development, because the proposed roadway construction has been anticipated and incorporated into the planning of other developments in the region.

3.16 PERMITS AND APPROVALS

Table 3.16-1 lists the approvals and permits that may be required to construct the Build Alternative, as well as those required for construction of the portion of Kapolei Parkway, from North-South Road to Renton Road, under the No-Build Alternative. As noted in Table 3.16-1, the processes to obtain some approvals are ongoing, and will be completed prior to completing the environmental review process. The City will obtain the permits required for construction of the proposed portion of Kapolei Parkway.

Table 3.16-1:
Permits and Approvals

AGENCY	PERMIT OR APPROVAL	NO-BUILD[1]	BUILD
Federal			
Army Corps of Engineers	Clean Water Act (CWA) Section 404 Permit		X
Federal Highway Administration	Interstate Access Approval		X
Federal Highway Administration	Location Hydraulic Study		X
State Historic Preservation Officer	Section 106 of the National Historic Preservation Act (completed)		X
Environmental Protection Agency, Region 9	Section 1424(e) Evaluation of the Safe Drinking Water Act (completed)		X
Federal Emergency Management Agency	Letter of Map Revision	X	X
National Resources Conservation Service	Farmland Conversion Impact Rating (completed)		X
U.S. Fish and Wildlife Service	Endangered Species Act Section 7 Consultation (completed)		X
State of Hawaii			
Department of Business, Economic Development, and Tourism	Hawaii Coastal Zone Management Program Consistency		X
Department of Health	CWA Section 401 Water Quality Certification		X
Department of Health	National Pollutant Discharge Elimination System (NPDES) Permit for storm water discharges relating to construction activities	X	X
Department of Health	Noise Permit (and noise variance if nighttime construction is anticipated)	X	X
Department of Land and Natural Resources (DLNR), Division of Forestry and Wildlife	Habitat Conservation Plan and Certificate of Inclusion (completed)	X	X
DLNR, Historic Preservation Division	HRS Chapter 6E-8 Review	X	X
City and County of Honolulu			
Department of Planning and Permitting	Floodway/Floodplain Variances	X	X
Department of Planning and Permitting	Floodway Districts Certification	X	X
Department of Planning and Permitting	Grubbing, Grading, Excavation and Stockpiling Permit	X	X
Department of Planning and Permitting	Discharge of Waters Permit	X	X
Department of Transportation Services	Street Usage Permit	X	X

Source: Parsons Brinckerhoff Quade & Douglas, Inc., April 2004.
Notes: [1]The permits and approvals listed in this column are only for construction of Kapolei Parkway from the proposed North-South Road to Renton Road. Permitting requirements for other elements of the No-Build Alternative, such as the widening of Fort Weaver Road, are not provided.

CHAPTER 4 ■

NORTH-SOUTH ROAD and KAPOLEI PARKWAY
FINAL ENVIRONMENTAL ASSESSMENT

CHAPTER 4
COMMENTS AND COORDINATION

This chapter summarizes public and agency consultation and coordination activities associated with this project that have been conducted to date. Project scoping and coordination activities included public information meetings; correspondence with government agencies, landowners, and environmental organizations; and meetings with government agencies and other interested parties. A summary of these activities is provided in this chapter. This chapter also provides a record of comments received during the comment period of the 1998 Draft EA for North-South Road.

4.1 PRE-CONSULTATION

4.1.2 AGENCY PRE-CONSULTATION

On October 2, 1995, a formal environmental scoping and project initiation meeting was held at Paki Hale in Honolulu, Hawaii. Agencies and organizations invited to and present at this meeting are listed on Table 4.1-1. During the meeting, participants identified the following key concerns:

- consistency of the project with the transit corridor to be dedicated along the section of North-South Road between the future Kapolei Parkway and Farrington Highway;
- control of stormwater runoff;
- preservation of the OR&L ROW, including its tracks; and
- impacts on the future UH-West Oahu Campus.

Meeting minutes of the project initiation meeting were prepared and are available for review at the HDOT Highways Division Planning Branch.

Following the environmental scoping/project initiation meeting, 17 agencies and organizations were solicited for further consultation and seven agencies responded with written comments (see Table 4.1-1). A summary of their comments is provided below, and copies of their letters are provided in Appendix A.

US Army Corps of Engineers (USACE)

USACE stated that Kaloi Gulch is not a "wetland", but is a "jurisdictional water of the U.S." A Department of Army (DA) permit may be required pursuant to Section 404 of the Clean Water Act if the gulch is subject to dredging or fill.

National Resources Conservation Service (NRCS)

NRCS provided information regarding Form AD 1006 (Farmland Conversion Impact Rating) pursuant to the Farmland Protection Policy Act.

Table 4.1-1
Summary of Agency Pre-Consultation Activities

Agency	Invited to Oct. 2&3, 1995 Agency and Public Meetings	Attended Oct. 2, 1995 Scoping Meeting	Further Consultation Requested or Received*
Federal			
Department of Defense			
USACE	☐		☐
U.S. Navy (BPNAS)	☐		
Department of Housing and Urban Development (HUD)	☐		
EPA	☐		
Department of the Interior, Fish and Wildlife Service (USFWS)	☐		☐
Department of Agriculture (USDA)			
NRCS	☐		☐
BPNAS Redevelopment Commission	☐		☐
State of Hawaii			
Department of Accounting and General Services	☐		
Department of Agriculture	☐		
Department of Business, Economic Development and Tourism	☐		
Department of Defense			☐
Department of Education	☐		
DHHL			☐
HDOH			
Environmental Management Division	☐		
DLNR			
Chair	☐		
Division of Forestry and Wildlife			☐
State Historic Preservation Division			☐
HFDC (now HCDCH)	☐		☐
Office of Environmental Quality Control	☐	☐	☐
Office of Hawaiian Affairs	☐		
Office of State Planning	☐	☐	☐
University of Hawaii			
Environmental Center	☐	☐	
Facilities Planning and Management Office	☐	☐	
Water Resources Research Center	☐		
City and County of Honolulu			
Building Department (now part of Department of Design and Construction)	☐	☐	
Department of Land Utilization (now part of Department of Planning and Permitting)	☐	☐	
Department of Parks and Recreation	☐		

Table 4.1-1
Summary of Agency Pre-Consultation Activities (cont.)

Agency	Invited to Oct. 2&3, 1995 Agency and Public Meetings	Attended Oct. 2, 1995 Scoping Meeting	Further Consultation Requested or Received*
Department of Public Works (now part of Department of Design and Construction)	☐	☐	☐
Dept. of Housing and Community Development (agency no longer exists)	☐	☐	☐
Honolulu Public Transit Authority (now Public Transit Division of the Department of Transportation Services)	☐	☐	☐
Oahu Civil Defense Agency	☐	☐	
Planning Department (now part of Department of Planning and Permitting)	☐	☐	
Other Organizations			
Oahu Metropolitan Planning Organization	☐	☐	

Note: *Includes letter correspondence and meetings.

U.S. Fish and Wildlife Service (USFWS)

USFWS provided a list of threatened or endangered species that might be in the project area.

State of Hawaii, Department of Hawaiian Home Lands (DHHL)

DHHL informed the project sponsors that they are to acquire 200 acres of land adjacent to the project corridor.

State Historic Preservation Division (SHPD)

SHPD informed project sponsors that the OR&L ROW is listed on the National Register of Historic Places, and that any potential impacts to this historic property should be coordinated with the SHPD.

Housing and Community Development Corporation of Hawaii (HFCD [now HCDCH])

HCDCH informed project sponsors that they intend to realign the existing Kaloi Gulch as part of its planned East Kapolei project. (HCDCH has dropped its East Kapolei development plans, including the realignment of Kaloi Gulch.)

Honolulu Public Transit Authority (now DTS)

DTS provided project sponsors with information about current bus routes that serve the project vicinity and stated that they are currently preparing a Transit Operations Analysis.

In addition to letter correspondence, seven pre-consultation meetings were held with the following agencies to discuss various aspects of the project, which are summarized below.

- City Department of Housing and Community Development (March 13, 1996) to discuss the Kapolei Parkway and North-South Road alignments near and within the Ewa Villages development;
- City Department of Public Works (March 13, 1996) to discuss re-alignment of Kaloi Gulch;
- State Office of State Planning and Barbers Point Redevelopment Commission (March 14, 1996) to discuss general land use plans in the project vicinity, and realignment of Kaloi Gulch
- Housing Finance and Development Corporation (March 28, 1996 and April 30, 1996) to discuss East Kapolei development plans, and re-alignment of Kaloi Gulch;
- Haseko Corporation (April 10, 1996) to discuss its Ewa Marina (now Ocean Pointe) development;
- PBR Hawaii (April 16, 1996) to discuss the North-South Road junction with Kapolei Parkway; and
- State Department of Transportation (June 27, 1996) to discuss the future bikeway between Waipahu Depot Road and Aliinui Drive using the OR&L Right-of-Way.

Meeting minutes were prepared and are available for review at the HDOT - Highways Division, Planning Branch.

A second iteration of pre-consultation was not performed prior to issuance of this FEA/FONSI. The basis of this decision is as follows. Distribution of this FEA/FONSI to those filing for consulted party status in 1998 provides an opportunity for these parties to rejoin the discussion by commenting on this document. Any formal pre-consultation processes that were previously conducted have been incorporated into the current process. Where those comments were still applicable, this FEA/FONSI has incorporated the public comments on the 1998 Draft EA. In cases where the comments were no longer directly relevant, because project conditions have changed, effort was made to incorporate the spirit or intent of the comment.

4.1.2 PUBLIC INVOLVEMENT

4.1.2.1 PUBLIC INFORMATION MEETING

On October 3, 1995, a public information meeting was held at the James Campbell Building in Kapolei to present the project publicly and to solicit comments. The agencies identified in Table 4.1-1, and the following elected officials, community organizations, and affected parties were notified of the public meeting:

Elected Officials

- John DeSoto, City Council
- Rene Mansho, City Council
- Paul Oshiro, State House of Representatives
- Annelle Amaral, State House of Representatives
- Joseph Souki, State House of Representatives
- Brian Kanno, State Senate

- Norman Mizuguchi, State Senate

Community Organizations

- Ewa Neighborhood Board No. 23
- Hawaiian Railway Society
- Leeward Oahu Transportation Management Association
- Makakilo-Kapolei-Honokai Hale Neighborhood Board No. 34
- Villages of Kapolei Association

Environmental and Other Organizations

- American Lung Association of Hawaii
- GTE (now Verizon) Hawaiian Telephone Company
- Hawaii Audubon Society
- Hawaiian Electric Company, Inc.
- Hawaiian Historical Society
- Native Hawaiian Legal Corporation
- Oceanic Cable
- The Outdoor Circle
- Sierra Club Hawaii Chapter
- Teamsters Local 996
- Major Land Owners and Private Developers
- The Estate of James Campbell
- Gentry Hawaii, Ltd.
- Haseko Hawaii, Inc.
- Schuler Homes, Inc.

Notice of the public meeting was also published in Oahu's two major newspapers, The Honolulu Advertiser and Honolulu Star-Bulletin, four weekdays prior to this meeting. Meeting minutes were prepared and are available for review at the HDOT - Highways Division - Planning Branch.

In summary, attendees identified the following key concerns:

- A North-South Road alignment closer to Fort Weaver Road would better serve Ewa Beach residents.
- The real traffic problem is east-west traffic, especially where the H-1 and H-2 Freeways intersect.
- Not all Ewa residents commute to Honolulu. Therefore, local east-west circulation must be improved, such as transportation between Ewa Beach/Ewa by Gentry and Kapolei.
- Easements should be dedicated for pedestrian walkways and bike paths.

4.1.2.2 OTHER COMMUNITY MEETINGS

In addition to the public meeting, project presentations were given during meetings of the Makakilo-Kapolei-Honokai Hale Neighborhood Board on October 17, 1995 and

August 21, 1997, and the Ewa Neighborhood Board on November 9, 1995 and July 10, 1997. The minutes of these meetings can be obtained through the City and County of Honolulu Neighborhood Commission Office or the chairpersons of these neighborhood boards. Additionally, the Ewa Beach Community Association was informed of the status of the North-South Road project on January 30, 1996. During both Ewa Neighborhood Board meetings the suggestion of a "straight alignment" was raised. In response to these suggestions, the "straight alignment alternative" was analyzed, but was dropped from further consideration. See Chapter 2 for additional information on alternatives considered.

4.1.2.3 PUBLIC COMMENTS ON THE HABITAT CONSERVATION PLAN

The publication of the draft Habitat Conservation Plan for *Abutilon menziesii* at Kapolei (HCP), discussed in Section 3.7, required a public hearing to be held by DLNR. Because HDOT took the lead in the preparation of the HCP, HDOT used this additional opportunity to receive any potential EA comments from the public. The public hearing was noticed in the Office of Environmental Quality Control (OEQC) publication, The Environmental Notice on December 23, 2003. Around the same time, HDOT independently distributed copies of the public hearing notice to approximately 40 community organizations and individuals, including elected officials. The meeting itself was held at Asing Park in Ewa on January 28, 2004. A court reporter has prepared a transcript of the public comments received at the public hearing.

Four individuals provided comments at the HCP public hearing. Three of the four individuals represented agencies in support of the HCP. These agencies were HDOT, the City, and DHHL. The City requested that its property be included in the Kapolei area defined by the draft HCP; this comment was addressed in the Final HCP (March 2004), and the City's property is now included as part of the official HCP. One resident submitted comments objecting to the taking of Kooloaula plants and the proposed North-South Road alignment.

An additional 15 comment letters were received during the HCP public comment period, including those from elected officials, neighborhood representatives, and other residents, most of which expressed support for the HCP and plans to improve the traffic in the area. One comment letter made recommendations and asked questions about details of the HCP, which have since been addressed in the Final HCP.

The HCP was approved on April 8, 2004 by DLNR. Public comments on the draft HCP were considered or incorporated in the Final HCP and this FEA/FONSI. DLNR is not required to prepare response letters for comments received during the HCP public comment period, so no letters will be prepared to respond specifically to these comments. Records of comments received are available for review at the HDOT Highways Division Planning Branch.

4.1.2.4 Environmental Justice Public Outreach

The Executive Order 12898 on Environmental Justice (EJ), signed on February 11, 1994, requires each federal agency to take appropriate and necessary steps to identify and

avoid disproportionately high and adverse effects of federal projects on health or environment of minority and low income populations. As discussed in Section 3.4.3, Varona Village was identified as an ethnic minority and/or low-income population. Participation and input from residents in Varona Village was solicited in the form of door-to-door outreach activities held on the last week of July through the first week of August, 2004. During this outreach, many of the Varona Village residents were personally invited to attend the project's public hearing (see Section 4.3.3). Information gathered during EJ outreach efforts is documented and addressed in Section 3.4.3.

4.2 REGULATORY COORDINATION

Since the project requires compliance with certain environmental laws and regulations, coordination and consultation with the following agencies and organizations were conducted. Prior to February 2004, coordination did not pertain to the Kapolei Parkway segment. However, after 2004, correspondence may pertain to either or both of the North-South and the Kapolei Parkway segment. Copies of letters are provided in Appendix A.

4.2.1 SECTION 404 OF THE CLEAN WATER ACT

This law prohibits the discharge of dredged materials into the waters of the U.S., which include non-navigable streams, wetlands and mudflats, unless USACE provides a permit. The Section 404 process for this project involved coordination and consultation with the USACE, and previously with HFDC (now HCDCH). The following consultation and coordination activities were conducted on behalf of the project, in addition to EA comment letters received from the USACE (see Section 4.3.2).

USACE

- February 27, 1996 letter from the DTS Director to the USACE District Engineer requesting information on whether Kaloi Gulch is a "waters of the U.S."
- March 21, 1996 letter from the USACE Environmental Engineer to the DTS Director confirming that Kaloi Gulch is a "waters of the U.S." subject to USACE jurisdiction
- HFDC (now HCDCH)
- October 22, 1996 letter from the HFDC Executive Director to the DTS Director informing that HFDC plans to re-align Kaloi Gulch (note that HCDCH no longer has these plans)

4.2.2 FARMLAND PROTECTION POLICY ACT (FFPA)

FPPA requires that federal agencies identify and consider the adverse effects of their actions on the preservation of farmland. The FPPA process involves coordination and consultation the NRCS. The following consultation and coordination activities were conducted with NRCS on behalf of the project.

- October 1, 1996 letter from Parsons Brinckerhoff (PB) to NRCS, requesting Land Evaluation Information as specified in Form AD-1006
- October 23, 1996 letter from NRCS to PB, providing a Form AD-1006 with Land Evaluation Information
- May 7, 2004 letter from PB to NRCS, describing recent project definition changes and requesting land evaluation information for Form NRCS-CPA-1006
- June 4, 2004 Form AD-1006 returned from NRCS, and later finalized by FHWA with an impact rating score of 149 points.

4.2.3 SECTION 1424(E) OF THE SAFE DRINKING WATER ACT

Section 1424(e) of the Safe Drinking Water Act allows EPA to prohibit federal funding for projects in areas that overlie a sole-source aquifer if the project threatens the aquifer. Southern Oahu Basal Aquifer (SOBA) is one of two sole source aquifers in Hawaii. For projects that trigger Section 1424(e) review, a water quality assessment must be prepared and be subject for EPA review. The following consultation and coordination activities were conducted with EPA, upon submittal of a water quality assessment.

- September 18, 1997 letter from EPA to FHWA approving the project pursuant to Section 1424(e) of the Safe Drinking Water Act.
- October 2, 1997 letter from FHWA to HDOT stating that EPA has approved the project pursuant to Section 1424(e) of the Safe Drinking Water Act.
- March 22, 2004 letter from PB to EPA, re-submitting the water quality assessment for review, and explaining changes to the project definition.
- April 19, 2004 letter from EPA to PB, determining that based on the Water Quality Assessment, it is unlikely that there would be a significant impact to the SOBA from this project.

4.2.4 SECTION 7 OF THE ENDANGERED SPECIES ACT (ESA) AND CHAPTER 195D, HRS

This law requires that actions that are federally funded, authorized or carried out be done in a manner so as to not jeopardize the continued existence of any plant or animal species listed as threatened or endangered, or destroy or adversely modify any designated critical habitat. The Section 7 process involves consultation with either the U.S. Fish and Wildlife Service (Service) or the National Marine Fisheries Service depending on the potentially affected species. Because no marine species are affected by this project, federal coordination occurred only with the USFWS. Corresponding State coordination occurred with DLNR's Department of Forestry and Wildlife (DOFAW). The following consultation and coordination activities were conducted on behalf of the project. Details of this coordination are also provided in Section 3.7 of this FEA/FONSI.

U.S. Department of the Interior, Fish and Wildlife Service

- December 8, 1995 letter from PB to the Service, requesting a species list.
- February 1, 1996 letter from the Service to PB, identifying species historically known to exist in the project area: two endangered plants, and three Species of Concern, of which two are plants and one is an insect.

- June 13, 1996 letter from the Service to PB, clarifying that the insect species in the February 1 letter is more common than previously believed and may not be native to Hawaii; there is no need to survey the project area for this species.
- September 3, 1997 letter from HDOT to the Service, confirming species list coordination to date and reporting the finding of another federal trust species, *Abutilon menziesii* (Kooloaula). HDOT noted that other additional coordination will be necessary under the new circumstances.
- October 1, 1997 informal Section 7 consultation meeting with USFWS, FHWA, HDOT, the City, PBR Hawaii, and PB; reviewed project history, botanical studies to date, proposed mitigation, the Biological Assessment (BA) to be submitted, and the Section 7 process.
- October 10, 1997 letter from the Service to HDOT, stating that the endangered species and species of concern mentioned in previous correspondence "will not be subject to consultation"; requesting additional information about Kooloaula locations; and stating the need for a Biological Assessment.
- May 6, 1998 meeting of the Service, FHWA, HDOT, City, PB, and PBR Hawaii to discuss Kooloaula.
- October 9, 1998 letter from the Service to FHWA, following-up on May 6 meeting. The Service states the project is likely to adversely affect Kooloaula, and a BA is required per 50 CFR 402.12. The Service has not received the BA or any other correspondence from FHWA or PB.
- January 26, 2004 formal Section 7 coordination meeting with the Service, FHWA, HDOT, DLNR-DOFAW, the City, and PB, to discuss recent changes in the project definition (inclusion of Kapolei Parkway), and procedures for formal consultation.
- January 30, 2004 letter from PB to the Service, requesting re-coordination of the species list.
- March 3, 2004 letter from the Service to PB, confirming that Kooloaula is the only federal trust species located within the proposed project footprint.
- March 23, 2004 letter from FHWA to the Service, initiating formal Section 7 consultation for the North-South Road and Kapolei Parkway project.
- April 22, 2004 letter from the Service to FHWA, acknowledging receipt of letter requesting initiation of formal Section 7 consultation and all required information.
- August 5, 2005 letter from the Service to FHWA, providing the Service's biological opinion that the proposed project is not likely to jeopardize the continued existence of the listed species, and that no critical habitat would be affected.

State of Hawaii DLNR, DOFAW

- December 8, 1995 letter from PB to DLNR-DOFAW, requesting a species list.
- April 24, 2001 Interim Management Report for *A. menziesii* prepared by DLNR, describing activities implemented by DLNR on behalf of HDOT from October 1998 to April 2001.
- October 31, 2003 Final Interim Management Report for *A. menziesii* prepared by DLNR, describing activities implemented by DLNR from April 2001 to October 2003.
- 1997 to 2004, multiple coordination telephone calls and meetings with DLNR-DOFAW and State of Hawaii, Endangered Species Recovery Committee (ESRC) on development of the HCP.

- April 8, 2004 approval of HCP by Board of Land and Natural Resources.

4.2.5 SECTION 106 OF THE NATIONAL HISTORIC PRESERVATION ACT (NHPA) AND SECTION 6E-8, HRS

NHPA requires that actions that are federally funded, authorized or carried out take into account the effect of such actions on any district, site, building, structure or object that is included in or eligible for inclusion in the National Register of Historic Places (such resources are called historic properties). The Section 106 process involves coordination and consultation with the State Historic Preservation Officer, and other agencies and organizations that have an interest in or is mandated to protect historic properties. In addition, the Advisory Council on Historic Preservation is afforded the opportunity to comment on actions that may potentially affect historic properties. The corresponding State law is Section 6E-8, HRS, which places similar responsibilities on State agencies to evaluate their projects. Completion of the Section 106 process normally satisfies the requirements of HRS Section 6E-8. The following consultation and coordination activities were conducted on behalf of the project.

DLNR, SHPD

- February 27, 1996 letter from the City and County of Honolulu Department of Transportation Services (DTS) Director to the SHPD Administrator, initiating consultation, and to inform the SHPD about possible impacts to the OR&L ROW (note that the project has since been redefined such that the OR&L ROW is no longer within the project limits).
- March 8, 1996 letter from the SHPD Administrator to the DTS Director, providing information about the OR&L ROW.
- November 5, 1997 letter from FHWA to the SHPD Administrator, requesting concurrence on a "no effect" determination regarding the project (note that this determination is now synonymous with a "no historic properties affected" determination pursuant to the updated Section 106 regulations).
- January 21, 1998 letter from the SHPO to the FHWA, concurring with the "no effect" determination.
- February 4, 1998 letter from FHWA to HDOT, stating that SHPO has reviewed the project and concurred that the project will have "no effect" determination.
- March 15, 2004 meeting and site visit to the proposed Kapolei Parkway/Renton Road intersection with SHPD architectural historian.
- March 31, 2004 letter from FHWA to SHPD Administrator, defining changes to the proposed undertaking and APE, noting the initiation of consultation with SHPD staff and concern about traffic signals at the Kapolei Parkway/Renton Road intersection, and informing of intention to start consultation with other parties.
- April 21, 2004 letter from the SHPO to FHWA, recommending an "adverse effect" determination for the architectural concerns and a "no historic properties affected" determination for archaeological resources.
- May 7, 2004 letter from FHWA to SHPD, responding to their determination letter, and expressing the intent to continue work with SHPD staff on appropriate architectural treatments within the historic district.

- June 15, 2004 meeting to coordinate preparation of a Draft Memorandum of Agreement regarding architectural concerns in the historic district.
- July 16, 2004 meeting and site visit involving SHPD, HDOT, the City's Department of Design and Construction, and the project consultant to re-evaluate potential project impacts.
- August 20, 2004 letter from FHWA to SHPD, containing FHWA's effect determinations of "no historic properties affected" with regards to archaeology, and a "no adverse effect" determination with regards to the Ewa Villages Historic District.
- September 8, 2002 letter from SHPO to FHWA, concurring with the effect determinations in the August 20, 2004 letter.

Section 106 Consulted Parties

- May 7, 2004 letter from FHWA to the Office of Hawaiian Affairs (OHA) Administrator describing the proposed project and requesting comments on potential impacts to historic properties.
- May 7, 2004 letter from PB to "Section 106 Consultation List" (see Appendix A) describing the proposed project and requesting comments on potential impacts to historic properties.
- May 17, 2004 meeting involving PB and Ewa Hongwanji representatives on site to answer questions about roadway alignment and to hear concerns about their desire to use a portion of the Kapolei Parkway ROW below Renton Road as their parking area.
- June 1, 2004 letter from OHA to FHWA describing cultural significance of Ewa region and request that appropriate agencies be notified if Native Hawaiian remains or deposits are discovered.
- July 14, 2004 presentation before the Oahu Island Burial Council (OIBC). OIBC requested Section 106 consultation with five additional individuals (identified in Appendix A).
- July 21, 2004 letter from PB to "Section 106 Consultation List #2" (See Appendix A) describing the proposed project and requesting comments on potential impacts to historic properties.

4.2.6 EXECUTIVE ORDER 11988 ON FLOODPLAIN MANAGEMENT

The Executive Order on Floodplain Management (E.O. 11988) directs each Federal agency to "provide leadership and... take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains." Similarly, FHWA's requirements pertaining to the analysis of floodplain impacts require public and agency involvement to assess a project's consistence with existing watershed and floodplain management programs (23 CFR 650.111 (f)), as described in Section 3.8.4. The following narrative and information is provided to describe agency coordination activities that have been conducted specific to this project's floodplain concerns, as well as selected coordination on regional floodplain concerns that have relevance to the project area.

The pre-consultation phase of the North-South Road Environmental Assessment began in 1995. The Director of the Department of Land and Natural Resources (DLNR) was consulted. The Director routed the pre-consultation documents to the Land Division for review. The reviewers included the State National Flood Insurance Program (NFIP) Coordinator.

In response to the federally declared flood emergency of 1996, funds for flood hazard mitigation were requested from FEMA. The Ewa Villages Hazard Mitigation Grant Application was submitted to the State NFIP Coordinator and FEMA in 1997 by the Department of Housing and Community Development.

The East Kapolei Master Plan Environmental Impact Statement was submitted to the Director of the DLNR for review. This master plan disclosed the regional drainage concept that was current at the time for the East Kapolei area. The Office of Environmental Quality Control publication date was 26 March 1997. No comments were received from DLNR, including the State NFIP Coordinator.

The original North-South Road Draft EA was submitted to the Director of the DLNR 1998. The draft EA was routed to the State NFIP Coordinator and no comments were received.

The Letter of Map Revision (LOMR) dated October 12, 2000 from FEMA to the City and County of Honolulu regarding the proposed revised flood elevation determinations for the Ewa Village Area was approved by FEMA and became effective on February 1, 2001. This letter is included in Appendix A.

A March 3, 2003 letter from FEMA to the City validates the approval of the Base Flood Elevations (BFEs) in the LOMR. The approved map is included in the Drainage Report (see Appendix J). FEMA approval extended flood hazard designations into areas not previously mapped. Correspondence demonstrating coordination of the LOMR with FEMA is included in Appendix A. Appendix A also includes correspondence with FEMA coordinating design flows in the area.

The Revised Draft EA was transmitted to DLNR and FEMA Oahu Office in July, 2004.

On August 17, 2004 a meeting was held with DOT, FHWA, and a representative of FEMA Region IX to discuss the North South Road flood hazard issues. It was determined that the proposed project is consistent with the City's Flood Ordinance which meets the minimum requirements of the NFIP Regulations.

Meetings of the Kaloi Gulch Technical Committee have addressed the North South Road and Kapolei Parkway project, and the contribution of these projects to the regional drainage plan. The project is consistent with the criteria established by the Technical Committee.

4.3 DRAFT ENVIRONMENTAL ASSESSMENT

4.3.1 1998 DRAFT ENVIRONMENTAL ASSESSMENT

The Draft EA (September 1998) for the North-South Road Corridor project was announced in the December 23, 1998 edition of the Environmental Notice, which initiated the 30-day public comment period that ended on January 22, 1999. Copies of the Draft EA were mailed to federal, State and County agencies and elected officials who may have an interest in the project. All parties who were sent copies of the Draft EA were asked to provide comments.

The following agencies, organizations and individuals provided written comments on the 1998 Draft EA during its 30-day comment period:

Federal Agencies

- USACE
- USFWS

State of Hawaii Agencies

- BPNAS Redevelopment Commission
- Department of Education
- DHHL
- Department of Health
- DLNR, Land Division
- DLNR, State Historic Preservation Division
- Office of Environmental Quality Control
- Office of Hawaiian Affairs

City and County of Honolulu Agencies

- Board of Water Supply
- Department of Facility Maintenance
- Department of Planning and Permitting
- Fire Department
- Police Department

Businesses, Organizations and Individuals

- GTE Hawaiian Tel (now Verizon Hawaii)
- Haseko (Ewa), Inc.
- Hawaiian Electric Company, Inc.
- Hawaiian Railway Society
- Leeward Oahu Transportation Management Association
- Oamilda, Glenn J.
- Sierra Club, Hawaii Chapter
- West Oahu Soil and Water Conservation District

Copies of the 1998 Draft EA comment letters are provided in Appendix A. In general, the comments were very informative, and were used to help prepare this FEA/FONSI. The following is a brief summary of the EA comments:

- Support for the project
- Requested to consider other alternatives for the project
- Utilities constraints and coordination with agencies regarding future plans
- Traffic and circulation impacts and increased traffic
- Concerns regarding Biological Resources, particularly for the Abutilon menziesii
- Coordination with future land development, particularly schools, residential, and commercial uses
- Project impacts related to: Air quality impacts, Noise impacts, Visual impacts, Historic and Cultural Resources, and Secondary and Cumulative impacts
- Water Resource issues related to sheet flow, flooding, diversion of Kaloi Gulch, creating a detention basin, and run off
- Construction impacts related to: Air quality and Noise impacts

This FEA/FONSI incorporates the public comments on the 1998 EA as much as possible. If comments were no longer directly relevant because project conditions have changed, effort was made to address or incorporate the spirit or intent of the comment.

Due to the unusual circumstances surrounding this project's environmental review process, HDOT and FHWA chose to treat the 1998 Draft EA comments as pre-consultation for this FEA/FONSI because the North-South Road portion of the project remained similar to what was proposed in 1998. In addition, the 1998 Draft EA comments did not cause HDOT or FHWA to reconsider their previous preliminary determination that the project would not have a "significant impact" (see Chapter 5). Therefore, the decision was made to forego additional pre-consultation.

Since the 1998 Draft EA comment letters are now considered pre-consultation, formal responses to each and every substantive comment were not provided to the commenter. However, the comments have been addressed in this FEA/FONSI, and all agencies, organizations and individuals who provided comments to the 1998 Draft EA received a copy of this FEA/FONSI, in addition to receiving a letter acknowledging their previous comments made in 1998 (see Appendix A).

4.3.2 2004 ENVIRONMENTAL ASSESSMENT

The EA process that began in 1998 was in part delayed by anticipated impacts to an endangered plant species, the Kooloaula (*Abutilon menziesii*). Changes being made to the State's endangered species law at the time resulted in complications of coordination between the State law and the federal ESA Section 7 process. In addition, the 1998 Draft EA had assumed a major land development proposal by the HFDC (now HCDCH), East Kapolei, would surround most of the North-South Road. Due to changing economic and financial conditions, HCDCH has since abandoned the East Kapolei proposal. These two factors resulted in substantial delay to HDOT and FHWA's ability to complete

the State and federal environmental review processes for the North-South Road project in a timely manner.

In July 2004, HDOT and the City and County of Honolulu prepared a Revised Draft EA pursuant to Chapter 343, HRS. The Revised Draft EA, with a revised project action, was noticed on July 23, 2004 in the Office of Environmental Quality Control's publication, The Environmental Notice, starting the 30-day public comment period. Copies of the Revised Draft EA were mailed to federal, State and County agencies and elected officials who may have an interest in the project. All parties who were sent copies of the Revised Draft EA were asked to provide comments. The public comment period was later extended to September 16, 2004 to provide sufficient time for the public to comment after the September 1, 2004 public hearing (see Section 4.3.3).

4.3.3 PUBLIC HEARING

HDOT and DTS held a public hearing on the July Revised Draft EA, pursuant to Chapter 343, HRS, on September 1, 2004 at Asing Park in Ewa. The public hearing was organized and advertised in conformance with all applicable State and County requirements, including HDOT Guidelines for Public Participation. Advance legal notices of the hearing and a notice extending the public comment period to September 16, 2004, were published on August 19 and 25 in the Star Bulletin. An article in the Star Bulletin published on August 21, 2004, announced the September 1, 2004 public hearing. Direct mail notices were sent to 290 people and organizations on the project mailing list, including those who had received the Revised Draft EA and those contacted during community outreach efforts conducted in Varona Village. Varona Village residents contacted during a focused outreach were notified and encouraged to attend the public hearing (see Section 3.4.3).

The public hearing was attended by a total of 42 people, of which ten were from Varona Villages. The first hour of the public hearing consisted of an open house format where project boards were displayed and project personnel were available for explanation and questions about the project. The formal portion of the public hearing consisted of a brief project description and public testimony. The public was informed that three methods of providing testimony were available at the public hearing: verbal comments before the audience; verbal comments to a court reporter in another room; and written comments using a comment form provided. In addition, the public was encouraged to send written comments to HDOT by the extended comment period of September 16, 2004.

4.3.4 COMMENTS

A total of 51 agencies, elected officials, businesses, organizations, and individuals provided comments on the Revised Draft EA through letters, written comment forms, and oral testimony made at the project's public hearing. The following agencies, organizations, and individuals provided written and/or oral comments on the EA during the public comment period:

Federal Agencies

- Federal Aviation Administration (FAA)
- FEMA
- NRCS
- U.S. Navy
- USACE

State of Hawaii Agencies

- Department of Accounting and General Services
- Department of Defense
- Department of Education
- Department of Health
- Department of Health, Solid and Hazardous Waste Branch
- Department of Human Services
- DHHL
- DLNR
- DLNR, CWRM
- DLNR, DOFAW
- DLNR, SHPD
- Oahu District Land Office
- Office of Environmental Quality Control
- Office of Hawaiian Affairs
- University of Hawaii at Manoa
- University of Hawaii at Manoa, Office of Capital Improvements

City and County of Honolulu Agencies

- Board of Water Supply
- Department of Community Services
- Department of Facility Maintenance
- Department of Parks and Recreation
- Department of Planning and Permitting
- Fire Department
- Police Department

Elected Officials, Businesses, Organizations and Individuals
(The asterisks indicate those who gave their comments through oral testimony, which are provided in the public hearing transcript (See Section 4.3.3 and Appendix A))

- Apo, Todd*
- Briones, Will
- Becker, Tony*
- Dudley, Kioni*
- Ewa by Gentry Community Association
- Garst Seed Co.
- The Gas Company
- Halverson, Lyle*

- Hange, Patrick
- Hawaiian Railway Society
- Hildebrand, Carolyn
- Interagency Coordination Councils Organization*
- Ko Olina Development, LLC
- Lee, Philmund*
- Leeward Oahu Transportation Management Association
- Lynn, Coby*
- Maria, Louis*
- Malama, Tesha*
- Malate, Cres*
- Mark Moses, State Representative*
- Oamilda, Glenn J.*
- Tagovailoa-Amosa*
- Willie C. Espero, State Senate

Comments and concerns that were expressed were instrumental in preparing this FEA/FONSI. The written comments received during the Revised Draft EA comment period included the following:

- Support for the project
- Permit information and potentially applicable regulations regarding floodplain management, NPDES, and Section 401 Water Quality Certification
- Utilities and coordination with agencies regarding existing land use, and future development, particularly schools and the future UH West Oahu Campus
- Concerns regarding traffic and existing congestion induced by growth in the area
- Construction and operational impacts related to: Air quality impacts, Noise impacts, Historic and Cultural Resources, Secondary and Cumulative impacts, Open Space Preservation, and Community Safety
- Water Resource issues related to flooding
- Farmland access during various project phases
- Project design and landscaping
- Solid waste management during project demolition, construction, and operation

General comments expressed during public testimony included concern that Kapolei Parkway would isolate Varona Village from the rest of Ewa Villages; support for the survival of the endangered Kooloaula including the possible use of the plan in roadway landscaping; and the need for traffic signalization on Kapolei Parkway outside the project limits. Also, an alternative alignment and project modifications were suggested.

Appendix A contains copies of comment letters and corresponding response letters, as well as a summary of comments received at or in conjunction with the public hearing, along with corresponding responses. Transcripts of the hearing are also included in Appendix A.

CHAPTER 5 ■

NORTH-SOUTH ROAD and KAPOLEI PARKWAY
FINAL ENVIRONMENTAL ASSESSMENT

CHAPTER 5
FINDING OF NO SIGNIFICANT IMPACT

5.1 DETERMINATION

The proposed project would not significantly alter the environment in either the long- or short-term. Through design features, consistency with regional master plans and committed mitigation measures described in Chapter 3, project impacts would be below significance thresholds as established by Chapter 343, Hawaii Revised Statutes (HRS).

Absent new information indicating that the project would generate a significant environmental impact, the State of Hawaii Department Transportation (HDOT), in coordination with the City and County of Honolulu Department of Transportation Services (DTS), anticipates preparing a Final Environmental Assessment (EA) addressing comments on this Revised Draft EA, and formally stating that the project will have no significant environmental impacts. The Final EA would thus include a Finding of No Significant Impact (FONSI), issued under State requirements. Therefore, the need to prepare a State Environmental Impact Statement (EIS) is not anticipated.

The Federal Highway Administration (FHWA) also needs to issue a federal document satisfying the requirements of the National Environmental Policy Act (NEPA). The current plan is for the Final EA to also serve as the NEPA EA. The FHWA may determine whether a federal FONSI is appropriate no sooner than 30 days after issuance of the NEPA EA. The significance criteria for a NEPA EA are different from the significance criteria for a State EA.

State and federal FONSI determinations would conclude the environmental review processes under the NEPA and Chapter 343, HRS. Environmental and construction-related permits and approvals listed in Section 3.15 would subsequently need to be obtained.

5.2 FINDINGS AND REASONS

In accordance with Chapter 343 and Hawaii Administrative Rules (HAR), Sections 11-200-9 and 11-200-11.2, HDOT, in coordination with the DTS, anticipates issuing a FONSI for the proposed project. This anticipated FONSI will be announced in the State's Environmental Notice along with an announcement of the availability of this Draft EA. This assessment is based on an evaluation of project impacts in relation to the "Significance Criteria" specified in HAR 11-200-12 (b). The definition of "significant effect" in Chapter 343 was amended by the 2000 State Legislature to include ". . . or adversely affect the economic [or] welfare, social welfare [.], or cultural practices of the community and State."

Below are the preliminary findings of this Draft EA, subject to the public and agency review comments that may be filed during the comment period. The Significance

Criteria appear below in italics, followed by a brief discussion of the project in relation to the specific criterion. The nature of the project's potential impacts, and committed mitigation measures to minimize adverse impacts, is discussed in detail in Chapter 3.

1. *Involves an irrevocable commitment to loss or destruction of any natural or cultural resource* – The proposed project would not involve an irrevocable commitment to loss or destruction of any natural or cultural resources. The project would convert land once used for sugarcane cultivation to a roadway. This land is currently being used for agriculture; however, the farmers have signed short-term land leases with the knowledge that the land will be converted to urban uses in the future. City and County of Honolulu (City) policy has slated the City of Kapolei and the Ewa Development Plan area for continued urbanization.

   The roadway would be near the Ewa Sugar Plantation Villages (Ewa Villages) Historic District, a resource listed on the State Register and nominated for the National Register of Historic Places. Because of early coordination, the FHWA anticipates that the roadway would result in an "adverse effect" on this site in accordance with Section 106 of the National Historic Preservation Act. This determination may result from traffic signals that are likely to be warranted at the intersection of Kapolei Parkway and Renton Road. These traffic signals would be the first erected within in the District, and thus have the potential to be inconsistent or affect adversely the visual integrity of the Historic District. The State Historic Preservation Officer (SHPO) is expected to concur with this "adverse effect" finding, should it be issued.

   Presently, however, FHWA has not issued its formal "adverse effect" determination. Coordination among HDOT, FHWA and the SHPO is continuing, and there is a possibility that FHWA will determine that the traffic signal would not have an "adverse effect" on the Historic District.

   Should an "adverse effect" determination be formally issued, Kapolei Parkway was planned in concert with the establishment of the Historic District. Further, a Memorandum of Agreement (MOA) would be processed stipulating subsequent review of the traffic signal design by the SHPO. The intent of the subsequent review is to minimize the visual intrusion of the traffic signal, consistent with applicable standards and requirements for traffic signals. Consequently, the visual impact of the traffic signal will be minimized.

   The project would not affect the Oahu Railway & Land Company (OR&L) right-of-way (ROW).

   A Habitat Conservation Plan (HCP) for the Kooloaula *(Abutilon menziesii)* was approved by the State of Hawaii Board of Land and Natural Resources on April 8, 2004. The HCP is designed to result in a net gain for this endangered species despite the construction of the proposed project and future developments planned for the area.

2. *Curtails the beneficial uses of the environment* – The proposed project would not curtail the beneficial uses of the environment. The existing land use is mostly vacant with short-term agricultural use. However, the land surrounding the proposed North-South Road is planned for urban uses by City policy, and the proposed project is consistent with these plans.

3. *Conflicts with the State's long-term environmental policies or goals and guidelines expressed in Chapter 344, HRS, and any revisions thereof and amendments thereto, court decisions, or executive orders* – The proposed project would not conflict with the State's long-term environmental policies. The Build Alternative is consistent with the policies and guidelines specified in HRS Chapter 343, as demonstrated by the discussion in this chapter and Chapter 3.

4. *Substantially affects the economic or social welfare of the community or State* – The proposed project would not substantially affect the economic or social welfare of the community or State. Existing nearby agricultural activity would be minimally affected, but only a small portion of the land under cultivation would be required for additional roadway ROW. With only a small amount of land removed from use by tenant farmers, the continuation of existing farming activities would not be jeopardized until such time as the land is urbanized. In addition, mitigation measures would be implemented to minimize impacts on the farming of adjacent land, such as reconstruction of agricultural infrastructure and maintenance of access to fields (see Chapter 3).

   Per Executive Order 12898 on "Environmental Justice (EJ)", and the requirements of Title VI, the proposed project would not negatively or disproportionately affect any one racial or economic group or segment any existing neighborhood. Nearby communities would benefit from an improved transportation network and creation of short-term construction jobs. Consultation with the residents of Varona Village, an EJ target population, will occur during the review period of this Draft EA, so these people will have full opportunity to participate in the planning process.

5. *Substantially affects public health* – The proposed project would not substantially affect public health. Potential risks to public health from roadway projects can be caused by unsafe highway conditions, degradation of air and water quality, and high traffic noise levels. However, the proposed project would not cause any of these health risks for the following reasons:

   - North-South Road and its interchange with the H-1 Freeway, and the section of Kapolei Parkway addressed by this document, would be designed using procedures and standards of the American Association of State Highway and Transportation Officials, ensuring roadway safety;
   - Carbon monoxide modeling indicates that the Build Alternative would not cause an exceedance of State or National Ambient Air Quality Standards;
   - Mitigation measures would be implemented to prevent possible contamination of the Southern Oahu Basal Aquifer;

- The locations where traffic noise impacts are predicted to approach FHWA Noise Abatement Criteria or substantially exceed existing noise levels are located in vacant areas. These areas are planned to be developed in the future. Therefore, the developer(s) would mitigate potential noise impacts before constructing noise sensitive uses, such as housing; and
- Standard construction-related activities and impacts (air and water quality, noise, traffic) would occur away from residential areas. Best Management Practices, dust control, and traffic control measures would be implemented.

6. *Involves substantial secondary impacts* – The proposed project would not involve substantial secondary impacts. Urban developments are being proposed in areas adjacent to North-South Road and Kapolei Parkway, and are anticipated to occur regardless of the construction of North-South Road. Therefore, the proposed project would not induce secondary land uses and related secondary impacts that would not otherwise occur. Rather, this project represents good planning practice by providing necessary infrastructure in an area designated for urban development.

7. *Involves substantial degradation of environmental quality* – The proposed project would not involve substantial degradation of environmental quality. The study area is comprised of land formerly used for sugarcane cultivation, and the land is planned for conversion to urban use. Therefore, the proposed project would not degrade environmental quality.

8. *Substantially affects a rare, threatened, or endangered species, or its habitat* – The proposed project would affect endangered Kooloaula. However, a Habitat Conservation Plan (HCP) was approved by the Board of Land and Natural Resources. While removal of the plants from their native habitat constitutes an adverse effect, the implementation of the HCP is expected to result in a net gain for the endangered species.

9. *Is individually limited but cumulatively has considerable effect upon the environment or involves a commitment for larger actions* – The impacts of the proposed action as described throughout Chapter 3 will not cumulatively have a considerable effect on the environment, in particular because the Ewa region is designated as the "second city" of Oahu. Development of the Ewa region consists of relatively substantial residential, governmental, business, and educational developments that have been built, are under construction, or are planned or approved by the State and City. Projects planned for areas abutting North-South Road and Kapolei Parkway would be completed regardless of completion of the proposed project. However, due to planned developments in Ewa, a number of transportation improvements must be implemented, such as North-South Road and Kapolei Parkway, to address existing traffic congestion and future travel demand. For instance, North-South Road would be consistent with regional land use plans, and help improve sub-regional mobility by providing an alternate to Fort Barrette and Fort Weaver Roads. In addition, North-South Road is a complete project, with logical termini, and will not cause

or automatically require the need for other roadway projects by the State and City.

10. *Detrimentally affects air or water quality or ambient noise levels* – The proposed project would not substantially affect air or water quality or ambient noise levels. The proposed project would comply with State of Hawaii, City and County of Honolulu and federal environmental regulations and standards. The proposed project would cause no violations of State or National Ambient Air Quality Standards. Noise levels would not substantially increase from existing levels in areas where noise-sensitive land uses presently exist. Mitigation measures would be implemented to prevent possible contamination of the Southern Oahu Basal Aquifer.

11. *Affects or is likely to suffer damage by being located in an environmentally sensitive area such as a floodplain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters* – The proposed project is not likely to be damaged as a result of being located in the following environmentally-sensitive areas: Special Management Area, Shoreline Setback, floodplain, tsunami inundation area, geologically hazardous area, estuary, and coastal and submarine areas. There are very few environmentally sensitive areas within the project limits, apart from the colony of endangered plants.

    Although the project area is presently prone to flooding, North-South Road and Kapolei Parkway will not contribute to the problem, and would provide drainage improvements to mitigate the increase in impervious surface created by the project.

    The project will provide for sufficient handling of runoff increases as well as offer improved levels of flood and storm water quality control within this portion of the watershed. Added flood control capacity provided by the project's drainage channel and drainage basin will enable the containment of the FEMA regulatory flood. The retention basin will provide sufficient mitigation to offset runoff increases from the project.

    Erosion and sediment transport controls such as the use of a sediment retention storage basin, the use of mild slopes to minimize entrainment of sediments and the use of vegetative linings in the basin and channel area are being designed into the drainage plan.

    Additionally, roadway drainage plans are based on the framework of the East Kapolei Drainage Master Plan to conform with adjacent area developments.

12. *Substantially affects scenic vistas and viewplanes identified in county or state plans or studies* – The proposed project would not affect scenic vistas and viewplanes identified in City and County of Honolulu or State plans or studies. The project area is not a designated scenic vista. The proposed project would not block or significantly affect any existing scenic views.

13. *Requires substantial energy consumption* – The Build Alternative would result in similar levels of overall vehicle miles traveled as the No-Build condition. Therefore, the Build Alternative would generate a similar level of vehicle fuel consumption as the No Build Alternative. Some energy would be required for construction and nighttime roadway lighting; however, it is not considered significant.

Following the State-mandated 30-day public comment period on this Revised Draft EA, HDOT, in coordination with the DTS, has considered all comments received, and determines that a FONSI determination is appropriate.

CHAPTER 6 ▪

NORTH-SOUTH ROAD and KAPOLEI PARKWAY
FINAL ENVIRONMENTAL ASSESSMENT

CHAPTER 6
BIBLIOGRAPHY

TECHNICAL REPORTS PREPARED FOR THIS EA

Char & Associates, Botanical Survey Report, November 1996 and October 1997

Char & Associates, Botanical Resources Assessment Study, Kapolei Parkway Extension from North-South Road to OR&L Right-of-Way, Kapolei, Oahu, Revised March 2004.

Cultural Surveys Hawaii, Archaeological Reconnaissance Survey, October 1997

Cultural Surveys Hawaii, Cultural Impact Evaluation in Support of the North-South Road and Kapolei Parkway Project, Honouliuli Ahupuaa, Ewa District, Oahu, April 2004

Kaloi Gulch Technical Committee, Kaloi Gulch Technical Committee Interim Report, June 1993

Parsons Brinckerhoff Quade & Douglas, Air Quality Technical Report, July 2004

Parsons Brinckerhoff Quade & Douglas, Corridor Alternatives Report, May 1998

Parsons Brinckerhoff Quade & Douglas, North-South Road and Kapolei Parkway Project Cumulative and Secondary Impacts Report, July 2004

Parsons Brinckerhoff Quade & Douglas, Hazardous Materials Technical Report, September 1997

Parsons Brinckerhoff Quade & Douglas, Interchange Alternatives Report, April 2004

Parsons Brinckerhoff Quade & Douglas, Noise Technical Report, July 2004

Parsons Brinckerhoff Quade & Douglas, Section 106 Report, September 1997

Parsons Brinckerhoff Quade & Douglas, Traffic Study for the North-South Road and Kapolei Parkway Project Environmental Assessment, July 2004

Parsons Brinckerhoff Quade & Douglas, Water Quality Assessment Southern Oahu Basal Aquifer (SOBA) Section 1424(e) Review, March 1997

Parsons Brinckerhoff Quade & Douglas, Zoological Technical Report, September 1997

R.M. Towill Corporation, Drainage Report, July 2004

State of Hawaii, Department of Transportation. Habitat Conservation Plan for *Abutilon menziesii* at Kapolei, Final HCP, March 2004

EA REFERENCES

American Association of State Highway and Transportation Officials (AASHTO), Policy on Geometric Design of Highways And Streets, A, 2001

Baker, Harold L., Agricultural Lands of Importance to the State of Hawaii, University of Hawaii College of Tropical Agriculture and Human Resources, 1977

Barbers Point NAS Redevelopment Commission, Final Recommended Land Use Plan, Barbers Point Naval Air Station, Summary, no date

Behavioral Research Consultants, Potential Impact of Proposed Ewa Marina, Ewa, Oahu on Seasonally-Resident Humpback Whales, 1991

Bruner, Phillip L. for Belt Collins and Associates, Survey of the Avifauna and Feral Mammals at the Ewa Marina Property, Ewa, Oahu, September 5, 1989

CH2MHill for Hawaiian Electric Company, Inc., Waiau-Campbell Industrial Park 138 kV Transmission Line Project, Part 1-CIP to Ewa Nui Substations, Ewa, Oahu, Final Environmental Assessment, February 1993

Char & Associates for Belt Collins and Associates, Botanical Survey Ewa Marina Phase II Project Ewa District, Island of Oahu, September 1989

City and County of Honolulu, Department of Land Utilization, Zoning Maps #12 and #13, 1996

City and County of Honolulu, General Plan: Objectives and Policies, 1992

City and County of Honolulu, Department of Housing and Community Development, Petition for Land Use District Boundary Amendment to Amend the Land Use District Boundary of Certain Lands situated at Honouliuli, District of Ewa, City and County of Honolulu, State of Hawaii, Identified by Tax Map Key Nos. 9-1-17:68 (Por.), 9-1-17:69 (Por.) and 9-1-17:75 (Por.), Consisting of Approximately 100.281 Acres from the Agricultural District of the Urban District, Volume 1, No date.

City and County of Honolulu, Department of Planning and Permitting, Annual Report on the Status of Land Use on Oahu, (July 2003), www.honoluludpp.org/Planning/DevPlanLandUseAnnual.asp, Accessed March 25, 2004

City and County of Honolulu, Planning Department, Development Plan Status Review, Fiscal Year 1988, September 1988

City and County of Honolulu, Planning Department, Ewa Development Plan, August 1997 (revised May 2000)

City and County of Honolulu, Planning Department, Ewa Development Plan: Public Review Draft, July 1995

City and County of Honolulu website, News Releases, Kapolei Hale Opened, www.co.honolulu.hi.us, Accessed March 18, 2004

City and County of Honolulu website, Interactive GIS Maps and Data. ftp://gisftp.hicentral.com, Accessed multiple dates

Coast Guard Air Station Barbers Point Barbers Point Naval Air Station, http://www.globalsecurity.org/military/facility/barbers-point.htm, Accessed April 15, 2004

Community Resources, Inc. for Schuler Homes, Inc., Socio-Economic Impact Assessment of East Kapolei Residential Project, November 1994

Cultural Surveys Hawaii for R.M. Towill Corporation, Archaeological Reconnaissance of the Ewa Villages Project Site Honouliuli, Ewa, Oahu, September 1990

Dunn, Amy E. and Alan E. Haun, Ph.D. for Haseko (Hawaii), Inc., Intensive Archaeological Survey and Test Excavations Ewa Marina Community - Project Phase II, January 1991

Environet, Inc., Additional Sampling and Analysis Report, Ewa Mill Site, Ewa, Oahu, Hawaii, June 2002

Estate of James Campbell, Kapolei Area Long Range Master Plan, July 1993. Revised map July 2003, http://www.kapolei.com/Business/maps.htm, accessed March 2003

Federal Highway Administration (FHWA), Visual Impact Assessment for Highway Projects, 1979

Federal Highway Administration (FHWA) Notice of policy statement "Additional Interchanges to the Interstate System", Federal Register, February 11, 1998. Vol. 63, Number 28. DOCID: fr11fe98-120

Federal Highway Administration (FHWA) "Section 4(f) Policy Paper", September 24, 1987, Revised June 7, 1989.

Funk, Evangeline, Ph.D. Botanical Consultants for Helber Hastert & Fee, Planners, Biological Resources Survey Report for Schuler Homes East Kapolei Project, 1994

Funk, Evangeline, Ph.D. for R.M. Towill Corporation, Biological Resources Survey Report for Ewa Villages Development, 1990

Furumoto, Augustine S., N. Norby Nielsen and William R. Phillips, A Study of Past Earthquakes, Isoseismic Zones of Intensity and Recommended Zones for Structural Design for Hawaii, Hawaii Institute of Geophysics, 1973

Gray, Hong, Bills, & Associates, Inc., Ewa By Gentry, Ewa, Oahu, Final Environmental Impact Statement, May 17, 1993

Gray, Hong, Bills, & Associates, Inc., Regional Drainage Concept, Kaloi Gulch, Honouliuli, Ewa, Oahu, Hawaii, January 18, 1995

Hawaii Community Development Authority, Discover Kalaeloa, http://www.hcdaweb.org/index.cfm?section=kalaeloa, Accessed April 15, 2004

Helber Hastert & Fee, Planners for Schuler Homes, Inc., East Kapolei Project, Ewa, Oahu, Hawaii, Draft Environmental Impact Statement, January 1995

Helber Hastert & Fee, Planners for Schuler Homes, Inc., East Kapolei Project, Ewa, Oahu, Hawaii, Final Environmental Impact Statement, April 1995

Helber Hastert & Fee, Planners for Schuler Homes, Inc., East Kapolei Project, Ewa, Oahu, Hawaii, Volume 1, Draft Environmental Impact Statement, January 1996

Housing Finance and Development Corporation, HFDC Development Summary, no date

Huan, Alan E., Ph.D., Paul H. Rosendahl, Ph.D., and Susan Goodfellow, Ph.D. for Haseko (Hawaii), Inc., Archaeological Mitigation Plan Ewa Marina Community Project - Phase I, Mitigation Plan for Data Recovery, Interim Site Preservation, and Monitoring, Land of Honouliuli, Ewa District Island of Oahu, February 1991

Kaku Associates, Inc., in association with Parsons Brinckerhoff for the Oahu Metropolitan Planning Organization, Oahu Regional Transportation Plan, November 1995

Kaloi Gulch Technical Committee, Interim Report, June 1993

Kapolei Public Library information, www.hawaii.edu/slis/courses/690/690-kapolei.html, Accessed March 31, 2004

Loomis Harold G., Tsunami Wave Runup Heights in Hawaii, Hawaii Institute of Geophysics, 1977

Mink, John, George Yuen and John Chang, Groundwater Resources and Sustainable Yield Ewa Plain Caprock Aquifer, Oahu, Hawaii, July 29, 1988

Oahu Metropolitan Planning Organization, Environmental Justice in the OMPO Planning Process, October 2001, http://oahumpo.org/T6EJ/t6ej.html, Accessed April 16, 2004

Oahu Metropolitan Planning Organization and City and County of Honolulu, Department of Planning and Permitting, Environmental Justice in the OMPO Planning Process, March 2004

Oahu Metropolitan Planning Organization, Transportation for Oahu Plan (TOP 2025), April 6, 2001

Oki, Delwyn, William Souza, Edward L. Bolke, and Glenn R. Bauer, Numerical Analysis of the Hydrogeologic Controls in a Layered Coastal Aquifer System, Oahu, Hawaii, USDA, Hydrogeology Journal, 1998

Pacific Business and Economic Consultants for R.M. Towill Corporation, Agricultural Impact Assessment of the Proposed Ewa Villages Master Plan, July 1990

Pacific Planning & Engineering, Inc. for the Ewa Region Highway Master Plan Working Group, Ewa Region Highway Transportation Master Plan: 1997 and 2005 Roadway Concepts, November 1992

PBR Hawaii for the State of Hawaii, Housing Finance and Development Corporation, HFDC East Kapolei Master Plan Development Project, Draft Environmental Impact Statement, April 1998

Research and Statistics Office, Hawaii Department of Labor and Industrial Relations, Labor and Occupational Information Hawaii 2003, http://www.loihi.state.hi.us/, Accessed April 9, 2004

R.M. Towill Corporation for the City and County of Honolulu Department of Housing & Community Development, Ewa Villages Master Plan, Final Environmental Impact Statement, February 1991

School Match, www.schoolmatch.com, Accessed March 31, 2004

State of Hawaii, Barbers Point Navel Air Station Redevelopment Commission, Kalaeloa Community Redevelopment Plan, June 2001

State of Hawaii, Department of Business, Economic Development and Tourism, Research and Economic Analysis Division, Population And Economic Projections for the State Of Hawaii To 2025 (DBEDT 2025 Series), February 2000

State of Hawaii, Department of Business, Economic Development and Tourism, Time Series, http://www.hawaii.gov/dbedt/timeseries/index.html, Accessed April 15, 2004

State of Hawaii, Department of Land and Natural Resources, Application for HECO 138 kV Easement

State of Hawaii, Department of Land and Natural Resources, Letter to Mr. Allan Ah San, University of Hawaii, "Subject: Fee Conveyance of 500 Acres to the University of Hawaii for its West Oahu Campus, Honouliuli, Ewa, Oahu, Tax Map Key (1) 9-1-016:por.108", October 1, 2002.

State of Hawaii, Department of Transportation, Harbors Division, History of Oahu's Harbors, http://www.state.hi.us/dot/harbors/oahu/history.htm, Accessed April 9, 2004

State of Hawaii, Department of Transportation, Noise Analysis and Abatement Policy, October 1996

State of Hawaii, Department of Transportation, State Right-of-Way Maps Reflecting 300 Ft. Right-of-Way Location, no date

State of Hawaii, Department of Transportation, Traffic Count Data, 1996

State of Hawaii, Department of Transportation, Bike Plan Hawaii, A State of Hawaii Master Plan, September 2003

Transportation Research Board, National Research Council, Special Report 209, Highway Capacity Manual, 1994 and 1985

Tyrone T. Kusao, Inc. for Haseko (Hawaii), Inc., Ewa Marina, Phase II, Final Environmental Impact Statement, Ewa, Oahu, Hawaii, April 1991

United States Census Bureau, Census 2000 Housing Units, March 16, 2004

United States Department of the Agriculture, National Agricultural Statistics Service, 2002 and 1997 Census of Agriculture, http://www.nass.usda.gov/census/, Accessed March 22, 2004

United States Department of the Agriculture, Soil Conservation Service, Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii, August 1972

United States Environmental Protection Agency, Extent of Contamination Oahu Sugar Company Site, Ewa, Hawaii, December 2000

United States Department of the Interior, Fish and Wildlife Service, Lanai Plant Cluster Recovery Plan, September 1995

United States Department of Transportation, Highway Construction Noise: Measurement, Prediction, and Mitigation, 1976

Villages of Kapolei, Website www.villagesofkapolei.com, Accessed March 18, 2004

Wilson Okamoto & Associates, Inc. for Haseko (Ewa) Inc., Ewa Marina, Phase I, Increment 2, Final Environmental Impact Statement, March 1992

APPENDICES

APPENDIX A

AGENCY AND PUBLIC CORRESPONDENCE

This appendix includes: pre-consultation coordination; various regulatory consultation; 1998 Draft Environmental Assessment comments; Transcript of September 2004 Public Hearing; and comments and responses on the July 2004 Revised Draft EA

PRE-CONSULTATION COORDINATION

and

REGULATORY CONSULTATION

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU

TSP96-00144

February 27, 1996

Mr. Kali Watson
Chair
Department of Hawaiian Home Lands
P.O. Box 1879
Honolulu, Hawaii 96805

Attention: Mr. Cleighton Goo

Dear Mr. Watson:

Subject: North-South Road Corridor Project, Ewa, Oahu

A new arterial roadway is being proposed in Ewa, Oahu, from the Interstate H-1 to the proposed Ewa Marina project. A location map showing the project area is attached for your use. We have been informed that Mr. Cleighton Goo from your staff will be the contact person for your agency.

We will be preparing a major investment study (MIS) as per 23 CFR 450.318 prior to the preparation of a NEPA/HRS Chapter 343 environmental document.

Based on the consensus of the participants at the agency scoping/initiation meeting held on October 2, 1995 and a public meeting held on the next day at the James Campbell Building, we selected the following alternatives to be studied in the MIS:

1. No Build — This alternative includes future widening of Fort Weaver Road and Farrington Highway, and future improvements to Kunia, Makakilo, and Palailai Interchanges. It does not assume an interchange on H-1 at North-South Road. The sections of North-South Road through Ewa Villages, Ewa Gentry, and Ewa Marina would be completed, and would connect with Kapolei Parkway at the western end of Ewa Villages.

2. Transportation Systems Management (TSM) — This alternative has not been completely defined. It would probably include TSM measures on Fort Weaver Road and regional Travel Demand Management strategies.

2. Arterial Roadway — This alternative includes an interchange on H-1 and has the following characteristics:

   - Roadway with termini at H-1 and Ewa Marina
   - Three operational sub-alternatives that include:
     - ◇ All general purpose (GP) lanes;
     - ◇ GP lanes plus high-occupancy vehicle lanes;
     - ◇ GP lanes plus a busway utilizing the width provided by a 50-foot transit easement running parallel to the roadway easement.

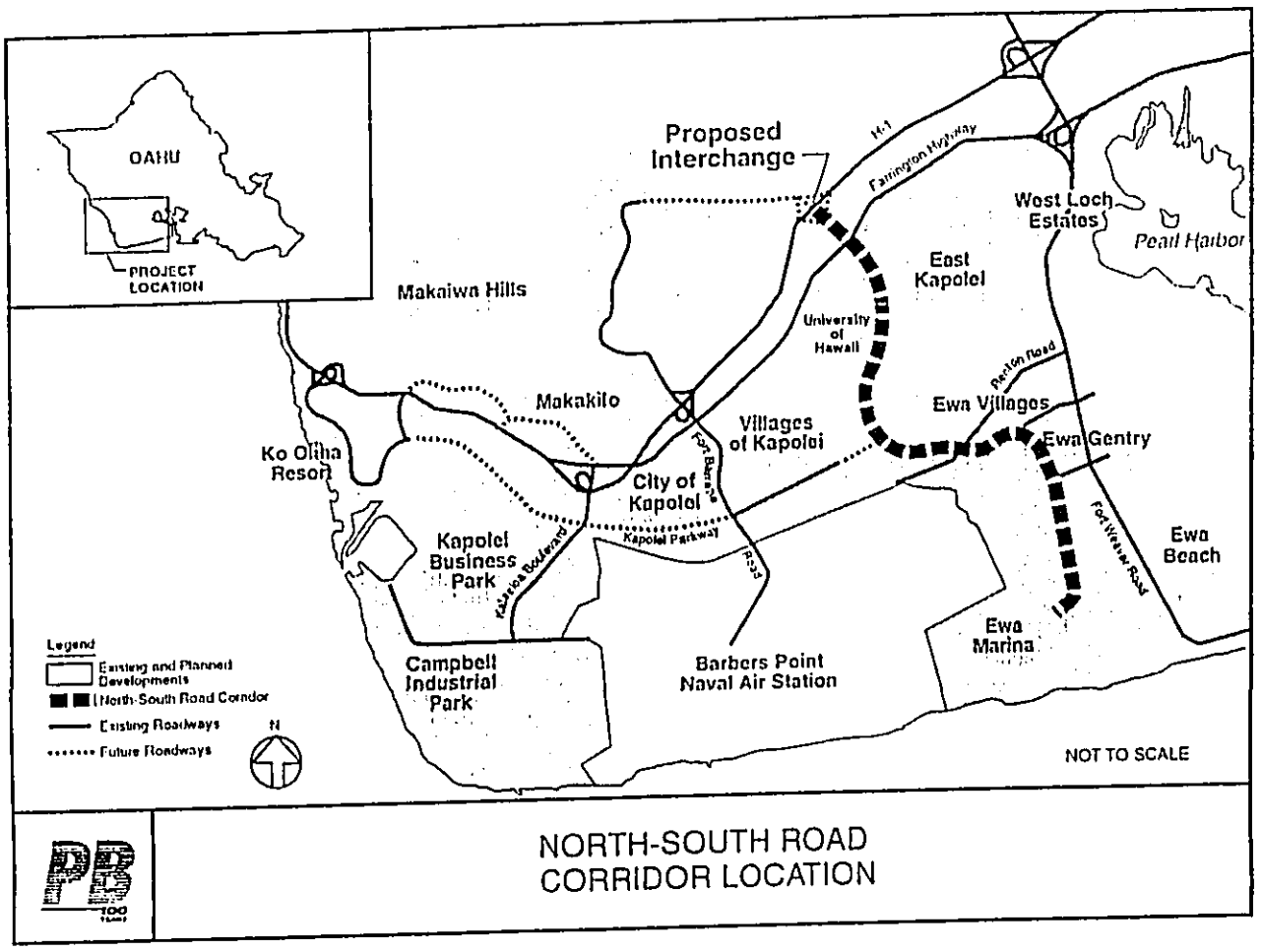
For the next few months we will be conducting traffic, environmental, and financial analyses for the MIS. We are therefore requesting input from your department to assist us in completing the MIS. Information such as the status of your agency's development plans would be very helpful.

Please call Mr. Gregory Hee at 527-6893 if you have any questions or require additional information. Your assistance in this matter will be greatly appreciated.

Respectfully,

for CHARLES O. SWANSON
Director

Enclosure: Project location map



NORTH-SOUTH ROAD
CORRIDOR LOCATION

BENJAMIN J. CAYETANO
GOVERNOR
STATE OF HAWAII

KALI WATSON
CHAIRMAN
HAWAIIAN HOMES COMMISSION

JOBIE M. K. M. YAMAGUCHI
DEPUTY TO THE CHAIRMAN

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

March 8, 1996

The Honorable Charles O. Swanson, Director
Department of Transportation Services
City and County of Honolulu
711 Kapiolani Boulevard, Suite 1200
Honolulu, Hawaii 96813

Dear Mr. Swanson:

Thank you for your letter of February 27, 1996, relating to the preparation of the Major Investment Study (MIS) for the proposed North-South Road Corridor Project, Ewa, Oahu. In response to your request, please note that the Department of Hawaiian Home Lands (DHHL) is anticipating receipt of 200 acres of land in East Kapolei as shown as the blank sector of your North-South Road Corridor Location map, also being the lower Waianae corner of the portion of lands known as the East Kapolei lands. Development of these lands were projected to begin in calendar year 1997.

However, as you may be aware, the State of Hawaii, through the Housing Finance and Development Corporation has proposed to develop the 1100 acres of land at East Kapolei to finance the development of the University of Hawaii-West Oahu Campus. Due to these recent events, current development plans of DHHL have been temporarily withheld pending legislative approval of the State's plans.

As the development of homestead lands in the Ewa region is of prime importance to DHHL, it is kindly requested that your office continue to keep Mr. Cleighton Goo (586-3885/3812) of my staff informed of your progress on this very important project.

Again thank you for your informational letter.

Warmest aloha,

Kali Watson

Kali Watson, Chairman
Hawaiian Homes Commission

c: Roy Oshiro, Housing Finance and Development Corporation

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
PACIFIC PARK PLAZA
711 KAPIOLANI BOULEVARD, SUITE 1200
HONOLULU, HAWAII 96813

JEREMY HARRIS
MAYOR

CHARLES O. SWANSON
DIRECTOR

TSP96-00141

February 27, 1996

MEMORANDUM

TO: HOWARD K. TAKARA, ACTING EXECUTIVE DIRECTOR
HONOLULU PUBLIC TRANSIT AUTHORITY

ATTN: JAMES BURKE

FROM: CHARLES O. SWANSON, DIRECTOR

SUBJECT: NORTH-SOUTH ROAD CORRIDOR PROJECT, EWA, OAHU, HAWAII

Thank you for your agency's participation in the North-South Road Corridor project. As mentioned at the agency initiation/scoping meeting held on October 2, 1995, we will complete a major investment study (MIS) prior to the preparation of a NEPA/HRS Chapter 343 environmental document.

Based on the consensus of the participants at this agency meeting and a public meeting held on the next day at the James Campbell Building, we selected the following alternatives to be studied in the MIS:

1. No Build — This alternative includes future widening of Fort Weaver Road and Farrington Highway, and future improvements to Kunia, Makakilo, and Palailai Interchanges. It does not assume an interchange on H-1 at North-South Road. The sections of North-South Road through Ewa Villages, Ewa Gentry, and Ewa Marina would be completed, and would connect with Kapolei Parkway at the western end of Ewa Villages.

2. Transportation Systems Management (TSM) — This alternative has not been completely defined. It would probably include TSM measures on Fort Weaver Road and regional Travel Demand Management strategies.

3. Arterial Roadway — This alternative includes an interchange on H-1 and has the following characteristics:

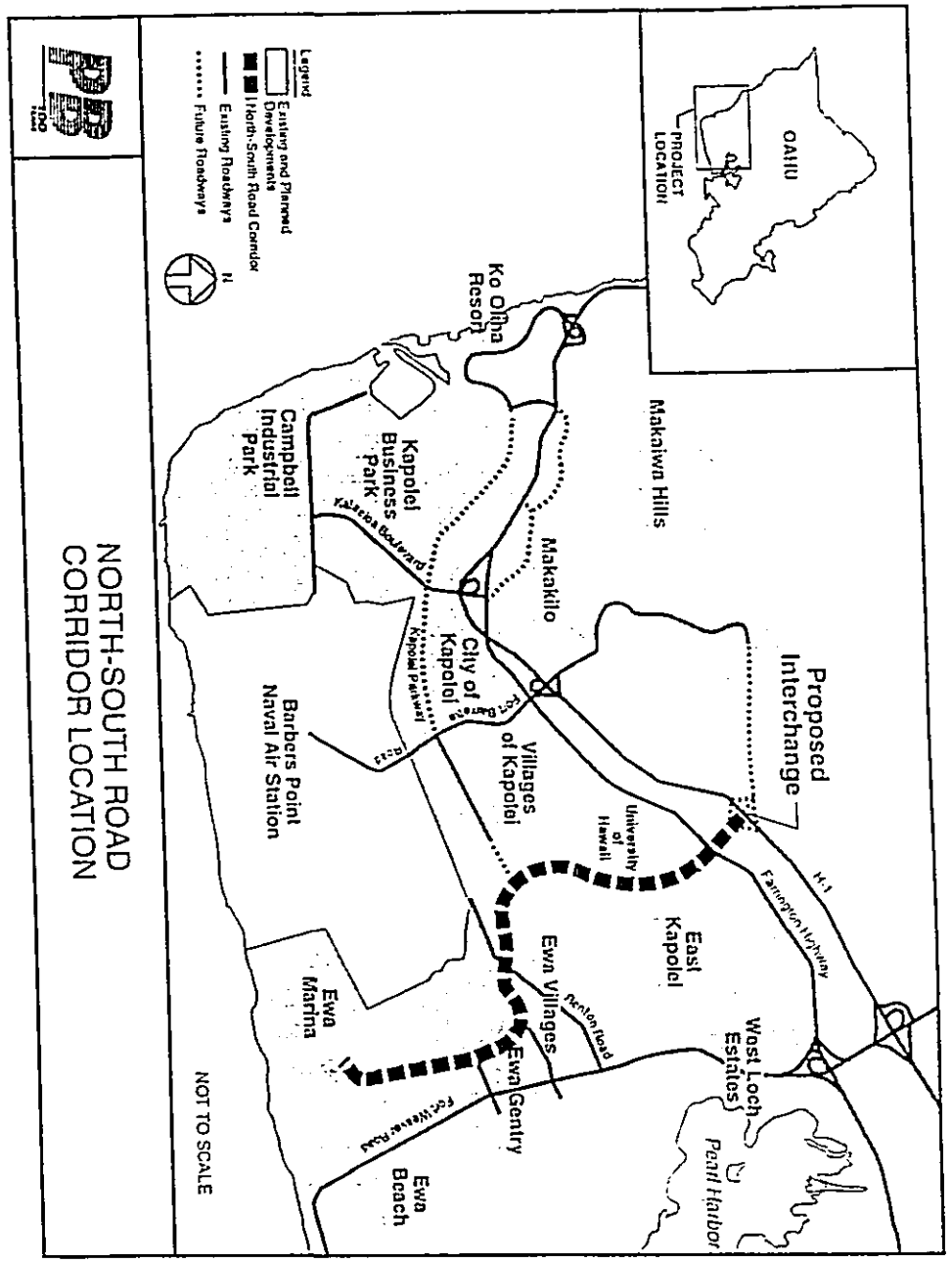
   - Roadway with termini at H-1 and Ewa Marina
   - Three operational sub-alternatives that include:
     - All general purpose (GP) lanes;
     - GP lanes plus high-occupancy vehicle lanes;
     - GP lanes plus a busway utilizing the width provided by a 50-foot transit easement running parallel to the roadway easement.

For the next few months, we will be conducting traffic, environmental, and financial analyses for the MIS. We are therefore requesting input from the HPTA to assist us in completing the MIS. Information such as HPTA's future plans for the Ewa region would be valuable input. Mr. James Burke, from your staff, stated at the agency meeting that as a user of this future facility, HPTA would want to review travel forecasts and the design concepts to ensure that the improvements would accommodate buses. This will be kept in mind as we progress with the development of the project.

Please call Mr. Gregory Hee at 527-6893 if you have any questions or require additional information.

for CHARLES O. SWANSON

Enclosure: Project location map



HONOLULU PUBLIC TRANSIT AUTHORITY
CITY AND COUNTY OF HONOLULU
PACIFIC PARK PLAZA SUITE 275
711 KAPIOLANI BOULEVARD • HONOLULU HAWAII 96813
PHONE (808) 527-4833 • FAX (808) 536-2180

March 13, 1996

BOARD OF DIRECTORS
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AMAR SAPPAL
CHARLES O. SWANSON

MEMORANDUM

TO: CHARLES O. SWANSON, DIRECTOR
DEPARTMENT OF TRANSPORTATION SERVICES

FROM: HOWARD K. TAKARA, ACTING EXECUTIVE DIRECTOR
HONOLULU PUBLIC TRANSIT AUTHORITY

SUBJECT: NORTH-SOUTH ROAD CORRIDOR PROJECT, EWA, OAHU, HAWAII

We are in receipt of your memorandum dated February 27, 1996, highlighting the agency meeting and public meeting regarding the North-South Road Corridor Project.

We have attached all current route/schedule maps that affect the area in question for your information. As you may be aware, we are currently conducting community workshops to gather data/information for our Transit Operations Analysis (TOA) study. Part of our goal for TOA is to prepare a Leeward/Central area circulation plan and develop a TheBUS and TheHandi-Van service integration plan; therefore, we will send the results to you when they are completed. Future planning efforts for the Ewa, Oahu, area will also be provided as they arise.

We look forward to working with you in evaluating travel forecasts and design concepts in the early stages of the MIS. This planning effort will benefit the transit riders in the Ewa community by ensuring the best and most efficient transit system possible.

Please call James Burke at Local 4445 if you have any questions.

Howard K. Takara
HOWARD K. TAKARA

Attachments

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
PACIFIC PARK PLAZA
711 KAPIOLANI BOULEVARD SUITE 1200
HONOLULU HAWAII 96813

CHARLES O. SWANSON
DIRECTOR

TSP96-00142

February 27, 1996

Lieutenant Colonel Ralph Graves
District Engineer
U. S. Army Corps of Engineers
Pacific Ocean Division
Department of the Army
Building 230
Fort Shafter, Hawaii 96858

Dear Lieutenant Colonel Graves:

Subject: North-South Road Corridor Project, Ewa, Oahu

A new north-south arterial roadway is being proposed in Ewa, Oahu, between Interstate H-1 and the proposed Ewa Marina project located on the southern coast of Ewa. A location map showing the project area is enclosed for your use.

As part of this project, we will complete a major investment study (MIS) prior to the preparation of a NEPA/HRS Chapter 343 environmental document. Both the MIS and the environmental document will require identification of potential wetland areas. We, therefore, request that the U. S. Army Corps of Engineers determine whether Kaloi Gulch, located adjacent to the proposed roadway, is a wetland and if so, the extent of the wetland. Another map showing the location of the gulch is enclosed.

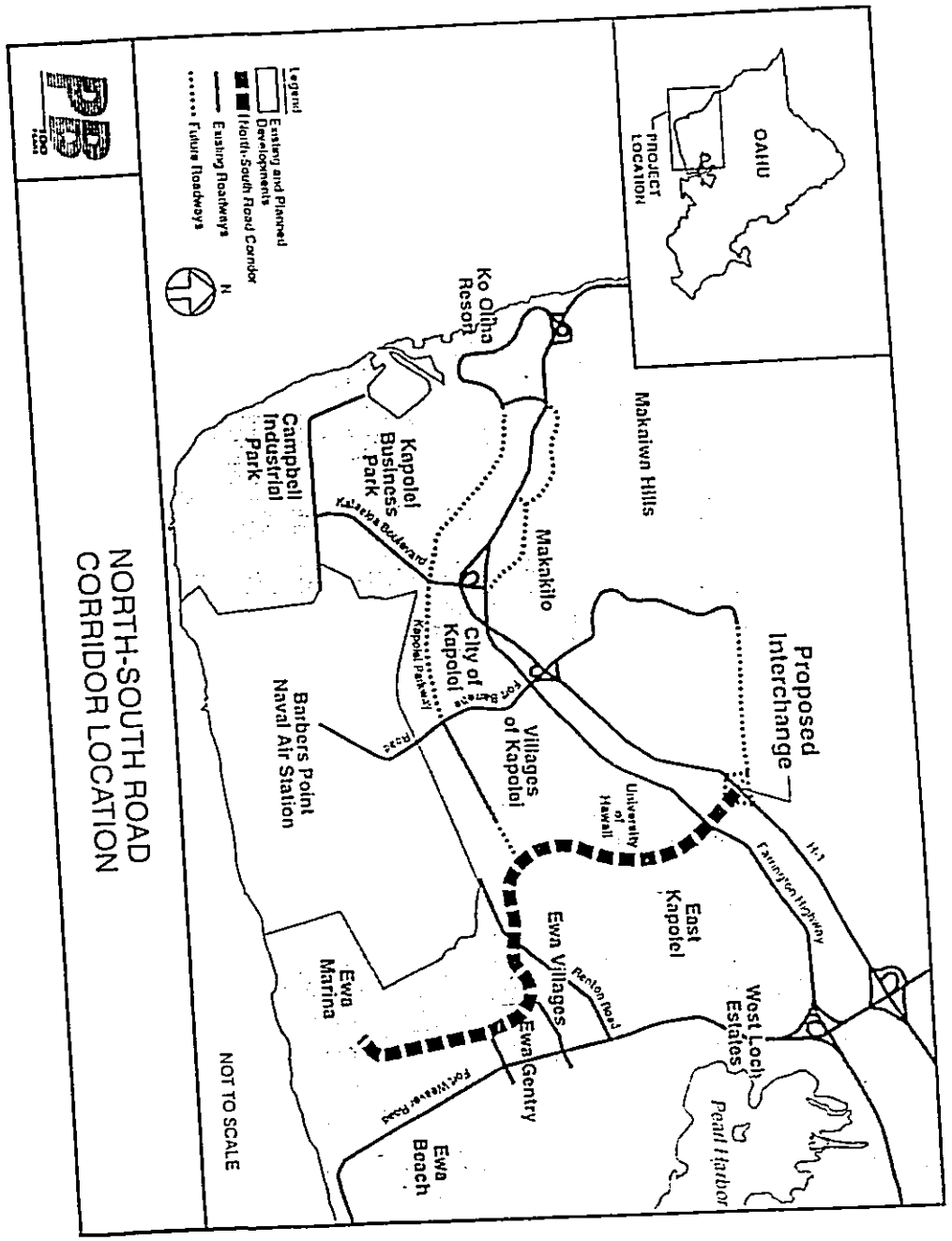
It is our understanding that there are plans to relocate and improve the gulch associated with land use developments in the region. These land use development plans, not directly related to the North-South Road project, provide an easement between H-1 and Ewa Villages that includes space for a relocated Kaloi Gulch. We would also appreciate any input you may have regarding these plans to relocate Kaloi Gulch.

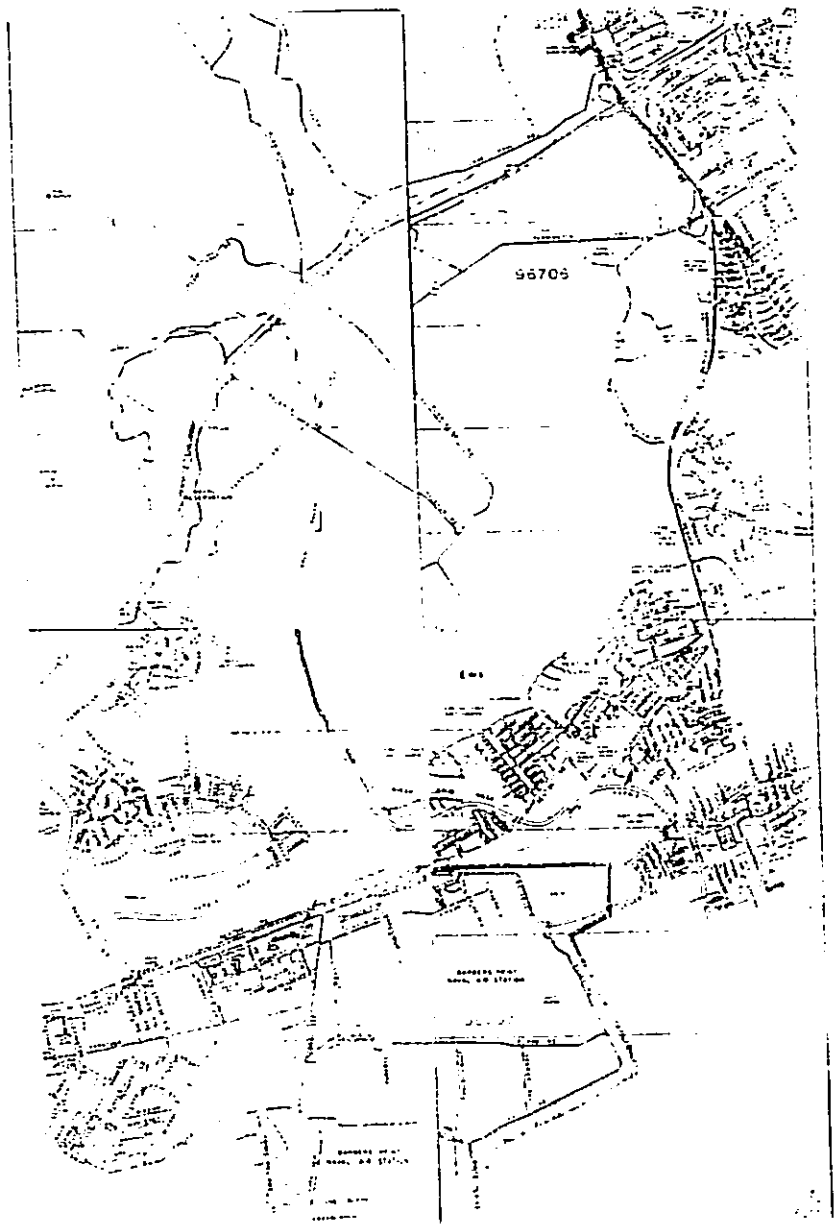
Please call Mr. Gregory Hee at 527-6893 if you have any questions or require additional information. Your assistance in this matter will be greatly appreciated.

Respectfully,

CHARLES O. SWANSON
Director

Enclosures: Project location map
Map showing location of Kaloi Gulch





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

REPLY TO ATTENTION OF
Operations Branch

March 21, 1996

Subject: North-South Road Corridor Project, Ewa, Oahu, Hawaii

Mr. Charles O. Swanson
Director
City and County of Honolulu
Department of Transportation Services
Pacific Park Plaza
711 Kapiolani Boulevard, Suite 1200
Honolulu, Hawaii 96813

Dear Mr. Swanson:

This letter is in regard to your January 27, 1996, letter requesting that the U.S. Army Corps of Engineers determine whether Kaloi Gulch, located adjacent to the proposed roadway, is a wetland, and if so, the extent of the wetland. The U.S. Geological Service topographic map for the area shows that an intermittent stream runs through Kaloi Gulch. Our office generally takes jurisdiction over intermittent streams as waters of the U.S. Under Section 404 of the Clean Water Act, a Department of Army (DA) permit is required for the placement of dredged or fill material into all waters of the U.S. Kaloi Gulch is not a "wetland," but is a jurisdictional water of the U.S.

You also requested our input regarding plans to relocate and improve Kaloi Gulch associated with land use developments in the region. The Corps generally comments on environmental review actions that might be associated with master plans and other development proposals. We recommend that you review these documents for our specific comments.

If you have any questions, please feel free to contact Mr. Alan Everson at 438-9258, extension 11. Please refer to File Number 960000129 in future correspondence.

Sincerely,

Kathleen A. Dadey
Environmental Engineer

BEN J. CAYETANO
GOVERNOR

ROY S. OSHIRO
EXECUTIVE DIRECTOR

IN REPLY REFER TO

STATE OF HAWAII
DEPARTMENT OF BUDGET AND FINANCE
HOUSING FINANCE AND DEVELOPMENT CORPORATION
677 QUEEN STREET SUITE 300
HONOLULU HAWAII 96813
FAX (808) 587-0600

96:DEV/3854

October 22, 1996

The Honorable Charles Swanson, Director
Department of Transportation Services
City and County of Honolulu
711 Kapiolani Boulevard, 12th Floor
Honolulu, Hawaii 96813

Dear Mr. Swanson:

Subject: Kaloi Gulch Realignment, 1100 Acre State Land Bank, Kapolei, Ewa, Oahu

This letter is to advise you that the Housing Finance and Development Corporation (HFDC) intends to realign the existing Kaloi Gulch drainageway from its present location west of the planned North/South Road Corridor to the 96.5' drainage easement within and along the east side of the 300' North/South Road Corridor.

Commencement and completion of the work is intended by HFDC to be accomplished prior to the construction of the North/South Road by the State Department of Transportation. As of this date, the work is in the conceptual master planning process by the planning engineer, R.M. Towill Corporation.

The work as described is of course subject to approval of the Commission on Water Resource Management, approval of plans and specifications by the City Department of Public Works, and issuance by HFDC of Special Revenue Bonds for financing of the project. Periodic updates of the progress of this capital improvement project may be forwarded to your department at the earliest dates they are made available if you so desire.

If there are any questions, please call me at 587-0640, or Stephen Thomas, Project Manager, at 587-0541.

Sincerely,

ROY S. OSHIRO
Executive Director

HFDC

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BENJAMIN J. CAYETANO
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF BUDGET AND FINANCE
HOUSING FINANCE AND DEVELOPMENT CORPORATION
677 QUEEN STREET, SUITE 300
HONOLULU, HAWAII 96813
FAX (808) 587-0600

ROY S. OSHIRO
EXECUTIVE DIRECTOR

IN REPLY REFER TO

97:DEV/1310

RECEIVED
97 APR 17 P12:21
DIRECTOR'S OFFICE
TRANSPORTATION SERVICES

April 14, 1997

The Honorable Cheryl D. Soon, Director
Department of Transportation Services
City and County of Honolulu
711 Kapiolani Boulevard, Suite 1200
Honolulu, Hawaii 96813

Dear Ms. Soon:

Subject: North-South Road Corridor Study

The Housing Finance and Development Corporation (HFDC), in response to your recent query regarding the status of certain progress items which directly or indirectly involve our agency, offer the following:

- Section 7 Consultation for Ko'oloa'ula endangered plant - HFDC staff has met with Mr. Michael Buck of DLNR/Forestry and Wildlife and our consultant PBR Hawaii who is in process of developing an acceptable mitigation plan for inclusion into the EIS for the subject property. A copy of the draft mitigation plan will be made available to you, within the next week.

- Opening Day Roadway Network Assumptions - HFDC is currently in the design approval process for the Kapolei Parkway Bridge. , It is anticipated that the bridge construction will begin by late summer 1997 and be completed by spring 1998. HFDC intends to start design work on the Kapolei Parkway extension to Renton Road (Ewa Villages) in January 1998 and start construction by July 1998. If this schedule can be maintained, the Kapolei Parkway segment through East Kapolei will be completed prior to the completion of the North-South Road.

- Farrington Highway - HFDC has included the cost of widening Farrington Highway from the Kapolei Golf Course entry to North-South Road intersection within the East Kapolei master plan budget as our pro-rata contribution to the Ewa Regional Transportation Master Plan cost sharing agreement.

HFDC

- Kaloi Gulch - HFDC intends to begin the infrastructure development of East Kapolei with the re-alignment of the Kaloi Gulch to the east side of the North-South Road corridor. Construction is anticipated to begin in early 1998. The excavated material from the gulch re-alignment will serve as the sub-base enbankment for the North-South Road Corridor.

You have my personal assurance that HFDC will make every effort as time progresses to faithfully coordinate and assist your department as well as the State Department of Transportation in expediting this most important project.

If there are any questions or other issues which require our immediate attention, please call Stephen Thomas, Project Manager at 587-0541.

Sincerely,

ROY S. OSHIRO
Executive Director

c: Honorable Kazu Hayashida, Director
State of Hawaii Department of Transportation

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Parsons Brinckerhoff
Pacific Tower, Suite 3300
1001 Bishop Street
Honolulu, HI 96813
808-531-7094
Fax: 808-528-2358

October 1, 1996

Saku Nakamura
Natural Resources Conservation Service
P.O. Box 50004
Honolulu Hi 96850

Dear Mr. Nakamura:

We spoke several months ago about a farmland conversion impact rating for North-South Road. A corridor has been proposed and is shown on the enclosed soils map. Site A and Site B on the Alternative Site Rating Columns are for a road with a 116 ft. right of way and a 150 ft. right of way to include a busway. There are a number of designs for the interchange but they all are in approximately the same location.

We would appreciate if you could fill out the Land Evaluation Information on the enclosed form. If you have any questions, please call me at 566-2271.

Sincerely,

Jan Reichelderfer

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Box 50004
olulu, HI
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USDA

Our People...Our Islands ..In Harmony

October 23, 1996

Ms. Jan Reichelderfer
Parson Brinckerhoff
Pacific Tower, Suite 3000
1001 Bishop Street
Honolulu, Hawaii 96813

Dear Ms. Reichelderfer:

Subject: Farmland Conversion Impact Rating - North-South Road Corridor, Ewa, Oahu, Hawaii

Enclosed is the Farmland Conversion Impact Rating (Form AD-1006) for the North-South Road Corridor. We completed Parts II, IV, and V.

If you have any questions, please call me at 541-3414.

Sincerely,

Saku Nakamura

SAKU NAKAMURA
Soil Scientist

Enclosure

cc: (w/ encl.)
Michael Bajinting, District Conservationist, USDA-NRCS, Aiea Field Office, Aiea, HI

U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

PART I (To be completed by Federal Agency)		Date Of Land Evaluation Request	
Name Of Project	North-South Road	Federal Agency Involved	Federal Highway Administration
Proposed Land Use	Road	County And State	Honolulu Hawaii
PART II (To be completed by SCS)		Date Request Received By SCS	10/2/96
Does the site contain prime, unique, statewide or local important farmland? (If no, the FPPA does not apply – do not complete additional parts of this form).		Yes ☒ No ☐	Acres Irrigated: 36,300 Average Farm Size: 139
Major Crop(s)	Farmable Land In Govt. Jurisdiction		Amount Of Farmland As Defined in FPPA
Pineapple, vegetables, corn, banana	Acres: 151,860 % 39		Acres: 94,500 % 24
Name Of Land Evaluation System Used	Name Of Local Site Assessment System		Date Land Evaluation Returned By SCS
State of HI LESA	None		10/22/96

PART III (To be completed by Federal Agency)	Alternative Site Rating			
	Site A	Site B	Site C	Site D
A. Total Acres To Be Converted Directly	333	350		
B. Total Acres To Be Converted Indirectly	—	—		
C. Total Acres In Site	333	350		
PART IV (To be completed by SCS) Land Evaluation Information				
A. Total Acres Prime And Unique Farmland	170	178		
B. Total Acres Statewide And Local Important Farmland	72	74		
C. Percentage Of Farmland In County Or Local Govt. Unit To Be Converted	0.256	0.267		
D. Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value	48	48		
PART V (To be completed by SCS) Land Evaluation Criterion Relative Value Of Farmland To Be Converted (Scale of 0 to 100 Points)	82	82		
PART VI (To be completed by Federal Agency) Assessment Criteria (These criteria are explained in 7 CFR 658.5(b))	Maximum Points			
1. Area In Nonurban Use	15	11	11	
2. Perimeter In Nonurban Use	10	1	1	
3. Percent Of Site Being Farmed	20	0	0	
4. Protection Provided By State And Local Government	20	0	0	
5. Distance From Urban Builtup Area	NA	--	--	
6. Distance To Urban Support Services	NA	--	--	
7. Size Of Present Farm Unit Compared To Average	10	0	0	
8. Creation Of Nonfarmable Farmland	25	0	0	
9. Availability Of Farm Support Services	5	0	0	
10. On-Farm Investments	20	0	0	
11. Effects Of Conversion On Farm Support Services	25	0	0	
12. Compatibility With Existing Agricultural Use	10	0	0	
TOTAL SITE ASSESSMENT POINTS	160	12	12	
PART VII (To be completed by Federal Agency)				
Relative Value Of Farmland (From Part V)	100	82	82	
Total Site Assessment (From Part VI above or a local site assessment)	160	12	12	
TOTAL POINTS (Total of above 2 lines)	260	94	94	

Selected: ____ Date Of Selection ____ Was A Local Site Assessment Used? Yes ☐ No ☐

Reason For Selection

Parsons Brinckerhoff Quade & Douglas, Inc.
American Savings Bank Tower
1001 Bishop Street, Suite 3000
Honolulu, HI 96813
808 531-7094
Fax 808-528-2368

May 7, 2004

Mr. Christopher Smith
Soil Scientist
Natural Resources Conservation Service
U.S. Department of Agriculture
P.O. Box 50004
Honolulu, Hawaii 96850-0050

Subject: North-South Road Corridor and Kapolei Parkway, Ewa, Oahu, Hawaii
Farmland Protection Policy Act, Form NRCS-CPA-106

Dear Mr. Smith

Pursuant to the Farmland Protection Policy Act and in behalf of the State of Hawaii, Department of Transportation (HDOT), we request Farmland Conversion Impact Ratings for this project. A partially completed Farmland Conversion Impact Rating form (NRCS-CPA-106) is attached.

The above referenced project was initially introduced to the National Resources Conservation Service (NRCS) in 1996 when a previous request was made for Farmland Conversion Impact Ratings. At that time, this project was called the North-South Road Project. The project definition and name has since been revised to include a portion of Kapolei Parkway contiguous with North-South Road. A Draft Environmental Assessment was published in September 1998. The project stalled for several years, mainly due to the discovery of an endangered plant and changes in land development plans.

The HDOT, in consultation with the City and County of Honolulu (City) and Federal Highway Administration (FHWA), now proposes to implement the North-South Road in conjunction with a portion of Kapolei Parkway. North-South Road would be a limited-access, principal arterial highway, connecting the Interstate Route H-1 (H-1 Freeway) to Kapolei Parkway, and will be utilizing State and Federal funds for its construction. The construction of Kapolei Parkway between the North-South Road and Renton Road intersections will be funded by both the City and Federal governments. The segment of Kapolei Parkway from North-South Road to Renton Road has a right-of-way of approximately 116 feet and a length of approximately 0.7 mile, as shown on the enclosed project location map. The proposed project also includes the following elements:

- a new H-1 Freeway interchange to provide access to and from North-South Road;
- associated intersections for North-South Road and Kapolei Parkway; and
- drainage features consisting of a drainage channel parallel to North-South Road, and a detention basin

All project elements will be constructed in the roadway right-of-way. The enclosed Project Location Map shows the locations of the proposed project elements.

Since both the State and City actions will be seeking Federal funding assistance, they will be treated as one project for environmental clearance purposes pursuant to the National Environmental Policy Act (NEPA).

Pursuant to the Farmland Protection Policy Act, we request Farmland Conversion Impact Ratings for the current project alternatives. A partially completed Farmland Conversion Impact Rating form (NRCS-CPA-106) is attached.

Corridor A on the Alternative Site Rating Columns is for North-South Road between Interstate H-1 Freeway and Kapolei Parkway plus the segment of Kapolei Parkway between North-South Road and Renton Road. Corridor B would require approximately 217 acres of land zoned for agricultural use.

The right-of-way footprints of both North-South Road and Kapolei Parkway are shown on the enclosed soils map. Final engineering may vary slightly, but all features will be in the configuration shown.

We would appreciate your cooperation in completing Parts II, IV, and V of Form NRCS-CPA-106. If you have any questions, please feel free to contact me at (808) 566-2239 or ohtomo@pbworld.com.

Sincerely,

Nami Ohtomo
Parsons Brinckerhoff Quade & Douglas, Inc.

Enclosures: 1. Form NRCS-CPA-106
2. Project location map with alternatives
3. Soils map

cc. Mr. Nelson Sagum, State Department of Transportation, (w attachments)
Ms. Faith Miyamoto, City and County of Honolulu, DTS (w attachments)
Mr. Pat Phung, Federal Highway Administration (w attachments)

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U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

PART I (To be completed by Federal Agency)	Date Of Land Evaluation Request 5/7/04
Name Of Project North South Road and Kapolei Parkway	Federal Agency Involved Federal Highway Administration
Proposed Land Use Transportation Project	County And State City and County of Honolulu, HI
PART II (To be completed by NRCS)	Date Request Received By NRCS 5/11/04

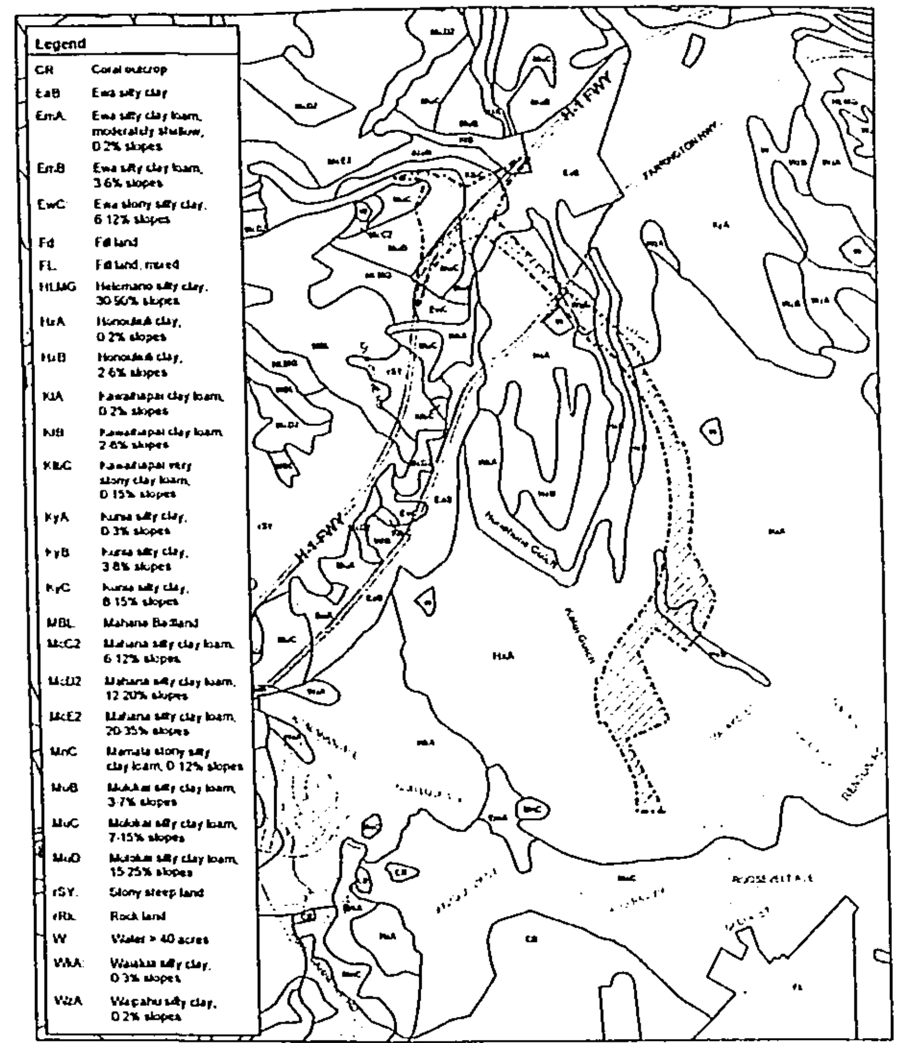
Does the site contain prime, unique, statewide or local important farmland? (If no, the FPPA does not apply -- do not complete additional parts of this form)	Yes ☒ No ☐	Acres Irrigated 16,303	Average Farm Size 91
Major Crop(s) previously sugar cane	Farmable Land In Govt. Jurisdiction Acres 151,660 % 33	Amount Of Farmland As Defined in FPPA Acres 94,500 % 24	
Name Of Land Evaluation System Used State of HI, LESA	Name Of Local Site Assessment System none	Date Land Evaluation Returned By NRCS 6/4/04	

PART III (To be completed by Federal Agency)	Maximum Points	Alternative Site Rating: Site A	Site B	Site C	Site D
A Total Acres To Be Converted Directly		217.0			
B Total Acres To Be Converted Indirectly		0.0			
C Total Acres In Site		217.0	0.0	0.0	0.0
PART IV (To be completed by NRCS) Land Evaluation Information					
A Total Acres Prime And Unique Farmland		36.0			
B Total Acres Statewide And Local Important Farmland		22.0			
C Percentage Of Farmland In County Or Local Govt. Unit To Be Converted		0.1			
D Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value		47.0			
PART V (To be completed by NRCS) Land Evaluation Criterion Relative Value Of Farmland To Be Converted (Scale of 0 to 100 Points)		83	0	0	0
PART VI (To be completed by Federal Agency) Site Assessment Criteria (These criteria are explained in 7 CFR 658.5(b))	Maximum Points				
1 Area In Nonurban Use					
2 Perimeter In Nonurban Use					
3 Percent Of Site Being Farmed					
4 Protection Provided By State And Local Government					
5 Distance From Urban Builtup Area					
6 Distance To Urban Support Services					
7 Size Of Present Farm Unit Compared To Average					
8 Creation Of Nonfarmable Farmland					
9 Availability Of Farm Support Services					
10 On Farm Investments					
11 Effects Of Conversion On Farm Support Services					
12 Compatibility With Existing Agricultural Use					
TOTAL SITE ASSESSMENT POINTS	160	0	0	0	0
PART VII (To be completed by Federal Agency)					
Relative Value Of Farmland (From Part V)	100	83	0	0	0
Total Site Assessment (From Part VI above or a local site assessment)	160	0	0	0	0
TOTAL POINTS (Total of above 2 lines)	260	83	0	0	0

Site Selected	Date Of Selection	Was A Local Site Assessment Used? Yes ☐ No ☐

Reason For Selection

(See Instructions on reverse side) Form AD-1006 (10-83)



Soils Map

North-South Road and Kapolei Parkway

Legend

North South Road Corridor

Kapolei Parkway

Existing Roadways

Committed Future Roadways

U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

PART I *(To be completed by Federal Agency)*	Date Of Land Evaluation Request 5/7/04
Name Of Project North-South Road and Kapolei Parkway	Federal Agency Involved Federal Highway Administration
Proposed Land Use Transportation Project	County And State City and County of Honolulu, HI
PART II *(To be completed by NRCS)*	Date Request Received By NRCS 5/11/04

Does the site contain prime, unique, statewide or local important farmland? *(If no, the FPPA does not apply – do not complete additional parts of this form)*	Yes	No	Acres Irrigated	Average Farm Size
	☑	☐	16,303	91

Major Crop(s)	Farmable Land In Govt Jurisdiction	Amount Of Farmland As Defined In FPPA
previously sugar cane	Acres: 151,860 % 39	Acres: 94,500 % 24
Name Of Land Evaluation System Used: State of HI, LESA	Name Of Local Site Assessment System: none	Date Land Evaluation Returned By NRCS: 6/4/04

PART III *(To be completed by Federal Agency)*	Alternative Site Rating			
	Site A	Site B	Site C	Site D
A Total Acres To Be Converted Directly	217.0			
B Total Acres To Be Converted Indirectly	0.0			
C Total Acres In Site	217.0	0.0	0.0	0.0
PART IV *(To be completed by NRCS)* Land Evaluation Information				
A Total Acres Prime And Unique Farmland	36.0			
B Total Acres Statewide And Local Important Farmland	22.0			
C Percentage Of Farmland In County Or Local Govt Unit To Be Converted	0.1			
D Percentage Of Farmland In Govt Jurisdiction With Same Or Higher Relative Value	47.0			
PART V *(To be completed by NRCS)* Land Evaluation Criterion Relative Value Of Farmland To Be Converted *(Scale of 0 to 100 Points)*	83	0	0	0
PART VI *(To be completed by Federal Agency)* Site Assessment Criteria *(These criteria are explained in 7 CFR 658.5(b)*	Maximum Points			
1 Area In Nonurban Use	15	9		
2 Perimeter In Nonurban Use	10	10		
3 Percent Of Site Being Farmed	20	7		
4 Protection Provided By State And Local Government	20	20		
5 Distance From Urban Builtup Area	--	--		
6 Distance To Urban Support Services	--	--		
7 Size Of Present Farm Unit Compared To Average	10	10		
8 Creation Of Nonfarmable Farmland	25	0		
9 Availability Of Farm Support Services	5	0		
10 On Farm Investments	20	5		
11 Effects Of Conversion On Farm Support Services	25	0		
12 Compatibility With Existing Agricultural Use	10	5		
TOTAL SITE ASSESSMENT POINTS	160	66	0	0	0
PART VII *(To be completed by Federal Agency)*					
Relative Value Of Farmland *(From Part V)*	100	83	0	0	0
Total Site Assessment *(From Part VI above or a local site assessment)*	160	66	0	0	0
TOTAL POINTS *(Total of above 2 lines)*	260	149	0	0	0

Site Selected: Site A	Date Of Selection 7/14/04	Was A Local Site Assessment Used? Yes ☐ No ☑

Reason For Selection:

Site A has been selected as the preferred alternative because it is consistent with the proposed roadway alignment, which is identified in the "Ewa Development Plan" and other local planning documents that guide long term land use and development in this area. The consistency with local plans combined with the low farmland impact rating affirm site A as the preferred alternative.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

RECEIVED
SEP 2 5 1997
HAWAII DIVISION

September 18, 1997

Mr Pat Phung
Transportation Engineer
Federal Highway Administration
300 Ala Moana Blvd., Room 3202
Honolulu, HI 96850

Re North-South Road, City and County of Honolulu, Hawaii

Dear Mr Phung:

I have reviewed the information you submitted regarding the North-South Road located in City and County of Honolulu, Hawaii and within the Southern Oahu Basal Sole Source Aquifer. Under provisions of the Safe Drinking Water Act, Section 1424(e), EPA is charged with review of projects that receive federal financial assistance and are located in Sole Source Aquifer areas. This program is designed by Congress to assure that projects receiving federal financial assistance are constructed to prevent contamination of drinking water resources.

After reviewing the Draft Water Quality Assessment and proposed mitigation measures, it appears unlikely that this project will significantly impact the SOBA Sole Source Aquifer, especially if prevention activities are implemented at the H-1 interchange. Therefore, under provisions of the Safe Drinking Water Act, Section 1424(e), we approve this project.

If you have additional questions or require further information, please contact me at 415-744-1831.

Sincerely,

Wendy L. Melgin
Regional Hydrologist

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
Hawaii Division
300 Ala Moana Blvd., Room 3202
Honolulu, HI 96850
October 2, 1997

IN REPLY REFER TO
HEC-HI

Mr. Kazu Hayashida
Hawaii Department of Transportation
869 Punchbowl Street
Honolulu, HI 96813-5097

RECEIVED
Oct 3 10 23 AM '97
DEPT. OF TRANSPORTATION
HIGHWAYS DIVISION

Attn.: Nelson Sagum

Dear Mr. Hayashida:

Subject: North-South Road, City & County of Honolulu, Hawaii
Section 1424(e) Review, Safe Drinking Water Act

The U S. Environmental Protection Agency (EPA) has reviewed the Draft Water Quality Assessment and the proposed mitigation measures for the subject project. In accordance with the Safe Drinking Water Act, Section 1424(e), the EPA has approved this project. Enclosed is the approval letter from the EPA.

Please contact me at 541-2536 if there are any questions.

Sincerely yours,

Pat V. Phung

Pat V. Phung, P.E.
Transportation Engineer

Enclosure

Oct 2 2 04 PM '97

Parsons Brinckerhoff
American Savings Bank Tower
1001 Bishop Street Suite 3000
Honolulu, HI 96813

March 22, 2004

Shannon Fitzgerald
EPA Groundwater Office
MS WTR-9
75 Hawthorne St
San Francisco, CA 94105

RE: North South Rd., Southern Oahu Basal Aquifer, Section 1424 (e) Review

Dear Ms Fitzgerald:

As we have discussed on the phone, we are in the process of reviving North South Road to be constructed on Leeward Oahu. A Draft Environmental Assessment was published in September 1998. The project stalled, mainly due to an endangered plant and changes in land development plans.

For the current project the State of Hawaii Department of Transportation (HDOT) proposes to build North-South Road, a limited-access, principal arterial roadway, which would connect the Interstate H-1 Freeway to Kapolei Parkway. In addition, the City and County of Honolulu (City) proposes to build a portion of Kapolei Parkway between the intersections with North-South Road and Renton Road. Both the State and City actions are federal-aid, and will be treated as one project for environmental clearance purposes pursuant to the National Environmental Policy Act (NEPA). The proposed project also includes the following elements:

- construction of a new H-1 Freeway interchange to provide access to and from North-South Road.
- associated intersections for North-South Road and Kapolei Parkway; and
- drainage features consisting of drainage channel parallel to North-South Road, and a detention basin

All project elements will be constructed in the roadway right-of-way. Attachment 1 shows the locations of the proposed project elements. The beginning of construction for North-South Road is planned for late 2004, with completion in 2009.

As with the previous project, the drainage system proposed for the mauka section of North-South Road and its intersection with Interstate Route H-1 would collect and convey roadway drainage and inadvertent spills along the roadway to a discharge to Kalaeloa Gulch approximately 450 m (1500 ft) south of Farrington Highway. The discharge point would be south of the caprock boundary, and therefore, would be located above caprock.

Parsons Brinckerhoff
American Savings Bank Tower
1001 Bishop Street Suite 3000
Honolulu, HI 96813

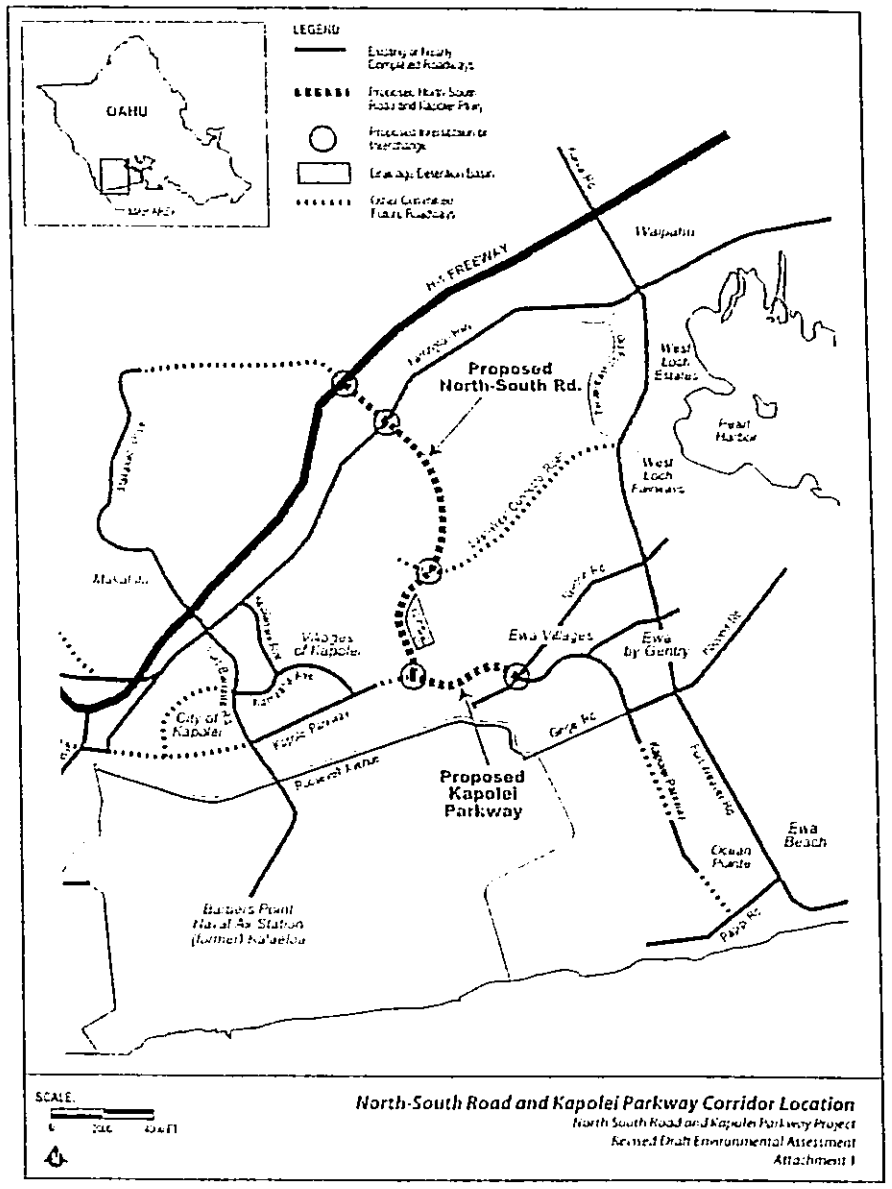
Please note too that one of the major changes from the previous EA is that the Housing Finance Development Corporation (HFDC) is no longer going to relocate and modify Kalaeloa Gulch.

We are now revising the Draft EA. I have copied for your convenience the Water Quality Assessment we submitted to EPA and the correspondence on EPA's approval.

Please contact me with any questions about the project. We would appreciate an updated approval letter to include in our Revised Draft EA.

Sincerely,

Jan Reichelderfer
Geologist/Lead Environmental Planner



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

Mail Code: WTR-9

April 19, 2004

Jan Reichelderfer
Geologist/Lead Environmental Planner
Parsons Brinckerhoff
1001 Bishop Street, Suite 3000
Honolulu, HI 96813

Re. North South Road, Southern Oahu Basal Aquifer (SOBA),
Safe Drinking Water Act Amendments §1424(e) Review

Dear Ms. Reichelderfer:

Thank you for resubmitting the North South Road Project for review under the Sole Source Aquifer program. Based on the Water Quality Assessment that you provided, it appears unlikely that there will be significant impacts to the SOBA from this project, especially if mitigation measures (i.e., draining stormwater runoff and spills away from the SOBA) are implemented at the H-1 interchange and during construction (i.e., not locating the construction staging area above the SOBA).

If you have any questions, please contact me at (415) 972-3525.

Sincerely,

Shannon FitzGerald
Environmental Scientist
Ground Water Office

Parsons Brinckerhoff
Pacific Tower, Suite 3000
1001 Bishop Street
Honolulu, HI 96813
808-531-7094
Fax: 808-528-2368

December 8, 1995

Brooks Harper, Field Supervisor
Ecology Services
Fish & Wildlife Service
P.O. Box 50167
Honolulu, HI 96850

Subject: North-South Road Project

Dear Mr. Harper:

Parsons Brinckerhoff has been selected as the engineering and environmental consultant for the North-South Road Project and we ask your assistance in our environmental assessment.

We request that the Fish and Wildlife Service identify the listed and proposed to be listed threatened and endangered species in the vicinity of the proposed corridor. A location map showing the project area is attached for your use.

Please do not hesitate to call me at 566-2271 if you have any questions or need more information.

Yours sincerely,
Parsons Brinckerhoff Quade & Douglas, Inc.

Jan Reichelderfer
Environmental Planner

Attachment: North-South Road Corridor Location Map

cc: Gregory Hee, DTS
Faith Miyamoto, DTS

Over a Century of Engineering Excellence

Parsons Brinckerhoff
Pacific Tower, Suite 3000
1001 Bishop Street
Honolulu, HI 96813
808-531-7094
Fax: 808-528-2368

December 8, 1995

Michael Buck
Department of Land and Natural Resources
Division of Forestry and Wildlife
1151 Punchbowl
Honolulu, HI 96813

Subject: North-South Road Project

Dear Mr. Buck:

Parsons Brinckerhoff has been selected as the engineering and environmental consultant for the North-South Road Project and we ask your assistance in our environmental assessment.

We request that the Division of Forestry and Wildlife identify the listed and proposed to be listed threatened and endangered species in the vicinity of the proposed corridor. A location map showing the project area is attached for your use.

Please do not hesitate to call me at 566-2271 if you have any questions or need more information.

Yours sincerely,
Parsons Brinckerhoff Quade & Douglas, Inc.

Jan Reichelderfer
Environmental Planner

Attachment: North-South Road Corridor Location Map

cc: Gregory Hee, DTS
Faith Miyamoto, DTS

Over a Century of Engineering Excellence

United States Department of the Interior

FISH AND WILDLIFE SERVICE
PACIFIC ISLANDS ECOREGION
300 ALA MOANA BOULEVARD, ROOM 3108
BOX 50088
HONOLULU, HAWAII 96850
PHONE: (808) 541-3441 FAX: (808) 541-3470

Jan Reichelderfer, Environmental Planner
Parsons Brinckerhoff Quade & Douglas, Inc.
Pacific Tower, Suite 3000
1001 Bishop St.
Honolulu, HI 96813

FEB 0 1 1996

Dear Ms. Reichelderfer:

On December 12, 1995, the U.S. Fish and Wildlife Service (Service) received your December 6, 1995 letter requesting identification of the proposed and listed threatened and endangered species in the vicinity of the proposed corridor for the North-South Road Project. We regret that our reply was delayed due to the recent Federal Furlough.

The Service has reviewed the map provided with your request and pertinent information in our files, including maps prepared by the Hawaii Heritage Program of the Nature Conservancy. Although the proposed project area has been extensively modified by agricultural and development activities, there are historical records of the following Federal Trust Species in the vicinity of the proposed corridor:

Plants
Centaurium sebaeoides (listed Endangered)
Marsilea villosa (listed Endangered)

There are also historical records of Species of Concern (formerly known as Candidate 2 Species). While these species are not currently federally protected, they may be added to the Endangered Species List in the future. Species of Concern historically in the vicinity of the project area include two species of plants, *Portulaca villosa* and *Torulinium odoratum* ssp. *auriculatum* (very possibly extinct) and one insect *Pentarthrum obscurum*.

We appreciate your concern for endangered species and would like the opportunity to review the Draft Environmental Assessment for this project. If you have any questions, please contact our Branch Chief for Interagency Cooperation, Ms. Margo Stahl, or Fish and Wildlife Biologist Tanya Ruhenstein at 808/541-3441 (fax: 808/541-3470)

Sincerely,

Brooks Harper

Brooks Harper
Field Supervisor
Ecological Services

United States Department of the Interior

FISH AND WILDLIFE SERVICE
PACIFIC ISLANDS ECOREGION
300 ALA MOANA BOULEVARD, ROOM 3108
BOX 50088
HONOLULU, HAWAII 96850
PHONE: (808) 541-3441 FAX: (808) 541-3470

JUN 1 4 1996
PARSONS BRINCKERHOFF
HONOLULU HAWAII

In Reply Refer To: TR

Jan Reichelderfer, Environmental Planner
Parsons Brinckerhoff Quade & Douglas, Inc
Pacific Tower, Suite 3000
1001 Bishop St.
Honolulu, HI 96813

JUN 1 3 1996

Dear Ms. Reichelderfer:

This letter is in response to your phone call on June 10, 1995, requesting further information on a beetle known as *Pentarthrum obscurum* (obscure pentarthrum weevil). In our letter dated February 1, 1996, the U.S. Fish and Wildlife Service (Service) noted that historical records of this species were known from the vicinity of the proposed corridor for the North-South Road Project. Our letter identified this species as a Species of Concern (formerly known as a Candidate 2) to the Service.

We would like to take this opportunity to clarify our policy on Species of Concern. The term "Species of Concern" describes species that are of concern to the Service, but require further biological research and field study to resolve their conservation status. These species are not currently federally protected, and the Service is no longer officially maintaining a list of these species

While some species considered Species of Concern may be quite rare, the Service believes that *Pentarthrum obscurum* is more common than previously believed and may not even be native to the Hawaiian Islands. Consequently, the Service is not reviewing the status of this insect for possible listing. There is no need to survey the project area for this insect as part of the environmental review process.

We appreciate your concern for endangered species. If you have any further questions, please contact our Branch Chief for Interagency Cooperation, Ms Margo Stahl, or Fish and Wildlife Biologist Tanya Rubenstein at 808/541-3441 (fax: 808/541-3470)

Sincerely,

Brooks Harper

Brooks Harper
Field Supervisor
Ecological Services

TS 97197 - 4696

BENJAMIN J. CAYETANO
GOVERNOR

KAZU HAYASHIDA
DIRECTOR

DEPUTY DIRECTORS
BRIAN K. MINAAI
GLENN M. OKIMOTO

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

IN REPLY REFER TO:
HWY-PA
2.6051

SEP - 3 1997

RECEIVED
97 SEP 5 A 9:41

Mr. Brooks Harper
U. S. Fish and Wildlife Service
Department of the Interior
300 Ala Moana Boulevard, Room 3108
Honolulu, Hawaii 96813

Attention: Ms. Margo Stahl

Dear Mr. Harper:

Subject: North-South Road Corridor Study

As you are aware, Ko'oloa'ula (Abutilon menziesii), which is a listed endangered species, has been found on property in Ewa that is to be developed by the Housing Finance and Development Corporation (HFDC) and this department. Our department and the Federal Highway Administration are proposing to develop the North-South Road on a portion of the property. It is our understanding that HFDC has been coordinating with your agency, through the State Department of Land and Natural Resources, Forestry and Wildlife Division, and is also representing us in this matter.

As the subject project intends to use federal funds for its construction, coordination in accordance with Section 7 of the Endangered Species Act is required prior to completion of the environmental assessment (EA). We anticipate completion of the draft EA by early November. Therefore, we are concerned that all proper steps are being taken to obtain this clearance in a timely manner.

Your letter of February 1, 1996, issued in response to the environmental scoping process for the subject project, identified the following federal trust species which may be present in the project vicinity:

1. Centaurium sebaeoides (listed Endangered);
2. Marsilea villosa (listed Endangered);
3. Portulaca villosa (species of concern);
4. Torulinium odoratum ssp. auriculatum (species of concern); and
5. Pentarthrum obscurum (species of concern).

Since your letter, detailed botanical surveys have been conducted along the alignment of the proposed road and in adjacent areas. We understand that HFDC has shared the results of these surveys with you. The botanical survey conducted for the subject project is enclosed. In summary, no population of federal trust species (1), (2), (3), or (4) were encountered. With respect to federal trust species (5), your June 13, 1996 letter states that "there is no need to survey the project area for this insect as part of the environmental review process."

However, another federal trust species, Abutilon menziesii, was encountered. Populations were found in the alignment of the proposed federal-aid highway and in property to be developed by HFDC. The attached map shows the areas where the plants were found.

Under these circumstances, we will be contacting you to arrange a meeting to discuss the following issues:

1. Receiving documentation from you that no further work is necessary regarding federal trust species (1) through (4); and
2. Any additional requirements that must be complied with for Abutilon menziesii.

In consideration of the coordination that has already occurred on the mitigation plan for Abutilon menziesii, we look forward to expeditious completion of the Section 7 coordination process for the subject project.

Should you have any questions regarding this matter, please call Ken Au at 587-1843.

Very truly yours,

KAZU HAYASHIDA
Director of Transportation

Enclosures: (1) Project Location Map
(2) Char & Associates, Botanical Subconsultants, Botanical Survey North-South Road Corridor Study, 'Ewa District, Island of Oahu, June 1996
(3) Char & Associates, Botanical Subconsultants, Letter to Parsons Brinckerhoff: Ko'oloa'ula on East Kapolei Project Site 'Ewa District, Island of Oahu, January 30, 1997

bc: C&C DTS

ISP-0197-3517

United States Department of the Interior

FISH AND WILDLIFE SERVICE
PACIFIC ISLANDS ECOREGION
300 ALA MOANA BOULEVARD, ROOM 3108
BOX 50088
HONOLULU, HAWAII 96850
PHONE: (808) 541-3441 FAX: (808) 541-3470

In Reply Refer To: LTG

OCT 10 1997

Kazu Hayashida
Director of Transportation
State of Hawaii
Department of Transportation
869 Punchbowl Street
Honolulu, HI 96813-5097

97 OCT 13 A10:09
RECEIVED

Re: Informal Consultation Under Section 7 of the Endangered Species Act on the Development of the North-South Road, Ewa, Oahu, Hawaii.

Dear Mr. Hayashida:

This responds to your September 3, 1997, letter requesting informal section 7 consultation with the U.S. Fish and Wildlife Service (Service) under the Endangered Species Act of 1973, as amended (ESA), regarding the development of the North-South Road. It is the Service's understanding that the Federal Highway Administration (the Federal agency responsible for complying with section 7 of the ESA) designates the Hawaii Department of Transportation (DOT) to be its non-federal representative for purposes of informal consultation.

The letter mentioned above requested a meeting to discuss various issues dealing with the North-South Road project. Representatives from the Service, Hawaii Department of Transportation, City and County Department of Transportation Services (DTS), Federal Highway Administration (FHWA), Parsons Brinckerhoff, and PBR Hawaii participated in a meeting conducted on October 1, 1997. The following issues were discussed at the meeting.

1. According to botanical surveys conducted in September, October, and December of 1996 the following plant species are not present within the project area:

   a. *Centaurium sebaeoides* (listed Endangered);
   b. *Marsilea villosa* (listed Endangered);
   c. *Portulaca villosa* (species of concern); and
   d. *Torulinium odoratum* spp. *auriculatum* (species of concern).

   Therefore, they will not be subject to this consultation.

2. The map enclosed with the above mentioned letter was not consistent with the maps included in the Proposal for a Habitat Conservation Plan for Abutilon Menziesii at the East Kapolei Master Plan Project, which we are currently reviewing. Further clarification is required concerning the locations of ko'oloa'ula (*Abutilon menziesii*) colonies in association with the North-South Road project.

3. The North-South Road project is considered a major construction activity. Therefore, a Biological Assessment (BA) is required as per 50 CFR part 402.12 (enclosed). A BA evaluates the impacts of the project on all listed species (i.e., *Abutilon menziesii*), proposed species, and critical habitats that may be present in the action area and proposes measures to mitigate for those impacts.

4. A site visit will be arranged to identify the colonies of *Abutilon menziesii* impacted by the North-South Road project and to discuss the project and potential mitigation measures.

We appreciate your concern for endangered species and we look forward to conducting a site visit and reviewing the Biological Assessment and the Draft Environmental Assessment for this project. If you have any further questions, please contact our Program Leader for Interagency Cooperation, Ms. Margo Stahl, or Fish and Wildlife Biologist Leila Gibson at 808/541-3441 (fax: 808/541-3470).

Sincerely,

Donald Palmer
for Brooks Harper
Field Supervisor
Ecological Services

enclosure
cc: FHWA, Honolulu
DTS, Honolulu
Parsons Brinckerhoff, Honolulu

United States Department of the Interio

FISH AND WILDLIFE SERVICE
Pacific Islands Ecoregion
300 Ala Moana Blvd, Rm 3-122
Box 50088
Honolulu, HI 96850

In Reply Refer To: LTG

OCT - 9 1998

Mr. Abraham Wong
Division Administrator
Federal Highway Administration
P.O. Box 50206
300 Ala Moana Blvd.
Honolulu, HI 96850

Re: Consultation Under Section 7 of the Endangered Species Act on the Development of the North-South Road, Ewa, Oahu, Hawaii

Dear Mr. Wong:

This follows up our May 6, 1998, meeting with representatives from PBR Hawaii, Parsons Brinckerhoff (the consultant representing the Hawaii Department of Transportation (DOT) and the Federal Highway Administration (FHWA)), DOT, and the City and County Department of Transportation Services concerning the proposed North-South Road in Ewa, Oahu, Hawaii. During the meeting, we discussed the section 7 consultation requirements under the Endangered Species Act for the proposed project.

The North-South Road project is considered a major construction activity that is likely to adversely affect a federally listed endangered species of plant, *Abutilon menziesii*. Therefore, a Biological Assessment (BA) is required as per 50 CFR 402.12. A BA evaluates the impacts (*i.e.*, direct and indirect) of the project on all listed species (*e.g.*, *Abutilon menziesii*), proposed species, and critical habitats that may be present in the action area and proposes measures to mitigate for those impacts.

At the May 6 meeting, Parsons Brinckerhoff stated that the Service should receive the BA by June 1998. We have not received the BA or any further correspondence from your agency or from Parsons Brinckerhoff on this matter. Please let us know if you have any questions about the section 7 consultation process or if there is anything further we can do to assist you in preparation of the required BA.

We look forward to continue working with you on this project. If you have any questions, please contact Fish and Wildlife Biologist Leila Gibson by telephone at 808/541-3441 or by facsimile transmission at 808/541-3470.

Sincerely,

Ruben A. Mayfield, Acting

Robert P. Smith
Pacific Islands Manager

cc: DOT, Honolulu
Parsons Brinckerhoff, Honolulu

Parsons Brinckerhoff Quade & Douglas, Inc.
American Savings Bank Tower
1001 Bishop Street, Suite 3000
Honolulu, HI 96813
808 531-7094
Fax 808-528-2368

January 30, 2004

Ms Gina Shultz
Acting Field Supervisor
Pacific Islands Office
U S Fish and Wildlife Service
300 Ala Moana Boulevard, Room 3-122
Box 50088
Honolulu, Hawaii 96850

Attn Mangold Zoll

Dear Ms Shultz

Subject North-South Road and Kapolei Parkway Project, Ewa, Oahu, Hawaii
Re-coordination of Species List under Section 7, Endangered Species Act

The Federal Highway Administration (FHWA), in cooperation with the State of Hawaii Department of Transportation and the City and County of Honolulu, proposes to construct the North-South Road and Kapolei Parkway Project As the project consultant, we are writing to request that the Service re-issue a species list to update the previous species list dated February 1, 1996, in order to comply with the requirements of Section 7 of the Endangered Species Act.

This project was previously introduced to the U S Fish and Wildlife Service (Service) in 1995. At that time, this project was called the North-South Road project The project definition and name has since been revised to include a portion of Kapolei Parkway contiguous with North-South Road A map indicating the location and footprint of the proposed project is attached

A brief history is provided below.

Past Section 7 Correspondence with the Service

In a letter dated February 1, 1996, and addressed to Parsons Brinckerhoff, the Service stated that the following listed species may occur in the proposed project area for North-South Road

Plants:
- *Centaurium sebaeoides* (listed Endangered)
- *Marsilea villosa* (listed Endangered)
- *Portulaca villosa* (Species of Concern)
- *Tonilinum odoratum ssp auriculatum* (Species of Concern, very possibly extinct)

Insect
- *Pentarthrum obscurum* (Species of Concern)

A botanical survey conducted for the proposed project did not find any of the plants identified by the Service. (Char, October 1997). In a letter dated October 10, 1997, the Service stated that the four aforementioned plant species "will not be subject to consultation" because botanical surveys did not find these species in the project area.

In a letter dated June 13, 1996, the Service stated that the *Pentarthrum obscurum*, a type of beetle, is more common that previously believed and may not even be native to the Hawaiian Islands. The Service recommended that no surveys for this beetle be performed in the project area during the environmental review process.

Abutilon menziesii

Subsequent to the February 1996 letter from the Service, the endangered plant *Abutilon menziesii*, commonly known as Kooloaula or red ilima, was discovered during a study for a development project adjacent to the proposed North-South Road (Nagata 1996). Subsequent surveys also confirmed and identified the locations of known Kooloaula plants. The plants discovered in this region are collectively referred to as the Kapolei population of *A. menziesii*.

As evidenced in past correspondence with the Service, we believe that no threatened or endangered species or critical habitat, other than *A. menziesii*, are found in the project area

We request that the Service re-issue the previous species list described above, adding *A. menziesii*, and advise us if any additional research or coordination will be required for species other than *A. menziesii*.

If you have questions or require additional information, please contact me at (808) 566-2239 or email at ohtomo@pbworld com.

Sincerely yours,

Nami Ohtomo
Environmental Planner

Enclosures:
Vicinity Map

cc. Ms. Mangold Zoll, USFWS
Mr. Pat Phung, FHWA
Mr. Paul Conry, DLNR-DOFAW
Mr. Nelson Sagum, HDOT
Ms Faith Miyamoto, C&C Honolulu
Ms Yukie Ohashi

Over a Century of Engineering Excellence

Parsons Brinckerhoff Quade & Douglas, Inc.
American Savings Bank Tower
1001 Bishop Street, Suite 3000
Honolulu, HI 96813
808-531-7094
Fax: 808 528 2368

January 30, 2004

Ms. Gina Shultz
Acting Field Supervisor
Pacific Islands Office
U.S. Fish and Wildlife Service
300 Ala Moana Boulevard, Room 3-122
Box 50088
Honolulu, Hawaii 96850

Attn: Marigold Zoll

Dear Ms. Shultz:

Subject: North-South Road and Kapolei Parkway Project, Ewa, Oahu, Hawaii
Re-coordination of Species List under Section 7, Endangered Species Act

The Federal Highway Administration (FHWA), in cooperation with the State of Hawaii Department of Transportation and the City and County of Honolulu, proposes to construct the North-South Road and Kapolei Parkway Project. As the project consultant, we are writing to request that the Service re-issue a species list to update the previous species list dated February 1, 1996, in order to comply with the requirements of Section 7 of the Endangered Species Act.

This project was previously introduced to the U.S. Fish and Wildlife Service (Service) in 1995. At that time, this project was called the North-South Road project. The project definition and name has since been revised to include a portion of Kapolei Parkway contiguous with North-South Road. A map indicating the location and footprint of the proposed project is attached.

A brief history is provided below.

Past Section 7 Correspondence with the Service

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Plants:
- *Centaurium sebaeoides* (listed Endangered)
- *Marsilea villosa* (listed Endangered)
- *Portulaca villosa* (Species of Concern)
- *Tetramolopium odoratum ssp. auriculatum* (Species of Concern, very possibly extinct)

Insect
- *Pentarthrum obscurum* (Species of Concern)

A botanical survey conducted for the proposed project did not find any of the plants identified by the Service. (Char, October 1997). In a letter dated October 10, 1997, the Service stated that the four aforementioned plant species "will not be subject to consultation" because botanical surveys did not find these species in the project area.

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Abutilon menziesii

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As evidenced in past correspondence with the Service, we believe that no threatened or endangered species or critical habitat, other than *A. menziesii*, are found in the project area.

We request that the Service re-issue the previous species list described above, adding *A. menziesii*, and advise us if any additional research or coordination will be required for species other than *A. menziesii*.

If you have questions or require additional information, please contact me at (808) 566-2239 or email at ohtomo@pbworld.com.

Sincerely yours,

Nami Ohtomo
Environmental Planner

Enclosures:
Vicinity Map

cc: Ms. Marigold Zoll, USFWS
Mr. Pat Phung, FHWA
Mr. Paul Conry, DLNR-DOFAW
Mr. Nelson Sagum, HDOT
Ms. Faith Miyamoto, C&C Honolulu
Ms. Yukie Ohashi

Over a Century of Engineering Excellence

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122
Box 50088
Honolulu, Hawaii 96850

TAKE PRIDE IN AMERICA

MAR 3 2004

In Reply Refer to
1-2-2004-SP-107

Ms. Nami Ohtomo
Parsons Brinckerhoff Quade & Douglas, Inc.
1001 Bishop Street, Suite 3000
Honolulu, Hawaii 96813

Re: Request for Updated Threatened and Endangered Species List for the Proposed North-South Road and Kapolei Parkway Project, Ewa, Oahu, Hawaii

Dear Ms. Ohtomo:

The U.S. Fish and Wildlife Service (Service) has reviewed the information provided in your letter dated January 30, 2004, and received by the Service on February 3, 2004, requesting an updated list of all threatened and endangered species that may be present within the proposed project site. The Federal Highway Administration, in cooperation with the State of Hawaii Department of Transportation and the City and County of Honolulu, is proposing to construct the North-South Road and Kapolei Parkway Project in Kapolei, Oahu. This project has had a long history and we have been in communication several times over the last few years to address the potential adverse affect to federally listed species pursuant to the Endangered Species Act of 1973, as amended.

To update species information within the proposed project area, we have reviewed the information you provided including recent surveys conducted by Winona Char and Associates. We also reviewed pertinent information in our files including maps prepared by the Hawaii Natural Heritage Program. We have determined only one endangered plant species, *Abutilon menziesii*, is located within the proposed project footprint. In addition, we have determined that there are no species proposed for listing, or proposed or designated critical habitat within the project area.

We appreciate your efforts to conserve endangered species. If you have any questions, please contact Marigold Zoll, Botanist (phone: 808/792-9400; fax: 808/792-9580).

Sincerely,

Gina Shultz
Acting Field Supervisor

cc:
Mr. Pat Phung, Federal Highway Administration
Mr. Paul Conry, Division of Land and Natural Resources-Department of Forestry and Wildlife
Mr. Nelson Sagum, Hawaii Department of Transportation
Ms. Faith Miyamoto, City and County of Honolulu
Ms. Yukie Ohashi

US Department of Transportation
Federal Highway Administration

Hawaii Division
Box 50206
300 Ala Moana Boulevard, Room 3-306
Honolulu, HI 96850

March 23, 2004

In Reply Refer To
HEC-HI

Ms. Gina Schultz
Acting Field Supervisor
U.S. Fish and Wildlife Service
Box 50088
300 Ala Moana Boulevard, Room 3-122
Honolulu, HI 96850

Attention: Ms. Marigold Zoll

Dear Ms. Schultz:

Subject: Initiation of Endangered Species Act Section 7 Formal Consultation for North-South Road and Kapolei Parkway Project Ewa, Oahu, Hawaii

Thank you for your March 3, 2004, species coordination letter addressed to project consultant Parsons Brinckerhoff, concurring that *A. menziesii* is the only listed plant species within the proposed project footprint.

Due to the anticipated adverse impact of these federal-aid highway projects on the *A. menziesii*, the Federal Highway Administration (FHWA) is writing to initiate formal Section 7 consultation with the U.S. Fish and Wildlife Service (Service) pursuant to the Endangered Species Act. The subject species of the formal consultation is the endangered plant Kooloaula, or red ilima (*Abutilon menziesii*).

This letter transmits to the Service a biological assessment (BA) pursuant to the requirements of 40 CFR 402.12(f). The BA consists of the State's Habitat Conservation Plan (HCP) for *Abutilon Menziesii* at Kapolei. This HCP was prepared pursuant to Hawaii Revised Statutes, Chapter 195D and reflects input received from the Service during the State's HCP process, as well as comments from the State's six-person Endangered Species Recovery Committee (ESRC), in which the Service is represented. The draft HCP was released for public review by the State's Board of Land and Natural Resources (BLNR) on December 23, 2003, and a public hearing was held on January 28, 2004. Public comments were received and relevant comments were incorporated into a subsequent version of the HCP, which was recommended for approval by the ESRC on March 12, 2004. Based on ESRC comments on March 12, another revision of the HCP has been produced, and is enclosed with this letter. Approval of the HCP by the BLNR is anticipated in April 2004, completing the HCP review process.

The BA/HCP (hereafter, BA) describes developments proposed on 1,300 acres of State property and about 81 acres of City and County of Honolulu property in Kapolei (collectively called the "Kapolei property"). These developments include the proposed North-South Road and Kapolei Parkway. The BA describes the impact of the development actions on the Kapolei population of *A. menziesii*, and provides mitigation strategies that would result in a net gain of *A. menziesii*.

Project Description

The State of Hawaii Department of Transportation (HDOT) proposes to build North-South Road, a limited-access, principal arterial roadway, which would connect the Interstate H-1 Freeway to Kapolei Parkway. In addition, the City and County of Honolulu (City) proposes to build a portion of Kapolei Parkway between the intersections with North-South Road and Renton Road. Both the State and City actions are federal-aid, and will be treated as one project for environmental clearance purposes pursuant to the National Environmental Policy Act (NEPA). The proposed project also includes the following elements:

- Construction of a new H-1 Freeway interchange to provide access to and from North-South Road;
- Associated intersections for North-South Road and Kapolei Parkway; and
- Drainage features consisting of a drainage channel parallel to North-South Road, and a detention basin.

All project elements will be constructed in the roadway right-of-way. The enclosed map shows the locations of the proposed project elements.

North-South Road would bisect the Kapolei property and address multiple transportation needs. It would improve the existing transportation network in the area by acting as a relief route to both Fort Weaver and Fort Barrette Roads, thereby reducing traffic congestion in the region. By providing alternatives to these routes, the proposed project will improve mobility within the Ewa region. The project would also provide access for developments planned in Ewa by other parties. The beginning of construction for North-South Road is planned for late 2004, with completion in 2009.

Project Impacts and Proposed Mitigation

Botanical surveys of the Kapolei property including the North-South Road and Kapolei Parkway footprints have been conducted by Kenneth Nagata (1996) and Char & Associates (1996, 1997, 2003, 2004). *A. menziesii* was the only federally listed species found during these surveys. These reports are included as Appendices in the BA.

The plants discovered on the State and City properties are collectively referred to as the Kapolei population of *A. menziesii*. The plants occur in five clusters (Clusters A, B, C, D, and E) in the central and southern portions of the Kapolei property. Figure 6 of the BA shows the locations of these clusters.

Specific project impacts would consist of removing plants presently located in the proposed project area. Clusters C and E plants directly affected by the proposed project would be transplanted to other selected outplanting sites, and their genetic material would be preserved at off-site facilities, as elaborated in the BA. Some of these actions have already occurred under the Interim Management Plan, and are addressed in the BA.

The BA proposes actions that would help ensure the protection and recovery of the species, including the following:

- The BA proposes active monitoring and management of the Kapolei population to protect its genetic diversity.
- BA implementation and active management period would be approximately 20 years and would be tied to the accomplishment of measurable goals, including the successful establishment of three "wild" offsite populations. The BA also proposes long-term management of the *A. menziesii* beyond the 20-year period. The funding strategy for this plan is articulated in the BA.
- The BA establishes a temporary 18-acre "contingency reserve area (CRA)" which would allow a portion of the Kapolei population to remain undisturbed and protected until at least one of the wild outplanting sites has achieved the short-term success criteria defined in the BA.

The successful implementation of the BA would significantly increase the numbers of new plants on Oahu as well as improve their quality compared to the *in situ* disturbed canefield conditions at the Kapolei property.

Note that other, subsequent development projects in the area are anticipated to result in the eventual removal of all plants in the Kapolei population in the course of 20 years. Therefore, the BA also addresses takes on other portions of the Kapolei property and establishes a "certificate of inclusion" procedure by which other developers may contribute to a "contingency fund" to help the preservation and recovery efforts for *A. menziesii*. Please refer to the BA for more detailed information.

The FHWA has determined that the mitigation measures summarized above and elaborated in the BA would reduce the potential for adverse impacts on *A. menziesii* to negligible levels. The FHWA therefore believes that the proposed project would not compromise the continued existence or recovery of the listed species.

Based on the information provided, we request that the Service accept the BA and initiate formal Section 7 consultation for the proposed project. To advance the planning process for this project, we would appreciate receiving an advance copy of the draft Biological Opinion at your earliest convenience.

If you have questions or require additional information, please contact me at (808) 541-2700, extension 305, or via email at Pat.Phung@fhwa.dot.gov.

Sincerely yours,

Pat V. Phung, P.E.
Transportation Engineer

Encls: Biological Assessment/HCP for *A. menziesii* at Kapolei (March 2004)
Project elements (figure)

cc: Mr. Nelson Sagum, HDOT, HWY-PA
Ms. Faith Miyamoto, C&C Honolulu
Mr. Paul Conry, DLNR-DOFAW
Ms. Yukie Ohashi, PB
Ms. Nami Ohtomo, PB

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122, Box 50088
Honolulu, Hawaii 96850

TAKE PRIDE IN AMERICA

RECEIVED
APR 23 2004
HAWAII DIVISION
APR 22 2004

In Reply, Refer To:
1-2-2004-F-123

Mr. Pat V. Phung
Federal Highway Administration
Box 50206
300 Ala Moana Boulevard, Room 3-306
Honolulu, Hawaii 96805

Re: HEC-HI; Request to Initiate Formal Section 7 Consultation on Proposed North-South Road and Kapolei Parkway Construction Project (1-2-2004-F-123)

Dear Mr. Phung:

This letter acknowledges the U.S. Fish and Wildlife Service's (Service) March 24, 2004, receipt of your March 23, 2004, letter requesting initiation of formal section 7 consultation under the Endangered Species Act. The consultation concerns the possible effects of your proposed North-South Road and Kapolei Parkway construction project on the endangered plant, *Abutilon menziesii* (Kooloaula, or red ilima).

All information required of you to initiate consultation was either included with your letter or is otherwise accessible for our consideration and reference. We have assigned log number 1-2-2004-F-123 to this consultation. Please refer to that number in future correspondence on this consultation.

Section 7 allows the Service up to 90 calendar days to conclude formal consultation with your agency and an additional 45 calendar days to prepare our biological opinion (unless we mutually agree to an extension). Therefore, we expect to provide you with our biological opinion no later than August 5, 2004.

As a reminder, the Endangered Species Act requires that after initiation of formal consultation, the Federal action agency may not make any irreversible or irretrievable commitment of resources that limits future options. This practice insures agency actions do not preclude the formulation or implementation of reasonable and prudent alternatives that avoid jeopardizing the continued existence of endangered or threatened species or destroying or modifying their critical habitats.

If you have any questions or concerns about this consultation or the consultation process in general, please feel free to contact me or Marigold Zoll of this office at (808) 792-9400.

Sincerely,

R. Mark Sattelberg
Acting Field Supervisor

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122, Box 50088
Honolulu, Hawaii 96850

TAKE PRIDE IN AMERICA

In Reply, Refer To:
1-2-2004-F-123

Mr. Pat V. Phung
Federal Highway Administration
Box 50206
300 Ala Moana Boulevard, Room 3-306
Honolulu, Hawaii 96805

AUG - 5 2004

Re: Biological Opinion on Construction of the North South Road and the Kapolei Parkway (HEC-III; 1-2-2004-F-123)

Dear Mr. Phung:

This biological opinion responds to your request for formal consultation with the U.S. Fish and Wildlife Service (Service) pursuant to section 7 of the Endangered Species Act of 1973, as amended (Act). Your request was dated March 23, 2004, and was received on March 24, 2004. The statutory deadline for completing this consultation is August 5, 2004. At issue are the impacts that the proposed construction of the North-South Road and Kapolei Parkway may have on the endangered plant species *Abutilon menziesii*. This species occurs on lands owned by the Estate of James Campbell, the State of Hawaii (University of Hawaii at West Oahu, Department of Hawaiian Homelands, Department of Land and Natural Resources Land Division), and the City and County of Honolulu, on the island of Oahu.

This biological opinion was prepared using the following information: 1) the State's 2004 Habitat Conservation Plan (HCP) for *Abutilon menziesii* at Kapolei; 2) the Hawaii Natural Heritage Program 2001 database; 3) information from our files; and, 4) notes from the January 26, 2004, and February 13 and 26, 2004, meetings and associated follow-up correspondence between the Federal Highway Administration (FHWA) and the Service. A complete administrative record of this consultation is on file in the Pacific Islands Fish and Wildlife Office (PIFWO).

Consultation History

The Administrative record regarding the proposed construction of the North-South Road and Kapolei Parkway dates back to 1995. At that time, FHWA and the Hawaii Housing and Community Development Corporation of Hawaii (HCDCH) requested the Service identify any federally protected species in the vicinity of the proposed corridor for the North-South Road and

a proposed housing development in Kapolei. From 1995 to 1999 meetings between the parties occurred to discuss the section 7 process, correspondence was exchanged that summarized the meetings and identified the next steps in the consultation process, and a visit to the Kapolei site was conducted on December 15, 1997. Since 1995 the scope of the proposed project has changed and currently entails proposed construction of the two roadways, and implementation of the *Abutilon menziesii* HCP.

Informal consultation with FHWA resumed on January 26, 2004, when representatives from FHWA, the Service, Hawaii Department of Transportation (HDOT), Hawaii Division of Forestry and Wildlife (DOFAW), City and County of Honolulu (City and County), Parsons Brinkerhoff (consultant for HDOT), Ms. Winona Char (private botanical consultant for Parsons Brinkerhoff/HDOT) and Ms. Yukie Ohashi (consultant for Parsons Brinkerhoff/HDOT) met to discuss the section 7 consultation process for the North-South Road and Kapolei Parkway construction project and HCP and to identify any information needs.

On February 3, 2004, the Service received a request from Parsons Brinkerhoff, on behalf of FHWA, for a list of federally protected and other rare species within the North-South Road and Kapolei Parkway project area on Oahu.

Representatives from the FHWA, Service, HDOT, City and County, Parsons Brinkerhoff, and Yukie Ohashi met on February 13, 2004, to discuss the Service's comments on the November 23, 2003, draft HCP and the section 7 consultation for the North-South Road and Kapolei Parkway construction project

On February 26, 2004, the FHWA organized a site visit to the naturally occurring populaiton of *Abutilon menziesii* at Kapolei, the Honouliuli and Kaena Point outplanting sites, and the DOFAW plant nursery above Dillingham airstrip. Representatives from the FHWA, Service, DOFAW, HDOT, Department of Hawaiian Homelands (DHHL) and City and County participated.

In a letter to Parsons Brinkerhoff dated March 3, 2004, the Service indicated that the endangered plant, *Abutilon menziesii*, is the only listed species currently found within the proposed project area.

On March 24, 2004, the FHWA provided the Service with a copy of the Final Habitat Conservation Plan (HCP) for *Abutilon menziesii* and requested initiation of formal section 7 consultation for the proposed construction of the North-South Road and Kapolei Parkway on Oahu.

In a letter dated April 22, 2004, the Service acknowledged the initiation of formal section 7 consultation as of March 24, 2004, the date FHWA's request was received. The consultation would address impacts from construction of the North-South Road and the Kapolei Parkway to the listed endangered plant *Abutilon menziesii* and implementation of the HCP.

BIOLOGICAL OPINION

DESCRIPTION OF PROPOSED ACTION

The HDOT proposes to build the North-South Road, a limited-access, principal arterial roadway, which would connect the Interstate H-1 Freeway to Kapolei Parkway. In addition, the City and County propose to build a portion of Kapolei Parkway between the intersections with North-South Road and Renton Road. Both the State and City and County actions are receiving funds through the FHWA, and will be treated as one project for environmental compliance pursuant to the National Environmental Policy Act (NEPA) (HCP 2004). In addition, a number of proposed projects are anticipated to occur adjacent to the above projects. The projects include the development of homesteads by the Department of Hawaiian Home Lands (DHHL), the development of the University of Hawaii West Oahu (UHWO) campus, and unspecified rural developments by the Department of Land and Natural Resources (DLNR). The above-mentioned projects are collectively referred to as the "Kapolei projects." The Kapolei projects occur on 559 hectares (ha) (1,381 acres (ac)) of State-owned land in Kapolei, Oahu.

The development of the Kapolei projects is expected to result in the removal of the entire Kapolei population of *Abutilon menziesii*. To mitigate for the impacts of the proposed Kapolei projects, the HDOT developed the Habitat Conservation Plan for *Abutilon menziesii* at Kapolei (HCP) pursuant to Hawaii Revised Statues § 195D-21. The action area for this consultation encompasses the area covered by the Kapolei Projects and the outplanting areas proposed in the HCP. Below is a description of the Kapolei projects and the HCP.

North-South Road

The proposed North-South Road will bisect the Kapolei area and address multiple transportation needs. It would improve the existing transportation network in the area by acting as a relief route to both Fort Weaver and Fort Barrette Roads, thereby reducing traffic congestion in the region. By providing alternatives to these routes, the proposed project will improve mobility within the Ewa region. The North-South Road will also provide access for other developments planned in Ewa. Construction of the North-South Road is planned to begin in late 2004, with completion in 2009 (HCP 2004).

The North-South Road encompasses 26 ha (64 ac) and will be a 6-lane major collector roadway that will be approximately 3.6 kilometers (km) (2.2 miles (mi)) long. Its alignment is adjacent to and toward the west of the corridor delineated by the existing Hawaiian Electric Company power line easement. The new roadway is designed with three vehicular lanes in each direction, a planting median, and sidewalks on both sides with an overall width of 35 meters (m) (116 feet (ft)). The proposed project also includes the following three elements: 1) construction of a new H-1 Freeway interchange to provide access to and from North-South Road; 2) associated intersections for North-South Road and Kapolei Parkway; and 3) drainage features consisting of a drainage channel parallel to North-South Road and a detention basin. All project elements will be constructed in the roadway right-of-way (HCP 2004).

Construction the North-South Road is planned in two phases: Phase 1 (late 2004 to 2007) consists of mass grading for six lanes, drainage improvements and construction of three highway lanes from the Kapolei Parkway to the H-1 Freeway; and, Phase 2 (late 2005 to 2008) includes the construction of three additional lanes, drainage detention basins, the Kapolei Parkway and Farrington Highway intersections and the interchange at the H-1 Freeway (HCP 2004).

Kapolei Parkway Segment

The Kapolei Parkway is a new 6-lane major collector roadway that will traverse the City's Ewa Villages property and will provide alternate regional access to the H-1 Freeway. It will connect the North-South Road at the north end to Renton Road at the south end, a distance of approximately 1.1 km (0.7 mi). The new roadway encompasses 33 ha (81 ac) and is designed with three vehicular lanes in each direction, a planting median, sidewalk on one side and a multiuse (pedestrian and bicycle) pathway on the other side with an overall width of 35 m (116 ft). The proposed project will include underground utilities (including water, sanitary sewer, electrical, and communication systems), a storm drainage system, street lighting system, and landscape irrigation system (HCP 2004).

The Kapolei Parkway roadway segment will be constructed in two phases: Phase 1 (mid 2006 to 2007) will include mass grading for six lanes and construction of the three makai travel lanes from North-South Road to Renton Road; and, Phase 2 (late 2007 to 2008), consisting of the construction of the three mauka lanes. The completion of the Kapolei Parkway is planned to coincide with the completion of the North-South Road (HCP 2004).

Department of Hawaiian Home Lands

DHHL is mandated to develop and deliver homesteads to qualified native Hawaiians. The development of 81 ha (200 ac) of DHHL lands at the Kapolei site would include approximately 1,000 residential homesteads and potentially some commercial and community facilities to serve its new subdivisions. The first phase is planned for occupancy in 2006 and buildout is expected in approximately 8 to 10 years. This development has been described in the East Kapolei Master Plan. The DHHL parcels are to the west of the proposed North-South Road, with one parcel to the north of the proposed UHWO and the other to the south of UHWO. An additional segment of Kapolei Parkway will bisect the DHHL parcel. This new segment will connect the existing Kapolei Parkway to the west and the City's proposed Kapolei Parkway segment (described above) and the North-South Road.

University of Hawaii West Oahu

In September 2002, the Board of Land and Natural Resources conveyed in fee approximately 202 ha (500 ac) of land at the Kapolei site to the University of Hawaii for its West Oahu campus. The UHWO campus will be a major educational facility in Kapolei, primarily serving the leeward and central Oahu region. The University is currently exploring options for the

development of the campus and at present is planning a campus of approximately 40 ha (100 ac) which will be developed in phases to accommodate a student population of, ultimately, 7,600. An additional 61 ha (150 ac) of land will be allocated for future campus expansion, beyond the 7,600-student population. The University is also considering a number of land use options for the remaining 101 ha (250 ac) of land within the property to serve the campus and surrounding region. Construction of the initial phase of the campus could begin in the latter part of 2005, with a completion date of fall 2007. The initial phase of campus development would be located in the northeastern portion of the property, in close proximity to Farrington Highway (HCP 2004).

Department of Land and Natural Resources

The remaining unassigned parcels (formerly part of the East Kapolei Master Plan) total approximately 243 ha (600 ac) in five parcels; the parcels are now under the authority of the DLNR Land Division and are to the east of the proposed North-South Road and north of Farrington Highway. The Environmental Impact Statement for the East Kapolei Master Plan designates urban uses including residential, public schools, parks, roadways as well as roadways and open space areas on these parcels, which would serve as drainage detention basins. The ultimate uses of these lands will be determined in the future when a development proposal is again proposed by the State or other non-governmental entity (HCP 2004).

Habitat Conservation Plan

In anticipation of the removal of the entire Kapolei population of *Abutilon menziesii* during an approximately 20-year development period, the HDOT developed a State HCP, with technical support from the Service and the Endangered Species Recovery Committee (ESRC). The HCP was completed in March of 2004. The HCP addresses anticipated impacts from the North-South Road and Kapolei Parkway projects as well as from future projects within the action area to the population of *A. menziesii* at Kapolei. A series of actions are proposed that will produce three new off-site outplanted populations, protect the genetic diversity of the existing Kapolei population, and protect existing individuals by relocating them to the new population locations. The HCP also proposes long-term management that would occur concurrently with project development to ensure that benefits are realized for *A. menziesii*. The HCP's active mitigation effort will span a period of 20 years and is tied to the accomplishment of measurable goals as identified in the HCP. In addition, the HCP provides additional funds to cover beyond the 20 years for the long-term management of the three outplanted sites (HCP 2004).

The preparation of the HCP was initiated in 1996 with two State sponsored development proposals. The first proposal involved a proposed 1,300-acre East Kapolei Master Plan project to be developed by the HCDCH under a right-of-entry agreement with the Department of Land and Natural Resources (DLNR). The second proposal by the HDOT, involved the construction of the North-South Road arterial highway, which would bisect the 1,300-acre property. The earlier drafts of the HCP were co-sponsored by HDOT and HCDCH (HCP 2004).

In October of 1998, special funds in the amount of $67,850 from HCDCH were made available to DOFAW to implement an interim management program for *Abutilon menziesii* on Oahu while the HCP was being developed. The interim management program included monitoring and providing protection from fire to the *in-situ* population; maintaining a complete genetic representation of the Kapolei population at the existing DOFAW nurseries; establishing two new populations of *A. menziesii* in appropriate habitat; researching the biological requirements and limiting factors of the species; and, providing partial funding for the construction of a DOFAW low-elevation greenhouse dedicated to growing *A. menziesii* and other threatened and endangered plant species for outplanting on Oahu (HCP 2004). However, the Board of Land and Natural Resources in September 2002 reassigned the 526 hectares (ha) (1,300 acres (ac)) of State land to other State of Hawaii entities. The University of Hawaii received 202 ha (509 ac) for the development of the west Oahu campus (UHWO); DHHL acquired approximately 81 ha (200 ac) for residential homestead development; and, the remaining approximately 243 ha (600 ac) were assigned to DLNR. Thus, HCDCH currently no longer holds an interest to these Kapolei lands, and is no longer a part of the HCP or this project (HCP 2004).

In addition, *Abutilon menziesii* has been subsequently found on lands adjacent to the North South Road, and owned by the City and County. The City and County, therefore, requested that its land also be included in the HCP to allow for the construction of the proposed Kapolei Parkway segment and other potential future urban uses. Thus, the final HCP incorporated an additional approximately 33 ha (81 ac) for a total of approximately 559 ha (1,381 ac) of land (HCP 2004).

The HDOT has assumed sole sponsorship of the HCP and mitigation responsibility for the entire Kapolei population of *Abutilon menziesii* as described in a Memorandum of Agreement (MOA) with DLNR (signed on April 16, 2004). In addition, a protocol for requesting a State incidental take license for the Kapolei population when other properties are ready to be developed has been established (HCP 2004).

The HDOT will provide funding in the amount of $1,000,000 as stipulated in the MOA referred to above. On March 14, 2001, HDOT made available funds in the amount of $250,000 to conclude the interim management program for *Abutilon menziesii* and to initiate the first five-year increment of HCP implementation (HCP 2004). The additional $750,000 will be delegated to DLNR and placed into an interest bearing account prior to approval of the HCP.

The HDOT will establish a contingency fund and has developed a process for third party developers (Cooperators) to utilize the State incidental take license through a Certificate of Inclusion. The Cooperators would pay into a contingency fund for the following purposes: 1) to finance unanticipated costs incurred by DLNR in the implementation of the HCP; and, 2) to fund the management and monitoring of three outplanted populations beyond 20 years. The contingency fund of $200,000 will include an initial deposit of the full amount by HDOT in and then be augmented by Cooperators. The contingency fund will be delegated to DLNR and placed into an interest bearing account (HCP 2004).

In addition, the HCP established a 7.3 ha (18 ac) contingency reserve on-site, which temporarily protects a colony of *Abutilon menziesii* within Cluster C from development until the short-term success criteria for *A. menziesii*, as defined by the HCP, are met on at least one off-site location. Management of this reserve may include measures such as temporary fencing and firebreaks. If an off-site location does not meet the short-term success criteria, this reserve site will be retained as a site for one of the three populations.

The successful implementation of the HCP would significantly increase the numbers of new *A. menziesii* plants on Oahu, as well provide for management of the established populations and their habitat. The Kapolei population of *A. menziesii* is currently found in a fallow canefield dominated by non-native vegetation (HCP 2004). Outplanting *A. menziesii* to several locations on Oahu to establish three populations are not expected to result in adverse affects to listed species within the outplanted areas. Therefore, other listed species will not covered by this consultation.

STATUS OF THE SPECIES

Species Description

Abutilon menziesii is a long-lived perennial shrub in the mallow family (Malvaceae) 2 to 2.5 m (6.6 to 8.2 ft) tall with coarsely-toothed, silvery, heart-shaped leaves two to eight centimeters (cm) (0.8 to 3.2 inches (in)) long. The flowers are medium red to dark red and about 2 cm (0.8 in) across. The capsules are hairy and five to eight-parted, usually with three seeds per cell (Bates *in* Wagner *et. al.* 1999).

Listing Status

Abutilon menziesii was federally listed as endangered on September 26, 1986 (51 FR 34412) and State-listed as endangered in Hawaii at the same time. Critical habitat was not designated for *A. menziesii* because of the threat of vandalism and the minimal benefit to the species that would result from a designation (51 FR 34412). A recovery plan was prepared for this species in 1995 (Service 1995).

Historic and Current Distribution

Abutilon menziesii has apparently been uncommon since its discovery in the 1800's. It once occurred locally in dryland forest habitats on the islands of Lanai, Maui, Hawaii, and Oahu. Currently, there are a total of approximately 1,300 plants throughout its historic range. On Lanai there is currently a total of approximately 330 individuals at two occurrences, including 30 individuals at Puu Mahanalua and 300 individuals at an area north of Kaumalapau Road (Keoni population) (Steve Perlman, National Tropical Botanical Garden (NTBG), pers. comm. 2003; Chris Puttock, Bishop Museum, pers. comm. 2004; Service 1995). On Maui, *A. menziesii* currently occurs in three occurrences including 20 individuals at Pohakea Gulch, 270 individuals at Puu o Kali, and 20 individuals at Kalialinui Gulch with a total of approximately 310

individuals (Joel Lau, Hawaii Natural Heritage Program (HINHP), pers. comm. 2003; Art Medeiros, Haleakala National Park (HALE), pers. comm. 2003 and 2004). *Abutilon menziesii* was once believed extirpated from the island of Hawaii, but was rediscovered in 1992 at Puako where 38 plants were found. However, subsequent efforts have been unsuccessful in relocating the plants (USFWS 1995; Lyman Perry, DOFAW, pers. comm. 2004) As of this year, 252 plants have been planted at the Kaupulehu Dry Forest Restoration project in Kona from stock collected from the Puako population (Susan Cordell, U.S. Forest Service, pers. comm. 2004). These are the only plants currently known from the island of Hawaii. On Oahu there is currently a total of approximately 406 individuals at five sites, including 62 individuals at Kapolei, one individual at Lualualei, 142 individuals at Kaena Point, 61 individuals at Honouliuli, and 140 individuals at Koko Crater. Of these five sites, Kapolei and Lualualei are the only sites containing naturally occurring *A. menziesii*. Koko Crater is an outplanting site intended to serve as a living genetic repository of the full Kapolei population. Kaena Point and Honouliuli are outplanting sites intended to establish populations of *A. menziesii* on Oahu as mitigation for removal of the Kapolei population.

Ecology

Abutilon menziesii has been reported from elevations of 18 to 425 m (60 to 1,400 ft). Historically, *A. menziesii* probably occurred within lowland dry grassland, shrubland, and forest. Much of its low elevation habitat has been converted for agricultural (*i.e.*, sugarcane) and residential uses. Therefore, throughout its range, *A. menziesii* currently persists within highly degraded communities dominated by alien plants (Service 1995).

On Oahu, *Abutilon menziesii* occurs on substrate composed of limestone characterized by sinkholes and coralline rubble with thin soils and pockets of humus. It is probable that *A. menziesii* occurred in lowland dry shrubland and grassland dominated by *Erythrina sandwicensis* (wiliwili) with an understory of native shrubs such as *Santalum ellipticum* (coastal sandalwood), *Myoporum sandwicense* (naio), *Sida fallax* (ilima), and *Capparis sandwichiana* (Hawaiian caper). Other associated native plant species include *Plumbago zeylanica* (iliee), *Psydrax odoratum* (alahee), *Sesuvium portulacastrum* (akulikuli), *Scaevola sericea* (naupaka), and *Waltheria indica* (uhaloa) (HINHP Database 2001).

On Lanai, *Abutilon menziesii* currently occurs in *psyllid*-damaged stands of *Leucaena leucocephala* (haole koa) with an understory of *Panicum maximum* (guinea grass), however, the native community was likely *Sida fallax-Dodonea* (aalii) shrubland (HINHP Database 2001).

The currently known habitat of *Abutilon menziesii* on Maui is gentle leeward slopes of summer-dry shrubland areas (part of the Lowland Dry Shrubland zone) with open to scattered canopy closure and a substrate of rocky aa lava or red soil, in communities usually dominated by alien plants. Associated species include *Sida fallax*, *Dodonaea viscosa*, and *Waltheria indica* (HINHP Database 2001).

On the island of Hawaii, the native community of *Abutilon menziesii* would have been lowland dry shrubland and grassland (HINHP Database 2001).

All known populations of *Abutilon menziesii* are frequently exposed to severe drought and periodic flooding. Due to the presence and abundance of alien grasses surrounding stands of *A. menziesii* throughout its current range, range expansion through natural seedling establishment appears virtually impossible (seedlings are establishing to a limited extent within existing *A. menziesii* stands on Lanai, but survival potential is probably reduced by deer browsing). Since *A. menziesii* may produce new leaves only during a flush growth period in the wet season, defoliation by such pests as the Chinese rose beetle may have a significant negative impact on the survival of the species. Carpenter bees and honeybees have been observed on the flowers, although honeybees seem to have difficulty accessing nectar because of the small size of the flowers. The native bee *Nesoprosopis* has rarely been observed on flowers of this species, and may have been more important as a pollinator in the past. A dual cycle of flowering has also been observed; some flowers open in early morning, staying open throughout the day and others open in the evening and remain open during the night. This may imply the past existence of a nocturnal pollinator, although no such pollinator has been observed. In cultivation, *A. menziesii* seeds germinate readily in a cinder medium in as little as one week, and grow quickly after transplanting to individual containers. Cultivated plants are reported to be thriving on windward Maui at elevations from 38 to 56 m (125 to 185 ft) with approximately 1,270 to 1,900 millimeters (mm) (50 to 75 inches (in)) of rainfall annually (Service 1995). Seed dispersal agents, longevity of plants and seeds, specific environmental requirements, and other limiting factors are unknown.

Threats

The primary reason for the decline of *Abutilon menziesii* is habitat alteration by humans, either directly (e.g. conversion of habitat to agricultural use) or indirectly (e.g. introduction of exotic species, erosion). Surviving remnants of native vegetation on all islands within its historic range provide evidence that prior to the arrival of Polynesian colonizers; the islands were covered throughout by forests and shrublands. Polynesian agriculture and fire undoubtedly significantly modified the vegetation. The rate of modification accelerated after arrival of Europeans with the ranching of cattle (*Bos taurus*) and sheep (*Ovis aries*), the clearing of land for pineapple and sugar cane cultivation, feralization of domestic animals such as goats (*Capra hircus*), cattle, and pigs (*Sus scrofa*), and the introduction of game animals such as axis deer (*Cervus axis*) and mouflon (*Ovis musimon*). Erosion, fire, drought, alien insects, competition from weedy alien plants, feral ungulates, and habitat alteration for development or agriculture currently threaten the species. In addition, *A. menziesii* has been shown to hybridize with *A. eremitopetalum* (no common name), therefore, care should be taken to minimize this problem in *ex situ* conservation efforts (Service 1995).

Conservation Efforts

There are propagules of this species in storage at Lyon Arboretum, Maui DOFAW nursery, Maui

Nui Botanical Garden, Pahole Mid-Elevation Rare Plant Facility, Dillingham DOFAW Nursery, Waimea Arboretum, the Auwahi Dry Forest Restoration project area, and the HTBG (Service propagation database 2003).

On Lanai, Chris Puttock of the Bishop Museum is working with local school children to monitor, control weeds, and plant native plant species, including *A. menziesii*, at the Keoni site. In addition, DOFAW has constructed an exclosure protecting two to three individuals of the Keoni population (C. Puttock, Bishop Museum, pers. comm. 2004).

On the island of Hawaii, 252, of the 272 *A. menziesii* individuals planted, are surviving within a fenced exclosure at the Kaupulehu Dry Forest Restoration project area in Kona. Stock from the individuals found at Puako was used in the outplanting effort (S. Cordell, pers. com. 2004).

On Maui, approximately 270 *A. menziesii* plants (99% of which are naturally occurring and 1% was outplanted in an area within the fence that did not have *A. menziesii*) are now protected within the Puu O Kali wiliwili fenced exclosure (A. Mederos, *in litt.* 2004).

Conservation efforts on Oahu, are being implemented by DOFAW, as outlined in the HCP, and by the Navy. The DLNR and the HCDCH initiated an interim management program in October of 1998 to test the viability of establishing *Abutilon menziesii* at three off-site locations on Oahu. The DOFAW has planted a total of 342 individuals at the following locations: Kaena Point (142), Koko Crater (140), and Honouliuli (61), and has collected and stored genetic material of all the naturally occurring plants at Kapolei. The Navy has implemented invertebrate control for the individual plant located at the Niulii Ponds Refuge at Lualualei in an effort to protect it from predation by the Chinese rose beetle (*Adoretus sinicus*). This plant is periodically monitored, and seeds have been collected and grown by DOFAW (Julie Rivers, U.S. Navy, pers. comm. 2004).

Needed Recovery Actions

The recovery plan for this species identifies the following important conservation actions: 1) protection of current habitat through purchases, easements and/or agreements with landowners; 2) threat abatement by fencing to exclude ungulates, removal/control of alien plants, protection from fire, control of rodents, insects and disease, protection from human disturbance, collection, storage and maintenance of genetic material and a comprehensive monitoring program; 3) implementation of a research program to study the growth and reproductive viability of *Abutilon menziesii*, determine the parameters of viable populations of *A. menziesii*, study possible pests and diseases and to use the results of research to improve management practices and; 4) a program of augmentation of very small populations and re-establishment of new populations within the historical range of the species is also needed. This includes selection of areas for augmentation and re-establishment, determination of the best methods for *ex situ* propagation and transplanting, selection of the best genetic stock for each area, propagation of suitable stock, preparation of sites for seeding and/or transplanting and monitoring and maintenance of new individuals and populations as they are established (Service 1995). In addition, a statewide

strategic plan is being developed by the Hawaii and Pacific Plants Recovery Coordinating Committee that will address the long-term conservation of *A. menziesii*. This plan will also include broader landscape actions that are needed for the recovery of this plant throughout its range (HPPRCC *in prep.* 2004).

ENVIRONMENTAL BASELINE

Status of the Species Within the Action Area

The action area (excluding the outplanting sites) was formerly cultivated sugarcane fields and is currently characterized as a disturbed coastal dry ecosystem. The vegetation of the area is generally lowland shrub with a coastal fringe of kiawe trees. In the past several years the area and surrounding lands have been taken out of sugarcane cultivation and put to other uses (e.g., urbanization, diversified agriculture, fallow fields) (HCP 2004).

Several botanical surveys have been conducted within the area since 1996. Based upon these surveys, the baseline for naturally occurring *A. menziesii* within the action area has been established as 93 plants. These individuals are found in five clusters. Cluster A consists of 10 individuals and is located at the southern end of the State road project site. Cluster B consists of 14 individuals located along the western boundary of the State property, which is marked by a chain-link fence. Cluster C, the largest cluster, consists of 61 plants in the general area of the Hawaiian Electric Company powerline easement and to the east of this easement. Cluster D consisted of a single plant in the central area of the State site; however, this individual has not been seen since the initial recording. The seven individuals in Cluster E are spread over an 81-acre area and occur as single plants, except at one location along a fence line at the property boundary and access roadway. At this location, there is a large, multi-stemmed plant, a young single-stemmed plant, and a seedling (HCP 2004).

By 2001, through natural senescence and accidental destruction, the number of plants had declined to 30 to 50 plants (DLNR 2001). However in 2003, DLNR recorded 16 new plants in close proximity of existing mature plants (DLNR 2003). The actual number of plants is difficult to determine due to the dry conditions at Kapolei; plants, which may appear to be dead may possibly revive during the wet season (DLNR 2001). Four plants were accidentally crushed/destroyed by being plowed and seedlings were killed in January 2000 (HCP 2004).

The baseline of 93 individuals for *A. menziesii* established for the HCP will be used to describe impacts to the species as a result of implementing the proposed projects. These 93 plants represent 99 percent of the naturally occurring *A. menziesii* on the island of Oahu. This is the largest naturally occurring population of *A. menziesii* on Oahu (HCP 2004, HINHP Database 2001).

Ongoing Conservation Actions Within the Action Area

Through funding provided in 1998 by the HCDCH, HCDCH and DLNR established an agreement to implement a pre-construction period Interim Management Program to test the viability of establishing *Abutilon menziesii* at three off-site locations on Oahu (HCP 2004).

On March 14, 2001, HDOT delegated the expenditure of $250,000 to DLNR for the implementation of conservation strategies, as outlined in the HCP, for years one through five. Funds became available in August 2001 and are being used by DLNR to complete the Interim Management Program that was initiated by HCDCH and to transition to implementation of the HCP (HCP 2004).

The preliminary results of the Interim Management Program indicate that propagation of the species from cuttings and seeds is highly successful in a controlled nursery environment. Outplanting to off-site locations has also been successful in the first year. The *Interim Management Report for Abutilon menziesii* (DLNR 2001) and the *Final Interim Management Report for Abutilon menziesii* (DLNR 2003) are summarized below.

The Scope of Services of the Interim Management Program include the following five tasks: Task 1: maintain *in-situ* population through monitoring, maintenance, and security (fire protection); Task 2: propagate a total representation of plants, through seeds and cuttings, from the Kapolei *Abutilon menziesii* population to be used to maintain genetic representation of stock and provide stock for outplanting purposes to be conducted at the existing DOFAW plant nurseries; Task 3: establish two new populations of *A. menziesii* in appropriate habitat to allow for natural establishment and long term viability; Task 4: research the biology of the species and determine seed storage requirements, salt and pathogen influence, and the best herbivore (i.e., ants) control methods; and, Task 5: provide partial funding for the construction of a low-elevation greenhouse dedicated to growing *A. menziesii* and other threatened and endangered plant species on Oahu to be owned and operated by DOFAW, including *A. menziesii* from the Kapolei population for the duration of implementation of the HCP (HCP 2004). A summary of on-going conservation actions, as outlined in the HCP, is given below:

Task 1: All known Kapolei plants have been marked with permanent stakes and mapped using a Geographic Information System (GIS) layer. The existing plants are being maintained by weeding (using chemical and manual methods) and, applying pesticide and fertilizer, as necessary. A fire management strategy consisting of the following measures is being implemented to ensure that the plants are not accidentally destroyed by fire: 1) fire fighting resources available near the Kapolei population have been identified; 2) information has been provided to fire stations to assist them in protecting *Abutilon menziesii* from fire; 3) and water resources near the Kapolei population have been identified (HCP 2004).

Task 2: All known Kapolei plants have been propagated through cuttings, resulting in 630 first generation progeny from 62 *in situ* individuals. In addition, 220 seedlings have been produced from seed collected from the first generation nursery plants (grown from cuttings). Additional

seeds have been distributed to Lyon Arboretum, the National Seed Storage Laboratory in Fort Collins, Colorado, and the Pahole Rare Plant Facility (HCP 2004).

Task 3. The following three outplanted populations of *Abutilon menziesii* have been initiated: Koko Crater Botanical Garden, Kaena Point State Park, and the Honouliuli Unit of the Pearl Harbor National Wildlife Refuge. Each site was planted with a representative sub-sample of the Kapolei plants and each individual plant has been tagged with a permanent metal tag (HCP 2004). Site-specific information can be found in the HCP.

Task 4: In an effort to control impacts from ants on *Abutilon menziesii*, Granular diazinon has been tested to determine its success in field applications. In addition azatin and dursban have been tested to determine if the chemicals are toxic to *A. menziesii* (HCP 2004).

Task 5: The construction of the Dillingham Greenhouse by DOFAW has been completed. A 557 square (sq) m (6,000 sq ft) greenhouse dedicated to the propagation of *Abutilon menziesii* and other threatened and endangered plant species on Oahu is located near the base of the Kealia Trail, just behind the western end of Dillingham Airstrip in Mokuleia. The land falls under the control of the DLNR Land Division and is in the process of being transferred to DOFAW. The construction included the installation of water and electrical systems. The greenhouse is 40 m (130 ft) long by 12 m (40 ft) wide by 4 m (12 ft) tall. It is divided into an upper and a lower section along the entire length. All propagation of *A. menziesii* now occurs at this new facility (HCP 2004).

Effects of the Action

The proposed action includes implementation of the Kapolei projects as well as the implementation of the HCP. For the purposes of the following analysis, the numbers of individuals at Kapolei reflect the baseline established in the HCP. However, because of natural annual and seasonal fluctuations, the actual number of individuals may be different. In fact, we have seen a decline in the number of individuals since the baseline for the HCP was established.

In order to analyse the anticipated effects of the proposed action on the species, it is necessary to consider the effects of a no action scenario. The species currently occurs in an area of highly disturbed non-native grassland that generally out competes *A. menziesii* for resources. In addition, the grasslands increase the susceptibility of the area to catastrophic fire events that could extirpate the species from this area. Proposed or future development is also threatening the population as it could significantly reduce the area to a point where the population would not be anticipated to persist. Unfortunately, it has been demonstrated that species continue to go extinct in Hawaii without a proactive management approach due to ongoing threats of habitat degradation. For example at least two species have been extirpated in the wild from the Waianae Mountain range of Oahu in the last ten years (*Solanum sandwicense* and *Cyanea pinnatifida*) (Trae Menard, The Nature Conservancy of Hawaii, pers. comm. 2004). Therefore, it is unlikely that if the population were left without management in its current location that it would persist over time due to habitat loss and degradation. The loss of this population would result in a

reduction in the species distribution, as it would remove the species only naturally occurring, reproducing population from Oahu.

Development of the Kapolei projects over a 20-year period as anticipated, will ultimately result in the removal of all *Abutilon menziesii* plants (93 individuals), the associated seed bank, and surrounding habitat at Kapolei. The following is a description of how each project will impact the Kapolei population of *A. menziesii* (HCP 2004).

The construction of the North-South Road and the Kapolei Parkway is expected to remove 28 plants within clumps C-1, C-2 and E of the Kapolei population of *Abutilon menziesii* as well as the seed bank and existing habitat surrounding these clumps. The removal of the plants is anticipated to occur between 2004 and 2007.

Development of DHHL lands will initially affect Cluster B followed by Cluster A. It is expected that this development will ultimately remove approximately 24 individuals of *A. menziesii*, the seed bank, and habitat surrounding clusters A and B. The removal of these plants is anticipated to occur sometime between 2006 and 2016.

Development of the UHWO campus involves the removal of approximately four individuals of *A. menziesii*, the seed bank, and habitat surrounding clusters C and D. These four plants are expected to be impacted in the future phase of the campus. The removal date of these plants is uncertain but will occur after Phase 1 (completion date estimated for 2007) and 2 (undetermined completion date) are completed.

If all of the lands within the DLNR parcel are developed, including the 18-acre contingency reserve site, approximately 37 individuals of *A. menziesii*, the seed bank, and habitat surrounding cluster C-3 will be removed. The development phases are conceptual and development schedules have yet to be determined at this time therefore, we do not have an estimated removal date of the plants on this parcel of land.

The phasing of the development is an important factor in reducing the likelihood that all of the individuals will be lost at one point in time and increasing the probability that the conservation measures will be successful for the following reasons: 1) it provides a longer time period to collect genetic material from all of the mature plants as well as seedlings thereby increasing the likelihood that the outplanting sites will have good genetic representation; 2) the threat of fire will be reduced at the contingency reserve site until at least one outplanting site meets the success criteria thereby reducing the possibility of a stochastic event exterminating the existing population; and 3) it provides time to solve any problems that may arise in establishing the off site outplanting sites through the established adaptive management plan.

The HCP establishes a process for third party developers (Cooperators) to utilize the State incidental take license through a Certificate of Inclusion. The Cooperators would pay into a contingency fund to finance unanticipated costs incurred by DLNR in the implementation of the HCP, and to fund the management and monitoring of three outplanted populations beyond 20

years. The contingency fund of $200,000 will include an initial deposit of the full amount by HDOT in and then be augmented by Cooperators. The contingency fund will be delegated to DLNR and placed into an interest bearing account (HCP 2004). Although the removal of plants located in lands managed by DHHL, UHWO, and DLNR are taken into account in this biological opinion, these parties will need to obtain a certificate of inclusion from HDOT and pay into the contingency fund prior to removing any of the plants located within their project areas.

In anticipation of the above impacts, the HDOT developed an HCP to avoid, minimize and mitigate these impacts. The primary goal of the HCP is the continued survival of the Kapolei population of *A. menziesii* by establishing three off-site outplanted populations and one off-site repository site. Each of the outplanted populations must meet the overall success criteria, which requires that there are more than 120 reproducing adult plants (including at least 40 plants recruited from the seed bank on site) that are naturally reproducing, and stable or increasing in number for a period of five consecutive years. The purpose is to obtain an overall net gain in the number and distribution of *A. menziesii* on the island of Oahu. We anticipate that this will contribute towards the recovery of the species (HCP 2004).

To achieve the above, the HCP: 1) establishes a secure funding source; adheres to a staggered schedule to prevent the removal of all individuals of the Kapolei population of *A. menziesii* at one time; 2) establishes new populations of *A. menziesii* at three off-site locations; 3) identifies short and long-term goals and success criteria to ensure the three off-site populations are established; 4) ensures the long-term protection and maintenance of permanent *A. menziesii* populations; 5) provides an adaptive management strategy that specifies the actions to be taken if the HCP is not achieving its goals; 6) conducts research that will aid in the successful implementation of the HCP; and 7) maintains a subpopulation of approximately 36 individuals on a 7.3 ha (18 ac) contingency reserve site that will not be removed until at least one of the populations in an off-site location meets the short-term success criteria as identified in the HCP (HCP 2004). Any future sites that are identified as necessary to achieve the success criteria will be assessed for potential impacts to other listed plants and animals. If there is the potential to adversely affect other listed species associated with implementation of management actions a that site, DOFAW will coordinate with the Service to determine if the actions can be modified to reach a not likely to adversely affect determination. If that cannot be accomplished reinitiation of consultation will be required.

To achieve the goals of the HCP, the adaptive management plan describes the monitoring including the data to be collected, analysis, data collection intervals and provides a framework for modifying management practices in a timely manner. Specifically, each monitoring protocol provides a description of the monitoring objectives, monitoring methods and data analysis, monitoring activity, and potential management activities to be implemented in response to the information gathered. This adaptive management plan was developed in close coordination with the Service and meets our requirements for data gathering, analysis and management response.

Preliminary results of the Interim Management Program indicate that propagation of *A. menziesii* from cuttings and seeds have been successful. Two (potential) outplanting sites have had a high

survival rate (96 – 98 percent), and some reproduction has occurred (2 seedlings produced from 142 plants outplanted at Kaena Point) at one of the outplanted sites In addition, the Kapolei site is surveyed once every quarter for new plants and seeds and cuttings are collected from all plants, when possible, to continue to ensure the genetic diversity of the population is maintained. Also, the HCP recommends DLNR initiate outplantings at more than three sites to ensure that three sites will meet the success criteria.

The HCP anticipates that the goals and success criteria will be reached within the 20-year period of active management, which began in 2001 and ends in 2021. The HCP identifies short and long-term success criteria that must be met to reach the goal of establishing three self-sustaining populations of *A. menziesii*. *A. menziesii* has been outplanted at two potential outplanting sites, Kaena Point in 2001 and Honoluliuli in 2002. It will likely take at least five years from when the initial outplanting occurred to reach the short-term success criteria. Once the short-term success criteria is reached it is anticipated to take 5-10 years to meet the long-term success criteria and then another 5 years to determine if the population meets the overall success criteria. Based upon the previously described measures that are incorporated into the HCP and current progress with establishing the off-site populations, it is likely that at least one (i.e., Kaena Point) of the populations will be established that meets the overall success criteria and the other two populations will be close (within 5 years) to attaining the long-term success criteria by 2021. In the event that all three off-site outplanted populations do not reach the overall success criteria by 2021, funds are available to ensure that the overall success criteria will be met, although it may occur beyond the 20-year time period specified in the HCP. Therefore, it is anticipated that the overall goal of establishing three off-site populations meeting the success criteria identified in the HCP will be met.

Cumulative Effects

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action area not considered in this section because they require separate consultation pursuant to section 7 of the Act. There are no known future State, local, or private actions that are not part of the proposed HCP and reasonably certain to occur in the action area.

CONCLUSION

After reviewing the current status of *Abutilon menziesii*, the environmental baseline for the action area, the effects of the North-South Road, Kapolei Parkway, other Kapolei projects, and the HCP, and the cumulative effects, it is the Service's biological opinion that the proposed projects, are not likely to jeopardize the continued existence of the species. No critical habitat has been designated for this species, therefore, none will be affected.

We reached this conclusion even though the entire Kapolei population of *A. menziesii* is anticipated to be removed as a result of implementing the Kapolei projects. This is because it is

unlikely that if the population were left in its current location that it would persist over time without management due to habitat degradation (e.g., encroachment of weeds), encroaching development, and the threat of fire. The Service considered this continued risk of extinction to *A. menziesii* in the evaluation of the affect of the proposed action. Implementation of the HCP will result in the net conservation benefit for *A. menziesii* and avoid jeopardy for the following reasons: the HCP is tied to the accomplishment of measurable goals and success criteria that will result in the establishment of a minimum of three off-site, self-sustaining populations that meet stabilization criteria for the species; the HCP provides adaptive management strategies and monitoring to ensure the goals and success criteria of the HCP is attained within the 20-years of active management; the HCP provides funds for the 20-years of active management, a contingency fund for unforeseen circumstances, and funds for long-term management of the three established outplanted populations; and the establishment of a 7.3 ha (18 ac) contingency reserve site, which temporarily protects a portion of the Kapolei population of *A. menziesii* from development until the short-term success criteria is met at one off-site location; and the contingency reserve site will serve as a population if any of the three off-site locations do not meet the long-term success criteria.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. The recommendations provided relate only to the proposed action and do not necessarily represent complete fulfillment of the FHWA section 7(a)(1) responsibilities for the species.

We recommend that research regarding the physical and biological needs, and pests and diseases of the species be conducted in order to gain a better understanding of the specific requirements and limiting factors for *Abutilon menziesii*. This knowledge will aid in the successful implementation and outcome of the proposed project. In addition, we recommend that an effort be made to collect the seed bank for use at the proposed outplanting sites to further minimize adverse impacts to the species. In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

REINITIATING-CLOSING STATEMENT

This concludes formal consultation on this action. If the project description changes then the FHWA will be required to reinitiate formal consultation to allow for re-evaluation of project effects within the context of the environmental baseline for *Abutilon menziesii*, which is covered in this biological opinion. As required in 50 CFR § 402.16, reinitiation of consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) new information reveals effects of the agency action

that may affect listed species in a manner or to an extent not considered in this opinion; (2) the agency action is subsequently modified in a manner that causes an effect to the listed species not considered in this opinion; or (3) a new species is listed or critical habitat designated that may be affected by the action.

The FHWA will coordinate with the Service if an unforeseen event occurs that significantly changes the baseline of the species. As stated in the Conclusion (above), the Service's finding of no jeopardy is based in large part on the conservation measures built into the project by the FHWA as part of the HCP. Should there be a failure to carry out any or all of the described measures, or if the measures are not effective, or if these measures are modified in any way beyond that accepted through the ESRC review process, reinitiation of consultation will be required. If you have any questions regarding this biological opinion, please contact Ms. Marigold Zoll of my staff at (808) 792-9400.

Sincerely,

Jeff M. Newman
Acting Field Supervisor

cc:
Mr. Nelson Sagum, HDOT
Ms. Faith Miyamoto, C&C Honolulu
Mr. Paul Conry, DLNR-DOFAW

Literature Cited

Bates, D.M. 1999. Malvaceae *in* Wagner, W.L., D.R. Herbst, and S.H. Sohmer, Manual of the flowering plants of Hawaii. University of Hawaii Press and Bishop Museum Press, Honolulu. Bishop Museum Special Publication 97:868-903.

Char, W.P. 2003. Botanical Survey, University of Hawaii West Oahu, East Kapolei, Ewa District, Oahu. Honolulu, HI. Unpublished.

Hawaii Natural Heritage Program. 2001. Hawaii Natural Heritage Program database, unpublished.

Hawaii and Pacific Plants Recovery Coordinating Committee. 2004. Integrated plan for the conservation of Hawaii's unique plants and the ecosystems they depend upon. *In preparation.*

Ohashi, Y. and PBR Hawaii. 2004. Final Habitat Conservation Plan for *Abutilon menziesii* at Kapolei. Prepared for Parsons Brinckerhoff and State of Hawaii Department of Transportation. Honolulu, HI. 65 pp.

U.S. Fish and Wildlife Service. 1986. Endangered and threatened wildlife and plants; determination of endangered status for *Abutilon menziesii* (ko oloa ula). Department of the Interior, Fish and Wildlife Service, 50 CFR Part 17, 26 September 1986. Federal Register 51 (187): 34412.

U.S. Fish and Wildlife Service. 1995. *Lanai Plant Cluster Recovery Plan.* U.S. Fish and Wildlife Service, Portland, OR. 119 pp.

U.S. Fish and Wildlife Service. 2003. Plant Propagation Database. Unpublished.

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU

PACIFIC PARK PLAZA
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HONOLULU, HAWAII 96813

PENNY HARRIS
MAYOR

CHARLES O. SWANSON
DIRECTOR

TSP96-00145

February 27, 1996

Mr. Don J. Hibbard
Administrator
State Historic Preservation Division
Department of Land and Natural Resources
State of Hawaii
33 South King Street, 6th Floor
Honolulu, Hawaii 96813

Dear Mr. Hibbard:

Subject: North-South Road Corridor Project, Ewa, Oahu

A new north-south arterial roadway is being proposed in Ewa, Oahu, between Interstate H-1 and the proposed Ewa Marina project. A location map showing the project area is attached for your use. As part of this project, we will complete a major investment study (MIS) prior to the preparation of a NEPA/HRS Chapter 343 environmental document. The purpose of this letter is to request coordination with the State Historic Preservation Division (SHPD) on both the MIS and the associated environmental document.

The proposed North-South Road will cross the OR&L right-of-way within Ewa Villages. It is our understanding that the OR&L right-of-way is listed on the National Register of Historic Places. Because the termini of North-South Road lie on either side of the OR&L right-of-way, all alternatives cross the OR&L right-of-way. Even the No Build alternative would affect the right-of-way. Sections of the North-South Road have been or are about to be constructed as part of residential developments. These segments, especially in the vicinity of the Ewa Villages and Ewa Gentry developments, would cross the OR&L right-of-way when completed. Furthermore, the Ewa Villages portion of the roadway would be in close proximity to other historic resources.

Our consultant for this project, Parsons Brinckerhoff, Inc., has already contacted Mr. Nathan Napoka of your staff. He mentioned that the State Department of Transportation (SDOT) is the owner of the right-of-way and suggested that we coordinate with the SDOT regarding OR&L issues. We have talked to Mr. Bob Itagaki of the SDOT, and he stated that his involvement in

the project would not occur until plans are submitted. He mentioned that they often consult with the Hawaiian Railway Society regarding impacts to the OR&L right-of-way. With this information, we sent a letter to the Hawaiian Railway Society requesting input on how we can minimize and/or mitigate adverse impacts.

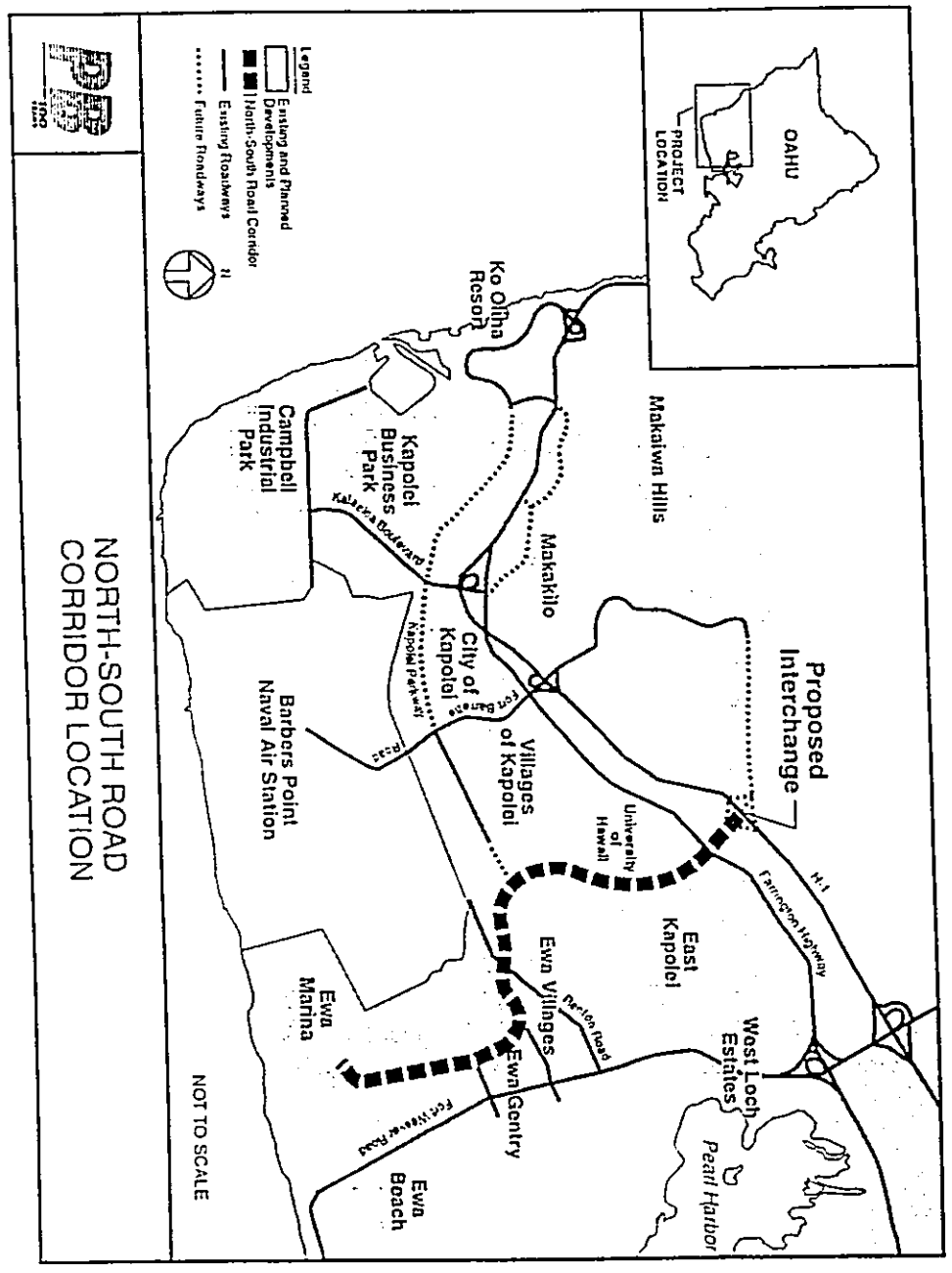
We would appreciate any comments the SHPD may have regarding North-South Road's potential impacts on the OR&L right-of way and other historic resources in Ewa Villages. We would also like to clarify the documentation requirements for the forthcoming environmental assessment.

Please call Mr. Gregory Hee at 527-6893 if you have any questions or require additional information. Your assistance in this matter will be greatly appreciated.

Respectfully,

for CHARLES O. SWANSON
Director

Enclosure: Project location map



BENJAMIN J. CAYETANO
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STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

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HISTORIC PRESERVATION DIVISION
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

March 8, 1996

LOG NO: 16697
DOC NO: 9603MN03

Mr. Charles O. Swanson, Director
Department of Transportation Services
C&C of Honolulu
Pacific Park Plaza
711 Kapiolani Blvd, Suite 1200
Honolulu, Hawaii 96813

Dear Mr. Swanson:

SUBJECT: North-South Road Corridor Project, Ewa, Oahu

Thank you for the opportunity to submit preliminary comments on this proposed corridor which will affect the OR&L Right of Way a property listed on the National Register of Historic Places.

Through telephone communications with Mr. Gregory Hee of your staff we explained that this Right of Way runs in a general east to west route from Honouliuli to Nanakuli. Given the linear nature and extent of this historic property it will be impossible to avoid a north-south corridor impact with this property thus mitigation will be inevitable.

We look foward to working on mitigating this impact in future consultations when more specific design plans are available. You might want to consult with the Ko Olina Development personel who designed major roadway intersections with the OR&L Right of Way within their planned community for design and mitigation ideas.

Sincerely yours,

DON HIBBARD, Administrator and
State Historic Preservation Officer

MN:smf

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
Hawaii Division
300 Ala Moana Blvd., Room 3202
Honolulu, HI 96850
November 5, 1997

IN REPLY REFER TO
HEC-HI

Mr. Don J. Hibbard
Historic Preservation Administrator
State of Hawaii
Department of Land and Natural Resources
33 South King Street, 6th Floor
Honolulu, Hawaii 96813

Dear Mr Hibbard:

Subject: Determination of Effect, Section 106
North-South Road
Ewa, Oahu

The purpose of this letter is to request the concurrence of the State Historic Preservation Officer (SHPO) regarding the "no effect" determination for this project on historic resources as described below Since the proposed highway will be federally funded, compliance with Section 106 of the National Historic Preservation Act is required, which, in turn, necessitates SHPO concurrence with this determination.

An archaeological and historic reconnaissance survey (attached) conducted by Cultural Surveys Hawaii for this project found the two following historic sites near the proposed highway alignment:

- The Ewa Villages Historic District (State Site 50-80-12-9756), nominated for National Historic Landmark status; and,
- The Oahu Railway and Land Company (OR&L) Right-of-Way (State Site 50-80-12-9714), listed in the National Register of Historic Places.

As indicated in the enclosed "Section 106 Report" for this project, the roadway would be constructed west of the Ewa Villages Historic District and north of the OR&L Right-of-Way. The roadway would generally run along the western side of the recently constructed HECO 138 kV transmission line

The "no effect" determination is based on the following: (1) the proposed highway right-of-way will not encroach upon the identified historic sites; and, (2) the proposed roadway would not change the characteristics of the site that qualified them for National Register recognition.

Please contact me at 541-2536 if there are any questions.

Sincerely yours,

Pat V. Phung

Pat V. Phung, P E
Transportation Engineer

Enclosures

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

RECEIVED
JAN 1998
HAWAII DIVISION

MICHAEL D. WILSON, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DEPUTIES

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AQUACULTURE DEVELOPMENT PROGRAM
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FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
DIVISION
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WATER AND LAND DEVELOPMENT

STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
33 SOUTH KING STREET, 6TH FLOOR
HONOLULU, HAWAII 96813

REF:HP-JK

JAN 21 1998

Mr. Pat V. Phung
Transportation Engineer
U S. Department of Transportation
Federal Highway Administration
Hawaii Division
300 Ala Moana Blvd , Room 3202
Honolulu, Hawaii 96850

LOG NO: 20666
DOC NO: 9712co07
Architecture

Dear Mr. Phung:

SUBJECT: Section 106 Review (NHPA)
North South Road
TMK 9-1, Ewa, Oahu

Thank you for the letter dated November 6, 1997, regarding proposed North South Road corridor location, in the September 1997 Report. A review of our records shows that there are no known historic sites at the project location. An *Archaeological Reconnaissance Survey of the North-South Road Corridor* by Cultural Surveys Hawaii submitted with the review provides an assessment and photos. It indicates that no archaeological sites are likely to be present in the project area because of past development and past land use for sugarcane cultivation. Thus, we believe that this project will have "no effect" on archaeological sites.

While the project is near the Ewa Villages Historic District and the Oahu Railway and Land Right of Way, the proposed highway right of way will not encroach upon the sites or change the characteristics of the site that qualified them for National Register recognition.

We concur with the determination that the project will have "no effect" on any known historic resources.

It appears that the proposed Kapolei Parkway may impact the OR&L right of way. We look forward to consultation for that project in the future. Thank you for the opportunity to comment, should you have any questions, please contact Carol Ogata at 587-0004

Aloha,

for MICHAEL D. WILSON, Chairperson and
State Historic Preservation Officer

CO:jk

U S DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
Hawaii Division
300 Ala Moana Blvd , Room 3202
Honolulu, HI 96850
February 4, 1998

RECEIVED
FEB 5 11 22 AM '98
DEPT OF TRANSPORTATION
HIGHWAYS DIVISION

IN REPLY REFER TO
HEC-HI

Mr. Kazu Hayashida
Hawaii Department of Transportation
869 Punchbowl Street
Honolulu, HI 96813-5097

Attn.: Nelson Sagum

Dear Mr Hayashida:

Subject: North-South Road, City & County of Honolulu, Hawaii
Section 106 Review

The State Historic Preservation Officer (SHPO) has reviewed the documentation for the subject project In accordance with Section 106 of the National Historic Preservation Act (NHPA), the SHPO has concurred that the subject project will have "no effect" on archaeological sites and any known historic resources Enclosed is the correspondence from the SHPO.

Please contact me at 541-2536 if there are any questions

Sincerely yours,

Pat V. Phung

Pat V. Phung, P E.
Transportation Engineer

Enclosure

HIGHWAYS DIVISION
PLANNING BRANCH
FEB 5 ... AM '98

DIRECTOR'S OFFICE
DEPT. OF
TRANSPORTATION
FEB 4 3 03 PM '98

US Department of Transportation
Federal Highway Administration

March 31, 2004

Hawaii Division
Box 50206
300 Ala Moana Boulevard, Room 3-306
Honolulu, HI 96850

In Reply Refer To:
HEC-HI

Ms. P. Holly McEldowney, Administrator
State Historic Preservation Division
Department of Land and Natural Resources
Kākuhihewa Building, Room 555
601 Kamokila Boulevard
Kapolei, HI 96707

Dear Ms. McEldowney:

Subject: North-South Road and Kapolei Parkway Project
National Historic Preservation Act, Section 106 Coordination

The Federal Highway Administration (FHWA), along with the State Department of Transportation, Highways Division (HDOT) and the City and County of Honolulu (City), have reinitiated environmental review of the subject project, which will include compliance with Section 106 of the National Historic Preservation Act (NHPA). We request your review and comment on the updated "undertaking" description, proposed Area of Potential Effect (APE) for the project, and anticipated consultation efforts with other parties, as described below. This letter also summarizes our consultation activities to date with your Historic Preservation Division staff.

Proposed Undertaking and Changes Since 1998

The proposed undertaking consists of the following elements (see enclosed figure):

- North-South Road. A new six-lane State roadway facility between the H-1 Freeway and the future Kapolei Parkway. North-South Road would include a landscaped median, sidewalks, a bike path, a new interchange at the H-1 Freeway, and an at-grade signalized intersection at Farrington Highway.

- Drainage improvements associated with North-South Road. Kaloi Gulch would be bridged at two places by North-South Road, a drainage channel would be provided parallel to North-South Road, and a detention basin would be constructed on the downstream end of North-South Road. These drainage improvements would be designed to control the floodplain impacts of the undertaking.

- Kapolei Parkway. A new six-lane City roadway facility between the future North-South Road and Renton Road. Kapolei Parkway would include a landscaped median, sidewalks, a bike path, and an at-grade signalized intersection with North-South Road and Renton Road.

The undertaking described above is different from the undertaking we proposed in 1997-1998. The previous undertaking included only the North-South Road, with an interchange at the H-1 Freeway. It did not include the drainage improvements, nor did it include development of a portion of Kapolei Parkway.

We completed a Draft Environmental Assessment (DEA) (September 1998) for the previous undertaking, which was announced in the December 23, 1998, edition of the Environmental Notice. The project was delayed after 1998 because of regulatory complications in addressing the potential impacts to an endangered plant species, the Ko'oloa'ula (*Abutilon menziesii*), discovered in the project area. The HDOT has just completed a Habitat Conservation Plan for the Ko'oloa'ula; therefore, we anticipate that the project can now move forward. We are currently preparing a Revised DEA for the new undertaking.

Another changed project condition is that the 1998 DEA anticipated a major land development surrounding most of North-South Road, proposed by the State's Housing Finance and Development Corporation (now Housing and Community Development Corporation of Hawaii, or HCDCH). The HCDCH has since dropped its East Kapolei proposal, which would have realigned Kaloi Gulch.

Previous Section 106 Activities

In 1998 we completed the NHPA Section 106 process for the previous undertaking, which resulted in a FHWA "no effect" determination and State Historic Preservation Office (SHPO) concurrence made under the old NHPA Section 106 rules (letter correspondence dated November 5, 1997, and January 21, 1998)

Area of Potential Effect (APE) of New Undertaking

Based on the description of the new undertaking provided above, the FHWA has determined the APE pursuant to NHPA Section 106 to be the following:

- Right-of-way of North-South Road from its interchange with the H-1 Freeway to Kapolei Parkway, including the land needed for the drainage channel and detention basin; and

- Right-of-way of Kapolei Parkway from its intersection with the proposed North-South Road to its intersection with Renton Road.

Consultation with Historic Preservation Division Staff

The project consultant, Parsons Brinckerhoff (PB), has initiated consultation with your Historic Preservation Division staff regarding the new undertaking. In an e-mail correspondence dated March 11, 2004, Dr. Sara Collins provided the following comments regarding the new undertaking's potential impact to archaeological resources (i.e., pre-contact or Native Hawaiian historic properties):

> After comparing the previous survey area with the proposed changes, and after looking at aerial photos, the "new" portion of the corridor is clearly in former sugar lands. Consequently, given that the earlier survey found nothing, and given that the "new" portions of the corridor were in sugar cane, we still believe -- from the standpoint of archaeology -- that "no historic properties will be affected."

In regards to post-contact historic properties, the FHWA finds that a portion of the Ewa Villages Historic District (State Site 50-80-12-9786) will be within the APE. The boundary of the historic district is limited to Renton Road between Varona and Tenney Villages. The new Kapolei Parkway will cross Renton Road at this location, and therefore, a portion of the intersection will be within the historic district. PB conducted a site visit with Ms. Susan Tasaki of your staff on March 15, 2004. We informed Ms. Tasaki that we anticipate the new intersection to warrant traffic signals because of projected traffic volumes. Ms. Tasaki expressed concern about traffic signals at the intersection because they would be the first within the historic district.

Consultation with Other Parties

We plan to invite the following organizations to participate in NHPA Section 106 consultation:

- Office of Hawaiian Affairs
- Historic Hawaii Foundation
- Hui Malama I Na Kupuna O Hawai'i Nei
- Oahu Island Burial Council
- Hawaiian Railway Society

Please advise me at your earliest convenience if other organizations or individuals should participate in the consultation.

In summary, the FHWA, along with the HDOT and the City, has reinitiated environmental review of the newly defined North-South Road and Kapolei Parkway project, including the NHPA Section 106 process. We have consulted with State Historic Preservation Division staff and plan to initiate consultation with other interested parties.

We ask that the SHPO review and provide any comments it may have regarding our proposed APE definition and planned consultation activities *within 30 days of receipt of this letter*. Upon completion of the consultation period, the FHWA will submit a letter of determination for the SHPO's concurrence.

If you have any questions or require additional information, please do not hesitate to contact me at 541-2700 (extension 305) or via email at Pat.Phung@fhwa.dot.gov.

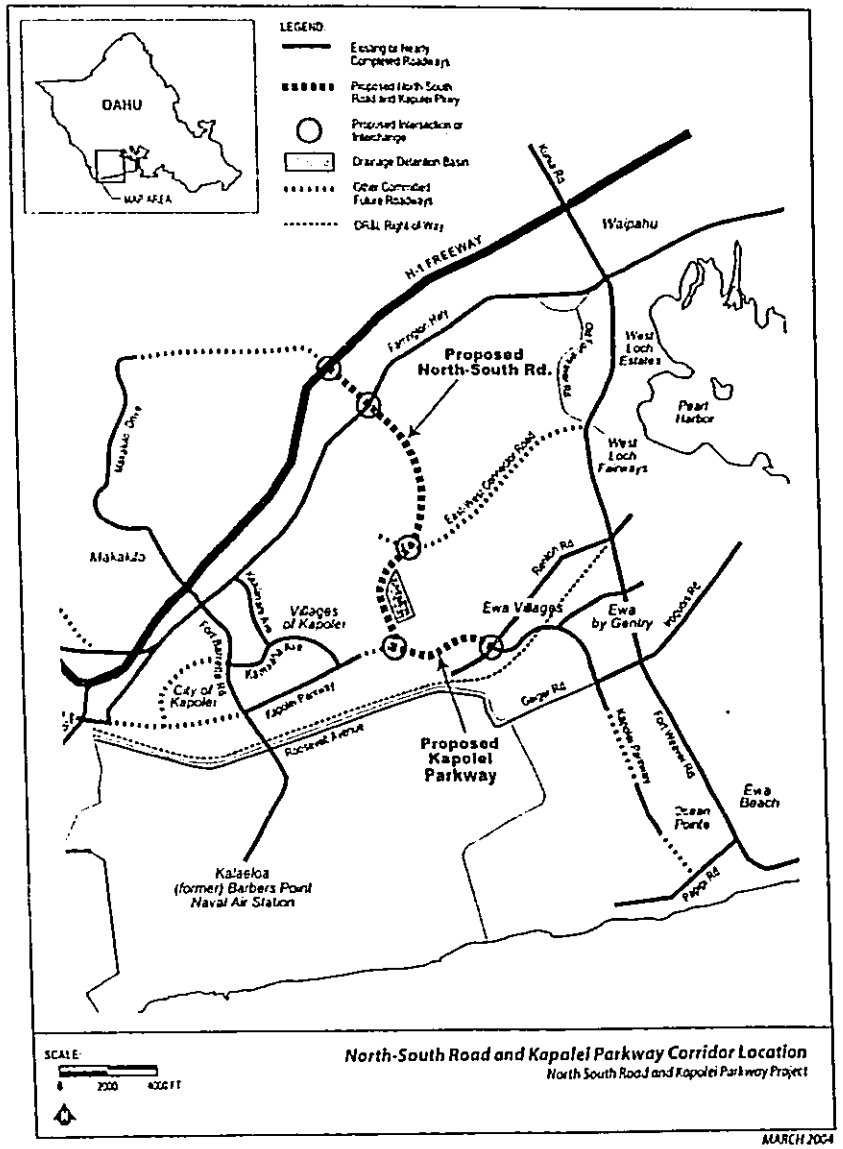
Sincerely yours,

Pat V. Phung, P.E.
Transportation Engineer

Enc: Project elements (map)

By Certified Mail

cc: Mr. Nelson Sagum, HDOT, HWY-PA
Ms. Faith Miyamoto, City & County of Honolulu, DTS
Ms. Nami Ohtomo, PB



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LINDA LINGLE
GOVERNOR OF HAWAII

RECEIVED
APR 22 2004
HAWAII DIVISION

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

DAN DAVIDSON
DEPUTY DIRECTOR - LAND

ERNEST Y. W. LAU
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
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CONSERVATION AND RESOURCES ENFORCEMENT
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HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
HISTORIC PRESERVATION DIVISION
KAKUHIHEWA BUILDING, ROOM 555
601 KAMOKILA BOULEVARD
KAPOLEI, HAWAII 96707

APR 21 2004

LOG NO: 2004.0957
DOC NO: 0403ct20
Architecture

Pat V. Phung, P.E.
Transportation Engineer
U.S. Department of Transportation
Federal Highway Administration - Hawaii Division
Box 50206
300 Ala Moana Boulevard, Room 3-306
Honolulu, Hawaii 96850

Dear Mr. Phung:

SUBJECT: Section 106 (NHPA) Review North-South Road and Kapolei Parkway Project
Honolulu, Hawaii TMK: (1) 9-1-017:059

Thank you for the submittal dated April 01, 2004. The proposed project is for the construction of: a new six-laned State roadway facility between the H-1 Freeway and the proposed Kapolei Parkway; drainage improvements associated with North-South Road; and a new six-laned City roadway facility between the proposed North-South Road and Renton Road.

Architectural Concerns
The six-laned highway cuts through between Varona and Tenney Villages, part of the Ewa Plantation Villages which was placed on the State Register of Historic Places on February 24, 1996. Because the project includes an at grade signalized intersection (North-South Road and Renton Road), we are concerned about the impacts of the traffic signals being located within the historic site. Therefore we believe that the determination for the architectural concerns of the proposed project is "adverse affect." We look forward to working with you in the development of a memorandum of agreement.

Archaeological Concerns
After comparing the previous survey area with the proposed changes, and after looking at aerial photos, the "new" portion of the corridor is clearly in former sugar lands. Consequently, given that the earlier survey found nothing, and given that the "new" portions of the corridor were in sugar cane, we still believe – from the standpoint of archaeology – that "no historic properties will be affected."

Thank you for the opportunity to comment. Should you have any questions regarding architectural concerns please contact Susan Tasaki at (808) 692-8032. Should you have any questions regarding architectural concerns please contact Sara Collins at (808) 692-8025.

Sincerely,

Peter T. Young
State Historic Preservation Officer

ST:jen

US Department of Transportation
Federal Highway Administration

Hawaii Division
Box 50206
300 Ala Moana Boulevard, Room 3-306
Honolulu, HI 96850

May 7, 2004

In Reply Refer To:
HEC-III

Ms. P. Holly McEldowney, Administrator
State Historic Preservation Division
Department of Land and Natural Resources
Kākuhihewa Building, Room 555
601 Kamokila Boulevard
Kapolei, HI 96707

Dear Ms. McEldowney:

Subject: North-South Road and Kapolei Parkway Project
National Historic Preservation Act, Section 106 Coordination and Review
Log No. 2004.0957, Doc No. 0403st20

Thank you for your letter dated April 21, 2004, responding to our request for your review the updated "undertaking," subject to Section 106 of the National Historic Preservation Act (NHPA).

In light of your opinion of an "adverse effect" determination for architectural concerns, we will continue to work with your staff to determine the architectural treatments appropriate for proposed traffic signals in the historic district at Ewa Plantation (State Site 50-80-12-9786). The environmental assessment being prepared for the project will include a Section 4(f) evaluation, pursuant to the Department of Transportation Act of 1966.

Your letter indicates that there would be "no historic properties affected" from the standpoint of archaeology, given the area's previous sugar cane cultivation and the lack of any archaeological sites in the earlier survey.

When consultation with other parties has been completed, the Federal Highway Administration will issue a Section 106 effect determination for the proposed project. If you have any questions or require additional information, please do not hesitate to contact me at 541-2700 (extension 305) or via email at Pat.Phung@fhwa.dot.gov.

Sincerely yours,

Pat V. Phung, P.E.
Transportation Engineer

cc: Mr. Nelson Sagum, HDOT, HWY-PA
Ms. Faith Miyamoto, City & County of Honolulu, DTS
Ms. Nanni Ohtomo, PB

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US Department of Transportation
Federal Highway Administration

AUG 2 4 2004
PARSONS BRINCKERHOFF
HONOLULU, HAWAII

Federal Highway Administration
Hawaii Division
Box 50206
300 Ala Moana Boulevard, Room 3-306
Honolulu, HI 96850

August 20, 2004

In Reply Refer To:
HEC-HI

Ms. P. Holly McEldowney, Administrator
State Historic Preservation Division
Kākuhihewa Building, Room 555
601 Kamokila Boulevard
Kapolei, Hawai'i 96707

Dear Ms. McEldowney:

Subject: Proposed North-South Road and Kapolei Parkway Project
City and County of Honolulu, Hawaii
Section 106 of the National Historic Preservation Act
Request for Concurrence on Effect Determination

The Federal Highway Administration, the State of Hawaii Department of Transportation (SDOT), and the City and County of Honolulu Departments of Transportation Services (DTS) and Design and Construction (DDC) are proposing to construct North-South Road and Kapolei Parkway between Renton Road and North-South Road, Ewa, Oahu. The mauka terminus of North-South Road would at the H-1 Freeway. The purpose of letter is to request that the State Historic Preservation Officer (SHPO) concur on our effect determinations in accordance with Section 106 of the National Historic Preservation Act (NHPA).

As described in our letter dated March 31, 2004, the FHWA determined that a portion of the Ewa Sugar Plantation Villages (Ewa Villages) Historic District (State Site 50-80-12-9786) will be within the project's Area of Potential Effect (APE). The district is listed in the Hawaii Register of Historic Places, and is eligible for listing in the National Register of Historic Places. The portion of the historic district within the APE is limited to Renton Road between Varona and Tenney Villages. The new Kapolei Parkway will cross Renton Road at this location, and therefore, a portion of the intersection will be within the historic district. At the time of the March 31, 2004 letter, the FHWA was not aware of any other historic property in the APE. In a letter dated April 21, 2004, which was in response to our March 31, 2004 letter, the SHPO stated the opinion that from the standpoint of archaeology, no historic properties would be affected by the project. We agree with this archaeological assessment.

In the same April 21, 2004 letter, the SHPO also provided an opinion that the project would cause an adverse effect on the Ewa Villages Historic District because the Kapolei Parkway and

Renton Road intersection warrants traffic signals, which might not be architecturally consistent with the historic district. As a follow-up to this assessment, a site visit was held on July 16, 2004, which involved staff from the SHPO, SDOT, DDC and the project consultant, to re-evaluate the potential impacts of the proposed Kapolei Parkway and Renton Road intersection and its traffic signals on the historic district. All parties agreed that the proposed intersection and traffic signals would not cause an adverse effect on the historic district because the intersection will be located in a relatively isolated area of the historic district, and not within the district proper, which contains the mill buildings, the plantation manager's house and other contributing or individually historic structures.

For your information, DDC is currently constructing Kapolei Parkway from the OR&L Right-of-Way in Ewa Gentry to Renton Road, along the border of Ewa Mahiko District Park. Because this project includes a new T-intersection with Renton Road, DDC will also upgrade the unimproved section of Renton Road surrounding the new intersection by extending the curbs, gutters and sidewalks that currently end at the Renton Road bridge over Kaloi Gulch. The future Kapolei Parkway, both mauka and makai of Renton Road, will be similar in appearance to the existing Kapolei Parkway in Ewa Gentry. It will include sidewalks, bike/pedestrian paths, and landscaped medians.

Over 20 organizations and individuals, which included the Office of Hawaiian Affairs, the Oahu Island Burial Council, Hui Malama, the Hawaiian Railway Society, and the Ewa Villages Homeowners Association, were invited in May 2004 to participate in consultation to help us identify historic properties in the APE, and to comment on potential impacts to the historic district. To date, we have not received any significant comments regarding historic properties or issues.

Based on the information herein provided and in accordance with NHPA Section 106, the FHWA has a rendered a "no historic properties affected" determination with regards to archaeology. With regards to the Ewa Villages Historic District, the FHWA has rendered a "no adverse effect" determination. Despite this "no adverse effect" determination, we will direct DDC, who will be responsible for constructing the Kapolei Parkway/Renton Road intersection, to consult with the SHPO on the architectural design of the traffic signals. This will be stated in our environmental assessment prepared pursuant to the National Environmental Policy Act.

The FHWA requests that the SHPO provide written concurrence with these effect determinations.

If you have any questions or require additional information on the project, please do not hesitate to call me at 541-2700 (ext. 305).

Sincerely yours,

Pat V. Phung, P.E.
Transportation Engineer

By Certified Mail

cc: Mr. Nelson Sagum, HDOT, HWY-PA
Ms. Faith Miyamoto, City & County of Honolulu DTS
Mr. Wayne Yoshioka, Parsons Brinckerhoff Quade & Douglas, Inc.

51560

LINDA LINGLE
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

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

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

DAN DAVIDSON
DEPUTY DIRECTOR - LAND

TYOMAS T. EZU
DEPUTY DIRECTOR - WATER

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CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

September 8, 2004

Mr. Pat V. Phung, P.E.
Transportation Engineer
Hawaii Division, Federal Highway Administration
Box 50206
Honolulu, Hawaii 96850

Log No: 2004.2721
Doc No: 0409hm01

Dear Mr. Phung:

SUBJECT: Section 106 of the National Historic Preservation Act - Proposed North- South Road and Kapolei Parkway Project, City and County of Honolulu
Honouliuli, Ewa, Oahu Island
TMK: (1) 9-1-017: 069

Thank you for your letter of August 20, 2004 in which you seek our concurrence on a determination of "no adverse effect" for the proposed North-South Road and Kapolei Parkway being planned by the City and County of Honolulu.

As correctly stated in your letter, we agreed in previous correspondence that no archaeological properties would be affected by the project. Most of the project area has been highly altered by intensive cultivation and no historic properties were identified in those portions of the project area surveyed. Remaining at issue was the possible effect the proposed parkway and road could have on the Ewa Sugar Plantation Villages Historic District (Site 50-80-12-9786) which is listed on the Hawaii Register of Historic Places. The proposed parkway crosses a stretch of Renton Road where it links the historic villages of Varona and Tenney. The boundary of the Historic District narrows along this stretch to include Renton Road.

Your letter also recounts the field inspection conducted by our staff and that of the State Department of Transportation and the City and County Department of Design and Construction on July 16, 2004. Discussed was the design of the proposed intersection at Renton Road and improvements such as curbs, gutters, sidewalks, median strips and traffic signals. This stretch of Renton Road has been significantly modified since the plantation era and it crosses a modern bridge immediately to the east of the proposed intersection. After the bridge it is curbed and lined with modern street light fixtures as it passes through Tenney Village.

Given these modern alterations we believe that the stretch of Renton Road crossed by the proposed parkway is not a contributing property to the Historic District and concur that the proposed design will have "no adverse effect" on the Historic District as a whole or its integrity. We say this with the understanding that it is still important to ensure that the proposed intersection disrupts the rural character of this setting as little as possible. As discussed at our recent meeting, we also ask that the intersection design and traffic signals allow residents of these villages to use Renton Road in a manner that conforms to its original purpose of linking the distinct plantation villages and that it remains a framed view corridor. We believe it will not be sufficient to set traffic signal timing on automatic settings based solely on traffic demand. We ask that signal timing have a favorable preference for Renton Road traffic during non-rush hours regardless of traffic demand on the Kapolei Parkway and North-South Road. We look forward to reviewing the more detailed design plans when they become available.

If you have any questions about the Historic District or the effects of the project on architectural properties, please call Thomas Lim at 692-8030. Archaeological questions may be directed to Sara Collins at 692-8026.

Sincerely,

Peter T. Young
State Historic Preservation Officer

sky: phm

c: Mr. Nelson Sagum
Ms. Faith Miyamoto, City and County of Honolulu DTS
Mr. Waye Yoshioka, Parsons Brinckerhoff, Quade & Douglas, Inc.

US Department of Transportation
Federal Highway Administration

Hawaii Division
Box 50206
300 Ala Moana Boulevard, Room 3 306
Honolulu, HI 96850

May 7, 2004

In Reply Refer To:
HEC-HI

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

Attention: Ms. Heidi Kai Guth

Dear Mr. Namu'o:

Subject: Section 106, National Historic Preservation Act Consultation for the North-South Road and Kapolei Parkway Project

The Federal Highway Administration (FHWA), the State of Hawaii Department of Transportation (HDOT), and the City and County of Honolulu (City) intend to construct the North-South Road and a portion of Kapolei Parkway from North-South Road to Renton Road (see enclosed map).

The purpose of the project is to improve the transportation network in the Ewa plain and provide additional roadway capacity to meet existing and future transportation demands. An Environmental Assessment is being prepared and will be released for public review this summer. Federal law requires that projects with federal participation consult with interested parties regarding potential impacts to historic properties, which include archaeological resources, historic buildings or structures, and traditional cultural properties. Therefore, we request your review and comment on the project, particularly from the standpoint of potential for impacts on historic properties.

We have already coordinated with the State Historic Preservation Division (SHPD). The SHPD has expressed that it has no archaeological concerns with this project, given past sugar cane cultivation uses in the project area, and the lack of any archaeological sites according to a 1996 survey conducted for the North-South Road portion of the project, as well as other studies conducted in the area.

However, the SHPD has architectural concerns because the traffic signals proposed at the intersection of Kapolei Parkway and Renton Road would be the first within the historic district at Ewa Plantation Villages (State Site 50-80-12-9786). The project's design team will coordinate with the SHPD to determine the best architectural treatment possible for these traffic signals.

If you have any comments or concerns about the project, we ask that you provide them by phone or letter correspondence *within 30 days of receipt of this letter*. If you require additional time to respond to this request, have additional questions, or require further information, please do not hesitate to call me at (808) 541-2700, extension 305.

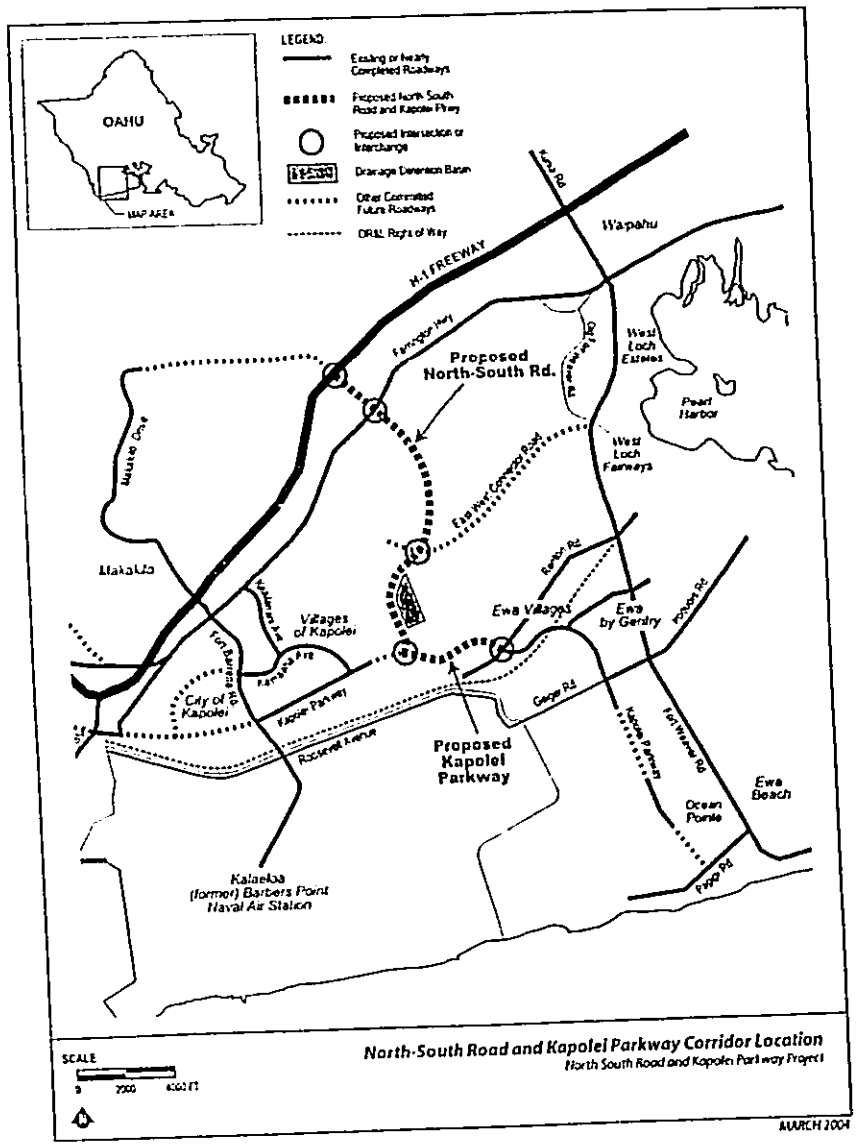
Sincerely yours,

Pat V. Phung, P.E
Transportation Engineer

Enc: Project map

By certified mail

cc. Mr. Nelson Sagum, HDOT, HWY-PA
Ms. Faith Miyamoto, City & County of Honolulu, DTS
Mr. Wayne Yoshioka, PB



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Parsons Brinckerhoff Quade & Douglas, Inc.
American Savings Bank Tower
1001 Bishop Street, Suite 3000
Honolulu, HI 96813
808 531-7094
Fax 808 528-2368

May 7, 2004

See Attached List

Subject: North-South Road and Kapolei Parkway Project

The Federal Highway Administration (FHWA), the State of Hawaii Department of Transportation (HDOT), and the City and County of Honolulu (City), intend to construct the North-South Road and a portion of Kapolei Parkway from North-South Road to Renton Road (see enclosed map). Parsons Brinckerhoff is the project consultant on this project.

The purpose of the project is to improve the transportation network in the Ewa plain and provide additional roadway capacity to meet existing and future transportation demands. An Environmental Assessment is being prepared and will be released for public review this summer.

Federal law requires that projects with federal participation consult with interested parties regarding potential impacts to historic properties, which include archaeological resources, historic buildings or structures, and traditional cultural properties. Therefore, we request your review and comment on the project, particularly from the standpoint of potential for impacts on historic properties.

We have already coordinated with the State Historic Preservation Division (SHPD). SHPD has expressed that they have no archaeological concerns with this project, given past sugar cane cultivation uses in the project area, and the lack of any archaeological sites according to a 1996 survey conducted for the North-South Road portion of the project, as well as other studies conducted in the area.

However, SHPD has architectural concerns because the traffic signals proposed at the intersection of Kapolei Parkway and Renton Road would be the first within the historic district at Ewa Plantation Villages (State Site 50-80-12-9786). The project's design team will coordinate with the SHPD to determine the best architectural treatment possible for these traffic signals.

If you have any comments or concerns about the project, we ask that you provide them by phone or letter correspondence within 30 days of receipt of this letter. If you require additional time to respond to this request, have additional questions, or require further information, please do not hesitate to call me or Ms. Nami Ohtomo at (808) 531-7094.

PARSONS BRINCKERHOFF QUADE & DOUGLAS, INC.
Very Truly Yours,

Wayne Y. Yoshioka
Project Manager

Enclosures: Project map

cc. Mr. Pat Phung, FHWA
Mr. Nelson Sagum, HDOT, HWY-PA
Ms Faith Miyamoto, C&County Honolulu, DTS

Over a Century of
Engineering Excellence

North-South Road and Kapolei Parkway
Section 106 Consultation List

Jalna Keala, President
Ahahui Siwila Hawai'i o Kapolei Hawaiian Civic Club
P.O. Box 700007
Kapoeli, HI 96709-0007

Frances Rivero
Boys & Girls Club
91-884 Fort Weaver Rd.
Ewa Beach, HI 96706

Calvary Chapel
91-928 Ft. Weaver Rd
Ewa Beach, HI 96706

Dolores White
Ewa Beach Community Association
PO Box 2003
Ewa Beach, HI 96706

Ewa Hongwanji
P.O. Box 60549
Ewa, HI 96706-7549

c/o Rodolfo Ramos
Ewa Task Force
91-1401 Kamahoi
Ewa Beach, HI 96706

William Gonsalves, President
Ewa Villages Homeowners Association
c/o Certified Management Inc.
3179 Koapaka St
Honolulu, HI 96819

Ewa by Gentry Community Association
91-1795 Keaunui Dr. Unit A
Ewa Beach, HI 96706

Pastor James Reid
Friendship Bible Church and School
91-1130 Renton Rd
Ewa Beach, HI 96706

George Kaeliwai, President
Hawaiian Civic Club of 'Ewa
2460-A Na'ai St
Honolulu, HI 96819

Robert Yatchmenoff, President
Hawaiian Railway Society
P.O. Box 60369
Ewa, HI 96706

David Scott
Historic Hawaii Foundation
P.O. Box 1658
Honolulu, HI 96821

Mr. Kunani Nihipali
Hui Malama I Na Kupuna O Hawai'i Nei
P.O. Box 190
Haleiwa, HI 96712-0190

Immaculate Concepcion Church
91-1298 Renton Rd.
Ewa Beach, HI 96706

Sam Schwab, Principal
Lanakila Baptist Church and Schools
91-1219 Renton Rd
Ewa Beach, HI 96706

A. Van Horn Diamond
Oahu Island Burial Council
1523-F Halekula Way
Honolulu, HI 96822

Our Lady of Perpetual Help Church
91-1004 North Rd.
Ewa Beach, HI 96706

Roger Evans, President
West Loch Estates Homeowners Assoc.
c/o First Hawaiian Bank
800 Bethel Street, Suite 501
Honolulu, HI 96813

West Loch Fairways Community Association
Aawa Dr
Ewa Beach, HI 96706

West Loch Villages Elderly
91-1472 Renton Rd.
Ewa Beach, HI 96706

Sent by Federal Highway Administration:
Office of Hawaiian Affairs
711 Kapi'olani Blvd., Suite 500
Honolulu, HI 96813

PHONE (808) 594-1888 FAX (808) 594-1865

STATE OF HAWAI'I
OFFICE OF HAWAIIAN AFFAIRS
711 KAPI'OLANI BOULEVARD, SUITE 500
HONOLULU, HAWAI'I 96813

HRD04/1350B

June 1, 2004

Pat V. Phung, P.E.
Transportation Engineer
U S Department of Transportation
Federal Highway Administration
Hawai'i Division
Box 50206
300 Ala Moana Boulevard, Room 3-306
Honolulu, HI 96850

RECEIVED
JUN - 3 2004
HIGHWAY DIVISION

RE: Request for Section 106, National Historic Preservation Act Consultation for the North-South Road and Kapolei Parkway Project, O'ahu – HEC-HI

Dear Pat V. Phung,

The Office of Hawaiian Affairs is in receipt of your May 7, 2004, request for comments on the above project. We offer the following comments.

As noted in your letter, in reference to statements by the State Historic Preservation Division, many of the lands affected by these proposed roads have been heavily disturbed by prior users, primarily the sugar industry. While this ground disturbance may make future historic and cultural finds unlikely, the historic and cultural landscape of the area bears consideration.

Stories are associated with this entire region, which has a unique history. The area itself lives on in the ancient place names, which often describe the history of the land and the people of that land, such as Kaupea, Kaupe'e, Pee Kaua, Kanehili, Pukaua, Ku'ialaka'i, Puainako, Keoneae, Po'ohilo, Kaupuaikaula, etc. These names and cultural sites give Native Hawaiians a sense of place and of the ancient communities of indigenous peoples who lived along the coastline and on the mid-elevation alluvial plains. Further information about this can be obtained from Shad Kane, Chairman, Historic Preservation Committee, O'ahu Council of Hawaiian Civic Clubs.

Also, while Pu'uokapolei is not within the immediately affected land of this project, it is relevant to require that respect and acknowledgement of this heiau, which is also a burial site, be given

throughout this region. Pu'uokapolei continues to serve as the piko of this region, as it did during ancient times. It is the largest and most sacred heiau in the entire ahupua'a of Honouliuli. As such, viewplanes toward and from this heiau should not be impacted. Hence, OHA requests that plans for the construction of the roads take this into consideration.

Equally, OHA will rely on your assurances that should iwi or Native Hawaiian cultural or traditional deposits be found during ground excavation or disturbance, work must cease and the appropriate agencies be contacted pursuant to applicable law.

Thank you for the opportunity to comment. If you have further questions, please contact Heidi Guth by phone at 594-1962 or by e-mail at heidig@oha.org.

Sincerely,

Clyde W. Namu'o
Administrator

Parsons Brinckerhoff Quade & Douglas, Inc.
American Savings Bank Tower
1001 Bishop Street, Suite 300
Honolulu, HI 96813
808-531-7094
Fax: 808-526-2368

July 21, 2004

(See attached list)

Dear _____:

Subject: North-South Road and Kapolei Parkway Project

The Federal Highway Administration (FHWA), the State of Hawaii Department of Transportation (HDOT), and the City and County of Honolulu (City), intend to construct the North-South Road and a portion of Kapolei Parkway from North-South Road to Renton Road (see enclosed map). Parsons Brinckerhoff is the project consultant on this project.

The purpose of the project is to improve the transportation network in the Ewa plain and provide additional roadway capacity to meet existing and future transportation demands. A Revised Draft Environmental Assessment (DEA) prepared pursuant to Chapter 343 of the Hawaii Revised Statutes (Hawaii's environmental impact statement law) is being released for public review. Public comments on the DEA are being accepted until August 23, 2004. An Environmental Assessment complying with federal requirements is also in preparation.

Federal law requires that implementers of projects with federal participation consult with interested parties regarding potential impacts to historic properties, which include archaeological resources, historic buildings or structures, and traditional cultural properties. At the Oahu Island Burial Council hearing on July 14, 2004, your name was suggested as a potential contact on such matters. Therefore, we are now writing to request your review and comment on the project, particularly from the standpoint of potential impacts to historic properties.

We have already coordinated with the State Historic Preservation Division (SHPD). SHPD has expressed that they have no archaeological concerns with this project, given past sugar cane cultivation uses in the project area, and the lack of any archaeological sites according to a 1996 survey conducted for the North-South Road portion of the project, as well as other studies conducted in the area.

However, SHPD has architectural concerns because the traffic signals proposed at the intersection of Kapolei Parkway and Renton Road would be the first within the historic district at Ewa Plantation Villages (State Site 50-80-12-9786). The project's design team will coordinate with the SHPD to determine the best architectural treatment possible for these traffic signals.

Please note that you have been added to the project mailing list, and will receive a copy of the Revised DEA. The DEA contains copies of archaeological and cultural reports completed for the proposed project, as well as copies of agency coordination letters to date.

If you have any comments or concerns about the project, we ask that you provide them by phone or letter correspondence within 30 days of receipt of this letter. If you require additional time to respond to this request, have additional questions, or require further information, please do not hesitate to call me or Ms. Nami Ohtomo at (808) 531-7094.

PARSONS BRINCKERHOFF QUADE & DOUGLAS, INC.
Very Truly Yours,

Wayne G. Yoshioka
Project Manager

Enclosures: Project map

cc. Mr. Pat Phung, FHWA
Mr. Nelson Sagum, HDOT, HWY-PA
Ms. Faith Miyamoto, City & County of Honolulu, DTS

Over a Century of
Engineering Excellence

North-South Road and Kapolei Parkway
Section 106 Consultation List #2

Glenn Oamilda
91-1179 Puamaeole Street, Apt V
Ewa Beach HI 96706-1895

Henry Chang Wo
91-1091 Hanaloa Street
Ewa Beach HI 96706

Arlene Eaton
94-766 Kaaholo Street
Waipahu HI 96797

Glenn Kila
Alika Silva
85-140 Matuu Road
Waianae HI 96792

Ted Norman
91-953 Laaulu Street, Apt A
Ewa Beach HI 96706

1000 fcuc-3549

Federal Emergency Management Agency

Washington, D.C. 20472

OCT 12 2000

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

The Honorable Jeremy Harris
Mayor, City and County of Honolulu
530 South King Street
Honolulu, HI 96813

IN REPLY REFER TO:
Case No.: 00-09-244P

Community: City and County of Honolulu, HI
Community No.: 150001
Panel Affected: 15003C0310 E
Effective Date of This Revision: FEB 01 2001

102-I-A-C

Dear Mayor Harris:

This responds to a request that the Federal Emergency Management Agency (FEMA) revise the effective Flood Insurance Rate Map (FIRM) and Flood Insurance Study (FIS) report for your community in accordance with Part 65 of the National Flood Insurance Program (NFIP) regulations. In a letter dated December 15, 1999, Mr. Greg H. Hiyakumoto, Project Manager, R. M. Towill Corporation, requested that FEMA revise the FIRM and FIS report to show the effects of construction along Kaloi Gulch of a new bridge at North-South Road, concrete- and cement rubble masonry-lined channels from Renton Road to North-South Road and from approximately 50 feet upstream to approximately 150 feet downstream of the O.R.& L. Railroad, and an unlined coral basin from North-South Road to approximately 50 feet upstream of the O.R.&L. Railroad.

All data required to complete our review of this request were submitted with letters from Mr. Randall K. Fujiki, A.I.A., Director of Planning and Permitting, City and County of Honolulu, and Mr. Hiyakumoto.

We have completed our review of the submitted data and the flood data shown on the effective FIRM and FIS report. We have revised the FIRM and FIS report to modify the elevations, floodplain boundary delineations, and zone designations of the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood) along Kaloi Gulch from Renton Road to approximately 400 feet downstream of the O.R. & L. Railroad. As a result of the modifications, the Base Flood Elevations (BFEs) for Kaloi Gulch increased in some areas and decreased in other areas, and the width of the Special Flood Hazard Area (SFHA), the area that would be inundated by the base flood, decreased. In addition, a regulatory floodway has been established along Kaloi Gulch from Renton Road to approximately 300 feet downstream of Mango Tree Road.

We are processing a FIRM and FIS report for the City and County of Honolulu in our digital format. The digital FIRM and FIS report, which include flood hazard information for your community, will become effective on November 20, 2000. Because the effective date has already been established, we will not incorporate the modifications made by this Letter of Map Revision (LOMR) into the digital FIRM and FIS report before they become effective. The modifications made by this LOMR are effective as of the date shown above.

This LOMR hereby revises newly effective FIRM Panel 15003C0310 E dated November 20, 2000. The revised flood hazard information is shown on the enclosed copy of FIRM Panel 15003C0310 E. Flood hazard information for this area was previously shown on FIRM Panel 0110 D dated September 30, 1995, and FIRM Panels 0130 C and 0135 C, both dated September 28, 1990. The title blocks from the previously effective FIRM panels are included on the enclosed FIRM panel.

This LOMR also revises affected portions of the newly effective FIS report dated November 20, 2000. Modifications were made to Profile Panel 113P and affected portions of the Floodway Data Table. The map panel listed above and as modified by this letter will be used for all flood insurance policies and renewals issued for your community.

The following table is a partial listing of existing and modified BFEs:

Location	Existing BFE (feet)*	Modified BFE (feet)*
Approximately 400 feet downstream of the O.R.& L. Railroad	None	29
Approximately 50 feet upstream of Renton Road	42	36
Approximately 2,100 feet upstream of Renton Road	44	43

*Referenced to the National Geodetic Vertical Datum, rounded to the nearest whole foot

Public notification of the modified BFEs will be given in the *Hawaii Tribune Herald* on or about October 27 and November 3, 2000. A copy of this notification is enclosed. In addition, a notice of changes will be published in the *Federal Register*. Within 90 days of the second publication in the *Hawaii Tribune Herald*, any interested party may request that FEMA reconsider the determination made by this LOMR. Any request for reconsideration must be based on scientific or technical data. All interested parties are on notice that, until the 90-day period elapses, the determination to modify the BFEs made by in this LOMR may itself be modified.

Because this LOMR will not be printed and distributed to primary users, such as local insurance agents and mortgage lenders, your community will serve as a repository for these new data. We encourage you to disseminate the information reflected by this LOMR throughout the community, so that interested persons, such as property owners, local insurance agents, and mortgage lenders, may benefit from the information. We also encourage you to prepare a related article for publication in your community's local newspaper. This article should describe the assistance that officials of your community will give to interested persons by providing these data and interpreting the NFIP maps.

The floodway is provided to your community as a tool to regulate floodplain development. Therefore, the floodway modifications described in this LOMR, while acceptable to FEMA, must also be acceptable to your community and adopted by appropriate community action, as specified in Paragraph 60.3(d) of the NFIP regulations.

This LOMR is based on minimum floodplain management criteria established under the NFIP. Your community is responsible for approving all floodplain development and for ensuring all necessary permits required by Federal or State law have been received. State, county, and community officials,

based on knowledge of local conditions and in the interest of safety, may set higher standards for construction in the SFHA. If the State, county, or community has adopted more restrictive or comprehensive floodplain management criteria, these criteria take precedence over the minimum NFIP criteria.

The basis of this LOMR is, in whole or in part, a channel-modification/bridge project. NFIP regulations, as cited in Paragraph 60.3(b)(7), require that communities ensure that the flood-carrying capacity within the altered or relocated portion of any watercourse is maintained. This provision is incorporated into your community's existing floodplain management regulations. Consequently, the ultimate responsibility for maintenance of the modified channel and bridge rests with your community.

This determination has been made pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (Public Law 93-234) and is in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, Public Law 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65. Pursuant to Section 1361 of the National Flood Insurance Act of 1968, as amended, communities participating in the NFIP are required to adopt and enforce floodplain management regulations that meet or exceed minimum NFIP criteria. These criteria are the minimum and do not supersede any State or local requirements of a more stringent nature. This includes adoption of the effective FIRM to which the regulations apply and the modifications described in this LOMR. Our records show that your community has met this requirement.

A Consultation Coordination Officer (CCO) has been designated to assist your community. The CCO will be the primary liaison between your community and FEMA. For information regarding your CCO, please contact:

Mr. Jack Eldridge
Chief, Community Mitigation Programs Branch
Federal Emergency Management Agency, Region IX
The Presidio of San Francisco, Building 105
San Francisco, CA 94129-1250
(415) 923-7184

FEMA makes flood insurance available in participating communities; in addition, we encourage communities to develop their own loss reduction and prevention programs. Through the *Project Impact: Building Disaster Resistant Communities* initiative, launched by FEMA Director James Lee Witt in 1997, we seek to focus the energy of businesses, citizens, and communities in the United States on the importance of reducing their susceptibility to the impact of all natural disasters, including floods, hurricanes, severe storms, earthquakes, and wildfires. Natural hazard mitigation is most effective when it is planned for and implemented at the local level, by the entities who are most knowledgeable of local conditions and whose economic stability and safety are at stake. For your information, we are enclosing a copy of a pamphlet describing this nationwide initiative. For additional information on *Project Impact*, please visit our website at www.fema.gov/impact.

If you have any questions regarding floodplain management regulations for your community or the NFIP in general, please call the CCO for your community at the telephone number cited above. If you have any questions regarding this LOMR, please call our Map Assistance Center, toll free, at 1-877-FEMA MAP (1-877-336-2627).

Sincerely,

Max H. Yuan, P.E., Project Engineer
Hazards Study Branch
Mitigation Directorate

For: Matthew B. Miller, P.E., Chief
Hazards Study Branch
Mitigation Directorate

Enclosures

cc: Mr. Randall K. Fujiki, A.I.A.
Director of Planning and Permitting
City and County of Honolulu

Mr. Greg H. Hiyakumoto
Project Manager
R. M. Towill Corporation

CHANGES ARE MADE IN DETERMINATIONS OF BASE FLOOD ELEVATIONS FOR THE CITY AND COUNTY OF HONOLULU, HAWAII, UNDER THE NATIONAL FLOOD INSURANCE PROGRAM

On September 30, 1995, the Federal Emergency Management Agency identified Special Flood Hazard Areas (SFHAs) in the City and County of Honolulu, Hawaii, through issuance of a Flood Insurance Rate Map (FIRM). The Mitigation Directorate has determined that modification of the elevations of the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood) for certain locations in this community is appropriate. The modified Base Flood Elevations (BFEs) revise the FIRM for the community.

The changes are being made pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (Public Law 93-234) and are in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, Public Law 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65.

A hydraulic analysis was performed to incorporate construction along Kaloi Gulch of a new bridge at North-South Road, concrete- and cement rubble masonry-lined channels from Renton Road to North-South Road and from approximately 50 feet upstream to approximately 150 feet downstream of the O.R.& L. Railroad, and an unlined coral basin from North-South Road to approximately 50 feet upstream of the O.R.&L. Railroad. This has resulted in the establishment of a regulatory floodway, a decrease in SFHA width, and increased and decreased BFEs for Kaloi Gulch. The table below indicates existing and modified BFEs for selected locations along the affected lengths of the flooding source(s) cited above.

Location	Existing BFE (feet)*	Modified BFE (feet)*
Approximately 400 feet downstream of O.R.&L. Railroad	None	29
Approximately 50 feet upstream of Renton Road	42	36
Approximately 2,100 feet upstream of Renton Road	44	43

*National Geodetic Vertical Datum, rounded to nearest whole foot

Under the above-mentioned Acts of 1968 and 1973, the Mitigation Directorate must develop criteria for floodplain management. To participate in the National Flood Insurance Program (NFIP), the community must use the modified BFEs to administer the floodplain management measures of the NFIP. These modified BFEs will also be used to calculate the appropriate flood insurance premium rates for new buildings and their contents and for the second layer of insurance on existing buildings and contents.

Upon the second publication of notice of these changes in this newspaper, any person has 90 days in which he or she can request, through the Chief Executive Officer of the community, that the Mitigation Directorate reconsider the determination. Any request for reconsideration must be based on knowledge of changed conditions or new scientific or technical data. All interested parties are on notice that until the 90-day period elapses, the Mitigation Directorate's determination to modify the BFEs may itself be changed.

Any person having knowledge or wishing to comment on these changes should immediately notify:

The Honorable Jeremy Harris
Mayor, City and County of Honolulu
530 South King Street
Honolulu, HI 96813

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
A	3.98	198	961	2.5	36.2	36.2	36.2	0.0
B	4.06	249	1,969	1.2	38.4	38.4	38.7	0.3
C	5.97	107	265	9.1	41.3	41.3	41.3	0.0
D	6.12	55	413	5.8	46.0	46.0	46.6	0.6
E	6.43	88	243	10.0	47.5	47.5	47.5	0.0
F	6.54	390	2,779	0.9	50.2	50.2	51.0	0.8
G	7.80	120	565	4.2	51.3	51.3	52.2	0.9

[1]THOUSANDS OF FEET ABOVE GEIGER ROAD

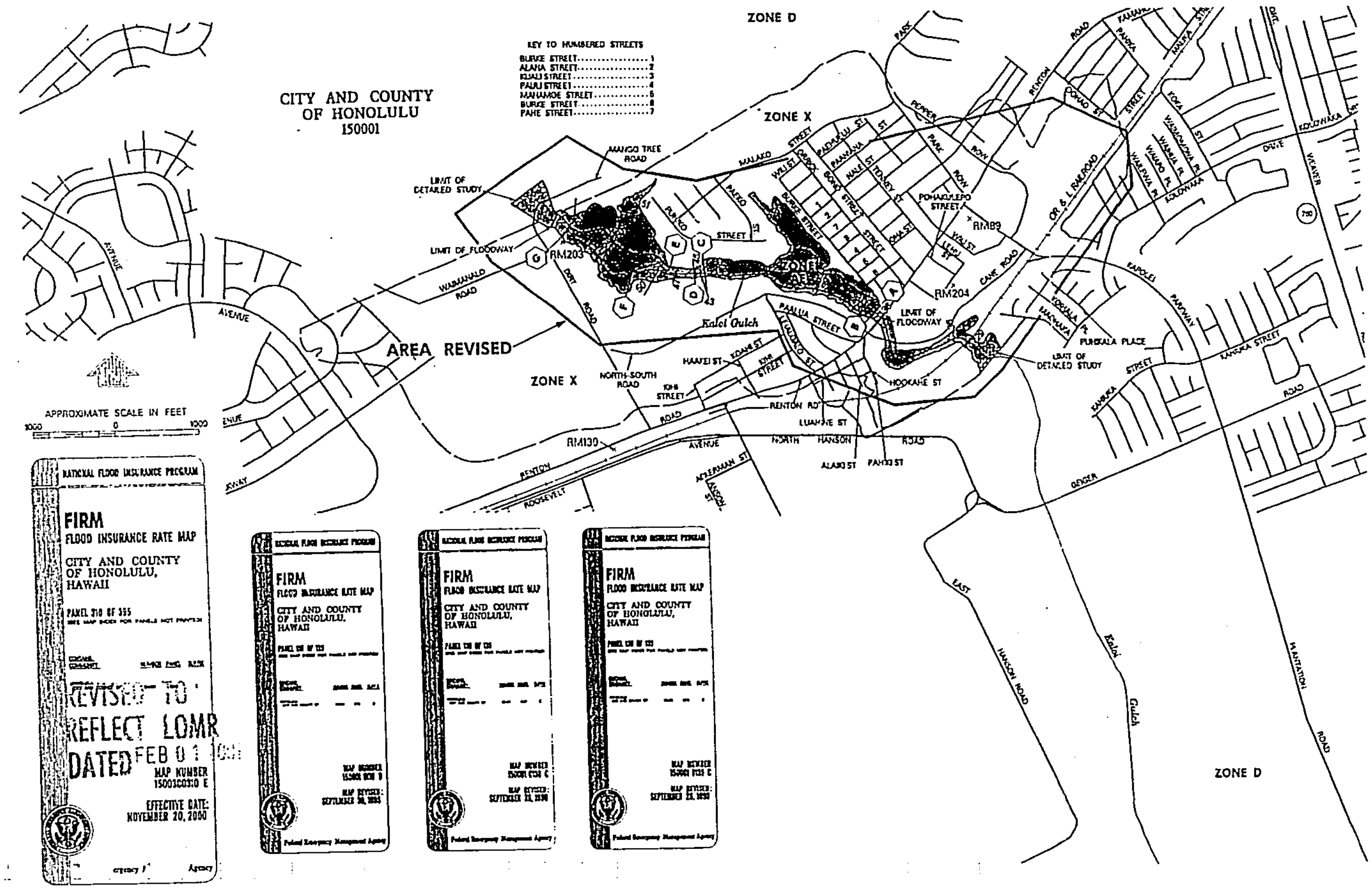
TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

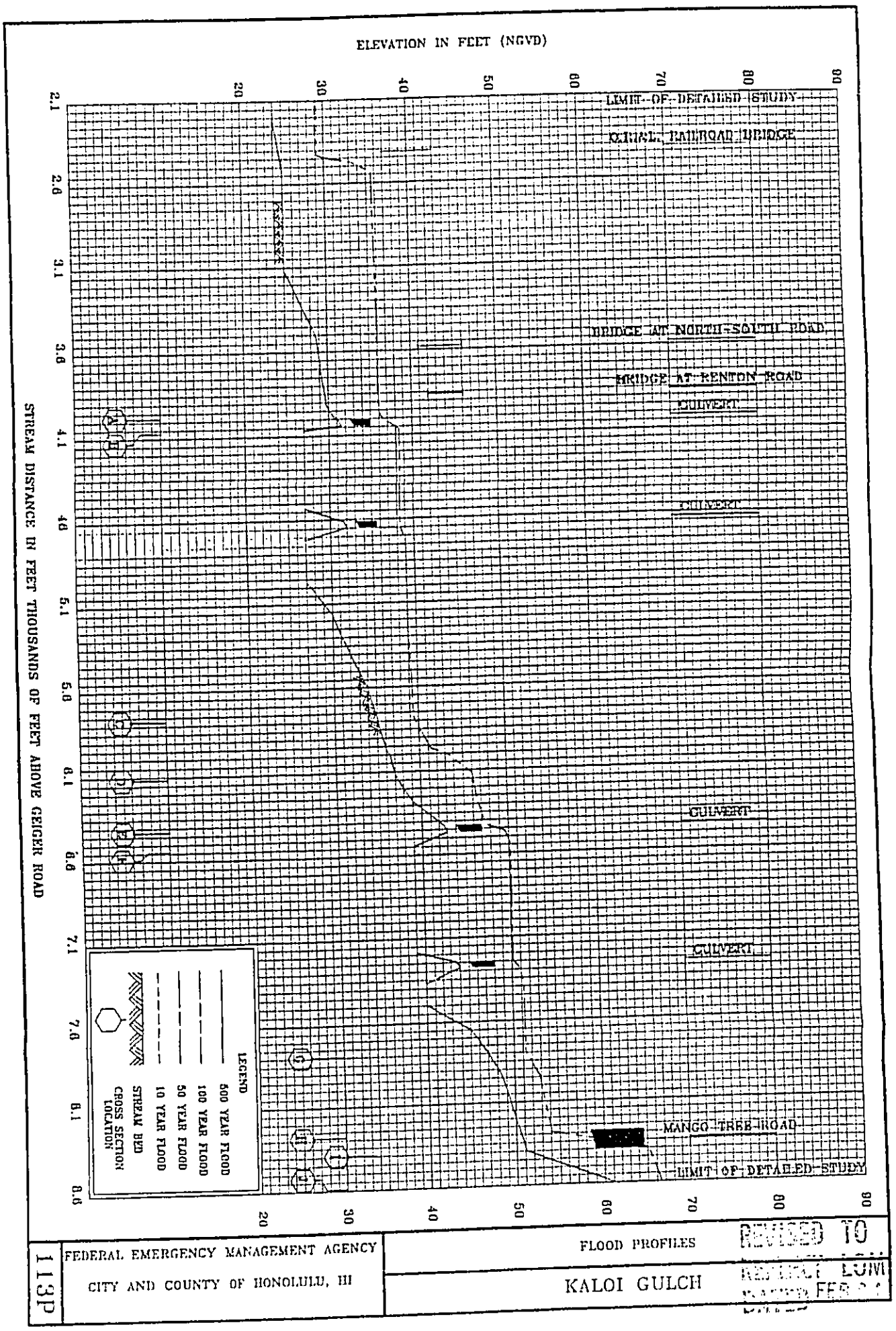
CITY AND COUNTY OF HONOLULU, HI

FLOODWAY DATA

KALOI GULCH



CITY AND COUNTY
OF HONOLULU
150001
ZONE D
ZONE X
KEY TO NUMBERED STREETS
BURKE STREET 1
ALANA STREET 2
KUALI STREET 3
PAUU STREET 4
MAHAMOE STREET 5
BURKE STREET 6
PAHE STREET 7
AREA REVISED
LIMIT OF DETAILED STUDY
LIMIT OF FLOODWAY
Kaloi Gulch
RM203
RM204
RM89
RM130
MANGO TREE ROAD
NORTH-SOUTH ROAD
WAIMANALO ROAD
DIRT ROAD
RENTON ROAD
NORTH HANSON ROAD
EAST HANSON ROAD
GEIGER ROAD
KAPOLEI PARKWAY
PLANTATION ROAD
OR & L RAILROAD
APPROXIMATE SCALE IN FEET
1000 0 1000
NATIONAL FLOOD INSURANCE PROGRAM
FIRM
FLOOD INSURANCE RATE MAP
CITY AND COUNTY
OF HONOLULU,
HAWAII
PANEL 310 OF 355
REVISED TO
REFLECT LOMR
DATED FEB 0 1
MAP NUMBER
15003C0310 E
EFFECTIVE DATE:
NOVEMBER 20, 2000
Agency
Federal Emergency Management Agency



113P	FEDERAL EMERGENCY MANAGEMENT AGENCY CITY AND COUNTY OF HONOLULU, HI	FLOOD PROFILES KALOI GULCH

REVISED TO REFLECT LOMR EFFECTIVE FEB

Federal Emergency Management Agency
Washington, D.C. 20472

MAR 03 2003

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:
Case No.: 00-09-244P

The Honorable Jeremy Harris
Mayor, City and County of Honolulu
530 South King Street
Honolulu, HI 96813

Community: City and County of Honolulu, HI
Community No.: 150001
Map Panel Affected: 15003C0310 E

116

Dear Mayor Harris:

In a letter we sent you on October 15, 2002, you were notified of proposed modified flood elevation determinations affecting the Flood Insurance Rate Map (FIRM) and Flood Insurance Study (FIS) report for the City and County of Honolulu, Hawaii, as modified in a Letter of Map Revision (LOMR) dated October 12, 2000. These determinations were for Kaloi Gulch from Renton Road to approximately 400 feet downstream of the O.R.&L. Railroad. The 90-day appeal period that was initiated on November 14, 2002, when the Federal Emergency Management Agency (FEMA) published a notice of proposed Base Flood Elevations (BFEs) in the *Honolulu Star-Bulletin*, has elapsed.

FEMA received no valid requests for changes to the modified BFEs. Therefore, the modified BFEs that became effective on February 1, 2001, remain valid and revise the FIRM and FIS report that was in effect prior to that date.

The modifications are pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (Public Law 93-234) and are in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, Public Law 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65. The community number(s) and suffix code(s) are unaffected by this revision. The community number and appropriate suffix code as shown above will be used by the National Flood Insurance Program (NFIP) for all flood insurance policies and renewals issued for your community.

FEMA has developed criteria for floodplain management as required under the above-mentioned Acts of 1968 and 1973. To continue participation in the NFIP, your community must use the modified BFEs to carry out the floodplain management regulations for the NFIP. The modified BFEs will also be used to calculate the appropriate flood insurance premium rates for all new buildings and their contents and for the second layer of insurance on existing buildings and their contents.

If you have any questions regarding the necessary floodplain management measures for your community or the NFIP in general, please contact the Director, Federal Insurance and Mitigation Division of FEMA in Oakland, California at (510) 627-7184. If you have any questions regarding the LOMR, the proposed modified BFEs, or mapping issues in general, please contact the FEMA Map Assistance Center, toll free, at 1-877-FEMA MAP (1-877-336-2627).

Sincerely,

Michael M. Grimm, Acting Chief
Hazards Study Branch
Federal Insurance and Mitigation Administration

cc: Mr. Randall K. Fujiki, A.I.A.
Director of Planning and Permitting
City and County of Honolulu

Mr. Greg H. Hiyakumoto
Project Manager
R.M. Towill Corporation

COMMENTS ON
1998 DRAFT ENVIRONMENTAL ASSESSMENT

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

REPLY TO ATTENTION OF
Civil Works Branch

February 23, 1999

RECEIVED
99 FEB 24 P5:16
DEPT OF TRANSPORTATION
HIGHWAYS DIVISION

DIRECTOR'S OFFICE
DEPT. OF
TRANSPORTATION
Feb 24 1 24 PM '99

RECEIVED
STATE DEPARTMENT
OF TRANSPORTATION
Feb 25 11 07 AM '99
HIGHWAYS DIVISION
PLANNING BRANCH

Mr. Kazu Hayashida, Director
State of Hawaii
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Hayashida:

Thank you for the opportunity to review and comment on the Draft Environmental Assessment (DEA) for the North-South Road Project, Ewa, Oahu, Hawaii. The following comments are provided in accordance with U.S. Army Corps of Engineers authorities to provide flood hazard information and to issue Department of the Army (DA) permits.

a. Based on the information provided, a DA permit will be required for work done in Kaloi Gulch at the road crossings. For further information, please contact Mr. Alan Everson of our Regulatory Section staff at 438-9258 (extension 11) and refer to file number 990000173.

b. The flood hazard information provided on pages 3-48 to 3-51 of the DEA is correct.

Sincerely,

Paul Mizue, P.E.
Chief, Civil Works Branch

RECEIVED
99 MAR 15 P4:05
DEPT OF TRANSPORTATION
HIGHWAYS DIVISION

DIRECTOR'S OFFICE
DEPT. OF
TRANSPORTATION
Mar 15 10 49 AM '99

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Pacific Islands Ecoregion
300 Ala Moana Boulevard, Room 3-122
Box 50088
Honolulu, Hawaii 96850

In Reply Refer To: L1G

MAR 12 1999

RECEIVED
STATE DEPARTMENT
OF TRANSPORTATION
Mar 16 3 14 PM '99
HIGHWAYS DIVISION
PLANNING BRANCH

Mr. Kazu Hayashida, Director
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813

Re: Draft Environmental Assessment for North-South Road, Ewa, Oahu, Hawaii

Dear Mr. Hayashida:

The U.S. Fish and Wildlife Service (Service) has reviewed the Draft Environmental Assessment (DEA) for North-South Road, Ewa, Oahu, Hawaii. The project sponsor is the State of Hawaii Department of Transportation (DOT) and the Federal Highway Administration (FHWA). This letter has been prepared under the authority of and in accordance with provisions of the National Environmental Policy Act of 1969 [42 U.S.C. 4321 *et seq.*; 83 Stat. 852], as amended, the Endangered Species Act of 1973 [16 U.S.C. 1531 *et seq.*; 87 Stat. 884], as amended (ESA), and other authorities mandating Service concern for environmental values. Based on these authorities, the Service offers the following comments.

The proposed project involves constructing a 3.6 kilometer (2.2 mile) principal arterial roadway from a future segment of Kapolei Parkway to the H-1 Freeway and an interchange with the freeway. The road will include three vehicular lanes in each direction, a median, and sidewalks on each side of the road. The purpose of the project is to respond to regional land use and economic development trends, meet roadway capacity needs, and meet future transportation demands.

The DEA provides an adequate description of the project, existing resources, and the various alternatives considered and identifies anticipated impacts to fish and wildlife resources. However, the DEA does not provide a complete description of the measures that will be implemented to minimize and mitigate impacts to *Abutilon menziesii*, a federally endangered plant species found within the project area. The DEA indicates that a Biological Assessment (BA) and Habitat

Conservation Plan (HCP), are currently in preparation and will contain additional details regarding mitigation measures for *Abutilon menziesii*. The Service is currently providing technical assistance to the State of Hawaii regarding the State HCP being developed for the proposed North-South Road project and the East Kapolei Master Plan Development Project (East Kapolei MPDP). We cannot concur with a Finding of No Significant Impact for the proposed North-South Road project until the following concerns are addressed in the Final EA:

1. The East Kapolei MPDP will directly impact *Abutilon menziesii* clusters A, B, C, and D and the North-South Road project will impact a portion of cluster C. Areas around existing plant clusters A, B, or portions of C, or a combination thereof, should be set aside and managed as preserves for the wild population of *Abutilon menziesii* until a self-sustaining off-site population is established on Oahu.

2. Establish and preserve a self-sustaining, wild population of *Abutilon menziesii* on Oahu in an area that is sufficiently distant from the North-South Road and East Kapolei development area to avoid negative impacts from the project and promote survival. The historic range of this species on Oahu is not well known, and identification of an appropriate site will require the assistance of botanical experts. Areas such as Barbers Point, Kaena Point, and Lualualei Naval Magazine may be appropriate for *Abutilon menziesii*. We will be happy to assist in identifying an appropriate area and developing a long term management plan for this plant.

3. Establish a propagation program that will assist in maintaining the genetic diversity and viability of the current wild population of *Abutilon menziesii* until a self-sustaining, off-site population is securely established in a protected area on Oahu. These activities should begin prior to initiation of the development project to assure that there is no loss of individual plants. We emphasize that the cultivation of *Abutilon menziesii* is not a substitute for a natural wild population, and is not adequate mitigation for the only known population of this species on Oahu.

4. The Final EA should contain a contingency plan or adaptive management strategy that specifies the actions to be taken periodically if the goals specified above have not been achieved.

5. Also, the Service considers the removal and translocation of the only known wild population of *Abutilon menziesii* on Oahu into a cultivated status as a permanent impact; therefore, mitigation measures (e.g. protection and management) should be provided into perpetuity. To date, these concerns have not been addressed in the Draft HCP. The Service recommends that the Final EA include the approved HCP.

Within Chapter 6, Anticipated Determination, the DEA incorrectly indicates that through the section

DEA, North-South Road
Ewa, Oahu, Hawaii

7 consultation process with the Service, proposed mitigation measures will reduce the net impact of the proposed project on *Abutilon menziesii* to a level below adverse. The Service considers the removal of 14 plants of *Abutilon menziesii* from the project area to be an adverse effect regardless of the provision of mitigation or minimization measures. The Service recommends that this section be removed from the Final EA or that it be clarified to reflect the above information.

Under section 7 of the ESA, Federal agencies are required to consult with the Service when any action may affect threatened or endangered species. Through informal consultation, it was determined that the North-South Road project is considered likely to adversely affect *Abutilon menziesii*. Therefore, formal consultation is required. According to your November 18, 1998, letter the BA for the formal consultation will be composed of a cover letter, approved State of Hawaii Habitat Conservation Plan (HCP), and the DEA. Formal consultation with the FHA will commence upon receipt of a complete BA.

The Service appreciates the opportunity to provide comments on the proposed project. We look forward to continuing to work with you during the development of this project. If you have any questions concerning these comments, please contact Fish and Wildlife Biologist, Leila Gibson by phone at 808/541-3441 or by facsimile transmission at 808/541-3470.

Sincerely,

Barbara A Maxfield, Acting

Robert P. Smith
Pacific Islands Manager

cc: FHA, Honolulu
DOFAW, Hawaii

DIRECTOR'S OFFICE
DEPT. OF
TRANSPORTATION
Feb 22 8 55 AM '99

BENJAMIN J. CAYETANO
GOVERNOR

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HIGHWAYS DIVISION

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

Paul G. LeMahieu, Ph.D.
Superintendent

OFFICE OF THE SUPERINTENDENT

February 17, 1999

Feb 23 6 23 AM '99
HIGHWAYS DIVISION
PLANNING BRANCH

ILLEGIBLE
STATE DEPARTMENT
OF TRANSPORTATION

MEMO TO: Mr. Kazu Hayashida, Director
Department of Transportation

F R O M: Paul G. LeMahieu, Ph.D., Superintendent
Department of Education

SUBJECT: North-South Road Draft Environmental Assessment

The Department of Education offers the following comments on the subject draft environmental assessment:

1. Page 3-31. There are ten elementary schools in the Campbell High School complex. Iroquois Point Elementary School should be added to the list.

2. The planned Housing and Community Development Corporation of Hawaii development in East Kapolei will contain three elementary schools and one middle school. Ewa Marina and Ewa Gentry (Makai) will also contain sites for future elementary schools. It may be necessary to add additional sites to comply with a new Board of Education policy for smaller schools unless a waiver is approved.

3. A 50-acre high school site in East Kapolei will be needed due to the region's expected increase in population. A site for the high school has not yet been determined.

Thank you for the opportunity to respond. We request that any subsequent environmental documents related to this project also be submitted to us for review.

If you have any questions, please call Mr. Sanford Beppu at 733-4862.

PLeM:SB:hy

cc: OBS
F. Fernandez, LDO

BENJAMIN J. CAYETANO
GOVERNOR
STATE OF HAWAII

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HIGHWAYS DIVISION

RAYNARD C. SOON
INTERIM CHAIRMAN
HAWAIIAN HOMES COMMISSION

JOBIE M. K. M. TAMASESE
DEPUTY TO THE CHAIRMAN

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

March 4, 1999

To: The Honorable Kazu Hayashida
Director of Transportation

From: Raynard C. Soon, Interim Chairman
Hawaiian Homes Commission

Subject: North-South Road, Draft Environmental Assessment, Project No. Hwy 0-01-0-92, Ewa, Oahu, Dated September, 1998

Thank you for the opportunity to review the subject application.

The proposed roadway and related interchange with H-1 freeway is scheduled for completion in the years 2001 and 2003, respectively.

The Department of Hawaiian Home Lands encourages the expeditious development of the North-South Road to facilitate development of residential homesteads in the Kapolei area.

If you have any questions, please call Daniel Ornellas at 586-3836.

HIGHWAYS DIVISION
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DIRECTOR'S OFFICE
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BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

DIRECTOR'S OFFICE
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DEPT. OF TRANSPORTATION
HIGHWAYS DIVISION

BRUCE S. ANDERSON, Ph.D., M.P.H.
DIRECTOR OF HEALTH

In reply, please refer to:
File:

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

April 8, 1999 99-027/epo

The Honorable Kazu Hayashida, Director
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813

HIGHWAYS DIVISION
PLANNING BRANCH
Apr 19 3 58 PM '99
STATE DEPARTMENT
OF TRANSPORTATION

Dear Mr. Hayashida:

Subject: Draft Environmental Assessment
North-South Road (Project No. Highway 0-01-0-92)
Ewa, Oahu

Thank you for allowing us to review and comment on the subject project. We have the following comments to offer:

Control of Fugitive Dust

Construction activities must comply with provisions of Hawaii Administrative Rules, Chapter 11-60.1, "Air Pollution Control," Section 11-60.1-33, Fugitive Dust.

The contractor should provide adequate measures to control dust from the road areas and during the various phases of construction. These measures include, but are not limited to:

a. Planning the different phases of construction, focusing on minimizing the amount of dust generating materials and activities, centralizing on-site vehicular traffic routes, and locating potentially dusty equipment in areas of the least impact;

b. Providing an adequate water source at the site prior to start up of construction activities;

c. Landscaping and rapid covering of bare areas, including slopes, starting from the initial grading phase;

d. Controlling of dust from shoulders and access roads;

e. Providing adequate dust control measures during weekends, after hours, and prior to daily start-up of construction activities; and

f. Controlling of dust from debris being hauled away from project site.

If you have any questions regarding these issues on fugitive dust, please contact the Clean Air Branch at 586-4200.

Noise Concerns

1. Activities associated with the construction phase of the project must comply with the Department of Health's Administrative Rules, Chapter 11-46, "Community Noise Control."

   a. The contractor must obtain a noise permit if the noise levels from the construction activities are expected to exceed the allowable levels of the rules as stated in Section 11-46-6(a).

   b. Construction equipment and on-site vehicles requiring an exhaust of gas or air must be equipped with mufflers as stated in Section 11-46-6(b)(1)(A).

   c. The contractor must comply with the requirements pertaining to construction activities as specified in the rules and the conditions issued with the permit as stated in Section 11-46-7(d)(4).

2. Heavy vehicles traveling to and from the project site must comply with the provisions of the Administrative Rules, Chapter 11-42, "Vehicular Noise Control for Oahu."

Should there be any questions on this matter, please call Mr. Jerry Haruno, Environmental Health Program Manager of the Noise, Radiation and Indoor Air Quality Branch at 586-4701.

Sincerely,

GARY GILL
Deputy Director for
Environmental Health

c: CAB
NR&IAQB

DIRECTOR'S OFFICE
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HIGHWAYS DIVISION

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

AQUACULTURE DEVELOPMENT PROGRAM
AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND DIVISION
STATE PARKS
WATER RESOURCE MANAGEMENT

FEB 26 1999

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HIGHWAYS DIVISION
PLANNING BRANCH

REF: PS:EH

Mr. Kazu Hayashida, Director
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Hayashida:

Subject: Draft Environmental Assessment (DEA) for
North-South Road, Ewa, Hawaii

We have reviewed the subject DEA and offer the following comments for your consideration.

We recommend that the water requirements for the proposed project be included in the Water Master Plan for Oahu, which is being prepared by the Land Division.

If the current water allocation to implement the landscaping plan for the North-South Roadway is not adequate, the additional water allocation requirements should be coordinated with the Land Division.

We recommend that sections of the proposed roadway located in the flood zone be designed in accordance with Section 7.10-4 Development Standards, Article 7 Special District Regulations of the City and County of Honolulu, Land Use Ordinance, latest edition.

Thank you for the opportunity to review this matter.

Very truly yours,

Dean Uchida,
Administrator

c.c. Engineering

WEST OAHU SOIL AND WATER CONSERVATION DISTRICT
P.O. Box 893
WAHIAWA, HI 96786

WEST

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HIGHWAYS DIVISION

DIRECTOR'S OFFICE
DEPT. OF
TRANSPORTATION
Jan 28 1 28 PM '99

20 January 1998

Mr. Kazu Hayashida
State of Hawaii Department of Transportation
869 Punchbowl Street
Honolulu, HI 96813

Dear Mr. Hayashida:

Upon reviewing your draft environmental assessment for the (proposed) North-South Road in Ewa, we (the West Oahu Soil and Water Conservation District) have concerns about a project of this magnitude proceeding without a full environmental impact statement.

As you are aware, the West Oahu Soil and Water Conservation District (WOSWCD) is formed under Chapter 180, Hawaii Revised Statutes. The district encompasses the region from Kawela Stream near Kahuku to Waiawa Stream in Pearl City to Kaena Point. The five-member WOSWCD Board of Directors consists of farmers and ranchers who voluntarily work with cooperators.

While we recognize that the Kaloi Gulch relocation is not part of the environmental assessment, it does assume that it would be relocated – and did not consider any "built" alternatives to the contrary. We would like to emphasize that significantly altering the region's drainage patterns strongly increases the impact of the North-South Road.

This necessitates full consideration of not only to where stormwater runoff should drain, but also to where it should travel from there. In addition, this project must comply with the *Coastal Nonpoint Source Pollution Control Program*, adopted by the State in 1997 and mandated by the National Oceanic and Atmospheric Administration (NOAA) and the US Environmental Protection Agency (EPA). The draft environmental assessment does not refer to the latter, and is insufficient to make a determination of the former.

First, as outlined in their conservation plans, our cooperators have built structures above your project area to transport runoff from their agricultural fields into the gulch. These diversions have been engineered by the cooperators in conjunction with the US Department of Agriculture's Natural Resources Conservation Service.

Therefore, computation of runoff amounts (and alteration of the natural drainage) needs to take these structures into account.

Second, clay pervades the area. This limits the amount of water that will be absorbed by the land. From what we can ascertain, the infiltration rate of the soil type has not been considered. In addition, region's drainage flows are unclear and unfocused – a situation which the project needs to address.

Third, how will Kaloi Gulch be connected to itself on the other side of the railroad tracks? At present, plans for the gulch seem to end it on the mauka side of the tracks. Given both the additional stormwater diverted down the gulch with the construction of the north-south road and the clay, there is an even greater need for the gulch to have an outlet at Oneula Beach.

Fourth, this combined agricultural/urban runoff is slated to enter from Kaloi Gulch into the Ewa Villages Golf Course. We are concerned with the potential for severe flooding in the adjacent watershed of Honouliuli. This region had severe flooding in November 1996, despite reassurances from the West Loch Golf Course. We do not believe that the Ewa Villages Golf Course has the capacity to absorb all of the runoff from the North-South Road and Kaloi Gulch in the event of a "flash" rainstorm. Since the golf course (eventually) drains into Honouliuli, it would exacerbate the watershed's flooding problem – a situation compounded by inadequate drainage infrastructure along Farrington Highway and Fort Weaver Road.

Given the above stormwater runoff issues, to which the North-South Road will contribute, we believe the impacts to the region are significant enough to warrant a full environmental impact statement.

Sincerely,

Charles AhToong, Chairman
West Oahu Soil and Water Conservation District

cc: Mr. Abraham Wong (Federal Highway Administration)

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HAWAII 96843

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DEPT. OF TRANSPORTATION
HIGHWAYS DIVISION

April 1, 1999

Mr. Kazu Hayashida, Director
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813

DIRECTOR'S OFFICE
DEPT. OF
TRANSPORTATION
APR 7 10 13 AM '99

Dear Mr. Hayashida:

Subject: Your Transmittal of January 21, 1999 Regarding the Draft Environmental Assessment for the Proposed North-South Road, Ewa, Oahu

Thank you for the opportunity to review and comment on the Draft Environmental Assessment for the proposed North-South Road. We have the following comments:

1. The proposed project will cross a 30-inch and 36-inch waterline located within Farrington Highway. The construction plans should be submitted for our review and approval.

2. The proposed transmission main in the North-South Road should conform to the water master plan for the East Kapolei area.

3. We are evaluating the siting of a reservoir north of the H-1 and North-South Road interchange which would connect to the North-South Road transmission main.

If you have any questions, please contact Barry Usagawa at 527-5235.

Very truly yours,

CLIFFORD S. JAMILE
Manager and Chief Engineer

HIGHWAYS DIVISION
PLANNING BRANCH
APR 9 1 04 PM '99

DEPARTMENT OF FACILITY MAINTENANCE

CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 11TH FLOOR • HONOLULU, HAWAII 96813
Phone: (808) 523-4341 • Fax: (808) 527-5477

DIRECTOR'S OFFICE
DEPT. OF TRANSPORTATION
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HIGHWAYS DIVISION

JEREMY HARRIS
MAYOR

ROSS S. SASAMURA
ACTING DIRECTOR AND CHIEF ENGINEER

IN REPLY REFER TO:
PRO 99-007

February 9, 1999

Mr. Kazu Hayashida, Director
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813

HIGHWAYS DIVISION
PLANNING BRANCH
FEB 12 11 20 AM '99
HI DEPARTMENT OF TRANSPORTATION

Dear Mr. Hayashida:

Attention: Mr. Wayne Yoshioka, Project Manager

Subject: Draft Environmental Assessment, North-South Road, Ewa

Thank you for allowing us to review the assessment. However, we do not have any comments.

If you have any questions, please call Laverne Higa at 527-6246.

Very truly yours,

Ross S. Sasamura
Acting Director and Chief Engineer

LH

FIRE DEPARTMENT

CITY AND COUNTY OF HONOLULU

3375 KOAPAKA STREET, SUITE H425
HONOLULU, HAWAII 96819-1896

DIRECTOR'S OFFICE
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HIGHWAYS DIVISION

JEREMY HARRIS
MAYOR

ATTILIO K. LEONARDI
FIRE CHIEF

JOHN CLARK
DEPUTY FIRE CHIEF

February 17, 1999

Mr. Kazu Hayashida, Director
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813

HIGHWAYS DIVISION
PLANNING BRANCH
FEB 23 1 24 PM '99
HI DEPARTMENT OF TRANSPORTATION

Dear Mr. Hayashida:

Subject: Draft Environmental Assessment
North-South Road
Ewa, Oahu, Hawaii
Project No. HWY-0-01-0-92
HFD Internal No. OL 99-038

This is in response to your memorandum dated January 21, 1999, regarding the Draft Environmental Assessment of the North-South Road Highway Project. We have no objections with the information submitted.

Please note that Hawaii Revised Statutes, Chapter 132, requires that certain types of building plans be reviewed and approved by the Fire Chief prior to the commencement of construction. We recommend that all future construction plans be submitted to the the Building Division of the City and County of Honolulu's Department of Planning and Permitting for review and approval.

Should you have any questions, please call Battalion Chief Charles Wassman of our Fire Prevention Bureau at 831-7778.

Sincerely,

ATTILIO K. LEONARDI
Fire Chief

AKL/CW:bh

DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET • HONOLULU, HAWAII 96813
PHONE: (808) 523-4414 • FAX: (808) 527-6743

JEREMY HARRIS
MAYOR

MADE SULLIVAN
DIRECTOR

LORETTA K.C. CHEE
DEPUTY DIRECTOR

1999/CLOG-844(ASK)
'99 EA Comments Zone 9

March 18, 1999

Mr. Kazu Hayashida, Director
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Hayashida:

Draft Environmental Assessment (EA) For
North-South Road - Kapolei
Tax Map Keys: 9-1-16 and 17

Based on our review, we have the following comments:

1. The documentation in the narrative of the report should specify that the "North-South" Road will be under the jurisdiction of the State Department of Transportation.

2. A schematic design of all intersections with the "North-South" Road should be provided during the early stages of the project, if the City is intended to have jurisdiction over the intersecting streets. These would include Kapolei Parkway and all new East Kapolei development roadways intersecting the "North-South" Road. The schematic design plans should include roadway cross-sections, left-turn storage lengths, lane widths, bicycle facilities, as required, and other design characteristics. Medians on City roadway facilities should be twenty feet wide. All roadways intersecting the "North-South" Road should have provisions for future signalization.

3. A double right-turn lane from Kapolei Parkway to the "North-South" Road should be provided to support the anticipated morning peak hour traffic demand. Access to the State's proposed sports complex, which we understand will be located at the makai approach and continue into Barber's Point, should be included in the design of the intersection.

4. Construction plans should be submitted to the Traffic Review Branch of our office for review and approval.

5. As several plants of Ko'oloa'ula will be lost as a result of the project, incorporating this plant into the highway landscaping should be considered as a mitigation measure to the lost specimens.

6. The "North-South" Road will have impacts on the Kaloi Gulch Drainage Basin and should be designed to comply with the DP Drainage System policies and principles. The final EA should include a figure showing both the location of the proposed roadway and the 96.5-foot wide drainage easement that will serve as the future realignment of Kaloi Gulch.

7. The final EA should include a drainage master plan for the realignment of Kaloi Gulch. The master plan shall be in conformance with City drainage standards and regulations. Construction of the "North-South" Road project should not proceed until the drainage master plan has been approved. Also, Housing & Community Development Corporation of Hawaii's construction schedule for the Kaloi Gulch realignment should be included in the final EA.

8. The project must comply with all City requirements regarding drainage, and during the construction period, soil erosion standards.

9. A 24-inch, 30-inch and 36-inch sewer line is planned within the "North-South" Road. The final EA should describe how this sewer line will be accommodated within the roadway alignment.

10. The "North-South" Road is planned to be one of the links in the Rapid Transit Corridor which will connect Ko Olina, the City of Kapolei, and Waipahu. The Ewa Development Plan (DP) calls for a right-of-way to be reserved along the "North-South" Road to insure that a future rapid transit system could be developed. In addition, the DP calls for three (3) transit nodes where medium density residential and commercial development will be encouraged to be located on the "North-South" Road.

    The "North-South" Road is also planned to be part of the region's open space network as a greenway and to provide bike paths as part of the region's bikeway network. The Road should be designed to be consistent with the DP vision and policies for the open space network and bikeway network.

    The final EA should address how the preferred alignment will address these DP strategies.

11. For your information, references to the following City agencies should be changed as indicated below:

Old	New
Department of Land Utilization	Department of Planning and Permitting
Planning Department	Department of Planning and Permitting, Planning Division
Department of Housing and Community Development	Department of Community Services

Thank you for the opportunity to comment. Should you have any questions, please contact Ardis Shaw-Kim of our staff at 527-5349.

Very truly yours,

JAN NAOE SULLIVAN
Director of Planning
and Permitting

JNS:am

[illegible]

POLICE DEPARTMENT
CITY AND COUNTY OF HONOLULU
801 SOUTH BERETANIA STREET
HONOLULU, HAWAII 96813 - AREA CODE (808) 529-3111

JEREMY HARRIS
MAYOR

LEE D. DONOHUE
CHIEF

WILLIAM B. CLARK
MICHAEL CARVALHO
DEPUTY CHIEFS

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HIGHWAYS DIVISION

OUR REFERENCE CS-DL

February 8, 1999

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PLANNING BRANCH
STATE DEPARTMENT OF TRANSPORTATION

Mr. Kazu Hayashida
Director
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Hayashida:

We have reviewed the Draft Environmental Assessment for the North-South Road in Ewa and have the following comments.

Please refer to page 3-31 and note that the Kapolei/Waianae Station, District 8, currently provides police service to the Ewa region.

Based on the document provided, we have no objection to the proposal. We do, however, anticipate that during the construction phases of the project, dust and noise complaints, as well as traffic problems, will have an impact on calls for police service. We may have more comments to offer as the project progresses.

If there are any questions, please call Major Paul Putzulu of District 8 at 674-8901.

Sincerely,

LEE D. DONOHUE
Chief of Police

By
EUGENE UEHUPA
Assistant Chief
Support Services Bureau

DIRECTOR'S OFFICE
DEPT. OF
TRANSPORTATION
Feb 19 9 17 AM '99

BPNAS
Barbers Point
Naval Air Station
Redevelopment Commission
Developing the Community as Asborbs

DIRECTOR'S OFFICE
DEPT. OF
TRANSPORTATION
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Benjamin J. Cayetano
Governor

Rich Egged
Chairman

William M. Bass
Executive Director

Ref. No.: BP-0346

January 7, 1999

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DEPT OF TRANSPORTATION
HIGHWAYS DIVISION

Mr. Kazu Hayashida, Director
State of Hawaii
Department of Transportation
Highways Division
869 Punchbowl Street
Honolulu, Hawaii 96813
ATTN: Mr. Kenneth Au

Re: Draft Environmental Assessment (EA) for North-South Road Corridor

Dear Mr. Hayashida:

RECEIVED
JAN 11 1 02 PM '99
HIGHWAYS DIVISION
PLANNING BRANCH
STATE DEPARTMENT
OF TRANSPORTATION

We request to be a consulted party for this Draft EA for the North-South Road Corridor.

Our major concern is the redevelopment of Barbers Point Naval Air Station (BPNAS) after the base is closed on July 2, 1999. After this date, substantial properties will be turned over to civilian use and non-military federal use. We are concerned with any new regional transportation facility in the Ewa region that may have a significant impact on the major transportation corridors that lead into the Barbers Point Naval Air Station area.

In previous communications with City Council members, neighborhood board representatives, and State legislators, concerns were raised on the traffic impacts on Fort Barrette Road and H-1 highway subsequent to base closure in July 1999. We are concerned on how this project will impact the Fort Barrette Road and Geiger Road, which will be the major transportation corridors leading into Barbers Point Naval Air Station subsequent to base closure.

Our future plans may involve working with other State of Hawaii agencies to construct a water transmission line that will be located within this North South Road Corridor. This water transmission line will be vital for the future development of the Barbers Point Naval Air Station area. Our concern is that adequate provisions will be made to physically allow the construction of this future water transmission line within the North-South Road Corridor.

Please address these concerns in the preparation of the environmental assessment. If there are any questions, please call me at 674-3542 or Infrastructure Development Manager Bennett Mark at 674-3541.

Respectfully,

William M Bass

William M. Bass
Executive Director

cc: Wayne Yoshioka, Parsons Brinckerhoff Quade & Douglas, Inc.
Gary Gill, Office of Environmental Quality Control

Campbell Square • 1001 Kamokila Blvd., Suite 208 • Kapolei, Hawaii 96707 • Phone: (808) 674-3540 • Fax: (808) 682-3023

HASEKO

HASEKO (Ewa), Inc.
820 Mililani Street, Suite 810, Honolulu, Hawaii 96813-2938
Phone (808) 593-1444 Fax (808) 545-5590

January 22, 1999

HAND-DELIVERED

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STATE DEPARTMENT
OF TRANSPORTATION
HIGHWAYS DIVISION
PLANNING BRANCH

Mr. Kenneth Au
Department of Transportation, Highways Division
869 Punchbowl Street
Honolulu, Hawaii 96813

Re: North-South Road Draft Environmental Assessment

Dear Mr. Au:

We appreciate this opportunity to submit comments to the Draft EA for the North-South Road. As the developer of the Ocean Pointe project (formerly known as Ewa Marina), we are interested in plans for all projects mauka of our project, and in particular, in the potential drainage impacts of other projects within the Kaloi Gulch Watershed.

According to the Draft EA, stormwater runoff from development of the North-South Road will be contained in detention basins to be constructed along the roadway by the State Housing and Community Development Corporation (formerly the State Housing Finance and Development Corporation). The Draft EA states that HCDC, in connection with the development of its East Kapolei project, plans to relocate and improve Kaloi Gulch and provide detention basins to contain runoff from the North-South Road and HCDC's East Kapolei project.

During the East Kapolei Master Plan EIS process, we commented that regional drainage must be coordinated with all of the projects in the watershed. HCDC (then known as HFDC) agreed that such coordination of regional drainage improvements is necessary and confirmed that the East Kapolei project had been designed to retain the additional flows on-site to ensure that additional flows generated by the project would not impact down-slope property owners.

HCDC's pending application with the U.S. Army Corps of Engineers to relocate Kaloi Gulch shows five detention basins along the proposed North-South Road, which we assume have been designed to accommodate all of the increased runoff from both the North-South Road and the East Kapolei project. In addition, all regional drainage improvements within the watershed must

be coordinated to ensure that flows within the watershed do not exceed downstream capacity and impact downstream properties. We are currently working towards implementing the Technical Solution for the Kaloi Gulch Watershed, which calls for certain drainage improvements to be constructed throughout the watershed to allow certain interim flows to be passed downstream.

Thank you for this opportunity to comment on your Draft EA.

Sincerely,

Nelson W.G. Lee
Executive Vice President

cc: Federal Highway Administration,
Attention: Mr. Abraham Wong
Parsons Brinckerhoff Quade & Douglas, Inc.
Attention: Mr. Wayne Yoshioka
Office of Environmental Quality Control

Hawaiian Electric Company, Inc. • PO Box 2750 • Honolulu, HI 96840-0001

February 25, 1999

Scott W.H. Seu, P.E.
Manager
Environmental Department

Mr. Abraham Wong
Federal Highway Administration
P.O. Box 50206
Honolulu, Hawaii 96950

Dear Mr. Wong:

Subject: North-South Road, Project No. HWY-0-01-92

Thank you for the opportunity to comment on your September 1998 Draft Environmental Assessment (DEA) for the North-South Road, as proposed by U.S. DOT and the State of Hawaii DOT. We apologize for the tardiness of our submittal but we did not receive the DEA until late January 1999. Hawaiian Electric's comments are as follows:

1. Figure 2-3 – Typical Sections – shows HECO's easement and identifies the Bike Path as "Bike Path/Access Road for Electric and Drainage Maintenance". HECO has concerns about using the bike path for maintenance purposes and will require use of the proposed road right of way to perform maintenance on our overhead electric lines and poles.

2. The DEA does not address the issue of whether access to the adjacent developments will be accessed from the proposed roadway for the Electrical Supply and whether it will be underground or overhead. This issue should be addressed as part of the visual mitigation of the project. HECO had previously provided infrastructure plans for this project. Attached is Revision 1 of the North-South Road SLD dated, 05/06/98. The SLD is based on the land use map and load summary for East Kapolei dated, 02/11/98 and 02/12/98.

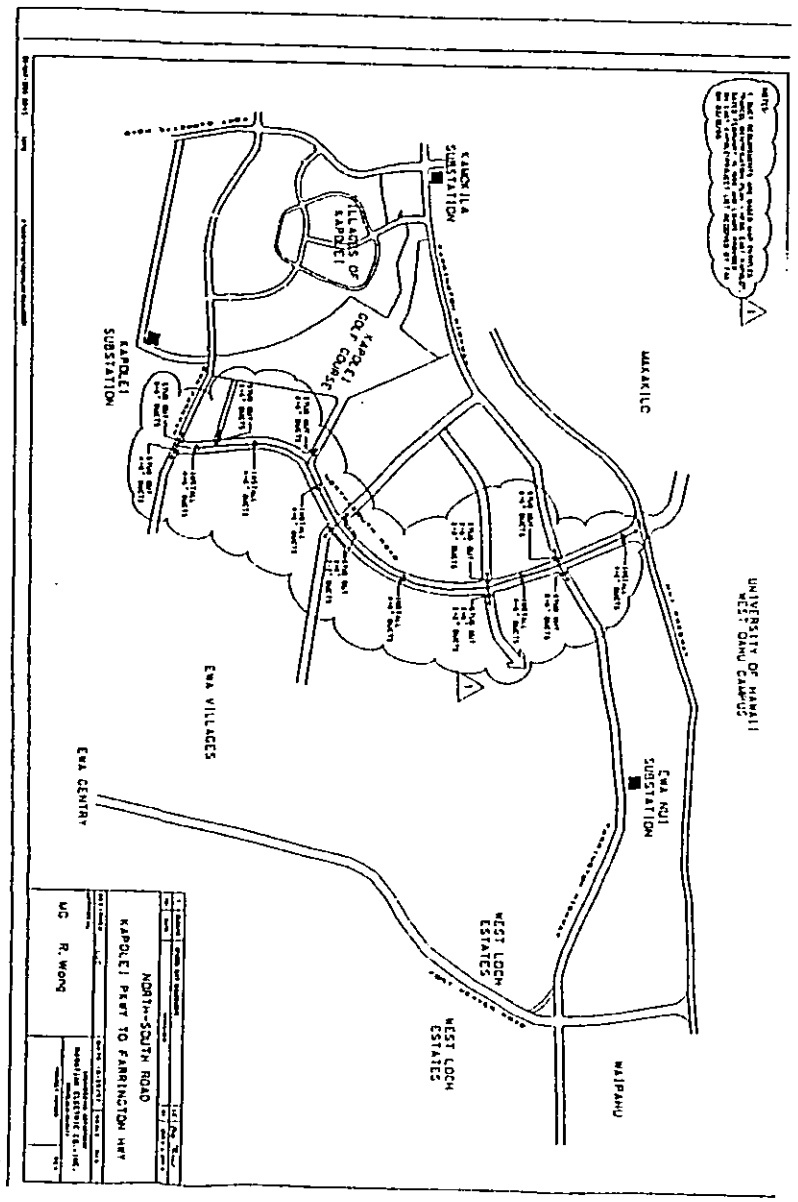
Also attached are several construction clearance concerns that we hope are addressed in pre-design and pre-constructions meetings.

HECO shall reserve further comments pertaining to the protection of existing powerlines bordering the project area until construction plans are finalized. Our points of contact for this project, and the originators of these comments, are Bill Muench (543-5557) Senior Customer Engineer and Ronald Wong (543-7714) Principal Planning Engineer. I suggest your staff and consultants deal directly with Bill and Ronald to coordinate HECO's continuing input on this project.

Sincerely,

Attachments

cc (w/attachments):
Kazu Hayashida
State of Hawaii Department of Transportation
869 Punchbowl Street
Honolulu, HI 96813



Attachment 2
North-South Road
138kV Construction Clearance Concerns*

1. The proposed project will involve some modification to the existing grade. All grading work should be performed such that a minimum 138kV conductor to ground clearance of 65 feet is maintained at all times. In the design of the 138kV alignment, we had planned for a future 46kV under build. The ground clearance at mid span for the 46kV was assumed to be 35 feet at a conductor temperature of 120 degrees F. Therefore, assuming a grade change of +/- 1.00 foot, the 46kV conductor will continue to remain above the G.O. 6 minimum ground clearance of 30 feet.

2. Related to the conductor clearance issue, we have some concerns regarding the proposed placement of the street lights along North-South Road. The street lighting plans show that the street lights will be placed along the edges of the road right of way. Thus, for the north bound lanes, the street lights will be directly under our transmission lines for a major portion of the alignment. The drawings show that the street light luminary will range in height from 10M (32.8') to 10.8m (35.4') above ground. The heights of these luminaries will cause a potential conflict with the future 46kV under build for this section. Recall that the 46kV under built was designed with a 35' ground clearance. To ensure proper G.O. 6 clearances, we need to maintain a minimum 8' clearance between the bottom 46kV phase and the top of the luminary. For example, assuming a ground clearance of 35' for the bottom 46 kV phase, the luminary cannot exceed a height of 27' (8.23m). To mitigate this potential conflict we would recommend that 1) the luminary height be adjusted to provide a minimum 8' vertical clearance or 2) the street light standards be relocated to the medial strip. If option 1 is selected, we will have to determine that maximum luminary height at each specific location. The maximum height will be dependent on the terrain elevation and the planned elevation of the bottom 46kV phase.

3. In reviewing the proposed drainage plans we noticed that road drain structure will be located relatively close to a few of the 138kV poles. We have a concern that, during construction of the underground drainage structure, the soil around the foundations will be exposed and the lateral resistive pressures of the foundation may be reduced. This would weaken the foundation of the poles which may cause the poles to deflect more than originally designed. Of particular concern are the following poles:
   a) Pole 37 - The face of the pole will be located approximately 2m from the side of the D600 drain line. The foundation of the pole is a pier foundation which extends about 0.61m beyond the face. Therefore the clearance between the edge of the foundation and the side of the drain will be only 1.39m. During the construction of the drain, the excavation will reduce the lateral soil resistance pressure of the foundation. We recommend that the drain be relocated to a distance which would allow a minimum of 10m clearance from the face of the pole to the edge of the D600 drain. Pole 37 is also located approximately 7m from the edge of culvert B. Again, we recommend that this distance be increased to a minimum of 10m.
   b) Pole 38 - The face of the pole will be located approximately 3.5m from the edge of the D600 drain. This distance should be increased to a minimum of 10m.
   c) Pole 42 - The face of the pole will be located approximately 5m from the edge of Culvert D. This distance should be increased to a minimum of 10m.
   d) Pole 45 - The face of the pole will be located approximately 8m from the edge of Culvert G. This distance should be increased to a minimum of 10m.
   e) Pole 54 - The face of the pole will be located approximately 4m from the edge of the D600 drain. This distance should be increased to a minimum of 10m.

4. Any equipment used during construction shall maintain a minimum radial clearance of 13 feet from the energized overhead lines.

*Concerns raised by Clinton Char (543-7913) Electrical System Engineer and Paul Nakagawa (543-7062) Transmission Engineer.

Hawaiian Railway

DIRECTOR'S OFFICE DEPT. OF TRANSPORTATION
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March 6, 1999

Mr. Kazu Hayashida, Director
Hawaii State Dept. of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

DEPT OF TRANSPORTATION HIGHWAYS DIVISION
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Dear Mr. Hayashida:

In response to the January 21, 1999 Draft Environmental Assessment on the North-South Road in Ewa, we have the following comments.

This portion of the North-South Road will not affect the Oahu Railway & Land Company (O.R.&L.) historic tracks, but Figure 3-4 shows an eventual extension through Ewa Marina to Fort Weaver Road. This extension would mean a crossing of the O.R.&L. track and Renton Road near our museum site. Unguarded crossings of major highways require our train to stop. We recommend automated crossing guards for future railroad crossings.

Page 3-60 states that the O.R.&L. right-of-way between Ewa and Ewa by Gentry is not used for railroad operations. This is not correct. We have restored and continue to maintain this section. It has been used in conjuction with the Ewa Carnival and will be part of our ride schedule once all interferring construction in that area is completed. Our main line from the Museum to Kahe Point carries about 21,000 riders a year, mainly on Sundays; but, also including special runs during the week. The reference to the historic restoration value of our efforts in the next paragraph is appreciated.

Figure 3-13 shows a special 100-year flood area in Kaloi Gulch near the Kapolei Parkway Bridges. The figure should also show the proposed Railroad and Bikeway Bridge which is in the East Kapolei Drainage Master Plan (Figure 1-3) of July, 1998. This bridge will pass 8800 cfs and reduce flooding.

We have previously reviewed plans for the Kaloi Gulch Railroad/Bikeway Bridge and understand that the project has been advertised for bids by the City & County of Honolulu.

Thank you for the opportunity to comment on this assessment. Our point of contact is Ben Schlapak at 838-8821.

Very truly yours,

Robert Yatchmenoff, President

HAWAIIAN RAILWAY SOCIETY
A Chapter of the National Railway Historical Society
P. O. Box 60369 • Ewa Station, Ewa Beach, Hawaii 96705 • Ph: (808) 681-5461 • Fax: (808) 681-4668
The Hawaiian Railway, a non-profit educational organization, is dedicated to preserving the history of railroading in Hawaii. Contributions are tax deductible.

HIGHWAYS DIVISION PLANNING BRANCH
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GTE Hawaiian Tel

Beyond the call

GTE Hawaiian Telephone Company Incorporated
P.O. Box 2200 • Honolulu, HI 96841 • (808) 546-4511

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February 19, 1999

Reply to
HIABY3

FEB 24 1 38 PM '99
DIRECTOR'S OFFICE
DEPT. OF
TRANSPORTATION

Mr. Kazu Hayashida, Director
Dept. of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, HI 96813

Dear Mr. Park:

Subject: **North-South Road – Draft Environmental Assessment**

Thank you for the opportunity to review and comment on the draft environmental assessment document for the Proposed North-South Road. We have no comments to add to your document at this time.

If you have any questions or require assistance in the future, please call me at 840-1447.

Sincerely,

Paul K. Hanohano

Paul Hanohano
Designer – Access Design

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HIGHWAYS DIVISION
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Form 90006055

OTMA Leeward Oahu Transportation Management Association

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DIRECTOR'S OFFICE
DEPT. OF
TRANSPORTATION

March 11, 1999

Mr. Kazu Hayashida
State of Hawaii Department of Transportation
869 Punchbowl Street
Honolulu, HI 96813

RE: Draft Environmental Assessment - North-South Road Project #HWY-0-01-92

Dear Mr. Hayashida:

We have reviewed the above-captioned document, which was received on February 6, 1999, and would like to offer the following comments

1. **Section 1.2 - Project Purpose and Need:** It appears that, in assessing regional land use and economic development trends, the primary focus was on accommodating the travel demand/traffic volume projections associated with the region's continued housing and employment growth. Since only cursory mention was given to the redevelopment of Barbers Point (BPNAS), the West Oahu campus of the University of Hawaii, and the State of Hawaii sports complex, it is unclear if any consideration was given to the anticipated traffic demands generated by students, athletic/recreational groups, airport users and spectators attracted to the three major activity centers planned for the region. An example of the potential magnitude of the impact from these developments is the recently-announced Hawaii Super Prix, which is expected to attract 70,000 to 100,000 racing spectators to Barbers Point this fall.

2. **Section 2.1.1.1 Roadway Network Assumptions:** Although a conceptual New Development Road and an existing Palehua Road were included in the assumptions, the planned road linkages for the BPNAS redevelopment were not, such as the extensions of North-South Road to Coral Sea Road; Tripoli Road to the Ewa Marina Roadway System; Saratoga Ave. to Geiger Road, and Lexington and Hornet Avenues to the City of Kapolei street network. Additionally, the plans for BPNAS do not include widening Fort Barrette to four lanes from Roosevelt Ave. to Kapolei Parkway.

3. **Section 2.1.1.2 Travel Demand Management Assumptions and Section 2.1.4.1 Description of Preferred Alternative:** Despite the assumption of key TDM actions recommended in the ORTP, such as an integrated HOV and park-and-ride system for the Ewa Area and the inclusion of bikeways, it is surprising that the preferred alternative is six general purpose lanes - no HOV and no bike lanes. In fact, the incorporation of bike lanes was not even addressed.

94-229 Waipahu Depot Road, #407 • Waipahu, Hawaii 96797
Telephone Number (808) 677-RIDE • Facsimile Number (808) 676-4741

4. **Section 2.2.2.3 Arterial with HOV Lanes or Busway**: The rationale for eliminating the HOV alternative, which would reserve two of the six lanes for high-occupancy vehicles, seems short-sighted, particularly when it would be "compatible with the long-range future transportation plan." It appears that the overriding determinant in this decision was the high cost of an interchange configuration necessary to link the N-S Road HOV lanes with HOV facilities on the H-1 freeway. Doesn't this decision foreclose the only opportunity to design and implement a direct HOV connection that can further the ORTP's goals for an integrated HOV and park-and-ride system for the Ewa area? And, in view of the major activity centers planned for the area, a direct HOV linkage between the North-South Road and the H-1and would be particularly advantageous in facilitating the accessibility and efficient operation of public transit services in the Ewa region.

5. **Section 2.3 Interchange Alternatives**: It is stated that the evaluation of interchange alternatives were based on traffic operations, right-of-way requirements, and cost. Was any consideration given to the ability to further long-range system design goals? Both the Kunia and Makakilo Interchanges are two examples of conventional diamonds which have become inadequate to handle the demand, thereby requiring costly redesign and causing major traffic impacts during the construction period. Wouldn't it be more prudent to be prepared to handle the region's continued growth from the beginning?

In summary, we are disappointed that the recommended build alternative does not propose to effectuate any TDM strategies recommended in the ORTP.

Sincerely,

Darilyn T. Bunda
Executive Director

cc: Ewa Region Transportation Master Planning Group

cc: Oahu Metropolitan Planning Organization

PUBLIC COMMENTS: NORTH/SOUTH ROAD CORRIDOR, 'EWA

March 11, 1999

Glenn J. Oamilda
91-819 B Pe'eone Place
'Ewa Beach, Hawai'i 96706

MR. KENNETH AU
Department of Transportation, Highways Division
869 Punchbowl Street
Honolulu, Hawai'i 96813

SUBJECT: THE NORTH-SOUTH ROAD CORRIDOR STUDY: Draft Environmental Assessment, Chapter 2

Aloha, Mr. Kenneth Au,

My name is Glenn Oamilda. I presently reside in 'Ewa Beach; a community along with the 'Ewa community is the oldest on the 'Ewa Plains. I am active in the community, sitting on numerous Boards and Organizations. I was born and raised in Waipahu on the sugar plantation, coming from a family of over three generations of sugar workers with combined years of over a century of sugar employment. I had seen changes in Waipahu during my childhood years, and yet I am still witnessing even more drastic population and physical transformations in the area now in my adult life. Like Waipahu, 'Ewa Beach has seen a tremendous amount of population growth and physical changes in the surrounding areas and will soon experience it's own physical transformation.

In 'Ewa Beach, one of the real ongoing nightmare effecting the residents' "well-being" and "life-style" is Traffic. Being at the end of the road, with only a "one-way-in and one-way-out", and without an innovative comprehensive area Plan for population growth, development, and construction, traffic along the FWR corridor from H-1 into 'Ewa Beach has increased and worsened at a phenomenal rate. From the makai end of 'Ewa Beach to the H-1 Freeway, roughly about five(5) miles, there are presently ten(10) traffic signals, about one every half mile. And to top it off, requests to the City for more traffic signals are still being made. I have, for a long time, been an advocate against traffic impacts that effect the "well-being" and the "quality of life" of individuals living in the community. For the past fifteen or so years, I have been advocating for a north/south road: a straight, alternate, reliever road, within

legal limits, paralleling Fort Weaver Road to the H-1 Freeway. But as most of us in the community have seen, housing and more housing, a preservation district, along with a golf course, has impeded a straight "true" route to the H1 Freeway. I honestly feel that an alternate north/south road is the real solution.

I have long been involved in the land use planning process for the 'Ewa Plains. One, being partners with community representatives, and the landowner and developer, we planned, conceptualized, for days and hours, and finally after years became REAL: the Second City of Kapolei.
I had been actively involved in the planning, formulating, and the completion process of the City's Ewa Development Plans. In the Amendments to the 'Ewa Development Plans, language was inserted referencing the North/South alignment. The North/South Road is not a new or novel idea. The idea of a "true" or "straight" N/S road alignment came simply from the community who anticipated long ago the traffic problems, even when there was nothing between us except the community of 'Ewa, and the freeway. Now government, the landowner and the developers has really distorted that concept by giving it a new direction.

Mr. Au, I want to make comments on the Draft Environmental Assessment, Chapter 2, North/South Road Corridor Study and refute some of the finding in that report. Permit me to make a few remarks before I begin. In all the meetings and/or presentations I've attended, it seems ever clearer to me that the landowner has pretty much dictated, sorry to say, the land use process, the timing and placement of development within the Region ignoring the concerns and impacts on citizens' lives. Top it off, government who supposedly seem to represent the people is simply a pawn to the wishes of the landowner. The thinking of a lot of people in the community is that they concede and accept the idea that wherever the final road alignment ends up to be that it was proscribed, "a done deal", "a snow job" because of a weak government up against a strong landowners. Moreover, with the push to develop a Second City, the landowner has convinced the government, federal as well as state, to pump millions of dollars into a conceptual arrangement, like a regional freeway interchange, on the one hand; and on the other, ignore the "real" every day traffic problems of the 'Ewa Beach community.

In section 2.2 "Alternatives Considered But Rejected", under paragraph 2.2.1.2, "'Ewa Villages Sub-alternative "B", this proposal is the most "ideal" and most favorable for the 'Ewa Beach community. Let me reiterate that this alternative is not a new one; it is one that was suggested years ago. But

as the landowner and government ignored the request from the community, that "straight" or "true" line to the H-1 has become skewed because of development making this concept obsolete and impractical. Mr. Au, let me repeat again, what the community of 'Ewa Beach invisioned was a North/South road to H-1 a mile apart parallelling FWR. I still want to continue with that vision even though there exist obstacles that have impeded a direct route. Alternative "B" addresses very well the issue at hand: what is good for the people of 'Ewa Beach? If condemnation, cost or a preserved area are big problems, so be it! Let us altogether deal with those problems. But again, any idea or proposal that detracts from the main issue at hand is totally unacceptable to the people of 'Ewa Beach. I honestly feel we deserve more than what we're getting now!

Mr. Au, let me for a minute make comments on Sub-Alternative "A", this surely is your main proposal in which the landowner because of movement toward the second city, the state and the city because of Federal funding and because they don't have to ante up their fair share of revenue for Alternative "B" are pushing for and trying to convince the public to accept. I honestly believe fullheartedly we are in dire need of a Road out of 'Ewa Beach now! Why build a Road where there aren't anybody around
to use it? Is the regional interchange a well thought out and honest idea with or without Federal money? In a few years, housing construction along the Fort Weaver Road Corridor will be build out; but I can assure you and many others, our 'Ewa Beach traffic problems will still persist.

Thank you for letting me speak and express my opinions on this most crucial issue of the North/South Road and Traffic that affects our "life-styles" and our "qualities of life."

Respectfully submitted,

Glenn J. Oamilda

BENJAMIN N.J. CAYETANO
GOVERNOR

Hwy 3121

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL

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SUITE 702
HONOLULU, HAWAII 96813
TELEPHONE (808) 586-4185
FACSIMILE (808) 586-4186

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HIGHWAYS DIVISION

January 22, 1999

Kazu Hayashida, Director
Department of Transportation
869 Punchbowl St.
Honolulu, HI 96813

Attn: Kenneth Au

Dear Mr. Hayashida:

Subject: Draft Environmental Assessment (EA) for North-South Road, Ewa

A thorough discussion of the cumulative impacts on the North-South Road from the relocation of Kaloi Gulch is missing from the draft EA. The discussion included on these impacts is brief and responsibility for their mitigation is assigned to HFDC. The EIS law requires a *full* discussion of cumulative impacts "regardless of what agency or person" undertakes past, present and reasonably foreseeable future actions, as noted in section 4.1.2 of the EA.

Section 3.7.2 of the draft EA also mentions the formation of the Kaloi Gulch Task Force regarding the hardening of former stormwater retention areas in Ewa. The realignment of Kaloi Gulch necessitates modification of natural drainage pathways that begin in the Wahiawa plateau. There are safety concerns attendant on all major highway systems in this region that can be adversely affected by such modifications.

This section also states that the Gulch will be realigned prior to the proposed construction of North-South Road, and that the new alignment and related modifications will mitigate the effects of 100-year floods. Regarding this, we have the following questions:

When was the Task Force formed and to what extent will it provide assurances concerning the safety of highway system users? To what extent will DOT be responsible for the safety of users in the event that highways are overwhelmed by flooding during extreme storm events and planned mitigation measures do not fully curtail impacts?

If you have any questions, call Nancy Heinrich at 586-4185.

Sincerely,

for Gary Gill
Interim Director

c: Wayne Yoshioka, Parsons Brinckerhoff

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DIRECTOR'S OFFICE
DEPT. OF
TRANSPORTATION (808) 524-1865
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STATE OF HAWAI'I
OFFICE OF HAWAIIAN AFFAIRS
711 KAPIOLANI BOULEVARD, SUITE 500
HONOLULU, HAWAI'I 96813

March 3, 1999

Mr. Kazu Hayashida, Director
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawai'i 96813

Eis (99) 274

Re: Draft Environmental Assessment for the North-South Road, Ewa O'ahu, Hawai'i, Project No. Hwy-0-01-92.

Dear Mr. Uchida:

Thank you for the opportunity to review the draft Environmental Assessment for the North-South Road proposed for Ewa O'ahu. The State of Hawaii Department of Transportation and the Federal Highways Administration are proposing to construct a new north-south road and a new interchange with the H-1 Freeway near the Villages of Kapolei and the future University of Hawaii West O'ahu Campus.

The Office of Hawaiian Affairs has no concerns with the concept of the proposed project. However, the project will impact a colony of endangered Ko'oloa'ula (sometimes called red lilima). The mitigation proposed for this impact, is to remove approximately fourteen Ko'oloa'ula plants from the highway corridor and attempt to propagate them in a nursery setting.

The DEA is vague on how this proposal will work, simply stating that a Conservation Plan must be worked out with the U.S. Fish and Wildlife Service (Service) after the completion of Biological Assessment also required by the Service. The assumption seems to be that the commitment to prepare a Conservation Plan is all the explanation or mitigation that is needed. This limited perspective and information is insufficient. For instance, the DEA contains no information on the effects of the proposed highway on the plants which will remain within the highway corridor except to state that a fire control plan will be prepared. Of key importance is how the remaining Ko'oloa'ula can be expected to react to the impacts of automobile emissions.

HIGHWAYS DIVISION
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The DEA states that the plants taken from the right-of-way will be cultivated in an off-site botanical garden. Again, this is insufficient. While it may be reasonable to have plants in a botanical garden, it is more important to protect endangered plants in their natural setting. We would like to see mitigation measures which describe how the DOT will encourage, enhance and protect the plants that remain in the highway corridor.

Again, thank you for the opportunity to review this document. If you have any questions, please contact Lynn Lee, EIS Planner at 594-1936.

Sincerely

Colin Kippen
Deputy Administrator

C. Sebastian Aloot
Land and Natural Resources Division Officer

cc: Board of Trustees

SIERRA CLUB, HAWAI'I CHAPTER

Jeffrey Mikulina
Director
jeff.mikulina@sierraclub.org

P.O. Box 2577,
Honolulu, Hawai'i 96803
(808) 538-6616

MAR 25 1 27 PM '99
DEPT. OF TRANSPORTATION
HIGHWAYS DIVISION

23 March 1999

Kazu Hayashida, Director
Department of Transportation
869 Punchbowl St.
Honolulu, HI 96813

RE: NORTH-SOUTH ROAD DRAFT ENVIRONMENTAL ASSESSMENT

The Draft Environmental Assessment for the construction of the North-South Road says that construction of the road will have both direct and indirect impacts on an endangered plant colony with 61 individuals (p. 4-39). The DEA indicates that DOT is in the process of preparing a Habitat Conservation Plan to allow for the taking of these species.

Please note that Hawai'i Administrative Rules, 11-200-12 reads in pertinent part: "In most instances, an action shall be determined to have a significant effect on the environment if it substantially affects a rare, threatened, or endangered species, or its habitat." Moreover, because the construction of roads is generally associated with traffic generation and development, the project involves substantial secondary impacts.

An EIS should fully disclose what will happen to the endangered species and how construction of the road will increase the likelihood that the species will recover. It should also more carefully discuss the impact on air quality. We look forward to reading the Draft Environmental Impact Statement because it is patently obvious that this project will have a significant impact on the environment.

Yours,

Jeffrey Mikulina
Director

cc: Director, Office of Environmental Quality Control

MAR 30 1 19 PM '99

DIRECTOR'S OFFICE
DEPT OF
TRANSPORTATION
Mar 29 1 02 PM 199

LINDA LINGLE
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
669 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

RODNEY K. HARAGA
DIRECTOR

Deputy Directors
BRUCE Y. MATSUI
LORRAIN W. JOESTING
BRIAN H. SEKIGUCHI

IN REPLY REFER TO

HWY-PA
2.4827

JUL 2 1 2004

Dear SEE ATTACHED LIST

Subject: North-South Road, Ewa, Oahu, Project No. HWY-0-01-92
1998 Draft Environmental Assessment

Thank you for your comments on the Draft Environmental Assessment (EA) for the proposed North-South Road in Ewa, Oahu. This Draft EA was circulated in September 1998 and several significant events have since occurred

One event was the discovery of an endangered plant species, the Abutilon Menziesii, a type of hibiscus along the proposed highway alignment. It has taken several years to resolve this issue, because it is a Federal and State protected species. This process was concluded in April 2004, when the State Board of Land and Natural Resources approved a habitat conservation plan (HCP), that will result in a net gain for this species, while allowing the proposed North-South Road to proceed.

Another critical event involved our decision to extend this project, to include a section of Kapolei Parkway, from Renton to the North-South Road intersection. The primary basis for this decision related to the requirement to complete both the Kapolei Parkway section and the North-South Road within the same relative time period. Consequently, with the completion of the environmental and planning stages, the City and County of Honolulu (City) can continue its efforts to design and construct this section of Kapolei Parkway.

To accommodate the above-mentioned changes/conditions the Revised Draft EA (2004) will supersede the 1998 document. The Revised Draft EA is to be issued shortly. Your previous comments on the 1998 document were considered in the preparation of this new document.

You will receive a copy of the revised Draft EA for your review and comments. In addition, copies of the new document will be made available at public libraries and the Office of Environmental Quality Control.

We encourage your continued involvement in our planning process. Comments on the revised Draft EA will be due on August 23, 2004. We believe that the Final EA for this project will be issued in September 2004 and this document will address all comments received on the revised Draft EA.

If you have any questions or require additional information, please contact Ronald Tsuzuki at 587-1830 or email at ronald.tsuzuki@hawaii.gov.

Very truly yours,

for RODNEY K. HARAGA
Director of Transportation

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PUBLIC HEARING TRANSCRIPT

SEPTEMBER 1, 2004

PUBLIC HEARING

NORTH-SOUTH ROAD & KAPOLEI PARKWAY

Wednesday, September 1, 2004

6:00 p.m.

Asing Park Meeting Room #1

(Transcript of meeting)

BEFORE: BARBARA ACOBA, CSR No. 412, RPR
Notary Public, State of Hawaii

MR. HARAGA: Thank you all for coming this evening and, let's see. Let's take care of a little bit of housekeeping before I do all of the things. The restrooms are out there in the second building, and we have refreshments in the back. Please help yourselves. It's a rather warm evening.

Again, I'm back in the same room that we did the previous hearings and glad to be back. My name is Rod Haraga. I'm the Director of Transportation for the State of Hawaii. It is now 7:09, and I declare this public hearing to be officially open. This is the public hearing for the North-South Road and Kapolei Parkway project.

Before we begin, I would first like to introduce others that have been involved with the project. Tonight we have present Representative Moses. Mark Moses, there he is. And then from the neighborhood board, Tesh Malama of the Ewa Neighborhood Board. And Representative Romy Mindo just walked in. We do have the consulting firm in Parsons Brinckerhoff and the R.M. Towill company, along with a number of State staff and my famous guy over there, Scott Ishikawa.

Some of you may remember that we were actively pursuing this project in the late 1990s. However, we encountered an endangered plant species in the roadway

alignment and it has taken some time to address the issues that resulted. At this point, we have full approval from the U.S. Fish and Wildlife Service and the State Department of Land and Natural Resources to proceed with the roadway.

The public hearing is being held for several reasons. First, this is a means of informing you of the current plans of the State Department of Transportation and the City's Department of Transportation Services. Our intent is to inform you how you may be affected either beneficially or adversely by the proposed project.

Secondly, we want to obtain facts that may not have been previously brought to our attention in connection with the location and design of the proposed project. A Revised Draft Environmental Assessment, or an EA, of the project that complies with the requirements of the State law, Hawaii Revised Statute Chapter 343, was formally noticed in the OEQC notice on July 23rd. The comment period for this Chapter 343 EA was originally supposed to end on August 23rd, 2004, but it has been extended to September 16th, 2004.

Another environmental assessment prepared for the project in compliance with the Federal law, the National Environmental Policy Act, called NEPA, will be

released soon. The comments received tonight are being accepted for the State's environmental review process under HRS Chapter 343.

HDOT and the City DTS anticipate that the proposed project would not have significant adverse impacts on the communities or the environment in either the long or short term. Therefore, we intend to issue a Finding Of No Significant Impact, called a FONSI, on this project which would allow the project to proceed to the final design, permitting, and construction phases.

If you do not want to provide any comments tonight, but would like to comment later before the September 16th deadline, I'll be providing information on how to submit your comments shortly.

Talk a little bit about the format of this particular public hearing. The project description. First, I'll provide a brief description and background of the North-South Road and the Kapolei Parkway project. At about 7:15, or let's see, let's make it 7:20, we will break for a 15-minute recess. During this time I encourage you to view the various display boards situated right outside in the foyer there, talk to the project team, and have some refreshments in the back. The restrooms, again, are located outside behind in the second building.

At about 7:30 our formal public testimony session will begin and will continue until everyone who has signed up to provide testimony has spoken.

Finally, I will close the meeting with a few remarks. And we -- just walked in Cheryl Soon, the Director of Department of Transportation. Hi, Cheryl.

Testimony cards are in the sign-in table in the back there. If you're interested in providing oral testimony to the group, please fill out an intent to provide testimony card, this blue card. Some of you may have filled out this card when you arrived. Indicate your name in the imprint on the card and turn it in at the sign-in table back there. We will be accepting testimony cards throughout the evening. So if you did not put in one initially, please do not hesitate to do so later. You will be called up in the order that the cards are received, except for elected officials who will be given the courtesy of going first. When you're called, please come up here to the podium.

To ensure that everyone has a chance to speak, there be will be a three minute time limit on providing testimony. If you are not done providing testimony, please indicate so and your card will be placed behind those who have not yet spoken and then you may speak after we have gone through the first round of

testimonies.

I would like to emphasize that this hearing is to provide public testimony on the project. Please do not interrupt the person providing testimony or ask them questions while they are testifying. All testimony is being transcribed by a court reporter and a formal transcript of these proceedings will be prepared. Every comment will be addressed in the Final Environmental Assessment report. Any questions you have on the project may be asked after the formal meeting is concluded.

For those of you who would like to provide testimony and comments on the project but have to leave, or who would prefer not to speak up here using the mic, we are providing other means to provide testimony comments. The court reporter, located just outside the entrance and right there in that lighted room back there in the foyer is another court reporter. Please feel free to provide your comments about the project to that court reporter privately at any point during this hearing. These comments will have the same importance as comments made in front of the group and will also become part of the hearing transcript.

At the sign-in table in the back we are providing comment forms. Please provide your comments

on these forms and drop them into the comment box located at the sign-in table. You may also take a comment form home and send it in later. If you have comments after this evening, please e-mail, mail, or fax your comments to the contact information provided on the project fact sheet. And we have two versions of the project fact sheet. One is written in small, itty bitty letters and the other in real bold letters. Please note, we need to receive your comments by September 16th.

If you haven't already, please pick up the project fact sheet, again, located at the sign-in table in the back. This is for you to take home and provides a map of the project, short project description, and contact information should you have any questions or comments after this evening.

Let me go through a little of the project background. The North-South Road and the Kapolei Parkway project consist of a new 2.2-mile principal arterial highway extending from Kapolei Parkway to the H-1 freeway. The project includes an interchange providing access to and from H-1 and an intersection at Kapolei Parkway. At the Kapolei Parkway a new 0.7 of a mile arterial roadway is provided from Renton Road to the North-South Road. Both the North-South Road and the

Kapolei Parkway ultimately will be a six-lane wide and will be able to accommodate three lanes of traffic in each direction separated by a raised landscaped median. Sidewalks will be provided on both sides of the roadway. North-South Road will also have a 10-foot paved outside shoulder, and those are described in the plans that are outside in the foyer there. A bike facility will be provided on the east side of the North-South Road and the mauka side of Kapolei Parkway within the road's right-of-way.

The center median of this North-South Road is reserved for future rapid transit corridor. The future rapid transit corridor preserves options for transit service improvements for the Ewa-Kapolei community and other planned developments such as the University of Hawaii's West Oahu campus.

The project also includes drainage features such as drainage canals and detention basins to handle drainage associated with the proposed North-South Road. Two culverts will carry the North-South Road over the existing Kaloi Gulch.

In the construction phase, the interim phase of the project consists of constructing the North-South Road and the H-1 interchange, westbound off-ramp, and eastbound on-ramp, and three lanes of the North-South

Road and the Kapolei Parkway.

The construction schedule. The final design of the project will be completed in October of this year. When a FONSI, or the Finding Of No Significant Impact, is obtained, the project will be advertised to the contractor. We are anticipating that this will occur in late October. Construction of the initial phase of the North-South Road is scheduled to begin early in January 2005. Construction of the interim phase of the Kapolei Parkway would begin thereafter. Both facilities are expected to be open for service in late 2007 and 2008.

The North-South Road and Kapolei Parkway will increase mobility and reduce delay on Fort Weaver Road and Fort Barrette Road corridors by decreasing traffic in these two corridors. Increase mobility within the Ewa plain by completing key pieces of the roadway network. It will maintain accessibility to the Ewa region by reducing bottlenecks at the Kunia and Makakilo interchanges. And increase flexibility for future regional and local transit routes through new interchange access at H-1 freeway, a more complete roadway network, and space for a future rapid transit corridor.

Again, the comment period for the Revised Draft

Environmental Assessment ends on Thursday, September 16th, 2004. Public testimony received this evening and during the remainder of the comment period will be documented and addressed in the final EA.

Thank you for your attention, and now we'll have a 15-minute break before we start -- let's see, let's make it a 10-minute break before we start public testimony. And as a reminder, if you are interested in providing testimony, please fill out the intent to provide testimony, the blue card, located at the sign-in table in the back. Also at the sign-in table are the project fact sheets and comment sheets. The court reporter in the foyer is ready to note down any comments that you may have at this point. So we're gonna take a break, and before I do that, I would like to introduce Senator Willie Espero. Senator, welcome. So with that, let's take a 10-minute break for those of you who want to get introduced to the project outside and we have staffers out there to answer questions.

(Off the record at 7:21 p.m.)

(Back on the record at 7:33 p.m.)

MR. HARAGA: Okay. Again, the rules that we've set up for this public hearing is you will have three minutes. I will let you know when you have 30 seconds left. The reason why we're gonna be very strict on the

three minutes is we have 40 people testifying tonight. That's at least two hours and that's not counting going up and down. So if you want to speak more than three minutes, we're gonna put you at the end, but right now we do have 40 cards for folks who want to speak.

And as I promised, we're gonna have Senator Willie Espero. Okay. Senator, if you'd like to come up and testify, please.

SENATOR ESPERO: Thank you, Director Haraga, for coming out to Ewa Beach and also Director Soon from the City and County. On behalf of the people of Ewa Beach, Ewa Villages, I'd like to just state my complete support for the North-South Road and everything you're doing. I've been the senator for this district now for two years and representative for three years and the biggest issues out here, as we all know, are traffic and education, and this is a project that everybody supports.

I know there's been some discussion regarding which way it would go, but at this point in time the route that has been chosen appears to be the best route. Any changes to that route would just cause delays in time and cost us more money, but this area is the fastest growing region on Oahu between Gentry homes and the Haseko homes. Approximately 700 to a thousand new

homes are being built and people are utilizing Fort Weaver Road. Right now Fort Weaver Road is at over capacity in the morning. It is just too small for what we have and the North-South Road will be a major, major relief road, a major regional road for Ewa Beach and for Kapolei. The Fort Weaver Road widening also will assist in the problems that we have now, so that by early 2007 I expect, and the community does expect, major relief on Fort Weaver Road.

This is a project that has been discussed for 25 years, from what I'm told. I've lived here for 15 years and each year I've seen the traffic get worse and worse, and finally the Government is catching up where they should have been doing more work probably five or 10 years ago. And it's not gonna be changed overnight, but we certainly appreciate all that you are doing.

This road will also assist in building UH West Oahu. This is a four-year institution which is lacking in our region. This will be an opportunity for more children in our district to go to a university versus having to drive into the traffic every morning towards Manoa.

I'd like to make a suggestion that when landscaping does occur on this roadway, that you do consider the red Ilima, the endangered plant, and see if

that can possibly be utilized. I know there are plans now to plant that in three different locations, but if you could look at it for North-South Road where, I guess, it's bad that it was in the route, but since it's there, maybe we could utilize it now since you are going to move forward with this.

And I have already submitted testimony in terms of the EA, and I know there's a lot of people here that also want to show their support for this project. So on behalf of the people of Ewa Beach and this district that I have been speaking with, please do what you can to get this project to break ground as soon as possible. It should have been done years ago, but it's happening now and we certainly appreciate it. Thank you very much.

MR. HARAGA: Thank you, Senator. For those of you who did not get the information, there is a larger map version in the back. Some of us old folks can't read that well. And again, there is a court reporter in the other room for those of you who don't want to come up here and testify. You can go to that other room in the back and go one-on-one with the court reporter.

I'm gonna start calling up the people. The people that signed in first will go first. Patrick, I believe, Hange. Patrick.

MR. HANGE: Good evening. My name is Patrick

Hange and I'm here on behalf of Varona Village. There's a couple concerns that we want to bring up, and this may or may not be the meeting to address this, but since this roadway is going in, this does tend to create a divide between Ewa Villages. Varona Village does seem to get cut off, especially if there will be some sort of intersection light or something here. You know, that kind of leaves us out in the cold. I'm sure everybody's familiar with the -- what's going on in the news and Ewa scandals and we're still suffering from that and we'd like to get some closure along with this.

So, you know, we'd like you to consider us as well as I know that this road comes the closest to Varona Village, so I didn't see anything to kind of damper noise or anything along that lines. That's a six-lane highway. So, you know, we live there and, you know, that's within a hundred or 200 feet. So if you could consider that. Thank you.

MR. HARAGA: Thank you. Next speaker is Coby Lynn representing the -- affiliated with the neighborhood board. Coby.

MR. LYNN: Hello and good evening everyone. My testimony tonight is a message about healing and understanding. I'd like to thank Director Rod Haraga and Scott Ishikawa for providing this well-attended,

open forum here tonight to hear our testimony and ideas regarding this very important and much needed secondary road for our growing community. I look forward to working with you, Rod and Scott, at the neighborhood board level to complete our connection with other communities for one purpose, and that is to move forward and put our past differences aside. Thank you.

MR. HARAGA: Thank you. Tony Becker. Tony.

MR. BECKER: Again, my name's Tony Becker and I'd like to, again, thank the Director for coming out this evening and all the other representatives who are here this evening supporting this project. My concern, or my issue, is simple. I would like to see a contractor be given an award for getting this project done early, as they are doing with the H-1 project. Anybody who's looked at the Fort Weaver Road project in comparison with the H-1 project, which started at the same time, we've moved dirt and they have a wall built. So I'm looking at possibly awarding some extra money for getting this project done early. Thank you very much.

MR. HARAGA: Lyle Halverson. Lyle.

MR. HALVERSON: Hi. My name's Lyle Halverson and I fully support the North-South Road and the Kapolei Parkway. I got a couple things I think we need to work on, though. One is the Geiger Road and Kapolei Parkway.

We need a stoplight there now.

Also, on the Kapolei Parkway between Haseko and Gentry, there's a small portion there that doesn't belong to either one of them and on your map here it doesn't show who's gonna build that.

And also on the North-South Road, when you're looking at it, we should drop it down from -- right down to Roosevelt Road. That would ease up traffic pull in a couple different ways there.

And the other issue that I got is your landscaping should be plants that don't take much water, don't take much maintenance, because they don't do very good on Fort Weaver Road, so I wouldn't expect any plants in this area to be maintained very well neither. That's all I have. Thank you very much.

MR. HARAGA: Thank you. Glenn Oamilda.

MR. OAMILDA: Aloha everybody. Good evening. My name is Glenn Oamilda. I live in Ewa Beach, and I've been a resident of this area for the last -- born and raised on the sugar plantation, Waipahu sugar plantation right down the street, and now I live in Ewa Beach. So I've been around a long time.

What I'm gonna do tonight is talk about two specific things. One, about the North-South Road, and I yielded my other half at the end to talk about the

endangered species.

My testimony was already submitted and it's in the EA, the revised statute of the EA, but let me go through the history of this North-South Road. Back in the '90s, I don't know if you guys remember that the Government wanted to move everybody west. So the Government said, let's build a second city, as simple as that. Which meant that population growth would move from town to the Ewa area, to the Kapolei area. So they said Kapolei is the second city, right. You know logical sense, in the logical thinking, population should never go back to town. That's the mind set of politicians and the Government today. They want a rapid transit system that goes back to town. They wanna -- they wanna widen the roads so that everybody get out of town. They want this so everybody can converge to the North-South Road and head on to town. Is that a concept or what?

I think the Government -- if you look at Government, they have screwed the public royal. Population isn't -- jobs isn't coming down here, as you can tell. Everybody's going back to town. We had proposed -- the North-South Road was a concept of the Ewa Beach community 20 years ago. Two tsunamis we had experienced in Ewa Beach gave us the idea that we need a

North-South Road out of Ewa Beach. Here's Fort Weaver Road right here. Here's the other road. We wanted a road that would parallel Fort Weaver Road all the way to the freeway within the Federal guidelines, which is a one mile between off-ramp. But what happened, we got a golf course over here and we got a storage center over here. Three minutes?

MR. HARAGA: Yeah, three minutes. We have Louis Maria of Varona Village.

MR. MARIA: Hi. My name is Louie Maria representing the people of Varona Village. For many years now I have been working with them, and as I look at this North-South Road, as long as it does not do anything to hurt the people of Varona Village, as long as it doesn't interfere with their lives or isolate them in any way from any of the other historical villages, I can see nothing wrong with this. I know Glenn was saying a historical area. At one time Glenn was part of that. He was part of the Friends Forever, if I'm not mistaken, weren't you, Glenn?

MR. OAMILDA: Never. I wasn't in that organization, Louie.

MR. MARIA: Well, my apologies. I was told different by somebody else. But, you know, as long as they don't hurt, take away housing from these people, I

can see nothing wrong. This will give us another way out of Ewa, a faster way. I know because I go to town just about every day to see my wife in a nursing home, so I know what the traffic is like. But I see nothing wrong with going back the other way and coming back around. Thank you.

MR. HARAGA: Thank you. Okay. Layne Makela. Layne Makela. Might have done it over there. Remember we have the other area in the back if you want to do it over there. Tesh Malama, concerned citizen. Tesh.

MS. MALAMA: Aloha everyone. I speak in favor of the current alignment for the North-South Road and Kapolei Parkway. I have some major concerns, though, on the section where it impacts Renton Road, so as we cross from Maliko to Renton Road, so I'm happy I seen Cheryl Soon, that we're gonna have to upgrade Renton Road along that particular area, the entire area of Renton Road because it's gonna be a major intersection. I did not see any discussion about that in the EA and how it's gonna impact the current Renton Road and intersection between Kapolei Parkway and Renton Road.

Also the intersections between Kolowaka, because now Kolowaka is gonna be a thoroughfare. Right now it's blocked off. It's gonna be a thoroughfare there. So we need some kind of measures there. And

also, this was mentioned before, at Geiger and Kapolei Parkway.

Another section I wanted to bring to the DOT is the section that DH -- I believe DHH&L is responsible for, and that's the section that would connect Ewa to Kapolei, the Villages of Kapolei. Actually, I support the Villages of Kapolei. They don't really wanna see this particular area built out. I support them. I don't think this area should be built out either. I think this should be a thoroughfare for Ewa Beach. I think that that should be our access. Let them widen their particular area and build their interchanges and have Fort Weaver widening so we can secure this particular route to that area. Thank you.

MR. HARAGA: Okay. Thank you, Tesh. Cres Malate from Varona Village.

MS. MALATE: I'm Cres Malate from Varona Village and my concern about our place is as they build that road, we have the bridge and we have that gonna be a busy road after, so how you gonna cross if like three lanes each gonna be like freeway, yeah. So I think we need -- we need a stoplight. I don't mind if they build like that, but, like, I think we need a stoplight for that intersection once you cross the bridge for the safety of the kids and us and everybody.

And one thing, my concern, too is like, you know, they open the railway over there, now it's very traffic. How much more to this if you have that road, new road they planning on build? So we like to close that gate, too, if possible.

So I'm for the road that they gonna make, too. As long as, like just say Tenney and Varona gonna be divided, we have that road divide us. And before, the administration of Harris like said, Varona Village, you know, (inaudible). We don't like that be happen again. And we are a historical village in there. So, I hope they not going to separate us, segregate us from the other villages. That's my concern, too. Thank you.

MR. HARAGA: Kioni Dudley.

MR. DUDLEY: Thank you very much. I'm Kioni Dudley and I'm just representing myself tonight. I'm also concerned about the endangered species that are there and how those are gonna be taken care of. It's not that I'm against the road. It's that I am against taking endangered species and moving them when it's known that they're not going to survive. And if we're talking about endangered species that don't exist elsewhere, which I think we are, then, you know, we need to really give that some concern.

I wanna also tonight speak, though, about the

freeway. I live, actually, in Makakilo. I teach at Aiea. Right now it's sometimes taking an hour and a half to go from Makakilo to Aiea, and that's about once a week. What are we going to do when we get this other road coming up there to the freeway? Now, it's not that I am against the road. It's that something has to be done to the freeway concomitantly, and concomitantly means at the same time. So, you know, we've got to do something about the freeway. We can't just make this road and put an extra lane on Fort Weaver Road. I'll never get to school, you know. And you'll never get to town. So it's just too much.

We've also got to start thinking about the fact that we, by plan, have made Mililani a bedroom community and this area a bedroom community. Nuts, you know. Right now everybody has to go to town, as Glenn is saying. Do you know that when Kapolei is fully built out they only expect 21 percent of the cars in this area to go to Kapolei. Only 21 percent of the cars. That means every two houses, figuring that every house has two cars, every two houses that are built, three cars are going to town and one is going to Kapolei at the best of times years from now, okay. Now that's something we all have to keep in mind, folks. We're about to get into complete gridlock here on this island

and this is the man that needs to help us out, so I'm glad he's here tonight to talk to us. Thank you very much.

MR. HARAGA: Okay. Thank you. Okay. Todd Apo.

MR. APO: Aloha. My name is Todd Apo. I do speak in favor of this project. I think my thoughts echo a lot of what we've heard tonight. I think this is the very beginning. There's a lot of details that the DOT and the ultimate contractor need to take into account from the individuals at Varona Village and other people in this area. I think the more important point is that I hope the DOT recognizes, I'm sure they do, that this is just one piece of a much bigger picture that needs to be taken care of in this region. And like I said, you've heard a lot of people testify about it and looking at the environmental impact and the overall impact of this project. We need to keep in mind that this is just a piece of the big puzzle that we need to solve for all of us. So, again, I speak in favor and I hope those considerations are taken into account. Thank you.

MR. HARAGA: Thank you. Philmund Lee representing Romy Mindo.

MR. LEE: Thank you, Director Haraga.

Actually, I'm Philmund Lee. I'm actually speaking on my own behalf tonight. I'd like to thank everybody for coming, and I'd especially like to thank the DOT for putting this project in the fore light and finally getting something done for the North-South Road. Let's hear it for Haraga and the DOT.

Also, our state legislators, Senator Willie Espero and Romy Mindo for not just talking the talk, but walking the walk and delivering the money for this project. Without the money, we wouldn't have all this planning done, and so I'd like to thank the legislatures for delivering the money and the DOT director and staff for putting this project in the fore light.

I'm in support of this project with the least amount of changes as proposed We have a competent engineering firm in Parsons, consulting firm, and they've done an excellent job in trying to find the most expedient route at the least cost and the least impact on the community. So I express our confidence in them and this project with as few many changes as possible which would cause excess delays and cost run ups. Thank you very much.

MR. HARAGA: Thank you very much. I must apologize, I thought we had 40 people wanting to speak, but I believe we don't have that many. We have 42

people here in attendance this evening. So with that we want to bring up Glenn Oamilda to finish what he started. With that, Glenn.

MR. OAMILDA: Thank you again. Bear with me. This testimony on the endangered species was presented in January and it hasn't been included in the EA, the draft, so I was wondering why. Anyway, the relocation plan, without question, is a remnant of past administration. In my opinion, I don't think this administration should take the time and run with it, the plan, or should burden or arbitrarily assume total responsibility without listening first to all the arguments, pro and con, weighing all the issues before a final decision is made. My testimony focus, of course, you heard earlier on the North-South Road alignment and also will zero in on the endangered specie tonight.

For the past 15 years, the people in Ewa lived through two political administrations. They also witnessed elected city-state representatives as well as public officials come and go. Those were seen as status quo years and business as usual. The game of politics played in their own arena on an uneven field with no public consultation or public participation. These politicians were engaged in party politics and political gamesmanship to the extreme. Some politicians wanted to

be super stars by promoting their own goals and interests. Others were always accused and seen as dirty players, closely tied and deeply embedded in the belly of the beast, the land owners and the developers.

I cannot dismiss, Mr. Haraga, the real purpose of why I'm here this evening, nor can I go home without expressing my thoughts on the State's plan to relocate this little red Ilima, or the Ko'oloa'ula flower, an indigenous native Hawaiian species, from it's original habitat. As everyone heard, my discussion was centered largely on the North-South Road alignment, but I think this Ko'oloa'ula was God sent and now I'm concerned about this little flower.

As attitudes slowly change extending beyond human relationships, beyond political gamesmanship, so should our feelings and compassion for environment and for all living things. It is unquestionably a God given responsibility to take care of the earth on which we all live on and to protect and respect the sanctity of our surroundings, the land, air, animals, and plants.

MR. HARAGA: Wrap it up.

MR. OAMILDA: I can remember back five years ago when Senator Representative Abercrombie was here and he said, Glenn, look, I done a lot for you guys. Appropriate money in Congress to give you guys a

North-South Road. You know what was reply, oh, thank you, but that road isn't even pertaining -- even convenient for the people in Ewa Beach. And he say, well, somebody should have told me.

MR. HARAGA: Glenn. Okay.

MR. OAMILDA: See, that's politics for you guys.

MR. HARAGA: Thank you, Glenn. Okay. We've got Sai Tagovailoa-Amosa.

MS. TAGOVAILOA-AMOSA: Aloha and good evening everyone. It is such a pleasure to meet everyone here and so nice to see concerned people about the project that's going on.

I'm in support of this project. Basically because it has been many, many years we've been trying to find another way and we haven't quite done that nor have we completed that. We've been stuck here in Ewa Beach with one way out and one way in. If you're pretty much creative, you can go all the way down to Kapolei into Geiger and then out to where you live. But you know what, it's been long awaited and we really need to support this project.

People are complaining about the red Ilima. There's a lot of complaining going on here, but you know what, we weren't there. Senator Espero also appeared

for the red Ilima and testified in support of this red Ilima, that they needed to do something. We, too, did the same thing. We went out to testify that they needed to support this red Ilima and what are they gonna do about it. But you know what, a lot of our own constituent, our own community here in Ewa and Ewa Beach, the majority of us, we did a lot of complaining, but no one showed up.

So please, I know that there's a lot of complaining going on here. The Department of Transportation is doing the best that they can, as well as the legislative here at the State capital, they're doing the best that they can, but they need our support. We cannot just be complaining here. We need to be a doer. Let's not sit here and bring out our complaints. We have to take a more active role in this. It isn't easy, because I know the Department of Transportation is doing the best that they can, but you know what, every time a complaint comes out, it holds them back with the project. It holds the representatives and the senators from even trying to do anything, because we're trying to work together. We as a community have to come together. If we don't come together, nothing's gonna ever be done and we're still gonna be stuck with one way in, one way out. Much mahalo.

MR. HARAGA: Thank you. Is there anyone else who would like to testify that hasn't signed up? Okay. Representative Moses.

REPRESENTATIVE MOSES: Thank you very much. I know a lot of you have been working on this for many, many years, Dicky Beamer, Glenn Oamilda. Many of you here. Varona Villages, Friends of Ewa, I know what you've been trying to do. It's about time we have this access because we need it.

Now, like Glenn said, we shouldn't have to have all of these cars going to town. I wish I was the only one who had to drive to town. Maybe Romy and the Senator, too. Maybe we can all drive to town together, but the rest of the people I hope could work out here. Not yet. More jobs are coming, but not yet. Todd Apo from Ko Olina. But that's what we need to do. But in the meantime we need roads out of here, okay.

This has been one of the things I've been working for at least 25 years now, not as long as many of you, but fortunately since '96-'97 I've been on the State Transportation Committee, so I'm able to push it, with the help of the Senator and the Representative and I'm on the Policy Committee which approves these things. I want to tell you, there's only 13 of us on that committee and Rod Haraga is one and Cheryl Soon is

another and I'm one. So there's already three out of 13. Without the votes, this wouldn't be approved and wouldn't get the Federal money. So you can thank them very much for getting the money for this.

Now the red Ilima. You know, I wanna move things, too, and make sure they grow. I hear Kioni say, you know, it's not gonna grow. I just want to remind you, this was sugar cane. There was nothing there. It was sugar cane. Every time it was burned, there was nothing there. No red Ilima, no nothing, except for the black ash. And out of the ashes, the red Ilima sprung. I believe it's a very hardy plant. I don't believe we can kill it off if we wanted to, and it has been transplanted at least three places. Are all three growing now, Rod?

MR. HARAGA: Yeah.

REPRESENTATIVE MOSES: Three different locations and they're all growing, and that's the Federal guidelines. You have to have three outplantings of it that survive. So that's been done. Red Ilima is not gonna go away. Thank you.

MR. HARAGA: Thank you. Do we have any other people to testify? Okay. Kioni.

MR. DUDLEY: I thought we were at the end. I'll just take one second. I just wanted to say that,

you know, I was talking about the bedroom community problem. The problem that this is a bedroom community and that Mililani is a bedroom community. The Ewa Development Plan is in a state of change at the present time. We need to change the Ewa Development Plan so that we have small business districts throughout this area and small business districts throughout the Mililani area. Those small business districts, every one of them is gonna have jobs and those jobs will keep people here rather than going on the freeway into the city. Thank you very much.

MR. HARAGA: And Glenn, you got three minutes.

MR. OAMILDA: You hear Kapolei say they don't want this addition right here. They don't want that. What does that make this road now? It becomes Ewa Beach's road. Doesn't it make sense? This road here, this proposed road, only would affect Ewa Beach people. It's clear. It's common sense. They don't want this portion, so there's nothing that links Ewa Beach with Makakilo and the west side. The alternative, and Mark and I sit -- we sat on the Ewa Development Plan, the plan was to have -- because of the golf course and the historic district, we want it inserted into the Ewa Development Plan that from this point there would be a finger coming up here as another alternative to the

road, to the North-South Road. Because this road was our proposal, Ewa Beach's proposal, and the land owner and the developer says, no, we shall have it here. We wanted it within the Federal guidelines, the Federal one mile limit between interchanges, but now it's gone way down here.

So how can people say we wanna support this road, yet make it convenient for the residents of Ewa Beach to get out of here? Doesn't make sense. And along here, like I said, that red Ilima flower is God sent. They been hassling with the red Ilima along this alignment because it shouldn't be. This alignment shouldn't be here. It should have gone up here. Convenient for the people in Ewa Beach. Does everybody see that? This linkage has no connection over here, so this alignment becomes Ewa Beach's road.

MALE AUDIENCE MEMBER: It's everybody's road.

MR. OAMILDA: It's not everybody's road. This was our conception to get us out of Ewa Beach, and we learned that through two tsunamis. So I tell you guys again, be wise on how you guys decide and how you think the Government in trying to lay this out for you guys. Think about it. And Mark and I, we sat on the Ewa Development Plan in the '90s, right, Mark? We proposed that finger to come from here up here so we can bypass

these two options right here so that it'd be convenient for us. Thank you.

MR. HARAGA: Thanks, Glenn. Okay. Well, one additional person. No. Same person. Louis Maria.

MR. MARIA: I'm just curious as to what Glenn meant. You meant you wanted the road to run through Ewa town? 'Cause I know at one time you asked me to help get rid of the historical designation.

MR. OAMILDA: Yeah.

MR. MARIA: Okay. So I'm sorry, we cannot have people from Ewa Beach saying that a road will run through our town, the same as you wouldn't like us telling us where you want -- we want a road through your town. I don't think that's proper.

MR. OAMILDA: Okay. Let me rebut that.

MR. MARIA: I'm talking, Glenn. You sit down and you wait and then you can have your chance.

MR. OAMILDA: Okay. I'll explain.

MR. MARIA: You know, we in Ewa have our towns and we do not appreciate people from outside. Now the same way you guys was gonna walk for Cal Kawamoto's light, the people of Ewa can do the same thing with the proposal to run a road through our villages. Thank you.

MR. OAMILDA: Can I respond to that, Rod?

MR. HARAGA: No. There is no response on that.

There is no response to public testimony. Thank you. Okay. With that, Representative Moses.

REPRESENTATIVE MOSES: It's not a response. I just want to add, one of the key reasons we were able to get the North-South Road funded is because of the plans to build a University West Oahu campus right next to the golf course. Right in here, okay. It's gonna be right in there, and the North-South Road will go right up next to it with a freeway access for people to come to it, but also it'll have some interconnecting roads into the campus. So that's one of the major reasons we're able to get the funding for this road.

So it's not that Kapolei-Makakilo doesn't want to use the road, we just don't want all of Ewa Beach -- excuse me, we don't want all of Ewa Beach to go right in front of the middle school and the high school and that's what will happen if it's open too soon before the other roads around it.

MR. HARAGA: Thank you, Representative.

MR. OAMILDA: Comment, Rod.

MR. HARAGA: Just a comment.

MR. OAMILDA: Back in the '70s and '80s, these two islands were not here. We wanted a road go through the village which was all that the people wanted. The people in Ewa, all the villages wanted a road. The road

was proposed to go through the villages up to within a mile limit. Now we have these two, one historical site, one the golf course, and it's 2004. We can't go through here. We cannot, but here's the proposal that we go from here to finger along here. If they gonna put the college here -- if they gonna put the college on the west side of the proposed freeway, let's be equal distance. Let's share the road halfway between these two points. Let's share it. Let's share it. Let's come out here so we don't have to go this way and this way. All we doing is losing 10 miles every time we take this North-South Road and come back to Fort Weaver Road, we've lost 10 miles. Understand that, people, we've lost.

MR. HARAGA: Thank you, Glenn. So with that, if there are any other folks that wanna speak. Okay. Thank you for your time and testimony this evening. Again, should you have any questions or comments on this project after this evening, please send them to the contact information located on either the big sheet or the little sheet, that looks like this, by September 16th, 2004.

So I want to thank you on behalf of the Department of Transportation and the Department of Transportation Services for coming out and giving us

Your feelings about the North-South collective road, thank you very much.

(Meeting concluded at 8:14 p.m.)

C E R T I F I C A T E

STATE OF HAWAII)
CITY AND COUNTY OF HONOLULU)

I, BARBARA ACOBA, Certified Shorthand Reporter and Notary Public, State of Hawaii, do hereby certify:

That on Wednesday, September 1, 2004, at 7:09 p.m., the foregoing meeting was taken down by me in machine shorthand and was thereafter reduced to typewriting under my supervision; that the foregoing represents, to the best of my ability, a true and correct transcript of the proceedings had in the foregoing matter.

I further certify that I am not an attorney for any of the parties hereto, nor in any way concerned with the cause.

Dated this 3rd day of September, 2004, in Honolulu, Hawaii.

BARBARA ACOBA, CSR NO. 412
Notary Public, State of Hawaii
My Commission Exp: 10-23-2004

STATE OF HAWAII

NORTH-SOUTH ROAD and KAPOLEI PARKWAY

PUBLIC HEARING

ASING PARK, EWA, HAWAII

WEDNESDAY, SEPTEMBER 1, 2004

BEFORE: Patricia Rivera, CSR 176

Notary Public, State of Hawaii

I N D E X

TESTIMONY BY:

TESTIMONY

MR. PHILMUND LEE: Okay. I am Philmund Lee. And I would like to testify in support of the North-South Road as proposed. And I would like -- I am in support of as few changes as possible and to proceed at a minimum of excess cost with regard and concern for the environment.

I would like to see the North-South Road and Kapolei Parkway proceed with all deliberate speed, with as few changes as possible in the current design. That's all. Thank you.

MS. CURRY: My comments is going to be extremely brief. I'm C. C. Curry with Interagency Coordination Councils Organization is a voting member of OMPO, O-M-P-O, Oahu Metropolitan Planning Organization.

And I have an extremely brief comment regarding the North-South Road is that as a voting agency within the Citizen Advisory Committee, we are very appreciative of the fact that Mayoral candidate Mufi Hannemann's talking about an alternative to the North-South Road being an interisland -- intraisland ferry.

In other words, the restoration of the Wikiwiki ferry, which we had for 5-million-dollar pilot program, and it took all the tons of traffic off Fort Weaver Road and it would continue to do so.

It is the best alternative. And the appropriation of the funds that are going to the North-South Road would be much better reappropriated to restore the Hawaii super ferry alternative to the Wikiwiki ferry. It would be more cost efficient and a better alternative to more land traffic.

And I just guess I better add a little footnote. They need to rename it from North-South Road because that's a real misnomer. It is not a north-south road. It's perpendicular east-west road, not a north-south road. And it goes the opposite direction of going Diamond Head. It goes Ewa-Kapolei direction which is not the direction anybody wants to go.

So that's it. Bring back the ferry.

(Proceeding concluded.)

C E R T I F I C A T E

STATE OF HAWAII)
) SS:
CITY AND COUNTY OF HONOLULU)

I, PATRICIA RIVERA, Notary Public, State of Hawaii, do hereby certify:

That on Wednesday, September 1, 2004;

That the proceeding was taken down by me in machine shorthand and was thereafter reduced to typewriting under my supervision; that the foregoing represents, to the best of my ability, a true and correct transcript of the proceedings had in the foregoing matter.

I further certify that I am not attorney for any of the parties hereto, nor in any way concerned with the cause.

DATED this 12th day of SEPTEMBER 2004, in Honolulu, Hawaii.

PATRICIA RIVERA, CSR 176
Notary Public, State of Hawaii
My commission expires 4/08/08

COMMENTS AND RESPONSES ON

2004 REVISED DRAFT ENVIRONMENTAL ASSESSMENT

NRCS
Natural Resources Conservation Service
P.O. Box 50004
Honolulu, HI 96850
808-541-2600

United States Department of Agriculture

Our People...Our Islands...In Harmony

2004 AUG 23 P 1:30

August 19, 2004

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

AUG 24 2 27 PM '04

Dear Mr. Haraga,

We have reviewed the project in question and have found that the concerns we had over this project in the 1998 Draft Environmental Assessment have been adequately addressed. Therefore, we have no further comments to make at this time.

Thank you for the opportunity to review this project.

Sincerely,

Lawrence T. Yamamoto
State Conservationist

The Natural Resources Conservation Service provides leadership in a partnership effort to help people conserve, maintain, and improve our natural resources and environment.

An Equal Opportunity Provider and Employer

LINDA LINGLE
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

RODNEY K. HARAGA
DIRECTOR

Deputy Directors
BRUCE Y. MATSUI
LINDEN H. JOESTING
BRIAN H. SEKIGUCHI

IN REPLY REFER TO

HWY-PA
2.5571

SEP 09 2004

Mr. Lawrence T. Yamamoto
State Conservationist
Natural Resources Conservation Service
Department of Agriculture
P.O. Box 50004
Honolulu, HI 96850

Dear Mr. Yamamoto:

Subject: North-South Road and Kapolei Parkway
Ewa, Island of Oahu
Project No. HWY-O-01-92
Revised Draft Environmental Assessment

Thank you for your letter of August 19, 2004, which mentioned that your concerns regarding this project have been adequately addressed in the project's *Revised Draft Environmental Assessment*.

We sincerely appreciate your review of this document, and if any other questions or issues arise, please feel free to contact us at your earliest convenience.

Very truly yours,

RODNEY K. HARAGA
Director of Transportation

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

REPLY TO
ATTENTION OF: CEPOH-EC-T

August 16, 2004

2004 AUG 17 P 4:33

Civil Works Technical Branch

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

Dear Mr. Haraga:

Thank you for the opportunity to review and comment on the Revised Draft Environmental Assessment (RDEA) for the North-South Road and Kapolei Parkway, Ewa, Oahu. The following comments are provided in accordance with Corps of Engineers authorities to provide flood hazard information and to issue Department of the Army (DA) permits.

a. Based on the information provided, a DA permit may be required for the project; however, additional information will be required to make a final determination. Please contact Ms. Connie Ramsey of our Regulatory Branch for further guidance at (808) 438-9258 and refer to file number 200400449.

b. The flood hazard information provided on page 3-5 of the RDEA is correct.

Should you require additional information, please contact Ms. Jessie Dobinchick of my staff at (808) 438-8876.

Sincerely,

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

AUG 23 ... 12 ... '04

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

RODNEY K. HARAGA
DIRECTOR

IN REPLY REFER TO:
HWY-PA
2.5571

SEP 29 2004

Mr. James Pennaz, P.E.
Chief, Civil Works
Technical Branch, Department of the Army
U.S. Army Engineer District, Honolulu
Building 223
Fort Shafter, HI 96858-5440

Dear Mr. Pennaz:

Subject: North-South Road and Kapolei Parkway
Ewa, Island of Oahu
Project No. HWY-O-01-92
Revised Draft Environmental Assessment

Thank you for your letter of August 16, 2004, which commented on the *Revised Draft Environmental Assessment* for this project.

Our responses to each of your comments are provided below:

a. Two bridges will be required to span the Kaloi Gulch, and we anticipate that a Clean Water Act (CWA), Section 404 permit will be required. In any event, we will contact your Regulatory Branch for further guidance and file number 200400449 will be used. For your information, in a letter dated February 23, 1998, the U.S. Army, Corps of Engineers, has indicated their jurisdiction over the Kaloi Gulch.

b. Your verification of our flood hazard information is appreciated.

We very much appreciate your participation in this project, and if any questions or problems arise, please feel free to contact us at your earliest opportunity.

Very truly yours,

RODNEY K. HARAGA
Director of Transportation

DIR 1615

U.S. Department of Homeland Security
1111 Broadway, Suite 1200
Oakland, CA 94607-4052

FEMA

August 22, 2004

Mr. Rodney K. Haraga, Director
State of Hawaii
Dept. of Transportation
869 Punchbowl Street
Honolulu, HI 96813

Re: Revised DEA: North-South Road Project
County of Honolulu, HI

Dear Mr. Haraga:

This letter serves to respond to your recent request for Agency input with respect to the referenced Revised Draft Environmental Assessment for the North-South Road and Kapolei Parkway Project, planned for development within the County of Honolulu, Hawaii

Please review the current effective Flood Insurance Rate Maps (FIRMs) for the referenced community and any other jurisdictions impacted by the project site. The County of Honolulu is a participant in the National Flood Insurance Program (NFIP), and keeps Flood Insurance Rate Maps (FIRMs) on file and available for review within the Planning & Permitting. Any development within this jurisdiction must comply with the requirements of the County flood prevention ordinance, which regulates development within the high-risk Special Flood Hazard Area (SFHA) and meets the minimum Federal requirements established in Volume 44, Code of Federal Regulations (44CFR). The NFIP floodplain management building requirements are described in Sections 59 through 65 of the Code.

A Flood Map Determination that specifically states which part of the proposed project occurs within any SFHA shown on the current FIRM should be developed; as well as identification of specific actions that will be taken to meet local governmental requirements for development within the Special Flood Hazard Areas. A determination of the Base Flood Elevation (BFE) may need to be performed prior to the start of development and indicated in the Proposal, demonstrating what impact the development would have on base flood levels.

Selected NFIP definitions and floodplain management building requirements are summarized as follows:

- The term development means any man-made change to improved or unimproved real estate, including but not limited to buildings, other structures, mining, dredging, filling, grading, paving, excavation or drilling operations, and storage of equipment or materials.

- If the area of development is located within a Regulatory Floodway as delineated on the FIRM, any development must not increase base flood elevation levels. A hydrologic and hydraulic analysis must be performed *prior* to the start of development, and must demonstrate that the development would not cause any rise in base flood levels. No rise is permitted within regulatory floodways.

- If implementation of the proposed project would result in a rise of the BFE, the requirements for revising the FIRM must be implemented (44CFR § 65.12). These regulations may include obtaining a Conditional Letter of Map Revision (CLOMR) from FEMA prior to the start of any development that will cause any rise within a floodway or that will alter or relocate a watercourse.

- Until a regulatory floodway is designated for the SFHA zones pertaining to this project site location, the Community shall assure that no new development (including fill) shall be permitted within the SFHA unless it is demonstrated that the cumulated effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface elevation of the (100-year) base flood more than one-foot at any point within the community.

- Upon completion of any development that results in physical changes that increase or decrease the BFE or otherwise changes existing Special Flood Hazard Areas, the NFIP directs all participating communities to submit the appropriate technical, hydrologic and hydraulic data to FEMA for a flood map revision as soon as practicable, but not later than six months after such data becomes available, in accordance with CFR44, § 65.3. To obtain copies of FEMA's Flood Map Revision Application Packages, please refer to the FEMA website at: http://www.fema.gov/mit/tsd/dl_mt-2.htm.

- All buildings constructed within a riverine floodplain, (i.e., Flood Zones A, AO, AH, AE, and A1 through A30 as delineated on the FIRM), must be elevated so that the lowest floor of a residential building is at or above the BFE in accordance with the effective Flood Insurance Rate Map.

- Coastal development: All buildings constructed within a coastal high hazard area, (any of the "V" Flood Zones as delineated on the FIRM), must be elevated on pilings and columns, so that the lowest horizontal structural member, (excluding the pilings and columns), is elevated to or above the base flood elevation level. In addition, the posts and pilings foundation and the structure attached thereto, is anchored to resist flotation, collapse and lateral movement due to the effects of wind and water loads acting simultaneously on all building components.

- Public Utilities: Proposed new development in a flood-prone area shall be reviewed to assure that: all public utilities and facilities, such as sewer, gas, electrical, and water systems are located and constructed to minimize or eliminate flood damage, and-

- Sanitary sewage systems: The Community (County of Honolulu) shall require within flood-prone areas: new and replacement sanitary sewage systems to be designed to minimize or eliminate infiltration of flood waters into the systems and discharges from the systems into flood waters and; onsite waste disposal systems to be located to avoid impairment to them, or contamination from them during flooding.

- Altering a watercourse: The NFIP-participating community (County of Honolulu) shall notify, in riverine situations, adjacent communities and the Hawaii State Coordinating Officer prior to any alteration or relocation of a watercourse, and submit copies of such notifications to the FEMA

Administrator; and,

- Assure that the flood-carrying capacity within the altered or relocated portion of any watercourse is maintained.

The full text of Volume 44, Code of Federal Regulations (44CFR) may be found on the Internet at:
http://www.fema.gov/nfip/laws1.shtm

In addition, compliance with Executive Order 11988 on Floodplain Management and Executive Order 11990 on Protection of Wetlands should be considered with respect to the project site map, including a review of impacts associated with restrictions identified under federal, state or local floodplain regulations. These Orders are implemented under FEMA's regulations at
44 CFR Part 9: Floodplain Management and Protection of Wetlands.

Please Note:

Many communities participating in the NFIP have adopted building requirements and regulations that are more restrictive or comprehensive than the minimum federal criteria set forth in CFR No.44 for purposes of floodplain management and regulation of development in the floodplain. You can contact the County of Honolulu Floodplain Administrator at (808) 523-4247 for further information on local permitting requirements.

If you have any questions, or if you need further assistance, you may contact Cynthia McKenzie of this office by telephone at: (510) 627-7190, or by email at: Cynthia.McKenzie@dhs.gov.

Sincerely,

Clare C. Polansky

Clare C. Polansky
Natural Hazards Program Specialist
Environmental Review Coordinator
Mitigation Division, Region IX
(510) 627-7036

Cc: Sandra Amaglio, Region IX Environmental Officer
Carol L. Tyau-Beam, Hawaii State NFIP Coordinator

State of Hawaii, Office of Environmental Control
235 So. Beretania Street, Suite 702
Honolulu, HI 96813

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

RODNEY K. HARAGA
DIRECTOR

IN REPLY REFER TO:
HWY-PA
2.5571

SEP 29 2004

Ms. Clare C. Polansky
Natural Hazards Program Specialist
Environmental Review Coordinator
Mitigation Division, Region IX
Federal Emergency Management Agency
U.S. Department of Homeland Security
1111 Broadway, Suite 1200
Oakland, CA 94607-4052

Dear Ms. Polansky:

Subject: North-South Road and Kapolei Parkway
Ewa, Island of Oahu
Project No. HWY-O-01-92
Revised Draft Environmental Assessment

Thank you for your letter of August 22, 2004, which commented on *Revised Draft Environmental Assessment* for this project.

For each of your comments, we have the following responses, which are generally in a corresponding order:

1. We have reviewed the latest Flood Insurance Rate Maps (FIRMs) for the region in the vicinity of this project. Several Letters of Map Revision (LOMR) and Conditional Letters of Map Revision (CLOMR) have been coordinated with and approved by Federal Emergency Management Agency. Accordingly, portions of the project are located within a designated floodplain, and in addition, the project does not encroach upon any regulatory floodway. Much of the project is located within areas designated as "undefined" or "undetermined".

2. An embankment for the proposed highways will be provided and a major section of the proposed North-South Road will be located within the areas which have

HWY-PA
2.5571

been designated as "undefined"; other portions of the project and highway embankment are located within a designated floodplain. Excavation for a detention basin would occur within the designated floodplain, thereby increasing floodwater storage capacity. Drainage channels and other features would also be implemented, which would reduce the flooding of outlying areas. In summary, we believe that this project will not increase base flood levels.

It should be noted that the project conforms with the requirements of a Memorandum of Understanding issued by the Kaloi Gulch Task Force and the project's drainage plans have been approved by the City and County of Honolulu, Department of Planning and Permitting.

In addition, a risk analysis is currently being developed to confirm the abovementioned findings. This risk analysis will be finalized and approved, prior to a FONSI determination by FHWA.

3. This project will comply with relevant floodplain management building requirements of the National Flood Insurance Program.

4. As indicated in the Revised DEA, there are no identified wetlands in the project area. The floodplain management requirements of Title 23,Code of Federal Regulations 650, Subpart A, will be addressed in the Final EA and will be discussed in more detail in the forthcoming risk analysis and location hydraulic study, which will also be submitted to FEMA.

We understand your concern for this project and are hopeful of your continuing assistance.

Very truly yours,

RODNEY K. HARAGA
Director of Transportation

DEPARTMENT OF THE NAVY
COMMANDER
NAVY REGION HAWAII
850 TICONDEROGA ST STE 110
PEARL HARBOR HI 96860-5101

11011
Ser N464/ 00444
24 AUG 2004

Mr. Rodney K. Haraga, Director
State of Hawaii
Department of Transportation
869 Punchbowl Street
Honolulu, HI 96813

Dear Mr. Haraga:

SUBJECT: NORTH-SOUTH ROAD AND KAPOLEI PARKWAY H-1 FREEWAY TO RENTON ROAD, EWA, OAHU PROJECT NO. HWY-0-01-92

In response to your letter (HWY-PA 2.4839) dated July 22, 2004, the Navy has no comments to the Revised Draft Environmental Assessment for the subject project.

Should you have any questions regarding this matter, please contact Mr. Jeff Takeuchi at (808) 471-1170 extension 261, fax (808) 471-1160, or email jeffrey.takeuchi@navy.mil.

Sincerely,

D. C. LEWIS
LCDR, CEC, U. S. Navy
Deputy Program Manager for
Facilities, Environmental, Safety,
and Passenger Transportation
By direction of
Commander, Navy Region Hawaii

LINDA LINGLE
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

RODNEY K. HARAGA
DIRECTOR

Deputy Directors
BRUCE T. MATSUI
LORRAIN H. JOESTING
BRIAN H. SEKIGUCHI

IN REPLY REFER TO

HWY-PA
2.5571

SEP 29 2004

LCDR D. C. Lewis
Navy Region Hawaii
Department of the Navy
850 Ticonderoga Street, suite 110
Pearl Harbor, HI 96860-5101

Dear Commander Lewis:

Subject: North-South Road and Kapolei Parkway
Ewa, Island of Oahu
Project No. HWY-0-01-92
Revised Draft Environmental Assessment

Thank you for your letter of August 24, 2004, regarding the *Revised Draft Environmental Assessment* for this project.

We sincerely appreciate your review of this document.

Very truly yours,

RODNEY K. HARAGA
Director of Transportation

U.S. Department of Transportation
Federal Aviation Administration

Western Pacific Region
Real Estate and Utilities Section, AWP-54B

DEPT OF TRANSPORTATION
P. O. Box 50109 TRANS.
Honolulu, Hawaii 96850-5000

DEPT OF TRANSPORTATION
2004 AUG 16 A 10:27
HIGHWAYS DIVISION

AUG 17 9 58 AM '04

August 9, 2004

Mr. Rodney K. Haraga, Director
State of Hawaii
Department of Transportation
869 Punchbowl Street
Honolulu, HI 96813

Dear Mr. Haraga:

Your letter of July 22, 2004, requested our review and comment on the Revised Draft Environmental Assessment (Revised DEA) for your project "North-South Road and Kapolei Parkway H-1 Freeway to Renton Road", Ewa, Oahu, Hawaii (Project No. HWY-O-01-92).

The Federal Aviation Administration has no objections or comments regarding the subject project.

We appreciate this opportunity to comment. If there are any questions, please contact me at 541-1236.

Sincerely,

Darice B. N. Young
Realty Contracting Officer

cc:
State of Hawaii
Office of Environmental Quality Control
235 S. Beretania Street, Suite 702
Honolulu, Hawaii 96813

LINDA LINGLE
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

RODNEY K. HARAGA
DIRECTOR

Deputy Directors
BRUCE T. MATSUI
LORRAINE R. AKIBA
BRIAN H. SEKIGUCHI

IN REPLY REFER TO

HWY-PA
2.5571

SEP 29 2004

Ms. Darice B. N. Young
Realty Contracting Officer
Federal Aviation Administration
U.S. Department of Transportation
P.O. Box 50109
Honolulu, HI 96850-5000

Dear Ms. Young:

Subject: North-South Road and Kapolei Parkway
Ewa, Island of Oahu
Project No. HWY-O-01-92
Revised Draft Environmental Assessment

Thank you for your letter of August 9, 2004, which commented on this project and its *Revised Draft Environmental Assessment*.

We sincerely appreciate your review of this document, and if any problems or questions arise, please feel free to contact us at your earliest convenience.

Very truly yours,

RODNEY K. HARAGA
Director of Transportation

LINDA LINGLE
GOVERNOR

RUSS K. SAITO
COMPTROLLER

KATHERINE H. THOMASON
DEPUTY COMPTROLLER

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

07)1280.4

AUG 25 2004

MEMORANDUM

TO: The Honorable Rodney K. Haraga, Director
Department of Transportation

FROM: Russ K. Saito
State Comptroller

SUBJECT: North-South Road and Kapolei Parkway
H-1 Freeway to Renton Road, Ewa, Oahu
Project No. Hwy-0-01-92

Thank you for the opportunity to provide comments prior to the subject project's revised Draft Environmental Assessment. This project does not directly impact any of the Department of Accounting and General Services' projects or existing facilities. Therefore, we have no comments to offer.

If you have any questions, please call me at 586-0400 or have your staff call Mr. Bruce Bennett of the Public Works Division at 586-0491.

c: Ms. Genevieve Salmonson, OEQC

LINDA LINGLE
GOVERNOR

RODNEY K. HARAGA
DIRECTOR

Deputy Directors
BRUCE T. DAVIS
BRENNON MORIOKA

IN REPLY REFER TO

HWY-PA
2.5571

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

SEP 09 2004

TO: THE HONORABLE RUSS K. SAITO, COMPTROLLER
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES

FROM: RODNEY K. HARAGA
DIRECTOR OF TRANSPORTATION

SUBJECT: NORTH-SOUTH ROAD AND KAPOLEI PARKWAY
EWA, ISLAND OF OAHU
PROJECT NO. HWY-0-01-92
REVISED DRAFT ENVIRONMENTAL ASSESSMENT

Thank you for your memorandum of August 25, 2004, regarding the *Revised Draft Environmental Assessment* for this project.

We appreciate your review of this document, and if any questions or problems arise, please feel free to contact us at your earliest convenience.

Ronald Tsuzuki/HWY/HIDOT
08/07/2004 04:08 PM

To Nelson Sagum/HWY/HIDOT@HIDOT
cc Darell Young/HWY/HIDOT@HIDOT
bcc
Subject Fw: Project No. HWY-O-01-92

Pls. follow up on this.

---- Forwarded by Ronald Tsuzuki/HWY/HIDOT on 08/07/2004 04:07 PM ----

Tracey.Omori@hi.ngb.army.mil
08/07/2004 03:20 PM

To ronald.tsuzuki@hawaii.gov
cc
Subject Project No. HWY-O-01-92

Subject:
North-South Road and Kapolei Parkway
H-1 Freeway to Renton Road, Ewa, Oahu
Project No. HWY-O-01-92

Mr. Tsuzuki,

Could you please send us a copy of the subject DEA as noted in the July 22, 2004 memo? I work for the Construction and Facilities and Management Office of the Hawaii Army National Guard, and our engineering officers would like to have a copy of the DEA for our office files.

Also, regarding your subject project - thank you but we have no comments at this time.

Sincerely,
Major Tracey Omori
State of Hawaii Dept of Defense
JFHQ-HIARNG, ATTN: HIARFM
3949 Diamond Head Road
Honolulu, HI 96816-4495

LINDA LINGLE
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

RODNEY K. HARAGA
DIRECTOR

Deputy Directors
BRUCE Y. MATSUI
LORENN M. NISHIMURA
BRENNON T. MORIOKA

IN REPLY REFER TO:

HWY-PA
2.5571

SEP 09 2004

TO: MAJOR TRACEY OMORI
DEPARTMENT OF DEFENSE

FROM: RODNEY K. HARAGA
DIRECTOR OF TRANSPORTATION

SUBJECT: NORTH-SOUTH ROAD AND KAPOLEI PARKWAY
EWA, ISLAND OF OAHU
PROJECT NO. HWY-O-01-92
REVISED DRAFT ENVIRONMENTAL ASSESSMENT

Thank you for your e-mail of August 7, 2004, which requested a copy of the project's *Revised Draft Environmental Assessment* (DEA) for the Construction and Facilities and Management Office, of the Hawaii Army National Guard.

We believe that a copy of the Revised DEA has been forwarded as requested, and if any questions or problems arise, please feel free to contact us at your earliest convenience.

DIR 1569

LINDA LINGLE
GOVERNOR

PATRICIA HAMAMOTO
SUPERINTENDENT

STATE OF HAWAI'I
DEPARTMENT OF EDUCATION
P.O. BOX 2360
HONOLULU, HAWAI'I 96804

OFFICE OF THE SUPERINTENDENT

September 1, 2004

MEMO TO: The Honorable Rodney K. Haraga, Director
Department of Transportation

FROM: Patricia Hamamoto, Superintendent
Department of Education

SUBJECT: Revised Draft Environmental Assessment for
North-South Road and Kapolei Parkway
Project No. HWY-O-01-92

The Department of Education (DOE) has reviewed the Revised Draft Environmental Assessment (Revised DEA) for the North-South Road and Kapolei Parkway from the H-1 Freeway to Renton Road. The DOE believes that the East Kapolei communities currently being planned will require a minimum of two elementary schools, one middle school and one high school. All of these schools will have a traffic impact on the roads leading in and out of the schools and connecting to the North-South Road and Kapolei Parkway.

The DOE does not have sites for these planned schools and has not been contacted by the East Kapolei landowners who may currently be planning their residential communities. We realize that schools are major generators of traffic during peak traffic flow periods. Any planning of the major roads in East Kapolei will have to anticipate the location of the four schools.

The DOE appreciates the Revised DEA recognition that safety mitigations will also have to be planned for students crossing the Kapolei Parkway to attend Kapolei Middle and Kapolei High Schools.

The DOE has no further comment at this time but appreciates the opportunity to review the Revised DEA. If you have any questions, please call Rae Loui, Assistant Superintendent of the Office of Business Services, at 586-3444 or Heidi Meeker of the Facilities and Support Services Branch at 733-4862.

Thank you.

PH:HM:mp

Attachment

c: Rae Loui, OBS
Mamo Carreira, CAS, Campbell/Kapolei/Waianae Complex Area
Genevieve Salmonson, OEQC

LINDA LINGLE
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

RODNEY K. HARAGA
DIRECTOR

Deputy Directors
BRUCE Y. MATSUI
LORENN H. KOESTNER
DARWIN SELKIRK

IN REPLY REFER TO:

HWY-PA
2.5571

SEP 29 2004

TO. THE HONORABLE PATRICIA HAMAMOTO, SUPERINTENDENT
DEPARTMENT OF EDUCATION

FROM: RODNEY K. HARAGA
DIRECTOR OF TRANSPORTATION

SUBJECT: NORTH-SOUTH ROAD AND KAPOLEI PARKWAY
EWA, ISLAND OF OAHU
PROJECT NO. HWY-O-01-92
REVISED DRAFT ENVIRONMENTAL ASSESSMENT

Thank you for your memorandum of September 1, 2004, which commented on this project and its *Revised Draft Environmental Assessment.*

We agree that schools are major traffic generators and the planning of our proposed highways should be coordinated with the development of any nearby schools. The North-South Road and Kapolei Parkway are urgently needed at this time and the construction of these highways will very likely occur in advance of the location and design of the four schools envisioned for East Kapolei. However, the Department of Transportation should be consulted as these schools are being planned and minor adjustments of our highways may be implemented to accommodate necessary access or operational improvements.

In addition, we are very concerned and hopeful that appropriate safety measures will be provided along Kapolei Parkway, for the students of Kapolei Middle and Kapolei High Schools.

If any other questions or problems arise, please feel free to contact us at your earliest convenience.

LINDA LINGLE
GOVERNOR
STATE OF HAWAII

MICAH A. KANE
CHAIRMAN
HAWAIIAN HOMES COMMISSION

BEN HENDERSON
DEPUTY TO THE CHAIRMAN

SAUSANA H. PARK
EXECUTIVE ASSISTANT

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
PO BOX 1879
HONOLULU HAWAII 96805

September 16, 2004

Mr. Ronald Tsuzuki, Engineer
Program Manager
Department of Transportation
State of Hawaii
869 Punchbowl Street, Room 301
Honolulu, HI 96813

Dear Mr.Tsuzuki:

Subject: NORTH SOUTH ROAD AND KAPOLEI PARKWAY
REVISED DRAFT ENVIRONMENTAL ASSESSMENT

Thank you for the opportunity to comment on the above document. The Draft EA appeared to be very thorough. We wanted assurance that the proposed DHHL developments within East Kapolei were included in the assessment of traffic, noise and air quality impacts.

We recognize the fact that noise will be generated by vehicular traffic using the proposed Kapolei Parkway and North-South Road. However, the time expended on the design and conveyance of North-South Road by DOT has caused substantial delays (over one year) to our planning and design of our East Kapolei developments. If DHHL had proceeded with its development without considering its effects on the North-South Road or coordinating its development with the design of the North-South Road, DHHL's project would have then been considered an existing development and thus DOT would be required to provide appropriate sound attenuation measures.

The required setbacks (200 to 220 feet for North-South Road, and 95 to 100 feet for Kapolei Parkway), measured from the centerline of the roadways, are unacceptable since that requirement essentially condemns a substantially large portion of DHHL's Parcel B located on the west side of North-South Road.

It is also noted that the 50-foot wide utility corridor, which was once situated on the west side of North-South Road has shifted to the east side, thus placing the travelway even closer to our proposed development and thereby creating a greater impact than that stated in the EA.

We also question the need to address traffic, noise, and air quality impacts along Farrington Highway if this is not part of the proposed action. Further, it is assumed that the setback requirements for Kapolei Parkway only applies to the City's portion through Varona Village and not DHHL's portion - that between the Villages of Kapolei and the North-South Road intersection.

To alleviate this problem, we are requesting that DOT construct the sound attenuation barrier or wall within its right-of-way fronting Parcel B. This will allow our Department to fully utilize the limited lands we have available to meet our goals in serving the Native Hawaiian community.

If there are any questions regarding these comments, please feel free to contact me at 586-3801.

Mahalo and aloha,

Micah A. Kane, Chairman
Hawaiian Homes Commission

LINDA LINGLE
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

RODNEY K. HARAGA
DIRECTOR

Deputy Directors
BRUCE Y. MATSUI
LINDEN H. JOESTING
BRIAN H. SEKIGUCHI

IN REPLY REFER TO

HWY-PA
2.5571

SEP 29 2004

TO: THE HONORABLE MICAH A. KANE, CHAIRMAN
HAWAIIAN HOMES COMMISSION

FROM: RODNEY K. HARAGA
DIRECTOR OF TRANSPORTATION

SUBJECT: NORTH-SOUTH ROAD AND KAPOLEI PARKWAY
EWA, ISLAND OF OAHU
PROJECT NO. HWY-O-01-92
REVISED DRAFT ENVIRONMENTAL ASSESSMENT

Thank you for your letter dated September 16, 2004, which commented on the *Revised Draft Environmental Assessment* for this project.

We have the following responses to each of your comments and these responses have been placed in a corresponding order:

1. In accordance with our "Noise Analysis and Abatement Policy", as approved by the Federal Highway Administration, after a project's environmental analysis and documentation is finalized, the State Department of Transportation (DOT) will no longer be responsible for providing noise abatement for new developments. This document also defines "existing" developments (as opposed to "new" developments) as improvements that have received building permits.

   Hence, the proposed development in East Kapolei, by the Department of Hawaiian Home Lands, is considered a "new" development, and the DOT is not responsible for noise abatement measures which may be necessary for this development.

2. The residential setbacks, which are reflected in the Revised DEA, are recommended, not required. Beyond these setbacks, noise abatement measures are not necessary; within the highway setbacks, noise impacts should be further evaluated, to determine if feasible and reasonable courses of action are possible.

3. Because the project will intersect Farrington Highway, the potential effects of the proposed intersection should be disclosed. Potential traffic, noise and air quality impacts in the vicinity of Farrington Highway, which are caused by the proposed North-South Road/Farrington Highway intersection, are indicated in the Revised DEA and may only involve the immediate area of this intersection.

   In addition, we agree that the setback recommendation for Kapolei Parkway applies only to the portion under the jurisdiction of the City and County of Honolulu. The DHHL portion of Kapolei Parkway, which is located westerly of the North-South Road/Kapolei Parkway intersection, was not included in the noise analysis for this project.

4. Your request for a sound wall fronting Parcel B warrants our further evaluation and consideration. The construction of the western half of this project is several years away, and the installation of noise reduction features may be incorporated into this project phase. However, more discussions are needed and the detailed plans for your development of Parcel B should soon be submitted for our justification studies and programming requirements.

We appreciate your concerns for this project and our Native Hawaiian community, and we look forward to hearing from you.

DIR 1397

LINDA LINGLE
GOVERNOR OF HAWAII

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

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

In reply, please refer to
File No.

August 3, 2004

H0801gms

The Honorable Rodney K. Haraga, Director
State Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Haraga:

SUBJECT: North-South Road and Kapolei Parkway
H-1 Freeway to Renton Road, Ewa, Oahu
Project No. HWY-O-01-92

The following are our comments to the above Revised Draft Environmental Assessment.

1. The Office of Solid Waste Management recommends the development of a solid waste management plan that encompasses all project phases including demolition, construction, and occupation of the buildings.

   Specific examples of elements that the plan should address include:
   - Recycling greenwaste generated during clear and grub activities;
   - Recycling construction and demolition wastes, if appropriate; and
   - The use of locally produced compost in landscaping.

2. Hawaii Revised Statutes Chapter 103D-407 stipulates that all highway and road construction and improvement projects funded by the state or a country or roadways that are to be accepted by the State or a county as public roads shall utilize a minimum of ten percent crushed glass aggregate as specified by the department of transportation in all basecourse (treated or untreated) and subbase when the glass is available to the quarry or contractor at a price no great than that of the equivalent aggregate.

3. The developer shall ensure that all solid waste generated during project construction is directed to a Department of Health permitted solid waste disposal or recycling facility.

Should there be any questions, please contact Mr. Lane Otsu at 586-4226.

Sincerely,

STEVEN Y.K. CHANG, P.E., CHIEF
Solid and Hazardous Waste Branch

c: Office of Environmental Quality Control

DEPT OF TRANSPORTATION
HIGHWAYS DIVISION
2004 AUG 16 A 10:27

LINDA LINGLE
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

RODNEY K. HARAGA
DIRECTOR

Deputy Directors
BRUCE T. MATSUI
LINDEN H. JOESTING
BRIAN H. SEKIGUCHI

IN REPLY REFER TO

HWY-PA
2.5571

SEP 09 2004

TO: STEPHEN Y. K. CHANG, CHIEF
SOLID AND HAZARDOUS WASTE BRANCH
DEPARTMENT OF HEALTH

FROM: RODNEY K. HARAGA
DIRECTOR OF TRANSPORTATION

SUBJECT: NORTH-SOUTH ROAD AND KAPOLEI PARKWAY
EWA, ISLAND OF OAHU
PROJECT NO. HWY-O-01-92
REVISED DRAFT ENVIRONMENTAL ASSESSMENT

Thank you for your letter of August 3, 2004, which commented on the *Revised Draft Environmental Assessment* for this project.

We appreciate receiving your information regarding solid waste disposal and the use of recycled glass materials for this project. Please also be assured that your recommendations and requirements will be forwarded to our construction contractor and personnel.

If any other questions or problems arise, please feel free to contact us at your earliest convenience.

LINDA LINGLE
GOVERNOR OF HAWAII

OFFICE OF ENVIRONMENTAL QUALITY CONTROL
STATEWIDE TRANS. PLANNING OFFICE

AUG 25 11 11 AM '04

DEPARTMENT OF TRANSPORTATION

2004 AUG 24 P 1:01

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

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

In reply, please refer to
File/Log:

HWY-P

August 19, 2004

08055PKP.04

To: The Honorable Rodney K. Haraga, Director
Department of Transportation

Attention: Mr. Ronald Tsuzuki
Head Planning Engineer

From: Chiyome Leinaala Fukino, M.D., Director
Director of Health

Subject: **North-South Road and Kapolei Parkway**
H-1 Freeway to Renton Road, Ewa, Oahu
Project No. HWY-O-01-92

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

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

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

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

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

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

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

   e. Discharges of hydrotesting water.

   f. Discharges of construction dewatering effluent.

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

   h. Discharges of treated effluent from well drilling activities.

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

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

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

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

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

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

5. The DOH is in the process of readopting HAR, Chapters 11-54 and 11-55 to regulate the application of pesticides to surface waters of the State. This may include overspray of pesticide applied adjacent to surface waters. Therefore, the applicant may be required to apply for NPDES permit coverage should the revised regulations be in effect during the length of the project.

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

c: Office of Environmental Quality Control, DOH

DLK.1581

LINDA LINGLE
GOVERNOR OF HAWAII

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

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

09001PJS.04

September 3, 2004

The Honorable Rodney K. Haraga
Director
State Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813-5097

Attention: Mr. Ronald Tsuzuki
Head Planning Engineer

Dear Mr. Haraga:

Subject: Review and Comment on Revised Draft Environmental Assessment (DEA) for
North-South Road and Kapolei Parkway
H-1 Freeway to Renton Road, Ewa, Oahu
Project No. HWY-0-01-92

The Department of Health (DOH), Clean Water Branch (CWB), has reviewed the Revised DEA, dated July 2004. Surface waters along the proposed right-of-ways are classified as Class 2, Inland Waters (Hawaii Administrative Rules (HAR), Section 11-54-05.1(a)). The CWB has the following comments:

1. Pursuant to Section 401(a)(1) of the Federal Water Pollution Control Act (commonly known as the "Clean Water Act"), a Section 401 Water Quality Certification is required for "[a]ny applicant for Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may result in any discharge into the navigable waters..."

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

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

   b. Discharges of hydrotesting water.

   c. Discharges of construction dewatering effluent.

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

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

4. The HAR, Section 11-55-38, also requires the applicant to either submit a copy of the new NOI or NPDES permit application to the State Department of Land and Natural Resources, State Historic Preservation Division (SHPD), or demonstrate to the satisfaction of the DOH that the project, activity, or site covered by the NOI or application has been or is being reviewed by SHPD. Please submit a copy of the request for review by SHPD or SHPD's determination letter for the project.

Please note that, in general, anyone causing or contributing to a violation of the State water quality standards must apply for an NPDES permit coverage. Discharges which are not an integral and normal part of the operation, but are caused by heavy rains, floods or other events outside the reasonable control of the owner or operation must also be permitted. Point sources include vehicle wash discharges or a discharge of processed wastewater from your construction activity. If there is a discharge of any pollutant to State waters, Hawaii Revised Statutes, Section 342D-11, provides for penalties of up to $25,000 per day for each violation. The CWB reserves its right to seek penalties for all violations.

If you have any questions, please contact Ms. Joanna L. Seto of the Engineering Section, CWB, at 586-4309.

Sincerely,

Chiyome Leinaala Fukino, M.D.
Director of Health

c: State of Hawaii, Office of Environmental Quality Control, 235 S. Beretania Street, Suite 702, Honolulu, Hawaii 96813
Mr. Ronald Tsuzuki, Head Planning Engineer, State Department of Transportation
- via e-mail to ronald.tsuzuki@hawaii.gov only
Mr. Dean Yanagisawa, State Department of Transportation, Highways Division, Oahu District - via fax 831-6725 only
Mr. Gerald Takayesu, Head, Storm Water Quality Branch, City Department of Environmental Services, Division of Environmental Quality - via fax 692-5520 only

LINDA LINGLE
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

RODNEY K. HARAGA
DIRECTOR

Deputy Directors
BRUCE Y. MATSUI
LYNDEN H. JOESTING
BRIAN H. SEKIGUCHI

IN REPLY REFER TO

HWY-PA
2.5571

SEP 09 2004

TO: THE HONORABLE CHIYOME LEINAALA FUKINO, M.D.
DEPARTMENT OF HEALTH

FROM: RODNEY K. HARAGA
DIRECTOR OF TRANSPORTATION

SUBJECT: NORTH-SOUTH ROAD AND KAPOLEI PARKWAY
EWA, ISLAND OF OAHU
PROJECT NO. HWY-O-01-92
REVISED DRAFT ENVIRONMENTAL ASSESSMENT

Thank you for your letter of September 3, 2004 and your memorandum of August 19, 2004, which commented on the *Revised Draft Environmental Assessment* for this project.

Please be assured that we will fully comply with the requirements of Sections 401 and 404, of the Federal Water Pollution Control Act, and with Hawaii Administrative Rules (HAR), Section 11-55-38. We will also be requesting a National Pollutant Discharge Elimination System (NPDES) general permit, for stormwater discharges due to our construction activities, and we anticipate submitting a Notice of Intent for this permit.

In addition, there are no surface waters in the vicinity of this project, and we do not believe that the spraying of pesticides will be necessary; consequently, HAR, Chapters 11-54 and 11-55 may not be applicable to this project.

If any other questions or problems arise, please feel free to contact us at your earliest convenience.

LINDA LINGLE
GOVERNOR

LILLIAN B. KOLLER, ESQ.
DIRECTOR

HENRY OLIVA
DEPUTY DIRECTOR

STATE OF HAWAII
DEPARTMENT OF HUMAN SERVICES
BENEFIT, EMPLOYMENT AND SUPPORT SERVICES DIVISION
820 Mililani Street, Suite 606
Honolulu, Hawaii 96813

2004 AUG 24 P 4:08

August 23, 2004

Refer to: 04 0682

Hwy-P

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

Dear Mr. Haraga:

This is in response to your letter of July 22, 2004, requesting a departmental review on the Revised Draft Environmental Assessment of Project No. HWY-O-01-92.

Mr. Larry Higa, Oahu Section 2 Administrator of our Department oversees five offices of approximately 65 employees in the Kakuhehiwa State Office Building in Kapolei. An informal poll was conducted and majority of the staff felt that the project would not have any impact on the way work is accomplished. However, a small minority felt that possibly the project may add to the traffic and that may have an impact on both employees and clients, especially in the afternoon hours.

Thank you again for allowing us to comment. If there are any further questions, please feel free to call Mr. Higa at 587-3309.

Sincerely,

Henry Oliva
Deputy Director

c: SOH, Office of Environmental
Quality Control

AN EQUAL OPPORTUNITY AGENCY

LINDA LINGLE
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

RODNEY K. HARAGA
DIRECTOR

Deputy Directors
BRUCE Y. MATSUI
LINDEN H. JOESTING
BRIAN H. SEKIGUCHI

IN REPLY REFER TO

HWY-PA
2.5571

TO: THE HONORABLE HENRY OLIVA, DEPUTY DIRECTOR
DEPARTMENT OF HUMAN SERVICES

FROM: RODNEY K. HARAGA
DIRECTOR OF TRANSPORTATION

SUBJECT: NORTH-SOUTH ROAD AND KAPOLEI PARKWAY
EWA, ISLAND OF OAHU
PROJECT NO. HWY-O-01-92
REVISED DRAFT ENVIRONMENTAL ASSESSMENT

Thank you for your letter of August 23, 2004, which commented on this project and its *Revised Draft Environmental Assessment*.

We appreciate receiving the results on your informal survey. Contrary to your findings, we are hopeful that this project will significantly improve travel for your personnel and clients.

If any other questions or problems arise, please feel free to contact us at your earliest convenience.

LINDA LINGLE
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

AUG 27 P3:51

August 24, 2004

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DAN DAVIDSON
DEPUTY DIRECTOR FOR LAND

YVONNE Y. IZU
DEPUTY DIRECTOR FOR
THE COMMISSION ON
WATER RESOURCE MANAGEMENT

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

Dear Mr. Haraga:

Subject: North-South Road and Kapolei Parkway, H-1 Freeway to Renton Road, Ewa, Oahu, Project No. HWY-0-01-92, Revised Draft Environmental Assessment.

We appreciate the opportunity to comment on your subject request. DOFAW has been involved with developing a Habitat Conservation Plan (HCP) to mitigate the impacts that this project will have on the *Abutilon*. The partnership between DOT, HCDCH, UH West Oahu, and DLNR-DOFAW has produced an agreed working plan (HCP) to protect the endangered plants in the area. DOFAW will continue to work with DOT and we thank you for the opportunity to comment on the revised draft EA.

Sincerely yours,

Paul J. Conry
Administrator

C: OEQC
Vickie Caraway, DOFAW Administration
Bill Standley, DOFAW Administration
DOFAW, Oahu Branch

LINDA LINGLE
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

RODNEY K. HARAGA
DIRECTOR

Deputy Directors
BRUCE Y. MATSUI
LINDEN H. JOESTING
BRIAN H. SEKIGUCHI

IN REPLY REFER TO
HWY-PA
2.5571

TO: PAUL J. CONRY, ADMINISTRATOR
DIVISION OF FORESTRY AND WILDLIFE
DEPARTMENT OF LAND AND NATURAL RESOURCES

FROM: RODNEY K. HARAGA
DIRECTOR OF TRANSPORTATION

SUBJECT: NORTH-SOUTH ROAD AND KAPOLEI PARKWAY
EWA, ISLAND OF OAHU
PROJECT NO. HWY-O-01-92
REVISED DRAFT ENVIRONMENTAL ASSESSMENT

Thank you for your letter of August 24, 2004, which commented on the *Revised Draft Environmental Assessment* for this project.

We sincerely appreciate your continuing support of this project, and if any questions or concerns arise, please feel free to contact us at your earliest opportunity.

JJK 14148

LINDA LINGLE
GOVERNOR OF HAWAII

DEPT OF TRANSPORTATION
STATEWIDE TRANS.
PLANNING OFFICE
04 AUG 24 2 27 PM '04

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

DAN DAVIDSON
DEPUTY DIRECTOR - LAND

YVONNE Y. IZU
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
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KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809
August 16, 2004

KAPOLEIPARKWAY.RCH

LD-NAV

2004 AUG 19 A 10:10

Honorable Rodney K, Haraga,
Director
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Haraga:

SUBJECT: North-South Road and Kapolei Parkway
H-1 Freeway to Renton Road, Ewa, Oahu
Project No. HWY-O-01-92

Thank you for the opportunity to review and comment on the subject matter

A copy of the document pertaining to the proposed project was transmitted or made available to the following Department of Land and Natural Resources' Divisions for their review and comment.

- Division of Forestry & Wildlife
- Division of State Parks
- Engineering Division
- Commission on Water Resource Management
- Office of Conservation and Coastal Lands
- Land-Oahu District Land Office
- Land-Planning and Development

Enclosed please find a copy of Commission on Water Resource Management and Oahu District Land Office comment

Based on the attached responses, the Department of Land and Natural Resources has no other comment to offer on the subject matter.

Should you have any questions, please contact Nicholas A. Vaccaro of the Land Division Support Services Branch at 587-0384.

Very truly yours,

DIERDRE S. MAMIYA
Administrator

C: ODLO

LINDA LINGLE
GOVERNOR OF HAWAII

RECEIVED
04 JUL 26 A10:21
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

DAN DAVIDSON
DEPUTY DIRECTOR - LAND

YVONNE Y. IZU
DEPUTY DIRECTOR - WATER

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LAND DIVISION

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
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COMMISSION ON WATER RESOURCE MANAGEMENT
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CONSERVATION AND RESOURCES ENFORCEMENT
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LAND
STATE PARKS

July 23, 2004
LD/NAV

KAPOLEIPARKWAY.CHT
Suspense Date: 8/9/04

MEMORANDUM:

TO: *XXX Division of Forestry & Wildlife
*XXX Engineering Division
*XXX Division of State Parks
*XXX Commission on Water Resource Management
*XXX Office of Conservation and Coastal Lands
*XXX Land-Oahu District Land Office
*XXX Land-Planning and Development

FROM: Dierdre S. Mamiya, Administrator
Land Division

SUBJECT: North-South Road and Kapolei Parkway
H-1 Freeway to Re3nton Road, Ewa, Oahu
Project No. HWY-0-01-92ential

Please review the document pertaining to the subject matter and submit your comment (if any) on Division letterhead signed and dated by the suspense date.

*Note: One copy of the document is available for your review in the Land Division Office, Room 220.

Should you need more time to review the subject matter, please contact Nick Vaccaro at 587-0384. If this office does not receive your comments by the suspense date, we will assume there are no comments.

( ) We have no comments. (✓) Comments attached.

Date:_____ Signed: David Mamiya

Division_____ Name: David M. Higa

LINDA LINGLE
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
P.O. BOX 621
HONOLULU, HAWAII 96809

PETER T. YOUNG
CHAIRPERSON

MEREDITH J. CHING
CLAYTON W. DELA CRUZ
JAMES A. FRAZIER
CHIYOME L. FUKINO, M.D.
LAWRENCE H. MIIKE, M.D., J.D.
STEPHANIE A. WHALEN

YVONNE Y. IZU
DEPUTY DIRECTOR

July 28, 2004

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

Dear Mr. Haraga:

Thank you for allowing us to comment on the Revised Draft Environmental Assessment for the North-South Road and Kapolei Parkway, Project No. HWY-O-01-92.

The only watercourse this roadway project crosses is Kalol Gulch. This gulch is not considered to be a stream as defined in the Hawaii Water Code, therefore this project will not require a stream channel alteration permit pursuant to Hawaii Revised Statutes §174C-71.

The roadway project may require other agency approvals regarding water quality, wetlands, grading, grubbing, stockpiling, and floodway and drainageway maintenance. This letter does not constitute or imply compliance with other Federal, state or county rules.

If you have any questions regarding this letter, please call David Higa at 587-0249.

Sincerely,

YVONNE Y. IZU
Deputy Director

c. Office of Environmental Quality Control

LINDA LINGLE
GOVERNOR OF HAWAII

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

DAN DAVIDSON
DEPUTY DIRECTOR - LAND

YVONNE Y. IZU
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
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BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
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HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION
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HONOLULU, HAWAII 96809

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2004 AUG 10 A 10:4[illegible]

July 23, 2004
LD/NAV

KAPOLEIPARKWAY.CMT
Suspense Date: 8/9/04

HEMORANDUM:

TO: *XXX Division of Forestry & Wildlife
*XXX Engineering Division
*XXX Division of State Parks
*XXX Commission on Water Resource Management
*XXX Office of Conservation and Coastal Lands
*XXX Land-Oahu District Land Office
*XXX Land-Planning and Development

FROM: Dierdre S. Mamiya, Administrator
Land Division

SUBJECT: North-South Road and Kapolei Parkway
H-1 Freeway to Ru3nton Road, Ewa, Oahu
Project No. HWY-0-01-92ential

Please review the document pertaining to the subject matter and submit your comment (if any) on Division letterhead signed and dated by the suspense date.

*Note: One copy of the document is available for your review in the Land Division Office, Room 220.

Should you need more time to review the subject matter, please contact Nick Vaccaro at 587-0384. If this office does not receive your comments by the suspense date, we will assume there are no comments.

( ) We have no comments.
(✓) Comments attached

Date: Aug. 9, 2004
Signed:

Division Land
Name: Robert M. Ing

LINDA LINGLE
GOVERNOR OF HAWAII

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

DAN DAVIDSON
DEPUTY DIRECTOR - LAND

ERNEST Y.W. LAU
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
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KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

August 9, 2004

MEMORANDUM

TO: Dierdre S. Mamiya, Administrator
Land Division

FROM: Robert M. Ing, Land Agent RI
Oahu District Land Office OI

SUBJECT: North-South Road and Kapolei Parkway
H-1 Freeway to Renton Road, Ewa, Oahu
Project No. Hwy-0-01-92

COMMENTS:

Proposed North-South Road
The selected route for the North-South Road, herein "roadway", involves the following State lands that will require one or more land dispositions from our office:

1. (1) 9-1-016:108, 109 and 127.

Parcel 109- The roadway appears to require most, if not all of this 47.183 acre parcel. A perpetual utility easement that runs the entire length of this parcel has been issued to HECO.

Parcels 108 and 127-
The Northern half of parcel 108 and all of parcel 127 (approximately 500 Acres), was conveyed to the University of Hawaii on November 8, 2002 by Land Office Deed No. 28,594. It is pending the assignment of a new TMK number by the City and County Tax Office. A local farmer has a month-to-month permit with the University to use this area to grow crops.

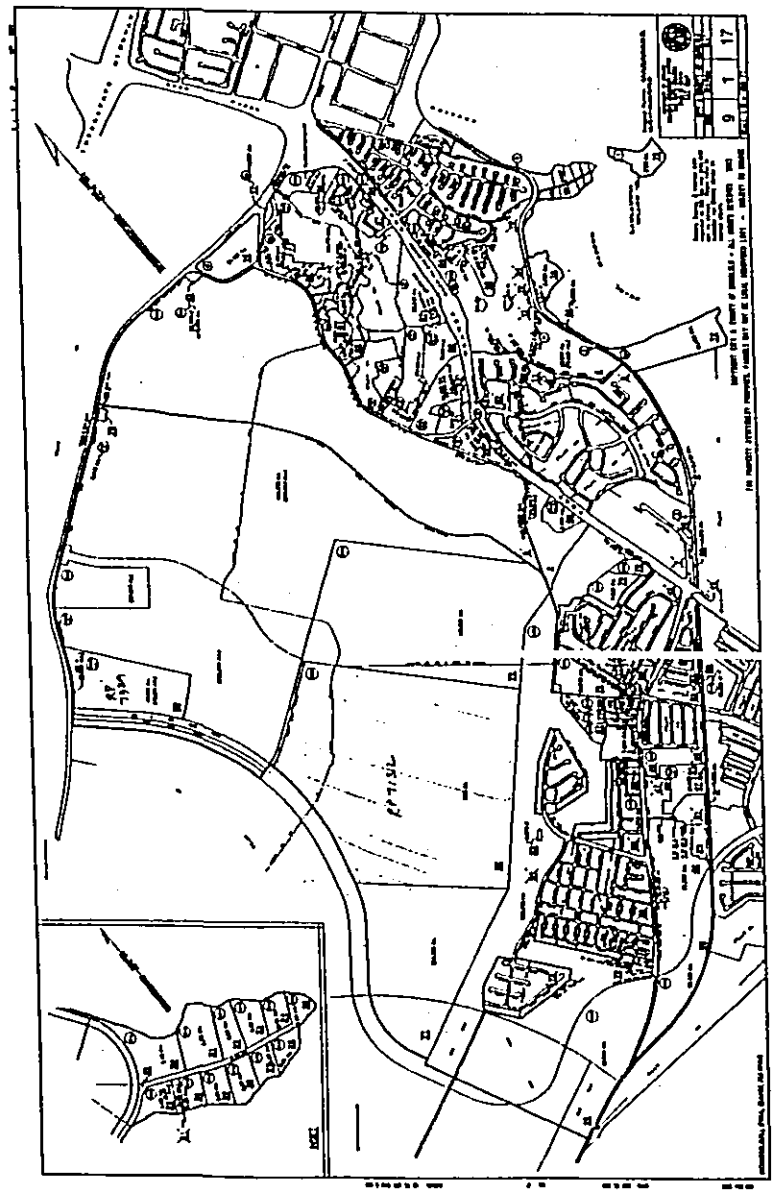
The Southern half of parcel 108 is DLNR land that is being conveyed to the Department of Hawaiian Homes Land (DHHL). A request to utilize any portion of

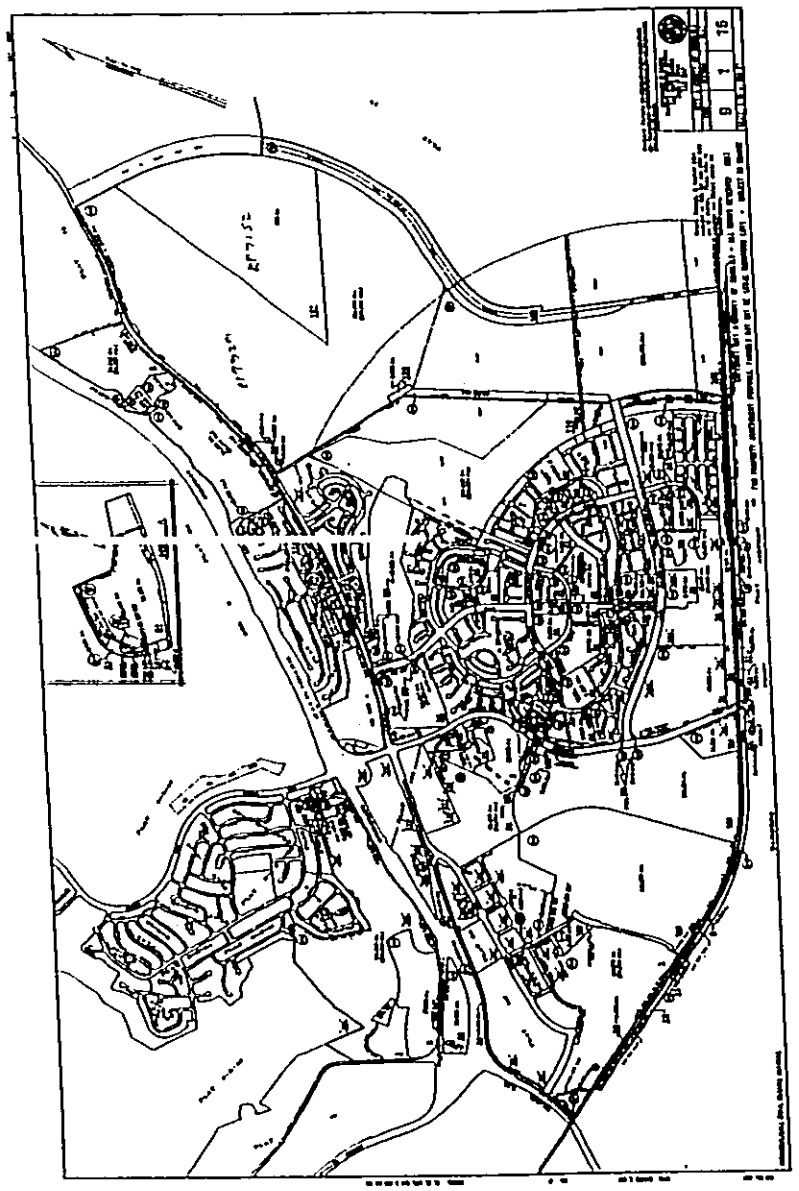
this area for the roadway will require a disposition or consent from DHHL, depending on when the conveyance occurs ; and

2. (1) 9-1-017:71, 66 & 88.

(Parcel 71)- Unencumbered DLNR land. Site of native Abutulon plants.
(Parcel 66)- DLNR land encumbered by month-to-month revocable permit (RP7329).
(Parcel 88)- DLNR land encumbered by month-to-month revocable permit (RP7152).

Proposed Kapolei Parkway Extension
This proposed extension will cross over State lands identified as TMK No. (1) 9-1-016:108. Land dispositions from DLNR and/or DHHL will need to be obtained prior to any use of this parcel for the proposed extension.





LINDA LINGLE
GOVERNOR OF HAWAII

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

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STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

GUY EDWARDS
DEPUTY DIRECTOR - LAND

TYOMAS T. EZU
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
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KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

July 23, 2004
LD/NAV

KAPOLEIPARKWAY.CMT
Suspense Date: 8/9/04

MEMORANDUM:

TO: *XXX Division of Forestry & Wildlife
*XXX Engineering Division
*XXX Division of State Parks
*XXX Commission on Water Resource Management
*XXX Office of Conservation and Coastal Lands
*XXX Land-Oahu District Land Office
*XXX Land-Planning and Development

FROM: Dierdre S. Mamiya, Administrator
Land Division

SUBJECT: North-South Road and Kapolei Parkway
H-1 Freeway to Re3nton Road, Ewa, Oahu
Project No. HWY-0-01-92ential

Please review the document pertaining to the subject matter and submit your comment (if any) on Division letterhead signed and dated by the suspense date.

*Note: One copy of the document is available for your review in the Land Division Office, Room 220.

Should you need more time to review the subject matter, please contact Nick Vaccaro at 587-0384. If this office does not receive your comments by the suspense date, we will assume there are no comments.

(√) We have no comments. ( ) Comments attached.

Date: AUG - 9 2004 Signed:

Division State Parks Name: Daniel S. Quinn

LINDA LINGLE
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

RODNEY K. HARAGA
DIRECTOR

Deputy Directors
BRUCE Y. MATSUI
LINDEN H. JOESTING
BRIAN H. SEKIGUCHI

IN REPLY REFER TO

HWY-PA
2.5571

SEP 10 2004

TO: DEIDRE S. MAMIYA, ADMINISTRATOR
LAND DIVISION
DEPARTMENT OF LAND AND NATURAL RESOURCES

FROM: RODNEY K. HARAGA
DIRECTOR OF TRANSPORTATION

SUBJECT: NORTH-SOUTH ROAD AND KAPOLEI PARKWAY
EWA, ISLAND OF OAHU
PROJECT NO. HWY-O-01-92
REVISED DRAFT ENVIRONMENTAL ASSESSMENT

Thank you for your letter of August 16, 2004, which commented on this project and its *Revised Draft Environmental Assessment*.

We appreciate receiving the information obtained by the Oahu District Land Office of the Land Division. In response to their comments, the Land Division will be contacted to coordinate the required land transfers for this project. In addition, it is anticipated that the proposed Kapolei Parkway will be located entirely on property owned by the City and County of Honolulu, and the project will not encroach upon the State-owned property, TMK (1)-9-1-016:108.

We are also appreciative of the information provided by the Commission on Water Resource Management and this will be appropriately reflected the project's final environmental assessment.

In addition, we are very grateful for your efforts regarding the coordination of your department's review, and if any other questions or problems arise, please feel free to contact us at your earliest convenience.

LINDA LINGLE
GOVERNOR OF HAWAII

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
235 SOUTH BERETANIA STREET
SUITE 702
HONOLULU, HAWAII 96813
TELEPHONE (808) 586-4185
FACSIMILE (808) 586-4186
E-mail: oeqc@health.state.hi.us

GENEVIEVE SALMONSON
DIRECTOR

July 27, 2004

Rodney Haraga
Department of Transportation
Highways Division
869 Punchbowl Street
Honolulu, HI 96813

Attn: Nelson Sagum

Dear Mr. Haraga:

Subject: Draft environmental assessment (EA), North-South Road & Kapolei Parkway

We have the following comments to offer:

Significance criteria: The analysis for this criterion, *Is individually limited but cumulatively has considerable effect upon the environment or involves a commitment for larger actions*, should be expanded in the final EA. If there is a possibility that a proposed project will lead to cumulative impacts, then an environmental impact statement must be prepared. If you feel that this is not the case for this project include an additional analysis giving your reasons why.

Funding: In the final EA indicate the percentages of federal, state and city/county funds involved.

Terminology: Section 3.3.1.1.b, *Traffic Conditions*, contains the terms "weaving maneuver" and "weaving segment." In the final EA define these terms.

Relocation of farms: Where will the farms be relocated to?

If you have any questions, call Nancy Heinrich at 586-4185.

Sincerely,

GENEVIEVE SALMONSON
Director

c: Wayne Yoshioka, Parsons Brinckerhoff

LINDA LINGLE
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

RODNEY K. HARAGA
DIRECTOR

Deputy Directors
BRUCE Y. MATSUI
LINCOLN H. JOLSTING
BRIAN H. SEKIGUCHI

IN REPLY REFER TO

HWY-PA
2.5571

SEP 09 2004

TO: THE HONORABLE GENEVIEVE SALMONSON, DIRECTOR
OFFICE OF ENVIRONMENTAL QUALITY CONTROL

FROM: RODNEY K. HARAGA
DIRECTOR OF TRANSPORTATION

SUBJECT: NORTH-SOUTH ROAD AND KAPOLEI PARKWAY
EWA, ISLAND OF OAHU
PROJECT NO. HWY-O-01-92
REVISED DRAFT ENVIRONMENTAL ASSESSMENT

Thank you for your letter of July 27, 2004, which commented on the *Revised Draft Environmental Assessment* for this project.

We have the following responses for each of your comments, and these responses have been placed in a corresponding order:

1. The analysis provided in Chapter 5, regarding whether the project would cause a significant cumulative impact on the environment, will be revised. The proposed action is a complete project with logical termini and does not lead directly to other highway projects. The proposed action will not cumulatively have a considerable effect on the environment.

2. The requested information will be included in the project's Final Environmental Assessment. Eighty percent of the rights-of-way and construction costs for the North-South Road would be provided by the Federal government and twenty percent would provided by the State. Eighty percent of the construction costs for Kapolei Parkway would be provided by the Federal government and twenty percent would be provided by the City and County of Honolulu.

3. The text in Section 3.3.1b will be revised in the following manner so that it would be easier to understand (new text underscored): "Northbound traffic . . . weave (vehicles originating . . . complete a lane change, whereas other vehicles originating from Ewa and Ewa Beach destined for eastbound H-1 Freeway do not have to execute a lane change)." Weaving refers to the crossing movement of vehicles from either lane to the next or adjacent lane.

4. As noted in Section 3.1 of the Revised DEA, farm relocations will not be necessary. This will be clarified in the project's final environmental assessment.

We appreciate your continued assistance, and if any other questions or problems arise, please feel free to contact us at your earliest convenience.

UNIVERSITY OF HAWAI'I AT MĀNOA

Department of Civil and Environmental Engineering
2540 Dole Street, Holmes Hall 383, Honolulu, Hawai'i 96822-2382
Telephone: (808) 956-7550, Facsimile: (808) 956-5014

August 18, 2004

MEMORANDUM

TO: John T. Harrison
Director, UH Environmental Center

FROM: Panos D. Prevedouros, Ph.D.
Associate Professor

SUBJECT: North-South Road Study – Revised Draft EA

The study was reviewed by two PhD students specializing in traffic engineering and myself. The traffic component of this Environmental Assessment and the detailed analyses in the Appendix Volume are properly done and documented. There is abundant evidence in this analysis (and in news reports) about traffic levels of service of E and F on movements that carry over 2,000 vehicles per hour. This project is sorely needed for the Kapolei, Ewa and Ewa Beach communities at the present time. The 2025 projections are unnecessary proofs of necessity, so any possible concerns about forecasting errors or assumptions are mute. Incidentally, this highway development will benefit any future expansions of the UH in central Oahu by providing an interchange abutting the proposed site of the new UH campus.

LINDA LINGLE
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

RODNEY K. HARAGA
DIRECTOR

Deputy Directors
BRUCE Y. MATSUI
LINDEN H. JOESTING
BRIAN H. SEKIGUCHI

IN REPLY REFER TO

HWY-PA
2.5571

SEP 09 2004

Mr. Panos D. Prevedouros, Ph.D.
Associate Professor
Department of Civil and Environmental Engineering
University of Hawaii
2540 Dole Street, Holmes Hall 383
Honolulu, Hawaii 96822-2382

Dear Dr. Prevedouros:

Subject: North-South Road and Kapolei Parkway
Ewa, Island of Oahu
Project No. HWY-O-01-92
Revised Draft Environmental Assessment

Thank you for sending us a copy of your memorandum dated August 18, 2004, which commented on this project and its *Revised Draft Environmental Assessment*, as prepared pursuant to Chapter 343, Hawaii Revised Statutes.

We appreciate your support of this important project and concur with your assessment regarding the potential benefits of the proposed highways to the West Oahu Campus of the University of Hawaii.

If any other concerns or problems arise, please feel free to contact us.

Very truly yours,

RODNEY K. HARAGA
Director of Transportation

DIR-1475

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843

JEREMY HARRIS, Mayor

EDDIE FLORES, JR., Chairman
CHARLES A. STED, Vice Chairman
HERBERT S. K. KAOPUA, SR.
CAROLYN H. LENDIO

RODNEY K. HARAGA, Ex Officio
LARRY J. LEOPARDI, Ex Officio

CLIFFORD S. JAMILE
Manager and Chief Engineer

DONNA FAY K. KIYOSAKI
Deputy Manager and Chief Engineer

2004 AUG 24 P 1:

August 16, 2004

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

Dear Mr. Haraga:

Subject: Your Letter of July 22, 2004 on the Revised Draft Environmental Assessment for the North-South Road and Kapolei Parkway, H-1 Freeway to Renton Road

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

The construction drawing should be submitted for our approval.

If you have any questions, please contact Joseph Kaakua 748-5442.

Very truly yours,

K. Jamile

for CLIFFORD S. JAMILE
Manager and Chief Engineer

cc: Office of Environmental Quality Control

Pure Water . . . our greatest need – use it wisely

LINDA LINGLE
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

SEP 10 2004

RODNEY K. HARAGA
DIRECTOR

Deputy Directors
BRUCE Y. MATSUI
LINDA H. JOESTING
BRIAN H. SEKIGUCHI

IN REPLY REFER TO

HWY-PA
2.5571

Mr. Clifford S. Jamile
Manager and Chief Engineer
Board of Water Supply
City and County of Honolulu
630 South Beretania Street
Honolulu, HI 96843

Dear Mr. Jamile:

Subject: North-South Road and Kapolei Parkway
Ewa, Island of Oahu
Project No. HWY-O-01-92
Revised Draft Environmental Assessment

Thank you for your letter of August 16, 2004, which commented on this project and its *Revised Draft Environmental Assessment*.

As you have indicated, our final plans for this project will be submitted to the Board of Water Supply, for review and approval.

If any questions or problems arise, please feel free to contact us at your earliest convenience.

Very truly yours,

Rodney Haraga

RODNEY K. HARAGA
Director of Transportation

DR 1449

DEPARTMENT OF COMMUNITY SERVICES
CITY AND COUNTY OF HONOLULU
715 SOUTH KING STREET, SUITE 311 • HONOLULU, HAWAII 96813
TELEPHONE: (808) 527-5311 • FAX: (808) 527-5498 • INTERNET: www.co.honolulu.hi.us

JEREMY HARRIS
MAYOR

MICHAEL T. AMII
DIRECTOR

JOHN B. SABAS
DEPUTY DIRECTOR

August 16, 2004

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

Dear Mr. Haraga:

Subject: Draft Environmental Assessment
North-South Road and Kapolei Parkway
Project No. HWY-O-01-92

The Department of Community Services (DCS) appreciates the opportunity to review and comment on the subject draft environmental assessment (EA).

Based on our review of the draft EA, we have determined that the proposed project will have no direct impact on any DCS projects or programs. As noted in Section 3.10 of the draft EA the Kapolei Parkway will enter the Ewa Villages Historic District and intersect Renton Road between Renton Village and Varona Village. We note in the draft EA that the Department of Transportation will be responsible for compliance with Section 106 of the National Historic Preservation Act as it relates to the impact of the proposed project on the Ewa Villages Historic District. To that end we urge your continued consultation with the State Historic Preservation Office and other interested entities to ensure Section 106 compliance.

The proposed North-South Road and Kapolei Parkway are essential elements of the transportation network for the Ewa/Kapolei region. DCS is supportive of efforts that contribute to the development of the Ewa/Kapolei region, particularly projects like the North-South Road and Kapolei Parkway, which will enhance mobility for area residents and businesses.

Thank you again for the opportunity to provide these comments. Questions regarding this matter may be directed to Mr. Keith Ishida at 527-5092.

Sincerely,

MICHAEL T. AMII
Director

cc: Office of Environmental Quality Control
Department of Transportation Services

2004 AUG 19 A 10:09

DEPT OF TRANSPORTATION
STATEWIDE TRANS.
PLANNING OFFICE
AUG 24 2 27 PM '04

LINDA LINGLE
GOVERNOR

RODNEY K. HARAGA
DIRECTOR

Deputy Directors
BRUCE Y. MATSUI
LINDEN H. JOESTING
BRIAN H. SEKIGUCHI

IN REPLY REFER TO

HWY-PA
2.5571

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

SEP 29 2004

Mr. Michael T. Amii
Director
Department of Community Services
City and County of Honolulu
715 South King Street, Suite 311
Honolulu, HI 96843

Dear Mr. Amii:

Subject: North-South Road and Kapolei Parkway
Ewa, Island of Oahu
Project No. HWY-O-01-92
Revised Draft Environmental Assessment

Thank you for your letter of August 16, 2004, which commented on this project and its *Revised Draft Environmental Assessment*.

Pursuant to Section 106 of the National Historic Preservation Act, we have consulted with several agencies and individuals, including the State Historic Preservation Division of the Department of Land and Natural Resources, the Office of Hawaiian Affairs, and the Oahu Island Burial Council. Documentation of this consultation will be provided in the project's final environmental assessment.

We appreciate your support of this project, and if any questions or problems arise, please feel free to contact us at your earliest convenience.

Very truly yours,

RODNEY K. HARAGA
Director of Transportation

DEPARTMENT OF FACILITY MAINTENANCE
CITY AND COUNTY OF HONOLULU
1000 ULUOHIA STREET, SUITE 215, KAPOLEI, HAWAII 96707
TELEPHONE: (808) 693-3694 FAX: (808) 693-4457

JEREMY HARRIS
MAYOR

LARRY J. LEOPARDI, P.E.
DIRECTOR AND CHIEF ENGINEER

IN REPLY REFER TO:
DRM 04-723

August 23, 2004

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

Dear Mr. Haraga:

Subject: North-South Road and Kapolei Parkway
H-1 Freeway to Renton Road, Ewa, Oahu
Project No. HWY-01-01-92

Thank you for the opportunity to review and comment on the Revised Draft Environmental Assessment for the subject project.

Our only comment regarding the project at this time is to increase the proposed 4-foot wide planting strip area noted on the Kapolei Parkway Typical Section, Figure S-3, to a minimum of 6 feet. In time, the trunk and roots of planted trees will overtake this narrow strip and damage the adjacent sidewalks, curbs and gutters.

Should you have any questions, please call Charles Pignataro of our Division of Road Maintenance, at 484-7697.

Very truly yours,

LARRY LEOPARDI, P.E.
Director and Chief Engineer

cc: Office of Environmental Quality Control

LINDA LINGLE
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

RODNEY K. HARAGA
DIRECTOR

Deputy Directors
BRUCE Y. MATSUI
LINDEN H. JOESTING
BRIAN H. SEKIGUCHI

IN REPLY REFER TO:

HWY-PA
2.5571

Mr. Larry Leopardi, P.E.
Director and Chief Engineer
Department of Facility Maintenance
City and County of Honolulu
1000 Uluohia Street, Suite 215
Kapolei, HI 96707

Dear Mr. Leopardi:

Subject: North-South Road and Kapolei Parkway
Ewa, Island of Oahu
Project No. HWY-O-01-92
Revised Draft Environmental Assessment

Thank you for your letter of August 23, 2004, which commented on this project and its *Revised Draft Environmental Assessment*.

Your comment has been submitted to the Department of Design and Construction, City and County of Honolulu, for their review and response. They have indicated that appropriate foliage and groundcover will be planted. In addition, the proposed 4-foot planting strip is consistent with other planned and existing sections of Kapolei Parkway, and because of the limitations of the proposed right-of-way, a wider planting strip may not be possible.

We appreciate your coordination efforts, and if any other problems or questions arise, please feel free to contact us.

Very truly yours,

RODNEY K. HARAGA
Director of Transportation

DEPT OF TRANSPORTATION
STATEWIDE PLANNING OFFICE
Aug 17 9 57 AM '04

FIRE DEPARTMENT
CITY AND COUNTY OF HONOLULU
3375 KOAPAKA STREET, SUITE H425 • HONOLULU, HAWAII 96819-1869
TELEPHONE: (808) 831-7761 • FAX: (808) 831-7750 • INTERNET: www.honolulu.gov

JEREMY HARRIS
MAYOR

ATTILIO K. LEONARDI
FIRE CHIEF

JOHN CLARK
DEPUTY FIRE CHIEF

August 12, 2004

Aug 23 8 36 AM '04
HIGHWAYS
PLANNING

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

Dear Mr. Haraga:

Subject: Revised Draft Environmental Assessment (DEA)
North-South Road and Kapolei Parkway
H-1 Freeway to Renton Road
Ewa, Oahu, Hawaii
Project No. HWY-O-01-92

We received your letter dated July 22, 2004, requesting our review and comments on the above-mentioned DEA.

The Honolulu Fire Department has no objections to the proposed revisions.

Should you have any questions, please call Battalion Chief Lloyd Rogers of our Fire Prevention Bureau at 831-7778.

Sincerely,

JOHN CLARK
Acting Fire Chief

JC/SK:bh

cc: Genevieve Salmonson, Director
Office of Environmental Quality Control

LINDA LINGLE
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

RODNEY K. HARAGA
DIRECTOR

Deputy Directors
BRUCE Y. MATSUI
LYNDON H. JOESTING
BRIAN H. SEKIGUCHI

IN REPLY REFER TO

HWY-PA
2.5571

Mr. John Clark
Acting Fire Chief
Fire Department
City and County of Honolulu
3375 Koapaka Street, Suite H425
Honolulu, HI 96819-1869

Dear Chief Clark:

Subject: North-South Road and Kapolei Parkway
Ewa, Island of Oahu
Project No. HWY-O-01-92
Revised Draft Environmental Assessment

Thank you for your letter of August 12, 2004, which commented on the *Revised Draft Environmental Assessment* for this project.

We appreciate your review of this document, and if any problems or questions arise, please feel free to contact us.

Very truly yours,

RODNEY K. HARAGA
Director of Transportation

DEPARTMENT OF PARKS AND RECREATION
CITY AND COUNTY OF HONOLULU
1000 ULUOHIA STREET, SUITE 309 • KAPOLEI, HAWAII 96707
TELEPHONE: (808) 692-5601 • FAX: (808) 692-5135 • INTERNET: www.co.honolulu.hi.us

JEREMY HARRIS
MAYOR

WILLIAM D. BALFOUR, JR.
DIRECTOR

EDWARD T. "SKIPPA" DIAZ
DEPUTY DIRECTOR

July 28, 2004

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

Dear Mr. Haraga:

Subject: Draft Environmental Assessment North-South Road
and Kapolei Parkway H-1 Freeway to Renton Road, Ewa,
Oahu Project No. HWY-O-01-92

Thank you for the opportunity to review and comment on the Draft Environmental Assessment relating to the North-South Road and Kapolei Parkway.

The Department of Parks and Recreation has no comment on the proposed highway improvements.

Should you have any questions, please contact Mr. John Reid, Planner, at 692-5454.

Sincerely,

WILLIAM D. BALFOUR, JR.
Director

WDB:mk
(70226)

cc: Office of Environmental Quality Control

LINDA LINGLE
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

RODNEY K. HARAGA
DIRECTOR

Deputy Directors
BRUCE Y. MATSUI
LINDEN H. JOESTING
SHARI H. SEKIGUCHI

IN REPLY REFER TO

HWY-PA
2.5571

Mr. William D. Balfour, Jr.
Director
Department of Parks and Recreation
City and County of Honolulu
1000 Uluohia Street, Suite 309
Kapolei, HI 96707

Dear Mr. Balfour:

Subject: North-South Road and Kapolei Parkway
Ewa, Island of Oahu
Project No. HWY-O-01-92
Revised Draft Environmental Assessment

Thank you for your letter of July 28, 2004, regarding the *Revised Draft Environmental Assessment* for this project.

We appreciate your review of this document, and if any problems or questions arise, please feel free to contact us.

Very truly yours,

RODNEY K. HARAGA
Director of Transportation

POLICE DEPARTMENT
CITY AND COUNTY OF HONOLULU
801 SOUTH BERETANIA STREET
HONOLULU, HAWAII 96813 - AREA CODE (808) 529-3111
http://www.honolulupd.org
www.co.honolulu.hi.us

GLEN R. KAJIYAMA
ACTING CHIEF

[illegible] B. PUTZULO
DEPUTY CHIEF

OUR REFERENCE CS-DK

August 12, 2004

HWY-P

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

Dear Mr. Haraga:

Thank you for the opportunity to review and comment on the Revised Draft Environmental Assessment for the North-South Road and Kapolei Parkway, H-1 Freeway to Renton Road, Project No. HWY-O-01-92.

This project will have an overall positive impact on the community and services provided by the Honolulu Police Department, as it will alleviate some of the existing traffic congestion in the area.

If there are any questions, please call Captain Gregory Lefcourt of District 8 at 692-4253 or Ms. Carol Sodetani of the Support Services Bureau at 529-3658.

Sincerely,

GLEN R. KAJIYAMA
Acting Chief of Police

By
KARL GODSEY
Assistant Chief of Police
Support Services Bureau

cc: OEQC

Serving and Protecting with Aloha

LINDA LINGLE
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

RODNEY K. HARAGA
DIRECTOR

Deputy Directors
BRUCE Y. MATSUI
LINDEN H. JOESTING
BRIAN H. SEKIGUCHI

IN REPLY REFER TO

HWY-PA
2.5571

SEP 29 2004

Mr. Boise Correa
Chief
Police Department
City and County of Honolulu
801 South Beretania Street
Honolulu, HI 96818

Dear Chief Correa:

Subject: North-South Road and Kapolei Parkway
Ewa, Island of Oahu
Project No. HWY-O-01-92
Revised Draft Environmental Assessment

Thank you for your letter of August 12, 2004, which commented on this project and its *Revised Draft Environmental Assessment*.

We agree with your comment and are appreciative of your support for this project.

If any questions or problems arise, please feel free to contact us.

Very truly yours,

RODNEY K. HARAGA
Director of Transportation

DIR 1341

The Senate
The Twenty-Second Legislature
of the
State of Hawaii
STATE CAPITOL
HONOLULU, HAWAII 96813

July 29, 2004

Mr. Rod Haraga, Director
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Haraga,

I have been in receipt of the:

NORTH-SOUTH ROAD and KAPOLEI PARKWAY
H-1 Freeway to Renton Road,
Ewa, Oahu, Hawaii
Revised Draft Environmental Assessment

In a perfect world, this thoroughfare would have been completed prior to any permits for additional housing rendered. The city and state are lagging behind in the design, planning, and construction for the infrastructure required to accommodate the growth in housing, industrial, and commercial expansion proposed.

It is of absolute necessity, that the North-South Road and Kapolei Parkway be completed as soon as possible. Traffic relief is overdue as our area roads are at, or exceeding their carrying capacity.

After careful review of the Revised Draft Environmental Assessment, it is apparent that numerous parties and individuals came together to put this road on the map with the best of intentions and usefulness as soon as it could be done. I applaud the efforts of all those who contributed to bring us to this point and will do everything in my position to assist and secure funding to make the roadway a reality.

Respectfully,

Willie C. Espero

Willie C. Espero
State Senator

LINDA LINGLE
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

RODNEY K. HARAGA
DIRECTOR

Deputy Directors
BRUCE Y. MATSUI
LYNDEN H. JOESTING
BRIAN H. SENGUCHI

IN REPLY REFER TO

HWY-PA
2.5571

The Honorable Willie C. Espero
State Senator. 20th District
The Twenty-Second State Legislature
State of Hawaii
State Capitol
Honolulu, HI 96813

Dear Senator Espero:

Subject: North-South Road and Kapolei Parkway
Ewa, Island of Oahu
Project No. HWY-O-01-92
Revised Draft Environmental Assessment

Thank you for your letter of July 29, 2004, which commented on this project and its *Revised Draft Environmental Assessment*, as prepared pursuant to Chapter 343, Hawaii Revised Statutes.

We agree with your assessment regarding the necessity of the North-South Road and Kapolei Parkway in Ewa and are anxiously anticipating the start of construction, for the North-South Road, in January 2005. The project was recently delayed due to federal requirements involving floodplain management and impacts on the Ewa Villages Historic District; these requirements have been met, and consequently, the environmental assessment, as prepared in accordance with the National Environmental Policy Act, will soon be approved and processed.

Your support of this project throughout its development, has been monumental and is sincerely appreciated. In the years ahead, the level of construction funding for this project will be significant and your continuing assistance at the State Legislature will again be needed to assure the completion of the North-South Road and Kapolei Parkway.

If you have any questions or problems, please feel free to contact us at your earliest convenience.

Very truly yours,

RODNEY K. HARAGA
Director of Transportation

4IK-1454

Ewa by Gentry
Ewa By Gentry Community Association
91-1795 A Keaunui Drive • Ewa Beach, Hawaii 96706 • Tel: (808) 685-0111 • Fax: (808) 685-0114

DEPT OF TRANSPORTATION SERVICES TRANS. OFFICE

Aug 24 2 27 PM '04

2004 AUG 23 P 1:09

August 20, 2004

Mr. Rodney K. Haraga, Director
State of Hawai'i
Department of Transportation
869 Punchbowl Street
Honolulu, HI 96813

Re: North-South Road and Kapolei Parkway
H-1 Freeway to Renton Road, Ewa, Oahu
Project No. HWY-O-01-92

Aug 25 9 11 AM '04

Aloha,

On behalf of the residents of the Ewa by Gentry Community Association, I appreciate the opportunity to comment in support of Project No. HWY-O-01-92, as described in the *Revised Draft Environmental Assessment July 2004*.

Our Community has grown very quickly in the past fifteen years, and the addition of other developments in our area has stressed the capacity of the service streets to move commuters in, out, and around Ewa Beach. A project to connect the existing sections of Kapolei Parkway, and to begin the North-South Road connection to the H-1 is many years overdue. While I am aware that our developer, Gentry Homes, is responsible for the construction of Kapolei Parkway through our community, approval for such things as stop lights and stop signs is dependant on City and State Departments of Transportation. I want to call to your attention that the subdivisions of Hu'ehani, Sun Terra on the Park, Sun Terra South, Coronado, Del Verde, and Kula Lei use Kapolei Parkway as their way to and from their homes. Additionally, Geiger Park is bordered on one side by Kapolei Parkway, meaning our children and families must cross this busy, and soon to be busier street, to use the park. I must express in the strongest possible terms that our community expects that approval for stop lights, stop signs, and crosswalks will be forthcoming so that these essential safety measures can be in place BEFORE the traffic begins flowing along Kapolei Parkway. The residents of Ewa by Gentry do not want repeats of the accidents and injuries that had to occur before Gentry Homes could get approval for lights at Luanahele and Geiger, and Keaunui and Iroquois.

Logic dictates that the traffic flow will support the need for lights, so please facilitate coordination of the approval and installation of these essential safety measures so that they can be operational with the opening of new section of Kapolei Parkway.

Sincerely,

Susan York
Board President

LINDA LINGLE
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

RODNEY K. HARAGA
DIRECTOR

Deputy Directors
BRUCE T. MATSUI
LINCOLN H. KOLESTRO
BRIAN H. SEKIGUCHI

IN REPLY REFER TO

HWY-PA
2.5571

Ms. Susan York
Board President
Ewa By Gentry Community Association
91-1795 A Keaunui Drive
Ewa Beach, HI 96706

Dear Ms. York:

Subject: *North-South Road and Kapolei Parkway*
Ewa, Island of Oahu
Project No. HWY-O-01-92
Revised Draft Environmental Assessment

Thank you for your letter of August 20, 2004, which commented on this project and its *Revised Draft Environmental Assessment*.

Since Kapolei Parkway is under the jurisdiction of the City and County of Honolulu, your letter has been forwarded to their Department of Design and Construction, and hence, we believe that they are indeed aware of the concerns of your community. They have indicated that a traffic signal for the Kapolei Parkway/Geiger Road intersection is currently under design and is expected to be installed soon. Traffic signals at other intersections along Kapolei Parkway, such as at Kolowaka Drive, will be implemented when warranted.

We are appreciative of your support for this project, and if any questions or problems arise, please feel free to contact us at your earliest convenience.

Very truly yours,

RODNEY K. HARAGA
Director of Transportation

DIR 1474

Garst

94-880 Kunia Road
P.O. Box 6
Kunia, HI 96759

Hawaii Research Station
Office: 808-688-1477
Fax: 808-688-1479

DIRECTOR'S OFFICE
TRANSPORTATION

2004 AUG 24 P 1:12

Mr. Rodney K. Haranga, Director
State of Hawaii
Department of Transportation
869 Punchbowl Street
Honolulu, HI 96813

August 23, 2004

Mr. Haranga:

Re: Project No. HWY-O-01-92

Thank you for allowing Garst Seed Co. to comment on the Revised DEA for the North South Road and Kapolei Parkway. Garst Seed's interest in the project stems from our cooperative grower agreement with Mr. Larry Jefts and Sugarland Farms.

We believe the impact on agriculture as detailed in chapter 3.2 Geology, Soils and Farmland is understated. Actual farmland displaced by the roadway may be minimal but potential negative effects are greater.

There appears to be a discrepancy between the two sections of chapter 3. Section 3.2.2 POTENTIAL IMPACTS states that "it was determined that Palehua Road will be maintained for vehicle access by tenants mauka of the H-1 Freeway..."

Section 3.2.3 MITIGATION MEASURES states that "Existing unlicensed agricultural vehicle crossings of the North-South Road will be maintained during construction..[and] Access between mauka and makai areas in the vicinity of Palehua Road will be maintained during construction... "

What appears lacking is a clear statement regarding the Operational Phase, which simply states, "Unlicensed agricultural vehicles will be allowed on Palehua Road..." However, if the project cuts off Palehua Road at the freeway it effectively severs a critical link between farm locations. This will render several hundred acres of farmland far less accessible to our operations.

The "cane haul" roads like Palehua are vital resources that make the agricultural land in this area useable and allow agriculture to coexist with urban and industrial uses. They also afford a far safer alternative to use of the public roadways. If the cross freeway access is broken, the alternative will be to use Farrington Highway, Fort Weaver and Kunia Roads for slow moving agricultural vehicular traffic. We are fairly certain that this would be permissible under Hawaii statute but certainly not a preferred alternative.

We seek clarification on this point and urge that the North South freeway underpass be maintained for agricultural traffic.

Sincerely,

Thomas R. Hill
Hawaii Parent Seed Supervisor
Garst Seed Co.

Cc: Office of Environmental Quality Control

LINDA LINGLE
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

RODNEY K. HARAGA
DIRECTOR

Deputy Directors
BRUCE Y. MATSUI
LINDEN H. JOESTING
BRIAN H. SEKIGUCHI

IN REPLY REFER TO
HWY-PA
2.5571

[illegible] 2004

Mr. Thomas R. Hill
Hawaii Parent Seed Supervisor
Garst Seed Company
94-880 Kunia Road
P.O. Box 8
Kunia, HI 96759

Dear Mr. Hill:

Subject: North-South Road and Kapolei Parkway
Ewa, Island of Oahu
Project No. HWY-O-01-92
Revised Draft Environmental Assessment

Thank you for your letter of August 23, 2004, which commented on the *Revised Draft Environmental Assessment* (DEA) for this project.

As stated in the Revised DEA, during the project's construction and interim phase, access to Palehua Road will be maintained, and travel between farms just mauka and/or makai of the H-1 Freeway could be accomplished via Palehua Road. However, during the ultimate phase of this project, Palehua Road will be severed by proposed improvements for the North-South Road and Interchange, and access to farming areas, which are located on either side of the H-1 Freeway, would be accomplished via the North-South Road. The final environmental assessment will be appropriately revised to clarify this issue.

We trust that your concerns have been addressed, and if any other questions or problems arise, please feel free to contact us at your earliest convenience.

Very truly yours,

RODNEY K. HARAGA
Director of Transportation

DIR 1591

THE GAS COMPANY

P.O. Box 3000
Honolulu, Hawaii 96802-3000

2004 SEP -9 P 1:24

September 7, 2004

State of Hawaii
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813-5097

Attention: Mr. Rodney K. Haraga
Director

Gentlemen:

Subject: Draft Environmental Assessment for
North-South Road and Kapolei Parkway
H-1 Freeway to Renton Road, Ewa, Oahu

Please be advised that The Gas Company, LLC maintains underground utility gas mains in the project vicinity, which serves commercial and residential customers in the area and is interconnected with the utility network in Ewa. We would appreciate your consideration during the project planning and design process to minimize any potential conflicts with the existing gas facilities in the project area.

Thank you for the opportunity to comment on the Draft Environmental Assessment. Should there be any questions, or if additional information is desired, please call Chris Anderson at 594-5564.

Sincerely,

Charles B. Calvet, P.E.
Manager, Engineering

CBC:krs
04-233

cc: State of Hawaii, Office of Environmental Quality Control

LINDA LINGLE
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

RODNEY K. HARAGA
DIRECTOR

Deputy Directors
BRUCE Y. MATSUI
LINDEN H. JOESTING
BRIAN H. SEKIGUCHI

IN REPLY REFER TO

HWY-PA
2.5571

SEP 09 2004

Mr. Charles B. Calvet, P.E.
Manager, Engineering
The Gas Company
P.O. Box 3000
Honolulu, HI 96802-3000

Dear Mr. Calvet:

Subject: North-South Road and Kapolei Parkway
Ewa, Island of Oahu
Project No. HWY-O-01-92
Revised Draft Environmental Assessment

Thank you for your letter of September 7, 2004, which commented on this project and its *Revised Draft Environmental Assessment*.

We realize that the proposed North-South Road will be crossing your gas mains. At the appropriate time, our project personnel will be contacting you to determine the precise location of these mains and whether they can be avoided.

We are appreciative of your continued support of this project, and if any other questions or problems arise, please contact us at your earliest convenience.

Very truly yours,

RODNEY K. HARAGA
Director of Transportation

DIR 1590

Hawaiian Railway

04 SEP -1 A 11:38

August 24, 2004

SEP 2 7 30 PM '04
DEPT OF TRANSPORTATION STATEWIDE TRANS. PLANNING OFFICE

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

Dear Mr. Haraga:

We have reviewed your Revised Draft Environmental Assessment on N-S Road and Kapolei Parkway, Ewa, Oahu. We concur that your project would not negatively affect the OR&L Right of Way and appreciate the document's consideration of the historic value of the "well preserved" remnant of the railroad track.

We met a couple of years ago with the City and County's designers and planners on the railroad crossing at Kapolei Parkway. The County agreed to include automated crossing guards in the future project and we agreed to maintain them.

We wonder if Renton Road will be extended in the future to Ft. Barrette Road. The maps in the revised EA do not show the connection between F.D.R. Avenue and Renton Road which was put in place about two years ago.

Thank you for the opportunity to comment.

Sincerely,

ROBERT YATCHMENOFF
President

SEP 7 3 52 PM '04
RECEIVED STATE DEPARTMENT ...

HAWAIIAN RAILWAY SOCIETY
A Chapter of the National Railway Historical Society
P.O. Box 60369 • Ewa Station, Ewa Beach, Hawaii 96706 • Ph: (808) 681-5461 • Fax: (808) 681-4860

LINDA LINGLE
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

RODNEY K. HARAGA
DIRECTOR

Deputy Directors
BRUCE Y. MATSUI
LYCENIA H. JOESTING
BRIAN H. SEKIGUCHI

IN REPLY REFER TO:
HWY-PA
2.5571

Mr. Robert Yatchmenoff
President
Hawaiian Railway Society
PO Box 60369
Ewa Beach, HI 96706

Dear Mr. Yatchmenoff:

Subject: North-South Road and Kapolei Parkway
Ewa, Island of Oahu
Project No. HWY-O-01-92
Revised Draft Environmental Assessment

Thank you for your letter of August 24, 2004, which commented on the *Revised Draft Environmental Assessment* for this project.

For your information, the Kapolei Parkway section that includes the railroad crossing, is not a part of this project. However, we have been in contact with the City and county of Honolulu, Department of Design and Construction, and they have indicated that supporting infrastructure for the automated crossing gates will be provided in Phase 8A of their Kapolei Parkway project; the automated gates will be installed when warranted.

In response to your second comment, the State of Hawaii and City and County of Honolulu do not currently have plans to extend Renton Road to Fort Barrette Road. In addition, due to map size and scale and the lack of an official designation, it was decided to omit the connector road between Renton Road and Franklin D. Roosevelt Avenue.

We are appreciative of your confirmation that this project will not negatively impact the OR&L right-of-way. If you have any other questions or concerns, please feel free to contact us at your earliest opportunity.

Very truly yours,

RODNEY K. HARAGA
Director of Transportation

OCR 1450

LOTMA

DEPT OF TRANSPORTATION
STATEWIDE TRANS.
PLANNING OFFICE
Aug 24 2 27 PM '04

2004 AUG 19 A 10:08

August 18, 2004

Mr. Rodney K. Haraga, Director
State of Hawaii
Department of Transportation
869 Punchbowl Street
Honolulu, HI 96813

RE: Revised Draft Environmental Assessment North South Road and Kapolei Parkway

Dear Mr. Haraga,

Thank you for the opportunity to review and comment on the Draft Environmental Assessment for the Proposed North-South Road and Kapolei Parkway. We would like to offer the following comments:

- Peak-hour High Occupancy Vehicle (HOV) lanes should be included to encourage ridesharing, which results in higher average vehicle occupancy and, therefore, more efficient use of the roadway system.
- More details should be provided regarding the bicycle facilities. How wide will the paths be? Will they be paved? Where will they be located and how will they connect? Will a street crossing be required?
- The proposed Park & Ride lot at the H-1 interchange should be constructed as part of *this project*, rather than waiting for the regional BRT project which is at least 10 years away from fruition.

Thank you again for the opportunity to comment on this document. We are hopeful that this project will include these important Transportation Demand Management facilities to encourage and promote alternative transportation choices for the Ewa community.

Sincerely,

Mindy Norris
Program Manager

Leeward Oahu Transportation Management Association
700 Bishop Street, Ste 1928 Honolulu, HI 96813
PH (808)577-7433 FX (808)536-0132 WEB www.lotma.org
lotma@lava.net

LINDA LINGLE
GOVERNOR

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RODNEY K. HARAGA
DIRECTOR

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IN REPLY REFER TO

HWY-PA
2.5571

SEP 29 2004

Ms. Mindy Norris
Program Manager
Leeward Oahu Transportation Management Association
700 Bishop Street, Suite 1928
Honolulu, Hawaii 96813

Dear Ms. Norris:

Subject: North-South Road and Kapolei Parkway
Ewa, Island of Oahu
Project No. HWY-0-01-92
Revised Draft Environmental Assessment

Thank you for your letter of August 24, 2004, which commented on the *Revised Draft Environmental Assessment* (DEA) for this project.

We have the following responses for each of your comments, and these responses have been placed in a corresponding order:

1. Peak hour High Occupancy Vehicle (HOV) lanes are not currently being considered for this project. However, the design of the completed North-South Road and Kapolei Parkway would be very conducive to the implementation of HOV lanes, and HOV lanes could be provided when warranted.

2. Information on the width and location of the proposed bike path along North-South Road was provided in Section 2.1.2.1a of the Revised DEA. As will be indicated in the final environmental assessment, the bike path will be paved and no special crossings for the bike path are anticipated.

3. The park-and-ride lot is a part of the Primary Corridor Transportation Project of the City and County of Honolulu and its inclusion in our current study would considerably divert and extend our project scope. Nevertheless, we have considered the park-and-ride lot, which is positioned along Farrington Highway, in the development of this project.

If any other questions or concerns arise, please feel free to contact us at your earliest opportunity.

Very truly yours,

RODNEY K. HARAGA
Director of Transportation

DAR-1595

Ko Olina
RESORT & MARINA

SEP 2 7 30 PM '04

2004 SEP -1 A 8:09

August 23, 2004

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

Ms. Cheryl Soon, Director
Department of Transportation Services
City and County of Honolulu
650 South King Street, 3rd Floor
Honolulu, Hawaii 96813

SUBJECT: NORTH SOUTH ROAD AND KAPOLEI PARKWAY

Dear Mr. Haraga and Ms. Soon:

We have reviewed the Revised Draft Environmental Assessment (EA) for the subject project and offer the following comments:

1. We support implementation of the subject project.
2. We advocate the Final EA include a Finding of No Significant Impact, thus obviating the need for preparing a State Environmental Impact Statement. This project has been studied and scrutinized for 20± years, and the benefits far outweigh the adverse impacts.
3. This project is clearly needed for our Region and we strongly support the expeditious construction of this important Road and Parkway.

We appreciate you providing us the opportunity to comment, and trust you will move this project to completion as fast as possible. We look forward to a cooperative working relationship with both your agencies in striving to resolve the transportation issues in the West Honolulu region.

SEP 1 3 2004

Sincerely,

Randall K. Fujiki, FAIA
Executive Vice President
Ko Olina Development, LLC

RF:ls

c: Office of Environmental Quality Control

55 MERCHANT STREET, SUITE 1500 • HONOLULU, HAWAII 96813 • TEL: 808 531-9761 • FAX: 808 531-1144

LINDA LINGLE
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
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RODNEY K. HARAGA
DIRECTOR

Deputy Directors
BRUCE Y. MATSUI
LINDEN H. JOESTING
BRIAN H. SEKIGUCHI

IN REPLY REFER TO

HWY-PA
2.5571

SEP 09 2004

Mr. Randall K. Fujiki, FAIA
Executive Vice President
Ko Olina Development, LLC
55 Merchant Street, Suite 1500
Honolulu, Hawaii 96813

Dear Mr. Fujiki:

Subject: North-South Road and Kapolei Parkway
Ewa, Island of Oahu
Project No. HWY-O-01-92
Revised Draft Environmental Assessment

Thank you for your letter of August 23, 2004, which commented on the *Revised Draft Environmental Assessment* for this project.

We fully understand and generally agree with each of your comments.

We also appreciate your support of this project, and if any other questions or concerns arise, please feel free to contact us at your earliest convenience.

Very truly yours,

RODNEY K. HARAGA
Director of Transportation

UNIVERSITY OF HAWAI'I

OFFICE OF CAPITAL IMPROVEMENTS

September 16, 2004

Mr. Rodney K. Haraga, Director
State of Hawai'i
Department of Transportation
869 Punchbowl Street
Honolulu, HI 96813

Ms. Cheryl Soon, Director
Department of Transportation Services
City and County of Honolulu
650 South King Street, 3rd Floor
Honolulu, HI 96813

Dear Mr. Haraga and Ms. Soon:

SUBJECT: NORTH-SOUTH ROAD AND KAPOLEI PARKWAY, H-1 FREEWAY TO RENTON ROAD REVISED DRAFT ENVIRONMENTAL ASSESSEMENT

Thank you for providing the University with an opportunity to comment on the Revised Draft Environmental Assessment (EA) for the North-South Road and Kapolei Parkway, H-1 Freeway to Renton Road project. The University recognizes the importance of the North-South Road as a key component in the successful development of a transportation network within the Ewa region. For these reasons, the University is very supportive of this project.

Based on our review of the Draft EA, we offer the following comments:

1. Land Dedication for Right-of-Way Requirements (Section 2.1.2.2, 3.1.1.3b). The Draft EA identifies an area of 7.9 acres in the north-east quadrant of the North-South Road interchange that will be acquired from the University of Hawaii by the Department of Transportation (DOT) for the right-of-way to construct the roadway. The Draft EA also identifies the following Tax Map Key parcels 9-1-16:129, 9-1-16:120, and 9-1-16:127 that are under the ownership of the University as potentially affected by the land acquisition. Please identify on a map the area required from the University so that we can incorporate this information into our planning efforts. 1

2. Description of the UH West Oahu Campus (Section 3.1.1.2). In July 2004, the University of Hawaii's Board of Regents adopted, in principle, the Long Range Development Plan for the UH West Oahu campus. The initial phase of the campus, anticipated to be completed in the Fall of 2008, has an initial student population of 1,520 students and a staff of 360. The LRDP identifies an ultimate phase of campus development with a student population of 7,600 and a staff of 1,040, occupying approximately 97 acres of land. To help finance construction of the campus, the University is considering a public/private partnership to develop up to an additional 320 acres of lands adjacent to the campus. The land uses envisioned include a mixed-use village, commercial, and residential uses. The remaining 83 acres of land is allocated for roads, open space, parks, an elementary school and other non-income generating land uses. The development of all or a portion of the 320 acres of land included in the public/public partnership could commence prior to, or about the same time as, development of the initial 1,520 student campus. 2

1851 EAST WEST ROAD • HONOLULU, HI 96822 • TEL (808) 956-7895 • FAX (808) 956 9906
AN EQUAL OPPORTUNITY / AFFIRMATIVE ACTION INSTITUTION

Thank you for providing us the opportunity to comment on the Draft EA. We look forward to further collaboration with you on this project. If there are any questions regarding these comments, please feel free to contact me at 956-7935.

Sincerely,

Jan Yokota
Director of Capital Improvements

c: State of Hawai'i
Office of Environmental Quality Control
235 S. Beretania Street, STE 702
Honolulu, HI 96813

Acting President McClain
Chief of Staff Callejo
Director Zwald
Lynn Nakamasu
Maynard Young

LINDA LINGLE
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

RODNEY K. HARAGA
DIRECTOR

Deputy Directors
BRUCE Y. MATSUI
LINDEN H. JOESTING
BRIAN H. SEKIGUCHI

IN REPLY REFER TO

HWY-PA
2.5571

SEP

Ms. Jan Yokota
Director of Capital Improvements
Office of Capital Improvements
University of Hawaii
1951 East West Road
Honolulu, Hawaii 96822

Dear Ms. Yokota:

Subject: North-South Road and Kapolei Parkway
Ewa, Island of Oahu
Project No. HWY-O-01-92
Revised Draft Environmental Assessment

Thank you for your comments in your letter of September 16, 2004 on the *Revised Draft Environmental Assessment* for the North-South Road and Kapolei Parkway Project. Our proposed project extends from the H-1 Freeway to Renton Road in the Ewa region of Oahu, Hawaii.

Enclosed is a copy of your written comments, which have been numbered. We would like to provide the following responses to these comments.

Response 1. As part of the on-going design efforts, we will work directly with you and your agents to convey information about land acquisition requirements from the University of Hawaii.

Response 2. Thank you for this information. We will update Section 3.1.1.2 of the Final EA to include this information.

We will be rendering a Finding of No Significant Impact for this project, and will be completing the project's Final Environmental Assessment.

If you have any questions, please contact Project Manager Mr. Nelson Sagum of my staff at 587-1834.

Very truly yours,

RODNEY K. HARAGA
Director of Transportation

DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET • HONOLULU, HAWAII 96813
TELEPHONE: (808) 523-4414 • FAX: (808) 523-6743 • INTERNET: www.co.honolulu.hi.us

JEREMY HARRIS
MAYOR

ERIC G. CRISPIN, AIA
DIRECTOR

BARBARA KIM STANTON
DEPUTY DIRECTOR

2004/ELOG-1681 (MW)

September 9, 2004

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
PLANNING BRANCH
SEP 8 2 14 PM '04
RECEIVED

Dear Mr. Haraga:

Revised Draft Environmental Assessment
For North-South Road and Kapolei Parkway

Here are our comments on the above project, as requested by your letter dated July 22, 2004. First, our traffic engineers have the following concerns:

1. The roadway cross-section for the City's portion of Kapolei Parkway should be consistent with the sections of the parkway that have already been constructed. This means providing a wider shoulder or sidewalk area on the makai side of the roadway. Your proposed cross-section reflects an eight-foot shoulder with a four-foot concrete sidewalk. Yet, based on the current subdivision roadway standards, the width of the shoulder should be twenty feet. Thus, the road right-of-way should proportionately increase to 128 feet.

2. At the intersection of Kapolei Parkway and North-South Road, there should be a double right turn in the westbound direction, exclusive of the three through lanes. The ultimate design of the intersection should include raised and channelized islands to facilitate pedestrian movement. The anticipated jurisdiction of this intersection should also be specified.

3. Consideration should be given to the possible extension of North-South Road makai of Kapolei Parkway to provide an additional point of connectivity to the Kalaeloa area, and provisions for the design of the intersection should be made accordingly.

4. Intermediary connection and access points to North-South Road should be identified and the roadway sections specified, since these intersections will most likely be constructed at the time the North-South Road is built. The spacing between these

points should generally be consistent with the recommendations contained in the documentation for the Smart Growth design manual. We assume that the east-west roadways leading to the intermediary connection and access points will eventually become County facilities and that North-South Road will be a State facility.

5. On Kapolei Parkway at its approach to North-South Road, a forty-mile-per-hour design speed should be utilized for design purposes with regard to horizontal and vertical curvature and taper lengths for all exclusive turning lanes.

6. Preliminary roadway plans for the entire length of the facility should be submitted for review prior to processing subdivision applications for these roadways. These plans should generally identify lane widths, lengths of right turn auxiliary lanes and left turn storage lanes, bicycle facilities, pedestrian walkways and access points and mass transit and/or bus stop locations.

Second, we note the following minor errors and inconsistencies:

- The report should be revised to reflect the fact that the State Land Use designation in the State-owned areas of East Kapolei was changed from agricultural to urban in 1999 under Docket A99-728, on pages 3-9 top, 3-10 bottom, and 3-18 middle.

- The report should be revised to indicate that a Special Area Plan for the former Barbers Point Naval Air Station has in fact been adopted (p. 3-71 upper). The Honolulu City Council adopted the Kalaeloa Redevelopment Plan by Resolution 01-86.

- The report should make clear the extent of the secondary urban center, on pages 1-4, 3-3, and 3-5. As shown on the General Plan map adopted by Resolution 02-205, CD1, the secondary urban center includes the City of Kapolei, Ko Olina Phases I and II, the Barbers Point Harbor area, Kapolei Business Park, and Campbell Industrial Park. Also, the fire stations serving the City of Kapolei are located in Makakilo and the Kapolei Business Park (page 3-3 top).

- The Ewa Development Plan should be dated August 1997, and was amended May 2000 (p. 2-5, etc.). Page 3-14 correctly states that the Ewa DP was revised in 2000. The change provided for a Five-Year Review of the Ewa DP.

- The DEA should discuss the accommodation of a planned transit corridor along the North-South Road as shown and discussed in the Ewa DP.

- Ewa also has its own wells, in addition to the wells mentioned on p. 3-57 upper.

- The executive summary (pages S10 to S-11) should be updated to match the text on the type of freeway interchange being proposed ("modified partial cloverleaf"), the location of the intersection of North-South Road and Kapolei Parkway, and the State's ownership of a portion of the North-South Road right-of-way.

- The report should be revised to make pages 2-20 and 2-23 consistent on how familiar the selected type of interchange is to drivers.

- For the No-Build Alternative, the Makakilo Drive extension can only feed into Farrington Highway, since there is no freeway interchange under this alternative (pages S-12, 2-3 bottom, etc.). Also, the No-Build write-up should highlight the lack of access to UH West Oahu and other nearby uses, in Section 3.1.1.4a.

- The median strip for the North-South Road is shown on the drawings on page 2-8 as 32 feet wide, not 20 feet wide as stated on page 2-7.

Should you have any questions, please call Mike Watkins of our staff at 523-4406.

Sincerely yours,

Kiri Crispin AIA

ERIC G. CRISPIN, AIA
Director of Planning and Permitting

EGC:js

cc: Department of Transportation Services
Office of Environmental Quality Control

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LINDA LINGLE
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

RODNEY K. HARAGA
DIRECTOR

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LINDEN H. JOESTING
BRIAN H. SEKIGUCHI

IN REPLY REFER TO:

HWY-PA
2.5571

Mr. Eric G. Crispin, AIA
Director
Department of Planning and Permitting
City and County of Honolulu
650 South King Street
Honolulu, HI 96813

Dear Mr. Crispin:

Subject: North-South Road and Kapolei Parkway
Ewa, Island of Oahu
Project No. HWY-O-01-92
Revised Draft Environmental Assessment

Thank you for your letter of September 9, 2004, which commented on this project and its *Revised Draft Environmental Assessment* (DEA).

We have the following responses for each of your comments, which have been placed in a corresponding order:

1. We agree that the typical section for the proposed Kapolei Parkway segment should be consistent with the typical sections of existing portions of Kapolei Parkway. The roadway cross section in Ewa by Gentry has a total right-of-way width of 116 feet, which matches the roadway cross section for Phase 8A of the Kapolei Parkway project, from the OR&L right-of-way to Renton Road. It should be noted, that the 116-foot right-of-way for Kapolei Parkway was established as early as 1994.

   In addition, the American Association of State Highway Transportation Officials have indicated that design elements should be maintained throughout a facility. Consequently, since the existing makai segments of Kapolei Parkway have 8-foot shoulders and 4-foot sidewalks, the proposed segment of Kapolei Parkway should

also have 8-foot shoulders and 4-foot sidewalks. If it is required, a modification of the new roadway standards will be requested.

2. Based on the year 2025 traffic analyses for the Build Alternative, the proposed North-South Road/Kapolei Parkway intersection would operate satisfactorily during its peak hours, with the westbound approach configured with two through lanes and two exclusive right-turn lanes. We believe that the intersection will be channelized and under the jurisdiction of the State of Hawaii.

3. Although an extension of the North-South Road is reflected in the Ewa Development Plan (Revised 2000), the purposes of proposed extension are not consistent with the purposes of this project, and consequently, the proposed extension of North-South Road should be examined separately. We believe that an access for the proposed extension can be accommodated at the North-South Road/Kapolei Parkway intersection; however, the project should also be coordinated with the Department of Hawaiian Home Lands, whose lands the proposed extension would directly impact.

4. At-grade intersections along the North-South Road will be provided at crossings for Kapolei Parkway, the future East-West Connector Road, the development access roadway makai of Farrington Highway, and Farrington Highway.

5. Your design speed of 40 miles per hour for Kapolei Parkway is reasonable.

6. Preliminary plans for the project section of Kapolei Parkway are being prepared by the City and County of Honolulu (City), Department of Design and Construction. These plans will identify lane widths, lengths of right-turn auxiliary lanes and left-turn storage lanes, bicycle facilities, pedestrian walkways and access points, and mass transit and/or bus stop locations and will be submitted for review.

7. We appreciate receiving this information regarding the change of State Lane Use designation for State-owned areas of East Kapolei, from agriculture to urban. It should be noted that our land use development analysis is based on the Ewa Development Plan, which also designates the area's land use as urban. For your information, the GIS information of Department of Planning and Permitting indicates that the East Kapolei area is classified as agriculture.

8. Section 3.4.1.4 of the *North-South Road and Kapolei Parkway, Final Environmental Assessment*, has been revised to reflect the adoption of the *Kalaeloa Redevelopment Plan* by the Honolulu City Council.

9. As requested, the extent of the Secondary Urban Center will be described in Sections 1.1 and 3.1 of the project's final environmental assessment. In addition, the text of the final environmental assessment will clarify the locations of the area's fire stations.

10. As requested, Section 2.1.2.1 of the *North-South Road and Kapolei Parkway, Final Environmental Assessment*, will be revised to note both the August 1997 publication date of the Ewa Development Plan and the approval of an amendment of this document in May 2000.

11. The *North-South Road and Kapolei Parkway, Final Environmental Assessment* contains a description of the proposed transit corridor. An exclusive rapid transit corridor will be located within the 28-foot median of the North-South Road. This transit corridor will begin at the H-1 Freeway and proceed makai to Kapolei Parkway. At Kapolei Parkway, the transit corridor of the North-South Road will connect to the east-west rapid transit corridor designated for the median of Kapolei Parkway. At various locations along North-South Road, the median may be widened to provide for transit stops.

12. We appreciate receiving this information, which concerns the existence of wells in Ewa.

13. The executive summary of the Revised DEA and other reports have been updated to reflect the currently proposed interchange configuration, which is a diamond interchange. As indicated in your letter, the description of the location of the North-South Road/Kapolei Parkway intersection will be corrected and the State's ownership of a portion of the North-South Road right-of-way will be indicated.

14. The referenced sections of Chapter 2 of the project's final environmental assessment have been modified to improve the consistency of the description of the preferred interchange configuration. Consequently, driver familiarity with the proposed diamond interchange will be consistently described in various portions of our environmental document.

15. Figure 2.1-1 and Section 2.1.1.1 has been modified to indicate, that for the No Build Alternative, there is no access planned from the Makakilo Drive Extension to the H-1 Freeway. We also agree that under the No Build Alternative, access from the H-1 Freeway to the proposed UH, West Oahu Campus, and other nearby facilities/developments would be improved. However, developers in the Ewa plain area maintain that access to their parcels is still available from Kapolei Parkway, Farrington Highway and etc., under the No Build Alternative, and in

consonance with these statements, the Department of Transportation intends to restrict access along the North-South Road.

16. The proposed typical section for the North-South Road has been revised and is shown in Figure 2.1-3 of the *North-South Road and Kapolei Parkway, Final Environmental Assessment.* The North-South Road will be a divided roadway with the mauka-bound and makai-bound roadbeds separated by a 28-foot wide raised median. At intersections where double left-turns are anticipated, the median width will be 6 feet.

We appreciate your thorough review of our Revised DEA, and if any other problems or questions arise, please feel free to contact us at your earliest convenience.

Very truly yours,

RODNEY K. HARAGA
Director of Transportation

91 1159 Hapua Street
Ewa Beach, Hawaii 96706
23 August 2004

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

SUBJECT: NORTH SOUTH ROAD AND KAPOLEI PARKWAY

Dear Mr. Haraga:

I will not claim to have reviewed all the pages of the Revised DEA dated July 2004. Here are my quick thoughts about our need for North South Road and Kapolei Parkway:

1. There seem to be more details about flora and fauna in the DEA than there is about relevant demographic details. It is likely that if one examines the demographics more carefully by age cohort and propensity to own/drive vehicle, one will project much higher need/impact for the proposed roads. My nonscientific field observation shows that Ewa/Kapolei has a very young population as indicated by burgeoning population of elementary schools. In our Ewa Villages neighborhood, I see that our elementary school graders of five years ago are now driving cars so families including mine have moved from having one to two cars, two cars to four cars, and so forth. The propensity of these younger population to drive and own cars is/will be much higher than their parents or grandparents.

2. There is great potential value in keeping the integrity and connectedness of the Ewa Villages to O&R Railway landscape (including Hongwanji Mission church). This is a case where the potential value of the whole historic district is higher than the summation of historic parts. Any road building should therefore try to help the people of this renewed community save such higher value.

3. I was surprise to learn that the areas which Aloun Farms and another company are leasing right now are not going to be agricultural in the Ewa Long Range Development Plan. When one has to drive through heavy traffic each morning and evening, it is definitely calming for the soul to see the changing agricultural landscape brought about by the activities of Aloun Farms. Such landscape has tremendous value for its effect on attitudes especially for driving and as you face the day for work or the evening for your family. I hope that these open space are kept intact.

I am reminded of the H-3 Highway. Many said we did not need it and that it will destroy many things. I am hopeful that the North South Road and Kapolei Parkway can be built like H-3, a boon without heavy toll on the historical and open space landscapes.

Thank You.

Sincerely,
Carolyn Hildebrand, Ewa Village Resident

LINDA LINGLE
GOVERNOR

RODNEY K. HARAGA
DIRECTOR

Deputy Directors
BRUCE Y. MATSUI
LINDEN H. JOESTING
BRIAN H. SEKIGUCHI

IN REPLY REFER TO:

HWY-PA
2.5571

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

SEP 29 2004

Ms. Carolyn Hildebrand
91-1159 Hapua Street
Ewa Beach, HI 96706

Dear Ms. Hildebrand:

Subject: North-South Road and Kapolei Parkway
Ewa, Island of Oahu
Project No. HWY-O-01-92
Revised Draft Environmental Assessment

Thank you for your letter of August 23, 2004, which commented on this project and its *Revised Draft Environmental Assessment*.

We have the following responses for each of your comments, which have been place in a corresponding order:

1. We are appreciative of the information contained in your letter regarding Ewa's changing demographics, which, in fact, confirms the need for this project and other transportation improvements.

2. Your perspective of the Ewa Sugar Plantation Villages Historic District is shared by many residents of Ewa. The proposed Kapolei Parkway will intersect Renton Road between Varona and Tenney Villages, and the State Historic Preservation Division, of the Department of Land and Natural Resources has indicated the importance of maintaining the "framed view corridor" and feeling of cohesiveness of this community and historic resource. The City and County of Honolulu, Department of Design and Construction, is aware of this objective for the historic district and will undertake appropriate measures.

3. The proposed North-South Road will have minimal direct impact to farmlands. However, other planned regional development for this area will considerably alter land use and the general landscape of East Kapolei. For your information, just easterly of the North-South Road, between the Ewa Golf Course and Farrington Highway, large drainage channels and detention basins are planned, and these basins must be kept "open" to control flooding.

We trust that we have satisfactorily addressed your immediate concerns, and if any other questions or problems arise, please feel free to contact us at your earliest convenience.

Very truly yours,

RODNEY K. HARAGA
Director of Transportation

NORTH-SOUTH ROAD AND KAPOLEI PARKWAY PROJECT

Ewa, Hawaii

REVISED DRAFT ENVIRONMENTAL ASSESSMENT (EA) (JULY 2004)

The information you provide on this form will help the State of Hawaii Department of Transportation in the future planning of the North-South Road and Kapolei Parkway Project. We appreciate any comment you may have. Comments must be postmarked or received by September 16, 2004.

Name: Will Bynes
Representing: West Loch Village
Address: 91-1478 Renton Rd. #5
Ewa Beach, Hi. 96706

Please make any comments below:

Build two bridges. 1st to Ford Island to Aiea (stadium) 2nd to Aloha Tower! - Ewa - Traffic solved.

Please mail/fax/e-mail all comment forms to:

Mr. Rodney K. Haraga, Director, Attn: Mr. Ronald Tsuzuki, Department of Transportation, 869 Punchbowl Street, Room 301, Honolulu, Hawaii 96813, Fax No. (808) 587-1787, E-mail Address: ronald.tsuzuki@hawaii.gov

NORTH-SOUTH ROAD AND KAPOLEI PARKWAY PROJECT

Ewa, Hawaii

REVISED DRAFT ENVIRONMENTAL ASSESSMENT (EA) (JULY 2004)

The information you provide on this form will help the State of Hawaii Department of Transportation in the future planning of the North-South Road and Kapolei Parkway Project. We appreciate any comment you may have. Comments must be postmarked or received by September 16, 2004.

Name: Patrick Hange
Representing: Varona Village (Benita Life)
Address: 91-1028 Manakuke St.
Ewa, HI 96706

Please make any comments below:

The residents of Varona Village are concerned over the "line" being drawn between the Ewa villages. The ~~Portion~~ North-South road will divide Varona from the rest of the villages, thus making it easier to forget about Varona Village. The residents still have not been able to purchase their homes and have dealt with numerous eviction threats to date. This would make it easier for the City and County to deal Varona Village off to Kapolei. The residents need the reassurance this will never be the intent or scope of the project in question. Traffic is a concern, but not the main concern of the residents, ~~that~~ that would be losing their homes over this deal.

Please mail/fax/e-mail all comment forms to:

Mr. Rodney K. Haraga, Director, Attn: Mr. Ronald Tsuzuki, Department of Transportation, 869 Punchbowl Street, Room 301, Honolulu, Hawaii 96813, Fax No. (808) 587-1787, E-mail Address: ronald.tsuzuki@hawaii.gov

NORTH-SOUTH ROAD AND KAPOLEI PARKWAY PROJECT

Ewa, Hawaii

REVISED DRAFT ENVIRONMENTAL ASSESSMENT (EA) (JULY 2004)

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Mr. & Mrs.
Name: Demetrio S. Balala
Representing:
Address: 91-1034 Manakiki St.
Ewa, Hawaii 96706

Please make any comments below:

I can not say anything because
I can not speak to much English

Please mail/fax/e-mail all comment forms to:

Mr. Rodney K. Haraga, Director, Attn: Mr. Ronald Tsuzuki, Department of Transportation, 869 Punchbowl Street, Room 301, Honolulu, Hawaii 96813, Fax No. (808) 587-1787, E-mail Address: ronald.tsuzuki@hawaii.gov

NORTH-SOUTH ROAD AND KAPOLEI PARKWAY PROJECT

Ewa, Hawaii

REVISED DRAFT ENVIRONMENTAL ASSESSMENT (EA) (JULY 2004)

The information you provide on this form will help the State of Hawaii Department of Transportation in the future planning of the North-South Road and Kapolei Parkway Project. We appreciate any comment you may have. Comments must be postmarked or received by September 16, 2004.

Name: Rosemary Angelo
Representing: Self (Resident)
Address: 91-1698 Burke Street
Ewa Beach, HI 96706

Please make any comments below:

I agree that an alternate route through this area would substantially relieve the congestion in this area. I did read your notice about the proposed roadway and have not read the entire draft. I do agree with the plan. I have seen some pretty dangerous situations in with the people trying to get through Ewa Beach in the mornings. An example is dangerous and careless drivers on Geiger, Kolowaka, and Renton Road. They will stop at nothing to cut into traffic, children walking to school, run red lights and block traffic at the intersections. There is just too much congestion and too many long lights. I saw in your proposal of North-South Road that there are a total of Six Lights. I forsee everyone headed that way and just total chaos. Is there a way to lesson them and eliminate at least one if any. I also want to note that even though there is an endangered plant species, our children our more endangered on these roadways. Please remember them in the course of the planning. Thank you for this opportunity and I look forward to the completion of this project.

Please mail/fax/e-mail all comment forms to:

Mr. Rodney K. Haraga, Director, Attn: Mr. Ronald Tsuzuki, Department of Transportation, 869 Punchbowl Street, Room 301, Honolulu, Hawaii 96813, Fax No. (808) 587-1787, E-mail Address: ronald.tsuzuki@hawaii.gov

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Summary of Public Hearing Comments

A public hearing was conducted pursuant to Chapter 343, Hawaii Revised Statutes, on Wednesday, September 1, 2004, 7:00 PM, at the Asing Park Recreational Center in Ewa, Oahu, Hawaii. The following is a summary of the comments received at or in conjunction with the public hearing, and the responses to those comments, which were provided by letter to the individuals listed below. Most of the public testimony, even from those having comments and concerns, was supportive of the project. The specific comments and concerns expressed are categorized by topic, so the names of individuals making more than one comment may appear more than once.

Alternative Alignment for North-South Road

Mr. Glenn Oamilda
91-1179 Puamaeole St, Apt. V
Ewa Beach, Hawaii 96706-1895

Comment: Suggested an alignment for North-South Road / Kapolei Parkway that would bisect the Ewa Villages Historic District, and have an interchange with the H-1 Freeway one mile west of Kunia Interchange.

Response: The suggested alternative alignment was considered, but was rejected in Section 2.2 of the Revised Draft EA, because it would bisect the Ewa Villages neighborhood, displace several residences in Ewa Villages Historic District, and adversely affect a publicly owned park (Ewa Villages Golf Course).

Mr. Lyle Halverson
91-1145 Kaipu Street
Ewa Beach, Hawaii 96706

Comment: Suggested the extension of North-South Road to Roosevelt Avenue.

Response: While this extension is shown as part of the Ewa Development Plan (Revised 2000), the extension would be beyond the purposes and needs of this project, as stated in the Revised Draft EA. The extension would be rightfully addressed as part of the Kalaeloa Redevelopment Plan with input from the State of Hawaii Department of Hawaiian Home Lands whose land the extension would traverse.

Mr. Will Briones
91-1478 Renton Road, #5
Ewa Beach, Hawaii 96706

Comment: Suggested two "bridges" alternatives to North-South Road – one between Ford Island and Aiea, and the other connecting Aloha Tower, Ewa, and Waianae.

Response: Your first suggested bridge appears to already have been completed: Admiral Clarey Bridge (Ford Island Bridge). Regarding your second suggestion, it is unclear how one would construct such a bridge. Nevertheless, both suggestions would not address the purposes and needs of our project, as stated in the EA.

Endangered Plant - Kooloaula (Abutilon menziesii)

Dr. Kioni Dudley
91-1365 Hauone Street
Kapolei, Hawaii 96707

Comment: Expressed concern about the survival of the endangered Kooloaula found along the road corridor.

Response: The habitat conservation plan (HCP) prepared with the cooperation of several resource agencies is anticipated to propagate the genetic stock of the Kooloaula plants found in the project area. The HCP was approved by the Board of Land and Natural Resources in March of this year, and the U.S. Fish and Wildlife Service concluded in August of this year that implementation of the HCP would result in a net conservation benefit for Kooloaula. Section 3.7 of the Revised Draft EA provides further information on this topic.

Mr. Glenn Oamilda
91-1179 Puamaeole St, Apt. V
Ewa Beach, Hawaii 96706-1895

Comment: Asked why testimony provided in a January public hearing was not included in the Revised Draft EA.

Response: The public hearing in January was held by the Department of Land and Natural Resources (DLNR) to obtain comments on the draft habitat conservation plan (HCP) for the endangered Kooloaula (Abutilon menziesii) at Kapolei. The Board of Land and Natural Resources later approved the HCP. The hearing was not conducted by HDOT for environmental review purposes under Chapter 343 of the Hawaii Revised Statutes. Therefore, public testimony provided at the HCP public hearing in January while related to the North-South Road and Kapolei Parkway project, did not need to be documented in the Revised Draft EA.

Varona Village Issues

Ms. Cres Malate
91-1024 Manakuke Street
Ewa Beach, Hawaii 96706

Comment: Suggested closure of the back gate next to the Railway Museum.

Response: Once Kapolei Parkway between Ewa Villages and the Villages of Kapolei is completed, access to and from the back gate may no longer be needed. Residents' concerns about the connection between the west end of Renton Road and Roosevelt Avenue have been noted by the City, and the City will determine the disposition of that connection at a later date.

Comment: Expressed concern that Kapolei Parkway would isolate Varona Village from the rest of Ewa Villages.

Response: The alignment of Kapolei Parkway will be within the vacant open space area between Varona and Tenney Villages, which also contains a section of Kaloi Gulch. Therefore, construction of Kapolei Parkway will not introduce any more of a gap than already exists. However, when the project is completed, Varona Village residents would have to cross a new intersection when traveling on Renton Road where none exists today. Due to projected traffic volumes, we anticipate the Kapolei Parkway / Renton Road intersection will be signalized when warranted. On the other hand, Varona Village residents would benefit from better access to Kapolei, the H-1 Freeway, and Ewa Beach.

Mr. Patrick Hange
91-1028 Manakuke Street
Ewa, Hawaii 96706

Comment: Expressed concern that Kapolei Parkway would isolate Varona Village from the rest of Ewa Villages.

Response: See response to same comment above from Ms. Cres Malate.

Comment. Wanted to know whether Kapolei Parkway will cause traffic noise impacts in Varona Village.

Response: Based on the noise analysis conducted for this project, as disclosed in Section 3.6 of the Revised Draft EA, we do not anticipate that current Varona Village residents will experience traffic noise impacts from Kapolei Parkway.

Kapolei Parkway Issues

Mr. Lyle Halverson
91-1145 Kaipu Street
Ewa Beach, Hawaii 96706

Comment: Suggested installation of traffic signals at Kapolei Parkway / Geiger Road intersection.

Response: Gentry Homes is scheduled to install a signal at the Kapolei Parkway / Geiger Road intersection within the near future, as a part of a separate project, subject to approval by the City and County of Honolulu.

Comment: Requested information of the party responsible for constructing the segment of Kapolei Parkway between Ocean Pointe and Ewa Gentry.

Response: This segment of Kapolei Parkway will be constructed by Gentry Homes as part of the first phase of the Ewa by Gentry Makai project.

Ms. Tesha Malama
91-818 Lawalu Place
Ewa Beach, Hawaii 96706

Comment: Suggested upgrading Renton Road at its intersection with the future Kapolei Parkway.

Response: The City and County of Honolulu is currently constructing Kapolei Parkway from the OR&L Right-of-Way to Renton Road, as part of a separate project. That project will construct the Kapolei Parkway / Renton Road intersection, including the supporting infrastructure for future traffic signals. When warranted, traffic signals will be installed at this intersection.

Comment: Suggested implementation of traffic measures at intersection of Kolowaka Street and Kapolei Parkway, and at the intersection of Kapolei Parkway and Geiger Road.

Response: The Kapolei Parkway and Kolowaka Street intersection will be signalized when warranted. Gentry Homes is scheduled to install a signal at the Kapolei Parkway / Geiger Road intersection within the near future as part of a separate project, subject to approval by the City and County of Honolulu.

Ms. Cres Malate
91-1024 Manakuke Street
Ewa Beach, Hawaii 96706

Comment: Suggested installation of traffic signals at the Kapolei Parkway / Renton Road intersection.

Response: The City and County of Honolulu is currently constructing Kapolei Parkway from the OR&L Right-of-Way to Renton Road, as part of a separate project. That project will construct the Kapolei Parkway / Renton Road intersection, including the supporting infrastructure for future traffic signals. When warranted, traffic signals will be installed at this intersection.

Landscaping of North-South Road and Kapolei Parkway

Mr. Lyle Halverson
91-1145 Kaipu Street
Ewa Beach, Hawaii 96706

Comment: Suggested that roadway landscaping use plants that do not use very much water or require a lot of maintenance.

Response: Details of the highway landscaping plan will be developed during the project's design phase. Use of plants that would minimize water requirements will be considered.

Systemwide Traffic Congestion Issues

Dr. Kioni Dudley
91-1365 Hauone Street
Kapolei, Hawaii 96707

Comment: Suggested that improvements to the H-1 Freeway be done concurrently with construction of the North-South Road / Kapolei Parkway project.

Response: The inclusion of capacity enhancement alternatives for the H-1 Freeway with the proposed project would be beyond the project's purpose and need. There are other projects that are incrementally addressing congestion issues on H-1 Freeway. An example is the widening project for the Waimalu Viaduct near the Waiau Interchange. Moreover, the EA discloses that traffic on the H-1 Freeway, within the study area, is projected to operate at an acceptable level-of-service with the proposed project. Section 3.3 of the Revised Draft EA provides further information.

Ms. Rosemary Angelo
91-1698 Burke Street
Ewa Beach, Hawaii 96706

Comment: The North-South Road and Kapolei Parkway project would contribute to the abundance of traffic signals in the area and related traffic congestion.

Response: Traffic signals are necessary for the safe and efficient operation of intersections along North-South Road and Kapolei Parkway. We agree that unnecessary traffic signals should not be installed, and any traffic signal will be installed only after warrants are satisfied.

Comment: Concerned about pedestrian safety.

Response. Pedestrian and bicyclist safety is a high priority in the planning of roadways. Pedestrian-friendly features have been incorporated into the proposed roadway designs, including sidewalks, traffic signals, and bike facilities.

General Support for the Project

The Honorable Senator Willie Espero
State Capitol, Rm
Honolulu HI 96813

The Honorable Representative Mark Moses
State Capitol, Rm 310
Honolulu HI 96813

Mr. Philmund Lee
Representative Romy Mindo
State Capitol, Rm 303
Honolulu HI 96813

Mr. Todd Apo
92-1461 Aliinui Dr 23C
Kapolei HI 96707

Mr. Tony Becker
91-1073 Kaiko Street
Ewa Beach HI 96706

Ms. C.C. Curry
IACC Organization
91-1476 Renton Rd #10
Ewa Beach HI 96706

Mr. Coby Lynn
91-1139 Hanakahi Street
Ewa Beach HI 96706

Mr. Louis Maria
91-1216 Renton Road #Z
Ewa Beach HI 96706

Ms. Sai Tagovailoa-Amosa
91-1145 Ha'ano Place
Ewa Beach HI 96706

Other - No Substantive Comments

Mr. and Mrs. Demetrios Balala
91-1034 Manakuke Street
Ewa, Hawaii 96706

APPENDIX B

CORRIDOR ALTERNATIVES REPORT

NORTH-SOUTH ROAD/KAPOLEI PARKWAY CORRIDOR STUDY

Ewa, Oahu, Hawaii
Project No. HWY-0-01-92

CORRIDOR ALTERNATIVES STUDY

May 1998

PARSONS BRINCKERHOFF
KAKU ASSOCIATES
R.M. TOWILL CORPORATION

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1. INTRODUCTION

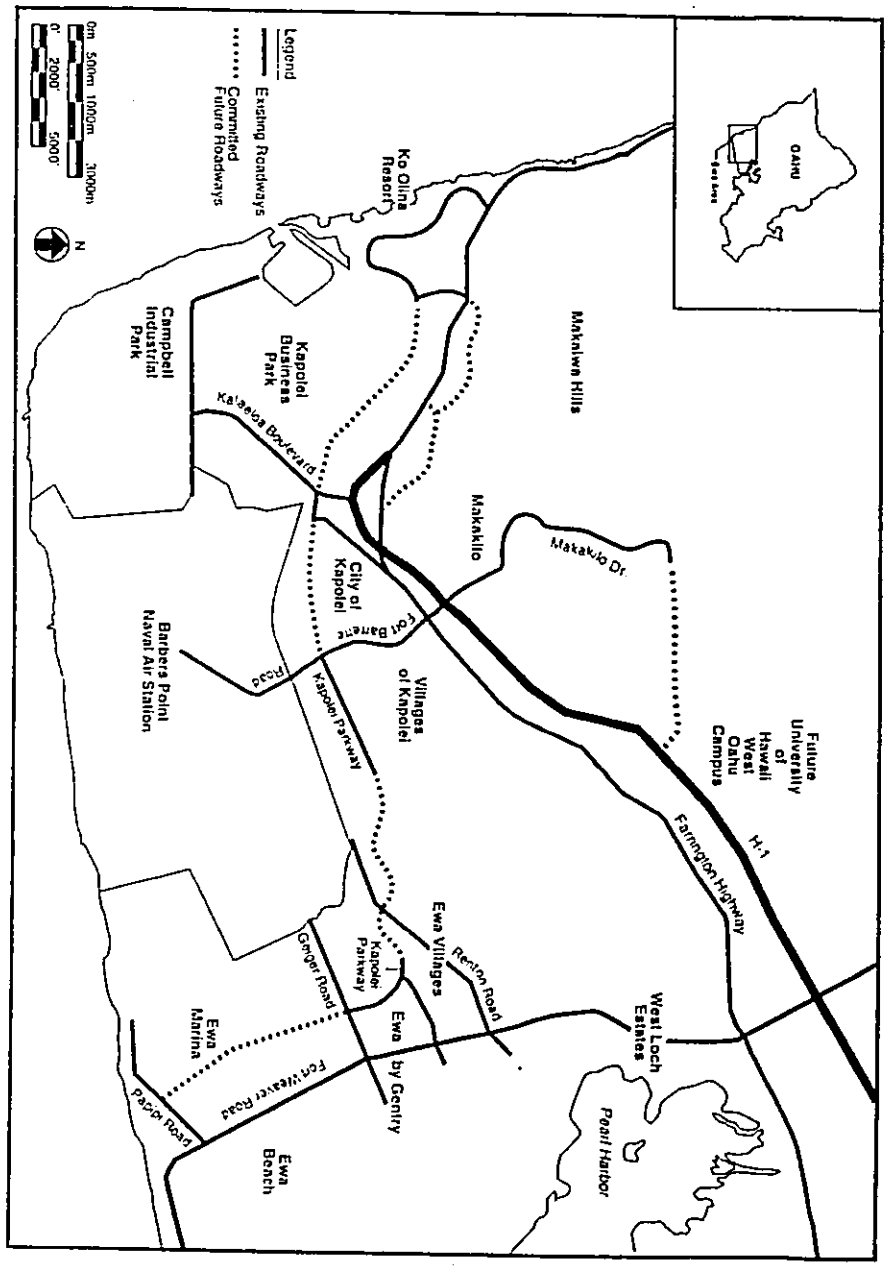
The designation of the Ewa region as the "second city" of Oahu in the General Plan provides an alternative area for the growth of population and employment outside of the Primary Urban Center and the Central Oahu Development Plan areas. Figure 1 illustrates this area. Within the past ten years, there has been significant growth in population and, to a lesser extent, in employment as development, sometimes aided by government, responded to the policy directive.

As a result, existing traffic analyses of the Ewa region indicate that there are, currently, major instances of traffic congestion occurring at the Makakilo and Kunia Interchanges on the H-1 Freeway during the peak traffic periods of the day. This congestion extends down the Kunia Road/Fort Weaver Road corridor into Ewa. Roadway improvements are clearly needed today to lessen the impact of this congestion.

Planning for the Ewa region has also identified infrastructure needs to support the projected growth in population and employment yet to occur. Planning studies such as the Ewa Regional Transportation Master Plan and the Oahu Regional Transportation Plan identified the need for major new transportation facilities within the Ewa region.

The proposed North-South Road is one of the elements identified through these studies. It has the potential for relieving both current and projected traffic congestion in the region and provides an important element in the sub-regional transportation circulation.

This study evaluates three alternative corridors that have been identified through the public participation process and determines that at least one of these corridors is a viable proposal and should be further developed.



Ewa Region
NORTH-SOUTH ROAD CORRIDOR STUDY
FIGURE 1

II. DEFINITION OF SYSTEM ALTERNATIVES

Three system alternatives were identified

- No-Build Alternative
- Transportation Systems Management (TSM) Alternative
- Build Alternative

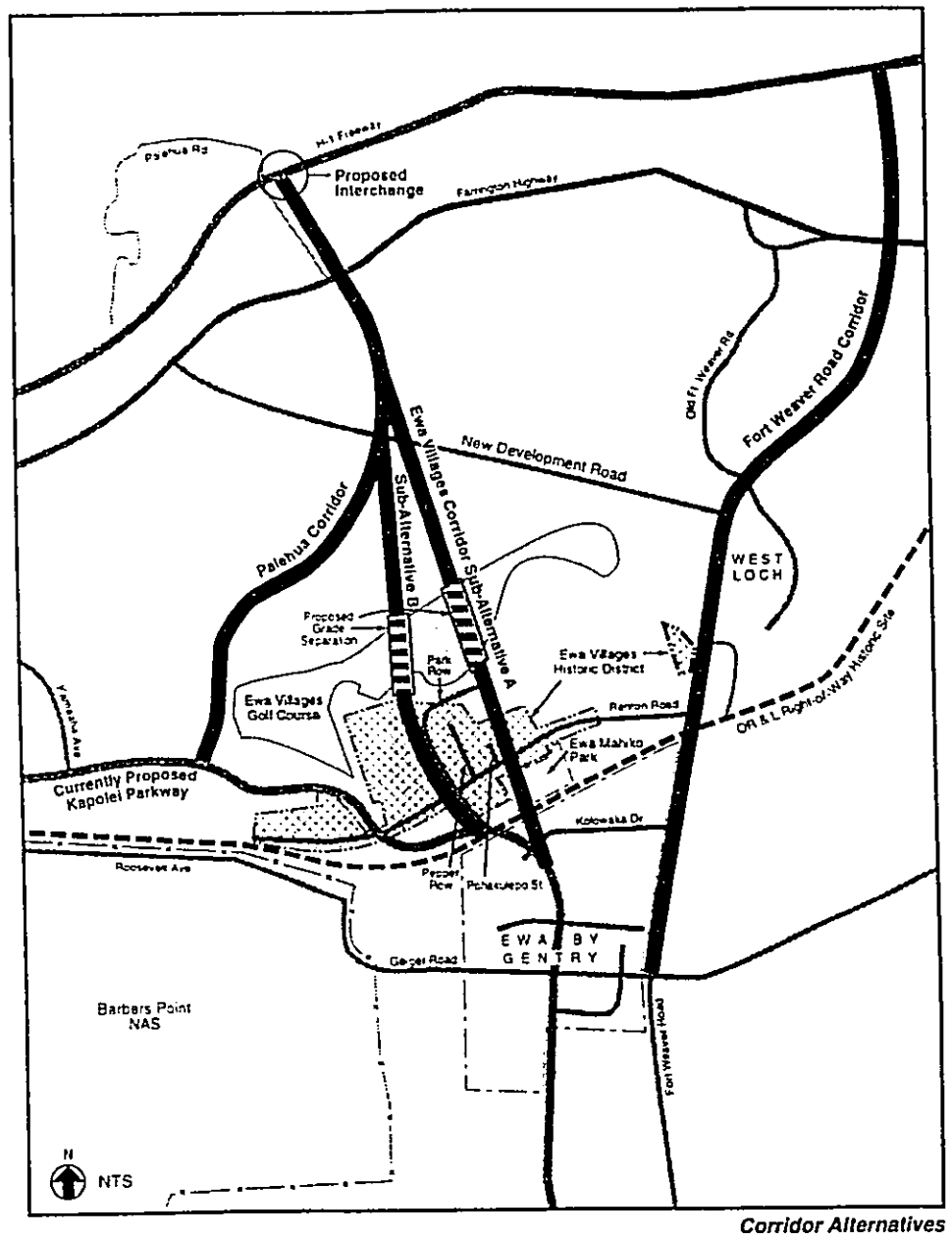
The **No-Build Alternative** represents a minimal approach to satisfying the purposes and needs of this project. It assumes that the proposed North-South Road is not constructed between the H-1 Freeway and Kapolei Parkway, and that no additional access is provided to the H-1 Freeway between the Kunia and Makakilo Interchanges. It does assume long-range improvements to H-1 Freeway, Fort Weaver Road, Fort Barrette Road, Farrington Highway, and Kapolei Parkway as documented in the Oahu Regional Transportation Plan, adopted by the Oahu Metropolitan Planning Organization in November, 1995.

The **Transportation Systems Management (TSM) Alternative** in this study is defined as the provision of a higher level of transit service to the Ewa region. The No-Build alternative assumes a 715-bus fleet by the Year 2020, while the TSM alternative assumes a larger fleet of 1,000 buses with much of this increased bus fleet enhancing service in the Ewa and Leeward areas.

The **Build Alternative** assumes that a transportation corridor and access to H-1 Freeway would be constructed between the Kunia and Makakilo Interchanges. There are three corridor alignment alternatives identified through community and governmental agency input.

- Fort Weaver Road Corridor,
- Ewa Village Corridor, and
- Palehua Corridor.

Figure 2 illustrates the corridor alignment alternatives. This study report focuses on the evaluation of these three corridor alignment alternatives with the intent to identify at least one corridor which would be representative of the Build alternative for comparison with the No-Build and TSM system alternatives.



Corridor Alternatives
NORTH-SOUTH ROAD CORRIDOR STUDY
FIGURE 2

III. DESCRIPTION OF CORRIDOR ALIGNMENT OF THE BUILD ALTERNATIVE

The three corridor alignment alternatives were identified through discussions with community organizations representing the Ewa region and through discussions with government agencies responsible for planning of this area. The alternatives are

- Fort Weaver Road Corridor.
- Ewa Villages Corridor.
- Palehua Corridor

A. Fort Weaver Road Corridor Alternative

This alternative would utilize the existing Fort Weaver Road corridor by upgrading the existing four-lane divided roadway to a four-lane freeway from Farrington Highway to Geiger Road. This alternative was developed in response to public and agency comments that suggested maximizing capacity within the Fort Weaver Road corridor as an alternative to constructing a new north-south roadway within the study area.

Future plans already recommend increasing the number of lanes on Fort Weaver Road from 4 to 6 lanes. This widening improvement is included in the Oahu Regional Transportation Plan in addition to constructing a separate North-South Road. Clearly, utilizing this corridor as an alternative to constructing a new North-South Road would require an enhancement above and beyond the 6-lane widening. Consequently, a 4-lane freeway with access regulated by grade-separated interchanges was identified as a way to accomplish this without major property acquisition along the Fort Weaver Road corridor. The 4-lane freeway configuration provides more traffic-carrying capacity than a 6-lane arterial roadway and can provide this within a comparable right-of-way except at interchanges.

In this alternative, grade-separated interchanges would be constructed at Geiger Road, Renton Road, a new East-West Development Road, and Laulaunui Street (West Loch Estates). No new access point would be provided on the H-1 Freeway between the Kunia and Makakilo Interchanges.

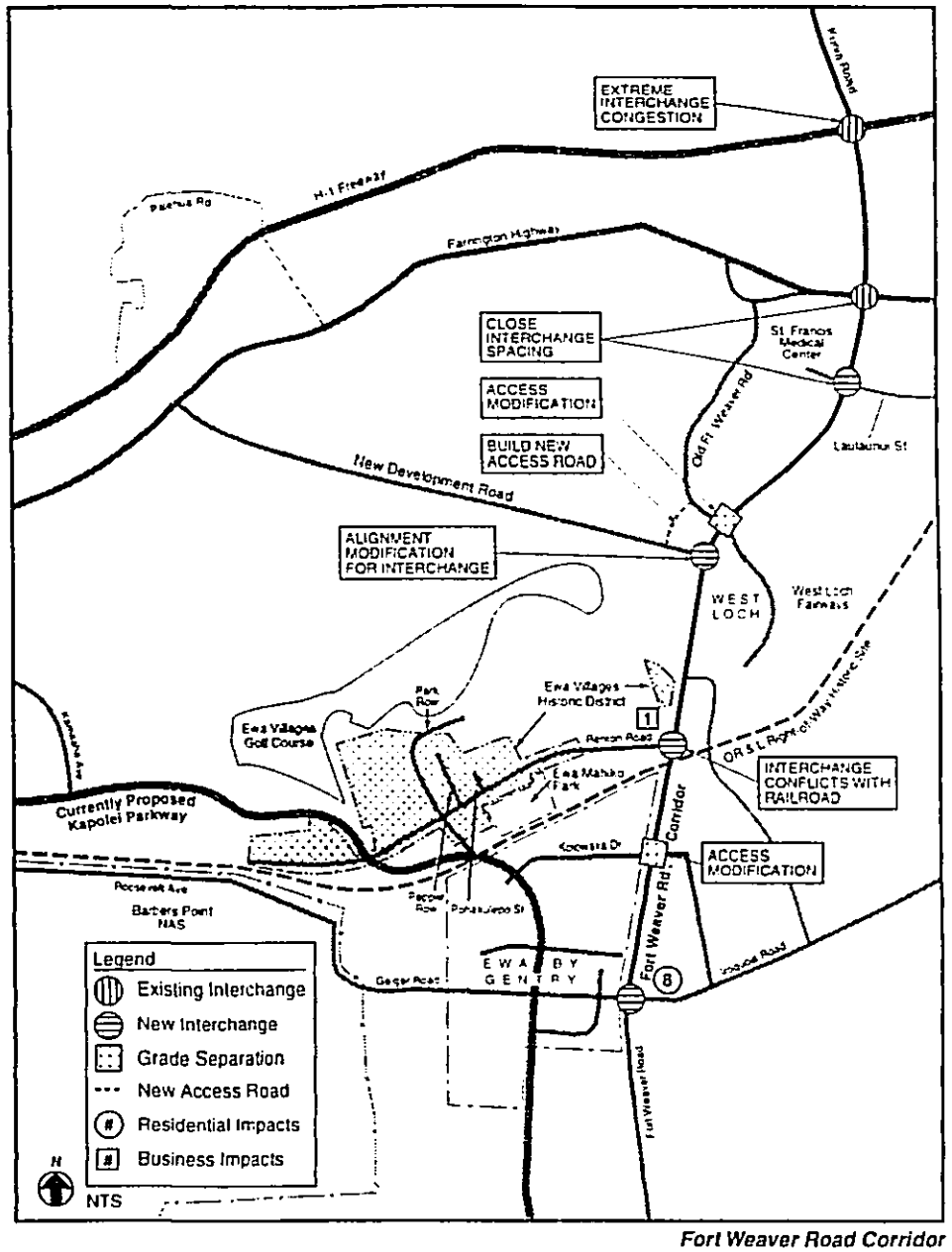
Additional right-of-way would be needed at these four interchange locations to accommodate the on and off ramps. Figure 3 shows the proposed corridor configuration and identifies some preliminary issues within the Fort Weaver Road corridor.

B. Ewa Villages Corridor Alternative

This corridor alignment provides a direct route from the Ewa and Ewa Beach areas to the proposed new North-South Road interchange with the H-1 Freeway. It is assumed to be a 6-lane arterial roadway with at-grade intersections. This alternative resulted from Ewa and Ewa Beach community requests to evaluate a "more direct" alignment of North-South Road than the alignment shown in the Ewa Regional Transportation Master Plan and the Oahu Regional Transportation Plan (ORTP). Two specific alignments were suggested by the public in meetings of the Ewa Neighborhood Board and the Ewa Beach Community Association.

One of the Ewa Villages Corridor alternative alignments identified through the public involvement process provides the most direct route from Ewa Beach through the Ewa Villages development to H-1 Freeway. For discussions purposes, this is labeled Sub-Alternative A. It would begin at the tangent portion of existing Kapolei Parkway between Geiger Road and Kolowaka Drive, adjacent to the Ewa by Gentry development. The alignment would continue to the northwest, cutting through the Ewa by Gentry development and the Ewa Mahiko Park. The alignment would then enter the Ewa Villages Historic District and parallel Pepper Row, cutting across the existing Ewa Villages Golf Course and the currently vacant Ewa Villages housing lots.

Another alignment, labeled Sub-Alternative B, would begin where the extension of Park Row would intersect Kapolei Parkway. The Oahu Railway & Land (OR&L) Right-of-Way passes through this intersection. The alignment would then follow the Park Row alignment north through the Ewa Villages Historic District and cross the existing Ewa Villages Golf Course fairway.



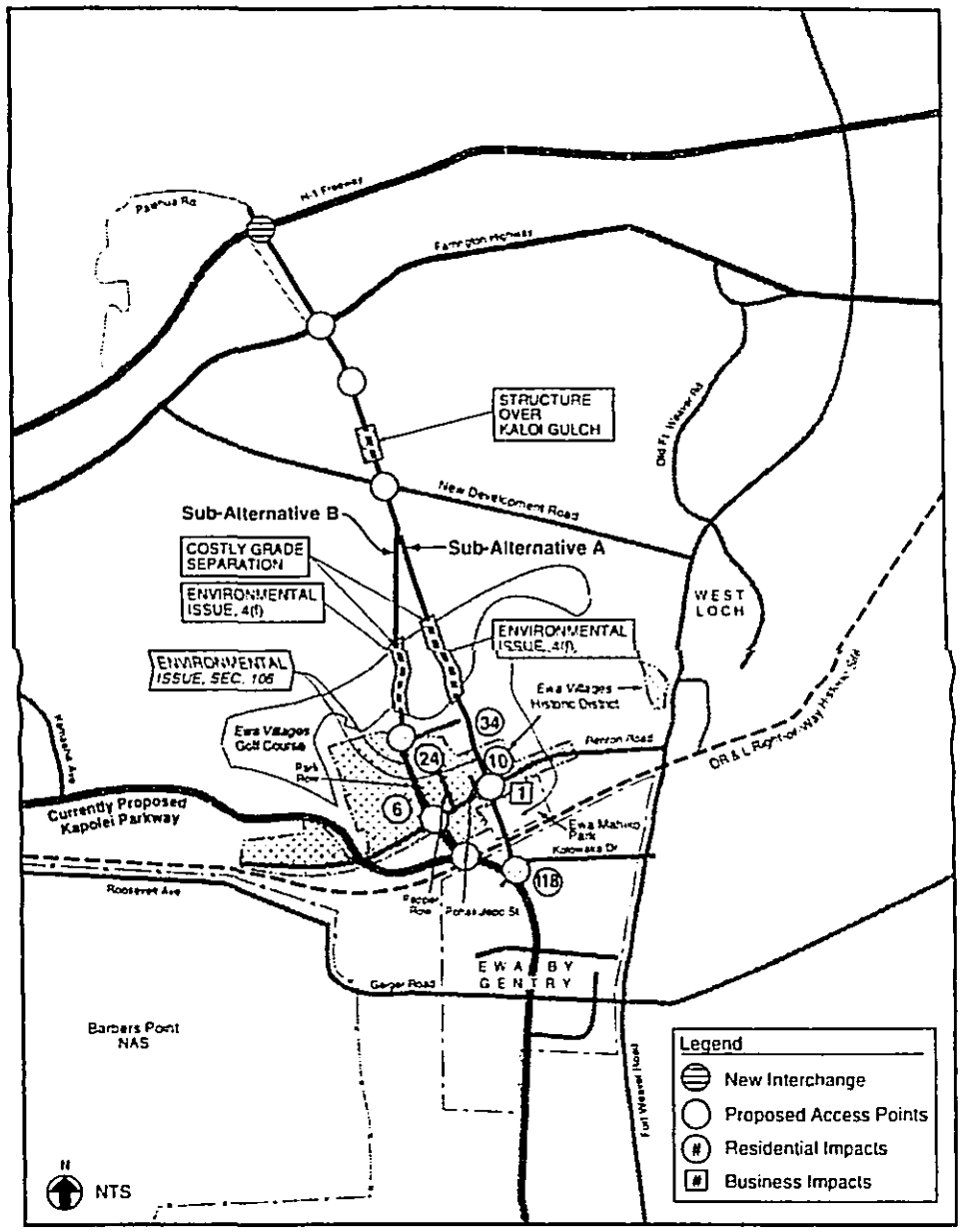
Fort Weaver Road Corridor
NORTH-SOUTH ROAD CORRIDOR STUDY
FIGURE 3

Both sub-alternative alignments would join together upon leaving the Ewa Villages Historic District and proceed towards the existing Palehua Road and the proposed interchange location on the H-1 Freeway. Figure 4 shows the two sub-alternatives and highlights areas of concern. These two sub-alternatives are both evaluated in this analysis.

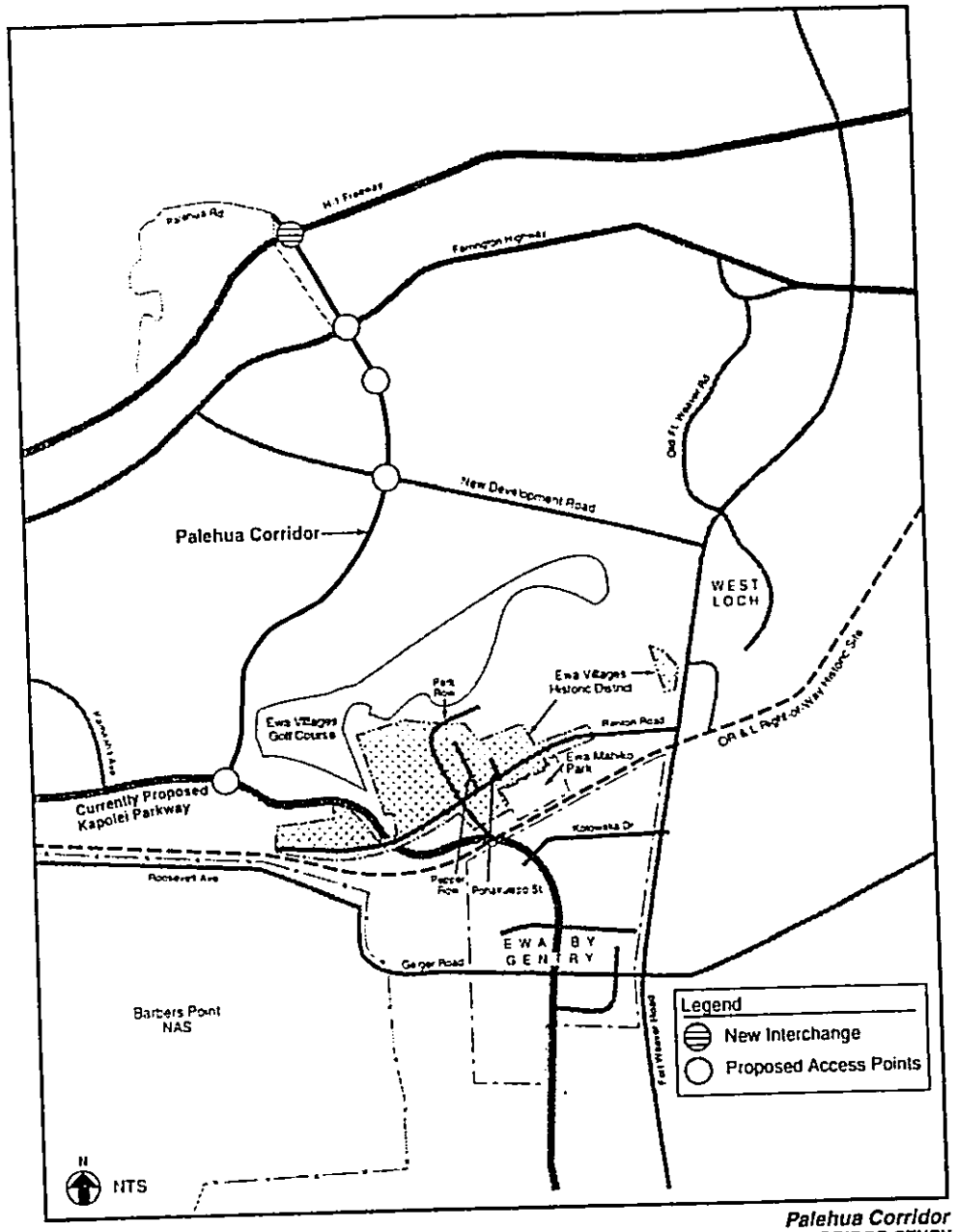
C. Palehua Corridor Alternative

This corridor alternative would intersect Kapolei Parkway in the vacant area between the existing "Villages of Kapolei" development and the Ewa Villages development. The alignment would proceed north to the proposed interchange at H-1 Freeway. As much as possible, the alignment would utilize an existing easement that was set aside for a major north-south roadway as part of sub-regional planning efforts in the Ewa region. This easement also accommodates existing Hawaiian Electric Company (HECO) 138 kV transmission towers and is planned to accommodate a realigned Kaloi Gulch. A 6-lane, divided arterial with at-grade intersections is assumed for this alternative.

This alternative has been shown on many development plans. The *Kapolei Long-Range Master Plan*, the original planning documents for the University of Hawaii - West Oahu Campus, and the current planning efforts of the Housing Finance and Development Corporation (HFDC) consistently show this conceptual alignment for the road. The ORTP, while not specific with regard to alignment, also indicates a North-South Road within this area. All of the lands traversed by this corridor alignment are currently undeveloped. Figure 5 shows the corridor alternative configuration.



Ewa Villages Sub-Alternatives A & B
NORTH-SOUTH ROAD CORRIDOR STUDY
FIGURE 4



Palehua Corridor
NORTH-SOUTH ROAD CORRIDOR STUDY
FIGURE 5

IV. EVALUATION OF CORRIDOR ALTERNATIVES

The three corridor alignment alternatives were compared in four areas 1) Community Impacts, 2) Right-of-Way Needs, 3) Construction Cost and 4) Travel Benefits Community impacts refer to the physical impacts to buildings, properties, and special features of the corridor alignment alternatives Right-of-way needs identify the right-of-way required to implement an alternative Preliminary construction cost estimates facilitate the comparison of implementation cost between the alternatives Travel benefits reflect the usefulness of the alternative regarding transportation circulation and congestion relief

A. Community Impacts

Four community impact elements were evaluated 1) Property, 2) Access, 3) Aesthetics, and 4) Recreational/Historic Property impacts refer to the number of structures impacted by a corridor alignment Access impacts identify access implications of a corridor alignment Aesthetic impacts consider the visual and community impacts as a result of developing an alignment alternative Recreational/historic impacts identify facilities protected by law that are impacted by a corridor alignment

1 Fort Weaver Road Corridor

Property Impacts

This corridor alternative was configured to minimize physical impacts to properties adjacent to Fort Weaver Road by keeping the east-west cross-streets at-grade, while grade-separating Fort Weaver Road over them This minimizes disruption to access points along the cross-streets However, even using a tight diamond interchange configuration which utilizes as little as 250-foot spacing between ramp terminal intersections, it appears that about 8 residential units would be displaced on the east side of Fort Weaver Road at Geiger Road Additionally, 1 business is likely to be displaced on the north-west quadrant of the Fort Weaver Road/Renton Road interchange

Access Impacts

The implementation of interchanges for access to Fort Weaver Road will impact access to Fort Weaver Road. The number of interchanges along Fort Weaver Road will be constrained by minimum interchange spacing criteria. As a result, two existing east-west cross streets will lose direct access to Fort Weaver Road: Kolowaka Drive and Old Fort Weaver Road. Grade-separations are proposed to provide cross-street continuity, and access to Fort Weaver Road will be rerouted to cross-streets with interchanges.

Aesthetics

The construction of massive grade-separated interchanges along Fort Weaver Road will have visual impacts within the fairly flat Ewa plain area.

Recreational/Historic Impacts

This corridor alternative is not likely to have either recreational or historic impacts as it is mostly contained within an existing roadway right-of-way.

2 Ewa Villages Corridor Alternatives

Property

The Ewa Villages Corridor Alternatives would have significant property impacts. Sub-Alternative A would displace at least 118 existing residential dwellings units within the Ewa by Gentry subdivision and 10 residences within the Ewa Villages Historic District along Pohakulepo Street. Thirty-four vacant residential lots along the Ewa Villages Golf Course will also be displaced. This option would also impact a recreational center in the Ewa by Gentry development. A commercial building on the south side of Renton Road that houses the Friends of Ewa organization will also be impacted. Sub-Alternative B has fewer direct physical impacts to the Ewa Gentry and Ewa Villages developments. It would impact 6 existing residences within the Ewa Villages Historic District along Park Row and 24 vacant residential lots along the Ewa Villages Golf Course.

Access

In both sub-alternatives, access to adjacent properties will be modified. Intersection spacing requirements for a principal arterial road will limit the frequency of access to the proposed North-South Road. This will require that cross-street access to North-South Road be closed within the Ewa Villages Historic District neighborhoods.

Aesthetics

Locating a principal arterial roadway in a neighborhood and recreational area is likely to impact the area aesthetically, especially in the areas of noise and change in character.

Recreational/Historic Impacts

Both sub-alternatives will pass through the Ewa Villages Historic District which is currently on the State of Hawaii Register of Historic Places and has been nominated for the National Register of Historic Places. This will trigger Section 106 of the National Historic Preservation Act of 1966 and Section 4(f) of the Department of Transportation Act.

Both Sub-Alternative A and Sub-Alternative B will impact the Ewa Villages Golf Course thereby triggering Section 4(f) relating to impacts on recreational facilities. Mitigation will require major modifications to the existing Ewa Villages Golf Course including grade-separation of North-South Road below grade under the fairways. Sub-Alternative A will also directly impact Ewa Mahiko Park, creating a Section 4(f) impact there as well.

3 Palehua Corridor Alternative

Property

The Palehua Corridor Alternative does not have property impacts since the land through which the alignment is proposed is vacant.

Access

Proposed access along the Palehua Corridor is appropriate for a principal arterial. Farrington Highway and Kapolei Parkway will be major intersections. Intersections between these two points are being planned as part of future development of the area and their frequency and location can be directed to appropriate points along the proposed North-South Road

Aesthetics

There is sufficient land available to implement appropriate landscaping along the Palehua Corridor to create a pleasant driving environment

Recreational/Historic Impacts

There are no recreational or historic sites within the Palehua Corridor

Table 1 summarizes the community impacts associated with the Fort Weaver, Ewa Villages, and Palehua Corridors

Table 1
Corridor Alignment Alternatives
Community Impacts

Corridor Alternative	Property-Residential Units	Property-Businesses	Access - Cross-Streets Affected	Recreational/ Historical Sites
Fort Weaver Road Corridor	8	1	2	0
Ewa Villages Corridor, Sub-Alternative A	162	1	1	3
Ewa Villages Corridor, Sub-Alternative B	30	0	6	2
Palehua Corridor	0	0	0	0

As shown in Table 1, the Palehua Corridor Alternative has the fewest community impacts

B. Right-of-Way Needs

Right-of-way needs refer to additional right-of-way that needs to be acquired above and beyond what exists today

1. Fort Weaver Road Corridor Alternative

The Fort Weaver Road Corridor will require additional right-of-way at the proposed interchange locations. The mainline should be able to fit within the right-of-way already reserved in anticipation of widening Fort Weaver Road from 4 to 6 lanes. The interchange right-of-way impacts were determined assuming tight diamond interchanges with 250-foot spacing between ramp terminal intersections. Right-of-way requirements were minimized by shifting the alignment within the existing corridor and by eliminating the median area. Retaining walls were assumed where necessary to reduce the amount of right-of-way needed

2. Ewa Villages Corridor Alternative

The Ewa Villages Corridor has the greatest right-of-way requirements. Both sub-alternatives will require additional right-of-way in the existing historic Ewa villages. The crossing of the Ewa Villages Golf Course may require some type of grade separation under the golf course fairways. If the grade separation is needed, the approaches to it will also impact existing cross streets, requiring additional access roadways and their associated right-of-way to maintain access to areas served by the cross-streets

Sub-Alternative A will also require right-of-way acquisition from the Ewa by Gentry development.

North of the Ewa Villages development, both sub-alternatives would pass through a land parcel designated for use by the Department of Hawaiian Home Lands (DHHL). While this land is owned by the State of Hawaii, the use of this land for a major transportation corridor is not consistent with the current DHHL plans for its use. North of the DHHL parcel, the land is owned by the Estate of James Campbell from whom this land would need to be acquired.

3 Palehua Corridor

The southern half of the Palehua Corridor alignment is owned by the State of Hawaii and the northern half is owned by the Estate of James Campbell. The State of Hawaii portion needs only to be transferred to the State of Hawaii Department of Transportation by Executive Order. The Campbell land needs to be acquired, but the land has already been set aside for infrastructure purposes

Table 2 summarizes the right-of-way requirements of the corridor alignments. The right-of-way required for the interchange with H-1 Freeway is not included.

Table 2
Corridor Alignment Alternatives
Right-of-Way Impacts

Corridor Alternative	Right-of-Way Needs - hectares (acres)
Fort Weaver Road Corridor	6 24 (15 41)
Ewa Villages Corridor, Sub-Alternative A	10 29 (25 42)
Ewa Villages Corridor, Sub-Alternative B	5 31 (13 12)
Palehua Corridor	3 97 (9 81)

As shown, the Palehua Corridor requires the least amount of right-of-way acquisition, followed by the Ewa Villages Corridor, Sub-Alternative B, and the Fort Weaver Road Corridor. The Ewa Villages Corridor, Sub-Alternative A requires, by far, the most right-of-way acquisition.

C. CONSTRUCTION COST

Construction cost does not include the costs of right-of-way acquisition and compensation for displaced residents or businesses

1 Fort Weaver Road Corridor Alternative

The Fort Weaver Road Corridor is the most expensive is terms of construction cost. To minimize impacts to the cross-streets, Fort Weaver Road was assumed to be grade-separated over them This resulted in large and expensive interchange structures.

The light diamond interchange configuration was assumed to minimize property impacts at the interchange locations. This required retaining walls between the mainline and interchange ramps, again increasing cost Therefore, much of the cost of this corridor alternative is the cost of the interchanges on Fort Weaver Road. The interchange for the Laulaunui Street area will be especially expensive due to its close proximity to the existing Farrington Highway interchange. This close distance will require ramp braiding with the Farrington Highway interchange ramps, requiring expensive ramp structures

2 Ewa Villages Corridor Alternative

The Ewa Villages Corridor Alternatives are also expected to have significant construction cost, due to the mitigation measures required through the Ewa Villages Historic District It is expected that some type of grade-separation will be required to convey the future North-South Road under the Ewa Villages Golf Course fairways Significant noise abatement walls will probably be required within the Tenney and Renton Village areas This corridor, unlike the other two, will cross the future realigned Kalol Gulch, requiring a significant drainage structure Sub-Alternative A has the additional cost of demolishing the existing Ewa by Gentry residential units and re-aligning Kapolei Parkway to intersect the new roadway Sub-Alternative B has the additional cost of constructing a service road for Park Row east of the future North-South Road to provide access to parcels landlocked by the closure of existing cross-streets that now access Park Row

Sub-Alternative B will probably have lower construction costs than Sub-Alternative A due to the need for a shorter grade-separation under the Ewa Villages Golf Course fairways and shorter roadway length Demolition costs are also lower for Sub-Alternative B

3 Palehua Corridor Alternative

The Palehua Corridor Alternative is projected to be the least expensive corridor alternative. It will be constructed on relatively flat topography with no major physical constraints Because the corridor penetrates an area that is currently undeveloped, no

noise mitigation is required as part of the roadway project. No major drainageways are crossed by the Palehua Corridor alignment

Table 3 summarizes the construction costs of the corridor alignment alternatives. The construction costs do not include right-of-way costs, building impact costs or a new interchange with the H-1 Freeway The interchange design at the H-1 Freeway has not been determined as part of this study

Table 3
Corridor Alignment Alternatives
Construction Cost Summary

Corridor Alternative	Construction Cost
Fort Weaver Road Corridor	$179 1 million
Ewa Villages Corridor, Sub-Alternative A	$93 0 million
Ewa Villages Corridor, Sub-Alternative B	$73 1 million
Palehua Corridor	$39 4 million

D. Travel Benefits

Projected peak period travel times were used to help quantify travel benefits of the corridor alternatives. Travel times were estimated from four origin areas to a point of the H-1 Freeway just west of the Kunia Interchange The most logical path was utilized for each travel time estimate

The four origin areas are

1. Ewa Beach Area - From the Fort Weaver Road/Papipi Road intersection
2. Ewa Villages Area - From the Kapolei Parkway/Park Row intersection
3. Kapolei Area - From the Kapolei Parkway/Kamaaha Avenue intersection
4. HFDC Development Area - From the New East-West Development Road/Kaloi Gulch intersection

For the purposes of this travel time assessment, the two Ewa Villages sub-alternatives were assumed to behave similarly and were consolidated into one alternative

Using measured distances and the posted speed limits, the free flow travel times were computed and then the intersection and interchange delays were added. Table 5 summarizes the travel path lengths and the resulting travel times for the corridor alternatives.

Table 4
Corridor Alignment Alternatives
Year 2020 AM Peak Hour Travel Time Summary
Area of Origin to H-1 at Kunia Interchange

Area Origin/ Corridor/Alternative	Travel Path Length meters (miles)	Total Travel Time minutes
Ewa Beach Area		
Fort Weaver Rd. Corridor	8,405 (5 22)	17 3
Ewa Villages Corridor	12,035 (7 48)	11 6
Palehua Corridor	13,955 (8 68)	13 7
Ewa Villages Area		
Fort Weaver Rd. Corridor	6,170 (3 83)	17 1
Ewa Villages Corridor	8,000 (4 97)	6 3
Palehua Corridor	9,930 (6 17)	8 9
Kapolei Area		
Fort Weaver Rd. Corridor	8,715 (5 41)	20 0
Ewa Villages Corridor	10,545 (6 55)	10 4
Palehua Corridor	8,660 (5 38)	7 6
HFDC Development Area		
Fort Weaver Rd. Corridor	6,350 (3 94)	16 4
Ewa Villages Corridor	5,885 (3 66)	4 6
Palehua Corridor	5,660 (3 64)	4 6

1 Fort Weaver Road Corridor Alternative

As shown in Table 5, the Fort Weaver Road Corridor alternative is projected to have the longest travel times during the Year 2020 AM peak period due to the extreme congestion expected to occur on Fort Weaver Road, south of the Kunia Interchange if no alternative access to H-1 Freeway is provided Converting Fort Weaver Road to a freeway maximizes the traffic capacity of Fort Weaver Road itself, but the traffic must still access the H-1 Freeway at a single interchange location

The Fort Weaver Road Corridor Alternative will have limited usefulness for the Kapolei area, requiring traffic originating in this area to utilize east-west cross-streets for significant distances to access the improved Fort Weaver Road corridor.

2 Ewa Villages Corridor Alternative

The Ewa Villages Corridor Sub-Alternatives provide much better travel times than the Fort Weaver Road Corridor Alternative during the AM peak period. It provides similar travel times to the Palehua Road Corridor Alternative, differing by only 3 minutes.

3 Palehua Corridor Alternative

The Palehua Corridor Alternative also provides much better travel times than the Fort Weaver Road Corridor Alternative during the AM peak period. Its travel times are similar to the Ewa Villages Corridor Alternative travel times, differing by about 3 minutes.

V. SELECTION OF PREFERRED CORRIDOR ALTERNATIVE

A. Evaluation Summary

The criteria elements examined include

1. Community Impacts
2. Right-of-Way Impacts
3. Construction Cost
4. Travel Benefits

Community Impacts - The Ewa Villages Corridor Alternatives had the largest community impacts. Property impacts, recreational 4(f) impacts, and historical (Section 106) impacts were greatest for this corridor. The Fort Weaver Road Corridor Alternative community impacts were significant mostly in the area of disruption of existing access to Fort Weaver Road. The Palehua Corridor Alternative community impacts are minimal.

Right-of-Way Impacts - The right-of-way impacts for the Ewa Villages Corridor Alternatives are the greatest as they will require acquisition of property not currently identified for roadway use. The Fort Weaver Road Corridor Alternative will require additional right-of-way primarily around its proposed interchanges. Much of the Palehua Corridor Alternative has been identified for roadway use and a significant portion of the land is already owned by the State of Hawaii.

Construction Cost - The Fort Weaver Road Corridor Alternative has the highest construction cost due to the cost of the proposed interchanges and the retaining walls required between the mainline and the interchange ramps. The Ewa Villages Corridor Alternatives also have high construction costs due to the grade separation needed to convey North-South Road under the Ewa Villages Golf Course fairways and the drainage structure needed to cross the realigned Kalol Gulch. The construction costs for the Palehua Corridor Alternative are the lowest of all the alternatives.

Travel Benefits- The Fort Weaver Road Corridor Alternative results in the worst travel time performance during the AM peak period due to projected congestion at the Kunia Interchange at the H-1 Freeway if no alternative access to H-1 is provided. The

Ewa Villages Corridor Alternatives and the Palehua Corridor Alternative provide similar travel time performance

B. Recommendation

Because it has no community impacts, requires the least amount of right-of-way acquisition, has the lowest construction cost, and provides a travel time advantage, the Palehua Corridor Alternative is a viable proposal and should be further evaluated. The Fort Weaver Road Corridor Alternative and the Ewa Villages Corridor Alternative are not recommended for further evaluation.

The Palehua Corridor Alternative will be used as the Build system alternative for further evaluation against the No-Build and Transportation System Management (TSM) system alternatives in the environmental assessment.

APPENDIX C

INTERSTATE ACCESS MODIFICATION REQUEST

DRAFT
INTERSTATE ACCESS MODIFICATION REQUEST

NORTH-SOUTH ROAD STUDY

Ewa, Oahu, Hawaii

May 2004

PARSONS BRINCKERHOFF

Over a Century of Engineering Excellence

NORTH-SOUTH ROAD CORRIDOR STUDY
Ewa, Oahu, Hawaii
Project No. HWY-0-01-92

DRAFT INTERSTATE ACCESS MODIFICATION REQUEST

Prepared for:

State of Hawaii
Department of Transportation
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City and County of Honolulu
Department of Transportation Services
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May 2004

PBQD Reference: 16218A – Product 11.1

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CHAPTER 1
INTRODUCTION AND PURPOSE

A. Introduction

In 1977, the City & County of Honolulu approved a new General Plan that designated the Ewa plain as the location for a secondary, urban center for Oahu, focused on the new town of Kapolei. The Secondary Urban Center was to be the focus of major economic activity and housing development, and a center for government services. While the General Plan promotes full development of the Primary Urban Center, it also encourages development of the Secondary Urban Center at Kapolei, and residential development of the urban fringe areas in Ewa and Central Oahu. Since the concept was first adopted, significant progress has been made in implementing the vision of the Second City in the Ewa plain.

In Ewa, the West Loch Estates and West Loch Fairways, Ewa by Gentry, and Ewa Villages, and Ocean Pointe residential developments with associated support commercial and educational facilities have all proceeded substantially into their planned buildout programs.

In Makakilo and Kapolei, development is also proceeding as planned. The Housing and Development Corporation of Hawaii (HCDCH) has completed a substantial portion of the Villages of Kapolei including the Kapolei Elementary School, Kapolei Middle School, and Kapolei High School. Within the City of Kapolei, The Estate of James Campbell has developed an office building complex, Bank of Hawaii has constructed an office building, and the State of Hawaii and the City and County of Honolulu have constructed new office buildings for their agencies. There is a new medical center, and support commercial uses such as shopping centers, a cinema megaplex, and big box retail development have occurred.

The Ewa Development Plan, adopted by City Council in 1997, reaffirms the role for the Ewa community outlined in the General Plan. As an extension of the plan, The Ewa Public Facilities Map identifies existing and future infrastructure needs for the Ewa Development Plan Area. Included in the Ewa Public Facilities Map is a new arterial

roadway and associated interchange on Interstate H-1 Freeway. This new roadway is referred to as North-South Road, and its associated interchange is proposed to be located between the existing Kunia and Makakilo Interchanges. Figure 1-1 illustrates the Ewa area and the proposed North-South Road and Interchange.

As the Secondary Urban Center is implemented, transportation facilities identified in the Ewa Public Facilities Map are needed to maintain regional and sub-regional access and mobility for the Ewa Development Plan area. The North-South Road and Interchange on Interstate H-1 Freeway will play an integral part in providing regional access to this important Secondary Urban Center.

B. Purpose

The purpose of this report is to provide the rationale for approval of an additional access to the Interstate System at its junction with proposed North-South Road in Ewa, Oahu, Hawaii as outlined in title 23, Code of Federal Regulations 630. The new Interchange is proposed to be located between the existing Makakilo and Kunia Interchanges at a distance of approximately 2 miles from each.

This report will detail the existing and anticipated future conditions in the study area, and analyze the anticipated impact to the Interstate and local roadway system.

C. Need for North-South Road Interchange

The designation of the Ewa area as the location for a secondary, urban center for Oahu and the Ewa Development Plan support the General Plan policies by:

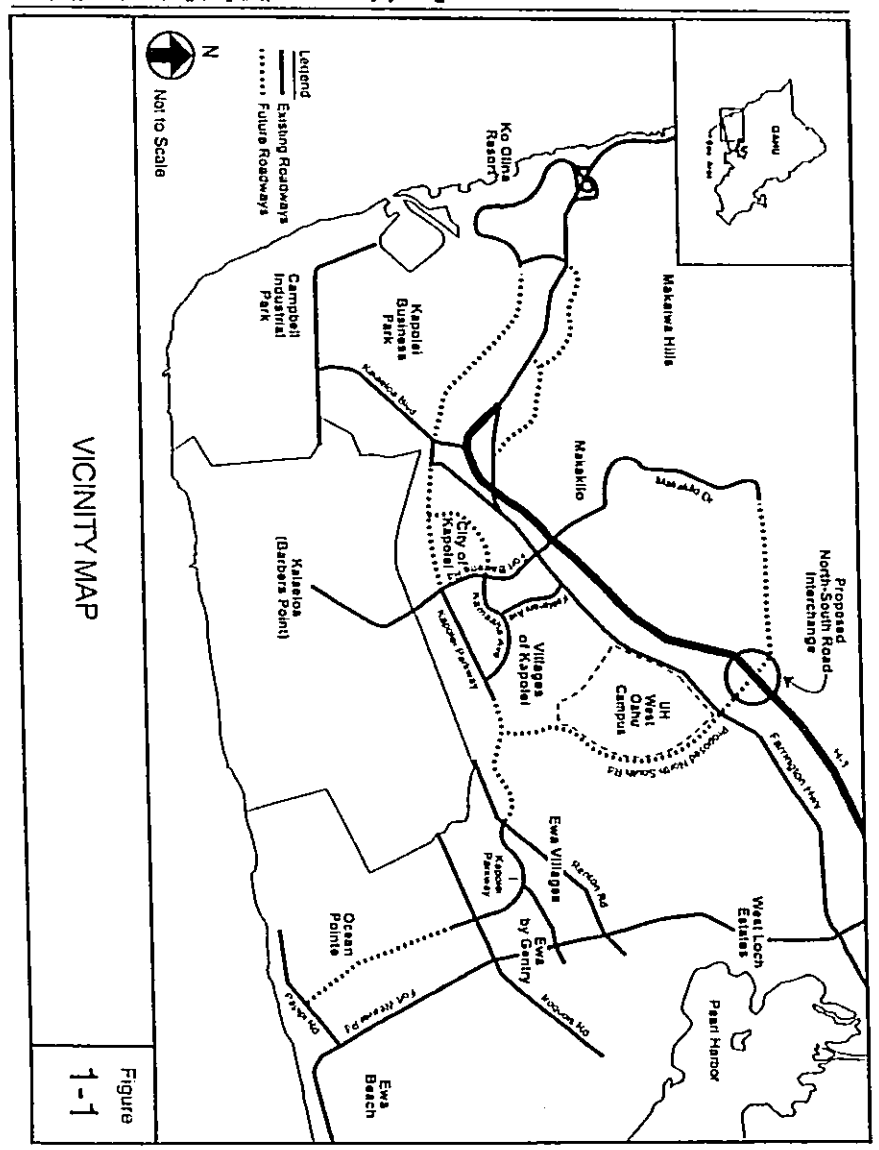
- Providing for an employment center outside of Downtown Honolulu to help divert commuter traffic from Downtown and nearby areas;
- Concentrating employment activities at industrial and resort areas in Ewa, and at government service and higher education centers near the city of Kapolei, so new markets are created outside Downtown and nearby areas for office and retail activities;
- Providing for significant residential development throughout Ewa -- including a variety of housing types from affordable units and starter homes to mid-size

and large houses and townhouses -- to help meet the housing needs of Oahu residents;

- Promoting diversified agriculture in specific areas;
- Providing a resort area at West Beach (Ko Olina) as an alternative to Waikiki,
- Helping limit urban development in other areas such as Waianae and the North Shore to help those areas preserve their "country" lifestyle; and
- Providing, along with Downtown and its surrounding "urban core", a focus for directed and concentrated public and private investment in buildings and the like for growth on the island of Oahu.

An integral element of the implementation of the Ewa Development Plan is the improvement of the transportation infrastructure in the Ewa area. Fort Weaver Road, a principal north-south arterial located within the eastern part of the Ewa area, has been improved, and improvements to its interchange with H-1 Freeway have been completed. Kunia Road, north of H-1 Freeway, is incrementally being widened to four lanes. Farrington Highway, a major east-west arterial within this area, is also being incrementally widened from a two-lane arterial to a four-lane arterial. The Makakilo Interchange has recently been upgraded with ramp and intersection improvements.

Even with these improvements, the Ewa Transportation Master Plan and the Oahu Regional Transportation Plan identify the need for an additional interchange on H-1 Freeway, located between the Kunia and Makakilo interchanges. This interchange is proposed to provide access to approved development areas and to relieve existing and projected traffic congestion at the Kunia and Makakilo interchanges on H-1 Freeway. Further, a Development Impact Fee program has been implemented for development within the Ewa plain through Chapter 33A of the Revised Ordinances of Honolulu (ROH) that specifically includes North-South Road and its interchange on H-1 Freeway as a regionally needed project.



CHAPTER 2
DESCRIPTION OF EXISTING CONDITIONS AND PROPOSED ACTION

A. Project Identification

The proposed North-South Road Interchange will be a new interchange located approximately midway between the existing Makakilo and Kunia Interchanges on Interstate H1 Freeway. The spacing between the existing Makakilo and Kunia Interchanges is approximately 4 miles and, therefore, the resulting distances between these interchanges and the proposed North-South Road Interchange are approximately 2 miles. These interchange spacing distances are consistent with guidelines published in the publication entitled, A Policy on Geometric Design of Highways and Streets, 2000 by the American Association of State Highway and Transportation Officials (Green Book) and current guidelines promulgated by the Federal Highway Administration (FHWA). Figure 1-1 in the previous section of this report illustrates the proposed location for the North-South Road Interchange, while Figure 2-1 illustrates the spacing distances between the North-South Road Interchange and the existing adjacent interchanges on Interstate H1 Freeway.

B. Project Evolution

In 1977, the City & County of Honolulu approved a new General Plan that designated the Ewa plain as the location for a secondary, urban center for Oahu, focused on the new town of Kapolei. The Secondary Urban Center was to be the focus of major economic activity and housing development, and a center for government services. While the General Plan promotes full development of the Primary Urban Center, it also encourages development of the Secondary Urban Center at Kapolei, and residential development of the urban fringe areas in Ewa and Central Oahu.

The Ewa Development Plan, adopted by City Council in 1997, reaffirms the role for the Ewa community outlined in the General Plan. The Ewa Public Facilities Map identified existing

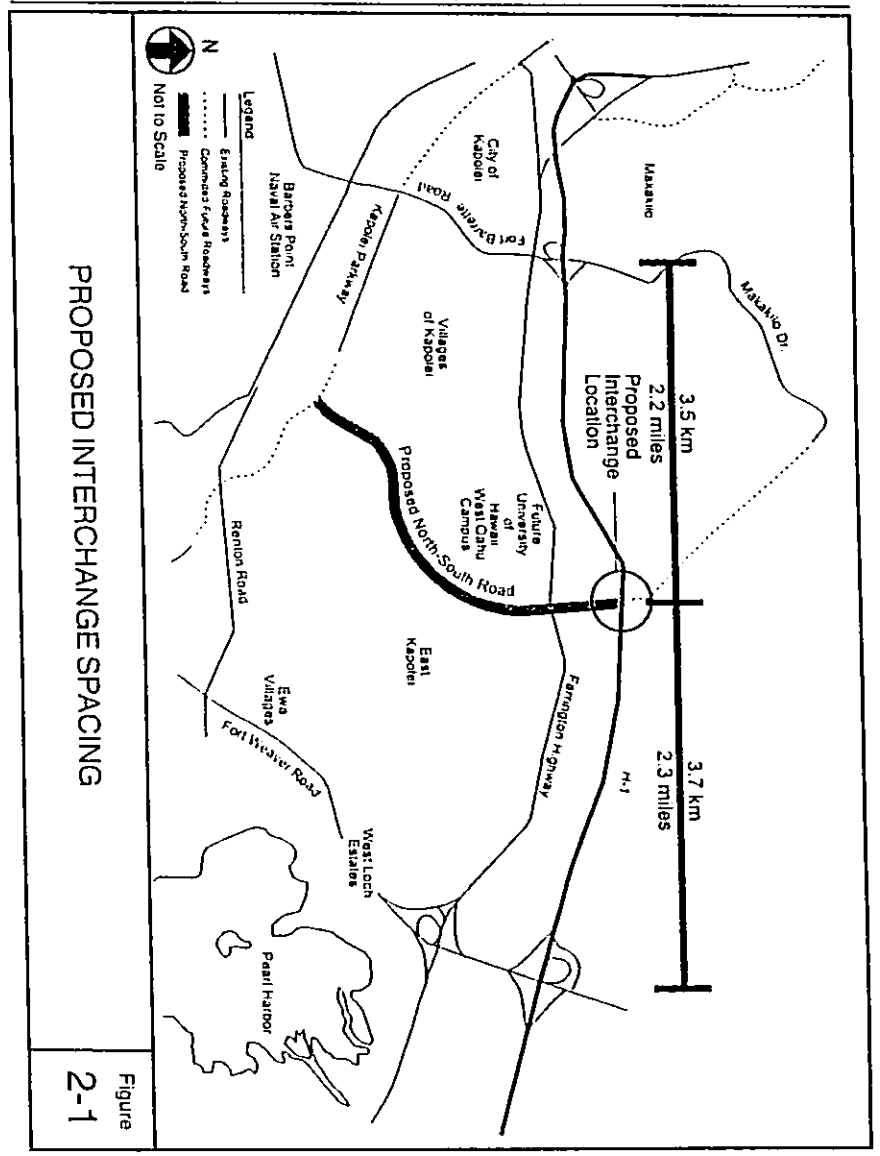


Figure 2-1

and future infrastructure needs for the Ewa Development Plan area. Included in the Public Facilities Map was a new arterial roadway and associated interchange to the H-1 Freeway. This new roadway is referred to as North-South Road, and it is located between the existing Kunia and Makakilo Interchanges.

Even before inclusion into these plans, a roadway and associated interchange parallel to Fort Weaver Road had been discussed. Previous and current versions of the Oahu Regional Transportation Plan and the Ewa Transportation Master Plan have identified the North-South Road and its associated interchange on Interstate H1 Freeway as a desired component of the transportation system for the Ewa plain.

In 1994, the State of Hawaii Department of Transportation (HDOT) initiated the planning stage of the North-South Road and Interchange and retained a consultant team to develop the environmental documentation, obtain the necessary clearance from the FHWA for modification of interstate access, and to update the Ewa Transportation Master Plan

During environmental documentation, two issues surfaced that required extended consultation: detection of *Abutilon menziesii*, an endangered plant, and regional drainage within the Kaloi Gulch basin. The former required considerable discussion and coordination to produce a Habitat Conservation Plan (HCP) as required under Chapter 195D, Hawaii Revised Statutes, as amended. The latter issue required considerable discussion with land owners and governmental agencies.

These two issues are now approaching closure and a revised Environmental Assessment is now being prepared. Other potential environmental impacts will be addressed in the EA for the North-South Road. HDOT desires to initiate the implementation of both the North-South Road and Interchange, and consequently is seeking approval to access the H-1 Freeway.

C. Existing Conditions and Proposed Project Modifications

1. Transportation Conditions, Deficiencies, and Engineering Considerations

a. Functional Classification and National Highway System (NHS)

The H-1 Freeway is on the National Highway System and is approximately 72-miles inland. The proposed North-South Road will be a principal arterial highway, under the jurisdiction of HDOT and will extend from the Kapolei Parkway to the H-1 Freeway a distance approximately 2.2-miles.

b. Culture, Terrain, and Climatic Conditions

The land that will be traversed by the proposed North-South Road was formerly used to cultivate sugar cane. In 1977, the City and County of Honolulu designated the Ewa plain as the Secondary Urban Center, and the area has been transitioning from agricultural to urban uses.

The terrain is fairly level, with the land sloping gradually from Interstate H-1 Freeway, which runs in the east-west direction, to the south shoreline.

The climate in the Ewa plain is usually arid, with infrequent winter thunderstorms that create major drainage events.

c. Control of Access

In Kapolei-Ewa area, the H-1 Freeway has full control of access with interchanges located at Kalaeloa Boulevard, Kakakilo Drive/Fort Barrete Road and Kunia Road/Fort Weaver Road.

The proposed North-South Road will be a limited access arterial roadway with at-grade intersection access regulated by the HDOT.

d. Existing Highway Section

Within the study area, Interstate H1 Freeway has six through lanes. There is currently enough width within most of this Interstate H1 Freeway segment to widen the freeway toward the existing median barrier to provide an additional lane. The Oahu Regional Transportation Plan identifies such a future widening to provide high-occupancy vehicle (HOV) lanes between the existing Palailai and Waiawa Interchanges. Figure 2-2 illustrates the existing lane configuration on Interstate H1 Freeway.

e. Abutting Highway Segments and Future Plans for Abutting Highway Segments

There have already been major improvements on highway facilities in the Ewa area. Both existing Kunia and Makakilo Interchanges have been recently improved with revised freeway ramp configuration and control. Kunia Road, between Interstate H-1 Freeway and Farrington Highway has been geometrically reconfigured to expedite traffic movement onto and off of the freeway. Makakilo Drive between Interstate H-1 Freeway and Farrington Highway has been widened and reconfigured to improve ramp terminal traffic operations. Farrington Highway between Fort Barrette Road and the Kapolei Golf Course Entrance has been widened from two to four lanes with median turn lanes.

The State of Hawaii Department of Transportation (HDOT) is planning to implement the widening of Fort Weaver Road from four to six lanes between Geiger Road/Iroquois Point Road and Farrington Highway by 2007. HDOT is also planning to widen Fort Barrette Road from two to four lanes between Kapolei Parkway and Farrington Highway. The City and County of Honolulu and appropriate State of Hawaii agencies expect to complete Kapolei Parkway between the OR&L right of way and North-South Road by 2007. The City and County of Honolulu is currently conducting the planning phase studies to widen Farrington Highway from two to four lanes between North-South Road and Fort Weaver Road. These projects are included in the Oahu Regional Transportation Plan and the Ewa Transportation Master Plan.

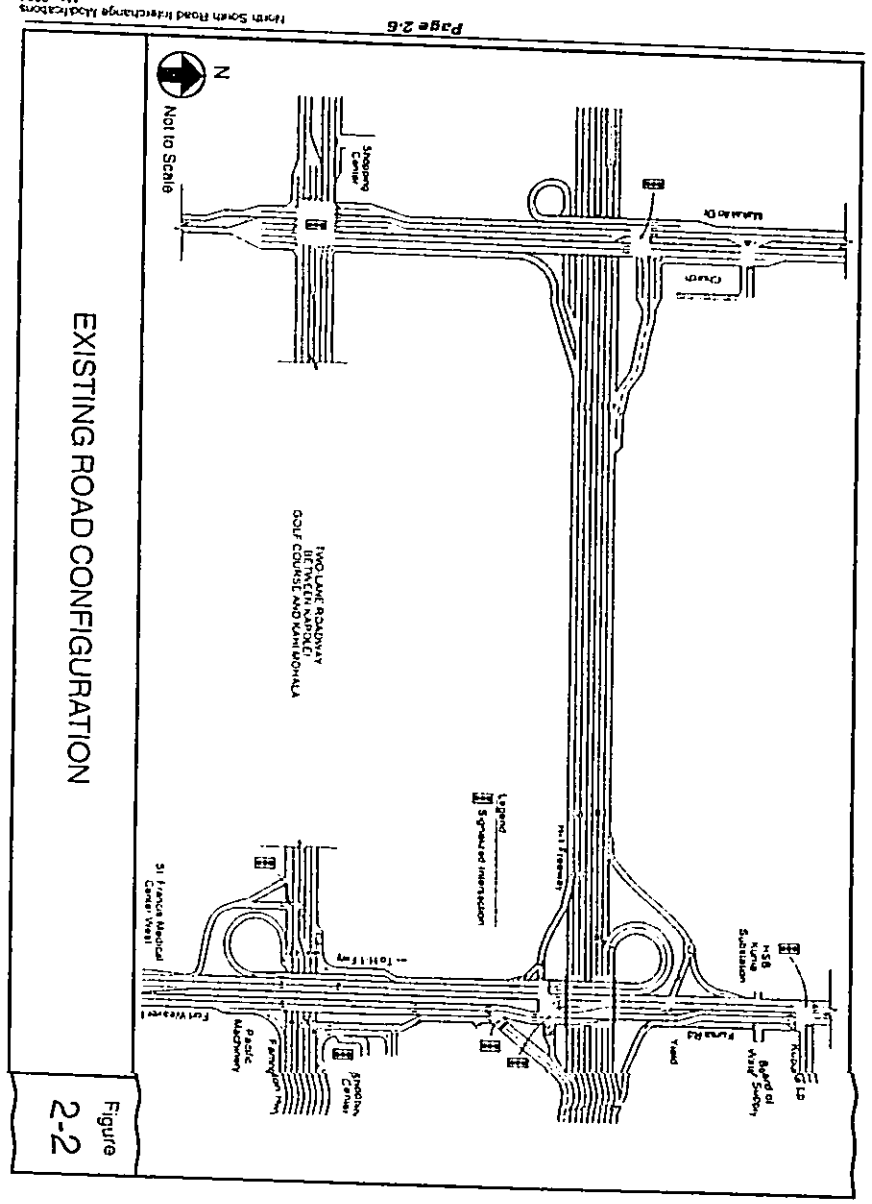


Figure 2-2

The proposed North-South Road will ultimately be a six-lane, principal arterial roadway between Kapolei Parkway and Interstate H1 Freeway. North of Interstate H1 Freeway, there will be a connection from the Makakilo area to the North-South Road Interchange. This roadway is expected to be a collector roadway.

f. Existing Public Transit Routes

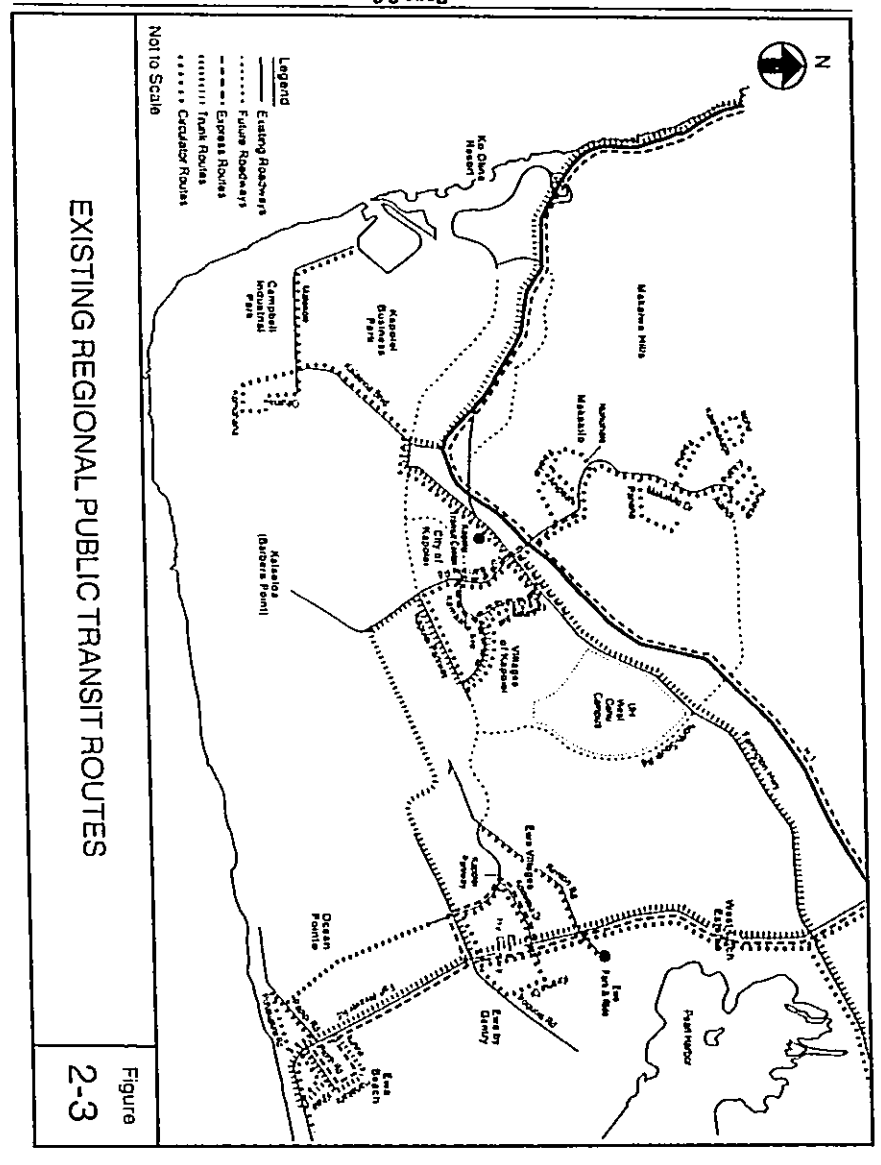
Figure 2-3 illustrates the existing public transit routes within the Ewa region. A full range of transit service is provided for the Ewa plain. Express buses provide peak hour commuter service to both Downtown and Waikiki. There is also skip-stop and regular trunk service along the major arterials with circulator bus service providing access to the neighborhoods.

g. Speeds and Delay

The posted speed limit of the H-1 Freeway 60 miles per hour (mph) between Kunia and Makakilo Interchanges. East of Kunia Interchange and west of Makakilo Interchange, the posted speed limits are 55 mph.

Vehicles traveling on Interstate H1 Freeway within the study area are usually unconstrained in terms of speed, even during peak periods. There is slight slowing associated with the off-ramps, but these usually do not cause major disruption to the freeway mainline.

The arterial roadways that serve to access the Interstate H1 Freeway do experience delay during peak periods. The Farrington Highway/Makakilo Drive/Fort Barrette Road intersection is a bottleneck for vehicles accessing the Kapolei/Makakilo area at the existing Makakilo Interchange. The intersection has already been significantly improved with double turn lanes provided where appropriate. The Fort Weaver Road corridor provides access to Interstate H1 Freeway for the Ewa and Ewa Beach areas. Currently, vehicles experience almost 20 minutes of delay during the AM peak period attempting to access Interstate H1 Freeway.



h. Existing Traffic Volumes

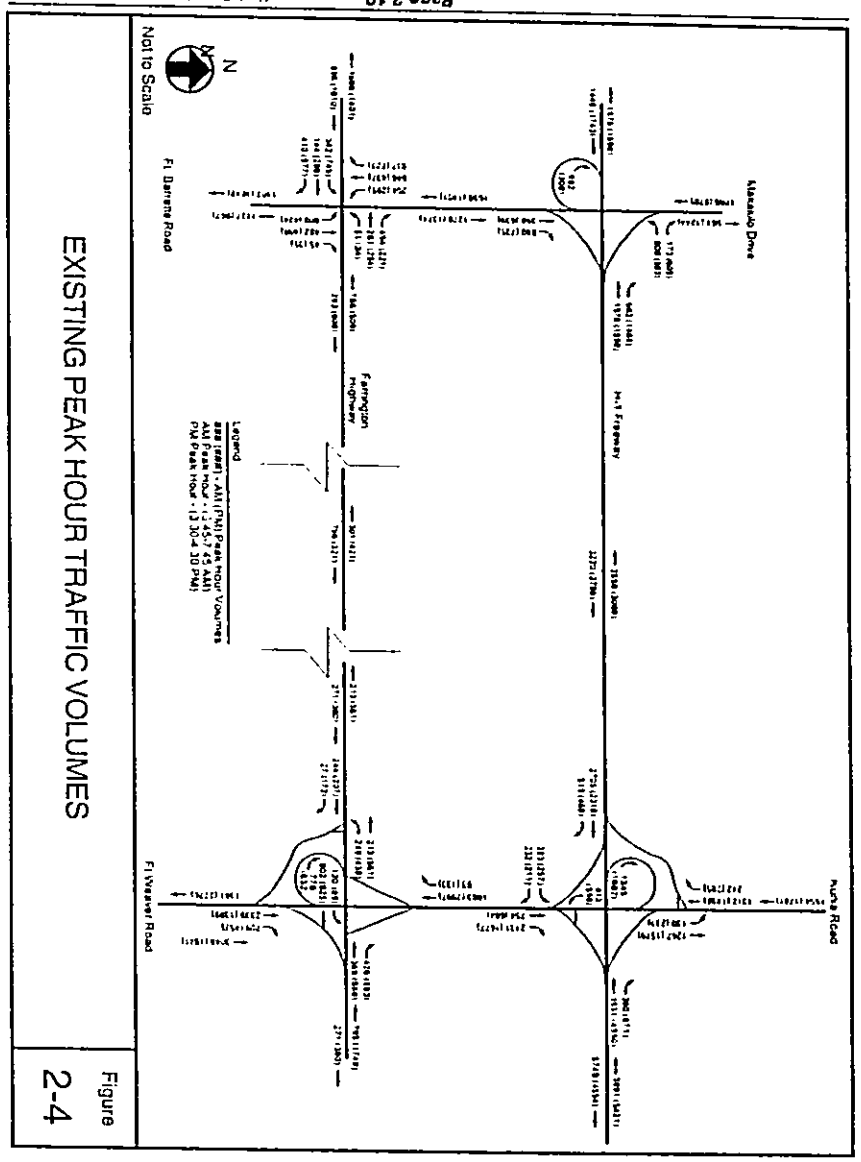
Figure 2-4 summarizes the existing peak hour traffic volumes within the study area.

Significant peak hour traffic volumes are observed during the AM peak hour on the Koko Head-bound on-ramps of the Kunia and Makakilo Interchanges. The total AM peak hour volume on the Kunia on-ramp is 3,034 vehicles per hour (vph), while the Makakilo on-ramps total 1,772 vph. These volumes approach the capacity of lane pickup and merge ramps, respectively. The PM peak hour Waianae-bound volumes are also significant with a total of 2,853 vph exiting at Kunia Interchange and 1,488 vph exiting at Makakilo Interchange.

i. Level of Service

Improvements to the Kunia Interchange were completed recently increasing capacity and efficiency to process traffic at on and off ramps. The Waianae-bound to makai-bound off ramp was widened from a one-lane to a two-lane loop ramp, and the ramp terminal intersection of the Waianae-bound to mauka-bound off ramp was modified to allow free-flow right-turn movement. Both actions reduced queuing on the off-ramps, thereby reducing congestion on H-1 Freeway. The H-1 Koko Head-bound lanes were re-configured to create a lane drop at the Kunia Interchange off ramp and to create a two-lane pickup at the Koko Head-bound Kunia on ramp increasing the ramp capacity to handle traffic joining H-1 Freeway at this interchange. During the morning peak period, traffic originating makai of H-1 at Kunia Interchange is allowed to utilize the shoulder lane on interstate H-1 in the Koko Head bound direction until the Paiwa Interchange located approximately two miles down stream from the Kunia Interchange. This provides an additional lane pick-up, further increasing interchange capacity.

At the Makakilo Interchange, the Waianae-bound off ramp was widened from a single to a double lane off ramp with channelization and signalization at Makakilo Drive. Traffic originating from Makakilo and headed in the Koko Head-bound direction, via the H-1 Freeway has been provided with an exclusive lane to bypass the signal at Makakilo



EXISTING PEAK HOUR TRAFFIC VOLUMES

Figure 2-4

Drive/Makakilo off ramp intersection. These improvements have helped to alleviate former queuing problems at the interchange.

2 Freeway Operations

Table 2-1 and Figure 2-5 summarize the existing freeway operations from Paiwa Interchange to Palailai Interchange.

Table 2-1
Existing Freeway Level of Service

Freeway Segment	Lanes xxx(xxx) AM(PM)	Direction	Existing LOS			
			AM Peak		PM Peak	
			LOS	Density	LOS	Density
Paiwa IC - Kunia IC	5 (5)	WB	B	14.9	C	20.8
Kunia IC - Makakilo IC	4 (4)	WB	B	13.4	B	16.2
Makakilo IC - Palailai IC	3 (3)	WB	A	8.3	A	8.4
Palailai IC - Makakilo IC	3 (3)	KKHD	A	7.6	A	9.1
Makakilo IC - Kunia IC	4 (4)	KKHD	B	16.9	B	14.6
Kunia IC - Paiwa IC	6 (5)	KKHD	E*	35.0	B	17.5

WB=Waianae bound, KKHD=Kuka Head bound, NB=northbound (makai bound), SB=southbound (mauka bound)
* Caused by downstream congestion

As shown in Table 2-1 and Figure 2-5, these recent improvements result in good mainline operations on H-1 Freeway in both directions during both the AM and PM peak periods. As Koko Head-bound traffic approaches the Paiwa Street Interchange, AM peak period operation declines to LOS E, due primarily to downstream congestion at the H-1/H-2 merge. The remaining segments all operate at a LOS of C or better.

3 Freeway Merge-Diverge Operations

The existing ramp conditions at the Kunia, Makakilo, and Fort Weaver Interchanges are summarized in Table 2-2.

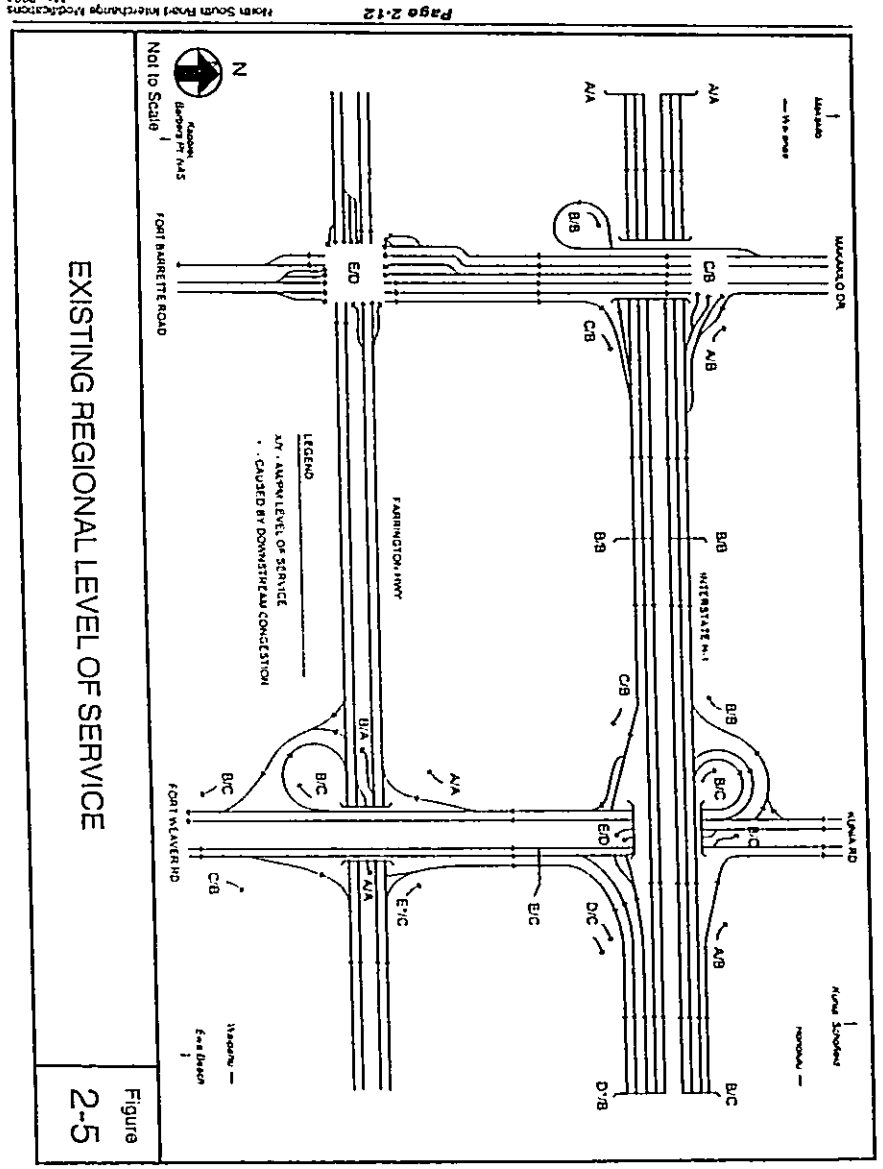


Figure 2-5

The results shown in Table 2-2 indicate that all of the ramps at the Kunia, Makakilo, and Fort Weaver Interchanges operate very well. The worst case being the on ramp at Fort Weaver Road/Kunia Road interchange headed northbound, which operates at LOS E during the AM peak period due to congestion in the segment of Kunia Road located between Farrington Highway and H-1 Freeway. The remaining ramps all operate at LOS B or better.

Table 2-2

Existing Ramp Level-of-Service

Interchange Ramp	AM		PM	
	LOS	Density	LOS	Density
Kunia Interchange				
WB Kunia Off Ramp Diverge	A	4.4	B	13.5
WB Ewa Off Ramp Diverge	B	14.6	C	25.6
WB Kunia On Ramp Merge	B	15.5	B	17.8
KKHD Off Ramp Lane Drop	C	11.4	B	10.4
KKHD On Ramp Lane Add	D	30.4	C	24.0
Makakilo Interchange				
KKHD Makakilo On Ramp Merge	B	17.0	B	13.4
KKHD Kapolei On Ramp Merge	C	21.5	B	16.5
WB Off Ramp Diverge	A	9.3	B	10.6
Fort Weaver Interchange				
NB Off Ramp Diverge	C	25.3	B	13.7
NB On Ramp Lane Add	E*	36.5	C	26.3
SB Off Ramp Diverge to WB	A	2.7	A	3.8
SB Off Ramp Diverge to EB	B	13.2	C	23.9
SB On Ramp Merge	B	13.5	C	25.5
NB Kunia/H-1 Weave	E	36.5	C	27.1

WB=Waianae bound, KKHD=Koko Head bound, NB=northbound (makai bound), SB=southbound (mauka bound)
* Caused by downstream congestion

4 Terminal Operations

Table 2-3 summarizes the results of the interchange terminal analysis

Table 2-3

Existing Interchange Terminal Level-of-Service

Interchange Terminals	AM		PM	
	LOS	Density	LOS	Density
Kunia Interchange	110 sec cycle		110 sec cycle	
H-1 KKHD On Ramp/ Kunia Road	C	33.2	C	27.7
Koko Head-bound Left Turn	E	67.2	E	62.6
Mauka-bound Through	D	41.6	D	40.1
Makai-bound Left Turn	E	60.4	D	44.9
Makai-bound Through	A	9.8	B	18.4
H-1 WB On Ramp/ Kunia Road	Unsignalized		Unsignalized	
Mauka-bound Left Turn	B	13.9	C	21.0
Makakilo Interchange	60 sec cycle		60 sec cycle	
H-1 WB Off ramp/ Makakilo Road	C	27.2	B	13.6
Waianae-bound Approach	A	6.3	A	6.7
Mauka-bound Through	B	18.7	C	23.1
Makai-bound Through	D	54.4	C	21.0
Fort Weaver Interchange	60 sec cycle		60 sec cycle	
Farrington SB On Ramp/ Fort Weaver Road	B	13.1	B	13.9
Koko Head-bound Through	A	5.2	A	9.7
Waianae-bound Left-Turn	C	20.8	B	15.9
Farrington NB On Ramp/ Fort Weaver Road	A	8.5	B	12.8
Koko Head-bound Left-Turn	B	17.7	B	10.9
Waianae-bound Through	A	5.5	B	13.0

WB=Waianae bound, KKHD=Koko Head bound.
NB=northbound (mauka bound), SB=southbound (makai bound)

The results of these analyses show that the many of the movements at the existing interchange ramp terminals are operating well during the peak periods, at a LOS of C or better. However, there are two left-turn movements at the Kunia Interchange that are constrained during the peak hours. The left-turn movement from the Koko Head-bound off-

ramp is at LOS E during both the AM and PM peak periods, and the makai-bound left-turn to the Koko Head-bound off-ramp operates at LOS E during the AM peak period. This is due to the heavy volume of vehicles being processed at this terminal. Additionally, mauka-bound traffic on Kunia Road turning right onto the Koko Head-bound on ramp is very congested during the AM peak period, constraining the ability for traffic generated in the Ewa plain to access the Interstate H1 Freeway.

5 Adjacent Intersection Operations

A review of adjacent intersections at the Makakilo and Kunia Interchanges shows that the Fort Weaver Road corridor is constrained during the AM peak period. Table 2-4 summarizes the intersection LOS for the Fort Barrette Road/Farrington Highway intersection and the intersections along the Fort Weaver Road corridor. As shown, key movements at the Fort Barrette Road/Farrington Highway intersection operate at LOS E. During the AM peak period, while the Koko Head-bound approach to this intersection is often at LOS F during the PM peak period.

The Fort Weaver Road corridor is congested during the AM peak period. Mauka-bound traffic flow is constrained, while side street queue length and delay is very long. Travel time runs in the corridor have shown delays approaching 14 minutes for mauka-bound traffic. Future plans call for Fort Weaver Road to be widened to six lanes in the future, but that improvement alone is not expected to alleviate the congestion in this corridor. An alternative path for regional highway access is needed to address this issue.

CORRECTION

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

Table 2-3

Existing Interchange Terminal Level-of-Service

Interchange Terminals	AM		PM	
	LOS	Density	LOS	Density
Kunia Interchange	**110 sec cycle**		**110 sec cycle**	
H-1 KKHD On Ramp/ Kunia Road	C	33.2	C	27.7
Koko Head-bound Left Turn	E	67.2	E	62.6
Mauka-bound Through	D	41.6	D	40.1
Makai-bound Left Turn	E	60.4	D	44.9
Makai-bound Through	A	9.8	B	18.4
H-1 WB On Ramp/ Kunia Road	**Unsignalized**		**Unsignalized**	
Mauka-bound Left Turn	B	13.9	C	21.0
Makakilo Interchange	**60 sec cycle**		**60 sec cycle**	
H-1 WB Off ramp/ Makakilo Road	C	27.2	B	13.6
Waianae-bound Approach	A	6.3	A	6.7
Mauka-bound Through	B	18.7	C	23.1
Makai-bound Through	D	54.4	C	21.0
Fort Weaver Interchange	**60 sec cycle**		**60 sec cycle**	
Farrington SB On Ramp/ Fort Weaver Road	B	13.1	B	13.9
Koko Head-bound Through	A	5.2	A	9.7
Waianae-bound Left-Turn	C	20.8	B	15.9
Farrington NB On Ramp/ Fort Weaver Road	A	8.5	B	12.8
Koko Head-bound Left-Turn	B	17.7	B	10.9
Waianae-bound Through	A	5.5	B	13.0

WB = Waianae bound, KKHD = Koko Head bound,
NB = northbound (mauka bound), SB = southbound (makai bound)

The results of these analyses show that the many of the movements at the existing interchange ramp terminals are operating well during the peak periods, at a LOS of C or better. However, there are two left-turn movements at the Kunia Interchange that are constrained during the peak hours. The left-turn movement from the Koko Head-bound off-

ramp is at LOS E during both the AM and PM peak periods, and the makai-bound left-turn to the Koko Head-bound off-ramp operates at LOS E during the AM peak period. This is due to the heavy volume of vehicles being processed at this terminal. Additionally, mauka-bound traffic on Kunia Road turning right onto the Koko Head-bound on ramp is very congested during the AM peak period, constraining the ability for traffic generated in the Ewa plain to access the Interstate H1 Freeway.

5. Adjacent Intersection Operations

A review of adjacent intersections at the Makakilo and Kunia Interchanges shows that the Fort Weaver Road corridor is constrained during the AM peak period. Table 2-4 summarizes the intersection LOS for the Fort Barrette Road/Farrington Highway intersection and the intersections along the Fort Weaver Road corridor. As shown, key movements at the Fort Barrette Road/Farrington Highway intersection operate at LOS E. During the AM peak period, while the Koko Head-bound approach to this intersection is often at LOS F during the PM peak period.

The Fort Weaver Road corridor is congested during the AM peak period. Mauka-bound traffic flow is constrained, while side street queue length and delay is very long. Travel time runs in the corridor have shown delays approaching 14 minutes for mauka-bound traffic. Future plans call for Fort Weaver Road to be widened to six lanes in the future, but that improvement alone is not expected to alleviate the congestion in this corridor. An alternative path for regional highway access is needed to address this issue

Table 2-4

Existing Adjacent Intersection Level-of-Service

Intersection	Existing			
	AM		PM	
	LOS	Delay	LOS	Delay
Farrington Hwy/Makakilo Dr - Fort Barrette Rd	E	60.2	D	47.5
KKHD	C	33.0	C	30.2
WB	E	61.9	E	56.4
Mauka-bound	E	71.7	E	66.0
Makai-bound	E	66.1	D	52.6
Ft Weaver Rd/Laulaunui St	D	49.4	D	51.4
KKHD	F	98.3	F	108.6
WB	F	105.3	E	68.9
Mauka-bound	E	58.7	C	26.6
Makai-bound	B	13.3	D	58
Ft Weaver Rd/Aawa Dr	E	56.3	D	36.8
KKHD	F	85.1	F	93.5
WB	F	164	F	83.2
Mauka-bound	E	59.9	C	23.6
Makai-bound	B	17.1	D	37.4
Ft Weaver Rd/Renton Rd	F	80.2	E	55.6
KKHD	F	225.5	F	81
WB	F	107.7	F	106.3
Mauka-bound	E	69.9	C	27.4
Makai-bound	C	31.6	E	68.3
Ft Weaver Rd/Kolowaka Dr	E	58.3	D	39.3
KKHD	F	95.9	F	88.1
WB	F	203.5	F	83.9
Mauka-bound	D	36.2	D	38.2
Makai-bound	D	37.4	C	30.5
Ft Weaver Rd/Geiger Rd	F	84.8	E	60.7
KKHD	F	127.2	F	87.6
WB	F	163.6	F	106.2
Mauka-bound	E	71.4	D	44.2
Makai-bound	D	39.2	D	52.5

KKHD=Koko Head bound,WB=Waianae bound, Delay in sec/veh

CHAPTER 3

PROJECTED CONDITIONS AND NEED FOR THE PROPOSED ACTION

A. Planned Development In Influence Area

The area served by the proposed North-South Road Interchange is designated a major growth area by the City & County of Honolulu General Plan and by the Ewa Community Development Plan. Figure 3-1 summarizes the projected increases in population, employment, and housing units in the Ewa plain as input into the regional travel demand model as part of the Oahu Regional Transportation Plan. This planned growth includes a second 4-year campus for the University of Hawaii and major increases in residential development. The potential redevelopment of the former Barbers Point Naval Air Station, now known as Kalaeloa, is not included in these forecasts, resulting in a conservative projection.

B. Safety Considerations

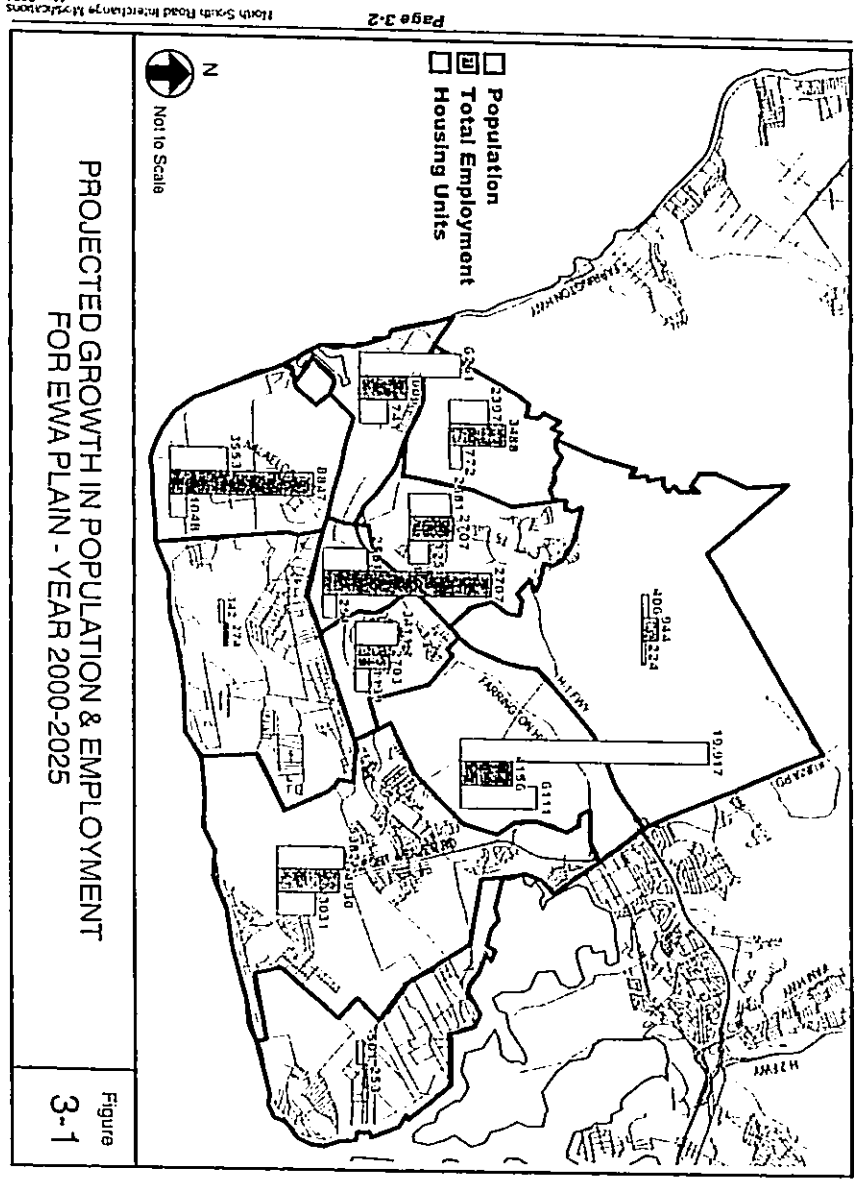
Any new access point on a freeway could increase accident potential. However, due to best practice design for the proposed interchange, any change in accident potential is not projected to be significant.

C. Non-Standard Features and Non-Conforming Features

All proposed design elements will conform to AASHTO and State of Hawaii Department of Transportation standards.

D. System Elements and Conditions

The proposed North-South Road Interchange is a integral part of the system plan for access to H-1 Freeway. The proposed interchange is included in the Oahu Regional



PROJECTED GROWTH IN POPULATION & EMPLOYMENT
FOR EWA PLAIN - YEAR 2000-2025

Figure 3-1

Transportation Plan and the Ewa Transportation Master Plan. The proposed interchange is located two miles from each of the adjacent interchanges on H-1 Freeway, which is an accepted interchange spacing on an interstate freeway. The interchange is part of a sub-regional system of arterials that will provide access and mobility to the Ewa plain. North-South Road, will be a major arterial that is an integral piece of this arterial plan.

E. Projected Roadway Networks

Figures 3-2 and 3-3 illustrate the projected roadway configurations for the year 2025 time frame, without and with the proposed North-South Road Interchange.

F. Projected Transit Routes

Figure 3-4 illustrates the projected bus routes for the study area. The primary difference from existing transit system is the assumed implementation of a high-capacity regional transit system that would serve the H-1 corridor.

G. Projected Year 2025 Traffic Volumes

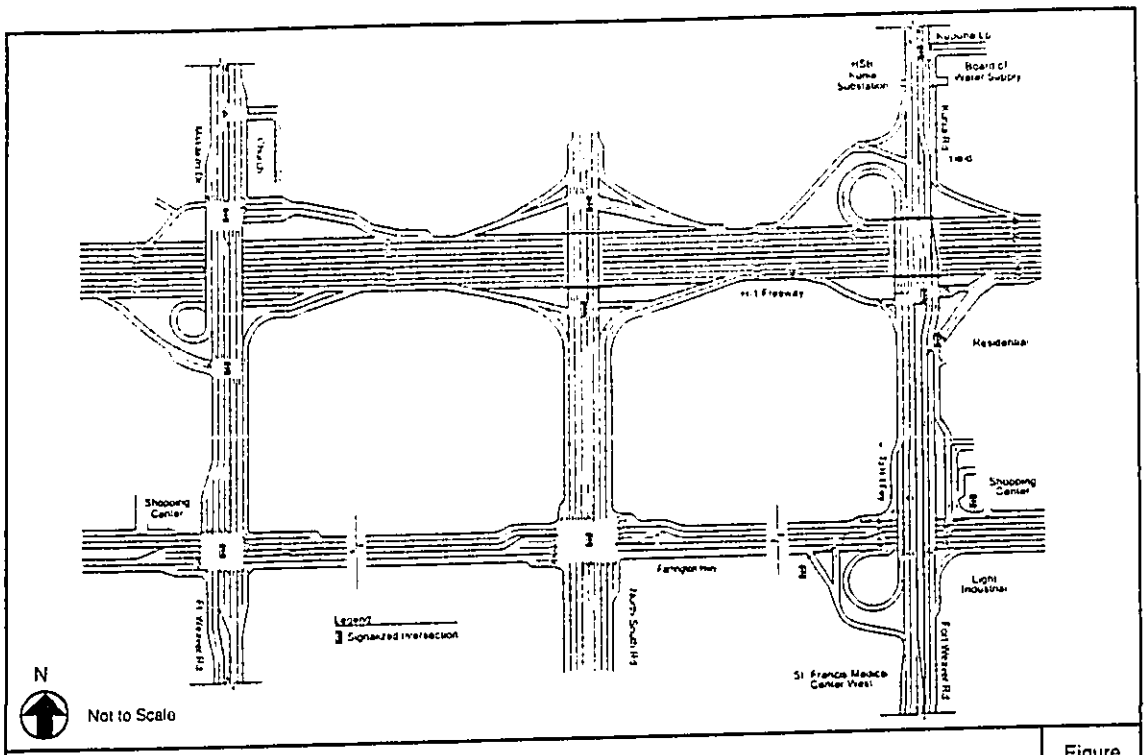
Figures 3-5 and 3-6 illustrate the projected year 2025 AM and PM peak hour traffic volumes without and with the proposed North-South Road Interchange. The projected volumes are based on traffic volumes estimated by the Oahu Metropolitan Planning Organization's (OMPO) regional travel demand model and refined using the travel demand model associated with the Ewa Transportation Master Plan.

H. Projected Traffic Operations

Figures 3-7 and 3-8 summarize the year 2025 projected peak hour traffic operations without and with the proposed North-South Road Interchange, respectively.

1. Freeway Operations

Table 3-1 summarizes the results of the freeway segment analysis.

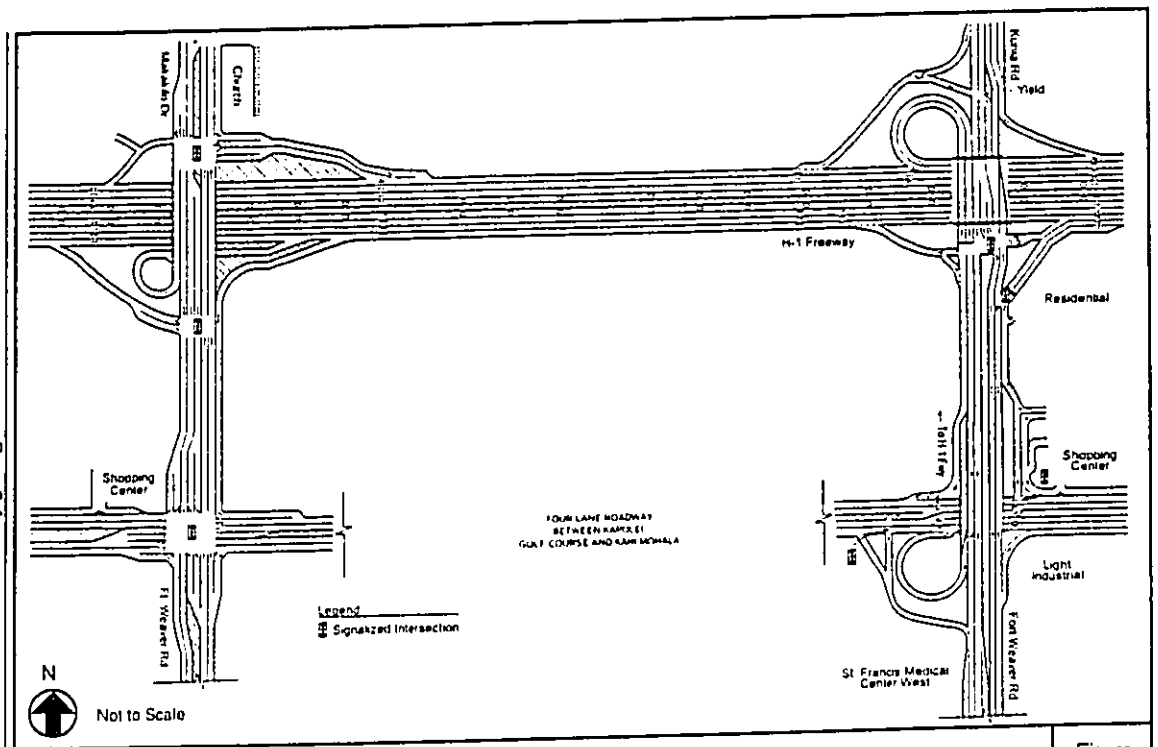


PROJECTED YEAR 2025 ROADWAY CONFIGURATION
WITH NORTH-SOUTH ROAD INTERCHANGE

Figure 3-3

Page 3-5

North South Road Interchange Modifications
May 2001

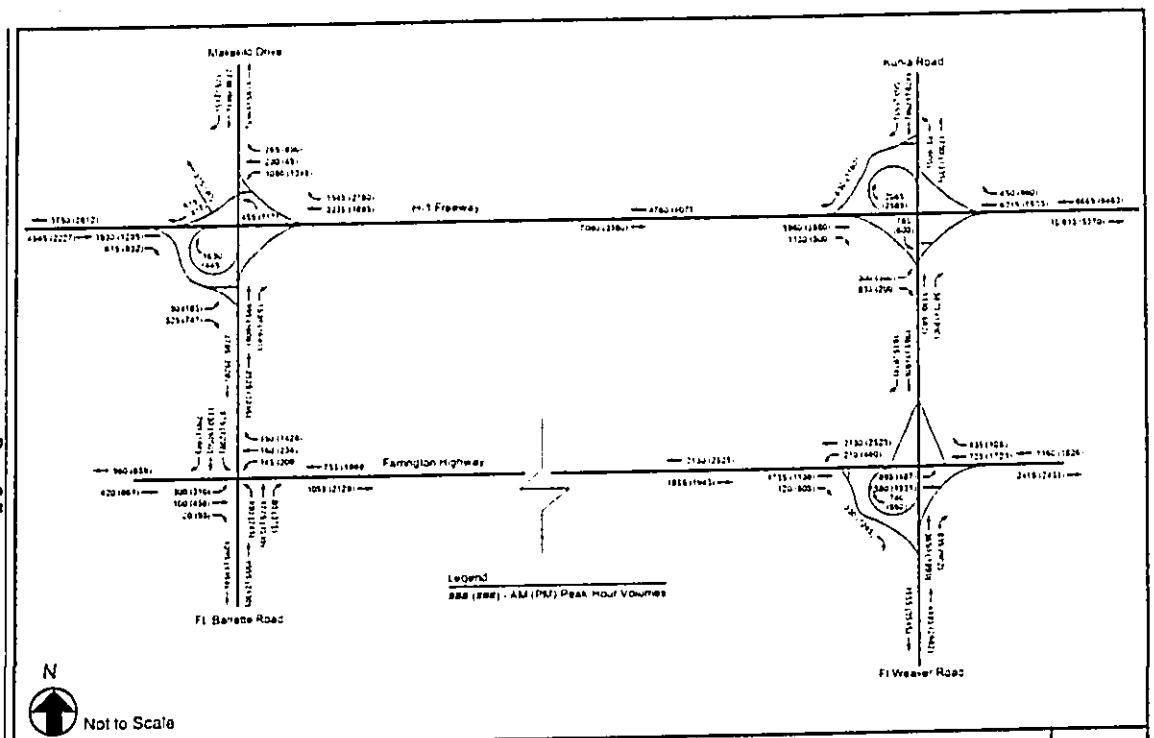


PROJECTED YEAR 2025 ROADWAY CONFIGURATION
WITHOUT NORTH-SOUTH ROAD INTERCHANGE

Figure 3-2

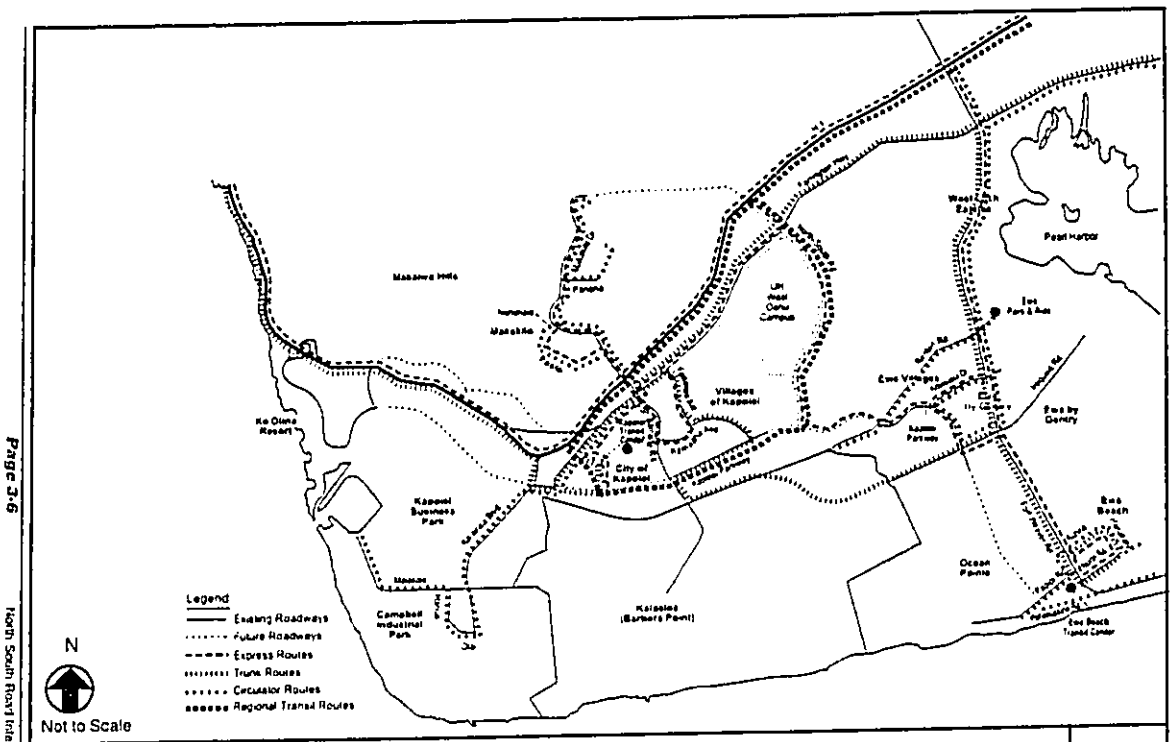
Page 3-4

North South Road Interchange Modifications
May 2001



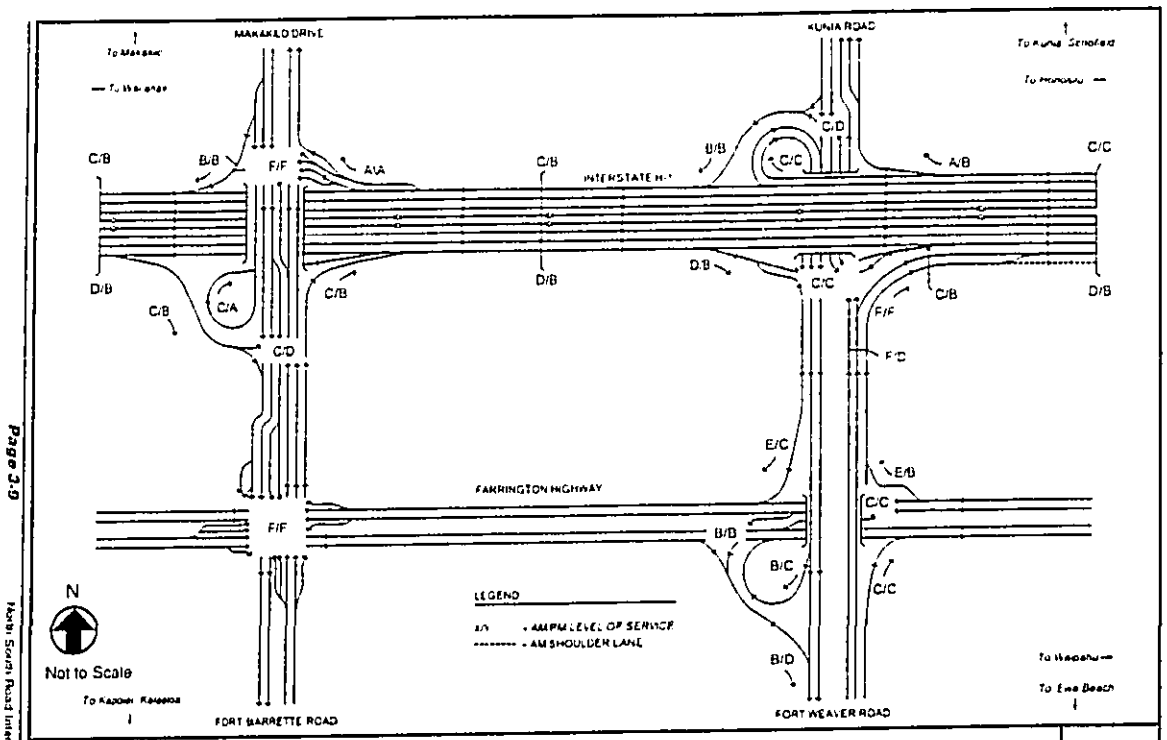
PROJECTED 2025 REGIONAL PEAK HOUR TRAFFIC VOLUMES WITHOUT NORTH-SOUTH ROAD INTERCHANGE

Figure 3-5



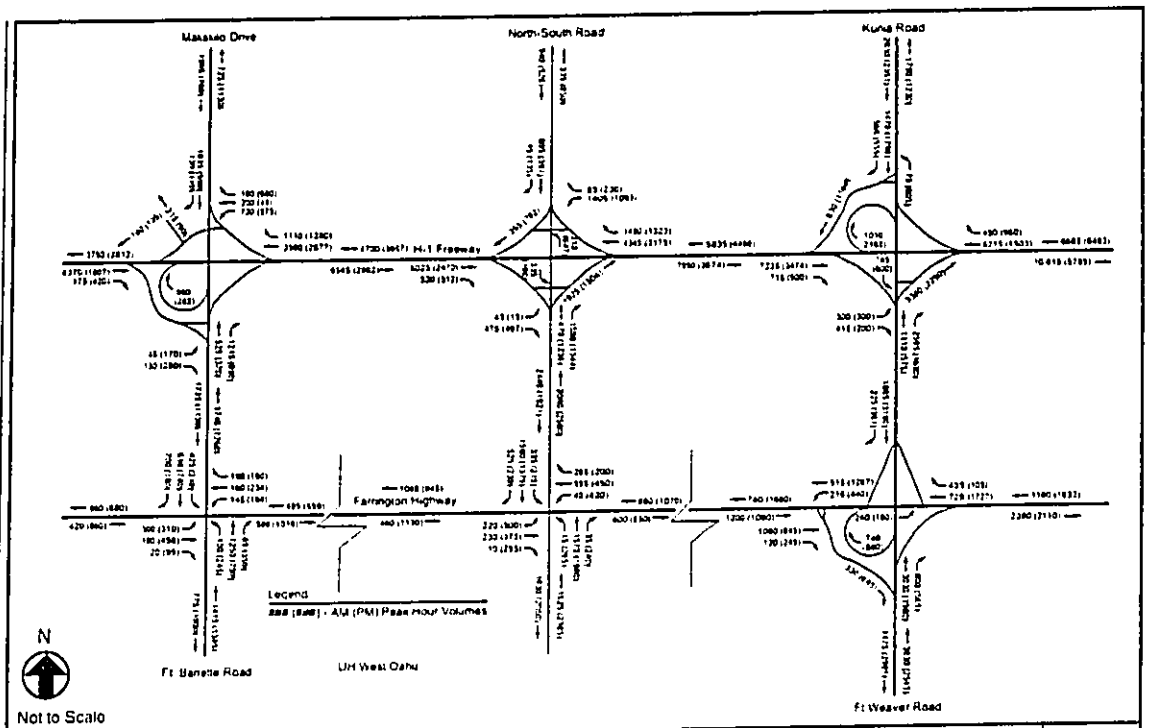
PROJECTED YEAR 2025 REGIONAL PUBLIC TRANSIT ROUTES

Figure 3-4



PROJECTED YEAR 2025 LEVEL OF SERVICE
WITHOUT NORTH-SOUTH ROAD INTERCHANGE

Figure 3-7



PROJECTED 2025 REGIONAL PEAK HOUR TRAFFIC VOLUMES
WITH NORTH-SOUTH ROAD INTERCHANGE

Figure 3-6

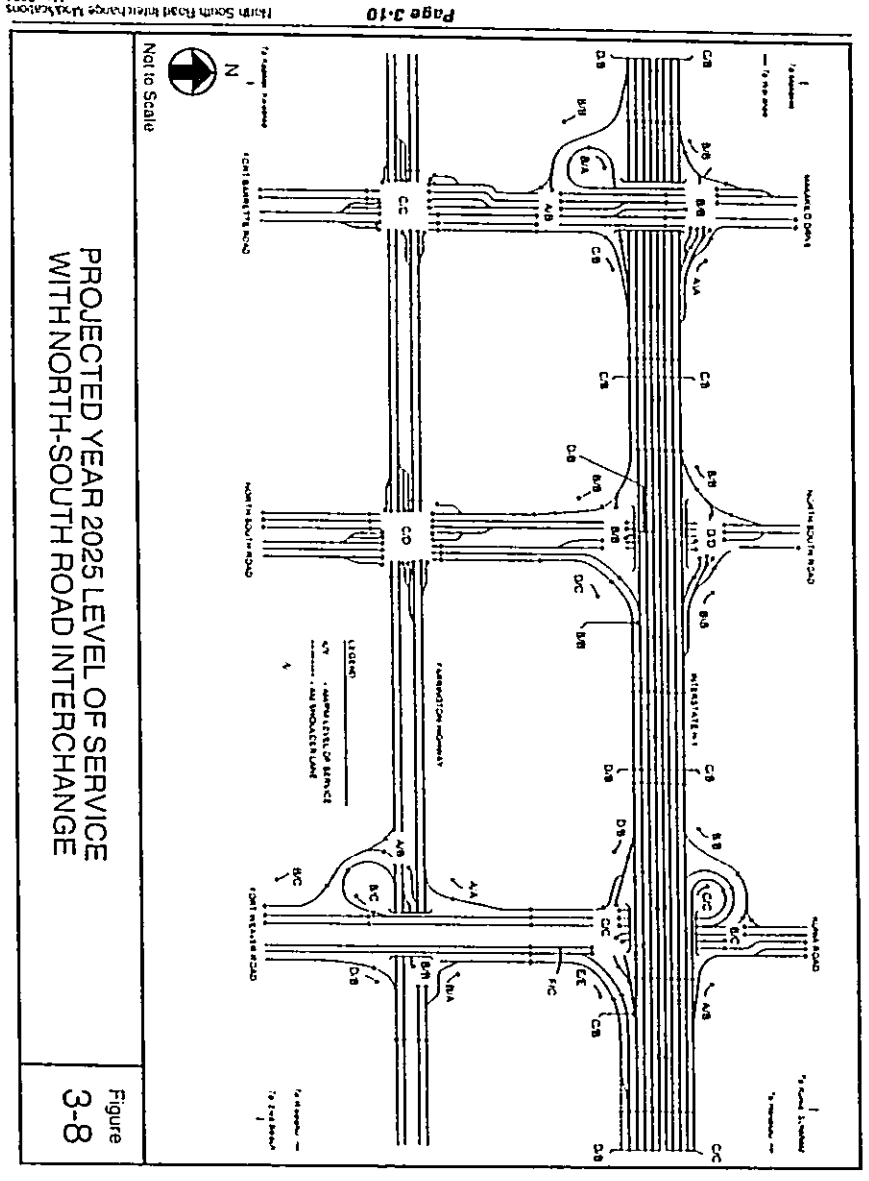


Table 3-1

Year 2025 Freeway Segment Level-of-Service

Freeway Segment	Lanes xxx(xxx) AM(PM)	Direction	AM Peak				PM Peak			
			w/o N/S RD		With N/S RD		w/o N/S RD		With N/S RD	
			LOS	Density	LOS	Density	LOS	Density	LOS	Density
Paiwa IC - Kunia IC	5 (5)	WB	C	20.1	C	20.1	C	19.4	C	19.4
Kunia IC - North-South Rd IC	4 (4)	WB	C	18.4	C	22.5	B	15.6	B	17.3
North-South Rd IC - Makakilo IC	4 (4)	WB			C	18.1			B	15.2
Makakilo IC - Palailai IC	3 (3)	WB	C	19.6	C	19.6	B	14.7	B	14.7
Palailai IC - Makakilo IC	3 (3)	EB	D	28.0	D	28.0	B	11.7	B	11.7
Makakilo IC - North-South Rd IC	4 (4)	EB	D	28.3	C	25.6	B	13.0	B	11.5
North-South Rd IC	3 (3)	EB			D	35.0			B	12.9
North-South Rd IC - Kunia IC	4 (4)	EB			D	33.8			B	15.3
Kunia IC - Paiwa IC	6 (5)	EB	D	27.8	D	27.8	B	16.2	B	17.3

WB=Waianae bound, NB/EB=Kolo Hea bound SB=north bound,mauka bound) SB=south bound(makai bound)

Copies of the analysis worksheets are included in a separate Technical Appendix.

As shown in Table 3-1, H-1 Freeway is projected to operate acceptably for peak hour conditions with and without North-South Road Interchange at LOS C or better at every segment except for the eastbound segments during the AM peak period which operate at LOS D. This can be explained by the typical heavy morning traffic headed east for either work or school

With the addition of North-South Road Interchange, the freeway density is slightly higher on the segment between North-South Road Interchange and Kunia Interchange, in both directions, than the density on that same segment in the no build scenario. More vehicles are on this segment because they are using the North-South Road Interchange over the Kunia Interchange to get to their destination. However, the level of service is the same for that segment in both build and no build scenarios.

2 Freeway Merge-Diverge Operations

Table 3-2 summarizes the results of the Freeway Merge-Diverge analyses The results of the ramp analysis show that there are several problem areas in the no build scenario, with certain ramps operating at LOS E and F. The eastbound on ramp at Kunia Interchange off of Kunia Road operates at LOS F during both the AM and PM peak periods and the weave between Kunia Interchange and Farrington Highway operates at LOS F during the AM peak period. Both of these conditions are caused by increased traffic coming out of the Ewa and East Kapolei areas.

At Fort Weaver Interchange, the southbound off ramp to Farrington Highway operates at LOS E during the AM peak period, as this ramp will pick up the majority of the UH West Oahu traffic. The northbound off ramp to Farrington Highway will also operate at LOS E due to growth in the Ewa and Ewa Beach areas.

The remaining ramps at the Kunia, Makakilo, and Fort Weaver Interchanges will operate reasonably well in the no build scenario during both the AM and PM peak periods. Operations at these ramps are at a low LOS D or better.

When North-South Road Interchange is included in the analysis, overall ramp operations at every interchange improve as vehicles now have another way to access H-1 Freeway. At Fort Weaver Interchange, the two off ramps operating at LOS E in the no build scenario, will both operate well in the build scenario. The southbound off ramp to Farrington Highway will operate at LOS A in the build scenario because North-South Road will provide easier access to those headed to the UH West Oahu Campus. The northbound off ramp to Farrington Highway will operate at an acceptable LOS C.

The LOS F conditions at Kunia Interchange in the no build scenario improve in the build scenario, but drivers will still experience a lot of congestion in these areas. The eastbound on ramp off of Kunia Road will operate at LOS E during both the AM and PM peak periods, and operations at the weave on Kunia Road between H-1 Freeway and Farrington Highway

Table 3-2

Year 2025 Freeway Merge-Diverge Level-of-Service

Interchange Ramp	AM Peak				PM Peak			
	w/o N/S RD		With N/S RD		w/o N/S RD		With N/S RD	
	LOS	Density	LOS	Density	LOS	Density	LOS	Density
Kunia Interchange								
EB Off Ramp Diverge	D	29.0	D	30.3	B	11.1	B	11.9
EB On Ramp Merge (Kunia)	C	21.8	C	24.7	B	14.0	B	15.5
EB On Ramp Lane Add (Ewa)	F	55.5	E	37.1	F	54.0	E	48.3
WB Kunia Off Ramp Diverge	A	9.6	A	9.6	B	12.8	B	12.8
WB Ewa Off Ramp Diverge	C	22.5	C	21.3	C	20.3	C	22.3
WB On Ramp Merge	B	17.2	B	19.8	B	16.7	B	16.6
North-South Interchange								
EB Off Ramp Lane Drop	-	-	B	11.6	-	-	B	11.4
EB On Ramp Merge	-	-	B	19.7	-	-	B	13.1
EB On Ramp Lane Add	-	-	D	30.3	-	-	C	25.6
WB Off Ramp Diverge	-	-	B	14.5	-	-	B	10.2
WB On Ramp Merge	-	-	B	15.2	-	-	B	15.5
Makakilo Interchange								
EB Off Ramp Diverge	C	20.8	B	18.6	B	13.3	B	10.7
EB Makakilo On Ramp Merge	C	20.2	B	18.8	A	9.2	A	9.6
EB Kapolei On Ramp Merge	C	22.2	C	21.2	B	17.3	B	13.7
WB Off Ramp Diverge	A	2.5	A	1.2	A	5.0	A	0.5
WB On Ramp Merge	B	14.5	B	14.1	B	12.7	B	10.2
Fort Weaver Interchange								
SB Off Ramp Lane Drop to WB	E	46.1	A	6.4	C	23.0	A	10.9
SB Off Ramp Diverge to EB	B	13.0	B	12.3	C	24.0	C	24.0
SB On Ramp Merge	B	13.7	B	13.7	D	30.2	C	25.9
NB Off Ramp Lane Drop	C	23.9	D	32.0	C	25.8	B	16.1
NB On Ramp Lane Add	E	38.0	B	19.3	B	16.9	A	8.1
NB Kunia/H-1 Weave	F	62.8	F	45.0	D	28.2	C	25.6

WB=Waianae bound, KKHD=Kaka'ako Hea't bound,
NB=northbound(mauka bound) SB=southbound(maka- boun'd)

will improve to a lower LOS F. The addition of the North-South Road did relieve some of the congestion on Fort Weaver Road, but as explained earlier in this report, Fort Weaver Road is already operating over capacity. The fact that the Ewa and Ewa Beach areas are still growing /developing only adds to the problem.

Copies of the analysis worksheets are included in a separate Technical Appendix.

3 Interchange Terminal Operations

Table 3-3 summarizes the results of the Interchange Terminal analysis.

Table 3-3

Year 2025 Interchange Terminal Level-of-Service

Interchange Terminals	AM Peak				PM Peak			
	w/o N/S Rd		With N/S Rd		w/o N/S Rd		With N/S Rd	
	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
Kunia Interchange	110 sec cycle				110 sec cycle			
Mauka Terminal	C	22.1	B	11.3	D	41.7	C	39.9
Mauka-bound Approach	C	22.0	C	32.8	D	46.4	D	50.8
Makai-bound Approach	C	22.1	B	10.3	D	40.1	C	36.2
Makai Terminal	C	25.3	C	24.7	C	30.0	C	26.6
Koko Head-bound Approach	D	48.6	D	48.6	D	45.6	D	35.5
Mauka-bound Approach	D	40.8	D	36.2	C	30.1	C	28.6
Makai-bound Through	B	12.5	A	7.7	C	28.7	C	25.0
Makai-bound Left-Turn	D	39.3	D	35.2	C	29.2	C	29.2
North-South Interchange			100 sec cycle				100 sec cycle	
Mauka Terminal	-	-	D	49.1	-	-	D	36.2
Waianae-bound Approach	-	-	D	53.8	-	-	D	40.7
Mauka-bound Approach	-	-	D	35.4	-	-	C	28.8
Makai-bound Approach	-	-	D	49.8	-	-	D	47.0
Makai Terminal	-	-	B	15.4	-	-	B	15.6
Koko Head-bound Approach	-	-	C	33.0	-	-	C	28.4
Mauka-bound Approach	-	-	B	19.6	-	-	B	18.3
Makai-bound Approach	-	-	B	14.2	-	-	B	13.3

Table 3-3 (Continued)

Year 2025 Interchange Terminal Level-of-Service

Makakilo Interchange	90 sec cycle		60 sec cycle		90 sec cycle		60 sec cycle	
Mauka Terminal	F	90.0	B	15.8	F	161.4	B	18.8
Waianae-bound Approach	F	92.3	B	19.2	F	273.8	B	18.3
Mauka-bound Approach	E	65.0	B	11.1	C	24.3	B	14.5
Makai-bound Approach	F	186.3	B	17.3	F	135.2	C	23.2
Makai Terminal	C	23.1	A	6.8	D	50.8	B	10.9
Koko Head-bound Approach	C	30.3	B	18.6	E	57.6	B	11.4
Mauka-bound Approach	B	16.3	A	5.3	E	63.3	B	10.9
Makai-bound Approach	C	24.2	A	5.4	B	16.6	B	10.3
Fort Weaver Interchange	60 sec cycle				60 sec cycle			
Waianae Terminal	B	13.6	A	9.2	B	16.0	B	13.6
Koko Head-bound Approach	B	12.9	A	7.2	B	15.8	B	13.3
Waianae-bound Approach	B	19.1	B	19.1	B	14.2	B	14.2
Koko Head Terminal	C	21.1	B	10.3	C	24.6	B	12.1
Koko Head-bound Approach	B	17.8	B	16.0	C	30.0	B	19.5
Waianae-bound Approach	C	25.0	A	8.4	C	23.0	B	11.4

Copies of the analysis worksheets are included in a separate Technical Appendix.

As shown in Table 3-3, the interchange terminals at Makakilo Interchange will experience problems under the no build scenario. The H-1 Westbound Off Ramp/Makakilo Drive terminal operates under a LOS of F during the AM peak period and the H-1 Eastbound Off Ramp/Makakilo Drive terminal operates at LOS F during the PM peak period. These terminals cannot handle the increased traffic demand caused by all of the development in this area.

The interchange terminals at Kunia Interchange and Fort Weaver Interchange will operate reasonably well in Year 2025 without North-South Road Interchange. The terminals at Fort

Weaver Interchange will operate at an acceptable LOS C or better, while the terminals at Kunia Interchange will experience longer delays but still operate at LOS D or better.

The addition of North-South Road Interchange will improve traffic conditions at all of the interchange terminals. Most importantly, it will alleviate the traffic volume at the Makakilo Interchange terminals, which will all operate at LOS B or better under the build scenario.

4 Adjacent Intersection Operations

Table 3-4 summarizes the results of the intersection analysis.

Copies of the analysis worksheets are included in Appendix C of this report.

As shown in Table 2-7, traffic operations at the intersection of Farrington Highway/Makakilo Drive – Fort Barrette Road in the scenario without North-South Road will experience heavy congestion and long delays on several approaches during both the AM and PM peak periods. The intersection experiences overcapacity conditions due to the large increase in traffic demand caused by the planned development of the City of Kapolei, the Villages of Kapolei, and the University of Hawaii West Oahu Campus.

Given the high-level of improvements already implemented at this intersection, further geometric changes and adjustments to signal timing are unlikely to be effective. During the AM peak period, the mauka-bound through movement and the makai-bound left-turn movement on Fort Barrette Road are the primary movements that are over-capacity. During the PM peak period, the same two movements plus the Waianae-bound right-turn movement on Farrington Highway are constrained.

The North-South Road Interchange provides another regional access into the Ewa plain thereby sharing and lessening the demand placed on Makakilo Drive/Fort Barrette Road intersection. With the North-South Road Interchange, the Farrington Highway/Makakilo Drive – Fort Barrette Road intersection will operate at an improved LOS C during both the AM and PM peak periods.

Table 3-4

Year 2025 Intersection Level-of-Service

Intersection	AM				PM			
	w/o N/S RD		With N/S RD		w/o N/S RD		With N/S RD	
	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
Farrington Hwy/Makakilo Dr/Ft Barrette Rd	**F**	**122.0**	**C**	**34.5**	**F**	**414.7**	**C**	**33.3**
Farrington Hwy EB	D	45.9	D	45.9	C	34.9	C	34.9
Left	D	48.5	D	48.5	C	33.1	C	33.1
Through	D	42.5	D	42.5	D	38.9	D	38.9
Right	C	23.9	C	23.9	C	21.2	C	21.2
Farrington Hwy WB	D	45.7	D	39.1	F	835.9	D	45.1
Left	D	49.6	D	49.6	E	66.7	D	50.5
Through	D	43.4	D	43.4	D	50.0	D	50.0
Right	D	45.2	C	27.3	F	-	C	32.2
Fort Barrette Rd NB	F	213.9	D	36.3	F	125.7	C	30.4
Left	D	38.9	D	38.9	D	45.5	D	45.5
Through	F	245.2	D	37.4	F	165.8	C	32.0
Right	B	10.2	B	10.1	B	16.7	B	16.3
Makakilo Dr SB	F	112.6	C	28.9	F	475.9	C	29.9
Left	F	288.9	D	47.9	F	891.1	D	44.5
Through	C	32.0	C	23.6	D	42.0	C	31.0
Right	C	22.1	C	22.1	A	7.9	A	7.9
Farrington Hwy/North-South Road	-	-	**C**	**33.4**	-	-	**D**	**39.0**
Farrington EB	-	-	D	44.6	-	-	D	45.7
Left	-	-	D	52.4	-	-	D	52.1
Through	-	-	D	39.0	-	-	D	46.1
Right	-	-	C	25.8	-	-	C	32.6
Farrington WB	-	-	D	43.5	-	-	D	45.5
Left	-	-	D	45.2	-	-	D	45.4
Through	-	-	D	48.9	-	-	D	52.1
Right	-	-	C	32.1	-	-	C	30.8
North-South Rd NB	-	-	D	39.8	-	-	D	49.8
Left	-	-	D	46.7	-	-	D	51.4
Through	-	-	D	40.3	-	-	D	42.9
Right	-	-	B	14.6	-	-	A	9.6
North-South Rd SB	-	-	C	23.4	-	-	C	28.5
Left	-	-	D	39.7	-	-	D	49.1
Through	-	-	C	23.3	-	-	C	28.5
Right	-	-	B	13.5	-	-	A	9.6

[illegible] Farrington Hwy WB - Waianae-bound, NB - mauka-bound, makai - makai, SB - makai-bound, mauka - mauka)

The Farrington Highway/North-South Road intersection is projected to operate at LOS C during the AM peak period and at a marginal LOS D during the PM peak period. These levels of service are considered acceptable for urban, peak hour operations.

The intersections along the Fort Weaver Road corridor are projected to operate at a much improved level of service due to the additional regional access to the H-1 Freeway.

I. Corridor Level Needs

Corridor level needs are related to the project level needs. The primary issue is the mobility and access for the major growth area in the Ewa Plain.

J. Transportation Plans

The proposed North-South Road Interchange is included in the Oahu Regional Transportation Plan and the Ewa Transportation Master Plan. The latter plan is the basis for a traffic impact fee ordinance (Honolulu Revised Ordinances, Chapter 33A) that requires developers within the Ewa plain to pay a predetermined impact fee per constructed unit. The impact fee is identified for six specific roadway projects in the Ewa area:

1. North-South Road and North-South Road Interchange;
2. Fort Weaver Road Widening;
3. Fort Barrette Road Widening;
4. Kapolei Parkway Completion;
5. Kapolei Interchange Ramp Modifications;
6. Makakilo Interchange Ramp Modifications

The impact fee is designed to help the State of Hawaii and the City and County of Honolulu provide the necessary matching funds for Federal-aid improvements on these facilities

The findings of both the Oahu Regional Transportation Plan and the Ewa Transportation Master Plan are consistent with the finding of this report which identifies North-South Road Interchange as a key component for regional mobility and access in the Ewa plain

K. Conclusion

The analysis of future Year 2025 traffic conditions without and with North-South Road Interchange shows that the proposed interchange will be effective in maintaining regional access and mobility for the Ewa plain. This Ewa plain is a policy directed growth area for the Island of Oahu. The Oahu Regional Transportation Plan and the Ewa Transportation Master Plan also include the North-South Road Interchange as a future project

The analysis also finds that the satisfactory operation of the H-1 Freeway will be maintained by the proposed North-South Road and Interchange, along with improvements as proposed in the Oahu Regional Transportation Plan

Based on these two findings, it is concluded that the proposed North-South Road interchange will maintain traffic flow and benefit the Ewa Community, and consequently, this facility should be implemented

CHAPTER 4 INTERCHANGE ALTERNATIVES

The analyses included in Chapter 3 of this report, assumed a diamond interchange configuration for the without versus for the interchange evaluation. That evaluation determined that a new North-South Road Interchange located between the existing Makakilo and Kunia Interchanges would be needed and can be implemented in a manner that preserves the level of operations of the H-1 Freeway.

This chapter reviews alternative configurations for the proposed North-South Road Interchange to determine the appropriate interchange configuration.

A. Design Criteria

1. Standards

All design elements will be based on the AASHTO A Policy on Geometric Design of Highways and Streets, 2001 and the State of Hawaii Statewide Uniform Design Manual for Streets and Highways, October 1980.

2. Critical Design Elements

The primary projected traffic movements at this interchange would be between areas Koko Head of the interchange and areas makai of the interchange. Therefore, the Waianae-bound off-ramp is configured as a two-lane off ramp and the Koko Head-bound on ramp is configured as a two-lane ramp with one of the ramps being a lane pickup. Because there is the potential that the Waianae-bound to makai-bound traffic movement at the proposed interchange could be larger than projected, it is recommended to acquire right-of-way to allow the construction of a loop ramp to accommodate this movement if needed

The interchange will have enough width on H-1 Freeway to accommodate the future high-occupancy vehicle (HOV) lanes to be constructed by others. The City & County of

Honolulu has proposed a park and ride lot in at the Koko Head/mauka corner of the North-South Road/Farrington Highway intersection. The interchange configuration proposed will work well with the proposed park and ride lot, providing transit vehicles with good access to the H-1 Freeway via the North-South Road Interchange.

3. Other Controlling Parameters

a. Interchange Spacing

The proposed North-South Road Interchange is located approximately two miles from the existing Makakilo Interchange and two miles from the existing Kunia Interchange. Given that the H-1 Freeway corridor in this area is starting to urbanize, this spacing is well within the guidelines for urban interchange spacing of about 1 mile as documented in AASHTO's A Policy on Design Standards – Interstate System, 1991. Figure 2-1 illustrates the interchange spacing with the proposed North-South Road Interchange.

b. Connection

The proposed interchange will connect to the North-South Road arterial roadway. This roadway will be owned and maintained by the State of Hawaii Department of Transportation.

c. Traffic Movement Configuration

All possible traffic movements will be provided for at the proposed North-South Road Interchange.

B. Alternatives Considered

1 Preliminary Screening of Interchange Configurations

a. Types of Freeway Interchanges

The AASHTO A Policy on Geometric Design of Highways and Streets, 2001 (Green Book) identifies several types of interchanges. Figure 4-1 illustrates selected examples of interchange configurations.

These interchange configurations are often grouped into two major categories: 1) freeway-to-freeway; and 2) freeway-to-arterial. The all-directional four-leg, three-leg directional, trumpet, and full cloverleaf are usually considered freeway-to-freeway interchanges. They are similar in that all interchange connections are provided via merge and diverge movements. No at-grade intersections are involved.

Freeway-to-arterial interchanges often involve configurations that allow at-grade intersections where interchange ramp terminals intersect the arterial roadway. Examples are the diamond and partial cloverleaf configurations. When appropriate, a flyover ramp is sometimes used to supplement a freeway-to-arterial configuration to accommodate a major traffic movement.

b. Basic Interchange Parameters at North-South Road

At the proposed interchange location, several basic parameters are identified:

- the interchange involves an arterial roadway (North-South Road) and a freeway (H-1);
- the interchange will have four-legs;
- all traffic movements will be accommodated;
- the proposed interchange will be located in a gulch between two ridges;
- H-1 Freeway, in the vicinity of the proposed interchange, is higher than the land to the south;
- there is significant topography to the north of the proposed interchange location;

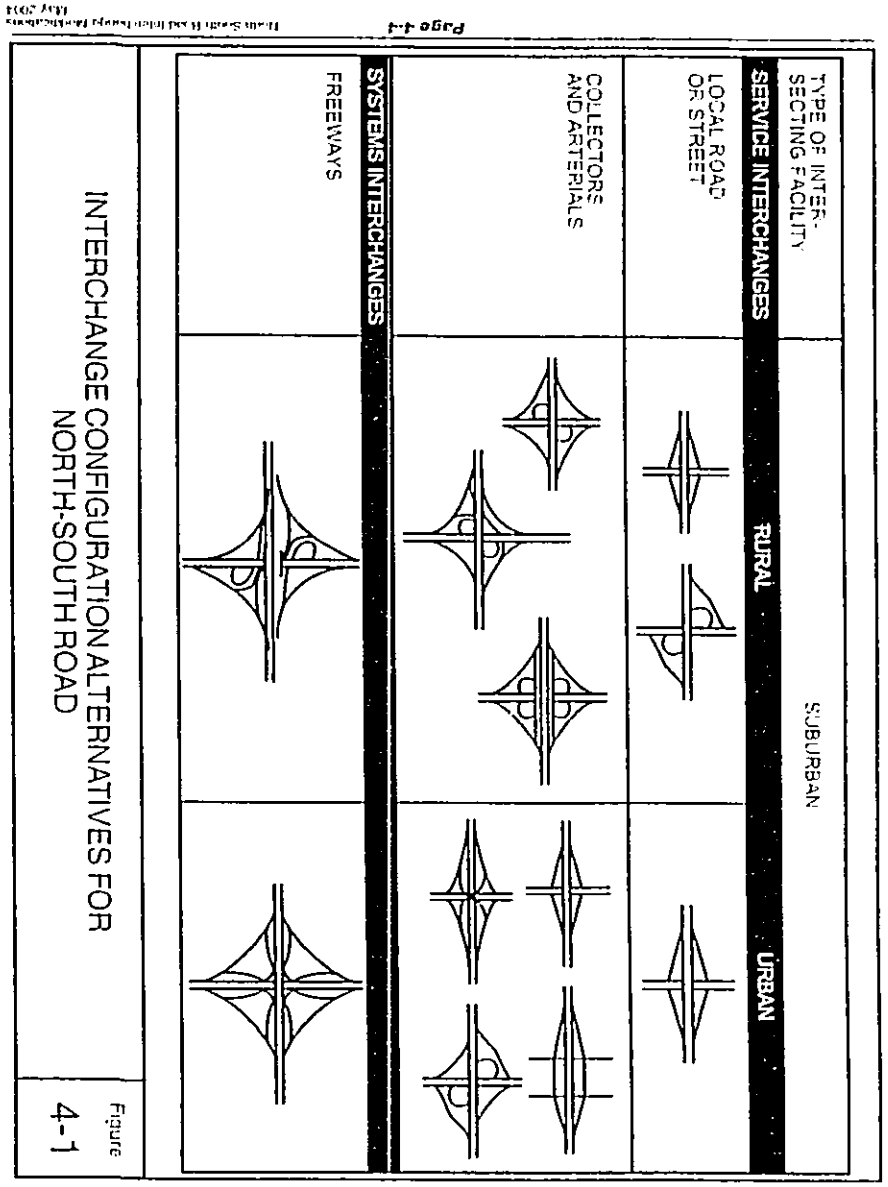


Figure 4-1

- there is a future major physical constraint in the southeast quadrant (Kaloi Gulch detention pond)
- North-South Road is a proposed principal arterial roadway.

As such, a freeway-to-arterial type interchange configuration is most appropriate. As shown in Figure 3-1, the diamond, partial cloverleaf, and single-point urban are examples of this type of interchange.

The proposed interchange will serve four roadway legs and, therefore, the three-legged configurations were eliminated from consideration. The east and west legs of the interchange are comprised of H-1 Freeway. The south leg will be North-South Road and it will serve the Ewa plain area. The north leg will provide future access to the Makakilo subdivision area, providing an alternative access for this residential area.

All traffic movements are proposed to be accommodated at the interchange and, therefore, all interchange configurations will allow for complete movements at the proposed interchange.

The proposed North-South Road Interchange will be located in a gulch between two ridges. In the vicinity of this location, H-1 Freeway is approximately 15 to 20 feet higher than the land to the south. In fact, there is an existing cane haul road that passes under H-1 Freeway near the proposed alignment of North-South Road. These factors strongly suggest that the interchange configuration be configured with North-South Road passing underneath H-1 Freeway.

There is significant topography to the north of H-1 Freeway in the vicinity of the proposed interchange. The topography to the north of H-1 in the vicinity of the proposed interchange climbs into hills, making it desirable to keep the interchange ramps close to H-1 Freeway to minimize earthwork associated with them. However, current and projected traffic patterns indicate that a loop ramp may be desirable in the northwest quadrant of the interchange. The trade-off between the right-of-way/cost impacts and the operational efficiency of the

loop ramp is, therefore, an important consideration in evaluating the alternatives in later analyses.

There is also a proposed detention pond proposed southeast of the interchange location as part of the management of the Kaloi Gulch regional drainage being done by others. Proposed interchange configurations attempt to avoid interfering with this proposed Kaloi Gulch detention pond. It is, therefore, desirable to also keep ramps in the southeast quadrant of the interchange close to the freeway.

c. Preliminary Screening of Configurations

The preliminary screening of interchange configurations are based on appropriate type, topography, and physical constraints.

Based on the discussion of interchange parameters, the proposed interchange should be a freeway-to-arterial interchange of urban design, it will service four legs and accommodate all traffic movements. North-South Road will cross H-1 Freeway as an underpass, and loop ramps will be avoided in the southeast quadrant of the interchange if possible.

Based on this description, the freeway-to-freeway interchanges are eliminated from further consideration based on economic and system appropriateness. Both the All-way directional and the full-cloverleaf configurations are designed to handle freeway-to-freeway junctions and are inappropriate for the freeway-to-arterial junction involved at North-South Road. Both are expected to be very expensive and require large amounts of right-of-way to implement.

d. Interchange Configurations Retained for Further Evaluation

The interchange configuration carried forward for further evaluation are:

1. diamond,
2. partial cloverleaf with loop ramp in northwest quadrant,
3. partial cloverleaf with loop ramp in northwest quadrant and westbound diamond off-ramp,
4. single point urban,

5. diamond with flyover ramp for westbound to southbound movement.

Figures 4-2 and 4-3 illustrate these configurations. These interchanges are examined further based on traffic operations, right-of-way requirements, environmental impacts, and cost.

C. Traffic Operations Analyses of Alternatives

One of the parameters used to identify the appropriate interchange configuration is its ability to achieve acceptable traffic operations, based on the projected traffic demand. Analyses that evaluate intersection operations at ramp terminal intersections and merge-diverge operations at freeway ramp junctions are used to determine the performance of the interchange configuration alternatives.

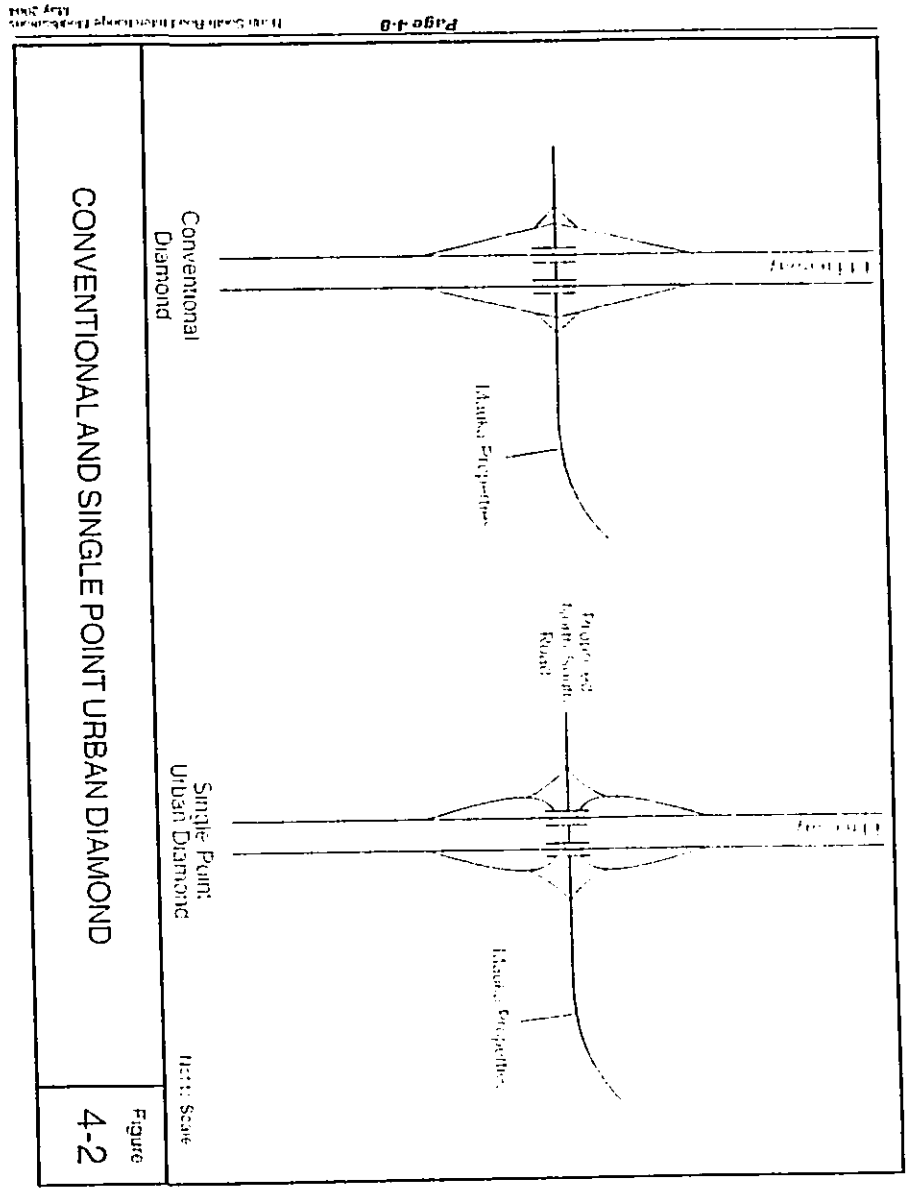
1 Methodology and Assumptions

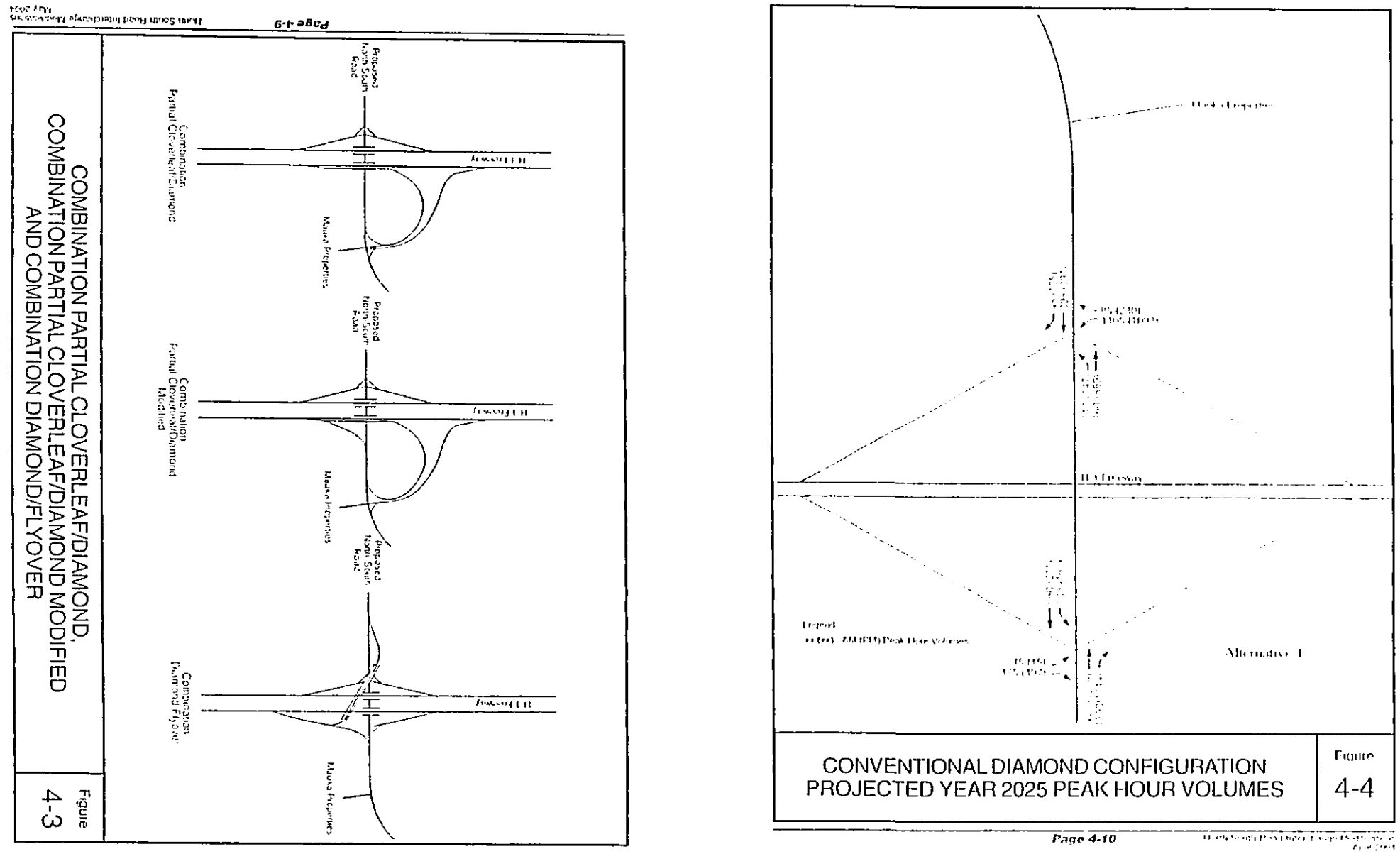
Future Year 2025 traffic volume forecasts developed as part of this study are used in these analyses. The future volume forecasts are based on the Oahu Regional Transportation Plan (ORTP) and land uses consistent with the Ewa Development Plan. Both future A.M. and P.M. peak hour time periods are evaluated.

Figures 4-4, 4-5, 4-6, 4-7, and 4-8 summarize the projected Year 2025 A.M. and P.M. peak hour turning movements for each interchange alternative.

The methodologies in the 2000 Highway Capacity Manual for Ramp Junctions, Signalized Intersections and Weaving Sections were used to analyze the interchange configurations. The assumed parameters used in the analysis are as follows:

- peak hour factor - 0.95
- truck percentage - 2%
- lateral clearance - ≥6 feet
- lane width - 12 feet
- roadway grade - <2% on H-1, 6% upgrade to north on North-South Road, north of interchange



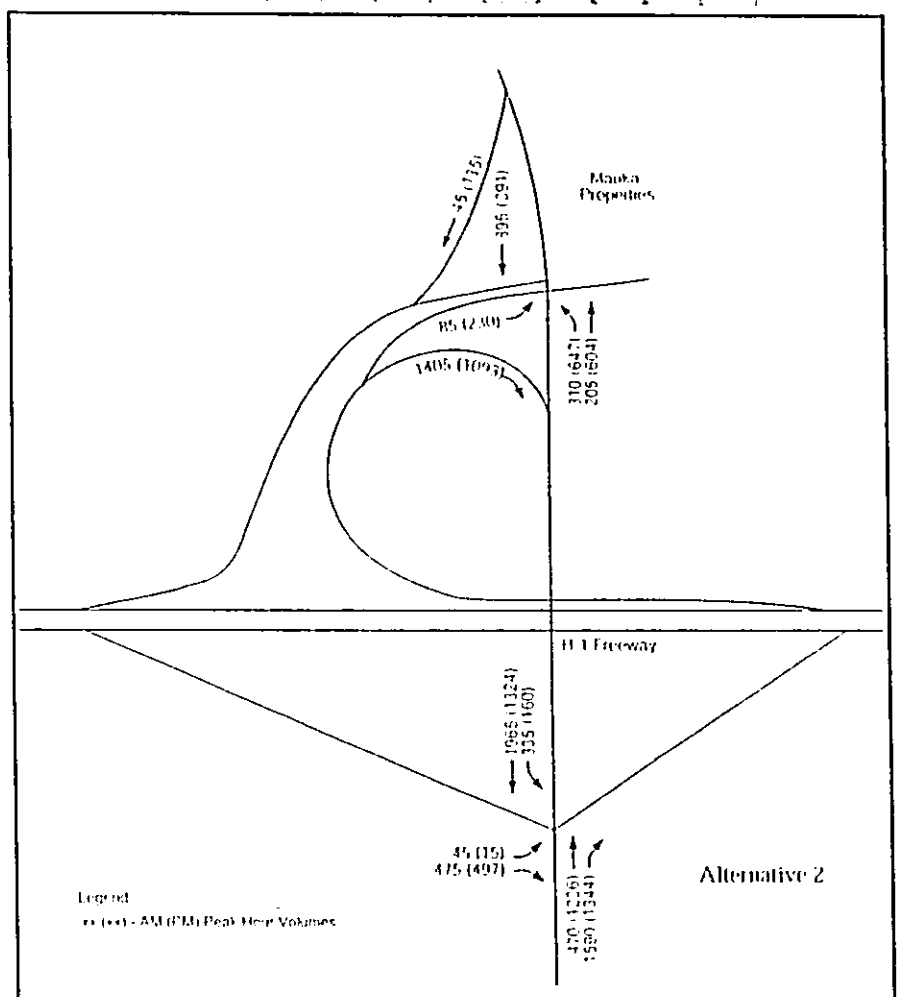


CONVENTIONAL DIAMOND CONFIGURATION
PROJECTED YEAR 2025 PEAK HOUR VOLUMES

Figure 4-4

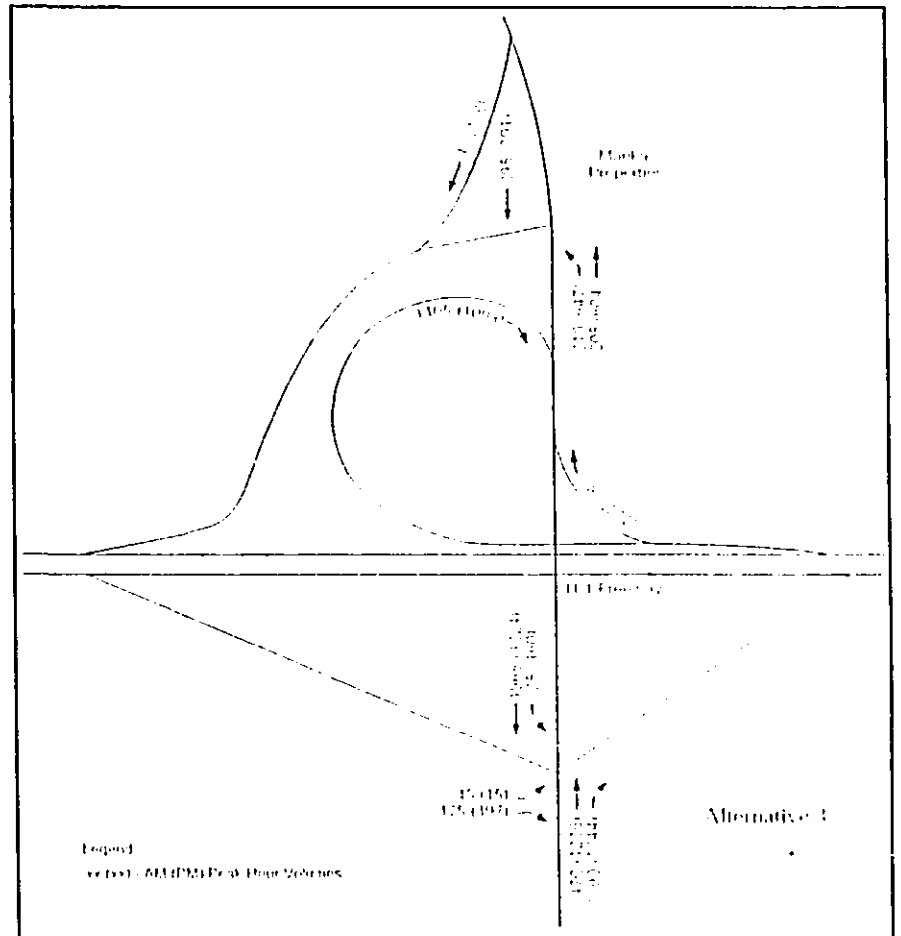
COMBINATION PARTIAL CLOVERLEAF/DIAMOND,
COMBINATION PARTIAL CLOVERLEAF/DIAMOND MODIFIED
AND COMBINATION DIAMOND/FLYOVER

Figure 4-3



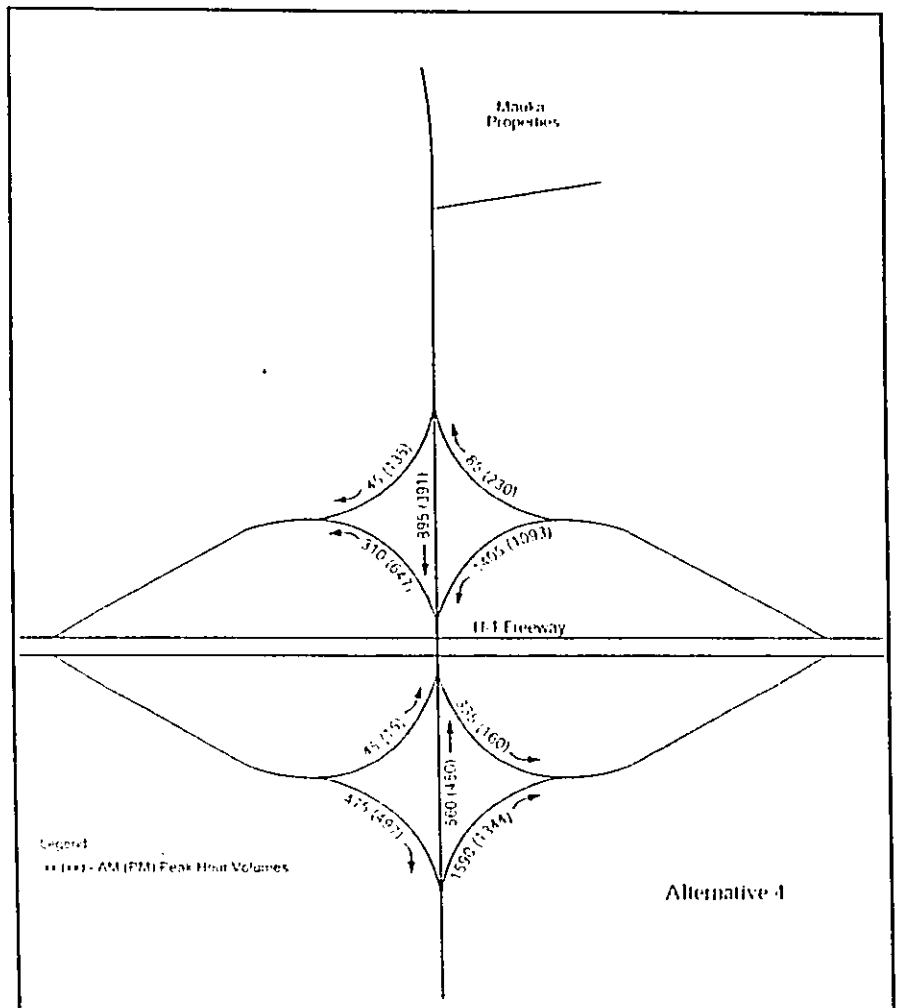
PARTIAL CLOVERLEAF CONFIGURATION
PROJECTED YEAR 2025 PEAK HOUR VOLUMES

Figure 4-5



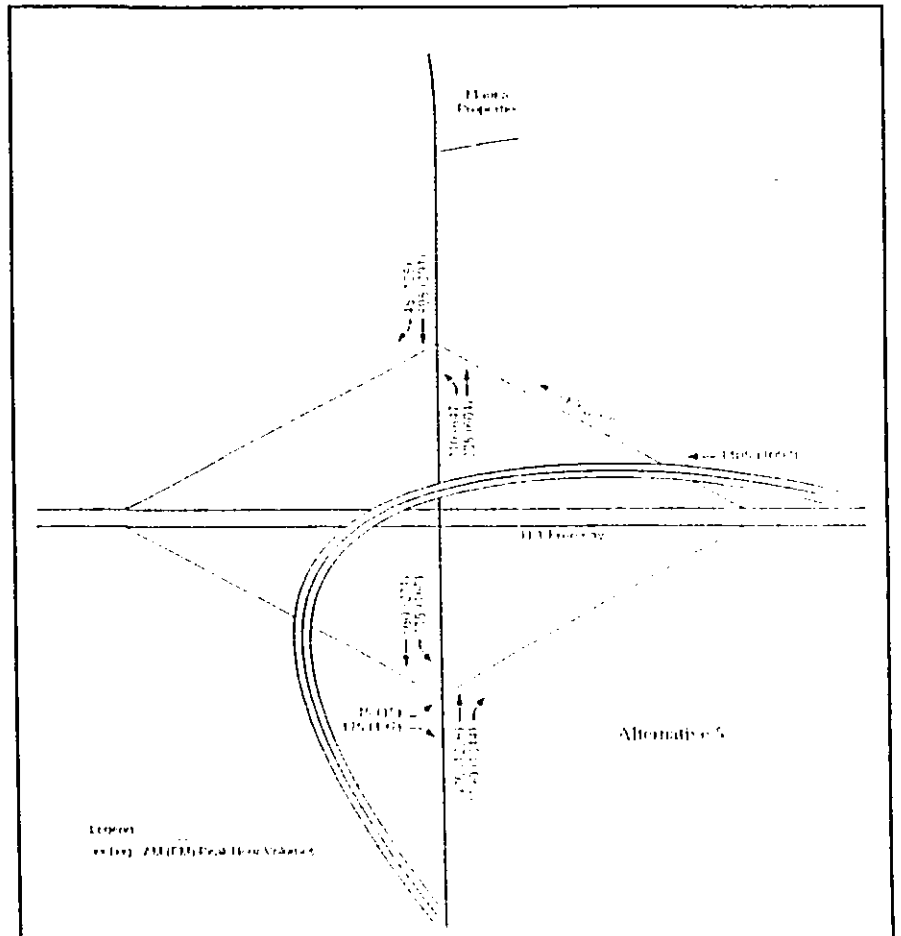
MODIFIED PARTIAL CLOVERLEAF CONFIGURATION
PROJECTED YEAR 2025 PEAK HOUR VOLUMES

Figure 4-6



SINGLE POINT URBAN CONFIGURATION
PROJECTED YEAR 2025 PEAK HOUR VOLUMES

Figure 4-7



COMBINATION DIAMOND/FLYOVER CONFIGURATION
PROJECTED YEAR 2025 PEAK HOUR VOLUMES

Figure 4-8

The turning lane storage lengths were determined using the Cumulative Poisson Distribution methodology. The intersection cycle length was assumed as shown in Table 4-1.

2 Analysis Results

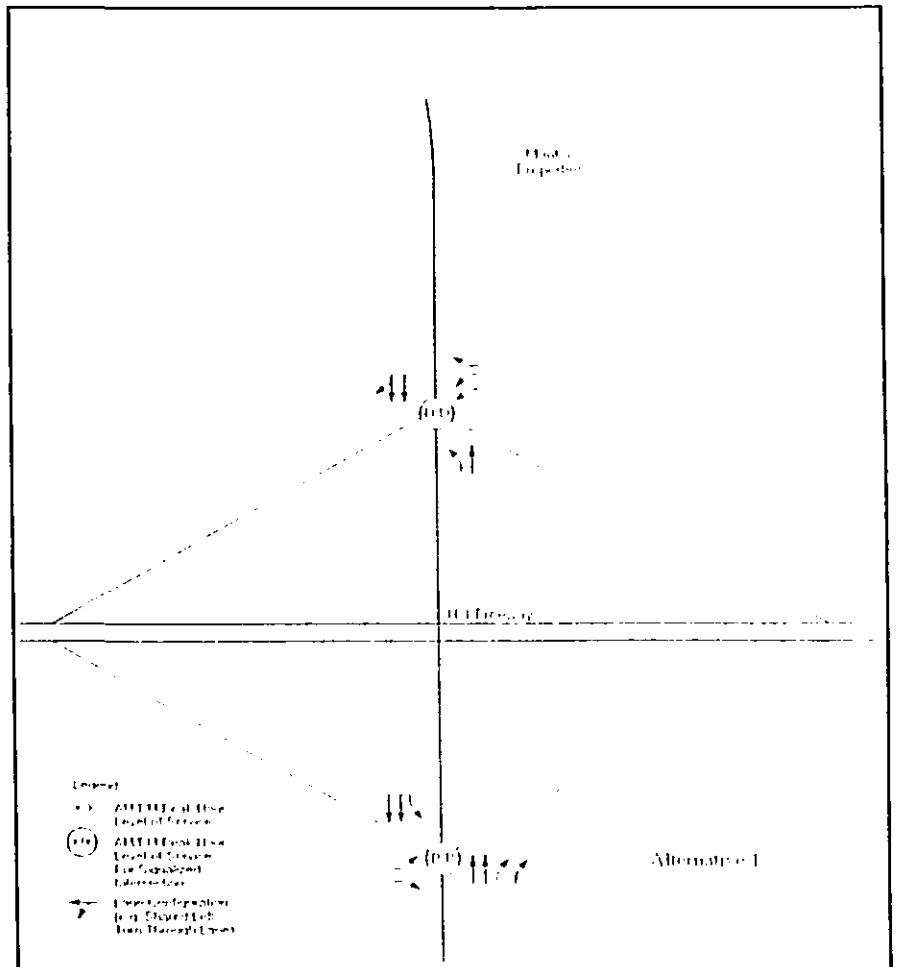
a Ramp Junctions

The operational performance of ramp junctions on H-1 Freeway are projected to function similarly between the five alternatives. The assumption is that all ramps to and from H-1 Freeway will be single point entrances and exits. For example, in one of the partial cloverleaf configurations, there are two ramps from westbound H-1 Freeway. One will be loop ramp to the south and the other a ramp to the north. Traffic for both ramps will exit H-1 Freeway at a common point onto an exit ramp that will then diverge into the loop ramp and the straight ramp. Table 3-2 in the previous chapter summarizes the results of the level of service (LOS) analysis for merge and diverge conditions for all alternatives.

The results show that ramp junctions are projected to operate acceptably for urban peak hour conditions

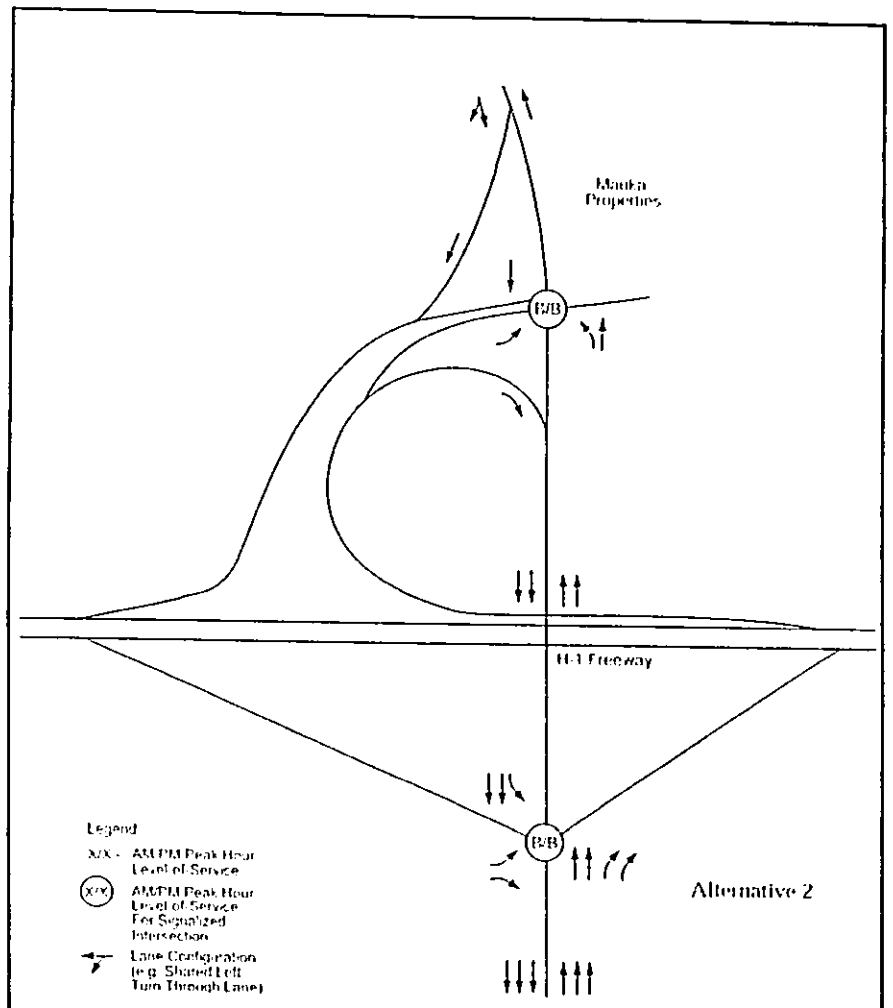
b Ramp Terminals Intersections

The overall intersection performance of the interchange ramp terminal intersections and the future UH campus intersection are summarized in Table 4-1. Figures 4-9 through 4-13 also summarize the intersection operations and document laneage assumptions. Also included are projected intersection operations at the future North-South Road/mauka lands intersection. This intersection is located approximately 700 feet from the mauka ramp terminal intersection in the Diamond, Single-Point Urban, and Diamond with Flyover configurations. In the partial cloverleaf configurations, it is integrated with the loop ramp terminal intersection. One of the key assumptions included in these analyses is that the cross-section of North-South Road as it passes under H-1 Freeway remains constant. Other key assumptions are that adequate turning lane storage is provided and that closely-



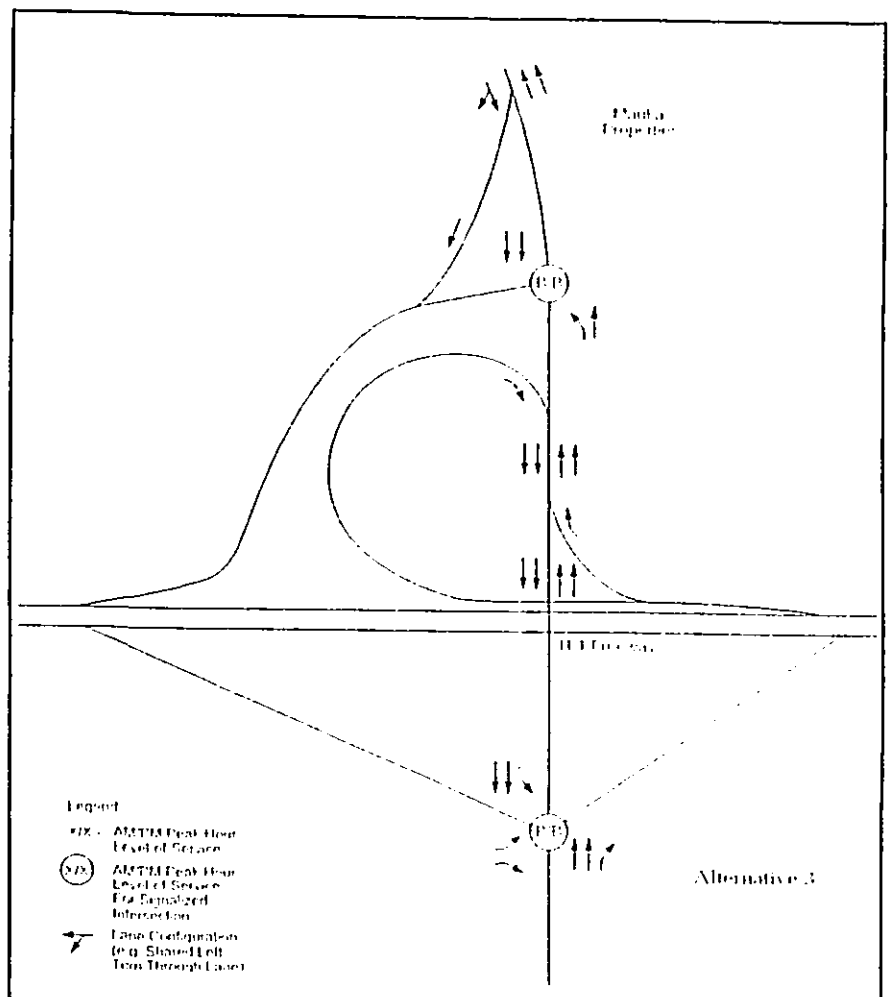
CONVENTIONAL DIAMOND LANE CONFIGURATION AND PROJECTED YEAR 2025 PEAK HOUR LEVEL-OF-SERVICE

Figure 4-9



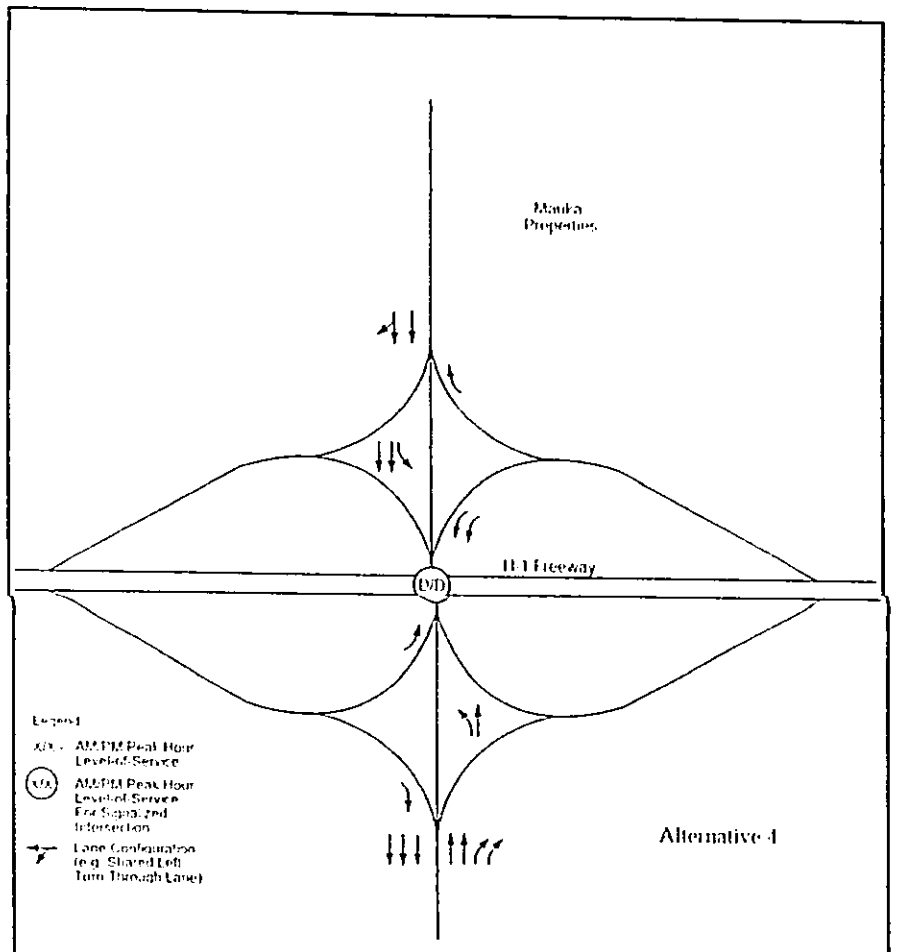
PARTIAL CLOVERLEAF LANE CONFIGURATION AND PROJECTED YEAR 2025 PEAK HOUR LEVEL-OF-SERVICE

Figure 4-10



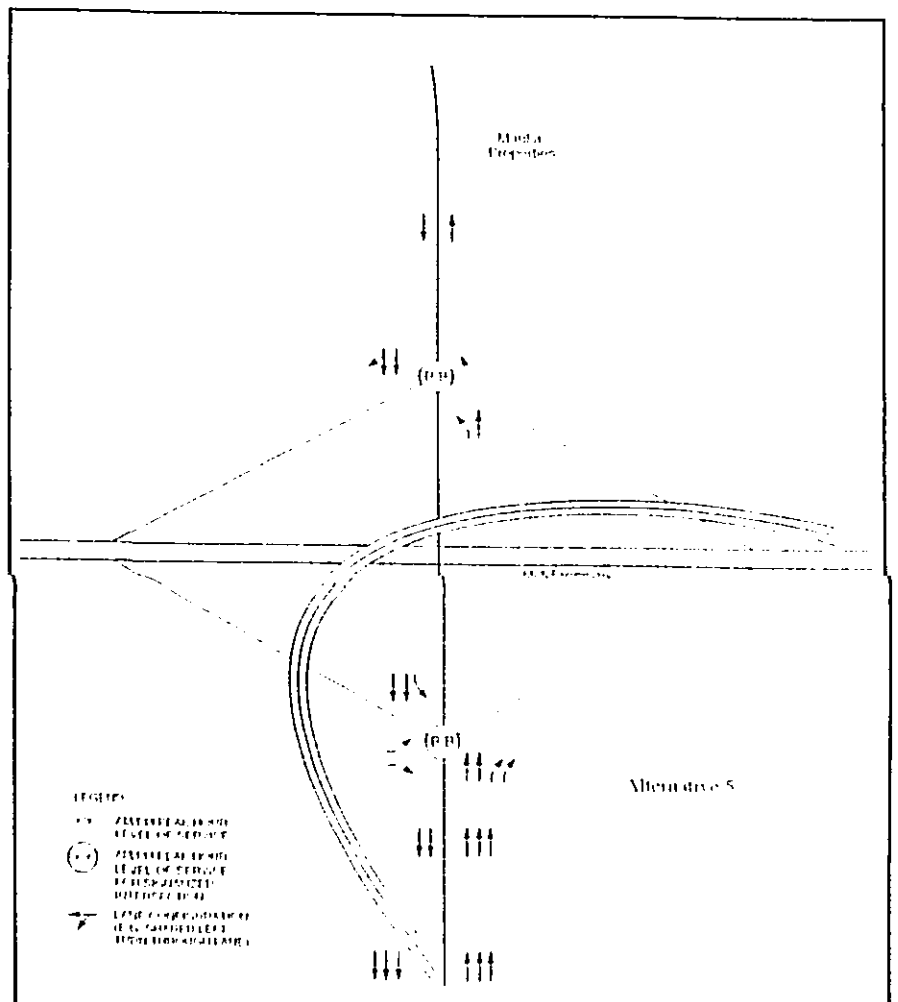
MODIFIED PARTIAL CLOVERLEAF LANE CONFIGURATION AND PROJECTED YEAR 2025 PEAK HOUR LEVEL-OF-SERVICE

Figure 4-11



SINGLE POINT URBAN
LANE CONFIGURATION AND PROJECTED YEAR 2025
PEAK HOUR LEVEL-OF-SERVICE

Figure 4-12



COMBINATION DIAMOND/FLYOVER
LANE CONFIGURATION AND PROJECTED YEAR 2025
PEAK HOUR LEVEL-OF-SERVICE

Figure 4-13

Table 4-1

Projected Year 2025 Peak Hour Ramp Terminal Intersection Level-of-Service

Alternative Configurations

Ramp Terminal Intersection		Diamond				Partial Cloverleaf				Modified Partial Cloverleaf				Combined Diamond/Flyover				Single Point Urban			
		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
		LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
		100 Sec Cycle				60/100 Sec Cycles				60/100 sec Cycles				60/60 sec Cycles				100 Sec Cycle			
Mauka Terminal		D	49.1	D	36.2	B	17.0	B	18.2	B	10.9	B	11.7	A	9.7	B	11.7				
Westbound Approach		D	53.6	D	40.7	B*	19.7*	C*	20.8*	Free Right for WB Off Ramp				Free Right for WB Off Ramp				Only one intersection			
Northbound Approach		D	35.4	C	28.8	B	14.6	B	15.0	B	12.9	B	11.7	A	9.8	B	11.7				
Southbound Approach		D	49.8	D	47.0	B	18.1	C	26.7	A	9.7	B	11.6	A	9.7	B	11.6				
Makai Terminal		B	15.4	B	15.6	B	15.4	B	15.6	B	15.4	B	15.6	B	12.2	B	13.7	D	42.5	D	42.4
Eastbound Approach		C	33.0	C	28.4	C	33.0	C	28.4	C	33.0	C	28.4	B	19.9	B	19.4	B	16.1	C	21.3
Westbound Approach		Not applicable for this configuration				Not applicable for this configuration				Not applicable for this configuration				Not applicable for this configuration				D	41.6	D	45.1
Northbound Approach		B	19.6	B	18.3	B	19.6	B	18.3	B	19.6	B	18.3	B	13.4	B	14.3	D	40.3	D	40.5
Southbound Approach		B	14.2	B	13.3	B	14.2	B	13.3	B	14.2	B	13.3	B	11.2	B	11.7	D	46.2	D	41.3

*Loop ramp intersection

spaced intersections are coordinated to maximize efficiency in processing traffic. The overall intersection performances of the five alternatives are very similar.

Alternative 1, the Conventional Diamond configuration appears to provide the best combination of operations at both the makai and mauka ramp terminal intersections. Its one weak point is its ability to increase storage for the double left-turn lanes and its ability to respond to unforeseen increases in traffic demand, especially for the westbound to southbound movement. Alternative 4, the Single-Point Urban configuration is close to the Conventional Diamond in performance, but its combined intersection does not operate as well as the Conventional Diamond's two separate ramp intersections. Alternative 5, the Diamond with Flyover Ramp provides excellent operation at the mauka ramp terminal intersection, but results in slightly worse LOS at the makai intersection. Alternatives 2 and 3, the Partial Cloverleaf configurations are hampered by the need to combine operations of the interchange with operations at the U.H. access and do not operate as well as the other alternative configurations.

D. Right-of-Way Requirements

The five interchange alternatives differ in the amount of right-of-way required to implement them. The partial cloverleaf configurations need the most right-of-way due to minimum radius requirements for the loop ramp. If the diamond with flyover configuration is constructed utilizing as much fill as possible for the flyover ramp, it could also require a very significant amount of right-of-way.

Table 4-2 summarizes the additional right-of-way for the proposed alternatives. As shown, the single-point urban configuration needs the least right-of-way, followed by the diamond configuration. The partial cloverleaf alternatives require a large area for the loop ramp in the northwest quadrant and the diamond with flyover ramp will probably require the most right-of-way.

Table 4-2

Approximate Right-of-Way Requirements for Interchange Alternatives

Alternative	Approximate Right-of-Way in Hectares				
	NW Quad	SW Quad	NE Quad	SE Quad	Total
1. Conventional Diamond	1 34	1 34	1.50	1.50	5 68
2. Partial Cloverleaf	5 62	1 34	0 04	1.50	8 50
3. Modified Partial Cloverleaf	5.62	1.34	1 34	1.50	9 80
4 Single Point Urban	0 87	0 62	0.79	1.06	3.34
5 Combined Diamond/ Flyover	1.34	>3 00	>3.00	1.50	>8 84

E. Cost Considerations

The cost of implementing an interchange configuration is an important component in identifying a preferred alternative. Table 4-3 summarizes planning level construction cost estimates for the five alternative interchange configurations in 1997 dollars.

Table 4-3

Cost Considerations for Interchange Alternatives

Alternative	Planning Level Construction Cost
1 Conventional Diamond	=$33 million
2. Partial Cloverleaf	=$40 million
3 Modified Partial Cloverleaf	=$41 million
4 Single Point Urban	=$35 million
5 Combined Diamond/ Flyover	>$50 million

Alternative 1, the Conventional Diamond is the least costly configuration, followed closely by Alternative 4, the Single-Point Urban Interchange (SPUI) configuration. Alternatives 2 and 3, the Partial Cloverleaf configurations fall into the next group of costs, while Alternative 5 - Combined Diamond/Flyover is the most expensive.

F. Environmental Factors

The five interchange alternative have differing physical footprints, both horizontally and vertically. These could, therefore, have differing levels of environmental factors. The following environmental factors were evaluated:

- social and economic;
- climate and air quality;
- noise and vibration;
- ecosystems;
- water resources;
- geographic setting and natural hazards;
- historic and cultural sites;
- parks and recreation;
- visual and aesthetic resources.

Environmental reconnaissance was conducted for the area surrounding the proposed North-South Road Interchange. No environmentally significant impacts were identified.

All interchange alternatives are expected to have similar environmental impacts with the exception of the Diamond with Flyover Ramp configuration. Because the flyover ramp will need to be high enough to provide vertical clearance over H-1 Freeway and because H-1 Freeway is already about 15 to 20 feet above the ground to the south, the flyover ramp will be at least 30 to 40 feet above the natural ground located to the south of the interchange. Aesthetically, this may not be desirable as view planes from the future University of Hawaii - West Oahu Campus to the coast and from the Ewa plain to the mountains will be impacted.

The proposed North-South Road Interchange is located in an area that is directly over the Southern Oahu Basal Aquifer (SOBA). As such, measures deemed necessary by the Environmental Protection Agency (EPA) and the Federal Highway Administration (FHWA) may need to be implemented. However, all five alternatives would be located within this area and requirements will be similar for all of them.

G. Selection of Preferred Alternative

1 Evaluation of Criteria

Table 4-4 summarizes the results of the criteria evaluated.

- traffic operations;
- right-of-way requirements;
- cost considerations;
- environmental factors

Table 4-4

Summary of Interchange Evaluation Criteria

	Alternative				
Criteria	1	2	3	4	5
Traffic Operations	-	+	+	-	+
Right-of-Way	+	-	-	+	-
Construction Cost	+	0	0	+	-
Environmental	0	0	0	0	-

Legend: + = better, 0 = average, - = worse

Based on this evaluation, Alternative 5, the Combination Diamond/Flyover, is eliminated from further consideration. Although it would provide good interchange ramp terminal level of service (LOS), its projected merge diverge and adjacent intersection operations is

expected to be similar to the other alternatives. The flyover ramp would need significant right-of-way, even if most of the ramp were on structure. Planning level estimates of construction cost for this configuration are the most expensive of the five alternative configurations. Environmentally, the flyover ramp will have visual and noise projection impacts to development within the Ewa plain.

The diamond and Single-Point Urban Interchange(SPUI) configurations are similar to each other in the evaluation criteria. Traffic operations at the ramp terminal intersections are not projected to be as good as the partial cloverleaf configurations. Although these interchanges require less right-of-way and are less costly than the partial cloverleaf configurations, they are less flexible in accommodating changes in future traffic conditions. Alternative 4, the SPUI must be constructed all at once due to the clear-span structure and ramp configuration. Phased construction of this type of interchange is not feasible. Once built, it is not easily expanded. Alternative 1, the Conventional Diamond can be expanded later, but that expansion is likely to result in a partial cloverleaf configuration such as the reconstruction that occurred at the Kunia Interchange.

Given that the development of Kalaeloa was not assumed in the future analyses, there is the potential that the demand for the Waianae-bound to makai-bound traffic movement could be greater than projected. Therefore, it is recommended that the partial cloverleaf configurations be selected as the preferred configurations. They would allow the maximum flexibility for future growth and could be phased in construction so as to match the growth of the Ewa plain.

Alternatives 2 and 3 have similar partial cloverleaf configurations, however, alternative 3, the Modified Partial Cloverleaf, is recommended based on the following reasons:

- Alternative 2 results in one less intersection on North-South Road. Even though this road serves a right turn movement only, it requires construction of a separate ramp. Alternative 3 consolidates all movements into one loop ramp.

- Alternative 3 will provide more integrated access into the mauka property. Although its use is not known at this time, the mauka property could generate significant traffic. Having the Alternative 1, the Conventional Diamond is more familiar to the driver population. Alternative 4 will require a learning curve before drivers are comfortable with traffic operations in this configuration.

H. Conclusion

Based on the slightly more inexpensive construction cost, greater flexibility in implementation, and greater driver familiarity, it is recommended that Alternative 3 - Modified Partial Cloverleaf interchange configuration be selected as the preferred alternative. A conceptual sketch of the proposed interchange is shown in Figure 4-14.

CONCEPTUAL NORTH-SOUTH ROAD INTERCHANGE CONFIGURATION

Figure 4-14

APPENDIX D

TRAFFIC ANALYSIS

A copy of Appendix D – Traffic Study (Draft Interstate Access Modification Request Report Technical Appendices for the North-South Road Study) can be viewed at the State Department of Transportation, Highway Planning Branch or the City and County of Honolulu, Department of Transportation Services

APPENDIX E

AIR QUALITY TECHNICAL REPORT

NORTH-SOUTH ROAD AND KAPOLEI PARKWAY PROJECT

Air Quality Technical Report

Prepared by:

PARSONS BRINCKERHOFF QUADE & DOUGLAS, INC.

June 2004

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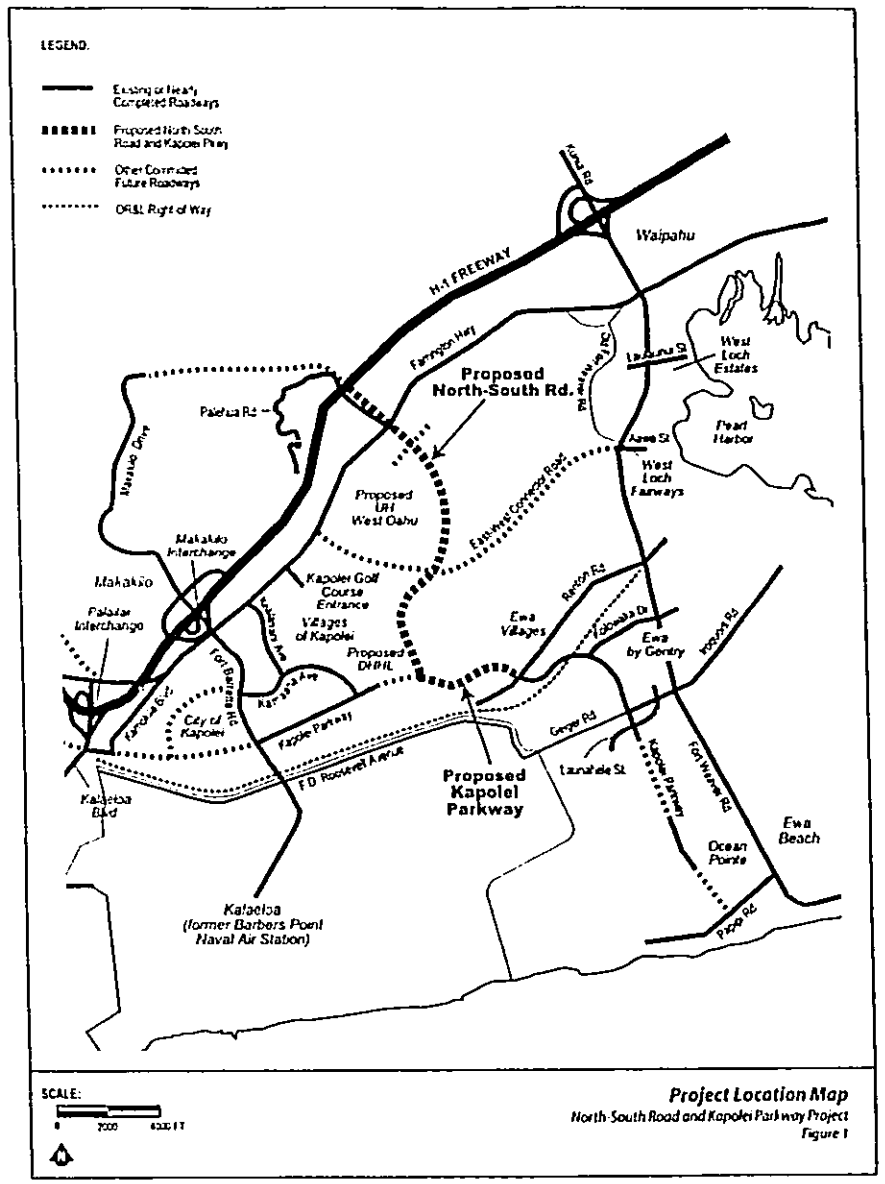
INTRODUCTION

The purpose of this report is to describe the air pollutants associated with motor vehicle exhaust, determine applicable standards and regulations, examine the existing air quality conditions in the study area, and identify and quantify the possible air quality impacts of the construction of the North-South Road and Kapolei Parkway Corridor.

PROJECT DESCRIPTION

The North-South Road would be a federal-aid, limited-access, principal arterial highway, that would connect Interstate Route H-1 (H-1 Freeway) to the proposed Kapolei Parkway, and is approximately 2.2 miles in length (see Figure 1). The North-South Road project also includes the construction of: (1) a major interchange at its junction with the H-1 Freeway, (2) the North-South Road/Kapolei Parkway intersection, and (3) various drainage features, such as a drainage channel and detention basin associated with the proposed highway, as well as two bridges over Kaloi Gulch. The roadway section of concern for the Kapolei Parkway is approximately 0.7 miles in length and is a proposed federal-aid, arterial roadway which would connect the proposed North-South Road to other existing, southerly portions of the Kapolei Parkway. North South Road would be a State facility; Kapolei Parkway is proposed as a City facility, to be constructed by the City's Department of Design and Construction (DDC).



PURPOSE AND NEED FOR ACTION

The purpose of this project is to address various types of transportation needs including:

- to meet roadway capacity need for existing travel demand,
- to respond to regional land use and economic development trends,
- to meet future transportation demand, and
- to improve sub-regional mobility.

Roadway Capacity Need for Existing Travel Demand

Traffic volumes on Ewa's arterial roadways reflect recent rapid urban development shown in Table S-1. From 1989 to 2001, growth in traffic volume on existing roadways ranged from 56 percent to 200 percent.

Fort Weaver Road repeatedly reaches near capacity conditions during both the AM and PM peak hours. In the AM peak period, approximately 85 percent of northbound vehicles on Fort Weaver Road access the eastbound H-1 Freeway via Kunia Interchange, regularly causing queues from the free way to the Fort Weaver Road/Farrington Highway Interchange. In the PM peak period, the existing traffic volumes on Fort Weaver Road have already exceeded capacity. While plans to widen Fort Weaver Road from four to six lanes in the next three years will help, it will be insufficient to accommodate planned future development in the Ewa area.

At Fort Barrette Road, traffic operations are congested during both the AM and PM peak hours. Particularly notable is the congestion at the Fort Barrette Road/Farrington Highway intersection, causing mauka-bound queues during the AM peak hour and eastbound queues during the PM peak hour.

The H-1 Freeway in the study area is affected by downstream congestion during the AM peak period. Recent improvements at the Kunia Interchange have mitigated PM peak period vehicle queues that used to back up on the westbound to makai-bound loop off-ramp and extend onto the freeway. Similarly, at the Makakilo Interchange in the westbound direction, PM peak period queuing on the westbound off-ramp that, at times, extended onto the freeway has been mitigated by recent improvements to the ramp.

Table S-1:
Traffic Volume Trends

Facility	Location	Average Daily Traffic			
		1989	2001	Percent Increase	Percent Annual Increase
Fort Weaver Road	North of Farrington Highway	45,000	70,000	56%	4%
	South of Farrington Highway	34,000	61,000	79%	5%
	At Honoululi Bridge	33,000	57,000	73%	5%
Fort Barrette Road	South of Interstate H-1	12,000	36,000	200%	10%
Interstate H-1	East of Kunia Interchange	74,000	140,000	89%	5%

Source: HDOT, Traffic Count Data

These recent improvements address only the existing traffic demand. It is projected that future travel demand at the Kunia and Makakilo Interchanges will exceed capacity, adversely affecting conditions on the H-1 Freeway. Therefore, construction of new roadways and interchanges, as well as improvements to existing roadways and interchanges, is needed to address continuing regional urban development, as directed by current State and City policy.

The proposed North-South Road would attract mauka-makai traffic, which would otherwise flow on Fort Weaver and Fort Barrette Roads. Diverting traffic to North-South Road would improve operating conditions on Fort Weaver and Fort Barrette Roads, allowing these other roadways to serve their travel markets better. Similarly, the North-South Road Interchange would relieve projected congested operations on H-1 freeway at the Kunia and Makakilo Interchanges.

Regional Land Use and Economic Development Trends

The Ewa region, as defined by the Ewa Development Plan (Ewa DP), had a population of 68,718 in 2000 (as defined by the City and County of Honolulu designated Ewa DP Area), approximately 8 percent of Oahu's total population. In contrast, the estimated population of the Ewa DP Area in 1990 was approximately 42,960 persons, 5.1 percent of the island total. In 2025, the estimated population of Oahu will be approximately 1.03 million. According to the City and County of Honolulu General Plan's population guidelines, the Ewa DP Area is intended to accommodate 13 percent of Oahu's 2025 population, or roughly 133,874 persons – an increase of 95 percent from 2000 (U.S. Census, 2000; Ewa DP, Revised 2000; State of Hawaii Department of Business, Economic Development and Tourism, Population And Economic Projections For The State Of Hawaii To 2025, 2000).

It is the objective of the State and County to create a "Second City" for Oahu in the Ewa area, by providing opportunities for residential and employment growth to supplement the Primary Urban Center (PUC). The Ewa Plain will experience the largest population, employment, and housing growth over the 25-year period between 2000 and 2025. By the year 2025, total population in the Ewa Plain would be over 116,000, up 66% from 2000, with a corresponding growth in housing of 73% to over 38,000 units. Public and private developers have facilitated achievement of this objective, and a number of projects are completed, under construction, or planned, including several residential developments in Ewa, Kapolei, East Kapolei, Makakilo, and employment centers in areas such as the City of Kapolei, Campbell Industrial Park, East Kapolei, Ewa, and Ewa Beach.

Regional transportation improvements are needed to accommodate this anticipated growth in Ewa, and the North-South Road is one component of the proposed regional improvements in the TOP 2025

Future Transportation Demand

Many residents in the Ewa region travel to and from the PUC with their primary route being the H-1 Freeway. In the base year 2000, there were approximately 159,000 daily production trips (trips originating from an area) and 114,000 daily attraction trips (trips ending in an area) in the Ewa region. Based on the City and County of Honolulu Department of Planning and Permitting's socio-economic forecasts, it was estimated that the region would generate approximately 802,800 daily production trips in the year 2025, an increase of 435 percent. The Primary Urban Center (PUC) is projected to receive approximately 60 percent of all attraction trips on Oahu in the year 2025. Socio-economic forecasts also indicate that approximately 646,900 attraction trips would be generated through employment growth in the Ewa region in 2025, an increase of 467 percent over 2000.

The TOP 2025 identified the need to increase access to the H-1 Freeway and transportation capacity in the North-South Road corridor area. It also noted the need to establish transportation links between residences in Ewa and future employment centers in the City of Kapolei. Therefore, the TOP 2025 included the construction of North-South Road, a new interchange with H-1, and the completion of Kapolei Parkway, among other future transportation improvements, such as widening Fort Barrette Road, Fort Weaver Road, and Farrington Highway.

Based on these transportation demand projections and the traffic volume trends described in Section 1.2, additional roadway and interchange capacity between existing and future residential communities and employment centers in the Ewa region and the H-1 Freeway is needed. Existing roadways and intersections connecting residential and employment areas with the H-1 Freeway are currently operating at or near their capacity and would not efficiently be able to accommodate the projected travel demand described above. Therefore, construction of North-South Road and Kapolei Parkway and a new interchange with the H-1 Freeway are needed to fully accommodate the policy-directed development in the Ewa Plain

Sub-regional Mobility

Providing an alternative facility to Fort Weaver Road and Fort Barrette Road will reduce congestion on these roadways, improving transportation conditions for traffic in the Ewa Plain. Moreover, North-South Road and Kapolei Parkway would help improve travel between activity centers within the Ewa Plain by providing alternative routes and improving overall system operation. Currently, travelers wanting to drive between points in Ewa have limited options, forcing mauka-makai roadways such as Fort Weaver Road and Fort Barrette Road to serve both mauka-makai demand and east-west demand. East-west connectivity is provided primarily by Farrington Highway and H-1 Freeway. Providing alternative roadway connections within the Ewa Plain will relieve both existing mauka-makai and east-west roadways thereby providing better sub-regional mobility.

ALTERNATIVES

Project alternatives were identified through discussions with government agencies and input gathered at public meetings. Alignment, interchange, and roadway concept alternatives, including a Transportation System Management (TSM) alternative, were examined. A preferred Build Alternative and a No-Build Alternative were selected for detailed examination in this EA, and are described below.

No-Build Alternative

The future No-Build Alternative assumes the roadway improvements in the TOP 2025, except the North-South Road Interchange and North-South Road, describing a future roadway network that includes some improvements for the Ewa Plain. Figure S-5 illustrates the 2025 No-Build Alternative roadway network. No-Build Alternative assumes that Kapolei Parkway is complete from Ewa Beach through the City of Kapolei by year 2025, including the segment between Renton Road and North-South Road. However, that segment of Kapolei Parkway would not be in place within the late 2007 to early 2008 time frame, to match initial implementation of the proposed North-South Road. The inclusion of this segment of the Kapolei Parkway is consistent with City plans for the future completion of Kapolei Parkway, but reflects current City budgetary constraints which make the timing of this project completion uncertain. Because the City owns the property on which Kapolei Parkway is proposed, the roughly 10-acre ROW for the Kapolei Parkway is being established by subdividing the parcel and changing its designation.

The No-Build Alternative assumes a 794-bus fleet by 2025. This fleet includes the Regional Bus Rapid Transit (BRT) system proposed as part of the Primary Corridor Transportation Project, which is part of the TOP 2025. However, because North-South Road and its interchange with H-1 Freeway does not exist in the No-Build Alternative, the proposed North-South Road Park-and-Ride is also assumed not to exist. In turn, the Regional BRT and local hub and spoke bus routes that would otherwise interact with the proposed North-South Road Park-and-Ride would need to be rerouted to other transfer facilities. This assumption lowers the efficiency of transit service to the Ewa Plain area.

Build Alternative

The preferred Build Alternative (also called the "Palehua Corridor alignment" and described in more detail in Chapter 2) assumes the construction of the North-South Road and the federalization of a segment of Kapolei Parkway between North-South Road and Renton Road.

North-South Road would ultimately be a six-lane, divided highway between the H-1 Freeway and Kapolei Parkway, consistent with the Kapolei Area Long Range Master Plan (July 1993) and the TOP 2025. In order to ensure that the key 0.7-mile section of the Kapolei Parkway between Renton Road and North-South Road is completed within the same time frame as the opening of North-South Road, this segment is proposed be "federalized." The proposed segment of Kapolei Parkway would ultimately be a six-lane arterial roadway, connecting the proposed North-South Road to existing, southerly portions of the Kapolei Parkway.

North-South Road would intersect Kapolei Parkway between the existing Varona and Tenney Villages in the Ewa Villages development. The roadway would proceed north to the proposed interchange at the H-1 Freeway following an existing easement reserved for a major north-south roadway. The Build Alternative also includes a new conventional diamond configuration interchange with the H-1 Freeway, as well as intersections with the existing Farrington Highway and proposed intersections with other future roadways that would be constructed between Farrington Highway and Kapolei Parkway. The preferred Build Alternative would provide regional access to the interstate system as well as local access and circulation. The proposed road would include three lanes in each direction, a median, and sidewalks.

The right-of-way (ROW) for the Kapolei Parkway is currently owned by the City & County of Honolulu and is roughly 9.8 acres. The ROW for North-South Road would either be obtained through a Governor's Executive Order (EO) or acquired from a private landowner. The southern 104.4-acre portion of the North-South Road right-of-way is owned by the State, but would be transferred by EO from the Department of Land and Natural Resources (DLNR) to HDOT. The northern 44.7-acre portion is currently owned by the Estate of James Campbell and would have to be acquired by the State.

At the interchange, more land would be acquired than would be required solely for the conventional diamond interchange. (The diamond interchange requires approximately 14 acres. An additional 11 acres would be acquired for the loop ramp expansion.) The additional acreage would be acquired to preserve the option of a westbound to southbound loop ramp in the future, when warranted by traffic volumes. While acquisition of the additional acreage is part of the preferred alternative assessed in this Draft EA, the possible construction of a loop ramp is not addressed in this document.

RELEVANT POLLUTANTS

Air quality impacts are quantified by the determination of air pollution levels. "Air Pollution" is a general term that refers to one or more chemical substances that degrade the quality of the atmosphere. Individual air pollutants degrade the atmosphere by reducing visibility, damaging property, reducing the productivity or vigor of crops or natural vegetation, or by reducing human or animal health.

Six air pollutants have been identified by the U.S. Environmental Protection Agency (EPA) as being of concern nationwide. These pollutants are: carbon monoxide, nitrogen oxides, ozone, particulate matter, sulfur oxides, and lead.

Carbon Monoxide

Carbon monoxide (CO) is a colorless and odorless gas which is generated in the urban environment primarily by the incomplete combustion of fossil fuels in motor vehicles. Relatively high concentrations of CO are typically found near crowded intersections and along heavily

used roadways carrying slow-moving traffic. CO chemically combines with the hemoglobin in the red blood cells to decrease the oxygen-carrying capacity of the blood. Prolonged exposure can cause headaches, drowsiness, or loss of equilibrium.

Nitrogen Oxides
Nitrogen oxides (NOx) constitute a class of compounds that include nitrogen dioxide (NO2) and nitric oxide, both of which are emitted by motor vehicles and stationary sources. Although NO2 and NO can irritate the eyes and nose and impair the respiratory system, NOx is of concern primarily because most of those compounds react in sunlight to form photochemical oxidants, including ozone. This reaction occurs comparatively slowly and ordinarily takes place far downwind from the site of actual pollutant emission.

Nitrogen oxides (NOx) constitute a class of compounds that includes nitrogen dioxide (NO_2) and nitric oxide (NO), both of which are emitted by motor vehicles. Although NO_2 and NO can irritate the eyes and nose and impair the respiratory system, NOx is also of concern primarily because of its role in the formation of ozone.

Ozone
Ozone (O_3), or photochemical oxidants, is a major cause of lung and eye irritation in an urban environment. It is formed through a series of reactions involving HC and NOx which take place in the atmosphere in the presence of sunlight. Relatively high concentrations of O_3 are normally found only in the summer.

Particulate Matter
Particulate pollution is composed of solid particles or liquid droplets that are small enough to remain suspended in the air. In general, particulate pollution can include dust, soot, and smoke; these can be irritating but usually are not poisonous.

Particulate pollution also can include bits of solid or liquid substances that can be highly toxic. Of particular concern are those particles that are smaller than, or equal to, 10 microns (PM_{10}) and 2.5 microns ($PM_{2.5}$) in size. Data collected through numerous nationwide studies indicates that most of the PM_{10} comes from:

- Fugitive dust
- Wind erosion
- Agricultural and forestry sources

A small portion of particulate matter is the product of fuel combustion processes. In the case of $PM_{2.5}$, the combustion of fossil fuels accounts for a significant portion of this pollutant. The main health effect of airborne particulate matter is on the respiratory system.

Sulfur Oxides
Sulfur oxides (SOx) constitute a class of compounds of which sulfur dioxide (SO_2) and sulfur trioxide (SO_3) are of great importance. The health effects of SOx include respiratory illness, damage to the respiratory tract, and bronchioconstriction. Relatively little SOx is emitted from motor vehicles.

Lead
Lead is a stable element which persists and accumulates both in the environment and in animals. Its principal effects in humans are on the blood-forming, nervous, and renal systems. Historically, motor vehicles constituted the major source of lead emissions to the atmosphere.

Lead levels in the urban environment from motor vehicles have significantly decreased due to the federally mandated switch to lead-free gasoline.

NATIONAL AND STATE AMBIENT AIR QUALITY STANDARDS

As required by the Clean Air Act, National Ambient Air Quality Standards ("NAAQS") have been established for six major air pollutants: carbon monoxide, nitrogen oxides, ozone, particulate matter smaller than 10 microns (PM_{10}), sulfur oxides, and lead. The State of Hawaii has also established its own standards for these pollutants. Both the National and State ambient air quality standards are summarized in Table 1. The "primary" standards have been established to protect the public health. The "secondary" standards are intended to protect the nation's welfare and account for air pollutant effects on soil, water, visibility, materials, vegetation, and other aspects of the general welfare. The State of Hawaii issues it's ambient air quality standards in terms of a single standard that is designed "to protect public health and welfare and to prevent the significant deterioration of air quality".

Table 1
National and State Ambient Air Quality Standards

Pollutant	Standards		
	Hawaii State Standard	Federal Primary Standard[a] (Health)	Federal Secondary Standard[b] (Welfare)
Carbon Monoxide			
1 Hour	10 mg/m³ (9 ppm)	40 mg/m³ (35 ppm)	40 mg/m³ (35 ppm)
8 Hour	5 mg/m³ (4.5 ppm)	10 mg/m³ (9 ppm)	10 mg/m³ (9 ppm)
Nitrogen Dioxide			
1 Hour	----	----	----
24 Hour	----	----	----
Annual (Arithmetic)	70 ug/m³	100 ug/m³	100 ug/m³
Particulate Matter			
24 Hour	150 ug/m³	----	----
Annual (Arithmetic)	60 ug/m³	----	----
PM-10[c]			
24 Hour	----	150 ug/m³	150 ug/m³
Annual (Arithmetic)	----	50 ug/m³	50 ug/m³
PM-2.5[d]			
24 Hour	----	65 ug/m³	65 ug/m³
Annual (Arithmetic)	----	15 ug/m³	15 ug/m³
Ozone			
1 Hour	----	235 ug/m³	235 ug/m³
8 Hour	157 ug/m³	157 ug/m³	157 ug/m³
Sulfur Dioxide			
3 Hour	1300 ug/m³	----	1300 ug/m³
24 Hour	365 ug/m³	365 ug/m³	----
Annual (Arithmetic)	80 ug/m³	80 ug/m³	----
Lead			
3 Months (Arithmetic)	1.5 ug/m³	1.5 ug/m³	1.5 ug/m³

[a] *Designated to prevent against adverse effects on public health*
[b] *Designated to prevent against adverse effects on public welfare, including effects on comfort, visibility, vegetation, animals, aesthetic values, and soiling and deterioration of materials.*
[c] *Particulate Matter which is 10 microns or less in diameter.*
[d] *Particulate Matter which is 2.5 microns or less in diameter.*
Source: State of Hawaii, Department of Health, Clean Air Branch

AIR QUALITY REGULATIONS AND PLANNING

Clean Air Act Amendments of 1990

The Clean Air Act Amendments of 1990 (CAAA) and the Final Conformity Rule (40 CFR Parts 51 and 93) direct the EPA to implement environmental policies and regulations that will ensure acceptable levels of air quality.

The Clean Air Act and the Final Conformity Rule affect proposed transportation projects such as the 26 Mile Road Project. According to Title I, Section 176 (c) 2.

> "No federal agency may approve, accept or fund any transportation plan, program or project unless such plan, program, or project has been found to conform to any applicable State Implementation Plan (SIP) in effect under this act."

The Final Conformity Rule defines conformity as follows:

> Conformity to an implementations plan's purpose of eliminating or reducing the severity and number of violations of the NAAQS and achieving expeditious attainment of such standards; and
>
> That such activities will not:
> i cause or contribute to any new violation of any NAAQS in any area;
> ii increase the frequency or severity of any existing violation of any NAAQS in any area; or
> iii. delay timely attainment of any NAAQS or any required interim emission reductions or other milestones in any area.

The determination of conformity is to be based on the most recent estimates of pollutant emissions, and such estimates are to be determined from the most recent population, employment, travel and congestion estimates as determined by the responsible metropolitan planning organizations or other agency authorized to make such estimates.

AMBIENT AIR QUALITY IN THE STUDY AREA

Local Meteorology

The climate of Hawaii is relatively moderate throughout most of the State, although some differences in certain meteorological parameters may occur from one region to another. Most of these differences are caused by the islands' mountainous topography.

The topography of Oahu consists of two nearly parallel mountain ranges (Waianae and Koolau) trending northwest to southeast and separated by Schofield Plateau. A large, relatively flat, gently sloping coastal plain borders the plateau on the south. The Ewa Plain lies within this coastal plain.

The Hawaiian Islands have some of the most temperate weather conditions in the world due to their geography and the presence of a large stable subtropical high pressure system that produces persistent cool northeast trade winds across the islands. The average frequency of the northeasterly trade winds vary from more than 90 percent during the summer to 50 percent in January. This accounts for the wetter climate on the windward (north and northeast) sides

of the islands in comparison to leeward areas (south and southwest). Winds from the south are infrequent, occurring only a few days during the year and mostly in winter in association with Kona storms.

Rainfall on Oahu is highly variable depending on elevation and location with respect to the trade winds. The Ewa area has a moderately dry climate. The Waianae Coast is the driest area on Oahu, where rainfall drops to about 20 inches a year.

At the Honolulu Airport temperatures have been recorded as high as the lower 90s and as low as the lower 50s.

During the past 30 years, over 130 storms have passed through or near one or more of the islands. Storms originating from the north Pacific usually occur between the months of October and April, and can cause severe wind and rain conditions, particularly on the north side of the islands. However, kona (Hawaiian word for leeward) storms, which normally form in the west and northwest Pacific Ocean, usually cause the more severe wind and rain conditions on the south side of the islands. Hurricanes are relatively rare to the islands. The last two hurricanes, Iwa in 1982 and Iniki in 1992, caused the most damage to Kauai. However, meteorologists warn that no island is safe from hurricanes.

Attainment Status of Study Area

Section 107 of the 1977 Clean Air Act Amendment requires the EPA to publish a list of all geographic areas in compliance with the NAAQS, as well as those not attaining the NAAQS. Areas not in compliance with the NAAQS are termed nonattainment areas. Areas which have insufficient data to make a determination are unclassified, and are treated as being attainment areas until proven otherwise. The designation of an area is made on a pollutant-by-pollutant basis.

The State of Hawaii is designated as an attainment area for CO, O_3, PM_{10} and $PM_{2.5}$.

Monitored Air Quality

Air pollutant levels in Hawaii are monitored by a network of sampling stations operated under the supervision of the State Department of Health (HDOH) at various locations around Oahu. The monitoring locations used for this study are listed in Table 2, with a summary of the pollutants that are monitored at each station. Although none of the air monitoring stations are located in the project area they are relevant to the project area and the pollutant data monitored at these stations are representative of the air quality conditions within the project study limits.

IMPACT ASSESSMENT

Pollutants for Analysis

Pollutants that can be traced principally, or in large measure, to motor vehicles are those that are of relevance to evaluating the impacts of the project. These include CO, HC, NO_x, O_3. Transportation sources account for a very small percentage of regional emissions of SO_x and particulate matter (PM_{10}), and detailed analyses for these contaminants are not warranted.

Motor vehicles have historically constituted a major source of lead emissions to the atmosphere. As already noted, lead levels have decreased significantly and will continue to do so, due to the mandated decrease and elimination of lead in gasoline. Therefore, a detailed analysis of the impact of lead emissions is also not warranted.

Table 2
Air Quality Summary for Study Area Monitoring Stations – 2002

Air Pollutant	Standard/ Exceedance	Honolulu	Kapolei**	Sand Island	West Beach (Ko'Olina Golf Course)
Carbon Monoxide (CO)	Percent Recovery*	98%	NM	NM	99.6%
	Max. 1-hour Concentration (mg/m^3)	3.99	2.05	NM	1.95
	Max. 8-hour Concentration (mg/m^3)	1.58	1.64	NM	0.4
	# Occurrences >Federal 1-hour Std. of > 40 mg/m^3	0	0	NM	0
	# Occurrences >Federal 8-hour Std. of > 10 mg/m^3	0	0	NM	0
	# Occurrences >Hawaii 8-hour Std. of > 5 mg/m^3	0	0	NM	0
Ozone (O_3)	Percent Recovery*	NM	NM	97%	NM
	Max. 1-hour Concentration ($\mu g/m^3$)	NM	NM	106	NM
	Max. 8-hour Concentration ($\mu g/m^3$)	NM	NM	89	NM
	# Occurrences >Federal 1-hour Std. of >235 $\mu g/m^3$	NM	NM	0	NM
	# Occurrences >Federal 8-hour Std. of >157 $\mu g/m^3$	NM		0	NM
Nitrogen Dioxide (NO_2)	Percent Recovery*	NM	70%	NM	98%
	Annual Arithmetic Mean ($\mu g/m^3$)	NM	9	NM	8
	% AAM Exceeded (Federal)	NM	0	NM	0
Sulfur Dioxide (SO_2)	Percent Recovery*	97%	85%	NM	85%
	Max. 3-hour Concentration ($\mu g/m^3$)	30	7	NM	11
	Max. 24-hour Concentration ($\mu g/m^3$)	9	2	NM	2
	Annual Arithmetic Mean (ppm)	3	0	NM	0
	# Occurrences >Federal 3-hour Std. of >1300 $\mu g/m^3$	0	0	NM	0
	# Occurrences >Federal 24-hour Std. of >365 $\mu g/m^3$	0	0	NM	0
Suspended Particulates (PM_{10})	Percent Recovery*	96%	99%	NM	92%
	Max. 24-hour Concentration ($\mu g/m^3$)	90	44	NM	37
	# Occurrences >Fed. 24-hour Std. of>150 $\mu g/m^3$	0	0	NM	0
	Annual Mean ($\mu g/m^3$)	15	13	NM	13
Suspended Particulates ($PM_{2.5}$)	Percent Recovery*	99%	49%	100%	NM
	Max. 24 hour Concentration ($\mu g/m^3$)	53	15	11	NM
	# Occurrences >Fed. 24-hour Std. of>65 $\mu g/m^3$	0	0	0	NM
	Annual Mean ($\mu g/m^3$)	4	4	5	NM
Lead	Maximum Monthly Concentration ($\mu g/m^3$)	NM	NM	NM	NM
	# Months Exceeding Federal Std.	NM	NM	NM	NM
Sulfates	Max. 24-hour Concentration ($\mu g/m^3$)	NM	NM	NM	NM

**Percent Recovery represents the amount of air quality data reported*
***The Kapolei station was shut down on 7/15/02 and began operation at a new site on 7/26/02. The results in this table are from the new site, starting 7/26/02*
NM Pollutant not monitored
Source: State of Hawaii, Department of Health, Clean Air Branch 2003, USEPA Airsdata

CO impacts are localized. Even under the worst meteorological conditions and most congested traffic conditions, high concentrations are limited to within a relatively short distance (300 to 600 feet) of heavily traveled roadways. Consequently, it is appropriate to predict concentrations of CO on a localized or "microscale" basis.

HC and NO_x emissions from automotive sources are of concern primarily because of their role as precursors in the formation of ozone. Ozone is formed through a series of reactions which take place in the atmosphere in the presence of sunlight. Since the reactions are slow and occur as the pollutants are diffusing downwind, elevated ozone levels are often found many miles from sources of the precursor pollutants. The effects of HC and NO_x emissions are therefore generally examined on a regional or "mesoscale" basis.

MESOSCALE ANALYSIS

Changes in "pollutant burdens" (i.e. the tons of pollutants emitted each day or year) provide an indication of the general change in air quality in the region. This analysis is useful in assessing relative changes in the concentrations of CO, HC and NO_x between the build and no build alternatives. These pollutant burdens are computed based on the estimated vehicle miles traveled (VMT), vehicle hours traveled (VHT), average travel speed and vehicle types for all major roadways in the study area.

MICROSCALE AIR QUALITY ANALYSIS

The analysis of mobile sources, which must be undertaken for a localized (microscale) area, applies mathematical models that simulate physical conditions to predict carbon monoxide (CO) concentrations at specific receptor locations. Mobile source dispersion models are the basic analytical tools used to estimate carbon monoxide concentrations expected under given conditions of traffic, roadway geometry and meteorology. The mathematical expressions and formulations that comprise the various models attempt to describe an extremely complex physical phenomenon. However, because all models contain simplifications and approximations of actual conditions, most of these dispersion models are conservative.

Methodology

Microscale air quality modeling was performed using the most recent version of the EPA mobile source emission factor model (MOBILE6.2) and the CAL3QHC version 2 air quality dispersion model to estimate existing, no build, and build CO levels in the project area.

Vehicular Emissions

Vehicular Emissions were estimated using the EPA Mobile6.2 vehicular emission factor model (User's Guide to MOBILE6.2, Mobile Source Emission Factor Model, Publication No. EPA-420-R-02-08, October 2002). MOBILE6.2 is a mobile source emission estimate program that provides current and future estimates of emissions from highway motor vehicles. The latest version of MOBILE incorporates updated information on basic emission rates, more realistic driving patterns, separation of start and running emissions, improved correction factors, and changing fleet composition. It also includes the effects of new regulations recently promulgated.

Total emissions are affected by the type of vehicles using the facility. The percentages of each type of vehicle used for this analysis were based on the EPA's recommended national average fleet mix.

Emissions are also greatly affected by speed, ambient temperature, vehicle age and mileage distribution. As CO concentrations are generally greater in winter conditions, ambient January

minimum/maximum temperatures of 65/79°F were used. National average vehicle age and mileage distribution data was also used. Emission estimates used for this analysis can be found in Appendix B.

Dispersion Model

Mobile source models are the basic analytical tools used to estimate CO concentrations expected under given traffic, roadway geometry, and meteorological conditions. The mathematical expressions and formulations that comprise the various models attempt to describe an extremely complex physical phenomenon as closely as possible. The dispersion modeling program used in this study for estimating pollutant concentrations near roadway intersections is the CAL3QHC dispersion model (Version 2.0) developed by the U.S. Environmental Protection Agency. Version 2, allows a more specific determination of the traffic characteristics occurring at a roadway intersection.

CAL3QHC is a Gaussian model recommended in the *EPA Guidelines for Modeling Carbon Monoxide From Roadway Intersections* (EPA-454/R-92-005). Gaussian models assume that the dispersion of pollutants downwind of a pollution source follow a normal distribution around the center of the pollution source.

Different emission rates occur when vehicles are stopped (idling), accelerating, decelerating and moving at different average speeds. CAL3QHC simplifies these different emission rates into the following tow components:

- Emissions when vehicles are stopped (idling) during the red phase of a signalized intersection.
- Emissions when vehicles are in motion during the green phase of a signalized intersection.

The CAL3QHC version 2 air quality dispersion model has undergone extensive testing by the EPA and has been found to provide reliable estimates of inert(non-reactive) pollutant concentrations resulting from emissions from motor vehicles. A complete description of the model can be found in the *User's Guide to CAL3QHC version 2.0. A Modeling Methodology for Predicting Pollutant Concentrations near Roadway Intersections*, EPA-454/R-92-006.

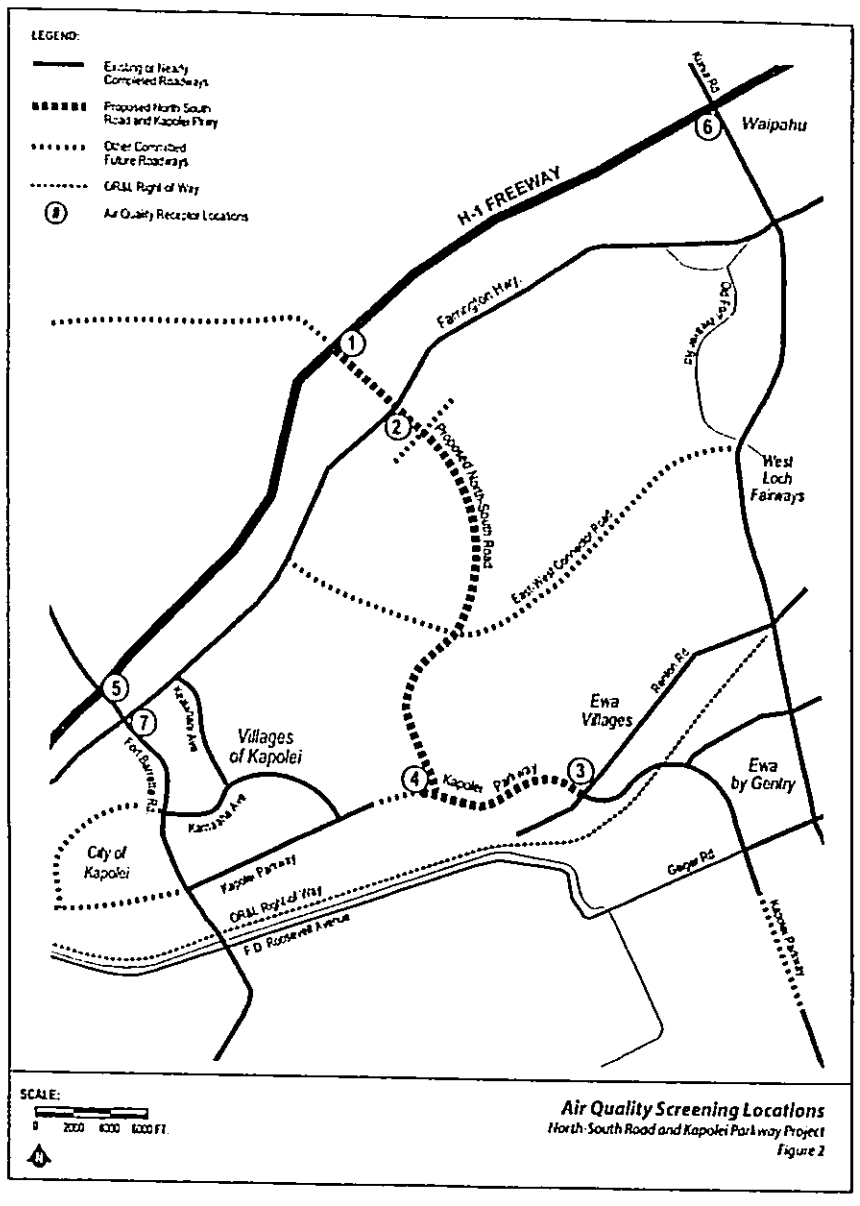
Appendix C contains all CAL3QHC version 2 data and output information.

Receptor Locations

CO levels resulting from motor vehicles using the proposed project and associated roadways were estimated at 7 locations using the CAL3QHC version 2 model (Figure 2). The analysis sites are:

1. North-South Road / H-1 Interchange
2. North-South Road / Farrington Highway
3. Kapolei Parkway / Renton Road
4. North-South Road / Kapolei Parkway
5. Makakilo / H-1 Interchange
6. Kunia / H-1 Interchange
7. Fort Barrette Road / Farrington Highway

Sites were selected on the basis of existing and estimated future traffic conditions and included the locations where the greatest project-related air quality impacts could occur. Receptors were placed in accordance with EPA's *Guidelines for Modeling Carbon Monoxide from Roadway Intersections*, EPA-454/R-92-005.



Air Quality Screening Locations
North-South Road and Kapolei Parkway Project
Figure 2

Meteorological Conditions

The transport and concentration of pollutants emitted from motor vehicles are influenced by three principal meteorological factors: wind direction, wind speed, and the temperature profile of the atmosphere. The values for these parameters were chosen to maximize pollutant concentrations at each prediction site (i.e., to establish a conservative worst case situation).

- **Wind Direction**. Maximum CO concentrations are normally found when the wind is assumed to blow approximately parallel to a single roadway adjacent to the receptor location. At complex intersections, however, it is difficult to predict which wind angle will result in maximum concentrations. At each receptor location, therefore, the approximate wind angle that would result in maximum pollutant concentrations was used in the analysis. All wind angles from 0° to 360° (in 5° increments) were considered.

- **Wind Speed**. CO concentrations are greatest at low wind speeds. Worst case conditions, as recommended by the EPA suggest the use of a wind speed of 2.2 miles per hour (1 meter per second). The lowest mean average monthly wind speed, as measured at the Honolulu Airport over the last 49 years is 9.4 miles per hour (4.2 meters per second). Given EPA general recommendation and actual monitored data, a conservation wind speed of 4.4 miles per hour (2 meters per second) was used to predict CO concentrations during the peak traffic period.

- **Profile of the Atmosphere**. A "mixing" height (the height in the atmosphere to which pollutants will rise) of 1000 meters, and "D" or neutral atmospheric stability conditions were used in estimating microscale CO concentrations. The selection of these meteorological parameters was based on recommendations from the Hawaii Department of Transportation and the EPA. This data was found to be the most representative of the conditions existing along the project area.

The CO levels estimated by the model will generally be the maximum concentrations which could be expected to occur at each air quality receptor site analyzed because they result from assuming the simultaneous occurrence of all worst case parameters (peak hour traffic conditions, conservative vehicular operating conditions, low wind speeds, low atmospheric temperature, neutral atmospheric conditions, and the maximizing wind direction).

Persistence Factor

Peak 8-hour concentrations of CO were obtained by multiplying the highest peak hour CO estimates by .7. This factor, recommended by USEPA, takes account of the fact that over eight hours (as distinct from a single hour) vehicle volumes will fluctuate downwards from the peak, vehicle speeds may vary, and meteorological conditions including wind speeds and wind direction will change to some degree as compared to the very conservative assumptions used for the single hour.

Analysis Years

Microscale carbon monoxide analyses have been performed for the existing year (2004) and the project's design year of 2025.

Background Concentrations

Microscale modeling is used to predict CO concentrations resulting from emissions from motor vehicles using roadways immediately adjacent to the location at which predictions are being made. A CO "background" level must be added to this value to account for CO entering the area from other sources upwind of the location at which predictions are being made.

A one-hour CO background level of 1.1 ppm and an eight-hour background level of 0.4 ppm were added to the mobile source results at each analysis site. These values are the second-highest one-hour and eight-hour readings from the West (Ewa) Beach monitoring station in the City and County of Honolulu, for the years 2001 - 2003.

Traffic Information

Traffic data for the air quality analysis was derived from traffic counts and other information developed as part of an overall traffic analysis for study. The microscale carbon monoxide analysis was performed based on data from this network for the AM peak traffic period. This is the period when maximum traffic volumes occur on local streets and when the greatest traffic and air quality impacts of the proposed project are expected.

Appendix D contains all traffic information used for the air quality analysis.

SUMMARY OF POTENTIAL IMPACTS

Mesoscale Impacts

Inasmuch as the change in regional VMT levels is predicted to be minor, no regional air quality analysis was conducted.

Microscale Impacts

Maximum 1-hour and 8-hour carbon monoxide levels were predicted at sensitive receptor sites within the proposed North-South Corridor's study area. The results of this analysis are given in Tables 3 and 4.

The levels predicted in this analysis are expected to be the highest microscale impacts due to the project within the study area. The sites analyzed are located near congested intersections that generally have elevated air quality levels due to emissions from vehicular queuing. No violations of the Federal or State one or eight hour CO standards are predicted.

As the project is predicted to not cause or exacerbate a violation of the applicable air quality standards, and is generally improving the predicted air quality levels in the study area, it conforms to the goals set forth in the New Clean Air Act.

CONFORMANCE WITH THE STATE IMPLEMENTATION PLAN (SIP) FOR AIR QUALITY

The State of Hawaii has been classified as an attainment area for O_3, PM_{10} and CO. As an attainment area, the State must demonstrate that the National Ambient Air Quality Standards will continue to be observed. The microscale analysis for the North-South Corridor demonstrates that no violations of the National Ambient Air Quality Standards are predicted. The goals set forth in the New Clean Air Act Amendments of 1990 are to insure that no violations of these standards are created or worsened. The project meets these goals and as such will not affect the State of Hawaii's current attainment status.

The North-South corridor project has been included in the State of Hawaii Fiscally Constrained Statewide Transportation Improvement Program (STIP) for Fiscal Years 2004 thru 2006, approved on December 9, 2003. The STIP is a multi-year, multi-modal transportation improvement program that has been developed using existing transportation plans and policies, and current highway, transit, and transportation programming processes as required under the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA).

Table 3
Predicted Worst-Case 1-Hour Carbon Monoxide Levels
(parts per million)

Site #	Description	Year 2020		
		Existing	No-Build	Build
1	North-South Road / H-1 Freeway Interchange	3.3	3.3	2.9
2	North-South Road / Farrington Highway	1.5	1.8	2.5
3	Kapolei Parkway / Renton Road	1.1	2.2	2.6
4	North-South Road / Kapolei Parkway	1.1	1.1	2.5
5	Makakilo Drive / H-1 Freeway Interchange	3.7	3.7	3.1
6	Kunia Road / H-1 Freeway Interchange	5.2	3.6	3.5
7	Fort Barrette Road / Farrington Highway	4.3	3.2	2.5

Note *State of Hawaii Standard 9 ppm*
Federal Standard 35 ppm,
Background level = 1.1 ppm

Table 4
Predicted Worst-Case 8-Hour Carbon Monoxide Levels
(parts per million)

Site #	Description	Year 2020		
		Existing	No-Build	Build
1	North-South Road / H-1 Freeway Interchange	1.9	1.9	1.7
2	North-South Road / Farrington Highway	0.7	0.9	1.4
3	Kapolei Parkway / Renton Road	0.4	1.2	1.5
4	North-South Road / Kapolei Parkway	0.4	0.4	1.2
5	Makakilo Drive / H-1 Freeway Interchange	1.8	1.7	1.3
6	Kunia Road / H-1 Freeway Interchange	3.3	2.2	2.1
7	Fort Barrette Road / Farrington Highway	2.6	1.9	1.4

Note *State of Hawaii Standard 4.5 ppm*
Federal Standard 9 ppm
Background Level = 0.4 ppm

MITIGATION MEASURES

Since there would be no adverse air quality impacts, mitigation would not be necessary. Measures to minimize construction emissions are suggested in the following section.

CONSTRUCTION IMPACTS ON AIR QUALITY

The air quality impacts of the proposed action would be limited to short-term increased fugitive dust and mobile source emissions during construction.

Fugitive Dust Emissions

Fugitive dust is airborne particulate matter, generally of a relatively large particulate size. Construction-related fugitive dust would be generated by haul trucks, concrete trucks, delivery trucks, and other earth moving vehicles operating around the construction sites. This would be due primarily to particulate matter resuspended ("kicked up") by vehicle movement over paved and unpaved roads and other surfaces, dirt tracked onto paved surfaces from unpaved areas at access points, and material blown from uncovered haul trucks.

Generally, the distance that particles drift from their source depends on their size, emission height, and wind speed. Small particles (30 to 100 micron range) can travel several hundred feet before settling to the ground, depending on wind speed. Most fugitive dust, however, is made up of relatively large particles (i.e., particles greater than 100 microns in diameter). These particles are responsible for the reduced visibility often associated with this type of construction. Given their relatively large size, these particles tend to settle within 20 to 30 feet of their source.

In order to minimize the amount of construction dust generated, the guidelines below should be followed. Since the project is in a PM_{10} non-attainment area, all the proposed particulate control measures related to construction activities should be followed. The following preventative and mitigative measures should be taken to minimize the possible particulate pollution problem:

I. Site Preparation

- A. Minimize land disturbance;
- B. Use watering trucks to minimize dust;
- C. Cover trucks when hauling dirt;
- D. Stabilize the surface of dirt piles if not removed immediately;
- E. Use windbreaks to prevent any accidental dust pollution;
- F. Limit vehicular paths and stabilize these temporary roads; and
- G. Pave all unpaved construction roads and parking areas to road grade for a length no less than 50 feet where such roads and parking areas exit the construction site to prevent dirt from washing onto paved roadways.

II. Construction

- A. Cover trucks when transferring materials;
- B. Use dust suppressants on traveled paths which are not paved;
- C. Minimize unnecessary vehicular and machinery activities; and

- D. Minimize dirt track-out by washing or cleaning trucks before leaving the construction site (alternative to this strategy is to pave a few hundred feet of the exit road, just before entering the public road).

III. Post Construction

- A. Revegetate any disturbed land not used,
- B. Remove unused material,
- C. Remove dirt piles; and
- D. Revegetate all vehicular paths created during construction to avoid future off-road vehicular activities.

Mobile Source Emissions

As discussed previously, carbon monoxide (CO) is the principal pollutant of concern when considering localized air quality impacts of motor vehicles. Since emissions of CO from motor vehicles increase with decreasing vehicle speed, disruption of traffic during construction could result in short-term elevated concentrations of CO, the temporary reduction of roadway capacity, and the increased queue lengths. In order to minimize the amount of emissions generated, every effort should be made during the construction phase to limit disruption to traffic, especially during peak travel periods.

REFERENCES

1. User's Guide to CAL3QHC Version 2.0: A Modeling Methodology for Predicting Pollutant Concentrations near Roadway Intersections; EPA-454-R-92, United States Environmental Protection Agency, Office of Air Quality, Planning and Standards, Research Triangle Park, NC; November 1992.

2. User's Guide to MOBILE 6.2 EPA420-R-03-001, United States Environmental Protection Agency, Assessment and Standards Division, Office of Transportation and Air Quality; October, 2002.

3. United States Environmental Protection Agency, Airsdata, www.epa.gov/air/data.

3. Guideline for Modeling Carbon Monoxide from Roadway Intersections: EPA-454/R-92-005, United States Environmental Protection Agency, Office of Air Quality, Planning and Standards, Research Triangle Park, NC; November 1992.

4. U.S. Congress, Clean Air Act Amendments of 1990 (P.L. 101-549)

5. State and National Ambient Air Quality Standards and Monitoring Data; State of Hawaii, Department of Health, Environmental Management Division, Clean Air Branch; June, 2004

6. Local Climatological Data for Honolulu, Hawaii - 1998: U.S. Department of Commerce, National Oceanic and Atmospheric Administration.

APPENDIX A
Ambient Air Quality
Monitoring Data

Appendix B

Mobile6.2 Emissions

A copy of the full report, including this Appendix, can be viewed at the State Department of Transportation, Highway Planning Branch or the City and County of Honolulu, Department of Transportation Services

Appendix C

CAL3QHCV2 Data and Outputs

A copy of the full report, including this Appendix, can be viewed at the State Department of Transportation, Highway Planning Branch or the City and County of Honolulu, Department of Transportation Services

Appendix D

Traffic

A copy of the full report, including this Appendix, can be viewed at the State Department of Transportation, Highway Planning Branch or the City and County of Honolulu, Department of Transportation Services

A copy of the full report, including this Appendix, can be viewed at the State Department of Transportation, Highway Planning Branch or the City and County of Honolulu, Department of Transportation Services

APPENDIX F

NOISE TECHNICAL REPORT

NORTH-SOUTH ROAD AND KAPOLEI PARKWAY PROJECT

Noise Technical Report

Prepared by:

PARSONS BRINCKERHOFF QUADE & DOUGLAS, INC.

July 2004

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1. INTRODUCTION

The purpose of this report is to analyze the traffic noise impacts of the proposed North-South Road and Kapolei Parkway project in Ewa, Oahu, Hawaii. This study was prepared in accordance with Federal Highway Administration (FHWA) rules and procedures and the State of Hawaii Department of Transportation (HDOT) Noise Analysis and Abatement Policy. Its elements include:

1. Measurements of existing noise levels at representative noise sensitive receivers;
2. Prediction of future traffic noise levels;
3. Comparison of existing and predicted future traffic noise levels with the FHWA Noise Abatement Criteria (NAC);
4. Preparation of noise contours to provide guidance for future developments;
5. Recommendations to reduce noise impacts,
6. Evaluation of possible noise barriers; and
7. The effects of construction noise and proposed mitigation measures

2. PROJECT DESCRIPTION

The HDOT and the FHWA propose to construct North-South Road in Ewa, Oahu, Hawaii (see Figure 1) The proposed roadway would be a principal arterial highway, that would connect Interstate Route H-1 (H-1 Freeway) to the proposed Kapolei Parkway, and is approximately 2.2 miles in length. The North-South Road project also includes the construction of: (1) a major interchange at its junction with the H-1 Freeway; (2) the North-South Road/Kapolei Parkway intersection; and (3) various drainage features, such as a drainage channel and detention basin associated with the proposed highway, as well as two bridges over Kalo Gulch The roadway section of concern for the Kapolei Parkway is approximately 0.7 miles in length and is a proposed federal-aid, arterial roadway which would connect the proposed North-South Road to other existing, southerly portions of the Kapolei Parkway North-South Road would be a State facility; Kapolei Parkway is proposed as a City facility, to be constructed by the City's Department of Design and Construction (DDC).

The following alternatives are under consideration.

1. No-Build Alternative – The future No-Build Alternative assumes the roadway improvements in the TOP 2025, except the North-South Road Interchange and North-South Road, describing a future roadway network that includes some improvements for the Ewa Plain. No-Build Alternative assumes that Kapolei Parkway is complete from Ewa Beach through the City of Kapolei by year 2025, including the segment between Renton Road and North-South Road However, that segment of Kapolei Parkway would not be in place within the late 2007 to early 2008 time frame, to match initial implementation of the proposed North-South Road The inclusion of this segment of the Kapolei Parkway is consistent

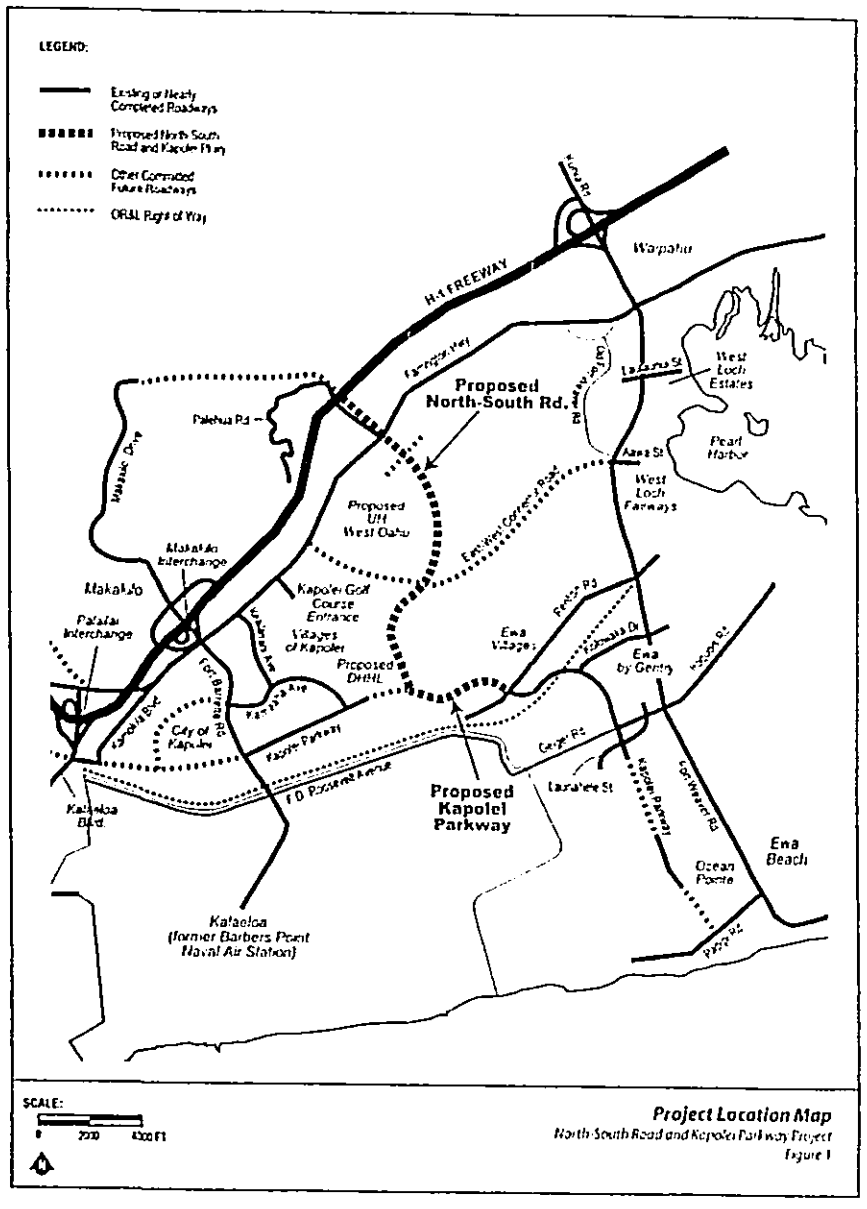
with City plans for the future completion of Kapolei Parkway, but reflects current City budgetary constraints which make the timing of this project completion uncertain. Because the City owns the property on which Kapolei Parkway is proposed, the roughly 10-acre ROW for the Kapolei Parkway is being established by subdividing the parcel and changing its designation.

The No-Build Alternative assumes a 794-bus fleet by 2025. This fleet includes the Regional Bus Rapid Transit (BRT) system proposed as part of the Primary Corridor Transportation Project, which is part of the TOP 2025. However, because North-South Road and its interchange with H-1 Freeway does not exist in the No-Build Alternative, the proposed North-South Road Park-and-Ride is also assumed not to exist. In turn, the Regional BRT and local hub and spoke bus routes that would otherwise interact with the proposed North-South Road Park-and-Ride would need to be rerouted to other transfer facilities. This assumption lowers the efficiency of transit service to the Ewa Plain area.

2. Build Alternative - The preferred Build Alternative (also called the "Palehua Corridor alignment") assumes the construction of the North-South Road and the federalization of a segment of Kapolei Parkway between North-South Road and Renton Road. North-South Road would ultimately be a six-lane, divided highway between the H-1 Freeway and Kapolei Parkway, consistent with the Kapolei Area Long-Range Master Plan (July 1993) and the TOP 2025. In order to ensure that the key 0.7-mile section of the Kapolei Parkway between Renton Road and North-South Road is completed within the same time frame as the opening of North South Road, this segment is proposed be "federalized." The proposed segment of Kapolei Parkway would ultimately be a six-lane arterial roadway, connecting the proposed North-South Road to existing, southerly portions of the Kapolei Parkway.

North-South Road would intersect Kapolei Parkway between the existing Varona and Tenney Villages in the Ewa Villages development. The roadway would proceed north to the proposed interchange at the H-1 Freeway following an existing easement reserved for a major north-south roadway. The Build Alternative also includes a new conventional diamond configuration interchange with the H-1 Freeway, as well as intersections with the existing Farrington Highway and proposed intersections with other future roadways that would be constructed between Farrington Highway and Kapolei Parkway. The preferred Build Alternative would provide regional access to the interstate system as well as local access and circulation. The proposed road would include three lanes in each direction, a median, and sidewalks.

The right-of-way (ROW) for the Kapolei Parkway is currently owned by the City & County of Honolulu and is roughly 9.8 acres. The ROW for North-South Road would either be obtained through a Governor's Executive Order (EO) or acquired from a private landowner. The southern 104.4-acre portion of the North-South Road right-of-way is owned by the State, but would be transferred by EO from the Department of Land and Natural Resources (DLNR) to HDOT. The northern 44.7-acre portion is currently owned by the Estate of James Campbell and would have to be acquired by the State.



Project Location Map
North-South Road and Kapolei Parkway Project
Figure 1

At the interchange, more land would be acquired than would be required solely for the conventional diamond interchange. (The diamond interchange requires approximately 14 acres. An additional 11 acres would be acquired for the loop ramp expansion.) The additional acreage would be acquired to preserve the option of a westbound to southbound loop ramp in the future, when warranted by traffic volumes. While acquisition of the additional acreage is part of the preferred alternative assessed in this Draft EA, the possible construction of a loop ramp is not addressed in this document.

3. EXISTING CONDITIONS

3.1 Background

Noise is defined as any sound that is undesirable or interferes with normal human activities. The decibel (dB) scale is used to quantify sound intensity and represents the ratio between a given sound and the faintest sound detectable by human hearing. Because sound pressure levels vary widely within the range of human hearing, the dB scale is logarithmic. The human ear is not equally sensitive to all frequencies within the entire sound spectrum. Accordingly, noise measurements are made using an A-weighting (dBA) scale to correspond to human perceptions of noise. A-scale sound levels are currently in use in many community and city noise ordinances and in state and city highway or traffic noise codes.

Time variation in noise exposure is typically accounted for as a constant energy level equivalent (L_{eq}) for a given time period. The L_{eq} is the constant noise level over some specified period of time that is equivalent in energy to a fluctuating (or brief) noise "averaged" over that period of time. L_{eq} is also a function of time and is expressed as L_{eq} (time period). For example, $L_{eq}(h)$, expressed in A-weighted decibels (dBA), is the calculated constant noise over one hour which is equivalent in total energy to the varying noise levels actually measured during that one hour.

3.2 Noise Standards

The HDOT Noise Analysis and Abatement Policy implements FHWA regulations on noise abatement (23 CFR 772) for the State of Hawaii. The regulations and policy require that a noise analysis be performed whenever potentially affected receivers exist, either as developed lands or lands that are planned, designed or programmed for future use.

The FHWA has established Noise Abatement Criteria (NAC), shown on Table 1, for different exterior and interior land use activities. The NAC do not constitute legally enforceable noise standards, but represent a yardstick for evaluating the effect of project noise on the surrounding community. The NAC have been adopted by the State of Hawaii as its standard.

Under HDOT policy, a noise impact occurs when the predicted traffic noise levels approach or exceed the NAC, or when the predicted traffic noise levels substantially

exceed the existing noise levels. "Approach" means at least 1 dBA less than the NAC, and "substantially exceed the existing noise levels" means an increase of at least 15 dBA. If the NAC are approached or exceeded, or if there is a substantial increase above the existing noise level, noise abatement measures must be considered.

Changes in traffic noise are assessed using human perceptions of sound level changes. Generally, changes in noise levels of less than 3 dBA are barely perceptible to most listeners, but a 10 dBA change is perceived as a doubling (or halving) of noise levels. These guidelines permit estimation of an individual's probable perception of changes in noise levels.

Table 1
Noise Abatement Criteria (NAC)

Activity Category	L_{eq}(h) for Noisiest Traffic Hour - dBA	Description of Activity
A	57 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose
B	67 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals
C	72 (Exterior)	Developed lands, properties, or activities not included in Categories A or B
D	----	Undeveloped lands
E	52 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums

Notes: L_{eq}(h) is the one-hour energy equivalent sound level

Interior noise level standards apply to:
1. Indoor activities for those parcels where no exterior noise sensitive land use or activities have been identified, and
2. Situations where the exterior activities are either remote from the highway or shielded, so that while the exterior activities remain undisturbed, noise nevertheless affects interior activities

Source: Federal Highway Administration

3.3 Noise Sensitive Receivers and Existing Noise Levels

Existing and future noise sensitive land uses, and activities adjacent to the proposed corridor and nearby major roadways, were identified from site inspections and existing mapping. These land use activities include residences, recreation and park areas, and institutions such as schools and churches. All of these activities have a NAC of $L_{eq}(h)$ 67 dBA and are considered Category B.

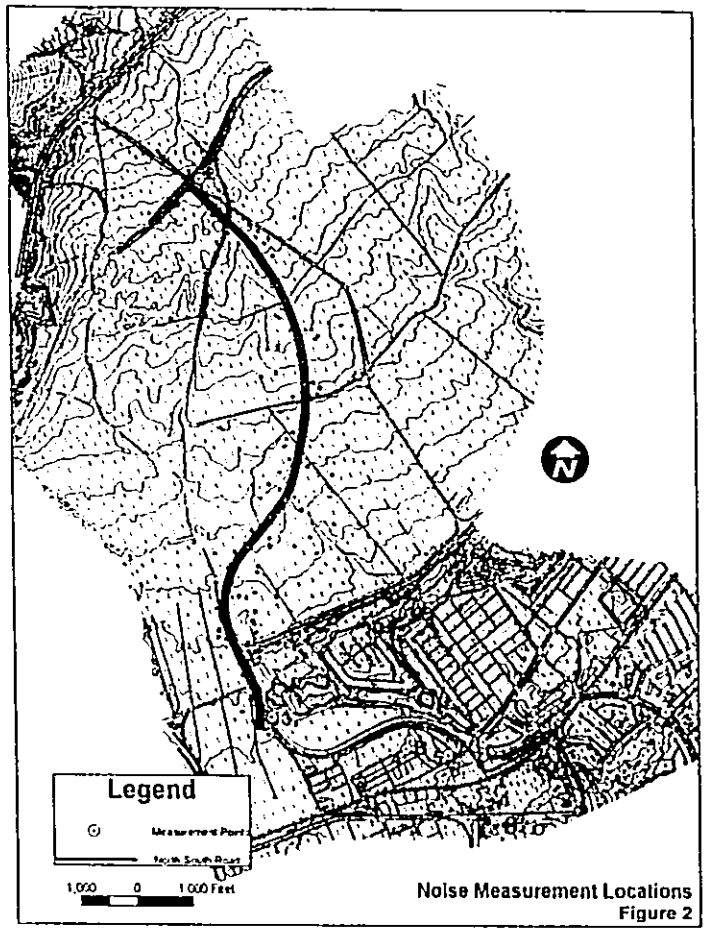
Existing noise levels in the project corridor were measured in March and April, 2004, from 9:12:00 a.m. to 3:5:00 p.m. Noise measurements were sampled for 15-minute periods at seven (7) sites considered representative of existing and future noise sensitive land uses (see Table 2). One hour noise measurements were taken at sites A and B over a 24-hour period. Sites A and B were used to identify the peak noise hour and adjust the 15-minute samples to the peak noise level (Table 2). The 15-minute sample is adjusted to peak hour by comparing the measured 15-minute noise level to that at the closest 24-hour measurement site during the same hour. The difference between the peak hour measured at the 24-hour site and the 15-minute measurement is used to determine the peak hour noise level. The locations of these sites are shown in Figure 2.

The existing peak hour noise levels at two of the nine receptor sites were above 66 dBA (Table 2), and therefore do exceed the Category B NAC. The noise levels at sites 1 and 2 are due to their close proximity to the H-1 Freeway and Palehua Road, which is heavily utilized by heavy trucks for hauling to and from the Grace Pacific Quarry, located north of the H-1 freeway.

Table 2
North South Road/Kapolei Parkway
2004 Noise Monitoring Schedule

Site No.	LOCATION	Date and Time	Measured Noise Level (Leq)	Adjusted Peak Hour Noise Level (Leq)*
15 minute monitoring				
1	Near H-1 and Palehua Rd. Future Commercial Property.	3/19 (1:35pm)	68	72
2	Approximately 100 ft. from Farrington Hwy and Palehua Rd intersection. Taken on Farrington Hwy. Current Agriculture Property, Future Residential Area	3/19 (2:19pm)	70	72
3	Near Future Intersection of North-South Road and Kapolei Pkwy. Near Golf Course	3/19 (12:30pm)	44	54
4	Varona Village, in Front of Corner Residenc facing Kapolei Pkwy on Kalii St.	3/24 (11:39am)	55	63
5	Varona Village Residence on Renton Rd., near Renton Rd and Kapolei Pkwy intersection	3/24 (11:03am)	56	62
6	In front of Town Homes on Kapolei Pkwy between OR&L and Kolowaka Dr.	3/18 (11:18am)	50	58
7	In front of Town Homes and Golf Course on Kapolei Pkwy, near the Kolowaka Drive intersection	3/18 (12:15pm)	61	64
24 hour monitoring				
A	Near H-1 and Palehua Rd. Current Agriculture Property, Future Residential Area	3/17 (6:00 am)	NA	62
B	Varona Village. Vacant lot marked by corner of Kalii St. and Lei Aloalo Pl.	4/27 (4:00 pm)	NA	64

Source: Parsons Brinckerhoff, March 2004
* Peak hour Noise Level is based on comparing the 15 minute measured noise with the closest 24 hour monitoring location



Noise Measurement Locations
Figure 2

4. FUTURE TRAFFIC NOISE IMPACTS

The noise impact analysis of the proposed project considers traffic noise levels along North-South Road and Kapolei Parkway under all the alternatives

4.1 Prediction Methodology

4.1.1 Traffic Noise Projections for Proposed Roads

The noise impacts of the No-Build and Build alternatives were modeled at nine (9) noise sensitive sites along the North-South Road and Kapolei Parkway alignments using the FHWA Traffic Noise Model (TNM) version 2.5 (FHWA, 2004). Impacts were calculated for the Year 2025

Input variables to noise modeling and analysis include traffic volumes, speeds and vehicle fleet mix (auto, medium truck, and heavy truck percentages). The noise analysis considers the noisiest hour of the day. This occurs when the traffic volume is at the capacity of the roadway, and vehicles operate at the allowable speed limit (level of service C). Table 3 summarizes the level of service (LOS) C traffic volumes. The traffic modeling assumptions, based on lane capacity operating at LOS C, are as follows

Table 3
LOS C Traffic Volumes

Roadway	LOS C Volume (pcph)		Posted Speed Limit (MPH)
	Mauka/KKHD	Makai/Waianae	
H-1 Freeway	6,250	5,114	60
Farrington Highway	2,046	1,674	35
Kapolei Parkway	1,931	1,580	35
North-South Road	3,069	2,511	45

- Vehicle mix for the new roadways, Kapolei Parkway and North-South Road, is projected to be 98.5 percent autos, one percent medium trucks and one-half percent heavy trucks
- Vehicle mix for H-1 freeway and Farrington Highway is based on traffic counts taken during the noise measurements. H-1 freeway vehicle mix is 93 percent autos, 1 percent medium trucks and 6 percent heavy trucks. Farrington Highway vehicle mix is 86 percent autos, 2 percent medium trucks and 12 percent heavy trucks

4.2 Noise Impact Analysis

In terms of the one-hour $L_{eq}(h)$ noise descriptor, a noise impact could potentially require mitigation if either of the following conditions is predicted to occur:

- Future year traffic noise approaches or exceeds the FHWA NAC; or
- Future year traffic noise substantially exceeds (15 dBA or more) the existing ambient noise level

Table 4 summarizes the results of noise modeling of receivers along North-South Road and Kapolei Parkway.

Table 4
Predicted Year 2025 Noise Levels

Site	Location	Existing Peak Hour	LOS C Future Noise Levels (L_{eq} (dBA))	
			No-Build	Build
A	Near H-1 and Palehua Rd Current Agriculture Property, Future Residential Area	69	69*	69
1	Near H-1 and Palehua Rd Future Commercial Property	72	72*	72
2	Approximately 100 ft from Farrington Hwy and Palehua Rd intersection Taken on Farrington Hwy Current Agriculture Property, Future Residential Area	72	72*	73
3	Near Future Intersection of North-South Road and Kapolei Pkwy Near Gulf Course	53	53*	65
B	Varona Village Vacant lot marked by corner of Kahi St and Lei Aloalo Pl	64	64*	65
4	Varona Village, in Front of Corner Residence facing Kapolei Pkwy on Kahi St	63	63*	64
5	Varona Village Residence on Renton Rd , near Renton Rd and Kapolei Pkwy intersection	63	63*	64
6	In front of Town Homes on Kapolei Pkwy between OR&L and Kolowaka Dr	58	68	68
7	In front of Town Homes and Golf Course on Kapolei Pkwy, near the Kolowaka Drive intersection	64	68	68

Note: * The predicted future no build traffic noise levels at Sites A, 1, 2, 3, B, 4 and 5 result in noise levels that are the same as the existing adjusted peak hour level

Source: Parsons Brinckerhoff, 2004

4.2.1 No-Build Alternative

Under the No-Build alternative, predicted 2025 traffic noise levels at the receptor sites are expected to be in the range of no change to a 10 dBA increase over the existing peak hour noise levels. The NAC of $L_{eq}(h)$ 67 dBA is predicted to be approached or exceeded at 5 of the 9 receptor sites

4.2.2 Build Alternative

Under the Build alternative, predicted 2025 traffic noise levels at the receptor sites are expected to be in the range of no change to a 12 dBA increase over the existing peak hour noise levels. The NAC of $L_{eq}(h)$ 67 dBA is predicted to be approached or exceeded at 5 of the 9 receptor sites.

4.3 Noise Contour Analysis

Sixty-six dBA noise contours, modeled for Build alternatives (Figures 3, 4 and 5), were prepared as a guide for future residential development along the North South Road and Kapolei Parkway alignments. Based on the NAC, the contours identify the distance from the roadway centerline where future residential development would be acceptable without noise abatement. The "substantially exceed the existing noise levels" criterion is not applicable because it depends on existing noise level measurements which can change in future years due to other sources of noise. The 66 dBA noise contour is a useful planning tool for future development without requiring a detailed noise study.

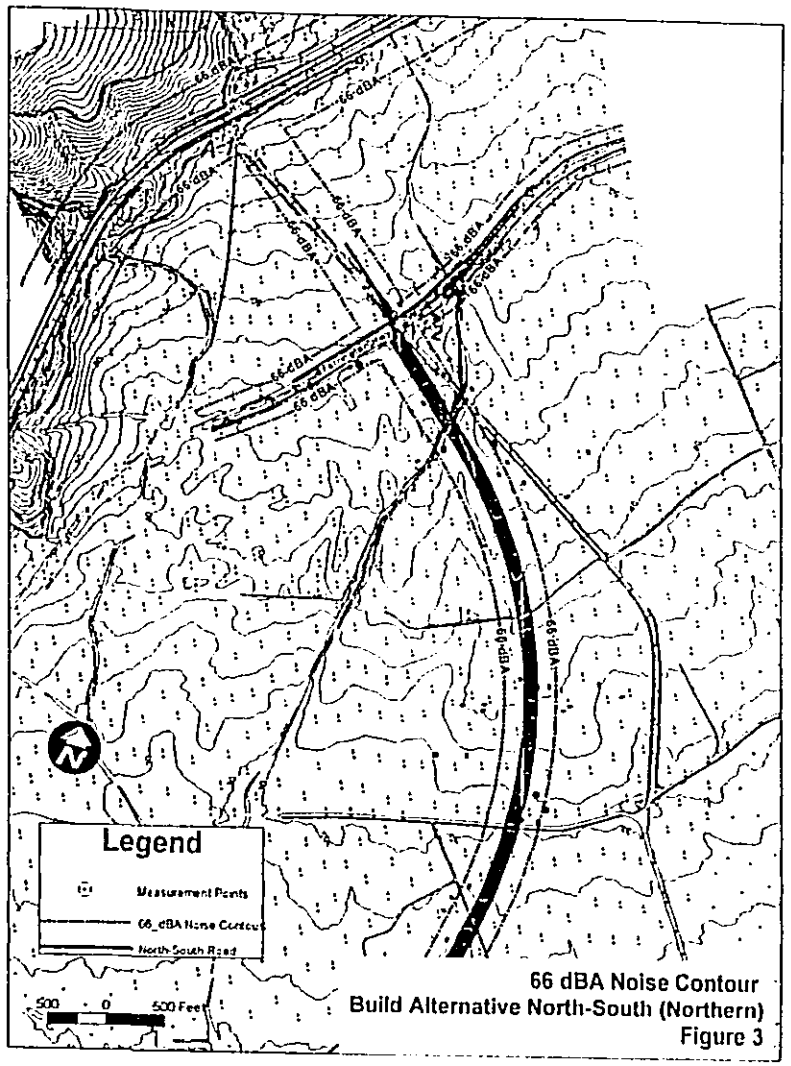
The minimum setbacks, where residential development could potentially be located without noise abatement, are listed in Table 5 as a range of distances from the roadway centerline. The variation in distances is due to changes in topography. Noise abatement measures may be required if noise sensitive activities are placed within these setback distances.

Table 5
Recommended Minimum Highway Setbacks
for Residential Developments

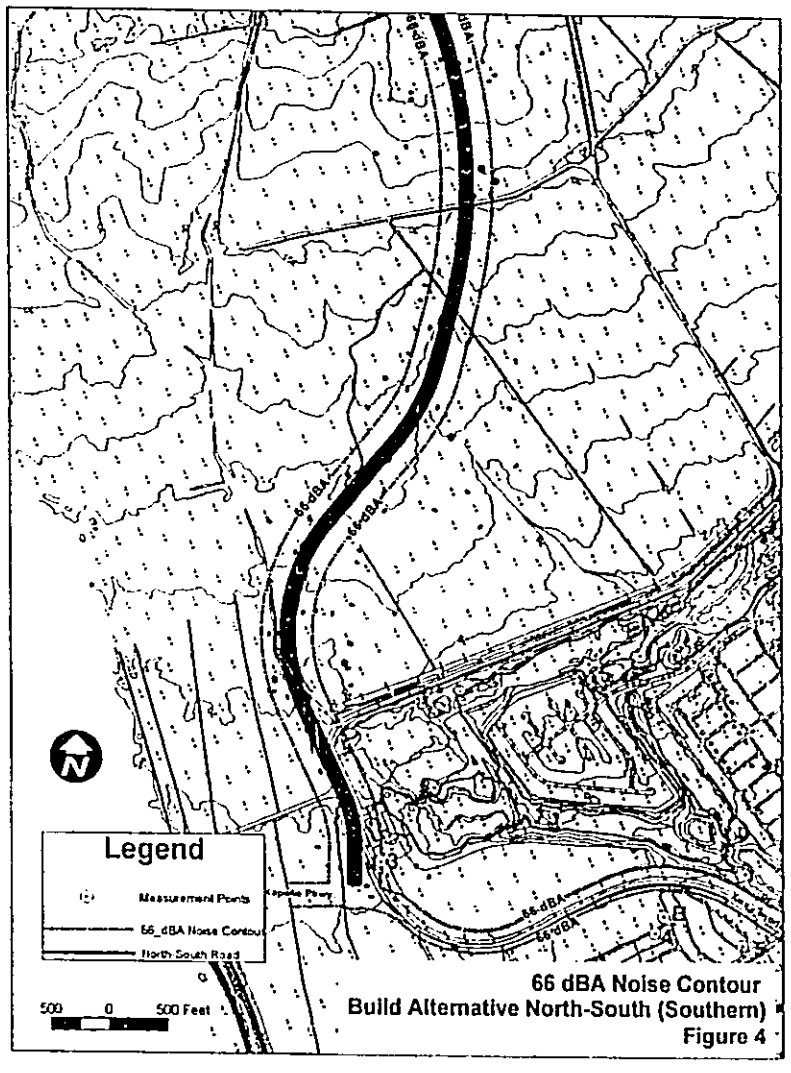
	H-1 Freeway	Farrington Highway	Kapolei Parkway	North-South Road
Build Alternative	345 feet	145 to 155 feet	95 to 100 feet	200 to 220 feet

Source: Parsons Brinckerhoff, 2004

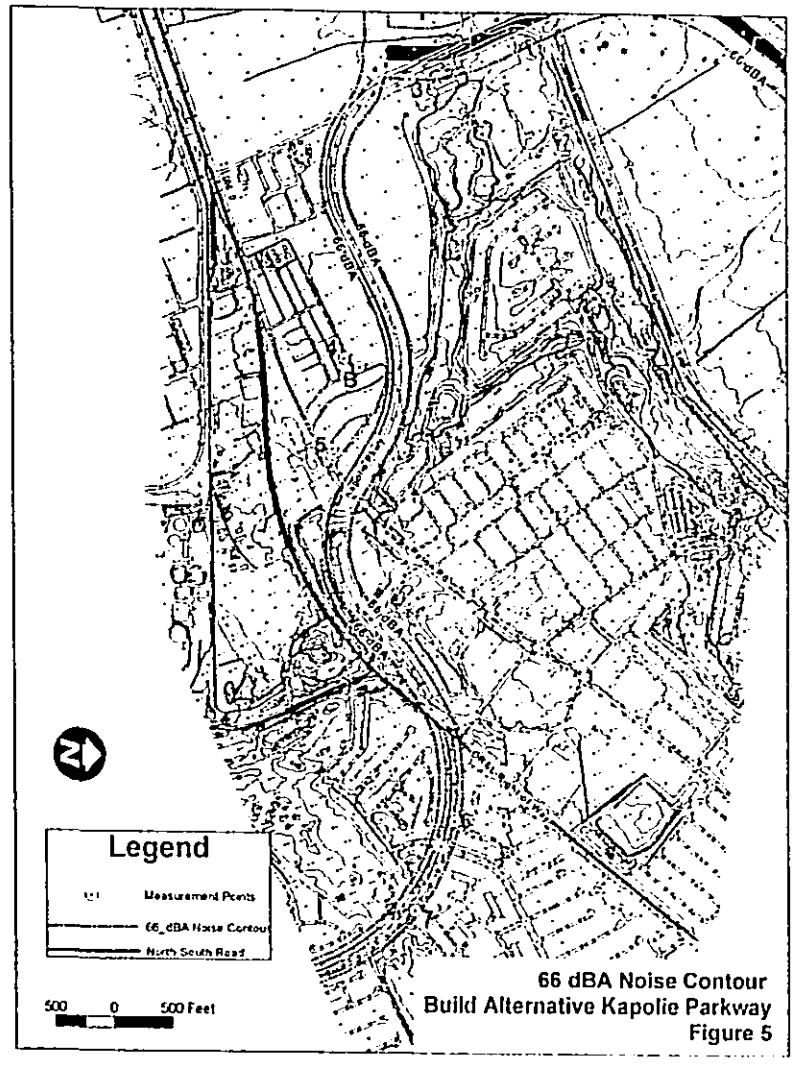
Any existing uses or future development beyond these distances would not require noise abatement. However, if a future residential project is built within these setback distances, it would be the responsibility of the developer to meet applicable standards. At this time, there are no existing developments in the setback distances that require noise abatement as part of the North-South Road and Kapolei Parkway project.



66 dBA Noise Contour
Build Alternative North-South (Northern)
Figure 3



66 dBA Noise Contour
Build Alternative North-South (Southern)
Figure 4



66 dBA Noise Contour
Build Alternative Kapolie Parkway
Figure 5

5. CONSTRUCTION NOISE IMPACTS

Construction noise represents a short term impact on the noise environment. The duration and level of construction noise depend on the phase of activity, such as:

- ground clearing, demolition and removal of existing structures, trees, rocks and soil;
- excavation;
- placement of foundations and roadbeds;
- erection of structures including retaining walls; and
- finishing, including filling, grading, paving, landscaping and cleanup operations.

The first two phases, ground clearing and excavation, typically generate the highest noise levels. Noise generated by construction equipment, including trucks, graders, bulldozers, concrete mixers and portable generators can reach levels from 67 dBA to 98 dBA at 15 m (50 feet). Construction equipment noise emissions are regulated by the Environmental Protection Agency's Noise Control Program (Part 204 of Title 40, Code of Federal Regulations). Presently, air compressors are the only equipment under regulation, and no new regulations are currently under consideration.

Noise levels for equipment which might be used during the excavation and construction of the proposed project are presented in Table 6. The noise levels presented are at a reference distance of 15 m (50 feet). Since construction equipment noise levels decrease at a rate of approximately 6 dBA per doubling of distance, at 30 m (100 feet) the noise levels would be about 6 dBA less than the levels shown at 15 m (50 feet). Similarly, at 60 m (200 feet) the noise levels would be 12 dBA less than shown. Intervening structures or topography can act as a noise barrier to further reduce noise levels.

Table 6
Construction Equipment Noise Levels

Source	L_{max} at 15 m (50 feet)	Model Tested
Backhoe	85 dBA	John Deere 609A
Front Loader	84 dBA	Caterpillar 980
Dozer	84 dBA	Caterpillar D7e
Grader	91 dBA	Caterpillar 16
Scraper	92 dBA	Caterpillar 660
Compressor	80-89 dBA	Various Tested
Pile Driver	95-100 dBA	Various Tested

Source: Federal Highway Administration, Highway Construction Noise: Measurement, Prediction and Mitigation, 1976

The State Department of Health (SDOH) maintains community noise control standards that apply to construction noise. The project would not exceed the stipulated noise limits unless a variance is granted by SDOH. Two measures which would minimize adverse construction noise impacts are:

- limit activities to between 7:00 a.m. and 6:00 p.m. on weekdays and between 9:00 a.m. and 6:00 p.m. on Saturdays
- require construction equipment to have mufflers in good working order.

6. Noise Abatement MEASURES

6.1 Future Traffic Noise

Noise abatement measures must be considered as part of the project if traffic noise impacts are identified. Impacts occur at sites where traffic noise levels approach or exceed the NAC of $L_{eq}(h)$ 67 dBA or substantially exceed (15 dBA or more) the existing ambient noise levels. HDOT's Noise Analysis and Abatement Policy is used to determine whether noise abatement measures can be implemented, depending on whether these measures are reasonable and feasible based on the following criteria:

- Provide a minimum noise reduction of 5 dBA
- Cost of noise abatement does not exceed $35,000 per residence benefited.
- Number of residences protected will include all dwelling units - owner occupied houses, rental units, mobile homes, etc. All units benefited by a 5 dBA or more noise reduction will be counted regardless of whether or not they were identified as impacted.
- Views from impacted residences are a major consideration in the reasonableness of noise abatement measures
- Residential areas where future traffic noise levels are greater than 70 dBA or 20 dBA higher than existing noise levels will be given greater consideration.
- Residential areas along highways at a new location and residential areas constructed before an existing highway will be given greater consideration.

Noise abatement would only be considered at existing residential or planned development sites where building permit approvals have been obtained. The abatement would only apply to outdoor ground level areas.

For the Build alternative, noise impacts are not predicted, at any of the receivers analyzed. Therefore noise abatement is not required for this project. The predicted future traffic noise levels at these sites are above the NAC of $L_{eq}(h)$ 67 dBA. However, this level represents the measured existing or modeled no build noise levels at these locations. The traffic noise contribution from the proposed project does not increase the existing or no build noise levels. As a result, abatement is not required at this

location. Additionally, Site B does not require abatement because the noise levels remain below 67 dBA and the increase is below 15 dBA.

In conclusion, no noise abatement measures are necessary as part of this project.

6.2 Construction Phase

Noise control measures during construction would be required to minimize impacts on existing noise sensitive land uses. The measures recommended in this section should be re-evaluated in greater detail during preliminary design because impacts to residences cannot be accurately determined without detailed construction plans and schedules. General abatement measures presented below are recommended as guidelines in developing construction plans that consider the adverse impacts of construction noise.

1. Design Considerations - During the early stages of construction plan development, natural and artificial barriers, such as ground elevation changes and existing buildings, can be considered shields against construction noise. Strategic placement of stationary equipment, such as compressors and generators, could reduce impacts at the sensitive receivers

2. Construction of Noise Barriers During Initial Stages - Noise barriers planned to ultimately be constructed along the right-of-way for traffic noise abatement could be constructed during the initial stages to reduce the impacts of construction. Initial construction of noise barriers would significantly reduce construction noise impacts at the sensitive receivers.

3. Alternate Construction Methods - Certain phases of highway construction work such as pile driving may produce noise levels in excess of acceptable limits, even when feasible noise reduction methods are used. These impacts may be reduced by using alternate methods of construction. In the case of pile driving, vibration or hydraulic insertion could be used. Drilled holes for cast in-place piles are another alternative that would produce significantly lower levels of noise.

4. Source Control - The contractor shall comply with HDOT Standard Specifications and all local sound control and noise level rules, regulations and ordinances which apply to any work performed pursuant to the contract. Each internal combustion engine used for any purpose on the job or related to the job shall be equipped with a muffler of a type recommended by the manufacturer. No internal combustion engine shall be operated on the project without a muffler.

5. Time and Activity Constraints - Noisier activities involving large machinery could be limited to daytime hours when most people normally impacted are either not present or engaged in less noise sensitive activities. Nighttime construction would require a variance. Compliance with local Noise Ordinances will mitigate impacts associated with construction noise. To comply with the ordinance, all

construction activities adjacent to residential uses will be limited to daytime hours (7.00 a.m. to 7.00 p.m.) on Monday through Saturdays

6. Community Relations - Community meetings can be held to explain the construction work, time involved, and the control measures to be taken to reduce the impact of the construction noise

The measures above can be incorporated into site specific construction plans to minimize noise impacts to sensitive receivers along the project corridor. Noise emission limits could be developed. Construction hours could be set, and noise level criteria could be decided upon and adhered to during construction.

7. REFERENCES

Federal Highway Administration (FHWA). Highway Construction Noise: Measurement, Prediction, and Mitigation. 1976

Federal Highway Administration (FHWA). Procedures for Abatement of Highway Traffic and Construction Noise. Code of Federal Regulations 23CFR 772

Federal Highway Administration (FHWA). Stamina 2.0/Optima Users Manual, Report No. FHWA DP-58-1, April 1982

State of Hawaii, Department of Transportation, Highways Divisions, Noise Analysis and Abatement Policy. October, 1996

APPENDIX G

ZOOLOGICAL TECHNICAL REPORT

United States Department of the Interior

FISH AND WILDLIFE SERVICE
PACIFIC ISLANDS ECOREGION
300 ALA MOANA BOULEVARD, ROOM 3108
BOX 50088
HONOLULU, HAWAII 96850
PHONE: (808) 541-3441 FAX: (808) 541-3470

FEB 0 1 1996

Jan Reichelderfer, Environmental Planner
Parsons Brinckerhoff Quade & Douglas, Inc.
Pacific Tower, Suite 3000
1001 Bishop St.
Honolulu, HI 96813

Dear Ms. Reichelderfer:

On December 12, 1995, the U.S. Fish and Wildlife Service (Service) received your December 6, 1995 letter requesting identification of the proposed and listed threatened and endangered species in the vicinity of the proposed corridor for the North-South Road Project. We regret that our reply was delayed due to the recent Federal Furlough.

The Service has reviewed the map provided with your request and pertinent information in our files, including maps prepared by the Hawaii Heritage Program of the Nature Conservancy. Although the proposed project area has been extensively modified by agricultural and development activities, there are historical records of the following Federal Trust Species in the vicinity of the proposed corridor:

Plants
Centaurium sebaceoides (listed Endangered)
Mawiliea villosa (listed Endangered)

There are also historical records of Species of Concern (formerly known as Candidate 2 Species). While these species are not currently federally protected, they may be added to the Endangered Species List in the future. Species of Concern historically in the vicinity of the project area include two species of plants, *Portulaca villosa* and *Tetralinium odoratum* ssp. *auriculatum* (very possibly extinct) and one insect *Pentarthrum obscurum*.

We appreciate your concern for endangered species and would like the opportunity to review the Draft Environmental Assessment for this project. If you have any questions, please contact our Branch Chief for Interagency Cooperation, Ms. Margo Stahl, or Fish and Wildlife Biologist Tanya Rubenstein at 808/541-3441 (fax: 808/541-3470)

Sincerely,

Brooks Harper

Brooks Harper
Field Supervisor
Ecological Services

US FISH & WILDLIFE 10:803-5415470 FEB 01'96 13:19 NO.038 P.01

United States Department of the Interior

FISH AND WILDLIFE SERVICE
PACIFIC ISLANDS ECOREGION
300 ALA MOANA BOULEVARD, ROOM 3108
BOX 50088
HONOLULU, HAWAII 96850
PHONE: (808) 541-3441 FAX: (808) 541-3470

RECEIVED
JUN 14 1996
PARSONS BRINCKERHOFF
HONOLULU OFFICE

In Reply Refer To: TR

JUN 13 1996

Jan Reichelderfer, Environmental Planner
Parsons Brinckerhoff Quade & Douglas, Inc.
Pacific Tower, Suite 3000
1001 Bishop St.
Honolulu, HI 96813

Dear Ms. Reichelderfer:

This letter is in response to your phone call on June 10, 1996, requesting further information on a beetle known as *Pentarthrum obscurum* (obscure pentarthrum weevil). In our letter dated February 1, 1996, the U.S. Fish and Wildlife Service (Service) noted that historical records of this species were known from the vicinity of the proposed corridor for the North-South Road Project. Our letter identified this species as a Species of Concern (formerly known as a Candidate 2) to the Service.

We would like to take this opportunity to clarify our policy on Species of Concern. The term "Species of Concern" describes species that are of concern to the Service, but require further biological research and field study to resolve their conservation status. These species are not currently federally protected, and the Service is no longer officially maintaining a list of these species.

While some species considered Species of Concern may be quite rare, the Service believes that *Pentarthrum obscurum* is more common than previously believed and may not even be native to the Hawaiian Islands. Consequently, the Service is not reviewing the status of this insect for possible listing. There is no need to survey the project area for this insect as part of the environmental review process.

We appreciate your concern for endangered species. If you have any further questions, please contact our Branch Chief for Interagency Cooperation, Ms. Margo Stahl, or Fish and Wildlife Biologist Tanya Rubenstein at 808/541-3441 (fax: 808/541-3470)

Sincerely,

Brooks Harper

Brooks Harper
Field Supervisor
Ecological Services

Parsons Brinckerhoff
Pacific Tower, Suite 300
1001 Bishop Street
Honolulu, HI 96813
808-531-7094
Fax: 808-526-2366

December 8, 1995

Michael Buck
Department of Land and Natural Resources
Division of Forestry and Wildlife
1151 Punchbowl
Honolulu, HI 96813

Subject: North-South Road Project

Dear Mr. Buck:

Parsons Brinckerhoff has been selected as the engineering and environmental consultant for the North-South Road Project and we ask your assistance in our environmental assessment.

We request that the Division of Forestry and Wildlife identify the listed and proposed to be listed threatened and endangered species in the vicinity of the proposed corridor. A location map showing the project area is attached for your use.

Please do not hesitate to call me at 566-2271 if you have any questions or need more information.

Yours sincerely,
Parsons Brinckerhoff Quade & Douglas, Inc.

Jan Reichelderfer
Environmental Planner

Attachment: North-South Road Corridor Location Map

cc: Gregory Hee, DTS
Faith Miyamoto, DTS

Over a Century of Engineering Excellence

Parsons Brinckerhoff
Pacific Tower, Suite 300
1001 Bishop Street
Honolulu, HI 96813
808-531-7094
Fax: 808-526-2366

December 8, 1995

Brooks Harper, Field Supervisor
Ecology Services
Fish & Wildlife Service
P.O. Box 50167
Honolulu, HI 96850

Subject: North-South Road Project

Dear Mr. Harper:

Parsons Brinckerhoff has been selected as the engineering and environmental consultant for the North-South Road Project and we ask your assistance in our environmental assessment.

We request that the Fish and Wildlife Service identify the listed and proposed to be listed threatened and endangered species in the vicinity of the proposed corridor. A location map showing the project area is attached for your use.

Please do not hesitate to call me at 566-2271 if you have any questions or need more information.

Yours sincerely,
Parsons Brinckerhoff Quade & Douglas, Inc.

Jan Reichelderfer
Environmental Planner

Attachment: North-South Road Corridor Location Map

cc: Gregory Hee, DTS
Faith Miyamoto, DTS

Over a Century of Engineering Excellence

3. IMPACT ASSESSMENT

The biological assessments prepared for the housing developments in the study area did not anticipate significant impacts to animals because most of the animals in the area are widespread, and they easily adapt to urban environments.

The impacts of the proposed North-South Road in terms of habitat disturbance would be similar to the impacts of the housing developments. Although the number of road kills may increase, the animals present in the area, such as cats, mongoose and mice, will readily adapt to the new roadway. The road occupies a narrow band of land, and abundant habitat for these animals will remain. Because these animals have occupied habitat near urban development, construction activities should not have a major negative effect on their daily habits. There are no wildlife or waterfowl refuges which could potentially contain sensitive animals in the project vicinity.

The project area also appears not to contain any threatened or endangered animals. Therefore, based on correspondence with the Service and documents from other projects in the vicinity, construction of North-South Road would not jeopardize any federally or state protected fauna

4. REFERENCES

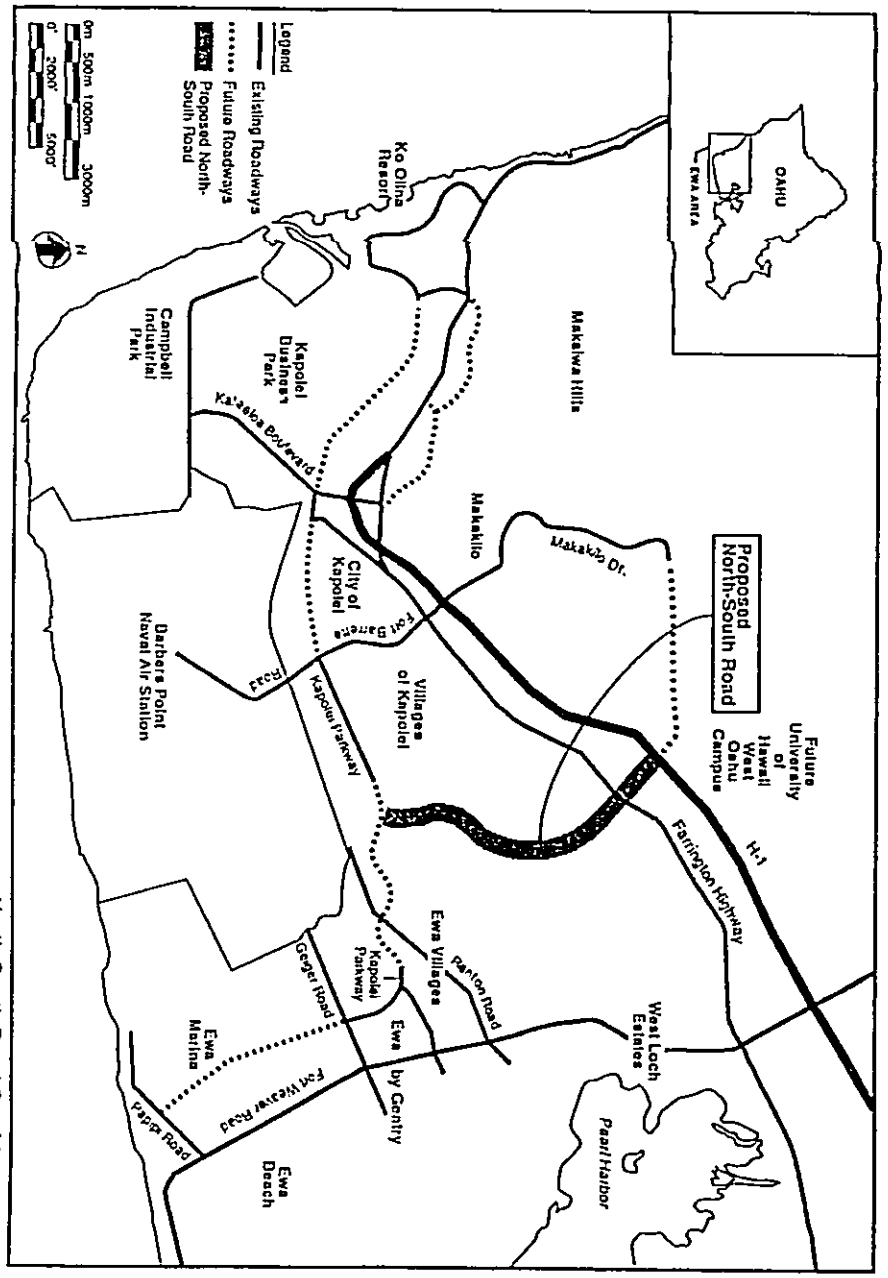
Andrew J. Berger for Gray Hong Bills & Associates, Inc. Birds and Mammals of the Ewa Gentry Region, 1968

Phillip L. Bruner for Belt Collins and Associates, Survey of the Avifauna and Feral Mammals at the Ewa Marina Property, Ewa, Oahu, 1989

Evangeline Funk for R.M. Towill Corporation, Biological Resources Survey Report for Ewa Villages Development, 1990

Evangeline Funk for Schuler Homes, Inc., Biological Resources Survey Report for Schuler Homes East Kapolei Project, 1994

Appendix
Correspondence Letters



North-South Road Corridor Location
NORTH-SOUTH ROAD CORRIDOR
Zoological Technical Report

The Service responded on February 1, 1996 (see Appendix) with information about one insect, *Pentarthrum obscurum*, a type of weevil, that has historically been found in the vicinity of the project area. However, as explained in the Service's June 13, 1996, letter (see Appendix), *Pentarthrum obscurum* is listed as a "Species of Concern." While some Species of Concern are quite rare, the Service states that this weevil is more common than previously believed and may not even be native to the Hawaiian Islands. The Service is not reviewing the status of this insect for potential federal protection. The Service recommends that no surveys for this beetle be performed in the project area during the environmental review process for North-South Road.

DLNR stated that they have not done any specific studies on threatened or endangered species in the area.

Table 1
Animals Seen During Recent Zoological Surveys in the Project Vicinity

	Common name	Scientific name
Mammals		
	Brown Rat	*Rattus norvegicus*
	House Mouse	*Mus musculus domesticus*
	Feral Dog	*Canis familiaris*
	Feral Cat	*Felis catus*
	Mongoose	*Herpestes auropunctatus*
Birds		
	House Sparrow	*Passer domesticus*
	Red Avadavat or Strawberry Finch	*Amandava amandava*
	Warbling Silverbill	*Lonchura malabarica*
	Chestnut Mannikin	*Lonchura malacca*
	Nutmeg Mannikin	*Lonchura punctata*
	Java Sparrow	*Padda oryzivora*
	Northern Cardinal	*Cardinalis cardinalis*
	Brazilian Cardinal	*Paroaria coronata*
	Red-Vented Bulbul	*Pycnonotus cafer*
	Cattle Egret	*Bubulcus ibis*
	House Finch	*Carpodacus mexicanus*
	Lesser or Pacific Golden Plover	*Pluvialis dominica fulva*
	Spotted Dove	*Streptopelia chinensis*
	Rock Dove	*Columba livia*
	Zebra Dove	*Geopelia striata*
	Mockingbird	*Mimus polyglottos*
	Common Myna	*Acridotheres tristis*
	Ring-Necked Pheasant	*Phasianus colchicus*
	Common Waxbill	*Estrilda astrild*
	White-Rumped Shama	*Copsychus malabaricus*
	Eurasian Skylark	*Alauda arvensis*
	White-Eyes	*Zosterops japonicus*

Sources: East Kapolei Project EIS, 1995; Ewa By Gentry EIS, 1988, 1995, Ewa Mauna, Phase II EIS, 1991; Ewa Villages Master Plan EIS, 1991

TABLE OF CONTENTS

LIST OF FIGURES AND TABLES

1. INTRODUCTION

1.1 Proposed Action

The Federal Highway Administration (FHWA) and the Highways Division of the State of Hawaii Department of Transportation (SDOT) are proposing to construct North-South Road, a divided major arterial, in Ewa, Oahu, Hawaii (see Figure 1). The roadway would connect the H-1 Freeway with a future segment of Kapolei Parkway, a distance of approximately 3.6 km (2.2 miles). The proposed project also includes a North-South Road interchange with the H-1 Freeway.

1.2 Purpose of Report

This zoological assessment investigated the impact North-South Road would have on the existing faunal community in the study area. This report relies on several recent biological assessments prepared for environmental documents of housing developments in the study area (East Kapolei Project Final Environmental Impact Statement (EIS), 1995; Ewa By Gentry Final EIS, 1988; Ewa Marina, Phase II Final EIS, 1991; and Ewa Villages Master Plan Final EIS, 1991). Based on field observations, the habitats that would be crossed by the proposed North-South Road are the same as and adjacent to the habitats that were surveyed for these biological assessments. Therefore, given the proximity and similarity to the areas that were already surveyed, the recent execution of these other biological assessments, and their findings of relatively common animals adapted to urban conditions, new faunal field surveys were not conducted for this project.

2. EXISTING CONDITIONS

2.1 Previous Studies

Several recent biological assessments prepared for housing developments unanimously concluded that the faunal communities in the study area are typical of abandoned sugarcane fields near urban areas on Oahu. Common animals include mice, mongoose, rats, a variety of birds, and feral cats and dogs (see Table 1). The studies concluded that the study area was extensively modified from its original state and has little value as native bird habitat. None of these studies reported evidence of threatened or endangered species.

2.2 Agency Consultation

Letters were sent to the U.S. Fish and Wildlife Service (Service) and the State of Hawaii Department of Land and Natural Resources (DLNR), Division of Forestry and Wildlife, to gather information about the possible presence of threatened or endangered species (see Appendix).

NORTH-SOUTH ROAD CORRIDOR STUDY
Ewa, Oahu, Hawaii
Project No. HWY-0-01-92

ZOOLOGICAL TECHNICAL REPORT

September 1997

PB 100 YEARS — *PARSONS BRINCKERHOFF* | *KAKU ASSOCIATES* | *R.M. TOWILL CORPORATION*

NORTH-SOUTH ROAD CORRIDOR STUDY
Ewa, Oahu, Hawaii
Project No. HWY-0-01-92

Zoological Technical Report

Prepared for:

State of Hawaii
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

City and County of Honolulu
Department of Transportation Services
Pacific Park Plaza
711 Kapiolani Boulevard, Suite 1200
Honolulu, Hawaii 96813

Submitted by:

Parsons Brinckerhoff Quade & Douglas, Inc.
Pacific Tower, Suite 3000
1001 Bishop Street
Honolulu, Hawaii 96813

September 1997

PBQD Reference: 16218A - Product 8.7A

APPENDIX H

BOTANICAL SURVEY REPORTS

This appendix includes: the November 1996 Botanical Survey Report; the March 2004 Botanical Resources Assessment Study for Kapolei Parkway; and the Habitat Conservation Plan.

November 1996 Botanical Survey Report for North-South Road

NORTH-SOUTH ROAD CORRIDOR STUDY
PHASE 1
'Ewa, O'ahu, Hawai'i
Project No. HWY-0-01-92

BOTANICAL SURVEY TECHNICAL REPORT

November 1996

PB 100 YEARS

PARSONS BRINCKERHOFF | KAKU ASSOCIATES | R.M. TOWILL CORPORATION

NORTH-SOUTH ROAD CORRIDOR STUDY - PHASE 1
'Ewa, O'ahu, Hawai'i
Project No. HWY-0-01-92

Botanical Survey Technical Report

Prepared for:

City and County of Honolulu
Department of Transportation Services
Pacific Park Plaza
711 Kapiolani Boulevard, Suite 1200
Honolulu, Hawaii 96813

Submitted by:

Parsons Brinckerhoff Quade & Douglas, Inc.
Pacific Tower, Suite 3000
1001 Bishop Street
Honolulu, Hawaii 96813

November 1996

PBQD Reference: 16218A - Product 8.6

BOTANICAL SURVEY
NORTH-SOUTH ROAD CORRIDOR STUDY
'EWA DISTRICT, ISLAND OF O'AHU

by

Winona P. Char

CHAR & ASSOCIATES
Botanical Consultants
Honolulu, Hawai'i

Prepared for: PARSONS BRINCKERHOFF
QUADE AND DOUGLAS, INC.

BOTANICAL SURVEY
NORTH-SOUTH ROAD CORRIDOR STUDY
'EWA DISTRICT, ISLAND OF O'AHU

INTRODUCTION

A botanical survey of the North-South corridor from its proposed interchange with Interstate Route H-1 to its makai terminus at the proposed 'Ewa Marina development was conducted on 17 June 1996. The majority of the alignment will cross through sugar cane fields which no longer are in cultivation. Although cane cultivation ceased approximately one to two years ago, many fields, especially those located between Farrington Highway and Waimanalo Road, still support large areas covered by cane. Smaller sections along the alignment support koa haole scrub or a mixed scrub composed of various grasses and weedy herbs and shrubs. The proposed corridor follows along Kapolei Parkway for a portion of its length; the parkway, which crosses through a residential area, is landscaped and maintained.

The reconnaissance field work focused on the undeveloped portions of the corridor as sensitive native plant communities were more likely to occur in these areas. The primary objectives of the field studies were to: 1) describe the vegetation found on the undeveloped portions of the corridor; 2) inventory the flora; 3) search for threatened and endangered species as well as rare and vulnerable plants; and 4) identify areas of potential environmental problems or concerns and propose appropriate mitigation measures.

SURVEY METHODS

Prior to undertaking the field studies, a search was made of the pertinent literature to familiarize the principal investigator with other botanical studies conducted in the general area. The roadway alignment maps were examined to determine terrain characteristics, access, boundaries, and reference points.

A walk-through survey method was used. Plant identifications were made in the field; plants which could not be positively identified were collected for later determination in the herbarium (University of Hawai'i, Manoa -- HAW). All plants were identified to the specific level prior to the preparation of this report, except for a Digitaria species -- an introduced crabgrass. Notes were made on plant distributions and associations, substrate types, drainage, disturbances, topography, exposure, etc.

The species recorded within the corridor study area are indicative of the season ("rainy" vs. "dry") and environmental conditions at the time of the survey. This survey was conducted on 17 June 1996 during the dry summer months. A survey taken at a different time of the year and under varying environmental conditions would no doubt yield slight variations in the species list, especially of the weedy, annual taxa.

DESCRIPTION OF THE VEGETATION

In the U.S. Fish and Wildlife Service sponsored 'Ewa Plains' Botanical Survey (Char and Balakrishnan 1979), the vegetation along the majority of the roadway corridor was mapped as "C", sugar cane fields. On areas which were not actively cultivated, koa haole shrubland and mixed grass-shrubland occurred. Since that survey, much of the 'Ewa Plains has been developed for the second city of Kapolei and the O'ahu Sugar Company, Ltd., has ceased cultivating the cane fields.

Because the 'Ewa Plains have been extensively disturbed by agricultural activities for such a long period of time, there are few areas which support native plant communities. The few places with native plants are restricted to sites with karst or limestone topography; since these areas do not have soil they were unsuitable for agriculture. Two listed endangered species which occur today in such habitats are the 'Ewa Plains 'akoko (Chamaesyce skottsbergii) and Achyranthes splendens var. rotundata. Both are found only on limestone sites within Campbell Industrial Park and Naval Air Station Barbers Point (Char and Balakrishnan 1979; Traverse Group, Inc., 1988). There are historical records of two listed endangered species, the 'awiwi (Centaurium sebaeoides) and 'ihi'ihi (Marsilea villosa), and two species of concern (formerly candidate 2 species), the 'ihi (Portulaca villosa) and pu'uka'a (Torulinium odoratum ssp. auriculatum), in the vicinity of the proposed corridor (B. Harper, USFWS, 01 Feb. 1996 letter).

Along the proposed North-South Road corridor, there are no areas with karst topography or remnant native plant communities or threatened and endangered species. The corridor, for the most part, crosses former sugar cane fields or weedy, overgrown scrub vegetation.

In the discussion below, the vegetation along the corridor is described from mauka to makai, that is, from its proposed interchange with Interstate Route H-1 to its makai terminus at the 'Ewa Marina development. Locations are referenced to existing roads and other landmarks. A checklist of all those plants inventoried during the field studies is presented at the end of the report.

Vegetation along the corridor

At the interchange with H-1, dense koa haole shrubs (Leucaena

leucocephala) border the highway and cover the southwest portion of the interchange. Clumps of Guinea grass (Panicum maximum), 3 to 5 ft. tall, form a thick cover between the shrubs. Scattered through this koa haole/Guinea grass scrub are trees of kiawe (Prosopis pallida) and 'opiuma (Pithecellobium dulce). Along Kalo'i Gulch, there are a few Java plum (Syzyzium cumini) and kukui (Aleurites moloccana) trees among the koa haole thickets. Upslope of the highway are former sugar cane fields now overgrown with Guinea grass and buffel grass (Cenchrus ciliaris).

Between Interstate Route H-1 and Farrington Highway, the former sugar cane fields are now densely overgrown with buffel grass. A few clumps of the taller Guinea grass can be found scattered here and there. Koa haole shrubs and a few kiawe trees line the edges of the grassy fields.

On State lands between Farrington Highway and Waimanalo Road, the cane fields were most recently abandoned and so there are still large areas covered by sugar cane plants (Saccharum officinarum), from 5 to 7 ft. tall. Where the plants collect runoff water, cane cover is high, about 80%. Where the soil is drier and cracked, many dried out clumps of cane remain, with the cover of live plants about 10 to 25%. These fields are being invaded by swollen fingergrass (Chloris barbata) and a number of other weedy species which include 'uhaloa (Waltheria indica), coat buttons (Tridax procumbens), Guinea grass, Johnson grass (Sorghum halepense), lion's ear (Leonotis nepetifolia), pink bindweed (Ipomoea triloba), castor bean (Ricinus communis), 'ilima (Sida fallax), etc.

Where the alignment follows between Varona Village and Tenny Village and then alongside the O'ahu Railway tracks and right-of-way, the vegetation is composed of disturbed, weedy scrub. Guinea grass, castor bean, and swollen fingergrass are abundant. Other

components of this weedy assemblage include bristly foxtail (Setaria verticillata), goose grass (Eleusine indica), Bermuda grass or manienie (Cynodon dactylon), Achyranthes aspera, koa haole, and wild lettuce (Lactuca serriola). Near the old sugar mill, there are ovegrown piles of soil, scrap lumber, concrete pipe sections, etc.

After the sugar mill, the alignment follows along Kapolei Parkway and most of the land is landscaped, or maintained to some degree (Kalo'i drainage channel). Homes or homes under construction border the parkway for most of its length.

From Geiger Road to its terminus at the 'Ewa Marina boundary, the vegetation consists of disturbed, weedy scrub vegetation along the northern portion of the corridor where construction is taking place. The remaining lands along the corridor are former cane fields which have been leveled and are now used to graze horses and beef cattle. The vegetation is heavily grazed and consists primarily of swollen fingergrass and weedy species. Patches of Guinea grass, buffel grass, and green panicgrass (Panicum maximum var. trichoglume) are scattered here and there. Locally abundant in places are prickly patches of spiny amaranth (Amaranthus spinosus), golden crownbeard (Verbesina encelioides), and saltbush (Atriplex suberecta). Among the woody components are a few shrubs of pluchea or sourbush (Pluchea symphytifolia), Indian pluchea (Pluchea indica), koa haole and young trees of kiawe and 'opiuma, 3 to 6 ft. tall.

DISCUSSION AND RECOMMENDATIONS

The proposed North-South Road corridor will cross primarily through former sugar cane lands now overgrown with weedy plants, koa haole scrub, and mixed scrub. All of the lands within the corridor have been disturbed at some time, and the vegetation is

composed almost exclusively of introduced or alien species. Introduced species are all those plants which were brought to the Hawaiian Islands by humans, intentionally or accidentally, after Western contact, that is, Cook's discovery of the islands in 1778. Large scale sugar cultivation removed almost all native cover and fields of sugar replaced vast tracts of forest and shrubland. In fact, erosion was actually promoted on the slopes above the 'Ewa sugar plantation. Vertical plowing and drainage ditches encouraged erosion from the lower Wai'anae slopes and soil deposition on the lower plains (Cuddihy and Stone 1990).

Of a total of 72 species inventoried within the corridor, 68 (95%) are introduced plants, 1 (1%) is originally of Polynesian introduction, and 3 (4%) are native. The three native species -- 'ilima (Sida fallax), popolo (Solanum americanum), and 'uhaloa (Waltheria indica), are all indigenous or presumably indigenous species. These are plants which are native (occur naturally) in the Hawaiian Islands and also elsewhere throughout the Pacific and/or tropics. None of the plants is a listed, proposed, or candidate threatened and endangered species (U.S. Fish and Wildlife Service 1991, 1994a, 1994b, 1996); nor is any plant a species of concern or rare and vulnerable (Wagner et al. 1990).

There have been a number of botanical studies for recent residential developments, golf courses, and other projects on the 'Ewa Plains, some of them conducted by the principal investigator (Char 1980, 1988, 1989, 1991). All have recorded findings similar to those above.

Given the findings above, the following conclusions can be made:

- The proposed North-South Road corridor project is not expected to have a significant negative impact on the botanical resources within the corridor; nor is it expected to have a significant cumulative impact on the flora of the general 'Ewa region. There are no threatened and endangered species or sensitive native plant-dominated communities within the corridor.

- No wetland or wetland vegetation occur within the proposed corridor.

- Botanically, there is little of interest or concern on the project site.

Recommendations: Act 73 which was passed by the 1991 Hawai'i State Legislature, mandates that any new or renovated landscapes for any project developed with State funds incorporate native Hawaiian plants wherever and whenever possible.

It is recommended that some of the more easily grown native species be used to landscape portions of the road such as the interchange. Native species which are already adapted to the local environmental conditions would require less water. Some plants suitable for this area include trees such as wiliwili (Erythrina sandwicensis) and aulu (Sapindus oahuensis); and shrubs such as naio (Myoporum sandwicense), 'a'ali'i (Dodonaea viscosa), 'akia (Wikstroemia uva-ursi), and kulu'i (Nototrichium sandwicense). Other examples of native plants which can be used for landscaping are found on display at the xeriscape garden at the Halawa Board of Water Supply.

PLANT SPECIES LIST -- North-South Road Corridor Study

The following checklist is an inventory of the plant species observed on the undeveloped lands within the proposed roadway corridor. The flowering plants are arranged alphabetically by families within each of two groups: Monocots and Dicots. The taxonomy and nomenclature of the flowering plants follow the most recent treatment of the Hawaiian flora by Wagner et al. (1990).

For each species, the following information is provided:

1. Scientific name with author citation.
2. Common English and/or Hawaiian name(s), when known.
3. Biogeographic status. The following symbols are used:

I = indigenous = native to the Hawaiian Islands and also elsewhere throughout the Pacific and/or tropics.

I? = questionably indigenous = data not clear if introduced or if arrived here by natural means, but weight of evidence suggests probably indigenous.

P = Polynesian = plants originally of Polynesian introduction prior to Western contact (Cook's discovery of the islands in 1778).

X = introduced or alien = all those plants brought to the islands by humans, intentionally or accidentally, after Western contact.

Scientific name	Common name	Status
MONOCOTS		
COMMELINACEAE (Dayflower Family)		
Commelina benghalensis L.	hairy honohono	X
CYPERACEAE (Sedge Family)		
Cyperus rotundus L.	nut sedge, nutgrass	X
POACEAE (Grass Family)		
Brachiaria mutica (Forssk.) Stapf	California grass	X
Cenchrus ciliaris L.	buffel grass	X
Cenchrus echinatus L.	sandbur	X
Chloris barbata (L.) Sw.	swollen fingergrass, mau'ulei	X
Chloris radiata (L.) Sw.	plush grass	X
Cynodon dactylon (L.) Pers.	Bermuda grass, manienie	X
Dactyloctenium aegyptium (L.) Willd.	beach wiregrass	X
Digitaria insularis (L.) Mez. ex Ekman	sour grass	X
Digitaria sp.	crabgrass	X
Eleusine indica Gaertn.	goose grass, wire grass	X
Leptochloa uninervia (Presl.) Hitchc. & Chase	leptochloa	X
Panicum maximum Jacq.	Guinea grass	X
Panicum maximum var. trichoglume Eyles ex Robyns	green panicgrass	X
Saccharum officinarum L.	sugar cane, ko	X
Setaria verticillata (L.) Beauv.	bristly foxtail	X
Sorghum halepense (L.) Pers.	Johnson grass	X
DICOTS		
ACANTHACEAE (Acanthus Family)		
Asystasia gangetica (L.) T. Anders.	Chinese violet	X
AMARANTHACEAE (Amaranthus Family)		
Achyranthes aspera L.		X
Alternanthera pungens Kunth	khaki weed	X
Amaranthus spinosus L.	spiny amaranth, pakai kuku	X
Amaranthus viridis L.	slender amaranth, pakai	X
ANACARDIACEAE (Mango Family)		
Schinus terebinthifolius Raddi	Christmas berry	X

Scientific name	Common name	Status
APIACEAE (Carrot Family)		
Ciclospermum leptophyllum (Pers.) Sprague	fir-leaved celery	X
ASTERACEAE (Daisy Family)		
Bidens pilosa L.	Spanish needle, beggars tick, ki	X
Conyza bonariensis (L.) Cronq.	hairy horseweed, 'ilioha	X
Emilia fosbergii Nicolson	Flora's paintbrush, red pua-lele	X
Flaveria trinervia (Spreng.) C. Mohr	flaveria	X
Lactuca serriola L.	prickly lettuce	X
Pluchea indica (L.) Less.	Indian pluchea	X
Pluchea symphytifolia (Miller) Gillis	pluchea, sourbush	X
Sonchus oleraceus L.	common sowthistle, pua-lele	X
Tridax procumbens L.	coat buttons	X
Verbesina encelioides (Cav.) Benth. & Hook.	golden crownbeard	X
BORAGINACEAE (Borage Family)		
Heliotropium procumbens var. depressum (Cham.) Fosb.	heliotrope	X
CHENOPODIACEAE (Goosefoot Family)		
Atriplex suberecta Verd.	saltbush	X
Chenopodium murale L.	'aheahea	X
CONVOLVULACEAE (Morning-glory Family)		
Ipomoea obscura (L.) Ker-Gawl.	field bindweed	X
Ipomoea triloba L.	pink bindweed, little bell	X
CUCURBITACEAE (Gourd Family)		
Coccinia grandis (L.) Voigt	ivy gourd, scarlet-fruited gourd	X
Cucumis dipsaceus Ehrenb. ex Spach	hedgehog gourd, wild cucumber	X
Momordica charantia L.	wild bittermelon	X
EUPHORBIACEAE (Spurge Family)		
Aleurites moluccana (L.) Willd.	kukui, kuikui	P
Chamaesyce hirta (L.) Millsp.	hairy spurge	X
Chamaesyce hypericifolia (L.) Millsp.	graceful spurge	X

Scientific name	Common name	Status
Chamaesyce prostrata (Ait.) Small	prostrate spurge	X
Euphorbia cyathophora J.A. Murray	Mexican fire plant, wild poinsettia	X
Phyllanthus debilis Klein ex Willd.	niruri	X
Ricinus communis L.	castor bean, pa'aila, koli	X
FABACEAE (Pea Family)		
Crotalaria incana L.	fuzzy rattlepod, kukae-hoki	X
Crotalaria pallida Aiton	smooth rattlepod, pika-kani	X
Desmanthus virgatus (L.) Willd.	slender mimosa	X
Indigofera spicata Forssk.	creeping indigo	X
Indigofera suffruticosa Mill.	indigo, 'iniko	X
Leucaena leucocephala (Lam.) de Wit	koa haole	X
Macroptilium latyroides (L.) Urb.	wild bean, cow pea	X
Pithecellobium dulce (Roxb.) Benth.	'opiuma	X
Prosopis pallida (Humb. & Bonpl. ex Willd.) Kunth	kiawe	X
Senna pendula (Humb. & Bonpl. ex Willd.) H. Irwin & Barneby	senna	X
LAMIACEAE (Mint Family)		
Leonotis nepetifolia (L.) R. Br.	lion's ear	X
MALVACEAE (Mallow Family)		
Abutilon grandifolium (Willd.) Sweet	hairy abutilon, ma'o	X
Malvastrum coromandelianum (L.) Garcke	false mallow	X
Sida fallax Walp.	'ilima	I
Sida rhombifolia L.		X
MYRTACEAE (Myrtle Family)		
Syzygium cumini (L.) Skeels	Java plum	X
NYCTAGINACEAE (Four-o'clock Family)		
Boerhavia coccinea Mill.	red-flowered boerhavia	X
PASSIFLORACEAE (Passion Flower Family)		
Passiflora foetida L.	running pop, pohapoha	X
SOLANACEAE (Nightshade Family)		
Lycopersicon pimpinellifolium (Jusl.) Mill.	currant tomato	X
Nicotiana glauca R.C. Graham	tree tobacco, paka	X

Scientific name	Common name	Status
Solanum americanum Mill.	glossy nightshade, popolo, 'olohua	I?
STERCULIACEAE (Cacao Family)		
Waltheria indica L.	'uhaloa, hi'aloa, kanakaloa	I?

LITERATURE CITED

Char, W.P. 1980. A botanical survey of the 'Ewa Marina Community project site, 'Ewa, O'ahu, Hawai'i. Prepared for Hawaii Marine Research, Inc. September 1980.

_____ . 1988. Botanical survey, 'Ewa Gentry Residential Community, 'Ewa District, O'ahu. Prepared for Gray, Hong & Associates, Inc. January 1988.

_____ . 1989. Botanical survey, 'Ewa Marina Phase II project, 'Ewa District, island of O'ahu. Prepared for Belt Collins & Associates. September 1989.

_____ . 1991. Botanical survey, Laulani/Fairways subdivision, 'Ewa District, island of O'ahu. Prepared for William E. Wanket, Inc. August 1991.

_____ and N. Balakrishnan. 1979. 'Ewa Plains Botanical Survey. U.S. Fish and Wildlife Service. Contract No. 14-16-0001-78171. 119 pp. + maps.

Cuddihy, L.W. and C.P. Stone. 1990. Alteration of native Hawaiian vegetation: Effects of humans, their activities and introductions. Cooperative National Park Resources Studies Unit, University of Hawai'i, Manoa.

Traverse Group, Inc. 1988. Natural resources management plan, Naval Air Station, Barbers Point. Prepared for Pacific Division, Naval Facilities Engineering Command. Contract No. N6274-86-C-0538.

U.S. Fish and Wildlife Service. 1991. Endangered and threatened wildlife and plants; Determination of endangered status for 26 plants from the Waianae Mountains, island of Oahu, Hawaii; Final rule. Federal Register 56(209): 55770-55786. October 29, 1991.

_____ . 1994a. Endangered and threatened wildlife and plants; Endangered status for three plants from the Waianae Mountains, island of Oahu, HI; Final rule. Federal Register 59(122): 32932-32938. June 27, 1994.

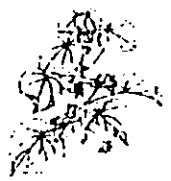
_____ . 1994b. Endangered and threatened wildlife and plants. 50 CFR 17.11 & 17.12. August 20, 1994.

_____ . 1996. Hawaiian Islands Plants: Updated March 1, 1996. Listed and candidate species, as designated under the U.S. Endangered Species Act. Unpublished list, Pacific Islands Office, Honolulu.

Wagner, W.L., D.R. Herbst, and S.H. Sohmer. 1990. Manual of the Flowering Plants of Hawai'i. 2 vols. University of Hawai'i Press and B.P. Bishop Museum Press, Honolulu. B.P. Bishop Museum Special Publication 83.

March 2004 Botanical Resources Assessment Study for Kapolei Parkway

Appendix E
Botanical Survey
W. Char
(March 2004)



BOTANICAL RESOURCES ASSESSMENT STUDY

KAPOLEI PARKWAY EXTENSION FROM NORTH-SOUTH ROAD TO OR&L RIGHT-OF-WAY

KAPOLEI, O'AHU

by

Winona P. Char

CHAR & ASSOCIATES
Botanical Consultants
Honolulu, Hawai'i

Prepared for: PARSONS BRINCKERHOFF

Revised March 2004

BOTANICAL RESOURCES ASSESSMENT STUDY
KAPOLEI PARKWAY EXTENSION FROM NORTH-SOUTH ROAD
TO OR&L RIGHT-OF-WAY
KAPOLEI, O'AHU

INTRODUCTION

The proposed Kapolei Parkway Extension will connect the proposed North-South Road with the OR&L right-of-way (ROW) where the existing Kapolei Parkway currently ends. A botanical survey for this extension of the Kapolei Parkway was conducted in two sections (Figure 1).

The first section of Kapolei Parkway is from the proposed intersection with North-South Road to the proposed intersection with Renton Road. The botanical survey area for this section consists of approximately 80 acres of City and County-owned lands located between Varona Village and Kalo'i Gulch/'Ewa Villages Golf Course (Figure 2). For the most part, the proposed parkway follows along or close to an existing paved road which accesses the golf course maintenance facility. In other places, it crosses koa haole/buffel grass scrub vegetation. The endangered Abutilon menziesii, common names ko'oloa'ula and red 'ilima, is known to occur on the adjacent State-owned lands; some Abutilon have also been recorded on the City and County-owned lands (Ohashi and PBR Hawaii 2003).

The second section of Kapolei Parkway is from the proposed intersection with Renton Road to the OR&L right-of-way (ROW). The botanical survey area for this section is an approximately 20-acre area bound by Renton Road to the west, the existing 'Ewa Mahiko Park to the north, the 'Ewa Gentry subdivision and a portion of the OR&L ROW to the east, and Kalo'i Gulch and the OR& L ROW to the south (Figure 3). This property is also owned by the City and County of Honolulu. The proposed parkway follows along an existing paved cane haul road. Except for Kalo'i Gulch, most of the site appears to have been graded in the past.

Field studies to assess the botanical resources on the ±80-acre study site including the proposed Kapolei Parkway corridor from North-South Road to Renton Road were conducted on 09 January 2004 by a team of two botanists. The Renton Road to OR&L ROW section was surveyed on 02 February 2004. The primary objectives of the field survey were to:

1) prepare a general description of the vegetation on the study sites; and
2) search for Abutilon menziesii as well as other threatened and endangered species and species of concern.

SURVEY METHODS

For the North-South Road to Renton Road section of Kapolei Parkway, a colored aerial photograph (roughly 1" = 250') was used, while the design and construction plans were

used for the Renton Road to OR&L ROW section. These were examined prior to the field studies to familiarize the botanists with vegetation cover patterns, terrain characteristics, access, boundaries, and reference points.

The proposed parkway corridor on the ±80-acre site was flagged and staked by the survey engineers before our field survey. Thirty (30)-foot wide transects were made through the koa haole/buffel grass scrub found between the existing paved road and the edge of the golf course. This is identified as "Area E" on Figure 1; plants of Abutilon are known from this portion of the study site. Less intensive transects were conducted for the more recently disturbed area makai of the existing paved road; this is identified as "Varona Village Extension" on Figure 1.

The survey for the proposed parkway corridor on the ±20-acre site between Renton Road to OR&L ROW focused on the less disturbed Kalo'i Gulch area. Notes were made on plant associations and distribution, disturbances, substrate types, topography, exposure, drainage, etc.

DESCRIPTION OF THE VEGETATION

The plant names used in this report follow Wagner et al. (1990) and Wagner and Herbst (1999). The few recent name changes are those reported in the Hawaii Biological Survey series (Evenhuis and Eldredge, eds., 1999-2002). The vegetation is described on each of the two areas within the ±80-acre site (Area E and Varona Village Extension), and on the ±20-acre Renton Road to OR&L ROW section.

Area E

Koa haole (Leucaena leucocephala)/buffel grass (Cenchrus ciliaris) scrub covers the portion of the study site located between the existing paved road and the golf course. Short-statured thickets of koa haole, 3 to 5 ft. tall, are scattered throughout this vegetation type. Buffel grass, 1 to 2 ft. tall, forms dense mats to loose tussocks between the thickets. Locally common are scattered patches of swollen fingergrass (Chloris barbata), stinkgrass (Eragrostis cilianensis), 'ilima (Sida fallax), Guinea grass (Panicum maximum), 'aheahea (Chenopodium murale), and hoary abutilon (Abutilon incanum). A few young trees of kiawe (Prosopis pallida), Chinaberry (Melia azedarch), and monkeypod (Samanea saman) can be observed here and there. Old bulldozer tracks and areas with coralline substrate are occasionally encountered. Scattered patches of false mallow (Malvastrum coromandelianum), Trianthema portulacastrum, swollen fingergrass, little bell (Ipomoea triloba), spiny amaranth (Amaranthus spinosus), 'aheahea, Macroptilium atropurpureum, and castor bean (Ricinus communis) are common on these more recently disturbed areas.

Along the edge of the golf course (slopes of Kalo'i Gulch), the woody components become very dense. Koa haole thickets are 7 to 12 ft. tall and there are small, scattered stands of emergent kiawe, monkeypod, Eucalyptus, and 'opiuma (Pithecellobium dulce) trees. Shrubs of hairy abutilon (Abutilon grandifolium), klu

(Acacia farnesiana), and sourbush (Pluchea carolinensis) are common. Robust clumps of Guinea grass, 5 to 6 ft. tall, and buffel grass, up to 3 ft. tall, form a dense cover between the woody components.

Four of the Abutilon menziesii locations occur on Area E in open koa haole/ buffel grass scrub (see Rare Plants section of this report).

Varona Village Extension

This portion of the study area located makai of the existing paved road has been bulldozed somewhat recently. Remnants of old house sites, old mango (Mangifera indica) and kalamungai (Moringa oleifera) trees, overgrown garden plots, and rusted parts of refrigerators, stoves, sheet metal, and a Suzuki Samurai vehicle can be found here. The vegetation is composed primarily of weedy, annual plants. Swollen fingergrass is the dominant component. Lion's ear (Leonotis nepetifolia), little bell, field bindweed (Ipomoea obscura), feather fingergrass (Chloris virgata), and saltbush (Atriplex suberecta) are locally abundant. Other weeds observed here include golden crown-beard (Verbesina encelioides), Spanish needle (Bidens pilosa), smooth rattlepod (Crotalaria pallida), 'uhaloa (Waltheria indica), castor bean, and wild tomato (Solanum lycopersicon).

Where the property borders the HECO easement, open, grassy fields of buffel grass are found. The woody components make up less than 5% of the cover; these include short-statured koa haole shrubs and young trees of kiawe and 'opiuma. Three medium-sized kiawe trees line the makai side of the existing paved road near the HECO easement. One plant of Abutilon is found associated with these trees. Also in this area are numerous clumps of Russian thistle or tumbleweed (Salsola tragus).

On the southwest corner of the property, there are large piles of coral rubble and boulders. This was the staging area for a sewer line at one time. The piles of excavated material are covered here and there with patches of tree tobacco shrubs (Nicotiana glauca), mats of Sida ciliaris and saltbush, and shrubs of 'ilima, 'uhaloa, and sourbush.

Renton Road to OR&L ROW Section

The proposed parkway alignment in this section follows along a former cane haul road. It consists of a thin layer of asphalt over crushed coral with patches of asphalt missing in many places. Along the open, grassy field of the park boundary is a narrow band of weedy vegetation with patches of reddish-colored soil. The weedy vegetation consists of a mixture of swollen fingergrass, buffel grass, green panicgrass (Panicum maximum var. trichoglume), and saltbush. A few scattered koa haole shrubs, 3 to 4 ft. tall, occur here. This area appears to have been graded when the parks playing field was installed.

On the makai side of the cane haul road, koa haole scrub borders the roadside and extends down the slopes into Kalo'i Gulch. Along the roadside, the shrubs are 6 to 10 ft. tall, but become somewhat taller, 10 to 15 ft. tall, within the gulch. Scattered through the koa haole scrub are emergent trees of kiawe and 'opiuma, 20 to 25 ft. tall. Other woody

components include sourbush and castor bean. Buffel grass and Guinea grass form dense clumps up to 3 ft. tall in most places.

On parts of the gulch slope, there are areas with exposed reddish-colored soil; a number of dirt bike trails also are found within the gulch. These open areas support a weedy mixture of plants which include castor bean, cocklebur (Xanthium strumarium), golden crown-beard, hairy merremia (Merremia aegyptia), spiny amaranth, false mallow, and Jimson weed (Datura stramonium). 'Uhaloa is locally abundant on these exposed areas. Other native species observed in the gulch area are 'ilima and hoary abutilon.

Along the gulch bottom, the vegetation is primarily Guinea grass and buffel grass with scattered koa haole shrubs and young kiawe and 'opiuma. In some places, there are small pools of standing muddy water; California grass (Brachiaria mutica) and primrose willow (Ludwigia octovalvis) are associated with these areas. Parts of the gulch adjacent to the bridge are concrete lined.

RARE PLANTS

The approximate locations of Abutilon menziesii are plotted on Figure 2. Only single plants are found at locations 2 to 5. At location 1, there is a large, multi-stemmed plant about 5 ft. tall; a young, single-stemmed plant about 2.5 ft. tall; and a seedling, 4 inches tall. No Abutilon menziesii was found in the Renton Road to OR&L ROW section.

The plants as well as the area around the plants have been flagged with blue and white stripped flagging. G. Mansker, Division of Forestry and Wildlife, will more accurately map the plants using a GPS unit later on.

No other threatened and endangered species or species of concern (U.S. Fish and Wildlife Service 1999; Wagner et al. 1999) were found during the field studies. The other native species which were observed on the study site are common species which can be found throughout the islands. These are the 'ilima (Sida fallax), 'uhaloa (Waltheria indica), hoary abutilon (Abutilon incanum), popolo (Solanum americanum), and pa'uohi'iaka (Jacquemontia ovalifolia ssp. sandwicensis).

DISCUSSION

The vegetation on the City and County-owned lands are dominated by introduced or alien species such as koa haole, buffel grass, kiawe, swollen fingergrass, etc. For the most part, the proposed Kapolei Parkway alignment follows along an existing paved road. None of the plants found on the property, with the exception of the Abutilon menziesii, is a threatened and endangered species or a species of concern.

The City and County will need to work closely with the other agencies involved in the Habitat Conservation Plan which has been prepared for the endangered Abutilon on the Kapolei site. Plant material from the five locations within the study site will need to be collected for propagation and included in future outplantings.

References

Evenhuis, N.L. and L.G. Eldredge, editors. 1999-2002. Records of the Hawaii Biological Survey. Bishop Museum Occasional Papers Nos. 58-70.

Ohashi, Y. and PBR Hawaii. 2003. Habitat Conservation Plan for Abutilon menziesii at Kapolei. Prepared for Parsons Brinckerhoff and State of Hawaii, Department of Transportation. November 2003.

U.S. Fish and Wildlife Service. 1999. Endangered and threatened wildlife and plants. 50 CFR 17.11 and 17.12. December 31, 1999.

Wagner, W.L., M.M. Bruegmann, D.R. Herbst, and J. Q.C. Lau. 1999. Hawaiian vascular plants at risk: 1999. Bishop Museum Occasional Papers No. 60.

Wagner, W.L., D.R. Herbst, and S.H. Sohmer. 1990. Manual of the flowering plants of Hawai'i. 2 vols. University of Hawai'i Press and Bishop Museum Press, Honolulu. Bishop Museum Special Publication 83.

Wagner, W.L. and D.R. Herbst. 1999. Supplement to the Manual of the flowering plants of Hawai'i, pp. 1855-1918. In: Wagner, W.L., D.R. Herbst, and S.H. Sohmer, Manual of the flowering plants of Hawai'i. Revised edition. 2 vols. University of Hawai'i Press and Bishop Museum Press, Honolulu.

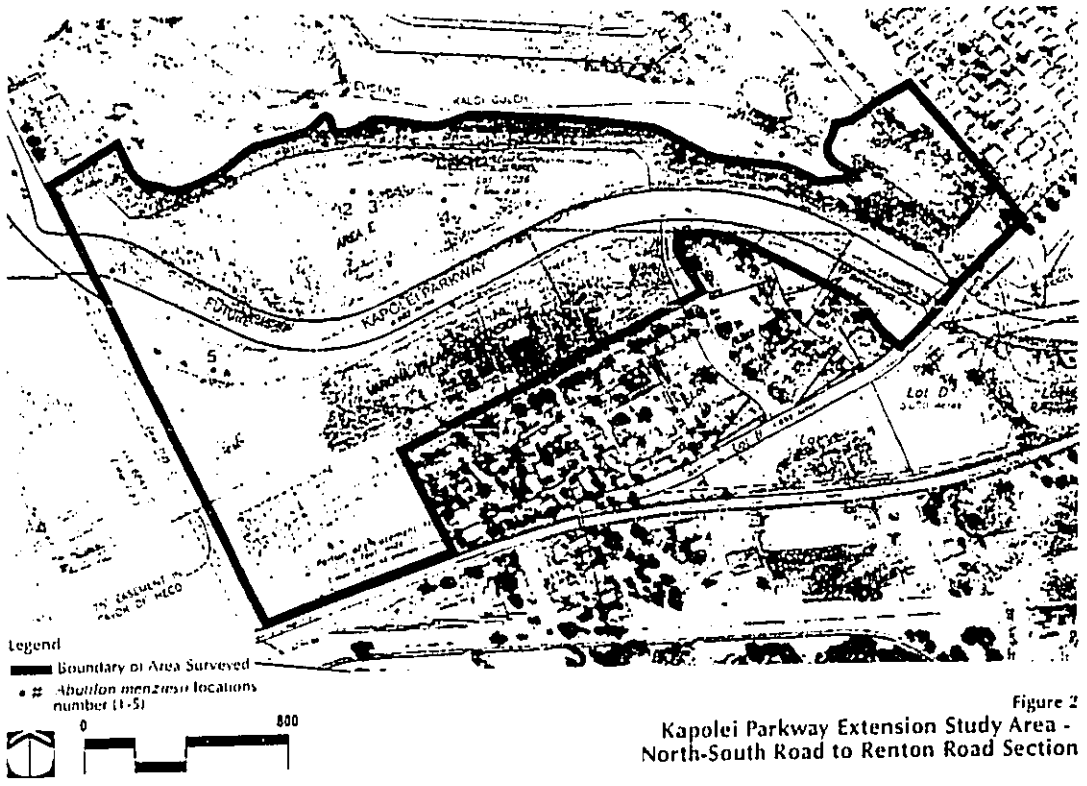


Figure 2
Kapolei Parkway Extension Study Area -
North-South Road to Renton Road Section

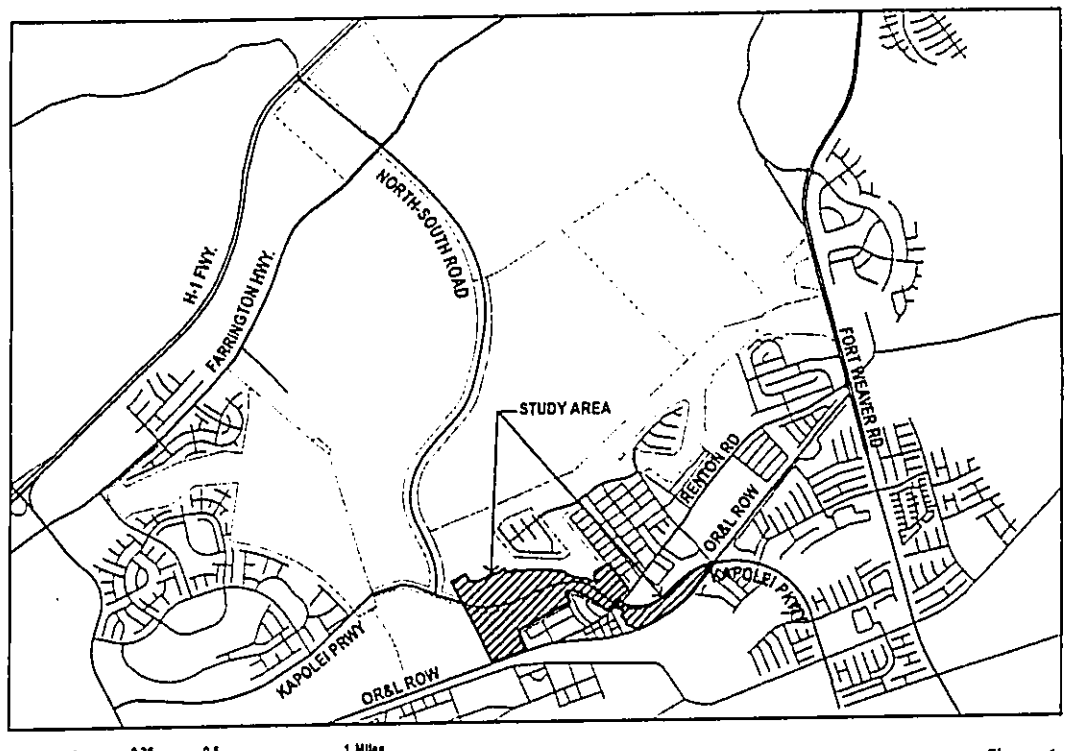


Figure 1
Regional View of Kapolei Parkway Extension Study Area

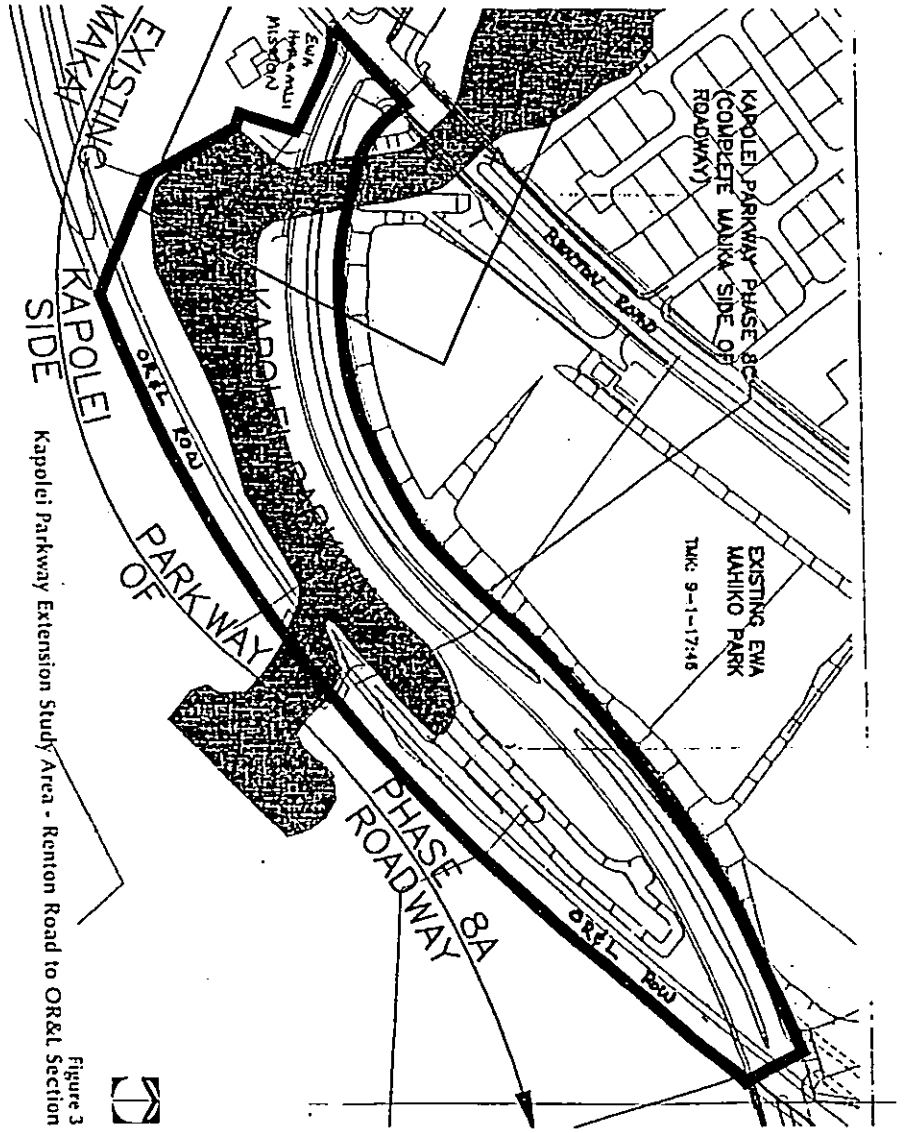


Figure 3
Kapolei Parkway Extension Study Area - Renton Road to OR&L Section

Appendix F
Interim Management Report
for Abutilon menziesii
(April 24, 2001)

Department of Land and Natural Resources
Division of Forestry and Wildlife
Natural Area Reserve System

Interim Management Report for *Abutilon menziesii*

April 24, 2001

The following is a summary of activities implemented by the Department of Land and Natural Resources (DLNR) under the agreement, East Kapolei - Interim Mitigation Plan for the Endangered species, *Abutilon menziesii*, during the 31-month October 1, 1998 to April 24,2001. This report will summarize the activities completed during each of the 10 quarters during that period. We have not completed all activities set forth in the agreement. The only task that remains is the construction of a greenhouse (Task # 5). This is not a final report. A final report will be submitted when all tasks have been completed.

Task 1: Maintain existing population of Abutilon menziesii on State land at East Kapolei, Oahu, Hawaii. This work will include the following:

1. Monitoring

A total of 76 visits were made to the *Abutilon menziesii* plants at Kapolei between October 1998 and March 2000. Two DLNR staff conducted most of the site visits. The breakdown of the visits per quarter can be found in Table 1 below. Each plant was given a number and a permanent tag. The numbers given to plants followed those assigned during the survey done by Kenneth Nagata in December 1997, where appropriate. New numbers were assigned to plants not located during the Nagata surveys. As part of the monitoring process, four mature plants not found in the original survey were discovered; three are outside the project area near the Ewa golf course maintenance building and one adjacent to population C-1. Therefore the number of original plants in the East Kapolei population was the 86 found during the December 1997 survey by Kenneth Nagata, plus the 4 new plants discovered during the site visits made by DLNR staff during this project, for a grand total of 90 plants. We were successful in propagating clones from 62 of the 90 plants. In the Interim Report of 20 June 2000 we stated that there were 62 remaining plants. Several of these plants have since died due to natural senescence. The number of plants still alive is between 30 and 50. Determining whether an *Abutilon menziesii* is still alive is difficult. The plant may appear to be only dead sticks but a heavy rain will cause the plant to suddenly sprout green leaves. Therefore it is difficult to give a definitive total on the plants still alive in East Kapolei. We have contracted with Hawaii Natural Heritage Program to produce a detailed GIS map of all known *Abutilon menziesii* plants and plant locations. This map will be provided in the final report for this project.

Table 1. Site visits to East Kapolei *Abutilon menziesii* plants

Quarter	Number of Site Visits	Total Person Days
October 1998 - December 1998	13	26
January 1999 - March 1999	6	12
April 1999 - June 1999	7	16
July 1999 - September 1999	8	16
October 1999 – December 1999	7	14
January 2000 – March 2000	8	16
April 2000 – June 2000	8	8
July 2000 – September 2000	5	5
October 2000 – December 2000	6	6
January 2001 – March 2001	8	8

2. Maintenance

Plants were watered during each visit and treated six separate times with systemic insecticide to control hibiscus snow scale, ants, and mealy bugs. Vegetation immediately adjacent to each plant was removed during each visit to keep potential fire fuels away from the plant. Plants were not fertilized because of a concern of encouraging soft growth in the wild plants that could not be sustained without the installation of a permanent irrigation system.

3. Security

A fire plan has been implemented for the area that: creates a fire break around the *Abutilon menziesii* populations and individual plants; identifies the fire fighting resources available near the East Kapolei *Abutilon menziesii* population; and provides information to these resources to assist them with protecting these plants from fire. We have contracted the Hawaii Natural Heritage Program to produce a detailed GIS map of all the known *Abutilon menziesii* plants and the key fire resources in the area. This map will be provided to all the Fire Department Stations listed in this fire plan for their reference in case of a fire. This map will be a part of the final report. The TMK for the East Kapolei area where the plants are found is Oahu 9:1:6, parcel 109. The nearest Fire Station to the area is Kapolei Fire Station (Station 40). Station 40 is approximately 2.5 miles from the *Abutilon menziesii* populations.

The potential ignition sources for fires in the East Kapolei area are accidental ignitions from children playing with fire, careless smoking, vehicles in dry flashy fuels, misuse of fireworks, and intentionally set arson fires. Fireworks are prevalent during the New Years and Fourth of July holidays and illegal aerial fireworks are becoming more prevalent during these times. The potential of fireworks as an ignition source in Kapolei is quite high. Illegal motorcycle use of the parcel occurs and is another likely source for fires in the area. To mitigate for the potential for fire we have removed all fuel immediately adjacent to each plant. In late June 2000, we contracted an agricultural disc to create a 30-foot barrier of bare soil around each plant or each cluster of plants. This firebreak is still in place because we have not received any significant rainfall in the area since the establishment of this firebreak.

The fire fighting resources available at Station 40 in Kapolei are an Engine, a Ladder truck, and a Brush Fire truck. A Honolulu Fire Department Battalion Chief is stationed at Station 40. The next closest fire units are at Station 12 in Waipahu. Station 12 has an Engine, a Ladder truck, and a Water Tender. Station 35 in Makakilo is the third closest unit to the area and it has an Engine on site. Station 28 in Makakilo is the fourth closest unit with an Engine and a Water Tender on station. The GIS map we developed shows all the access routes to the main population clusters. This map will be provided the above Fire Stations.

Task 2: Propagate a total representation of plants through seeds and cuttings from the East Kapolei <u>Abutilon menziesii</u> population.

Task 2 of the agreement has been completed. All the known East Kapolei Abutilon menziesii plants have been propagated through cuttings. Figure 1 shows some of the 630 plants we have propagated from cuttings so far. The bullets below detail the propagation work we have done. Table 2 below details the cuttings taken from the East Kapolei *<u>Abutilon menziesii</u>* plants per quarter. Each cutting taken from an East Kapolei plant can be divided into up to six cuttings. We attempt to produce a plant from each cutting but not all are successful. Figure 2 is a photo of many *<u>Abutilon menziesii</u>* plants ready for outplanting.

- A total of 630 plants have been propagated from cuttings of 62 East Kapolei individuals.
- 220 seedlings have been produced from seed. This seed was collected from nursery plants grown from cuttings of the East Kapolei population.
- Research on optimum germination method is ongoing. We are using a heating mat under the seeding tray to speed germination rate. This method has been successful in speeding germination time from 3 to 4 months with regular germination technique to 2 to 3 weeks using this technique.
- We have sent over 800 seeds to Dr. Alvin Yoshinaga at Lyon Arboretum. A percentage of these are sent to the National Seed Storage Lab in Fort Collins, Colorado. These seeds are from nursery plants.
- We have seeds from 39 of the East Kapolei plants in storage at the Pahole Rare plant facility.

Table 2: Cuttings taken of East Kapolei <u>Abutilon menziesii</u>

Quarter	Number of Cuttings Taken
October 1998 - December 1998	120
January 1999 - March 1999	200
April 1999 - June 1999	70
July 1999 - September 1999	30
October 1999 – December 1999	36
January 2000 – March 2000	28
April 2000 – June 2000	40
July 2000 – September 2000	0
October 2000 – December 2000	0
January 2001 – March 2001	70

Figure 1: *Abutilon menziesii* cuttings

Figure 2: Plants grown from cuttings ready for outplanting

Task 3: Establish two wild populations of <u>Abutilon menziesii</u> in appropriate habitat

Two outplanting sites have been identified as the initial sites for the establishment of new wild populations of *<u>Abutilon menziesii</u>* The first site is on unencumbered State land on the Mokuleia side of Kaena Point and the second is on City and County of Honolulu land in Koko Crater.

The first outplanting site is located at the Koko Crater Botanical Garden. The Honolulu Botanical Gardens provided a 100 x 100 foot site set aside for the plant for the initial planting On 16 November 2001, 140 *<u>Abutilon menziesii</u>* were planted at the site provided. These plants represent 2 complete sets of each of the original East Kapolei plants. The planting was accomplished with Honolulu Botanical gardens staff, DLNR staff, and several volunteers The plants have been irrigated with a drip irrigation system and are thriving Koko Crater Botanical Gardens staff will provide the long term care of these plants and will be propagating *<u>Abutilon menziesii</u>* from materials taken from these plants

The Kaena Point outplanting site was initiated in April 2001. The outplanting area is about ¼ mile to the west of the site identified in the June 20, 2000 report The approximately 3-acre outplanting site was established with two distinct planting areas separated by a four-wheel drive road The site is completely protected from four-wheel drive vehicles by a rock barrier along the dirt road fronting the outplanting site We prepared the site by clearing the non native brush and grass with weedeaters and with hand tools We treated the area with herbicide to prevent regrowth of these non-natives A total of 61 *<u>Abutilon menziesii</u>* plants were planted by 6 April 2001. We will be planting more plants in the Kaena Point outplanting site by the end of May 2001. When planting is complete we will have two representatives of each of the 62 East Kapolei plants we have propagated We also planted over 300 other native coastal plants of 20 different species in this site

A complete irrigation system was constructed at the Kaena Point outplanting site to provide the initial irrigation for these plants The DLNR received permission from the U. S. Air Force to tap into the 4-inch water main that runs adjacent to the outplanting site. We contracted a plumber to tap into the line and provide a pressure reducing valve, a backflow preventer, a water meter, and a 1-½ inch stub to attach our irrigation system to We also installed a valve to supply water for fire suppression in the area We constructed a corrugated galvanized steel water tank with a capacity of approximately 3,000 gallons to provide a water reserve for irrigating the plants. This tank is necessary because the 4-inch water main is pressurized only two days a week for 4 hours per day. The cost of the irrigation water will be an ongoing expense for this project. We consulted with DLNR Historic Preservation Division and they declared that the construction of the outplanting site would have no effect on significant historical sites We checked with the City and County about the need for a Special Management Area permit. They confirmed that this site is within the Special Management Area However, the work of developing the outplanting site did not require a permit because was not considered development.

Each outplanting site was planted with a representative sub-sample of the wild plants from East Kapolei and each individual plant will be tagged with permanent metal tags Maintenance of these sites will be done during the establishment of these plants via weeding, application of herbicide, pesticide, and fertilizer.

As part of the national program to preserve rare species, replicates of all wild individuals will be planted in the living collections at Waimea Arboretum It is hoped that this will provide seeds for further out plantings and for distribution We have not done this yet because of the current staffing levels at the Waimea Arboretum

When the above sites are established we will consider other outplanting sites including:

- U. S. Navy land in Lualualei
- Barbers Point
- Kaena Ikí/Yokohama Bay
- Diamond Head Crater
- Makapu'u/Queen's Beach
- A current outplanting site on State land near Kealia Trail

Task 4: Research into the biology of the Abutilon menziesii population

1. Document Past Research
The University of Hawaii has not yet been contracted to document past research on the *<u>Abutilon menziesii</u>* population

2. Testing

a) Test granular diazinon for use in controlling ants.
This was done on all plants and it is a very effective treatment in controlling ants.

b) Test Azatin and encapsulated Dursban on a few plants to determine toxicity
These pesticides provide good control of scale and mealy bugs with no toxicity to *Abutilon* The first trial was conducted on 6 plants in October 1998 The treatment was shown to be effective in this trial and about one month later the treatment was done on the remaining East Kapolei plants

c) Test seed storage in appropriate facilities
Seeds have been collected from 39 individual East Kapolei plants and are being stored at the DLNR rare plant seed storage facility Approximately 700 seeds have been collected from the East Kapolei plants We have collected over 1,000 seeds from nursery plants grown from cuttings We provided over 800 seeds to Dr Alvin Yoshinaga at Lyon Arboretum for seed storage research Some of these seeds have been sent to the National Seed Storage Lab in Fort Collins, Colorado for long term storage.

We will continue to work on finding the most effective germination technique for *<u>Abutilon menziesii</u>* seeds

Task 5: Provide partial funding for the construction of a low-elevation greenhouse dedicated to growing A. menziesii and other threatened and endangered plant species on Oahu.

We have been working on getting a site for a nursery for *<u>Abutilon menziesii</u>* that is near the outplanting site and the DLNR rare plant nursery The preferred site for the low-elevation nursery facility was identified behind Dillingham airfield We had discussions with the Department of Transportation over a 6 month period an I eventually were told that they were unable to lease any portion of the airfield for a use not associated with aviation

The second site we identified for the nursery is on a portion of land owned by DLNR and leased by YMCA Camp Erdman This six-acre site is immediately adjacent to the Camp on the Kaena Point side makai of Farrington Highway YMCA Camp Erdman indicated keen interest in cooperating in the placement of this nursery here This site is attractive because it is close to a

water and power source. Camp Erdman offers the benefits of 24-hour security and the potential as an educational outreach site for rare native plants. This site is considered a backup site because of the amount of work involved in removing the many iron wood trees on the site. The other negatives are that because the site is so close to the ocean the nursery would receive heavy salt spray and would be threatened by salt water during periods of high surf.

The primary site identified for the nursery is on land owned by the State of Hawaii, and leased to Mr. Ron Weidenbeck of Fish Farms Hawaii. The parcel is located in Lot 3 of TMK 6: 9: 01. Mr. Weidenbeck has approved DLNR removing a portion of Lot 3 to establish a nursery. The advantages of this site are: within a hundred yards of a water source; within a hundred yards of a power source; within a 8 foot high chain link perimeter fence; located away from the direct influence of the waves and salt spray; and above a planned caretakers cabin which will provide oversight of the area. We are currently working with Ms. Charlene Unoki of the Division of Land Management, DLNR to convert the lease of this parcel to the Division of Forestry and Wildlife from Mr. Weidenbeck. We expect to complete the transfer of this property and begin construction soon. We will submit the final report for the Housing and Community Development Corporation of Hawaii when we have completed the construction of this greenhouse.

Appendix G

Final Interim Management Report

for Abutilon menziesii

(October 31, 2003)

Department of Land and Natural Resources
Division of Forestry and Wildlife
Natural Area Reserves System

Final Interim Management Report for *Abutilon menziesii*

Actions completed by the Division of Forestry and Wildlife
October 31, 2003

The following is a summary of activities implemented by the Department of Land and Natural Resources (DLNR), Division of Forestry and Wildlife (DOFAW), for the Endangered species, *Abutilon menziesii*, during the 30-month period from April 24, 2001 to October 31, 2003. This is a final report on the interim management activities completed by DOFAW. The Habitat Conservation Plan (HCP) for *Abutilon menziesii* is nearly complete. The Board of Land and Natural Resources must approve the HCP before the plan is considered complete. All future reporting on the management of *Abutilon menziesii* will be done in relation to the HCP.

Project Background

The East Kapolei *Abutilon menziesii* population was discovered in 1996 by Kenneth Nagata during a biological survey conducted for PBR Hawaii, a consulting firm hired by the State of Hawaii agency then known as the Housing Finance and Development Corporation. This survey was done for the East Kapolei Master Plan project that proposed a mixture of residential and community development projects for the area. The East Kapolei area was in sugar cane cultivation for over a century when agricultural operations ceased in spring 1995. The State of Hawaii, Department of Transportation, and the City and County of Honolulu, Department of Transportation Services commissioned another botanical survey by Char and Associates, Botanical Associates, for a proposed highway. The corridor of this proposed highway, known as the North-South Road, passes directly through a significant portion of the East Kapolei Abutilon *menziesii* population. These surveys are documented in previous versions of the East Kapolei Master Plan Habitat Conservation Plan for *Abutilon menziesii*.

In 1999, the State of Hawaii, Housing Finance and Development Corporation, which had changed its' name to the Housing and Community Development Corporation of Hawaii (HCDCH), entered into an agreement with the DLNR/DOFAW for the interim mitigation of the East Kapolei *Abutilon menziesii* population. This agreement (found in Appendix A), which was signed September 15, 1999, was to cover tasks that DLNR/DOFAW completed from October 1, 1998 to March 31, 2000. This agreement was to provide $67,850.00 to complete 5 main tasks in relation to the protection of the East Kapolei *Abutilon menziesii* population and the conservation of the species. The main tasks were: 1) Maintain existing population of *Abutilon menziesii* on State land at East Kapolei, Oahu, Hawaii; 2) Propagate a total representation of plants through seeds and cuttings from the East Kapolei *Abutilon menziesii* population; 3) Establish two wild populations of *Abutilon menziesii* in appropriate habitat; 4) Research into the biology of the *Abutilon menziesii* population; 5) Provide partial funding for the construction of a low-elevation greenhouse dedicated to growing *Abutilon menziesii* and other threatened and endangered plant species on Oahu. A report entitled, Interim Management Report for *Abutilon menziesii*, dated April 24, 2001 documented the work done by DLNR/DOFAW from October 1, 1998 until the report date. DLNR/DOFAW was paid $40,125 for the work accomplishments documented in that

report. All phases of tasks 1, 2, and 4 were accomplished during that period. We were unable to complete all phases of tasks 3 and 5 of the original agreement. We were unable to complete task 3, the establishment of two wild populations of *Abutilon menziesii*, because we had difficulty finding landowners who had suitable habitat and were willing to allow a new population of endangered plant species to be established on their land. The difficulty we had in completing task 5, the establishment of a low-elevation greenhouse, was finding a suitable parcel of State owned land where building a nursery was feasible with a small budget.

A second agreement between HCDCH and DLNR/DOFAW was signed on January 30, 2001 (see Appendix B). This agreement was signed to complete the actions that were not fully completed in the first agreement. This agreement covered actions to complete the establishment of two wild populations, construction of a greenhouse, and the completion of a final report. In this agreement DLNR/DOFAW was to complete the remaining tasks during the period from November 1, 2000 to October 31, 2001. DLNR/DOFAW continued to work through the problems associated with completion of the tasks identified in the second agreement. However, we were not able to complete them all by October 31, 2001. In October 2001, HCDCH was no longer seeking to complete the East Kapolei Master Plan and the agreement was not extended. DLNR/DOFAW did not receive the $27,725.00 that was set aside to complete the tasks in this second agreement. This report will document the completion of all tasks completed by DLNR/DOFAW since April 24, 2001 that were identified in the original agreement. DLNR/DOFAW staff used a variety of funding sources to complete the second outplanting site and complete the nursery. The HCDCH only paid about 60% of the $67,850.00 they had originally pledged to complete the mitigation measures for the conservation of *Abutilon menziesii*.

The North/South Road project of the State of Hawaii, Department of Transportation (DOT), and the City and County of Honolulu, Department of Transportation Services, has become the lead project in the development of the HCP for the East Kapolei population of *Abutilon menziesii*. The DOT has set aside funds to continue work on the conservation of *Abutilon menziesii* until the HCP is finalized, and beyond. These funds have paid for part of the salary of a Horticulturist working for DLNR/DOFAW to work on the completion of the tasks mentioned above. That Horticulturist was hired in March 2001 and he continues to work on the conservation of *Abutilon menziesii*. The DOT funds have also been used to complete the nursery and support tasks related to the conservation of this species.

ACCOMPLISHMENT OF TASKS

Task 1: Maintain existing population of Abutilon menziesii on State land at East Kapolei, Oahu, Hawaii. This work will include the following:

1.Monitoring

A total of 30 visits were made to the *Abutilon menziesii* plants at Kapolei between April 2001 and October 2003. The Horticulturist DLNR/DOFAW hired to work on *Abutilon menziesii* did all the monitoring. The Horticulturist visited the East Kapolei population once a month, or three times per quarter. Each plant has been given a number and a permanent tag. The numbers given to plants followed those assigned during the survey done by Kenneth Nagata in December 1997, where appropriate. The total number of *Abutilon menziesii* at the time of the last report was 90. The DOFAW Horticulturist has found 16 new *Abutilon menziesii* plants in the East Kapolei area since the last report. New numbers were assigned to plants. We have not taken any cuttings from any of these plants. The plants are still too small to be able to withstand the stress of cuttings being

taken from them. One of the 16 new plants has produced seed. That seed has been collected and stored.

The East Kapolei area has been in drought conditions since April 2001. In the spring of 2002, the area did receive a few significant rains. In surveys done at East Kapolei by DLNR/DOFAW in March through May 2002 many *Abutilon* seedlings were found. The Horticulturist decided that the survival of these seedlings was more likely if they were transplanted when they were still small. A total of 31 seedlings from the East Kapolei population were dug up and transplanted in the nearby outplanting site at the Honouliuli Unit of the Pearl Harbor National Wildlife Refuge. 21 seedlings of known parentage and 10 seedlings of unknown parentage that were removed from the East Kapolei population have been planted there. A small portion of the seedlings produced at the East Kapolei population (approximately 10%) during the spring of 2002 were left at East Kapolei and subsequently perished.

In the time since April 24, 2001, several of the original 86 plants have died due to natural senescence. The number of plants still alive is between 25 and 40. Determining whether an *Abutilon menziesii* is still alive is difficult. The plant may appear to be only dead sticks but a heavy rain will cause the plant to suddenly sprout green leaves. Therefore it is difficult to give a definitive total on the plants still alive in East Kapolei. In Appendix C, we have a map with all the *Abutilon menziesii* plants and plant locations noted in relation to existing infrastructure and boundaries. In Appendix D, we provide a map with all known *Abutilon menziesii* plant locations, existing infrastructure, and boundaries overlaid on an aerial photo from PBR Hawaii that was in HCDCH HCP.

2. Maintenance

Irrigation was provided to the 16 new plants to enhance their establishment. A small amount of fertilizer was given to all the live plants. Weeding was done around the base of all plants, including the plants that have died, to discourage the deposition of weed seeds around the mother plant and to reduce competition from weedy species

3. Security

A fire plan has been implemented for the area that created a fire break around the *Abutilon menziesii* populations and individual plants; identifies the fire fighting resources available near the East Kapolei population; and provides information to these resources to assist them with protecting these plants from fire. We have contracted the Hawaii Natural Heritage Program to produce a detailed GIS map of all the known plants and the key fire resources in the area. This map (in Appendix C) will be provided to all the Fire Department Stations listed below for their reference in case of a fire. The TMK for the East Kapolei area where the plants are found is Oahu 9:1:6, parcel 109.

The potential ignition sources for fires in the East Kapolei area are accidental ignitions from children playing with fire, careless smoking, vehicles in dry flashy fuels, misuse of fireworks, and intentionally set arson fires. Fireworks are prevalent during the New Years and Fourth of July holidays and illegal aerial fireworks are becoming more prevalent during these times. The potential of fireworks as an ignition source in Kapolei is quite high. Illegal motorcycle use of the parcel occurs and is another likely source for fires in the area. In late June 2000, we contracted an agricultural disc to create a 30-foot barrier of bare soil around each plant or each cluster of plants. We have not had any significant heavy rains since then to increase the fuel near the plants. Currently this firebreak is still in place. This method of firebreak creation may be more detrimental

than beneficial to the East Kapolei population. The use of the agricultural disc can disturb seeds in the soil bank around the existing plants, which could be detrimental to their germination.

At this time (October 2003) the fuel in the entire project area is light and discontinuous. It is highly unlikely a brush fire could be sustained in the East Kapolei *Abutilon menziesii* population area at this time. The area should be monitored regularly because an extended period of above average rainfall could increase fuel levels sufficiently to present a fire threat

The nearest Fire Station to the area is Kapolei Fire Station (Station 40). Station 40 is approximately 2.5 miles from the *Abutilon menziesii* populations. The fire fighting resources available at Station 40 in Kapolei are an Engine, a Ladder truck, and a Brush Fire truck. A Honolulu Fire Department Battalion Chief is stationed at Station 40. The next closest fire units are at Station 12 in Waipahu. Station 12 has an Engine, a Ladder truck, and a Water Tender. Station 35 in Makakilo is the third closest unit to the area and it has an Engine on site. Station 28 in Makakilo is the fourth closest unit with an Engine and a Water Tender on station. The GIS map shown in Appendix C shows all the access routes to the main population clusters. This map will be provided the above Fire Stations

Task 2:Propagate a total representation of plants through seeds and cuttings from the East Kapolei <u>Abutilon menziesii</u> population.

Task 2 was completed before April 24, 2001. The 16 plants discovered since that time have not been propagated from cuttings. These plants are still to small to sustain cuttings being taken from them.

We have not propagated any new plants from seed since April 24, 2001. We have continued to collect seed from the East Kapolei population. There are 52 plants from the East Kapolei population represented in the seed collection at the Lyon arboretum seed storage facility. This total includes seeds from one of the 16 new plants discovered since April 24, 2003

Task 3: Establish two wild populations of <u>Abutilon menziesii</u> in appropriate habitat

The Interim management report of April 24, 2001 identified two outplanting sites that were the initial sites for the establishment of new wild populations of *<u>Abutilon menziesii</u>*. The first site is on City and County of Honolulu land in Koko Crater and the second is on State land on the Mokuleia side of Kaena Point. Since that report we have completed a third outplanting site at the Honouliuli Unit of the U. S. Fish and Wildlife Service Pearl Harbor National Wildlife Refuge.

1. Koko Crater

The first outplanting site is located at the Koko Crater Botanical Garden. The Honolulu Botanical Gardens provided a 100 x 100 foot site set aside for the plant for the initial planting. On 16 November 2001, 140 *<u>Abutilon menziesii</u>* were planted at the site provided. The planting was accomplished with Honolulu Botanical gardens staff, DLNR staff, and several volunteers. The plants have been irrigated with a drip irrigation system since then and are thriving. Koko Crater Botanical Gardens staff will provide the long term care of these plants and will be propagating *<u>Abutilon menziesii</u>* from materials taken from these plants. DLNR has provided support to weed the Koko Crater population on periodic visits to the site. This site met the criteria for the establishment of wild

populations under the first interim mitigation plan agreement between HCDCH and DLNR/DOFAW when it was initially established. However, since the establishment of this site, we have received comments from the Endangered Species Recovery Committee and others. These comments have caused DLNR/DOFAW to reconsider the appropriateness of this population to be considered a wild population. DLNR/DOFAW agrees that since this site is within a public display garden that it should not be considered as a wild population for the purposes of the Habitat Conservation Plan. In addition, the plants at Koko Crater have been on drip irrigation since they were planted. This has caused the plants to grow taller and have more luxuriant growth than they would in a truly wild population. DLNR/DOFAW views this population as a living collection representation of the genetic stock of the East Kapolei *Abutilon menziesii* population. DLNR/DOFAW will work with the staff at Koko Crater Botanical Gardens to coordinate the management of this population.

2. Kaena Point

The Kaena Point outplanting site was started in April 2001. The outplanting area is about ½ the distance between the end of the paved Farrington Highway and the vehicle barrier at the entrance to the Kaena Point Natural Area Reserve. The land is under the jurisdiction of the DLNR, Division of State Parks (TMK 6.9.01, Parcel 4). The DLNR Historic Preservation Division declared that the construction of the outplanting site would have no effect on significant historical sites. The City and County of Honolulu Planning Section confirmed that this site is within the Special Management Area. However, the work of developing the outplanting site did not require a permit because was not considered development.

The approximately 3-acre outplanting site was established with two distinct planting areas separated by a four-wheel drive road. The site is completely protected from four-wheel drive vehicles by a rock barrier along the dirt road fronting the outplanting site. The initial cost of installing this barrier was nearly $4,000. This barrier has been challenged by off-road vehicles occasionally and we have improved the barrier in areas where vehicles have attempted to breech the barrier. We prepared the site by clearing the non-native brush and grass with weedeaters and with hand tools. We treated the area with herbicide to prevent regrowth of these non-natives. A total of 61 *Abutilon menziesii* plants were planted by 6 April 2001. We have planted 81 additional plants since April 2001. A total of 142 *Abutilon menziesii* plants have been planted in the Kaena Point outplanting site. The plants were irrigated at the site to promote their establishment. The approach we plan to take at this site is to irrigate the plants to encourage the production of a maximum amount of seed to allow the build up of the seed bank and natural establishment of seedlings. The survival rate for plants at this site has been 98%. The 142 plants at this site represent a total of 43 of the original East Kapolei plants. Two *Abutilon* seedlings have grown naturally from seed produced by plants outplanted at this site. These seedlings have grown large enough to be considered part of this population.

A complete irrigation system was constructed at the Kaena Point outplanting site to provide the initial irrigation for these plants. The DLNR received permission from the U.S. Air Force to tap into the 4-inch water main that runs adjacent to the outplanting site. We contracted a plumber to tap into the line and provide a pressure reducing valve, a backflow preventer, a water meter, and a 1-½ inch stub to attach our irrigation system to. We also installed a valve to supply water for fire suppression in the area. We constructed a corrugated galvanized steel water tank with a capacity of approximately 3,000 gallons to provide a water reserve for irrigating the plants. This tank is necessary because the 4-

inch water main is pressurized only two days a week for 4 hours per day. The cost of the installation of this irrigation system was nearly $12,000 to complete these tasks.

The Kaena Point outplanting site has been a difficult one to maintain. This site was established in area with deep soil that was dominated by Guinea grass (*Panicum maximum*) and koa haole (*Leucaena leucocephala*). We have had difficulty keeping up with the weed threat presented by these species and others at this outplanting site. DLNR/DOFAW has used a variety of labor including regular Natural Area Reserves System employees, temporary workers such as the Emergency Environmental Workforce, and volunteers to control weeds in the outplanting site. This additional labor has barely allowed us to keep pace with the weed threat at this site. The money provided under the HCDCH agreement was used to establish the irrigation system at this site and pay a portion of the first year of the salary for the Horticulturist assigned to work on all the activities concerning the conservation and recovery of *Abutilon menziesii*. Money provided by the State of Hawaii DOI has continued to support this position since 2001. This Horticulturist position has spent the majority of his time working on construction of the nursery dedicated to growing *Abutilon menziesii*. We would not have been able to keep up with the weed threat at this site without the additional labor supplied by regular DLNR/DOFAW employees. We will not be able to continue to support the weed threat control at this site at this level. This is due to other important projects taking precedence and a hiring freeze that has left the Oahu Branch with three vacant positions. It will be very difficult for the Horticulturist to keep up with the weed threat at this outplanting site.

The other major threat to this outplanting site is fire. The fire plan that has been in place at this site is the installation of the water tank that serves as a resource for fire fighting in addition to being part of the irrigation system, installation of a 2 inch outlet to allow fire engine hookup near the road as another fire fighting resource, and the planting of native plants along the perimeter of the outplanting site to serve as a fuel break. These tasks were accomplished. However, the fuel break portion of this fire plan needs to be developed further with a wider buffer of fire resistant species established.

On August 20, a brush fire started by a vehicle about ¼ mile away burned a total of 160 acres along the coastal flats up to the nearby Kuaokala Game Management Area at about 1,100 feet elevation. This fire started late at night and was fanned by winds of 25 to 35 mph. The fire burned to the edge of the outplanting site and around it. The fire moved so quickly that Honolulu Fire Department engine companies were not able to engage the fire near the ignition point, or near the outplanting site. They did fight the fire to prevent its' spread in the Kuaokala GMA on August 21. The fire burned approximately 30 percent of the 3-acre outplanting site. The effects of the fire on the *Abutilon menziesii* plants at the site are unknown at this time. We will not know how many were killed by the fire until the rainy season commences and there is sufficient moisture for growth. The plants along the edge were affected by the flames but not completely consumed. It is possible that many of these *Abutilon menziesii* plants will survive. The fire did burn many of the other native species planted in the area to serve as a fuel break along the front of the outplanting site. This fire would of caused more damage if these plants had not been in place. These fuel break plants will need to be replaced. The fire did destroy all irrigation pipes in the area. The cost to replace this pipe will be about $3,000. The lesson that DLNR/DOFAW has learned from this experience is that the fuel break plantings are the most useful part of the fire plan. The fuel break at the Kaena Point outplanting site needs to be replaced and improved to encompass the entire outplanting site.

The HCP should set aside enough funds to cover the full costs of developing and maintaining an outplanting site. The money provided under the agreement with HCDCH provided funds to install the vehicle barrier and the irrigation system, and provided some funds towards the first year of the Horticulturists' salary. The total cost to establish this outplanting site was more than $20,000. This does not include the cost of staff time of DLNR/DOFAW employees. The cost would have been significantly higher if the site was further from a water source.

The initial establishment of outplanting sites will be the most expensive phase of the project. Future outplanting sites should be chosen with that in mind. Several important factors need to be considered when developing an outplanting site for wild *Abutilon menziesii* populations: 1) The site should have a water source or irrigation method identified and accounted for in the budget; 2) It is important that the weed threat at the site is manageable with limited staffing or, if that is not possible, the work force and the resources necessary to combat the weed threat should be identified up front; 3) The fire threat to the site should be addressed with fuel break plantings; 4) The site must not be too remote as to require significant travel time and effort to get personnel and tools and equipment there; 5) The protection of the site from human impact needs to be considered and addressed in the establishment of the site. The HCP should front load the first few years of the budget to address the costs associated with initial development of outplanting sites.

3. Honouliuli Unit of Pearl Harbor National Wildlife Refuge

A third outplanting site has been developed at the Honouliuli Unit of the U.S. Fish and Wildlife Service Pearl Harbor National Wildlife Refuge that borders the West Loch of Pearl Harbor (TMK 9:1:17). This 37-acre unit is mostly a fresh water wetland managed for a variety of endangered water birds. The entire Honouliuli Unit is enclosed in an eight-foot chain link fence that provides predator control for the birds and security for the plants. There is an upland area within this Unit that we felt was suitable for planting *Abutilon menziesii*. We installed an irrigation system at the site to assist with the initial establishment of plants there at a cost of approximately $2,500.

We have planted a total of 61 *Abutilon menziesii* plants at the Honouliuli Unit. The survival rate of the plants outplanted there is 96%. Plants from cuttings from 21 of the original East Kapolei plants are planted here. In addition, 21 seedlings of known parentage and 10 seedlings of unknown parentage that were removed from the East Kapolei population in the spring of 2002 have been planted here. A small portion of the seedlings produced at the East Kapolei population (approximately 10%) during the spring of 2002 were left at East Kapolei and subsequently perished. Three plants produced from seed were also planted at Honouliuli. The amount area covered by this outplanting site is approximately ½ an acre. There is sufficient area to add many more plants to this site.

The threat to this outplanting site from fire is minimal. The eight-foot chain link fence provides a barrier to most of the possible ignition sources. A buffer of approximately 6 feet of bare ground is in place just inside most of the perimeter fence of this unit to serve as a barrier to predators of the endangered water birds. This buffer strip also serves as a firebreak to the outplanting site. The portion of the fence that doesn't have this buffer has fresh water marsh just inside the fence. The only fire plan we have for this site is to make sure this buffer strip remains in place.

Task 4: Research into the biology of the Abutilon menziesii population.

No further research activities have been conducted on the biology of the *Abutilon menziesii* population. We have continued to collect seed produced by 52 of the original East Kapolei plants. Over 20,000 seeds have been collected.

Task 5: Provide partial funding for the construction of a low-elevation greenhouse dedicated to growing A. menziesii and other threatened and endangered plant species on Oahu.

We have completed the construction of a 6,000 square foot nursery dedicated to the propagation of *Abutilon menziesii* and other threatened and endangered plant species on Oahu. The nursery is located above the Kaena Point end of Dillingham Air Field on the North Shore of Oahu. The nursery is located is located in Parcel 3 of TMK 6 9 01. This parcel is owned by the State of Hawaii, managed by the Land Division of the DLNR, and was leased to Mr. Ron Weidenbeck of Fish Farms Hawaii. We are still in the process of getting the parcel under the jurisdiction of DLNR/DOFAW. There have been issues related to some of the other parcels leased to Mr. Weidenbeck in the area that have slowed this process.

This task has been the most difficult one to complete. The most difficult phase was locating suitable parcel of State owned land where building a nursery was feasible with a small budget. We looked at sites on DOT land closer to the Dillingham Airfield and a parcel near Camp Erdman in addition to others. The selection of a nursery site was not complete until October 2001. The site needed a significant amount of groundwork before it was usable as a nursery. The leveling of the site included hauling 300 tons of rock to the site. We finally completed the groundwork in March 2002. The next difficulty was developing construction specifications and getting bids for the construction of the main part of the nursery. This phase took from April 2002 until June 2002. We completed the construction of the main part of the nursery in the fall of 2002. Once the construction of the nursery was complete we installed the shade cloth with the help of DLNR/DOFAW staff and volunteers. The next to the last phase of the project was the completion of the electrical hook up which included the installation of a new power pole, electrical meter, and safety switch. We also had to wire the pumps for the water system, provide power in the nursery for lights, and outfit the storage containers we had moved to the site with lights and power outlets. The final phase of the nursery project was the installation of a water system. This phase required obtaining permission to tap into a line at a nearby concrete reservoir tank, the installation of a 10,000 gallon storage tank, installation of a 1,000 gallon booster tank, installation of pumps to lift water to the upper storage tank and pressurize the nursery supply lines, and installation of the irrigation system within the nursery. These final two phases were completed by the end of August 2003.

The original agreement with HCDCH set a budget of $10,000 to contribute towards the construction of a nursery dedicated to growing *Abutilon menziesii*. The total cost for completing all phases of this nursery was over $68,000.00. We utilized a variety of funding sources to complete the nursery. We utilized $13,189.53 of the funds set aside by DOT for *Abutilon menziesii* during the nursery construction phase of the project. The nursery alone cost more than the entire amount originally budgeted to complete all tasks in the first Interim Mitigation plan for the Endangered Species, *Abutilon menziesii*, between DLNR/DOFAW and HCDCH. The Horticulturist hired with a majority of his salary coming from DOT funds has spent 80% of his work time since October 2001 working on completion of this nursery. The monetary value of his time is not included in the total listed above.

APPENDIX A

BENJAMIN J. CAYETANO
GOVERNOR

DONALD H.W. LAU
EXECUTIVE DIRECTOR

SHARYNE S. MIYASHIRO
EXECUTIVE ASSISTANT

FAX (808) 587-0600

STATE OF HAWAII
DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT AND TOURISM
HOUSING AND COMMUNITY DEVELOPMENT CORPORATION OF HAWAII
677 QUEEN STREET, SUITE 300
Honolulu, Hawaii 96813

TO: Department of Land and Natural Resources
Division of Forestry and Wildlife
Oahu Branch

DATE: September 16, 1999
ATTENTION: Randy Kennedy

RE: East Kapolei - Interim Mitigation Plan for the Endangered Species, Abutilon Menziesii

WE ARE SENDING YOU X ATTACHED
___ UNDER SEPARATE COVER VIA _____ THE FOLLOWING ITEMS

COPIES	DATE	NO	DESCRIPTION
1	9/15/99		Executed Agreement for the East Kapolei interim mitigation plan

THESE ARE TRANSMITTED as checked below:

___ For approval
X For your use
___ As requested/required
___ For review and comment
___ FOR BIDS DUE _____.

___ Approved as submitted
___ Approved as noted
___ Returned for corrections

___ Resubmit
___ Submit
___ Return

___ copies for approval
___ copies for distribution
___ corrected prints

REMARKS. _____

IF THERE ARE ANY QUESTIONS, PLEASE CONTACT. Leo Domingo TELEPHONE NO. 587-3170

SIGNED. _____
Project Coordinator

COPY TO. _____

IF ENCLOSURES ARE NOT AS NOTED, KINDLY NOTIFY US AT ONCE

DHS 1308/ (8/87)

AGREEMENT

THIS AGREEMENT is made this 15th day of September, 1999, by and between the HOUSING AND COMMUNITY DEVELOPMENT CORPORATION OF HAWAII ("HCDCH"), a public body and body corporate and politic of the State of Hawaii, whose post office address and principal place of business is 677 Queen Street, Suite 300, Honolulu, Hawaii 96813, and the DEPARTMENT OF LAND AND NATURAL RESOURCES ("DLNR"), State of Hawaii, whose address is 1151 Punchbowl Street, Honolulu, Hawaii 96813, and

WHEREAS, the Department of Land and Natural Resources (DLNR), has title to that certain real property situated at Honouliuli, Ewa, Oahu, Hawaii, containing an area of 1,300.000 acres, and identified as tax map keys: 9-1-016:008, 9-1-016:109, 9-1-016:109, 9-1-017:006, 9-1-017:071, 9-1-018:003, and 9-1-018:005 (collectively referred to as "East Kapolei State Land Bank,") and

WHEREAS, DLNR is in the process of transferring title of the East Kapolei State Land Bank to HCDCH for development purposes in order to satisfy legislative and administrative goals and objectives, specifically to generate funds for the University of Hawaii West Oahu Campus, to facilitate the development of private sector housing units, and to provide off-site infrastructure for the 200-acre site to be transferred to the Department of Hawaiian Home Lands, and

WHEREAS, HCDCH is the designated master plan developer for the East Kapolei Master Planned Development Project, which encompasses the East Kapolei State Land Bank, and

WHEREAS, HCDCH has filed a Final Environmental Impact Statement (FEIS) for the East Kapolei State Land Bank. The FEIS was accepted by the Governor of the State of Hawaii on September 23, 1998, conditioned upon satisfying the requirements of Chapter 343, Hawaii Revised Statutes, and specifically to implement the Habitat Conservation Plan for the endangered abutilon menziesii in accordance with the requirements of the U.S. Fish and Wildlife Service and the State Department of Land and Natural Resources;

WHEREAS, DLNR has the capability of performing the plant mitigation and has the knowledge and expertise to administer the mitigation of the endangered Abutilon Menziesii, and is willing to provide services for the interim mitigation of the endangered Abutilon Menziesii,

NOW THEREFORE, in consideration of the premises above, the parties mutually agree as follows:

1. DLNR shall perform the tasks set forth in "Exhibit A", attached hereto and incorporated herein. DLNR shall provide reasonable safeguards to secure the existence of the endangered Abutilon Menziesii, to maintain the existing plant population, to establish a new "wild" population, and to perform research into the biology of the endangered Abutilon Menziesii.

2. HCDCH will pay to DLNR the total sum of $67,860.00 as set forth in "Exhibit B", attached hereto and incorporated herein. Quarterly payments will be made upon submission of written quarterly reports of progress to HCDCH.

3. DLNR will perform the tasks during an 18-month period, beginning from October 1, 1998 and ending on March 31, 2000.

4. This Agreement shall be null and void if the Habitat Conservation Plan is not approved by DLNR.

5. This Agreement may be terminated at any time by written consent of both parties.

IN WITNESS WHEREOF, the undersigned have executed these presents as of the day and year first written above.

APPROVED AS TO FORM:

Deputy Attorney General

HOUSING AND COMMUNITY DEVELOPMENT CORPORATION OF HAWAII

Donald K. W. Lau
Its Executive Director

DEPARTMENT OF LAND AND NATURAL RESOURCES

Timothy E. Johns, Chairperson
Board of Land and Natural Resources

Exhibit "A"

SCOPE OF SERVICES

A. Task 1

Maintain existing population of Abutilon Menziesii on State lands at East Kapolei, Oahu, Hawaii. This work will include the following:

1. Monitoring

   a. Place permanent stakes for sequence shots.
   b. Record GPS data in notebook and on video soundtrack.
   c. Create a new map with GPS points using GIS.

2. Maintenance

   Maintain existing population by weeding, and applying herbicide, pesticide and fertilizer.

3. Security

   Develop and implement a fire protection plan for the population.

B. Task 2

Propagate a total representation of plants through seeds and cuttings from the Abutilon Menziesii population. These plants will be used to maintain genetic representation of stock and provide stock for outplanting purposes. Work will be done at the existing State DLNR, Division of Forestry and Wildlife (DOFAW) nurseries or at appropriate co-operating nurseries.

C. Task 3

Establish two wild populations of Abutilon Menziesii in appropriate habitat to allow for natural establishment and long term viability. Prepare and implement fire protection plan for the population. Secure wild population from off-road vehicles using boulder barriers.

D. Task 4

Research into the biology of the Abutilon Menziesii population.

1. Contract the University of Hawaii to document past research on the Abutilon Menziesii population.

2. Perform testing and identify testing parameters as follows:

   a. test granular diazinon for use in controlling ants;
   b. test Azatin and encapsulated Dursban on a few plants to determine toxicity;
   c. test seed storage in appropriate facilities in the event of problems with wild populations;
   d. establish testing parameters for outplanting site selection to include, but not limited to, salt influence, occasional storm wave wash influence, associated soil organisms, and accompanying pests.

E. Task 5

Construct a greenhouse dedicated to growing Abutilon Menziesii endangered plant species. The greenhouse would serve as a long-term greenhouse for threatened and endangered plant species on Oahu. Task 5 includes the following scope:

1. Site Preparation

   a. clear and grade the greenhouse site, having approximately 0.5 acres in size; and
   b. construct an eight-foot high chain link fence.

2. Water Supply

   a. develop a permanent water source for greenhouse irrigation;
   b. purchase and construct a 5,000 gallon tank for emergency backup water supply; and
   c. provide irrigation system for greenhouse.

3. Greenhouse Construction

   a. construct a greenhouse using a prefabricated greenhouse kit;
   b. construct two shade structures for preparing nursery stock for outplanting; and
   c. purchase benches, pots, and equipment necessary to operate the greenhouse.

F. Administration

Document findings and prepare quarterly reports of progress. At the end of the contract period, prepare a summary final report which provides a recommendation of action and possible alternatives, if any, based upon documented findings and results.

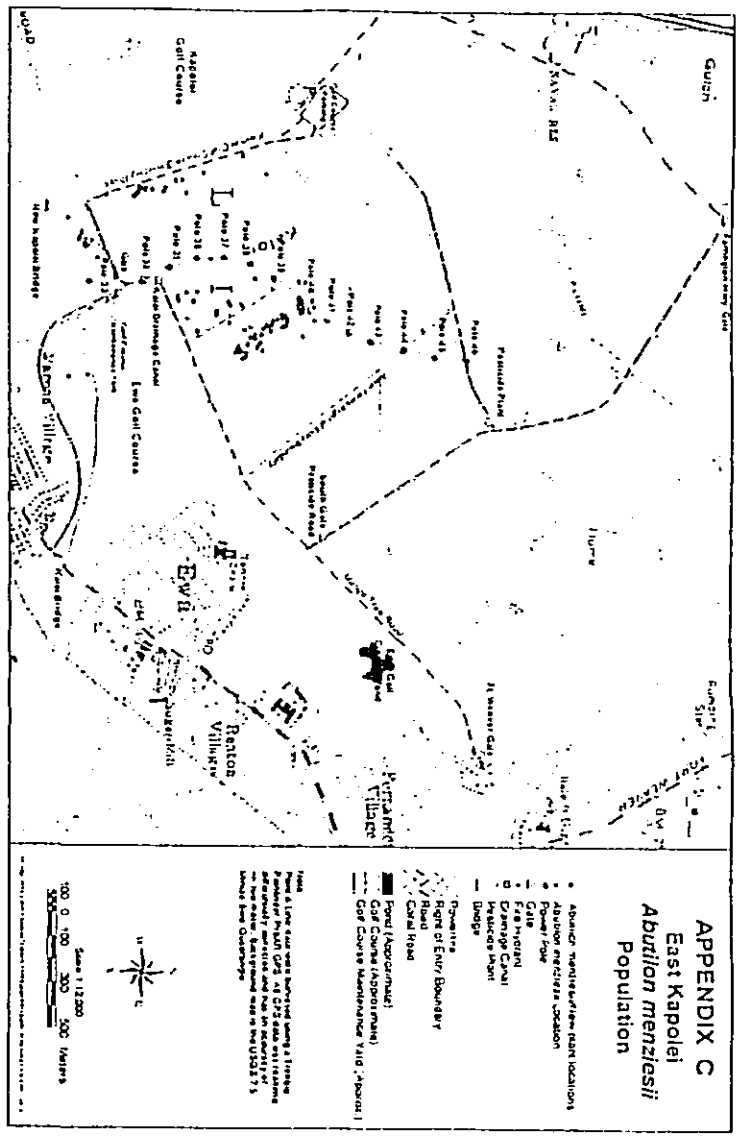
DEV 21000.19

Exhibit "B"

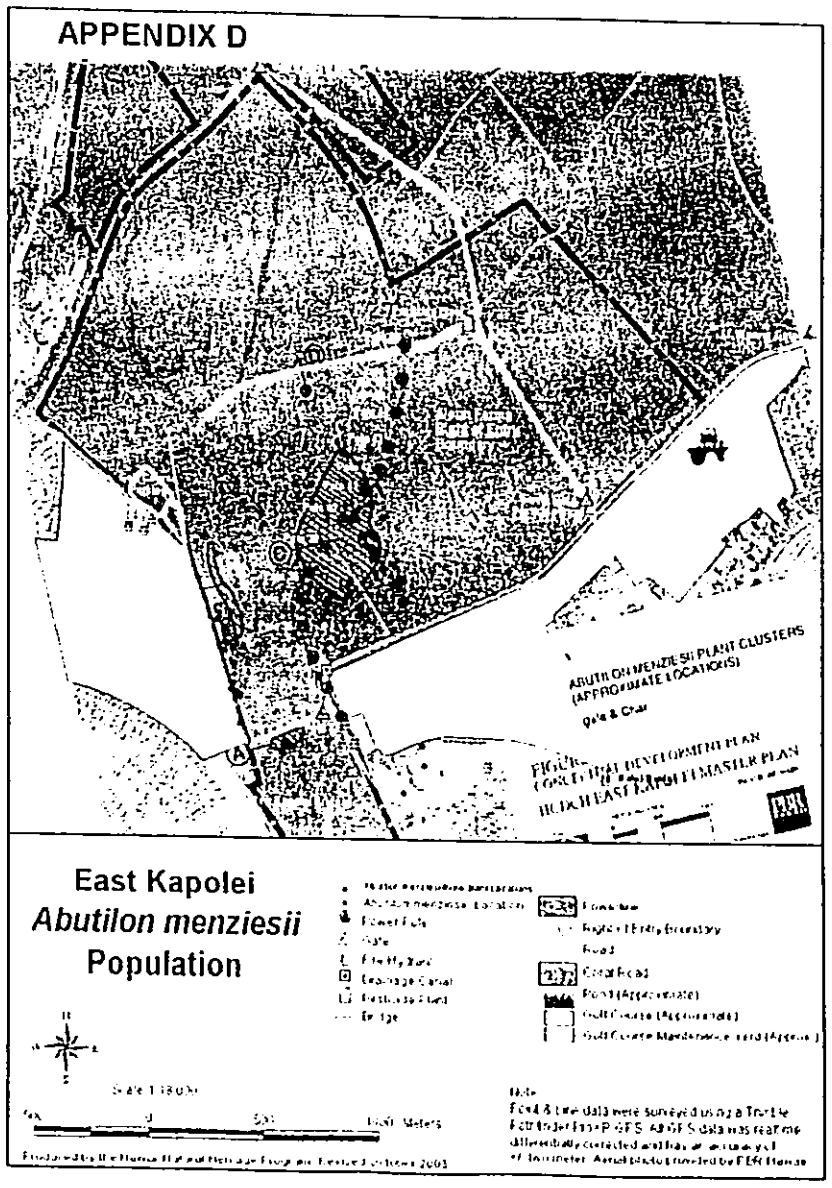
COMPENSATION

Payment will be made upon DLNR's submission of quarterly reports to HCDCH. Final payment will be made upon DLNR's submission of a final report to HCDCH. Compensation is based upon the following cost breakdown:

Task 1	in the amount of	$18,300.00
Task 2	in the amount of	$10,950.00
Task 3	in the amount of	$16,600.00
Task 4	in the amount of	$ 7,500.00
Task 5	in the amount of	$10,000.00
Administration	in the amount of	$ 4,500.00
	TOTAL COMPENSATION	$67,850.00

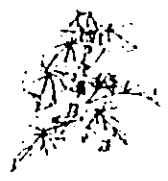


APPENDIX D


ABUTILON MENZIESII PLANT CLUSTERS
(APPROXIMATE LOCATIONS)
Gate & Chair
East Kapolei
Abutilon menziesii
Population
Scale 1:8000
Meters

Habitat Conservation Plan
for *Abutilon Menziesii* at Kapolei

HABITAT CONSERVATION PLAN FOR ABUTILON MENZIESII AT KAPOLEI



State of Hawai'i
Department of Transportation

FINAL HCP
March 2004

HABITAT CONSERVATION PLAN FOR ABUTILON MENZIESII AT KAPOLEI

State of Hawaii
Department of Transportation

Prepared by

Value Olaosha
with
PBR HAWAII
for
Parsons Brinckerhoff
and
State of Hawaii
Department of Transportation

FINAL HCP
March 2004

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PREFACE

The preparation of the *Habitat Conservation Plan for Abutilon menziesii at Kapolei* ("HCP") was initiated in 1996 with two State sponsored development proposals. The first proposal involved the 1,300-acre East Kapolei Master Plan project proposed by the Housing and Community Development Corporation of Hawaii ("HCDCH") under a right-of-entry agreement with the Department of Land and Natural Resources ("DLNR"). The second proposal by the Department of Transportation ("DOT") involved the North-South Road arterial highway which would bisect the 1,300-acre property. The earlier drafts of the HCP were therefore co-sponsored by DOT and HCDCH.

In actions by the Board of Land and Natural Resources in September 2002, the 1,300 acres of State land have been re-assigned to other State of Hawaii entities. The University of Hawaii has received 500 acres for the development of the University of Hawaii West Oahu campus ("UHWO") and the Department of Hawaiian Home Lands has acquired 200 acres for residential homestead development. The remaining 600 acres are again under the control of the DLNR. Thus, HCDCH no longer holds an interest to these Kapolei lands.

Abutilon menziesii has also been found on adjacent lands owned by the City and County of Honolulu. The City has therefore, requested that its land be included in the subject HCP to allow the construction of a proposed roadway segment and other potential future urban uses. Thus, the Final HCP incorporates an additional 81 acres for a total of 1,381 acres of land.

As described herein, DOT has assumed sole sponsorship of the HCP for the total population of *Abutilon menziesii* at the Kapolei property. DOT has also assumed mitigation responsibility as described in a Memorandum of Agreement ("MOA") with DLNR.

And finally, a request for an Incidental Take License for the Kapolei population will involve coordination and cooperation between DOT and other stakeholder parties through future agreements (i.e., MOA, Certificate of Inclusion) when other properties are ready to be developed.

EXECUTIVE SUMMARY

A population of *Abutilon menziesii* was discovered in late 1996 at Kapolei in the Ewa area, island of Oahu, State of Hawaii, on former sugarcane land. Hence, this population is referred to as the "Kapolei population". *A. menziesii* of the Mallow Family (Malvaceae) is also known by its Hawaiian name Kooloaula and its common name "red ilima". It has been a federally listed endangered species since 1986 and is protected under the provisions of the federal Endangered Species Act of 1973, as amended, and Chapter 195D, *Hawaii Revised Statutes*, as amended. *A. menziesii* is one of nine species included in the *Lanai Plant Cluster Recovery Plan* (US Fish and Wildlife Service, 1994).

This habitat conservation plan is prepared pursuant to Chapter 195D-21, HRS, as amended. Accordingly, the HCP provides a description of the development actions proposed on the 1,300-acre State-owned property and an adjacent 81-acre City and County of Honolulu ("City") property at Kapolei (referred herein as the "Kapolei property"). The HCP describes the impact of development actions on the Kapolei population and proposes a series of mitigative strategies that would provide a net gain of *A. menziesii* to further the recovery of the species.

The preparation of this HCP began in 1997, with drafts prepared in 1997, 1999, 2001, and 2003 and reviewed by the Department of Land and Natural Resources Division of Forestry and Wildlife ("DLNR DOFAW"), the Endangered Species Recovery Committee ("ESRC"), and the US Fish and Wildlife Service ("USFWS"). The present HCP incorporates the actions which have been undertaken as interim mitigation measures and describes the mitigation measures for the Kapolei population that are planned over a period of approximately 20 years.

The sponsor of this HCP is the State Department of Transportation ("DOT"), which will be acquiring a portion (approximately 24.6 acres) of the Kapolei property from DLNR for the proposed North-South Road. The Housing and Community Development Corporation of Hawaii ("HCDCH") had also previously contributed substantially to the development of the HCP and its Interim Management Plan.

The Presence of Abutilon menziesii on the Kapolei Property

For nearly a century, the Kapolei property was cultivated in sugarcane. According to the Oahu Sugar Company, sugarcane was last harvested on the property in 1994, prior to the permanent closure of the company in Spring 1995. Typical of sugarcane grown in Hawaii, the cane was a two-year crop and harvesting practices involved burning to reduce the leaf bulk before the cane stalks were mechanically harvested. Generally, the cane fire in each field lasted 20 to 30 minutes. The now abandoned fields at the Kapolei property were exposed to cane fires every two years during nearly ten decades of cane cultivation.

Botanical surveys of the Kapolei property have been conducted by Kenneth Nagata (1996) and Char & Associates (1996, 1997, 2003, 2004). The survey reports are attached as Appendices A, B, C, D, and E, respectively.

The property is described as a disturbed site characterized by the dominance of alien weed species interspersed with remnant sugar cane. Therefore, the discovery of *A. menziesii* in September 1996 by Nagata approximately two years after the last cane harvest is seen as an enigma (Nagata 1996). Nagata's 1996 reconnaissance survey covered 80 percent of the State property. A subsequent survey by Char in December 1996 following an unusually wet period in November and December 1996 recorded 88 plants. In December 1997 Nagata conducted a second comprehensive survey and recorded 86 plants on-site. One plant was observed off-site to the south of the project site at Renton Road. The December 1997 survey produced taxonomic data and a precise mapping of the plants. A subsequent GPS based map was produced by DLNR. In 2003, Char completed a survey of the City property and discovered an additional 7 plants.

The plants are spatially distributed in five clusters in the central and southern portions occupying approximately 25 percent of the Kapolei property and are described as Clusters A, B, C, D, and E. Through attrition the present number of plants has been reduced to between 30 and 50 (DLNR 2001) but new seedlings have recently been recorded (DLNR 2003), however, this HCP is generally based on the baseline number of 93 plants.

Landownership

The State-owned Kapolei property, consisting of approximately 1,300 acres, was previously leased to Oahu Sugar Company, Limited until 1995; upon its closure, the land was transferred back to the State of Hawaii under the jurisdiction of DLNR Land Division. Through a right-of-entry agreement with HCDCH the property was reclassified in 1998 for urban uses to further the development of Kapolei as the secondary urban center of the City and County of Honolulu and the State of Hawaii. The land tenure however, was changed in late 2002 and 500 acres were transferred to the University of Hawaii for a new West Oahu campus. In addition, 200 acres will be transferred to the Department of Hawaiian Home Lands ("DHHL") for residential development. Both the University of Hawaii and the DHHL have received right-of-entry to their properties and HCDCH's right-of-entry has been revoked. The remaining 600 acres have reverted to DLNR.

A portion of the proposed North-South Road property is owned by DLNR and a portion is owned by the Estate of James Campbell. *A. menziesii* is present only on the State-owned portion. The planned development of the North-South Road will require property conveyance from DLNR and the Estate of James Campbell to DOT. The land conveyance actions are anticipated to be accomplished in 2004 prior to the commencement of construction.

The 81-acre City and County of Honolulu property is comprised of portions of two larger parcels of land which include the adjacent existing Ewa Villages Golf Course to the north. The City's Kapolei Parkway roadway segment and future urban development are anticipated on this vacant land.

The Proposed Developments

Developments proposed by public agencies include the North-South Road, the Kapolei Parkway segment, and the University of Hawaii West Oahu campus. In addition, DHHL will develop residential homesteads for native Hawaiian beneficiaries. Collectively, the HCP refers to these

developments as the "Kapolei projects". The remaining DLNR land area has also been planned for urban uses, however, no specific development proposal is under consideration at this time.

North-South Road

The Department of Transportation is proposing to develop the North-South Road, a federal-aid highway, which would be a principal arterial roadway providing support to the regional network of roadways and to the Interstate Route H-1 ("H-1 Freeway"). The North-South Road would bisect and provide access to the land developments at the Kapolei property and also provide an alternate access roadway for other Kapolei and Ewa communities.

The North-South Road would traverse the Kapolei property between the H-1 Freeway (located to the north) and the City's segment of Kapolei Parkway (located to the south).

Kapolei Parkway Extension

The Kapolei Parkway segment is a 0.7 mile major collecter roadway which will link the North-South Road and Renton Road and existing segments of the Kapolei Parkway. The subject roadway project will traverse the City's Ewa Villages property and will provide an alternative regional access to the H-1 Freeway. Regional access to Interstate H-1 is currently limited to Fort Weaver Road. The Kapolei Parkway segment is also a federal-aid highway project.

Department of Hawaiian Home Lands

DHHL is mandated to develop and deliver homesteads to qualified native Hawaiians. The development of 200 acres of DHHL lands would include approximately 1,000 residential homesteads and potentially some commercial and community facility uses to serve its new subdivisions. The first phase is planned for occupancy in 2006 and buildout expected in approximately 8 to 10 years. These uses have been described as part of the East Kapolei Master Plan. The DHHL parcels are to the west of North-South Road, with one parcel to the north of UHWO and the other to the south of UHWO.

A new segment of Kapolei Parkway will bisect the DHHL parcel. This segment will connect to the existing Kapolei Parkway to the west and to the City's proposed Kapolei Parkway segment (described above) and the North South-Road.

University of Hawaii West Oahu

The UH West Oahu campus will be a major educational facility in Kapolei, primarily serving the Leeward and Central Oahu region. The University is currently exploring options for the development of the campus and at present is planning an approximately 100-acre campus which will be developed in phases to an ultimate student population of 7,600. Additionally, about 150 acres of land will be allocated on the property for future campus expansion beyond the 7,600 student population. The University is also considering a number of land use options for the remaining 250 acres of land within the 500-acre property to serve the campus and surrounding region. Construction of the initial phase of the campus could begin in the latter part of 2005, with a completion date of

Fall 2007. The initial phase of campus development would be located in the northeastern portion of the property, in close proximity to Farrington Highway.

Department of Land and Natural Resources

The 600 acres of land under the authority of the DLNR Land Division have been previously planned for residential and school facilities as well as open space areas, which would serve as drainage detention basins as part of the East Kapolei Master Plan. The ultimate specific uses of these lands will be determined in the future.

Habitat Conservation Plan Goals and Objectives

Pursuant to Chapter 195D, the habitat conservation plan shall contain sufficient information for the Board of Land and Natural Resources ("BLNR") to ascertain with reasonable certainty the likely effect of the plan upon any endangered, threatened, proposed, or candidate species in the plan area and throughout its habitat range. Thus, the goal of this HCP is to initiate and sustain a program which would result in an overall net gain in the number of *Abutilon menziesii* on Oahu, thus, contributing towards the recovery of the species as required by HRS Chapter195D-30. HRS Chapter195D-2 defines "Recovery" or "recover" to mean that "the number of individuals of the protected species has increased to the point that the measures provided under this chapter (Chapter 195 HRS) or the Federal Endangered Species Act are no longer needed."

The objectives of the HCP are threefold: (1) describe the existing conditions of the Kapolei population; (2) describe the potential impacts of the Kapolei projects on *Abutilon menziesii*; and (3) describe the strategies and actions to mitigate the impacts. The major strategy designed to mitigate impacts and to benefit the species is the creation of three protected off-site wild populations on Oahu from the single degraded Kapolei population.

To test whether new populations could be established from Kapolei stock of *A. menziesii*, an Interim Management Program was initiated in 1998 and funded by HCDCH. This program has successfully been implemented by DLNR. A complete representation of 630 plant progeny were propagated from the Kapolei population and outplanted at Koko Crater Botanical Gardens, Kaena Point State Park, and Honouliuli Unit of the Pearl Harbor National Wildlife Refuge. The Interim Management Program is described in detail in Strategy (1) of Section 3 and in the DLNR Draft and Final Interim Management Report for *Abutilon menziesii* (2001, 2003), attached as Appendix F and Appendix G.

The HCP is formatted according to the guidelines set forth in HRS Chapter 195D-21. In addition, recommendations received from DLNR, the Endangered Species Recovery Committee, and the US Fish and Wildlife Service have been incorporated

Impacts and Mitigative Measures

The development of the Kapolei projects is expected to result in incidental take of the entire Kapolei population during an approximately 20-year development period. Therefore, a series of actions are proposed that will produce three new offsite "wild" populations, protect the genetic diversity of the existing population, and protect existing individuals by relocating them to the new population

locations. This HCP also proposes long-term management that would occur concurrently with project development to ensure that benefits are realized for *A. menziesii*.

The duration of the HCP implementation and active management period is approximately 20 years and is tied to the accomplishment of the measurable goals that include the establishment of a minimum of three offsite self-sustaining populations. The successful implementation of the HCP would significantly increase the numbers of new plants on Oahu as well as improve their quality compared to the *in situ* disturbed canefield conditions at the Kapolei property.

Funding and Implementation

The primary funding mechanism is a trust fund for endangered species as promulgated in Chapter 195D-31, HRS. DOT will provide the funding to implement the HCP. The North-South Road, as planned, would affect approximately 25 percent of the population, and the other Kapolei projects would affect the remaining 75 percent. As agreed by DOT and DLNR in a Memorandum of Agreement, DOT on March 14, 2001 made available funds in the amount of $250,000 for the initial five years of HCP implementation. These initial funds are being utilized (since approximately August 2001) by DLNR to manage and implement the HCP strategies. The MOA also stipulates that the subsequent 15 years will also be funded by DOT. An additional $750,000 will also be delegated to DLNR upon the approval of the HCP by the Board of Land and Natural Resources (or the Hawaii Legislature, as appropriate) and the Governor's release of the funds for a total not to exceed $1 million over a maximum period of 20 years.

DOT will also establish a contingency fund and has developed a process for third party developers ("Cooperators") to utilize the Incidental Take License through a Certificate of Inclusion. The Cooperators would pay into a contingency fund for the following purposes: 1) to finance unanticipated costs incurred by DLNR in the implementation of the HCP measures; and 2) to fund the management and monitoring of three "wild" populations beyond 20 years. The total initial amount of the Contingency Fund is $200,000. To ensure this fund DOT will deposit the full $200,000 amount following the approval of the HCP.

SECTION 1

Identify the geographic area encompassed by the plan; the ecosystems, natural communities, or habitat types within the plan area that are the focus of the plan; and the endangered, threatened, proposed, and candidate species known or reasonably expected to be present in those ecosystems, natural communities, or habitat types in the plan area.

(1a) Geographic Area Encompassed by the Plan

The location of the existing plants is at Kapolei, Ewa District, Oahu, Hawaii (Figure 1). The property is bounded on the north by Farrington Highway and H-1 Freeway, to the west by the Villages of Kapolei and Kapolei Golf Course, to the south and southeast by Ewa Villages and Renton Road, and to the east by diversified agricultural fields and fallowed sugarcane land. It encompasses former sugar cane lands from approximately 60 feet above mean sea level ("AMSL") at Renton Road up to 200 feet MSL at the H-1 Freeway. The site also contains an existing Hawaiian Electric Company, Inc. ("HECO") powerline easement. Since 1999, BLNR has leased approximately 550 acres of the property to Aloun Farms, Inc. and A.M. Enterprise, LLC on a month-to-month basis for crop farming. The leased parcels are not known to have any *A. menziesii* on the premises. Kaloi Gulch and the Hunehune tributary, both intermittent ephemeral streams, traverse the property from the north to the southeast boundary. There are no known *A. menziesii* plants in the gulch and tributary.

New offsite populations of *Abutilon menziesii* have been initiated at the City and County of Honolulu Koko Crater Botanical Garden (Outplant Site #1), Kaena Point State Park (Outplant Site #2, Wild Site #1), and Honouliuli National Wildlife Refuge (Outplant Site #3, Wild Site #2). The Koko Crater site is not considered a "wild site"; however, its value is as a protected repository for the full genetic stock of the Kapolei population.

Additional outplant wild sites will be initiated within the region of the Kapolei population as well as other suitable areas on Oahu as described in Section 3, Strategy (4). Candidate sites include Diamond Head State Park, Lualualei Naval Reserve (at the Radio Transmission Facility), Kealia Trail, Kalaeloa Northern Trap and Skeet Range, Kalua Kauila (near Makua Valley), area mauka of Yokohama Beach and Makapuu Head. These sites are also described in Section 3, Strategy (4).

(1b) Ecosystems, Natural Communities, or Habitat Types within the Plan Area

The Ewa Plain experiences light rainfall with a mean annual rainfall of about 20 inches per year, most of which occurs between the months of November and April. Based on more than 50 years of data collected at Oahu Sugar Company (and its predecessor, Ewa Plantation), average annual daily minimum and maximum temperatures in the project area are 65 degrees F and 84 degrees F, respectively. On the arid Ewa plain, the fallow agricultural land and the low levels of evapo-transpiration which occurs from scrub vegetation produces little cooling effect.

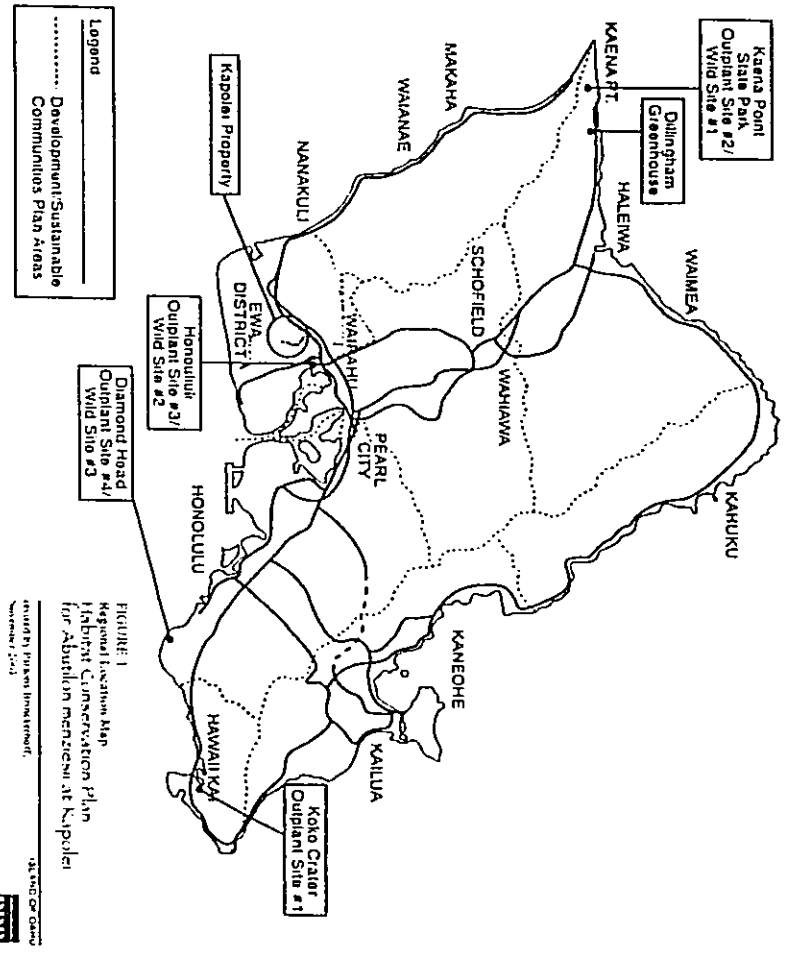


FIGURE 1
Regional Location Map
Habitat Conservation Plan
for *Abutilon menziesii* at Kapolei

The project area was formerly cultivated as sugarcane land and is now characterized as a disturbed coastal dry ecosystem. The vegetation of the region is generally lowland shrub with a coastal fringe of kiawe trees. In the past several years the Kapolei property and surrounding lands have been taken out of sugar cane cultivation and put to other uses (e.g. urbanization, diversified agriculture, fallowed fields).

The vegetation in the region is largely determined by the history of cultivation (or disturbance) on each parcel of land. Nagata (1996) has identified eight plant communities within the State's 1,300-acre project area: 1) Abandoned Cane Fields, 2) Fallowed Fields Mixed Herb Association, 3) Fallowed Fields Grassland Association, 4) Abandoned Fields, 5) Cultivated Fields, 6) Grasslands, 7) Gulch Association, and 8) Roadside Vegetation.

Within the Kapolei Parkway area, Char (2004, Appendix E), documents the dominant vegetation type as koa haole / buffel grass scrub.

Within the Kapolei property there are 80 to 100 plant species common to former sugar cane lands (Appendices A and B). Only two species are indigenous (*Sida fallax* or ilima and Jacquemontia *ovalifolia* or pauohiiaka), two are probably indigenous (*Waltheria indica* or uhaloa and *Abutilon incanum* or hoary abutilon), that is, they are native to the Hawaiian islands and elsewhere; and one, the subject plant, *Abutilon menziesii* or kooloaula is endemic, or native only to the Hawaiian Islands. The vast numbers of plants are non-native.

As previously mentioned, *Abutilon menziesii* is not known to be present on the areas which are in crop cultivation.

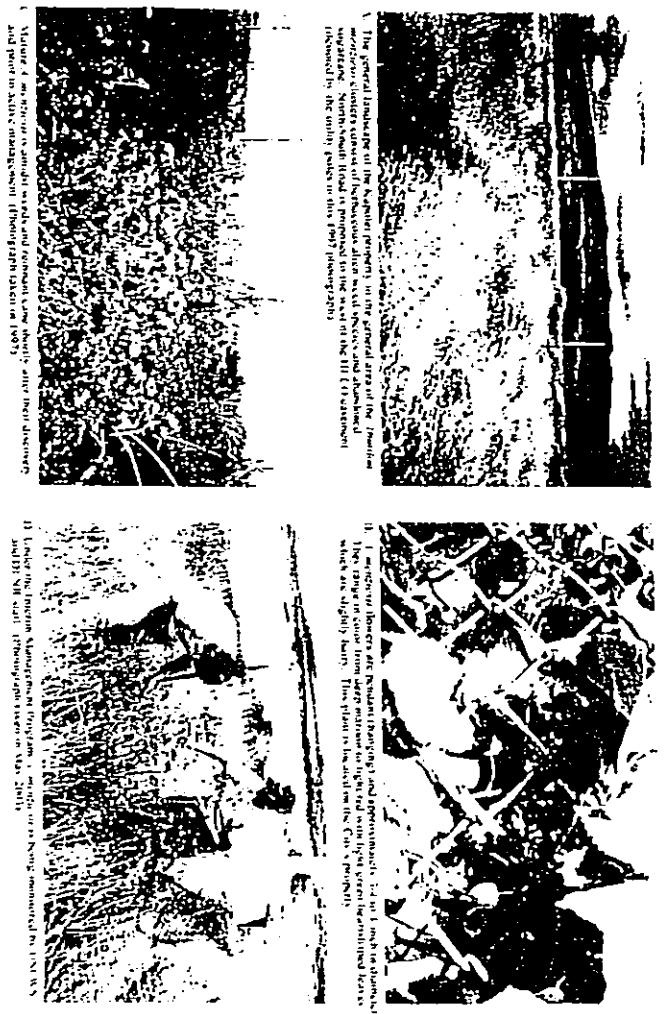
The Kaloi Gulch and Honchune tributary gulch are intermittent and originate north, or mauka, of the H-1 Interstate Freeway. As stated above, past and recent surveys have found no *A. menziesii* within or directly adjacent to the gulches (Nagata 1996 and Char 1997, 1997, 2003, 2004).

(1c) The endangered, threatened, proposed, and candidate species known or reasonably expected to occur in the ecosystems, natural communities, or habitat types in the plan area.

Except as noted above, *A. menziesii* has been found throughout the natural communities and ecosystems of the Kapolei property.

Abutilon menziesii, also known by its Hawaiian name kooloaula, is a shrub in the Mallow Family (Malvaceae) with light green heart-shaped leaves and characteristic small dark red to maroon flowers; hence, the plant is also commonly referred to as the red ilima. Photographs in Figure 2 show *A. menziesii* in the Kapolei habitat.

Abutilon menziesii was federally listed as an endangered species in 1986 and is now protected under the provisions of the federal Endangered Species Act of 1973, as amended, and Chapter 195D, *Hawaii Revised Statutes* ("HRS"), as amended. It is one of nine endangered species included in the *Lanai Plant Cluster Recovery Plan* (US Fish and Wildlife Service, 1994).



Photographs *Abutilon menziesii* at Kapolei Property
Habitat Conservation Plan
for *Abutilon menziesii* at Kapolei

March 2004

PBR HAWAII

Of the nine taxa described in the Lanai Recovery Plan, *A. menziesii* was assigned a high probability of recovery due to its larger population size, its resistance to some of the current threats, and the relative ease of propagation. The Lanai Recovery Plan does not describe the Kapolei population; the populations which are identified are on Lanai, Hawaii, and Maui.

At the time of the Nagata survey in September 1996, 38 individuals were recorded in a reconnaissance survey covering 80 percent of the State property. After the unusually heavy rains of November 1996, Char (1997) in a 100 percent survey of the areas described by Nagata recorded 86 plants at approximately the same locations as Nagata. In December 1997 Nagata performed a detailed survey and count which was followed by precise mapping. The survey and count resulted in 87 plants, 86 on the subject property and one (1) plant at an off-site location on City and County of Honolulu property at Renton Road adjacent to the southern boundary of the State property.[1] Additional plants were identified by Char in 2004 on the City property. The plants are in four clusters (Clusters A, B, C, and E) one additional plant (Cluster D) was also identified (Figure 3). In October 2003, DLNR DOFAW produced an updated map (Figure 3A) depicting the baseline and 16 new plant locations. The new plants occur in close proximity of a mature plant and fall within the known and mapped clusters.

Since the previous baseline year of 1997 the numbers of individuals on the State-owned property have fluctuated with rainfall levels and it is anticipated that the number of individuals will continue to be dynamic. Therefore this HCP covers the entire population of *A. menziesii* within the State and City lands as depicted in Figure 5. To attempt to quantify the development impacts, a baseline population number of 93 (revised in 2004 to include City land) individuals has been assigned. This baseline of 93 individuals is differentiated from the approximate number of 50± currently existing plants. Table 1 describes the baseline distribution of *A. menziesii*.

Table 1. Baseline Population of *Abutilon menziesii* at Kapolei, 1997 (Revised to Include Cluster E, 2004)

Cluster	No. of Plants
A	10
B	14
C	61
D	1
E	7
TOTAL	93

Cluster A consists of 10 individuals and is located at the southern end of the State project site. An existing dirt road situated in an east to west direction provides access to this cluster.

[1] The Kapolei population is distributed on State and City lands.

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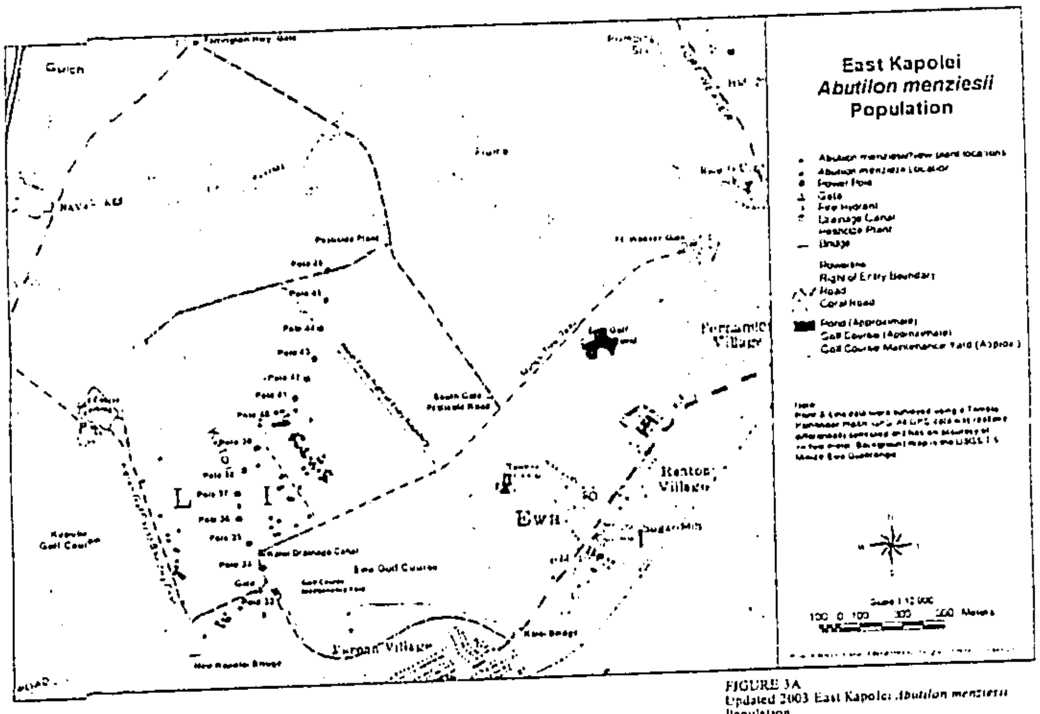


FIGURE 3A
Updated 2003 East Kapolei *Abutilon menziesii* Population

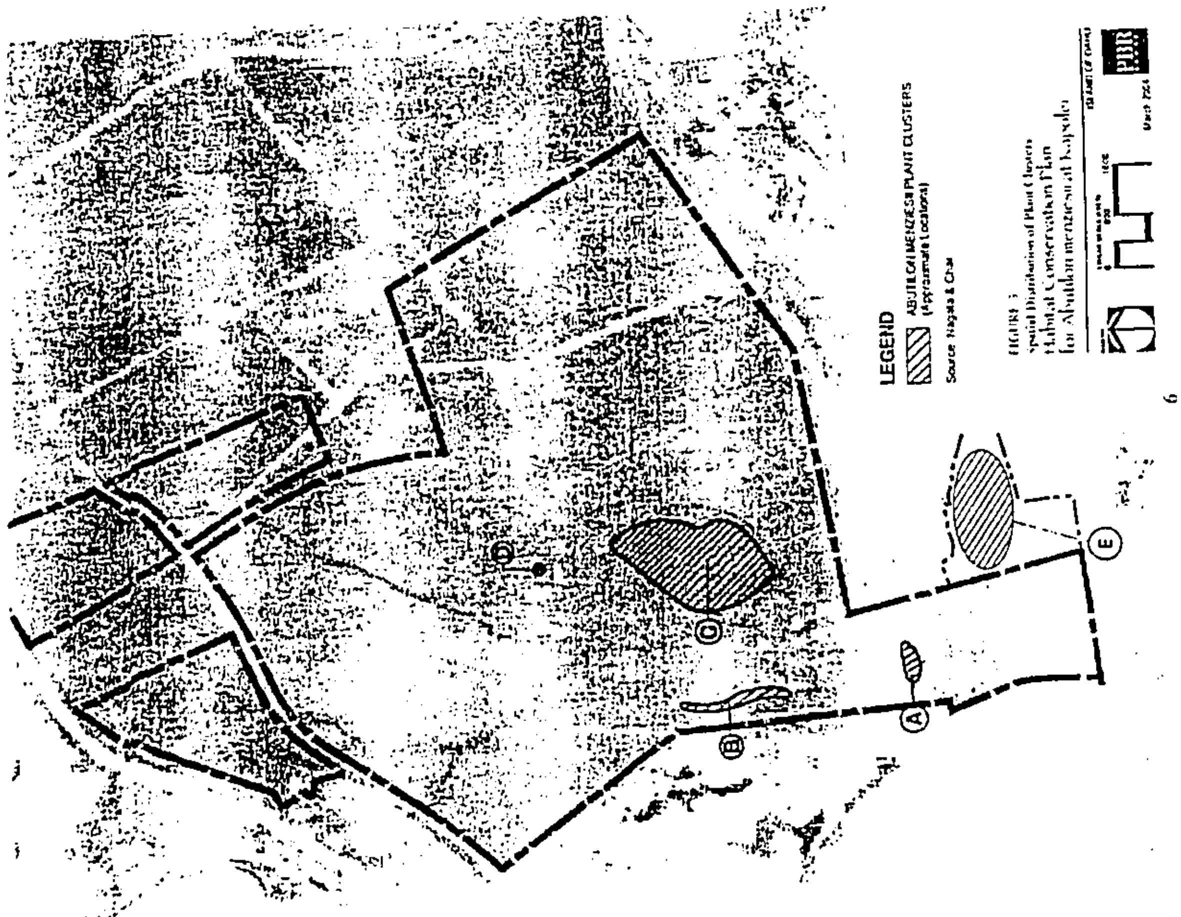
Habitat Conservation Plan
for Abutilon menziesii at Kapolei

ISLAND OF OAHU

revised by Parsons Brinckerhoff, November 2003

PBR

November 2003



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Cluster B consists of 14 individuals located along the western boundary of the State property which is marked by a chain-link fence. Individuals in this cluster are spread in a north-south direction and are accessed from the dirt road near Cluster A at the southern end of the property.

Cluster C, the largest cluster consisting of 61 plants occurs in the general area of the HECO powerline easement and primarily to the east of the powerline easement. The cluster is accessed from Mango Tree Road which is situated in an east-west direction. Several land uses would affect Cluster C, therefore three sub-areas identified as C-1, C-2 and C-3 have been designated.

Table 2. Cluster C (Sub-Areas)

Sub-Area	No. of Plants	Land Use
C-1	14	North-South Road
C-2	7	Drainage/Open Space Corridor
C-3	40	Residential, other urban uses
TOTAL	61	

Cluster D consisted of a single plant in the central area of the State site; however, this individual has not been seen since the initial recording.

The individuals in Cluster E are spread over an 81-acre area and occur as single plants, except at one location along a fence line at the property boundary and access roadway. At this location, there is a large, multi-stemmed plant, a young single-stemmed plant, and a seedling. Cluster E is accessed from the dirt road which leads to the Ewa Villages Golf Course Maintenance Facility. A segment of Kapolei Parkway and future urban uses are planned at this location.

At the time of the 1997 Nagata survey, plants in the population were 1 to 3.5 feet in height and included juveniles and mature individuals. Approximately 74% of the population were taller than 3 feet, 20% were between 2 to 3 feet, and only 6% were between 1 to 2 feet. No seedlings or small plants were identified. In December 1997, 37% of the plants were flowering and/or fruiting (Nagata 1997).

Present Status. Through natural senescence and accidental take (1997 to 2001), the number of plants has declined to 30 to 50 plants (DLNR 2001); however, in 2003, DLNR recorded 16 new plants in close proximity of existing mature plants (DLNR 2003). The actual number of plants is difficult to determine due to the dry conditions at Kapolei; plants which may appear to be dead may possibly revive during the wet season (DLNR 2001).

Contributing to the decline of the Kapolei population was a January 2000 incident in which approximately four plants were crushed/destroyed (by being plowed) and seedlings were killed (DLNR DOFAW/V. Caraway, personal communication).

SECTION 2

Describe the activities contemplated to be undertaken within the plan area with sufficient detail to allow the department to evaluate the impact of the activities on the particular ecosystems, natural communities, or habitat types within the plan area that are the focus of the plan habitat types in the plan area.

(2a) Description of the activities to be undertaken within the plan area in sufficient detail

The Kapolei projects include North-South Road, a segment of Kapolei Parkway, University of Hawaii West Oahu campus, Department of Hawaiian Home Lands residential homestead development, and unspecified urban uses on the DLNR lands. The projects are shown in a Conceptual Land Use Plan in Figure 4. Land ownership is shown in Figure 5 and described in Table 3.

Table 3. Landownership of the Parcels at the Kapolei Property

Project	TMK Number	Acres*
DOT / North-South Road**	9-1-16: 109 Campbell Estate portion	24.6 39.1
City & County of Honolulu Kapolei Parkway and Urban Uses	9-1-17: por. 069 9-1-17: por. 075	***41.0 / 6.3 ***40.0 / 2.7
DHHL	9-1-16: 108**** 9-1-18: 003	165.466 44.235
UHWO	9-1-16: por. 108 and 9-1-16: 120	500.327
DLNR	9-1-16: 008 9-1-17: 071 9-1-17: 088 9-1-17: 056 9-1-18: 005	31.915 201.254 200.090 40.619 65.599

* Approximate area. (NOTE: Information gathering is still in process due to recent changes in land disposition.)

** North-South Road alignment is under State DLNR and Campbell Estate ownership, to be transferred to DOT in 2004. Legal subdivision is still pending.

*** Approximately 81 acres of the vacant City property was surveyed by Char (2003); however, only approximately 9 acres comprise the Kapolei Parkway segment ROW. The remaining land is anticipated to be urbanized.

**** Parcel 108 includes another future segment of Kapolei Parkway; this roadway segment is to be sub divided out of Parcel 108. The net area to DHHL will be approximately 203 acres.

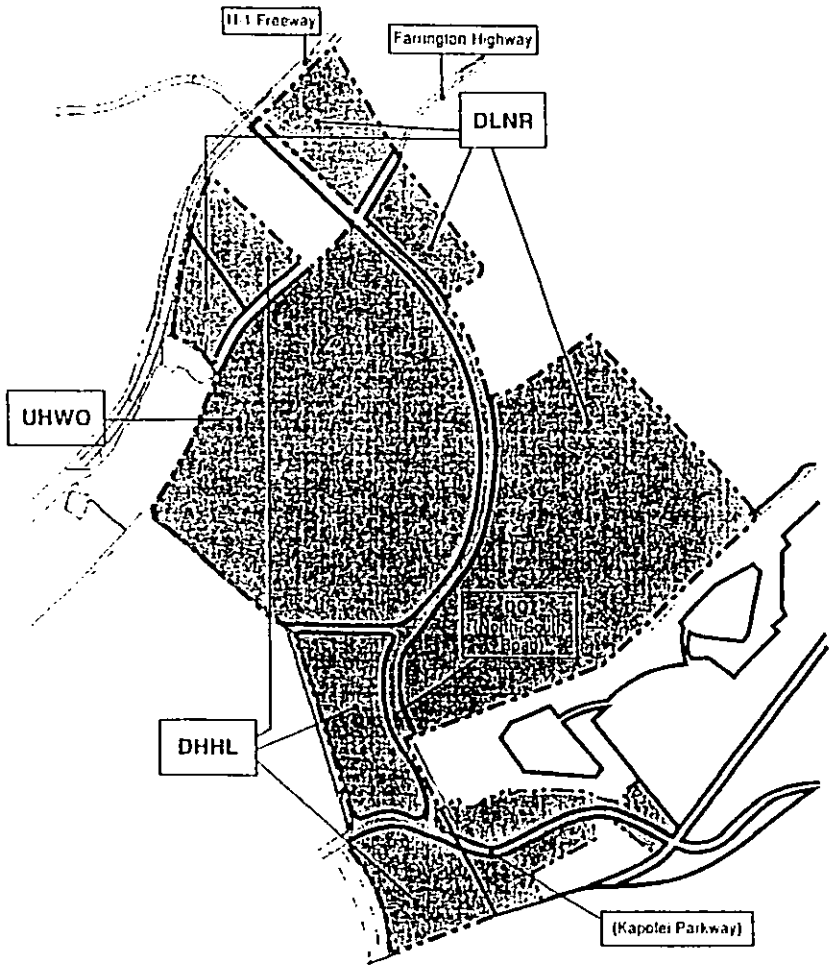
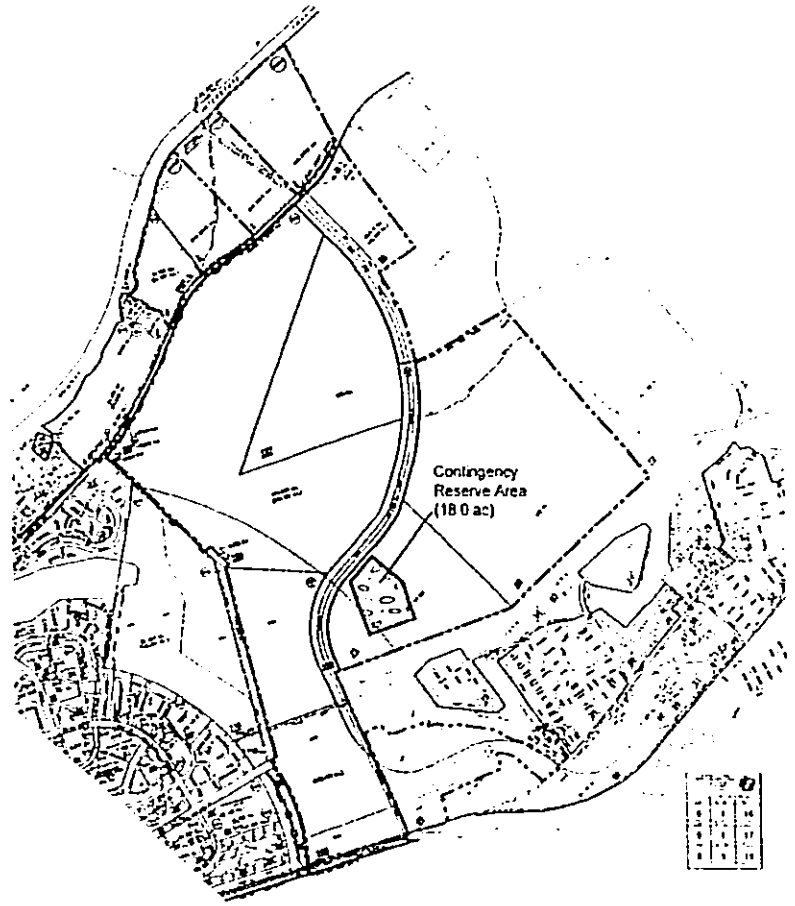


FIGURE 4
Conceptual Land Use Plan
Kapolei Property
Habitat Conservation Plan
for Abutilon menziesii at Kapolei



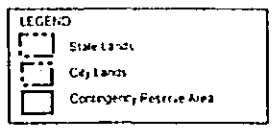


FIGURE 5
Landownership Map
Habitat Conservation Plan
for Abutilon menziesii at Kapolei

The distribution of *A. menziesii* on the Kapolei property, and more specifically, within the development parcels, is shown in Figure 6. Surveys conducted since 1996 have not identified A. menziesii in Kaloi and Hunehune Gulches (Nagata 1996, 1997; Char 1997, 2003, 2004 and DLNR 2001, 2003); thus the HCP is not affected by activities proposed at either gulch location.[2] The approximate numbers of individuals are described in Table 4 following the descriptions of the proposed projects.

North-South Road

The North-South Road, a new 6-lane major collector roadway, will traverse the Kapolei property and will provide regional access to the Interstate H-1 Freeway, connecting the Interstate Route H-1 ("H-1 Freeway") (at the north end) to a future segment of Kapolei Parkway (at the south end), a distance of approximately 3.6 km (2.2 miles). Its alignment is adjacent to and toward the west of the corridor delineated by the existing HECO power line electrical easement. The new roadway is designed with three vehicular lanes in each direction, a planting median, and sidewalks on both sides with an overall width of 116 feet.

The overall schedule for the North-South Road began with the initial planning in 1994 and an anticipated completion in 2008:

Planning:	June 1994 to September 2004
Design:	Aug 1997 to Sept 2004
Construction:	Dec 2004 to Dec 2008

The North-South Road construction is planned to be built in two phases:

- Phase 1 (late 2004 - 2007) - Mass grading for six (6) lanes and drainage improvements; construction of three (3) highway lanes from Kapolei Parkway to H-1 Freeway.

- Phase 2 (late 2005 - @2008) - Construction of additional three (3) lanes; construction of drainage detention basins, construction of intersections at Kapolei Parkway and Farrington Highway; construction of interchange at H-1 Freeway.

The Phase 1 component includes roadway and drainage grading and the construction of three (of the six) lanes on the Kapolei property. The impact to *A. menziesii* is anticipated in Phase 1.

The Phase 2 components include the construction of the additional three lanes and intersections on the Kapolei property. The off-site construction of the Interchange at the H-1 Freeway will also be completed in Phase 2. The Interchange would provide an access to the Kapolei downtown area and the Ewa plain. There are no known *A. menziesii* within the area of the Interchange, therefore,

[2] DOT will coordinate with the US Department of the Army Corps of Engineers on matters related to Kaloi and Hunehune gulches.

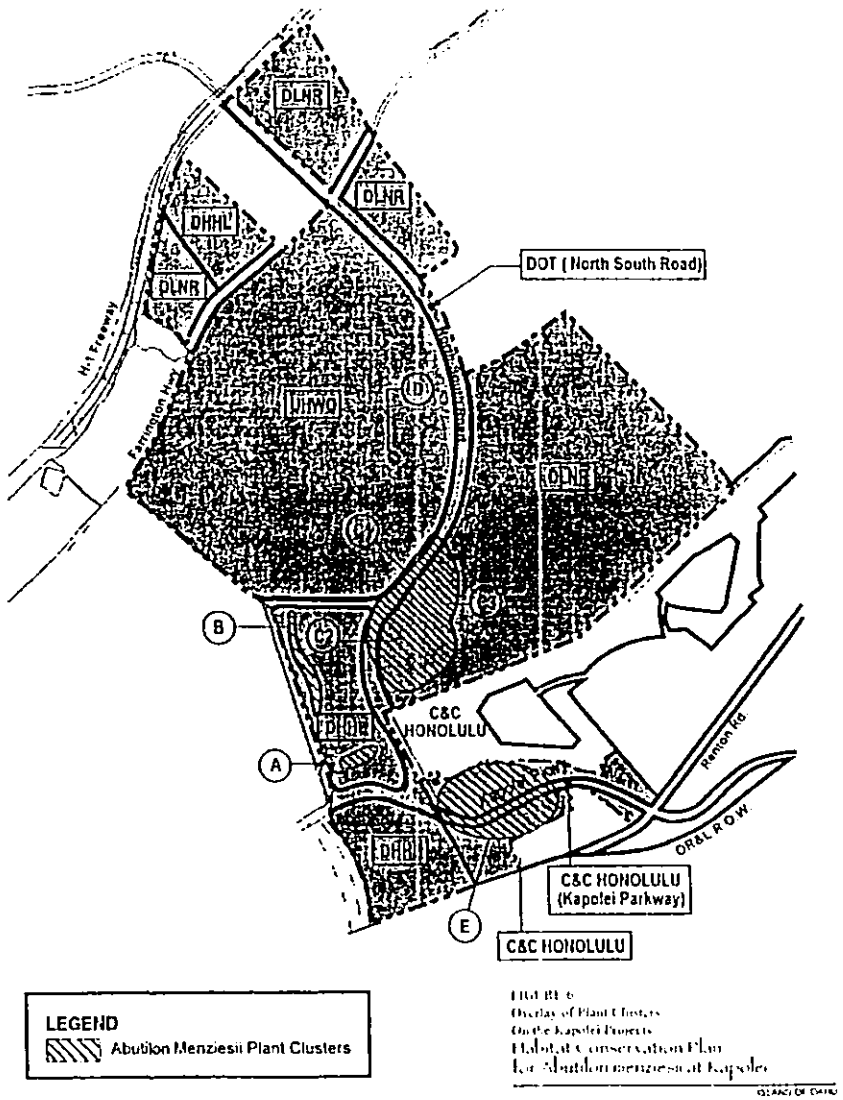


FIGURE 6
Overlay of Plant Clusters
On the Kapolei Property
Habitat Conservation Plan
for *Abutilon menziesii* at Kapolei

references to the North-South Road development is understood to be the segment through the Kapolei property.

A staging area and construction transit area approximately 50 feet to 75 feet wide along the west boundary of the North-South Road corridor is required; however, no known plants are present along this strip.

As a federal-aid highway, the North-South Road is undergoing a National Environmental Policy Act ("NEPA") review and Endangered Species Act, Section 7 consultation. The subject HCP will be submitted to USFWS as a component of the required biological assessment for the Section 7 process.

Kapolei Parkway Segment

The Kapolei Parkway, a new 6-lane major collector roadway, will traverse the City's Ewa Villages property and will provide alternate regional access to the H-1 Freeway, connecting the North-South Road at the north end to Renton Road at the south end; a distance of approximately 0.7 miles. The new roadway is designed with three vehicular lanes in each direction, a planting median, and sidewalk on one side and a multiuse (pedestrian and bicycle) pathway on the other side with an overall width of 116 feet. The project will include underground utilities (including water, sanitary sewer, electrical, and communication systems), storm drainage system, street lighting system, and landscape irrigation system.

The overall schedule for this segment of Kapolei Parkway began with initial planning in 1994, and the City anticipates completion in 2008:

Planning:	June 1994 to September 2004
Design:	December 2001 to December 2005
Construction:	June 2006 to December 2008

The Kapolei Parkway roadway is planned for construction in two phases:

- Phase 1 (mid 2006 - 2007) - Mass grading for six (6) lanes; construction of three (3) makai travel lanes from North-South Road to Renton Road.

- Phase 2 (late 2007 - 2008) - Construction of additional three (3) mauka lanes. The construction of these lanes is to be coordinated with completion of the North-South Road.

The Phase 1 components include roadway and drainage grading, the construction of three (of the six) lanes, and a portion of the underground utilities, storm drainage system, street lighting system, and landscape irrigation system on the Ewa Villages property. The impact to *A. menziesii* is anticipated in Phase 1.

The Phase 2 components include the construction of the additional three lanes and the balance of the underground utilities, storm drainage system, street lighting system, and landscape irrigation system on the Ewa Villages property.

A staging and construction transit area is required; it will be located where no known plants are present.

As a federal-aid highway, this segment of Kapolei Parkway is undergoing a NEPA review and Endangered Species Act, Section 7 consultation. The subject HCP will be submitted to USFWS as a component of the required biological assessment for the Section 7 process.

The City is planning to schedule construction of an additional three (3) lanes for the Kapolei Parkway segment from the Renton Road intersection (at the north end) to its connection to the existing Kapolei Parkway in the vicinity of the OR&L track right-of-way (at the south end) in coordination with the above Phase 2 segment and North-South Road completion. There are no known *A. menziesii* plants within this area (Char 2004). This latter construction activity will complete this 6-lane major collector roadway segment with the same typical roadway section with an overall width of 116 feet, matching the segment proposed above the Renton Road intersection.

University of Hawaii West Oahu

In September 2002, the BLNR conveyed in fee approximately 500 acres of land to the University of Hawaii for its West Oahu campus. The BLNR also issued to the University a right-of-entry to the property for planning purposes. The UH West Oahu property is bordered by the proposed North-South Road to the east, Farrington Highway to the north, the Kapolei Golf Course and Villages of Kapolei to the west, and DHHL lands to the south. The Kaloi Gulch and Hunehune Gulch traverse this parcel.

At the present time, portions of the UH West Oahu property are being leased for agricultural crop farming under revocable permits. A small portion of the 500-acre property (.826 acres) is also presently encumbered by revocable permit to Kapolei People's Inc. dba Kapolei Golf Course for their parking lot. Approximately two-thirds of the leased area has been cleared and plowed in preparation for planting.

The UH West Oahu will be a major educational facility in Kapolei, primarily serving the Leeward and Central Oahu region. The University is currently exploring options for the development of the campus and at present is planning for an approximately 100-acre campus which will be developed in phases to an ultimate student population of 7,600. Additionally, about 150 acres of land will be allocated on the property for future campus expansion beyond the 7,600 student population. Finally, the University is considering a number of land use options for the remaining 250 acres of lands within the 500-acre property to serve the campus and surrounding region. Construction of the campus could begin in the latter part of 2005, with a completion date of Fall 2007. The initial phase of campus development would be located in the northeastern portion of the property, in close proximity to the Farrington Highway.

There are very few *Abutilon menziesii* on this area of the Kapolei property. A recent survey in June 2003 by Char (Appendix D) confirms that there are two to three individuals from Cluster C at the south boundary and the one individual in Cluster D is no longer alive. However, Char (2003) notes that seeds may be present in the soil.

Department of Hawaiian Home Lands

In November 2002, BLNR granted DHHL a right-of-entry to approximately 200 acres at the Kapolei property and commenced the process to transfer those parcels to DHHL. The two parcels are to the west of the proposed North-South Road and at the northern and southern points of the Kapolei property. The northern property, Parcel 3, is approximately 49 acres and located between Farrington Highway and the H-1 Freeway. Directly to the south is the proposed UHWO property. The southern property, Parcel 108 (portion), is approximately 165 acres and directly adjacent to the UHWO southern boundary. Kapolei Golf Course and the Villages of Kapolei are to the west with the North-South Road to the east and DLNR lands beyond that. A portion of Parcel 108 will require future subdivision for the Kapolei Parkway extension in an east-west orientation. This latter subdivision will bisect the property into two non-contiguous parcels.

The mission of DHHL is to develop and deliver homesteads to qualified native Hawaiians pursuant to the Hawaiian Homes Commission Act. The acquisition of these parcels will allow DHHL to plan and develop approximately 1,000 residential homesteads and potentially some commercial and community facility uses to serve the new subdivision over a 8 to 10 year period from 2006-2016. Conceptually, the first increment is targeted to be completed in 2006. Ownership by DHHL and development of these uses have been described in the EIS for the East Kapolei Master Plan.

Abutilon menziesii is present on DHHL's Parcel 108 (portion) at Clusters A and B. Based on the baseline population, 10 individuals comprise Cluster A and 14 individuals comprise Cluster B. The development sequence will affect Cluster B initially followed by Cluster A.

Department of Land and Natural Resources

The remaining unassigned parcels (formerly part of the East Kapolei Master Plan) total approximately 600 acres in five parcels; the parcels are now under the authority of the DLNR Land Division and are to the east of the proposed North-South Road and the north of Farrington Highway.

The Environmental Impact Statement for the East Kapolei Master Plan designates urban uses including residential, public schools, parks, roadways as well as roadways and open space areas on these parcels which would serve as drainage detention basins. The ultimate uses of these lands will be determined in the future when a development proposal is again proposed by the State or other non-governmental entity.

More than half of the *A. menziesii* in Cluster C occur on the DLNR lands.

Kapolei Projects Conceptual Development Schedule

The commencement of construction for the North-South Road is planned for late 2004 with completion in 2008. The other Kapolei projects are in the early stages of planning and schedules have not yet been determined. Thus, Table 4 below is conceptual and may be changed. The impact to the full population of *A. menziesii* is assumed over 20 years as described in this HCP. However, even if development plans are delayed, the HCP strategies and mitigation measures will be

completed in its entirety. Moreover, in accordance with the expiration date of the incidental take license, any remaining in situ plants after July 31, 2021, will remain within the Kapolei property.

Table 4. Conceptual Development Phasing and Impacts to Plant Clusters

Development Phase* (Conceptual)	Plant Cluster	No. of Plants**	Land Use (Conceptual)
2004-2007 North South Road (Phase 1)	C	14+ 7 = 21	Roadway (Initial Lanes 1-3, Drainage basins)
2005-2008 North-South Road (Phase 2)		0	Roadway (Lanes 4-6; intersections; interchange), phasing of drainage channel
2006 – 2007 Kapolei Parkway (Phase 1)	E	3	Roadway (Mass grading for 6 lanes; Lanes 1-3)
2007 – 2008 Kapolei Parkway (Phase 2)		0	Roadway (Lanes 4-6)
City Land / Future Urban Uses***	E	4	Future Urban uses
2006-2016 DHHL (Parcel 108 por.)	A	10	Residential
	B	14	Residential
2005 -2007 UHWO (Phase 1)		0	University campus
___ - ___ UHWO (Phase 2)*		0	University campus extension
___ - ___ UHWO (Future Phase)*	C, D	4	Other related uses (to be determined)
___ - ___ DLNR lands*	C****	37	Ultimate Uses***** Residential, Schools, Parks, Roadways

* Development phases are conceptual and development schedules have yet to be determined at this time
** The number of plants is estimated and is based on the baseline population of 93 plants
*** Future urban uses may include residential development by DHHL.
**** Sub-population includes plants within the 18-acre contingency reserve site
***** Ultimate uses are as proposed by HCDCH for the East Kapolei Master Plan

(2b) Evaluation of the impact of the activities on the particular ecosystems, natural communities, or habitat types within the plan area

The ultimate development of the Kapolei projects would result in incidental take of all *A. menziesii* plants and the plants are unlikely to survive in their current locations. Much of the non-native plant community on the proposed development sites will also be heavily impacted.

In anticipation of the impacts, an Interim Management Program has been implemented through an agreement between HCDCH and DLNR, and subsequently DOT, as described in Section 3, Strategy (1). Under Strategy (1), the following have been accomplished: 1) DOFAW successfully propagated the genetic representation of the Kapolei population[3], 2) DOFAW initiated outplanting at three sites:

[3] Propagules for genetic representation, including cuttings and seeds, of Kapolei population individuals, were collected from plants mature enough (multi-stemmed of fruiting) or alive at the commencement of collection Immature individuals and the recently integrated City property individuals are yet to be genetically represented The genetic resource of expired individuals not yet represented would attempt to be reclaimed through the soil seed bank

Koko Crater (2000), Kaena Point (2002), and Honouliuli (2002), and 3) monitoring of those sites has been ongoing. The primary purpose of the HCP is the survival of East Kapolei's *Abutilon menziesii* and this will be accomplished through various identified measures including the "relocation" of the basic plan area of this species.

As the agency to implement the HCP, DLNR will pursue use of additional appropriate outplanting sites, and outplanting will occur after all required clearances have been obtained. The selection of appropriate outplanting sites is described in greater detail in Section 3 Strategy (4).

The HCP also establishes an 18-acre contingency reserve site (see Figures 5 and 11) which temporarily protects a colony of Cluster C from development until the short-term success criteria (as described in Section 7) are met at one wild site. Management of this area may include measures such as temporary fencing and firebreaks. If an outplanting site does not meet the short-term success criteria, this reserve site could be considered as a wild site.

SECTION 3

Identify the steps that will be taken to minimize and mitigate all negative impacts, including without limitation the impact of any authorized incidental take, with consideration of the full range of the species on the island so that cumulative impacts associated with the take can be adequately assessed; and the funding that will be available to implement those steps.

Described below are the details of the core elements of this HCP, including the mitigative steps and strategies for the impacts to *Abutilon menziesii* on the Kapolei property.

(3a) Full range of the species

Abutilon menziesii is uncommon and local in dry forests between elevations 200-520 meters on Lanai, East Maui, and Hawaii (Wagner 1999). On Oahu, a collection (Char 81,002, BISH) from an abandoned canefield at Barbers Point, Ewa, was made in 1981 and believed to represent an escapee from cultivation. At that time all cultivated plants on Oahu were descendent from plants derived from individuals propagated on the island of Hawaii. Differences in leaf morphology of progeny from this plant suggest that the Barbers Point plant may represent a distinct population (USFWS 1994). A single individual plant has recently been documented on Navy property at Lualualei (Moribe 1998 and Miyashiro 2001, personal communication). *A. menziesii* is also present in several botanical collections on Oahu including the Waimea Arboretum & Botanical Garden, the Honolulu Botanical Gardens, and Amy B. Greenwell Botanical Garden in Kealakekua in South Kona.

A database search by the Hawaii Natural Heritage Program for *A. menziesii* on Oahu resulted in the subject Kapolei population only.

The relationship of Kapolei plants and island of Hawaii plants is unknown at this time. Prior to the discovery of the Kapolei population, the area was not commonly known as a habitat for *A. menziesii*. Thus, DLNR botanists believe that the abundance and spatial distribution suggest that the Kapolei plants are probably natural remnants of a once more extensive Oahu population (Garnett 2001, personal communication) and not an escapee from cultivation as previously theorized. Moreover, the Kapolei population is the larger of the two known populations and accounts for approximately 99 percent of the known wild plants on Oahu (USFWS, L. Gibson).

(3b) Steps and strategies that will be taken to minimize and mitigate all negative impacts, including, without limitation, the impact of any authorized incidental take.

The strategies under consideration in this Habitat Conservation Plan include off-site and on-site measures which would be implemented, as listed in Table 5:

Table 5. Strategies to Assess and Mitigate the Development Impacts on *Abutilon menziesii* at Kapolei

Strategy	Mitigation Steps and Strategies
1	Interim Management Program (October 1998 to March 2000, extended to October 2001); Establish two test outplant wild population sites
2	Funding for the implementation of the HCP
3	Development schedule and mitigation phasing sequence
4	Establish new populations at three off-site locations
5	Long-term protection and maintenance of permanent *A. menziesii* populations
6	Appropriate research
7	Kapolei population strategies

Strategy (1) Interim Management Program (October 1998 to October 2001)

Through funding provided in 1998 by the Housing and Community Development Corporation of Hawaii ("HCDCH"), HCDCH and DLNR established an agreement to implement a pre-construction period Interim Management Program to test the viability of establishing *Abutilon menziesii* at two offsite locations on Oahu.

On March 14, 2001, DOT delegated the expenditure of $250,000 to DLNR for the implementation of the HCP strategies for Years 1 through 5. Funds became available in August 2001 and are subsequently being used by DLNR to complete Strategy (1) (Interim Management Program) of the HCP and to transition to HCP implementation to accomplish the overall HCP implementation strategies (described below).

The preliminary results of the Interim Program indicate that propagation of the species from cuttings and seed is highly successful in the nursery environment. Outplanting to offsite locations has also been successful in the first year. The *Interim Management Report for Abutilon menziesii* (DLNR 2001) and the *Final Interim Management Report for Abutilon menziesii* (DLNR 2003) are attached as Appendix F and Appendix G.

The Scope of Services of the Interim Management Program include the following tasks:

Task 1: Maintain in-situ population through monitoring, maintenance, and security (fire protection).

Known Kapolei plants have been marked with permanent stakes and mapped to a GIS layer. The existing plants are being maintained by weeding around them, and the application of herbicide, pesticide, and fertilizer, as necessary. A fire management strategy consisting for the following measures is being implemented to ensure that the plants are not accidentally destroyed.

- Identification of fire fighting resources available near the Kapolei population;
- Provide information to fire stations to assist them in protecting *A. menziesii* from fire;
- Identification of water resources near the Kapolei population.

The details of the fire management strategies are described in the Final Interim Management Report for *Abutilon menziesii* (DLNR DOFAW 2003, Appendix G).

Task 2: Propagate a total representation of plants through seeds and cuttings from the Kapolei Abutilon menziesii population. These plants will be used to maintain genetic representation of stock and provide stock for outplanting purposes. Work will be done at the existing State DLNR, Division of Forestry and Wildlife (DOFAW) nurseries.

All the known Kapolei population plants have been propagated through cuttings resulting in 630 first generation progeny from 62 in situ individuals.[4] In addition, 220 seedlings have been produced from seed collected from the first generation nursery plants (grown from cuttings). Additional seeds have been distributed to Lyon Aboretum, the National Seed Storage Laboratory in Fort Collins, Colorado, and the Pahole Rare Plant Facility.

Task 3: Establish two new populations of Abutilon menziesii in appropriate habitat to allow for natural establishment and long term viability. Each outplanting site was planted with a representative sub-sample of the Kapolei population and each individual plant has been tagged with a permanent metal tag.

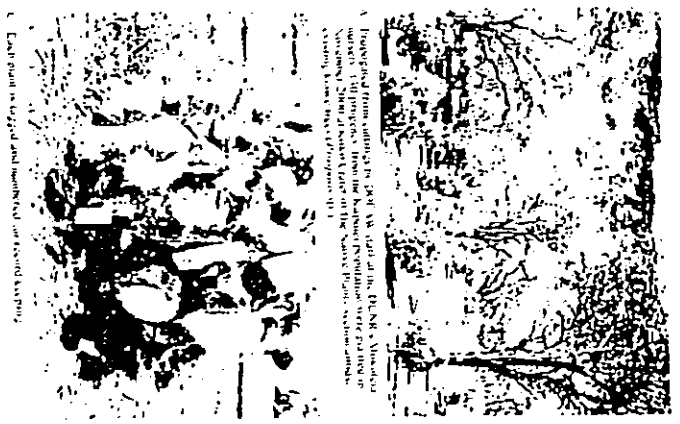
Three outplant populations of *Abutilon menziesii* have been initiated.

Outplant Site #1: Koko Crater Botanical Garden (Figure 7)

Through an agreement with DLNR DOFAW, the City and County of Honolulu Koko Crater Botanical Garden provided a 100 ft x 100 ft (10,000 sf) site for the initial planting. In November 2000, 140 *Abutilon menziesii* were planted in the 10,000 sf site, representing two complete sets of each of the original Kapolei plants. The *Abutilon* plot is in a public display area supported with drip irrigation. Hence, plants are lush and thriving. Koko Crater Botanical Garden staff will provide the long term care of these plants and will be propagating *Abutilon menziesii* from materials taken from these plants. Although this site is not being considered as a "wild site" its intent is as a living genetic repository of the full Kapolei population. DLNR will continue to coordinate the management regime (e.g. irrigation requirements, etc.) with Koko Crater Botanical Garden.

The outplant site is within a public garden setting and located in close proximity of one individual of another endangered *Abutilon* species (*A. eremitopetalum*) creating concerns about hybridization. Therefore, propagules from the Koko Crater outplanting will be limited to cuttings. Recent observations of this site indicate flowering, fruiting, and setting of seeds (personal communication, N. Sugii). The outplantings will be monitored for seedling recruitment, however due to the potential for hybridization with *A. eremitopetalum*, propagules for outplanting will be limited to cuttings.

[4] The baseline number of in situ plants at the Kapolei population numbered 93 individuals; however, through natural causes, the number had declined to 62 individuals at the time Task 2 was implemented, resulting in a genetic representation of only those existing at that time. Propagation of any subsequent "new" in situ plants (and including the plants on City property) which would constitute parental stock is also being undertaken by DLNR.



Outplant Site #2: Kaena Point State Park (Wild Site #1) (Figure 8)

The Kaena Point outplanting site was started in April 2001. The land is under the jurisdiction of the DLNR, Division of State Parks (TMK: 6-9-01: 4).

The approximately 3-acre outplanting site was established with two distinct planting areas separated by a four-wheel drive road. The site is completely protected from four-wheel drive vehicles by a rock barrier along the dirt road fronting the outplanting site. Site preparation included clearing the non-native brush and grass with weedeaters and with hand tools and treating the area with herbicide to prevent regrowth. A total of 142 *Abutilon menziesii* plants have been planted in the Kaena Point outplanting site. In addition, 20 other native species have been planted to create a coastal strand community.

The plants were irrigated at the site to promote their establishment and to encourage the production of a maximum amount of seed to allow the build up of the seed bank and natural establishment of seedlings. The survival rate for plants at this site has been 98%. The 142 plants at this site represent a total of 44 of the original East Kapolei plants. Two *Abutilon* seedlings have grown naturally from seed produced by plants outplanted at this site. These seedlings have grown large enough to be considered part of this population.

The DLNR received permission from the U. S. Air Force to tap into the 4-inch water main that runs adjacent to the outplanting site allowing the construction of a complete irrigation system and including a galvanized steel water tank with a capacity of approximately 3,000 gallons to provide a water reserve for irrigating the plants. This tank is necessary because the 4-inch water main is pressurized only two days a week for 4 hours per day.

The threats to the Kaena Point outplanting site include the rapid growth of weeds and wild fires. This site was established in area with deep soil that was dominated by Guinea grass (*Panicum maximum*) and koa haole (*Leucaena leucocephala*). DLNR staff have had difficulty keeping up with the weed threat presented by these species and others at this outplanting site To control weeds in the outplanting site, DLNR has used a variety of labor including regular Natural Area Reserves System employees, temporary workers such as the Emergency Environmental Workforce, and volunteers.

The other major threat to this outplanting site is fire. The fire strategy and fire fighting resources includes the installed water tank, the installed 2-inch outlet to allow fire engine hookup near the road, and the planting of native plants along the perimeter of the outplanting site to serve as a fuel break.

On August 20, 2003, a brush fire started by a vehicle about ¼ mile away burned a total of 160 acres along the coastal flats up to the nearby Kuaokala Game

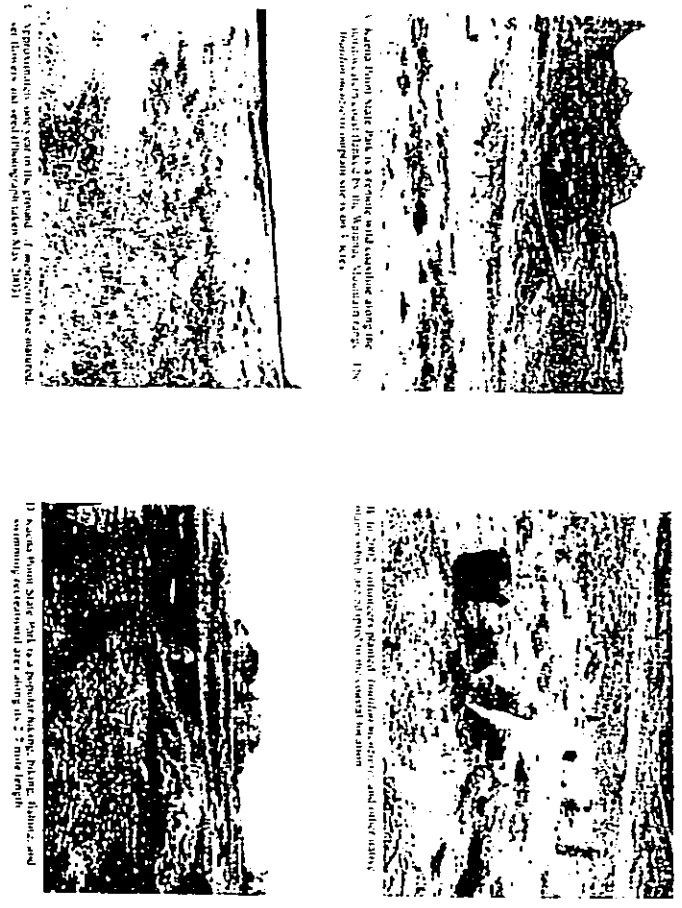


FIGURE 8
Photographs, Kaena Point State Park Outplant Site #2, Wild Site #1
Habitat Conservation Plan
for *Abutilon menziesii* at Kapolei

Management Area at about 1,100 feet elevation. This fire started late at night and was fanned by winds of 25 to 35 mph and burned to the edge of the outplanting site and around it. The fire moved so quickly that Honolulu Fire Department engine companies were unable to engage the fire near the ignition point or near the outplanting site resulting in a burn of approximately 30 percent of the 3-acre outplanting site. The effects of the fire on the *Abutilon menziesii* plants at the site are unknown at this time. An assessment will be made when the rainy season commences and there is sufficient moisture for growth.

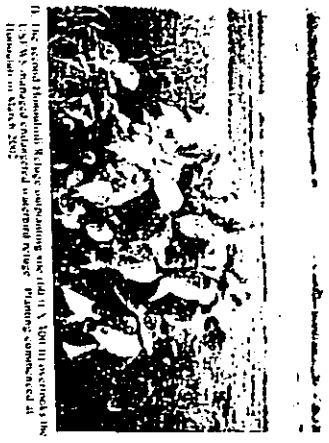
The plants along the edge were affected by the flames but not completely consumed. It is possible that many of these *Abutilon menziesii* plants will survive. The fire did burn many of the other native species planted in the area to serve as a fuel break along the front of the outplanting site. This fire would have been more damaging if these plants had not been in place. These fuel break plants will need to be replaced. The fire did destroy all irrigation pipes in the area and will need replacement. The lesson learned from this experience is that the fuel break plantings are perhaps, the most useful part of the fire strategy. The fuel break portion of this fire management strategy needs to be replaced and developed further with a wider buffer of fire resistant species established to encompass the entire outplanting site.

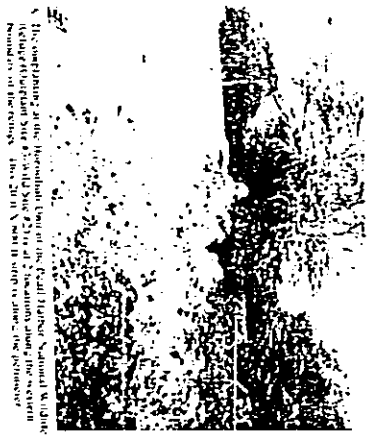
Outplant Site #3: Honouliuli Unit of the Pearl Harbor National Wildlife Refuge (Wild Site #2) (Figure 9)

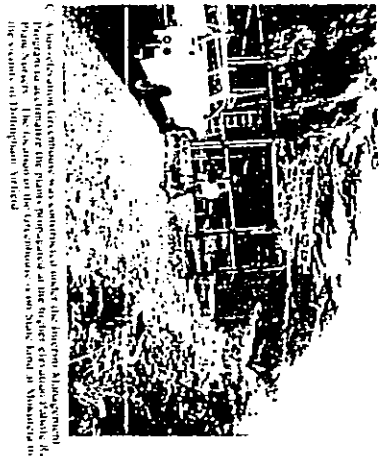
A third outplanting site has been developed at the Honouliuli Unit of the US Fish and Wildlife Service Pearl Harbor National Wildlife Refuge which borders the West Loch of Pearl Harbor (TMK: 9-1-17). USFWS has a cooperative agreement with the Navy to manage the site as a refuge in perpetuity. This 37-acre unit is mostly a fresh water wetland managed for a variety of endangered water birds. The entire Honouliuli Unit is enclosed in an eight-foot chain link fence that provides predator control for the birds and security for the plants. DLNR DOFAW has selected and planted an upland area within this Unit and installed an irrigation system to assist with the initial establishment of plants.

There are two separate areas being used for outplanting within the refuge. The first consists of a narrow strip, approximately 20 by 600 feet, while the second site is approximately 60 by 300 feet. The first planting commenced on March 15, 2002 in the 20 by 600-foot site. Work at the second location began in January of 2003. Both locations are on an irrigation system and are managed entirely by DLNR DOFAW staff.

At this time the planting includes a total of 61 *Abutilon menziesii* plants at the Honouliuli Unit with a survival rate of 96 percent of the outplants. Plants from cuttings from 21 of the original East Kapolei plants are represented here. In addition, 21 seedlings of known parentage and 10 seedlings of unknown parentage that were removed from the East Kapolei population in the spring of 2002 have been planted here.







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A small number of the seedlings produced at the Kapolei population (approximately 10%) during the spring of 2002 were left there and subsequently perished. Three plants produced from seed were also planted at Honouliuli. The amount of area covered by this outplanting site is approximately ½ acre. There is sufficient area to add many more plants to this site.

The fire threat at this site is minimal. The eight-foot chain link fence provides a barrier to most of the possible ignition sources. A buffer of approximately 6 feet of bare ground is in place just inside most of the perimeter fence of this unit to serve as a barrier to predators of the endangered water birds. This buffer strip also serves as a firebreak to the outplanting site. The portion of the fence that doesn't have this buffer has fresh water marsh just inside the fence. The fire management strategy for this site is to ensure that this buffer strip remains in place.

Task 4: Research the biology of the species and determine seed storage requirements, salt and pathogen influence, and the best herbivore control methods.

Granular diazinon has been tested to determine success at controlling ants and azatin and dursban have been tested on a few plants to determine toxicity. Seed have been stored in an appropriate seed bank facility. Additional research is discussed under Strategy (6) below.

Task 5: Provide partial funding for the construction of a low-elevation greenhouse dedicated to growing A. menziesii and other threatened and endangered plant species on Oahu. This greenhouse would serve as a long-term greenhouse, to be owned and operated by the Division of Forestry and Wildlife, for low elevation threatened and endangered plant species on Oahu, including A. menziesii from the Kapolei population for the duration of HCP implementation.

The construction of the Dillingham Greenhouse by DLNR DOFAW has been completed (see Figure 9).

A 6,000 square foot nursery dedicated to the propagation of *Abutilon menziesii* and other threatened and endangered plant species on Oahu is located near the base of the Kealia Trail head, just behind the western end of Dillingham Airstrip in Mokuleia. The land falls under the control of the DLNR Land Division and is in the process of being transferred to DOFAW. The construction included the installation of the water and electrical systems. The greenhouse is 130 feet long by 40 feet wide by 12 feet tall. It is divided into an upper and a lower section along the entire length. All propagation of *A. menziesii* is now at this new facility.

Strategy (2) Funding for the Implementation of the HCP

The HCP's active mitigation effort will span a period of 20 years. The HCP is intended to provide adequate funding for the 20-year period beginning August 1, 2001 to July 31, 2021. Following the completion of 20 years of active mitigation, the HCP will provide additional funds for management of three wild outplanted sites.

The allotment for active mitigation over 20 years is valued at $1,000,000 averaging $250,000 over each five-year increment. This amount is pledged by DOT through funds which have already been delegated ($250,000) and funds which are to be released and delegated upon the approval of the HCP ($750,000).

Additional funds for the 20-year active mitigation period and for the post-Year 20 management period are from two sources: (1) Contingency Fund ($200,000) and (2) Interest earned on monies delegated (preliminary calculation of $440,000). Both of these fund sources are dynamic in nature and subject to change. The Contingency Fund of $200,000 would include an initial deposit of the full amount by DOT in 2005 and then be augmented by Cooperators. Cooperators are defined as other Kapolei property developers who would become sub-permittees of DOT's Incidental Take License through a Certificate of Inclusion. The interest earned is subject to the prevailing interest rates and actual drawdown of the principle.

The funding sources for the HCP are summarized in Table 6.

Table 6. Funding Sources for the Habitat Conservation Plan (2001 to 2021+)

	HCP Phase / Time Period	Cost (in 2004 Dollars)	Source
(1)	Interim Management Program October 1998 – October 2001	$67,850 ($40,000 only has been remitted)	Special Funds by HCDCH
(2)	HCP Mitigation Period (2001 – 2021) Year 1 to Year 5 August 1, 2001 – July 31, 2006	$50,000/yr for five years. ($250,000 deposited March 14, 2001, with funds available August 1, 2001)	DOT funds
(3)	HCP Mitigation Period (2001 – 2021) Year 6 to Year 20 August 1, 2007 – July 31, 2021	$750,000 for 15 years. (Equivalent of $50,000 average per year for 15 years)	DOT funds (Funds appropriated by State Legislature, pending HCP approval & Governor's release of funds, about June 2004)
(4)	HCP Mitigation Period and Contingency Period (2005 – 2021+) Year 4 to Year 20+	$200,000 (Initial full deposit of $200,000 by DOT in 2005)	Contingency Fund (Fund to be augmented by Cooperators)
(5)	Post Year 20+ Management of Three (3) Wild Outplant Sites August 1, 2021 – Undetermined future	This amount is anticipated to be available from the remaining amount of the Contingency Fund and interest income.	Remaining Contingency Fund and Interest earned on Items (3) and (4)

Funding for Years 1 – 20 of HCP Implementation

The provision for the establishment of the endangered species trust fund to be administered by DLNR is described in HRS Chapter195D-31. It states "the funds shall be held separate and apart from all other moneys, funds, and accounts in the state treasury, provided the moneys received as deposits or contributions from private sources shall be deposited and accounted for in accordance with the conditions established by the agencies or persons making the contribution. Earnings on the investment of the assets of the fund shall become part of the fund. Any balance in the fund at the end of a fiscal year shall be carried forward to the next fiscal year."

DOT intends to delegate a total of $1,000,000 for implementation of the HCP over a 20-year period from August 1, 2001 to July 31, 2021.

Contingency Fund - Funding After the 20th Year

Funding is provided for unanticipated events and for the management of three wild sites in the years following the 20-year HCP period.

DOT will establish a $200,000 contingency fund for the following purposes: 1) to finance unanticipated costs incurred by DLNR in the implementation of the HCP measures; and 2) to fund the management and monitoring of three "wild" populations beyond 20 years. The initial $200,000 deposit by DOT in 2005 will be augmented by Cooperators in the Incidental Take License, who have filed a certificate of inclusion with DOT.

Certificate of Inclusion

A Certificate of Inclusion would indicate the following:

a. DOT will be the holder of the Incidental Take License ("ITL").
b. Other agencies who propose to develop projects at the Kapolei property may have the protection of the ITL by obtaining a fully-executed Certificate of Inclusion and filing this document with DLNR.
c. The DOT, in consultation with DLNR, may require that other agencies contribute their various resources in order to sustain the mitigation effort of this HCP.

Memorandum of Agreement

DOT and DLNR have prepared a Memorandum of Agreement ("MOA") to implement the HCP. The MOA describes and states the following:

1. On August 1, 2001, DLNR shall implement the tasks set forth in "Exhibit A", attached hereto and incorporated herein. DLNR shall provide reasonable safeguards to secure the existence of at least three (3) "wild" *Abutilon menziesii* populations in appropriate protected habitats.

2. These populations will be maintained and managed beginning on the 1st day of August, 2001, and ending on the 31st day of July, 2021 or until all of the "success criteria" of the HCP has been accomplished.

3. DOT has delegated the expenditure of $250,000 from Act 328, SLH 1997, Item C0135, as amended by Act 116, SLH 1998, North-South Road, Kapolei Parkway to Interstate Route H-1, Oahu, to DLNR for the purpose of implementing mitigative strategies for the endangered *Abutilon menziesii*, thereby insuring funds to finance the HCP mitigative strategies costs for its first five years.

4. DOT shall also delegate to DLNR an additional lump sum amount of $750,000, which is intended to provide adequate funding for a period of fifteen (15) years from August 1, 2006. The precise amount needed to finance the mitigation effort will be estimated by DLNR and approved by DOT. The estimate shall not exceed $250,000 for 5 years, and funding will be used specifically to cover the expenses of DLNR, which relate to the mitigation of impacts to the Kapolei *Abutilon menziesii*. Interest earned on the funding, as delegated to DLNR, shall be retained by DLNR, be reserved to finance any additional mitigation beyond the term of the HCP, and be utilized in accordance with the purposes of the HCP. If a portion of the funding is unexpended due to an early termination of this MOA or the HCP, such funding shall be returned to DOT.

   DOT shall also delegate to DLNR an additional lump sum of $200,000 to serve as a "contingency fund", available over the term of the HCP. The contingency fund shall be used for emergency response, site development costs or other unanticipated expenditures required to fulfill the purposes of the HCP. The contingency fund is subject to legislative appropriation.

   All funding as directly or indirectly transferred by DOT to DLNR, shall be retained by DLNR, for the planned recovery of the *Abutilon menziesii*, until the "success criteria" is fully attained. If it is determined that all of the "success criteria" have been satisfactorily accomplished, the unexpended funds as of the date of the determination, shall be returned to DOT.

   In the event that additional funds for continued implementation of the HCP are needed, the DOT will seek alternative funding sources, including, but not limited to, transfers from the project's construction budget, participation by other State departments, and a separate legislative appropriation.

5. The MOA shall be null and void if the Board of Land and Natural Resources (or the State Legislature, as necessary) does not approve the HCP for the *Abutilon menziesii* in Kapolei.

6. The MOA may be terminated at any time by written consent of the parties of this agreement and any respective remaining funds shall be returned to DOT.

7. The MOA may be amended at any time by written consent of the parties of this agreement.

Strategy (3) Development schedule and mitigation phasing sequence

The period from 1997 to 2004 for the preparation of the HCP was unforseen at the start of the HCP planning period. The delay has been attributed to a number of factors including funding issues, real estate market conditions, analyses of regional drainage issues, and most recently, legislative amendments to the HCP law (Chapter 195D) to enable public agencies / landowners to participate in the HCP process.

This delay has provided an opportunity to test the HCP mitigation measures, specifically, the viability of propagating this species and to initiate outplant populations of *A. menziesii*. A further unanticipated consequence of the prolonged delay is the changes in land uses and ownership of parcels at the Kapolei property.

The decision of the Endangered Species Recovery Committee in the 2002 review established a review period of 15 years with a cap at 20 years for the subject HCP. However, presently, a 20-year implementation and active management time period is anticipated, followed by any necessary management at three wild sites after the conclusion of the 20th year.

A tentative conceptual schedule which represents the best information available at this time is provided in Table 7 to determine the order of impact of development on the Kapolei population. Once construction has commenced the impacts would occur incrementally over approximately 20 years during the Kapolei projects development period. The area of greatest impact is in the south of the property where *A. menziesii* are concentrated.

Table 7. Conceptual Development Phasing and Impacts to Plant Clusters

Development Phase* (Conceptual)	Cluster	No. of Plants	Land Use
2005 to 2008 (North-South Road)	C-1 C-2	14 7	Roadway Drainage basins
2006 to 2008 (Kapolei Parkway Segment) Future Urban Uses (undetermined schedule)	E E	3 4	Roadway Infill Residential Uses (Future)
2005 to 2014 (DHHL Homesteads)	A B	10 14	Residential
200_ to 20__ (UHWO)**	C C, D	0 3	Campus Campus related uses
20-- to 2020 (DLNR other lands)	C-3***	38	Residential, Parks, Schools, etc.,

* Development phases are conceptual and development schedules have yet to be determined at this time.
** UHWO development schedule has not yet been established.
*** Sub-cluster C-3 incorporates the 18-acre contingency reserve which will remain in place until the short-term success criteria are met at one outplant wild population.

The implementation of the mitigation measures described herein and a phasing sequence and conceptual schedule is shown in Table 8. The schedule assumes a favorable approval of the HCP.

Table 8. HCP Implementation Schedule (Conceptual)

Phases	Actions
Interim Management Programs 1998 – 2001 (Extended to 2003)	HCDCH funds Interim Management Programs - Implemented by DLNR -Test Outplant Site #1 (Koko Crater) planted (130 plants / November 2000) -Test Outplant Site #2 / Wild Site #1 (Kaena State Park) planted (April 2001) -Test Outplant Site #3 / Wild Site #2 (Honouliuli National Wildlife Refuge) (2002-2003) -Dillingham Greenhouse under construction (2002-2003) DOT deposits initial $250,000 for Years 1-5 (2001 - 2006 - in part, to conclude the interim program and to initiate the first five-year increment of HCP implementation) to DLNR to implement the HCP. [NOTE: Funds were available in August 2001 for Year 1.] -DLNR hires staff to implement the HCP
HCP Review and Approval / Federal Section 7 Consultation 2003-2004	-BLNR review/approval of HCP -DOT/DLNR establish MOA -Approval of Incidental Take License -DOT delegates $750,000 to Years 6-20 funding -Section 7 consultation initiated and concluded with USFWS
HCP Implementation 2001 – 2021	- Establish the 18 acre contingency reserve at the in situ Kapolei population - Initiate and manage additional appropriate outplanting sites - Annual reporting - analyze success criteria, reporting of progress, and applying adaptive management strategies, as appropriate - Implement all other measures identified in the HCP - Annual fiscal reporting to DOT by DLNR - Development of Kapolei projects (Conceptually described in Table 7)
Long-term Management (After 2021)	- Appropriately manage 3 established outplant wild sites

The basis for this mitigation phasing sequence, although conceptual, is the result of the initial results of the Interim Program. This is based on the successful nursery propagation and initial outplanting to the three outplanting sites (Koko Crater, Kaena Point State Park, and Honouliuli National Wildlife Refuge).

Strategy (4) Establish new populations at three off-site locations

The HCP outlines a strategy to take cuttings and collect seeds from the existing *Abutilon menziesii* plants at the Kapolei property prior to their removal and to use these materials to: 1) maintain genetic representation of the original population by growing cuttings in nurseries and placing seeds in seed storage facilities; and 2) to establish three new wild populations in protected areas elsewhere on Oahu.

Described below are the following: 1) Criteria for wild site selection, and 2) Candidate sites for outplanting

(4) 1. Criteria for Wild Site Selection

Wild sites for *A. menziesii* re-introduction is generally considered to be an area where the species, after initial planting, with the support of temporary active management measures (e.g. irrigation, control of threats, etc.), will become self-sustaining and will naturally reproduce.

To establish criteria for site selection of appropriate candidate sites on Oahu for *A. menziesii* a brief summary description of the extant populations on Lanai and Maui was made. The physical characteristics, including vegetation type/plant communities, soils, elevation, rainfall, overall site characteristics, and identified threats were analyzed.

These sites are at Kaumalapau and Puu Mahanalua on Lanai and Kalialinui Gulch and Puu o Kali on Maui. Table 9 summarizes the findings and a preliminary analysis of the findings is summarized below.

Table 9. Summary description of extant Lanai and Maui populations of *Abutilon menziesii*

Site (Location)	Site Characteristics	Vegetation type/ Plant communities	Soil type	Elevation & Annual Rainfall	Threats
Kaumalapau (Lanai)	*Abutilon menziesii* occur in scattered colonies numbering approximately 400± in the area north of Kaumalapau Road to Paliamao Gulch. The area is formerly grazed by cattle and makai of overgrown abandoned pineapple fields	Guinea grass (2 ft. to 3 ft. tall); scattered clumps of koa haole in swales	Molokai silty clay loam (MuC) Well-drained, deep soils on uplands	1,050 ft. to 1,150 ft. amsl 20 - 25 inches between Nov. and April; hot, dry summers	-Weeds -Fire
Puu Mahanalua "Twin Peaks" (Lanai)	*A. menziesii* is found at the base of the most mauka puu along abandoned pineapple field dirt roads. Mature colony of 35± plants (observed in 2001) with plant heights ranging from 4 ft to 7 ft. Blossoms are unique in color (pale peach) and are upright (not pendant)	Guinea grass (6 ft. to 7 ft. tall)	Uwala silty clay loam (UwC) Well-drained soils on uplands, formed in material derived from basalt. Soil temperature of 70 degrees	1,200 ft. amsl 15 - 25 inches between Nov and April; very little rainfall in summer	-Weeds -Fire

Kalialinui Gulch (Central Maui)	Plants occur along the top banks of gulch adjacent to cane haul road. Fields are in active cultivation. Population in 3 colonies. 3 mature colonies of *A menziesii* with plants reaching heights of 7 ft. to 8 ft. tall	Open scattered koa haole/Guinea grass	Kealiia silty clay loam (KnB) Well drained reddish brown soils on uplands weathered from basic igneous rock., 20 to 40 inches deep	691 ft. to 750 ft. amsl 15 to 25 inches	-Weeds -Grazing -Fire
Puu o Kali (Kihei, Leeward Maui)	Plants occur on shallow pockets of soil on aa lava flow. Generally open with scattered stands of wiliwili (*Erythrina sandwicensis*)	Native lowland dry shrubland	Very Stony Land (rVS) Young aa lava that has a thin covering of volcanic ash that extends deep into cracks and depressions	500 ft. to 1,400 ft. amsl 30 to 40 inches	-Weeds -Grazing -Fire -Ungulates A fencing project is underway to control the deer grazing threat

A preliminary analysis of the extant Lanai and Maui populations is summarized in Table 10.

Table 10. Preliminary analysis of physical characteristics of extant Lanai and Maui populations

Site Characteristics	Vegetation type/ Plant communities	Soil	Elevation & Rainfall
-Leeward or southern location -Located between actively or formerly cultivated fields and scrubland -Threats include weeds, fire, and ungulates -At Puu o Kali, deer browsing threat to seedlings (being controlled through fencing) -Fire threats, species indicated to be somewhat fire tolerant (i.e. the Kapolei population)	-Presence of and abundance of alien grasses surround stands of *A. menziesii* -Natural recruitment of seedling establishment unknown over time due to alien grass cover	-Well drained deep soils	-Elevation ranges 500 - 1,400 amsl -Annual rainfall range generally averages 20 inches. -USFWS (1995) notes that all known populations are frequently exposed to severe drought and flooding

In addition, the following set of guidelines for re-introduction is from the World Conservation Union[5]:

Choice of re-introduction site and type

- Site should be within the historic range of the species. For a re-introduction, there should be no remnant population to prevent disease spread, social disruption and introduction of alien

[5]Website: www.iucnssc.rsg.org

genes. In some circumstances, a re-introduction may have to be made into an area which is fenced or otherwise delimited, but it should be within the species' former natural habitat and range.

- An introduction outside its historical range should be undertaken only as a last resort when no opportunities for re-introduction into the original site or range exist and only when a significant contribution to the conservation of the species will result.
- The re-introduction area should have assured their long-term protection (whether formal or otherwise).

Evaluation of re-introduction site

- Availability of suitable habitat: re-introductions should only take place where the habitat and landscape requirements of the species are satisfied, and likely to be sustained for the foreseeable future. The possibility of natural habitat change since extirpation must be considered. Likewise, a change in the legal/ political or cultural environment since species extirpation needs to be ascertained and evaluated as a possible constraint. The area should have sufficient carrying capacity to sustain growth of the re-introduced population and support a viable (self-sustaining) population in the long run.
- Identification and elimination, or reduction to a sufficient level, of previous causes of decline: could include disease; over-hunting; over-collection; pollution; poisoning; competition with or predation by introduced species; habitat loss; adverse effects of earlier research or management program; competition with domestic livestock, which may be seasonal. Where the release site has undergone substantial degradation caused by human activity, a habitat restoration program should be initiated before the re-introduction is carried out.

[End: World Conservation Union text]

(4) 2 Candidate Sites

Three new populations of *A. menziesii* have been initiated and are tentatively expected to persist. As evidenced by the successful propagation by DLNR in the Interim Management Program (Strategy (1), plants grown from cuttings and seed from the in situ Kapolei population thrive and produce fruit and viable seed under nursery conditions. The results of the Koko Crater Botanical Garden (Outplant Site #1), Kaena Point State Park (Outplant Site #2 / Wild Site #1), and Honouliuli National Wildlife Refuge (Outplant Site #3 / Wild Site #2) will provide critical information for the selection of additional candidate Wild Sites. It is anticipated a total of three viable wild sites will be determined from planting at several (e.g. more than three) outplant sites to achieve the long-term goal of this HCP, therefore, additional appropriate locations will be pursued and planted while monitoring the sites already planted.

DLNR DOFAW, ESRC, and DOT have had considerable discussion from 1997 to the present (2004) in evaluating potential outplant (or release) sites. Trials at several sites for wild site viability have been initiated and have resulted in outplanting at two sites, Kaena Point State Park and the Honouliuli Unit of the Pearl Harbor National Wildlife Refuge.

These and each future outplanting site will require active management over a 5-year period to before a determination is made on success or failure. Additional sites will continue to be pursued while existing sites are monitored, to yield three successful wild sites.

The discussions for the selection of additional wild sites include the following priority candidate site and other possible sites:

1. Priority Candidate Site
   - Diamond Head State Monument (Approved for outplanting by DLNR Division of State Parks)
2. Other Possible Sites
   - Honouliuli Kaluaa (The Nature Conservancy)
   - Kalaeloa (former Barber's Point Naval Air Station) Northern Trap and Skeet Range
   - Kalua Kauila (near Makua Valley)
   - Kealia Trail area (State DLNR) (Test planted by DOFAW)
   - Lualualei Naval Reserve
   - Makapuu Head
   - Yokohama Beach (mauka area)

The candidate site locations are shown in Figure 10 and Table 11 summarizes the sites which have been considered as candidate outplanting sites. The physical site characteristics, threats such as invasive weeds and the potential for fire, and land ownership and availability have been assessed to determine the suitability of each site as a permanent habitat for *A. menziesii*

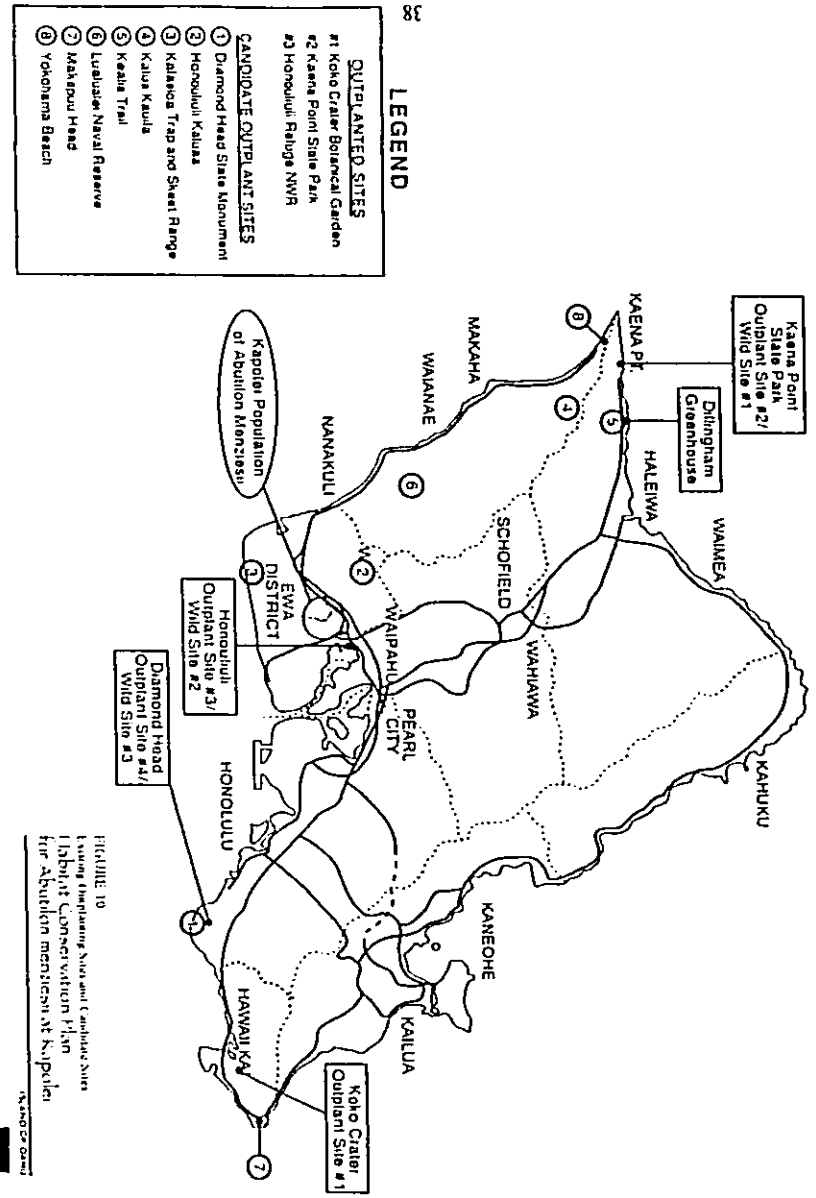


FIGURE 10
Existing Outplanting Sites and Candidate Sites
Habitat Conservation Plan
for Abutilon menziesii at Kapolei

Table 11. Candidate sites for outplanting of *Abutilon menziesii*

Site Name/ Location	Ownership	Size (Outplant Site)	Site Characteristics	Threats / Other Relevant Comments
Diamond Head State Monument Waikiki, East Honolulu	State DLNR Division of State Parks	1 to 2 acres	-Within DLNR control -Convenient site accessibility -Controlled access -State parks master plan designates areas which are not within heavy "public transit areas" -Dry environment -Fairly deep soils -Waterline available in near proximity	-Fire -Weeds -Presently requires MOU between National Guard and DLNR. -National Guard to relocate from Diamond Head in 2007-2010 -High Priority candidate site to be planted in 2004
Honoutiuli Kaluaa Kunia, Waianae Mountains	Campbell Estate (The Nature Conservancy of Hawaii, Inc.)	6r 0.5 acre	-Site accessible by rough dirt road and on foot -Not a public access area, however, site is used by hunters, hikers -Dry mesic forest -No waterline available	-Fire -Weeds -Low Priority site due to uncertainty of lease renewal
Kalaeloa Northern Trap and Skeet Range Former Barbers Point Naval Air Station, Ewa	Federal Navy	---	-Convenient site accessibility -Controlled access (to some degree) -Site is scheduled for remediation to remove hazardous materials -Dry coastal lowlands -Presence of Ewa Plains 'Akoko (Chamaesyce skottsbergii, an endangered species -Shallow soil layer on karst substrate (to be exacerbated by remediation) -Unknown Waterline availability	-Fire -Weeds, Buffel grass -Site is planned to be remediated to remove lead shots, top layer of soil to be removed -Low Priority site
Kalua Kauila Near Makua Valley	Federal Department of the Army	---	-Site access by foot -Controlled site access	-Fire -Weeds - Army is unwilling to allow more T&E species on its lands at this time
Kealia Trail Mokuleia (near Dillingham Nursery)	State DLNR	0.5 to 1.0 acre	-Convenient site accessibility -Public hunting and recreational area -Dry, forested environment -Moderate depth soils	-Fire -Invasive weeds -DOFAW's initial test planting at this site is not

			-No Waterline available	too positive; -2nd site will be test planted in 2004
Lualualei Naval Reserve Waianae	Federal Navy	---	-Convenient site accessibility -Controlled access -Dry environment -Presence of *A. menziesii* (2 known) -Deep soils -Waterline available in proximity	-Fire -Weeds, Guinea grass -Navy is currently unwilling to collaborate and allow additional T&E species on its lands
Makapuu Head	State DLNR Division of State Parks	---	-Relative convenient site accessibility -Public recreational area -Dry coastal environment - Pockets of deep soils -Scattered pockets of native plant communities, including T&E species -Unknown Waterline availability	-Fire threat -Weeds, koa haole scrub, Guinea grass -Limited salt spray -Uncontrolled access (public recreational area)
Yokohama Beach (Within Kaena Point State Park) Leeward Coast (North of Makaha)	State DLNR Division of State Parks	0.5 to 1.0 acres	-Convenient site accessibility -Public recreational area -Dry coastal environment - Deep soils -*Unknown Waterline availability*	-High fire threat -Weeds, Guinea grass -Uncontrolled access (public recreational area) -Salt spray during kona weather

The priority candidate site, Diamond Head State Monument, is located at Waikiki in East Honolulu and is under DLNR Division of State Parks jurisdiction. The Diamond Head State Monument Master Plan includes areas which will remain as wildlands which may be appropriate for *A. menziesii* introduction. This site has been approved by the Division of State Parks.

From a biological perspective, the Lualualei Naval Reservation environment is a preferred site with appropriate microclimate, soil conditions, and protected status. Moreover, the site is believed to be an historic range of *Abutilon menziesii* with two individuals present at the NCTAMS PAC Radio Transmission Facility and is monitored by Navy staff (R. Miyashiro, personal communication). However, the current position of the Navy precludes the introduction of additional protected species at this location. Follow-up communication with the Navy will resume after the approval of the HCP.

Important considerations in the selection of each site include the following:

- Generally all sites may be exposed to fire threats, therefore, a site specific fire protection plan will be developed for each site – as part of the site assessment /selection process. The fire

plan will include identification of the following: 1) fire fighting resources, 2) response responsibilities, 3) location of water resources, and 4) plans for fire breaks and fuel control.

- All sites that persist are to be considered permanent sites, therefore, future urbanization within and adjacent to the sites must be analyzed and landowner commitments for preservation must be secured.

Strategy (5) Long term protection and maintenance of permanent *Abutilon menziesii* populations

As described in this HCP and in the MOA between DOT and DLNR (Appendix H), the funds for a 20-year period for active management, protection, and maintenance of three permanent outplant sites have been partially delegated by DOT and will be supplemented after the approval of the HCP. Additionally, DOT agrees with the need for management of three wild sites beyond 20 years. Therefore, as described in Strategy (2), the funds for such management will be derived from two sources: 1) Interest earned (estimated at $440,000) on the delegated amounts of $950,000, and 2) Contingency Fund revenues (a portion of $200,000).

A further responsibility for long-term protection and maintenance of the permanent outplant sites after the HCP active management period of 20 years requires the commitment of Landowners of three outplant sites. The property owners will be required to commit to maintaining land uses that are compatible with the protection and management of the *Abutilon menziesii* populations on their property. Thus, the site selection process has analyzed criteria such as landownership status and potential future urbanization pressures on the candidate sites.

The MOA further states, "DLNR has the knowledge, expertise, and permanent presence needed to implement the mitigation of threatened and endangered species and agrees to implement the mitigation of threatened and endangered species and agrees to implement the management of the *A. menziesii* mitigation populations as outlined in the HCP".

Protection and Management of Wild Sites. The protection and management of the of the wild sites 3 will be funded through the monies contributed by DOT and earmarked for *A. menziesii* and as described in the MOA "Exhibit A - Scope of Services" includes the following:

A. Maintain three wild populations. The purpose of the populations is to allow for natural seedling recruitment and establish long-term viability of all three populations.

B. Propagation of a total representation of plants through cuttings from the Kapolei *Abutilon menziesii* population. These plants will be used to maintain genetic representation of stock and provide stock for outplanting purposes.

C. Administration: 1) Prepare biannual reports of progress and findings, and 2) Maintain adaptive management strategy as needed to improve plant recovery and success.

D. At the end of the contract period, DLNR shall prepare a summary final report, providing recommendations for future actions and possible alternatives, if any, based upon documented findings and results.

Strategy (6) Appropriate research

The research component would augment the research and testing measures described in Task 4 of Strategy (1): Interim Management Program which includes biological research, testing, and identification of testing parameters.

Research would focus on the "cultivation methods" of *A. menziesii* to attain the goal of establishing three viable new outplant sites. A review of past research studies would be made and appropriately applied to this project as situations arise at the various outplant site. The need would be determined by DLNR.

Research may include studies of various aspects of life history, habitat, pollinators, reproductive biology, optimum requirements for growth, requirements for population viability, and control of threats to better understand the requirements necessary for perpetuation of these plants. Such additional knowledge would allow more appropriate management and assessment techniques to be developed.

6.1 Collect diagnostic data on crucial associated ecosystem components.

1) Composition of flora and invertebrate, bird, and other fauna populations within the existing clusters to gain an understanding of any relationships between these organisms and *A. menziesii*.

2) Comparison of such information collected over time correlated with data from monitored populations of *A. menziesii* in known locations to provide insight into the required and/or preferred habitat for the species.

6.2 Study various aspects of growth of *A. menziesii*

1) Growth and mortality of seedlings, cuttings, transplanted parent plants;

2) Growth of mature plants, including seasonal changes, optimum conditions and limiting factors;

3) Seasonal differences in temperature and light needs;

4) Water sources and requirements; and

5) Soil and nutrient requirements.

6.3 Study reproductive viability.

1) Breeding systems including self-compatibility;

2) Pollination vectors; and

3) Preferred conditions for flowering and seed set.

6.4 Determine the degree of threats posed by the nature of interactions with selected diseases/ introduced species.

Determine mechanisms of impact of diseases or pests. If diseases or introduced pests with negative impacts on *A. menziesii* are discovered, effects and mechanisms of each would be

determined. Research into mechanisms of impact of alien species, and any others that may be threats, would be performed as deemed necessary.

6.5 Determine effective control methods to combat insect pests that may adversely affect the species.

6.5.1 *Determine effective control methods for pests.* If the pests are determined to pose a threat to *A. menziesii*, research into effective control methods for these pests would be undertaken, ensuring that the control measures do not adversely affect this species.

6.5.2 *Determine effective control methods for hibiscus scale on Abutilon menziesii.* If the hibiscus scale is determined to pose a threat to *A. menziesii*, research into effective control methods for the hibiscus scale on the appropriate *A. menziesii* species would be undertaken, ensuring that the control measures do not adversely affect this species.

6.6 Other appropriate research to be considered.

Potential research would also be considered for the following:

1) Testing adult plants, seedlings, and seeds for salt tolerance via soil and salt spray, and

2) Conducting studies (or researching) off-island populations of *A. menziesii* to gain an understanding of how these populations function.

The decision to implement any additional research would be subject to other funding availability and a determination that these studies would directly significantly benefit the Kapolei population and the outplant sites as described in this HCP.

6.7 Currently ongoing research.

A research project by the University of Hawaii (Cliff Morden, principal investigator) is currently ongoing as a research component of the HCP. The research is to assess the extent of the genetic variation within the Ewa population of *Abutilon menziesii*. A genetic analysis of all plants from the Ewa population (at the Kapolei site or at outplanting/nursery sites) will be carried out. A limited number of individuals from other populations of *A. menziesii* (Lualualei, Oahu; Lanai, and Hawaii) will be sampled to determine affinities of the Ewa population. This research will address the extent of the genetic variation of the Ewa population, if this population is genetically distinct from other existing populations, and if genetic distance among plants correlate with the physical distance between plants. Random amplified polymorphic DNA (RAPD) markers will be used to assess the genetic diversity among individual plants. All population genetic distances will be statistically evaluated and will be compared to results from similar studies. Assessment of the genetic variation of the Kapolei population of *A. menziesii* will provide information allowing managers to make more informed management decisions concerning selection of source material for outplanting, collection, and storage of propagules to ensure representation of existing genetic material. The final report will include the following items:

1) Collection information for individuals
2) Description of methods
3) Results and discussion of genetic analyses

4) Statement regarding intra-population variation of *Abutilon menziesii* and its genetic relation to other populations

Strategy (7) Kapolei Population strategies

An objective of the HCP over its 20-year program would allow the removal of the Kapolei population and relocating the full genetic resource to three offsite protected locations on Oahu. To assure that the short-term success criteria are met before the full population is removed (as described in Section 7 Table 13) an 18-acre area within the Kapolei population is established as a temporary contingency reserve. This area is shown in Figure 11, as well as on Figure 5.

An additional "Special Condition" to the State Incidental Take License to be issued to accompany the "Habitat Conservation Plan for Abutilon menziesii at Kapolei" would state, "No take or development can occur within the 18-acre area that surrounds the core *Abutilon menziesii* concentration within the area identified as Cluster C3 in the "Habitat Conservation Plan for *Abutilon menziesii* at Kapolei" until such time that one outplanting site has met short-term success criteria described in the HCP."

Management of the 18-acre reserve may include measures such as temporary fencing and firebreaks. If an outplanting site does not meet the short-term success criteria, this could be considered as a wild site.

Incidental Take

DLNR, as the property owner, will be responsible for the Kapolei population until the Kapolei projects are fully entitled and prior to the transfer of land to the Kapolei project developers. A stipulation of the transfer of the property would be the issuance of an Incidental Take Permit by DLNR to enable the removal of the Kapolei population plants to the outplant sites. The cost to remove and upkeep these "original plants" will be from the funds provided by DOT or from contributions to the Endangered Species Trust Fund. The costs associated with the transplanting of original plants would be from the allocations to each of the three wild sites.

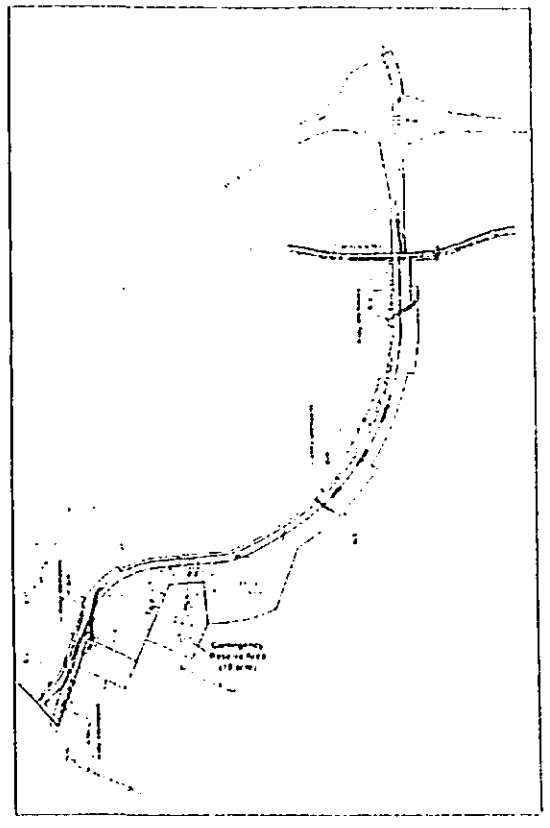
The City and County of Honolulu will issue a right-of-entry permit to DLNR DOFAW to collect propagules and conduct appropriate monitoring of the *A. menziesii* individuals (as described in this HCP) on the City property. However, the City will have overall responsibility for the plants on its property.

Prior to the construction of the North-South Road and removal of *A. menziesii*, DOT personnel will be consulting with DLNR regarding the location and treatment of the endangered plants along the project corridor.

Mitigation of the Seed Bank

To mitigate the seed bank at Kapolei, DOFAW has collected seeds and cuttings from approximately 75±% of all baseline plants. The uncollected 25±% is the due to plants lost through attrition, etc..

Mitigation of the seed bank will focus on seed storage at Lyon Arboretum, vegetative propagation at the new Dillingham Nursery, and the living genetic bank at Koko Crater Botanical Garden. The documentation of the Lyon Arboretum collection is accessed at the following website: http://www.hawaii.edu/scb/docs/science/seed/seedtabl.html



LEGEND

Abutilon menziesii

18 acre contingency reserve

FIGURE 11
18 Acre Contingency Reserve Area
Habitat Conservation Plan
for *Abutilon menziesii* at Kapolei

The requirements of soil collection and storage may not be practical or feasible and collection is unproven as a means to mitigate the seed bank when compared to the successful collection of seeds and vegetative cuttings from the Kapolei population. Therefore, soil collection and banking is left to be exercised at the discretion of DLNR.

SECTION 4

Identify those measures or actions to be undertaken to protect, maintain, restore, or enhance the ecosystems, natural communities, or habitat types within the plan area; a schedule for implementation of the actions or measures, including monitoring, that are to be undertaken in accordance with the schedule.

(4a) Measures or actions to be undertaken to protect, maintain, restore, or enhance the ecosystems, natural communities, or habitat types

Short-term and long-term measures and actions which would affect the existing *Abutilon menziesii* population have been described in detail in Section 3. The strategies outline the measures and actions of the HCP for the existing habitat, the interim management period, and the long-term period at the offsite outplant mitigation populations.

(4b) A schedule for implementation of the proposed measures and actions.

The schedule for implementation of the proposed measures and actions is described in detail in Section 3, Strategy (3).

All of the populations of *A. menziesii* have been and will be periodically monitored throughout each of the phases of the HCP Implementation Schedule. Monitoring of the *in situ* and reintroduction populations will be conducted to determine progress toward attaining taxon stability. Monitoring will also be conducted to assess the status of the management unit relative to control of alien taxa and to habitat restoration. In addition, monitoring is an essential and integral part of adaptive management, which will be undertaken and is more thoroughly described in Section 8.

SECTION 5

Be consistent with the goals and objectives of any approved recovery plan for any endangered species or threatened species known or reasonably expected to occur in the ecosystems, natural communities, or habitat types in the plan area.

The preparation of the subject HCP involved the review of the *Lanai Plant Cluster Recovery Plan* (USFWS 1994) which includes *Abutilon menziesii* as one of nine endangered taxa. Appropriate guidelines are incorporated into the strategies contained herein.

Abutilon menziesii is considered to be a "long-lived" perennial and known or believed to have a life-span greater than 10 years (USFWS 1994, page 69). Conversely, "short-lived" perennials are those known or believed to have life spans greater than 1 year but less than 10 years. There are fewer than 700 *A. menziesii* individuals on Lanai, Maui and Hawaii; Oahu is listed as a possible location (USFWS 1994).

The Lanai Recovery Plan states the most serious threats as browsing and trampling by introduced ungulates, and competition from alien plants. Other threats include fire, seed predation, loss of pollinators and disease. Additional threats noted on Maui and Hawaii include agricultural and urban development.

The presence of the Kapolei population validates that the Leeward Oahu (and possibly Lualualei) and Ewa areas as historic ranges for the species. Threats to the subject population at Kapolei included agricultural cultivation until 1994 and impending urbanization as described herein.

The Lanai Recovery lists five necessary actions: 1) Protect habitat of current populations and manage threats, 2) Conduct research essential to conservation of the species, 3) Expand current populations, 4) Establish new populations as needed to reach recovery objectives, and 5) Validate and revise recovery objectives.

The total estimated cost of recovery for one (of nine) species in the Lanai Recovery Plan is estimated at $3,000,000 over a period of 20 years. The date of recovery (for all nine species) for downlisting to Threatened would be in 2015, if recovery criteria are met (USFWS 1994, page v.).

The Kapolei population is expected to be taken and relocated to the three new outplant sites where threats will be actively managed, research conducted, and populations expanded over the 20 year period. To implement the HCP measures, a funding commitment has been made, as described in the Memorandum of Agreement (Exhibit G) between DOT and DLNR for approximately $50,000 per year for a period of 20 years. Moreover, a commitment to implement the strategies of the HCP has been made by DLNR.

As indicated, there are no other endangered or threatened species in the East Kapolei area. However, remaining, in situ *Abutilon menziesii* will be maintained and protected onsite by DLNR until they are to be taken and relocated to the wild, outplanted sites, as described under Task 1 of Section 3, Strategy (1). In addition, an objective of this plan is the establishment of outplanting sites, which may become "plan areas" which may have other endangered species, and the coordination of these recovery efforts will also be performed by DLNR.

The mitigative measures of this HCP will contribute towards the USFWS Recovery Objective to delist this species. The criteria to meet the Recovery Objective of delisting are summarized below.

Table 12. Recovery Objectives of the Lanai Recovery Plan and HCP Objectives

Objectives	Lanai Recovery Plan	Associated HCP Actions
Interim Objectives	Stabilizing the existing populations. To be considered stable, each taxon must be managed to control threats (e.g. fenced) and be represented in an ex situ collection. In addition, a minimum total of three populations should be documented on Lanai and, if possible, at least one other island where they now occur or occurred historically. Each of these populations must be naturally reproducing and increasing in number, with a minimum of 25 mature individuals per population for long-lived perennials	HCP goal is to establish 3 new ex situ wild populations on Oahu from the original degraded cane field population at Kapolei At the new populations, threats from fire, vehicles, insect and weed pests, are to be controlled
Downlisting	Taxon may be downlisted when a total of five to seven populations are documented on Lanai and at least one other island where it now occurs or occurred historically. Each of these populations must be naturally reproducing, stable or increasing in number, and secure from threats, with minimum of 100 mature individuals per population for long lived perennials. Each of these populations must persist at this level for at least 5 consecutive years before downlisting is considered	Presently, 830 progeny from cuttings and seeds, representing the full range at Kapolei have been propagated and planted at two outplant sites (Kaena Point and Honouliuli) and at Koko Crater Botanical Garden, which serves as a repository for the full genetic range of the Kapolei population The next outplant site is anticipated to be on State land at Diamond Head Monument. Additional sites are being evaluated and will be selected for outplanting after all clearances are received. The goal is to achieve at least three sites which meet the success criteria described herein.
Delisting	Taxon may be delisted when a total of 8 to 10 populations are documented on Lanai and at least one other island where it now occurs or historically occurred. Each of these populations must be naturally reproducing, stable or increasing in number, and secure from threats, with a minimum of 100 mature individuals per population for long lived perennials. Each population should persist at this level for at least five consecutive years before delisting is considered	The funding for the HCP is provided by DOT and implementation of the HCP is by DLNR as described herein

SECTION 6

Provide reasonable certainty that the ecosystems, natural communities, or habitat types will be maintained in the plan area, throughout the life of the plan, in sufficient quality, distribution, and extent to support within the plan area those species typically associated with the ecosystems, natural communities, or habitat types, including any endangered, threatened, proposed, and candidate species known or reasonably expected to be present in the ecosystems, natural communities, or habitat types within the plan area.

The ecosystems, natural communities or habitat types of the Kapolei property are described in Section 1(b). Studies by Nagata (1996) and Char (1997, 1997, 2003, 2004) indicate that, for the most part, the landscape and ecological conditions are typical of fallowed sugarcane fields at other Oahu locations. It should also be noted that other listed, endangered species have not been discovered in this area, and the interdependency of any organism with *A. menziesii* has not been established at this point.

As described in Section 3, Strategies (1) and (4), the establishment of three new outplant wild populations is a major goal of this HCP, as such, there will ultimately be three "plan areas". Several more potential outplant sites are planned, in order to achieve a minimum of three successful sites.

A primary purpose of the Interim Management Program was to preserve the genetic resource at the Kapolei population and to test the viability of outplanting at appropriate offsite locations. This represents the initial task towards providing a reasonable certainty that the natural Kapolei community of *A. menziesii* will be maintained. The initial results of the Interim Management Program are a positive indication that new plants can successfully be grown from seeds and cuttings and potentially, new populations can be established at appropriate offsite locations to maintain a habitat for this species. At the Kaena Point outplant site, a coastal strand community including approximately 20 native species has been initiated and seedling recruitment has been reported.

The initial results indicate that with continued management there is reasonable certainty that *A. menziesii* from the original Kapolei population could be established as a natural community. However, a final assessment will require continued management over time.

SECTION 7

Contain objective, measurable goals, the achievement of which will contribute significantly to the protection, maintenance, restoration, or enhancement of the ecosystems, natural communities, or habitat types; time frames within which the goals are to be achieved; and provisions for monitoring (such as field sampling techniques) and evaluating progress in achieving the goals quantitatively and qualitatively.

(7a) Objective, measurable goals, the achievement of which will contribute significantly to the protection, maintenance, restoration or enhancement of the ecosystems, natural communities, or habitat types

The primary objective of the HCP is the continued survival of the Kapolei genetic stock of *Abutilon menziesii* through the establishment of three offsite wild populations and one offsite repository site from the degraded canefield population at Kapolei. To achieve this goal, several sites will be outplanted, managed, and monitored for a period of five years before a determination is made whether a site has met the success criteria described herein. The short- and long-term goals are summarized in Table 13:

Table 13. HCP Short-term and Long-term Goals

	Goals
Short-Term Goals	1) Propagate the full complement of lineages of the in situ Kapolei population of *Abutilon menziesii* 2) Establish a cultivated repository of the full complement of lineages of Kapolei *A. menziesii* at Koko Crater Botanical Garden 3) Establish two test outplantings of *A. menziesii* at appropriate sites. 4) Represent the full complement of lineages of the in situ Kapolei population at all sites. 5) Establish and maintain an 18-acre contingency reserve area within the Kapolei population until the short-term success criteria are met at one wild outplant site.
Long-Term Goals	1) Maintain three new stable wild populations of *A. menziesii* by out-planting at several (more than three) appropriate sites. 2) For each wild population maintain an effective population of 120 flowering and seed producing plants (minimum of 100 mature individuals) over the term of the HCP. This number will assure an approximate 75 to 100 percent increase of the original population in each location and is five times that recommended by the Hawaii and Pacific Plants Recovery Coordinating Committee (as cited in USFWS 1998). 3) Monitoring of the outplanted populations will be conducted to determine progress toward attaining population stability. 4) The goal for seedling survival rate will be on average in the 10 - 25 percent range over a five year period taking into consideration the many variables related to achieving stability of reintroduced populations. "Survival rate" is defined as survival of individual plants for a minimum of one year. 5) Natural recruitment shall occur in all wild populations not dependent upon artificial management such as irrigation.

(7b) Time frame within which goals are to be achieved

At this time, the goals are anticipated to be achievable within the 20-year timeframe of the HCP. Following the 20-year period of active implementation and management, subsequent monitoring and any necessary management actions would be undertaken through a separate agreement with DLNR (or other qualified organization), for a period of time to be specified by DLNR and the Endangered Species Recovery Committee, until the final determination is made that the three outplant sites are firmly established.

(7c) Provisions for monitoring and evaluating progress in achieving the goals quantitatively and qualitatively

The criteria to measure success of the HCP actions include short-term, long-term, and overall criteria as described in Table 14.

Table 14. Measurable Criteria for Monitoring and Evaluating Progress of Goals

	Success criteria
Measurable Short-Term success criteria	1) At least 25% of the full complement of lineages outplanted in a population must survive for 2 years after irrigation is ceased. 2) During the first 5 years after each wild population is established there must be (a) recruitment of seedlings that survive through the dry season, and (b) seed production by at least 25 % of the full complement of outplanted lineages after irrigation is ceased.
Measurable Long-Term Success Criteria	1) At least 80 reproducing adult plants will be present in each population, averaged over a five-year period after irrigation is ceased. 2) The number of seedlings recruiting into the mature age class must be greater than the mortality rate of existing adult plants, averaged over a five-year period after irrigation is ceased
Overall Success Criteria	If both Long-Term Success Criteria are met and there are more than 120 reproducing adult plants present at the end of a 5-year period at a site (including at least 40 plants recruited from the seed bank on site) then no additional management action will be required for that site as part of the HCP and only monitoring need continue over the following 5-year period

Strategies which have been completed or are in progress - including Strategies (1) and (4) - have demonstrated promising initial results of the HCP actions. Approximately 850 plants have been propagated by DLNR and outplanted to three sites. At this time the 1,000 percent increase in total number of Kapolei-derived plants over the original baseline of 93 plants is a positive preliminary indicator of establishing three ex situ wild populations.

An annual reporting process is required by Chapter 195D-21(f), HRS, which states, "Participants in habitat conservation plan shall submit an annual report to the department within 90 days of each fiscal year ending June 30, that includes a description of activities and accomplishments, analysis of the problems and issues encountered in meeting or failing to meet the objectives set forth in the HCP, areas needing technical advice, status of funding, and plans and management objectives for the next fiscal year, including any proposed modifications thereto." In addition, monitoring will occur

throughout the term of the HCP (as described in Section 8 below) and a report will be issued annually with a major assessment at each 5th year increment.

DOT intends to engage the services of DLNR to implement the strategies described in this HCP. DLNR, through the implementation of Strategy (1), has demonstrated the viability of propagating *Abutilon menziesii* and documented this in a progress report (Appendix F) and a final report (Appendix G).

SECTION 8

Provide for an adaptive management strategy that specifies the actions to be taken periodically if the plan is not achieving its goals.

Adaptive management is a strategy that allows for the change of management activities described in the HCP to ensure that the goals and accompanying success criteria of the HCP are achieved. Information from monitoring activities and other sources (e.g., research) will be used to evaluate whether the biological goals and success criteria of the HCP are being achieved and may be used to refine the design, scope, or implementation of the management actions described in the HCP.

Monitoring of the outplanting sites, which are intended to be self-sustaining, wild populations of *Abutilon menziesii*, as well as propagation and outplanting methods, and an examination of threats will be conducted to determine progress toward attaining the short-term and long-term goals and success criteria of the HCP. Monitoring will also be conducted of the Kapolei population of *A. menziesii* to track (e.g., survival, mortality, reproduction) live plants, including new recruits, remaining on site in order to maintain a complete representation of the genetic diversity of this population. Modifications to the management of the Kapolei population and outplanting sites will be made based on the results of the monitoring program and as research results in new information regarding *A. menziesii* (e.g., crucial ecosystem components, growth aspects, reproductive viability, outplanting methods, threat control methods, salt tolerance, genetics, seed bank dynamics).

The monitoring protocols are for various aspects of the HCP, as modified from the Makua Implementation Plan's Appendix E. Each monitoring protocol provides a description of the: 1) monitoring objectives; 2) monitoring methods and data analysis; 3) monitoring activity; and 4) potential management activities to be implemented in response to the information gathered.

Final decisions to change certain management actions will be approved by the DOT and DLNR DOFAW. DLNR DOFAW will determine which actions require additional recommendations by the ESRC.

There are five monitoring protocols which are described below:

- ***MONITORING PROTOCOL 1 – Monitor Individuals of Abutilon menziesii in the Kapolei Population***
- ***MONITORING PROTOCOL 2 – Conduct Phytosanitation Monitoring in Greenhouse Facilities***
- ***MONITORING PROTOCOL 3 – Assess Status and Stability of Outplanted Populations***
- ***MONITORING PROTOCOL 4 – Conduct Phytosanitation Monitoring at Outplanted Populations***
- ***MONITORING PROTOCOL 5 – Monitor Success of Outplanted Individuals***

The monitoring protocols are described in detail below.

MONITORING PROTOCOL 1 – Monitor Individuals of Abutilon menziesii in the Kapolei Population

Type of activity: Monitoring – As a goal of the Habitat Conservation Plan for *Abutilon menziesii* at Kapolei ("HCP") to provide a complete representation of the genetic diversity and survival of the Kapolei population of *A. menziesii*.

Description: Conduct monitoring of the survival of the Kapolei population; to determine phenology; and to collect propagules for storage, propagation, or experimentation.

Applicable for: *Abutilon menziesii* within the Kapolei population.

Management goals: Determine a window when collection of propagules is highly probable. Successfully collect an adequate number of propagules to achieve the goals for the HCP (e.g., complete representation of the genetic diversity of the Kapolei population). Manage to maintain the existence of the Kapolei population (i.e., survival of existing individuals and additional recruits until take occurs).

Preliminary sampling objectives: Be sure that the window for collection will ensure successful seed collection if plants reproduce.

Management response: Adjust schedule according to phenology patterns of *A. menziesii* for seed collection.

Area to monitor: The Kapolei population of *A. menziesii*, with the purpose of locating mature individuals from which propagules will be collected.

Monitoring framework: Conduct a complete survey of all individuals in the Kapolei population to determine if or when they would be flowering or fruiting

Data to collect: Data will be collected following the Hawaii Rare Plant Restoration Group ("HRPRG") rare plant monitoring format. Record location information (map and/or GPS coordinates) as needed for any new mature individuals of *A. menziesii* found in the Kapolei population.

1. Record reproductive status of all individuals – record presence of fruit (mature or immature), and flower (buds or opened) and numbers of individuals with each.

2. Collection information – Record any collections made, assign numbers to plants sampled, designate purpose for collection before collecting. This information should follow all propagules throughout its life.

Data analysis methods: No statistical analyses are needed for this protocol. All data resulting from the field surveys should be entered into a database and GIS.

Data collection interval: Visit the Kapolei population quarterly to determine phenology or visit at time of year when reproduction expected.

MONITORING PROTOCOL 2 – Conduct Phytosanitation Monitoring in Greenhouse Facilities

Type of activity: Monitoring - A component of the HCP to establish three wild, self-sustaining *A. menziesii* populations on Oahu.

Description: Maintain phytosanitation monitoring at the nursery designated for out-planting to ensure it is not contaminated with new pathogens or other pests of concern (Appendix 2.2 Phytosanitation Standards and Guidelines from the Makua Implementation Plan may be used as a reference).

Applicable for: Plants to be outplanted as part of establishing a wild, self-sustaining population of *A. menziesii* on Oahu.

Management goal: To prevent any introduction of pathogens or other pests of concern from the greenhouse (*ex situ*) environment into the out-planted site.

Preliminary sampling objectives: Be certain that pathogens or other pests of concern do not visibly contaminate the majority of the greenhouse plants proposed for outplanting.

Management response: If pathogens or pests are discovered within the lot of plants designated for outplanting, treat all of the plants with an appropriate pesticide and quarantine for longer period of time; reexamine the plants prior to any future outplanting.

Group to monitor: All of the individual plants proposed for outplanting.

Monitoring framework: Examine all individual plants proposed for outplanting.

Data to collect:

1. Presence or absence of pathogens or pests of concern – Record outbreaks of pathogens or pests of concern.

2. Identify type of pathogen present – Identify type of pathogen present. If pathogen is not controlled, then make a further identification by identifying pathogenic symptoms, document via photo and collect sample for analysis.

Data analysis methods: No statistical analyses are needed for this protocol. However, it is essential that a proper random sample be taken of all of the plants that are in the proposed outplanting lot unless all plants are to be examined.

Data collection interval: Data must be collected during the growing period and prior to outplanting. Monitoring should be conducted during the life of the plant in the propagation growing facility at least bi-weekly. The sampling must be done just before planned outplanting date because any lag

between inspection and planting may allow for new pathogens to become established.

MONITORING PROTOCOL 3 – Assess Status and Stability of Outplanted Populations

Type of activity: Monitoring - A component of the HCP to establish three wild, self-sustaining *A. menziesii* populations on Oahu.

Description: Conduct initial baseline survey and continuing monitoring program for *A. menziesii* within each outplanted population to assess its status relative to the goals and success criteria identified in the HCP. Additionally, determine if the demographic structure of each outplanted population will be able to meet the overall goal and long-term success criteria of the HCP. Data will be collected on the distribution, abundance, status (vigor), population structure, and phenology of plants sampled, as well as evidence of damage by alien animal species (e.g., insects, rats, slugs) within an outplanted population.

Applicable for: Each outplanted population of *A. menziesii* on Oahu intended to be a wild, self-sustaining population.

Management goal: Manage each outplanted population to achieve the specified number of mature, reproducing individuals, and duration as specified in the HCP.

Preliminary sampling objectives:

1. Be certain that the number of mature plants capable of reproduction in each outplanted population is equal to or greater than the minimum number specified in the HCP to achieve the short-term success criteria.
2. Determine if demographic structure of outplanted population appears to be adequate to sustain a viable population of *A. menziesii* over time based on comparison of number of individuals in life-stage classes with predicted model of a stable population for *A. menziesii*.

Management response: If population stability is not achieved, one or more of the following responses are appropriate: 1) continue with the same management program for a longer time, 2) intensify threat control, 3) implement species augmentation, or 4) select another location to establish a wild, self-sustaining population.

Area to monitor: Systematic survey of all of the individuals in each outplanting population. Individuals must be within 500 meters of another plant of the same taxon to be considered to be part of that population.

Pilot studies: It is important to emphasize that the suggestions that follow regarding monitoring framework, data to collect, and data analysis methods are preliminary suggestions that need to be developed following completion of pilot studies in the outplanting populations. Pilot studies will be used to collect data that will be used to refine the protocol relative to variables which will be sampled, plot size and shape, sampling framework, number of samples to be taken, monitoring interval, and data analysis methods to be used.

Sample unit: Outplant population.

Monitoring framework: Either of several survey strategies may be used initially to establish the monitoring framework for this protocol. Continue to use that strategy for subsequent monitoring of the population.

1. Census of plants in the outplanted population. All individuals within an outplanted population will be located and data collected as specified below.

Data to collect: The fields described below are included in the HRPRG's Rare Plant Field Data Form, which may be used for data collection in this monitoring protocol.

1. Location of individuals – this would be quadrat number if sampling conducted along contiguous-plot belt transect, or GPS coordinates (UTM Zone 4, NAD 83 datum base) if using cluster sampling strategy. Some of the individuals in the population may be uniquely identified and tagged to help with collection of propagules or to allow for the collection of data on the progress of individuals through size or stage classes. Where GPS points cannot be used to locate individuals, the position of individuals will be hand-drawn in relationship to local landmarks and topography.

2. Number of individuals - use the following life-stage classes as defined for *A. menziesii*: *seedlings*; *immature individuals*; and *reproductively mature individuals*. Each of these classes must be determined for *A. menziesii*. For most outplanted populations, all of the mature plants will be located and counted.

3. Vigor of all individuals in the following classes: *healthy* – foliage appears green and vigorous, less than 10% dead leaves or defoliation; *moderate* – some chlorosis or deformity (e.g., curled, extremely small, insect damage) may be seen in the leaves, 10-50% dead leaves or defoliation; *poor* – most leaves may be dead or chlorotic or deformed, 50% dead leaves or defoliation; *dead* – no live foliage or woody tissue.

4. Evidence of damage from alien animals: data will also be recorded on the presence or sign of damage on the sampled plants from alien animals, particularly invertebrates, rats, or slugs.

5. Phenological stage: record data on the presence of *buds, flowers, immature fruits, mature fruits,* or *vegetative state* for each plant, or if the plant is *vegetative*, or *dormant*. This information will be summarized for the population as a whole.

Data analysis methods:

1. In many cases all of the individuals within an outplanted population will be enumerated so direct comparisons of the resulting numbers will be made with the specified short-term and long-term goals and success criteria of the HCP.

Data collection interval: Data should be collected on the status of each outplanted population annually. It would be ideal if data collection could coincide with time of fruiting by the plants to

better evaluate seed set and to allow for collection of additional propagules, if needed, at the same time. In any case data should always be collected at the same month of the year for a specific outplanted population.

MONITORING PROTOCOL 4 – Conduct Phytosanitation Monitoring at Outplanted Populations

Type of activity: Monitoring - A component of the HCP to establish three wild, self-sustaining *A. menziesii* populations on Oahu.

Description: Maintain baseline inventory for pathogens at outplanted populations and phytosanitation monitoring on outplanted individuals to determine if they are contaminated by new pathogens or other pest species of concern (Appendix 2.2 Phytosanitation Standards and Guidelines from the Makua Implementation Plan may be used as a reference).

Applicable for: All outplanting sites on Oahu and outplanted individuals of *A. menziesii*.

Management goal: To detect and control any introduction of a pathogen from the greenhouse (*ex situ*) environment into the outplanted site.

Preliminary sampling objectives: Be certain that all outplanted individuals are not visibly contaminated by pathogens or other pest species of concern, and other individuals within the vicinity of the outplanting site are not contaminated above the baseline as a result of the outplanting. Pathogens or pest species of concern must be identified by an expert.

Management response: If pathogens or other pest species of concern are discovered on outplanted individuals, there are options: 1) eliminate the problem with an appropriate control technique and continue to monitor in the field, or 2) remove contaminated plants from reintroduction site and treat the contaminated planting sites with an appropriate pesticide to eliminate the problem in the field. Additionally, if contaminated plants are found in the field, it is necessary to reevaluate the greenhouse phytosanitation monitoring protocol to determine why it failed and to make modifications to that protocol if needed.

Group to monitor: All of the individual plants that were outplanted, as well as a sample of other plant taxa within the outplanting area.

Monitoring framework: 1) Examine all individual plants that were outplanted. 2) Conduct a pilot study to determine the extent and number of plants to be examined for pathogens or other pest species of concern within the study area.

Data to collect:

1. Presence or absence of pathogens or pests of concern – Record outbreaks of pathogens or pests of concern.

2. Identify type of pathogen present – Identify type of pathogen present. If pathogen is not controlled, then make a further identification by identifying pathogenic symptoms, document via photo and collect sample for analysis.

Data analysis methods: No statistical analyses are needed for this protocol.

Data collection interval: Data should be collected on the status of plants at each outplanting site monthly for the first three months and then every three months to complete first year.

MONITORING PROTOCOL 5 – Monitor Success of Outplanted Individuals

Type of activity: Baseline survey and monitoring – A component of the HCP to achieve the short-term and long-term goals and success to achieve three wild, self-sustaining populations *A. menziesii* populations on Oahu.

Description: Monitor germination and/or survival, growth, reproduction, and phenology of all individual plants that have been outplanted or introduced as seeds for *A. menziesii* in an area. The results of this short-term monitoring will be used to develop or refine techniques that maximize the survival of individual plants that are outplanted into the wild. Additionally the information will be the basis for determining how many individuals need to be planted if augmentation of the outplanted population is needed.

Applicable for: Plants or seeds outplanted to sites intended to meet the goal of being a wild and self-sustaining population. Monitoring may be focused on determining germination or survival and growth of all individuals outplanted.

Management goals: 1) Determine germination and/or survival of plants, and 2) document horticultural methods used for propagation and outplanting (i.e., cuttings, mound layering, seeding, size of pot, etc.).

Preliminary sampling objectives: 1) Track lineages of outplanted individuals to aid in determining if complete genetic diversity of the Kapolei population is represented in the outplanted populations. 2) Track survival rate of outplanted individuals.

Management response: 1) The results of monitoring plant growth relative to the different horticultural treatments will be used to help predict or refine the results of the plant survival analysis. The results of the analysis of survival will also be used to determine or refine the projected number of individuals to outplant for *A. menziesii* to achieve a specified number of plants that will become part of the reproductive pool.

Area to monitor: Complete outplanted population.

Monitoring framework: All outplanted individuals will be maintained.

Data to collect:

1. Percent germination of planted seeds: When seeds are planted as a outplanting strategy, the number of individuals that germinate will be counted in a specific seed sowing block within the outplanted site. Percent germination will be calculated by dividing the number of germinants by the total number of seeds planted.

2. Vigor will be recorded for all sampled individuals in the following classes: *healthy* – foliage appears green and vigorous, less than 10% dead leaves or defoliation; *moderate* – some chlorosis or deformity (e.g., curled, extremely small, or insect damage) may be seen in the leaves, 10-50% dead leaves or defoliation; *poor* – most leaves may be dead or chlorotic or deformed, 50% dead leaves or defoliation; *dead* – no live foliage or woody tissue.

3. Phenological stage: Record data if the plant is vegetative, reproductive, or dead.

4. Damage to Plants: Any obvious damage to the plants from ungulates, rodents, or insects will be identified and recorded when each of the sampled plants is examined and measured. This information may be useful in helping to understand reduced vigor or death of some of the plants that have been outplanted.

Data analysis methods:

1. Data collected in general will be used as a measure of the short- and long-term goals and the measurable short- and long-term success criteria, and vigor or survival of individual plants will be analyzed using a **contingency table design.**

Data collection interval: The first data collection time for this protocol will be just prior to moving plants out of the greenhouse and into the outplanting sites. During the first six months, data on germination (if seeds are used for outplanting) and/or survival of the plants will be assessed at least three times during this initial period. The next sampling time will be 12 months after seed sowing or planting, and thereafter the plants will be monitored annually.

Adaptive management options to consider include, but are not limited to:

- increasing or decreasing the number of plants outplanted into a site annually during the initial reintroduction phase
- (re)initiating reintroduction or augmentation efforts for a particular population unit;
- intensifying or changing post-planting care (e.g., watering)
- increasing or decreasing the control of specific threats as indicated by threat monitoring

Final decisions to change management actions must be approved by the DOT and DLNR DOFAW. In addition, detailed adaptive management strategies will continue to be prepared in consultation with DLNR and USFWS.

REFERENCES

Char, W.P. 1997. *Botanical Resources Study, North South Road Corridor (H-1 Freeway to Kapolei Parkway), Ewa District, Island of O'ahu.* Honolulu, HI.

Char, W.P. 1997. *Summary of Findings: Ko'bloa'ula on East Kapolei Project Site, Ewa District, Island of O'ahu.* Honolulu, HI.

Char, W.P. 2003. *Botanical Survey, University of Hawaii West Oahu, East Kapolei, Ewa District, Oahu.* Honolulu, HI.

Char, W.P. 2004. *Botanical Resources Assessment Study, Kapolei Parkway Extension from North-South Road to OR&L Right-of-Way, Kapolei Oahu.* Honolulu, HI.

Department of Land and Natural Resources, Division of Forestry and Wildlife, Natural Area Reserve System, *Interim Management Report for Abutilon menziesii*, April 24, 2001.

Department of Land and Natural Resources, Division of Forestry and Wildlife, Natural Area Reserve System, Final Interim Management Report for *Abutilon menziesii*, October 31, 2003.

Memorandum of Agreement Between the State of Hawaii Department of Transportation and Department of Land and Natural Resources.

Nagata, K. 1996. *East Kapolei Master Plan Biological Survey.* Honolulu, HI.

Nagata, K. 1997. Data Survey. Honolulu, HI.

Parsons Brinckerhoff. 1999. *North-South Road Draft Environmental Assessment.* Honolulu, HI.

PBR Hawaii. 1998. *East Kapolei Master Plan Project: Final Environmental Impact Statement.* Prepared for Housing and Community Development Corporation of Hawaii. Honolulu, HI.

U.S. Department of the Army, _____. Final Implementation Plan for Makua Military Reservation, Island of Oahu. DACA83-96-D-0007/0055.

U.S. Fish and Wildlife Service. 1994. *Lanai Plant Cluster Recovery Plan: Abutilon eremitopetalum, Abutilon menziesii, Cyanea macrostegia spp. Gibsonii, Cyrtandra munroi, Gahnia lanaiensis, Phyllostegia glabra var. Lanaiensis, Santalum freycinetianum var. Lanaiensis, Tetramolopium remyi, and Viola lanaiensis.* U.S. Fish and Wildlife Service, Portland, OR.

U.S. Fish and Wildlife Service. 1998. *Recovery Plan for Oahu Plants.* U.S. Fish and Wildlife Service, Portland, OR. 207 pp., + appendices.

U.S. Department of the Interior, Fish and Wildlife Service and US Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service. November 4, 1996. *Habitat Conservation Planning and Incidental Take Permit Processing Handbook.*

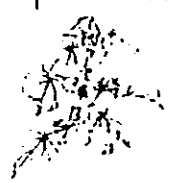
Wagner, W. L., D. R. Herbst, S. H. Sohmer. 1999. *Manual of the Flowering Plants of Hawaii.* Bishop Museum, Honolulu, HI.

www.hawaii.edu/scb/docs/science/seed/seedtabl.html

www.iucnsscrsg.org

Personal Communications: Vickie Caraway, William Garnett, Randy Miyashiro, Joel Moribe, Nelli Sugii

Appendix A
Biological Survey
K. Nagata
(September 1996)



Prepared by: Kenneth M. Nagata
For: PBR Hawaii
17 September 1996

INTRODUCTION

The project site occupies approximately 1300 acres in Honouliuli, Ewa District, Oahu. It encompasses the former sugar cane lands mauka of Varona Village from approximately 60' elevation, up to Farrington Highway. Two sections extend mauka to the H-1 Freeway. The west is bordered by the Kapolei development and the east boundary runs through abandoned sugar cane fields.

Ripperton and Hosaka (1942) classified the vegetation of the region as one of lowland shrub with a coastal fringe of kiawe trees (Prosopis pallida). Because of the arid conditions of the region the vegetation cover is generally sparse. Dominant shrubs include klu (Acacia farnesiana), koa-haole (Leucaena leucocephala) and 'ilima (Sida fallax) and the herb layer generally consists of annual grasses such as bristly foxtail (Setaria verticillata), swollen fingergrass (Chloris barbata) and feather fingergrass (Chloris virgata). In the foothills mauka of the flat lowlands where rainfall is more abundant the vegetation is denser and the herb layer includes Spanish needle (Bidens pilosa), false mallow (Malvastrum coromandelianum), cockelbur (Xanthium strumarium) and pili (Heteropogon contortus) in addition to the annual grasses of the lowlands.

Several recent surveys have been conducted in certain portions of the subject property and in the adjacent lands. In 1990 Funk completed a biological survey of the land immediately east and makai of the project site, including the village of Ewa (Funk 1990). Among the vegetation types recognized were Sugar Cane Fields, Ruderal Fields and Fallow Fields. These communities were characterized by actively cultivated sugar cane fields, abandoned cane fields, common "weedy" introduced plants and lowland wayside species including those mentioned by Ripperton and Hosaka (1942). Similar vegetation was found in the region immediately east of the subject property where common wayside species including koa-haole, Guinea grass (Panicum maximum) and cultivated and abandoned sugar cane fields were found to be prevalent (Funk 1994). Many of these same species were also present in the area between Varona Village and the golf course just makai of the project site (Nagata 1996) and in Kaloi Gulch (Nagata 1994).

METHODS AND MATERIAL

A walk-through survey was conducted in all plant communities between mid-September and early October, 1996 to determine the floristic compostition of the project site. Transects were established throughout the site and all plants observed were recorded and their relative abundance determined. In conjunction

with the plant survey a cursory inventory of animals was also made. All birds and mammals observed along the transects were recorded and listening posts were established at regular intervals. No quantitative analyses was attempted, however, and nests were not investigated.

RESULTS

FLORA

Virtually all of the lowlands and foothills in the Ewa-Honouliuli region has been altered by the cultivation of sugar cane. In the past several years certain lands have been taken out of sugar and put to other use, eg. diversified agriculture, urbanization, fallowing. Consequently, the vegetation of these lands are entirely secondary and the vegetation in the region is largely determined by the history of cultivation (or disturbance) on each individual parcel of land, ie. how long the cane field has been abandoned, whether the land was recently tilled, etc. Based mostly on these criteria, eight plant communities were recognized. Although these are drawn with discreet boundaries on the vegetation map it must be remembered that such finite boundaries do not exist in nature. Rather, each community exists as a continuum wth one blending into another. Furthermore, the survey was conducted during the dry season. Species composition and vegetational cover will differ somewhat during the rainy season.

(1) Abandoned Cane Fields (ACF)

This is the largest vegetation type in the project site, representing the most recently abandoned sugar cane fields. Here, sugar cane generally accounts for about 50% of the total vegetational cover. In some areas the cane is 15' tall, robust and still very dense. In most areas, however, the cane is senile, less than 7' tall and accounts for as little as 30% of the total vegetational cover. In fields that have been abandoned for a longer period or where growing conditions were not optimal the clumps of cane are mostly dead or dying. Even in these fields these decrepit clumps are still in distinct rows. The vegetation between clumps usually consist of a mixed herb cover of 'ilima, Guinea grass, radiate fingergrass (Chloris radiata), 'uhaloa (Waltheria indica), hoary abutilon (Abutilon incanum), fuzzy rattlepod (Crotalaria incana), peria (Mesordica charantia var. abbreviata) and nut grass (Cyperus rotundus). Total vegetational cover is generally about 75-90%; only where the cane is vigorous and dense is the cover up to 100%.

In some areas such as along the Ewa boundary fence the abundance of cane

is very low and the vegetation approaches that of the Fallow Fields. Here the vegetation is more open with more exposed ground. 'Ilima, 'uhaloa, peria, hoary abutilon and little bell (Ipomoea triloba) are abundant.

Fallowed Fields

The Fallowed Fields are those sugar cane fields which have been abandoned for such a long time that almost no living cane remain. Dead and dying clumps generally constitute less than 5% of the total cover. Dead cane stalks may litter the ground and planting furrows may still be evident but these fields are often difficult to recognize as sugar cane fields without close examination. Two Fallowed Fields subcommunities were recognized depending on the relative abundance of grasses.

(F) Fallowed Fields Mixed Herb Association (Fmh)

Typically the vegetation in this community is less than 4' tall and consists of a mixture of 'uhaloa, radiate fingergrass, 'ilima, hoary abutilon, false mallow, buffelgrass (Cenchrus ciliaris), golden crown-beard (Verbesina encelioides) and coat buttons (Tridax procumbens). Small isolated stands of dying cane occur in certain portions of this community. Small patches of Guinea grass and/or radiate fingergrass can also be found. These grasses along with swollen fingergrass (Chloris barbata), sourgrass (Digitaria insularis) and Natal redtop (Rhynchelytrum repens) are especially common in the mauka portions of this community. Along the road delineating the makai boundary the vegetational cover is only about 50%. Pa'uohi'iaka (Jacquemontia ovalifolia) is common in this open area. Several stands of dead or dying cane also occur here.

(f) Fallowed Fields Grassland Association (Fg)

In certain areas the fallowed cane fields are dominated by Guinea grass and/or radiate fingergrass. Almost no standing cane remain although the furrows are still more or less intact and fallen cane stalks are occasional throughout the community. In most areas the grass cover is 100% but small communities and individuals of 'ilima, hoary abutilon and false mallow are scattered through certain portions and swollen fingergrass and sourgrass are common in other areas.

(A) Abandoned Fields (A)

Several former cane fields in the mauka portion along Palehua Road and between Farrington Highway and the H-1 Freeway have been tilled or graded sometime in the past. The ground is quite level with few stones and although some sugar cane is resprouting the planting furrows are gone. These fields were probably planted in some crop in years past but are now overgrown with mostly 'uhaloa, fuzzy rattlepod,

nut grass and little bell. In one field mauka of Farrington Highway Guinea grass is abundant but in most of the Abandoned Fields this species is not quite so prevalent. Re-sprouting sugar cane is also common in the mauka portion of this field. Golden crown-beard, peria and hoary abutilon are common in some of the fields.

(C) Cultivated Fields (C)

Cultivated Fields are fields which have been recently plowed, actually planted in a crop (other than sugar cane), or which have been put to some urban use. Of the five fields designated as Cultivated Fields, three have been recently plowed. The vegetation in these consist mostly of seedling little bell, peria, fuzzy rattlepod, 'uhaloa, castor bean (Ricinus communis), graceful spurge (Chamaesyce hypericifolia) and re-sprouting nut grass. Vegetational cover is about 25-50%. In two fields watermelons (Citrellus lanatus) have been planted and along the Ewa boundary fence an approximately two-acre site has been graded and turned into a parking lot. Approximately half of this field has been paved with gravel. Most of the vegetation in this portion consist of Amaranthus viridis and nut grass. The vegetation in the ungravelled portion consist of peria, nut grass, 'uhaloa, radiate fingergrass, false mallow and re-sprouting sugar cane.

(G) Grasslands (GR)

Grasslands represent those lands which apparently have not been tilled, graded or planted in any crop including sugar cane. This community exists only on the steepest slopes just makai of the H-1 Freeway and is the smallest of all the vegetation types in the project site. The vegetation is one of Guinea grass 1-2' tall with emergent klu, koa-haole and kiawe. On eroded slopes, 'ilima, false mallow, 'uhaloa, Boerhavia coccinea, garden spurge (Chamaesyce hirta) and virgate mimosa (Desmanthus virgatus) are found in small numbers.

(G) Gulch Association (GU)

Kaloi Gulch together with its tributary Honehone Gulch represents the only natural drainage system in the project site. The vegetation in the gulches is characterized by extremely dense stands of Guinea grass 5-10' tall. So dense is this layer that very few other species are present. In the makai portion the predominant arborescent species is castor bean which grows to about 15' height. Koa-haole 20-30' tall replaces castor bean as the dominant overstory in the mauka sections of the gulch system. In the mauka portion of Honehone Gulch ivy gourd (Coccinea grandis) is abundant, often completely enshrouding the Guinea grass and koa-haole. Paragrass (Brachiaria mutica), wood rose (Merremia tuberosa),

moon flower (Ipomoeaalba) and peria are also found but only in small to moderate numbers.

(4) Roadside Vegetation (R)

Numerous plant species are found along the paved and gravel roads. More species are found in this community than in any other in the project site. Guinea grass and radiate fingergrass are abundant.. 'Uhaloa and nut grass are also found in large numbers and many other species including castor bean, fuzzy rattlepod, buffelgrass, graceful spurge, virgate mimosa, peria, lion's ear (Leonotis nepetifolia), Australian saltbush (Atriplex semibaccata), goosegrass (Eleusine indica), Natal redtop (Rhynchelytrum repens) and stinkgrass (Eragrostis ciliianensis) are found in smaller numbers. This is not considered a significant plant community and its total area is very small.

Native Plant Communities

As a result of decades of sugar cultivation, virtually all of the vegetation in the project iste is secondary in nature. Of the 99 plant species recorded two are indigenous ('ilima, pa'uohi'iaka), two are probably indigenous ('uhaloa, hoary abutilon) and one is endemic (ko'oloa'ula, Abutilon menziesii). Of these, 'ilima, 'uhaloa and hoary abutilon are dominant or co-dominant in several plant communities and are significant elements in the vegetation in the site as a whole. Pa'uchi'iaka is found in small to moderate numbers in four vegetation types and is common in certain areas in the Fallowed Fields Mixed Herb community. It frequently grows in association with 'ilima, 'uhaloa and hoary abutilon. They do not, however, represent native plant communities. Rather, these native or possibly native species are well adapted to arid lowlands and are able to recolonize disturbed sites.

Except for ko'oloa'ula, all of the native species in the site are common lowland species in Hawaii. Ko'oloa'ula, on the other hand, is a rare and endangered species once endemic to Lanai, Maui, Oahu and Hawaii. It is now extinct on Hawaii.

Endangered Species

At least 38 individuals of the federally listed endangered species ko'oloa'ula were recorded from the site. Most of these (28) were in the Abandoned Cane Fields, six were in the Fallowed Fields Mixed Herb Association and four were in the Fallowed Fields Grassland Association. Approximate locations are indicated on Figure 2. All of these plants were healthy and most were flowering and/or fruiting.

Ko'oloa'ula was first submitted for listing as an endangered species in 1976 (Fed. Reg. 1976). The Endangered Species Act Amendments of 1978 required that the list of candidates for endangered status be withdrawn after two years and in 1979 ko'oloa'ula was withdrawn from consideration (Fed. Reg. 1979). In 1980 it was resubmitted as a top priority Category 1 candidate (Fed. Reg. 1980) and in 1985 the U.S. Fish and Wildlife Service proposed to list it as an endangered species (Fed. Reg. 1985). On Sept. 26, 1986 it was formally listed (Fed. Reg. 1986) and is now protected under the provisions of the Endangered Species Act of 1973, as amended, and the Hawaii State Revised Statutes.

Significant wild populations of ko'oloa'ula are found on Lanai and Maui but its occurrence on Oahu is somewhat of an enigma. It was known from a single plant discovered in an abandoned sugar cane field mauka of Hawaii Raceway Track at Barbers Point in 1981 and more recently from another individual at the Lualualei Naval Magazine (D. Herbst, pers. comm.). Both of these occurrences as well as the current discovery are from highly disturbed environments. The Barbers Point location is approximately four miles from the project site and the Lualualei site is at least 15 miles away. Ko'oloa'ula was not found in any of the prior surveys in the immediate area (Funk 1990, 1994; Nagata 1994, 1996).

FAUNA

Mammals

No mammals were observed in the site. It is probable, however, that field mice (Mus musculus), mongoose (Herpestris auropunctatus) and one or more species of rats (Rattus spp.) are found in the property. In addition, pig trails were observed in several plant communities.

Birds

Seventeen species of birds were observed in the site. To be considered a sighting, the individual must be observed perched or on the ground and not merely flying overhead. In addition, owl pellets were found in the Fallowed Fields Grassland Association community. It is not known, however, whether these are from the barn owl (Tyto alba) or pueo (Asio flammeus). Fifteen species are introduced, one is a common migratory species (Pacific golden-plover) and one is indigenous (Black-crowned night heron).

ARDEIDAE

Cattle egret (Bubulcus ibid)

Eight individuals were observed in the Abandoned Fields mauka of Farrington

Highway. On 4 October the Abandoned Field community immediately makai of the Cultivated Field east of Palehua Road was being plowed. Nearly 100 cattle egrets were seen feeding in the freshly tilled ground.

Black-crowned night heron (Nycticorax nycticorax)

Two young birds were flushed out of Hunehune Gulch near Plantation Road. As therewas no water in either Hunehune Gulch or Kaloi Gulch it is not known whether these individuals are residents of the area or whether they are transients. The black-crowned night heron is indigenous to Hawaii.

CHARADRIIDAE

Pacific golden-plover (Pluvialis dominica)

The Pacific golden-plover is a migratory species which commonly spends its winters in Hawaii. Many were observed in the site. Thirty-two were counted in exposed areas in the Abandoned Cane Fields. Most of these were in the open site near the Ewa boundary. Twenty-six were observed in various areas in the Fallowed Fields Mixed Herb Association - six of them from the exposed areas near the makai boundary road. Twenty-six were seen in the Cultivated Areas. Of these, 20 were in the "parking lot" at the Ewa boundary.

COLUMBIDAE

Rock dove (Columba livia)

Three were observed in the exposed sections of the Fallowed Field Mixed Herb Association in the makai portion of the site.

Barred dove (Geopelia striata)

Many were seen in all but two vegetation types. They were most abundant along the paved roads.

Lace-neck dove (Streptopelia chinensis)

This is the most widespread species in the property. It was found in moderate numbers in all vegetation types.

FRINGILLIDAE

Red-crested cardinal (Paroaria coronata)

Three individuals were seen in koa-haole shrubs along Plantation Road.

Kentucky cardinal (Richmondena cardinalis)

One individual was seen in the Fallowed Fields Mixed Herb Association.

PHASIANIDAE

Francolin (Francolinus sp.)

About a dozen were seen in the Abandoned Cane Fields near Kaloi Gulch in the makai portion of the property. These birds ran and hid too quickly for a positive identification to species.

Ring necked pheasant (Phasianus colchicus)

Three pairs were flushed from the Abandoned Cane Fields and one pair was flushed from the Abandoned Fields along Palehua Road.

PLOCEIDAE

House finch (Carpodacus mexicanus)

About 20 were seen in the property, mostly along the roadways.

Orange-cheeked waxbill (Estrilda melpoda)

These were seen in small numbers in the Fallowed Fields Mixed Herb Association, Abandoned Fields and along the roadways.

Black-headed mannikin (Lonchura malacca)

Black-headed mannikins were seen in moderate numbers in the Abandoned Cane Fields, Fallowed Fields communities and along the roadways.

Rice bird (Lonchura punctulata)

Rice birds were seen in moderate to small numbers in all but two plant communities. They were most common along the roadways and in the Fallowed Fields Grassland Association.

PYCNONOTIDAE

Red-vented bulbul (Pycnonotus cafer)

The red-vented bulbul was the second most widespread species in the site. It was found in small to moderate numbers in all vegetation types except the Cultivated Fields.

STURNIDAE

Common mynah (Acridotheres tristis)

Only three were seen in the Abandoned Cane Fields in the makai portion of the property.

ZOSTEROPIDAE

Japanese white-eye (Zosterops japonicus)

Japanese white-eyes were found in small numbers mostly along the roadways.

SUMMARY

The vegetation in the project site consists of sugar cane, lowland shrubs and herbs and grasses. The vast majority of the 99 species recorded from the property is non-native. Only three native species (one endemic, two indigenous) and two possibly indigenous species were encountered but with the exception of the endemic ko'oloa'ula these were present in moderate to large numbers. Native species constitute a rather significant element of the vegetation. However, no native plant communities are present. As a result of decades of sugar cultvation the vegetation is entirely secondary and the native ('ilima, pa'uohi'iaka) or possibly native (hoary abutilon, 'uhaloa) species which are so common in the site are merely recolonizing an already completely altered habitat. According the the U.S. Fish and Wildlife Service the endangered species ko'oloa'ula can also be included as secondary in origin.

The various plant communities in the site serve as an excellent refuge and feeding site for 17 bird species. Fifteen are introduced urban, field or game birds, one is indigenous (black-crowned night heron) and one is a common migratory species (Pacific golden-plover). Many of the birds including the plover are present in moderate to large numbers.

The proposed project will result in the loss of large numbers of 'ilima, pa'uohi'iaka, 'uhaloa and hoary abutilon. These are all common lowland species and theirs is not considered a significant loss to the native flora. The project will also result in the loss of habitat for a large number of Pacific golden-plovers and two black-crowned night herons. At least 38 individuals of the endangered ko'oloa'ula will be affected by the project. The disposition of these will be determined through consultation with the State of Hawaii Division of Forestry and Wildlife as prescribed by the Hawaii Endangered Species Law.

RECOMMENDATIONS

Because of the presence of the federally endangered ko'oloa'ula in the project site, consultation with the Hawaii State Department of Land and Natural Resources Division of Forestry and Wildlife is required under the provisions of the State Endangered Species Law before any grubbing can commence. Similar discussions with the U.S. Fish and Wildlife Service is also recommended. These consultations will essentially determine the fate of the proposed project and what mitigating measures will be required to preserve the ko'oloa'ula.

The plant survey was conducted at 80% coverage and although a more intensive search was conducted in the vicinity of each ko'oloa'ula there is a high probability that more individuals are present in the site. It is therefor recommended that a 100% survey be undertaken in selected areas as indicated in Figure 2.

LITERATURE CITED

Berger, A.J. 1981. Hawaiian Birdlife. 2nd ed. Univ. Press of Hawaii. Honolulu. 260 pp.

Federal Register. 1976. 41 FR 24523; June 16, 1976.

_____. 1979. 44 FR 70796; December 10, 1979.

_____. 1980. 45 FR 82480; December 15, 1980.

_____. 1985. 50 FR 28876; July 16, 1985.

_____. 1986. 51 FR 34412; September 26, 1986.

Funk, E. 1990. Biological Resources Survey Report for Ewa Villages Development. Prepared for R.M. Towill Corp. 20 pp.

_____. 1994. Biological Resources Survey Report for Schuler Homes East Kapolei Project, East Kapolei, Oahu, Hawaii. Prepared for Schuler Homes, inc. 15 pp.

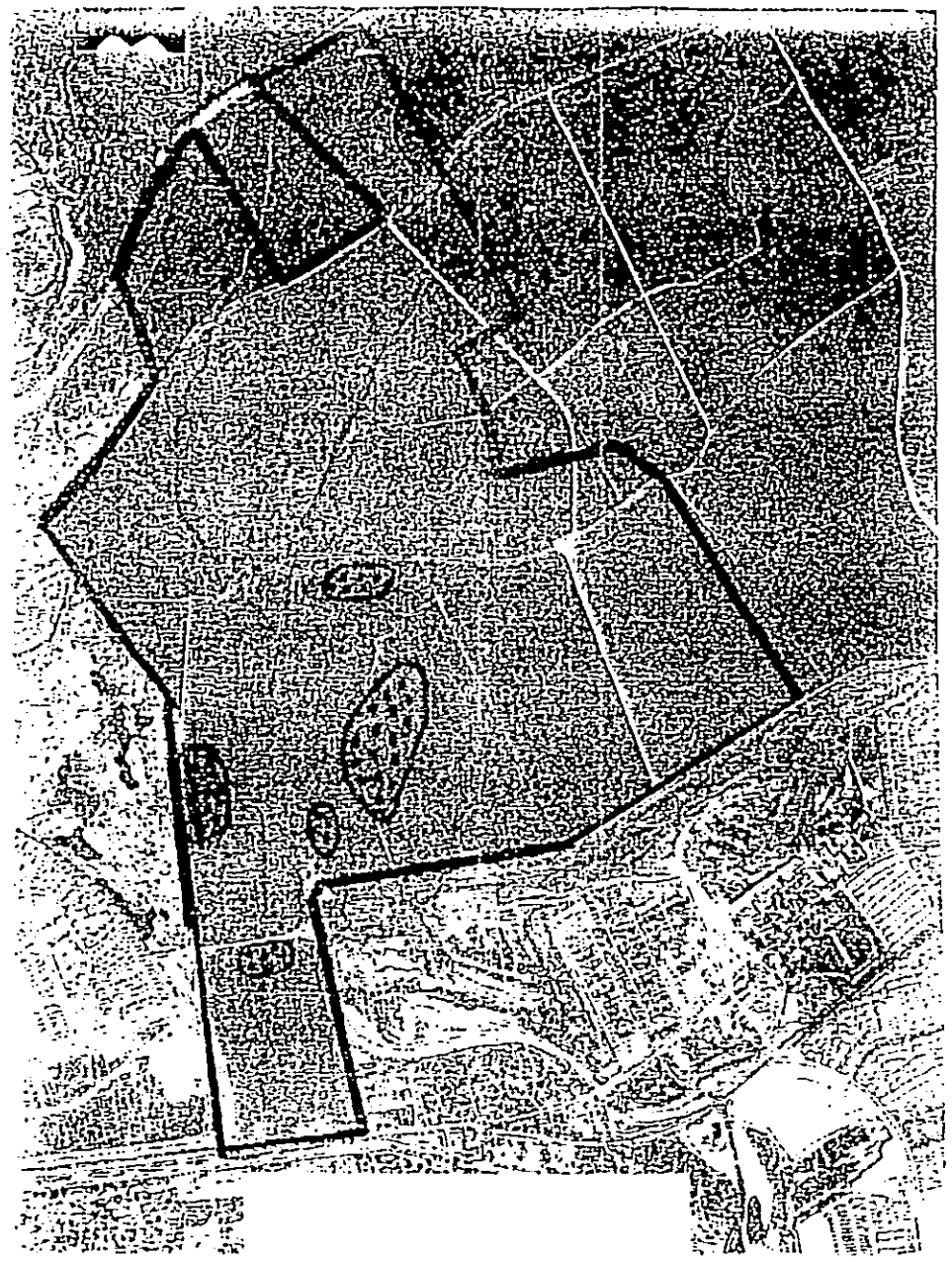
Nagata, E.M. 1994. Valoi Gulch Vegetation Survey. unpublished. 1 pp.

_____. 1996. Varona Village biological survey. Prepared for PBR Hawaii. 14 pp.

Neal, M.C. 1965. In Gardens of Hawaii. Bernice P. Bishop Museum Special Publ. 50. Bishop Museum Press. Honolulu. 924 pp.

St. John, H. 1973. List and Summary of the Flowering Plants in the Hawaiian Islands. Pac. Trop. Bot. Gard. Mem. No 1. Lawai. 579 pp.

Wagner, W.L., D.R. Herbst & S.H. Sohmer. 1990. Manual of the Flowering Plant of Hawaii. 2 vols. Univ. of Hawaii Press & Bishop Museum Press. Honolulu. 1853 pp.



PLANT SPECIES CHECKLIST

Families are arranged alphabetically in two groups: Monocotyledons and Dicotyledons. Genera and species are arranged alphabetically within each family. Taxonomy, common names and status follow those of Neal (1965), St. John (1973) or Wagner et. al. (1990). The abundance determinations are relative and are subject to the judgement of the investigator.

EXPLANATION OF SYMBOLS

Species Status:

E - Endemic to the Hawaiian Islands, ie. occurring naturally nowhere else in the world.

I - Indigenous, ie. native to the Hawaiian Islands but also occurring naturally elsewhere.

X - Exotic (alien), ie. plants introduced after the Western discovery of the islands.

P - Polynesian introductions, ie. plants introduced before the Western discovery of the islands.

Relative Abundance Ratings:

A - ABUNDANT, generally the major or dominant species in a given area.

C - COMMON, generally distributed throughout a given area in large numbers.

O - OCCASIONAL, generally distributed through a major portion of a given area, but in small numbers.

U - UNCOMMON, observed uncommonly but more than 10 times in a given area.

R - RARE, observed 2 to 10 times in a given area.

Vegetation Types:

ACF - Abandoned Cane Fields
Fmh - Fallowed Fields Mixed Herb Association
Fg - Fallowed Fields Grassland Association
A - Abandoned Fields
C - Cultivated Fields
GR - Grasslands
GU - Gulch Association
R - Roadside Vegetation

ANIMAL SPECIES CHECKLIST

Families are arranged alphabetically and genera and species are arranged alphabetically within each family. Taxonomy follows that of Berger (1981). Quantitative techniques were not employed and thus only presence is recorded in each vegetation type.

EXPLANATION OF SYMBOLS

Species Status:

M - Migratory species.

I - Indigenous, ie. native to the Hawaiian Islands but also occurring naturally elsewhere.

X - Exotic (alien), ie. animals introduced after the Western discovery of the islands.

Vegetation Types:

ACF - Abandoned Cane Fields
Fmh - Fallowed Fields Mixed Herb Association
Fg - Fallowed Fields Grassland Association
A - Abandoned Fields
C - Cultivated Fields
GR - Grasslands
GU - Gulch Association
R - Roadside Vegetation

CHECK LIST OF PLANTS

SCIENTIFIC NAME	COMMON NAME	STATUS	ACF	Fan	Fs	A	C	CE	CW	E
CHECKLIST OF PLANTS										
MONOCOTYLEDONS										
CYPERACEAE										
Cyperus rotundus L.	Nut grass	I	O	C	O	C	C	-	-	C
POACEAE										
Bothriochloa pertusa (L.) A. Camus	Pitted beardgrass	I	R	U	U	-	-	-	-	U
Brachiaria mutica (Forssk.) Stapf	Paragrass	I	R	R	R	R	-	-	U	U
Cenchrus ciliaris L.	Buffelgrass	I	O	C	-	U	R	U	U	U
Chloris barbata (L.) Sw.	Swollen fingergrass	I	O	O	C	U	-	R	-	C
C. radiata (L.) Sw.	Radiate fingergrass	I	C	C	A	U	-	U	-	R
Cynodon dactylon (L.) Pers.	Bermuda grass	I	-	-	-	R	R	-	-	U
Digitaria insularis (L.) Mez ex Ekman	Sourgrass	I	U	U	O	U	-	-	R	R
Echinochloa crus-galli (L.) P. Beauv.	Barnyard grass	I	U	-	-	-	-	-	-	U
Eleusine indica (L.) Gaertn.	Goosegrass	I	U	U	-	R	-	-	-	U
Eragrostis cilianensis (All.) Link	Stinkgrass	I	R	-	-	R	-	-	-	U
E. tenella (L.) P. Beauv. ex Roem. & Schult.	Japanese lovegrass	I	-	-	-	-	-	-	-	U
Leptochloa uninervia (J. Presl) Hitchc.		I	U	-	-	-	-	-	-	-
Panicum maximum Jacq.	Guinea grass	I	C	O	A	C	U	A	R	R
Rhynchelytrum repens (Willd.) Hubb.	Natal redtop	I	O	O	R	R	R	-	R	O
Saccharum officinarum L.	Sugar cane	I	A	U	R	R	-	-	-	R
Setaria verticillata (L.) P. Beauv.	Bristly foxtail	I	-	-	-	R	-	-	R	-
Sorghum halepense (L.) Pers.	Johnson grass	I	-	-	U	U	-	-	-	U
DICOTYLEDONS										
AMARANTHACEAE										
Achyranthes aspera L.		I	U	-	-	-	-	-	-	R
Alternanthera caracasana Kunth	Mat chaff flower	I	-	R	-	-	-	-	-	U
Amaranthus spinosus L.	Spiny amaranth	I	U	U	-	U	R	-	-	R
A. viridis L.		I	U	U	-	U	U	-	-	U
ANACARDIACEAE										
Mangifera indica L.	Mango	I	-	-	-	-	-	-	-	R
Schinus terebinthifolius Raddi	Christmas berry	I	-	-	-	-	-	-	-	R
ASCLEPIADACEAE										
Calotropis gigantea (L.) W.T. Aiton	Crown flower	I	-	R	R	-	-	-	-	-
ASTERACEAE										
Bidens pilosa L.	Spanish needle	I	U	-	-	U	-	-	-	U
B. pilosa var. minor (Bl.) Sherff		I	U	-	-	-	-	-	-	-
Conyza bonariensis (L.) Cronq.	Hairy horseweed	I	U	-	-	-	-	-	-	-
Emilia fosbergii Nicolson	Flora's paintbrush	I	O	-	-	-	U	-	-	R
Flaveria trinervia (Spreng.) C. Mohr		I	-	-	-	-	-	-	-	R
Lactuca serriola L.	Prickly lettuce	I	U	R	-	R	-	-	-	-
Pluchea indica (L.) Less.	Indian fleabane	I	U	U	U	-	-	-	-	U
P. x fosbergii Cooperr. & Galang		I	-	U	R	-	-	-	-	-
P. symphytifolia (Mill.) Gillis	Sourbush	I	U	U	U	-	-	-	-	U
Sonchus asper (L.) J. Hill	Prickly sow thistle	I	R	-	-	-	-	-	-	-

CHECK LIST OF PLANTS

SCIENTIFIC NAME	COMMON NAME	STATUS	ACF	Fan	Fs	A	C	CE	CW	E
ASTERACEAE										
Sonchus oleraceus L.	Sow thistle	I	R	-	-	-	U	-	-	-
Tridax procumbens L.	Coat buttons	I	U	C	U	U	U	-	-	C
Verbesina encelioides (Cav.) Benth. & Hook.	Golden crown-beard	I	U	C	-	U	R	-	-	U
Xanthium strumarium L.	Cocklebur	I	R	-	-	-	R	-	-	U
BIGNONIACEAE										
Spathodea campanulata Beauv.	African tulip	I	R	R	-	-	-	-	-	-
BORAGINACEAE										
Heliotropium procumbens var. depressum (Cham.) Fosb.		I	-	-	-	-	-	U		U
CAPPARACEAE										
Cleome gynandra L.	Wild spider flower	I	-	-	-	-	R	-	-	-
CHENOPODIACEAE										
Atriplex semibaccata R. Br.	Australian saltbush	I	-	-	-	R	-	-	-	O
A. suberecta Verd.		I	U	U	-	-	-	-	-	U
CONVOLVULACEAE										
Convolvulus arvensis L.	Field bindweed	I	R	C	-	-	U	-	-	U
Ipomoea alba L.	Moon flower	I	-	-	-	-	-	-	U	-
I. cairica (L.) Sweet	Koali	I?	-	R	-	-	-	-	-	-
I. obscura (L.) Ker-Gawl		I	U	U	-	-	-	-	-	U
I. triloba L.	Little bell	I	U	U	U	R	R	-	-	U
Jacquemontia ovalifolia (Choisy) H. Hallier	Pa'uohi'iaka	I	U	O	U	-	-	-	-	R
Merremia aegyptia (L.) Urb.	Hairy merremia	I?	U	O	-	C	C	-	-	-
M. tuberosa (L.) Rendle	Wood rose	I	-	-	-	-	-	-	R	-
CUCURBITACEAE										
Citrullus lanatus (Thunb.) Matsum. & Nakai	Watermelon	I	-	-	-	-	U	-	-	-
Coccinia grandis (L.) Voigt	Ivy gourd	I	O	U	U	U	U	R	R	U
Cucumis dipsaceus Ehrenb. ex Spach	Teasel gourd	I	-	R	-	-	-	-	-	-
Momordica charantia L. var. abbreviata	Balsam pear	I	O	O	U	O	C	-	U	O
EUPHORBIACEAE										
Chamaesyce hirta (L.) Millsp.	Garden spurge	I	-	R	R	-	U	U	-	O
C. hypericifolia (L.) Millsp.	Graceful spurge	I	O	R	R	O	O	-	-	O
C. hyssopifolia (L.) Small		I	-	-	R	R	-	-	-	U
Euphorbia cyathophora J.A. Murray	Mexican fire plant	I	-	-	-	-	-	-	-	R
E. heterophylla L.	Kaliko	I	-	-	-	U	U	-	-	-
Ricinus communis L.	Castor bean	I	R	-	U	U	O	-	C	O
FABACEAE										
Acacia farnesiana (L.) Willd.	Klu	I	-	-	R	R	-	U	R	R
Cassia sp.		I	-	U	-	-	-	-	-	-
Chamaecrista nictitans (L.) Moench	Japanese tea	I	-	-	-	-	R	-	-	R
Crotalaria incana L.	Fuzzy rattlepod	I	O	R	O	C	O	U	-	O
C. pallida Aiton	Smooth rattlepod	I	R	R	R	-	-	-	-	O
Desmanthus virgatus (L.) Willd.	Virgate mimosa	I	U	O	U	U	-	U	-	O

CHECK LIST OF PLANTS

SCIENTIFIC NAME	COMMON NAME	STATUS	RELATIVE ABUNDANCE								
			ACS	Fed	Fs	S	C	CS	CD	J	
FABACEAE											
Desmodium tortuosum (Sw.) DC.	Florida beggarweed	I	-	-	-	-	-	-	-	M	
Erythrina sp.		I	-	-	-	-	-	-	R	R	
Indigofera spicata Forssk.	Creeping indigo	I	-	-	-	-	-	-	-	M	
L. suffruticosa Mill.	Indigo	I	U	U	U	F	-	-	-	M	
Lablab purpureus (L.) Sweet	Bractish bean	I	U	F	-	-	-	-	-	U	
Leucaena leucocephala (Lam.) de Wit	Lea-kaole	I	U	U	U	U	-	O	R	U	
Macroptilium lathyroides (L.) Urban	Cow pea	I	U	U	-	-	U	-	-	R	
Pithecellobium dulce (Roxb.) Benth.	Opiuma	I	R	R	-	-	-	-	-	R	
Prosopis pallida (Humb. & Bonpl. ex Willd.) Kunth	Kiawe	I	-	R	-	-	-	R	-	U	
Senna occidentalis (L.) Link	Coffee senna	I	-	O	-	-	-	-	-	-	
Vigna marguiperdata Wight	Long bean	I	R	-	-	-	-	-	-	-	
LAMIACEAE											
Leonotis nepetifolia (L.) R. Br.	Lion's ear	I	O	U	R	U	U	U	-	U	
MALVACEAE											
Abutilon grandifolium (Willd.) Sweet	Hairy abutilon	I	-	-	-	-	-	U	-	U	
A. incanum (Link) Sweet	Hoary abutilon	IT	C	C	C	O	R	U	-	-	
A. mauritii Sesn.	Ko'olou'ula	C	C	I	-	-	-	-	-	-	
Malvastrum coromandelianum (L.) Garcke	False mallow	I	O	C	O	O	C	U	-	O	
Sida ciliaris L.		I	-	-	-	-	-	-	-	U	
S. fallax Walp.	'Ilima	I	C	I	C	U	-	U	-	R	
S. rhombifolia L.	Cuba jute	I	-	U	-	-	-	-	-	U	
S. spinosa L.	Prickly sida	I	-	U	-	R	-	U	-	U	
MORACEAE											
Ficus sp.		I	U	-	-	-	-	-	-	-	
MYRTACEAE											
Psidium cattleianum Sabine	Strawberry guava	I	C	C	C	C	C	C	-	C	
P. guajava L.	Common guava	I	C	C	C	C	C	C	-	C	
Syzygium cumini (L.) Skeels	Java plum	I	O	O	F	U	U	U	-	C	
NYCTAGINACEAE											
Pisonia umbellifera (Forst.) Seem.	Parataheke	I	-	-	-	-	-	-	-	-	
OLEACEAE											
Jasminum sambac (L.) Ait.	Pikake	I	-	-	-	-	-	-	-	-	
PASSIFLORACEAE											
Passiflora foetida L.	Love-in-a-mist	I	R	-	R	O	R	U	-	U	
PORTULACACEAE											
Portulaca oleracea L.	Pigweed	N	R	O	R	R	U	U	-	-	
PRIMULACEAE											
Anagallis arvensis L.	Scarlet pimpernel	I	R	-	-	-	-	-	-	-	
SCROPHULARIACEAE											
Bacopa atropurpurea (L.) Wettst.	Purple bacopa	I	-	-	-	-	-	-	-	-	
Leucophyllum frutescens (Berl.) I.M. Johnston	Texas ranger	I	-	-	-	-	-	-	-	-	
Scoparia dulcis L.	Licorice weed	I	-	-	-	-	-	-	R	-	
Stemodia durantifolia (L.) Sw.	Jimsonweed	I	R	R	-	R	U	-	-	U	
Verbascum virgatum Stokes	Wand mullein	I	R	R	R	-	-	-	-	U	
SOLANACEAE											
Capsicum annuum L.	Chili pepper	I	C	A	O	C	O	U	-	C	
Datura stramonium L.	Jimsonweed	I	R	R	R	-	-	-	-	-	
Lycium carolinianum Walter	Christmas berry	N	C	C	C	C	C	C	-	C	
Nicotiana glauca R.C. Graham	Tree tobacco	I	C	C	C	C	C	C	-	C	
Physalis angulata L.	Cutleaf ground cherry	I	C	C	C	C	C	C	-	C	
Solanum americanum Mill.	American black nightshade	N	C	C	C	C	C	C	-	C	
Solanum nigrum L.	Black nightshade	I	C	C	C	C	C	C	-	C	
STERCULIACEAE											
Waltheria indica L.	'Uhaloa	IP	C	A	O	C	O	U	-	C	

CHECK LIST OF PLANTS

SCIENTIFIC NAME	COMMON NAME	STATUS	RELATIVE ABUNDANCE								
			ACS	Fed	Fs	S	C	CS	CD	J	
VITACEAE											
Vitis tiliifolia Humb. & Bonpl. ex Schult.	Guayaba	I	-	-	-	-	-	-	-	R	
ZYGOPHYLLACEAE											
Tribulus terrestris L.	Puncture vine	I	-	R	-	-	R	-	-	O	

Appendix B
Botanical Survey
W. Char
(January 1997)

CHECK LIST OF PLANTS

SCIENTIFIC NAME	COMMON NAME	STATUS	RELATIVE ABUNDANCE							
CHECKLIST OF ANIMALS			ACC	Com	FC	A	C	CR	CU	R
ARDEIDAE										
Bubulcus ibis	Cattle egret	I	-	-	-	I	I	-	-	-
Nycticorax nycticorax	Black-crowned night heron	I	-	-	-	-	-	-	-	I
CHARADRIIDAE										
Pluvialis fulva	Pacific golden-plover	M	I	I	-	-	I	-	-	-
SCOLOPACIDAE										
Limnodus griseus	Dark dove	I	-	I	-	-	-	-	-	-
Limnodus griseus	Barred dove	I	I	I	I	I	-	-	I	-
Strepsilas interpres	Lace-neck dove	I	I	I	I	I	I	I	I	-
FALCONIDAE										
Falco sparverius	Red-crested cardinal	I	-	-	-	-	-	-	I	-
Richmondena cardinalis	Kentucky cardinal	I	-	I	-	-	-	-	-	-
PASSERIDAE										
Lonchura punctulata	Nutmeg mannikin	I	I	-	-	-	I	-	-	-
Fringillaria tahitica	Ring-necked parakeet	I	I	-	-	I	-	-	-	-
PSITTACIDAE										
Carpodacus mexicanus	House finch	I	I	-	-	-	-	-	-	I
Estrilda melpoda	Orange-cheeked waxbill	I	-	I	-	I	-	-	-	I
Lonchura malacca	Black-headed munnikin	I	I	I	I	-	-	-	-	I
L. punctulata	Nice bird	I	I	I	I	I	-	I	-	I
PYCNONOTIDAE										
Pycnonotus cafer	Red-vented bulbul	I	I	I	I	I	-	I	I	I
STURNIDAE										
Acridotheres tristis	Common myna	I	I	-	-	-	-	-	-	-
ZOSTEROPIDAE										
Zosterops japonicus	Japanese white-eye	I	I	I	-	-	-	-	-	I

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January 1997

SUMMARY OF FINDINGS
KO'OLOA'ULA ON EAST KAPOLEI PROJECT SITE
'EWA DISTRICT, ISLAND OF O'AHU

INTRODUCTION

The ko'oloa'ula (Abutilon menziesii), a member of the hibiscus or mallow family (Malvaceae), is a much-branched shrub up to 6 to 9 ft. tall, which is covered by velvety, stellate pubescence. The heart-shaped leaves are silvery-green and the attractive flowers are maroon. It is uncommon and occurs in dryland habitats (Wagner et al. 1990). Today, the largest population is found on Lana'i (about 600 plants) in koa haole scrub. Five small populations occur on Maui on 'a'a lava and also on red soils in a large gulch adjacent to sugar cane fields. One population occurs at Puako on the island of Hawai'i. On O'ahu, a single plant was found in abandoned sugar cane fields near the Campbell Industrial Park. Recently, a single plant was found on the Navy's Lualualei facility in kiawe/Guinea grass scrub.

In 1986, the species was federally listed as endangered. All plants on the federal list are automatically added to the state endangered species list. In its natural habitat the ko'oloa'ula plants are threatened by browsing animals (cattle, goats, axis deer), competition from weedy introduced plants, fires, predation by introduced insects, loss of native pollinators, and development (U.S. Fish and Wildlife Service 1994).

Because the plant is attractive and is easy to cultivate (seeds and cuttings), it was once sold by several plant nurseries as "red 'ilima" prior to its listing.

A new populaion of the ko'oloa'ula was recently discovered by Nagata while conducting a survey of the HFDC's East Kapolei project site in September and October 1996. Nagata recorded at least 38 ko'oloa'ula plants from the southwest corner of the project site (Figure 1). Collections of the plants were deposited by Nagata at the Bishop Museum.

A survey to verify and to more accurately inventory and map the plants found by Nagata was conducted in December 1996. This survey followed an unusually heavy rainfall in November 1996 which lasted for about 10 days.

RESULTS

Three colonies of plants were identified in the field and mapped (Figure 2). We could not locate the northern-most colony mapped by Nagata.

Colony A: This colony consists of 6 large, mature (flowering/budding) plants, 2 to 6 ft. tall, and 2 juvenile (young, immature) plants, 1 to 1.5 ft. tall.

Colony B: This colony is found along the golf course fence. About half (11 plants) are composed of juvenile plants, most of which have probably sprouted and grown since the November rains. The remaining plants (10) are mature individuals.

Colony C: This is the largest colony and is found near the power

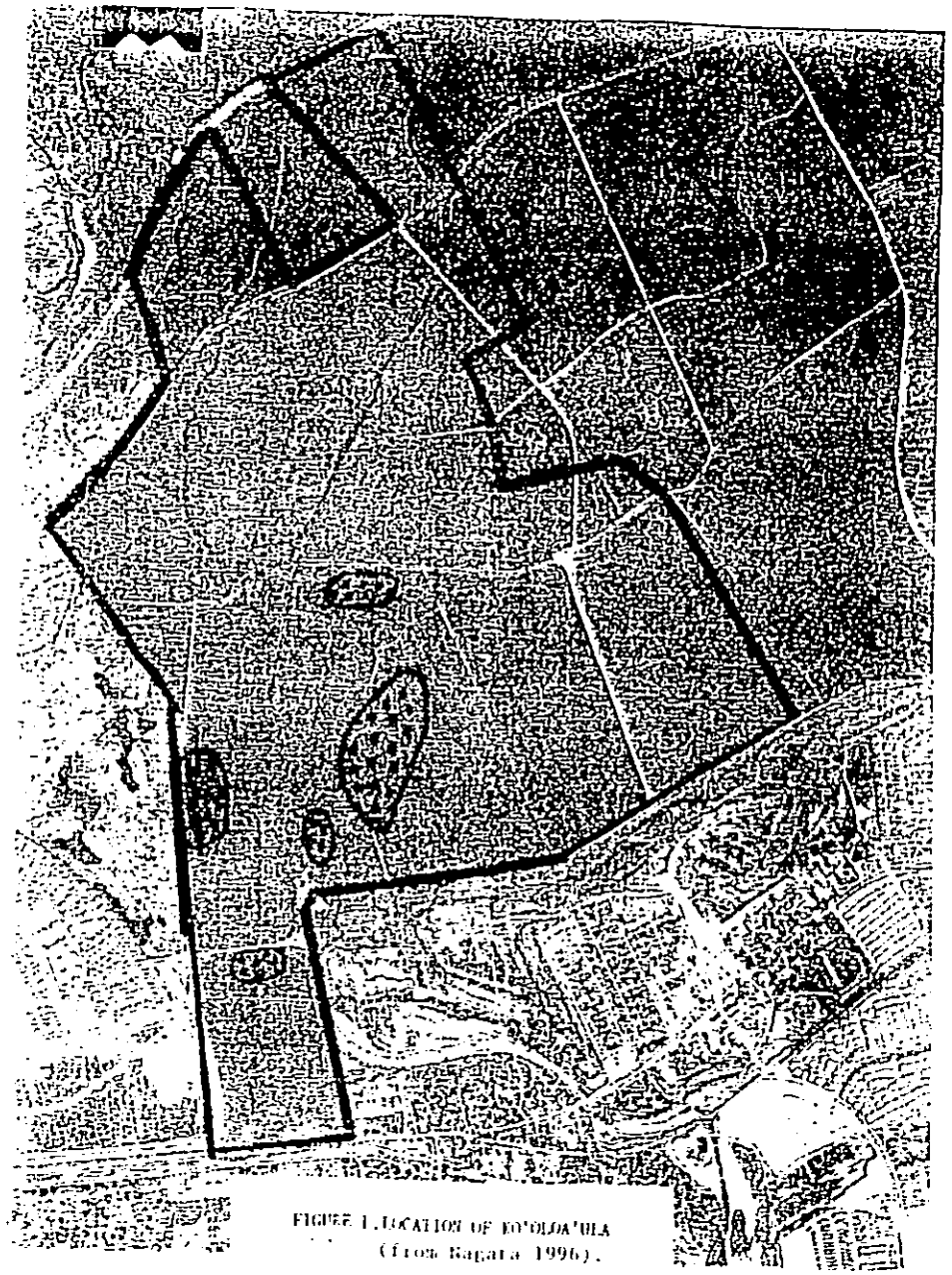

FIGURE 1.LOCATION OF KO'OLOA'ULA
(from Kagara 1996).

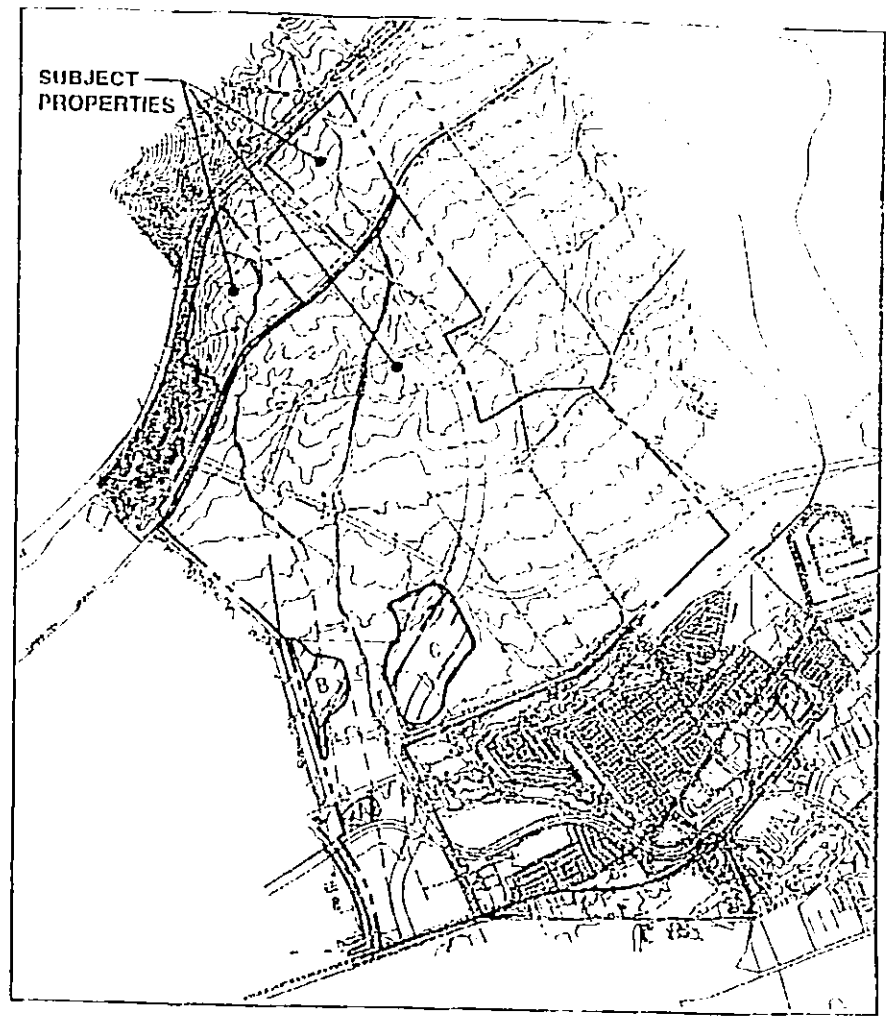

FIGURE 2

LOCATION OF KO'OLOA'ULA DURING
THIS SURVEY.

line. Nagata maps it as two separate colonies. But after the more intensive survey, we located plants between the two colonies and have thus lumped them into one larger colony. The majority of the plants are centered around an overgrown, coral-lined cane haul road. A few plants cross under the power line and extend north of the power line for a short distance. The colony consists of 55 large, mature plants (many of them 4 to 6 ft. tall), and 4 juvenile plants.

DISCUSSION AND RECOMMENDATIONS

A total of 88 ko'oloa'ula plants were found during the recent study to flag and inventory the plants on the East Kapolei site. There are a large number of juvenile plants, most of which sprouted and established themselves since the unusually heavy rainfall in November 1996. The number of plants will most likely increase during this rainy season (November 1996 to about February 1997).

It is recommended that a mitigation plan be initiated as soon as possible as the mature plants will continue to set seeds and the colonies will continue to expand in area.

The larger plants can be easily cultivated from seeds and cuttings while the smaller plants can be dug up and transplanted. It is recommended that an area be set aside for the conservation of these plants. An excellent location would be within the power line corridor. A greenway or belt of vegetation with the ko'oloa-'ula could be established here. A few plants already occur within this corridor.

References

U.S. Fish and Wildlife Service. 1994. Lana'i plant cluster recovery plan: Abutilon eremitopetalum, Abutilon menziesii, Cyanea macrostegia ssp. gibsonii, Cyrtandra munroi, Gahnia lanaiensis, Phyllostegia glabra var. lanaiensis, Santalum freycinetianum var. lanaiensis, Tetramolopium remyii, and Viola lanaiensis. Portland, Or.

Wagner, W.L., D.R. Herbst, and S.H. Sohmer. 1990. Manual of the flowering plants of Hawai'i. 2 vols. University of Hawai'i Press and B.P. Bishop Museum Press, Honolulu. B.P. Bishop Museum Special Publication 83.

Appendix C.
Botanical Survey
W. Char
(October 1997)

BOTANICAL RESOURCES STUDY
NORTH-SOUTH ROAD CORRIDOR
(H-1 FREEWAY TO KAPOLEI PARKWAY)
'EWA DISTRICT, ISLAND OF O'AHU

by

Winona P. Char

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Prepared for:
PARSONS BRINCKERHOFF

October 1997

BOTANICAL RESOURCES STUDY
NORTH-SOUTH ROAD CORRIDOR
(H-1 FREEWAY TO KAPOLEI PARKWAY)
'EWA DISTRICT, ISLAND OF O'AHU

INTRODUCTION

The botanical resources found on the North-South road corridor from its proposed interchange with Interstate Route H-1 to its terminus at the proposed Kapolei Parkway is presented in this report. The majority of the alignment crosses sugar cane fields which are no longer in cultivation. Although sugar cane cultivation ceased two to three years ago, there are still a few remnant clumps of sugar cane in the area between Farrington Highway and Waimanalo Road. However, in most places the former fields are now overgrown with Guinea grass or mixed scrub vegetation. A narrow band of koa haole scrub can be found along old irrigation ditches, drainageways, and roadways.

A reconnaissance-level field study was conducted in June 1996, and later in December 1996 during the rainy season. The primary objectives of the field studies were to:

1) provide a description of the vegetation found on the undeveloped portions of the corridor;
2) inventory the flora;
3) search for threatened and endangered plants as well as species of concern; and
4) identify areas of potential environmental problems or concerns and propose appropriate mitigation measures.

One Federal and State listed endangered species, the ko'oloa'ula (Abutilon menziesii), was found during the field studies and is discussed in more detail in the "Endangered Plants" section of the report.

SURVEY METHODS

Prior to undertaking the field studies, a search was made of the pertinent literature to familiarize the principal investigator with other botanical studies conducted in the general area. The roadway alignment maps and a recent colored aerial photograph of the study area were examined to determine vegetation cover patterns, terrain characteristics, access, boundaries, and reference points.

A walk-through survey method was used. Notes were made on plant distributions and associations, substrate types, drainage, topography, exposure, etc. Plant identifications were made in the field; plants which could not be positively identified were collected for later determination in the herbarium (University of Hawai'i, Manoa - HAW), and for comparison with the recent taxonomic literature.

The species recorded during the field studies are indicative of the season ("rainy" vs. "dry") and the environmental conditions at the time of the studies. A survey taken at a different time of the year and under varying environmental conditions would no doubt yield slight variations in the species list, especially of the weedy, annual taxa.

DESCRIPTION OF THE VEGETATION

In the U.S. Fish and Wildlife Service sponsored 'Ewa Plains' Botanical Survey (Char and Balakrishnan 1979), the vegetation along the roadway corridor was mapped as "C", sugar cane fields.

On areas which were not actively cultivated, koa haole shrubland and mixed grass-shrubland were found. Since that survey, O'ahu Sugar Company, Ltd., has ceased cultivating the fields, and much of the 'Ewa Plains has been developed for the second city of Kapolei.

In the discussion below, the vegetation along the proposed North-South road corridor is described from mauka to makai, that is, from its proposed interchange with Interstate Route H-1 to its makai terminus at Kapolei Parkway. Locations are referenced to existing roads and landmarks as the corridor had not been flagged and staked at the time of the field studies. A checklist of all those plants inventoried during the field work is presented at the end of the report.

Vegetation along the corridor

At the interchange with H-1, dense koa haole shrubs (Leucaena leucocephala) border the highway and cover the southwest portion of the interchange. Clumps of Guinea grass (Panicum maximum), 3 to 5 ft. tall, form a thick cover between the shrubs. Scattered through this koa haole/Guinea grass scrub are trees of kiawe (Prosopis pallida) and 'opiuma (Pithecellobium dulce). Along Kalo'i Gulch, there are a few Java plum (Syzygium cumini) and kukui (Aleurites moluccana) trees among the koa haole thickets. Upslope of the highway are former sugar cane fields now overgrown with Guinea grass and buffel grass (Cenchrus ciliaris).

Between Interstate Route H-1 and Farrington Highway, the former sugar cane fields are now overgrown with buffel grass. A few clumps of the taller Guinea grass can be seen scattered here and there. Koa haole shrubs and a few kiawe trees line the edges of the grassy fields. A few of the fields had been planted earlier

with other crops such as watermelons, but in December these fields were overgrown with low mats of pink bindweed (Ipomoea triloba) and clumps of other weedy species such as cocklebur (Xanthium strumarium), apple of Peru (Nicandra physalodes), kaliko (Euphorbia heterophylla), etc.

On the State-owned lands between Farrington Highway and Waimanalo Road, the cane fields were the most recently fallowed and so there are still a few areas with remnant clumps of sugar cane plants (Saccharum officinarum), from 5 to 7 ft. tall. Where the plants collect runoff water in low lying areas, the sugar cane cover is somewhat dense. Where the soil is drier and cracked, there are only dead, dried out clumps of cane. The abandoned fields have been invaded by a mixed scrub composed of swollen fingergrass (Chloris barbata) and a number of other weedy species which include 'uhaloa (Waltheria indica), 'ilima (Sida fallax), hoary abutilon (Abutilon incanum), currant tomato (Lycopersicon pimpinellifolium), Guinea grass, lion's ear (Leonotis nepetifolia), coat buttons (Tridax procumbens), pink bindweed, castor bean (Ricinus communis), etc. In some places, Guinea grass has formed a dense cover, 3 to 6 ft. tall, with only a few other species present. Kalo'i and Makakilo Gulches, now reduced to somewhat narrow drainage channels, support koa haole shrubs and thick tangles of ivy gourd vine (Coccinia grandis).

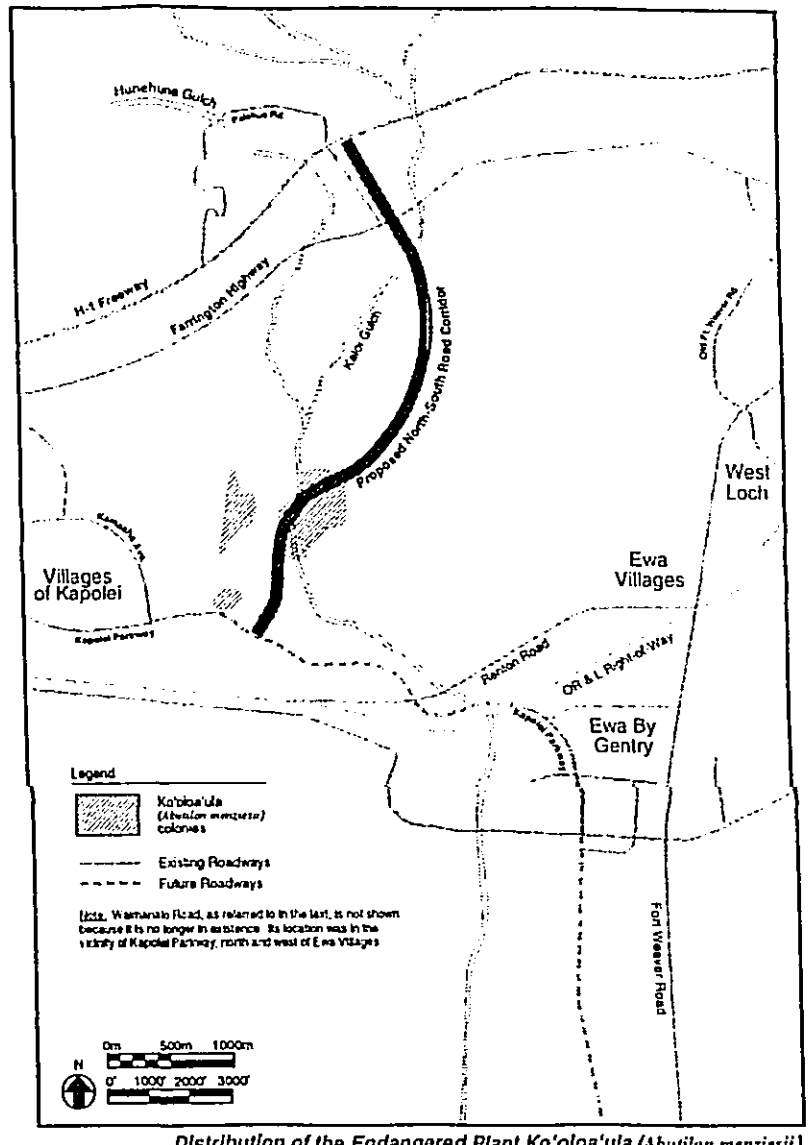
ENDANGERED PLANTS

Because the 'Ewa Plains have been extensively disturbed by agricultural activities for such a long period of time, there are few places which support native plant communities. The few places with native plants tend to be found on areas with karst or limestone topography; since these areas do not have soil they were unsuitable for agriculture. Two listed endangered species which occur today in such habitats are the 'Ewa Plains 'akoko (Chamaesyce

skottsbergii) and Achyranthes rotundata. Both are found only on limestone sites within Campbell Industrial Park and Barbers Point Naval Air Station (Char and Balakrishnan 1979; Traverse Group, Inc., 1988). One plant of the endangered ko'oloa'ula (Abutilon menziesii) was found in an overgrown sugar cane field near Kalaeloa Boulevard in the industrial park (Char and Balakrishnan 1979; Wagner et al. 1990; U.S. Fish and Wildlife Service 1994). There are historical records of two listed endangered species, the 'awiwi (Centaurium sebaeoides) and 'ihi'ihi (Marsilea villosa), and two species of concern, the 'ihi (Portulaca villosa) and pu'uka'a (Torulinium odoratum ssp. auriculatum), in the vicinity of the proposed corridor (B. Harper, USFWS, 01 February 1996 letter).

During the field studies for the State Housing Finance and Development Corporation's (HFDC) East Kapolei project, in September and October 1996, 38 plants of the endangered ko'oloa'ula were found by Ken Nagata, botanist, on the southwest corner of the HFDC project site. The plants occur primarily in mixed scrub and also in areas with remnant clumps of sugar cane. A survey to verify the findings and to more accurately inventory and map the plants was conducted in December 1996 (Char 1997). This December survey followed an unusually heavy period of rainfall in November 1996 in which the 'Ewa area received more than 20 inches of rainfall in about 10 days; average rainfall for the 'Ewa area is 20 inches per year.

A total of 88 ko'oloa'ula plants were flagged and inventoried; the plants occur in three colonies, located fairly close to each other. A large number of juvenile plants which had sprouted after the November rains were found. Some of the ko'oloa'ula plants lie within the proposed North-South road corridor where it follows near the existing HECO powerline (Figure 1).



Distribution of the Endangered Plant Ko'oloa'ula (Abutilon menziesii)
NORTH-SOUTH ROAD CORRIDOR STUDY
Botanical Survey Report
FIGURE 1

DISCUSSION AND RECOMMENDATIONS

The majority of the proposed North-South Road corridor will cross over former sugar cane fields now overgrown with weedy scrub and scattered koa haole thickets. These areas have little of botanical interest as they have been disturbed (under cultivation) for a long period of time and are dominated by introduced or alien plant species. The only area of concern is that portion of the corridor which will cross through the endangered ko'oloa'ula population.

A mitigation plan which would relocate the affected ko'oloa'ula plants is being prepared.

LITERATURE CITED

Char, W.P. 1997. Summary of findings, Ko'oloa'ula on East Kapolei project site, 'Ewa District, island of O'ahu. Prepared for PBR Hawai'i. January 1997.

Char, W.P. and N. Balakrishnan. 1979. 'Ewa Plains Botanical Survey. U.S. Fish and Wildlife Service. Contract No. 14-16-0001-78171. 119 pp. + maps.

Traverse Group, Inc. 1988. Natural resources management plan, Naval Air Station, Barbers Point. Prepared for Pacific Division, Naval Facilities Engineering Command. Contract No. N6274-86-C-0538.

U.S. Fish and Wildlife Service. 1995. Lana'i plant cluster recovery plan: Abutilon eremitopetalum, Abutilon menziesii, Cyanea macrostegia ssp. gibsonii, Cyrtandra munroi, Gahnia lanaiensis, Phyllostegia glabra var. lanaiensis, Santalum freycinetianum var. lanaiensis, Tetramolopium remyi, and Viola lanaiensis. U.S. Fish and Wildlife Service, Portland, OR. 138 pp. September 1995.

Wagner, W.L., D.R. Herbst, and S.H. Sohmer. 1990. Manual of the flowering plants of Hawai'i. 2 vols. University of Hawai'i Press and B.P. Bishop Museum Press. Honolulu. B.P. Bishop Museum Special Publication 83.

Wagner, W.L. and D.R. Herbst. 1995. Contributions to the Flora of Hawai'i. IV. New Records and Name Changes. Bishop Museum Occasional Papers 42: 13-27.

SPECIES LIST -- North-South Road Corridor (H-1 Freeway to Kapolei Parkway)

The following checklist is an inventory of the plants observed on the undeveloped lands within the proposed roadway corridor. The plants are arranged alphabetically by families within each of two groups: Dicots and Monocots. The taxonomy and nomenclature of the flowering plants follow the most recent treatment of the Hawaiian flora by Wagner et al. (1990) and new additions to the flora in Wagner and Herbst (1995).

The following information is provided for each species:

1. Scientific name with author citation.
2. Common English and/or Hawaiian name(s), when known.
3. Biogeographic status. The following symbols are used:
   - E = endemic = native only to the Hawaiian Islands.
   - I = indigenous = native to the Hawaiian Islands and also elsewhere throughout the Pacific and/or tropics.
   - I? = questionably indigenous = data not clear if introduced or if arrival here by natural means, but weight of evidence suggests probably indigenous.
   - P = Polynesian = plants originally of Polynesian introduction prior to Western contact (Cook's discovery of the islands in 1778).
   - X = introduced or alien = all those plants brought to the islands by humans, intentionally or accidentally, after Western contact (1778).
   - X? = questionably introduced = dates of introduction unclear or very early, may be indigenous or of Polynesian introduction.

Scientific name	Common name	Status
DICOTS		
ACANTHACEAE (Acanthus family)		
Asystasia gangetica (L.) T. Anders.	Chinese violet	X
AIZOACEAE (Fir-marigold family)		
Trianthema portulacastrum L.		X
AMARANTHACEAE (Amaranthus family)		
Achyranthes aspera L.		X
Amaranthus spinosus L.	spiny amaranth, pakai kuku	X
Amaranthus viridis L.	slender amaranth, pakai	X
ANACARDIACEAE (Mango family)		
Schinus terebinthifolius Raddi	Christmas berry	X
ASCLEPIADACEAE (Milkweed family)		
Calotropis procera (Aiton) W.T. Aiton	blue crown flower	X
ASTERACEAE (Daisy family)		
Bidens pilosa L.	Spanish needle, beggars tick, ki	X
Conyza bonariensis (L.) Cronq.	hairy horseweed, 'ilioha	X
Emilia fosbergii Nicolson	Flora's paintbrush, red pualele	X
Pluchea indica (L.) Less.	Indian pluchea	X
Pluchea carolinensis (Jacq.) G. Don	pluchea, sourbush	X
Sonchus oleraceus L.	common sowthistle, pualele	X
Tridax procumbens L.	coat buttons	X
Verbesina encelioides (Cav.) Benth. & Hook.	golden crownbeard	X
Vernonia cinerea (L.) Less.	little ironweed	X
Xanthium strumarium var. canadense (Mill.) Torr. & A. Gray	cocklebur, kikania	X
BIGNONIACEAE (Bignonia family)		
Spathodea campanulata P. Beauv.	African tulip tree	X
CHENOPODIACEAE (Goosefoot family)		
Atriplex suberecta Verd.	saltbush	X
Chenopodium murale L.	'aheahea	X

Scientific name	Common name	Status
CONVOLVULACEAE (Morning-glory family)		
Ipomoea obscura (L.) Ker-Gawl.	field bindweed	X
Ipomoea triloba L.	pink bindweed, little bell	X
Merremia aegyptia (L.) Urb.	hairy merremia, koali kua hulu, kuahulu	X?
CUCURBITACEAE (Gourd family)		
Coccinia grandis (L.) Voigt	ivy gourd, scarlet-fruited gourd	X
Momordica charantia L.	wild bittermelon	X
EUPHORBIACEAE (Spurge family)		
Aleurites moluccana (L.) Willd.	kukui, tutui	P
Chamaesyce hirta (L.) Millsp.	hairy spurge	X
Chamaesyce hypericifolia (L.) Millsp.	graceful spurge	X
Chamaesyce prostrata (Ait.) Small	prostrate spurge	X
Euphorbia heterophylla L.	kaliko	X
Phyllanthus debilis Klein ex Willd.	niruri	X
Ricinus communis L.	castor bean, pa'aila, koli	X
FABACEAE (Pea family)		
Crotalaria incana L.	fuzzy rattlepod, kukae-hoki	X
Crotalaria pallida Aiton	smooth rattlepod, pika-kani	X
Desmanthus virgatus (L.) Willd.	slender mimosa	X
Indigofera suffruticosa Mill.	indigo, 'iniko	X
Indigofera spicata Forssk.	creeping indigo	X
Leucaena leucocephala (Lam.) de Wit	koa haole	X
Macroptilium lathyroides (L.) Urb.	wild bean, cow pea	X
Phaseolus sp.		X
Pithecellobium dulce (Roxb.) Benth.	'opiuma	X
Prosopis pallida (Humb. & Bonpl. ex Willd.) Kunth	kiawe	X
Senna pendula (Humb. & Bonpl. ex Willd.) H. Irwin & Barneby	senna	X
LAMIACEAE (Mint family)		
Leonotis nepetifolia (L.) R. Br.	lion's ear	X
MALVACEAE (Mallow family)		
Abutilon grandifolium (Willd.) Sweet	hairy abutilon, ma'o	X
Abutilon incanum (Link) Sweet	ma'o, hoary abutilon	I?

Scientific name	Common name	Status
Abutilon menziesii Seem.	ko'oloa'ula	E
Malvastrum coromandelianum (L.) Garcke	false mallow	X
Sida fallax Walp.	'ilima	I
Sida rhombifolia L.		X
MYRTACEAE (Myrtle family)		
Syzygium cumini (L.) Skeels	Java plum	X
NYCTAGINACEAE (Four-o'clock family)		
Boerhavia coccinea Mill.	red-flowered boerhavia	X
PASSIFLORACEAE (Passion flower family)		
Passiflora foetida L.	running pop, pohapoha	X
PORTULACACEAE (Purslane family)		
Portulaca oleracea L.	pigweed, 'akulikuli kula	X
SOLANACEAE (Nightshade family)		
Lycopersicon pimpinellifolium (Jusl.) Mill.	currant tomato	X
Nicandra physalodes (L.) Gaertn.	apple of Peru	X
Nicotiana glauca R.C. Graham	tree tobacco, paka	X
Solanum americanum Mill.	glossy nightshade, popolo, 'olohua	I?
STERCULIACEAE (Cacao family)		
Waltheria indica L.	'uhaloa, hi'aloa, kanakaloa	I?
ZYGOPHYLLACEAE (Creosote bush family)		
Tribulus terrestris L.	puncture vine, goat head	X
MONOCOTS		
COMMELINACEAE (Dayflower family)		
Commelina benghalensis L.	hairy honohono	X
CYPERACEAE (Sedge family)		
Cyperus rotundus L.	nut sedge, nutgrass	X
POACEAE (Grass family)		
Bothriochloa pertusa (L.) A. Camus	pitted beardgrass	X
Brachiaria mutica (Forssk.) Stapf	California grass	X

Scientific name	Common name	Status
Brachiaria subquadriparia (Trin.) Hitchc.		X
Cenchrus ciliaris L.	buffel grass	X
Cenchrus echinatus L.	common sandbur, 'ume'alu, mau'u kuku	X
Chloris barbata (L.) Sw.	swollen fingergrass, mau'u lei	X
Chloris radiata (L.) Sw.	plush grass	X
Cynodon dactylon (L.) Pers.	Bermuda grass, manienie	X
Dactyloctenium aegyptium (L.) Willd.	beach wiregrass	X
Digitaria insularis (L.) Mez. ex Ekman	sourgrass	X
Eleusine indica Gaertn.	goose grass, wire grass	X
Leptochloa uninervia (Presl.) Hitchc. & Chase	leptochloa	X
Melinis repens (Willd.) Zizka	Natal redtop, Natal grass	X
Panicum maximum Jacq.	Guinea grass	X
Panicum maximum var. trichoglume Eyles ex Robyns	green panicgrass	X
Saccharum officinarum L.	sugar cane, ko	X
Setaria verticillata (L.) Beauv.	bristly foxtail	X
Sorghum halepense (L.) Pers.	Johnson grass	X

Appendix D

Botanical Survey

W. Char

(August 2003)

BOTANICAL SURVEY
UNIVERSITY OF HAWAI'I WEST O'AHU
EAST KAPOLEI, 'EWA DISTRICT, O'AHU

by

CHAR & ASSOCIATES
Botanical Consulants
Honolulu, Hawai'i

Prepared for: PBR HAWAII

August 2003

BOTANICAL SURVEY
UNIVERSITY OF HAWAI'I WEST O'AHU
EAST KAPOLEI, 'EWA DISTRICT, O'AHU

INTRODUCTION

In mid-September 2002, the University of Hawai'i Board of Regents selected the 500-acre Kapolei Makai site as the permanent site for the University of Hawai'i West O'ahu campus. The 500-acre project site is bounded by Farrington Highway to the north; the proposed North-South Road to the east; overgrown, former sugar cane lands to the south; and the Kapolei residential area and Kapolei Golf Course to the west. A large portion of the 500-acre project site has recently been cleared for vegetatable crops or is already under cultivation by Aloun Farms. The Kalo'i and Hunehune Gulches cross the property. Scrub vegetation is found on the former cane fields on the lower southern portion of the site. A few plants of the endangered ko'oloa'ula (Abutilon menziesii) are associated with the scrub vegetation.

Field studies to assess the botanical resources on the proposed University of Hawai'i West O'ahu campus site were conducted from 17 to 20 June 2003. The primary objectives of the field studies were to:

1) prepare a general description of the vegetation on the site;
2) inventory the flora;
3) search for threatened and endangered species as well as species of concern; and
4) identify areas of potential environmental problems or concerns and propose appropriate mitigation measures.

SURVEY METHODS

Prior to undertaking the field studies, a search was made of the pertinent literature to familiarize the principal investigator with other botanical studies conducted in the general area. Topographic maps and a recent, colored aerial

photograph (1" = 200') were examined to determine vegetation cover patterns, terrain characteristics, access, boundaries, and reference points.

The areas with scrub and gulch vegetation were surveyed more intensively as they were more likely to harbor native plants. A few plants of the endangered ko'oloa'ula (Abutilon menziesii) occur on the project site; larger clusters of plants are found on the adjacent lands. All of the ko'oloa'ula plants, both on and off the project site, have been mapped and/or flagged during earlier studies. The plants are monitored periodically by staff from the State Division of Forestry and Wildlife (DOFAW). Actively cultivated farm lands were not surveyed in detail as rare plants were not likely to occur in such areas.

A walk-through survey method was used. Notes were made on plant associations and distribution, substrate types, disturbances, topography, exposure, drainage, etc. Plant identifications were made in the field; plants which could not be positively identified were collected for later determination in the herbarium, and for comparison with the most recent taxonomic literature.

The species recorded are indicative of the season ("dry" vs. "rainy") and the environmental conditions at the time of the survey. A survey taken at a different time of the year and under varying environmental conditions would no doubt yield slight differences in the species list, especially of the weedy, annual plants.

DESCRIPTION OF THE VEGETATION

Nagata (1996) conducted a biological survey (flora and fauna) for the approximately 1,300-acre East Kapolei Master Plan project site. This study covered the proposed 500-acre UH West O'ahu property. It was during the field survey in September and October 1996 that Nagata discovered the endangered ko'oloa'ula plants (see "Endangered Species" section in this report for discussion). In the 1996 study, large portions of the East Kapolei site supported abandoned sugar cane fields with sugar cane (Saccharum officinarum) making up 30 to 50% of the total

vegetation cover. In other places, sugar cane made up less than 5% of the cover with mixed herbs and grasses abundant. A botanical survey for the proposed North-South Road (Char 1997) recorded similar vegetation types.

Today, large areas with sugar cane are no longer present on the study site, having been replaced by a scrub vegetation composed primarily of swollen fingergrass (Chloris barbata), mixed herbaceous species, and small shrubs (subshrubs). The lands on the northern portion of the site, adjacent to Farrington Highway, are under cultivation by Aloun Farms.

Three vegetation types are recognized on the UH West O'ahu site in this report. An inventory of all the plant species observed during the field studies is presented at the end of the report.

Agricultural/Farm

Actively cultivated fields make up the agricultural farm lands vegetation type which covers the majority of the 500-acre project site. Most of the large fields bordering Farrington Highway have recently been bulldozed to clear them of woody growth and were being disked during our field survey in June. Short stumps of koa haole shrubs (Leucaena leucocephala) could be observed here and there in these fields. On the planted fields on the eastern portion of the site, hybrid sweet corn (Zea mays) covers large areas. Other crops observed include bell pepper (Capsicum annuum cv. "Grossum"); eggplant (Solanum melongena); a number of different melon cultivars such as watermelon and Thai watermelon (Citrullus lanatus), and canteloupe and honeydew (Cucumis melo); cultivars of Cucurbita pepo -- zucchini, pumpkin, kabocha; and yard-long bean (Vigna unguiculata).

A few weedy species such as swollen fingergrass, field bindweed (Ipomoea obscura), spiny amaranth (Amaranthus spinosus), and pigweed (Portulaca oleracea) can be found growing among the crop plants. Most of the weedy plants, however, occur along the uncultivated areas which border the fields; these weedy patches receive runoff from the cultivated fields so the weeds tend to

be lush and green, and 2 to 4 ft. tall in some places. Weedy species found here include clumps of Guinea grass (Panicum maximum), field bindweed, lion's ear (Leonotis nepetifolia), young koa haole shrubs, graceful spurge (Chamaesyce hypericifolia), Trianthema portulacastrum), milkweed (Sonchus oleraceus), cheese weed (Malva parviflora), etc. The native 'ilima (Sida fallax) is locally common in some places. One new species not recorded from the island of O'ahu, Russian thistle or tumbleweed (Salsola tragus), was collected and deposited at the Bishop Museum herbarium.

Scrub Vegetation

This vegetation type occupies the southern portion of the project site and is usually 1 to 3 ft. tall. Long dead stalks of sugar cane are scattered throughout this vegetation type. At the time of this survey, the project site was very dry with plant cover 50 to 60%. Bare soil areas with large, knee-deep cracks were prominent and made surveying difficult.

Swollen fingergrass is the most abundant species forming fairly large patches. In some places, buffelgrass (Cenchrus ciliaris) becomes locally abundant and forms a thick mat, 2 to 3 ft. tall. Four herbaceous species are abundant to common; these are false mallow (Malvastrum coromandelianum), coat buttons (Tridax procumbens), fuzzy rattlepod (Crotalaria incana), and golden crown-beard (Verbesina encelioides). Small shrubs of hoary abutilon (Abutilon incanum), 'uhaloa (Waltheria indica), and 'ilima are abundant; these small shrubs have fuzzy, gray to bluish-gray leaves, and give a grayish-blue cast to the vegetation where they form extensive patches, 1 to 3 ft. tall.

Scattered through this scrub cover are taller shrubs of koa haole and sourbush (Pluchea carolinensis), 3 to 10 ft. tall. Other woody components found here in small numbers are young kiawe (Prosopis pallida) and 'opiuma (Pithecellobium dulce) trees, 7 to 12 ft. tall. Interestingly, a few species usually used as landscaping material have established themselves within these former cane fields; these are the small crown flower (Calotropis procera), carrion flower (Stapelia

gigantea), and Sebesten plum (Cordia dichotoma).

On the old, crushed coral-covered cane haul roads and along irrigation ditches, the vegetation is somewhat denser. Koa haole shrubs and Guinea grass are common. Other species forming fairly large patches here include saltbush (Atriplex suberecta), 'uhaloa, slender mimosa (Desmanthus pernambucanus), Macroptilium atropurpureum, Natal redtop grass (Melinis repens), 'ilima, and swollen fingergrass.

Along the lower boundary (makai end), especially along the North-South Road corridor, there are a few plants of the endangered ko'oloa'ula within the project site. A more detailed discussion of the ko'oloa'ula plants on the project site is presented in the "Endangered Species" section of the report.

Gulch Vegetation

Kalo'i Gulch and Hunehune Gulch cross the project site. In most places, the gulches are shallow and narrow, however, Kalo'i Gulch becomes 25 to 45 ft. deep and wider along its eastern segment. A large plunge pool with standing water was found during the field studies. The intermittent streams along the bottom of each of the gulches have eroded down to the hardpan parent material.

The vegetation within the gulches (sides and bottom) is characterized by dense, robust clumps of Guinea grass, 5 to 10 ft. tall. The dense Guinea grass cover tends to exclude other species, but a few patches of California grass (Brachiaria mutica), sourbush, castor bean (Ricinus communis), wild bittermelon (Momordica charantia), coaby hyptis (Hyptis pectinata), and cocklebur (Xanthium strumarium) are found where the Guinea grass cover is thin and the soil exposed.

Along the top banks of the gulches, buffelgrass forms a thick mat up to 3 ft. tall, but Guinea grass can also be abundant in places. Koa haole shrubs, 10 to 20 ft. high, occur as scattered stands or can sometimes become very dense and form small thickets, especially along the eastern section of Kalo'i Gulch.

Tangled mats of coccinia vine (Coccinia grandis) are frequently observed climbing up and over the koa haole shrubs. A few kiawe trees, 20 to 25 ft. tall, are also found along the top of the gulches.

ENDANGERED SPECIES

The ko'oloa'ula (Abutilon menziesii) is a member of the hibiscus or mallow family (Malvaceae). It is a much-branched shrub covered by velvety, silvery hairs. The heart-shaped leaves are silvery-green and the small 'ilima-like flowers range in color from pale peach to dark red. Abutilon is found in dry, lowland habitats on the islands of O'ahu, Maui, Lana'i, and Hawai'i (Wagner et al. 1990). In 1986, the species was federally listed as endangered and is protected under the provisions of the Endangered Species Act of 1973, as amended, and Chapter 195D, Hawaii Revised Statutes, as amended. In its natural habitat the plants are threatened by browsing animals, competition from weedy introduced species, fires, predation by insects, loss of native pollinators, and development (U.S. Fish and Wildlife Service 1994).

In September 1996, Nagata found 38 Abutilon menziesii plants on the East Kapolei project site; the reconnaissance survey covered roughly 80% of the property. After the unusually heavy rains in November 1996, Char (1997) conducted an intensive inventory of the plants in December and recorded a total of 88 plants. A year later, in December 1997, Nagata performed a detailed survey flagging and attaching numbered tags to the plants; survey engineers then mapped the plants. The 1997 survey recorded 87 plants, 86 from the East Kapolei site and North-South Road corridor and one plant within the fenceline of the adjacent City and County-owned golf course.

In 1998, a Habitat Conservation Plan (HCP) was prepared for the East Kapolei Master Plan; the HCP is an "umbrella plan" that includes the East Kapolei project as well as the North-South Road project. The HCP provides a description of the development actions which would impact the Abutilon plants and proposes a series of mitigative strategies to address the impacts (PBR 1998).

A few of the endangered Abutilon plants occur on the proposed UH West O'ahu site. These represent the most mauka extension of the Cluster C population. One plant remained at the Cluster D site in Nagata's 1997 study, but it has subsequently died (V. Caraway, DOFAW, pers. comm.); there may still be seeds of Abutilon present in the soil around Cluster D. The Abutilon population is periodically monited by the Division of Forestry and Wildlife (G. Hansker, pers. com.).

DISCUSSION AND RECOMMENDATIONS

The proposed 500-acre UH West O'ahu site was under sugar cane cultivation for nearly a century with the last harvest occurring in 1994, prior to permanent closure of Oahu Sugar Company in 1995 (PBR 1998). Today, only dead stalks of sugar cane and faint traces of planting furrows remain. Weedy scrub vegetation consisting of a mixture of swollen fingergrass and buffelgrass, herbaceous species, and small shrubs covers the former cane fields on the southern half of the property, while the northern portion is actively cultivated for various fruit and vegetable crops by Aloun Farms. The gulches which cross the site support dense Guinea grass and stands of koa haole shrubs.

The vegetation on the project site is dominated by introduced or alien species. A total of 95 plant species were observed during this study. Of these 89 (94%) are introduced; introduced species are all those plants which were brought to the Hawaiian Islands by humans, intentionally or accidentally, after Western contact, that is, Cook's arrival in the islands in 1778. Four species are indigenous or presumably indigenous, that is, they are native to the islands and elsewhere; these are the 'ilima (Sida fallax), hoary abutilon (Abutilon incanum), 'uhaloa (Waltheria indica), and popolo (Solanum americanum). Two species are endemic, that is, they are native only to the Hawaiian Islands; these are the endangered ko'oloa'ula (Abutilon menziesii) and pa'uohi'iaka (Jacquemontia ovalifolia subsp. sandwicensis).

None of the plants found on the project site, with the exception of the

ko'oloa'ula, is a threatened and endangered species or a species of concern (U.S. Fish and Wildlife Service 1999a, 1999b; Wagner et al. 1999). Almost all of the plants can be found in dry, lowland, disturbed habitats throughout the islands. Some of the natives such as the 'ilima, hoary abutilon, and 'uhaloa are common to abundant throughout the scrub vegetation on the project site and elsewhere.

A Habitat Conservation Plan for the endangered ko'oloa'ula plant on the 'Ewa site has already been prepared. Plant material from this population has been propagated and a few outplantings have been made at other locations. The University will need to work closely with the agencies involved in the Habitat Conservation Plan.

LITERATURE CITED

Char, W.P. (Char & Associates). 1997. Summary of findings: Ko'oloa'ula on East Kapolei project site, 'Ewa District, Island of O'ahu. Prepared for PBR Hawaii. January 1997.

Char, W.P. (Char & Associates). 1997. Botanical resources study, North-South Road Corridor (H-1 Freeway to Kapolei Parkway), 'Ewa District, Island of O'ahu. Prepared for Parsons Brinckerhoff. October 1997.

Evenhuis, N.L. and L.G. Eldredge, editors. 1999-2002. Records of the Hawaii Biological Survey. Bishop Museum Occasional Papers Nos. 58-70.

Nagata, K.M. 1996. East Kapolei Master Plan biological survey. Prepared for PBR Hawaii. September 1996.

Nagata, K.M. 1997. Data survey. Prepared for PBR Hawaii. December 1997.

PBR Hawaii. 1998. East Kapolei Master Plan: Habitat Conservation Plan for Abutilon menziesii. Prepared for State of Hawai'i, Housing Finance Development Corporation. June 1998.

U.S. Fish and Wildlife Service. 1986. Endangered and threatened wildlife and plants: Determination of endangered status for Abutilon menziesii (ko'oloa'ula). Federal Register 51(187): 34412-34415. 26 September 1986.

U.S. Fish and Wildlife Service. 1994. Lana'i plant cluster recovery plan: Abutilon eremitopetalum, Abutilon menziesii, Cyanea macrostegia ssp. gibsonii, Cyrtandra munroi, Gahnia lanaiensis, Phyllostegia glabra var. lanaiensis, Santalum freycinetianum var. lanaiense, Tetramolopium remyi, and Viola lanaiensis. U.S. Fish and Wildlife Service, Portland, OR.

U.S. Fish and Wildlife Service. 1999a. U.S. Fish and Wildlife Service species

list: plants. March 23, 1999. Pacific Islands Office, Honolulu, HI.

U.S. Fish and Wildife Service. 1999b. Endangered and threatened wildlife and plants. 50 CFR 17.11 and 17.12. December 31, 1999.

Wagner, W.L., M.H. Bruegmann, D.R. Herbst, and J. Q.C. Lau. 1999. Hawaiian vascular plants at risk: 1999. Bishop Museum Occasional Papers No. 60.

Wagner, W.L., D.R. Herbst, and S.H. Sohmer. 1990. Manual of the flowering plants of Hawai'i. 2 vols. University of Hawai'i Press and Bishop Museum Press, Honolulu. Bishop Museum Special Publication 83.

Wagner, W.L. and D.R. Herbst. 1999. Supplement to the manual of the flowering plants of Hawai'i, pp. 1855-1918. In: Wagner, W.L., D.R. Herbst, and S.H. Sohmer, Manual of the flowering plants of Hawai'i. Revised edition. 2 vols. University of Hawai'i Press and Bishop Museum Press, Honolulu.

APPENDIX A

PLANT SPECIES LIST -- U.H., West O'ahu

The following checklist is an inventory of all the plants observed on the project site during the field studies. The plants are arranged alphabetically by families into each of two groups: Dicots and Monocots. The taxonomy and nomenclature of the flowering plants, Dicots and Monocots, are in accordance with Wagner et al. (1990) and Wagner and Herbst (1999). The few recent name changes are those reported in the Hawaii Biological Survey series (Evenhuis and Eldredge, editors, 1999-2002).

For each species, the following information is provided:

1. Scientific name with author citation.
2. Common English and/or Hawaiian name(s), when known.
3. Biogeographic status. The following symbols are used:
   - E = endemic = native only to the Hawaiian Islands;
   - I = indigenous = native to the Hawaiian Islands and elsewhere;
   - I? = questionably indigenous = data not clear if dispersal to the islands by natural or human-related mechanisms, but weight of evidence suggests probably natural;
   - X = introduced or alien = all those plants brought to the Hawaiian Islands by humans, intentionally or accidentally, after Western contact, that is Cook's arrival in the islands in 1778;
   - X? = questionably introduced = dates of introduction are very early/unclear; may be indigenous or of Polynesian introduction.
4. Presence (+) or absence (-) of a particular species within each of three vegetation types recognized on the project site (see text for discussion):
   - a = Agricultural/Farm Lands
   - s = Scrub Vegetation
   - g = Gulch Vegetation

Scientific name	Common name	Status	Vegetation type a	s	g
BORAGINACEAE (Borage family)					
Cordia dichotoma Forst. f.	Sebesten plum	X	-	+	-
CAPPARACEAE (Caper family)					
Cleome gynandra L.	wild spider flower, nchohina	X	+	-	-
CHENOPODIACEAE (Goosefoot family)					
Atriplex suberecta Verd.	saltbush	X	+	+	+
Chenopodium murale L.	'aheahea	X	+	+	-
Salsola tragus L.	Russian thistle, tumbleweed	X	+	+	-
CONVOLVULACEAE (Morning glory family)					
Ipomoea cairica (L.) Sweet	koali 'ai, koali	X?	-	-	+
Ipomoea obscura (L.) Ker-Gawl.	field bindweed	X	-	+	+
Ipomoea triloba L.	little bell, pink bindweed	X	+	+	-
Jacquemontia ovalifolia ssp. sandwicensis (A. Gray) K. Robertson	pa'uohi'laka	E	-	+	-
Merremia aegyptia (L.) Urb.	hairy merremia, koali kua hulu	X?	+	+	-
CUCURBITACEAE (Gourd family)					
Citrullus lanatus (Thunb.) Matsum. & Nakai	watermelon	X	+	-	-
Coccinia grandis (L.) Voigt	coccinia, ivy gourd	X	+	-	+
Cucumis melo L. various cultivars	cantaloupe, honeydew	X	+	-	-
Cucurbita pepo L. various cultivars	zucchini, pumpkin, kabocha	X	+	-	-
Momordica charantia L.	wild bittermelon	X	+	-	+
EUPHORBIACEAE (Spurge family)					
Chamaesyce hirta (L.) Millsp.	hairy spurge, garden spurge	X	-	+	+
Chamaesyce hypericifolia (L.) Millsp.	graceful spurge	X	+	+	+
Chamaesyce hyssopifolia (L.) Sm.		X	+	-	+
Euphorbia heterophylla L.	*Mexican fireweed*	X	+	-	-
Ricinus communis L.	castor bean, koli	X	+	+	+

Scientific name	Common name	Status	Vegetation type a	s	g
FLOWERING PLANTS					
DICOTS					
AIZOACEAE (Fig-marigold family)					
Trianthema portulacastrum L.		X	+	+	+
AMARANTHACEAE (Amaranth family)					
Amaranthus spinosus L.	spiny amaranth, pakai tuku	X	+	+	-
Amaranthus viridis L.	slender amaranth, pakai	X	+	+	-
ANACARDIACEAE (Mango family)					
Schinus terebintifolius Raddi	Christmas berry	X	-	+	-
ASCLEPIADACEAE (Milkweed family)					
Calotropis procera (Aiton) W.T. Aiton	small crown flower	X	-	+	-
Stapelia gigantea N.E. Brown	carrion flower, Zulu-giant	X	-	-	+
ASTERACEAE (Daisy family)					
Bidens alba var. radiata (Schultz-Bip.) Ballard ex Melchert		X	+	-	-
Bidens pilosa L.	Spanish needle, ki, ki nehe	X	+	-	+
Emilia fosbergii Nicolson	flora's paintbrush, pualele	X	+	+	-
Pluchea carolinensis (Jacq.) G. Don	sourbush, pluchea	X	+	+	+
Pluchea indica (L.) Less.	Indian fleabane	X	+	+	-
Sonchus oleraceus L.	sowthistle	X	+	+	-
Tridax procumbens L.	coat buttons	X	-	+	+
Verbesina encelioides (Cav.) Benth. & Hook.	golden crown-beard	X	+	+	-
Xanthium strumarium var. canadense (Mill.) Torr. & A. Gray	cocklebur, kikania	X	-	-	+
BIGNONIACEAE (Bignonia family)					
Spathodea campanulata P. Beauv.	African tulip tree	X	-	+	-

Scientific name	Common name	Status	Vegetation type a	s	g
NYCTAGINACEAE (Four-o'clock family)					
Boerhavia coccinea Mill.		X	-	+	-
PASSIFLORACEAE (Passion flower family)					
Passiflora foetida L.	running pop, poha poha	X	-	+	-
PORTULACACEAE (Purslane family)					
Portulaca oleracea L.	common purslane, pigweed	X	+	-	-
SOLANACEAE (Nightshade family)					
Capsicum annuum L. cultivar "Grossum"	bell pepper	X	+	-	-
Datura stramonium L.	Jimson weed, la'au hano	X	-	+	-
Nicandra physalodes (L.) Gaertn.	apple of Peru	X	+	-	+
Nicotiana glauca R.C. Graham	tree tobacco	X	-	+	-
Solanum americanum Mill.	popolo, glossy nightshade	I?	+	+	-
Solanum lycopersicon var. cerasiforme (Dunal) Spooner, Anderson & Jansen	currant tomato, wild tomato	X	+	+	-
Solanum melongena L. various cultivars	eggplant, long eggplant	X	+	-	-
STERCULIACEAE (Cacao family)					
Waltheria indica L.	'uhaloa, hi'aloa, kanakaloa	I?	-	+	-
VERBENACEAE (Verbena family)					
Lantana camara L.	lantana, lakana	X	-	+	-
Stachytarpheta cayennensis (Rich.) Vahl	nettle-leaved vervain, owi, oi	X	-	+	-
MONOCOTS					
MUSACEAE (Banana family)					
Musa x paradisiaca L.	banana, mai'a	X	-	-	+
CYPERACEAE (Sedge family)					
Cyperus rotundus L.	nutgrass, nut sedge	X	+	-	-

A-5

Scientific name	Common name	Status	Vegetation type a	s	g
FABACEAE (Pea family)					
Acacia farnesiana (L.) Willd.	klu	X	+	+	-
Cassia sp.		X	-	+	-
Chamaecrista nictitans (L.) Moench	partridge pea, lauki	X	-	+	-
Crotalaria incana L.	fuzzy rattlepod, kukaehoki	X	+	+	-
Crotalaria pallida Aiton	smooth rattlepod, pikakani	X	+	-	-
Desmanthus pernambucanus (L.) Thellung	slender mimosa	X	+	+	+
Indigofera hendecaphylla Jacq.	creeping indigo	X	-	+	-
Indigofera suffruticosa Mill.	indigo, 'iniko	X	+	+	-
Leucaena leucocephala (Lam.) de Wit	koa haole, ekoa	X	+	+	+
Macroptilium atropurpureum (DC) Urb.		X	-	+	-
Macroptilium lathyroides (L.) Urb.	wild bean, cow pea	X	+	-	-
Pithecallobium dulce (Roxb.) Benth.	'opiuma	X	-	+	+
Prosopis pallida (Humb. & Bonpl. ex Willd.) Kunth	kiawe	X	+	+	+
Senna occidentalis (L.) Link	coffee senna, 'auko'i	X	+	-	-
Vigna unguiculata ssp. sesquipedalis (L.) Verdc.	yard-long bean	X	+	-	-
LAMIACEAE (Mint family)					
Hyptis pectinata (L.) Poit.	comb hyptis	X	+	-	+
Leonotis nepetifolia (L.) R. Br.	lion's ear	X	+	+	+
MALVACEAE (Mallow family)					
Abutilon grandifolium (Willd.) Sweet	hairy abutilon	X	+	-	-
Abutilon incanum (Link) Sweet	hoary abutilon, ma'o	I?	+	+	+
Abutilon menziesii Seem.	ko'oloa'ula	E	-	+	-
Malva parviflora L.	cheese weed	X	+	-	-
Malvastrum coromandelianum (L.) Garcke	false mallow, hauuoi	X	+	+	-
Sida ciliaris L.		X	+	+	-
Sida fallax Walp.	'ilima	I	+	+	+
Sida spinosa L.	prickly sida	X	+	+	-
MELIACEAE (Mahogany family)					
Melia azedarach L.	Chinaberry, pride of India	X	-	+	-

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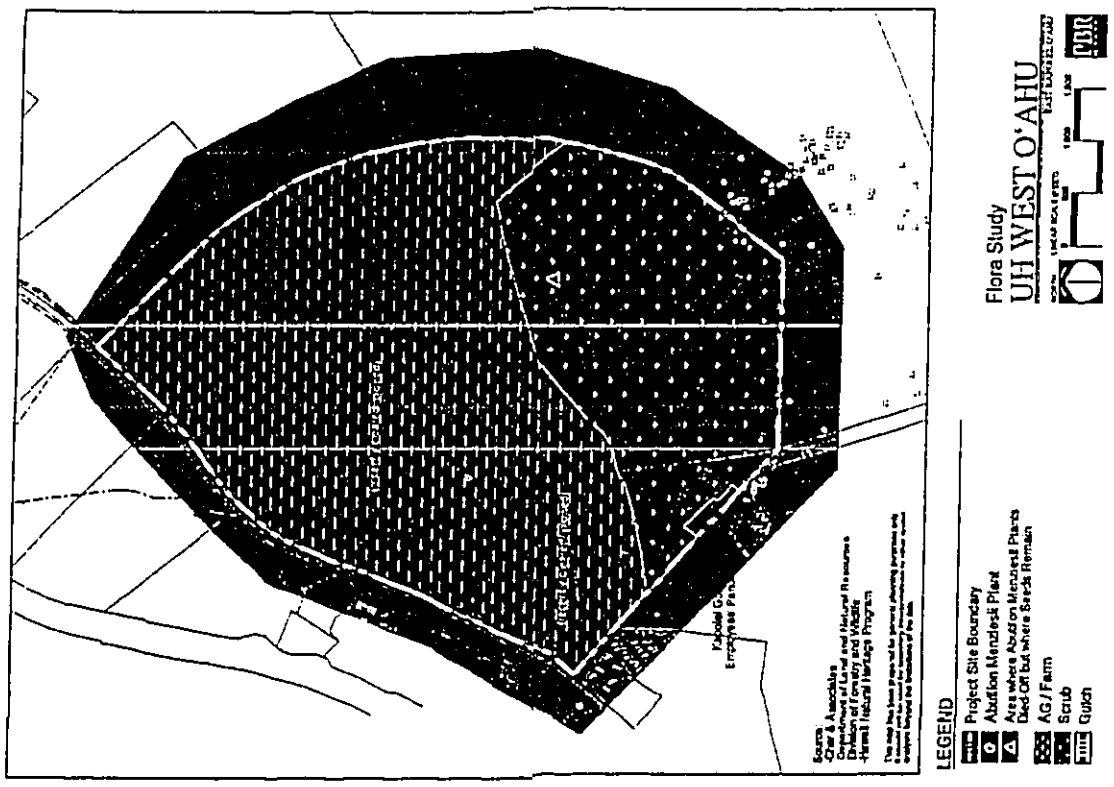

Vegetation type

Scientific name	Common name	Status	a	s	g
POACEAE (Grass family)					
Bothriochloa pertusa (L.) A. Camus	pitted beardgrass	X	-	+	-
Brachiaria mutica (Forssk.) Stapf	California grass	X	-	-	+
Cenchrus ciliaris L.	buffelgrass	X	+	+	+
Cenchrus echinatus L.	common sandbur, 'ume'alu	X	+	-	-
Chloris barbata (L.) Sw.	swollen fingergrass, mau'ulei	X	+	+	+
Cynodon dactylon (L.) Pers.	Bermuda grass, manienie	X	-	+	-
Digitaria insularis (L.) Mez ex Ekman	sourgrass	X	+	-	+
Digitaria sp.	crabgrass	X	-	+	-
Eleusine indica (L.) Gaertn.	wiregrass, goosegrass	X	+	-	-
Eragrostis amabilis Wight & Arnott	lovegrass	X	-	+	-
Eragrostis cilianensis (All.) Link	stinkgrass	X	-	+	-
Melinis repens (Willd.) Zizka	Natal redtop, Natal grass	X	-	+	+
Panicum maximum Jacq.	Guinea grass	X	+	+	+
Panicum maximum var. trichoglume Eyles ex Robyns	green panicgrass	X	-	-	+
Saccharum officinarum L.	sugar cane, ko	X	-	+	-
Setaria verticillata (L.) P. Beauv.	bristly foxtail, mau'u pilipili	X	+	-	+
Sorghum bicolor (L.) Moench	sorghum	X	+	+	-
Zea mays L.	hybrid corn	X	+	-	-

APPENDIX I

Water Quality Assessment, Southern Oahu Basal Aquifer (SOBA), Section 1424(e) Review

NORTH-SOUTH ROAD CORRIDOR STUDY
Ewa, Oahu, Hawaii
Project No. HWY-0-01-92

WATER QUALITY ASSESSMENT SOUTHERN OAHU BASAL AQUIFER (SOBA) SECTION 1424 (e) REVIEW

March 1997

PB 100 YEARS — PARSONS BRINCKERHOFF | KAKU ASSOCIATES | R.M. TOWILL CORPORATION

NORTH-SOUTH ROAD CORRIDOR STUDY
Ewa, Oahu, Hawaii
Project No. HWY-0-01-92

Water Quality Assessment Southern Oahu Basal Aquifer (SOBA) Section 1424 (e) Review

Prepared for

State of Hawaii
Department of Transportation
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City and County of Honolulu
Department of Transportation Services
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March 1997

FBCD Reference: 16218A - Product 8.14

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EXECUTIVE SUMMARY

North-South Road, a proposed at-grade arterial roadway in the Ewa region of the island of Oahu, overlies the Southern Oahu Basal Aquifer (SOBA), a designated Sole Source Aquifer. In accordance with the 1984 Sole Source Aquifer Memorandum of Understanding between the Federal Highway Administration (FHWA) and the Environmental Protection Agency (EPA), this water quality assessment has been prepared to meet the coordination requirements of Section 1424 (e) of the Safe Drinking Water Act.

The SOBA is under artesian pressure in the porous basalt below the caprock, a wedge of alluvial sediments and limestone. The caprock layer thins with distance from the shoreline, and at varying distances inland, the caprock layer ends, and the basalt layer, containing the SOBA, underlies surficial materials. Water quality in the SOBA is excellent and the SOBA is the primary source of drinking water on Oahu. Water in the caprock aquifers is too saline to be potable.

The North-South Road project traverses the boundary between caprock and basalt. Without mitigation, roadway drainage and inadvertent spills could infiltrate into the SOBA at the northern portion of North-South Road, including the interchange with Interstate Route H-1. The caprock boundary lies approximately 300 - 450 m (1000 -1500 ft) south of North-South Road's intersection with Farrington Highway.

The drainage system proposed for the mauka section of North-South Road and its intersection with Interstate Route H-1 would collect and convey roadway drainage and inadvertent spills along the roadway to a discharge to Kaloi Gulch approximately 450 m (1500 ft) south of Farrington Highway. The discharge point would be south of the caprock boundary, and therefore, would be located above caprock. In addition, hazardous spills would require immediate containment and clean up as required by State regulations. With the drainage system and these incident response procedures in place, ground infiltration impacts of the new roadway on the SOBA would be minimal.

1. INTRODUCTION AND PROJECT DESCRIPTION

This water quality assessment has been prepared to meet the coordination requirements of the Section 1424 (e) Review (Safe Drinking Water Act) for the North-South Road project, in accordance with the 1984 Sole Source Aquifer Memorandum of Understanding between FHWA and EPA. The water quality assessment is intended to provide EPA the necessary information to determine the project's impact on the quality of the groundwater in the Southern Oahu Basal Aquifer (SOBA), a sole source aquifer which was designated in November, 1997. As shown in Figure 1, most of southern Oahu overlies the SOBA.

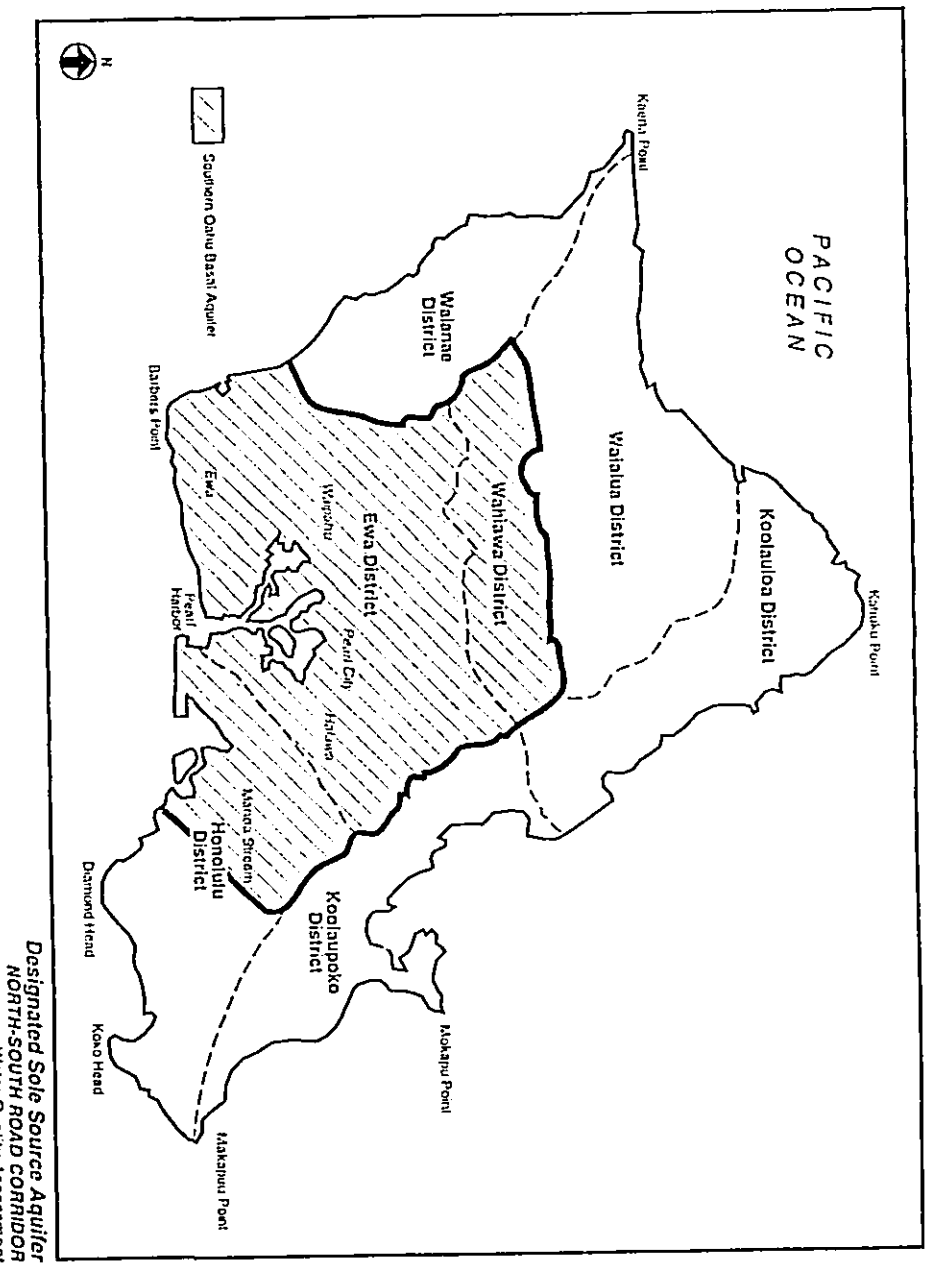
FHWA and the Highways Division of the State of Hawaii Department of Transportation (SDOT) are proposing to construct North-South Road, a divided, at-grade arterial roadway in the Ewa region of the island of Oahu (Figure 2). The roadway would be aligned in a generally north-south orientation from the Interstate H-1 Freeway to Kapolei Parkway between the Villages of Kapolei and Ewa Villages. The proposed project also includes an interchange with the H-1 Freeway.

2. ENVIRONMENTAL SETTING OF THE EWA PLAIN

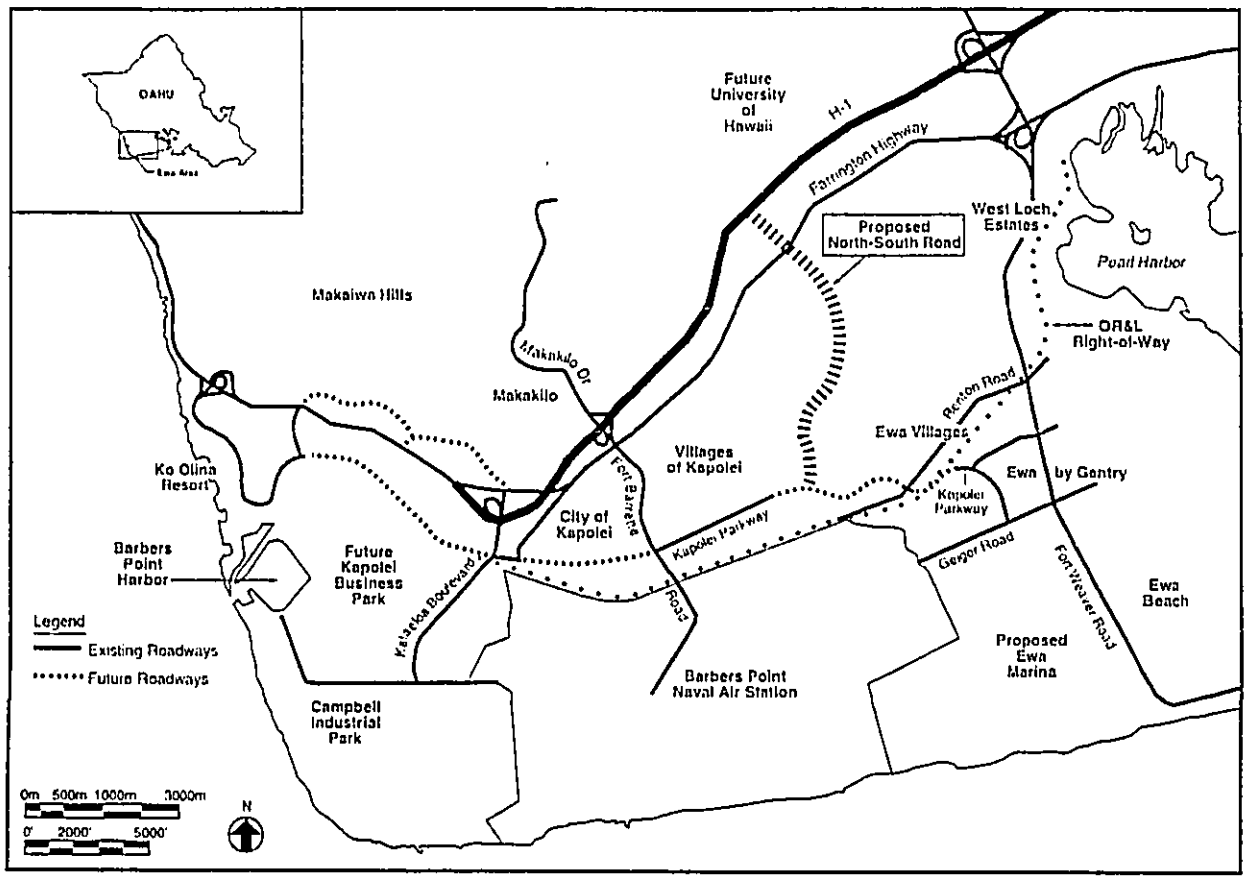
The Ewa Plain is a level to gently sloping landscape composed of terrestrial sediments near the Waianae Mountains and marine limestone nearer the coast (Figure 3). In geologic cross section (Figure 4, approximately A to A' on Figure 3), the terrestrial alluvium, which consists of clay and mud eroded from volcanic rock, is inter-layered with coral limestone deposited during periods when the area was covered by the ocean. This wedge of sediments and sedimentary rock is referred to as "caprock". The caprock sequence is approximately 300 m (1000 ft) thick at the shoreline.

The limestone layers are thickest at the shoreline and taper out towards the center of the island. Limestone layers in the caprock contain aquifers because they are porous enough to contain groundwater. The uppermost caprock aquifer is brackish and is used for irrigation and industrial purposes in some areas of Oahu. The lower caprock aquifer is approximately as saline as the ocean and is used only for industrial purposes. Hydraulic conductivity in the upper caprock has been computed based on tidal response data to be 7620 m/day (25,000 ft/day) (Dale, 1964) and 6346 m/day (20,822 ft/day) (Williams, 1976). Using the computed rate of discharge along the coast, Yuen and Associates (1989) find these values to be high by an order of magnitude. They cite 600 to 1500 m/day (2500 to 5000 ft/day) as a reasonable hydraulic conductivity (Yuen and Associates, 1989, Mink and Yuen, 1993).

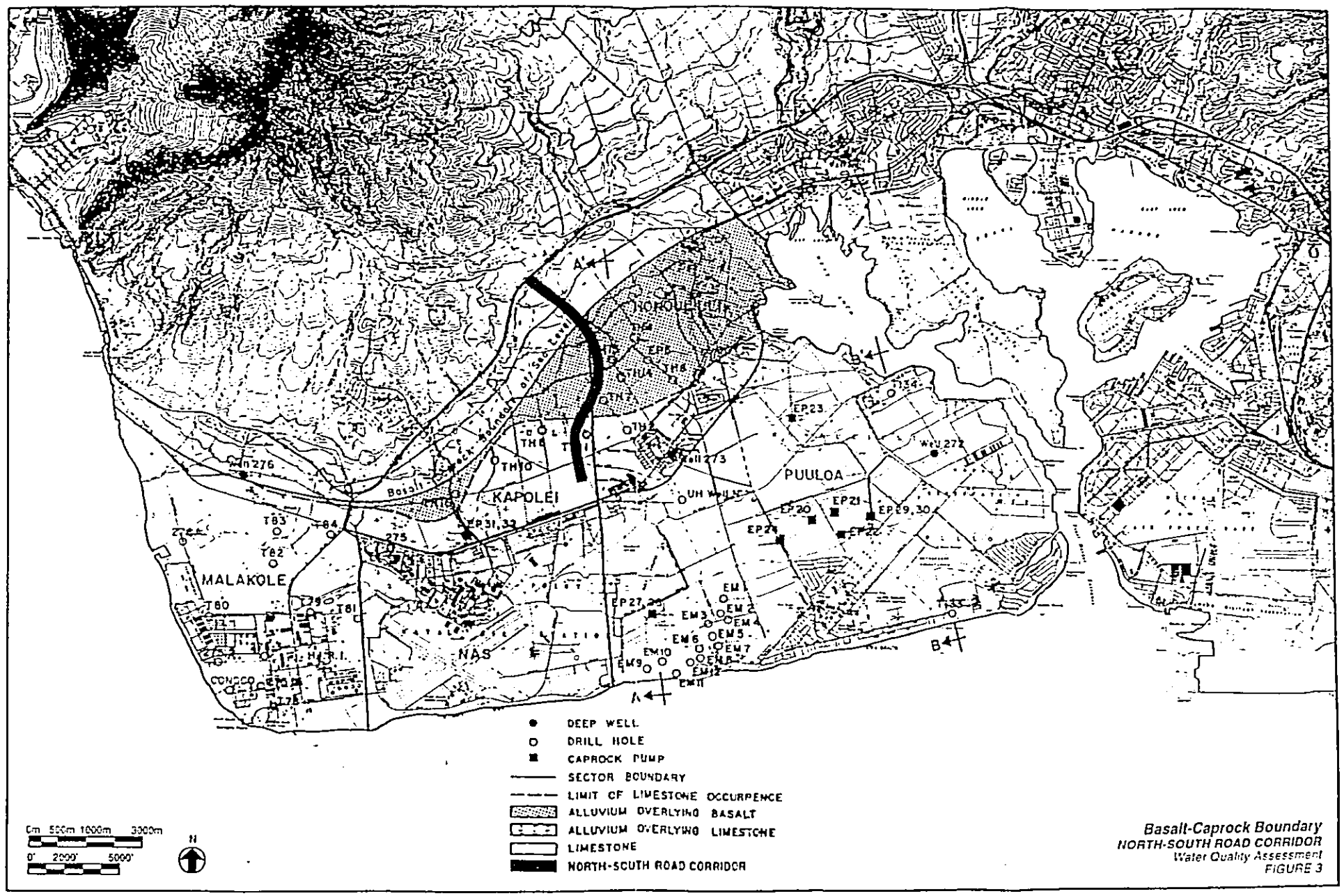
The terrestrial clays and muds between the aquifers are referred to as aquitards or aquicludes. They have low permeabilities and impede the flow of groundwater between the limestone



Designated Sole Source Aquifer
NORTH-SOUTH ROAD CORRIDOR
Water Quality Assessment
FIGURE 1



North-South Road Corridor Location
NORTH-SOUTH ROAD CORRIDOR
Water Quality Assessment
FIGURE 2



Basalt-Caprock Boundary
NORTH-SOUTH ROAD CORRIDOR
Water Quality Assessment
FIGURE 3

Modified from Yuen & Associates, 1989.

aquifers. The alluvium has a hydraulic conductivity between 0 006 and 0 011 m/day (0 019 and 0 037 ft/day) (Mink and Lau, 1980).

Numerous wells have been drilled in the caprock in the project area and the location of these wells is shown on Figure 3. Table 1 (modified from Yuen and Associates, 1989) lists the depth to water in some of the wells used to map the extent of the caprock aquifer.

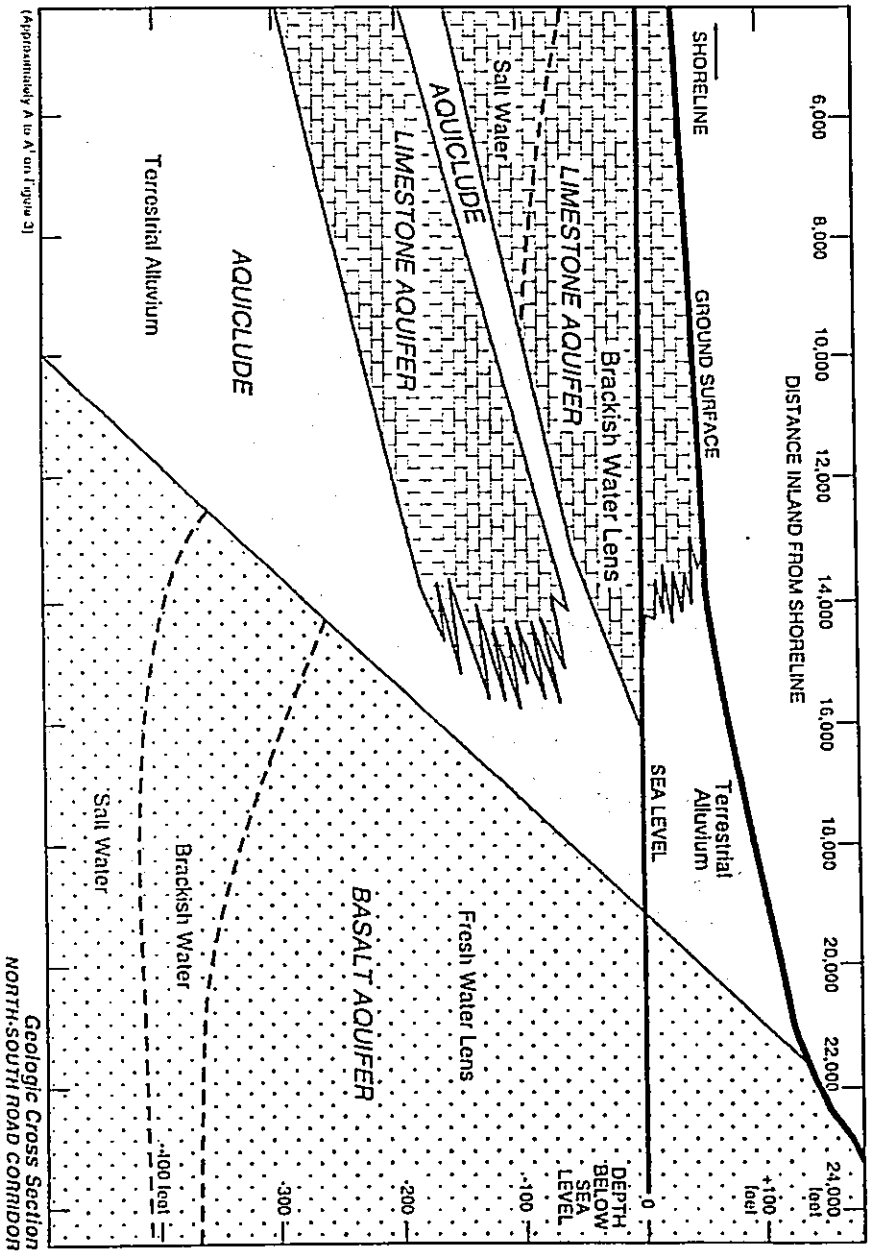
Table 1

Test Borings Honouliuli and Kapolei Sectors (meters (feet))

Well	Well Elevation	Well Depth	Elevation at Bottom of Well	Depth to Water
TH-1	17 (55)	14 (47)	2 (8)	
TH-2	18 (59)	18 (59)	-0 3 (-1)	17 (55)
TH-3	18 (60)	18 (59)	-0 3 (-1)	
TH-4	31 (103)	29 (95)	2 (8)	20 (66)
TH-5	27 (87)	27 (89)	-0 6 (-2)	20 (65)
TH-6	21 (70)	24 (78)	-2 (-8)	17 (55)
TH-7	23 (75)	24 (78)	-1 (-3)	19 (62)
TH-8	21 (70)	22 (71)	-0 3 (-1)	20 (66)
TH-9	25 (82)	26 (83)	-0 3 (-1)	22 (72)
TH-10	23 (75)	22 (71)	1 (4)	20 (64)
TH-11	21 (70)	22 (71)	-0 3 (-1)	
TH-12	28 (93)	29 (95)	-0 6 (-2)	
TH-13	33 (108)	29 (95)	4 (13)	26 (84)
TH-14	26 (85)	29 (95)	-3 (-10)	19 (62)
TH-15	20 (64)	22 (71)	-2 (-7)	18 (60)

The Ewa Plain receives about 500 mm (20 inches) of rain each year. This rain, along with irrigation water and leakage from the underlying basalt aquifer (SOBA), recharges fresh water into the caprock aquifer. Irrigation water has been obtained from both the SOBA and the caprock aquifer.

Land use has played a large role in water quality in the caprock aquifer. Until recently, much of the Ewa Plain was devoted to sugarcane cultivation. Changes in land use and agricultural practices began to occur in the early 1990s. Furrow irrigation was replaced by drip irrigation and the amount of recharge to the caprock aquifer decreased. When the caprock aquifer did not receive as much fresh water recharge, it became more saline. A more drastic change has occurred with the urbanization of the Ewa Plain. Except for golf course irrigation, the caprock aquifer is no longer recharged by irrigation water. Hydrological modeling (Mink and Yuen, 1993) predicts that the salinity of the caprock aquifer will increase.



Geologic Cross Section
NORTH-SOUTH ROAD CORRIDOR
Water Quality Assessment
FIGURE 4

Underlying the caprock is the volcanic basement. It is approximately four million years old and contains the SOBA, a designated a sole source aquifer. The SOBA occurs as a basal freshwater lens floating on salt water. The quality of the groundwater in this aquifer is excellent, and it is under artesian pressure because it is confined by the caprock. Because of the artesian pressure, water leaks upward from the SOBA into the caprock aquifer. Since artesian water was first discovered on Oahu, the artesian head has been lowered as a result of heavy pumping. When the first artesian well in this area was drilled in 1879, the maximum head was slightly higher than 12.5 m (41 ft) above sea level. In 1958 the maximum head was 6.7 m (28.5 ft), and today it is less than 7.5 m (24.6 ft) above sea level (Macdonald et. al., 1983).

The basalt is composed of lava flows of varying thickness and hydrologic properties. Taken as a unit, the basalt is highly permeable with hydraulic conductivities in excess of 300 m/day (1000 ft/day) (Mink and Lau, 1990). The slope on the basalt basement is .045 percent and was derived from two deep borings, T-133 and T-134. These wells penetrated the entire caprock sequence and, along with some deep plantation wells and numerous shallower wells (refer to Table 1), are shown on Figure 3.

The SOBA in the project area is in the Pearl Harbor Aquifer Sector and the Ewa Aquifer System. Based on Hawaii status codes to protect drinking water, it is rated as a currently used source of fresh drinking water which is both irreplaceable and highly vulnerable to contamination (Mink and Lau, 1990).

All of the surficial surface of the Ewa Plain seaward of Farrington Highway has traditionally been classified as caprock. Yuen and Associates(1989), however, place the caprock boundary about 300 - 450 m (1000 to 1500 ft) seaward of Farrington Highway as shown on Figure 3. Only a thin, patchy veneer of terrestrial alluvium overlays the basalt north of this boundary. Yuen and Associates' more restrictive boundary is the inland margin along the surface trace of the intersection of the volcanic basement with sea level. According to Yuen and Associates (1989), inland of this boundary recharge infiltrates into the underlying basalt, while seaward it accumulates in alluvium or passes into exposed limestone. Wherever the volcanic basement lies below sea level, the sediment above acts to confine the volcanic aquifer.

3. GROUNDWATER ALONG THE PROJECT ALIGNMENT

The North-South Road alignment traverses the boundary between recharge areas as shown on Figure 3. From the shoreline to about 300 to 450 m (1000 to 1500 ft) south of Farrington Highway along the alignment, surface waters recharge the caprock. In this area, the potential for contamination of the SOBA from surface waters and activities occurring above the aquifer is low due to the artesian conditions and the relative impermeability of the caprock. However, north of this boundary, which includes the interchange with Interstate Route H-1, is the area which recharges the SOBA. In this area only a thin veneer of terrestrial alluvium overlays the basalt. Surface water may infiltrate into the SOBA in this area.

4. POTENTIAL IMPACTS AND MITIGATION DURING OPERATION

The proposed road could generate two wastewater streams: roadway pollutants and inadvertent spills, possibly including hazardous materials. Roadway drainage contains a range of potential pollutants. North-South Road would include a drainage collection system which would carry the roadway drainage beyond the SOBA recharge area before discharging to Kaloi Gulch. Impermeable drainage culverts would prevent infiltration into the SOBA.

The roadway drainage system would also collect and convey inadvertent material releases beyond the SOBA recharge area. In addition, hazard response procedures would be adhered to for aquifer protection. As soon as a spill is reported, it would be contained and any hazardous materials must be removed from the site.

With the drainage system and incident response procedures, impacts of the new roadway and interchange on the SOBA would be minimal.

The addition of impervious surface from paving of the highway would not have a significant impact on the quantity of recharge of the SOBA. As described above, rainfall in the area is sparse, and the extent of impervious surface being added is small in a regional context.

5. POTENTIAL IMPACTS AND MITIGATION DURING CONSTRUCTION

The project area was recently used for sugarcane cultivation and therefore the potential exists for herbicides and pesticides to remain in the soil. The EPA identified a pesticide storage, mixing and loading source near the alignment and performed a Preliminary Assessment in 1987 (Hataoka, 1987). The area of contaminated soil was estimated to be 6 m (18 ft) by 30 m (100 ft) extending down to a depth of 3 m (9 ft). The site is located approximately 300 m (1000 ft) east of the alignment. Groundwater is at approximately 20 m (80 ft) below the surface and there is evidence from surrounding wells that the contaminants may have migrated. During roadway excavation and grading, the contamination site would be unaffected. The excavation would not be deep enough to encounter groundwater.

The possibility of spills associated with construction activities poses a potential impact to the SOBA. The construction staging area for the project would not be located in the SOBA recharge area. Any onsite fueling and maintenance of construction vehicles would be limited to the southern portion of the roadway, above the caprock.

A National Pollutant Discharge Elimination System (NPDES) Permit for Stormwater Discharge During Construction would be required. The permit would describe Best Management Practices and erosion control plans to minimize surface erosion and groundwater impacts.

6. REFERENCES

Dale, R.H., Probable Effects on Groundwater Reservoirs by Enlarging the Harbor at Barbers Point, Oahu, Hawaii, USGS Administrative Report to United States Army Corps of Engineers, 1968

Hataoka, Bryce. Preliminary Assessment for Ewa Sugar Mill/Oahu Sugar Company, Ewa, Hawaii, March, 1992.

Macdonald, Gordon A., Agatin T. Abbott, and Frank L. Peterson, Vo'canoes in the Sea: The Geology of Hawaii, University of Hawaii Press, 1983.

Mink, John F. and Stephen Lau, Aquifer Identification and Classification for Oahu, Groundwater Protection Strategy for Hawaii, Water Resources Research Center Technical Report No. 179, February, 1990.

Mink, John F. and Stephen Lau, Hawaiian Groundwater Geology and Hydrology, and Early Mathematical Models, Water Resources Research Center Technical Report No. 179, September, 1980.

Mink and Yuen, Inc., Hydrogeological Impacts Proposed Expansion of the Barbers Point Harbor, prepared for the Department of Transportation, July, 1993.

Stearns, Harold T. and Knute N. Vaksvik, Geology and Ground-Water Resources of the Island of Oahu, Hawaii, Bulletin 1, USGS, May, 1935.

Wentworth, Chester K., Geology and Ground-water Resources of the Honolulu-Pearl Harbor Area Oahu, Hawaii, Board of Water Supply, 1951.

Williams, J.A., Groundwater Leakage in the Vicinity of the Barbers Point Barge Harbor, Oahu, Hawaii, Report to the United States Army Corps of Engineers, 1976.

Yuen, George A.L. and Associates, Inc., Groundwater Resources and Sustainable Yield Ewa Plain Caprock Aquifer, Oahu, Hawaii, March, 1989

APPENDIX J

DRAINAGE REPORT

DRAINAGE REPORT

North-South Road (Kapolei Parkway to H-1 Freeway) and
Portion of Kapolei Parkway (Renton Road to North-South Road)
Ewa, Oahu, Hawaii

September 20, 2004

Prepared for:

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1001 Bishop, Suite 3000
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SECTION 1
INTRODUCTION

1.1 Project Overview

North-South Road and Kapolei Parkway are two roadways being proposed for development in the Ewa Plain of Oahu, Hawaii. The Location Map is shown in Figure 1-1. The Project Site Map is shown in Figure 1-2.

1.1.1 North-South Road

North-South Road is principal arterial proposed in a north-south direction in the so-called *East Kapolei* development area of the Ewa Plain. The roadway will connect Kapolei Parkway with the Interstate Route H-1 Freeway. This facility will consist of 3-lanes in each direction separated by a median and will be designed in accordance with design of standards of the Hawaii State Department of Transportation (HDOT) and the guidelines of American Association of State Highway Officials (AASHTO) for urban arterials.

A new conventional diamond-configuration interchange will be constructed at the Interstate Route H-1. Right-of-way has also been set aside for future expansion into a modified partial cloverleaf interchange. At-grade intersections will be constructed at Farrington Highway, Kapolei Parkway and at two future collector roadways between Farrington Highway and Kapolei Parkway.

1.1.2 Kapolei Parkway

Kapolei Parkway is a minor arterial proposed on the Ewa Plain. This study covers the portion of Kapolei Parkway between Renton Road and North-South Road. This facility will consist of 3-lanes in each direction separated by a median. Design will be in also in accordance with HDOT standards and AASHTO for urban arterials.

1.2 Background

This report is based on the existing and proposed drainage conditions as described in the *East Kapolei Drainage Master Plan* dated July 1998.

1.3 Purpose and Scope

1.3.1 Purpose

This purpose of this report is to describe the proposed drainage plans for North-South Road and Kapolei Parkway and to assess related drainage benefits and impacts.

1.3.2 Scope

The scope of this report includes an evaluation of existing, interim and ultimate drainage conditions for the project.

1.4 Related Studies

This report is based on the plans, assumptions and data of previous drainage plans in the Ewa area, including:

1.4.1 Ewa Villages Drainage Master Plan, March 1997

This report was prepared in support of the Ewa Villages Revitalization sponsored by the City and County of Honolulu. It contains evaluation of existing watershed conditions and defined most of the Kaloi Watershed subareas and drainage patterns.

1.4.2 East Kapolei Drainage Master Plan, Draft Report, July 1998

This report was prepared in support of the East Kapolei development which was sponsored by the State of Hawaii, Housing and Finance Development Corporation. It forms the major basis for regional drainage requirements being implemented by this project.

1.4.3 Kaloi Gulch Technical Committee Interim Report

The Kaloi Gulch Technical Committee was formed to study and coordinate the drainage requirements and the water quality issues of the projects within the Kaloi Gulch Watershed. Members included representatives from State, City and private developers. This report identified interim and ultimate drainage guidelines to facilitate development within the watershed. Recommendations included using storage during the interim period to control runoff and ultimately to control water quality.

SECTION 2
EXISTING CONDITIONS

2.1 Watershed Description

2.1.1 Climate

The area receives only a moderate amount of rainfall from the prevailing northeasterly trade winds. The mean annual rainfall is about 23 inches per year. Most of the rainfall occurs from October through April, during southerly "Kona" storms.

During the day and early evening hours, the site is relatively warm compared to other locations around Oahu and the state. Late night and early morning periods, however, are generally cooler than other locations. These conditions are a result of the site being on a downwind, or leeward, side of the island. Based on more than 50 years of data collected at the Ewa Plantation, average annual daily minimum and maximum temperatures in the project area are 65° F and 84° F, respectively. Extreme minimum and maximum temperatures were 47° F and 93° F.

2.1.2 Topography

The study area is located in the mid-to-lower portion of the Kaloi Gulch watershed, on the southern slopes of the Waianae Mountain Range. The uppermost portion of the watershed is over 2,200 feet above sea level. The lower end of the project site at Renton Road is at an elevation of approximately 44 feet MSL. The upper limit of the site above the Interchange at H-1 is at an elevation of about 230 feet MSL. The lower portion of the site is relatively mild with slopes varying between 0.7 and 2 percent. Slopes gradually increase to over 5 percent at the H-1 Freeway. Above the H-1 Freeway, slopes increase considerably in mountainous terrain reaching well over 20 percent in the upper watershed areas.

2.1.3 Soil Type and Ground Cover

The site contains four general soil types as classified by the Soil Conservation Service, now called the Natural Resource Conservation Service, NRCS. These include Honouliuli (HxA and HxB), Waialua (WkA), Waipahu (WzA and WzB), Mamala (Mcn), Ewa (EwC, EaB), Kunia (KyA), Kawaihapai (KlaB and KlbC), Molokai (MuB and MuC), Mahana (McD2 and MBL) and Stony Steep Land (rSY), with Honouliuli being the predominant type. These are clay soils with moderately low permeability and high shrink-swell potential.

Ground cover conditions within the project site are primarily agricultural. The area was previously used for the cultivation of sugar cane. In the mountainous areas above the H-1 Freeway, ground cover consists of thin stand trees and fallow sugarcane fields.

2.2 Existing Drainage Conditions

2.2.1 Existing Hydrology

The existing Kaloi Watershed Map is shown in Figure 2-1. The proposed project is situated within the Kaloi Gulch watershed and can be described as affecting two main subwatersheds. Subwatershed A (subareas 1 to 24 and S1) contains the Kaloi and Hunehune Gulch channels and discharges to the western portion of the Ewa Villages Golf course. Subwatershed B (subareas S2 to S17) encompasses the area just above Ewa Villages. Subwatershed B discharges into the central area of Ewa Villages and combines with the Kaloi Gulch channel upstream of the O.R.& L. Railroad Right-of-Way.

Runoff is carried through the project site primarily along the Kaloi and Hunehune Gulch channels and overbank areas. Both of these drainageways are normally dry and are ephemeral in nature (flows occur only in response to precipitation that is significant to cause direct runoff). These drainageways form a confluence in the University of Hawaii West Oahu (UHWO) parcel to the northwest of Ewa Villages. A U.S. Geological Survey crest-stage gauge is located approximately 2,000 feet upslope of the H-1 Freeway (No.16212450 Drainage Area = 1 .70 sq . mi.) .

Runoff also flows through the project site as undefined sheet flows and poorly-defined shallow concentrated flows. These sheet and shallow concentrated flows occur mainly in the milder reaches below Farrington Highway.

Kaloi Gulch crosses the project at the H-1 Freeway and at two locations between Farrington Highway and Kapolei Parkway. The upper crossing occurs approximately 900 feet south of Farrington Highway. The lower crossing occurs approximately 500 feet north of the Ewa Villages.

North-South Road will discharge into Kaloi Gulch at several locations:

a. Kaloi Gulch Channel just above the H-1 Freeway (non-roadway runoff)
   Drainage Area = 2,896 acres (E. Kapolei DMP)
   Peak Discharge = 5,900 cfs (ultimate watershed flow per Plate 6)

b. Kaloi Gulch Channel at the entrance to Ewa Villages
   Drainage Area = 3,686 acres (Ewa Villages DMP)
   Peak Discharge = 7,000 cfs (ultimate watershed flow per Plate 6)

c. Sheet Flow into Ewa Villages over Relocated Mango Tree Road for eventual discharge into Kaloi Gulch through the Ewa Villages drainage system
   Drainage Area = 429 acres (Ewa Villages DMP)
   Peak Discharge = 1,450 cfs (ultimate watershed flow per Plate 6)

2.2.2 Existing Drainage Features

The existing drainage features in the vicinity of the project site include the Kaloi Gulch and Hunehune Gulch channels and culverts and bridges across existing roadways.

Features in Subwatershed A:

Along Kaloi Gulch (in order from upstream to downstream):

a. 2-42 in CMP Culverts at a Plantation Road approximately 50 feet upstream of the H-1 Freeway
b. 2-12 ft x 12 ft Box Culverts at H-1 Freeway
c. 7 ft x 7 ft Concrete Arch Culvert at a Plantation Road approximately 200 feet downstream of the H-1 Freeway
d. 20 ft x 12 ft Single-span Bridge at Farrington Highway
e. 15 ft x 10 ft Concrete Arch Culvert at a Plantation Road approximately 40 feet downstream of Farrington Highway
f. 20 ft x 8 ft Single-span Bridge at Palehua Road
g. Bridge (size undetermined) at a Plantation Road approximately 4,000 feet downstream of Palehua Road
h. 20 ft x 8 ft Box Culvert at Relocated Mango Tree Road
i. 90 ft wide, Two-Span Bridge at Renton Road

Along Hunehune Gulch Tributary:

a. 96-in Culvert at H-1 Freeway
b. 20 ft x 9 ft Single-span Bridge at Farrington Highway

Features in Subwatershed B:

a. Interceptor Ditches along Relocated Mango Tree Road above Ewa Villages
b. Culverts across Relocated Mango Tree Road

These features are further described below:

The Kaloi Gulch crosses a plantation road approximately 50 feet upslope of the H-1 Freeway through a pair of 42-inch CMP culverts. The culverts are approximately 60 feet in length and have mitered-end conditions and headwalls.

The existing Kaloi Gulch crosses the H-1 Freeway approximately 1,300 feet east of the proposed North-South Road and will be affected by the two eastern ramps of the interchange. It consists of two 12-ft by 12-ft box culverts, approximately 132 feet in length. This cross-drain is owned and maintained by the SDOT and has an estimated capacity of approximately 2,800 cfs when flowing full. By comparison, the ultimate

watershed flow in accordance with Plate 6 of the City and County of Honolulu *Storm Drainage Standards* is 5,900 cfs.

Kaloi Gulch passes through a 7 ft x 7 ft concrete arch culvert at a Plantation Road located approximately 200 fee downstream of the H-1 Freeway. This culvert is owned by the Estate of James Campbell.

At Farrington Highway, Kaloi Gulch crosses through a 20 ft wide x 12 ft high single-span bridge. This bridge is owned and maintained by the City and County of Honolulu, Department of Facilities Maintenance.

Approximately 40 feet downstream of Farrington Highway, Kaloi Gulch crosses through a 15 ft x 10 ft concrete arch culvert which is owned by the State Department of Land and Natural Resources (DLNR).

Approximately 900 feet downstream of Farrington Highway, Kaloi Gulch crosses Palehua Road through a 20 ft wide x 8 ft high bridge owned by the State DLNR.

Flows from the North-South Road project site will contribute Kaloi Gulch where is enters the northwest corner of the Ewa Villages Golf Course. Kaloi Gulch enters the golf course via a 20 ft x 8 ft concrete box culvert crossing beneath the Relocated Mango Tree Road. This culvert is owned and maintained by the City and County of Honolulu and has an estimated capacity of 900 cfs to closely match the 800 cfs Kaloi Channel capacity leading to the culvert.

Flows from the Kapolei Parkway project site will enter Kaloi Gulch just upstream of the Renton Road Bridge. This bridge is 90 feet wide and is able to handle the ultimate watershed flow (per Plate 6) of 8,350 cfs.

Hunehune Gulch crosses the project at the H-1 Freeway, approximately 1,600 feet east of the existing Palehua Road undercrossing. The existing Hunehune Gulch crossing at H-1 will be affected by the two western ramps of the interchange. It consists of a 96-inch diameter concrete culvert, approximately 260 feet in length. This cross-drain is owned and maintained by the SDOT.

Runoff from Subwatershed B sheet flows down towards Ewa Villages and is collected in a series interceptor ditches. Culvert cross-drains carry collected runoff into the Ewa Villlages Golf Course. The capacity of the interceptor ditches and culverts were designed for a 10-year recurrence and are limited because of their temporary purpose. Runoff exceeding the capacities of these ditches and culverts overtops Relocated Mango Tree Road and enters a large interceptor ditch designed as part of the Ewa Villages Golf Course drainage system.

The existing bridge at the OR&L Railroad right-of-way is designed to ultimately pass the Plate 6 peak discharge. However, a berm currently restricts the flow capacity to 2,500 cfs until developments downstream are able to accommodate additional flows.

The North-South Road will cross over Kaloi Gulch twice between Farrington Highway and the proposed Kapolei Parkway. At these two other crossings, Kaloi Gulch consists of a dirt and grass channel section with built-up banks. The built-up channel once served to contain Oahu Sugar Company (OSCo) irrigation water down to the lower fields. The Kaloi Gulch Channel at these two locations are owned by the State Department of Land and Natural Resources.

The channel at the upper crossing location is approximately 35 ft wide between tops of banks, approximately 8 ft wide at the bottom and approximately 8 ft deep (channel bottom to top of lower bank). The channel bottom is sloped at approximately 0.9 percent and the bank-full channel flow capacity at this location is estimated at approximately 800 cfs.

At the lower crossing location, the channel is approximately 40 ft wide between tops of banks, approximately 10 ft wide at the bottom and approximately 8 ft deep (channel bottom to top of lower bank). The channel bottom is sloped at approximately 0.6 percent and the bank-full channel flow capacity at this location is estimated at approximately 800 cfs.

2.3 Flood Hazard Areas

2.3.1 Regulatory Flood Plain

A portion of project is situated within the 100-year regulatory flood plain as determined by the Federal Emergency Management Agency (FEMA). The regulatory flood map is filed as a Letter of Map Revision, effective February 1, 2001 and is shown in Figure 2-2. The 100-year peak discharge used in the FEMA study is 2,359 cfs. A floodway is designated within the Ewa Villages Golf Course and terminates at Relocated Mango Tree Road. The project encroaches on a portion of the flood plain in the area at the northwest corner of Ewa Villages.

2.3.2 Other Flood-prone Areas

The mild and uneven topography of the Ewa Plain creates many areas that have the potential for flooding. Runoff patterns are undefined and flow concentration paths change over time as the area usage changes. Some of the areas that are prone to flooding in the vicinity of the project include:

a. Entire length of the Kaloi and Hunehune Gulch channels, including tributaries and overbank areas due to the limited capacities of the channels.

b. Along Relocated Mango Tree Road where large flows from Subarea B are anticipated to overtop the roadway and flow into the Ewa Villages Golf Course.

c. Varona Village near Renton Road where ponding occurred in 1996.

d. Along the upslope side of the H-1 Freeway where uncontrolled runoff can occur from the open watershed above.

SECTION 3
DRAINAGE PLAN CRITERIA AND CONSIDERATIONS

3.1 Goals and Objectives

The goals and objectives of the proposed drainage plan include:

a. Handle roadway drainage for safe operation of the proposed roadways;
b. Meet requirements for interim regional drainage;
c. Consider needs for system expansion to meet ultimate regional drainage;
d. Minimize impact to flooding of downstream and adjacent properties;
e. Minimize impact to the Kaloi Gulch where the roadway crosses the channel; Minimize impact to the Southern Oahu Basal Aquifer (SOBA);
f. Minimize impact to water quality; and
g. Minimize land, cost, operations and maintenance requirements.

3.2 Drainage Criteria Guidance

The drainage system preliminary engineering design and this report have been prepared in accordance with the following guidance documents:

a. *Federal-Aid Policy Guide covering 23 CFR, Subchapter G – Engineering and Traffic Operations, Part 650 – Bridges, Structures, and Hydraulics, Subpart A – Location and Hydraulic Design of Encroachments on Flood Plains*, U. S. Department of Transportation, Federal Highway Administration, December 7, 1994.
b. *Design Criteria for Highway Drainage*, State of Hawaii, Department of Transportation, Highways Division, February 1, 2001.
c. *Storm Drainage Standards*, City and County of Honolulu, Department of Planning and Permitting, January 2000.

3.3 Roadway Drainage Hydrologic Criteria

The hydrologic recurrence frequency used for design of the roadway drainage facilities are as follows:

a. H-1 Freeway, Tm = 50 years (HDOT criteria)
b. North-South Road, Tm = 25 years (HDOT criteria for areas outside regulated FEMA flood plains)
c. North-South Road, Tm = 100 years (HDOT criteria for areas within regulated FEMA flood plains)
d. Kapolei Parkway Roadway Drainage, Tm = 50 years (City criteria for areas with tailwater conditions)
e. Bridges, Tm = 100-years.

3.4 Regional Drainage Criteria – Ultimate Conditions

The regional drainage system as defined by the *East Kapolei Drainage Master Plan* generally follows criteria used by the City and County of Honolulu. This project will be installing a portion of the regional drainage system in order to handle project-related runoff. The regional system consists of a drainage channel, storm water basin(s) and cross-drain culverts.

The drainage channel will sized for ultimate build-out conditions (100-year flow per Plate 6 of the City's Storm Drainage Standards), but will be phased so that interim conditions, as described below in Section 3.5, can be met. The drainage basin will be sized to accommodate runoff increases only attributable to the North-South Road project. The basin may be increased in the future size by others for holding runoff from their developments.

The North-South Road project will be also install cross-drains to accommodate flows from future developments. These are being installed at this time to their ultimate sizes and depths in order to avoid future impact to the roadway operations and to other utilities that are placed along the roadway. These cross-drains are sized in accordance with City Storm Drainage Standards, Tm = 50-year (Drainage Areas less than 100 acres) or 100-years (Drainage Areas greater than 100 acres).

3.5 Regional Drainage Criteria - Interim Conditions

The regional drainage system as defined in the *East Kapolei Drainage Master Plan* was to be implemented by the State of Hawaii, Housing and Community Development Corporation (HCDCH). The North-South Road was originally programmed to tie into the East Kapolei regional drainage system. However, HCDCH has indefinitely deferred their plans for development of East Kapolei.

Therefore, in order to proceed with the development of North-South Road, an interim drainage plan was coordinated with between HDOT and the City and County of Honolulu. This plan was based on the guidelines of the Kaloi Gulch Technical Committee. Projects being implemented are required to provide detention and retention facilities to offset increases in storm runoff as well as control sediment transport for enhancement of water quality.

The Kaloi Gulch watershed does not have adequate capacity downstream to accommodate the 100-year storm peak discharge in accordance with the current City drainage standards. Until such time that downstream capacity is provided, the project will be following the guidance contained in the *Kaloi Gulch Interim Drainage Plan* Technical Memorandum and Addendum, dated May 24, 2002. This memorandum, which was accepted by the City and County of Honolulu on June 6, 2002, specifies the

interim drainage criteria to be used by the project. The basic intent of the interim plan is to limit runoff from the upper watershed areas until downstream capacity is available.

The technical memorandum specifies that the regional drainage channel along North-South Road is to be designed with a capacity of 2,500 cfs. Flows that are in excess of this amount are anticipated to overflow the proposed channel and drainage basin and sheet flow into the Ewa Villages Golf Course by overtopping Relocated Mango Tree Road for eventual return to the Kaloi Gulch channel.

The memorandum also specifies that the existing culvert at the Kaloi Gulch inlet to Ewa Villages Golf course be enlarged by the project to the interim drainage channel flow of 2,500 cfs.

3.6 Flood Plain Development Criteria and Considerations

The project will encroach onto the existing regulatory flood plain and will be subjected to requirements of the National Flood Insurance Program (NFIP) as well as 23 CFR Part 650A. The City and County of Honolulu administers the NFIP for this community and requires that flood plain compliance certifications be submitted for any work within a regulated flood plain.

A portion of the channel grading work will occur within the Ewa Villages Golf Course, where a floodway has been designated. Work within the floodway will require that a certification of "no-rise" to the regulatory flood elevations be submitted to the City and County of Honolulu for approval to ensure that such work does not cause any loss of flow conveyance.

The HDOT may also apply with the City and County of Honolulu for a change to the flood insurance rate map (FIRM) for Kaloi Gulch in order to reflect changes to the flood boundaries and elevations as a result of this project for the purpose of revising insurance rate zones in the area. In this case, the changes may be inconsequential since they will involve only minor flood boundary revisions and will affect only areas within the HDOT road right-of-way.

3.7 Kaloi Gulch Crossings

The Kaloi Gulch channel is under the jurisdiction of the U. S. Amry Corps of Engineers, pursuant to Section 404 of the Clean Water Act. The State is planning to apply for a Nationwide permit to cover the two North-South Road crossings over the Kaloi Gulch channel as well as the extension of inlet and outlet of the existing Kaloi Gulch 2-12 ft x 12 ft culvert at the H-1 Freeway. Channel realignment will not be allowed and any channel alternation will need to fall within the Nationwide Permit allowances for minor dredging and discharges.

3.8 Southern Oahu Basal Aquifer (SOBA) Requirements

The Environmental Protection Agency (EPA) has designated the SOBA as a sole-source aquifer. This designation requires that roadway projects receiving FHWA federal funding minimize discharge of pollutants over the aquifer recharge area. The limit of the SOBA recharge area is located approximately 1,000 to 1,500 feet makai of Farrington Highway. A criterion in this project is to capture all roadway runoff for areas over the SOBA and convey it via an impermeable conduit or channel to a point at least 1,500 feet downstream of Farrington Highway before it can be discharged to a permeable drainage channel.

3.9 Water Quality Considerations

The Ewa Development Plan and the Kaloi Gulch Technical Committee documents provide general guidance towards the need for enhancing storm water quality. There is a high potential for sediment generation and transport from the largely undeveloped upper watershed due to the relatively dry and steep conditions. The project will need to consider methods to reduce soils erosion and sediment transport.

3.10 Site Constraints

There are a number of physical site constraints that the project's drainage system will need to consider:

a. Endangered plant colonies are located near the lower portion of the project site. A contingency reserve area has been designated around some of these plant colonies in order to preserve its natural habitat;
b. The 138 KV Hawaiian Electric Company power transmission line paralleling the roadway and drainage channel will need to have appropriate setbacks from deep channel and trench excavations in order to minimize any impact to pole foundations;
c. There are a number of utilities, including petroleum and gas lines and major water transmission mains, along the Farrington Highway corridor. The drainage culvert used to convey flows to below the SOBA recharge limit will need to go under these utilities;
d. The North-South Road hydraulics is constrained to the boundary conditions at the connection to Ewa Villages: Invert elevation of 52 feet MSL and a starting 100-year hydraulic grade of 63 feet MSL; and
e. The construction of the drainage features and incidental work activities, such as dust and erosion controls, hauling, access, and other activities will be restricted to within the proposed road right-of-way and designated construction parcels.

3.11 Other Technical Considerations

Other technical design issues being considered in this project include:

a. Safety with respect to open drainage basins and channels (fencing and access);
b. Bridge scour requirements;
c. Allowance for appropriate overflow in the event the design capacity is exceeded;
d. Maintenance of existing flow patterns as much as practicable;
e. Ease of operations and maintenance (use of ramps, access roadways, etc);
f. Constructability;
g. Cost of construction and maintenance;
h. Land requirements;
i. Future adjacent land uses and needs;
j. Standing water nuisance and related health hazards;
k. Vandalism and trespassing;
l. Durability of materials;
m. Depths of future utilities and allowance for sufficient clearance of cross-drains
n. Erosion potential and sediment entrainment; and
o. Flexibility for future expansion needs.

3.12 Computational Methods

Standard computational methods were used in preparing this report, as summarized below.

a. Hydrologic Computational Methods

   i. Rational method (for determining 10-, 25- and 50-year peak discharges for drainage areas less than 100 acres)
   ii. City and County of Honolulu Storm Drainage Standards, Plate 6 (for determining 100-year peak discharges for drainage areas of 100 acres or more);
   iii. Natural Resources Conservation Service Technical Release 20 (TR-20) and the U. S. Army Corps of Engineers, Hydrologic Engineering Center HEC-1 (for assessment of runoff hydrograph routing and determination of runoff peak discharge rate and volume changes);

b. Hydraulic Computational Methods

   i. Manning's equation (for determining sizes in open channel flow conditions with no tailwater);
   ii. U. S. Army Corps of Engineers, Hydrologic Engineering Center HEC-RAS (for determining flow conveyance capacities and elevations affected by backwater conditions);
   iii. Weir equation (for determining basin spillway outlet capacity);

SECTION 4
PROPOSED DRAINAGE PLAN

4.1 Drainage Plan Concept

The intent of the drainage plan is to provide adequate handling of roadway storm runoff as well as to control drainage patterns for minimizing the potential for area flooding. The plan concept is to capture roadway runoff and convey it to the Kaloi Gulch regional drainage facilities.

Runoff from the North-South Road drainage system will empty into the Kaloi Gulch channel at the top of Ewa Villages. The lowermost portion of North-South Road will connect to the Kapolei Parkway drainage system or discharge into the Ewa Villages Golf Course. Runoff from the Kapolei Parkway drainage system will discharge into the Kaloi Gulch channel just upstream of the Renton Road bridge. Both the North-South and Kapolei Parkway roadways will be developed to urban standards and will utilize curbs and gutters for containing drainage.

The ultimate drainage plan for the area calls for "regional" facilities to be implemented to address off-site runoff and mitigate flooding from Kaloi Stream. These regional improvements are anticipated to be installed by area developments and will generally consist of drainage channels and storm water storage basins. Project areas above Farrington Highway as well as areas west of the proposed North-South Road are planned to feed the regional drainage system.

The proposed drainage plan for the project is considered an *interim* drainage plan for the East Kapolei area. The North-South Road and Kapolei Parkway are the initial developments in the area and will be implementing a portion of the regional drainage plan in order to provide adequate handling of roadway runoff and meet the interim requirements of the Technical Memorandum, *Kaloi Gulch Interim Drainage Plan*, May 24, 2002 as coordinated between HDOT and the City and County of Honolulu, Department of Planning and Permitting.

4.2 North-South Road Drainage Plan

The North-South Road drainage plan was analyzed under two watershed conditions: Interim and Ultimate. Interim watershed conditions assume that the developments in East Kapolei are not in-place. Ultimate watershed conditions assume that the developments are in-place.

The primary difference between the interim and ultimate drainage plans for North-South Road is in the amount of flows being carried by the proposed drainage channel and the regional cross-drains. The proposed drainage channel being installed under the North-South Road project will handle flows only for interim watershed conditions to meet the

Technical Memorandum requirements. The channel will be sized and installed for ultimate flows (per Plate 6) in order to minimize overall cost to the State. Implementation of the channel will be phased such that during the interim period, constrictions will be used within the channel to meet the 2,500 cfs flow requirement. These constrictions will be removed in the future as downstream flow capacity becomes available.

Cross-drains will be sized for ultimate build-out conditions, in accordance with the *East Kapolei Drainage Master Plan* in order to avoid reconstruction of the roadway pavement and disruption to traffic in the future. Under interim conditions, these cross-drains will be used to convey runoff from the undeveloped areas west of the roadway to the drainage channel along the east side of the roadway.

The Ultimate and Interim drainage plans for North-South Road are shown in Figures 4-1 and 4-2, respectively.

4.2.1 North-South Road Roadside Drainage Facilities

a. Roadside Drainage Facilities

The North-South Road roadside drainage system will serve to capture runoff from traveled-ways, median and shoulder areas and will consist of a series of catch basins connected by pipe culverts. Culverts will range in sizes from 24- to 84-inches. The catch basins spacing ranges from 200 to 250 feet and are designed to limit flow spread to a maximum of 1/3 of the width of the travel lane. Pipe culverts are sized to maintain hydraulic grades with a minimum freeboard of 1 foot between the design water levels and the gutter low point at the catch basins.

b. Interchange and Roadway Portions over the SOBA Recharge Area

Runoff from off-site watershed areas (non-roadway runoff) above the interchange will be intercepted by ditches and sent to either Kaloi Gulch or Hunehune Gulch for disposal and will not be mixed with roadway runoff. Cutoff ditches are proposed along the tops of all cut slopes along the mauka perimeter of the interchange ramps.

Roadway runoff from portions upslope of the SOBA recharge line will be captured and piped down to a point downstream of the recharge line (approximately 1,500 feet south of Farrington Highway). Reinforced concrete culverts used to carry runoff off of the SOBA recharge area vary in size from 48-inches to 84-inches.

Runoff from non-roadway areas within the interchange area will be allowed to drain to Kaloi Gulch or percolate in sumps created in the open spaces between ramps. Overflow from these sumps will be captured and directed towards the west for disposal into Kaloi Gulch via an open grass swale and culvert system.

c. Roadway Portions below the SOBA Recharge Area

Roadway runoff from the portions below the SOBA recharge line will be collected and piped to the regional drainage channel through a series of outfalls spaced approximately 1,000 apart. Runoff from the lower portion of North-South Road (situated below the Kaloi Gulch inlet to Ewa Villages and including the intersection with Kapolei Parkway) will be piped into the Ewa Villages Golf course for disposal into the Kaloi Gulch system.

c. Interim Interceptor Ditches

During the interim period, when areas adjacent to the roadway are undeveloped, sheetflows from these undeveloped off-site areas along the roadway segment will be intercepted by a series of temporary ditches and piped across the roadway through the regional cross-drains for discharge into the drainage channel. Temporary inlet structures with rock filters will be used to capture and handle runoff from these areas. These temporary ditches are necessary to control and dispose of runoff that would be otherwise be diverted to other areas by the roadway embankment. All ditches and inlets will be located within the proposed road right-of-way.

4.2.3 North-South Road Regional Drainage Facilities

a. Regional Drainage Channel

The drainage plan for North-South Road calls for the implementation of a portion of the regional drainage channel and storage basin to handle project runoff. The purpose of the channel is to receive roadway runoff. It will also serve to capture overflows from the Kaloi Gulch channel at it upper crossing of North-South Road (approximately 900 feet south of Farrington Highway).

The channel will be located along the east side of the roadway and will be designed to convey ultimate watershed flows in accordance with Plate 6 of the City drainage standards. During the interim period, however, flow constrictions will be used to meet the 2,500 cfs flow requirement in accordance with the Technical Memorandum for the Interim Kaloi Gulch Drainage Plan. The flow constrictions may consist of reduced width channel sections, berms and spillways, and/or roadway crossings with culverts. These constrictions will be removed in the future as downstream flow capacity becomes available.

The channel has three distinct reaches, as described below:

i. Lower Reach (between between the drainage basin and the Campbell Estate parcel, approximately 3,500 feet south of Farrington Highway). This section will utilize a trapezoidal section consisting of a 60-foot wide bottom and 2:1 side

slopes for a total top of bank width of 160 feet. The channel will be lined with grass to filter sediments and slopes are kept to a mild 0.08 percent to minimize erosion. Hydraulic drop structures, varying in height from 2 to 3 feet and consisting of CRM lining, will be used to maintain mild channel grades. At the interim design flow of 2,500 cfs, flow velocities range from 4 to 6 fps and channel shear stresses range from 0.5 to 0.8 psf.

ii. Middle Reach (along the Campbell Estate parcel, between approximately 3,500 to 1,900 feet south of Farrington Highway). Due to land acquisition constraints along this Campbell Estate parcel, a narrowed section is used, consisting of a trapezoidal section with a 20-foot wide bottom and 1:1 side slopes for a total top of bank width of 70 feet. Slopes are maintained at a slightly steeper 0.9 percent in order to improve hydraulic capacity. The channel will be lined with grouted rip-rap, CRM or concrete due to the higher velocities anticipated in this narrowed section. At the interim design flow of 2,500 cfs, flow velocities range from 12 to 14 fps and channel shear stresses range from 1.6 to 1.8 psf.

iii. Upper Reach (from approximately 1,900 feet to 1,000 feet south of Farrington Highway). This section will be similar to the lower reach in dimension and channel slope and will also utilize 3-foot deep CRM drop structures for gradient control.

The channel depth (invert to top of bank) varies from 18 to 22 feet. Maximum flow depths based on the interim design flow 2,500 cfs range from 4 to 9 feet.

The 100-year (Plate 6) discharges, in accordance with the *East Kapolei Drainage Master Plan*, were analyzed in the channel to assess hydraulic grades and velocities under ultimate build-out conditions. Flow depths were found to range between 6 and 15 feet and resulted in a minimum freeboard of 3 feet. Flow velocities ranged from 4 to 8 fps in the grass-lined sections and 16 to 18 fps in the CRM-lined section.

b. Drainage Retention / Detention Basin

A drainage retention / detention basin is proposed to handle runoff increases from the North-South Road project and help reduce sediment transport from the watershed. The basin is not sized to accommodate runoff increases from other developments within the watershed. It may be enlarged by others in the future to accommodate runoff increases from their developments.

The basin is proposed to be located at the downstream end of the regional drainage channel. The project is estimated to create an increase of approximately 76 acre-feet in runoff at Kaloi Gulch channel into Ewa Villages. This increase is due to the added impervious surfaces, based on a contributing roadway drainage area of 130 acres as well as a slightly larger drainage area being directed to the Kaloi Gulch channel at Ewa Villages.

Sediment loading is estimated at 16 acre-feet per year, based on an estimated 12 tons per acre per year from the approximately 3,000-acre watershed.

The retention storage volume provided in the basin was selected at 110 acre-feet to account for 76 acre-feet of runoff retention plus sediment storage of volume of 32 acre-feet (approximately 2 years of storage capacity).

The detention volume (storage above the retention volume) is estimated at 30 acre-feet and includes storage within the basin as well as in the lower portions of the drainage channel. The basin depth may be deepened to increase sediment storage to reduce long-term maintenance. It is anticipated that adjacent developments will enlarge the basin to meet their development runoff and sediment storage needs.

c. Interface at Ewa Villages Golf Course

The regional drainage system will discharge into Kaloi Gulch at the Ewa Villages Golf Course. The existing 20-ft x 8-ft box culvert at the Kaloi Gulch channel inlet to Ewa Villages will be enlarged to accommodate a flow of 2,500 cfs in accordance with the Interim Drainage Plan for North-South Road. The interface between the drainage basin and the golf course will consist of a spillway from which basin overflows will enter the box culvert structures. Flows exceeding the 2,500 cfs capacity will overflow the basin, overtop Relocated Mango Tree Road and enter into into the golf course to the east of the Kaloi channel.

Some minor improvements will be required within the Ewa Villages Golf Course to accommodate the added culvert structure. These improvements will consist of modification of the existing debris structure and minor grading to transition existing grades to the wider culvert structure.

d. Drainage Channel Bridge Crossings

Two future collector roadway connections are anticipated to occur along North-South Road. In order to maintain access to adjacent lands over the regional drainage channel, bridges at these future roadways are proposed to be implemented by the project. Each of these roadways is assumed to have a right-of-way width of 150 feet.

Bridge or culvert structures are proposed to be implemented over the drainage channel at these future roadway locations to maintain access across the channel. These structures will be sized to pass the design flow of 2,500 cfs to meet the interim watershed requirements. These structures are anticipated to be enlarged by others when needed to carry the ultimate watershed flows.

e. Kaloi Gulch Bridge Crossings

The North-South Road crosses Kaloi Gulch at two locations between Farrington Highway and Kapolei Parkway. The upper crossing occurs approximately 900 feet south of Farrington Highway. The lower crossing occurs approximately 500 feet north of the Ewa Villages. At each crossing, 40-foot, single-span bridges will be used to carry the roadway over the Kaloi Gulch channel. Alternation of the channel will involve trimming the tops of the channel banks to accommodate the bridge structure and foundations. Work is not planned to occur below the ordinary high water mark at each of the crossings.

f. Kaloi Gulch Culvert Modification at H-1

The existing double 12-ft x 12-ft box culverts at the Kaloi Gulch crossing of the H-1 Freeway will need to be lengthened at the inlet and outlet to accommodate freeway widening involved with the two eastern ramps (westbound off-ramp and eastbound on-ramp). The capacity of these culverts is in adequate to handle the 100-year flow, however, upgrading the size of this culvert is not being proposed due to the operational disruption to the freeway and due to permit requirements for performing major alteration of the Kaloi Gulch channel.

g. Cross-Drains for Future Developments

Major cross-drains will be installed across North-South Road to accommodate runoff into the regional drainage channel from future developments situated to the west of the roadway. The sizes and locations of these culverts are generally as specified in the *East Kapolei Drainage Master Plan*. Cross-drains were designed to be relatively deep in order to provide sufficient clearance for future utilities that are planned within the utility corridor area next to the roadway.

4.3 Kapolei Parkway Drainage Plan

The drainage plan for Kapolei Parkway (portion between Renton Road and North-South Road) calls for runoff to be piped down to the vicinity of Renton Road where an approximately 84-inch culvert (or equivalent box culvert structure) will discharge approximately 100 cfs runoff into the Kaloi Gulch channel at the bottom of the Ewa Villages Golf Course, just upstream of the existing Renton Road bridge. Kapolei Parkway does not encroach onto any regulated flood plain.

The drainage plan for Kapolei Parkway is shown in Figure 4-3.

4.3.1 Kapolei Parkway Roadside Drainage Facilities

The Kapolei Parkway roadside drainage system will serve to capture runoff from traveled-ways, median and shoulder areas and will consist of a series of catch basins

connected by pipe culverts. A drain connection is also provided pick-up future flows from a 5-acre portion of an adjacent residential development parcel.

Culverts will range in sizes from 18- to 84-inches. The catch basins spacing ranges from 150 to 250 feet and are designed to limit flow spread to a maximum of 1/3 of the width of the travel lane. Pipe culverts are sized to maintain hydraulic grades with a minimum freeboard of 1 foot between the design water levels and the gutter low point at the catch basins.

4.3.2 Kapolei Parkway Regional Drainage Facilities

The regional drainage facilities for mitigating runoff increases for Kapolei Parkway have already been built into the Ewa Villages Golf Course in accordance with the *Ewa Villages Drainage Master Plan*. Runoff increases of 5 acre-feet are estimated from the roadway portion between Renton Road and North-South Road. The Ewa Villages Golf Course contains approximately 60 acre-feet of retention storage and some 300 acre-feet of combined detention storage.

4.4 Plan Evaluation

4.4.1 Assessment of Hydrologic Impacts

a. North-South Road

The storage basin retention volume of 50 acre-feet is more than adequate to contain the 20 acre-feet of runoff increase from the roadway. In addition, the Interim Drainage Plan for North-South Road requires concentrated peak discharges to be limited to 2,500 cfs at the Kaloi Gulch channel inlet to Ewa Villages. The use of the retention / detention basin will serve to disperse flows that exceed this capacity by allowing runoff to overflow into the Ewa Villages Golf Course along the Relocated Mango Tree Road boundary. Runoff will not be increased downstream and adverse hydrologic impacts from the project are not anticipated.

b. Kapolei Parkway

Mitigation for Kapolei Parkway runoff was already considered in the *Ewa Villages Drainage Master Plan* and implemented in the Ewa Villages Golf Course. Additionally, the roadway embankment already exists and local drainage pattern will not change significantly by the project. No adverse hydrologic impacts are anticipated.

4.4.2 Assessment of Flood Plain Impacts

a. Proposed Flood Plain Description

A portion of the regulatory flood plain along Kaloi Gulch will be impacted by the North-South Road project. The area of impact is located near the northwest corner of the golf course, where Kaloi Gulch enters.

b. Assessment of Impacts

The project will increase the culvert capacity at the Kaloi Gulch inlet to Ewa Villages to 2,500 cfs. This flow is greater than the 2,359 cfs flow used by FEMA in its flood plain analysis of Kaloi Gulch and therefore, flooding will be contained within the Kaloi Gulch channel and 2,500 cfs regional drainage channel and basin areas.

The capacity enhancements within the Ewa Villages Golf course will enlarge the drainageway in the golf course slightly and improve hydraulic capacity. Therefore, adverse effect to the flood plain floodway conveyance is not anticipated.

The affected area of the flood plain lies within the Ewa Villages Golf Course, where a flood plain is already delineated, or within the proposed North-South Road right-of-way, where the roadway, drainage channel and basin are proposed. The flood plain changes will not affect other adjacent lands.

4.4.3 Assessment of Other Items

a. Flooding and Drainage

The project is designed to handle roadway as well as address regional drainage concerns. The project will reduce flooding above Ewa Villages by using increased culvert and channel flow capacities.

b. Future Expansion

In terms of future expansion, the regional drainage channel is sized to accommodate the interim watershed flow of 2,500 cfs. The west side of the channel and drainage basin along the roadway will be set to their permanent grades. Widening of the channel and drainage basin to accommodate ultimate watershed flows is anticipated to occur along the east side.

c. SOBA Impacts

The impact to the SOBA has been mitigated by piping roadway runoff to discharge below the SOBA recharge area.

d. Regional Drainage Criteria

The project is being implemented based on the concepts in the *East Kapolei Drainage Master Plan*. This approach will enhance the ability of future developments to expand

these initial facilities according to ultimate development needs. The project also adheres to the intent and spirit of the Kaloi Gulch Technical Committee recommendations for interim development within the Kaloi Gulch watershed.

e. Assessment of compliance with Water Quality Considerations

Water quality enhancement is promoted through the use of vegetative linings along the drainage channel as well as within open swales. Mild slopes are used in the channel to reduce the potential for entrainment of sediment during high flows. Finally, the use of a large retention will significantly reduce sediment loads from migrating downstream.

SECTION 5
CONCLUSION

The drainage plans for North-South Road and Kapolei Parkway were evaluated based their affects on a number of factors including hydrology, flooding, flood plain encroachment, ground and surface water quality, compatibility with future developments, land requirements, site constraints, construction cost, and operations and maintenance requirements. The assessments were made based on a review of existing conditions and were compared with anticipated watershed conditions caused by the proposed project.

Based on the report findings, it has been determined that the project will provide for sufficient handling of runoff increases as well as offer improved levels of flood and storm water quality control within this portion of the watershed. The added flood control capacity of 2,500 cfs provided by the regional drainage channel and drainage basin will enable the containment of the FEMA regulatory flood. The 110 acre-feet retention basin will provide sufficient mitigation to offset runoff increases from the project.

In order to minimize cost to the State, the drainage channel is being sized for the ultimate (Plate 6) flows and will be implemented in phases in order to meet the interim (2,500 cfs) flow requirement.

Erosion and sediment transport controls such as, the use of a sediment retention storage basin, the use of mild slopes to minimize entrainment of sediments and the use of vegetative linings in the basin and channel area are being designed into the drainage plan.

Additionally, the roadway drainage plans will be designed based on the framework of the East Kapolei Drainage Master Plan in order to be in conformance with adjacent area developments.

It is concluded that the proposed drainage systems will adequately support the roadways and that significant adverse impacts to downstream and adjacent properties are not anticipated.

LIST OF REFERENCES

1. "Storm Drainage Standards," Department of Public Works, City and County of Honolulu, January 2000.

2. King, Horace W. and Brater, Ernest F., Handbook of Hydraulics, McGraw-Hill Book Co., New York, N. Y., c.1963.

3. "Rainfall Frequency Study for Oahu," Report R-73, State of Hawaii, Department of Land and Natural Resources, Division of Land and Water Development, 1984.

4. "HEC-1 Flood Hydrograph Package, Users Manual," Computer Program 723-X6-L2010; U.S. Corps of Engineers, Hydraulic Engineering Center, September 1981 (revised January 1985).

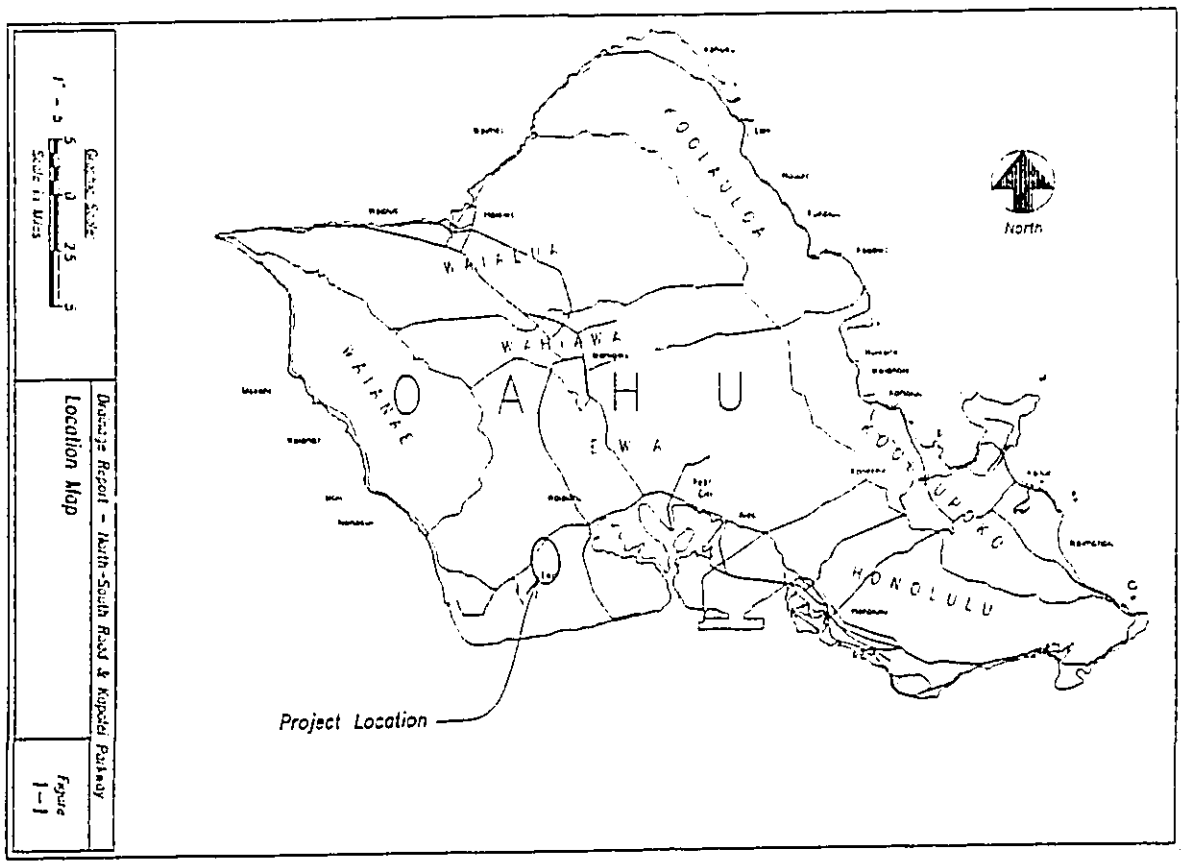
5. "HEC-RAS," River Analysis System, Backwater Hydraulic Computer Program, U.S. Army Corps of Engineers, Hydraulic Engineering Center, Version 3.1.1, May 2003.

6. "National Engineering Handbook, Section 4, Hydrology," U.S. Department of Agriculture, Soil Conservation Service, PB86 180494, produced by National Technical Information Service, U.S. Department of Commerce, Springfield, Virginia 22161, March 1985.

7. "Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii," United States Department of Agriculture, Soil Conservation Service, August 1982.

8. "Kaloi Gulch Technical Committee Interim Report," prepared by Kaloi Technical Committee, April 29, 1993.

9. "Technical Memorandum, Kaloi Gulch Interim Drainage Plan, North-South Road," prepared by the State of Hawaii, Department of Transportation and City and County of Honolulu, Department of Planning and Permitting, May 24, 2002.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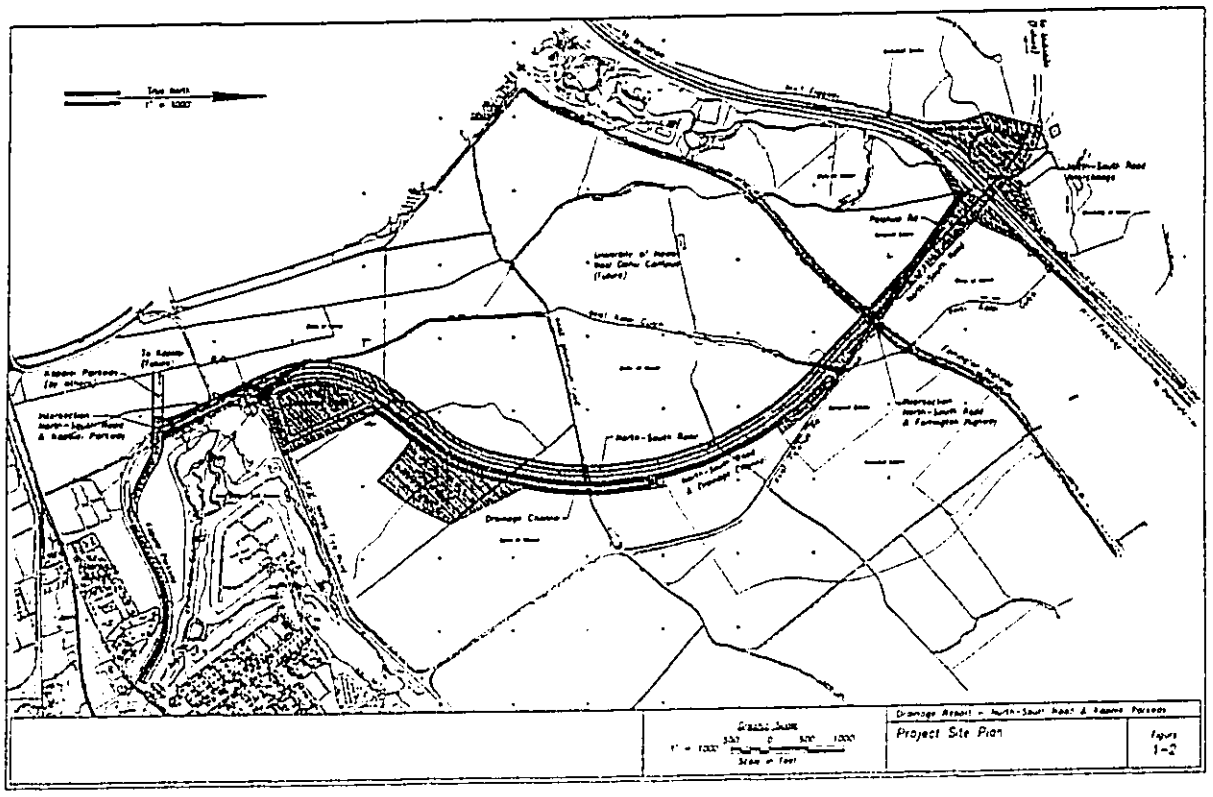
Drainage Report - North-South Road & Kapolei Parkway
Location Map
Figure
1-1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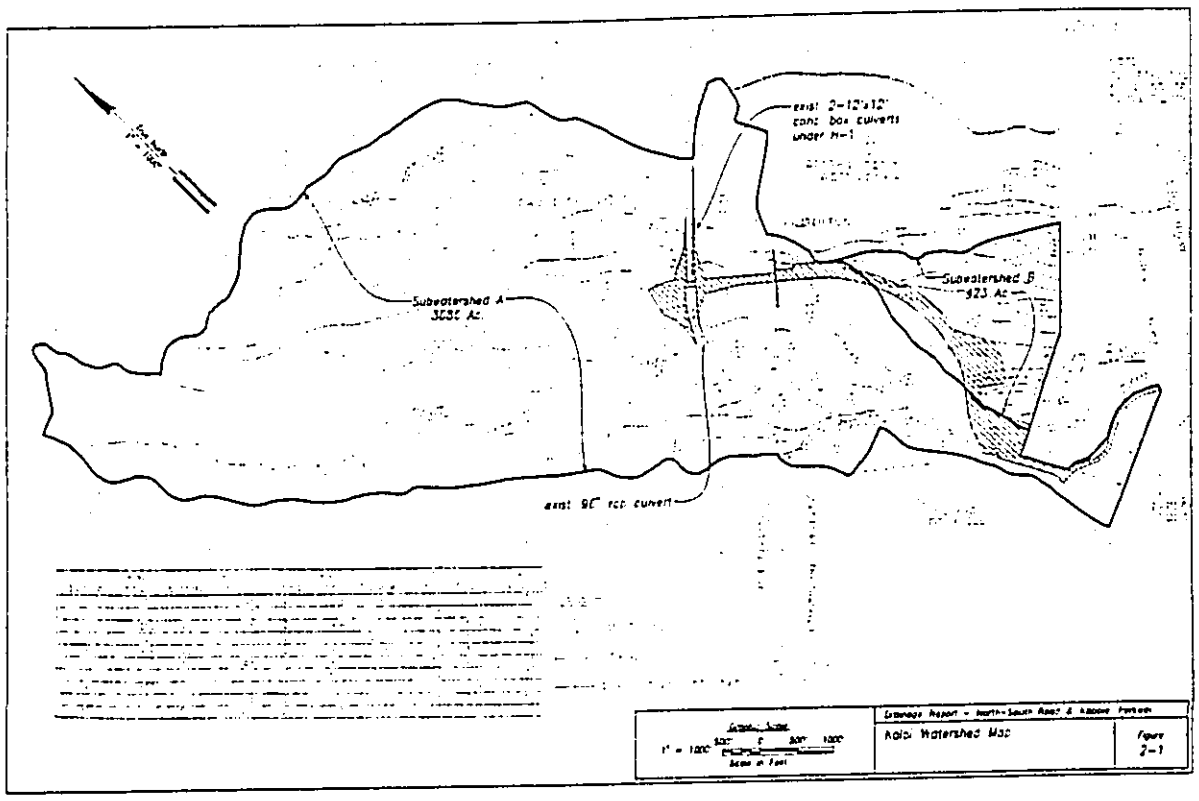
Project Site Plan
Figure
1-2


exist 2-12'x12' conc box culverts under H-1
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Subwatershed B
923 Ac.
exist 96" rcp culvert
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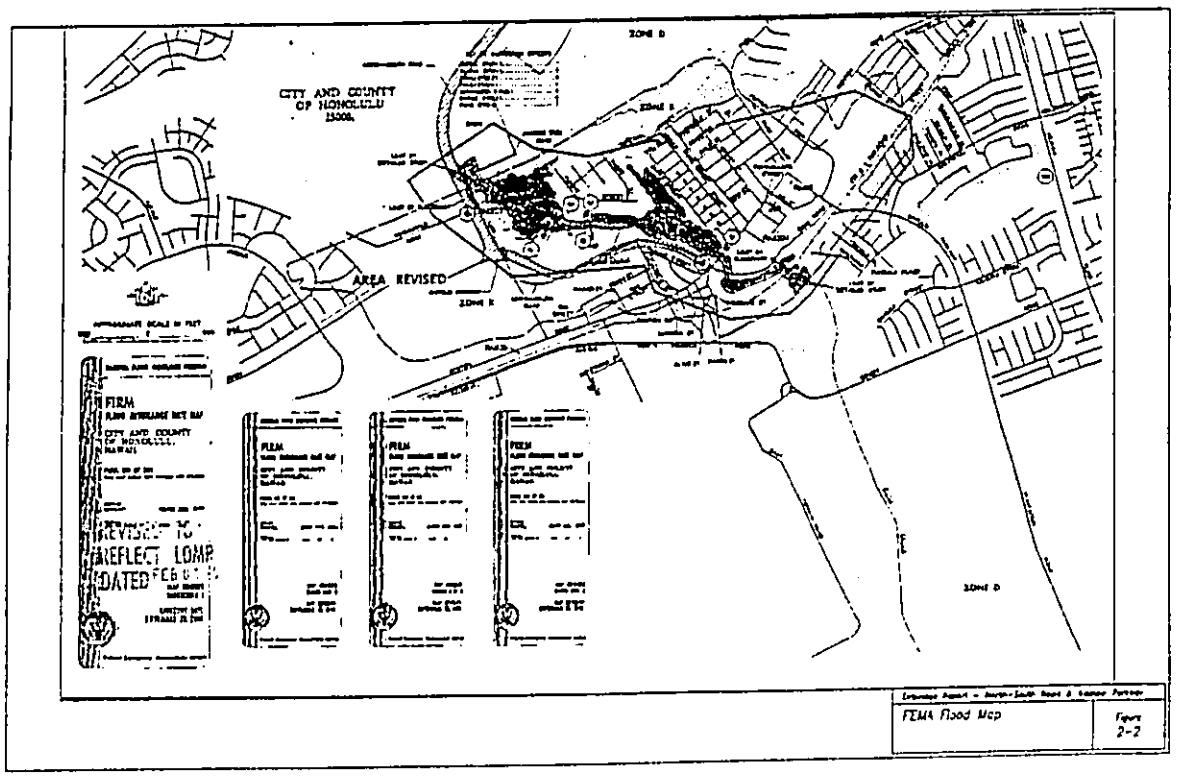
Drainage Report - North-South Road & Kapolei Parkway
Kalaeloa Watershed Map
Figure
2-1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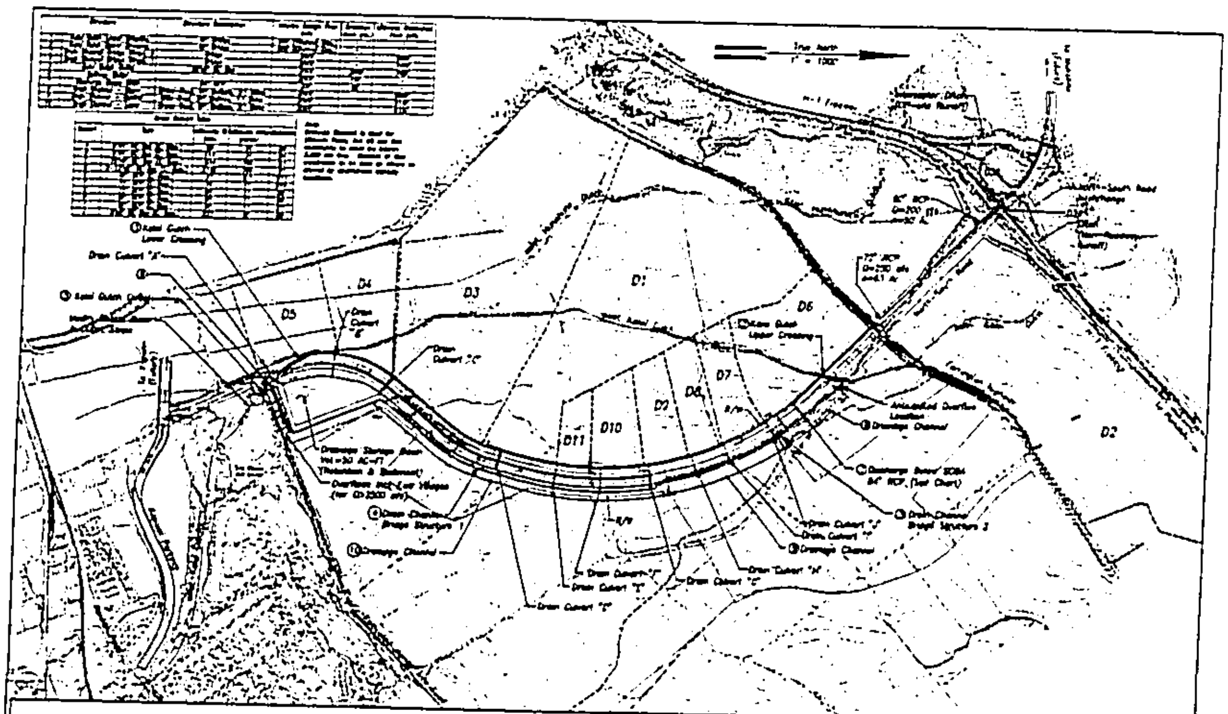
FEMA Flood Map
Figure
2-2



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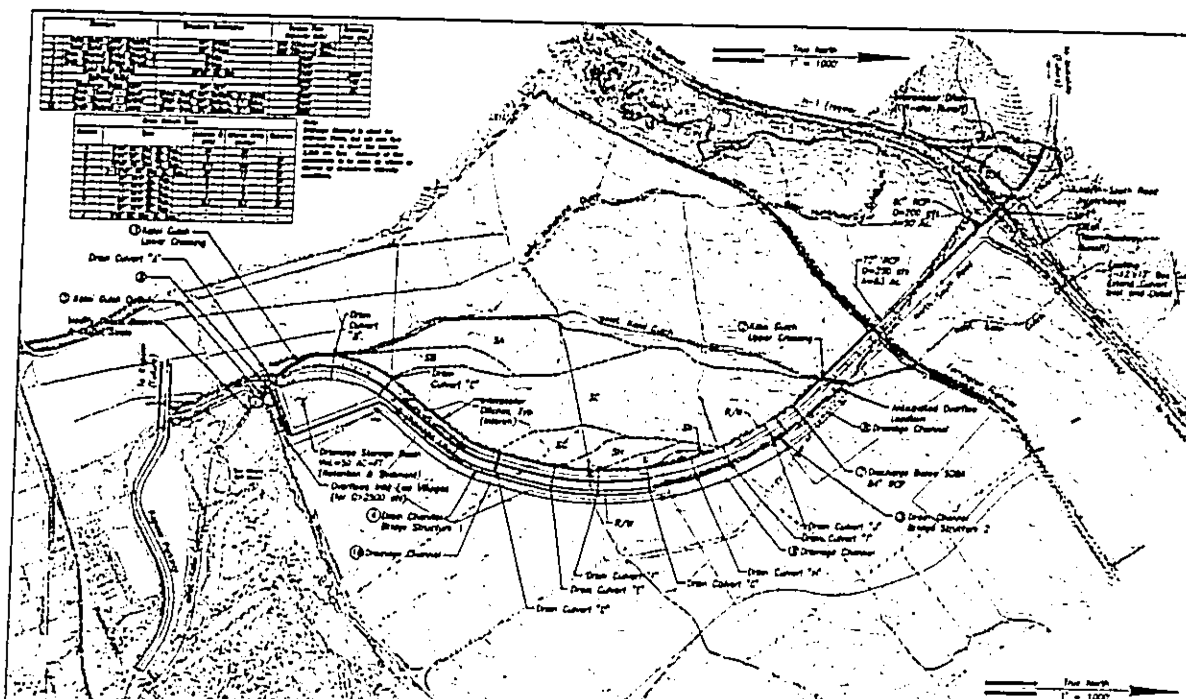
Drainage Report – North-South Road & Kapolei Parkway

North-South Road Drainage Plan – Ultimate

Figure 4-1



Graphic Scale
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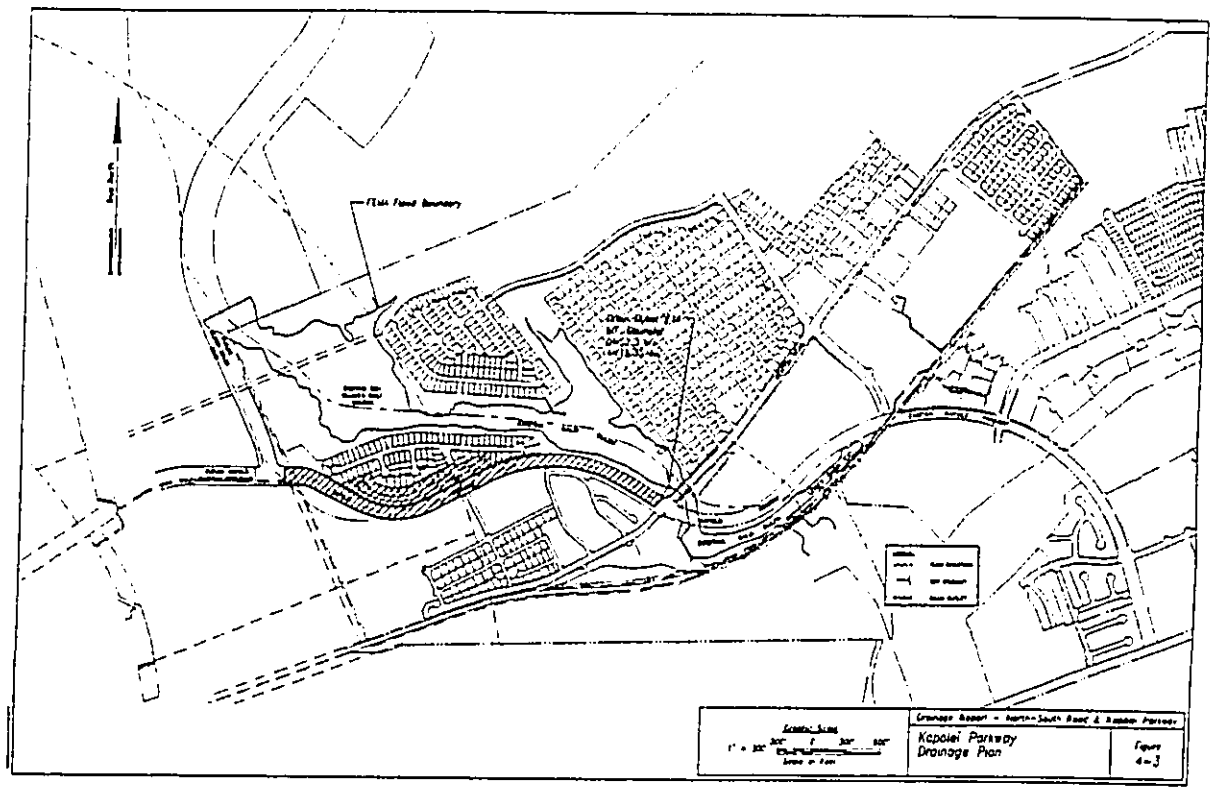
Drainage Report – North-South Road & Kapolei Parkway

North-South Road Drainage Plan – Interim

Figure 4-2


Kapolei Parkway
Drainage Plan
Figure
4-3

APPENDIX A

Technical Memorandum
Kaloi Gulch Interim Drainage Plan

DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU

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JEREMY HARRIS
MAYOR

RANDALL K. FUJIKI, AIA
DIRECTOR

LORETTA K.C. CHEE
DEPUTY DIRECTOR

2002/ACT-04-144 (sn)

June 6, 2002

Mr. Brian K. Minaai, Director of Transportation
State of Hawaii
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813-5097

Dear Mr. Minaai:

Technical Memorandum, Kaloi Gulch Interim Drainage Plan, North South Road Phase 1, Kapolei Parkway to Farrington Highway (HWY-DS 2.6179)

This is in response to your letter of April 10, 2002, regarding a proposed technical memorandum for hydrology for the Kaloi Gulch Interim Drainage Plan.

We have reviewed the technical memorandum and its addendum, which was submitted by R.M. *Towill Corporation on May 24, 2002.*

As submitted, the interim drainage plan for Phase 1 of the North South Road Project is acceptable.

Should you have any questions, please call Scott Nakamatsu of our Site Development Division at 527-6247.

Sincerely yours,

RANDALL K. FUJIKI, AIA
Director of Planning and Permitting

RKF:ky
[151393]
cc: R. M. Towill Corporation

ADDENDUM TO TECHINICAL MEMORANDUM

KALOI GULCH INTERIM DRAINAGE PLAN - NORTH-SOUTH ROAD PHASE 1, KAPOLEI PARKWAY TO FARRINGTON HIGHWAY
HYDROLOGY FOR THE INTERIM DRAINAGE PLAN

DATE SUBMITTED: May 24, 2002
PROJECT: NORTH-SOUTH ROAD
PREPARED BY: R. M. Towill Corporation
PREPARED FOR: Department of Transportation, State of Hawaii

Purpose

This Memorandum describes the proposed the interim drainage plan hydrology of Kaloi Gulch that will be used in the North-South Project.

Background

The original North-South Road drainage system was integrated into the Housing and Community Development Corporation of Hawaii (HCDCH) East Kapolei Project's Drainage System for Kaloi Gulch. Due to the change in the housing market, the HCDCH has deferred the development of their East Kapolei Project. The date when the proposed East Kapolei development will proceed is indeterminate at this time.

The Department of Transportation (DOT) of the State of Hawaii intends to continue with the planning and design of the North-South Road Project and construct the road prior to the re-start *of the East Kapolei Project. An interim drainage plan for Kaloi Gulch is required to design and* construct the North-South Road until the drainage improvements for the proposed East Kapolei Project are completed.

Interim Drainage Plan

The North-South Road will cross Kaloi Gulch approximately 2,500 feet south of Farrington Highway. The road grade will be higher than the existing grade of the gulch. Most of the Kaloi Gulch storm runoff will flow to the east of the North-South Road and the rest will flow within the stream channel to the west. A culvert will be constructed to allow the North-South Road to cross the Gulch to maintain the Kaloi Gulch streambed and allow runoff to flow from east to west. The culvert will be sized to convey the flow determined by the interim drainage plan hydrology. The remainder of the runoff on the east side of the North-South Road will be conveyed within a channel sized for 2,500 cubic feet per second (cfs) according to the Interim Agreement of the Kaloi Gulch Flood Task Force or sheet flow to the boundary of the Ewa Villages Golf Course. A second culvert is required where Kaloi Gulch once again crosses the North-South Road at the northwest corner of the Ewa Villages which is the Kaloi Gulch entrance to the Golf Course. This

culvert will be sized to convey the remainder of the flow for the drainage basin, Subarea but will be restricted during the interim until the regional drainage system for Kaloi Gulch is resolved. A detention basin sized for the increase in runoff generated by the North-South Road project will be constructed at the Kaloi Gulch entrance to the Ewa Villages Golf Course. A new box drain will be constructed to discharge the storm runoff into the Ewa Villages Golf Course.

Interim Drainage Plan Hydrology

The proposed interim drainage plan hydrology to be used for the North-South Road drainage analysis is based on the existing drainage patterns defined in the Ewa Villages Drainage Master Plan. The existing drainage patterns are shown on Figure 3-2 (attached) of the Ewa Villages Drainage Master Plan. Figure 3-2 shows that Subareas 1 - 4, 13, 14, 22, 24 and S1 - S17 drain into the Ewa Villages Golf Course from within or from the east side of Kaloi Gulch. The runoff is sheet flowing to the Golf Course except for the flow within the stream channel.

The proposed North-South Road culvert at the Kaloi Gulch crossing will convey the flow calculated in the Ewa Villages Drainage Master Plan for the stream channel. The calculated channel flow is 800 cfs. This flow will be allowed to pass under the North-South Road at the second culvert near the Golf Course. The remainder of the flows calculated for Subareas 1 - 4, 13, 14 and S2 - S17 will remain in the east side of the North-South Road and flow within the 2,500 cfs channel to the proposed basin or sheet flow to the Ewa Villages Golf Course. Subareas 15, 22, 24 and S1 will be restricted from flowing to the Golf Course by restricting the flow of the second culvert to the calculated channel capacity of 800 cfs. The ultimate capacity of the culvert will be sized to drain subareas 5 - 12, 15 - 21, 23, 25 and 26.

An excerpt from the Eva Villages Drainage Master Plan has been attached for background information as well as a drainage area map (FIGURE 3-2A), Plate 6 peak discharge design curve (FIGURE 3-3) with projected flows and the Conceptual North-South Road Interim Drainage Plan (FIGURE 3-4). Kaloi gulch is an intermittent stream with limited capacity. In many areas the stream banks are higher than the land adjacent to the stream. The mauka North-South Road culvert near Farrington Highway will be designed to convey 800cfs under entrance control conditions. The headwater at 800 cfs will match the water surface of the 2,500 cfs channel and the weir flow over the banks of the 2,500 cfs channel for the remaining overland sheet flow. The makai North-South Road culvert will be designed to convey 2,900 cfs but the Kaloi Gulch stream channel leading to the culvert can only convey 800 cfs. Additional berms will be added during the preparation of the drainage master plan if they are needed to ensure that only 800 cfs is conveyed to the makai culvert.

The North-South Road basin will discharge into the Ewa Villages Golf Course where the existing Kaloi Gulch 20' x 8' box culvert presently discharges into the golf course. The box culvert capacity is limited to 905 cfs by entrance control. Additional box culverts will be designed to

convey the additional 1,595 cfs allowed under the Interim Kaloi Gulch Agreement and the full 5,863 cfs for the ultimate development as described in the Ewa Villages Drainage Master Plan, Table 5-1. The culverts for the ultimate development will be plugged until additional flows are allowed by the Ewa Marina.

Excerpt from Ewa Villages Drainage Master Plan

SECTION 1
INTRODUCTION

1.1 Background

The Ewa Villages Revitalization development is sponsored by the Department of Housing and Community Development (DHCD) of the City and County of Honolulu (CCH) for the purpose of providing affordable housing for the community. The project site is located in the old Ewa Villages area and covers roughly 606 acres (see Figures 1-1 and 1-2). The project will consist of approximately 1,028 single-family (SF) and 400 multi-family (MF) residential units, schools, parks, commercial and civic facilities and an 18-hole golf course. The homes and infrastructure that presently exists will be upgraded where feasible. Further development information may be found in the Final Environmental Impact Statement for the Ewa Villages Master Plan (Reference 8).

The Ewa Villages site has poor drainage due to inadequate drainage systems. The flat topography combined with tight clayey topsoil promotes ponding in many areas. In addition, a large portion of the site is located within the Kaloi Stream flood plain. Irrigation ditches and swales used for draining the surrounding sugarcane fields comprise most of the drainage system. In general, there are no street culvert systems, except in the more recently improved areas, such as Fernandez Village.

1.2 Purpose and Scope

This report describes the drainage plan for the Ewa Villages Revitalization project. The purpose of the drainage plan is to improve local drainage and remove incompatible areas from stream flooding.

The scope of this master plan includes:

- Assessment of drainage during existing conditions.
- Assessment of drainage during interim developed conditions (project site developed, upper watershed undeveloped).
- Assessment of drainage during ultimate developed conditions (project site developed, upper watershed developed).
- Sizing of regional drainage facilities (for handling off-site generated runoff).
- Sizing of backbone drainage facilities (for handling on-site generated runoff).

1.3 Related Studies

1.3.1 EIS for the Ewa Villages Master Plan

A preliminary drainage assessment was made in the report entitled "Final Impact Statement for the Ewa Villages Master Plan" dated February 1991 prepared by R. M. Towill Corporation (RMTC) for the DHCD (Reference 8). Flood protection measures cited in the report included using the proposed golf course to safely convey floodwaters through the area and using the proposed relocated Mango Tree/Waimanalo Road (cane haul) as a berm to control runoff entering the site from above.

1.3.2 FEMA Flood Insurance Study

A portion of Kaloi Gulch has been studied by the FEMA and is included in the effective FIS for the CCH. The September 1990 FIS has been recently revised by a Letter of Map Revision (LOMR) dated March 21, 1995 (Reference 16). The study reach stretches from 400 feet below the OR&L Railroad Right-of-Way up to the relocated Mango Tree Road (cane road). The 100-year peak discharges were listed as 2,425 cfs at the lower limit, drainage area (DA) = 5.8 square miles and 2,359 cfs at the upper limit, DA = 5.2 square miles. The revised Flood Insurance Rate Map (FIRM) (Reference 16) shows the Ewa Villages Golf Course and portions below Renton Road to be in the 100-year flood zone.

1.3.3 Drainage Master Plan for the Gentry-Ewa Project

The immediate neighbor downstream of Ewa Villages is the Gentry-Ewa development. The "Drainage Master Plan for the Gentry-Ewa Project" prepared by Belt Collins and Associates (BCA) describes facilities that will accept the Ewa Villages runoff (Reference 5). Runoff is shown to enter the Gentry site in two locations: 1) At Kaloi Stream, where Gentry proposes a golf course to handle the runoff from a realigned stream course; and 2) Along Fort Weaver Road, where an existing drain line along Fort Weaver Road is sized

to convey the runoff into another portion of the Gentry golf course.

The BCA report proposes an interim drainage plan due to limited capacity below the Gentry site. The interim plan is based on allowing only 800 cfs through the Kaloi Stream channel from the Ewa Villages site until the Ewa marina project provides adequate capacity below Gentry. The computations in this study indicate that more than 800 cfs may enter the Gentry site under existing and developed conditions. The Kaloi Gulch Technical Committee was formed to address this and other issues related to the drainage coordination between projects along the Kaloi Stream watershed.

The design hydraulic grade line (HGL) and tie-in invert elevations listed at the upper Gentry boundary are 32.6 feet and 26.0 feet, respectively. The Plate 6 peak discharge is 8,800 cfs. *The 9,400 cfs listed in the Gentry Report used a peak flow rate graph that was superseded by the 1988 revised drainage standards.*

1.3.4 Kaloi Gulch Technical Committee Interim Report

The Kaloi Gulch Technical Committee was formed to study and coordinate the drainage requirements and the water quality issues of the projects in the Kaloi Gulch watershed. The members of the committee include engineers for the private developments, representatives for the State and City projects, and representatives from the Drainage Section of the City and County of Honolulu, Department of Public Works.

Projects along the Kaloi Watershed are at various stages of planning, design and construction. The Kaloi Gulch Technical Committee Interim Report (Reference 9) identifies interim and ultimate drainage guidelines to facilitate ongoing improvements and mitigate the impact of greater conveyance of runoff through the watershed.

Part of the interim plan calls for the incorporation of detention storage features in all projects. It specifies that Ewa Villages should provide approximately 60 acre-feet of "retention" (small outflow allowed) and 300 acre-feet of detention to meet its share of the storage requirement.

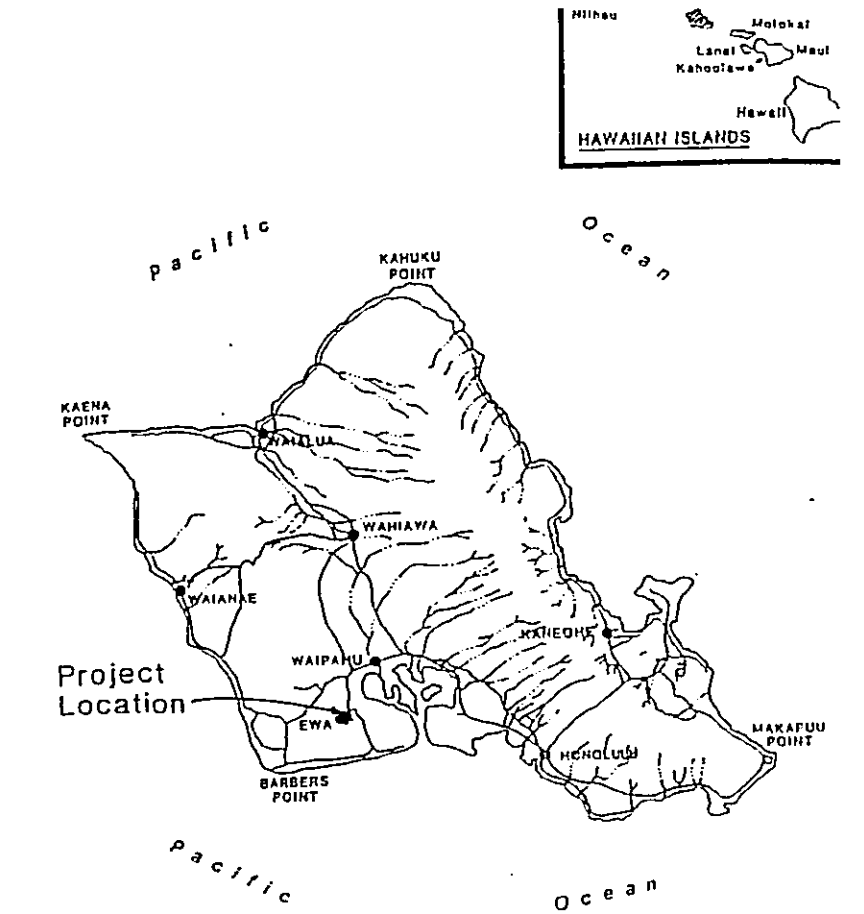


Figure 1-1
Location & Vicinity Map

R. M. Towill Corporation

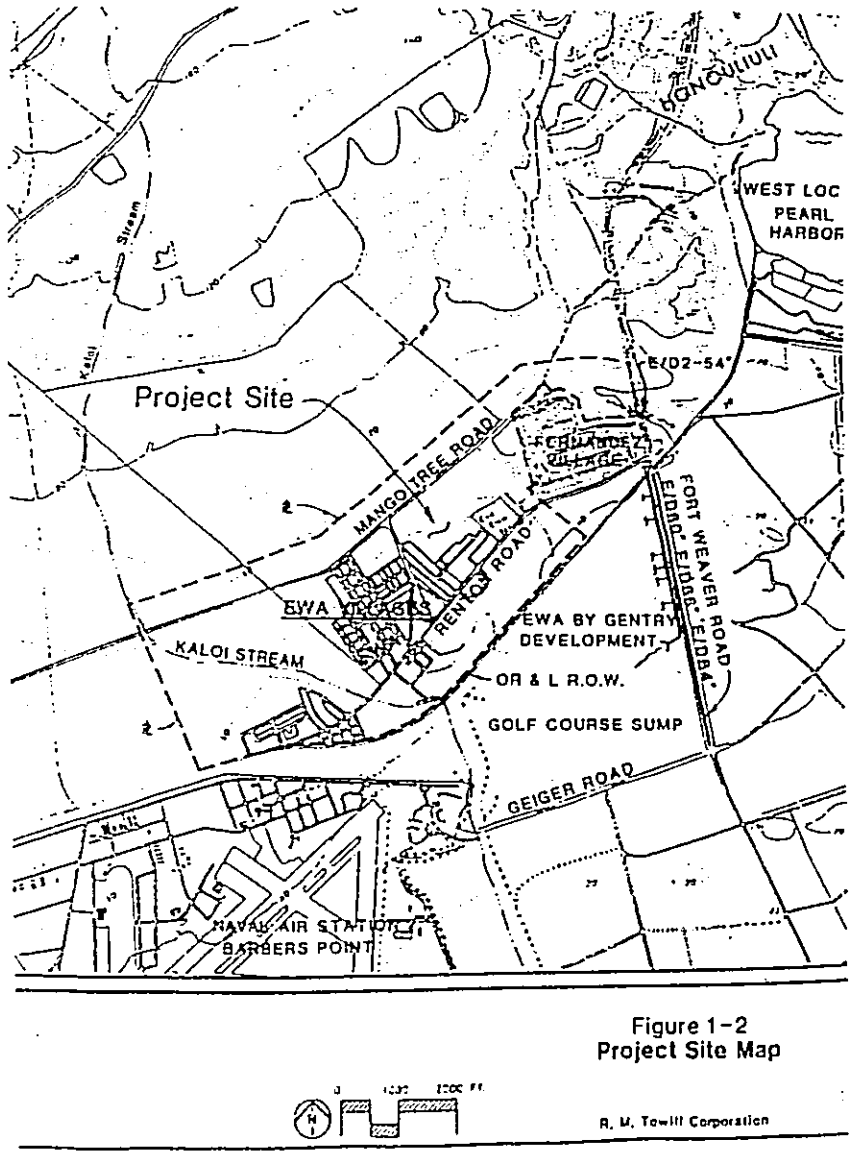


Figure 1-2
Project Site Map

SECTION 2
CRITERIA AND METHODOLOGY

The criteria used in this study are summarized below. The City and County of Honolulu Storm Drainage Standards provide the general requirements.

- Roadway Bridges and Box Culverts
  - Capacity = peak discharge from Plate 6 (Reference 1)
  - Sizing Method
    - Culverts: Inlet/outlet control charts (Reference 15)
    - Bridges: HEC-2 backwater analysis (Reference 12)
    - Freeboard: 5 feet between HGL and top of roadway

- Street Drainage System
  - Capacity = DA > 100 acres: Peak discharge from Plate 6
    DA < 100 acres: 10-year peak discharge or 50-year peak (in sump or tailwater situations) using rational method (Reference 1)
  - Sizing Method = Manning's
  - Minimum Freeboard = 1 foot between HGL and inlet opening

- Golf Course Drainageways
  - Capacity = Plate 6 discharge
  - Sizing Method = HEC-2 backwater analysis

- Golf Course Basins and Spillways
  - Spillway Capacity = Plate 6 discharge
  - Spillway Sizing Method

    Weir lengths approximated using

    $Q = CLH^{3/2}$ (Reference 7)

    C = coefficient
    L = length
    H = head over weir
  - Interim outflow rates (based on Kaloi Gulch Technical Committee Guidelines)

    Limited to small amounts until 60 ac-ft of runoff is stored.

    Limited to the 2-year, 6-hour peak discharge until 300 ac-ft of runoff is stored.
  - Flood Routing Method - HEC-1 Storage Indication Method (Reference 11)

- Hydrographs for Existing and Developed Conditions Peak Flows
  - Rainfall Depths = DLNR R-73 (Reference 10)
  - Runoff Curve Numbers = SCS (Reference 14)
  - Time of Concentration = SCS (Reference 14)
  - Hydrograph Computation = HEC-1

SECTION 3
PRE-DEVELOPED DRAINAGE CONDITIONS

3.1 Study Area Location

The study area is located in Ewa, Oahu, Hawaii, covering portions of Tax Map Keys: 9-1-16:25 and 9-1-17. It is approximately two miles south of Waipahu and 1 mile northeast of the Villages of Kapolei and is on a region of Oahu commonly referred to as the Ewa Plain. The 606-acre site is owned by the City and County of Honolulu. Land uses include residential, schools, park and commercial.

3.2 Climatology

The area receives only a moderate amount of rainfall from the prevailing northeasterly tradewinds. The mean annual rainfall is about 23 inches per year. Most of the rainfall occurs from October through April, during southerly "Kona" storms. In recent years, the "El Nino" pacific meteorological effect has contributed to moister atmospheric conditions.

During the day and early evening hours, the site is relatively warm compared to other locations around Oahu and the state. Late night and early morning periods, however, are generally cooler than other locations. These conditions are a result of the site being in a downwind area of the island. Based on more than 50 years of data collected at the Ewa Plantation, average annual daily minimum and maximum temperatures in the project area are 65°F and 84°F, respectively. Extreme minimum and maximum temperatures were 47°F and 93°F. (Reference 8)

3.3 Topography

The study area is located near the mid- to lower portion of the Kaloi Stream watershed, on the southern slopes of the Waianae Mountain Range. The uppermost portion of the watershed is over 2,200 feet above sea level. At the project site, the average elevation at the lower boundary (OR&L Railroad Right-of-Way) is 39 feet and rises to about 65 feet at the upper boundary (referenced to mean sea level). The site is relatively flat with

slopes varying between 0.7 and 2 percent. The slopes gradually increase to over 5 percent at the H-1 Freeway. Above the H-1 Freeway, slopes increase considerably in mountainous terrain reaching well over 20 percent in the upper watershed areas.

3.4 Soil Type and Ground Cover

The site contains four general soil types as classified by the Soil Conservation Service. These include Honouliuli (HxA and HxB), Waialua (WkA), Waipahu (WzB), and Mamala (Mcn), with Honouliuli being the predominant type. These are clay soils with moderately slow permeability and high shrink-swell potential. In the southwest portion of the site, the clay soils transition to exposed coral deposits.

Soil borings taken during a preliminary geotechnical exploration (Reference 6) revealed that the site is underlain by a layer of medium stiff silty clay over medium dense coral gravel deposits.

Cover conditions within the project site include agricultural, residential, civic and industrial (sugar mill) developments. Patches of fallow sugarcane, brush and weeds fill open spaces between the buildings. Sugarcane is cultivated within and above the project site to the H-1 Freeway. In the mountainous areas above the H-1 Freeway, ground cover consists of thin stand trees and fallow sugarcane fields.

3.5 Pre-developed Drainage Patterns

The drainage areas contributing runoff to Ewa Villages are shown on Figure 3-2). The flat topography between the OR&L Railroad Right-of-Way and Farrington Highway make a clear delineation difficult to determine. For purposes of computing Plate 6 flows, the small ridges of high ground as shown on the topographic maps are used to divide the watershed (USGS 1"=2000' and C&C 1"=200').

The project site is located in two watersheds: Kaloi Stream watershed and West Loch watershed. The West Loch watershed, consisting of subareas S18 to S21 and 27, enters the *northeastern* portion of Ewa Villages and exits through openings at Fort Weaver Road. The openings currently consist of a cane haul road underpass and two 54-inch RCP culverts. The culverts have a capacity of approximately 500 cfs.

The Kaloi Stream enters the western portion of the site and is anticipated as being the primary drainageway in the future. It is a small ditch with a full bank capacity of less than 1,000 cfs. Numerous road crossings further restrict flow to less than 500 cfs in some locations. Overflows are generally not able to return to the channel. Kaloi Stream was used by Oahu Sugar Company (OSCo) to carry irrigation water down to the lower fields and therefore has built-up banks which are higher than the adjacent ground.

Kaloi Stream is gauged above the H-1 Freeway by the U.S. Geological Survey (Gauge No. 16212450 Drainage Area = 1.70 sq. mi).

There are several existing sumps between Farrington Highway and the project site that provide storage of storm runoff. The topography within the Ewa Villages area is relatively flat and ponding has been reported in many areas due to inadequate drainage. The OR&L Railroad Right-of-Way is slightly higher than the ground immediately upstream of it and therefore compound the potential for flooding. A 60-inch culvert is used to pass irrigation flows in Kaloi Stream under the railroad tracks. The capacity of this culvert is estimated at less than 200 cfs.

The 2-year, 10-year, and 100-year discharge estimates into and out from Ewa Villages have been computed for existing conditions. The HEC-1 computations incorporate flow diversions caused by restrictions (e.g., culverts at roadways) as well as flow routing in the natural depressions. The discharges are summarized in Table 5-1.

SECTION 4
PROPOSED DRAINAGE PLAN

4.1 Drainage Plan Concept

The intent of the drainage plan is to control riverine flooding and provide adequate drainage for on-site and off-site generated runoff.

To carry out the plan, "regional" facilities are proposed to address off-site runoff and mitigate flooding from Kaloi Stream. "Backbone" facilities are proposed to address on-site generated runoff and feeds into the regional facilities. The street drainage systems within each of the development parcels which feed the backbone system are referred to as the subdivision systems. Due to the preliminary status of street layouts within these subdivisions, sizing and alignment of these smaller systems are left as design items.

4.2 Regional Drainage System

Flood control along Kaloi Stream and conveyance of major runoff are handled by the regional drainage system. The primary facilities of the regional system include the golf course, Kaloi Stream channel improvements, and roadway bridges and box culverts. Figure 4-1 shows the regional drainage system.

The regional facilities were sized using the criteria in Section 2. HEC-1 analyses were conducted to determine the 2-year, 10-year and 100-year peak flow rates under Interim and Ultimate conditions. Interim conditions refer to the watershed with the areas above Ewa Villages as undeveloped (remain as sugarcane/agriculture). Ultimate conditions assume that the areas above Ewa Villages are reasonably built-out.

The golf course is the main regional facility. It stretches the entire length of the project site and intercepts all incoming mauka flows. The golf course will be excavated in order to convey the City standard Plate 6 peak discharge. Detention basins will be incorporated to help attenuate peak flows and address water quality.

Kaloi Stream will be realigned slightly as part of the golf course and downstream channel improvements. The connection point to the Gentry development is about 350 feet southwest of the present Kaloi channel crossing at the OR&L Railroad Right-of-Way. The invert tie-in to the Gentry development is 26 feet msl.

A 105-foot wide bridge is proposed at the Kaloi Stream/OR&L Railroad crossing. Ninety-foot wide bridges are also proposed at North-South Road and at Renton Road. Each of these bridges are designed to pass the Plate 6 discharge. Interim use basins will be constructed between each of these bridges. Ultimately, an open channel will replace the basins. The channel will consist of rectangular and trapezoidal sections, varying in width between 90 and 110 feet. The channel will be lined with concrete and riprap and is proposed to be maintained by the City.

Overflows from Kaloi Stream above Ewa Villages is expected to flow on the east overbank and enter Ewa Villages from subwatershed S1.

A 20' x 8' box culvert is planned at the top of Kaloi Stream Branch "A" at the northwest corner of the golf course. This culvert is sized to the capacity of the Kaloi Stream channel (approximately 1,000 feet). It is anticipated that this culvert will be expanded in the future to carry the Plate 6 discharge.

A 20' x 8' box culvert/golf cart underpass along Branch "B" at the subdivision "A" Access Road will also be used. It is anticipated that when the mauka lands are developed, a large drainage culvert will be installed at the golf course boundary at subwatershed S7B to carry runoff into Basin 5.

A set of pipe culverts are proposed to pass the 10-year flow beneath relocated Mango Tree Road. These culverts will be temporary until the mauka drainage systems are implemented. A 10-year protection was used as required by the Oahu Sugar Company.

The State Department of Land and Natural Resources (DLNR) required that relocated Mango Tree Road be placed at existing grade. Flows exceeding the 10-year storm will overtop the roadway and enter the golf course. Contouring within the golf course will direct these flows either to Kaloi Stream (Branches "A" or "B") or to West Loch (Fort Weaver Road).

The golf course detention basins and outlets are used to control discharge and provide on-site storage. The storage and outflow requirements are based on the goals of the Kaloi Stream Technical Committee. For the interim period until the Ewa Marina opens the flow capacity, the Committee recommended minimal release of flows from the basins until on-site storage of approximately 60 acre-feet is obtained. Subsequently, the basin outflows are to be limited to the 2-year, 6-hour rate until on-site detention of approximately 300 acre-feet is obtained.

Runoff contributing to West Loch are routed to two basins before entering the two existing 54-inch culverts at Fort Weaver Road. Based on the Fernandez Village HGL of 39 feet, the inlet capacity of these culverts is about 500 cfs. The culverts are not planned to be upgraded at this time since the routed 100-year flow does not exceed the 500 cfs limit.

The golf course is sized with sufficient capacity to pass the Plate 6 flow to Fort Weaver Road, however, improvements will be needed should the mauka areas develop and add runoff to the golf course. The two culverts at Fort Weaver Road may need upgrading. An existing 42-inch water main crossing between Basins 8 and 9 limit the amount of runoff that may leave Basin 8.

Multiple HEC-1 computations were made to size the basins and outlets to allow passage of the 100-year flow while meeting the Technical Committee's recommended storage volumes and controlled outflow rates. The resulting discharges for interim and ultimate conditions are shown on Table 5-1. Flooding from Kaloi Stream will be controlled

ultimately by increasing capacity at the OR&L Railroad right-of-way and excavating drainageways through the golf course.

The FEMA flood map revision that reflects the interim conditions described herein became effective on March 21, 1995 (Reference 16). A request for flood map revision to show the ultimate conditions is planned to be submitted to FEMA in the near future.

4.3 Backbone Drainage System

The backbone system consists of major pipe and box culverts which convey on-site generated runoff from the subdivision systems, as well as a portion of the golf course, to the OR&L Railroad bridge. The middle portion of the golf course below Subdivision "B" does not accept any off-site runoff and is considered a part of the backbone system (rather than part of the regional system). Figure 4-2 illustrates the layout of the backbone drainage system. Drain line and node labels are indicated for cross-referencing with the discharge, invert and HGL data in the appendices.

The backbone system includes facilities sized to convey runoff from the off-site area west of the project site.

SECTION 5
SUMMARY AND CONCLUSION

5.1 Summary

The Ewa Villages project is a 606-acre housing development coordinated by the City and County of Honolulu Department of Housing and Community Development. The plan includes 1,428 single- and multi-family market and affordable residential units, schools, parks, a golf course and commercial and civic facilities. This master plan was prepared to describe the drainage facilities required for this project.

Two drainage systems were described: 1) Regional system for addressing off-site runoff and flood protection and 2) Backbone system for on-site drainage.

The backbone drainage system was sized according to the City's Storm Drainage Standards.

The regional drainage system was sized to pass the City's standard flow and meet the guidelines of the Kaloi Gulch technical committee. Peak discharges for existing, interim and ultimate conditions are summarized on Table 5-1. The flood boundary map is shown as Figure 5-1.

5.2 Conclusion

It is concluded that the proposed drainage systems will adequately serve the proposed project. The regional system improvements will control stream flooding to facilitate development of areas currently in the floodplain. A request for map revision will be made to FEMA to include these drainage improvements. The backbone system, in conjunction with the subdivision system, will provide adequate on-site drainage in accordance with the City's Drainage Standards.

TABLE 5-1
SUMMARY OF DISCHARGES

LOCATION	AREA (acres)	2-YEAR DISCHARGES Existing (cfs)	2-YEAR DISCHARGES Interim (cfs)	2-YEAR DISCHARGES Ultimate (cfs)	10-YEAR DISCHARGES Existing (cfs)	10-YEAR DISCHARGES Interim (cfs)	10-YEAR DISCHARGES Ultimate (cfs)	100-YEAR DISCHARGES Existing (cfs)	100-YEAR DISCHARGES Interim (cfs)	100-YEAR DISCHARGES Ultimate (cfs)	C & C Plate G (cfs)
ALONG KALOI STREAM WATERSHED											
Below Subarea EW50	737 (1)	854	--	--	2,568	--	--	4,842	--	--	2,230
Below Subarea EW70	481 (4)	286	--	--	602	--	--	745	--	--	1,620
Below Subarea EW80	38	13	--	--	80	--	--	124	--	--	85 (3)
Below Subarea EW90	206	187	--	--	319	--	--	458	--	--	870 (3)
Below Subarea EW150	3,651 (2)	832	--	--	842	--	--	860	--	--	--
(Kaloi Stream Channel)											
Box Culvert at Relocated Mango Tree Road (Kaloi Stream Channel)	3,688 (Int.) (2) 3,894 (Ult.) (2)	--	869	--	--	879	--	--	905	--	7,000
Box Culvert at Subdivision "A" Access Road	429	--	222	1,815 397	--	389	3,546 823	--	599	5,863 1,303	7,075 1,450
Renton Road Bridge	4,632	--	1,702	1,722	--	3,339	4,622	--	5,817	7,476	8,350
North-South Road Bridge	4,797	--	1,738	1,767	--	3,403	4,833	--	5,971	7,929	8,500
O.R. & L. Railroad Bridge	4,862	--	1,779	1,833	--	3,485	6,109	--	6,107	8,319	8,800
(Realigned Kaloi Channel)											
Basin No. 1 Outlet	3,816	--	1,424	1,596	--	2,831	3,616	--	4,971	5,826	7,150
Basin No. 2 Outlet	3,978	--	1,447	1,555	--	2,878	3,620	--	5,041	5,988	7,500
Basin No. 3 Outlet	4,589	--	1,690	1,713	--	3,326	4,631	--	5,793	7,469	8,300
Basin No. 4 Outlet	4,632	--	1,702	1,722	--	3,339	4,622	--	5,817	7,476	8,350
Basin No. 5 Outlet	429	--	222	397	--	389	923	--	599	1,303	1,450
Basin No. 6 Outlet	90	--	15	15	--	63	63	--	251	251	200 (3)
Basin No. 7 (Irrigation Lake)	12	no discharge			no discharge			no discharge			--
ALONG WEST LOCH WATERSHED											
Basin No. 8 Outlet	181 (Int.)	--	48	--	--	104	--	--	255	--	--
Basin No. 8 Outlet (Ft. Weaver Rd. Culverts)	238 (Int.) 839 (Ult.)	--	58	-- 732	--	111	-- 1,526	--	335	-- 2,100	-- 2,400

1) Discharges reflect the inclusion of diverted flows from the upper watershed.
2) Includes the drainage areas tributary to the diverted flows.
3) Rational method used since the drainage area is less than 100 acres.
4) Includes 163 acres for Subareas S18, S19, S20 and S21.

LIST OF REFERENCES

1. "Storm Drainage Standards," Department of Public Works, City and County of Honolulu, March 1986.

2. "Soil Erosion Standards and Guidelines," Department of Public Works, City and County of Honolulu, November 1975.

3. "Flood Insurance Study, City and County of Honolulu, Hawaii, Community Number 150001," Volumes 1, 2 and 3, Federal Emergency Management Agency, Federal Insurance Administration, Revised September 28, 1990.

4. "Flood Insurance Rate Map, City and County of Honolulu," Parcels 150001-110C, 150001-130C, 150001-135C, Federal Emergency Management Agency, Federal Insurance Administration, Map Revised September 18, 1990.

5. "Drainage Master Plan for the Gentry - Ewa Project," prepared by Belt Collins and Associates for the Gentry Development Company, Revised February 1991.

6. "Preliminary Geotechnical Engineering Exploration, Ewa Villages, Ewa, Oahu, Hawaii," W.O.2546-00(A), prepared by C.W. Associates, Inc., Dba Geolabs-Hawaii," December 14, 1992.

7. King, Horace W. and Brater, Ernest F., Handbook of Hydraulics, McGraw-Hill Book Co., New York, N. Y., c.1963.

8. "Final Environmental Impact Statement for the Ewa Villages Master Plan, Ewa, Oahu, Hawaii," prepared by R. M. Towill Corporation for the Department of Housing and Community Development, City and County of Honolulu, February 1991.

9. "Kaloi Gulch Technical Committee Interim Report," prepared by Kaloi Technical Committee, April 29, 1993.

10. "Rainfall Frequency Study for Oahu," Report R-73, State of Hawaii, Department of Land and Natural Resources, Division of Land and Water Development, 1984.

11. "HEC-1 Flood Hydrograph Package, Users Manual," Computer Program 723-X6-L2010; U.S. Corps of Engineers, Hydraulic Engineering Center, September 1981 (revised January 1985).

12. "HEC-2 Water Surface Profiles Users Manual," Computer Program 723-X6-L2024, U.S. Army Corps of Engineers, Hydraulic Engineering Center, September 1982.

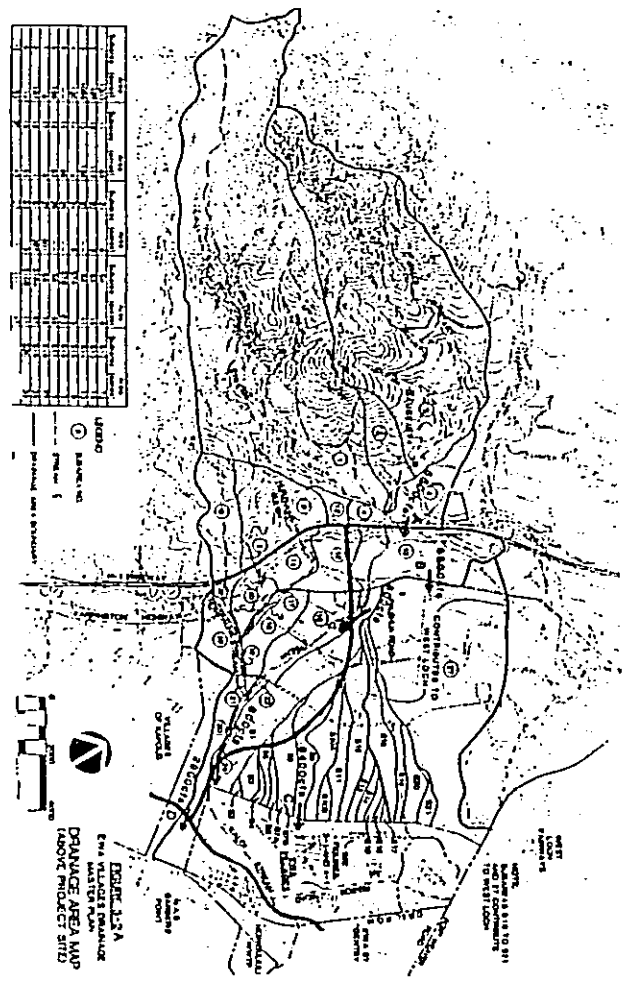
13. "Guidelines for Determining Flood Flow Frequency," Bulletin #17B, Water Resources Council Interagency Advisory Committee on Water Data, U.S. Geological Survey, Department of the Interior, March 1982.

14. "National Engineering Handbook, Section 4, Hydrology," U.S. Department of Agriculture, Soil Conservation Service, PB86-180494, produced by National Technical Information Service, U.S. Department of Commerce, Springfield, Virginia 22161, March 1985.

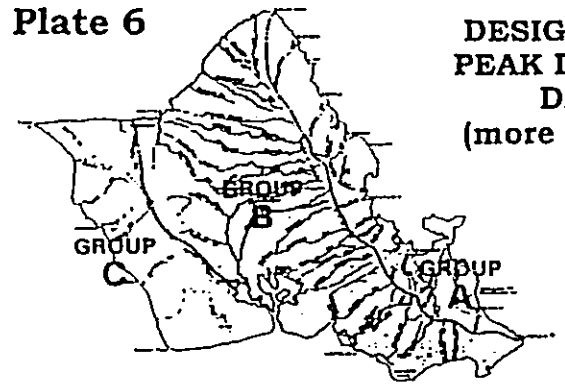
15. "Hydraulic Charts for the Selection of Highway Culverts," U.S. Department of Commerce, Bureau of Public Roads.

16. Federal Insurance Rate map, Letter of Map Revision, effective March 21, 1995, Case No. 95-09-040P, Community No. 150001, Panels 0110C, 0130C and 0135C, Federal Emergency Management Agency.

Plate 6



DESIGN CURVES FOR PEAK DISCHARGE VS. DRAINAGE AREA (more than 100 acres)



* CURVES ARE FOR STREAM CHANNELS AND DRAINAGE STRUCTURES.

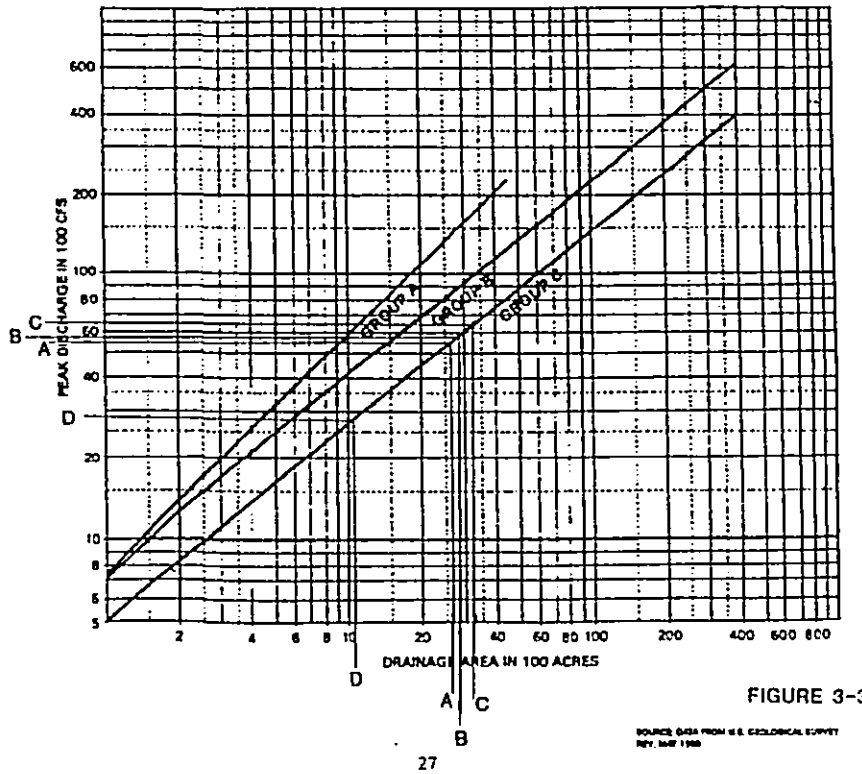
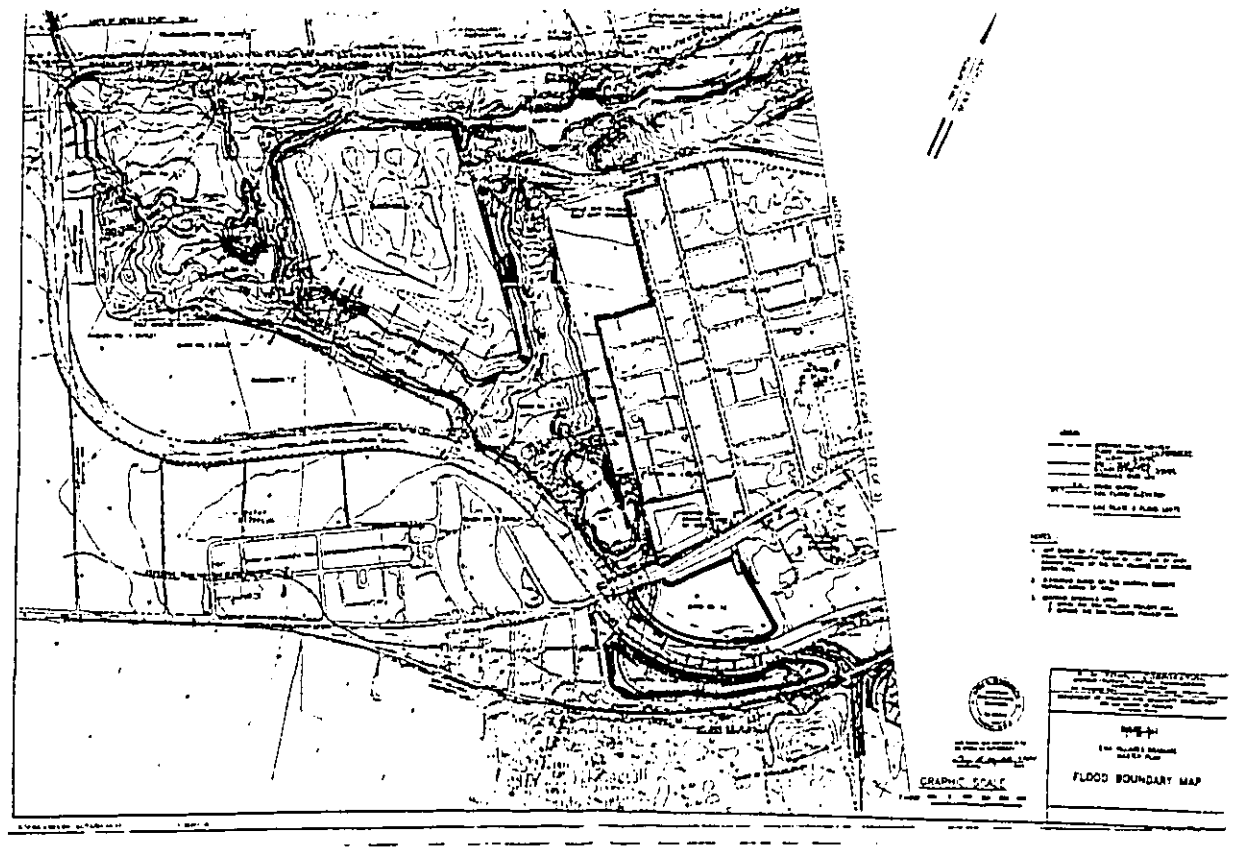
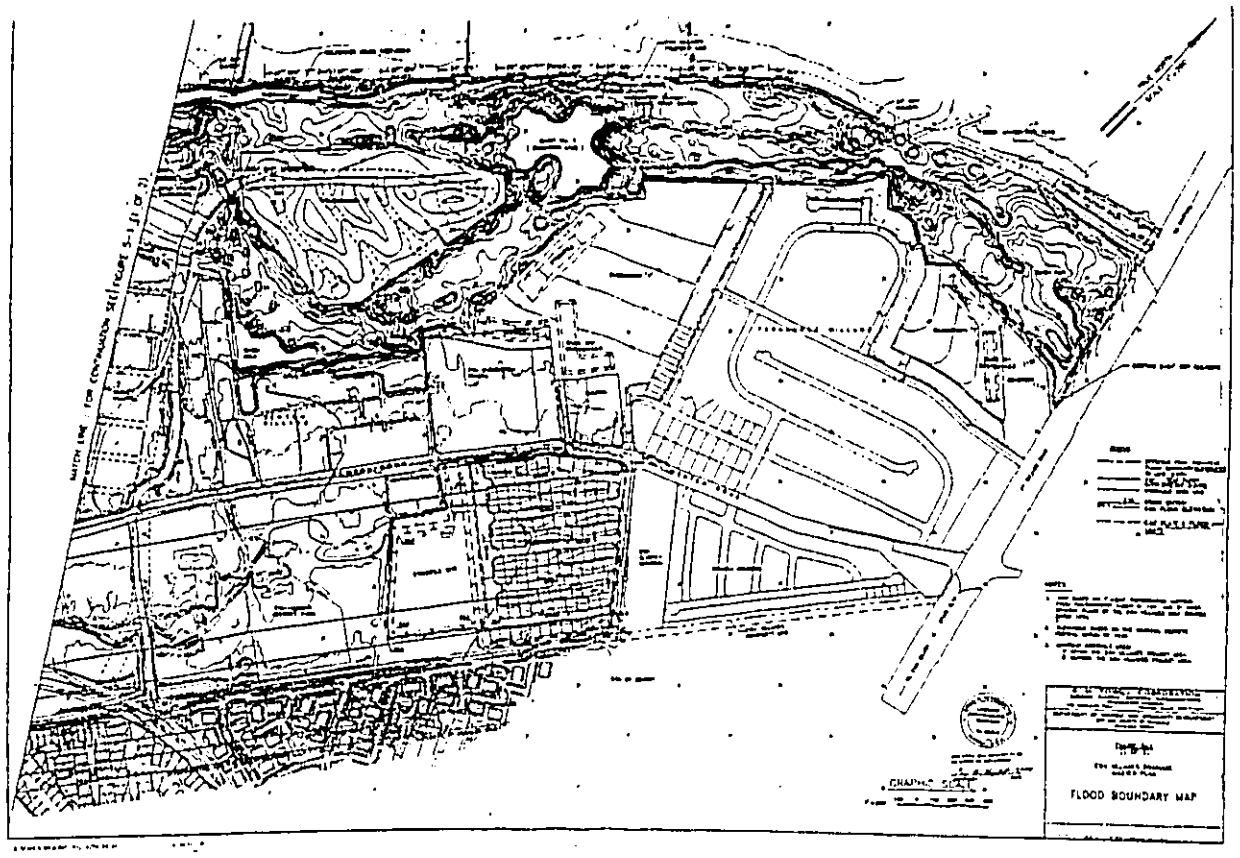
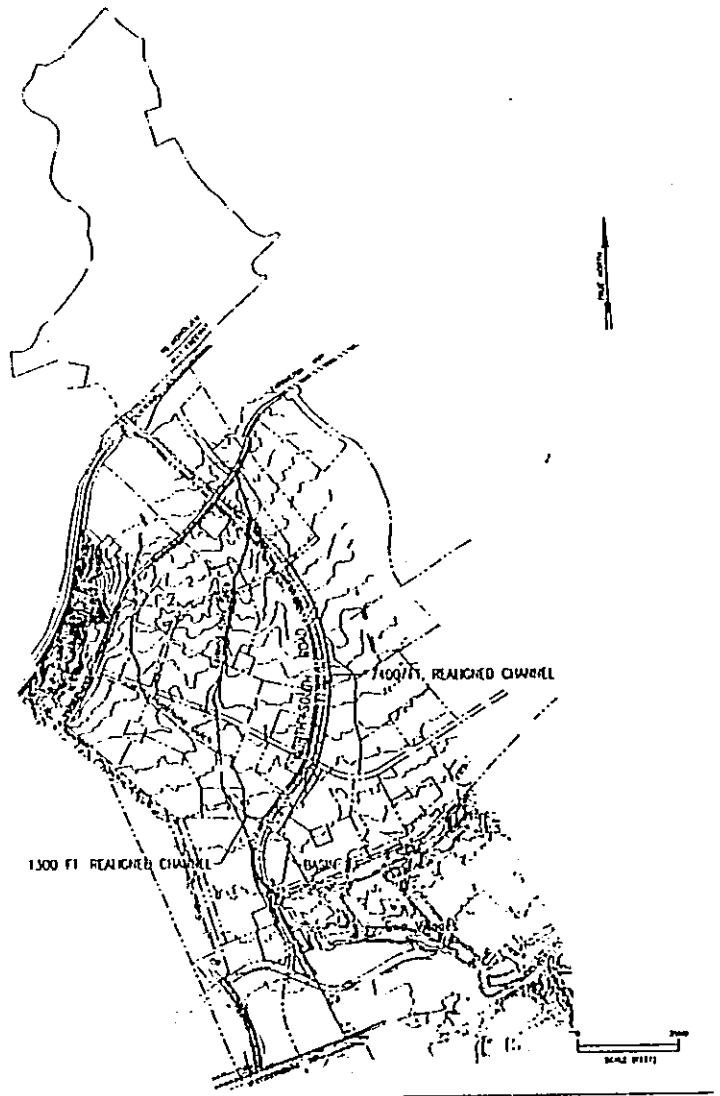


FIGURE 3-3

SOURCE: DATA FROM U.S. GEOLOGICAL SURVEY REP., MAY 1969


GRAPHIC SCALE
FLOOD BOUNDARY MAP


GRAPHIC SCALE
FLOOD BOUNDARY MAP



PARTIAL KALOI GULCH REALIGNMENT

FIGURE 3-4
NORTH-SOUTH ROAD
R.M. TOWILL CORPORATION

APPENDIX B

Kaloi Gulch Technical Committee Reports

KALOI GULCH TECHNICAL COMMITTEE

INTERIM REPORT

June 1993

Committee Members:

Richard Suzuki, Sumio Tano - City and County of Honolulu Dept. of Public Works
Steve Thomas - State of Hawaii Housing Finance and Development Corporation
Greg Hiyakumoto - R.M.Towill Corporation
Tom Nance - Tom Nance Water Resources Engineering
Daniel Hong - Gray, Hong, Bills and Associates, Inc.
Derrick Elfalan - ParEn, Inc. dba Park Engineering
Kay Muranaka, Craig Arakaki - Engineering Concepts, Inc.

KALOI GULCH TECHNICAL COMMITTEE
INTERIM REPORT

Introduction

Development of various projects within the Kaloi Gulch watershed requires coordination of drainage improvements through and between the projects. These drainage improvements must accommodate both the interim and ultimate conditions faced by the developments. Presently, very little surface runoff reaches the makai properties or coastal waters. At full development, however, substantial runoff is expected to flow all the way to the ocean. Estimated runoff quantities at full development based on the City and County Drainage Standards are indicated on Exhibit 1, Ewa District Runoff Map.

The Kaloi Gulch Technical Committee was formed to study the drainage requirements and the water quality issues of the projects and to recommend a coordinated plan for review and consideration by the various developers, that addresses both the interim and ultimate development conditions. The members of the technical committee include the engineers for the privately developed projects, representatives of the State and City projects, and representatives from the Drainage Section of the City and County of Honolulu Department of Public Works.

Background

The Kaloi Gulch watershed extends from the crest of the Waianae Range to the shoreline, encompassing approximately 11 square miles. Proposed development areas within the watershed include: Campbell Estate lands; the State property; the City and County of Honolulu Department of Housing and Community Development's (HCD) Ewa Villages and Laulani projects; Ewa by Gentry; and Ewa Marina by Haseko. The limits of the Kaloi Gulch watershed and the land ownerships within the watershed are also identified in Exhibit 1.

Projects are in various stages of planning, design and construction. The immediate concern is the identification and implementation of an interim drainage plan to facilitate ongoing improvements and mitigate the impact of greater conveyance of surface runoff to low-lying lands.

Conditions Before Urban Development

Prior to development, much of the Kaloi watershed was used for sugarcane cultivation by Oahu Sugar Company (OSCO). Only the steep upper reaches of the watershed, the low lying areas near the shore, and the OSCO residential and mill facilities found between Mango Tree Road and the railroad right-of-way, were not cultivated.

Several subwatersheds converge above the freeway with their combined runoff passing through a large culvert. Between the freeway and Mango Tree Road, Kaloi Gulch is generally a narrow, shallow, unlined ditch with limited capacity. Runoff from larger storms typically overtops the banks and spills into the adjacent cane fields. Additional restrictions are imposed at haul road crossings where culverts allow only minimal flows to pass through without overtopping the channel.

From a short distance above Mango Tree Road to its makai terminus, the Kaloi Gulch channel is man-made and consists of two levees built above existing ground. The channel invert is at or above the adjacent ground. The capacity of the channel through this section is very limited and unable to accommodate large runoff under existing conditions. Runoff spills out of the channel at various places and runs through the cane fields and other areas. Limits of flooding depends on the storm intensity. The natural depressions in the cane fields, along cane haul roads, and other areas also currently act to provide some retention/detention areas for runoff.

The section of the channel from Mango Tree Road to the railroad r-o-w has limited conveyance capacity of about 800 cfs, primarily due to the culvert restrictions at both ends of this section. Its backwater effect causes significant overtopping just above Mango Tree Road with consequent flooding into Ewa Villages.

The lower portion of the channel, which extends from Ewa by Gentry into the Ewa Marina property, is estimated to have a capacity of only 200-300 cfs without overtopping. The man-made channel ends at the makai end of the cane fields approximately 1700 feet from the shoreline. There is no natural definition of a drainageway below the end of the channel. This area of the Ewa Marina site is characterized by scrub brush and kiawe trees. Oneula Beach Park is also located along the shore below the end of the channel.

Current Developments

Development of Ewa by Gentry began in 1988 and has several phases already completed and occupied. Its interim drainage measures include substantial onsite storage for retention/detention and also takes advantage of existing restrictions which limit runoff into the upper end of the project.

The initial improvements for the Ewa Villages are scheduled to begin soon. These improvements would eliminate the flooding of areas to be developed in the project, but the changes to the natural detention/retention features and elimination of flow restrictions will also result in the discharge of higher flows into the Ewa by Gentry project and the makai lands below the Gentry project.

Recognizing the limited downstream capacity of the existing Kaloi Gulch, Ewa Villages and Ewa by Gentry have incorporated detention features within their projects. Both projects have golf courses which serve as the major drainageway through the projects. Although the drainageway through the golf courses is sized

to accommodate the peak runoff, retention/detention of runoff generated onsite during smaller storms is also provided.

Despite incorporation of retention/detention within the Gentry and Ewa Villages projects, continued development will require that additional runoff be discharged into the makai properties prior to construction of full downstream improvements.

Interim Alternatives Considered

The interim period assumes that the Campbell Estate lands and the State of Hawaii property will remain in sugarcane rather than be developed. The end of the interim period will occur when continuous adequate conveyance from Mango Tree Road to a shoreline outlet has been constructed. Reevaluation of drainage requirements will be necessary if the State of Hawaii or the Estate of James Campbell decides to begin development of their properties.

The following alternatives to address interim drainage conditions were considered:

1) No action - each developer would proceed independently.

2) Hold up development until Ewa Marina constructs its marina.

3) Construct a drainage channel of adequate capacity to the ocean immediately.

4) Provide sufficient detention to keep runoff discharges to present levels.

5) Elimination of the present restrictions between Mango Tree Road and the railroad right-of-way and construction of temporary drainage improvements, including increasing the capacity of existing Kaloi channel, to accommodate the resulting higher flows through the interim period.

Discussion of Alternatives

1) Alternative No. 1 may result in interim drainage improvements that are not coordinated, creating problems for adjacent developments. This is the present constraint to development today.

2) Alternative No. 2 would delay proposed developments for an unknown period and would be dependent on Ewa Marina's Development Schedule.

3) Alternative No. 3 is costly, would involve a long review and approval process, and require substantial funding. Pursuing this alternative would also delay present development.

4) Alternative No. 4 would require undesirable large land areas for retention/detention to keep flows to existing levels. In addition, large areas

of cane land would suffer crop damages and excavation of large basins at great expense would be required to provide enough storage volume.

5) Alternative No. 5 would result in more runoff being discharged makai of Ewa by Gentry onto the Lauiani and Ewa Marina properties than currently being experienced which may impact the quality and quantity of runoff discharged. Retention/detention would be implemented by the mauka developments to reduce the flows and improve water quality of runoff being discharged to the makai properties. Temporary improvements below Ewa by Gentry and improvements to Kaloi Gulch would be required to accommodate flows during the interim period.

Recommended Interim Plan

The Committee recommends Alternative No. 5. This recommendation is based on the additional issues listed later in this report being resolved first.

To minimize the potential damages within the Ewa Marina property due to increased runoff, retention/detention features shall be incorporated by all projects. The Ewa Villages plan provides approximately 60 acre-ft of retention and 300 acre-ft of detention. Ewa by Gentry would provide approximately 200 acre-ft of retention and 400 acre-ft of detention. Ewa Villages and Ewa by Gentry would implement permanent detention features within their respective projects. Each project would be responsible for meeting NPDES and water quality requirements and regulations before runoff leaves each project.

An interim drainage channel would be constructed from the makai boundary of the Gentry project to the existing Kaloi Gulch. Protection and impact to the EP27 well would have to be addressed. The required improvements to the existing Kaloi Gulch could consist of excavation below grade, widening of the existing levee system, or a combination of both. Further detailed studies are required to address the various details for a workable plan. Included in these studies would be the determination of the best location for providing additional offsite detention capacity, either in the area above Ewa Villages or some other location.

Since the improvements to Kaloi Gulch channel would be an interim solution, it is proposed that the capacity of the channel be sized for runoff from a 10-year storm under interim land use conditions. The channel improvements would be designed to direct overflow from larger storms away from the existing residences and to the west side of the gulch. The actual details of the Kaloi Gulch improvements would be addressed during the design process.

Implementation Steps

1. Interim report to be distributed by the Public Works Department for review and comments by affected developers.

2. Resolution of additional issues.

3. Perform detailed studies.

4. Preparation and approval of Plans for Interim Improvements.

5. Construction of Interim Improvements.

Ultimate Improvements

The major drainageway through the projects must be able to accommodate the peak flow as defined by Plate 6 of the Storm Drainage Standards of the Department of Public Works. Improvements through each project and mitigating impacts on water quality mandated by Federal, State or County laws, regulations, and standards are the responsibility of each project. Interface of the major drainageway shall be coordinated to a mutually agreeable solution. Issues such as connection location and inverts would be included in these coordination efforts.

Permanent detention facilities would be incorporated within each project to improve runoff water quality. Each project would be responsible for compliance with requirements of the NPDES permit and related water quality regulations.

Additional Issues

The committee has focused its attention on technical engineering issues related to drainage through the Kaloi watershed and its recommendations are based on engineering principles. The committee did not attempt to resolve nontechnical issues, but recognizes the need to resolve these issues before the recommended drainage improvements can be implemented. These include:

1) Responsibility for sugar cane crop damage;

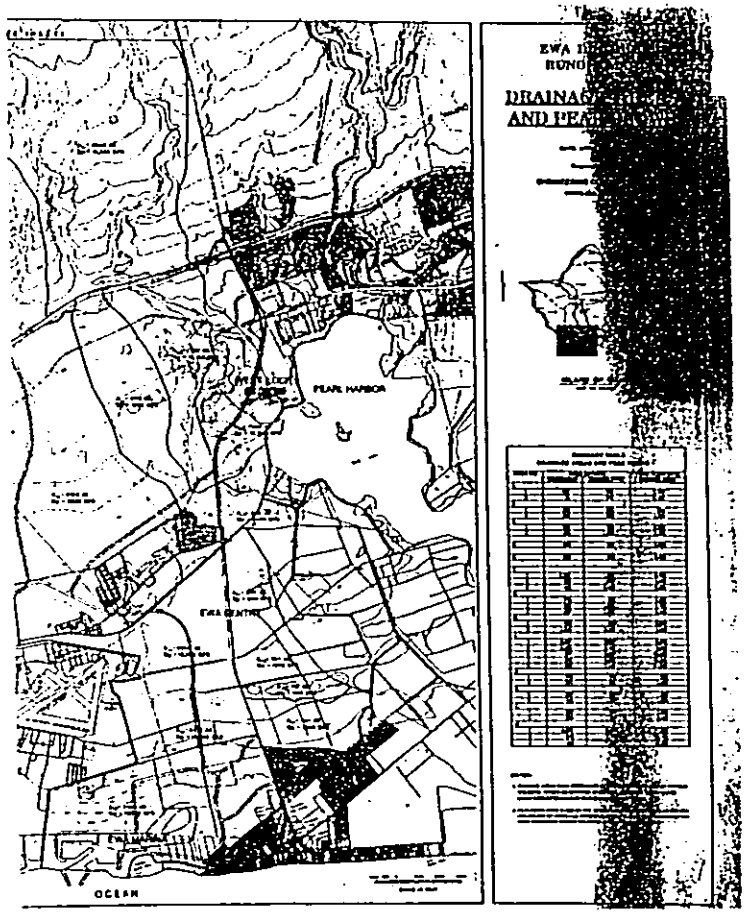
2) Responsibility for the design and construction of interim drainage improvements;

3) Maintenance of interim drainage improvements;

4) Responsibility for potential damages due to increased flows.

5) Maintenance of ultimate improvements.

6) Responsibility of water quality controls.



DEPARTMENT OF PUBLIC WORKS

CITY AND COUNTY OF HONOLULU

DIVISION OF ENGINEERING

JEREMY HARRIS
MAYOR

JONATHAN K. SHIMADA, P.E.
DIRECTOR

'97 OCT 15 P2:04

REFERRED TO

TECHNICAL SOLUTION FOR POTENTIAL FLOODING IN THE KALOI GULCH DRAINAGE BASIN

September 18, 1997

A. MEMBERS

NAME	COMPANY/REPRESENTS
Craig Arakaki	Engineering Concepts, Inc./Ewa-Makai West, Gentry
Marvin Fukagawa	Department of Public Works/City
Greg Hiyakumoto	R. M. Towill Corporation/Ewa Villages
Daniel Hong	Gray, Hong, Bills & Associates,Inc./Haseko
Felix Limtiaco	Limtiaco Consulting Group/Haseko
Kay Muranaka	Engineering Concepts, Inc./Campbell Estates
Tom Nance	Tom Nance Water Resource Engineering/Gentry & Coral Creek Golf Course
Richard Suzuki	Department of Public Works/City
Melvin Takakura	Department of Public Works/City
Dennis Toyama	Department of Public Works/City
James Yamamoto	R. M. Towill Corporation/State

B. BACKGROUND

As a follow up to the September 4, 1997 meeting involving the City and developers within the Kaloi Gulch Drainage Basin, a technical group was formed to derive a technical solution for potential flooding in the Kaloi Gulch Drainage Basin. The group was given until September 18, 1997 to prepare recommendations.

As experienced in November 1996, flooding of the Ewa Villages project in the Kaloi Gulch Drainage Basin occurred due to the lack of an outlet to the ocean. Developments are presently required to provide retention basins for the storage of storm water runoff within their respective projects. During time of heavy-storms, the volume of the storm water runoff may exceed the storage capacity of the retention basins and cause flooding in the area, as occurred in the November 1996 storm. As such, it is the intent of this technical group to derive a plan to pass runoff to the ocean to provide a degree of flood protection for the existing developments.

As a starting basis, the group was faced with the following timelines:

1) Passing of 1,200 cfs to the ocean by January 1998.
2) Passing of 2,500 cfs to the ocean by January 2000.
3) Passing of 11,500 cfs to the ocean by the year 2005.

C. TECHNICAL SOLUTION

In developing the Kaloi Gulch Drainage Basin the following conditions were derived at for the stated timelines.

1) The maximum allowable hydraulic grade line within Haseko's basin will be limited to an elevation of 11 feet.

2) The access road to Oneula Park shall be raised and berms installed within Oneula Park to convey 2,500 cfs from Haseko's basin to the ocean and to protect the existing Ewa Beach residences.

3) The overflow weir elevation from Haseko's 15 acre retention basin (invert = 3 feet) to Oneula Park will be set at an elevation of approximately 8.5 Feet. Measures to convey the overflow to Oneula Park shall be designed to protect the existing Ewa Beach residences.

4) The channel invert at the Haseko/Ewa-Makai West interface will be set at an elevation of 15 feet. The channel within Haseko's property shall be designed to convey 1,200 cfs with freeboard capacity of 2,500 cfs and maintaining a hydraulic grade line of 19 feet as shown in Exhibit A.

5) The channel invert at the Ewa-Makai West/ Gentry interface will be set at an elevation of 14 feet. The channel within Ewa-Makai West property shall be designed to convey 1,200 cfs with a freeboard capacity of 2,500 cfs as shown in Exhibits A and B. Any modifications to the channel will require the approval of all parties involved in this agreement.

6) Man-made diversion of storm water runoff to the west of the existing Kaloi Gulch berms shall not be allowed.

7) At the Ewa Villages/Gentry interface a drainage structure designed to convey 2,500 cfs shall be constructed.

8) Each property owner will be responsible for the design and construction of all necessary improvements on their respective property.

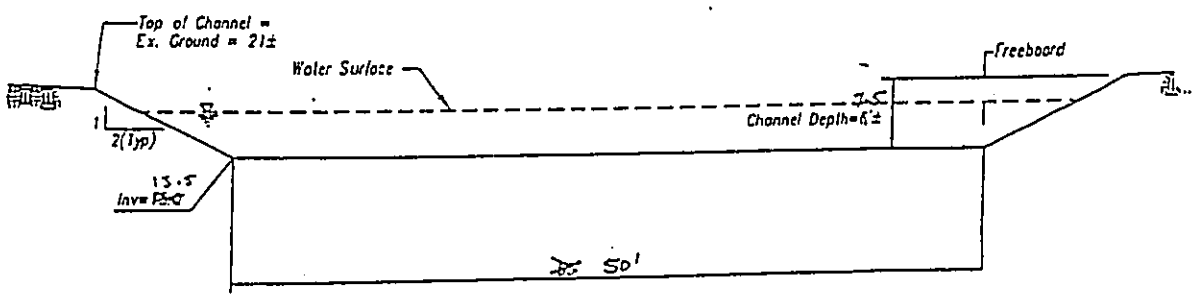
The passing of 11,500 cfs will take place tentatively at the year 2005 to provide a permanent outlet to the ocean, unless otherwise noted.

D. SUBMITTED

We the undersigned acknowledge and agree to the conditions presented herein and fully endorse this technical solution.

Division of Engineering Department of Public Works City and County of Honolulu (Coordinator)	9/19/97 Date
Engineering Concepts, Inc. (Ewa-Makai West by Gentry) Subject to our letter dated 9/19/97	9/19/97 Date
R. M. Towill Corporation (Ewa Villages) Subject to letter dated 9-19-97	9-22-97 Date
Gray, Hong, Bills & Associates, Inc. (Haseko)	9-18-97 Date
Engineering Concepts, Inc. (Campbell Estates) Subject to our letter dated 9/19/97	9/19/97 Date
Tom Nance Water Resource Engineering (Gentry and Coral Creek Golf Course) SUBJECT TO MY ATTACHED LETTER OF SEPT. 23, 1997	Oct. 6, 1997 Date
R. M. Towill Corporation (State) Subject to our letter dated 9-19-97	9-22-97 Date

cc: · All Participants



CHANNEL SECTION

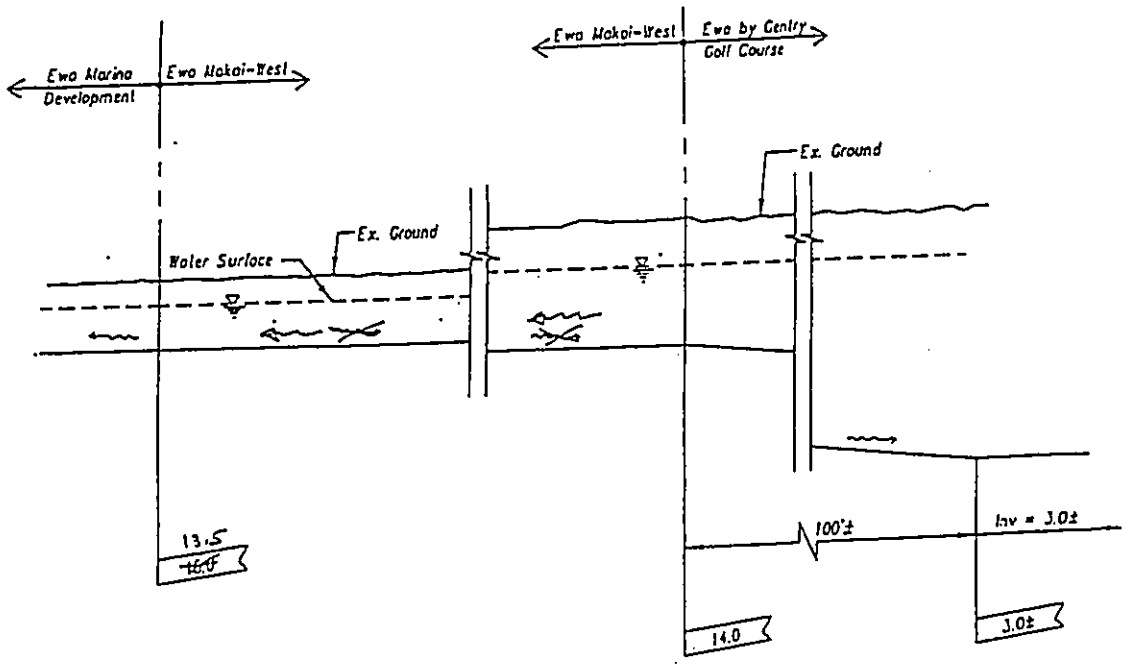
Scale: 1"=10'-0"

Slope=0.20%

Q (cfs)	Water Surface Elevation	Freeboard (ft.)
1200	18.0	X 3
~~1500~~ 2500	21.0	0

EXHIBIT A

KALOI GULCH
EXHIBIT A



PROFILE

Scale: 1"=10'-0"

EXHIBIT B

KALOI GULCH
EXHIBIT B

Technical Memorandum
Kaloi Gulch Interim Drainage Plan for North-South Road, Phase 1, Kapolei Parkway to Farrignton Highway

DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET • HONOLULU, HAWAII 96813
TELEPHONE: (808) 523-4414 • FAX: (808) 527-6743 • INTERNET:

MAYOR'S OFFICE
DEPT. OF TRANSPORTATION
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'02 JUN 13 P

JEREMY HARRIS
MAYOR

RANDALL K. FUJIKI, AIA
DIRECTOR
LORETTA K. DESIGN BRAN
DEPUTY HIGHWAYS DIVI
DEPT. OF TRANSPO

2002/ACT-04-144 (sn)

June 6, 2002

JUN 10 7 25 AM '02

Mr. Brian K. Minaai, Director of Transportation
State of Hawaii
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813-5097

Dear Mr. Minaai:

Technical Memorandum, Kaloi Gulch Interim Drainage Plan, North South Road
Phase 1, Kapolei Parkway to Farrington Highway (HWY-DS 2.6179)

This is in response to your letter of April 10, 2002, regarding a proposed technical memorandum for hydrology for the Kaloi Gulch Interim Drainage Plan.

We have reviewed the technical memorandum and its addendum, which was submitted by R.M. Towill Corporation on May 24, 2002.

As submitted, the interim drainage plan for Phase 1 of the North South Road Project is acceptable.

Should you have any questions, please call Scott Nakamatsu of our Site Development Division at 527-6247.

Sincerely yours,

RANDALL K. FUJIKI, AIA
Director of Planning and Permitting

RKF:ky
[151393]
cc: R. M. Towill Corporation

HWY-DS 2.6179

APR 10 2002

Mr. Randall Fujiki, Director
Department of Planning and Permitting
City and County of Honolulu
650 South King Street, 7th Floor
Honolulu, Hawaii 96813

Attention: Mr. Bob Sumitomo

Dear Mr. Fujiki:

Subject: Technical Memorandum, Kaloi Gulch Interim Drainage Plan, North South Road Phase 1, Kapolei Parkway to Farrington Highway, Hydrology for the Interim Drainage Plan, Kapolei, Oahu, Hawaii

We are pleased to submit the enclosed Technical Memorandum describing our proposed Hydrology for the Kaloi Gulch Interim Drainage Plan for your concurrence. Your expeditious review and concurrence will facilitate the continuation of the permitting and design of the North-South Road project.

A response by April 26, 2002 would be greatly appreciated.

Should you or your staff have any questions please call Craig Watanabe at 692-7551, Technical Design Services Office, Design Branch, Highways Division.

Very truly yours,

BRIAN K. MINAAI
Director of Transportation

Enclosure.

c: R.M. Towill (G. Hiyakumoto)

bc: HWY-DS (CW)
HWY-DH (FN)
DEP-P

CW:tk

TECHNICAL MEMORANDUM

KALOI GULCH INTERIM DRAINAGE PLAN - NORTH-SOUTH ROAD PHASE 1, KAPOLEI PARKWAY TO FARRINGTON HIGHWAY
HYDROLOGY FOR THE INTERIM DRAINAGE PLAN

DATE SUBMITTED: March 7, 2002
PROJECT: NORTH-SOUTH ROAD
PREPARED BY: R. M. Towill Corporation
PREPARED FOR: Department of Transportation, State of Hawaii

Purpose

This Memorandum describes the proposed the interim drainage plan hydrology of Kaloi Gulch that will be used in the North-South Project.

Background

The original North-South Road drainage system was integrated into the Housing and Community Development Corporation of Hawaii (HCDCH) East Kapolei Project's Drainage System for Kaloi Gulch. Due to the change in the housing market, the HCDCH has deferred the development of their East Kapolei Project. The date when the proposed East Kapolei development will proceed is indeterminate at this time.

The Department of Transportation (DOT) of the State of Hawaii intends to continue with the planning and design of the North-South Road Project and construct the road prior to the re-start of the East Kapolei Project. An interim drainage plan for Kaloi Gulch is required to design and construct the North-South Road until the drainage improvements for the proposed East Kapolei Project are completed.

Interim Drainage Plan

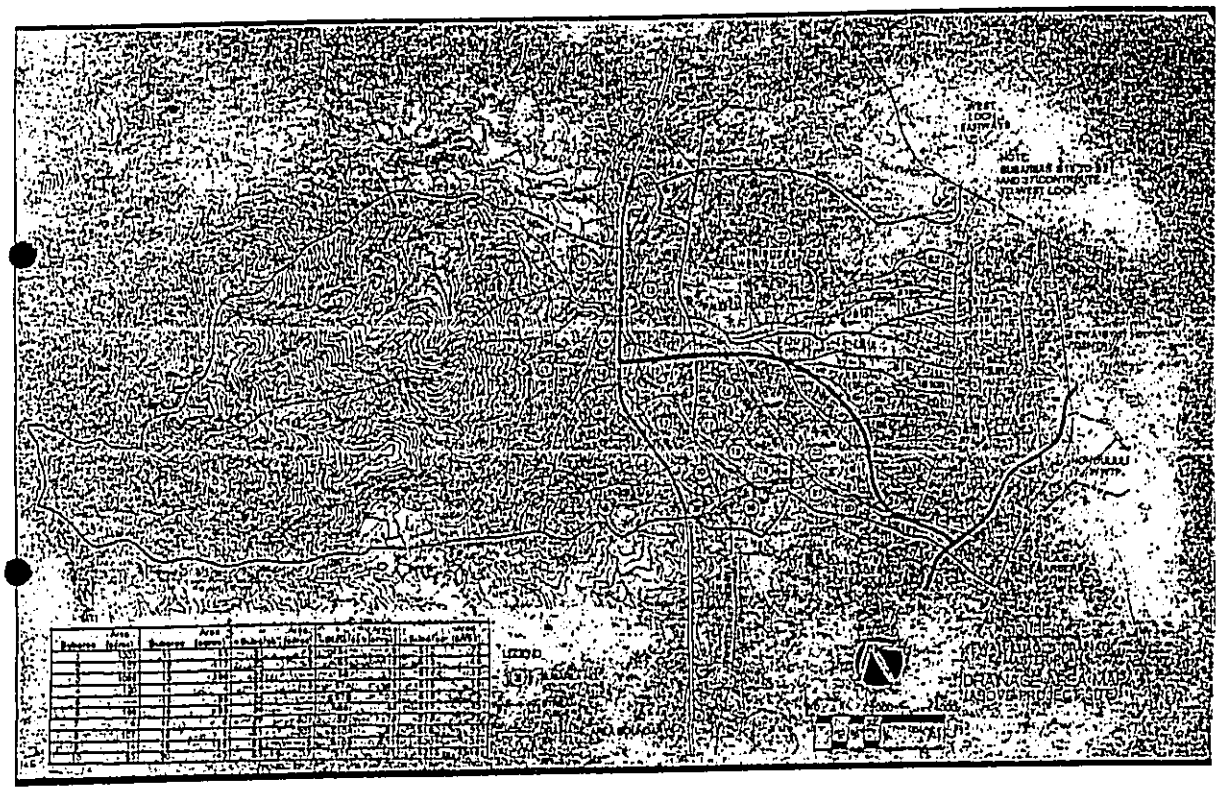
The North-South Road will cross Kaloi Gulch approximately 2,500 feet south of Farrington Highway. The road grade will be higher than the existing grade of the gulch. Most of the Kaloi Gulch storm runoff will flow to the east of the North-South Road and the rest will flow within the stream channel to the west. A culvert will be constructed to allow the North-South Road to cross the Gulch to maintain the Kaloi Gulch streambed and allow runoff to flow from east to west. The culvert will be sized to convey the flow determined by the interim drainage plan hydrology. The remainder of the runoff on the east side of the North-South Road will be conveyed within a channel sized for 2,500 cubic feet per second (cfs) according to the Interim Agreement of the Kaloi Gulch Flood Task Force or sheet flow to the boundary of the Ewa Villages Golf Course. A second culvert is required where Kaloi Gulch once again crosses the North-South Road at the northwest corner of the Ewa Villages which is the Kaloi Gulch entrance to the Golf Course. This

culvert will be sized to convey the remainder of the flow for the drainage basin, Subarea but will be restricted during the interim until the regional drainage system for Kaloi Gulch is resolved. A detention basin sized for the increase in runoff generated by the North-South Road project will be constructed at the Kaloi Gulch entrance to the Ewa Villages Golf Course. A new box drain will be constructed to discharge the storm runoff into the Ewa Villages Golf Course.

Interim Drainage Plan Hydrology

The proposed interim drainage plan hydrology to be used for the North-South Road drainage analysis is based on the existing drainage patterns defined in the Ewa Villages Drainage Master Plan. The existing drainage patterns are shown on Figure 3-2 (attached) of the Ewa Villages Drainage Master Plan. Figure 3-2 shows that Subareas 1 - 4, 13, 14, 22, 24 and S1 - S17 drain into the Ewa Villages Golf Course from within or from the east side of Kaloi Gulch. The runoff is sheet flowing to the Golf Course except for the flow within the stream channel.

The proposed North-South Road culvert at the Kaloi Gulch crossing will convey the flow calculated in the Ewa Villages Drainage Master Plan for the stream channel. The calculated channel flow is 800 cfs. This flow will be allowed to pass under the North-South Road at the second culvert near the Golf Course. The remainder of the flows calculated for Subareas 1 - 4, 13, 14 and S2 - S17 will remain in the east side of the North-South Road and flow within the 2,500 cfs channel to the proposed basin or sheet flow to the Ewa Villages Golf Course. Subareas 15, 22, 24 and S1 will be restricted from flowing to the Golf Course by restricting the flow of the second culvert to the calculated channel capacity of 800 cfs. The ultimate capacity of the culvert will be sized to drain subareas 5 - 12, 15 - 21, 23, 25 and 26.



APPENDIX K

HAZARDOUS MATERIALS TECHNICAL REPORT

NORTH-SOUTH ROAD CORRIDOR STUDY
Ewa, Oahu, Hawaii
Project No. HWY-0-01-92

HAZARDOUS MATERIALS TECHNICAL REPORT

September 1997

PB 100 YEARS

PARSONS BRINCKERHOFF *KAKU ASSOCIATES* *R.M. TOWILL CORPORATION*

NORTH-SOUTH ROAD CORRIDOR STUDY
Ewa, Oahu, Hawaii
Project No. HWY-0-01-92

Hazardous Materials Technical Report

Prepared for:

State of Hawaii
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

City and County of Honolulu
Department of Transportation Services
Pacific Park Plaza
711 Kapiolani Boulevard, Suite 1200
Honolulu, Hawaii 96813

Submitted by:

Parsons Brinckerhoff Quade & Douglas, Inc.
Pacific Tower, Suite 3000
1001 Bishop Street
Honolulu, Hawaii 96813

September 1997

PBQD Reference: 16218A - Product 8.4A

Table of Contents

List of Figures

1. INTRODUCTION

The Federal Highway Administration (FHWA) and the Highways Division of the State of Hawaii Department of Transportation (SDOT) are proposing to construct North-South Road, a divided multi-lane arterial, in Ewa, Oahu, Hawaii (see Figure 1). The roadway would connect the H-1 Freeway with a future segment of Kapolei Parkway, a distance of approximately 3.6 km (2.2 miles). The proposed project also includes a North-South Road interchange with the H-1 Freeway.

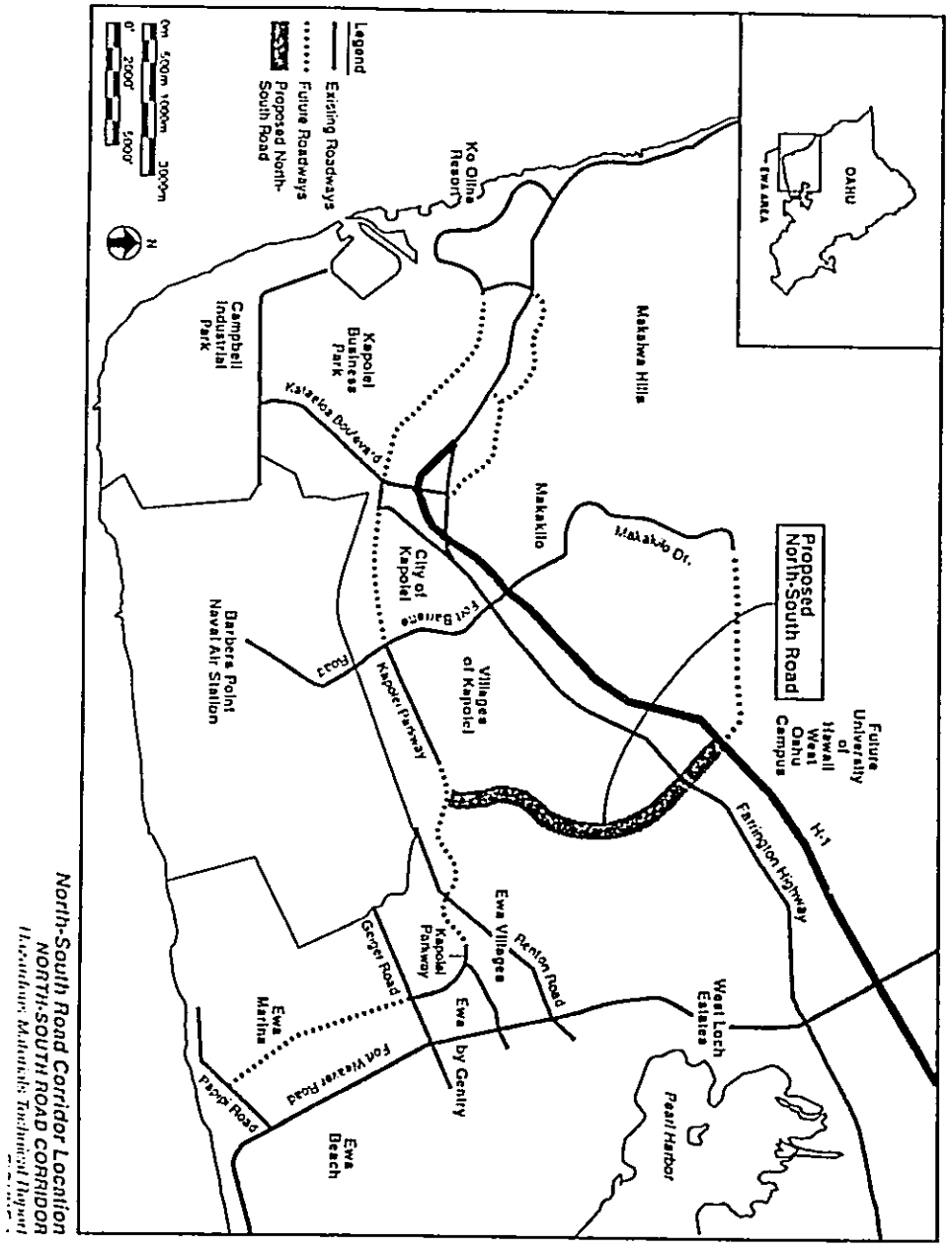
This Hazardous Materials Technical Report resembles a Phase 1 site assessment in that it identifies reported and obvious potential hazardous material conditions that may affect the construction of the proposed project. This assessment does not provide a definitive determination of the actual presence or absence of contamination, and would not meet "innocent landowner" provisions under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) that establish a defense for the purchase of real property. It does not report the presence of asbestos-containing material, lead-based paint, and radon, and does not guarantee, imply, or assert that all potential contaminant sources have been located because of the possible presence of unlisted contaminant occurrences.

2. ASSESSMENT METHODOLOGY

The study area for the environmental site assessment extends laterally east and west from the centerline of the proposed North-South Road to a maximum distance of 1,600 m (one mile).

This report includes:

- Review of federal and State environmental databases that report potential contaminant sources. The database search was conducted by Environmental Database, Inc. (EDI), in accordance with the American Society for Testing and Materials (ASTM) standards for environmental site assessments (E1527-93).
- Review of State of Hawaii Department of Health (SDOH) files on sites identified in the database search and on sites identified from site reconnaissance (see below).
- Review of historic maps of the project area to identify past land uses.
- Review of available historic aerial photography of the project area to identify past activities.
- Review of existing reports of the area that describe land uses, geology, hydrogeology, contaminant occurrences, and other information that may be used to assess the potential occurrence of hazardous materials along the alignment.
- A site reconnaissance to confirm listed potential contaminant source locations and identify additional unlisted potential contaminant sources.



North-South Road Corridor Location
NORTH-SOUTH ROAD CORRIDOR
Hazardous Materials Technical Report

3. ENVIRONMENTAL SETTING

The project site is located on the eastern end of the Ewa plain within the coastal plain. The coastal plain consists of ancient coral-algal reefs interbedded with thin layers of alluvial and marine sedimentary deposits, and is referred to as caprock. These layers are built atop the basalt core of the Waianae Volcanics. Worldwide climatic changes and isostatic adjustments led to large fluctuations in the mean sea level resulting in this layered structure.

U.S. Geological Service borings located 160 m (525 ft.) northwest and 480 m (1575 ft.) southeast of the project area mauka of Ewa Villages encountered groundwater at 26 m (84 ft.) and 23 m (75 ft.). Groundwater underlying the project area occurs in two aquifers. The caprock aquifer is generally too saline for potable use and is used mainly for irrigation and industrial purposes. The caprock aquifer is recharged by rainfall, stream infiltration, seawater intrusion, irrigation return and basaltic aquifer leakage.

The basal aquifer belongs to the Southern Oahu Basal Aquifer, which is an EPA designated Sole Source Aquifer. It is part of the Pearl Harbor aquifer sector and serves as one of the main sources of drinking water for Oahu's population. The freshwater in the basal aquifer is recharged in the Waianae Mountains and the central plain by direct rainfall, infiltration of stream runoff and irrigation water.

The general direction of groundwater flow in the Ewa area is southward from the central plain to the coastline.

4. EXISTING CONDITIONS

4.1 Database Search

The databases that were searched and the results are described below:

1. Federal National Priorities List (NPL)/Superfund Sites. This database lists those sites that pose an immediate public health hazard and where an immediate response to the discovery was necessary. These sites are also found in the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) database, known as CERCLIS. This database, prior to this study, was last updated on September 30, 1995. The NPL database search did not identify any sites within 1,600 m (one mile) of the proposed North-South Road.

2. CERCLIS Sites. These sites are usually abandoned or inactive hazardous substance sites that are under review by the U.S. Environmental Protection Agency (EPA) to determine the extent of public health hazard. This database, prior to this study, was last updated on September 30,1995. The CERCLIS database search identified one site within 1,600 m (one mile) of the proposed North-South Road.

3. Emergency Response Notification System (ERNS) Sites. The ERNS database lists reports filed by local emergency response agencies, such as fire and police departments, county agencies, state agencies, and federal agencies that respond to

hazardous material release situations. This database, prior to this study, was last updated on March 31, 1996. The ERNS database search did not identify any sites within 1,600 m (one mile) of the proposed North-South Road.

4. Resource Conservation and Recovery Act (RCRA) Treatment, Storage, or Disposal (TSD) Facilities. These sites have permits to treat, store, dispose, or transport RCRA Subtitle C hazardous wastes. This database, prior to this study, was last updated on November 31, 1995. The TSD database search did not identify any sites within 1,600 m (one mile) of the proposed North-South Road.

5. RCRA Generator Facilities. The sites listed on this database have EPA identification numbers identifying them as managers of generated hazardous waste as defined by RCRA. These sites include:
   - conditionally exempt small quantity generators (CESQG) that produce less than 100 kilograms per month (kg/month) of hazardous waste or store less than 1,000 kg of hazardous waste;
   - small quantity generators (SQG) that produce more than 100 kg/month, but less than 1,000 kg/month of hazardous waste; and
   - large quantity generators (LQG) that produce more than 1,000 kg/month of hazardous wastes.

   This database, prior to this study, was last updated on November 31, 1995. The RCRA database search did not identify any sites within 180 m (600 feet) of the proposed North-South Road.

6. State of Hawaii Landfills. The sites listed on this database accept solid wastes, and are either active or closed. This database, prior to this study, was last updated on November 15, 1995. This database search did not identify any sites within 800 m (one-half mile) of the proposed North-South Road.

7. Registered Underground Storage Tanks (RUST) Sites. These sites have a registered underground storage tank on site. The majority of these tanks store petroleum products. This database, prior to this study, was last updated on February 23, 1995. The RUST database search did not identify any sites within 180 m (600 feet) of the proposed North-South Road.

8. Leaking Underground Storage Tanks (LUST) Sites. These sites have reported release of stored product, usually petroleum hydrocarbons. This database, prior to this study, was last updated on January 13, 1994. The LUST database search did not identify any sites within 800 m (one-half mile) of the proposed North-South Road.

9. Permit Compliance System (PCS) Sites. The PCS supports the National Pollutant Discharge Elimination System under the Clean Water Act. This database, prior to this study, was last updated on September 1, 1992. The PCS database search did not identify any sites within 400 m (one-quarter mile) of the proposed North-South Road.

4.2 State of Hawaii Department of Health Files Review

The federal and State environmental database searches identified only one CERCLIS site, Ewa Sugar Mill/Oahu Sugar Company, Inc. This record consisted of three locations that are labeled 1a, 1b and 1c as shown on Figure 2.

Data from the SDOH was obtained for the site identified in the database search and other sites that may potentially affect the project. The type of data reviewed consisted of tank registration reports, documented environmental violations, general extent of contamination at the site, types of contaminants identified, contaminant concentrations detected, and status of remedial actions.

A Preliminary Assessment of Ewa Sugar Mill/Oahu Sugar Company, Inc. (1992) was reviewed at the SDOH Office of Hazard Evaluation and Emergency Response. This report indicated that there are three locations of concern: the Ewa Sugar Mill (Site 1a); a pesticide storage, mixing and loading area located 1.9 km (1.2 miles) northwest of the sugar mill (Site 1b); and a coral pit located 2.9 km (1.8 miles) to the south of the sugar mill (Site 1c).

Some hazardous substances may have been used at the sugar mill's laboratory. The sugar mill was gradually demolished between 1973 and 1983. Records were lost when ownership was transferred to the Oahu Sugar Company from Ewa Plantation Company.

The pesticide mixing, storage and loading area is located in former sugarcane fields close to the proposed alignment. It was first used in 1953 until probably 1972. A statewide study of pesticide mixing sites concluded that there was a strong likelihood of groundwater contamination from discharge at the mixing site. A study by the University of Hawaii and the Hawaii State Department of Agriculture in 1990 (Miles et. al., 1990), confirmed that soil in the area was contaminated with residues of common pesticides used by Oahu Sugar Company. Wells in the area in both the caprock and basal aquifers also showed traces of pesticides such as atrazine in the groundwater.

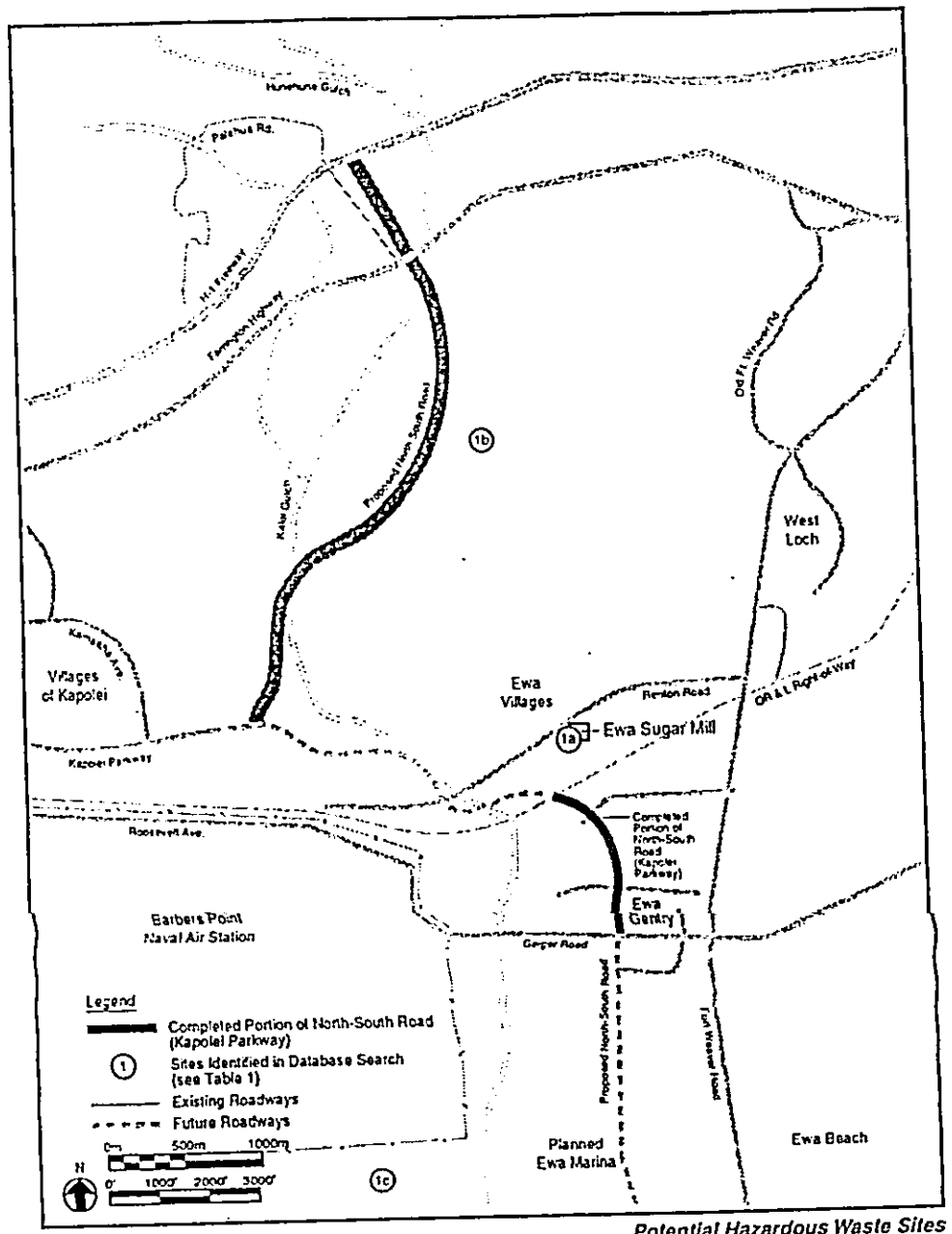
The coral pit was used by Ewa Plantation and Oahu Sugar Company as a disposal site for municipal solid waste from the company's Ewa Villages and industrial waste from the plantation's activities. It was also used for the disposal of empty pesticide drums and residue from decommissioned underground storage tanks.

4.3 Historic Maps

Three maps from the State of Hawaii Archives were reviewed to identify changes in area land uses and potential contaminant sources that may have been present.

1930 Map: 1:20,000 Ewa Quadrangle, Territory of Hawaii

This map shows the area south of Renton Village, Varona Village and Fernandez Village. Fernandez Village is labeled "Filipino Village." Oahu Sugar Mill is present and the Oahu Railway and Land Company railroad alignment is shown prominently on the map. The remainder of the area is generally undeveloped, except for a number of cane haul roads which are still in existence today.



Potential Hazardous Waste Sites
NORTH-SOUTH ROAD CORRIDOR STUDY
Hazardous Materials Technical Report
FIGURE 2

1953 Map: 1:24,000 Quadrangle, Territory of Hawaii

This map identifies the building used for pesticide mixing.

1968 Map: 1:24,000 Quadrangle, State of Hawaii

Interstate H-1 is shown on the map. No other changes were noted, except minor variations in Renton Village, Varona Village and Fernandez Village. This map appears almost identical to the 1983 edition of this map.

4.4 Historic Aerial Photographs

Aerial photographs from 1993, 1982, 1974 and 1969 were examined to identify past activities in the area. The photos reveal little change between the oldest and newest photographs. Renton, Varona and Fernandez Villages appear in all the photographs and sugarcane farming is the dominant land use. The secondary cane haul roads vary in location, but most of the major roads were in place in 1969. The 1993 photograph shows Kapolei Parkway under construction and land being cleared for the recent housing developments near the sugar mill.

4.5 Petroleum Pipelines

Commercial pipelines are located near the project area. These pipelines originate at Campbell Industrial Park, located on the western side of Ewa, and end in Honolulu. Chevron USA's pipeline runs along Renton Road (personal communication: Paul Liang, Chevron USA Products Marketing Company). A 10 cm (4-inch) gas pipeline belonging to BHP Gas Company also runs along Renton Road (personal communication: Bob Pettit, BHP Gas Company). There is no documentation of contamination associated with these pipelines in the project area.

4.6 Site Reconnaissance

The Ewa Sugar Mill/Oahu Sugar Company site was examined further during a site reconnaissance on July 31, 1996 to confirm its reported location, assess the general "housekeeping" at the site, and identify additional environmental concerns. In addition, the project area was surveyed to identify potential contaminant sites not listed in the databases, but appearing to have potential environmental concerns.

The site reconnaissance was performed from public access areas. Therefore, some of the areas were inaccessible. For example, the coral pit and the pesticide mixing area are both located on posted land. However, an abandoned concrete foundation at the pesticide mixing site was observed on a previous site visit.

The Ewa Sugar Mill has generally been dismantled. A number of businesses, such as a welding company, automobile repair shops, sand suppliers, and other industrial service type businesses, now occupy the remaining former mill buildings. The types and amounts of hazardous materials used by these businesses are uncertain but would generally consist of petroleum products.

No new sites were noted during the site reconnaissance.

5. POTENTIAL IMPACTS

Hazardous materials, if encountered during highway construction, could jeopardize worker safety, delay the project, cause cost overruns and have other undesirable effects on the construction of North-South Road. The sites identified in this report have been evaluated for their potential impacts on the project.

Only Site 1b associated with the Ewa Sugar Mill/Oahu Sugar Company CERCLIS record is near enough to the project to warrant an impact evaluation. Sites 1a and 1c are located approximately 1.75 km (1.1 miles) and 3 km (1.9 miles) from the proposed alignment.

Contamination associated with the former pesticide mixing area, located approximately 300 m (1,000 ft.) from the proposed alignment, is not likely to impact construction. Even though soil samples from the site contained traces of common pesticides that were used by Oahu Sugar Company and water drawn from both the basal and caprock aquifers in the vicinity contained atrazine (see Section 4.2), the groundwater gradient is toward the coastline and pesticides from the site should not have migrated toward the project right-of-way. In addition, the proposed North-South Road project does not involve deep excavation and is not expected to encounter groundwater.

The commercial fuel pipelines, located along Renton Road approximately 500 meters (1640 feet) south of the proposed roadway, could potentially leak and cause soil contamination in the project right-of-way. No releases have been reported in association with the pipelines. However, leaks are often undetected until pipelines are excavated. During excavation for the highway, the contractor should be alert for signs of petroleum-related soil contamination.

6. REFERENCES

Hawaii State Office of Hazard Evaluation and Emergency Response, Preliminary Assessment of Ewa Sugar Mill/Oahu Sugar Company, Ewa, Oahu, 1992

Miles, Carl J. , Karl Yanagihara, Steven Ogata, Gail Van De Verg, and Robert Boesch, Soil and Water Contamination at Pesticide Mixing and Loading Sites on Oahu, Hawaii, Bulletin of Environmental Contamination and Toxicology, Vol. 4, pg. 955-962, 1990

APPENDIX L

ARCHAEOLOGICAL RECONNAISSANCE SURVEY

NORTH-SOUTH ROAD CORRIDOR STUDY
Ewa, Oahu, Hawaii
Project No. HWY-0-01-92

ARCHAEOLOGICAL RECONNAISSANCE SURVEY

October 1997

PB 100 YEARS — PARSONS BRINCKERHOFF | KAKU ASSOCIATES | R.M. TOWILL CORPORATION

NORTH-SOUTH ROAD CORRIDOR STUDY
Ewa, Oahu, Hawaii
Project No. HWY-0-01-92

Archaeological Reconnaissance Survey

Prepared for

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October 1997

PBQD Reference: 16218A - Product 8.5A

ARCHAEOLOGICAL RECONNAISSANCE SURVEY OF A 4.5-KILOMETER (14,730-FT.) LONG LAND CORRIDOR WITHIN HONOULIULI *AHUPUA'A*, 'EWA DISTRICT, O'AHU ISLAND

by

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Prepared for

PARSONS BRINCKERHOFF QUADE & DOUGLAS, INC.

CULTURAL SURVEYS HAWAII
September 1997

ABSTRACT

At the request of Parsons Brinckerhoff Quade & Douglas, Inc., Cultural Surveys Hawaii has completed an archaeological reconnaissance survey of a 4.5-kilometer (14,730-ft.) long land corridor in the *ahupua'a* of Honouliuli in the 'Ewa District of O'ahu. The corridor is proposed for a north/south-oriented roadway connecting the *makai* portion of 'Ewa to the H-1 Freeway. Virtually the entire corridor has been extensively graded repeatedly over the past century by the Ewa Plantation Company (which merged with the Oahu Sugar Company in 1971) in association with sugar cultivation and the construction of plantation infrastructure.

Only two previously-identified sites of archaeological and historic concern are in the vicinity of the corridor: 1) the 'Ewa Villages Historic District (State site 50-80-12-9786) which has been nominated for the National Register of Historic Places; and 2) the Oahu Railway and Land Co. Right-of-Way which has been placed on the National Register of Historic Places (Site 50-80-12-9714).

No prehistoric or early historic Hawaiian archaeological sites or surface finds were encountered during the archaeological reconnaissance within the project area. Plantation constructions - remnants of flumes and a ditch - and roadways were observed within portions of the corridor that have not been developed since the sugar cane era. These constructs are not considered of historic value and therefore were not classified as sites during the present survey. No further archaeological investigation is recommended for the entire project area corridor and on-site or on-call monitoring is not justified during future construction activities.

The present corridor does not directly impact the structures of the 'Ewa Villages Historic District or the Oahu Railway and Land Co. Right-of-Way. However, the planning of the road should be coordinated with the State Historic Preservation Division (SHPD) of the Department of Land and Natural Resources to address possible concerns for indirect impact.

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I. INTRODUCTION

A. Project Description

At the request of Parsons Brinckerhoff Quade & Douglas, Inc., Cultural Surveys Hawaii has completed an archaeological reconnaissance survey of a 4.5-kilometer (14,730-ft.) long land corridor in the *ahupua'a* of Honouliuli in the 'Ewa District of O'ahu (Figure 1). The corridor is proposed for a north/south-oriented roadway connecting the *makai* portion of 'Ewa to the H-1 Freeway. The *makai* (south) end of the corridor commences 3.7 kilometers inland from the shoreline at Ewa Beach; elevation at this end of the corridor is 50 ft. above mean sea level. Beginning at the *makai* end, the corridor runs *mauka* (north) along the west side of the Ewa Villages Golf Course, traversing idle sugar cane fields, following the route of Palehua Road across Farrington Highway, and terminating *mauka* of the H-1 Freeway. Maximum elevation at the corridor's *mauka* end is 280 ft. above mean sea level. The corridor is generally 350 to 450 feet wide, but includes two larger land areas along its length. At the *makai* end of the corridor is a trapezoidal-shaped parcel of approximately 100 acres. At its *mauka* end, the corridor broadens to include an approximately 231.4 acre parcel encompassing lands on both sides of the H-1 Freeway for a length of approximately 6000 ft. (1829 meters).

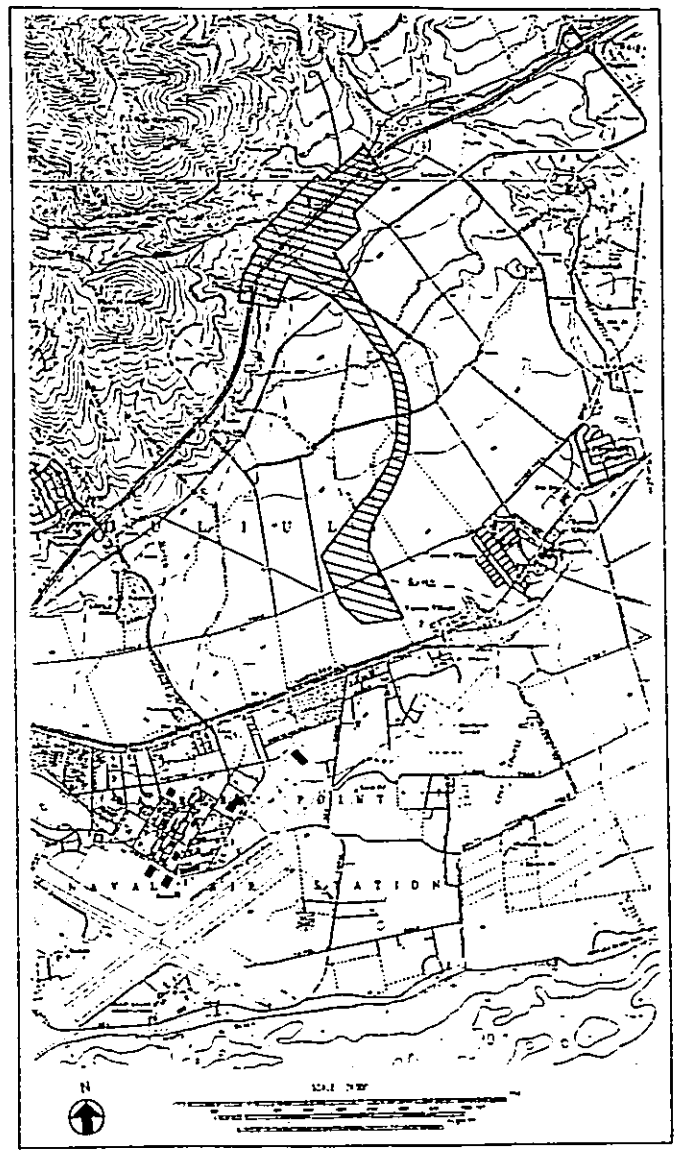

Figure 1 Portion of USGS 7.5 Minute Series Topographical Map, Ewa and Schofield Barracks Quadrangles, showing project area (hatched)

B. Scope of Work

The scope of work included:

1. Historical background review of existing historical and archaeological reports.

2. Reconnaissance survey of the corridor to assess existing conditions and to determine what portion of the corridor is not in present or former cane cultivation. Delineation of any archaeologically sensitive areas.

3. Preparation of a report to summarize the results of fieldwork, background studies, major archaeological and historic issues, and recommendations for future research and action.

C. Work Accomplished

Reconnaissance survey fieldwork was conducted on June 24 and 26, 1996. The entire length of the corridor was traversed by foot and vehicle. Photographs and field notes documented terrain and features of the corridor. A detailed topographic survey map (scale 1 in.=50 ft.) of the project area provided by Parsons Brinckerhoff Quade & Douglas, Inc. facilitated assurance that all portions of the project area were inspected during the survey.

Background research included: a review of previous archaeological studies on file at the State Historic Preservation Division of the Department of Land and Natural Resources; studies of documents at Hamilton Library of the University of Hawai'i, the Hawai'i State Archives, the Mission Houses Museum Library, the Hawai'i Public Library, and the Archives of the Bishop Museum; and study of maps at the Survey Office of the Department of Land and Natural Resources.

II. NATURAL SETTING

The present project area corridor extends from *mauka* to *makai* across the 'Ewa Plain in the *ahupua'a* of Honouliuli. The 'Ewa Plain is a Pleistocene reef platform overlain by alluvium from the southern end of the Wai'anae Mountain Range. This

alluvium has supported commercial sugar cane cultivation for over a century and much of the present project area remains under cover of sugar cane (*Saccharum sp.*) which is no longer harvested.

The 'Ewa Plain is hot and dry with an average mean temperature of 74°F and rainfall of 25 inches per year. Despite the aridity, the area is prone to flooding: floods of 1916, 1917, 1923, and 1927 have been well documented by archival photographs, some of which show standing water as far as the eye can see.

III. HISTORY OF LAND USE WITHIN THE STUDY AREA

Traditional sources, the earliest maps and early archaeological studies are mute regarding this portion of Honouliuli *ahupua'a*. Kaloi Gulch, which courses through portions of the study area corridor, is the only Hawaiian named land form within the project area which has been documented. Pukui (1984:77) translates the name to mean "the taro patch" and Sterling and Summers (1978:35) relate a number of vignettes regarding the "Waihuna" or "Punahuna" hidden spring associated with Kaloi Gulch. Ida E.K. von Holt (in Sterling and Summers 1978:35) relates the account of "two old Hawaiians" that the hidden spring "had been one of the principal sources of water for all that country, which was quite heavily populated before the smallpox epidemic of 1840."

In discussing the trails of Honouliuli, John Papa Ii (1983:97) suggests that the most common traditional Hawaiian trail from the West Loch area to the northern Wai'anae Coast was via Kolekole Pass. He mentions another trail from Pu'uloa (Pearl Harbor) to Pu'u Kapolei and Waimanalo ('Ewa). It seems most likely that this trail followed the route of the present Farrington Highway through Honouliuli and across the present study area.

Censuses taken by Protestant missionaries throughout the Hawaiian islands beginning in 1831 provide the earliest record of the size of the native population after the first decades of western contact. In the 1831-32 census of O'ahu, the total population of Honouliuli is recorded as 1,026, comprising 428 adult males, 394 adult females, 112 male children and 92 female children (Schmitt 1973:19). A few years later, during the census of 1835-1836, the total Honouliuli population had dropped to 870, comprising 345 adult males, 294 adult females, 111 male children and 120 female children (*Ibid.*:22).

The earliest detailed map of the area (Alexander 1873) shows no habitation closer than the western edge of West Loch in the vicinity of Papapapuhi Point. The Monsarrat survey map of 1878 documents substantial settlement at the "Honouliuli Taro Lands" in the Papapapuhi Point area and it seems clear that in early historic times that was the focus of the population of Honouliuli. The amenities of the area - including fishponds, taro *lo'i*, abundant shellfish, and salt pans - would have focused population there in prehistoric times as well.

The Organic Acts of 1845 and 1846 initiated the process of the *mahele* - the division of Hawaiian lands - which introduced private property into Hawaiian society. In 1848 the crown and the *ali'i* (royalty) received their land titles. The common people received their *kuleana* (individual parcels) in 1850. At the *mahele*, the *ahupua'a* of Honouliuli (43,250 acres) was granted to the *ali'i* Miriam Ke'ahi-Kuni Kekau'onohi (Royal Patent 6071, Land Commission Award 11216, Apana 8). Land Commission Awards (LCAs) for *kuleana* to commoners in Honouliuli appear to have been located at Papapapuhi Point. No LCAs were recorded within any portion of the present study area.

In 1871, Ke'ahi-Kuni Kekau'onohi rented much of Honouliuli to James Dowsett and John Meek for stock running and grazing (Frierson 1973:13). When James Campbell

paid $95,000 for most of Honouliuli in 1877 he drove off the land 32,347 head of stock belonging to Dowsett, Meek and James Robinson (*Ibid.*:13).

Until 1889 most of Campbell's lands in Honouliuli were used exclusively for cattle ranching. At that time, one planter remarked "the country was so dry and full of bottomless cracks and fissures that water would all be lost and irrigation impracticable" (Ewa Plantation Co. 1923:6-7). But the capital of entrepreneurs like James Campbell, Benjamin Dillingham and W.R. Castle, along with the rapid development of artesian water, led to the creation of Ewa Plantation which was incorporated in 1890.

> The first crop, 2,849 tons of sugar, was harvested in 1892. Ewa was the first all-artesian plantation and, in spite of early troubles...it gave an impressive demonstration of the part artesian wells were to play in the subsequent history of the Hawaiian sugar industry. (Kuykendall 1967:69)

Contemporaneous with the establishment and growth of the Ewa Plantation was the development of the Oahu Railway and Land (O.R.&L.) Company, organized by Benjamin Dillingham in 1889, which connected outlying areas of O'ahu to Honolulu. During the last decade of the 19th century, the railroad would reach from Honolulu to Pearl City in 1890, to Waianae in 1895, to Waialua Plantation in 1898, and to Kahuku in 1899 (*Ibid.*:100).

During the 20th century, the Ewa Plantation would continue to grow and, by the 1930s, would encompass much of the eastern half of the Honouliuli *ahupua'a* (see Figure 2 below). This growth impelled the creation of plantation villages to house the growing immigrant labor force working the fields. In the decade of the 1890s, the plantation built 72 houses, cottages or dwellings; in the first decade of this century, 536; in the second decade, 132; in the 1920s, 285; in the 1930s, 168; and in the 1940s, only 35. Censuses of the Ewa Plantation population record 4967 persons in 1928, 4477 in 1929, and 4100 in 1932. After the outbreak of World War II, which siphoned off much of the plantation's manpower, along with the changeover to almost complete reliance on mechanical

harvesting in 1938, there was little need for the large multi-racial (Japanese, Chinese, Okinawan, Korean, Portuguese, Spanish, Hawaiian, Filipino, European) labor force that had characterized most of the early history of the plantation.

During the subsequent decades of the 20th century, sugar cane operations at Ewa Plantation have been phased out and, in recent years, former cane lands have been rezoned for residential development. Structures in the area of the former plantation villages have fallen into disrepair or have been demolished. However, portions of the area - including Varona Village, Tenney Village and Renton Village - have been designated the 'Ewa Villages Historic District (State site 50-80-12-9786) which has been nominated for the National Register of Historic Places (see Figure 4 below). Additionally, the still-extant O.R.&L. rail line through Honouliuli has been placed on the National Register of Historic Places (Site 50-80-12-9714)(see Figure 2 below).

The above historical study suggests that the 'Ewa Villages Historic District and the O.R.&L. Right-of-Way are the only currently-identified areas of archaeological and historic concern in the vicinity of the present study area.

IV. PREVIOUS ARCHAEOLOGICAL RESEARCH

During a 1930 survey of O'ahu for the B.P. Bishop Museum, J. Gilbert McAllister identified Site 146 in Honouliuli *ahupua'a*:

> Ewa coral plains, throughout which are remains of many sites. The great extent of old stone walls, particularly near the Puuloa Salt Works, belongs to the ranching period of about 75 years ago. It is probable that the holes and pits in the coral were formerly used by the Hawaiians. Frequently the soil on the floor of the larger pits was used for cultivation, and even today one comes upon bananas and Hawaiian sugar cane still growing in them. They afford shelter and protection, but I doubt if previous to the time of Cook there was ever a large population here. (McAllister 1993:109)

McAllister's survey map places Site 146 in the general vicinity of the present study area, but this type locale is presently observable in 'Ewa more than 3 kilometers to the

southeast of the study area. The only other early documented site within the vicinity of the corridor was a *heiau* on Pu'u Kapolei, located more than 3 kilometers to the west.

Beginning in the 1980s, archaeological research has been conducted in Honouliuli in the general vicinity of the present study area. An archaeological reconnaissance survey (Rosendahl 1987) was conducted in association with the development of the 232-acre "West Loch Estates" Residential Increments I and II project, part of which lies to the east of the present study area. An archaeological reconnaissance (Kennedy 1988) and subsequent archaeological subsurface survey (Davis 1988) were conducted in association with the development of the 1016-acre "Ewa Gentry" project area which lies immediately to the east of the *makai* portion of the present study area.

The combined surface and subsurface reconnaissance survey of the "West Loch Estates" project area confirmed an initial impression that the project area had been extensively and almost entirely modified by decades of commercial sugar cane cultivation (Rosendahl 1987:9). This study identified a modern cemetery, two historic sites of minimal integrity and an ambiguous midden deposit (*Ibid.*:7,9). One of the historic sites recorded (T-3) was related to the plantation settlement of Lower Village. It was noted that some artifacts "indicate the possibility of pre-1900 occupation" (*Ibid.*:8).

In the "Ewa Gentry" project area the initial reconnaissance (Kennedy 1988) found no surface evidence of potentially significant cultural/historic remains. A subsequent subsurface exploration was undertaken. Eighteen backhoe trenches were excavated however "no evidence of past *in situ* cultural activity was found anywhere in the Ewa Gentry project area" (Davis 1988:10).

In 1990, Cultural Surveys Hawaii conducted an archaeological reconnaissance survey of an approximately 616-acre area which included "three extant plantation villages (Renton Village, Tenney Village and Varona Village), the sites of three former plantation

villages (C Village, Mill Village, Middle Village) and several other sites associated with the 'Ewa Plantation infrastructure..." (Hammatt *et al.*1990:i). The survey found no evidence of any prehistoric activity within the project area and recommended further documentation of some of the ruined plantation structure sites.

V. SURVEY RESULTS

Virtually the entire study area corridor (Figure 2) comprises land formerly under cultivation of sugar cane which commenced in the late 19th century (Figure 3). Since the cessation of cane production (the last harvest occurring within the present decade), portions of the corridor have undergone varied levels and types of development.

Makai End of Corridor to Farrington Highway

The *makai* end of the corridor commences outside of the 'Ewa Villages Historic District, approximately 300 meters northwest of the northwest corner of Varona Village (Figure 4). The corridor is also 400 meters north of the O.R.&L. Right-of-Way.

The east side of the corridor runs along the west side of the newly-developed Ewa Villages Golf Course, following the alignment of an asphalt-paved road that appears to have been constructed recently in association with the golf course (a golf course maintenance building is accessed by this road) (Figure 5).

The corridor's *makai* end encompasses an approximately 100-acre parcel adjoining the paved road to the west (Figure 6). The parcel remains planted in "ratoon" (no longer harvested) cane. It was traversed by foot and vehicle (along an access road bisecting it from east to west). No archaeological sites or plantation-era structures were observed in this parcel.

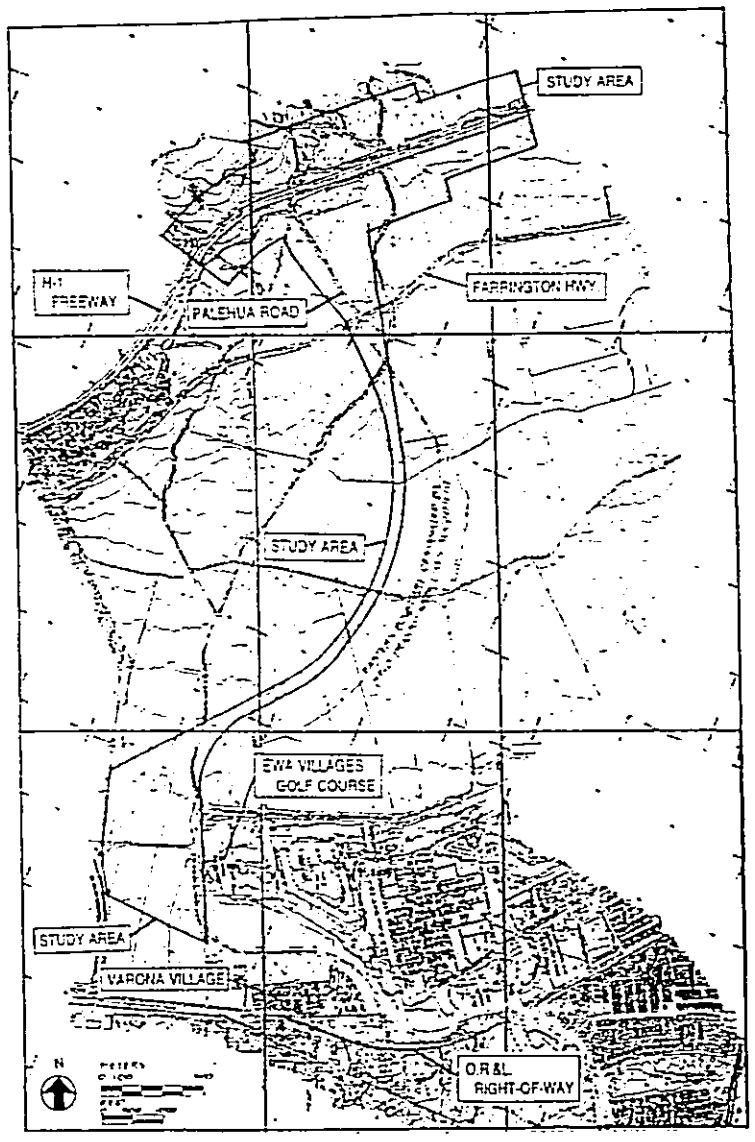

Figure 2 Study Area Corridor

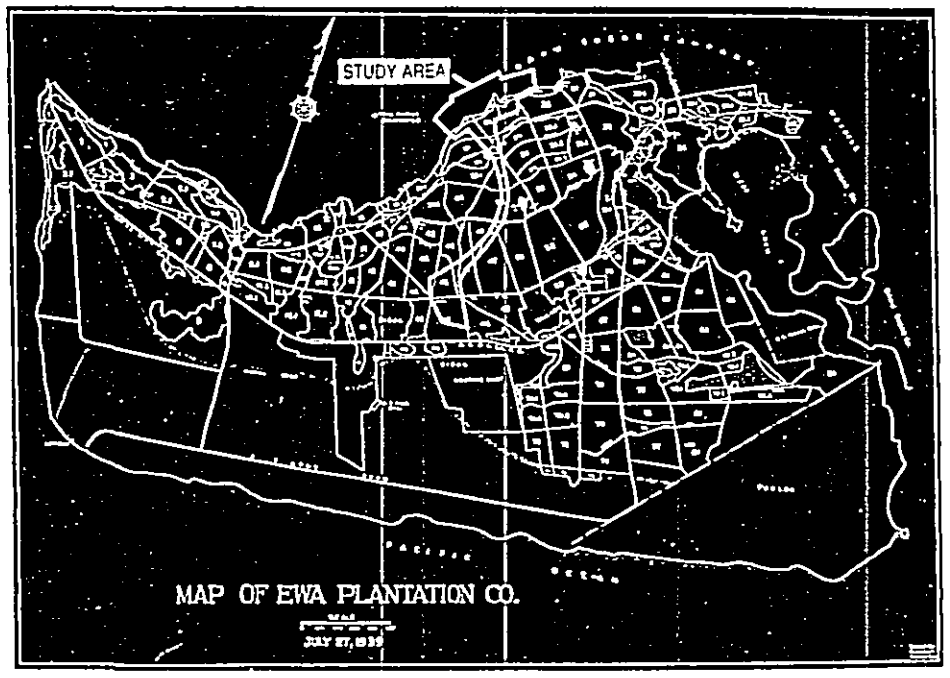

Figure 3 1939 Map of Ewa Plantation Company Camp and Port [illegible] with outline of project study area [illegible]

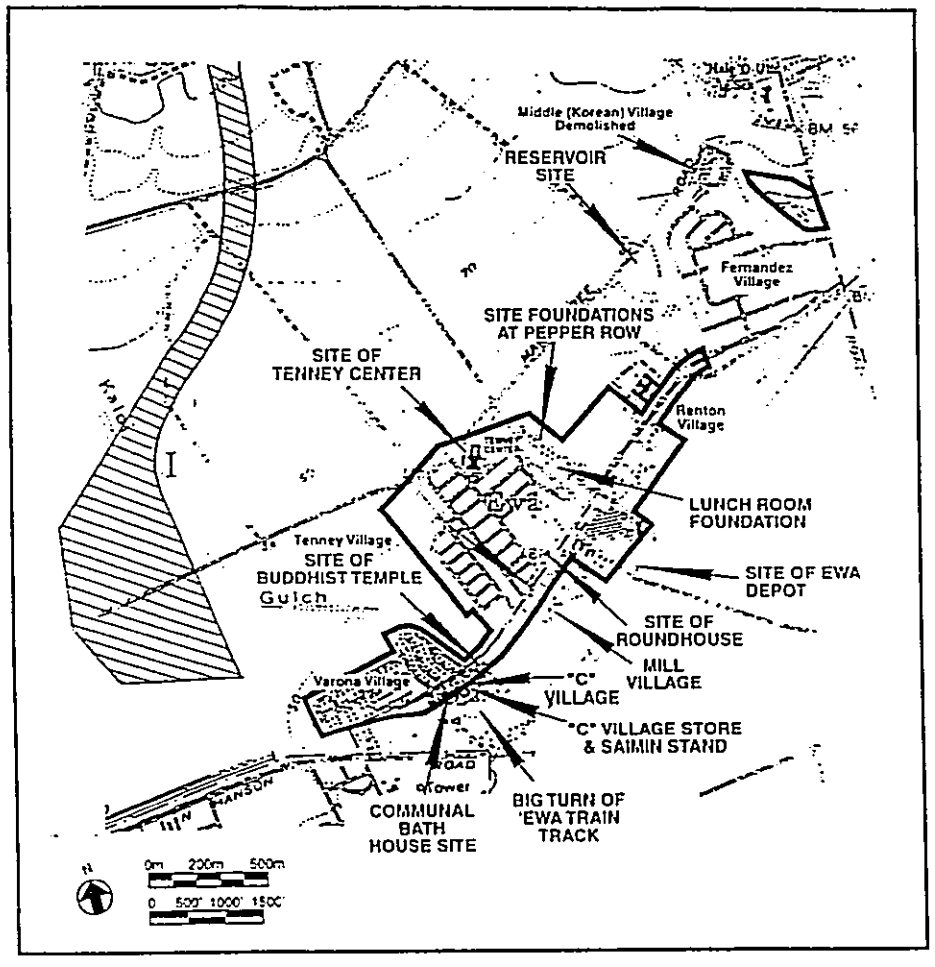

Figure 4 Map showing locations of former 'Ewa Plantation structures within 'Ewa Villages Historic District (State site 50-80-12-9786) and *makai* end of present study corridor to the northwest of Varona Village

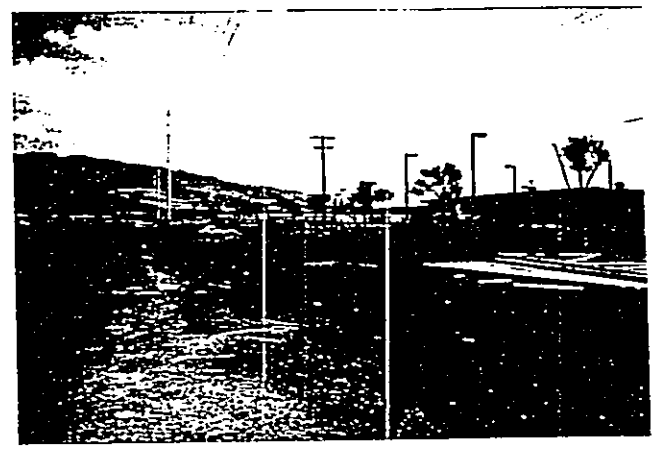

Figure 5 View of *makai* commencement of corridor showing paved road on east side of corridor and golf course maintenance buildings (view north)

Figure 6 View of "ratoon cane" in 100-acre parcel within corridor west of paved road in foreground (view west)

At the north corner of the parcel, the corridor curves *mauka* (north) to Farrington Highway through now-idle cane fields, the route demarcated by an alignment of electricity lines (Figures 7 & 8). This portion was surveyed on foot. Visibility was excellent. No archaeological sites were encountered. Two plantation-era structures, however, were observed. A ditch (following alongside a plantation road) crosses the corridor 1300 meters *makai* of Farrington Highway (Figures 9 & 10). The ditch is approximately 2 meters (6.6 ft.) wide and 1.5 meters (4.9 ft.) deep, and is constructed of cut stone with a mortar coating. It is in good condition within the corridor and continues intact considerable distances to the east and west of the corridor. Approximately 800 meters *makai* of Farrington Highway, a flume remnant was observed on the west side of the corridor (Figures 11 & 12). The flume consists of half-round sheet metal supported by a brick and wood framework and is raised approximately .6 m. (2 ft.) above the ground surface. The flume remnant has been wrecked and other discontinuous remnants of the flume were observed continuing west beyond the corridor.

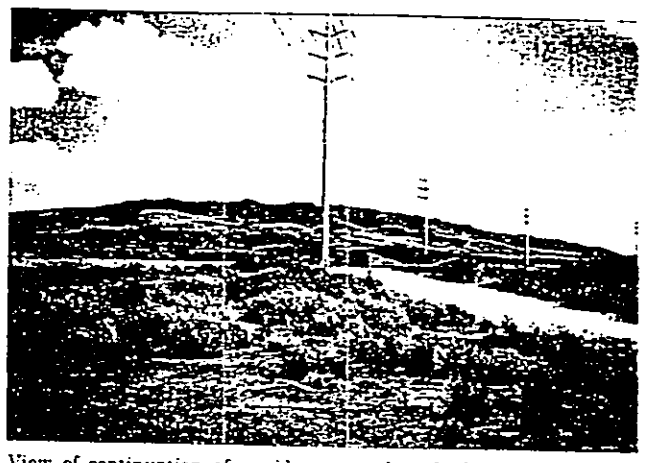

Figure 7 View of continuation of corridor at north end of 100-acre parcel where electricity transmission lines demarcate corridor path *mauka* (view north)

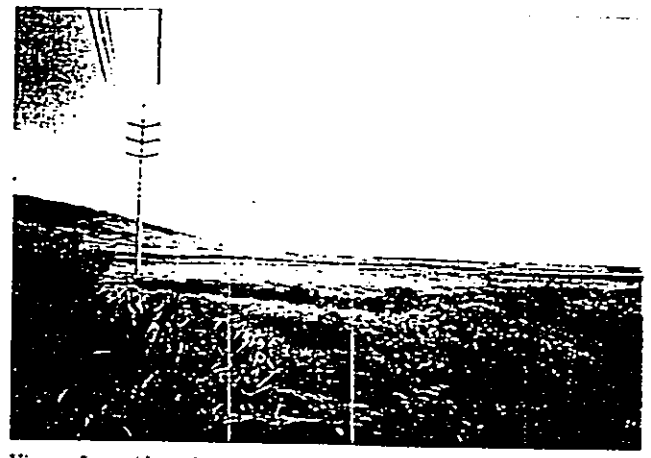

Figure 8 View of corridor through idle cane fields, demarcated by electricity transmission lines (view northeast)

Figure 9 View of ditch traversing corridor in former cane land (view south)

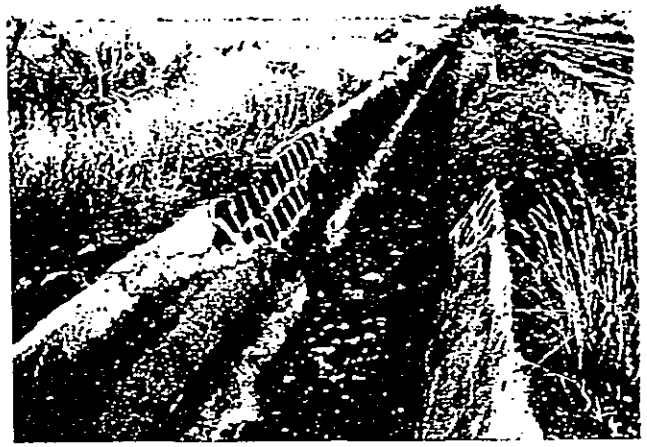

Figure 10 View of ditch outside of corridor showing cut stone and mortar construction (view southwest)

Figure 11 Flume remnant on west side of corridor in former cane lands (view southwest)

Figure 12 Flume remnant outside west side of corridor showing construction (view northwest)

Farrington Highway to H-1 Freeway and *Mauka* End of Corridor

Mauka of Farrington Highway the corridor follows the route of Palehua Road *mauka* of the H-1 Freeway where the corridor broadens to include an approximately 231.4 acre parcel encompassing lands on both sides of the freeway for a length of approximately 6000 ft. (1829 meters) (Figures 13 & 14).

Two shallow gulches coursing through the corridor - Hunehune Gulch to the west of Palehua Road and Kaloi Gulch to the east - were inspected on foot. The northeast third of the parcel at the *mauka* end of the corridor, on both sides of the H-1 Freeway, comprises land that is currently being cultivated in non-sugar crops (Figures 15 & 16). The remainder of the open land within the corridor on both sides of the H-1 Freeway, which was inspected on foot, shows evidence of former sugar cultivation. Wrecked remnants of a flume alignment were observed on both sides of Palehua Road just *makai* of the H-1 Freeway (Figures 17 & 18).

No archaeological sites were observed in this portion of the corridor.

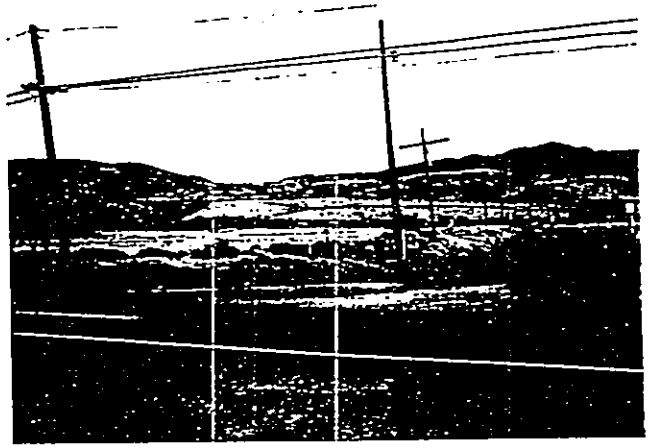

Figure 13 West side of corridor *mauka* of Farrington Highway in foreground showing Palehua Road and former cane lands *mauka* and *makai* of H-1 Freeway (view northwest)

Figure 14 East side of corridor *mauka* of Farrington Highway showing Palehua Road and former cane lands *mauka* and *makai* of H-1 Freeway (view northeast)

Figure 15 Currently cultivated (non-sugar) land *makai* of H-1 Freeway comprising northeast portion of the present study area (view northeast)

Figure 16 Currently cultivated (non-sugar) land *mauka* of H-1 Freeway comprising northeast portion of the present study area (view northeast)

Figure 17 Flume remnant in Hunehune Gulch on west end of corridor *makai* of H-1 Freeway (view south)

Figure 18 Flume remnant on east side of corridor *makai* of H-1 Freeway (view southwest)

VI. SUMMARY AND RECOMMENDATIONS

A. Summary

The present 4.5-kilometer (14,730-ft.) long study area corridor is comprised of lands formerly in sugar cane cultivation that commenced at the end of the nineteenth century. Virtually the entire corridor has been extensively graded repeatedly over the past century by the Ewa Plantation Company in association with sugar cultivation and the construction of plantation infrastructure. Portions of the corridor follow routes of former plantation roadways.

No prehistoric or early historic Hawaiian archaeological sites or surface finds were encountered during the archaeological reconnaissance within the project area. (Other archaeological surveys on adjacent parcels within the *ahupua'a* of Honouliuli have identified no prehistoric occupation or utilization of the immediate area.) Plantation constructions - remnants of flumes and a ditch - and roadways were observed within portions of the corridor that have not been developed since the sugar cane era. These constructs are not considered of historic value and therefore were not classified as sites during the present survey.

The *makai* portion of the corridor is in the vicinity of two previously identified areas of archaeological and historic concern: 1) the 'Ewa Villages Historic District (State site 50-80-12-9786) which has been nominated for the National Register of Historic Places; and 2) the Oahu Railway and Land Co. Right-of-Way which has been placed on the National Register of Historic Places (Site 50-80-12-9714).

B. Recommendations

No further archaeological investigation is recommended for the entire project area corridor and on-site or on-call monitoring is not justified during future construction activities.

The present corridor does not directly impact the structures of the 'Ewa Villages Historic District or the O.R.&L. Right-of-Way. However, the planning of the road should be coordinated with the State Historic Preservation Division (SHPD) of the Department of Land and Natural Resources to address possible concerns for indirect impact.

VII. REFERENCES

Armstrong, Warwick, ed.
1973 *Atlas of Hawai'i*. University of Hawaii Press: Honolulu.

Conde, Jesse and Gerald M. Best
1973 *Sugar Trains: Narrow Gauge Rails of Hawaii*. Glenwood Publishers: Felton, Calif.

Davis, Bertell D.
1988 "Final Report Archaeological Subsurface Survey of the Proposed Ewa Gentry Project Area, Honouliuli, 'Ewa, O'ahu." B.P. Bishop Museum: Honolulu.

Foote, Donald E., E.L. Hill, S. Nakamura and F. Stephens
1972 *Soil Survey of the Islands of Kaua'i, Oahu, Maui, Molokai and Lanai, State of Hawaii*, U.S. Dept. of Agriculture, U.S. Government Printing Office, Washington, D.C.

Ewa Plantation Company
1923 *Ewa Plantation Company Annual Report*.

Frierson, Barbara
1973 "A Study of Land Use and Vegetation Change: Honouliuli, 1790-1925." M.A., Plan B Paper, Department of Geography, University of Hawaii at Manoa, Honolulu.

Hammatt, Hallett H., David Shideler, and William Folk
1990 *Archaeological Reconnaissance of the 'Ewa Villages Project Site, Honouliuli, 'Ewa, O'ahu*. Cultural Surveys Hawaii, Kailua, HI.

Handy, E.S. Craighill and Elizabeth G. Handy
1972 *Native Planters in Old Hawaii: Their Life, Lore, and Environment*, Bishop Museum Bulletin 233, Honolulu.

'I'i, John Papa
1959 *Fragments of Hawaiian History*. Bishop Museum Press: Honolulu.

Kennedy, Joseph
1988 "Archaeological Reconnaissance Report Concerning the Proposed Ewa Gentry Project in Honouliuli, Oahu."

Kuykendall, Ralph S.
1967 *The Hawaiian Kingdom*, Vol.III. University of Hawaii Press: Honolulu.

Macdonald, G.A. and A.T. Abbott and F. L. Peterson
1983 *Volcanoes in the Sea*, Second Edition, University of Hawaii Press, Honolulu.

REFERENCES (continued)

McAllister, J. Gilbert
1933 *Archaeology of Oahu*. Bulletin 104. Bishop Museum: Honolulu.

Pukui, Mary K., Samuel H. Elbert and Esther Mookini
1974 *Place Names of Hawaii*. University of Hawaii Press: Honolulu.

Rosendahl, Paul
1987 *Archaeological Reconnaissance Survey for Environmental Impact Statement, West Loch Estates - Residential Increments I and II, Land of Honouliuli, Ewa District, Island of Oahu*. PHRI.

Schmitt, Robert C.
1973 *The Missionary Censuses of Hawaii*. Bishop Museum: Honolulu.

Sterling, Elspeth P. and Catherine C. Summers (comp.)
1978 *Sites of O'ahu*, Dept. of Anthropology, B.P. Bishop Museum, Honolulu, Hi.

APPENDIX

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

TS-3/96-1189 FEE

MICHAEL D. WILSON, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

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DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
33 SOUTH KING STREET, 6TH FLOOR
HONOLULU, HAWAII 96813

March 8, 1996

Mr. Charles O. Swanson, Director
Department of Transportation Services
C&C of Honolulu
Pacific Park Plaza
711 Kapiolani Blvd, Suite 1200
Honolulu, Hawaii 96813

LOG NO: 16697
DOC NO: 9603NN03

Dear Mr. Swanson:

SUBJECT: North-South Road Corridor Project, Ewa, Oahu

Thank you for the opportunity to submit preliminary comments on this proposed corridor which will affect the OR&L Right of Way a property listed on the National Register of Historic Places.

Through telephone communications with Mr. Gregory Hee of your staff we explained that this Right of Way runs in a general east to west route from Honouliuli to Nanakuli. Given the linear nature and extent of this historic property it will be impossible to avoid a north-south corridor impact with this property thus mitigation will be inevitable.

We look fcward to working on mitigating this impact in future consultations when more specific design plans are available. You might want to consult with the Ko Olina Development personel who designed major roadway intersections with the OR&L Right of Way within their planned community for design and mitigation ideas.

Sincerely yours,

DON HIBBARD, Administrator and
State Historic Preservation Officer

NN:smf

APPENDIX M

CULTURAL IMPACT EVALUATION

Cultural Impact Evaluation in Support of the North-South Road and Kapolei Parkway Project, Honouliuli Ahupua'a, 'Ewa District, O'ahu

by
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and
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for
Parsons, Brinckerhoff, Quade & Douglas, Inc.

Cultural Surveys Hawaii
April 2004

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I. INTRODUCTION

A. Project Description

At the request of Parsons Brinckerhoff Quade & Douglas, Inc., Cultural Surveys Hawaii has undertaken a cultural impact evaluation of the North-South Road and Kapolei Parkway Project in the *ahupua'a* of Honouliuli in the 'Ewa District of O'ahu (Figure 1). The North-South Road portion of the project is proposed by the State of Hawaii Department of Transportation and comprises the construction of a limited-access, principal arterial roadway that would connect the Interstate H-1 Freeway to Kapolei Parkway. The Kapolei Parkway portion of the project is proposed by the City and County of Honolulu and comprises the construction of a portion of Kapolei Parkway between the intersections with North-South Road and Renton Road.

The two portions of the project comprise a single, approximately 15,000 ft. (4.6 kilometer) long corridor which is the subject of the present cultural impact evaluation.

B. Scope of Work

The scope of work included:

1) Examination of historical documents, Land Commission Awards, historic maps, with the specific purpose of identifying traditional Hawaiian activities including gathering of plant, animal and other resources or agricultural pursuits as may be indicated in the historic record.

2) A review of the existing archaeological information pertaining to the general region as it may allow us to reconstruct traditional land use activities and identify and describe the cultural resources, practices, and beliefs associated with the harbor area prior to construction.

3) Contact persons knowledgeable about the historic and traditional practices in the project area and region by letter and telephone. We anticipate a few informal interviews possibly to include O'ahu Island Burial Council members, former plantation workers, Campbell Estate personnel, State Historic Preservation Division staff, Hawaiian Civic Club members, and Neighborhood Board members.

4) Preparation of a report on items 1-3 summarizing the information gathered related to traditional practices and land use. The report will assess the impact of the proposed action on the cultural practices and any features identified.

C. Work Accomplished

Field inspection of the project area was conducted on April 1, 2004. The corridor was inspected by foot and vehicle.

Background research included: a review of previous archaeological studies on file at the State Historic Preservation Division of the Department of Land and Natural Resources; studies of documents at Hamilton Library of the University of Hawai'i, the Hawai'i State Archives, the Mission Houses Museum Library, the Hawai'i Public Library, and the Archives of the Bishop Museum; and study of maps at the Survey Office of the Department of Land and Natural Resources.

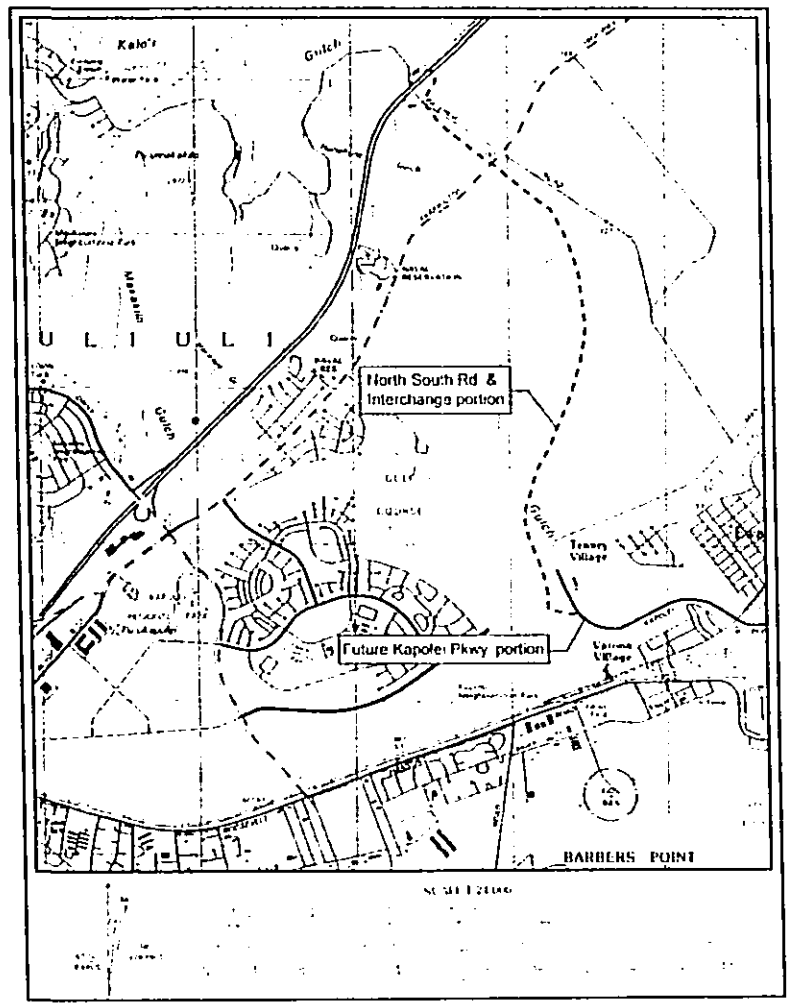


Figure 1 **Portion of USGS 7.5 Minute Series Topographical Map, Ewa and Schofield Barracks Quadrangles, showing project area (hatched)**

II. TRADITIONAL LAND USE IN HONOULIULI AHUPUA'A

A. The Physical Layout

The present project area is located in the *ahupua'a* of Honouliuli, the largest traditional land unit on the island of O'ahu. Honouliuli includes all the land from the western boundary of Pearl Harbor (West Loch) westward to the 'Ewa/Wai'anae District Boundary, with the exception of the west side of the harbor entrance which is in the *ahupua'a* of Pu'uloa (the 'Ewa Beach/Iroquois Point area). This comprises approximately 12 miles of open coastline from One'ula westward to Pili O Kahe. The *ahupua'a* extends *mauka* from West Loch nearly to Schofield Barracks and the western boundary is the Wai'anae Mountain crest running *makai* to the east ridge of Nānākuli Valley.

Not only does Honouliuli boast a long coastline along the normally calm waters of leeward O'ahu, but there are four miles of waterfront running along the west side of West Loch. The land immediately inland of the sea coast consists of a flat karstic raised limestone reef forming a level, nearly featureless "desert" plain covered in pre-contact times by a thin or non-existent soil mantle. The microtopography is notable in containing countless sinkholes in some areas, created by chemical weathering (dissolution) of the limestone shelf. Proceeding inland, this plain is overlain by alluvium deposited through a series of gulches draining the Wai'anae Mountains. The largest of which, Honouliuli gulch, is on the east side of the plain draining into West Loch. To the west are fairly steep gradient gulches forming a more linear than dendritic drainage pattern. The major gulches are (from east to west) Awanui, Palailai, Makaīwa, Waimānalo and Lumaloa. These gulches are steep-sided in the uplands and generally of a high gradient until they emerge onto the flat 'Ewa plain. The alluvium they have carried has spread out in delta fashion over the inland portions of the plain. These gulches are generally dry, but during seasonal Kona storms they carry immense quantities of runoff onto the plain and into the ocean. As typical drainages in arid slopes, they are either raging uncontrollably or are dry, and as such do not form stable water sources in their upper reaches. These gulches do not have valleys suitable for extensive irrigated agriculture. However, this lack is more than compensated for by the rich, watered lowlands at the base of Honouliuli Gulch (the *'ili* of Honouliuli).

Honouliuli Ahupua'a, as a traditional land unit, had tremendous and varied resources available for exploitation by early Hawaiians. The "karstic desert" and marginal characterization of the limestone plain (which is the most readably visible terrain) does not do justice to the *ahupua'a* as a whole. The following available resources mark the richness of this land unit:

1. Twelve miles of coastline with continuous shallow fringing reef, which offered rich marine resources.
2. Four miles of frontage on the waters of West Loch, which offered extensive fisheries (mullet, *awa*, shellfish) as well as frontage suitable for development of fishponds-Laulaunui for example.
3. The lower portion of Honouliuli Valley in the 'Ewa plain offered rich level alluvial soils with plentiful water for irrigation from the stream as well as abundant springs. This land would have stretched well up the valley.
4. A broad limestone plain, which because of innumerable limestone sinkholes, offered a nesting home for a large population of avifauna. This resource may have been one of the early attractions to human settlement.

5. An extensive upland forest zone extending as much as 12 miles inland from the edge of the coastal plain. As Handy and Handy (1972:469) have pointed out, the forest was much more distant from the lowlands here than it was on the windward side, but on the leeward side was more extensive. Much of the upper reaches of the *ahupua'a* would have had species-diverse forest with *kukui*, *'ōhia*, sandalwood, *hau*, *ti*, banana, etc.

Within this natural setting archaeological and traditional sources show a general pattern of three main areas of settlement within the *ahupua'a*: 1) the coastal zone including Kalaeloa (Barber's Point), Ko'Ōlina (West Beach), and One'ula ('Ewa Marina), 2) the Honouliuli Taro Lands and 3) the inland area of Pu'u Ku'ua.

B. The Coastal Zone

1. Kalaeloa (Barber's Point)

Archaeological research at Barber's Point has focused on the areas in and around the newly constructed Deep Draft Harbor. A series of small clustered shelters, enclosures and platforms show limited but recurrent use at the shoreline zone for marine oriented exploitation. This settlement covers much of the shoreline, with more concentrated features around small marshes and wet sinks. Immediately behind the shoreline under a linear dune deposit is a buried cultural layer believed to contain some of the earliest habitation evidence in the area.

The attraction of the area to early Hawaiians was the plentiful and easily exploited bird population. Particular evidence for taking of petrel occurs at Site -2763 located 1 km. south of the project area (Hammatt and Folk 1981:213). Initial heavy exploitation of nesting seabirds and other species, in conjunction with habitat destruction, probably led to early extinction of these bird communities.

There is some indication of agriculture in mulched sinkholes and soil areas. Considering rainfall, this activity would have been constrained by accessibility to water, probably involving tree crops and roots (sweet potatoes). The archaeological content of the sites indicates a major focus on marine resources.

Bertel Davis (1990a:135), in his Ph.D. dissertation, summarizes our knowledge of traditional Hawaiian use of the coastal zone of Honouliuli:

> I suggest the west coast of O'ahu, including the area off Barbers Point, (a) probably became a well established fishery at least by AD 1000, perhaps much earlier; (b) the initial settlement at Barbers Point also began around this time or possibly earlier; and (c) the settlement initially involved task-specific groups exploiting the adjacent fishery on a seasonal round, probably during the winter months.

2. Ko'Ōlina (West Beach)

Studies associated with the Ko'Ōlina area, which includes the western portion of the present project, document around 200 component features at approximately 50 sites and site complexes consisting of habitation sites, gardening areas, and human burials. Chronologically the occupation covers the entire span of Hawaiian settlement, in what Davis and Haun (1987:37) describe as "one of the longest local sequences in Hawaiian prehistory." The earliest part of the sequence relates to the discovery of an inland marsh but early dates were also obtained for a beachfront site and an inland rock shelter.

C. Honouliuli Taro Lands

Centered around the west side of Pearl Harbor at Honouliuli Stream and its broad outlet into the West Loch are the rich irrigated lands of the *'ili* of Honouliuli which give the *ahupua'a* its name. This area bordering West Loch was clearly a major focus of population within the Hawaiian Islands. This was a logical response to the abundance of fish and shellfish resources in close proximity to a wide expanse of well-irrigated bottomland suitable for wetland taro cultivation. As early as 1825 all the roads of southwest O'ahu coalescing and descending the *pali* as they funnel into the locality which gave the district of Honouliuli its name. Dicks et al. (1987:78-79) conclude, on the basis of 19 carbon isotope dates and 3 volcanic glass dates that "Agricultural use of the area spans over 1,000 years."

Undoubtedly, Honouliuli was a locus of habitation for thousands of Hawaiians. Prehistoric population estimates are a matter of some debate but it is worth pointing out that in the earliest mission census 1831-1832, the land (*'āina*) of Honouliuli contained 1026 men, women, and children (Schmitt 1973:19). It is not clear whether this population relates to Honouliuli Village or district but the village probably contained the vast majority of the district's population. The nature of the reported population structure for Honouliuli (less than 20% children under 12 years of age) and the fact that the population decreased more than 15% in the next 4 years (Schmitt 1973:22) suggests that the pre-contact population of Honouliuli Village may well have been significantly greater than it was in 1831-1832.

D. Pu'u Ku'ua: Inland Settlement

Documentation of inland settlement in Honouliuli Ahupua'a is more problematic in the general absence of archaeological studies. However, it is probable that the area around Pu'u Ku'ua, on the east side of the Wai'anae Ridge seven miles inland of the coast, was a Hawaiian place of some importance.

In 1899 Hawaiian Newspaper "*Ka Loea Kalaiaina*" relates a story of Pu'u Ku'ua as "a place where chiefs lived in ancient times" and a "battle field," "thickly populated." The article summarizes:

1) This place was entirely deserted and left uninhabited and it seems that this happened before the coming of righteousness to Hawai'i nei. Not an inhabitant is left.

2) The descendants of the people of this place were so mixed that they were all of one class. Here the gods became tired and returned to Kahiki (in Sterling and Summers 1978:33).

McAllister (1933:134, 137) recorded three sites in this area: two *heiau*, Pu'u Kuina and Pu'u Ku'ua (both destroyed), and most interesting, a series of enclosures in Kukuilua which he calls "kuleana sites." There is no direct archaeological evidence available that Hawaiian settlement occurred here but extensive settlement appears likely from traditional accounts. Geographically, the area is well-watered and would have had abundant locally available forest resources.

E. Summary of Settlement Patterns in Honouliuli

Based on the above summary of areas of Honouliuli settlement the following general considerations are made to place the project area in the context of the *ahupua'a* settlement

pattern. There are three areas of Hawaiian settlement in the *ahupua'a*; two are well documented while one is more problematic:

a. The extensive limestone plain with recurrent use habitations for fishermen and gatherers and sometime gardeners;

b. The rich cultivated lands of Honouliuli *'ili* for extensive wetland taro and clearly the *ahupua'a* population center;

c. The uplands around Pu'u Ku'ua for presently uncertain reasons but probably agriculture and forest resource utilization.

Honouliuli, as a unit, contains all the geographic elements of a typical Hawaiian valley *ahupua'a*, except they are arranged geomorphically in an atypical relationship. The *ahupua'a* is not organized around a single drainage network but shares the west portions of Waikele drainage in its upper reaches. A highly advantageous characteristic for human subsistence is included in a vast coastline and fringing reef, as well as an extensive limestone plain that would support only limited agriculture but would be excellent for bird catching in early times, and a huge expanse of sloping forest land. The richest forestland for foraging for wood, birds, feathers, etc. would have been the east slope of the Wai'anae Range. The *mauka/makai* route would have been up Honouliuli Gulch or up the Makakilo ridge, paralleling the coast from Honouliuli Gulch to Kahe. The most convenient route to *mauka* lands, even from the western end of the coast (Ko'olina), would have been *mauka* only to the base of the hills and then either up the Makakilo Ridge or northeast to a trail to Pu'u Ku'ua. The *makai* slope is the dry side of the ridgeline. Here streams would respond to rainfall quickly but drain quickly leaving little available water for even short-term use.

The *makai* slope was not a major thoroughfare. We can see some very limited evidence of part-time agriculture in and around gulches and two foci of sparse habitation. The first is limited to *makai* portions of gulches and lava flats. This habitation is considered a *mauka* component or continuing of the Ko'Olina coastal settlement rather than an independent focus. The second focus, separated from the first by a barren zone, is generally above the 800-foot elevation. Supported by seasonal dry land planting and forest foraging, this *mauka* habitation could have been the lower portion of a thinly scattered, but widespread zone of settlement stretching eastward and northeast along the east Wai'anae Range slopes; possible increasing in intensity along the more watered lands forming the *mauka* western boundary of Honouliuli.

There is to date no archaeological evidence of high status residences in Honouliuli. Large residential structures are not present along the shoreline where they would be expected. The late prehistoric occurrence of chiefs' houses is not apparent, perhaps because the ocean shoreline, although rich in marine resources, is uninviting for sport and unsuitable for fishponds. The chiefly focus of 'Ewa District was Waipi'o. Whatever activities of this class occurred in Honouliuli would have been in or near the rich lands fronting West Loch (the *'ili* of Honouliuli) but to date there is no direct archaeological evidence of this. Concerning status associations with Honouliuli it is interesting to note the connection of the Pu'u Ku'ua settlement with pariah (*kauwā*), the lowest class of Hawaiians (Sterling and Summers 1978:33).

The central locale within the *ahupua'a* of Honouliuli in terms of population, as well as cultivated foods, was the *'ili* of Honouliuli. There is good reason to assume, given the lack of intensive agricultural resources in other locations during prehistoric times, that all other habitation zones were economically and socially co-dependent.

III. HISTORIC DOCUMENTATION OF THE PROJECT AREA

Traditional sources, the earliest maps and early archaeological studies are mute regarding this portion of Honouliuli *Ahupua'a*. Kalo'i Gulch, which courses through portions of the present study area, is the only documented Hawaiian-named land form associated with the study area. Pukui (1984:77) translates the name to mean "the taro patch" and Sterling and Summers (1978:35) relate a number of vignettes regarding the "Waihuna" or "Punahuna" hidden spring which is associated with Kalo'i Gulch. Mrs. E.K. von Holt (in Sterling and Summers 1978:35) relates the account of "two old Hawaiians" that the hidden spring "had been one of the principal *sources of water for all that country, which was quite heavily populated before the smallpox* epidemic of 1840."

In discussing the trails of Honouliuli, John Papa I'i (1983:97) suggests that the most common traditional Hawaiian trail from the West Loch area to the northern Wai'anae Coast was via Kolekole Pass. He mentions another trail from Pu'uloa (Pearl Harbor) to Pu'u Kapolei and Waimanalo ('Ewa). It seems most likely that this trail followed the route of the present Farrington Highway through Honouliuli and across the present study area.

Censuses taken by Protestant missionaries throughout the Hawaiian Islands beginning in 1831 provide the earliest record of the size of the native population after the first decades of western contact. In the 1831-32 census of O'ahu, the total population of Honouliuli is recorded as 1,026, comprising 428 adult males, 394 adult females, 112 male children and 92 female children (Schmitt 1973:19). A few years later, during the census of 1835-1836, the total Honouliuli population had dropped to 870, comprising 345 adult males, 294 adult females, 111 male children and 120 female children (Ibid.:22).

The earliest detailed map of the area (Alexander 1873) shows no habitation closer than the western edge of West Loch in the vicinity of Pāpapapuhi Point. A Monsarrat survey map of 1878 documents substantial settlement at the "Honouliuli Taro Lands" in the Pāpapapuhi Point area and it seems clear that in early historic times that was the focus of the population of Honouliuli. The amenities of the area - including fishponds, taro *lo'i*, abundant shellfish, and salt pans - would have focused population there in prehistoric times as well.

The Organic Acts of 1845 and 1846 initiated the process of the *mahele* - the division of Hawaiian lands - which introduced private property into Hawaiian society. In 1848 the crown and the *ali'i* (royalty) received their land titles. The common people received their *kuleana* (individual parcels) in 1850. At the mahele, the *ahupua'a* of Honouliuli (43,250 acres) was granted to the *ali'i* Miriam Ke'ahi-Kuni Kekau'ōnohi (Royal Patent 6071, Land Commission Award 11216, Apana 8). Land Commission Awards (LCAs) for *kuleana* to commoners in Honouliuli appear to have been located at Pāpapapuhi Point. No LCAs were recorded within any portion of the present study area.

In 1871, Ke'ahi-Kuni Kekau'ōnohi rented much of Honouliuli to James Dowsett and John Meek for stock running and grazing (Frierson 1973:13). When James Campbell paid $95,000 for most of Honouliuli in 1877 he drove off the land 32,347 head of stock belonging to Dowsett, Meek and James Robinson (Ibid.:13). A 1880s photograph of James Campbell's residence in Honouliuli shows the open, sparsely vegetated plain of 'Ewa, likely an effect of the years of cattle grazing across the plain (Figure 2).

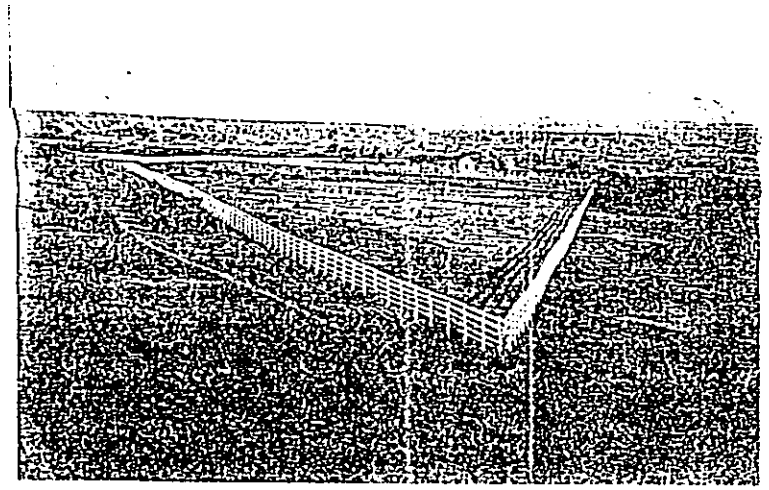


Figure 2 1880s photograph of James Campbell's residence on the 'Ewa Plain (Bishop Museum Archives)

Until 1889 most of Campbell's lands in Honouliuli were used exclusively for cattle ranching. At that time, one planter remarked "the country was so dry and full of bottomless cracks and fissures that water would all be lost and irrigation impracticable" (Ewa Plantation Co. 1923:6-7). But the capital of entrepreneurs like James Campbell, Benjamin Dillingham and W.R. Castle, along with the rapid development of artesian water, led to the creation of Ewa Plantation which was incorporated in 1890.

> The first crop, 2,849 tons of sugar, was harvested in 1892. Ewa was the first all-artesian plantation and, in spite of early troubles...it gave an impressive demonstration of the part artesian wells were to play in the subsequent history of the Hawaiian sugar industry. (Kuykendall 1967 69)

Contemporaneous with the establishment and growth of the Ewa Plantation was the development of the Oahu Railway and Land (O.R &L.) Company, organized by Benjamin Dillingham in 1889, which connected outlying areas of O'ahu to Honolulu. During the last decade of the 19th century, the railroad would reach from Honolulu to Pearl City in 1890, to Waianae in 1895, to Waialua Plantation in 1898, and to Kahuku in 1899 (Ibid.:100).

During the 20th century, the Ewa Plantation would continue to grow and, by the 1930s, would encompass much of the eastern half of the Honouliuli *ahupua'a* (Figure 3). This growth impelled the creation of plantation villages to house the growing immigrant labor force working the fields. In the decade of the 1890s, the plantation built 72 houses, cottages or dwellings; in the first decade of this century, 536; in the second decade, 132, in the 1920s, 285; in the 1930s, 108; and in the 1940s, only 35. Censuses of the Ewa Plantation population record 4967 persons in 1928, 4477 in 1929, and 4100 in 1932. After the outbreak of World War II, which siphoned off much of the plantation's manpower, along with the changeover to almost complete reliance on mechanical harvesting in 1938, there was little need for the large multi-racial (Japanese, Chinese, Okinawan, Korean, Portuguese, Spanish, Hawaiian, Filipino, European) labor force that had characterized most of the early history of the plantation.

During the subsequent decades of the 20th century, sugar cane operations at Ewa Plantation were phased out and, more recently, former cane lands have been rezoned for residential development. Structures in the area of the former plantation villages have fallen into disrepair or have been demolished. However, portions of the area - including Varona Village, Tenney Village and Renton Village - have been designated the 'Ewa Villages Historic District (State site 50-80-12-9786) which has been nominated for National Historic Landmark status. Additionally, the still-extant O.R.&L. rail line through Honouliuli has been placed on the National Register of Historic Places (Site 50-80-12-9714).

An aerial photograph of the 1980s indicates that, by the last decades of the twentieth century, the present project area is a portion of an 'Ewa landscape that has been fully developed by commercial agriculture and urban expansion (Figure 4).

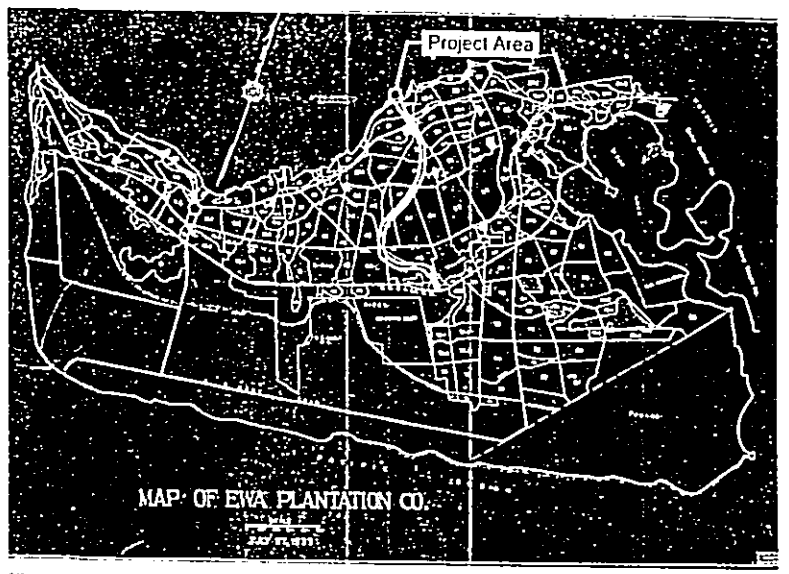


Figure 3 1939 "Map of Ewa Plantation Co." (from Conde and Best 1973) with outline of present project area corridor indicated

Figure 4 1980s aerial photograph of 'Ewa with present project area indicated

IV. ARCHAEOLOGICAL RESEARCH IN THE VICINITY OF THE PROJECT AREA

During a 1930 survey of O'ahu for the B.P. Bishop Museum, J. Gilbert McAllister identified Site 146 in Honouliuli *ahupua'a*:

> Ewa coral plains, throughout which are remains of many sites. The great extent of old stone walls, particularly near the Pu'uloa Salt Works, belongs to the ranching period of about 75 years ago. It is probable that the holes and pits in the coral were formerly used by the Hawaiians. Frequently the soil on the floor of the larger pits was used for cultivation, and even today one comes upon bananas and Hawaiian sugar cane still growing in them. They afford shelter and protection, but I doubt if previous to the time of Cook there was ever a large population here. (McAllister 1993:109)

McAllister's survey map places Site 146 in the general vicinity of the present study area, but this type locale is presently observable in 'Ewa more than 3 kilometers to the southeast of the study area. The only other early documented site within the vicinity of the corridor was a *heiau* on Pu'u Kapolei, located more than 3 kilometers to the west.

Beginning in the 1980s, archaeological research has been conducted in Honouliuli in the general vicinity of the present study area. An archaeological reconnaissance survey (Rosendahl 1987) was conducted in association with the development of the 232-acre "West Loch Estates" Residential Increments I and II project, part of which lies to the east of the present study area. An archaeological reconnaissance (Kennedy 1988) and subsequent archaeological subsurface survey (Davis 1988) were conducted in association with the development of the 1016-acre "Ewa Gentry" project area which lies immediately to the east of the *makai* portion of the present study area.

The combined surface and subsurface reconnaissance survey of the "West Loch Estates" project area confirmed an initial impression that the project area had been extensively and almost entirely modified by decades of commercial sugar cane cultivation (Rosendahl 1987:9). This study identified a modern cemetery, two historic sites of minimal integrity and an ambiguous midden deposit (Ibid.:7,9). One of the historic sites recorded (T-3) was related to the plantation settlement of Lower Village. It was noted that some artifacts "indicate the possibility of pre-1900 occupation" (Ibid.:8).

In the "Ewa Gentry" project area the initial reconnaissance (Kennedy 1988) found no surface evidence of potentially significant cultural/historic remains. A subsequent subsurface exploration was undertaken. Eighteen backhoe trenches were excavated however "no evidence of past in situ cultural activity was found anywhere in the Ewa Gentry project area" (Davis 1988:10).

In 1990, Cultural Surveys Hawaii conducted an archaeological reconnaissance survey of an approximately 616-acre area which included "three extant plantation villages (Renton Village, Tenney Village and Varona Village), the sites of three former plantation villages (C Village, Mill Village, Middle Village) and several other sites associated with the 'Ewa Plantation infrastructure..." (Hammatt et al.1990:i). The survey found no evidence of any prehistoric activity within the project area and recommended further documentation of some of the ruined plantation structure sites.

V. FIELD INSPECTION FINDINGS

Field investigation of the project area corridor was conducted on April 1, 2004 (Figures 5 & 6). The corridor was also previously investigated by Cultural Surveys Hawai'i in June 1996. Virtually the entire corridor comprises land formerly under cultivation of sugar cane which commenced in the late 19th century. Since the cessation of cane production, portions of the corridor have undergone varied levels and types of development.

Immediately *mauka* of Renton Road and beyond the former plantation villages the corridor continues west, following - for approximately 1500 meters - the route of an asphalt-paved road that appears to have been constructed in association with the Ewa Villages Golf Course along the east side of the corridor. The corridor on both sides of the road is leveled and cleared, and no archaeological evidence was observed.

At the north corner of the parcel, the corridor curves mauka (north) to Farrington Highway through now-idle cane fields, the route demarcated by an alignment of electricity lines. This portion was surveyed on foot. No properties related to traditional Hawaiian culture were observed anywhere near the corridor. Two plantation-era structures, however, were observed. A ditch (following alongside a plantation road) crosses the corridor 1300 meters *makai* of Farrington Highway. The ditch is approximately 2 meters (6.6 ft.) wide and 1.5 meters (4.9 ft.) deep, and is constructed of cut stone with a mortar coating. It is in good condition within the corridor and continues intact considerable distances to the east and west of the corridor. Approximately 800 meters *makai* of Farrington Highway, a flume remnant was observed on the west side of the corridor. The flume consists of half-round sheet metal supported by a brick and wood framework and is raised approximately .6 m. (2 ft.) above the ground surface. The flume remnant has been wrecked and other discontinuous remnants of the flume were observed continuing west beyond the corridor.

Mauka of Farrington Highway the corridor follows the route of Pālehua Road *mauka* of the H-1 Freeway. Two shallow gulches coursing through the corridor - Hunehune Gulch to the west of Pālehua Road and Kalo'i Gulch to the east - were inspected on foot. The northeast third of the parcel at the *mauka* end of the corridor, on both sides of the H-1 Freeway, comprises land that is currently being cultivated (non-sugar crops). The remainder of the open land within the corridor on both sides of the H-1 Freeway, which was inspected on foot, shows evidence of former sugar cultivation. Wrecked remnants of a flume alignment were observed on both sides of Pālehua Road just *makai* of the H-1 Freeway. No properties related to traditional Hawaiian cultural practices were observed in this portion of the corridor.

Figure 5 View of *makai* commencement of project area corridor (view north)

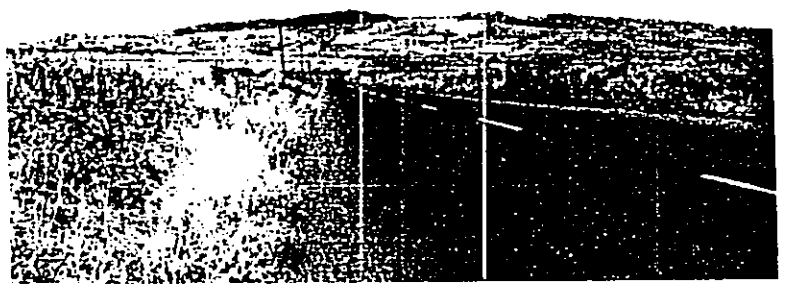


Figure 6 View of project area corridor near intersection of Palehua Road and Farrington Highway (view north toward H-1)

VI. RESULTS OF COMMUNITY CONTACT PROCESS

Throughout the course of this assessment, an effort was made to contact and consult with Hawaiian cultural organizations, government agencies, and individuals who might have knowledge and/or concerns about traditional cultural resources, practices and beliefs specifically related to the Northern Leg of the Western Bypass Road project area. This effort was made by letter, e-mail, telephone or in-person contact. In the majority of cases, letters – along with a map and aerial photograph of the project area – were mailed with the following text:

> At the request of Parsons Brinckerhoff Quade & Douglas, Inc., Cultural Surveys Hawaii has undertaken a cultural impact evaluation of an approximately 15,000 ft. (4.6 kilometer) long land corridor in the *ahupua'a* of Honouliuli in the 'Ewa District of O'ahu. The corridor is proposed for a north/south-oriented roadway connecting the *makai* portions of 'Ewa to the H-1 Freeway. The *makai* (south) end of the corridor commences at Renton Road between Varona Village and Tenney Village. As it runs *mauka* and northwest, the corridor incorporates a portion of the future development of Kapolei Parkway. *Mauka* of the present Kapolei Parkway, the corridor runs north, traversing former sugar cane fields, then paralleling and crossing Pālehua Road over Farrington Highway, and terminating at the H-1 Freeway. The purpose of the cultural evaluation is to evaluate potential impacts of the project to traditional cultural practices.
>
> We are seeking your input regarding the following issues:
>
> > Identification of traditional Hawaiian activities including gathering of native plants, animals and other resources.
> >
> > Identification of existing archaeological or cultural sites, trails, burials etc., which may be impacted by the proposed study.
> >
> > Cultural associations with the study area through legends, traditional use or otherwise.

Attempts were made to contact fourteen individuals, cultural organizations and government agencies (see Table 1 below). The organizations and agencies include: the Office of Hawaiian Affairs, the Burials Program of the State Historic Preservation Division, Hawaiian Civic clubs, and the Culture and History Branch of the State Historic Preservation Division. The table below presents the responses and comments received.

Table 1 Community Contacts

Name	Organization, Affiliation	Comments
Āila, William	Hui Mālama Chairperson	Referred to Shad Kane
Collins, Sara	Archaeology Branch Chief, State Historic Preservation Division	Referred to reports at the State Historic Preservation Division
Guth, Heidi	Native Rights Policy Analyst, Office of Hawaiian Affairs	No reply/
Espero, Willie C.	Senator District 20, Hawai'i State Legislature	No reply.

Name	Organization, Affiliation	Comments
Gabbard, Mike	Councilman District 1, Honolulu City Council	North-South Road and the Kapolei Parkway are two key roadway projects that will help reduce traffic congestion in the area.
Ka'iliwai, George Jr.	Chair, Hawaiian Civic Club of Pu'uloa and 'Ewa	No reply
Kane, Shad	'Ahahui Siwila Hawaiian Civic Club	No reply.
Kanno, Brian	Senator District 19, Hawai'i State Legislature	No reply
Kapeliela, Kana'i	Burials Program Manager State Historic Preservation Division	Referred to reports at the State Historic Preservation Division.
Komori, Eric	Historic Sites Inventory Coordinator, State Historic Preservation Division	Referred to reports at the State Historic Preservation Division.
Lenchenko, Tom	District Superintendent	No reply.
Matkell, Ku'iana	Burials Program, State Historic Preservation Division	No reply.
Nāpoka, Nathan	History and Cultural Branch Chief, State Historic Preservation Division	Referred to Shad Kane.
Tiffany, Nettie Pualani	Oahu Island Burial Council 'Ewa District	She is more familiar with the area Ko'Olina near the sea.

VII. TRADITIONAL CULTURAL PRACTICES

Traditional cultural practices are based on profound awareness concerning harmony between man and their natural resources. The Hawaiians of old depended on these cultural practices for survival. Based on their familiarity with specific places and through much trial and error, Hawaiians communities were able to devise systems that fostered sustainable use of nature's resources. Many of these cultural practices have been passed down from generation to generation and are still practiced in some of Hawaii's communities today.

This project seeks to assess traditional cultural practices as well as resources pertaining to the project area within Honouliuli Ahupua'a. This section will convey the different types of traditional practices, cultural resources associated with the vicinity. Excerpts from interviews are incorporated in sections where applicable.

A. Gathering for Plant Resources

Upland resources were utilized by Hawaiians for a multitude of purposes. Forest resources were gathered, not only for the basic needs of food and clothing, but for tools, weapons, canoe-building, house construction, dyes, adornments, hula, medicinal and religious purposes. Within the project area itself no specific documentation was found in regards to gathering of plants during traditional Hawaiian times. During this assessment there were no ongoing practices related to traditional gathering rights identified in the present project area. None of the individuals contacted or interviewed for this assessment identified any native gathering practices within the project area.

B. Marine Resources

The sea is a rich resource and the Hawaiian people were traditionally expert fishermen. Fish of all types supplied the Hawaiian diet with a rich source of protein. Today many people continue to fish along the shoreline south of the project area.

C. Traditional Hawaiian Sites

During this assessment there were no traditional Hawaiian sites identified within the proposed project area.

D. Burials

No specific documentation was found regarding *'iwi* (ancestral remains) in the project area. None of the people contacted mentioned any burials that would be affected by the proposed project.

E. Trails

Trails served to connect the various settlements throughout the District of 'Ewa. Based on nineteenth and twentieth century maps the primary transportation routes *mauka/makai* correlated closely to the existing major roadways.

F. *Wahi pana* (Storied Places)

While clearly Pu'u Kapolei (Kapolei Regional Park west of the current project area) was a storied place (*wahi pana*) associated with a number of Hawaiian traditions we have identified no other storied places in the immediate vicinity of the project area.

VIII. SUMMARY OF FINDINGS

Honouliuli, as a unit, contains all the geographic elements of a typical Hawaiian valley *ahupua'a*, except they are arranged geomorphically in an atypical relationship. The *ahupua'a* is not organized around a single drainage network but shares the west portions of Waikele drainage in its upper reaches. A highly advantageous characteristic for human subsistence is included in a vast coastline and fringing reef, as well as an extensive limestone plain that would support only limited agriculture but would be excellent for bird catching in early times, and a huge expanse of sloping forest land.

The central locale within the *ahupua'a* of Honouliuli in terms of population, as well as cultivated foods, was the *'ili* of Honouliuli. There is good reason to assume, given the lack of intensive agricultural resources in other locations during prehistoric times, that all other habitation zones were economically and socially co-dependent.

The present project area – located in the broad, dry inland plain of central Honouliuli – was well outside the traditional centers of permanent habitation within the *ahupua'a*. The only preserved Hawaiian place name associated with any feature in the immediate vicinity of the project area is Kalo'i Gulch, which courses through portions of the project area. An indication that this portion of Honouliuli was not unknown in traditional Hawaiian times are stories concerning "Waihuna" or "Punahuna", a hidden spring associated with Kalo'i Gulch.

Another feature of the landscape was the traditional Hawaiian trail through Honouliuli going from Pu'uloa to Pu'u Kapolei and Waimanalo ('Ewa) (I'i 1983.97). It seems most likely that this trail followed the route of the present Farrington Highway across the present project area. However, no remnant traces of this trail have been documented in modern times.

Given the environmental constraints within this portion of the *ahupua'a*, it is likely that the major traditional cultural practice associated with the region including the present project area would have been the gathering of native plant resources. Barbara Frierson (1973) has compiled a list of native plant species present in Honouliuli before 1790. Plants present in the *ahupua'a* lowlands, where the present project area is located, include:

Common/Hawaiian Name	Scientific Name	Use
Hala, pandanus	Pandanus odoratissimus	Weaving
Hau, hibiscus	Hibiscus tiliaceus	Cordage
Milo	Thespesia paradisiaca	Wood used for bowls
Sumac, nenelau	Rhus sandwicensis Rhus chinensis	
'Ilima	Sida cordifolia S. fallax	Leis, medicine
Kou	Cordia subcordata	Bowls

Common/Hawaiian Name	Scientific Name	Use
Makaloa, sedge	Cyperus laevigatus	
Pili grass	Heteropogon contortus	Thatch
Kakonakona, grass	Panicum torridum	
honohonowai	Commelina nudiflora	
Ma'o, cotton	Gossypium tomentosum Abutilon incanum	
'Ulei	Osteomeles anthyllidifolia	
'Uhaloa	Waltheria americana	
Koali'ai	Ipomoea cairica	
Pā'ū o Hiiaka	Jacquemontia sandwicensis	
Ko'oko'olau	Bidens sp.	
'Ulu, breadfruit	Artocarpus incisus	
Niu, coconut	Cocos nucifera	

The accessibility of Honouliuli lands, including the present project area, to the Hawaiians for gathering or other cultural purposes would be radically curtailed during the second half of the nineteenth century. As noted above in this evaluation, by the 1870s, herds of cattle grazing across the 'Ewa Plain likely denuded the landscape of much of the native vegetation. Subsequently, during the last decade of the nineteenth century, the traditional Hawaiian landscape was further distorted by the introduction and rapid development of commercial sugar cane cultivation. Throughout the twentieth century sugar cane cultivation was the dominating land use activity within the project area. Cane cultivation – and the sense that the project area was private property – restricted access inside the project area to employees of 'Ewa Plantation.

On the evidence gathered for this evaluation, at present no contemporary or continuing cultural practices occur within the project area specifically.

During field investigation of the project area no evidence was encountered of any on-surface historic properties related to traditional Hawaiian culture. The decades of sugar plantation activities would have eliminated any such properties.

Based on the above findings, the North-South Road and Kapolei Parkway Project will have minimal direct impact upon native Hawaiian cultural resources, beliefs and practices.

IX. REFERENCES

Armstrong, Warwick, ed.
1973 Atlas of Hawai'i, University of Hawaii Press: Honolulu.

Conde, Jesse and Gerald M. Best
1973 Sugar Trains: Narrow Gauge Rails of Hawaii. Glenwood Publishers: Felton, Calif.

Davis, Bertell D.
1990 Human Settlement in Pristine Insular Environments: A Hawaiian Case Study from Barbers Point, Southwestern O'ahu, Ph.D. Dissertation, University of Hawaii, Honolulu.

1988 "Final Report Archaeological Subsurface Survey of the Proposed Ewa Gentry Project Area, Honouliuli, 'Ewa, O'ahu." B.P. Bishop Museum: Honolulu.

Davis, Bertell D. and Alan E. Haun
1987 Interim Report: Phase 2) Intensive Survey and Test Excavations West Beach Data Recovery Program, Honouliuli, Ewa, Island of Oahu, PHRI Inc.

Dicks, A. Merrill, Alan E. Haun and Paul H. Rosendahl
1987 Archaeological Reconnaissance Survey for Environmental Impact Statement, West Loch Estates Golf Course and Parks, Honouliuli, 'Ewa, O'ahu, Paul H. Rosendahl, Ph.D., Inc.

Foote, Donald E., E.L. Hill, S. Nakamura and F. Stephens
1972 Soil Survey of the Islands of Kaua'i, Oahu, Maui, Molokai and Lanai, State of Hawaii, U.S. Dept. of Agriculture, U.S. Government Printing Office, Washington, D.C.

Ewa Plantation Company
1923 Ewa Plantation Company Annual Report.

Frierson, Barbara
1973 "A Study of Land Use and Vegetation Change: Honouliuli, 1790-1925." M.A., Plan B Paper, Department of Geography, University of Hawaii at Manoa, Honolulu.

Hammatt, Hallett H. and Rodney Chiogioji
1996 Archaeological Reconnaissance Survey of a 29,000-Ft. Long Corridor Within Honouliuli Ahupua'a, 'Ewa District, O'ahu Island Cultural Surveys Hawai'i, Kailua, HI.

Hammatt, Hallett H. and William H. Folk
1981 Archaeological and Paleontological Investigation at Kalaeloa (Barber's Point), Honouliuli, 'Ewa, O'ahu, Federal Study Areas 1a and 1b, and State of Hawai'i Optional Area I, ARCH 14-115.

Hammatt, Hallett H., David Shideler, and William Folk
1990 Archaeological Reconnaissance of the 'Ewa Villages Project Site, Honouliuli, 'Ewa, O'ahu. Cultural Surveys Hawai'i, Kailua, HI.

Handy, E.S. Craighill and Elizabeth G. Handy
1972 Native Planters in Old Hawaii: Their Life, Lore, and Environment, Bishop Museum Bulletin 233, Honolulu.

'I'i, John Papa
1959 Fragments of Hawaiian History. Bishop Museum Press: Honolulu.

Kennedy, Joseph
1988 "Archaeological Reconnaissance Report Concerning the Proposed Ewa Gentry Project in Honouliuli, Oahu."

Kuykendall, Ralph S.
1967 The Hawaiian Kingdom, Vol.III. University of Hawaii Press: Honolulu.

Macdonald, G.A. and A.T. Abbott and F. L. Peterson
1983 Volcanoes in the Sea. Second Edition, University of Hawaii Press, Honolulu.

McAllister, J. Gilbert
1933 Archaeology of Oahu. Bulletin 104. Bishop Museum: Honolulu

Pukui, Mary K., Samuel H. Elbert and Esther Mookini
1974 Place Names of Hawaii. University of Hawaii Press: Honolulu.

Rosendahl, Paul
1987 Archaeological Reconnaissance Survey for Environmental Impact Statement, West Loch Estates - Residential Increments I and II, Land of Honouliuli, Ewa District, Island of Oahu, PHRI.

Schmitt, Robert C.
1973 The Missionary Censuses of Hawaii. Bishop Museum: Honolulu

Sterling, Elspeth P. and Catherine C. Summers (comp)
1978 Sites of O'ahu, Dept. of Anthropology, B.P Bishop Museum, Honolulu, Hi

APPENDIX N

SECONDARY AND CUMULATIVE IMPACTS REPORT

NORTH-SOUTH ROAD AND KAPOLEI PARKWAY PROJECT

Cumulative and Secondary Impacts Report

Prepared by:

PARSONS BRINCKERHOFF QUADE & DOUGLAS, INC.

July 2004

CUMULATIVE AND SECONDARY IMPACTS

1.0 INTRODUCTION

According to the Federal Highway Administration's (FHWA) "Position Paper on Secondary and Cumulative Impact Assessment" (August 20, 1992), the 1978 regulations of the Council on Environmental Quality (CEQ) implementing the National Environmental Policy Act (NEPA) require agencies to examine indirect consequences all proposed federal activities and programs. These consequences may occur in areas beyond the immediate influence of a proposed action and at some time in the future. The CEQ prepared a handbook entitled "Considering Cumulative Effects Under the National Environmental Policy Act" (January 1997), in which they refer to these consequences as secondary and cumulative impacts. CEQ guidelines for implementing NEPA broadly define both cumulative and secondary impacts.

Cumulative effects are impacts which result from the incremental consequences of an action when added to other past and reasonably foreseeable future actions (40 Code of Federal Regulations [CFR] 1508.7). These impacts are less defined than secondary effects. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

Secondary effects are those that are "caused by an action and are later in time or farther removed in distance but are still reasonably foreseeable" (40 CFR 1508.8). Generally, these impacts are induced by the initial action. They comprise a wide variety of secondary effects, such as changes in land use, water quality, economic vitality and population density. Effects and impacts as used in these regulations are synonymous.

This cumulative and secondary effects analysis uses the best information currently available to assess the extent to which the proposed North-South Road and Kapolei Parkway project interacts with reasonably foreseeable past, present, and future projects in the Ewa Plain to cause potential impacts above and beyond the direct impacts of the project alone. Section 2.0 addresses potential cumulative impacts, and Section 3.0 addresses secondary impacts.

2.0 CUMULATIVE IMPACTS

The purpose of cumulative effects analysis is to ensure that federal agencies consider the full range of consequences of actions related to project activities. NEPA, the CEQ regulations, and Hawaii's Environmental Impact Statement Law (Hawaii Revised Statutes Chapter 343 [HRS 343]), require analysis of cumulative issues within the context of the action, alternatives, and effects. The context of cumulative analyses

includes resources, ecosystems, and human communities considered over a meaningful geographic area and through time (past, present, and future).

The cumulative impact analysis consists of evaluating impacts related to projects that are reasonably foreseeable and would be constructed or operated during the life of the proposed project. The time frame for the cumulative analysis is the 20-year design life of the proposed project after construction. The 20-year time frame was selected because this is the maximum period of time that a given transportation facility remains effective and has a contributing influence on the transportation system.

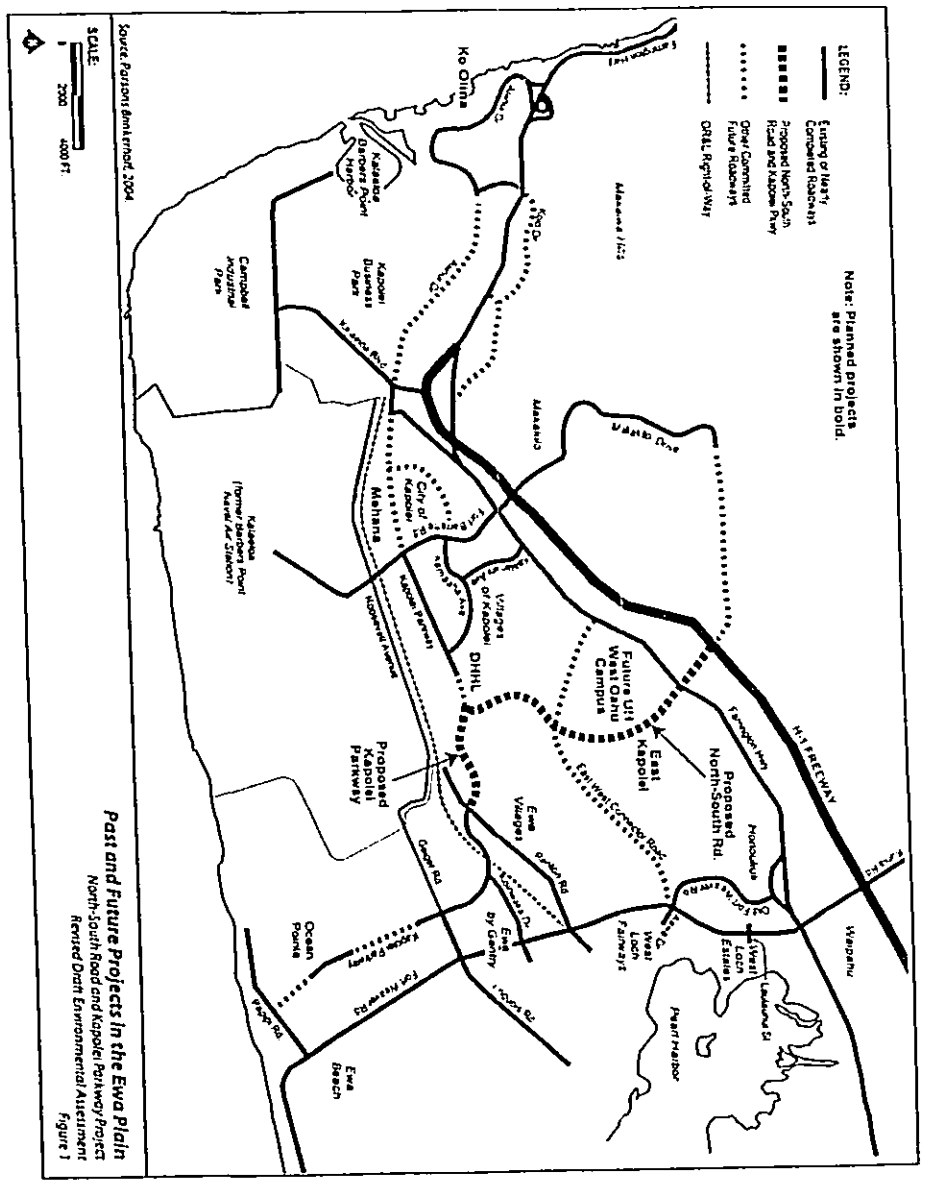
Cumulative impacts to resources in the project area may result from residential, commercial, industrial, and infrastructure development. These land use activities can degrade habitat and species diversity through consequences such as displacement and fragmentation of habitats and populations, alteration of hydrology, contamination, erosion, sedimentation, and disruption of movement and/or migration corridors. Cumulative impacts include increased demand for public services and infrastructure, such as water supply and sewage treatment, schools, recreational facilities, and roadways, as well as increased adverse effects on noise levels, air quality, water quality and the permanent loss of agricultural land. They can also contribute to potential community impacts identified for the project, such as changes in community character, traffic patterns, housing availability and employment.

2.1 METHODOLOGY

A detailed methodology was prepared for analyzing cumulative impacts, as well as secondary impacts, in the Secondary and Cumulative Effects Analysis Guidelines (Parsons Brinckerhoff, 2004).

The geographic area encompassed by this cumulative impacts analysis is the Ewa Plain, as shown in Figure 1. This geographic area was determined by considering the existing natural, physical, environmental, and socioeconomic conditions of the area, and examination of the existing and planned development projects in the Ewa Plain that would potentially utilize or be affected by the proposed North-South Road and/or Kapolei Parkway. The geographic boundaries encompassed by this cumulative impacts analysis include lands in the vicinity of the North-South Road and Kapolei Parkway project, from the Interstate Route H-1 (H-1 Freeway) makai to the Pacific Ocean, and from Ft. Weaver Road west to Farrington Highway. The existing and planned projects within this area were assumed as part of the baseline existing conditions for this cumulative impacts analysis.

As stated above, this cumulative impacts analysis considers past, present, and reasonably foreseeable future projects in the area that collectively have the potential to cause adverse effects. Past projects are assumed to be part of the existing environment, and are therefore not considered separately. Therefore, the types of projects considered in this report are existing projects and planned projects, as well as projects similar in nature to the proposed action i.e. transportation projects. While the proposed project is being designed to minimize impacts and takes existing projects



into account, it has no control over conditions already established by other projects Depending on the status of a particular project, each of the projects included in this cumulative impacts analysis is supported by different levels of available information. Public documents, conceptual plans, documents or applications prepared as part of the environmental review or regulatory processes were the primary sources of information. When adequate information on specific aspects of other projects was not readily available, nor could be obtained through reasonable efforts, professional judgment was used to analyze potential impacts

One of the primary sources of information about the future development of the Ewa Plain is the City and County of Honolulu Ewa Development Plan (Ewa DP) issued by the City and County of Honolulu Planning Department (August 1997, Revised May 2000). The Ewa DP is based on the City's General Plan, which designated Ewa and specifically Kapolei as a Secondary Urban Center for Oahu. This "Second City" was to be the focus of major economic activity and housing development, and a center for government services, with residential development of fringe areas in Ewa and Central Oahu.

It should be noted that the Ewa DP includes the construction of the North-South Road and completion of Kapolei Parkway as integral components of the plan Both roads are shown on figures in the Ewa DP, including the Open Space Map, the Urban Land Use Map, and the Phasing Map

The remainder of this cumulative impacts analysis identifies existing and planned development projects in Section 2 3. Considering these existing and planned projects, Section 2.4 provides an overall assessment of each of the following environmental and social discipline areas.

- Land Use
- Geology, Soils, and Farmland
- Infrastructure
- Social, Cultural, and Economic Conditions
- Air Quality
- Noise
- Ecosystems
- Water Resources
- Hazardous Materials
- Historic Resources
- Parks and Recreation
- Visual & Aesthetic Resources

2.2 REGIONAL PLANNING EFFORTS

Substantial residential growth will occur primarily in master planned communities in the Ewa Plain. Almost 28,000 new residential units are anticipated by 2020, including the City of Kapolei, Ewa by Gentry, Ocean Pointe, Ewa Villages, Ko Olina, Laulani, Makaiwa

Hills, Makakilo, the Villages of Kapolei, and an area some refer to as East Kapolei The Ewa DP calls for these communities to be designed to meet a wide range of housing needs, including affordable units, starter homes, large multi-family and single family units, as well as housing for students going to school at the University of Hawaii -West Oahu Campus (UH-West Oahu)

A key element of the vision put forth in the Ewa DP is the creation of the Secondary Urban Center, which will provide a wide range of jobs visitor and activity centers in Ko Olina and Ocean Pointe (formerly called Ewa Marina), heavy and light industrial areas near the Kalaeloa Barbers Point Harbor, offices and retail centers in the City of Kapolei, and community and neighborhood centers The Ewa DP anticipates that job growth will be as substantial as housing growth, increasing from 17,000 jobs to more than 64,000 jobs in 2020.

Population and economic projections to the year 2025 prepared by the State of Hawaii Department of Business, Economic Development and Tourism (DBEDT) indicate that the population of Honolulu County in 2000 was approximately 872,900 and is projected to reach approximately 999,400 in 2020, and approximately 1,029,800 in 2025, an increase of approximately 15 percent and 18 percent respectively. During the same periods, total civilian jobs in Honolulu County are expected to increase from approximately 507,000 in year 2000, to 658,300 in 2020 and to 694,300 in 2025, reflecting increases of approximately 30 percent and 37 percent, respectively (DBEDT 2025 Series, February 2000).

2.3 PROJECTS CONSIDERED FOR CUMULATIVE ANALYSIS

The local environment, particularly in areas near the project site, includes existing and planned residential, commercial, industrial, and institutional development A large portion of the area surrounding the proposed project site consists of former sugar cane plantation land. Historic 1927 United States Geological Survey (USGS) aerial photographs were examined and confirmed that the Ewa Plain was primarily in agricultural use until the 1990's

The following criteria were considered in identifying past, present, and reasonably foreseeable future projects that could result in cumulative impacts to the Ewa Plain's resources:

1. Projects that are similar in nature, could affect similar resources, or are located in close geographic proximity to the proposed project (Section 2.3.1)

2. Past projects that have been constructed and are part of the baseline, existing conditions These projects may be expanding, and may have the potential to generate additional cumulative impacts (Section 2 3 2)

3. Projects that are proposed for development that have received or are pending environmental and/or regulatory review or approvals, and are expected to be implemented (Section 2.3.3).

These projects include housing, commercial, and industrial developments; infrastructure projects; and new schools, including UH-West Oahu.

Specifically, the cumulative effects analysis included the following projects, which are shown on Figure 1.

2.3.1 Projects Similar in Nature

The following transportation projects are planned for the Ewa Plain:

- Widening Fort Weaver Road, from 4 lanes to 6 lanes
- Widening Fort Barrett Road, from 2 lanes to 4 lanes
- Widening Farrington Highway, from 2 lanes to 4 lanes
- Completing Kapolei Parkway missing segments, and extending it west to Ko Olina. Includes constructing the segment between NSR and the existing KP cul-de-sac in the Villages of Kapolei.
- Extending Kamaaha Boulevard west into City of Kapolei
- Adding ramps at H-1 Freeway/Makakilo Interchange, oriented towards Waianae
- Adding new Kapolei interchange between Makakilo and Palailai interchanges
- Extending Palehua Road segment, between North-South Road interchange and Makakilo Drive
- Adding H-1 Freeway HOV lanes, increasing total lanes in H-1 Freeway from 6 to 8 lanes
- Regional Bus Rapid Transit miscellaneous projects

2.3.2 Existing Projects

2.3.2.1 Ewa Villages

Ewa Villages is the oldest community in the Ewa region, as discussed in Section 3.1.1. At one time there were eight villages housing immigrant plantation workers. Now only Renton, Tenney, Varona, and Fernandez Villages remain. Renton and Fernandez Villages were redeveloped by the City and County of Honolulu (City) in the late 1970s and early 1980s, and Tenney Village was redeveloped in the 1990s for affordable housing. Ewa Villages also includes district and neighborhood parks, a municipal golf course as well as other golf courses, and a small commercial area. The Ewa Plantation Villages was placed as a historic district on the Hawaii Register of Historic Places in 1996.

Ewa Villages has an approximate land area of one square mile, and had a 2000 population of 4,741 people and 1,274 housing units, approximately 79 percent of which were owner-occupied. These figures were a 25 percent increase above the 1990 population of 3,780 and a 36 percent increase above the 939 housing units in 1990. Of industries providing employment for Ewa Villages, 16.7 percent were in educational, health and social services; 15.7 percent were in arts, entertainment, recreation,

accommodation and food services; and 14.8 percent were in retail trade. The mean travel time to work was 35.6 minutes (www.city-data.com/, accessed April 2004).

The Ewa DP estimates that there will be approximately 1,585 housing units in Ewa Villages in 2020, consisting of affordable and market-prices housing, including 200 units of rehabilitated housing.

According to the Oahu Metropolitan Planning Organization's (OMPO) Forecasted Land Use Model's Population and Employment Comparison for Years 2000 and 2025 (OMPO's *Land Use Model*), population for "Ewa & Ewa Beach" (see Section 2.3.2b Ewa Beach below) is expected to increase by 16 percent, the number of housing units is expected to increase by 182 percent, and total employment is expected to increase by 30 percent during that period.

2.3.2.2 Ewa Beach

Ewa Beach, an existing urban area, has a land area of 1.4 square miles, and had a 2000 population of 14,650 people and 3,515 housing units, of which approximately 69 percent were owner-occupied. This was a 2.3 percent increase above the 1990 population of 14,315 people and a 2.6 percent increase above the 1990 number of 3,426 housing units. Of industries providing employment for Ewa Beach, 17.5 percent were in educational, health and social services; 17.5 percent were in arts, entertainment, recreation, accommodation and food services; and 13.6 percent were in retail trade. The mean travel time to work was 39.6 minutes (city-data.com).

From the population data it is apparent that there has been little change in Ewa Beach in the past decade or more. Little additional growth is anticipated in Ewa Beach, according to Table 2.2 Phasing of Ewa Development, in the Ewa DP.

2.3.2.3 Ewa by Gentry

Ewa Gentry has a land area of 0.3 square mile, and had a 2000 population of 4,939 people, with 1,843 housing units, of which approximately 68 percent were owner-occupied. This was a 148 percent increase above the 1990 population of 1,992 people and a 145 percent increase above the 1990 number of 752 housing units. Of industries providing employment for Ewa by Gentry, 18.8 percent were in educational, health and social services; 15.5 percent were in arts, entertainment, recreation, accommodation and food services; 14.4 percent were in public administration; and 10.3 percent were in retail trade. The mean travel time to work was 36.6 minutes (www.city-data.com/, accessed April 2004).

The Ewa DP notes that 7,678 housing units are anticipated in Ewa by Gentry by the year 2010.

2.3.2.4 Makakilo

Makakilo, a hillside community started in the early 1960s, has a land area of 3.1 square miles, and had a 2000 population of 13,156 people, with 4,119 housing units (single-

family homes and townhouses), of which approximately 70 percent were owner-occupied. This was a 34 percent increase above the 1990 population of 9,828 people and a 35 percent increase above the 1990 number of 3,050 housing units. Of industries providing employment for Makakilo, 16.9 percent were in educational, health and social services, 12.5 percent were in public administration, and 13.7 percent were in retail trade. The mean travel time to work was 35.3 minutes (www.city-data.com/, accessed April 2004).

According to the OMPO Land Use Model data comparisons between Year 2000 and Year 2025, population is expected to increase by 28 percent, the number of housing units is expected to increase by 43 percent, and total employment is expected to increase by 428 percent during that period.

2.3.2.5 Villages of Kapolei

The Villages of Kapolei consist of eight privately developed residential villages, three schools (an elementary, intermediate, and high school), a senior housing center, an 18-hole golf course, neighborhood parks and two recreation centers. The first homes for the Villages of Kapolei were completed in 1990. Five of the villages have been built with three more planned for future development. Some of the units are designated as "affordable" (below market price) to allow buyers who would not otherwise be able to own a market priced home. Like the City of Kapolei, the Villages of Kapolei are a vital component of Oahu's Secondary Urban Center.

According to the OMPO Land Use Model data, the Villages of Kapolei had a 2000 population of 3,301 people, and are projected to increase by approximately 103 percent to a total population of 6,712 by 2025. Housing units in Villages of Kapolei in 2000 were estimated at 888, and OMPO projects a total of 2,027 housing units by 2025, an increase of 128 percent. OMPO projects the largest growth to be in total employment, rising from 53 in 2000 to total employment of 2,756 in 2025, an increase of 510 percent.

2.3.2.6 West Loch Estates and West Loch Fairways

West Loch Estates, developed by the City's Department of Housing and Community Development, is located on the shores of Pearl Harbor's West Loch. The master plan envisioned a mix of single-family residential units, housing for seniors, a convenience commercial area, day care center, district park, elementary school, park and ride facility, municipal golf course, and a shoreline park. Sixty percent of all the housing units were to be affordable housing. Phase I of the project included 600 single-family homes on approximately 4,000 square-foot lots.

Another West Loch master planned neighborhood is the West Loch Fairways project, which also includes affordable housing. West Loch Fairways includes 720 single-family homes and 120 townhouses. Some of the homes border the public West Loch Golf Course. The project was built in the 1990's by the City and County of Honolulu Department of Housing and Community Development, primarily as an affordable

housing project. However, now all homes are market value. No new homes are being built.[1]

2.3.2.7 James Campbell Industrial Park

The James Campbell Industrial Park is Hawaii's largest industrial park (1,367 acres) and Kapolei's largest job center, accounting for more than an 4,500 jobs. The park is strategically located next to Kalaeloa/Barbers Point Harbor, the state's second busiest commercial harbor. The park has Foreign Trade Zone status and Enterprise Trade Zone status. Its companies represent the following industries: manufacturing, recycling, import/export, power generation, construction, warehouse and distribution.

According to the OMPO's Land Use Model, Joseph Campbell Industrial Park had a 2000 population of 38, which is projected to rise to 3,591 by the year 2025, a significant increase of 9,350 percent. The number of housing units is projected to rise nearly 3,500 percent from 3 in 2000, to 1,051 in 2025, and the total employment is projected to increase from 3,016 in 2000 to 11,863 in 2025, an increase of approximately 293 percent.

2.3.2.8 Kalaeloa (formerly Barbers Point Naval Air Station)

In October 1995 the U.S. Navy published a Notice of Surplus Determination, indicating that 2,147 acres and 256 facilities were available for consideration for the Barbers Point Naval Air Station (Barbers Point NAS) Community Redevelopment Plan. As the plan evolved, the Navy removed 48 acres from the Surplus Determination for transfer to the U.S. Coast Guard. The majority of the former Barbers Point NAS lands were made available to various State and City and County agencies through public benefit conveyances (DBEDT website). The area is now the Kalaeloa Community Development District.

The City and County of Honolulu Board of Water Supply proposes to build a seawater reverse osmosis desalination facility in Kalaeloa. The proposed desalination facility will produce 5 million gallons per day (MGD) of freshwater that will add to Oahu's potable water supply. The desalination facility will occupy a portion of a 20-acre parcel. An electrical transformer substation will be constructed on an adjacent one-acre parcel mauka of the proposed desalination facility. This substation will provide a dedicated source of power to the desalination plant. Source water for the desalination will be provided through a network of three basal aquifer wells located on the 20-acre parcel (Draft Environmental Impact Statement for the Proposed Kalaeloa Desalination Facility, March 2003).

The OMPO Land Use Model indicates that in the year 2000 Kalaeloa had a total population of 4,609, which is projected to decrease to a 2025 population total of 4,276, a decline of approximately 7 percent. Housing units, according to the OMPO, would

[1] Telephone conversation with West Loch Fairways Community Association, April 27, 2004.

remain stable at 1,446 units from 2000 to 2025, while total employment is projected to increase by 6 percent, from 4,493 in 2000 to an anticipated 4,767 in 2025.

2.3.2.9 Kapolei Business Park

The Kapolei Business Park, which opened in 1994, is located next to James Campbell Industrial Park and Kalaeloa Harbor. The infrastructure and landscaping for the first 135 acres of this 890-acre project have been completed. The park has an advanced telecommunications infrastructure as well as access to both regional and Asian and U.S. domestic satellites. The park is targeting companies ranging from light industrial, processing, suppliers, wholesalers, warehouses and distribution companies to data processing, high tech research and development, integrated systems networks, Internet exchanges, data centers, and switching stations telecom companies. (www.enterprisehonolulu.com/html/display.clm?sid=29, accessed April 2004)

A private California investment firm (Jupiter Holdings LLC) has recently agreed to buy all the undeveloped property at Kapolei Business Park, approximately 91 acres, from Kapolei master developer Campbell Estate. Presently the park has seven tenants on 18 acres, including Cardinal Health, a Neiman Marcus warehouse, a Palama Meat processing plant, two churches and a city fire station (*The Honolulu Advertiser*, April 6, 2004).

2.3.2.10 City of Kapolei

The City of Kapolei, which is State-mandated as Oahu's Secondary Urban Center, is an urban mix of commercial, office, and residential uses. Its 6,000 acres are planned for 6 million square feet of civic-commerce and 12,000 dwellings, as a satellite city to be complementary to Honolulu (www.jfpartners.com/2001%20Website/planning/kapolei/, accessed April 2004)

According to the OMPO Land Use Model, the City of Kapolei had a 2000 population of 654 people, which is projected to increase to 3,512 by 2025, an increase of 437 percent. Similarly, the OMPO estimated number of housing units in 2000 was 175, and is projected to increase by 492 percent to 1,036 housing units in 2025, while the total employment is to increase by approximately 617 percent, from 1,690 in 2000 to a projected 12,118 total employment in 2025. This reflects the anticipated growth of the City of Kapolei as the heart of the Secondary Urban Center.

The Ewa DP projects that by 2020 the City of Kapolei will house more than 7,000 residents and provide work sites for 25,000 private jobs and 5,000 City and State jobs, to be located at the City's Civic Center, which is a regional commercial center.

2.3.2.11 Honouliuli

Honouliuli is an older residential community east of and along Old Fort Weaver Road makai of Farrington Highway. It includes residences, shops and a ranch. Other Honouliuli facilities include the Honouliuli Water Recycling Facility, the Honouliuli Wastewater Treatment Plant, the Honouliuli Sewage Treatment Plant, and a large water

reservoir holding water diverted from the Windward side of the island (Hawaii Business, April 2003).

2.3.2.12 Ko Olina

The Ko Olina project includes the Ko Olina Resort & Marina, a 652-acre major resort approved for hotel (e.g., Marriott's Ihilani Resort & Spa), time-share, commercial, recreational development, including golf courses and a 43-acre marina with 270 full service slips; and private luxury residences.

Letters of intent were signed by hotel conglomerates Ritz-Carlton Co. and Hilton, stating they would construct additional 250-room and 340-room hotels, respectively. Others intend to follow suit, such as Hyatt, with a 400-room hotel and 250-unit time-share project, and Interwest Corp., with a 390-unit village. Centrex Destination Properties also plans to build 60 single-family homes and 260 townhouses on 35 acres at Ko Olina Resort (Pacific Business News, May 29 and October 16, 2003).

According to the OMPO's Land Use Model, Ko Olina had a population of 2,450 in 2000, which is projected to increase to 8,701 by 2025, an increase of 255 percent. The number of housing units is expected to increase from 581 in year 2000, to 2,322 units in 2025, or approximately 300 percent. Total employment is projected to increase 986 percent from 3,016 in 2000 to 11,863 in 2025.

According to the developer, Jeff Stone, the Ko Olina project is anticipated to take 10 years, cost $715 million, create 10,800 construction jobs and 2,100 permanent jobs, and generate $186 million in tax revenue (Pacific Business News, February 28, 2003).

2.3.2.13 Ocean Pointe

In 1989, Haseko Homes, Inc. purchased the 1,100-acre parcel, then called the Ewa Marina Project. The parcel includes 3½ mile of oceanfront. Construction of Phase 1 homes began in 1997, when the project was renamed Ocean Pointe. Phase 2 began in 2001. As of May 2003, about 1,000 homes had been sold and built. Haseko plans to build another 960 homes in Ewa as part of Phase 3 of its Ocean Pointe development. The project will be comprised of a mix of five types of homes. Several parks, open space and an 18-hole golf course are also planned for the project. Haseko has permission to build 4,850 homes as part of the Ocean Pointe master plan (Pacific Business News, May 2, 2003, ocean-pointe.com).

2.3.3 Planned Projects

2.3.3.1 Department of Hawaiian Home Lands

In November 2002, the State's Board of Land and Natural Resources (BLNR) granted the Department of Hawaiian Home Lands (DHHL) a right-of-entry to approximately 200 acres at the Kapolei property and began the process of transferring those parcels to DHHL. The two parcels are to the west of the proposed North-South Road and at the

northern and southern points of the Kapolei property. The northern property is approximately 49 acres located between Farrington Highway and the H-1 Freeway. Directly to the south is the proposed UH-West Oahu property. The southern property is approximately 165 acres and directly adjacent to the UH-West Oahu southern boundary. A portion of this southern parcel will require further subdivision for the Kapolei Parkway extension in an east-west orientation.

The mission of DHHL is to develop and deliver homesteads to qualified native Hawaiians pursuant to the Hawaiian Homes Commission Act. The acquisition of these parcels allows DHHL to plan and develop approximately 1,000 residential homesteads and potentially some commercial and community facility uses to serve the new subdivision over an 8 to 10 year period from 2006-2016. Conceptually, the first increment is targeted to be completed in 2006.

It is anticipated that DHHL would construct the final portion of Kapolei Parkway between the southern terminus of North-South Road and the existing cul-de-sac of Kapolei Parkway by the Villages of Kapolei. Therefore the DHHL project would complete the portion of Kapolei Parkway connecting Ewa and Kapolei, thus allowing traffic to flow on Kapolei Parkway. When this completion of Kapolei Parkway occurs and traffic volumes increase on Kapolei Parkway, pedestrian safety will need to be maintained, in particular for the students attending Kapolei Intermediate School and Kapolei High School, both on Kapolei Parkway and across from the residences in Villages of Kapolei. Additional crosswalks, traffic signals, and/or crossing guards may be warranted to protect pedestrian safety. These design issues will need to be addressed in the design and construction phases of the project.

2.3.3.2 University of Hawaii-West Oahu

The UH-West Oahu is planning to build another campus makai of Farrington Highway, west of the proposed North-South Road. At one time the proposed site for the new UH-West Oahu campus was mauka of the H-1 Freeway. Currently it is planned for a site makai of Farrington Highway. It is anticipated that this UH-West Oahu campus will have 7,600 students and 800 staff and faculty by the year 2020 (Ewa DP).

2.3.3.3 East Kapolei Area

The East Kapolei Master Plan Environmental Impact Statement (EIS) published in 1998 by the State's Housing and Community Development Corporation of Hawaii (HCDCH) proposed a mixture of residential, commercial, public facility, and open space recreation land uses to replace existing fallow agricultural lands.

The project is no longer being pursued by HCDCH, but the UHWO campus is now planned on its site and no specific plans now exist for this East Kapolei area. However, upon anticipation that some other developer will pursue a similar project within the vicinity of this site in the near future, a brief explanation of the project previously proposed is provided below. According to the OMPO's Land Use Model, the 2000 population of the East Kapolei area was 5,455, which is projected to increase to 25,372 by 2025, an increase of approximately 365 percent. Housing units in East Kapolei

numbered 1,473 in 2000 and are projected to increase to 7,584 housing units in 2025, an increase of approximately 415 percent, while total employment in 2000 was 1,071 and is projected to increase to 5,227 in 2025, for an increase of approximately 388 percent.

The subject property is bounded on the north by Farrington Highway and H-1 Freeway, to the west by the Villages of Kapolei and the Kapolei Golf Course, to the south and southeast by the former Barbers Point Naval Air Station and Ewa Villages, and to the east by fallow agricultural land. Two separate parcels located between the H-1 Freeway and Farrington Highway consisting of 76 acres and 66 acres were also included in the 1,300-acre project area (East Kapolei Master Plan Final EIS, July 1993).

The development was slated to include access and circulation roadways, pedestrian paths, drainage improvements, distribution lines for potable water, collection lines for wastewater, and communication/utility systems. Once the major infrastructure is in place, large lot development parcels could be sold to individual developers for construction of new homes and businesses.

2.3.3.4 Mehana

Schuler Homes plans to build 1,150 homes on 120 acres on the edge of Kapolei's civic center, during the next 11 to 16 years. The community, called Mehana, is designed to have six parks, running and cycling paths, a recreation center, pool, commercial complex, and an approximately 50-50 mix of single-family and multi-family homes. Schuler and Campbell Estate plan to contribute a 12-acre adjacent site for a new elementary school. Schuler expects to contribute an estimated $1.6 million to the state for school construction, spend $5 million for off-site road improvements related to Mehana, and $6.5 million for road construction and improvements in the Ewa area. Schuler projects its first Mehana home could be built in 2008, with the community growing to about 500 homes between 2010 and 2015. The last homes are expected to take until 2015 to 2020 to finish (The Honolulu Advertiser, March 30, 2004).

2.4 POTENTIAL CUMULATIVE IMPACTS

2.4.1 Projects Similar in Nature

Future traffic improvements within the Ewa Plain and Central Oahu region would be developed independently of the proposed project improvements. However, they provide linkages within the local and regional transportation system, as does the proposed project. With implementation of future transportation improvements, it is anticipated that all planned roadways and intersections would operate under improved conditions. The North-South Road and Kapolei Parkway would become a part of this improved system, and contribute to improving regional and sub-regional mobility, by improving network connectivity.

CORRECTION

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

northern and southern points of the Kapolei property. The northern property is approximately 49 acres located between Farrington Highway and the H-1 Freeway. Directly to the south is the proposed UH-West Oahu property. The southern property is approximately 165 acres and directly adjacent to the UH-West Oahu southern boundary. A portion of this southern parcel will require further subdivision for the Kapolei Parkway extension in an east-west orientation.

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Table 1:
Cumulative Impacts of Planned Projects in the Area

DISCIPLINE	POTENTIAL/ANTICIPATED IMPACTS
Land Use	The State and local policies have designated the development of the Ewa Plain as the Secondary Urban Center of Oahu. The area surrounding North-South Road (NSR) was master planned in the Ewa Development Plan (Ewa DP) and Kapolei Area Long Range Master Plan for urban development. All planned projects appear to be consistent with existing plans for development of the Ewa Plain, including the permanent conversion of vacant or agricultural lands for urban uses. These projects are consistent with City and County plans for the development of the Ewa Plain as the Secondary Urban Center of Oahu The NSR and KP project is consistent with area plans. In comparison to planned development and regional development trends, the NSR and KP project is not anticipated to induce more or more intensive development than what is already planned or anticipated. The NSR and KP project will facilitate the Department of Hawaiian Home Lands (DHHL) homesteads and future development of the area called East Kapolei, but additional transportation infrastructure is necessary to support the projected urbanization of the Ewa Plain and to avoid undesirable traffic conditions upon full-build out of the Ewa Plain.
Geology, Soils, Farmland	Construction of NSR will convert approximately 217 acres of prime farmland, some of which is being actively cultivated under short-term leases. KP will affect approximately 10 acres of prime farmland. Farms located mauka of the H-1 Freeway would lose have their existing roadway access modified, because their current access road Palehua Road will be displaced by NSR. However, in the long-term, the area surrounding the project is planned for non-agricultural uses, and the existing short-term leases will not be continued. All planned projects involve the conversion of fallow agricultural land to urban use. This conversion is consistent with the Ewa DP plans for the development of this area as the Secondary Urban Center for Oahu. Urban growth will be contained within a boundary which will protect prime agricultural lands along Kunia

2.4.2 Existing Projects

A number of the past and present projects in the Ewa Plain area, as noted above, include plans for expansion, which have been factored into the development of the Ewa DP and other related area community master plans. A key component of the Ewa DP as well as of various community master plans is the development of North-South Road, and the completion of the Kapolei Parkway segments. While the past and existing projects are not dependent upon the construction of North-South Road or the project segment of Kapolei Parkway, implementation of their expansion plans would be facilitated by the construction of the proposed project. In addition, if these projects were to continue to expand as planned, and the proposed project was not implemented, traffic conditions on area roadways, and the accompanying air quality impacts, would worsen.

2.4.3 Planned Projects

Based on best available information, the cumulative impacts of planned projects, including North-South Road and Kapolei Parkway, were evaluated per environmental resource in Table 1. Potential impacts of each development were evaluated in combination with the impacts from the proposed project and the other planned developments for each of the environmental resources, in order to determine the cumulative effects upon each resource.

The table indicates that some cumulative impacts would occur in the Ewa Plain as a result of the several planned projects, including North-South Road and Kapolei Parkway. However, none of these impacts would be unexpected, because of the widely anticipated effect of public policies and private enterprises to re-direct growth to the Ewa Plain and promote the development of Kapolei as the Secondary Urban Center for Oahu.

	agencies, and would conform to the East Kapolei Water Master Plan, which was prepared to support the Housing and Community Development Corporation of Hawaii (HCDCH) East Kapolei project (State Water Projects Plan [SWPP], Volume 5 – Island of Oahu, February 2003). The East Kapolei development is currently working with the Board of Water Supply (BWS) to acquire a water source for the water system. The potable (drinking water) system will interconnect with the Villages of Kapolei water system. The water system will provide service connections to UH-West Oahu and Kalaeloa Community District water systems. The Barbers Point Redevelopment Commission is coordinating source development with the BWS (SWPP, Volume 5 – Island of Oahu, February 2003). Potable water, sewer, and non-potable water lines are planned to be co-located within NSR; utilities would also be placed under KP. Coordination of utilities with the construction the roadway would minimize long-term potential cumulative impacts, because such coordination would avoid repeated construction within the right-of-way (ROW) and the need to disturb existing roadways and traffic.
Cycling Facilities	Existing cycling facilities in the general vicinity of the project area include a bike path along Fort Weaver Road from Farrington Highway to just north of Ewa Beach, and bike lanes on Fort Weaver Road in Ewa Beach. Bike paths are also provided in the Ewa Gentry community along Geiger Road, Kapolei Parkway, Kolowaka Drive, and Keaunui Road. NSR and KP would be designated as a bike route, and include developed to include a parallel bike/pedestrian path and provide wide curb lanes paved shoulders that would might be usable designated by bicyclists. In the interim initial phase of NSR, a parallel shared bicycle/maintenance road located west of North-outh Road would be used as a bke path as a bike route KP would include a parallel bicycle/pedestrian path. Therefore, no adverse cumulative impact is anticipated to cycling facilities. On the contrary, the proposed NSR and KP project would contribute to the planned improvement of cycling facilities in the Ewa Plain.
Social, Cultural, Economic	NSR and KP will improve linkages between residential areas and centers of employment in the Ewa Plain, as well as support its planned development as the Secondary Urban Center for Oahu Construction of NSR and KP project would strengthen economic and social ties between the Ewa Beach/Ocean Pointe/Ewa by Gentry area and the City and Villages of Kapolei, as well as the more distant projects like Ocean Pointe, by improving access to schools, libraries, and commercial establishments.

	Road and within the West Loch Naval Magazine Blast Zone for diversified agriculture (Ewa DP). Potential environmental impacts would occur primarily during construction activities at all sites, due to soil erosion, which should be mitigated by best management practices.
Transportation Infrastructure	Traffic congestion is an existing concern related to continued residential development in the area. The NSR and KP project is included in a number of development plans (e.g., Ewa DP) in order to address and alleviate traffic congestion and improve access for the proposed developments in the Ewa Plain area. Although development will continue in the Ewa Plain with or without the NSR and KP project, traffic conditions would be considerably worse without the project. KP will also provide linkages between residential areas and employment centers, for both existing and planned developments. Traffic conditions would be substantially improved along the congested Kunia Rd./Ft Weaver Rd. Corridor. Similarly, traffic conditions would be improved along the Makakilo Dr./Ft. Barrette Rd. Corridor. NSR itself is projected to carry large traffic volumes, all of which would relieve other streets in the study area. Each of the future intersections along the NSR and KP, including those at the H-1 Freeway interchange, are projected to operate at acceptable levels of service. Construction of NSR and KP would serve as an alternate route to access the greater Ewa area. The proposed project would provide additional roadway capacity in a high-growth area and would relieve key congested roads running parallel to it, such as Fort Weaver Road. The NSR and KP project will also provide subregional and regional access to the University of Hawaii-West Oahu Campus (UH-West Oahu). An access road would connect the adjacent DHHL residential area with the campus, thereby providing easy access to advanced education facilities to Hawaiian homesteaders.
Utilities Infrastructure	Utilities will be provided as a component of each of the proposed development projects. In addition, the City and County of Honolulu Board of Water Supply proposes to build a desalination facility at Kalaeloa that will produce 5 million gallons a day (MGD) of freshwater for Oahu (Draft Environmental Impact Statement for the Proposed Kalaeloa Desalination Facility, March 2003). The Honouliuli Water Recycling Facility and Honouliuli Wastewater and Sewage Treatment plants currently serve the area. Construction and installation of water transmission lines would be coordinated with appropriate City

	adapt to urban environments. Environmental documents prepared for proposed housing developments in the general vicinity of the proposed roadways reported similar findings.
Botany	The proposed project would result in the clearing of vegetation in both the KP and NSR Corridors, roughly 217 acres. With the exception of the endangered plant (*Abutilon menziesii*), the botanical surveys conducted for the project stated that the project corridor is overgrown with weedy plants, and is composed almost exclusively of introduced or alien species. Thus, vegetation communities that would be cleared by construction activities are not considered regionally important. Overall, proposed urban landscaping will replace the existing scrub vegetation and vacant properties. While there is an immediate adverse effect on individuals in the road ROW, simultaneous implementation of the Habitat Conservation Plan (HCP) for *A. menziesii* at Kapolei, an integral part of the proposed action, is anticipated to result in "no jeopardy" and a net gain for the species. The HCP will provide for the continued survival of the Kapolei plant population through the establishment of three offsite wild populations and one offsite repository site from the degraded canefield population at Kapolei. The HCP also established a temporary plant reserve area and provided funding for maintenance work, in conjunction with the issuance of the incidental take license for *A. menziesii*.
Water Resources	Groundwater: The EPA has stated that it is unlikely that the project will substantially affect the Southern Oahu Basal Aquifer (SOBA) Sole Source Aquifer, especially with the proposed roadway drainage system and incident response procedures in place. The storm water system proposed for the northern section of NSR and its interchange with the H-1 Freeway would collect and convey roadway drainage and inadvertent spills along the roadway to a discharge point south of the caprock boundary. Surface Water/ Floodplains: NSR will alter the local drainage pattern by interrupting sheet flow across the Ewa Plain. Most of the storm runoff will flow in a drainage system to the east of the NSR and the rest will flow within the stream channel to the west. A bridge, culvert or some combination will be built where NSR crosses Kaloi Gulch to maintain the Kaloi Gulch streambed and allow runoff to flow from east to west. An area north of Ewa Villages will function as a stormwater retention area for drainage from NSR. The Kaloi Gulch Technical Committee continues to develop a regional drainage plan that would include storm water

	Improving transportation infrastructure will also enhance emergency response services throughout the region. NSR and KP would provide more social, economic, and public services support to Ewa communities by providing a link to the H-1 Freeway, as well as between existing and future communities. The NSR and KP project will support development of other projects, by providing increased access to jobs, services, shopping, and community facilities for area residents - a socioeconomic benefit. DHHL Project: As part of its residential development, DHHL would construct the portion of Kapolei Parkway between North-South Road and the existing cul-de-sac of Kapolei Parkway by the Villages of Kapolei, completing Kapolei Parkway between Ewa and Kapolei. When this occurs, pedestrian safety will need to be maintained on Kapolei Parkway, especially for students of Kapolei Intermediate and Kapolei High Schools. Additional crosswalks, traffic signals, and/or crossing guards may be warranted.
Air Quality	Air quality in the Ewa Plain area should improve with the development of the NSR and KP project, as traffic congestion is relieved on alternative roadways. Potential air quality impacts from construction activities would be short-term, consisting of soil erosion, fugitive dust, and machinery exhaust emissions. Best Management Practices (BMPs) would be implemented to reduce soil erosion, fugitive dust, and machinery exhaust emissions to a minimal level. The proposed project would have to comply with all National and State Ambient Air Quality Standards.
Noise	Planned residential communities would be constructed either after or roughly simultaneously with NSR and KP, and ambient noise conditions in the region will change as a result of overall urbanization. Some residents in existing residential communities may experience some increased noise levels from new or improved roadways such as NSR and KP project, as well as the increased traffic levels, as the region continues to experience growth. The proposed project would have to comply with FHWA regulations on noise impacts (23 CFR 772).
Zoology	The NSR and KP project would convert faunal habitats within the corridor to a roadway. However, it would not threaten the relatively common faunal communities in this region because the original natural habitats which once existed on these former agricultural lands, including within the corridor, have already been disturbed and the animals now present (cats, mongooses, mice) are considered nuisances and easily

	district and passing by other historic buildings in the area, such as the Ewa Hongwanji Mission. Other planned development projects would also contribute to the overall urbanization of the Ewa Plain, and increase traffic, including the intersection of Kapolei Parkway with Renton Road. However, these changes are not unexpected, because development in Ewa has been widely anticipated, and the approximate alignments of KP and NSR are well known in the community. There should be no notable incremental impact on historic resources as a result of the NSR and KP project.
Parks & Recreation	Development of NSR and KP will not require right-of-way from any existing park or recreational facility. Conversely, development of NSR and KP would facilitate public access to parks and recreational facilities by improving regional mobility in Ewa for area residents. Traffic may increase on Kapolei Parkway, which is adjacent to public parks such as Geiger Park in Ewa by Gentry and Ewa Mahiko District Park. However, this change cannot be avoided due to the planned urbanization of the Ewa Plain.
Visual & Aesthetic Resources	Both KP and NSR would be designed as urban "parkways," featuring ample landscaping and sidewalks. In the context of existing and planned urban development, neither NSR nor KP are anticipated to represent a visually intrusive addition to the Ewa viewshed. Urbanization and development of the Ewa Plain in general and of the Secondary Urban Center at Kapolei in particular are major goals of the City and County of Honolulu. Construction of other planned development projects would alter visual resources by replacing the open, undeveloped views of the area with housing, commercial, and public facility developments. The NSR and KP project would contribute only minimally to the change in the visual landscape, caused by the overall urbanization anticipated in the Ewa Plain. Both NSR and KP are expected to be surrounded by new developments, and would become only one element of an urbanized landscape.

	retention areas, such as golf courses, at various locations. The additional storm water runoff created by the impermeable roadway surface would not contribute to flooding because during high intensity storms, the rainfall doesn't soak into the ground but sheet flows across the surface. Efforts to modify the floodplain will continue whether NSR and KP are built or not. Consistent with the Ewa DP, accelerated development will occur along KP, an area with well-defined flooding risks. East Kapolei: It is anticipated that at some future date, a third party developer of the East Kapolei area would relocate the existing Kalol Gulch, so that it would flow entirely on the eastern side of the proposed NSR alignment. After project development and implementation of appropriate mitigation measures, no significant cumulative impacts affecting water quality are anticipated.
Hazardous Materials	Two potentially contaminated sites associated with the Ewa Sugar Mill/Oahu Sugar Co. were identified near the NSR and KP Corridor. Although the mill property is near KP, the main mill operations were located at least 1,000 feet from the alignment. No interaction with hazardous materials is expected. The two sites should not affect nor be affected by planned projects. No additional hazardous materials sites would be affected or created because of any planned development projects, including NSR and KP.
Historic Resources	The State Historic Preservation Division (SHPD) determined that the entire NSR and KP project area would be within former sugarcane land and feels that no historic properties would be affected with regard to archaeology. The intersection of KP with Renton Road would be within the Ewa Villages Historic District, although most of the road would be outside of the district. The alignment of KP was master planned as part of the City's efforts to re-develop the Ewa Villages Historic District, and the roadway does not require the displacement of any structure within the district. A traffic signal will likely be warranted at the intersection with Renton Road, which SHPD has indicated would result in an "adverse effect" on the district. The NSR and KP would be part of the roadway network contributing to increased traffic through the Ewa Villages historic

3.0 SECONDARY IMPACTS

According to 40 CFR 1508.8, secondary impacts are impacts that have the potential to occur "later in time or farther removed in distance but are still reasonably foreseeable." For roadway projects, secondary impacts typically occur because urban development is induced by the project. Development is considered induced if it would not have occurred unless the roadway improvement was made. Induced development can cause additional environmental and social impacts than those directly associated with the road, such as adversely affecting endangered and threatened species and taxing public infrastructure.

In contrast, the proposed developments identified in Section 2.3.3 would occur regardless of which alternative is selected, including the No-Build Alternative. The NSR and KP project will facilitate the development of DHHL homesteads and future development of the area called East Kapolei, but will not induce secondary impacts separate from the previously planned development. The Ewa region, as previously discussed, has been planned as a Secondary Urban Center for Oahu, with the expansion of the City of Kapolei and area as the focal point of the development activity. Therefore, the Build Alternatives would not induce additional development, and would not cause adverse secondary impacts, because the proposed roadway construction has been anticipated and incorporated into the planning of other developments in the region.

References

Atwater, Gail W., AICP, Planning Consultant, East Kapolei Project Market Assessment, Appendix A: Competitive Product, October 1994.

Brian Menne and Associates, Makaiwa Hills, www.menne.com/maka.htm, accessed April 2004.

Codwell Banker, Pacific Properties, Leeward Oahu Region, www.cbpacific.com/NeighLeeward.asp#ckapolei, accessed April 2004.

DiPietro, Ben, Governor, Ko Olina developers to meet, May 10, 2002, http://pacific.bizjournals.com/stories/2002/05/06/daily55.html, accessed April 2004.

DiPietro, Ben, Governor reiterates Ko Olina veto threat, April 29, 2002, http://pacific.bizjournals.com/stories/2002/04/29/daily10.html, accessed April 2004.

Enterprise Honolulu, Business Parks, Incubators and Technology Parks, www.enterprisehonolulu.com/html/display.cfm?sid=29, accessed April 2004.

Estate of James Campbell, 2002 Annual Review, www.campbellestate.com/02review/02reivew.pdf, accessed April 2004.

Gomes, Andrew, Deal Reached for Kapolei land, www.thehonoluluadvertiser.com/article/2004/Mar/30/bz/bz01a.html, accessed April 2004.

Hawaii Bigger Cities (over 6000 residents), www.city-data.com/, accessed April 2004.

Hawaii Department of Business, Economic Development and Tourism, Statistics and Economic Information, www2.hawaii.gov/DBEDT/index.cfm?_parent=statistics_and_economic_information, accessed April 2004.

Helber Hastert & Fee Planners, West Loch Estates - Phase 1, www.hhf.com/projects/west_loch_estates_ph1.html, accessed April 2004.

Honolulu Board of Water Supply, City and County of Honolulu, State of Hawaii, Draft Environmental Impact Statement for the Proposed Kalaeloa Desalination Facility, March 2003.

Jefferson, Steve, Developer: Re-brand Oahu to help market Ko Olina, February 28, 2003, http://pacific.bizjournals.com/stories/2003/03/03/story5.html, accessed April 2004.

Jefferson, Steve, Haseko plans 950 more Ewa homes, May 2, 2003, www.bizjournals.com/pacific/stories/2003/05/05/story6.html, accessed April 2004.

Jefferson, Steve, Governor meets with Ko Olina developers, partners, May 13, 2002, http://pacific.bizjournals.com/stories/2002/05/13/daily11.html, accessed April 2004.

Johnson Fain, City of Kapolei, www.jfpartners.com/2001%20Website/planning/kapolei, accessed April 2004.

Ko Olina Resort and Marina, www.koolina.com/home2.html, accessed April 2004

Natarajan, Prabha, Bringing Ko Olina to Life, February 28, 2003, http://pacific.bizjournals.com/stories/2003/03/03/story4.html, accessed April 2004

Natarajan, Prabha, Hotel Tax-credit Proposals Alive, Not Well, February 27, 2004, http://pacific.bizjournals.com/stories/2004/03/01/story5.html, accessed April 2004

Natarajan, Prabha, Lingle does balancing act, February 21, 2003, http://pacific.bizjournals.com/stories/2003/02/24/story3.html, accessed April 2004

Natarajan, Prabha, February 21, 2003, Marriott eyes time-share expansion, http://pacific.bizjournals.com/stories/2003/02/24/story2.html, accessed April 2004

Natarajan, Prabha, June 25, 2002, Cayetano vetoes tax break for Ko Olina development, http://pacific.bizjournals.com/stories/2002/06/24/daily15.html, accessed April 2004.

Natarajan, Prabha, Ko Olina Resort to get $75 million tax credit, April 26, 2002, http://pacific.bizjournals.com/stories/2002/04/22/daily83.html, accessed April 2004

Oakley, Doug, Makaha: Hospitality Training Ground?, April 11, 2003, http://pacific.bizjournals.com/stories/2003/04/14/story3.html, accessed April 2004

Ocean Pointe, www.ocean-pointe.com, accessed April 2004

Pacific Business News, Destination-home builder plan project at Ko Olina, October 16, 2003, http://pacific.bizjournals.com/stories/2003/10/13/daily42.html, accessed April 2004.

Pacific Business News, Market, investor confidence should drive development, May 31, 2002, http://pacific.bizjournals.com/pacific/stories/2002/06/03/editorial1.html, accessed April 2004.

Pacific Business News, Lingle signs Ko Olina tax credit, May 29, 2003, http://pacific.bizjournals.com/stories/2003/05/26/daily44.html, accessed April 2004.

Pacific Business News, Tax credits should come down to return on investment, February 28, 2003, http://pacific.bizjournals.com/stories/2001/03/03/editorial1.html, accessed April 2004.

Pacific Business News, Ko Olina: tax break proposed, February 2, 2002, http://pacific.bizjournals.com/stories/2002/02/04/daily22.html, accessed April 2004

Parsons Brinckerhoff, Secondary and Cumulative Effects Analysis (SCEA) Guidelines – For North-South Road and Kapolei Parkway Project Draft Environmental Assessment, March 18, 2004.

State of Hawaii, Department of Land and Natural Resources, Commission on Water Resource Management, State Water Projects Plan, Volume 5 – Island of Oahu, February 2003, prepared by Fukunaga and Associates, Inc.

The Marketplace at Kapolei, Kapolei Area Residential Units – Existing and Proposed, www.marketplaceatkapolei.com/images/Kapolei%20Residential%20Units.pdf, accessed April 2004.

The Nature Conservancy, Honouliuli, www.nature.org/wherewework/northamerica/states/hawaii/preserves/art2350.html, accessed April 2004.

Telephone conversation with West Loch Fairways Community Association, April 27, 2004