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County of Hawaii
DEPARTMENT OF PUBLIC WORKS
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May 22, 2001

Ms. Genevieve Salmonson, Director
State of Hawaii
Office of Environmental Quality Control
235 South Beretania Street, 7th Floor
Honolulu, Hawaii 96813-2437

Subject: Final Environmental Assessment/Finding of No Significant Impact (FONSI) Determination, Kealakehe Wastewater Treatment Plant Effluent Reuse Master Plan, North Kona District, Hawaii

Dear Ms. Salmonson:

The County of Hawaii Department of Public Works has reviewed the Final Environmental Assessment (EA) for the Kealakehe Wastewater Treatment Plant Effluent Reuse Master Plan, North Kona District, Hawaii project and has determined a Finding of No Significant Impact (FONSI). The basis of this determination is attached and follows the significance criteria set forth in Hawaii Administrative Rules, Title 11, State of Hawaii Department of Health Chapter 200, Environmental Impact Statement Rules, Section 12.

Please publish the notice of availability of the Final EA in the June 8, 2001 issue of the Environmental Notice.

Should you have any questions, please call me at 808.961.8338 or Mr. John Sakaguchi of Wilson Okamoto & Associates, Inc. at 808.946.2277.

Sincerely,

Dennis K.W. Lee, P.E.
Director of Public Works

cc: Wastewater Division

Enclosure

FINDING OF NO SIGNIFICANT IMPACT (FONSI) DETERMINATION
Kealakehe Wastewater Treatment Plant Effluent Reuse Master Plan,
North Kona District, Hawaii

Short-term construction impacts include delays to traffic near the project site, decline in air quality from construction activities, and increase in noise levels. Once construction has been completed, the short-term adverse impacts will no longer occur.

Based on analysis of the anticipated impacts, a Finding of No Significant Impact (FONSI) is determined for the proposed reuse project. The significance criteria to make this determination are set forth below and in Hawaii Administrative Rules Title 11, State of Hawaii Department of Health, Chapter 200, Environmental Impact Statement Rules.

1) *Involve an irrevocable commitment to loss or destruction of any natural or cultural resources*;

The reuse project involves the application of R-1 or R-2 quality effluent to areas which have previously been developed or will have been developed when the effluent is used. Thus, the reuse project will not involve destruction of natural or cultural resources.

2) *Curtail the range of beneficial uses of the environment*;

The reuse project involves the use of effluent for crop irrigation, landscape and golf course irrigation, and dust control. The reuse project will provide an alternative to the use of potable water for these uses. Thus, reuse project will not curtail beneficial uses of the environment.

3) *Conflict with the State's long-term environmental policies or goals as expressed in Chapter 344, HRS, and any revisions thereof and amendments thereto, court decisions, or executive orders*;

Reuse of recycled water has been established an objective in the Hawaii State Plan, which identifies the overall theme, goals, objectives, policies, and priorities

67

for the State. The reuse project will support this State Plan objective by providing R-1 and R-2 quality effluent which can be used for crop irrigation, landscape and golf course irrigation, and dust control.

4) *Substantially affect the economic or social welfare of the community or state*;

Reuse of effluent will decrease reliance on groundwater for irrigation and dust control. Each reuse site must conform to the DOH *Water Reuse Guidelines* which have been established to assure that the distribution and use of reclaimed water will not create a health hazard or nuisance. Reuse of effluent would decrease the use of limited potable water resources. Thus, the reuse project will not have an adverse impact to the economic or social welfare of the community or State.

5) *Substantially affect public health*;

Each reuse site must conform to the DOH Guidelines which have been established to assure that the distribution and use of reclaimed water will not create a health hazard or nuisance. All of the reuse sites are located below the Underground Injection Control (UIC) line established to protect underground sources of drinking water. Thus, the reuse project will not have an adverse impact to public health.

6) *Involve substantial secondary impacts, such as population changes or effects on public facilities*;

The reuse project involves the application of R-1 or R-2 quality effluent to areas which have previously been developed or will have been developed when the effluent is used. This will not create secondary impacts to population this area of Kona or which would effect the need for public facilities.

7) *Involve a substantial degradation of environmental quality;*

The intent of the reuse project is to use effluent from the Kealakehe WWTP, which has been treated to acceptable standards, for a number of purposes. Reuse of effluent would decrease the use of limited potable water resources. Each reuse site must conform to the DOH Guidelines, which have been established to assure that the distribution, and use of reclaimed water will not create a health hazard or nuisance.

8) *Have a cumulative effect upon the environment or involves a commitment for larger actions;*

The reuse project has been developed to identify the primary users of effluent in the vicinity of the Kealakehe WWTP. The size and location of transmission system has been developed to serve these identified users. Thus, development of additional transmission systems will not be required for the identified users.

9) *Affect a rare, threatened or endangered species;*

The surveys of undeveloped areas indicated they did not provide habitat for a Federal (U.S. Department of the Interior Fish and Wildlife Service) or State of Hawaii listed or candidate threatened or endangered species of birds. The developed reuse areas do not provide habitat for Federal or State of Hawaii listed or candidate threatened or endangered species of birds.

The surveys of undeveloped areas which would encompass the reuse sites indicated they did not provide habitat for a Federal (U.S. Department of the Interior Fish and Wildlife Service) or State of Hawaii listed or candidate threatened or endangered plant species.

10) *Detrimentally affect air or water quality or ambient noise levels*;

There may be short-term adverse impacts to air quality and to ambient noise levels construction during construction activities. However, once construction is completed, the reuse projects will not have adverse impacts to the air quality and ambient noise levels of this area of Hawaii.

Each reuse project must comply with the DOH Guidelines related to irrigation. All of the reuse sites are located makai of the UIC line. Thus, use of effluent for irrigation would not have adverse impacts to underground sources of drinking water. Analysis of groundwater flows indicate that the dilution and mixing of the effluent within the brackish basal lens occurs such that surface use of effluent will not affect nearby coastal waters.

11) *Affects or likely to suffer damage by being located in an environmentally sensitive area such as a floodplain, tsunami zone, beach, erosion-prone area, geographically hazardous land, estuary, fresh water or coastal waters.*

The reuse project will require construction of an underground transmission system and underground distribution system at each site. These facilities will be constructed to County standards which place these lines under 3 to 4 feet of backfill material. One reuse site is located in the coastal flood hazard zone. The County standards for construction of wastewater collection systems provide for safety in the event of coastal flooding.

12) *Substantially affect scenic vistas and viewplanes identified in county or state plans or studies*;

The reuse project includes construction of an effluent transmission system which will be placed at least 3 to 4 feet below the surface. Thus, the reuse project will

not adversely affect scenic vistas or viewplanes which have been identified in previous studies.

13) *Require substantial energy consumption.*

The increase in electrical demand is not anticipated to be significant enough create adverse impacts to the overall electrical needs of this area of the Kona coast.

Based on these findings and the assessment of potential impacts from the Kealakehe WWTP effluent reuse project, a Finding of No Significant Impact (FONSI) is determined.

2001-06-08-HI-FEA-

FINAL ENVIRONMENTAL ASSESSMENT

KEALAKEHE WASTEWATER TREATMENT PLANT EFFLUENT REUSE MASTER PLAN

Prepared for:

COUNTY OF HAWAII
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
HILO, HAWAII

Prepared by:

Wilson Okamoto & Associates, Inc.

June 2001

SUMMARY

Proposing Agency:	County of Hawaii Department of Environmental Management 25 Aupuni Street Hilo, Hawaii 96720
Accepting Agency:	County of Hawaii Department of Environmental Management 25 Aupuni Street Hilo, Hawaii 96720
EA Preparer:	Wilson Okamoto & Associates, Inc. 1907 South Beretania Street, Suite 400 Honolulu, Hawaii 96826 Contact: John L. Sakaguchi, Project Manager Tel: (808) 946.2277; Fax: (808) 946.2253
Project Location:	Keahole to Kailua-Kona, Hawaii
Recorded Fee Owner:	Various
Tax Map Key:	N/A
Area:	N/A
State Land Use Classification:	Various
County Zoning:	Various
Proposed Action:	Use of treated effluent from the Kealakehe Wastewater Treatment Plant for irrigation of landscaping, dust control, and fire suppression at various sites located between Keahole and Kailua-Kona on the western coast of Hawaii. All uses must comply with State of Hawaii Department of Health Guidelines for the Treatment and Use of Reclaimed Water.
Impacts:	No significant impacts are anticipated from use of the treated effluent at the various proposed reuse sites.

Final Environmental Assessment

Kealakehe Wastewater Treatment Plant
Effluent Reuse Master

Prepared for:

County of Hawaii
Department of Environmental Management
25 Aupuni Street
Hilo, Hawaii 96720

Prepared by:

Wilson Okamoto & Associates, Inc.
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826
WOA: 6089-01

Under Contract to:

Brown and Caldwell
119 Merchant Street, Suite 200
Honolulu, Hawaii 96813-0226

June 2001

List of Figures

List of Tables

PREFACE

Chapter 343, Hawaii Revised Statues (HRS), as amended, Environmental Impact Statements, requires that a government agency or a private developer proposing to undertake a project consider the potential environmental impacts of the proposed project by preparing an assessment. Among the criteria set forth in Chapter 343, HRS, for preparation of an environmental assessment is the use of public funds for a project. The contractor's fill station, one of the reuse projects, and the effluent transmission system will be constructed and operated with funds provided by the County of Hawaii Department of Environmental Management. (Note, the Wastewater Division of the Department of Environmental Management was formerly within the Department of Public Works. On November 7, 2000 a County of Hawaii charter initiative was passed to create the Department of Environmental Management.)

This Environmental Assessment (EA) has been prepared to meet the requirements of Chapter 343, HRS, as amended, and Hawaii Administrative Rules Title 11, State of Hawaii Department of Health, Chapter 200, Environmental Impact Statement Rules. This EA has determined a Finding of No Significant Impact (FONSI) for this project.

1.0 INTRODUCTION

1.1 Background

The County of Hawaii Department of Public Works constructed the Kealakehe Wastewater Treatment Plant (WWTP) near Kailua-Kona with the intent to reuse effluent from the WWTP for irrigation of the proposed Kealakehe Golf Course which, due to a variety of factors, was never constructed. As a result, since 1993, the primary method for disposal of R-2 quality effluent from the WWTP has been the use of a temporary sump located in the lava fields east or mauka of Queen Kaahumanu Highway, about 2,000 feet northeast of the WWTP.

1.2 Assessment Purpose

The purpose of this Environmental Assessment (EA) is to assess the effects of the reuse of effluent from the Kealakehe Wastewater Treatment Plant (WWTP) for the various purposes described in Section 1.6, Project Description. The EA will also assess construction of the effluent transmission system within existing public rights-of-way. Construction of a contractor's fill station will also be assessed as described in Section 1.6.2, Priority Project.

1.3 Project History

A review of documents related to the Kealakehe WWTP indicates, that, in the mid 1970s, planning was initiated for a wastewater treatment facility and related collection system for the Kona area. In May 1974, the County of Hawaii issued a report titled *Master Plan for the Kailua-Kona Sewerage System, Phase IV (Northern Zone)*. Subsequently, in April 1981, the *Facility Plan for the Kailua-Kona Sewerage System, Phase IV (Northern Zone)* was issued.

In July 1981, the *Revised Environmental Impact Statement (EIS) for the Kailua-Kona Sewerage System, Phase IV (Northern Zone)* was issued. This EIS assessed the environmental impacts of the *Facility Plan for the Kailua-Kona Sewerage System, Phase IV (Northern Zone)* which had been issued in April 1981.

The July 1981 Revised EIS indicated the Kailua-Kona Sewage Treatment Plant (STP) had approached its design capacity of 1.0 million gallons per day (mgd) and that the projected flow for 2005 was 1.48 mgd. The collection system and STP served only the resort hotels, commercial, and industrial sources, and some high density residential developments in Kailua Village. At that time, effluent had been disposed in individual cesspools, and injection wells had been used to dispose effluent from the Kailua-Kona STP and from small package STPs.

The proposed project described in the July 1981 Revised EIS included the following elements:

- Expansion of the existing Kailua-Kona collection system to sewer the recently urbanized areas (Northern Zone) and to include the Kailua-Kona Southern Zone;
- Construction of a new treatment facility on about 25 acres of State-owned land adjacent to Honokohau Harbor;
- Abandonment of the Kailua-Kona STP; and
- Disposal of effluent by land reclamation.

The design flow of the new treatment facility was 2.8 mgd. At that time, although land reclamation was the preferred method of effluent disposal, the planned disposal was by deep ocean outfall.

Subsequent to preparation of the July 1981 Revised EIS, resort, commercial, agricultural, and recreational development occurred between Kailua-Kona and Kona International Airport. In addition, the Kailua-Kona STP, the source of irrigation water for the recreational facilities at the Old Kona Airport, was to be closed. Further, there was increasing concern related to use of the deep ocean outfall for disposal of effluent. Lastly, the proposed Kealakehe municipal golf course, which was to be privately developed, could be used as the primary method of disposal of the effluent.

Based on these considerations, in August 1990, the County prepared the *Amendment to the Revised Environmental Impact Statement for the Kailua-Kona*

Sewerage System, Phase IV (Northern Zone). The proposed project described in the Amendment included the following:

- Land area large enough to dispose the effluent (a golf course of approximately 200 acres);
- An effluent distribution and spraying system;
- A pumping station;
- Disinfection facilities; and
- A storage pond or ponds (water hazards in the golf course).

Documents at the County and at the Office of Environmental Quality Control (OEQC) show that, on August 10, 1990, the Amendment to the Revised EIS was distributed to agencies and others for comment. As permissible under the OEQC regulations applicable at that time, on August 23, 1990, a Negative Declaration notice was published in the OEQC Bulletin. Starting on August 30, 1990 and subsequently thereafter, comment letters regarding the *Amendment to the Revised EIS* were sent to the County by various agencies and others.

At that point, the County had begun discussions with a developer for the Kealakehe Golf Course and, as part of those discussions the golf course developer was to respond to the comments. There are no records to show the golf course developer or the County responded to the comments on the *Amendment to the Revised EIS*.

1.4 Project Background

The County of Hawaii and the State of Hawaii Department of Health (DOH) have agreed to develop plans to reuse the effluent from the Kealakehe WWTP as the primary method for effluent disposal rather than continuing use of the temporary sump. Further, in November 1997, the County and the DOH entered into a Consent Order that requires the County to expend $175,000 toward providing R-2 quality water for irrigation of landscaping within Honokohau Harbor.

Most recently, the DOH, in a letter to the County dated November 24, 1999, approved the request of the County to extend the completion of the reuse system

to irrigate the landscaping at Honokohau Harbor and along the access road between Queen Kaahumanu Highway and Honokohau Harbor. Although design and construction funds have not yet been approved by the County of Hawaii Council, the projected completion date for this project is now August 2002. However, at this time, the County and the DOH are discussing implementing another environmentally beneficial project in lieu of the harbor project.

In 1995, the County of Hawaii contracted Waimea Water Services, Inc., Waimea, Hawaii to conduct a study to determine the impact of the temporary sump disposal on the groundwater and the nearby coastal waters. In March 1996, the results of the study were released in a report titled *Kealakehe Wastewater Treatment Plant Effluent Reuse and Management Project, Final Progress Report on Effluent Discharge, Reuse, and Quality (Effluent Reuse Report).* The results of tests from the monitoring wells indicated that use of the temporary sump for disposal of effluent did not result in significant adverse impacts to: the water quality at Honokohau Harbor; groundwater resources; and nearby coastal waters. The March 1996 report also included several options for potential reuse of the effluent.

1.5 Reuse Requirements

Reuse of effluent from wastewater treatment plants has been considered at numerous locations throughout the U.S., including in Hawaii, for a number of years. Although Federal regulations have been established for wastewater effluent discharge, reclamation for nonpotable reuse of effluent has taken place without the national standards. In 1992, the U.S. Environmental Protection Agency (EPA) and the U.S. Agency for International Development (USAID) jointly published a manual titled *Guidelines for Water Reuse* which presented guidelines for water reuse and provided information to assist others in developing guidelines or regulations.

In November 1993, in response to a number of requests for clarification, the DOH issued *Guidelines for the Treatment and Use of Reclaimed Water* (DOH Guidelines) to supplement the regulations set forth in Chapter 62 of Title 11

Hawaii Administrative Rules which refer to subsurface disposal and effluent irrigation with treated wastewater. The objectives of the Guidelines are to:

- Protect public health and avoid public nuisance;
- Prevent environmental degradation of aquifers and/or surface waters;
- Delineate specific reclaimed water application with reclaimed water quality treatment;
- Facilitate use of reclaimed water in greater amounts by providing knowledge of the conditions under which DOH can assure the safe of use of reclaimed water; and
- Facilitate acceleration of planning, design, permitting, and implementation of water reclamation projects.

In addition to these objectives, the DOH Guidelines define and set forth uses for reclaimed water. The three categories of reclaimed water are:

- R-1 Water — Significant reduction of viral and bacterial pathogens;
- R-2 Water — Disinfected secondary reclaimed water (secondary treatment with disinfection to achieve a fecal coliform limit of 4 cfu/100 ml);
- R-3 Water — Undisinfected secondary reclaimed water

Among the number of specific topics, the DOH Guidelines are applicable to the design and operation of wastewater treatment plants, transmission of the reclaimed water to a reuse site, distribution of the reclaimed water on the site, and uses of the reclaimed water at the reuse site. In regards to uses of the reclaimed water, the DOH Guidelines set forth:

- Allowable uses;
- Soils testing and subsurface monitoring plans;
- Setback requirements from drinking water wells;
- Operations and maintenance plans for the system;
- Runoff and ponding control;

- Public access control to sites;
- Public and employee education plans; and
- Backup disposal and storage systems.

Allowable uses for R-3 quality water in the Guidelines include:

- Surface, drip or subsurface irrigation of:
  - Feed, fodder and fiber crops;
  - Trees grown for timber, firewood, and ornamental purposes;
  - Orchards and vineyards provided the water does not contact consumable portions of the crop; and
  - Food crops which undergo extensive processing prior to consumption.
- Surface or drip irrigation of non-consumable seed crops.

Allowable use for R-2 quality water in the DOH Guidelines include:

- Allowable uses of R-3 quality water;
- Surface, drip or subsurface irrigation of:
  - Landscape of cemeteries, freeway buffers, and non-edible plants where there is limited exposure of the irrigation water to the public;
- Industrial processes that do not generate mist, or involve human contact;
- Dampening for consolidation of backfill material around underground pipelines (excluding potable water lines);
- Dust control of unpaved roads and at construction sites;
- Washing aggregate and making concrete; and
- Flushing sanitary sewers

Allowable use for R-1 quality water in the Guidelines include:

- Allowable uses of R-2 and R-3 quality water;
- Subsurface irrigation at pre-school yards and playgrounds;

- Surface, drip or subsurface irrigation of:
  - Golf courses, parks, elementary school yards, and athletic fields;
  - Residential properties when managed by an irrigation supervisor;
  - Road sides and medians;
  - Grazing pastures for dairy animals;
- Fire fighting from hydrants, fire trucks or aircraft;
- High pressure water blasting to clean surfaces;
- Commercial and public laundries; and
- Decorative fountains (with some restrictions).

Table 1.1 shows a summary of the various allowable uses for each category of reclaimed water set forth in the DOH Guidelines.

Beyond the uses shown in Table 1.1, there are a number of precautions related to the use of reclaimed water in the DOH Guidelines among which include:

- The provisions of the Guidelines shall be complied with when any reclaimed water is used on an approved use area. Use of any reclaimed water without an approved use area is prohibited.
- The purveyor of reclaimed water shall provide a copy of the Guidelines to all persons to whom it provides reclaimed water, and shall obtain their agreement in writing to comply with all applicable provisions of the Guidelines.
- Signs shall be posted where reclaimed water is used pursuant to Public Education and Employee Training Plan in the Guidelines.
- Adequate measures shall be taken to prevent ponding of reclaimed water.
- Reclaimed water shall always be managed to avoid conditions conducive to proliferation of mosquitoes and other disease vectors, and to avoid creation of a public nuisance or health hazard.
- No discharge, runoff, or overspray shall extend beyond the approved use area boundaries.

Table 1.1
Summary of Suitable Uses for Reclaimed Water

Suitable Uses of Reclaimed Water	R-1	R-2	R-3
IRRIGATION: (S)pray, (D)rip & Surface, S(U)bsurface, (A)ll=S D & U, Spray with (B)uffer, (N)ot allowed			
Golf course landscapes	A	U/B	N
Freeway and cemetery landscapes	A	A	N
Parks, elementary schoolyards, athletic fields and landscapes around residential property	A	U	N
Roadside and median landscapes	A	U/B	N
Non-edible vegetation in areas of limited public exposure	A	AB	U
Sod farms	A	AB	N
Ornamental plants for commercial use	A	AB	N
Food crops above ground and not contacted by irrigation	A	U	N
Pastures for milking and other animals	A	U	N
Fodder, fiber, and seed crops not eaten by humans	A	AB	DU
Orchards and vineyards bearing food crops	A	D/U	DU
Orchards and vineyards not bearing food crops during irrigation	A	AB	DU
Timber and trees not bearing food crops	A	AB	DU
Food crops undergoing commercial pathogen destroying process before consumption	A	AB	DU
SUPPLY TO IMPOUNDMENTS: (A)llowed, (N)to allowed			
Restricted recreational impoundments	A	N	N
Basins at fish hatcheries	A	N	N
Landscape impoundments without decorative fountains	A	A	N
Landscape impoundments with decorative fountains	A	N	N
SUPPLY TO OTHER USES: (A)llowed, (N)ot allowed			
Flushing toilets and urinals	A	N	N
Fire fighting	A	N	N
Cooling saws while cutting pavement	A	N	N
Decorative fountains	A	N	N
Washing yards, lots, and sidewalks	A	N	N
Flushing sanitary sewers	A	N	N
High pressure water blasting to clean surfaces	A	N	N
Industrial process without exposure of workers	A	A	N
Industrial process with exposure of workers	A	N	N
Cooling or air conditioning system without tower, evaporative condenser, spraying, or other features that emit vapor or droplets	A	N	N
Cooling or air conditioning system with tower, evaporative condenser, spraying, or other features that emit vapor or droplets	A	A	N
Industrial boiler feed	A	N	N
Water jetting for consolidation of backfill material around potable water piping during water shortages	A	A	N
Water jetting for backfill material consolidation around piping for reclaimed water, sewage, drainage, and gas; and electrical conduits	A	A	N
Washing aggregate and making concrete	A	A	N
Dampening roads and other surfaces for dust control	A	A	N
Dampening brushes and street surfaces in street sweeping	A	A	N

Source: *Guidelines for the Treatment and Use of Reclaimed Water.*

The DOH Guidelines also set forth the requirements related to each water reclamation reuse project. The submission requirements for users of recycled water include the following:

- Basis of Design Report for Water Reclamation Reuse
- Engineering Design Report for Water Reclamation Reuse
- Construction Plans for Water Reclamation Reuse

The reports are intended to assure the DOH that the distribution and use of reclaimed water will not create a health hazard or nuisance. The reports and plans are to be prepared and stamped by a qualified engineer registered in the State of Hawaii and experienced in irrigation systems.

The Basis of Design Report for Water Reclamation Reuse must be prepared for all projects which are to use reclaimed water. The information to be submitted includes:

- A map showing the exact boundaries (azimuth-distance) of the proposed "approve use area";
- A map delineating the irrigated or wetted areas and buffer zones;
- A copy of the lease (if applicable);
- Base maps with the present land uses and anticipated land uses within one mile of the site boundaries;
- Types of vegetation cover;
- Consumptive rate of the selected vegetation cover; and
- Design application rate including the month application rate, monthly mean evapotranspiration rate, and month precipitation rate.

The Engineering Design Report for Water Reclamation Reuse must also be prepared for projects which are to use reclaimed water. The Engineering Report is to include three plans: (1) Irrigation Plan; (2) Management Reuse Plan; and (3) Public Education Plan. The Irrigation Plan is to delineate the methods and controls to be used in the irrigation system such that no runoff or ponding will

occur. The Irrigation Plan is to also include the exact boundaries of the proposed use area; amount and type of reclaimed water to be used; distribution system to deliver the water; and method of irrigation.

The Management Plan is to set forth the responsibilities for operation and maintenance of the reuse system. Once a reuse system has been established by the owner of a site, all subsequent owners must adhere to the Management Plan. The user is responsible for maintaining all on-site facilities and must appoint a reclaimed water user supervisor who shall be approved by the DOH.

The Public Education Plan is to inform persons likely to come in contact with the reclaimed water. The Public Education Plan must encompass all areas where reclaimed water is used. It must include conspicuous warning signs indicating pictorially and with wording of sufficient size to be clearly read by the public. If reclaimed water other than R-1 water is to be used, signs are to be posted with the statement: "R-2 - - RECLAIMED WATER USED IN SUBSURFACE IRRIGATION - - DO NOT DRINK - - WASH THOROUGHLY WITH SOAP AND DRINKING WATER IF CONTACT OCCURS". If R-1 water is used, signs are to be posted with the statement: "R-1 - - RECLAIMED WATER USED IN SPRAY IRRIGATION - - DO NOT DRINK." Similar signs are to be posted if the reclaimed water is used for decorative fountains or landscape impoundments.

Where other than R-1 is to be used for irrigation, the owner or lessee wishing to limit their liability related to health from exposure to reclaimed water may install fencing or other barriers to restrict public access.

Tank trucks and other equipment used to distribute reclaimed water must also be clearly identified with warning signs.

Where spray irrigation is to be used, the user shall submit a plan which either establishes a reuse advisory committee or designates an existing committee or organization which meets the same criteria. The objective of the committee is to identify, document, and notify the user supervisor of inappropriate uses of reclaimed water.

An Employee Training Plan is to be prepared to notify workers that reclaimed water is in use. The workers must be notified orally and in writing that reclaimed water is not suitable for ingesting and that drinking reclaimed water may result in serious illness.

Construction Plans for Water Reclamation Reuse projects must conform to applicable requirements set forth in the Design Standards of the Division of Wastewater Management.

1.6 Project Description

Subsequent to the March 1996 *Effluent Reuse Report*, the County of Hawaii initiated a follow-on study to examine other effluent reuse options. In February 1999, the *Effluent Reuse Master Plan* was issued which included a market assessment conducted by telephone and mail to determine potential reuse of the effluent. The market assessment examined a study area extending from Henry Street on the southern edge of Kailua-Kona northward to Kona International Airport at Keahole. In addition to Honokohau Harbor, the market assessment identified 20 other existing and future potential sites in the North Kona area for reuse of the effluent, including 12 sites which will require further treatment of the effluent to R-1 quality. Table 1.2 is the list of potential users and their estimated usage.

According to the *Effluent Reuse Master Plan*, a total of about 2.5 million gallons per day (mgd) of R-2 effluent could be reused by nine projects in the North Kona area. Golf course and landscape irrigation projects would account for six projects (1.601 mgd) and would be the major users of R-2 quality water. The other three projects (.879 mgd) would include evaporation make up water, underground fire suppression, and dust control for construction projects. The three largest reuse projects (Cyanotech, Kealakehe golf course, and Kealakehe WWTP buffer zone) would account for about 1.8 mgd or approximately 73 percent of the total effluent to be reused. Of these three largest reuse projects, two projects, the Kealakehe golf course and the Kealakehe WWTP buffer zone, have yet to be constructed. See Table 1.2.

Table 1.2
Summary of Potential Reuse Sites

Site No.	Site	Landowner (1)	R-2 mgd (2)	R-1 mgd (2)	Potential Use
1	Cyanotech Corp	Cyanotech Corp	0.450	0.450	Evaporation make up water
2	Keahole Agricultural Park	State Department of Agriculture	0.050	0.100	Irrigation of crops/plants
3	Costco (Kaloko Industrial Park	Costco Wholesale Corp	N/a	0.010	Landscape irrigation
4	Allied Aggregates Quarry	Lanihau Partners, L.P.	N/a	0.033	Dust control of quarry operations
5	West Hawaii Concrete	Honokohau Properties	N/a	0.010	Dust control of quarry operations
6	Kiewit Pacific Co. Quarry	Honokohau Properties	N/a	0.033	Dust control of quarry operations
7	Kealakehe Golf Course (3)	State/Exec Order to County	1.000	1.000	Golf course irrigation
8	Honokohau Harbor	State DLNR	0.022	0.022	Landscape irrigation/aggregate washing
9	Kealakehe High School	State Department of Education	N/a	0.007	Landscape irrigation
10	Hawaii Youth Tennis Center (3)	State of Hawaii	N/a	0.091	Landscape irrigation
11	Kailua Landfill	County of Hawaii, DPW	0.267	0.267	Underground fire suppression
12	Contractors' Fill Station (3)	County of Hawaii, DPW	0.162	0.162	Dust control for construction projects
13	Kealakehe WWTP Buffer Zone (3)	State of Hawaii, DHHL	0.378	0.378	Landscape irrigation of buffer planting
14	Queen Kaahumanu Hwy Landscaping (3)	State Dept of Transportation	0.121	0.121	Landscape irrigation
15	Multi-Use Recreational Trail (3)	Various	N/a	N/A	----------
16	Queen Liliuokalani Children's Cnt	Liliuokalani Trust	N/a	0.016	Landscape and food crop irrigation
17	Swing Golf Course Driving Range	Liliuokalani Trust	0.030	0.060	Landscape irrigation
18	Kailua Park (4)	County of Hawaii, DPR	N/a	0.100	Drip and spray irrigation of grass/plants
19	Kona Bay Estates	Various	N/a	0.005	Landscape irrigation
20	Kona Coast Shopping Center	Keane P. & Adele L. Dimick	N/a	0.001	Landscape irrigation
21	Laniahu Center	Lanihau Partners, L.P.	N/a	0.013	Landscape irrigation
TOTAL			2.5	2.9	

Source: *Effluent Reuse Master Plan*, February 1999

(1) Based on Tax Map information.
(2) million gallons per day
(3) Future to be constructed.
(4) County of Hawaii Department of Parks Recreation estimate 0.066 mgd
n/a: Not applicable.

In the future, upon construction of additional treatment capabilities at the Kealakehe WWTP, R-1 quality water would be available for 12 additional reuse projects which would then have a total reuse demand of about 2.9 mgd. These R-1 uses would include dust control for quarry operations and landscape irrigation at projects which may involve human contact with the reclaimed water.

The following is a brief summary of the potential reuses in the *Effluent Reuse Master Plan.*

1. **Cyanotech Corporation** has an aquaculture facility of about 90 acres located in the Hawaii Ocean and Technology Park south of Kona International Airport and could use R-1 quality water for evaporation makeup. Currently, most of the 90 acres is used for algae growing ponds. By 2001, after expansion, a total of 180 acres would be used for algae growing which amount to 450,000 gallons/day of R-1 quality water.

2. **Keahole Agricultural Park** is a 191-acre agricultural park under the control of the State of Hawaii Department of Agriculture which leases land to farmers for growing various agricultural products including flowering and ornamental plants. Currently, about 135 acres have been developed. About 100,000 gallons/day (approximately 3.0 million gallons/month) of water is used for irrigation. Most of the products could use R-2 quality water, although some R-1 quality water maybe required.

3. **Costco** is a membership wholesale store located in Kaloko Light Industrial Park. About 300,000 gallons/month of water are used to irrigate landscaped areas surrounding and within the parking lots. Given the potential for public access, R-1 quality water would have to be used.

4. **Allied Aggregates** operates a quarry with an asphalt and concrete plant located within the quarry area at a site south of Kaloko Light Industrial Park and east of Queen Kaahumanu Highway. These operations use about 1,000,000 gallons/month of water for dust control on its aggregate conveyor belts. R-1 quality water would be required due to the potential of contact by workers.

5 and 6. **West Hawaii Concrete and Kiewit Pacific Company** together use 1,300,000 gallons/month for dust control and aggregate crushing. R-1 quality water would be required due to the potential of contact by workers.

7. A **future Kealakehe golf course** could be constructed at the previously abandoned County of Hawaii and Kealakehe Partners site east of Queen Kaahumanu Highway. If no residential development were to occur adjacent to the golf course, R-2 quality water could be used for irrigation of the course. However, if residential development were to occur R-1 quality water would be necessary. The future water use would be about 1,000,000 gallons/day, 30,000,000 million gallons/month, for golf course irrigation.

8. **Honokohau Harbor** is to receive irrigation water from the Kealakhe WWTP for landscaping the harbor entrance as set forth in the Consent Order between the County of Hawaii and the DOH. Current and future uses would include landscape irrigation, aggregate washing, and power washing of boat ramps. A total of approximately 11 acres of landscaping could use R-2 quality water. R-1 quality water would be required for power washing of boat ramps. Up to 650,000 gallons/month (22,000 gallons/day) could be used at Honokohau Harbor.

9. **Kealakehe High School** uses between 100,000 to 200,000 gallons/month to irrigate school lawns, trees, shrubs, and other landscaped areas within the school grounds. R-1 quality water would be required due to the potential of contact by students and teachers.

10. **Hawaii Youth Tennis Center** is planned for a future site adjacent to the southern end of Kealakehe High School. An estimated 91,000 gallons/day (273,00 gallons/month) of water would be used for irrigation of landscaped areas. R-1 quality water would be required.

11. The **County of Hawaii Kailua Landfill** uses water to suppress underground fires which have been occurring within the 13-acre landfill since its closure in 1993. The water is injected into the landfill to control fires. Although

the need for fire control is highly variable, for planning purposes, the estimated usage is 8,000,000 gallons/month. Contingent upon approval of by the DOH, R-2 quality water could be used for this purpose.

12. A **contractor's fill station** is proposed by the County to provide water for dust control purposes. Although usage is expected to be variable, an estimated 162,000 gallons/day (4,860,000 gallons/month) of R-1 or R-2 quality water could be used by nearby contractors for dust control.

13. A **landscaped buffer zone** surrounding the Kealakehe WWTP could use 378,000 gallons/day (11,340,00 gallons/month) of R-2 quality water for landscape irrigation purposes. A buffer of 150 to 200 feet wide surrounding the WWTP facility would be planted with a variety of trees and other plant material to buffer the plant from other land uses.

14. A **landscaped median** is planned as part of the Queen Kaahumanu Highway widening project. The 8-mile long segment will extend from Henry Street on the south to the Kona International Airport access road on the north. The estimated usage over the entire length is 121,000 gallons/day (3,630,000 gallons/month) of R-2 or R-1 quality water.

15. A **recreational trail** has been proposed by the People's Advocacy for Trails Hawaii to connect Honokohau Harbor and the Old Kona Airport. This segment would be part of an island-wide pathway for non-motorized use. At this time, there are no landscape plans or water usage estimates for the trail.

16. **Queen Liliuokalani Children's Center** uses about 16,200 gallons/day (485,000 gallons/month) for irrigating plants, trees, and some food crops. Based on the potential for public contact, R-1 quality water would be necessary. Some R-2 quality water could be used on a limited basis.

17. The **Swing Zone golf driving range** currently uses about 30,000 gallons/day (900,000 gallons/month) of R-2 quality water to irrigate their grass and trees. An on-grade PVC pipe is used to carry the R-2 quality water from the

Kealakehe WWTP to a storage tank at the driving range. The irrigation is done at night. The driving range could use up to 60,000 gallons/day (1,800,000 gallons/month) of R-1 quality water.

18. **Kailua Park,** a County of Hawaii public park, currently uses about 100,000 gallons/day (3,000,000 gallons/month) to irrigate the developed portion of the park, an area of approximately 25 to 30 acres. R-1 quality water would be required to irrigate the park.

19. **Kona Bay Estates**, a residential subdivision located near Kailua Park, uses about 5,000 gallons/day (155,000 gallons/month) to irrigate a 1-mile long roadway which is landscaped with grass and other plant material. R-1 quality water would be required for this use.

20 and 21. **Lanihau Center and the Kona Coast Shopping Center** use a total of about 13,000 gallons/day (418,000 gallons/month) to irrigate landscaped areas within and surrounding their parking lots. R-1 quality water would be required for this use.

As previously discussed, as set forth in the Guidelines, each user, and as necessary, the County, must submit the required documentation and plans to the DOH prior to implementing a reuse project.

In addition to reuse, there will be the continuing need to dispose effluent through the use of a sump as a backup disposal method when the supply of effluent exceeds disposal capabilities. The present temporary sump could be replaced by using a larger number of smaller sumps for effluent disposal. A total of seven sumps located west or makai of Queen Kaahamanu Highway between the WWTP access road and the Honokohau Harbor access road could be constructed for effluent disposal. The March 1996 *Kealakehe Wastewater Treatment Plant Effluent Reuse and Management Project, Final Progress Report* recommended use of sumps east or mauka of the Highway within the previously proposed Kealakehe golf course. However, at this time, the County intends to

use sumps west or makai of the Highway between the WWTP access road and the Honokohau Harbor access road.

1.6.1 Project Location

Figure 1.1 is the project location map. Figure 1.2 shows the location of potential reuse sites. Figure 1.3 shows photographs of the various sites.

1.6.2 Priority Project

In the first phase of the County's implementation plan, the County is proposing to construct the contractor's fill station (Reuse Site 12) to provide a source of R-2 quality water for control of dust at construction sites. The contractor fill station is be located near the County's existing refuse transfer station about 1,500 feet east or mauka of Queen Kaahumanu Highway near the Kailua Landfill.

Beyond this initial project, the County has not developed an implementation schedule for funding the design and construction for any County reuse project. As previously discussed, the DOH approved the request of the County to extend the completion of the reuse system to irrigate the landscaping at Honokohau Harbor and along the access road between Queen Kaahumanu Highway and Honokohau Harbor. The County of Hawaii Council has not yet approved design and construction funds for this project. However, the projected completion date for this project is August 2002.

As discussed above, R-1 quality water will be needed before the effluent can be used at number of the potential reuse sites. Conceptually, the WWTP would need to be upgraded to include unit processes to remove the algae and disinfect the effluent to meet R-1 quality water standards. In development of the Reuse Plan, the County considered a gravity filtration process and ultraviolet disinfection process train to produce R-1 quality water. At this time, the County has not developed a detailed plan or implementation schedule for treating the effluent from the Kealakehe WWTP to R-1 quality water.

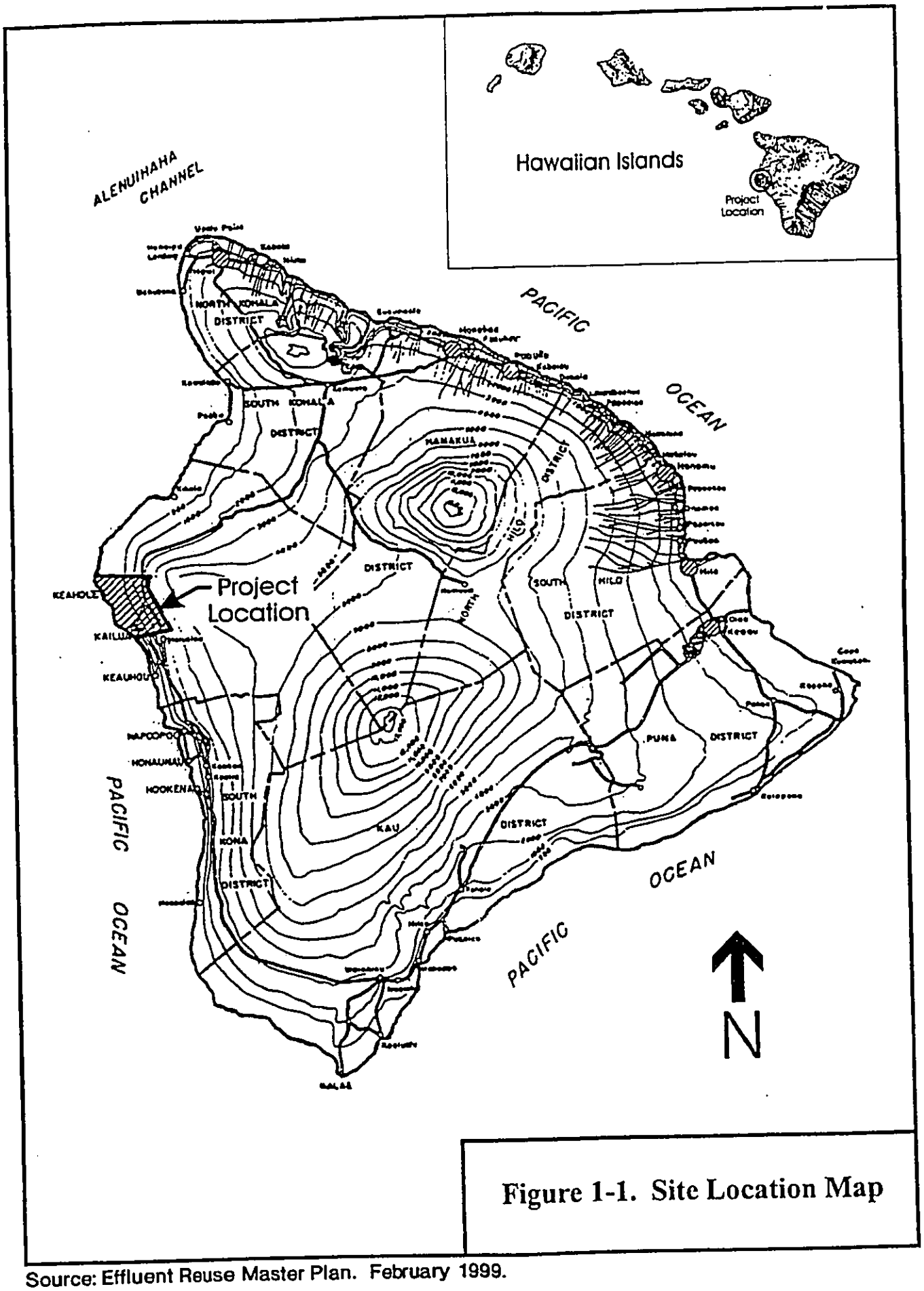

Figure 1-1. Site Location Map

Source: Effluent Reuse Master Plan. February 1999.

LEGEND:

Kealakehe Wastewater Treatment Plant

Potential Reuse Site

Number	Reuse Site	Number	Reuse Site
1	Cyanotech Corporation	13	Kealakehe WWTP Buffer Zone
2	Keahole Agricultural Park	14	QueenKaahumanu Hwy Landscaping
3	Costco		A: Urban Zone
4	Allied Aggregates		B: Transition Zone
5	West Hawaii Concrete		C: Airport Zone
6	Kiewit Pacific Co. Quarry	15	Recreational Trail
7	Future golf course	16	Queen Liliuokalani Children's Center
8	Honokohau Harbor	17	Swing Zone driving range
9	Kealakehe High School	18	Kailua Park
10	Hawaii Youth Tennis Center	19	Kona Bay Estates
11	Kailua Landfill	20	Kona Coast Shopping Center
12	Contractor's water fill station	21	Lanihau Center

U.I.C. Line

1 2 3 4 14C

Source:
Brown and Caldwell, Kealakehe Wastewater Treatment Plant Effluent Reuse Master Plan, 1999.
County of Hawaii and R.M. Towill Corporation, Keahole to Kailua Development Plan, 1991.

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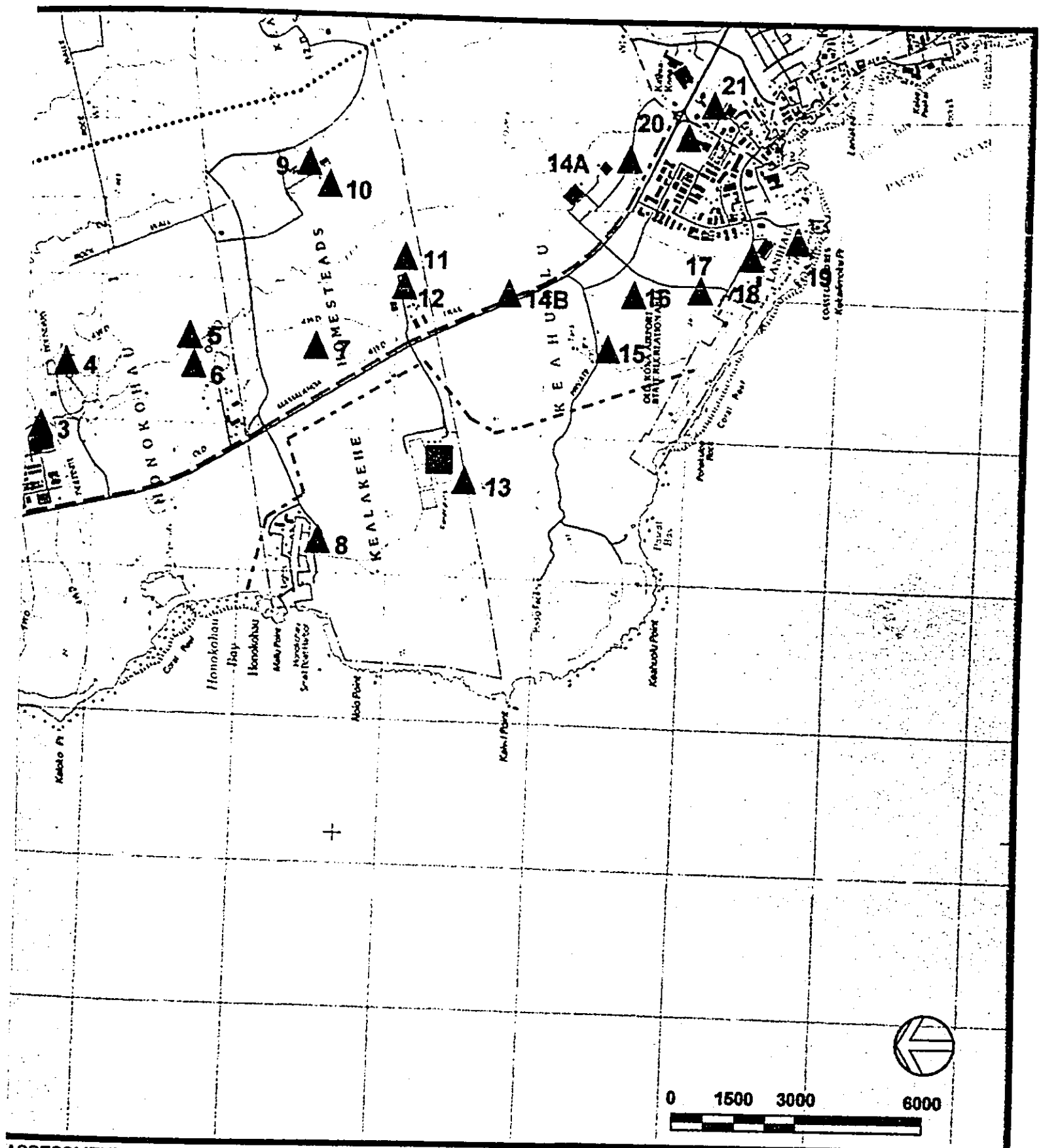
ENVIRONMENTAL ASSESSMENT
KEALAKEHE WASTEWATER TREATMENT PLANT EFFLUEN

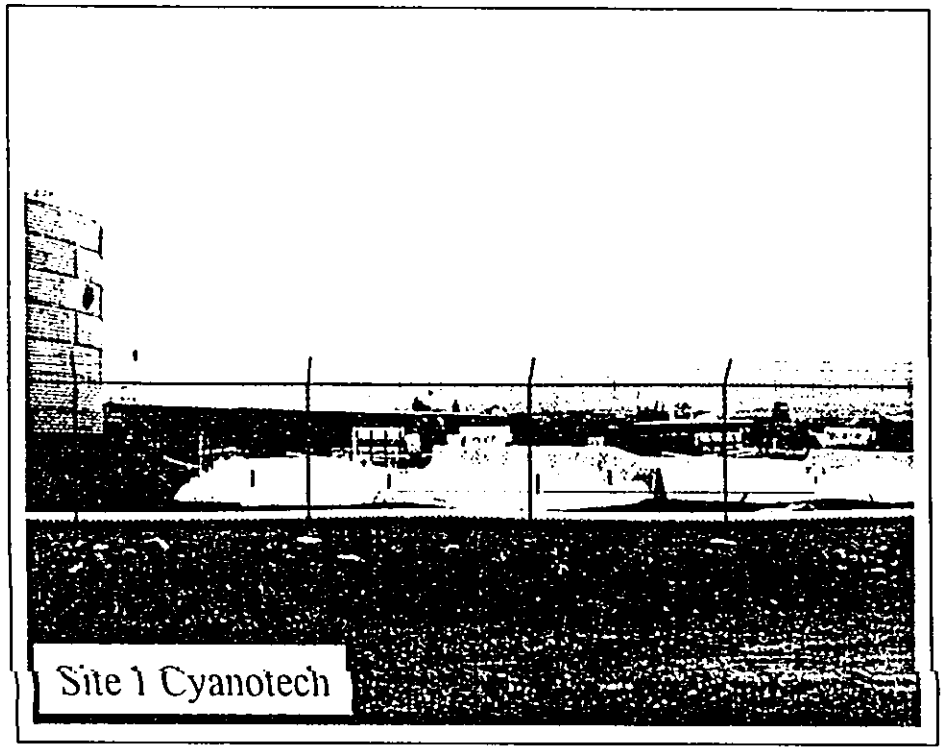
POTENTIAL REUSE SIT

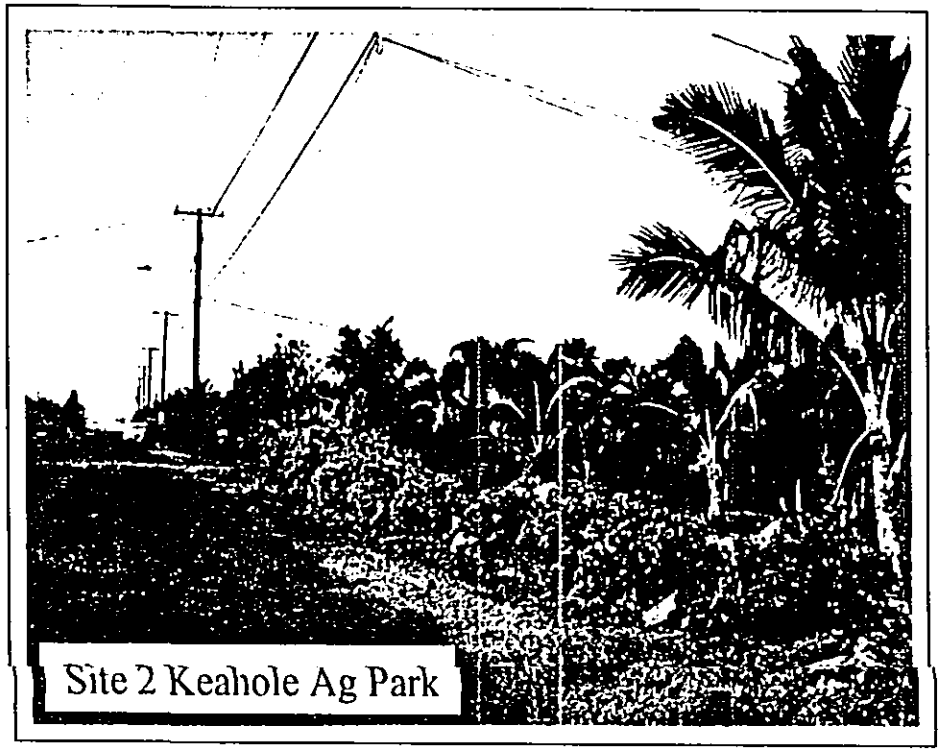


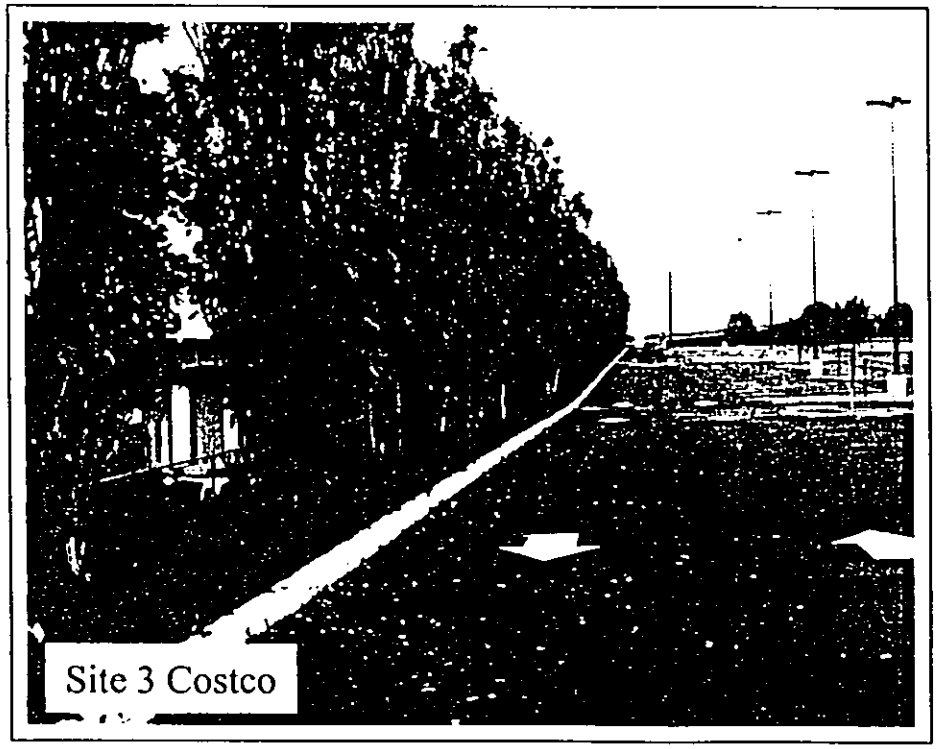
ASSESSMENT
LANT EFFLUENT REUSE MASTER PLAN

EUSE SITES

FIGURE
1.2


Site 1 Cyanotech


Site 2 Keahole Ag Park


Site 3 Costco

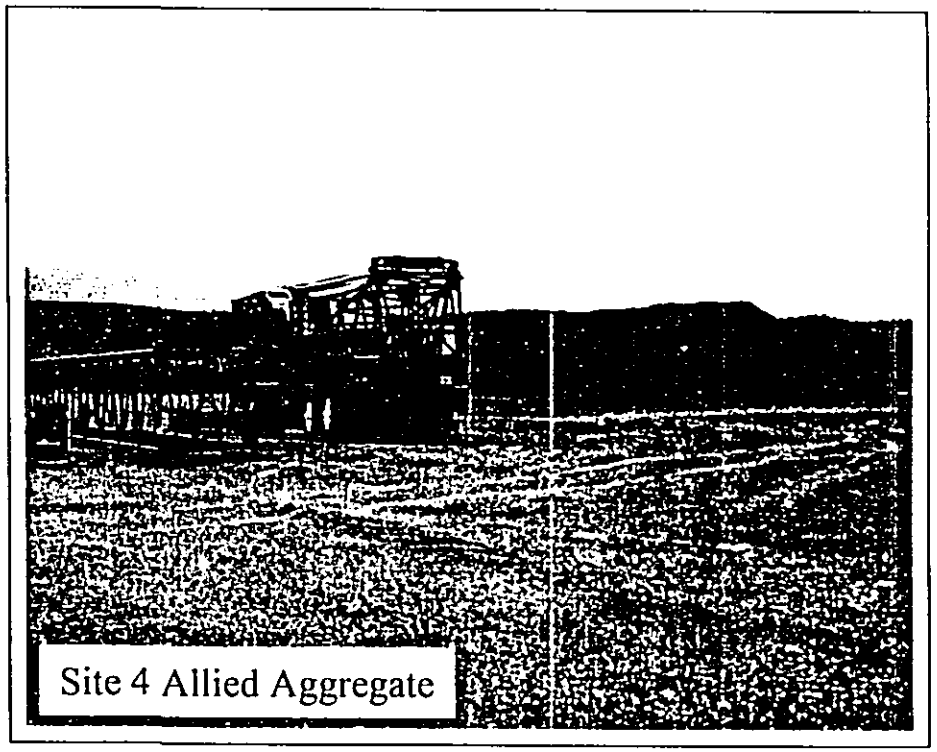
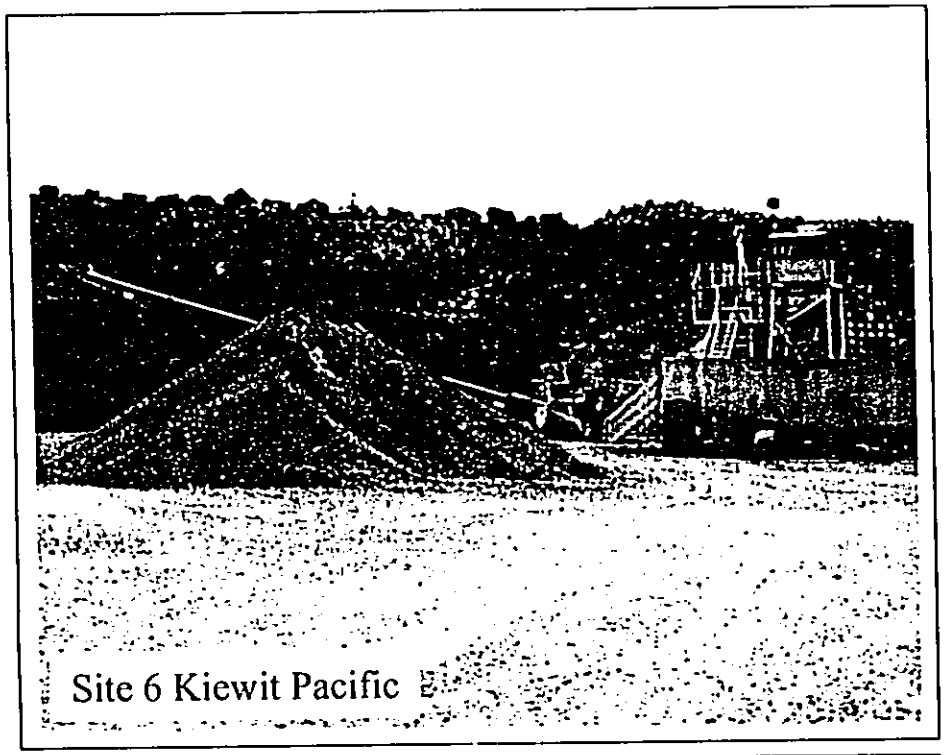
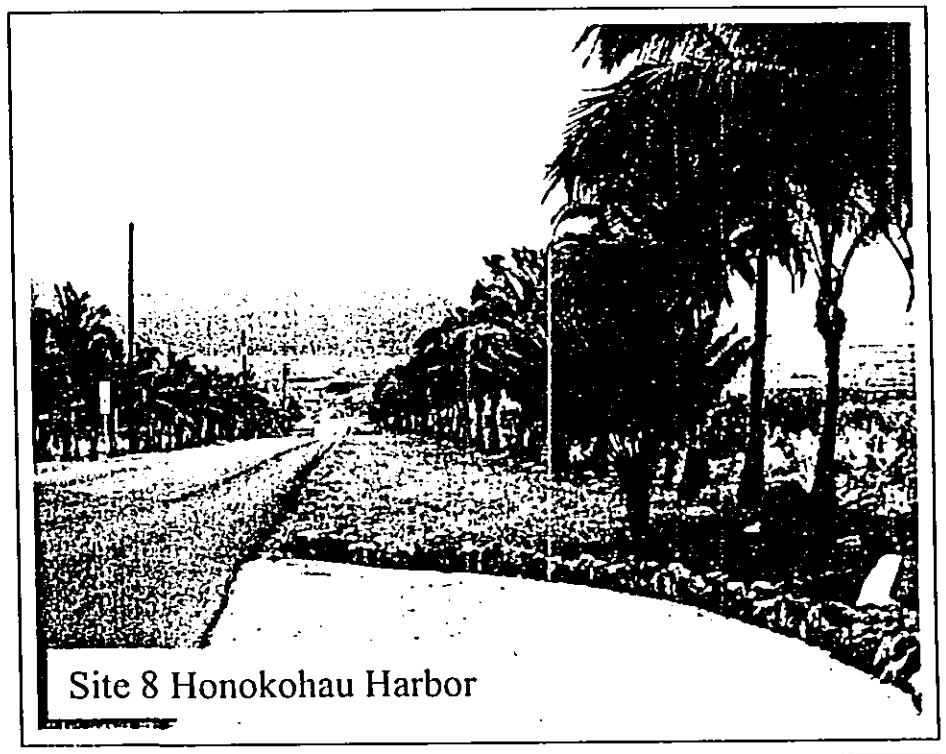

Site 4 Allied Aggregate

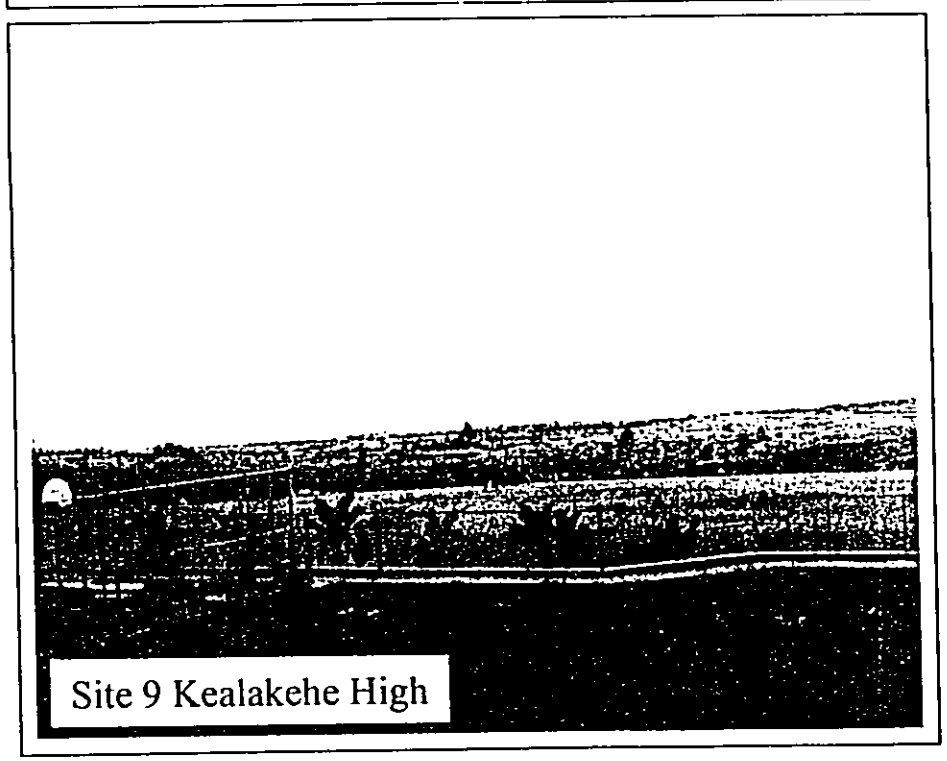
Figure 1.3



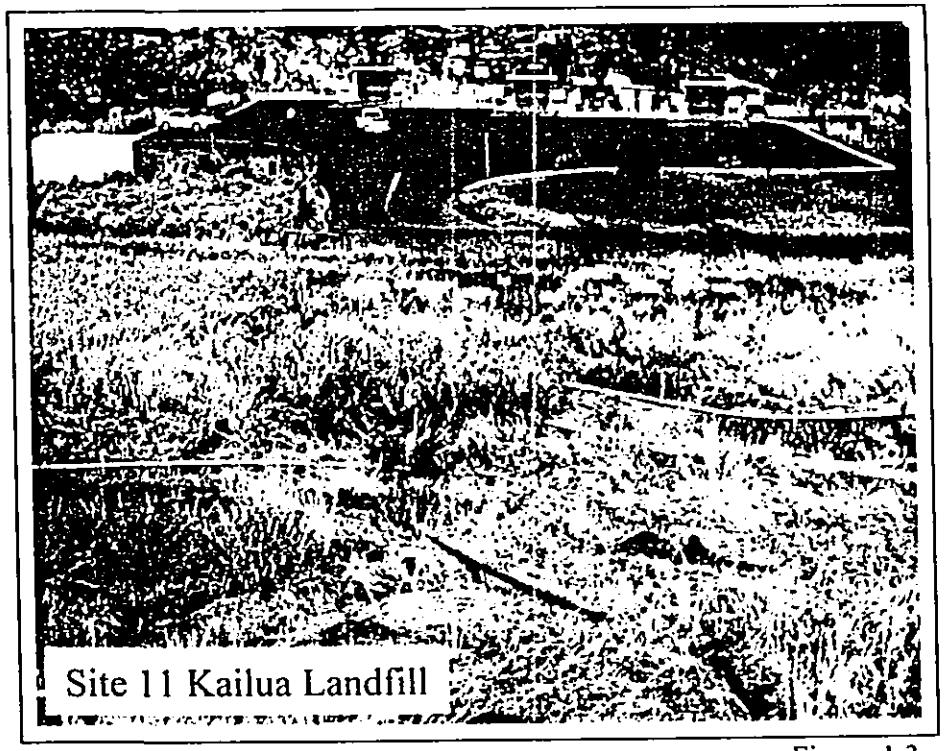
Site 6 Kiewit Pacific



Site 8 Honokohau Harbor



Site 9 Kealakehe High

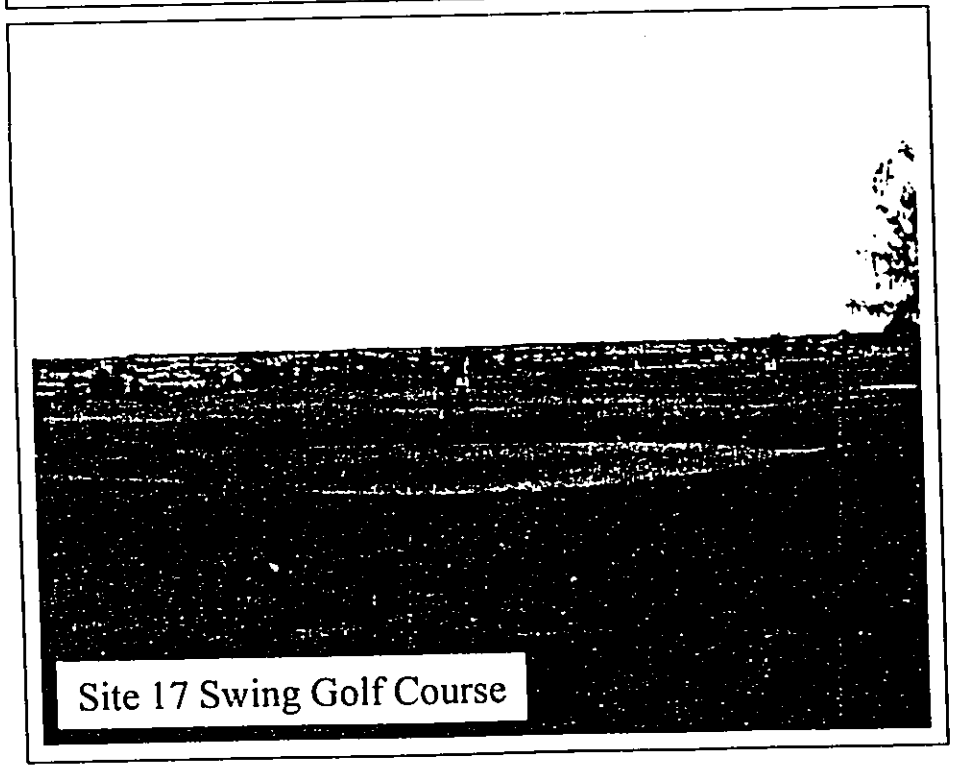


Site 11 Kailua Landfill

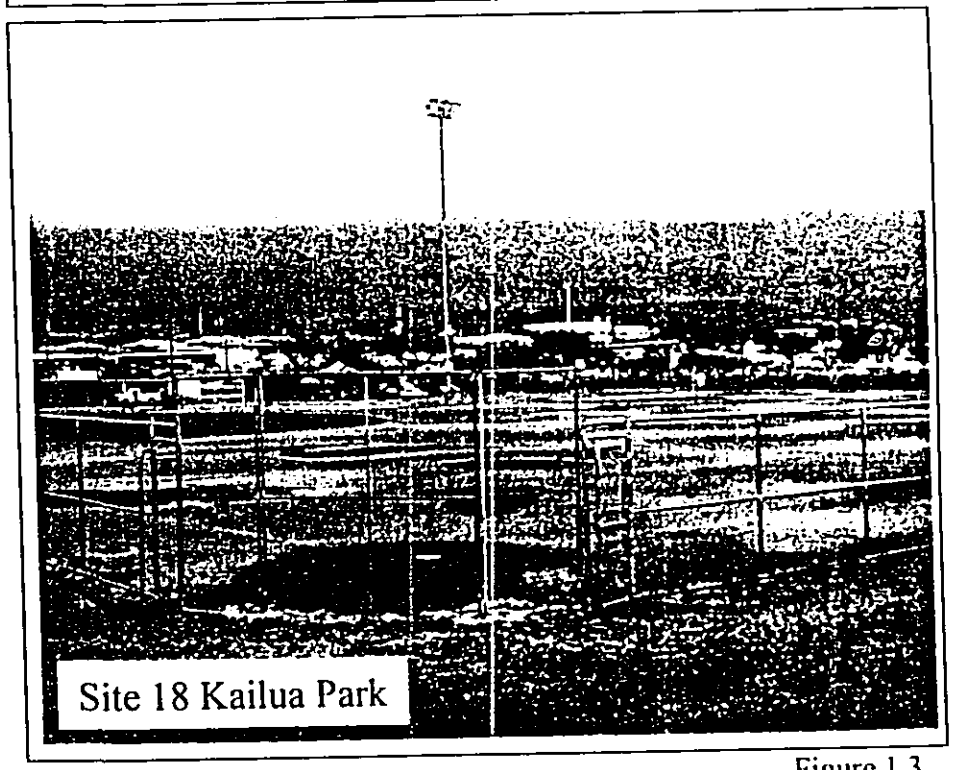
Figure 1.3

Site 12 Contractor's Fill

Site 16 Queen Liliuokalani

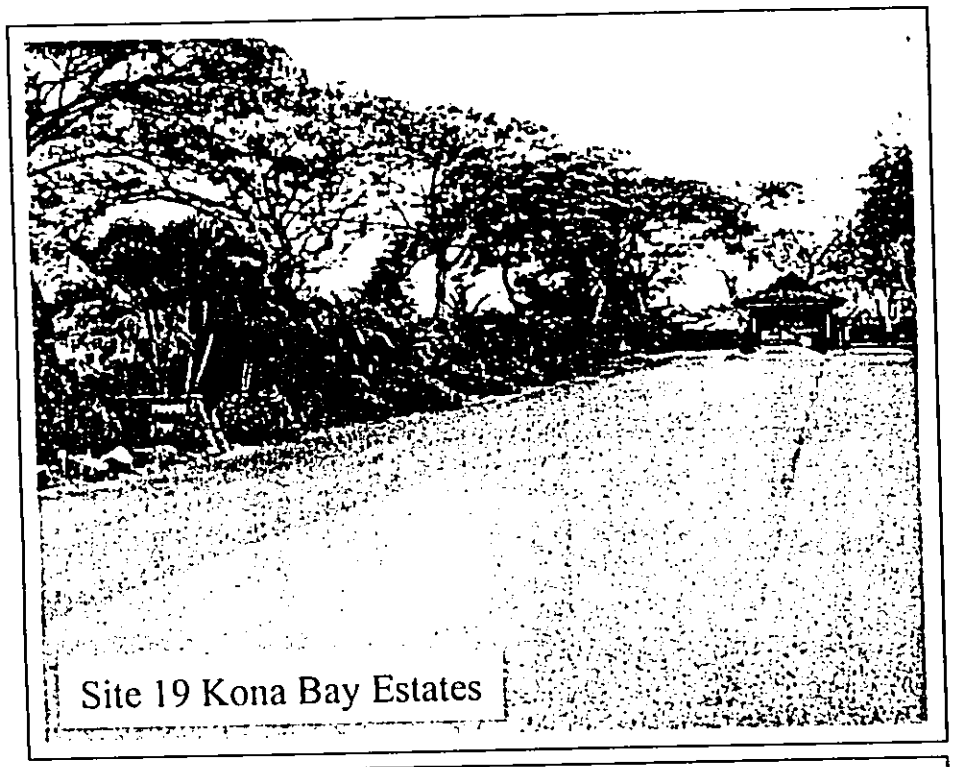


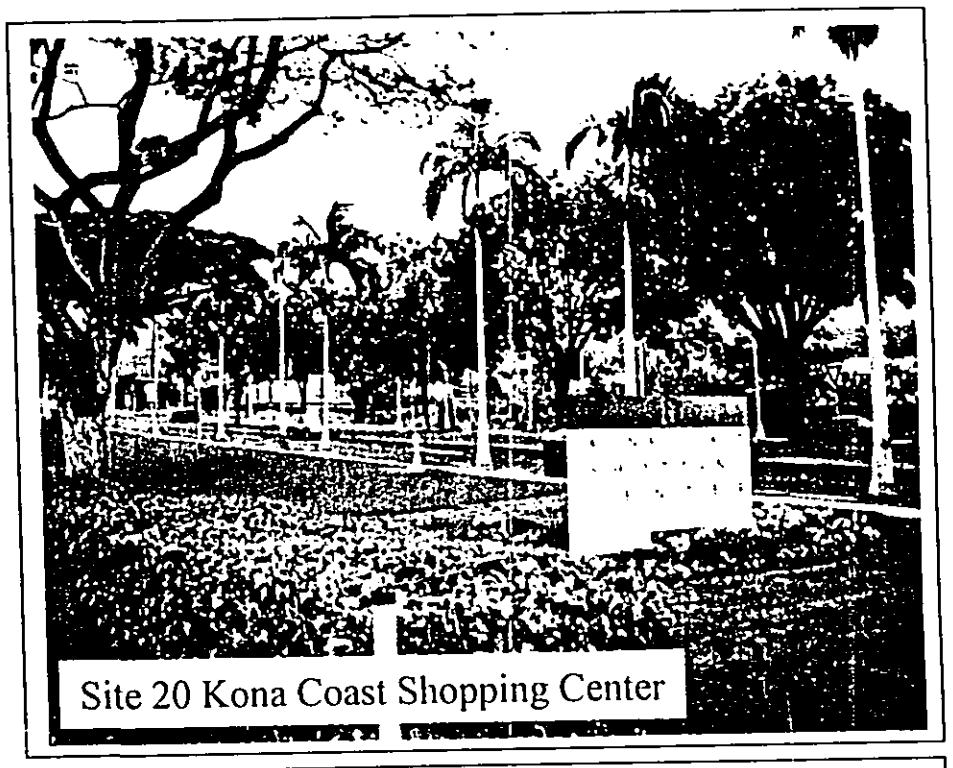
Site 17 Swing Golf Course



Site 18 Kailua Park

Figure 1.3


Site 19 Kona Bay Estates


Site 20 Kona Coast Shopping Center


Site 21 Lanihau Center

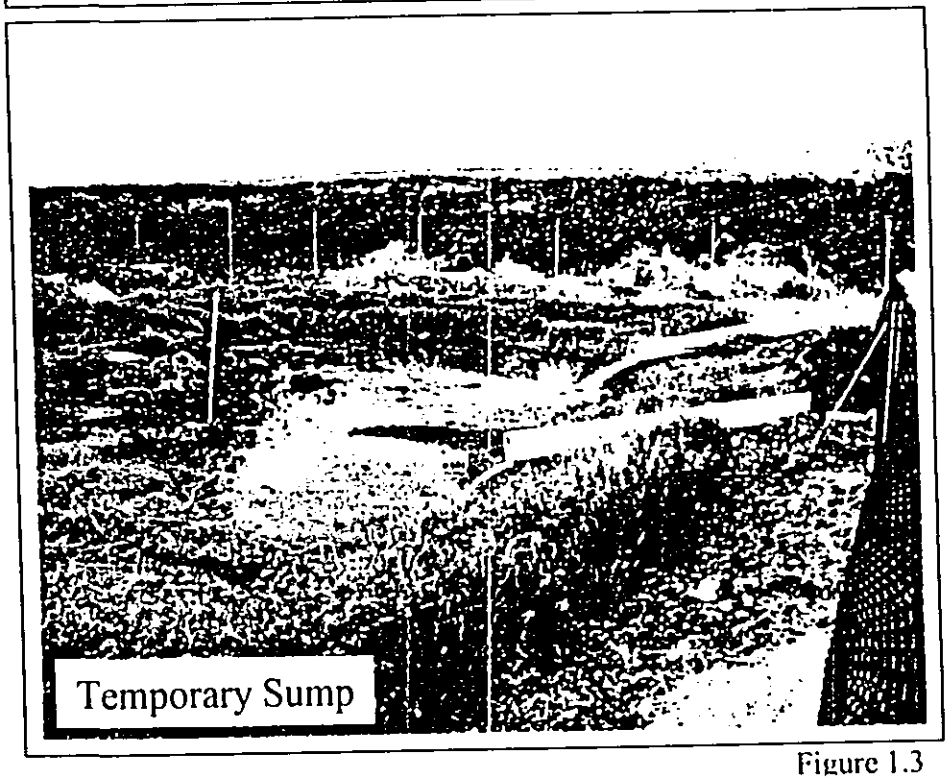

Temporary Sump

Figure 1.3

1.6.3 Transmission System

As described in the Guidelines, a transmission system will be required to convey the treated effluent to a reuse site. The County of Hawaii would be responsible for the design, construction, operation, and maintenance of the transmission system. It is expected that any transmission system which might be constructed would be located within public rights-of way for State of Hawaii or County of Hawaii roads. Plans for any construction within the State right-of-way must be submitted to the State of Hawaii Department of Transportation for review and approval. At this time, the County has not established a schedule to fund the design or construction of a transmission system.

The *Effluent Reuse Master Plan* identified a number of layouts to serve each of the potential reuse sites. Using various pipeline segments, four layouts were developed based solely on the reuse of R-2 quality water. Similarly, nine layouts were developed for reuse of R-1 quality water. Figure 1.4 shows the transmission system.

Each potential user would be responsible for design and construction of the distribution system within their property. As previously discussed, each user's system would have to meet the requirements established by the DOH to ensure that the system does not create a health hazard or nuisance.

1.7 Project Cost

The contractor's fill station (Reuse Site No. 12) is estimated to cost approximately $700,000. The entire project (contractor's fill station, transmission system, reservoir, upgrade of the WWTP to produce R-1 water) is estimated to cost about $12.0 million. The County of Hawaii Department of Environmental Management would fund the design, construction, operation, and maintenance of these facilities.

When the WWTP is upgraded, it will not be necessary to construct a new transmission system to distribute the R-1 quality water. The transmission system

used for R-2 quality water can be used for R-1 quality water when the WWTP has been upgraded to produce R-1 quality water.

The other public agencies (County of Hawaii and State of Hawaii departments) would fund the design, construction, operation, and maintenance of effluent distribution systems used within their sites.

Private organizations would be responsible for the design, construction, operation, and maintenance of the effluent distribution systems within their properties.

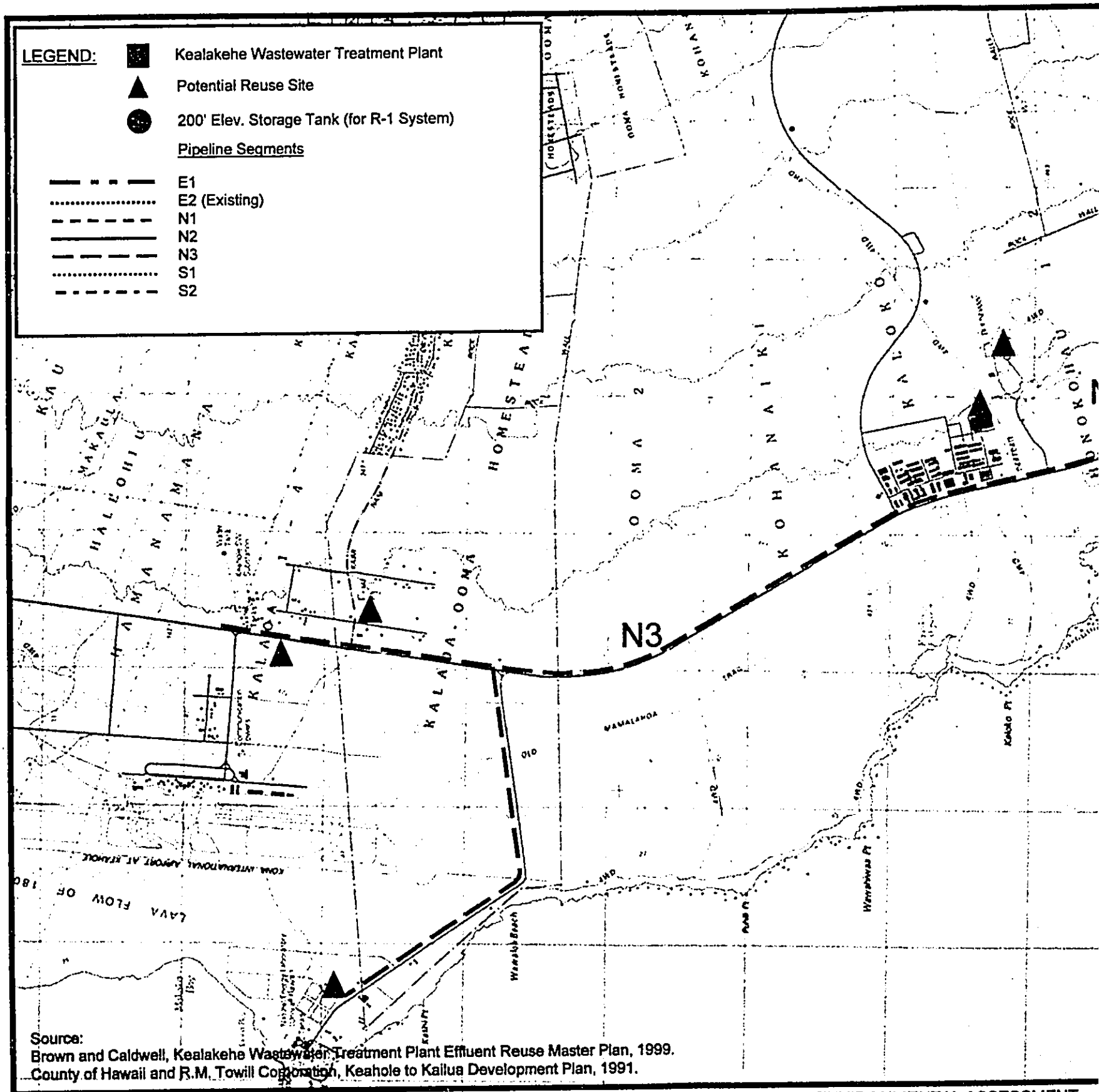
1.8 Project Schedule

Beyond the contractor's fill station, the County of Hawaii Department of Environmental Management has not developed a schedule to implement any other reuse project. As previously discussed, on November 24, 1999, the DOH approved the request of the County to extend the completion of the reuse system to irrigate the landscaping at Honokohau Harbor and along the access road between Queen Kaahumanu Highway and Honokohau Harbor to August 2002. However, at this time, the County and the DOH are discussing implementing another environmentally beneficial project in lieu of the harbor project and County funding for the project has not yet been approved.

1.9 Kealakehe Wastewater Treatment Plant

1.9.1 Existing Operations

The Kealakehe WWTP has been in operation since March 1993 and currently receives and treats approximately 1.0 million gallons per day (mgd) of wastewater from the service area bounded by the Royal Sea Cliff in the south, Kailua-Kona, and Kealakehe High School in the east. At the WWTP, influent from the collection system first enters the headworks, then passes through bar screens and grit chambers to remove solids and grit. The wastewater is then sent to a series of five aerated lagoons where the effluent is further treated to remove solids and organic material. The WWTP effluent flows into the effluent



Source:
Brown and Caldwell, Kealakehe Wastewater Treatment Plant Effluent Reuse Master Plan, 1999.
County of Hawaii and R.M. Towill Corporation, Keahole to Kailua Development Plan, 1991.

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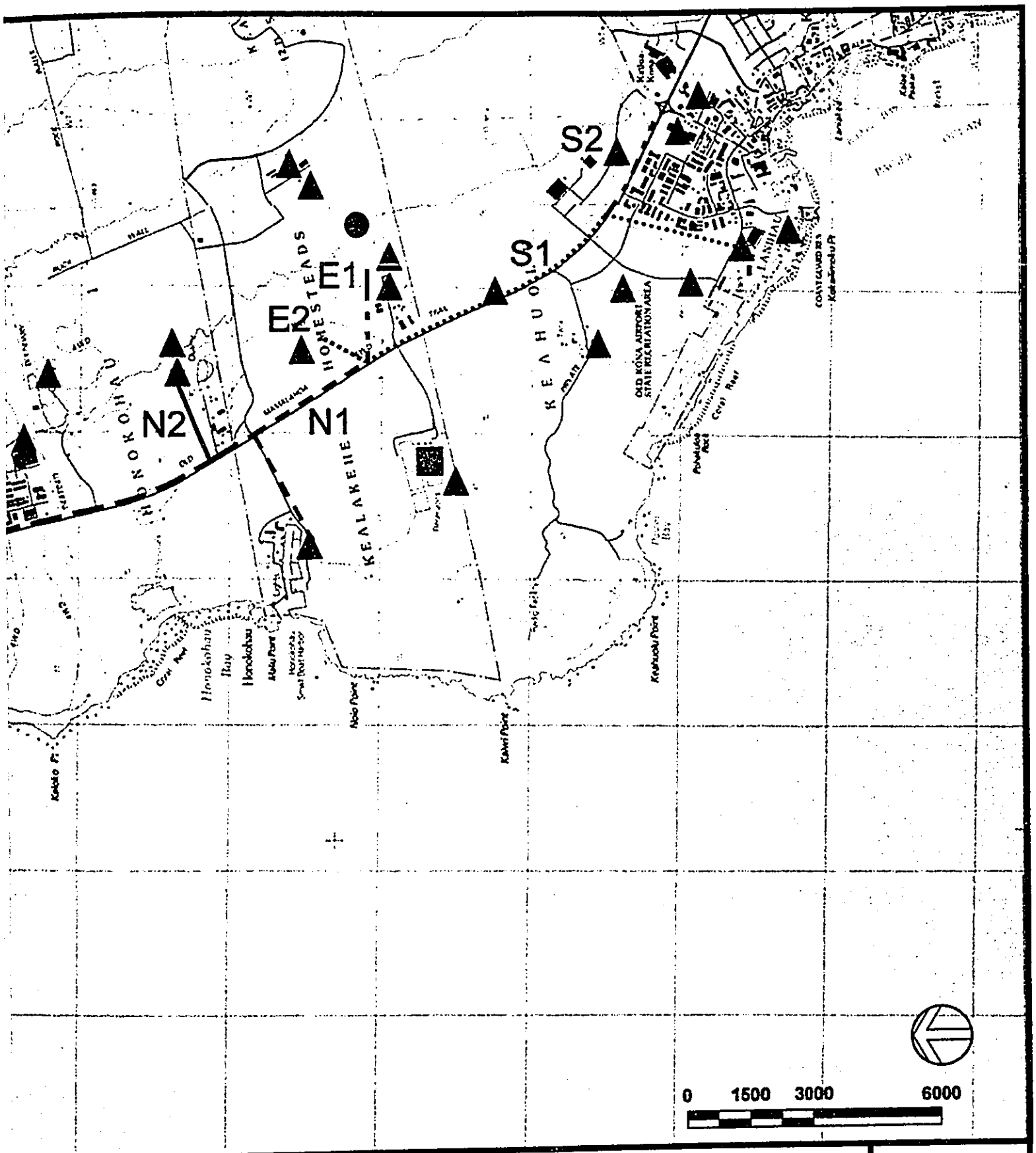
ENVIRONMENTAL ASSESSMENT
KEALAKEHE WASTEWATER TREATMENT PLANT EFFLUENT

TRANSMISSION SYSTEM



ASSESSMENT
LANT EFFLUENT REUSE MASTER PLAN

ON SYSTEM

FIGURE
1.4

pump station where it is mixed with a chlorine solution and then pumped to the temporary sump located east of Queen Kaahumanu Highway for disposal. (Note, the chlorine solution is added to the effluent before disposal for disinfection and odor control purposes.) The temporary sump, located within lands which were transferred to the County by Executive Order, currently receives about 0.8 mgd. The WWTP is designed to treat 5.3 mgd.

1.9.2 Effluent Quality

The quality of the effluent from the Kealakehe WWTP is well within design criteria. Results of the analysis of plant records from August 1, 1995 to December 31, 1995 show that the average effluent total suspended solids (TSS) was 13 mg/l (milligrams/liter), the average biochemical oxygen demand (BOD) was 4 mg/l and the average chloride concentration was 1,100 mg/l. The average flow during this sample period was about 1.3 mgd, or approximately 25 percent of the design flow (5.3 mgd) greatly extending the treatment time of the wastewater in the lagoons.

A more recent review, between January 1997 and April 1998, showed the average TSS was about 18 mg/l, with daily peaks as low as 7 mg/l and as high as 30 mg/l and the average BOD was 10 mg/l, with a range of 0.25 to 16.25 mg/l. During two separate sample periods, the average chloride concentration was found to range from 1,080 to 2,000 mg/l.

Between November 1996 and March 1998, coliform testing was conducted once a week by the WWTP staff. The testing showed only 3 out of 73 samples resulted in positive total coliform counts. Fecal coliform counts were also low.

1.10 Future Treatment Option

Recent discussions between the County of Hawaii and the US Bureau of Reclamation (BurRec) has caused the County to evaluate the opportunity of entering into an agreement with the BurRec to design a treatment system to further treat the WWTP's effluent to produce R-1 water. The agreement would

call for the BurRec fund the design of subsurface and constructed wetlands in conjunction with a landscape buffer zone surrounding the WWTP to enhance the WWTP's effluent to meet the requirements of a R-1 quality water with ultraviolet disinfection.

This approach to producing R-1 water also provides the additional benefit of a bird refuge for native birds that reside in the West Hawaii region and possibly mitigate the concern of birds nesting adjacent to Kona International Airport.

This option will be analyzed further by the County and, if considered for implementation, will be examined in future environmental documentation. Analysis of this option is not included in this Environmental Assessment.

2.0 DESCRIPTION OF EXISTING ENVIRONMENT, IMPACTS and MITIGATION MEASURES

2.1 Geology and Topography

2.1.1 Existing Environment

The reuse sites lie along the western slope of Hualalai, a dormant shield-type volcano that last erupted in 1801 along its northwest rift zone. The western slopes of Hualalai Volcano consist predominantly of alkalic olivine basalt flows that are typically thin-bedded, dip 10 to 15 percent, and average 4 to 5 feet in thickness on the upper slopes and average 10 feet in thickness on the more gentle slopes (2 percent) near the coast. These flows consist of both pahoehoe and a'a types and belong to the prehistoric member of the Hualalai volcanic series.

The composition of the uppermost 100 feet of lava flows is significant in determining the nature of groundwater flow systems at sea level and the rate at which effluent could migrate vertically. The geology of the area of the reuse sites, along with this portion of the Kona coast, is primarily pahoehoe and a'a lava flows.

The reuse sites lie at elevations from below 20 feet mean sea level (msl) for Reuse Sites Nos. 1, 18, and 19 to about 360 feet msl for Reuse Sites Nos. 9 and 10. The reuse sites makai of Queen Kaahumanu Highway lie at elevations below about 80 feet msl.

2.1.2 Impacts and Mitigation Measures

Reuse will involve irrigation or other use of the effluent on the ground surface which will not alter the geologic character of this area of the Kona coast. The reuse of effluent will not create adverse impacts to the geology of this area of the Kona coast.

Construction of the transmission system will require excavation of trenches to place the pipelines. Typically, since about 3 to 4 feet of cover is placed above the buried line, excavation will be up to about 5 to 5½ feet below the surface. Once the pipe has been placed in the excavated trench, backfill material will be placed on the pipe and the surface returned to the previous condition. Thus, construction of the trench and placement of the pipe will not create adverse impacts to the topographic character of this area of the Kona coast.

2.2 Soils

2.2.1 Existing Environment

As previously stated, the underlying soils of the area of the reuse project sites are mainly pahoehoe and a'a. According to the *Soil Survey of Island of Hawaii*, these soils are characterized by the almost complete lack of covering soils and the absence of vegetation. Areas near Kaloko Industrial Park show soils of the Punaluu series which consist of well-drained, thin organic soils over pahoehoe lava bedrock. Most landscaped areas, such as those found at the reuse sites, would have relied on imported top soils to provide material for the plantings.

The limited depth of the top soil somewhat limits the removal of nutrients in the effluent through the process of soil adsorption. This shallow cover of top soil also means limited retention of surface flows in the covering soil material. According to the *Soil Survey of Hawaii*, pahoehoe lava is slowly permeable, although water moves rapidly through the cracks.

2.2.2 Impacts and Mitigation Measures

Construction of the transmission system will occur within public rights-of-way. Soils will be disturbed during construction of the transmission system including periods of trenching and backfilling work. Once the backfill has been compacted, surface soils would be returned to their previous conditions.

Reuse of the effluent for irrigation at each reuse site will be governed by the requirements set forth in the DOH Guidelines which, as previously stated, are intended to assure the DOH that the distribution and use of reclaimed water will not create a health hazard or nuisance. Each reuse site using irrigation will need to prepare an Irrigation Plan according to the Guidelines specific to its location, its weather conditions, and its vegetative cover.

The effluent reused for irrigation will have the impact of adding nutrients to the soil for the irrigated crop. Soils in areas where effluent is used can be expected to typically show increased levels of nitrogen, phosphorus, and potassium. Nitrogen is typically removed from the soil by plant and vegetative cover uptake.

The impact to the soils from the nitrogen in the effluent will vary considerably according to the specific soil profile at the reuse site. The Irrigation Plan for each reuse site will need to specifically address conditions according to its location and soil conditions.

2.3 Groundwater

2.3.1 Existing Environment

Existing groundwater conditions in the vicinity of the reuse sites have been documented in the March 1996 *Effluent Reuse Report.* Among its components, the report provided information on the results of measurements taken from two observation/monitor wells, one located within the Kealakehe WWTP site and the other located next to the temporary disposal sump. (Note, the two observation/ monitor wells were part of the Effluent Reuse Report analysis. All of the observation/monitor wells were existing at the time of that study and were not drilled for the *Effluent Reuse Report.*) The analysis indicated, although nutrients such as phosphorus are arriving at Honokohau Harbor, the sampling data did not show obvious or identifiable impacts to the Harbor from the disposal of effluent in the temporary sump. The *Effluent Reuse Report* stated that the explanation for this condition is caused by the dilution and mixing of the effluent within the brackish basal lens.

A flow model was not used in the *Effluent Reuse Report* as the analysis of the observation wells showed the groundwater was not behaving in a manner consistent with any model. However, according to the *Effluent Reuse Report*, Darcy's law was used to estimate regional groundwater flows. Darcy's law is: Q=KA dh/dl, where Q = groundwater flow in mgd/coastal mile; K = hydraulic conductivity; A = cross sectional area through the aquifer; and dh/dl = hydraulic gradient in feet per foot.

The March 1996 *Effluent Reuse Report* also reviewed the results of previous water quality and dye injection tests conducted in 1994 by R.M. Towill and AECOS. These tests were inconclusive in identifying the migration of effluent to the Harbor or to the nearby shoreline waters. However, the 1994 tests did report some increases in ammonia and nitrate/nitrogen from samples taken at the mauka end of the Harbor. The 1994 report indicated that this could have been caused by septic facilities in the Harbor and/or by discharge of wastes from boats within the Harbor. The 1994 report also stated it could have also resulted from the Kealakehe WWTP discharge sump located mauka of Queen Kaahumanu Highway. As discussed in the March 1996 *Effluent Reuse Report*, although examined in 1996, it was not possible to confirm the same findings reported in the 1994 report.

In addition to these findings, the other groundwater issue is the location of the underground injection control (UIC) program which is set forth in the State of Hawaii Department of Health Administrative Rules, Title 11, Chapter 23, Underground Injection Control. The purpose of Chapter 23 is to establish an UIC program to protect the quality of the State's underground sources of drinking water from pollution by the subsurface disposal of fluids. An underground source of drinking water is defined as an aquifer which supplies any public or private drinking water system or contains a sufficient quantity of groundwater to supply a public water system.

According to Chapter 23, unless expressly exempted, all aquifers are considered to be underground sources of drinking water. However, Chapter 23 has exempted lands which are makai of the UIC in the horizontal dimension as being

an underground source of drinking water. (The UIC line is defined as the line which separates, in plan view, the exempted aquifers and underground sources of drinking water.) Figure 1.2 shows the location of the UIC line.

2.3.2 Impacts and Mitigation Measures

The DOH Guidelines provide that the irrigation rates do not exceed plant consumptive rates. The vegetative cover, weather conditions and mean evapotranspiration rates are used to determine the plant consumptive rates and to ensure that the application rate does not adversely affect groundwater conditions. The DOH Guidelines require the use of lysimeters to monitor irrigation rates when the reuse is 40 acres or more but less than 200 acres. Site No. 7, Kealakehe golf course and Site No. 13, Kealakehe WWTP buffer zone are over 40 acres and would require monitoring with lysimeters according to the DOH Guidelines. The other reuse sites encompass less than 40 acres and would not require monitoring.

As shown by Figure 1.2, all of the potential reuse sites are located makai or below of the UIC. Thus, the reuse sites should not have an adverse affect to underground sources of drinking water. Further, the DOH Guidelines indicate that generally irrigation shall not exceed the consumptive rates of the vegetative cover. Based on the location of the potential reuse sites and the UIC line, reuse of effluent at the reuse sites should not result in adverse impacts to groundwater quality. The DOH Guidelines require groundwater monitoring when the reuse site encompasses more than 500 acres. None of the potential reuse sites encompass an area of more than 500 acres. The DOH Guidelines do not require the monitoring of coastal waters when effluent is reused. Thus, groundwater monitoring is not required for the reuse sites.

The March 1996 *Effluent Reuse Report* includes analysis of a groundwater flow model to analyze the effect of the current method of disposal using the temporary sump. The analysis was to understand the magnitude of groundwater flux, salt water mixing and the sensitivity of the groundwater system to disposal volumes and nutrients. The analysis indicates extensive mixing of the groundwater with

the nearshore tidal influence. A comparison of the water level fluctuation in two observation wells (one mauka near the temporary sump and one makai in the Kealakehe WWTP) show that the groundwater flow to the sea is extensively mixed with the very cold salt water which underlies the lighter brackish lens. Discharge of the lens to the sea is restricted to a very thin face which appears to flow seaward primarily during outgoing tides. Flow reversals within the aquifer, accompanied by the rise and fall of tides beneath the lens, produce extensive mixing of the already brackish lens. Compared to the current method of disposal, reuse of effluent for surface applications at the reuse sites would decrease the potential for nutrients entering the groundwater.

As discussed in the 1996 *Effluent Reuse Report*, disposal to the existing sump concentrates the discharge to one point. Disposal at several locations as discussed in the Waimea Water Services report would redistribute the effluent and would greatly reduce any impacts to the lens or shoreline waters.

Further, it should be noted that use of effluent at the potential reuse sites would decrease flows to the disposal sump(s) which should decrease the potential for adverse impacts to shoreline waters and the groundwater lens. One of the intents for reusing effluent at the reuse sites is to decrease flows to the disposal sump(s).

2.4 Hydrogeology and Flood Hazard

2.4.1 Existing Environment

There are no streams, stream beds. or surface water sources in the area of the potential reuse sites or the transmission system. Runoff from buildings, structures, or roads enters the ground and proceeds vertically down to the underlying groundwater which is found as a basal lens.

The Federal Emergency Management Agency (FEMA) publishes Flood Insurance Rate Maps (FIRMs) for areas which may be subjected to flood hazard. Depending upon the area, the most recent FIRMs for the project area have been

published in 1988 and 1994. The applicable FIRMs show that, for most of this area of the Kona coast, the concern is with coastal flooding along the coastal areas. The Map Index and Street Index to the FIRMs (Community Panel Numbers 155166 0001 - 1900, revised May 16, 1994) also shows that most of the reuse sites are in Zone X, areas determined to be outside the 500-year flood plain, and as a result panels have not been printed.

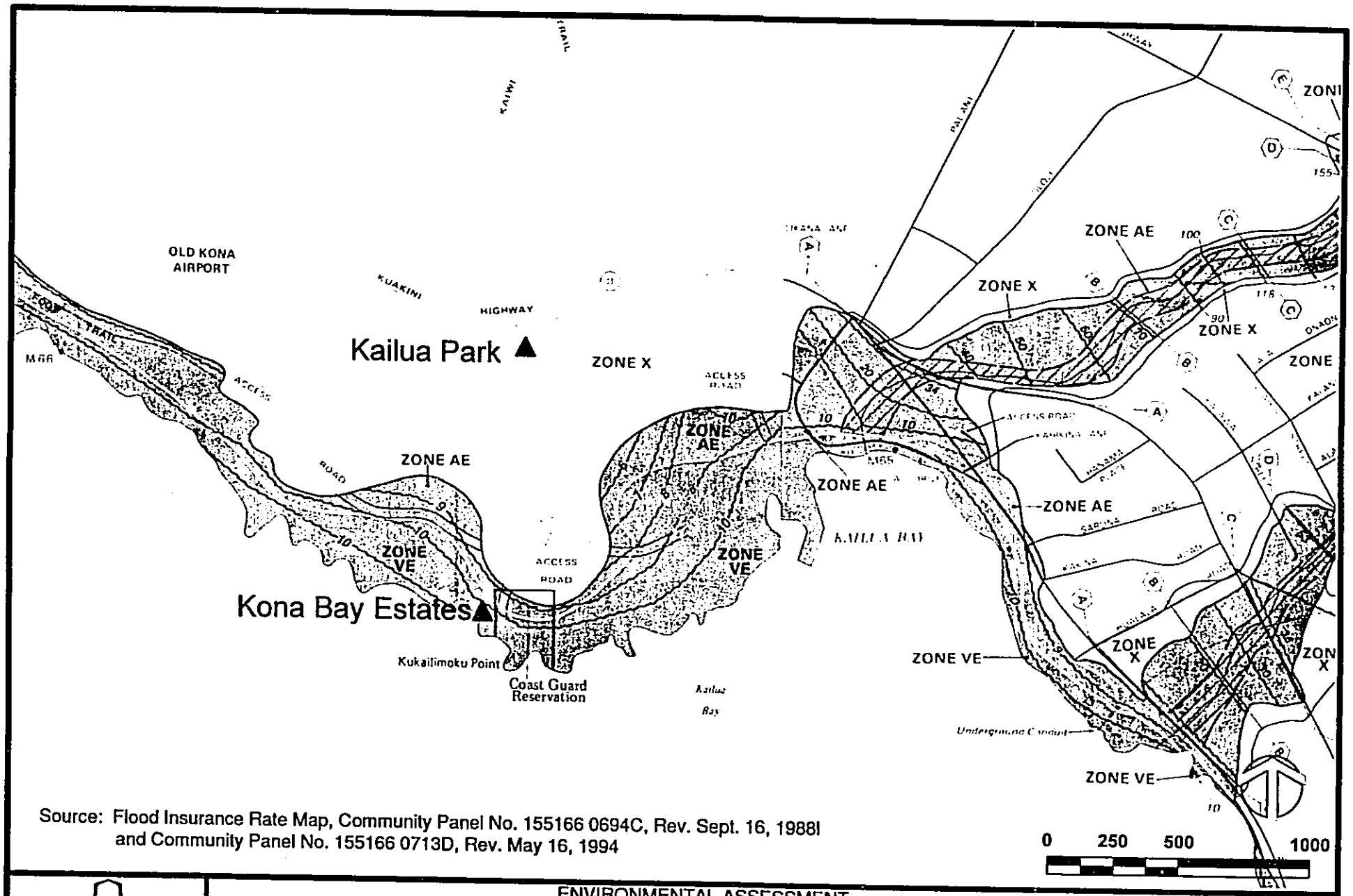
The only potential reuse site shown in the FIRMs to be subjected to flood hazards is Site No. 19, Kona Bay Estates, (Community Panel 155166 0694C, revised September 16, 1988). The Kona Bay Estates would be subject to coastal flood hazard. Figure 2.1 shows the Flood Insurance Rate Map for the coastal area near Site No. 19.

2.4.2 Impacts and Mitigation Measures

The reuse sites and transmission system will not have an adverse affect on stream or surface water resources in the area.

The Kona Bay Estates reuse site (Site No. 19), which requires R-1 quality effluent, lies within the coastal flood hazard area. The effluent transmission and distribution systems would be buried below the surface, as would other utility systems, including the sewer collection system. Typically, utility systems within publicly-owned roads and rights-of-way have minimum cover of 4 feet which means the pipes would be buried at least 4 feet below the surface. Within the private property, the minimum cover could be less, although eventually the private line would have to tie into the subsurface public system. These minimums have been established to protect the integrity of the systems.

Although there is the potential for damage, if coastal flooding is extensive, the effluent transmission and distribution systems would be designed and constructed to County of Hawaii design standards. As described above, this would typically place transmission lines and distribution lines at least 4 feet below the surface. The County design standards do not establish special requirements within areas subject to coastal flooding.



Source: Flood Insurance Rate Map, Community Panel No. 155166 0694C, Rev. Sept. 16, 1988l and Community Panel No. 155166 0713D, Rev. May 16, 1994

WILSON OKAMOTO & ASSOCIATES, INC. ENGINEERS - PLANNERS	ENVIRONMENTAL ASSESSMENT KEALAKEHE WASTEWATER TREATMENT PLANT EFFLUENT REUSE MASTER PLAN FLOOD INSURANCE RATE MAP	FIGURE 2.1

As previously described, Kona Bay Estates would reuse R-1 quality effluent. Thus, if the transmission or distribution systems were to be extensively damaged by coastal flooding, there should not be significant adverse health effects from the surface release of R-1 effluent.

2.5 Flora and Fauna

2.5.1 Existing Environment

Flora

Most of the potential reuse sites have been developed with their various uses including for landscaping or for specific industrial uses. These developed potential reuse sites do not have Federal (U.S. Department of the Interior Fish and Wildlife Service) or State of Hawaii listed or candidate threatened or endangered species of flora. Existing land uses at the potential reuse sites are shown on Table 2.1.

There are five undeveloped areas which are potential reuse sites (Site No. 7, Kealakehe golf course; Site No. 10, Hawaii Youth Tennis Center; Site No. 13, Kealakehe WWTP buffer zone; Site No. 14, Queen Kaahumanu Highway landscaping; and Site No. 15, Multi-Use Recreational Trail). A botanical survey was previously completed for the Kealakehe golf course. The botanical survey found four types of vegetation within the golf course; open mixed shrubland; Canthium/Christmas berry shrubland; koa-haole shrubland; and fountain grass grassland. The botanical survey identified one Federal and State listed species, the uhi uhi, on the golf course site. One candidate endangered species, Bidens micrantha, was also found scattered throughout the open mixed shrubland and the Canthium/Christmas berry shrubland.

Table 2.1
Existing Land Uses

Site No.	Site	Potential Use	Existing Land Use
1	Cyanotech Corp	Evaporation make up water	Existing algae growing ponds
2	Keahole Agricultural Park	Irrigation of crops/plants	Crops/plants
3	Costco (Kaloko Industrial Park)	Landscape irrigation	Landscaped areas
4	Allied Aggregates Quarry	Dust control of quarry operations	Quarry operations
5	West Hawaii Concrete	Dust control of quarry operations	Quarry operations
6	Kiewit Pacific Co. Quarry	Dust control of quarry operations	Quarry operations
7	Kealakehe Golf Course (1)	Golf course irrigation	Undeveloped
8	Honokohau Harbor	Landscape irrigation/aggregate washing	Landscaped areas
9	Kealakehe High School	Landscape irrigation	Landscaped areas
10	Hawaii Youth Tennis Center (1)	Landscape irrigation	Undeveloped
11	Kailua Landfill	Underground fire suppression	Landfill now closed
12	Contractor's Fill Station (1)	Dust control for construction projects	Transfer station property
13	Kealakehe WWTP Buffer Zone (1)	Landscape irrigation of buffer planting	Undeveloped
14	Queen Kaahumanu Hwy Landscaping (1)	Landscape irrigation	Undeveloped
15	Multi-Use Recreational Trail (1)	Landscape irrigation	Undeveloped
16	Queen Liliuokalani Children's Cnt	Landscape and food crop irrigation	Landscaped area
17	Swing Golf Course Driving Range	Landscape irrigation	Golf driving range
18	Kailua Park	Drip and spray irrigation of grass/plants	Recreation fields
19	Kona Bay Estates	Landscape irrigation	Landscaped area
20	Kona Coast Shopping Center	Landscape irrigation	Landscaped area
21	Lanihau Center	Landscape irrigation	Landscaped area

(1) Future to be constructed.

A botanical survey was also conducted along the 300-foot right-of-way for Queen Kaahumanu Highway, Site No. 14. This survey showed much of the lands on either side of the existing Highway was covered by a'a and pahoehoe lava. As a result, scrub vegetation is the primary type of flora found in the vicinity of the Highway.

The Hawaii Youth Tennis Center, Site No. 10, has not been specifically sited at this time. However, the general location would indicate vegetation similar to that found on the golf course site.

Similarly, Site No. 13 Kealakehe WWTP buffer zone and Site No. 15, Multi-Use Recreational Trail have not been specifically sited. However, these two reuse sites are located makai of Queen Kaahumanu Highway indicating scrub vegetation would be the primary vegetation of the area.

The transmission system would be constructed within public road rights-of-way either under the roadway or under the adjacent shoulder areas which would have been previously cleared of vegetation.

Fauna

Fauna surveys were conducted as part of the planning for the Kealakehe Planned Community and the Urban Expansion of State Lands project. These surveys indicated no native birds species were found in either of the project areas. A number of species of introduced birds were recorded during the survey of both these project areas. The surveys indicated both project areas did not provide habitat for Federal (U.S. Department of the Interior Fish and Wildlife Service) or State of Hawaii listed or candidate threatened or endangered species of birds.

The reuse sites lie at elevations from approximately 20 feet mean sea level (msl) for Reuse Sites No. 1, No. 18, and No. 19 to about 360 feet msl for Reuse Sites No. 9 and No. 10. The reuse sites makai of Queen Kaahumanu Highway lie at elevations below about 80 feet msl. The lower elevations and developed nature

of the reuse sites would indicate similar findings related to Federal or State of Hawaii listed or candidate threatened or endangered species of birds.

The Kealakehe WWTP site lies at an elevation of approximately 40 feet msl. The WWTP site contains five aerated lagoons which are used to treat the effluent prior to disposal. The presence of the lagoons and the undeveloped surrounding area has attracted various bird species including the Hawaiian stilt (*Himantopus mexicanus*) and the Hawaiian coot (*Fulica americana alai*). Both of these waterbird species are listed as an endangered species by the U.S. Department of the Interior Fish and Wildlife Service (USFWS).

These species nest along the shoreline of the treatment lagoons, in the areas between the lagoons, or on the rocks in the lagoon. The open areas between the lagoons are good nesting areas as birds can see predators that might be present. The rocks in the lagoons are not accessible by predators. These nesting areas have allowed the population of both species to expand. The lagoons provide feeding grounds for these species. Neither species nest or feed in the areas surrounding the lagoons.

Various species of feral and domestic mammals would be expected to be found on the reuse sites. None of these species would be Federal or State of Hawaii listed or candidate threatened or endangered species of fauna.

Coastal Species

Kaloko Pond is located about 11,000 feet (about 2.1 miles) north of the Kealakehe WWTP and about 6,600 feet (about 1.1 miles) west of the Reuse Site No. 3, Costco parking lot landscaping. The candidate endangered shrimp, *Palaemonella burnsi,* has been recorded at Kaloko Pond as indicated by the USFWS.

The USFWS has stated there is concern related to algae blooms creating anoxic conditions in Kaloko Pond, although no occurrence of this condition has been noted at the Pond. Anoxic conditions could affect avian species from outbreaks

of avian botulism. The USFWS has noted that, in the past, avian botulism among wetland birds has occurred at Aimakapa Pond near Honokokau Harbor.

2.5.2 Impacts and Mitigation Measures

Flora

Reuse of effluent for irrigation will be done according to the DOH Guidelines which are intended to assure the DOH that the distribution and use of reclaimed water will not create a health hazard or nuisance. The Guidelines must be used to determine a consumptive rate for application of the effluent to any vegetative cover. Uptake of nitrogen by plant material acts to remove nitrogen which may be present in the effluent. Nitrogen in the effluent is a source of nutrients for plant material. Thus, reuse of effluent will not have an adverse impact to the flora of this area of the Kona coast.

Construction of the transmission system would occur within public road rights-of-way which would have been previously cleared of vegetation. Thus, construction of the transmission system would not have an adverse impact to the flora of this area of the Kona coast.

Fauna

There may be impacts to fauna during the short-term construction of the transmission system. However, the impacts are not likely to be adverse to the bird or mammal species of this area of the Kona coast.

Except for the buffer area surrounding the Kealakehe WWTP (Site No. 13), reuse of effluent would not result in land use changes at the various sites which could create adverse impacts to birds or mammal species.

As previously discussed, the lagoons at the Kealakehe WWTP provide habitat for two species of the waterbrids (Hawaiian stilt and Hawaiian coot) listed as endangered by the USFWS. However, the area surrounding the lagoons is not

used by either species for nesting or feeding. Thus, construction of the landscape buffer for the WWTP may affect the listed endangered species. However, the buffer is not likely to adversely affect these listed species.

Coastal Species

As previously discussed, the DOH Guidelines include precautions which state that no discharge, runoff, or overspray shall extend beyond the approved use area boundaries. In addition, as stated above, reuse of effluent for irrigation must meet the requirements of the DOH Guidelines which include the need for surface monitoring of reuse areas to ensure that application rates do not exceed the consumptive rate of the vegetated area. Also, the Basis of Design Report must include the types of vegetative cover, consumptive rate of vegetation and the design application rate. A groundwater monitoring plan must also be submitted to the DOH, should the site be over 40 acres.

These measures are to prevent environmental degradation of aquifers and/or surface waters. This would ensure that the effluent is used on the approved use area and does not discharge to adjacent lands. Given this condition and the other limitations set forth in the DOH Guidelines, effluent from potential reuse Site No. 3, Costco parking lot landscaping, would not be a consideration for the Kaloko Pond and the adjacent shoreline which are located about 6,000 feet, or over 1.1 miles away from the Costco site.

Further as discussed in Section 2.3, Groundwater, the March 1996 *Effluent Reuse Report* was not able to confirm the same findings of 1994 report regarding increased levels of ammonia and nitrate/nitrogen at Honokuahu Harbor located about 7,000 feet (about 1.3 miles) south of the Kaloko Ponds and the adjacent shoreline. Based on this finding and the limitations related to overspray of effluent, the reuse of effluent at Site No. 3, Costco parking lot, should not be a consideration at the Kaloko Pond. Given the stringent conditions related to the reuse of effluent, the effect on the nutrient levels and the possibility of anoxic conditions in Kaloko Pond from reuse of effluent at Site No. 3 does not appear to be significant.

2.6 Climate

2.6.1 Existing Environment

West Hawaii is characterized as having a semi-tropical climate. The average temperature is 75° Fahrenheit (F), with an average high of 83° F, and an average low of 67° F. Average annual precipitation in Kailua-Kona is 25 inches, with most of this coming from infrequent storms. Winds are usually light with on-shore afternoon or up-slope breezes.

2.6.2 Impacts and Mitigation Measures

Reuse of effluent would not result in changes in land use at the various sites which would be sufficient to affect the temperature or climate of this area of the Kona coast. The reuse project will not create changes to the climate of this area of Hawaii.

2.7 Air Quality

2.7.1 Existing Environment

Although portions of the Kona coast have significant commercial and residential developments, for the most part, West Hawaii still does not have large-scale urban development. As a result, the air quality is affected primarily by emissions from vehicle traffic, dust from the quarries, and emissions from volcanic eruptions. Of these sources, volcanic eruptions are the most significant, especially since the latest eruption phase of Kilauea volcano which began in 1983. Emissions from the volcano can be seen as volcanic haze (vog) which persistently hangs over the area.

2.7.2 Impacts and Mitigation Measures

Construction of the transmission system will increase dust to adjacent areas during the construction of the pipelines. Once the construction is completed, air quality should not be adversely affected from the reuse projects.

Use of R-1 or R-2 quality water to control dust at construction sites and at the quarries could potentially lead to some improvement in air quality to this area of Hawaii. However, the expected level of improvement would, most likely, not be noticeably significant.

As previously noted, a chlorine solution is added to the effluent before disposal for disinfection and odor control purposes. As a result of this procedure, the Swing Zone golf course, which has been using R-2 effluent for about two years, has not gotten complaints regarding problems with effluent odors. Further, R-2 quality water has been used for irrigation of the Silversword Golf Course on Maui for the last eight years. During this period, there have been no complaints regarding odors from the effluent on Maui. Based on these findings, odors from the reuse of effluent should not have a significant adverse effect on lands adjacent to a reuse site. Notwithstanding these findings, the detection of odors varies by person with some persons able to detect odors at much lower concentrations of contaminants than by others.

2.8 Traffic

2.8.1 Existing Environment

Queen Kaahumanu Highway (State Route 19) is the main two-lane highway which serves the coastal region of west Hawaii extending from Kailua in the south to Kawaihae in the north. Traffic studies were conducted in 1996 in conjunction with the Queen Kaahumanu Highway Widening proposed by the State of Hawaii Department of Transportation (DOT) Highways Division. Existing and projected traffic volumes on Queen Kaahumanu Highway were shown in the *Final Environmental Assessment (EA) Queen Kaahumanu Highway Widening*, May 1996. Existing average daily traffic (ADT) was 7,800 vehicles along the Highway. The ADT was 26,300 vehicles on Palani Road west of Queen Kaahumanu Highway.

A forecast of ADT for Queen Kaahumanu Highway was also included in the Final EA. The forecast showed an ADT of 19,000 vehicles for 2010. Based on this

CORRECTION

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

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A forecast of ADT for Queen Kaahumanu Highway was also included in the Final EA. The forecast showed an ADT of 19,000 vehicles for 2010. Based on this

forecast, the State DOT has proposed a highway widening project for the Queen Kaahumanu Highway between Henry Street and the Kona International Airport access road, a distance of about eight (8) miles. The widening project would upgrade Queen Kaahumanu Highway to a four-lane divided roadway with a proposed right-of-way of 300 feet. The existing right-of-way varies from 80 feet wide between Palani Road and the Honokohau Harbor access road and 300 feet wide from there to the Kona International Airport access road.

2.8.2 Impacts and Mitigation Measures

Construction of the transmission system would create disruptions to traffic while construction activities occur with the public rights-of-way. When construction of the transmission system has been completed, reuse of either R-2 or R-1 quality effluent should not create adverse impacts to traffic in the areas of the potential reuse sites.

Construction of the distribution system would occur within the specific user's property and should not affect public rights-of-way. The distribution system would have to meet the requirements of the DOH, including location within the property.

Construction and operation of the contractor's fill station would increase truck traffic in and out of the fill station access road and onto Queen Kaahumanu Highway. The contractor's fill station has a projected average usage of 162,000 gallons/day. Given a tank truck with a capacity of 4,000 gallons, about 40 trips/day would occur in and out of contractor's fill station. This level of activity compares to the existing average daily traffic (ADT) of 7,800 vehicles along the Queen Kaahumanu Highway. This would indicate the increase in traffic is not anticipated to be significant when compared to existing conditions.

2.9 Noise

2.9.1 Existing Environment

An acoustical study was conducted as part of the Queen Kaahumanu Highway widening project. The study indicated the major source of noise in the area is from vehicle traffic on the Highway. The study also found that noise sensitive land uses such as residential developments, schools, and hospitals are not located in close proximity to the Highway. The other land use along the Highway is the light industrial area near Kailua and the Kaloko Industrial Park. The two quarries along the Highway are set well back from the roadway.

2.9.2 Impacts and Mitigation Measures

Construction of the transmission system will increase noise levels to adjacent areas during the construction of the pipelines. Since the noise sensitive areas are not located close to the Highway, the increase in noise levels from construction of the transmission system should not create adverse impacts to these uses. Once the construction is completed, the noise levels should return to existing conditions. The pipelines or reuse of the effluent for the various proposed uses will not create a long-term increase in the noise level to project sites or to adjacent areas.

2.10 Archaeological and Historic Resources

2.10.1 Existing Environment

The archaeological surveys were conducted as part of the Kealakehe Planned Community project. The results were further documented in the *Amendment to the Revised Environmental Impact Statement for the Kailua-Kona Sewerage System, Phase IV (Northern Zone)*. The findings of that document indicate that no major archaeological or artifact sites were found in the area of the future golf course.

The developed reuse sites have been fully developed with a number of uses as shown in Table 2.1. The developed reuse sites do not contain archaeological or historic resources.

2.10.2 Impacts and Mitigation Measures

The findings of that document *(Amendment to the Revised Environmental Impact Statement for the Kailua-Kona Sewerage System, Phase IV (Northern Zone))* indicate that no major archaeological or artifact sites were found in the area of the future golf course. Reuse of effluent for golf course irrigation would not create adverse impacts to archaeological resources.

The developed potential reuse sites would use effluent to irrigate landscaped areas which have already been developed by their owners and have various species of plant material growing on the sites. A separate or modified irrigation system would have to be installed to use effluent for irrigation. Installation of the irrigation system would be the responsibility of the site owner. Archeological or historical resources would have been removed when the landscaped areas were planted. Reuse of effluent at the reuse sites would not create adverse impacts to archaeological or historic resources.

The County's intent is to construct the transmission lines within existing County or State rights-of-way which, in most cases, have already been cleared of surface features. Monitoring for subsurface archaeological and historical resources during construction will be included in the transmission system construction contract.

2.11 Infrastructure

2.11.1 Water

Existing Environment

Potable water is provided by wells and distribution lines in most areas of the County by the Department of Water Supply (DWS). This is the case in the area

of the reuse sites. Wells and distribution lines owned, operated, and maintained by the DWS provide potable water to residential, commercial, industrial, and recreation users in this area of Kona. Agricultural users may use a combination of potable DWS water and groundwater from wells. DWS-owned distribution lines would be located within public rights-of-way.

Impacts and Mitigation Measures

Use of effluent at the various sites set forth in Section 1.6, Project Description, would assist in meeting water requirements for this area of Kona. With construction of treatment facilities to provide R-1 quality water, up to 2.9 mgd of R-1 quality water could be made available for a variety of uses.

Use of R-1 quality water would conserve potable water for uses which require water meeting drinking water quality standards. Conservation of the potable water would retain this water in aquifers for future use. Reuse of effluent would avoid the high cost and uncertainty of exploration for locating additional sources of potable groundwater.

2.11.2 Electrical

Existing Environment

Hawaii Electric Light Co. (HELCO) provides electrical service to this area of the Kona coast, including to the reuse sites. Electrical service to the Kealakehe WWTP is provided by the HELCO Kealakehe 5.0 MVA substation which also serves the Kona police station, Honokohau Harbor, Kealakehe High School, and other nearby areas.

The HELCO Kealakehe substation, which serves the Kealakehe WWTP, has no ties to other substations in the area. HELCO will be constructing a temporary tie to the Kailua substation, which is located south of the Kealakehe substation, within the State of Hawaii Department of Transportation right-of-way.

Impacts and Mitigation Measures

Pump stations will be required to lift the effluent to the reuse sites located above the Kealakehe WWTP. The pump stations would require electrical power to operate the pumps. Thus, there would be an increase in electrical demand. However, the increase in electrical demand is not anticipated to be significant enough create adverse impacts to the overall electrical needs of this area of the Kona coast. Moreover, reuse of effluent would decrease the need for pumping potable water from groundwater sources.

2.12 Public Health

2.12.1 Existing Environment

The reuse sites currently use potable water supplied by the County of Hawaii Department of Water Supply for their various needs. This water meets the requirements for potable water to protect the public health of its users.

2.12.2 Impacts and Mitigation Measures

The EPA *Guidelines for Water Reuse* has provided a brief discussion of the health effects related to reuse of effluent. The key consideration of any reuse program is to assure that health protection is not compromised when using reclaimed water. The starting point of any reuse program is the safe delivery and use of properly treated reclaimed water.

The protection of public health is primarily achieved by reducing the concentration of pathogenic bacteria, parasite, and viruses in the reclaimed water. Protection is also achieved by controlling chemical constituents in the reclaimed water and by limiting public exposure (contact, inhalation, ingestion) to the reclaimed water.

The EPA *Guidelines for Water Reuse* notes, epidemiological studies have limited value when examining persons exposed to disinfected reclaimed water which

has been treated to a relatively high level. The studies are limited because of the low illness rate, the small size of the study population, and the difficulty in determining the actual level of exposure of each individual. Notwithstanding these limitations, water reuse in the U.S. has not been implicated as the cause of any infectious disease outbreaks.

The stabilization ponds, such as at the Kealakehe WWTP, are designed primarily to remove pathogenic microorganisms following biological oxidation processes. According to the EPA, biological treatment is capable of removing over 90 percent of the bacterial organisms and viruses.

In addition to stabilization ponds, to achieve a greater degree of safety, disinfection is used as the most important process to destroy microorganisms. Historically, chlorine has been the most commonly used disinfectant for wastewater. The efficiency of disinfection with chlorine is dependent on a number of factors including water temperature, the pH, degree of mixing, time of contact, presence of interfering substances, and the nature and concentration of the organism to be destroyed. Generally, bacteria are less resistant to chlorine than are viruses, which in turn are less resistant than parasites ova and cysts.

Notwithstanding the disinfectant characteristics of chlorine, there are concerns regarding the toxicity of chlorine to aquatic and marine species. In addition, chlorine can react with organics in wastewater to form chlorinated hydrocarbons, many of which are suspected human carcinogens. Chlorine can also have harmful effects to some plants when the wastewater is used for irrigation.

As an alternative to chlorine, ultraviolet (UV) disinfection can be used to treat wastewater. Either low or medium pressure (high intensity) UV disinfection could be used at the Kealakehe WWTP to achieve R-1 quality water. Under this approach, high intensity lamps are used to treat the wastewater to an acceptable quality of effluent. This type of system has been used on Maui at the Lahaina and Kihei wastewater facilities. At this time, the County favors the use of UV treatment to achieve R-1 quality water.

3.0 RELATIONSHIP to PLANS, POLICIES and CONTROLS

3.1 Introduction

The plans and policies relating to the reuse project range from the broad program guidance in the Hawaii State Plan to the land use controls governing development at each reuse site. The reuse project will be consistent with various governmental plans, policies and controls. The following is a review of these plans and policies.

3.1 Hawaii State Plan

The Hawaii State Plan, adopted in 1978, and revised in 1988, serves as the guide for the future long-range development of the State. It identifies the overall theme of the Plan and sets forth goals, objectives, policies, and priorities for the State and provides a basis for determining priorities and allocating limited resources. The reuse project supports and is consistent with the following State Plan objectives and policies:

Section 226-13 Objectives and policies for the physical environment - land, air, and water quality.

> *(b) (2) Promote the proper management of Hawaii's land and water resources.*

The reuse project has the potential to provide up to 2.9 mgd of effluent which can be used for crop irrigation, landscape and golf course irrigation, and dust control. Use of effluent will displace the use of potable water now used for these purposes. Thus, the reuse project will be consistent with the proper management of limited potable water resources.

> *(b) (3) Promote effective measures to achieve desired quality in Hawaii's surface, ground and coastal waters.*

Each reuse project must comply with the DOH Guidelines which are intended to assure that the distribution and use of reclaimed water will not create a health hazard or nuisance. As previously discussed, the reuse sites are located makai of the State's UIC and thus would not affect underground sources of drinking water. Thus, the reuse project will be consistent with the effective measures to achieve the desired quality of Hawaii's water resources.

Section 226-15 Objectives and policies for facility systems - solid and liquid wastes.

> *(b) (2) Promote reuse and recycling to reduce solid and liquid wastes and employ a conservation ethic*

The intent of the reuse project is to use effluent from the Kealakehe WWTP, which has been treated to acceptable standards, for a number of purposes. Reuse of effluent would decrease the use of limited potable water resources. Thus, the reuse project is consistent with this State Plan objective.

3.2 Land Use Plans and Policies

3.2.1 State Land Use District

Chapter 205, HRS, as, amended, Land Use Commission, establishes a State Land Use Commission and sets forth that all lands in the state shall be placed in four land use districts: Urban, Agriculture, Rural, and Conservation. The State Land Use Commission has classified the potential reuse sites according to the districts shown in Table 3.1.

Reuse of the effluent will not affect or conflict with the State Land Use designation for each site. Thus, reuse of effluent will be consistent the State Land Use designation for the sites as no change in use is proposed with the reuse of effluent.

Table 3.1
Land Use Classifications

Site No.	Site	Existing Land Use	State Land Use	General Plan	Zoning	SMA*
1	Cyanotech Corp	Existing algae growing ponds	U	IN	MG-1a	Yes
2	Keahole Agricultural Park	Crops/plants	A	EA	A-5a	No
3	Costco (Kaloko Industrial Park)	Landscaped areas	U	IN	ML-1a	No
4	Allied Aggregates Quarry	Quarry operations	C	UE	O	No
5	West Hawaii Concrete	Quarry operations	C	UE	O	No
6	Kiewit Pacific Co. Quarry	Quarry operations	C	UE	O	No
7	Kealakehe Golf Course (3)	Undeveloped	C	US	O	No
8	Honokohau Harbor	Landscaped areas	U	OP	O	Yes
9	Kealakehe High School	Landscaped areas	A	UE	Up	No
10	Hawaii Youth Tennis Center (3)	Undeveloped	A	UE	Up	No
11	Kailua Landfill	Landfill now closed	U	IN	O	No
12	Contractors' Fill Station (3)	Transfer station property	U	IN	O	No
13	Kealakehe WWTP Buffer Zone (3)	Undeveloped	U	UE	O	Yes
14	Queen Kaahumanu Hwy Landscaping (3)	Undeveloped	C	---	---	No
15	Multi-Use Recreational Trail (3)	Undeveloped	C	UE	O	Yes
16	Queen Liliuokalani Children's Cnt	Landscaped area	A	UE	Up	Yes
17	Swing Golf Course Driving Range	Golf driving range	A	IN	ML-1a	Yes
18	Kailua Park	Recreation fields	U	HD	ML-20	Yes
19	Kona Bay Estates	Landscaped area	U	R	RS-15	Yes
20	Kona Coast Shopping Center	Landscaped area	U	HD	CV-10	Yes
21	Lanihau Center	Landscaped area	U	HD	CG-20	Yes

State Land Use Notes
- U: Urban
- A: Agriculture
- C: Conservation

General Plan Notes
- UE: Urban Expansion
- IN: Industrial
- EA: Extensive Agriculture
- R: Resort
- HD: High Density
- OP: Open

Zoning Notes
- MG: General Industrial Open
- O: Open
- Up: Unplanned
- ML: Limited Industrial
- CV: Village Commercial
- CG: General Commercial
- RS: Single Family Residential

Special Management Area (SMA)
- Yes: Within SMA
- No: Outside of SMA

Uses within the State "Urban" district are subject to County of Hawaii jurisdiction. The reuse of effluent at the potential reuse sites would be permitted uses within the "Urban" district, consistent with the specific County zoning designation.

Uses within the State "Agricultural" district are subject to Chapter 205, Hawaii Revised Statutes. Transmission services to potential reuse sites within the "Agricultural" district would be permitted. Chapter 205-2(d) permits bona fide agricultural services and uses which support the agricultural activities of the owner of the property and accessory to any of the agricultural uses set forth in the section. Surface irrigation reusing effluent would be consistent with the provisions of Chapter 205-2(d). In addition, Chapter 205-4.5(a)(7) permits various uses in the "Agricultural" district including, among others, public, private, and quasi-public utility lines, major water storage tanks, and appurtenant small buildings such as booster pumping stations.

3.2.2 County of Hawaii General Plan

The County of Hawaii General Plan sets forth a statement of development guidelines, standards and principles with respect to the most desirable use of land, density of population, system of principle highways, and the general location of public infrastructure and recreation uses within the County. Within the General Plan, the Land Use Pattern Allocation Guide Map depicts the desired distribution of land uses within the County. Table 3.1 lists the General Plan designation for each potential reuse site.

Reuse of effluent will not affect the General Plan designation for each reuse site as no land use changes will be undertaken by the reuse projects. In addition effluent reuse is consistent with the County of Hawaii General Plan's Environmental Quality (General Plan Ordinance No. 89-142) policy that encourages the concept of recycling waste material.

3.2.3 County of Hawaii Zoning

The County of Hawaii has established zoning designations for lands in the County and adopted these as Chapter 25, Zoning, of the Hawaii County Code. The zoning designations for each potential reuse site are shown in Table 3.1.

Reuse of effluent will not affect the zoning designation for each reuse site as no land use changes requiring a zoning change will be undertaken by the reuse projects. Chapter 25 provides that, water transmission lines of public and private utilities and governmental agencies are permitted uses in any zoning district. Further, public uses, structures, and buildings are also permitted in any zoning district, subject to the Plan Approval requirements of the County Zoning Code.

3.2.4 County of Hawaii Special Management Area

Chapter 205A, Hawaii Revised Statutes, sets forth the goals and objectives of the Hawaii Coastal Zone Management (CZM) Act. Based on the CZM Act, the County of Hawaii has established its Special Management Areas (SMA). Any development within the SMA boundary requires a SMA Use permit which is administered by the County of Hawaii Planning Commission.

Within the project area, Queen Kaahumanu Highway is the SMA boundary. Reuse sites located west or makai of the Highway will require a SMA Use permit. Table 3.1 identifies the SMA designation for each site.

Construction of the effluent transmission system is a development according to the County of Hawaii Planning Commission rules and will require a SMA (major) Use Permit. In January 1989, the County of Hawaii Planning Commission approved and granted a SMA (major) Use Permit for development of the Kealakehe WWTP. Approval of the Kealakehe WWTP included use of the effluent for the irrigation of the Kealakehe Golf Course.

In addition, the future upgrade of the Kealakehe Wastewater Treatment Plant to produce R-1 quality water will require a SMA Use Permit as the upgrade will involve construction of facilities at the Plant which is located within the SMA.

3.2.5 Keahole to Kailua Development Plan

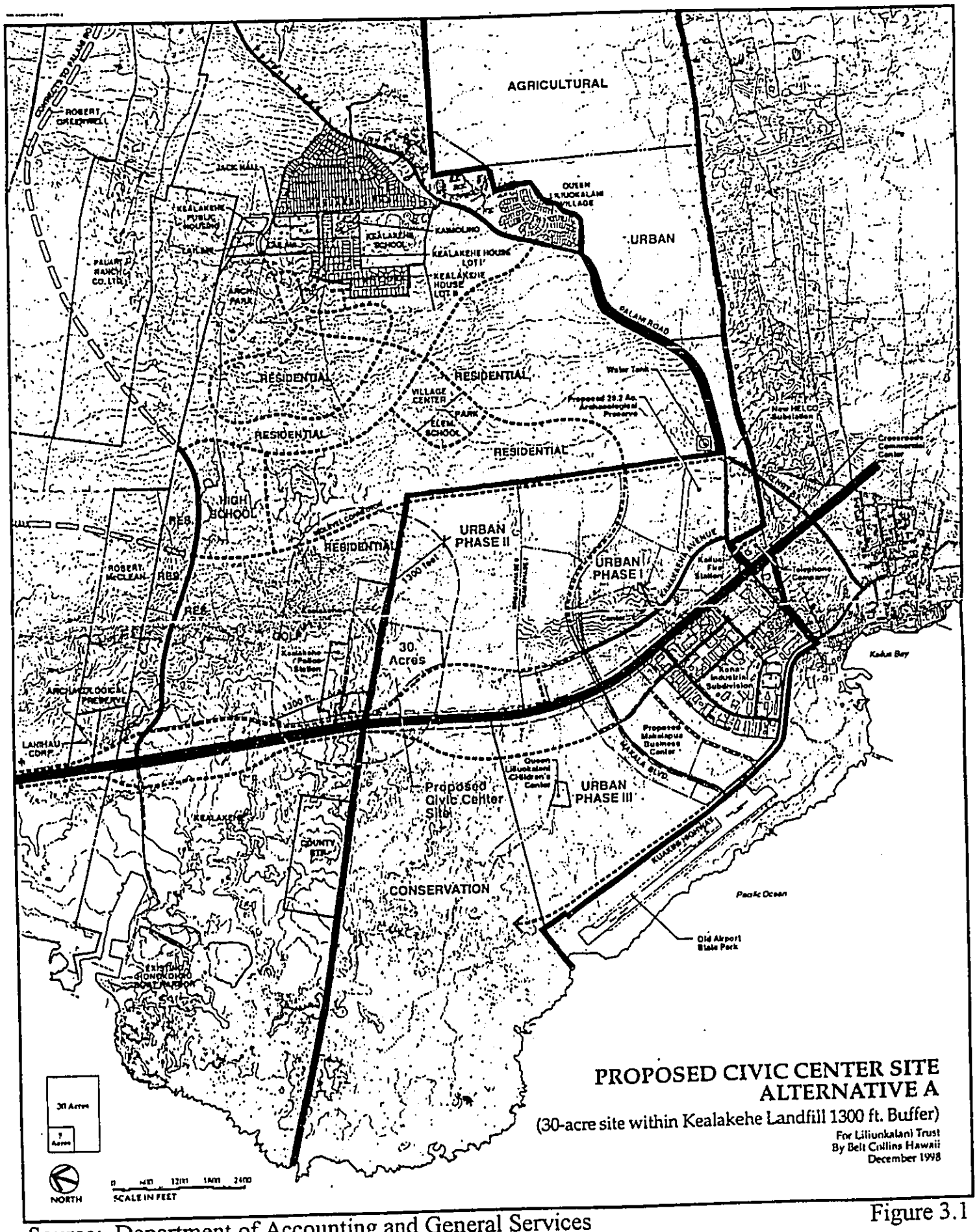
The County of Hawaii undertook the Keahole to Kailua Development Plan study in 1988. The final report for the Keahole to Kailua Development Plan was issued in 1989. The overall goal stated in the Keahole to Kailua Development Plan was to: develop a mixed residential, commercial, resort, industrial, and recreational community of approximately 8,000 or more residential units, in a functional, attractive, and financially viable manner. The community will include appropriate shoreline uses, public facilities, and infrastructure and will be built over the next 20 years.

The total project area covered approximately 17,000 acres of which about 14,000 acres was undeveloped at that time. The State of Hawaii was the largest landowner with about 6,600 acres.

The reuse project will be consistent with the Keahole to Kailua Development Plan as it will provide a source for crop irrigation, landscape and golf course irrigation, all of which are envisioned to occur with the development area.

3.4 Kona Civic Center

The State of Hawaii Department of Accounting and General Services (DAGS) is currently negotiating with the Queen Liliuokalani Trust Estate (QLTE) to acquire about 30 acres for the planned Kona Civic Center. The proposed Civic Center site is located on QLTE land south of the Kealakehe police station and the closed Kealakehe landfill site. Figure 3.1 shows the proposed Civic Center site.



PROPOSED CIVIC CENTER SITE ALTERNATIVE A

(30-acre site within Kealakehe Landfill 1300 ft. Buffer)

For Liliuokalani Trust
By Belt Collins Hawaii
December 1998

Figure 3.1

Source: Department of Accounting and General Services letter dated February 9, 2000

3.5 Permits and Approvals

The permits and approvals will be project specific to each potential reuse site. However, each potential reuse site will require DOH approval as described in Section 1.5, Reuse Requirements.

The Priority Project described in Section 1.6.2 will require a building permit and trenching permit from the County of Hawaii Department of Public Works. Work in the State DOT right-of-way will require review and approval from the DOT.

4.0 ALTERNATIVES TO THE PROPOSED ACTION

4.1 No Action

The No Action alternative would not implement the reuse project. Potable water would continue to be used for crop irrigation, landscape and golf course irrigation, and dust control. As the area from Keahole to Kailua continues to develop, the County will have to undertake the exploration, development, and distribution of potable groundwater to provide for the needs of the community. Development and use of groundwater will deplete aquifers as groundwater is pumped to meet demands of development.

The reuse of effluent from the Kealakehe WWTP would avoid the need to develop additional groundwater resources. Thus, the reuse project is a preferable alternative to the further development of additional groundwater resources.

The No Action alternative would continue use of the temporary sump for disposal of effluent from the Kealakehe WWTP. The March 1996 *Effluent Reuse Study* documented, at that time, that there are no adverse impacts to groundwater resources or to the nearby coastal waters in Honokohau Harbor from this disposal method. However, as discussed in the Waimea Water Services Inc. *Effluent Reuse Study*, disposal to the existing sump concentrates the discharge to one point. Disposal at several locations as discussed in the Waimea Water Services report would redistribute the effluent and would greatly reduce impacts to the lens or shoreline waters.

Further, it should be noted that use of effluent at the potential reuse sites would decrease flows to the disposal sump(s) which should decrease the potential for adverse impacts to shoreline waters and the groundwater lens. Clearly, one of the intents for reusing effluent is to decrease flows to the disposal sump(s), or to eliminate use of the disposal sump(s).

Lastly, as previously discussed, the County and the DOH have entered into a Consent Order that requires the County to expend $175,000 toward providing R-2 water for irrigation of landscaping within Honokohau Harbor, although the County and DOH are discussing implementing another environmentally beneficial project in lieu of the Harbor project. The No Action alternative would not be consistent with the Consent Order.

4.2 Alternative Disposal Methods

An alternative to reuse of effluent would be disposal of the effluent by other methods. The disposal method considered is use of a deep disposal injection well at the Kealakehe WWTP. Deep disposal would require a well to a depth of at least 500 feet below sea level. However, deep injection wells have a drawback of plugging which creates additional maintenance costs for operation of the WWTP.

This disposal method would not require construction of an effluent transmission system. However, long term disposal of treated effluent in injection wells would preclude the reuse of the effluent from the WWTP. This would then continue the need to use potable water for irrigation purposes.

5.0 DETERMINATION

Short-term construction impacts include disruption of traffic near the project site, decline in air quality from construction activities, and increase in noise levels. Once construction has been completed, the short-term adverse impacts will no longer occur.

Based on analysis of the anticipated impacts, a Finding of No Significant Impact (FONSI) is determined for the proposed reuse project. The significance criteria to make this determination are set forth below and in Hawaii Administrative Rules Title 11, State of Hawaii Department of Health, Chapter 200, Environmental Impact Statement.

1) *Involve an irrevocable commitment to loss or destruction of any natural or cultural resources*;

The reuse project involves the application of R-1 or R-2 quality effluent to areas which have previously been developed or will have been developed when the effluent is used. Thus, the reuse project will not involve destruction of natural or cultural resources.

2) *Curtail the range of beneficial uses of the environment*;

The reuse project involves the use of effluent for crop irrigation, landscape and golf course irrigation, and dust control. The reuse project will provide an alternative to the use of potable water for these uses. Thus, the reuse project will not curtail beneficial uses of the environment.

3) *Conflict with the State's long-term environmental policies or goals as expressed in Chapter 344, HRS, and any revisions thereof and amendments thereto, court decisions, or executive orders*;

Reuse of recycled water has been established as an objective in the Hawaii State Plan, which identifies the overall theme, goals, objectives, policies, and

priorities for the State. The reuse project will support this State Plan objective by providing R-1 and R-2 quality effluent which can be used for crop irrigation, landscape and golf course irrigation, and dust control.

4) *Substantially affect the economic or social welfare of the community or State*;

Reuse of effluent will decrease reliance on groundwater for irrigation and dust control. Each reuse site must conform to the DOH *Water Reuse Guidelines* (November 1993) which have been established to assure that the distribution and use of reclaimed water will not create a health hazard or nuisance. Reuse of effluent would decrease the use of limited potable water resources. Thus, the reuse project will not have an adverse impact to the economic or social welfare of the community or State.

5) *Substantially affect public health*;

Each reuse site must conform to the DOH Guidelines which have been established to assure that the distribution and use of reclaimed water will not create a health hazard or nuisance. All of the reuse sites are located below the Underground Injection Control (UIC) line established to protect underground sources of drinking water. Thus, the reuse project will not have an adverse impact to public health.

6) *Involve substantial secondary impacts, such as population changes or effects on public facilities*;

The reuse project involves the application of R-1 or R-2 quality effluent to areas which have previously been developed or will have been developed when the effluent is used. This will not create secondary impacts to population in this area of Kona or create secondary impacts which would effect the need for public facilities.

7) *Involve a substantial degradation of environmental quality*;

The intent of the reuse project is to use effluent from the Kealakehe WWTP, which has been treated to acceptable standards, for a number of purposes. Reuse of effluent would decrease the use of limited potable water resources. Each reuse site must conform to the DOH Guidelines which have been established to assure that the distribution and use of reclaimed water will not create a health hazard or nuisance.

8) *Have a cumulative effect upon the environment or involves a commitment for larger actions*;

The reuse project has been developed to identify the primary users of effluent in the vicinity of the Kealakehe WWTP. The size and location of the transmission system has been planned to serve these identified users. Thus, development of additional transmission systems will not be required for the identified users.

9) *Affect a rare, threatened or endangered species*;

The surveys of undeveloped areas indicated they did not provide habitat for a Federal (U.S. Department of the Interior Fish and Wildlife Service) or State of Hawaii listed or candidate threatened or endangered species of birds. The developed reuse areas do not provide habitat for Federal or State of Hawaii listed or candidate threatened or endangered species of birds.

The surveys of undeveloped areas which encompassed the reuse sites indicated they did not provide habitat for a Federal (U.S. Department of the Interior Fish and Wildlife Service) or State of Hawaii listed or candidate threatened or endangered plant species.

10) *Detrimentally affect air or water quality or ambient noise levels*;

There may be short-term adverse impacts to air quality and to ambient noise levels during construction activities. However, once construction is completed,

the reuse projects will not have adverse impacts to the air quality and ambient noise levels of this area of Hawaii.

Each reuse project must comply with the DOH Guidelines related to irrigation. All of the reuse sites are located below the UIC line. Thus, use of effluent for irrigation would not have adverse impacts to underground sources of drinking water. Analysis of groundwater flows indicate that the dilution and mixing of the effluent within the brackish basal lens occurs such that surface use of effluent will not affect nearby coastal waters.

11) *Affects or likely to suffer damage by being located in an environmentally sensitive area such as a floodplain, tsunami zone, beach, erosion-prone area, geographically hazardous land, estuary, fresh water, or coastal water;*

The reuse project will require construction of an underground transmission system and an underground distribution system at each site. These facilities will be constructed to County standards which place these lines under 3 to 4 feet of backfill material. One reuse site is located in the coastal flood hazard zone. The County standards provide for safety in the event of coastal flooding.

12) *Substantially affect scenic vistas and viewplanes identified in county or state plans or studies;*

The reuse project includes construction of an effluent transmission system which will be placed at least 3 to 4 feet below the surface. Thus, the reuse project will not adversely affect scenic vistas or viewplanes which have been identified in previous studies.

13) *Require substantial energy consumption.*

The increase in electrical demand is not anticipated to be significant enough to create adverse impacts to the overall electrical needs of this area of the Kona coast.

Based on these findings and the assessment of potential impacts from the Kealakehe WWTP effluent reuse project, a Finding of No Significant Impact (FONSI) is determined.

6.0 CONSULTED PARTIES

6.1 Pre-Assessment Consultation

Pre-Assessment consultation comments were solicited from government agencies as listed below. The comments are included in Appendix A.

State of Hawaii Department of Health
State of Hawaii, Department of Land and Natural Resources
State of Hawaii, Department of Land and Natural Resources, State Historic Preservation Division
County of Hawaii, Department of Parks and Recreation
County of Hawaii, Planning Department
County of Hawaii, Department of Water Supply

6.2 Draft Environmental Assessment

Draft Environmental Assessment (EA) comments were solicited from government agencies and other organizations as shown below. A total of 15 comments were received on the Draft EA, as shown by (✓). Of those comments, there were ten substantive comments, as shown by (✓✓). Copies of the comments and responses are included in Appendix B.

Federal Agencies

Environmental Protection Agency, Region IX
✓✓ U.S. Department of Agriculture, Natural Resources Conservation Service
✓ U.S. Department of the Army Corps of Engineers
✓✓ U.S. Department of the Interior, Fish and Wildlife Service
✓* U.S. Department of the Interior, Geological Survey
U.S. Department of the Interior, National Park Service, Kaloko-Honokohau National Park

✓* No comment via telephone call.

State Agencies

✓✓ State of Hawaii, Department of Accounting and General Services

State of Hawaii, Department of Business, Economic Development, & Tourism
✓✓ State of Hawaii, Department of Hawaiian Home Lands
✓✓ State of Hawaii, Department of Health
State of Hawaii, Department of Health - Environmental Management Division
State of Hawaii, Department of Land and Natural Resources
State of Hawaii, Department of Land and Natural Resources, State Historic Preservation Division
✓✓ State of Hawaii, Department of Land and Natural Resources, Water Resources Management
✓✓ State of Hawaii, Department of Transportation
State of Hawaii, Department of Transportation, Highway Division, Hilo
Office of Hawaiian Affairs
✓✓ State of Hawaii, Office of Environmental Quality Control
✓ University of Hawaii, Environmental Center
Kailua-Kona Library

County of Hawaii

County of Hawaii, Fire Department
County of Hawaii, Department of Parks and Recreation
✓✓ County of Hawaii, Planning Department
✓ County of Hawaii, Police Department
County of Hawaii, Department of Research and Development
✓ County of Hawaii, Department of Water Supply
County of Hawaii Councilmember Curtis Tyler

Other

GTE Hawaiian Telephone, Hilo Office
✓✓ Hawaii Electric Light Co.
Kona Kohala Chamber of Commerce

7.0 REFERENCES

Amendment to the Revised Environmental Impact Statement for the Kailua-Kona Sewerage System, Phase IV (Northern Zone). August 1990.

Facility Plan for the Kailua-Kona Sewerage System, Phase IV (Northern Zone). April 1981.

Final Environmental Assessment for Queen Kaahumanu Highway Widening, Kailua to Keahole, County of Hawaii. U.S. Department of Transportation Federal Highways Administration and State of Hawaii Department of Transportation Highways Division. May 1996.

Final Environmental Impact Statement Urban Expansion State Lands Keahole to Kailua Region North Kona, Hawaii. Office of State Planning. July 1993.

Guidelines for the Treatment and Use of Reclaimed Water. State of Hawaii Department of Health. December 1993.

Hawaii Administrative Rules Title 11 State of Hawaii Department of Health Chapter 23, Underground Injection Control. November 1992.

Hawaii Revised Statutes, Volume 4, 1993 Replacement, Titles 13-14, Chapters 201 -225.

Hawaii Revised Statutes, Volume 4, 1998 Cumulative Supplement, Titles 13-14, Chapters 201 -225, for Use with the 1993 Replacement Volume.

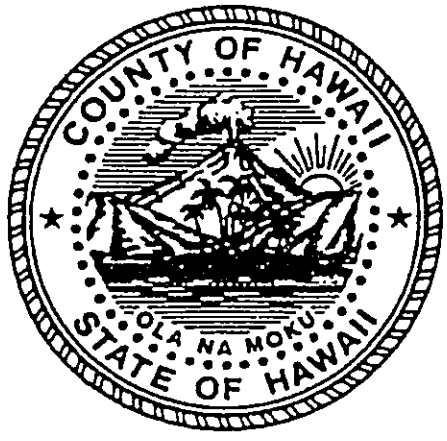
Keahole to Kailua Development Plan. County of Hawaii. September 1989.

Kealakehe Wastewater Treatment Plant Effluent Reuse Master Plan (Final Report) February 1999

Kealakehe Wastewater Treatment Plant Effluent Reuse and Management Project, Final Progress Report on Effluent Discharge, Reuse, and Quality. March 1996.

Master Plan for the Kailua-Kona Sewerage System, Phase IV (Northern Zone). May 1974.

Revised Environmental Impact Statement for the Kailua-Kona Sewerage System, Phase IV (Northern Zone). July 1981.



APPENDIX A

(6089-01) JB
7/8/99 CS

DEPARTMENT OF WATER SUPPLY • COUNTY OF HAWAII
25 AUPUNI STREET • HILO, HAWAII 96720
TELEPHONE (808) 961-8660 • FAX (808) 961-8657

July 2, 1999

RECEIVED
JUL 07 1999
WILSON OKAMOTO & ASSOC., INC.

cc: PC, CH, DPW > VIA FAX 7/8/99

Mr. John L. Sakaguchi, Senior Planner
Wilson Okamoto & Associates, Inc.
1907 South Beretania Street
Honolulu, HI 96826

DRAFT ENVIRONMENTAL ASSESSMENT, PRE-ASSESSMENT CONSULTATION:
KEALAKEHE WASTEWATER TREATMENT PLANT EFFLUENT REUSE
MASTER PLAN, NORTH KONA, HAWAII

The Department has reviewed the project summary sheet on the above subject and has the following questions:

1. What potential reuse sites require R-1 quality water?
2. What quantities of R-2 quality water are planned to be used?
3. How is this amount compared to the total output of R-2 quality water from the treatment plant?
4. R-1 quality water upgrade at the plant is proposed in the master plan. When will this happen? How much R-1 quality water will be reused?
5. What are the Department of Health Guidelines for the reuse of effluent to prevent the degradation of aquifers?

Milton D. Pavao, P.E.
Manager

DL:gms

... Water brings progress...

6089-01
September 7, 1999

Mr. Milton D. Pavao, P.E.
Manager
Department of Water Supply
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Subject: Draft Environmental Assessment, Pre-Assessment Consultation; Kealakehe Wastewater Treatment Plant Effluent Reuse Master Plan, North Kona, Hawaii, Response to Comment

Dear Mr. Pavao:

Thank you for your Pre-Assessment Consultation letter of July 2, 1999. The following responds to your questions.

1) The Kealakehe Wastewater Treatment Plant Effluent Reuse Master Plan identified 12 sites which will require R-1 quality effluent. A list of these sites is shown in the attached table which will be included in the Draft EA.

2) The Kealakehe Wastewater Treatment Plant Effluent Reuse Master Plan shows a potential demand of 2.5 million gallons per day (mgd) of R-2 quality effluent, as shown in the attached table.

3) In 1998, the Kealakehe Wastewater Treatment Plant (WWTP) had an average daily influent flow of 1.3 mgd. This is projected to increase to 1.47 mgd in 1999 and to 1.53 mgd in 2000. Additional connections will increase flows to about 2.0 mgd in the near future.

4) A schedule for funding the upgrade of the Kealakehe WWTP will be driven by commitments from potential users. The potential demand of 2.9 mgd of R-1 quality effluent is shown in the attached table.

5) The November 1993, Department of Health (DOH) "Guidelines for the Treatment and Use of Reclaimed Water" sets forth guidelines for reuse of effluent. These "Guidelines" establish that each reuse project must conduct studies related to the design and effects of reusing effluent prior to construction and implementation. The Guidelines also set forth the

requirements related to each water reclamation reuse project. The submission requirements include the following:

- o Basis of Design Report for Water Reclamation Reuse
- o Engineering Design Report for Water Reclamation Reuse
- o Construction Plans for Water Reclamation Reuse

The reports are intended to assure the DOH that the distribution and use of *reclaimed water will not create a health hazard or nuisance. The reports and* plans are to be prepared and stamped by a qualified engineer registered in the State of Hawaii and experienced in irrigation systems. The County and the potential users will have to comply with the requirements of the Guidelines to distribute and to reuse the effluent. The DOH Guidelines generally state that irrigation over public drinking water aquifers shall not exceed the consumptive rates of the vegetative cover. None of the reuse is located over a public drinking water aquifer. Additional discussion of projects and public drinking water aquifers will be included the Draft EA.

We appreciate your participation in the Draft EA. If you have any questions, please call me.

Sincerely,

John L. Sakaguchi, Senior Planner

Attachment

cc: BC; J. Honda
COHDPW; P. Boucher

Table 1.1
Summary of Potential Reuse Sites

Site No.	Site	Landowner (1)	R-2 mgd (2)	R-1 mgd (2)	Potential Use
1	Cyanotech Corp	Cyanotech Corp	0.450	0.450	Evaporation make up water
2	Keahole Agricultural Park	State Department of Agriculture	0.050	0.100	Irrigation of crops/plants
3	Costco (Kaloko Industrial Park)	Costco Wholesale Corp	n/a	0.010	Landscape irrigation
4	Allied Aggregates Quarry	Lanihau Partners, L.P.	n/a	0.033	Dust control of quarry operations
5	West Hawaii Concrete	Honokohau Properties	n/a	0.010	Dust control of quarry operations
6	Kiewit Pacific Co. Quarry	Honokohau Properties	n/a	0.033	Dust control of quarry operations
7	Kealakehe Golf Course (3)	State Executive Order to County-	1.000	1.000	Golf course irrigation
8	Honokohau Harbor	State DLNR	0.022	0.022	Landscape irrigation/aggregate washing
9	Kealakehe High School	State Department of Education	n/a	0.007	Landscape irrigation
10	Hawaii Youth Tennis Center (3)	State of Hawaii	n/a	0.091	Landscape irrigation
11	Kailua Landfill	County of Hawaii, DPW	0.267	0.267	Underground fire suppression
12	Contractors' Fill Station (3)	County of Hawaii, DPW	0.162	0.162	Dust control for construction projects
13	Kealakehe WWTP Buffer Zone (3)	State of Hawaii, DHHL	0.378	0.378	Landscape irrigation of buffer planting
14	Queen Kaahumanu Hwy Landscaping (3)	State Dept of Transportation	0.121	0.121	Landscape irrigation
15	Multi-Use Recreational Trail (3)	Various	n/a	N/A	
16	Queen Liliuokalani Children's Cnt	Liliuokalani Trust	n/a	0.016	Landscape and food crop irrigation
17	Swing Golf Course Driving Range	Liliuokalani Trust	0.030	0.060	Landscape irrigation
18	Kailua Park	County of Hawaii, Parks and Rec	n/a	0.100	Drip and spray irrigation of grass/plants
19	Kona Bay Estates	Various	n/a	0.005	Landscape irrigation
20	Kona Coast Shopping Center	Keane P. & Adele L. Dimick	n/a	0.001	Landscape irrigation
21	Lanihau Center	Lanihau Partners, L.P.	n/a	0.013	Landscape irrigation
TOTAL			2.5	2.9	

Source: Effluent Reuse Master Plan, February 1999

(1) Based on Tax Map information.
(2) million gallons per day
(3) Future to be constructed.
n/a: Not applicable.

6143-01
5089-01

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

P.O. BOX 621
HONOLULU, HAWAII 96809

AUG - 2 1999

cc: COH VIA FAX
BC

8/7/99

RECEIVED
AUG 04 1999
WILSON OKAMOTO & ASSOC., INC.

Ref:PS:EH

Mr. John L. Sakaguchi
Senior Planner
Wilson Okamoto & Associates
1907 South Beretania Street
Suite 400
Honolulu, Hawaii 96825

Dear Mr. Sakaguchi:

Subject: Draft Environmental Assessment (DEA), Pre-Assessment Consultation; Kealekehe Wastewater Treatment Plant Effluent Reuse Master Plan, North Kona, Hawaii

We have reviewed the subject DEA Project Description document and offer the attached comments from our Land Division, Engineering Branch for your consideration.

Thank you for the opportunity to comment on the proposed project.

Should you have any questions or require further assistance, please contact staff planner Ed Henry at 587-0380.

Very truly yours,

Timothy E. Johns

TIMOTHY E. JOHNS
Chairperson

Attachment

c.c. Engineering Branch
HDLO

ENGINEERING BRANCH

COMMENTS

Please extend the proposed reuse transmission line to Kona International Airport at Keahole, and include the airport as a reuse site available for a potential (effluent) demand.

We request a copy of the DEA when it is prepared.

Project must comply with rules and regulations of the National Flood Insurance Program (NFIP), and all applicable County Flood Ordinances. If there are questions regarding the NFIP, please contact the State NFIP Coordinator, Sterling Yong, of the Department of Land and Natural Resources at 587-0248. If there are questions regarding flood ordinances, please contact the applicable County representative.

The proposed project shall be done according to Chapter 27 of the Hawaii County Code (sections related to construction in a flood zone).

kealacom.h15

6089-01
September 20, 1999

WILSON
OKAMOTO
ASSOCIATES, INC.

ENGINEERS
PLANNERS
07 S. BERETANIA ST.
SUITE 400
ONOLULU, HI 96826
PH (808)946-2277
FAX (808)946-2253

Mr. Timothy E. Johns
Chairperson
Department of Land and Natural Resources
State of Hawaii
1151 Punchbowl Street
Honolulu, Hawaii 96813

Subject: Draft Environmental Assessment, Pre-Assessment Consultation; Kealakehe Wastewater Treatment Plant Effluent Reuse Master Plan, North Kona, Hawaii, Response to Comment

Dear Mr. Johns:

Thank you for your Pre-Assessment Consultation letter of August 2, 1999. Our responses follow:

1. The County of Hawaii Department of Public Works will be responsible for the design, construction, operation, and maintenance of the effluent transmission system, along with other County proposed projects. The transmission facilities as currently planned will extend to the State of Hawaii Department of Agriculture Kealhole Agricultural Park located near the Kona International Airport access road. Extension of the transmission to the Airport is not included in the current planning.

2. Portions of the transmission system will be extend into the flood hazard areas as shown by the Federal Emergency Management Agency Flood Insurance Rate Maps. This information will be included in the Draft Environmental Assessment (EA).

3. A Draft EA will be sent to you for review and comment.

We appreciate your participation in the Draft EA. If you have any questions, please call me.

Sincerely,

John L. Sakaguchi, Senior Planner

cc: BC; J. Honda
COHDPW; P. Boucher

6089-01

BRUCE S. ANDERSON, M.D., M.P.H.
DIRECTOR OF HEALTH

In reply, please refer to:
File:

cc: COH PC > V/A FAX 7/10/99

99-132/epo

JS

RECEIVED
JUL 08 1999
WILSON OKAMOTO & ASSOC, INC

LINDA J. CAYETANO
GOVERNOR OF HAWAII

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

July 7, 1999

Mr. John L. Sakaguchi
Senior Planner
Wilson Okamoto & Associates, Inc.
1907 S. Beretania Street
Honolulu, Hawaii 96826

Dear Mr. Sakaguchi:

Subject: Pre-Assessment Consultation
Kealakehe Wastewater Treatment Plant Effluent Reuse Master Plan
North Kona, Hawaii

Thank you for allowing us to review and comment on the subject project. We do not have any comments to offer at this time. However, we would like to receive a copy of the Draft Environmental Assessment when it is completed.

Sincerely,

GARY GILL
Deputy Director for
Environmental Health

6089-01
Virginia Goldst
7/1/99 Director
Russell Kokub
Deputy Director
cc: COH; DPW
BC; JS V.A FAX

Stephen K. Yamashiro
Mayor

County of Hawaii

PLANNING DEPARTMENT
25 Aupuni Street, Room 109 • Hilo, Hawaii 96720-4252
(808) 961-8288 • Fax (808) 961-8742

June 29, 1999

RECEIVED
JUL 02 1999
WILSON OKAMOTO & ASSOC, INC.

Mr. John L. Sakaguchi
Wilson Okamoto & Associates, Inc.
1907 South Beretania Street, Suite 400
Honolulu, HI 96826

Dear Mr. Sakaguchi:

Pre-Assessment Consultation regarding Preparation of a Draft Environmental Assessment for the Kealakehe Wastewater Treatment Plant Effluent Reuse Master Plan
Kealakehe, North Kona, Hawaii

Thank you for your letter dated June 6, 1999, notifying this office of the preparation of the above-described environmental assessment.

The use of treated effluent at various potential sites is not regulated by this office through our Zoning or Subdivision Codes. We view the use of treated effluent no differently than as if one was using regular potable water.

The construction of transmission improvements to transport the treated effluent to the various potential users will be subject to review by this office for compliance with our Zoning Code and Special Management Area requirements. Therefore, details regarding the location of transmission facilities must be included within the draft environmental assessment.

Thank you for allowing our office the opportunity to comment. Please feel free to contact Daryn Arai of this office should you have any questions.

Sincerely,

VIRGINIA GOLDSTEIN
Planning Director

DSA:gp
f:\wp60\ch343\1999\LSakag01.dsa

WILSON
OKAMOTO
& ASSOCIATES, INC.
ENGINEERS
PLANNERS
1907 S. BERETANIA ST.
SUITE 400
HONOLULU, HI 96826
PH. (808)946-2277
FAX (808)946-2253

6089-01
September 20, 1999

Ms. Virginia Goldstein
Planning Director
Planning Department
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Subject: Draft Environmental Assessment, Pre-Assessment Consultation; Kealakehe Wastewater Treatment Plant Effluent Reuse Master Plan, North Kona, Hawaii, Response to Comment

Dear Ms. Goldstein:

Thank you for your Pre-Assessment Consultation letter of June 29, 1999. Under the November 1993, State of Hawaii Department of Health (DOH) "Guidelines for the Treatment and Use of Reclaimed Water", as the purveyor of the effluent, the County of Hawaii Department of Public Works will be responsible for the design, construction, operation, and maintenance of the effluent transmission system, along with other County proposed projects. The location of the transmission facilities and other County projects will be included in the Draft Environmental Assessment.

We appreciate your participation in the Draft EA. If you have any questions, please call me.

Sincerely,

John L. Sakaguchi, Senior Planner

cc: BC; J. Honda
COHDPW; P. Boucher

JUL-27-99 TUE 4:45 PM Parks Administration FAX NO. 808 961 8811

Stephen K. Yamashiro
Mayor

Juliette M. Tul
Director

C. Kenneth Sor
Deputy Direct

cc: BC
COH

cc: BC
COH

County of Hawaii

DEPARTMENT OF PARKS AND RECREATION
25 Aupuni Street, Room 210 • Hilo, Hawaii 96720-4252
(808) 961-8311

July 27, 1999

Wilson Okamoto & Associates, Inc.
1907 South Beretania St., Suite 400
Honolulu, HI 96826

Attn: John Sakaguchi

Re: Draft EA/Pre-Assessment Consultation
Kealakehe Wastewater Treatment Plan Effluent Reuse Master Plan,
North Kona, Hawaii

Dear Mr. Sakaguchi:

The use of non-potable effluent for landscaping irrigation at the County's Kailua Park complex (Site 18) would be beneficial to this department. At present, portable water is being used to irrigate athletic fields at considerable cost to the County. Our average monthly water consumption is 2m+ gallons ($ 4,000+ monthly charge).

If any additional information is needed, please contact Glenn Miyao at 961-8313.

Sincerely,

Juliette Tulang
Director

WILSON
OKAMOTO
& ASSOCIATES, INC.

ENGINEERS
PLANNERS
1907 S. BERETANIA ST.
SUITE 400
HONOLULU, HI 96826
PH. (808) 946-2277
FAX. (808) 946-2253

6089-01
September 20, 1999

Ms. Juliette Tulang
Director
Department of Parks and Recreation
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Subject: Draft Environmental Assessment, Pre-Assessment Consultation;
Kealakehe Wastewater Treatment Plant Effluent Reuse Master Plan,
North Kona, Hawaii, Response to Comment

Dear Ms. Tulang:

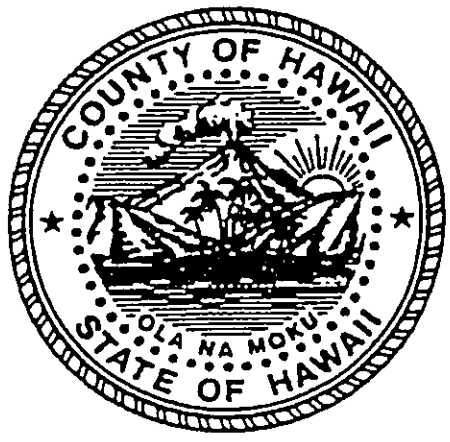
Thank you for your Pre-Assessment Consultation letter of July 27, 1999. The information provided in your letter regarding current water consumption will be included in the Draft Environmental Assessment..

We appreciate your participation in the Draft EA. If you have any questions, please call me.

Sincerely,

John L. Sakaguchi, Senior Planner

cc: BC; J. Honda
COHDPW; P. Boucher



APPENDIX B

USDA

6089-01

United States Department of Agriculture

Natural Resources Conservation Service

P.O. Box 50004
Honolulu, HI
96850

Our People...Our Islands...In Harmony

3/9/00

cc: Corr BC, V. FA

February 25, 2000

Mr. John L. Sakaguchi
Wilson Okamoto & Associates, Inc.
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

RECEIVED
MAR 03 2000
WILSON OKAMOTO & ASSOC, INC.

Dear Mr. Sakaguchi:

Subject: Draft Environmental Assessment/Finding of No Significant Impact (DEA/FONSI), Kealakehe Wastewater Treatment Plant Effluent Reuse Master Plan, North Kona, Hawaii

We have reviewed the above mentioned document and offer the following comment:

We see no major problems; however, groundwater and coastal water monitoring should accompany the effluent reuse. The contractor reuse should be monitored to insure that water is not being used for other than the approved purposes.

Thank you for the opportunity to review this document.

Sincerely,

KENNETH M. KANESHIRO
State Conservationist

The Natural Resources Conservation Service works hand-in-hand with the American people to conserve natural resources on private lands.

AN EQUAL OPPORTUNITY EMPLOYER

6089-01
September 14, 2000

WILSON OKAMOTO & ASSOCIATES, INC.
ENGINEERS PLANNERS
1907 S. BERETANIA ST. SUITE 400
HONOLULU, HI 96826
PH. (808)946-2277
FAX (808)946-2253

Mr. Kenneth M. Kaneshiro
State Conservationist
U.S. Department of Agriculture
Natural Resources Conservation Service
P.O. Box 50004
Honolulu, Hawaii 96850

Subject: Draft Environmental Assessment/Anticipated Finding of No Significant Impact (FONSI); Kealakehe Wastewater Treatment Plant Effluent Reuse Master Plan, Kealakehe, Hawaii; Response to Comment

Dear Mr. Kaneshiro:

Thank you for your comment letter of February 25, 2000 regarding the Draft Environmental Assessment(EA)/Anticipated Finding of No Significant Impact (FONSI), for the Kealakehe Wastewater Treatment Plant Effluent Reuse Master Plan project. Our response is as follows:

As stated in the Draft EA, reuse of effluent at all of the potential sites will need to meet the November 1993 State of Hawaii Department of Health Guidelines for the Treatment and Use of Reclaimed Water (DOH Guidelines). Among the objectives of the DOH Guidelines are to protect public health and to avoid public nuisance.

The DOH Guidelines do not include the requirement to monitor groundwater and coastal waters when effluent is reused. At this time, no monitoring is planned for groundwater or coastal waters. However, in the future, if necessary, a monitor project or program could be implemented.

We appreciate your comments to the Draft EA. If you have any questions, please call me at 808.946.2277.

Sincerely,

John Sakaguchi, Project Manager

JS/ry

cc: COH
BC
OEQC

6089-01
J 2/17/00 JS

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

REPLY TO ATTENTION OF

February 15, 2000

CC: COH BC > VIA FAX

Civil Works Technical Branch

Mr. John L. Sakaguchi, Senior Planner
Wilson Okamoto and Associates
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

Dear Mr. Sakaguchi:

Thank you for the opportunity to review and comment on the Draft Environmental Assessment (DEA) for the Kealakehe Wastewater Treatment Plant Effluent Reuse Master Plan, North Kona, Hawaii. 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 is not required for the work described in the DEA; however, a DA permit may be required when the distribution system is constructed.

b. The flood hazard information provided on pages 2-6 of the DEA is correct.

Sincerely,

James Pennaz

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

6089-01
JS

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Pacific Islands Ecoregion
300 Ala Moana Blvd, Rm 3122
Box 50088
Honolulu, HI 96850

CC: COH BC > VIA F.

FEB 25 2000

In Reply Refer To: JTN

John L Sakaguchi
Wilson Okamoto& Associates, Inc.
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

Dear Mr. Sakaguchi:

The U.S. Fish and Wildlife Service (Service) has reviewed your January 21, 2000, letter and Draft Environmental Assessment: Kealakehe Wastewater Treatment Plant Effluent Reuse Master Plan for comment. We appreciate the opportunity to continue working with Wilson Okamoto & Associates, Inc. and the County of Hawaii Department of Public Works to ensure adequate protection of endangered plant species *Caesalpinia kavaiensis*, *Isodendrion pyrifolium* (not mentioned in the DEA), and candidate endangered plant species, *Bidens micrantha*. Please refer to the Revised Draft of Mitigation Plan for Endangered Plant Species at Villages of La`i`opua at Kealakehe, North Kona, Hawaii for mitigation procedures to avoid the "taking" of protected plant species. Because listed and candidate plant species are distributed throughout the area proposed, botanical surveys should be conducted along proposed effluent pipelines and pipelines rerouted if listed or candidate species may be impacted.

Because effluent is proposed to be used at as many as 21 sites from Kailua Bay north to the Kona International Airport and there is the possibility of effluent contacting ground water and discharge of nutrient enriched ground water into anchialine pools and coastal areas, we recommend the following steps be taken:

(1) Because the candidate endangered shrimp *Palaemonella burnsi*, has been recorded at Kaloko Pond (Biological Database of Rare Species and Natural Communities in Anchialine Ponds of the State of Hawaii, Hawaii Heritage Program, The Nature Conservancy of Hawaii, June 1987), we recommend that all anchialine ponds and pools in the potential impact area be surveyed for this and other candidate species, including: *Metabetaeus lohena, Antecaridina lauensis, Calliasmata pholidota, Procaris hawaiana, and Vetericaris chaceorum*, listed in the Federal Register/Vo. 64, No. 205/ Monday, October 25, 1999/Proposed Rules.

(2) Possible increase in nutrient levels in ponds could lead to algae blooms creating anoxic conditions detrimental to listed species. We recommend that nutrient levels and algae in ponds be monitored to establish a base line before application of effluent and that monitoring continue after application to determine if there is a statistically significant elevation in nutrient levels and algae growth and/or oxygen depletion in ponds.

(3) We also recommend that a mitigation plan be in place to respond to any detrimental changes that might occur. Possible mitigation actions might include: reduced irrigation rate and or additional effluent treatment to reduce effluent nutrient loads.

(4) Anoxic conditions that might develop are also a concern for listed avian species, *Himantopus mexicanus knudseni* (Black-necked Stilt or Ae`o) and *Fulica americana alai* (American Coot or `Alae Ke`oke`o) because of possible outbreaks of avian botulism. Outbreaks of avian botulism among wetland birds have occurred at Aimakapa Pond near Honokohau Boat Harbor and Kanaha Pond on Maui during anoxic conditions.

Given the lack of information on possible impacts of the proposed action on anchialine pools and coastal aquatic resources over a large area and potential impacts on several listed and candidate species, we do not support a Finding of No Significant Impact (FONSI), and the Service recommends an Environment Impact Statement (EIS) be written to address possible impacts on wildlife resources and appropriate mitigation measures.

The Service appreciates the opportunity to comment on the proposed project. If you have any questions, please contact Fish and Wildlife Biologist, Jay Nelson at 541-3441.

Sincerely,

for Paul Henson
Field Supervisor
Ecological Services

6089-01
September 14, 2000

WILSON
OKAMOTO
& ASSOCIATES, INC.
ENGINEERS
PLANNERS
1907 S. BERETANIA ST.
SUITE 400
HONOLULU, HI 96826
PH (808)946-2277
FAX. (808)946-2253

Mr. Paul Henson
Field Supervisor Ecological Services
U.S. Department of the Interior
Fish and Wildlife Service
300 Ala Moana Boulevard, Room 3122
Box 50088
Honolulu, Hawaii 96850

Subject: Draft Environmental Assessment/Anticipated Finding of No Significant Impact (FONSI); Kealakehe Wastewater Treatment Plant Effluent Reuse Master Plan, Kealakehe, Hawaii; Response to Comment

Dear Mr. Henson:

Thank you for your comment letter of February 25, 2000 (JTN) regarding the Draft Environmental Assessment(EA)/Anticipated Finding of No Significant Impact (FONSI), for the Kealakehe Wastewater Treatment Plant Effluent Reuse Master Plan project. Our responses are as follow:

As stated in the Draft EA, any transmission system which might be constructed by the County of Hawaii would be located within public roads (State or County controlled) rights-of-way which would have been previously cleared of vegetation. Construction of the effluent distribution system within the individual reuse site would be the responsibility of the user, not the County.

(1) As stated in the Draft EA, reuse of effluent at each potential reuse site would be subject to the requirements set forth in the State of Hawaii Department of Health Guidelines for the Treatment and Use of Reclaimed Water (DOH Guidelines), November 1993. The Draft EA indicated that these DOH Guidelines include precautions which state that no discharge, runoff, or overspray shall extend beyond the approved use area boundaries. This would ensure that the effluent is used on the approved use area and does not discharge adjacent lands. Given this condition and the other limitations set forth in the Guidelines, it does not seem that effluent from potential reuse Site 3, Costco parking lot landscaping, would be a consideration for the shoreline which is located about 6,000 feet, or over 1.1 miles away. Based on these.

considerations, surveys of the anchialine ponds do not appear warranted. This information will be included in the Final EA.

(2) Based on the above, monitoring of the nutrient levels in the anchialine ponds does not appear warranted.

(3) As stated above, reuse of effluent for irrigation must meet the requirements of the DOH Guidelines which, as stated in the Draft EA, include the need for surface monitoring of reuse areas to ensure that application rates do not exceed the consumptive rate of the vegetated area. As indicated in the Draft EA, the Basis of Design Report must include the types of vegetative cover, consumptive rate of vegetation and the design application rate. A groundwater monitor plan must also be submitted. These measures are to prevent environmental degradation of aquifers and/or surface waters.

(4) Given the stringent conditions related to the reuse of effluent, the effect on the nutrient levels and the possibility of anoxic conditions in Kaloko Pond from reuse of effluent at Site 3 does not appear to be significant.

Based on the above considerations, the County of Hawaii, the lead agency for the project, still maintains that preparation of an Environmental Impact Statement is not supported and a Finding of No Significant Impact (FONSI) remains appropriate.

We appreciate your comments to the Draft EA. If you have any questions, please call me at 808.946.2277.

Sincerely,

John L. Sakaguchi, Senior Planner

JS/ry

cc: COH
BC
OEQC

6089-01
2/12/00

BENJAMIN J. CAYETANO
GOVERNOR

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

LETTER NO (P)1062.0

cc: COH BC VIA FAX

FEB 9 2000

RECEIVED
FEB 10 2000
WILSON OKAMOTO & ASSOC, INC.

Wilson Okamoto & Associates
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

Attention: Mr. John L. Sakaguchi

Gentlemen:

Subject: Kealakehe Wastewater Treatment Plant Effluent Reuse Master Plan
Keahole to Kailua-Kona, Hawaii
Draft Environmental Assessment/FONSI

Thank you for the opportunity to review the subject document.

Please be informed that the State Department of Accounting and General Services is currently negotiating with the Queen Liliuokalani Trust Estate (QLTE) to acquire a 30 acre parcel for the planned Kona Civic Center. This parcel is located on QLTE land South of the Kealakehe Police Station and old landfill as shown on the attached plan. Therefore, any adverse environmental impacts resulting from the Kona Landfill may have undesirable impacts on the parcel we are attempting to acquire.

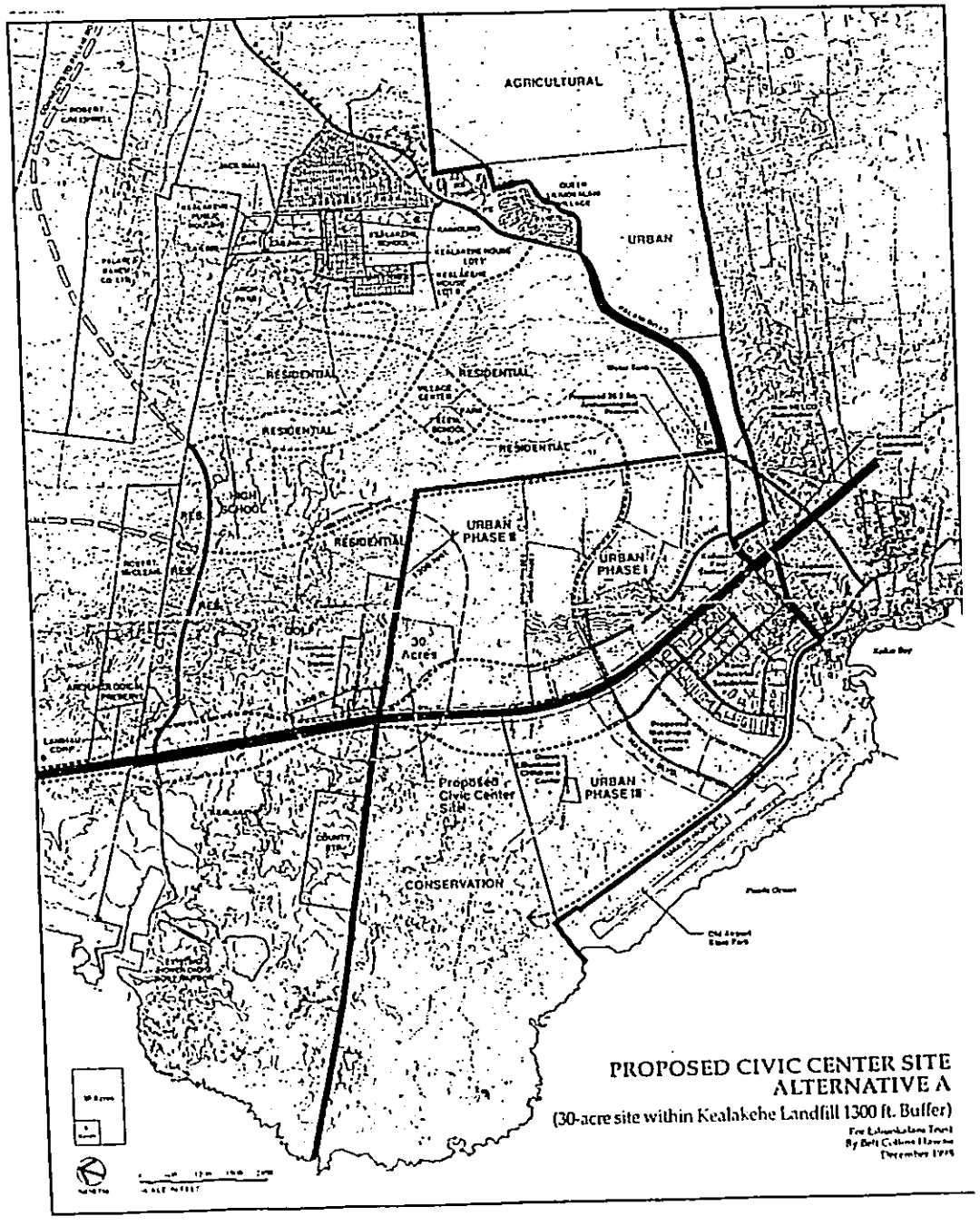
If there are any questions regarding the above, please call Mr. Alan Sanborn of the Planning Branch at 586-0499.

Sincerely,

GORDON MATSUOKA
Public Works Administrator

RY:mo

Encl. - MAP



6089-01
March 22, 2000

WILSON OKAMOTO & ASSOCIATES, INC.
ENGINEERS PLANNERS
1907 S. BERETANIA ST. SUITE 400
HONOLULU, HI 96826
PH. (808)946-2277
FAX. (808)946-2253

Mr. Gordon Matsuoka, Public Works Administrator
State of Hawaii
Department of Accounting and General Services
P.O. Box 119
Honolulu, Hawaii 96810

Subject: Draft Environmental Assessment/Anticipated Finding of No Significant Impact (FONSI); Kealakehe Wastewater Treatment Plant Effluent Reuse Master Plan, Kealakehe, Hawaii; Response to Comment

Dear Mr. Matsuoka:

Thank you for your comment letter of February 9, 2000 ((P) 1062.0) to the Draft Environmental Assessment(EA)/Anticipated Finding of No Significant Impact (FONSI), for the Kealakehe Wastewater Treatment Plant Effluent Reuse Master Plan project. The effluent from the treatment plant would be used to control underground fires which occasionally occur at the landfill. Closure of the landfill and its associated impacts are not included in the Effluent Reuse project.

We appreciate your comments to the Draft EA. If you have any questions, please call me at 808.946.2277.

Sincerely,

John Sakaguchi, Project Manager

JS/ry

cc: COH
BC
OEQC

BENJAMIN J. CAYETANO
GOVERNOR
STATE OF HAWAII

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

6089-01
2/15/00

JOBIE M. K. M. YAMAGUCHI
DEPUTY TO THE CHAIRMAN

CC: COH, BC) VIA Fi

FEB 14 00

WILSON OKAMOTO & ASSOC. INC

February 8, 2000

Mr. John L. Sakaguchi
Wilson Okamoto & Associates, Inc.
1907 South Beretania Street, Suite 400
Honolulu, HI 96826

Dear Mr. Sakaguchi:

Subject: Kealakehe Wastewater Treatment Plant Effluent Reuse Master Plan, Draft Environmental Assessment, TMK 7-4-8:03, North Kona, Hawaii, Dated January, 2000

Thank you for the opportunity to review the subject application. The Department of Hawaiian Home Lands (DHHL) has property interest in 200 acres within the subject TMK.

The subject document proposes to develop a "landscaped buffer zone" (LBZ) surrounding the Wastewater Treatment Plan (WWTP) for the disposal of up to 378,000 gallons/day of R-2 quality effluent for landscape irrigation purposes.

The subject document states that "the underlying soils of the area of the reuse project sites are mainly pahoehoe and a'a." Furthermore, the subject document states, according to the *Soil Survey of Hawaii*, that "pahoehoe is slowly permeable…"

The department is concerned that the subject document does not address mitigation measures necessary to ensure containment of disposed effluent within the LBZ. What mitigation measures do you propose to contain effluent within the LBZ?

In section 2.7, Air Quality, the subject document does not address whether or not odors will emanate from areas used for disposal of R-2 quality effluent. To what extent does R-2 effluent emanate odors and how will it impact adjacent land uses?

If you have any questions, please call me at 586-3801 or contact Daniel Ornellas of our Planning Office at 586-3836.

Aloha,

Raynard C. Soon, Chairman
Hawaiian Homes Commission

WILSON OKAMOTO & ASSOCIATES, INC.
ENGINEERS PLANNERS
1907 S. BERETANIA ST. SUITE 400
HONOLULU, HI 96826
PH. (808)946-2277
FAX. (808)946-2253

6089-01
September 20, 2000

Mr. Raynard Soon, Chairman
Hawaiian Home Commission
State of Hawaii
Department of Hawaiian Home Lands
P.O. Box 1879
Honolulu, Hawaii 96805

Subject: Draft Environmental Assessment/Anticipated Finding of No Significant Impact (FONSI); Kealakehe Wastewater Treatment Plant Effluent Reuse Master Plan, Kealakehe, Hawaii; Response to Comment

Dear Mr. Soon:

Thank you for your comment letter of February 8, 2000 to the Draft Environmental Assessment(EA)/Anticipated Finding of No Significant Impact (FONSI), for the Kealakehe Wastewater Treatment Plant Effluent Reuse Master Plan project. Our responses are as follows:

The landscape buffer area will be located within the property boundaries of the Kealakehe Wastewater Treatment Plant (WWTP). As stated in the Draft EA, the State of Hawaii Department of Health Guidelines indicate it is allowable to use R-2 quality water for surface, drip, or subsurface irrigation for landscape buffers. Further, as indicated in the Draft EA, each project which is to use reclaimed water must prepare a Basis of Design Report for Water Reclamation Reuse including an Irrigation Plan. The Draft EA also indicated the Irrigation Plan must delineate the methods of controls to be used in the irrigation system such that no runoff or ponding will occur. In addition, no discharge, runoff, or overspray is to extend beyond the approved use area boundaries. Among the objectives of the DOH Guidelines are to protect public health and to avoid public nuisance.

The Final EA will include that the County of Hawaii intends to extend the boundaries of the WWTP by about 200 feet to create an additional buffer zone between the irrigated landscape area and the adjacent properties. This additional buffer zone may consist of constructed wetlands, nursery, and/or parklands to protect the adjacent properties from overspray from the irrigation system. The enclosed letter dated January 19, 1996 addressed to the Department of Hawaiian Home Lands from the County of Hawaii discusses the landscape buffer.

The Effluent Reuse Master Plan identified various locations in Hawaii which use effluent for irrigation including a number golf courses located on all of the islands. As stated in the Draft EA, the Swing Zone golf course currently uses about 30,000 gallons/month of R-2 quality water from the Kealakehe WWTP irrigation of the golf course and driving range.

The Final EA will include information that the Swing Zone golf course has been using R-2 effluent for about two years. During this period, there have been no complaints regarding problems with effluent odors at the Swing Zone golf course. Further, R-2 quality water has been used for irrigation of the Silversword Golf Course on Maui for the last eight years. During this period, there have been no complaints regarding odors from the effluent on Maui. Please note, the Draft EA indicated a chlorine solution is mixed with the effluent for disinfection purposes and also for odor control purposes prior to disposal.

We appreciate your comments to the Draft EA. if you have any questions, please call me at 808.946.2277.

Sincerely,

John L. Sakaguchi, Project Manager

JS/ry

Enclosure

cc: COH
BC
OEQC

ephen K. Yamashiro
Mayor

Donna Fay K. Kiyosaki
Chief Engineer

Jiro A. Sumada
Deputy Chief Engineer

County of Hawaii

DEPARTMENT OF PUBLIC WORKS
25 Aupuni Street, Room 202 • Hilo, Hawaii 96720-4252
(808) 961-8321 • Fax (808) 969-7138

January 19, 1996

MR KALI WATSON
CHAIRMAN HAWAIIAN HOMES COMMISSION
DEPARTMENT OF HAWAIIAN HOME LANDS
335 MERCHANT STREET
HONOLULU HI 96813

SUBJECT: KEALAKEHE EFFLUENT REUSE PROJECT

The Department of Public Works (DPW), through the Wastewater Division, has been preparing an effluent reuse plan for its Kealakehe Wastewater Treatment Plant in Kona. In the course of developing the plan, we have determined that a buffer zone around the plant is desirable to protect the interests of the Department of Hawaiian Home Lands (DHHL), as well as provide potential reuse application for the plant. These reuse options could include various landscaping ground cover, agricultural crops, nursery, or other applications. The area could be managed by DHHL, DPW, or other agencies.

While we understand that DHHL has not yet taken title to the property, we would like to explore the feasibility of such a buffer zone with your Department. It is anticipated that a perpetual easement in favor of the County would be required in order for the County to proceed with plans for the improvements. With your concurrence, a meeting could be arranged to discuss the various reuse options as well as explore the legal implications.

Should you have any questions, please contact Peter Boucher, Wastewater Division Chief, at 961-8338.

DONNA FAY K. KIYOSAKI, P.E.
Chief Engineer

cc: P. Boucher, WWD
S. Bowles, Waimea Water Services

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

BRUCE S. ANDERSON, Ph.D., R.D.
DIRECTOR OF HEALTH

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

In reply, please refer to:
File:

cc: CIH
BC
VIA F
3/9/00

March 2, 2000

99-132A/epo

Mr. John L. Sakaguchi
Senior Planner
Wilson Okamoto & Associates, Inc.
1907 S. Beretania Street, Suite 400
Honolulu, Hawaii 96826

RECEIVED
MAR 08 2000
WILSON OKAMOTO & ASSOC., INC.

Dear Mr. Sakaguchi:

Subject: Draft Environmental Assessment (DEA)
Kealakehe Wastewater Treatment Plant Effluent Reuse Master Plan
North Kona, Hawaii

Thank you for allowing us to review and comment on the subject document. We have the following comments to offer:

1. Page 1-3. Project Background. The Department of Health in a letter to the County of Hawaii dated November 24, 1999, approved the request of the County to extend the completion date of the reuse system to irrigate landscaping at Honokohau Harbor and along the access road between Kaahumanu Highway and Honokohau Harbor. The completion date for this project is now August 2002. Please update the background information.

2. The Department recommends that the Honokohau Harbor irrigation be part of the DEA. The County should give priority to this project, being that it is part of the Consent Order. The DEA only mentions the project cost and the schedule for the contractor's fill station.

3. Section 2.3.1, Existing Environment, page 2-4. The statement quoted from the 1994 report regarding nutrient level increases in the Harbor should be revised to read as follows: "The 1994 report of the tests indicated that this could have been caused by the septic facilities in the Harbor and/or by discharge of wastes from boats within the harbor. It could have also resulted from the Kealakehe WWTP discharge sump located

mauka of Queen Kaahumanu Highway." See the March 1996 Effluent Reuse Report, page 11, paragraph 2.

4. Section 4.1, Alternatives to the Proposed Action - No Action, Page 4-1. The statement that quoted from the March 1996 Effluent Reuse Study saying that there are no adverse impacts to groundwater resources or to the nearby coastal waters in Honokohau Harbor from the temporary sump disposal is not accurate. At the time the study was prepared, the flow to the Kealakehe WWTP was only between 0.7 to 0.8 million gallons per day (MGD). The basis for calculating the nutrient loading coming from the sump was based on a flow of 1 MGD. In 1998 the average flow to the plant was 1.3 MGD. The 1996 study recommended that a reassessment of the impacts should be conducted when higher volumes of wastewater are processed. Discharge in excess of 1.0 MGD would increase the shallow lens discharge by 4 MGD along a one mile stretch of shore. This was the reason why the 1996 study suggested that the effluent be redistributed for reuse and disposal along several miles of the Queen Kaahumanu Highway to reduce the impacts on the lens or shoreline waters.

All wastewater plans must conform to applicable provisions of the Department of Health's Administrative Rules, Chapter 11-62, "Wastewater Systems." Wastewater reuse plans should conform to applicable provisions of the "Guidelines for the Treatment and Use of Reclaimed Water - November 1993."

Should you have any questions, please contact Mr. Tomas See of the Wastewater Branch at 586-4294.

Sincerely,

GARY GILL
Deputy Director for
Environmental Health

c: WWB
OEQC

6089-01
September 14, 2000

WILSON
OKAMOTO
& ASSOCIATES, INC.

ENGINEERS
PLANNERS
1907 S. BERETANIA ST.
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PH. (808)946-2277
FAX. (808)946-2253

Mr. Gary Gill
Deputy Director for Environmental Health
State of Hawaii
Department of Health
P.O. Box 3378
Honolulu, Hawaii 96801

Subject: Draft Environmental Assessment/Anticipated Finding of No Significant Impact (FONSI); Kealakehe Wastewater Treatment Plant Effluent Reuse Master Plan, Kealakehe, Hawaii; Response to Comment

Dear Mr. Gill:

Thank you for your comment letter of March 2, 2000 (99-132A/epo) regarding the Draft Environmental Assessment(EA)/Anticipated Finding of No Significant Impact (FONSI), for the Kealakehe Wastewater Treatment Plant Effluent Reuse Master Plan project. Our responses are as follows:

1. The Final EA will include the updated information on the completion date of the Honokohau Harbor irrigation project.

2. The Final EA will indicate the Honokohau Harbor irrigation project is a priority project for the County. While the County recognizes the Honokohau Harbor irrigation project is included in the Consent Agreement, any funding for construction would require appropriation and approval by the County Council. It is also planned that the irrigation lien to Honokohau Harbor would be constructed concurrent with the planned Queen Kaahumanu Highway widening project currently scheduled for advertisement in Fiscal Year 2002.

3. The Final EA will include the additional information that the nutrient level increases at Honokohau Harbor could have also resulted from the Kealakehe Wastewater Treatment Plant sump located mauka of Queen Kaahumanu Highway. However, as stated in the Draft EA, the 1996 Waimea Water Services Inc. Effluent Reuse report was not able to confirm the nitrogen increases reported in the 1994 report.

4. The information regarding the need for additional disposal sump sites will be included in the Final EA. As discussed in the Waimea Water Services Inc. Effluent Reuse report, disposal to the existing sump concentrates the discharge to one point. Disposal at several locations as discussed in the Waimea Water Services report would redistribute the effluent and would greatly reduce the any impacts to the lens or shoreline waters.

   Further, it should be noted that use of effluent at the potential reuse sites would decrease flows to the disposal sump(s) which should decrease the potential for adverse impacts to shoreline waters and the groundwater lens. Clearly, one of the intents for reusing effluent at the reuse sites identified in the Draft EA is to decrease flows to the disposal sumps.

The Draft EA stated that effluent reuse will need to conform to the applicable provisions of the Department of Health Guidelines for the Treatment and Use of Reclaimed Water dated November 1993.

We appreciate your comments to the Draft EA. If you have any questions, please call me at 808.946.2277.

Sincerely,

John Sakaguchi, Project Manager

JS/ry

cc: COH
BC
OEQC

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
P.O. BOX 621
HONOLULU, HAWAII 96809

TIMOTHY E. JOHNS
CHAIRPERSON
BRUCE S. ANDERSON
ROBERT G. GIRALD
BRIAN C. NISHIDA
DAVID A. NOBRIGA
HERBERT M. RICHARDS, JR.

LINNEL T. NISHIOKA
DEPUTY DIRECTOR

6089-01

February 22, 2000

JS
cc: COH
BC VIA

Mr. John L. Sakaguchi
Wilson Okamoto & Associates, Inc.
1907 S. Beretania Street, Suite 400
Honolulu, HI 96826

Dear Mr. Sakaguchi:

SUBJECT: Draft EA for Kealakehe Wastewater Treatment Plant Effluent Reuse Master Plan

FILE NO.: 6089-01

Thank you for the opportunity to review the subject document. Our comments related to water resources are marked below.

In general, the CWRM strongly promotes the efficient use of our water resources through conservation measures and use of alternative non-potable water resources whenever available, feasible, and there are no harmful effects to the ecosystem. Also, the CWRM encourages the protection of water recharge areas, which are important for the maintenance of streams and the replenishment of aquifers.

[ ] We recommend coordination with the county government to incorporate this project into the county's Water Use and Development Plan.

[ ] We recommend coordination with the Land Division of the State Department of Land and Natural Resources to incorporate this project into the State Water Projects Plan.

[x] We are concerned about the potential for ground or surface water degradation/contamination and recommend that approvals for this project be conditioned upon a review by the State Department of Health and the developer's acceptance of any resulting requirements related to water quality.

[ ] A Well Construction Permit and/or a Pump Installation Permit from the Commission would be required before ground water is developed as a source of supply for the project.

[ ] The proposed water supply source for the project is located in a designated water management area, and a Water Use Permit from the Commission would be required prior to use of this source.

[ ] Groundwater withdrawals from this project may affect streamflows, which may require an instream flow standard amendment.

[ ] We recommend that no development take place affecting highly erodible slopes which drain into streams within or adjacent to the project.

[ ] If the proposed project includes construction of a stream diversion, the project may require a stream diversion works permit and amend the instream flow standard for the affected stream(s).

[ ] If the proposed project alters the bed and banks of a stream channel, the project may require a stream channel alteration permit.

[X] OTHER:

What is the March 1996 report reference – not in references. Specifically, what flow model was used and what were the observation wells used? If permanent observation wells, they need to be permitted under our well program.

If there are any questions, please contact Ryan Imata at 587-0255.

Sincerely,

LINNEL T. NISHIOKA
Deputy Director

RI:ss

WILSON
OKAMOTO
& ASSOCIATES, INC.

ENGINEERS
PLANNERS

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HONOLULU, HI 96826
PH: (808)946-2277
FAX: (808)946-2253

6089-01
September 14, 2000

Ms. Linnel T. Nishioka, Deputy Director
Commission on Water Resource Management
Department of Land and Natural Resources
State of Hawaii
P.O. Box 621
Honolulu, Hawaii 96809

Subject: Draft Environmental Assessment/Anticipated Finding of No Significant Impact (FONSI); Kealakehe Wastewater Treatment Plant Effluent Reuse Master Plan, Kealakehe, Hawaii; Response to Comment

Dear Ms. Nishioka:

Thank you for your comment letter of February 22, 2000 regarding the Draft Environmental Assessment(EA)/Anticipated Finding of No Significant Impact (FONSI), for the Kealakehe Wastewater Treatment Plant Effluent Reuse Master Plan project. As stated in the Draft EA, reuse of effluent at all of the potential sites will need to meet the November 1993 State of Hawaii Department of Health Guidelines for the Treatment and Use of Reclaimed Water.

Chapter 7, References, of the Draft EA lists the Kealakehe Wastewater Treatment Plant Effluent Reuse and Management Plan Project, Final Progress Report of Effluent Discharge, Reuse and Quality, March 1996 (Effluent Reuse Report).

A flow model was not used in the Effluent Reuse Report as the analysis of the observation wells showed the groundwater was not behaving in a manner consistent with any model. However, Darcy's law was used to estimate regional groundwater flows. Darcy's law is: Q=KA dh/dl, where Q = groundwater flow in mgd/coastal mile; K = hydraulic conductivity; A = cross sectional area through the aquifer; and dh/dl = hydraulic gradient in feet per foot. This information will be included in the Final EA.

The observation wells cited in the Draft EA were part of the Effluent Reuse Report analysis. All of the wells were existing wells and were not drilled for the Effluent Reuse Report. This information will be included in the Final EA.

We appreciate your comments to the Draft EA. If you have any questions, please call me at 808.946.2277.

Sincerely,

John Sakaguchi, Project Manager

JS/ry

cc: COH
BC
OEQC

BENJAMIN J. CAYETANO
GOVERNOR

6089-01

KAZU HAYASHIDA
DIRECTOR

DEPUTY DIRECTORS
BRIAN K. MINAAI
ALEN M. OKIMOTO

2/23/00

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

February 17, 2000

IN REPLY REFER TO
STP 8.9409

cc: COH
BC
VIA FAX

FEB 22 2000

Mr. John L. Sakaguchi
Senior Planner
Wilson Okamoto & Associates, Inc.
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

Dear Mr. Sakaguchi:

Subject: Draft Environmental Assessment/Finding of No Significant Impact (FONSI), Kealakehe Wastewater Treatment Plant Effluent Reuse Master Plan, North Kona, Hawaii

Thank you for your transmittal requesting our review and comments on the subject project.

Plans for any construction work within the State right-of-way must be submitted for our review and approval.

We appreciate the opportunity to provide comments.

Very truly yours,

KAZU HAYASHIDA
Director of Transportation

6089-01
March 22, 2000

WILSON
OKAMOTO
ASSOCIATES, INC.

ENGINEERS
PLANNERS

07 S. BERETANIA ST.
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ONOLULU, HI 96826
PH. (808)946-2277
FAX. (808)946-2253

Mr. Kazu Hayashida
Director
State of Hawaii
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813-5097

Subject: Draft Environmental Assessment/Anticipated Finding of No Significant Impact (FONSI); Kealakehe Wastewater Treatment Plant Effluent Reuse Master Plan, Kealakehe, Hawaii; Response to Comment

Dear Mr. Hayashida:

Thank you for your comment letter of February 17 2000 (STP 8.9409) regarding the Draft Environmental Assessment(EA)/Anticipated Finding of No Significant Impact (FONSI), for the Kealakehe Wastewater Treatment Plant Effluent Reuse Master Plan project. The Final EA will note that plans for any construction work within the State right-of-way must be submitted to the Department of Transportation for review and approval.

We appreciate your comments to the Draft EA. If you have any questions, please call me at 808.946.2277.

Sincerely,

John Sakaguchi, Project Manager

JS/ry

cc: COH
BC
OEQC

BENJAMIN J. CAYETANO
GOVERNOR

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

GENEVIEVE SALMONSON
DIRECTOR

6089-01 J
2/15/00 8
cc: COH
BC
VIA
FAX

February 10, 2000

WILSON OKAMOTO & ASSOCIATES, INC

Mr. Jiro A. Sumada, Deputy Chief Engineer
Hawaii County Department of Public Works
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Sumada:

Subject: Draft Environmental Assessment for the Kealakehe WWTP Effluent Reuse, Hawaii

Thank you for the opportunity to review the subject document. We have the following comments.

1. What is the basis that the developed sites do not contain archaeological or historic resources? Please consult the State Historic Preservation Division regarding the above issue and concerning any impacts to archaeological resources during construction of the transmission and distribution lines.

2. Please compare the costs and benefits of treating all the effluent to R-1 standards and using a single delivery system versus a double (R-1 and R-2) treatment and delivery system.

3. Please include a list of all permits and approvals (State, Federal, County) required for the project in the final environmental assessment.

Should you have any questions, please call Jeyan Thirugnanam at 586-4185. Mahalo.

Sincerely,

Genevieve Salmonson
Director

c: Wilson Okamoto & Associates, Inc.

CORRECTION

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

6089-01
March 22, 2000

WILSON
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Mr. Kazu Hayashida
Director
State of Hawaii
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813-5097

Subject: Draft Environmental Assessment/Anticipated Finding of No Significant Impact (FONSI); Kealakehe Wastewater Treatment Plant Effluent Reuse Master Plan, Kealakehe, Hawaii; Response to Comment

Dear Mr. Hayashida:

Thank you for your comment letter of February 17 2000 (STP 8.9409) regarding the Draft Environmental Assessment(EA)/Anticipated Finding of No Significant Impact (FONSI), for the Kealakehe Wastewater Treatment Plant Effluent Reuse Master Plan project. The Final EA will note that plans for any construction work within the State right-of-way must be submitted to the Department of Transportation for review and approval.

We appreciate your comments to the Draft EA. If you have any questions, please call me at 808.946.2277.

Sincerely,

John Sakaguchi, Project Manager

JS/ry

cc: COH
BC
OEQC

BENJAMIN J. CAYETANO
GOVERNOR

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
235 SOUTH BERETANIA STREET
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HONOLULU, HAWAII 96813
TELEPHONE (808) 586-4185
FACSIMILE (808) 586-4186

GENEVIEVE SALMONSON
DIRECTOR

6089-01 J
2/15/00 S
cc: COH
BC
FAX

February 10, 2000

Mr. Jiro A. Sumada, Deputy Chief Engineer
Hawaii County Department of Public Works
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Sumada:

Subject: Draft Environmental Assessment for the Kealakehe WWTP Effluent Reuse, Hawaii

Thank you for the opportunity to review the subject document. We have the following comments.

1. What is the basis that the developed sites do not contain archaeological or historic resources? Please consult the State Historic Preservation Division regarding the above issue and concerning any impacts to archaeological resources during construction of the transmission and distribution lines.

2. Please compare the costs and benefits of treating all the effluent to R-1 standards and using a single delivery system versus a double (R-1 and R-2) treatment and delivery system.

3. Please include a list of all permits and approvals (State, Federal, County) required for the project in the final environmental assessment.

Should you have any questions, please call Jeyan Thirugnanam at 586-4185. Mahalo.

Sincerely,

Genevieve Salmonson
Director

c: Wilson Okamoto & Associates, Inc.

6089-01
September 14, 2000

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

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& ASSOCIATES, INC.

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HONOLULU, HI 96826
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FAX. (808)946-2253

Subject: Draft Environmental Assessment/Anticipated Finding of No Significant Impact (FONSI); Kealakehe Wastewater Treatment Plant Effluent Reuse Master Plan, Kealakehe, Hawaii; Response to Comment

Dear Ms. Salmonson:

Thank you for your comment letter of February 10, 2000 to the Draft Environmental Assessment (EA)/Anticipated Finding of No Significant Impact (FONSI) for the Kealakehe Wastewater Treatment Plant Effluent Reuse Master Plan project. Our responses are as follows:

1. The developed potential reuse sites would use effluent to irrigate landscaped areas which have already been developed by their owners and have various species of plant material growing on the sites. A separate or modified irrigation system would have to be installed to use effluent for irrigation. Installation of the irrigation system would be the responsibility of the site owner. Archeological or historical resources would have been removed when the landscaped areas were planted. The County's intent is to construct the transmission lines within existing County or State rights-of-way which, in most cases, have already been cleared of surface features. Monitoring for subsurface archaeological and historical resources during construction will be included in the transmission system construction contract.

2. As stated in Draft EA, the entire project (contractor's fill station, transmission system, reservoir, and upgrade of the Wastewater Treatment Plant (WWTP) to produce R-1 quality water) is estimated to cost about $12.0 million. The Effluent Reuse Master Plan indicated that it will cost an estimated $5.3 million to upgrade the WWTP to produce R-1 quality water. When the WWTP is upgraded, it will not be necessary to construct a new transmission system to distribute the R-1 quality water. The transmission system used for R-2 quality water can be used for R-1 quality water when the WWTP has been upgraded to produce R-1 quality water.

3. A list of permits will be included in the Final EA.

We appreciate your comments to the Draft EA. If you have any questions, please call me at 808.946.2277.

Sincerely,

John L. Sakaguchi, Project Manager

JS/ry

cc: COH

6089-6
2/9/0

cc: COH
PC
WA
FAX

University of Hawai'i at Mānoa

Environmental Center
A Unit of Water Resources Research Center
2550 Campus Road • Crawford 317 • Honolulu, Hawai'i 96822
Telephone: (808) 956-7361 • Facsimile: (808) 956-3980

February 7, 2000

John L. Sakaguchi
Wilson Okamoto & Associates, Inc.
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

Dear Mr. Sakaguchi,

Draft Environmental Assessment
Kealakehe Wastewater Treatment Plant Effluent Reuse Master Plan
North Kona, Hawaii

John Harrison has been temporarily assigned to the Vice President's Office of the University of Hawaii and is no longer coordinating reviews for the Environmental Center. Peter Rappa is currently overseeing the review process at the Environmental Center. Please refer any questions or requests for comments to him.

Thank you for the opportunity to comment on the Kealakehe Wastewater Treatment Plant Effluent Reuse Master Plan Draft EA. We have no comments at this time.

Sincerely,

Jacquelin N. Miller
Associate Environmental Coordinator

cc: County of Hawaii, Department of Public Works

Stephen K. Yamashiro
Mayor

Virginia Goldstein
Director

Russell Kokubun
Deputy Director

County of Hawaii

PLANNING DEPARTMENT
25 Aupuni Street, Room 109 • Hilo, Hawaii 96720-4252
(808) 961-8288 • Fax (808) 961-8742

2089-01
2/24/00

cc: COH
BC > VIA FAX

February 22, 2000

Mr. John L. Sakaguchi
Wilson Okamoto & Associates, Inc.
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

Dear Mr. Sakaguchi:

Your Request for Review & Comments:
DEA – FONSI (Jan. 2000)
(Draft Environmental Assessment - Finding of No Significant Impact)
Kealakehe Wastewater Treatment Plant Effluent Reuse Master Plan
TMK: 7-4-08: 58, N. Kona, Hawaii Island

Thank you for requesting our review and comments on the above DEA. Pursuant to Hawaii Administrative Rule 11-200-9(a)(1) our comments are provided below as the County agency responsible for implementing the Hawaii County General Plan. Generally, the following information pertains to the land use laws that apply to this project site and that are under or related to the Planning Department's jurisdiction.

Land Use Zonings & Designations
According to the department's zoning maps, the parcel location of this project is subject to the following land use laws:

- *County Zoning Code: varies by parcel location, 21 potential sites
- *SMA (Special Management Area): only sites makai of Queen Kaahumanu Highway
- *SLU (State Land Use): varies by parcel location
- *County GP (General Plan) Land Use Designation: varies by parcel location

*see DEA, Table 3.1, Land Use Classifications

SMA (Special Management Area). We agree with the DEA's statement that sites makai of Queen Kaahumanu Highway will require an SMA application to the Hawaii County Planning Commission, and these may require a SMA (major) Use Permit. The proposed effluent reuse master plan and construction of the effluent transmission system (DEA, figure 1.4) is a development according to Planning Commission Rule 9-4(10)A and will, for example, change the intensity of the use of land.

Development of the wastewater treatment plant was originally approved and granted SMA (major) Use Permit No. 280 (January 31, 1989) by the County Planning Commission. Approval of the treatment plant included the use of effluent disposal for irrigation purposes, initially planned for the proposed Kealakehe municipal golf course.

Hawaii County Zoning Code Requirements: Permitted Use. Although the proposed 21 sites have various zoning designations, County Zoning Code secs.25-4-11(a), (b), & (c) provides that water transmission lines and substations of public and private utilities and governmental agencies *are permitted uses within any district*. Furthermore, public uses, structures and buildings are also permitted uses in any district, subject to administrative Plan Approval requirements of the County Zoning Code. The substation use is required to not be hazardous or dangerous to the surrounding area and also requires the Director's Plan Approval.

SLU Districts. Since the State *"Urban" district* is subject to County jurisdiction, the proposed improvements would be permitted in "Urban" districts consistent with the County Zoning Code sections discussed above.

Within the State *"Agricultural" district*, transmission service to sites is permitted. In this district, Haw. Rev. Stat. sec. 205-2(d) *permits* bona fide agricultural services and uses that support the agricultural activities of the property owner and accessory to any of the activities described in this section. Ground surface irrigation service would appear to be consistent with this provision. Furthermore, sec. 205-4.5(a)(7), *permits* public, private, and quasi - public utility lines, transformer stations, solid waste transfer stations, major water storage tanks and appurtenant small buildings, e.g., booster pumping stations. *This provision excludes, however,* offices or yards for equipment, material, vehicle storage, repair or maintenance, *treatment plants*, corporation yards, or other like structures.

Whether a CDUA permit is required to install a transmission line to service sites in the State *"Conservation" district* should be discussed with the State DLNR agency.

Conforms w/ the Hawaii County General Plan (GP) Ordinance No. 89-142 (effective: November 4, 1989). The proposed reuse of wastewater treatment plant effluent is consistent with the GP's Environmental Quality policy that encourages the

concept of recycling municipal waste material. In addition, the discussion of the *DOH Guidelines for the Treatment and Use of Reclaimed Water* at DEA 1.5 Reuse Requirements, is consistent with the GP Environmental Quality goal to, if feasible, improve the existing environmental quality of the island. GP at 3.

Generally, the proposal is also consistent with the goals and policies of the GP Public Facilities and the Public Utilities elements as well as the public utilities' Sewer policies. GP at 7, 9, & 10.

Thank you for this opportunity to offer comments on the draft Environmental Assessment. Any follow-up to these comments may be made with Earl Lucero. Ph: 961-8288.

Sincerely,

VIRGINIA GOLDSTEIN
Planning Director

EML:gp
f:\wp60\earl\letter\dea7.doc

cc: Chief Engineer
SMA Section
West HI Planning Office

6089-01
March 22, 2000

WILSON
OKAMOTO
& ASSOCIATES, INC.

ENGINEERS
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1907 S. BERETANIA ST.
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PH. (808)946-2277
FAX: (808)946-2253

Ms. Virginia Goldstein, Planning Director
Planning Department
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Subject: Draft Environmental Assessment/Anticipated Finding of No Significant Impact (FONSI); Kealakehe Wastewater Treatment Plant Effluent Reuse Master Plan, Kealakehe, Hawaii; Response to Comment

Dear Ms. Goldstein:

Thank you for your comment letter of February 22, 2000 to the Draft Environmental Assessment (EA)/Anticipated Finding of No Significant Impact (FONSI) for the Kealakehe Wastewater Treatment Plant Effluent Reuse Master Plan project. Our responses are as follows:

Special Management Area (SMA). The Final EA will note that the effluent transmission system is a development under the rules of the County of Hawaii Planning Commission and, as such, will require a SMA (major) Use Permit. In addition, the future upgrade of the Kealakehe Wastewater Treatment Plant to produce R-1 quality water will require a SMA Use Permit as the upgrade will involve construction of facilities at the Plant which is located within the SMA.

Hawaii County Zoning. The Final EA will note that the County-owned effluent transmission line is a public facility which is a permitted use in within any County zoning district.

State Land Use (SLU) Districts. The Final EA will include the information regarding the "Urban" and "Agricultural" districts and their respective permitted uses.

Hawaii County General Plan Ordinance No. 89-142. The Final EA will include the information that the effluent reuse is consistent with the County of Hawaii General Plan's Environmental Quality policy that encourages the concept of recycling waste material.

We appreciate your comments to the Draft EA. If you have any questions, please call me at 808.946.2277.

Sincerely,

John L. Sakaguchi, Project Manager

JS/ry

cc: COH
BC
OEQC

6089-01

Stephen K. Yamashiro
Mayor

Wayne G. Ca
Police Chie

James S. Cc
Deputy Police

2/6/00

County of Hawaii
POLICE DEPARTMENT

349 Kapiolani Street • Hilo, Hawaii 96720-3998
(808) 935-3311 • Fax (808) 961-2702

cc: COH
BC

January 31, 2000

Mr. John L. Sakaguchi
Senior Planner
Wilson Okamoto & Associates, Inc.
1907 S. Beretania Street, Suite 400
Honolulu, HI 96826

Dear Mr. Sakaguchi:

SUBJECT : DRAFT ENVIRONMENTAL ASSESSMENT/FINDING OF NO SIGNIFICANT IMPACT (FONSI), KEALAKEHE WASTEWATER TREATMENT PLANT EFFLUENT REUSE MASTER PLAN, NORTH KONA, HAWAII

Staff has reviewed the above-referenced document and does not believe the project will adversely affect public safety or traffic.

Thank you for the opportunity to comment.

Sincerely,

WAYNE G. CARVALHO
POLICE CHIEF

THOMAS J. HICKCOX
ASSISTANT POLICE CHIEF
FIELD OPERATIONS BUREAU

DAF:lk

6089-01

DEPARTMENT OF WATER SUPPLY • COUNTY OF HAWAII
25 AUPUNI STREET • HILO, HAWAII 96720
TELEPHONE (808) 961-8660 • FAX (808) 961-8657

2/4/00

JS

CC: COH BC VIA FAX 2/4/00

January 31, 2000

Mr. John L. Sakaguchi, Senior Planner
Wilson Okamoto & Associates, Inc.
1907 South Beretania Street, Suite 400
Honolulu, HI 96826

RECEIVED
FEB 03 2000
WILSON OKAMOTO & ASSOC., INC.

DRAFT ENVIRONMENTAL ASSESSMENT
KEALAKEHE WASTEWATER TREATMENT PLANT
EFFLUENT REUSE MASTER PLAN

Thank you for allowing us to review the final draft on the above subject. The Department has no comment.

Thank you for including in the final draft, information that was requested earlier—namely, the summary of potential reuse sites.

Sincerely yours,

Milton D. Pavao, P.E.
Manager

DL:dms

... Water brings progress...

2-23-00;16:30 ;HELCO ENGINEERING :808 969 0256

Hawaii Electric Light Company, Inc. • PO Box 1027 • Hilo, HI 967

6089-01

2/24/

February 23, 1999 CC: COH BC F

FAX LETTER

Wilson Okamoto & Associates, Inc.
1907 South Beretania Street, Suite 400
Honolulu, Hawaii 96826

Attention: Mr. John L. Sakaguchi

Gentlemen:

SUBJECT: Kealakehe Wastewater Treatment Plant Draft EA
North Kona, Island Of Hawaii

Thank you for the opportunity to comment on the subject master plan. The following is Hawaii Electric Light Company Inc's (HELCO's) comments:

Section 2.12.2 Electrical:

1. The existing Kealakehe Wastewater Treatment Plant is served by our Kealakehe 5.0 MVA Substation. This substation feeds the Kona Police Station, Honokahau Harbor, Kealakehe High School, industrial loads on Boat Park Road, and Robert McClean subdivision.

2. Currently, Kealakehe Substation has no 12.47KV distribution ties to other substations. Thus, when the substation is de-energized for maintenance or during an outage, the loads on this substation will not be served until the substation is restored to service. HELCO will be building a temporary 12.47KV tie to our Kailua Substation, South of the Kealakehe substation, on the State Department of Transportation – Highway Division right-of-way. To improve reliability to the Kealakehe substation's critical loads, we are requesting that this 12.47KV tie along the DOT highway be approved permanently.

3. HELCO recommends that energy efficient and conservation features suitable to reduce the peak electrical demand are part of the development's plans and requirements.

If you have any questions, please contact H. Kamigaki at 969-0322.

Sincerely,

Clyde H. Nagata, Manager
Engineering Department

CC: H. Kamigaki

6089-01
March 22, 2000

WILSON
OKAMOTO
& ASSOCIATES, INC.
ENGINEERS
PLANNERS
1907 S. BERETANIA ST.
SUITE 400
HONOLULU, HI 96826
PH. (808)946-2277
FAX (808)946-2253

Mr. Clyde H. Nagata, Manager
Engineering Department
Hawaii Electric Light Company, Inc.
P.O. Box 1027
Hilo, Hawaii 96721-1027

Subject: Draft Environmental Assessment/Anticipated Finding of No Significant Impact (FONSI); Kealakehe Wastewater Treatment Plant Effluent Reuse Master Plan, Kealakehe, Hawaii; Response to Comment

Dear Mr. Nagata:

Thank you for your comment letter of February 23, 2000 regarding the Draft Environmental Assessment (EA)/Anticipated Finding of No Significant Impact (FONSI) for the Kealakehe Wastewater Treatment Plant Effluent Reuse Master Plan project. The Final EA will note that the Hawaii Electric Light Company Inc.'s (HELCO) Kealakehe Substation serves the Kealakehe Wastewater Treatment Plant and that the substation has no ties to other substations. The Final EA will also note that HELCO will be constructing a temporary tie to the Kailua substation within the State of Hawaii Department of Transportation right-of-way.

We appreciate your comments to the Draft EA. If you have any questions, please call me at 808.946.2277.

Sincerely,

John Sakaguchi, Project Manager

JS/ry

cc: COH
BC
OEQC