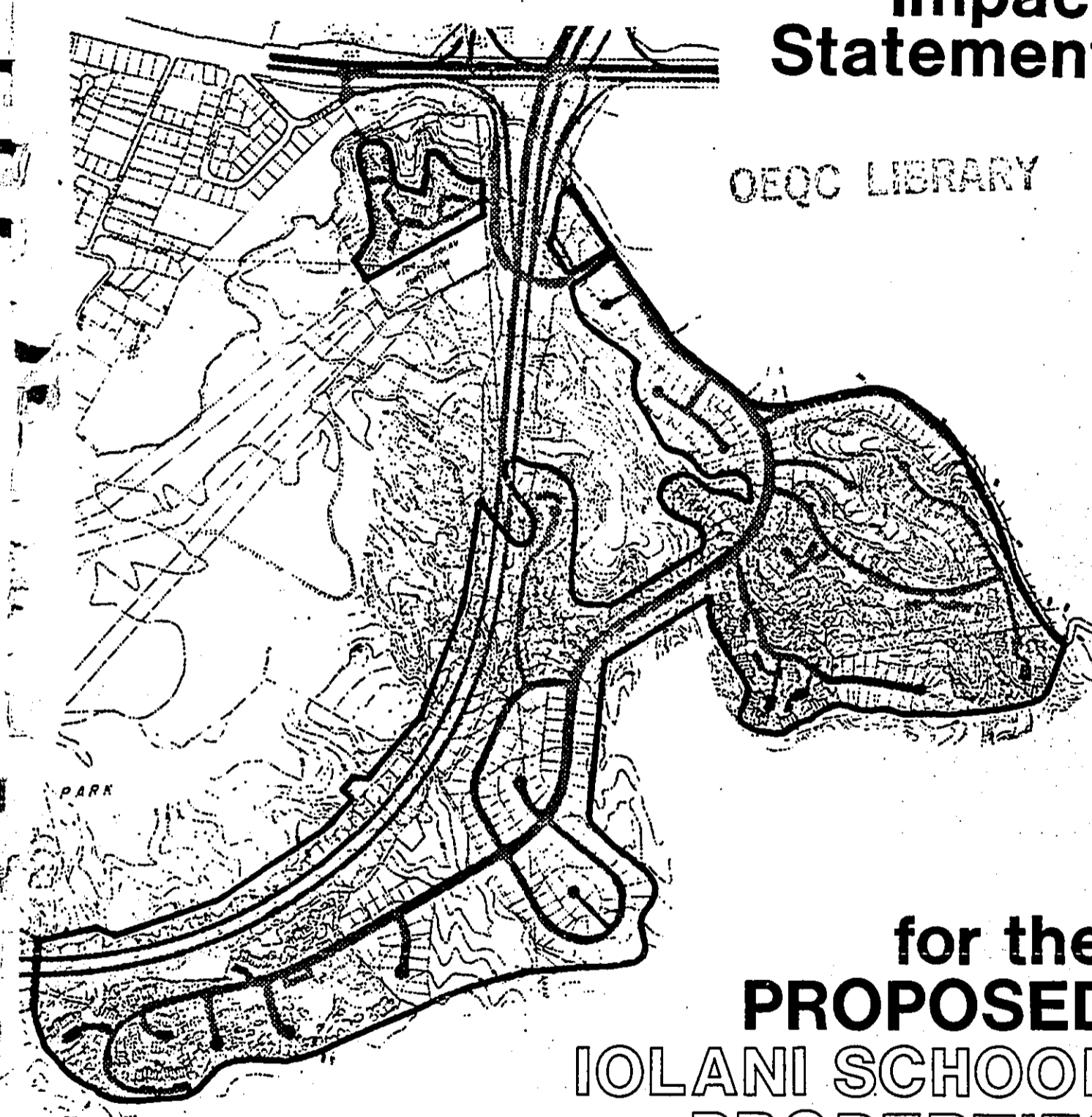


Environmental Impact Statement

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PROPOSED
IOLANI SCHOOL
PROPERTIES
PROJECT

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I
SUMMARY

I. SUMMARY

The proposed project will encompass 201.4 acres of which 103.2 acres will be utilized to create a series of neighborhoods situated in small clusters. The project will provide 611 dwelling units, including 259 single-family units, 82 duplex units, and 270 townhouse units.

Adequate infrastructure and utilities will be made available to accommodate all requirements of the proposed project, including water, sewerage, drainage, electrical, telephone and roadway systems.

It is the intent and objective of Iolani School to provide low- and moderate-income housing necessary to assist in satisfying the stated demand for housing in Oahu and specifically, in Kaneohe, as defined in the "Demand Analysis" for the Iolani School Project, prepared by John Child and Co., Inc.

During construction of the proposed project, there should be increased generation of fugitive dust and noise; potential incidences of sedimentation and erosion which may impact adjacent streams; increased traffic; elimination of existing flora species; relocation of existing fauna species; impact on archaeological sites; and an infusion of cash into the local economy resulting from increased tax revenue accrued from the sale of supplies. Operation of the proposed project will increase the supply of low-and moderate-housing in Oahu. It is anticipated that operations will not adversely impact air quality, noise quality, and water quality; endangered or threatened flora and fauna species; archaeological sites; visual and scenic character; service facilities; and will not increase traffic significantly.

Although actual total construction development costs are unknown at this time, it is estimated that approximately \$18,600,000 will be expended.

The proposed project will represent the Phase I increment for the development of a total 383.8 acres. The proposed action for this project will develop 201.4 acres, while the balance of the acreage will be developed during the subsequent Phase IIA and IIB increments. This phasing scheme has been devised because the petitioner is aware that the overall development should be planned and geared to meet immediate needs as well as long-term demands for housing.

This Environmental Impact Statement will address only the Phase I development increment of the total 383.8 acres. The scope of work and proposed action will therefore, be limited to such analysis.

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PROJECT DESCRIPTION

II. PROJECT DESCRIPTION

A. Project Location

The proposed Iolani School project is located in the Koolaupoko District, on the windward side of the island of Oahu (Figure 1). The land under consideration, for development of single-family and duplex dwellings and townhouses, consists of 201.4 acres of the total 975.6 acres and defined as portions of Tax Map Keys: 4-5-25: 23; 4-5-41: 1; & 4-5-42: 1,6,8, & 10, is bounded on the east by Kionaole Road and Kamehameha Highway, on the south by the summit of the Koolau Range, on the west by Likelike Highway, and on the north by the City's Ho'omaluhia Park and the proposed Interstate Highway H-3 alignment.

B. Statement Of Objectives

It is the intent of the proposed project to provide low- and moderate- income housing necessary to assist in satisfying the stated demand for housing in Oahu and specifically, in Kaneohe, as defined in Appendix A, "Demand Analysis" for the Iolani School Project, prepared by John Child and Co., Inc.

In the above mentioned analysis, the State has identified the lack of affordable, suitable shelter as one of Hawaii's most widespread social problems. The proposed State Housing Plan, one of 12 functional plans prepared in accordance with Chapter 226, Hawaii Revised Statutes, to establish long-range planning guidelines and policies for the State, focuses on the problems of providing affordable housing for all of Hawaii's people. It was structured to implement the Hawaii State Plan housing objectives and policies, and directly supports the State Plan objectives and policies of "greater housing opportunities", "increased housing choices", and "increased homeownership and

rental opportunities". In particular, these plans promote the policy to "stimulate and promote feasible approaches that increases housing choices for low income, moderate income, and gap group households".

The State is now in the process of developing a means of resolving differences between the various functional plans when their objectives and policies are in conflict. A significant input into this process is the Hawaii State Plan Survey. The Survey was prepared for the Department of Planning and Economic Development (DPED) to assist the State Plan Policy Council in their required review of the Hawaii State Plan. The most recent Survey was completed in July, 1981. Among the questions asked of Hawaii's residents was a request to prioritize the areas that they thought our State government should give the most attention to over the next few years. While "safety and protection from crime" head the list with 73% of the attention, "affordable housing" was the second most selected area. Fully, 54% of Hawaii's residents surveyed (55% in Oahu) felt that the State should put more time and money into affordable housing. Affordable housing was followed by "quality of education" (49%), and "having good jobs for residents" (32%).

The survey also addressed the difficult choices that sometimes have to be made in resolving conflicts between the various functional plans. In relation to the issue of affordable housing, residents were asked to choose the more important of the following: "lower housing costs" or "preserving agricultural land". Statewide, 60% selected lower housing costs as the more important objective, while only 36% chose preservation of agricultural lands. There were several choices of this nature offered to the residents, and based on the responses to the survey, it is likely that while residents support the efforts to

save agricultural and conservation lands and to control urban growth, they would likely accept some loss of agricultural and conservation lands for more affordable housing.

While the proposed County Development Plan for Koolaupoko does not project a need for further urbanization to accommodate targeted population growth in the area, analysis has shown that the projected capacity of the area's existing land inventory to accommodate even the scaled down population targeted for the area is open to question. Population targeted for the area is questionable. Population distribution is just one of ten areas of concern addressed by the General Plan for the City and County of Honolulu, although it played a major part in the land use recommendations contained in the Development Plans.

An equally important area of concern is "Housing." Objective A for Housing is "to provide decent housing for all the people of Oahu at prices they can afford", and in the most recent revision process, an effort was made to develop more specific policies which would encourage the development of "affordable housing." The following Housing policies included in the revised General Plan demonstrate this increased emphasis on affordable housing:

Policy 7 - "Provide financial and other incentives to encourage the private sector to build homes for low- and moderate- income residents."

Policy 8 - "Encourage and participate in joint public-private development of low- and moderate- income housing."

It is clear that the State Plan, the proposed State Housing Functional Plan, and the County General Plan all support and encourage the development of affordable housing, and have

specific policies which are designed to assist the private sector in accomplishing this goal. The most recent Hawaii State Plan Survey indicates that Hawaii's residents believe affordable housing to be the second most important area of concern after crime, on which the State government should spend its efforts and money. The residents also expressed a willingness to accept some loss of agricultural and conservation lands if the net result would be more affordable housing.

The residential development proposed by Iolani School for the property in this petition is oriented to the low- and moderate-income/gap group families identified as need groups by State and County housing agencies. The proposed project will provide 611 homes which would be affordable to the estimated 27,300 families on Oahu in the gap group who are currently renting. The combined efforts of State and County housing agencies currently project the construction of only 2,182 additional housing units for these Oahu families through 1990, and based on past experience, it is probable that many of these projected units will not be built. It has been estimated that about 3,900 of the 27,300 gap group housing units are needed in Koolaupoko, with 1,200 to 1,300 units within Kaneohe alone. In relation to these existing needs, the State and County housing agencies have planned for the construction of only 388 units in Koolaupoko through 1990. There is a clear need for more affordable housing, and the project proposed by Iolani School will meet a portion of this need at virtually no cost to government.

C. Description of Proposed Project

The proposed project will encompass 201.4 acres of which 103.2 acres will be utilized to create a series of neighborhoods situated in small clusters. The remaining 98.2 acres proposed for

urbanization are set aside for the alignment of the Interstate Highway H-3, major roadways, park areas, open space, and drainage ways. The project will provide 611 dwelling units, in the following mix: 259 single-family dwelling units on lots of a minimum of 6,000 square feet, 82 duplex units on lots of 11,000 square feet, and 270 townhouse units arranged in five separate clusters. The single residences will be located on the flattest portion of the site, with a minimum of grading. The duplexes and townhouses will be constructed on the remaining buildable areas of the property. The project design provides sufficient flexibility in the siting of these units with maximum open space and minimal disturbance to the natural terrain. Each townhouse cluster will provide private yard space adjacent to each unit, a common open space recreation area and on-grade parking located conveniently to each unit. Considered in the design are the view planes to Kaneohe Bay and the Koolau mountains.

Density will be approximately 5.2 units per acre for the total developable site. For the single family residences, density will be 5.0 units per acre; for the duplexes, 5.1 units per acre and 5.5 units per acre for the townhouses.

The following is an acreage breakdown of the remaining uses to be provided by the proposed action:

1. Residential	103.2 acres
2. Roads	17.2 acres
3. Parks	10.4 acres
4. Open Space	39.2 acres
5. Interstate Highway H-3 Right-of-Way	31.4 acres

A main 60-foot wide collector road will provide access to each neighborhood cluster from Kamehameha Highway with connection to existing Kionaole Road.

Existing public services and facilities will be made available to the proposed project. The proposed action will include construction of street improvements and utilities, clearing, grubbing, and grading of roadway prism, water and drainage systems, and sewer systems. At the park sites, the proposed action will include: clearing and grubbing, grading, grassing and automatic sprinkler systems.

D. Infrastructure Requirements

Detailed infrastructure requirements, as it relates to the project site, will be developed as the proposed action is implemented. The following discussion is a brief review of anticipated requirements resultant of the project.

1. Drainage System. Storm runoff from the development area will be collected on-site by catch-basins located within the roadways and conveyed in underground pipe systems to existing streams and to the Kaneohe Flood Control Ponding Basin at Ho'omaluhia Park.
2. Potable Water System. Water service is available to serve the project site. A 2 inch waterline is located within Kio-naole Road. Additional facilities will be provided to serve the needs of the development and the proposed construction of a 0.5 million gallon (MG) reservoir and necessary appurtenances.
3. Sewerage System. Sanitary sewer services to service the development will be made available. There is an existing interceptor sewer line along Kaneohe Stream which has sufficient capacity to accommodate the expected flow of 244,400 gallons per day. The Department of Public Works has indicated that capacity of the Kaneohe STP may be inadequate to accomodate the proposed project. Therefore,

in order to accomodate the increased sewage flows, improvements will be made to increase capacity at the existing Kaneohe STP. The proposed project will be provided with adequate sewerage facilities.

4. Electrical and Telephone System. Both electrical and telephone systems may need to be upgraded to service the development. All units will be directly connected to Hawaiian Electric Co. and Hawaiian Telephone Co. lines for ultimate service. Extension of electrical and telephone services to the project will be undertaken by the respective utility company.
5. Solid Waste Collection. Solid waste pickup will be collected by the Department of Public Works, Division of Refuse Collection and Disposal, City and County of Honolulu. If necessary, refuse pickup by private companies can be arranged.
6. Roadway System. All existing roads providing access to the project site have adequate design capacity to accomodate the traffic which will be generated by the development. All proposed internal roadways will be designed in accordance with City and County standards for public or private roadways, as applicable.

E. Development Schedule

A tentative development program schedule may be as follows:

- | | |
|---|-----------|
| 1. Application for urban State Land Use | 1982-1983 |
| 2. Application for City and County of Honolulu Development Plan | 1983-1984 |
| 3. Preparation of construction plans | 1984-1986 |
| 4. Construction of improvements | 1986-1990 |
| 5. Occupancy | 1987-1992 |

The proposed project will represent the Phase I increment for the development of a total 383.8 acres. The proposed action for this project will develop 201.4 acres, while the balance of the acreage will be developed during the subsequent Phase IIA and IIB increments. Figure 2 delineates the various phasing boundaries. This phasing scheme has been devised because the petitioner is aware that the overall development should be planned and geared to meet immediate needs as well as long-term demand for housing.

This Environmental Impact Statement will address only the Phase I development increment for 201.4 of the total 383.8 acres. The scope of work and proposed action will therefore, be limited to such analysis.

F. Costs

Although actual total construction development costs for the proposed action are indeterminate at this time, it is estimated that approximately \$18,600,000 will be expended.

The approximate cost for improvements, based on 1983 estimates, to implement the proposed action is as follows:

1. Off-Site Costs:
 - a. Water-Related Improvements. Construction of the 0.5 M.G. reservoir, deep wells, pumps, pump station, transmission mains and access road is approximated to be \$1,300,000.
 - b. Sewer-Related Improvements. Construction of sewer pump station, sewer force main and gravity main with connection to two existing 24-inch sewer main is \$1,715,000.

FINAL
ENVIRONMENTAL IMPACT STATEMENT
FOR THE PROPOSED
IOLANI SCHOOL PROPERTIES PROJECT
at Kamooalii, Koolaupoko,
Kaneohe, Oahu

May, 1983

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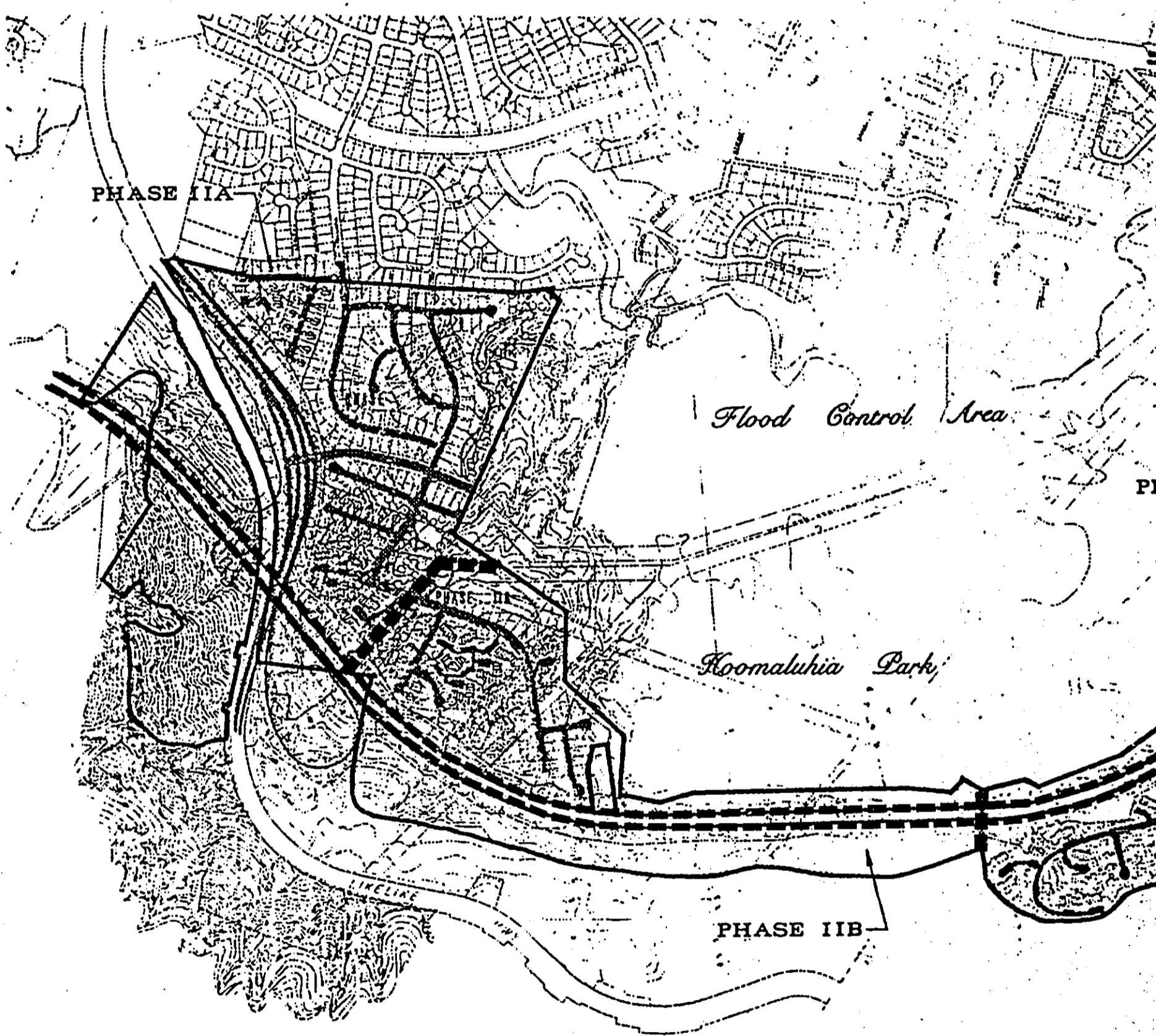
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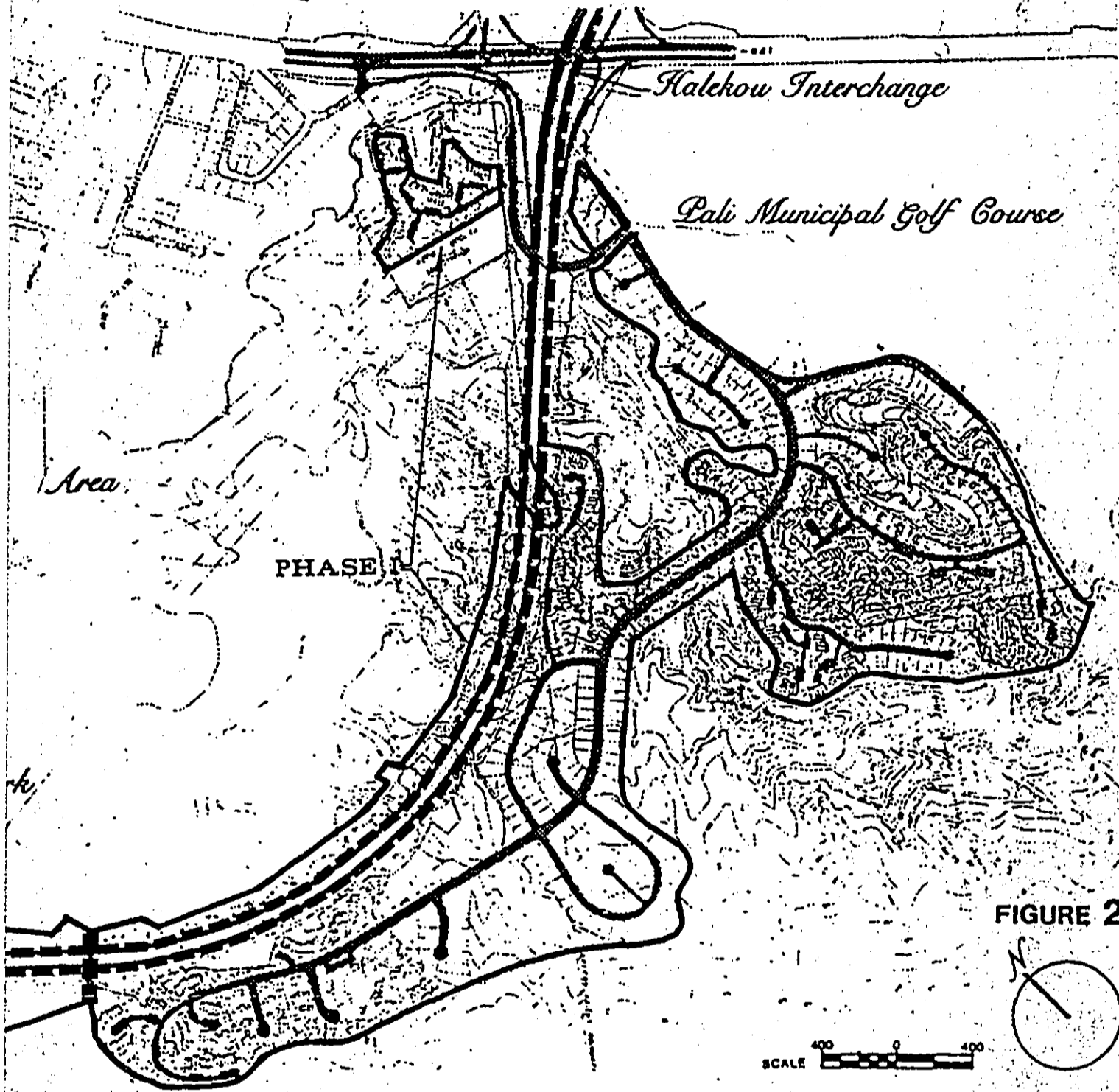
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PHASING
Iolani School
Properties

The total estimated cost for the off-site water and sewer system, including, \$603,000 for engineering and contingencies, is \$3,618,000.

2. On-Site Costs:

Residential-related improvements, including engineering and contingencies, are approximated at \$14,820,000. Improvements to the park site, including engineering and contingencies, is \$162,000.

The total estimated cost for street improvements, utilities and improvements of park sites, including engineering and contingencies, is \$14,982,000.

G. Intended Market

The proposed project is intended to supply needed housing to all of Oahu, with special attention given to prospective purchasers from the Kaneohe area.

To meet the market demand, presently believed to be the low-and moderate-income purchaser, the petitioner desires to market the homes within the affordable price market. In order to meet this demand, the petitioner contemplates a leasehold arrangement for the land for a set period of time, with the right to purchase clause inserted into the lease.

To ensure the project is competitive with housing prices for gap group buyers currently available at prices from \$80,000 to \$115,000, estimated prices could range from \$63,000 for townhouses up to \$111,000 for single family homes. This range is based on leasehold purchase, improvement district on leasehold purchase, improvement district participation to finance off-site costs, and basic, no frills housing. The

low-income group, with annual incomes under \$19,000 for a family of four, would not qualify for the estimated sales price without government subsidy. Such participation by government agencies would be pursued by the future developer. The fee value of the land is not available at this time. It will be determined at the time housing is offered to purchasers at fair market value. An option to purchase the fee will be offered to all prospective purchasers.

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ENVIRONMENTAL SETTING

III. DESCRIPTION OF THE ENVIRONMENTAL SETTING

A. Geographical Characteristics

1. Topography. Geologically, the entire area was created by the Koolau volcanic series and was of basaltic origin.

The project site varies in elevation from 200 to 525 feet above mean sea level. The slopes on the project site are predominately between 0-20 percent. However, slopes in excess of 20 percent, do also exist.

2. Soils. The following details the soil types which comprise the project site (U.S. Department of Agriculture Soil Conservation Service, 1972).

- a. Lolekaa Series: This series consists of well-drained soils on fans and terraces on the windward side of the island of Oahu. These soils developed in old, gravelly colluvium and alluvium. They are gently sloping to very steep. Elevations range from nearly sea level to 500 feet. The annual rainfall amounts to 70 to 90 inches and is well distributed throughout the year. The mean annual soil temperature is 71° F. Lolekaa soils are geographically associated with Alaeha and Waikane soils. These soils are used for pasture, homesites, orchards, and truck crops. The natural vegetation consists of guava, Christmas berry, californiagrass, hilograss, and ricegrass.

Lolekaa silty clay, 3 to 8 percent slopes (LoB) -
This soil is on terraces and fans. In a representative profile the surface layer is dark-brown silty clay about 10 inches thick. The subsoil is 46 to more than 70 inches thick. The upper part is dark-brown silty clay that has subangular blocky structure, and the lower part is dark yellowish-brown loam that has subangular blocky structure. The substratum is strongly weathered gravel. The soil is strongly acid in the surface layer and strongly acid to extremely acid in the subsoil. Permeability is moderately rapid. Runoff is slow, and

the erosion hazard is slight. The available water capacity is about 1.3 inches per foot of soil. Soft, weathered gravel is common in the subsoil but does not affect use and management of the soil for farming. In places roots penetrate to a depth of 5 feet or more.

Lolekaa silty clay, 8 to 15 percent slopes (LoC) -
On this soil, runoff is slow to medium and the erosion hazard is slight to moderate. Workability is slightly difficult because of the slope.

Lolekaa silty clay, 15 to 25 percent slopes (LoD) -
This soil is on side slopes of terraces and along drainageways. Runoff is medium, and the erosion hazard is moderate. Workability is slightly difficult because of the slope.

Lolekaa silty clay, 25 to 40 percent slopes (LoE) -
This soil occurs along drainageways and on fans adjacent to the Koolau Range. Runoff is medium to rapid, and the erosion hazard is moderate to severe. Workability is difficult because of the slope.

Lolekaa silty clay, 40 to 70 percent slopes (LoF) -
This soil occurs along drainageways and on fans adjacent to the Koolau Range. Runoff is rapid, and the erosion hazard is severe. It is impractical to cultivate this soil.

- b. Kaneohe Series: This series consists of well-drained soils on terraces and alluvial fans on the windward side of Oahu. These soils developed in alluvium and colluvium derived from basic igneous rock. In a few places they developed in volcanic ash and in material weathered from cinders. The soils are gently sloping to very steep. Elevations range from 100 to 1,000 feet. The annual rainfall, which is fairly well distributed throughout the year, amounts to 70 to 90 inches. The mean annual soil temperature is 71° F. Kaneohe soils are geographically associated with Alaeloa, Lolekaa, and Waikane soils.

These soils are used for pasture, homesites, and urban development. The natural vegetation consists of guava, Boston fern, sensitive plant, glenwoodgrass, and hilograss.

Kaneohe silty clay, 3 to 8 percent slopes (KgB) -
This soil occupies uniform slopes. Included in mapping were small areas of reddish-colored soils and areas of dark-brown soils that formed in gravelly alluvium. In a representative profile the surface layer is dark-reddish-brown silty clay about 14 inches thick. The subsoil, 40 to more than 50 inches thick, is dusky-red and dark-red silty clay that has subangular blocky structure. The substratum is soft, weathered gravel. The soil is slightly acid in the surface layer and strongly acid in the subsoil. Permeability is moderately rapid. Runoff is slow to medium, and the erosion hazard is slight. The available water capacity is 1.2 inches per foot in the subsoil. In places roots penetrate to a depth of 5 feet or more. This soil is used for pasture and golf courses.

Kaneohe silty clay, 8 to 15 percent slopes (KgC) -
On this soil, runoff is medium and the erosion hazard is moderate. Included in mapping were small eroded spots and gravelly areas.

Kaneohe silty clay, 30 to 65 percent slopes (KHOF) -
This soil occurs on terrace faces and along drainageways. Runoff is medium to rapid, and the erosion hazard is moderate to severe. Workability is difficult because of the slope.

- c. Hanalei Series: This series consists of somewhat poorly drained to poorly drained soils on bottom lands on the islands of Kauai and Oahu. These soils developed in alluvium derived from basic igneous rock. They are level to gently sloping. Elevations range from nearly sea level to 300 feet. The annual rainfall amounts to 20 to 120 inches. The mean annual soil temperature is 74° F. Hanalei soils are geographically associated with Haleiwa, Hihimanu, Mokuleia, and Pearl Harbor soils. These soils are used for taro, pasture, sugarcane, and vegetables. The natural vegetation consists of paragrass, sensitive plant, honohono, Java plum, and guava.

Hanalei silty clay, 0 to 2 percent slopes (HnA) -
This soil is on stream bottoms and flood plains. Included in the areas mapped on Kauai along the Waimea River and in Waipaoiki Valley are small areas where the surface layer is 8 to 10 inches of reddish-brown silty clay. Included in the areas mapped on Oahu were small areas of very deep, well-drained alluvial soils and small areas of very poorly

drained to poorly drained clay soils that are strongly mottled and are underlain by peat, muck, or massive marine clay. In a representative profile the surface layer, about 10 inches thick, is dark-gray and very dark gray silty clay that has a dark-brown and reddish mottles. The subsurface layer is very dark gray and dark-gray silty clay about 3 inches thick. The subsoil, about 13 inches thick, is mottled, dark-gray and dark grayish-brown silty clay loam that has angular blocky structure. The substratum is stratified alluvium. The soil is strongly acid to very strongly acid in the surface layer and neutral in the subsoil. Permeability is moderate. Runoff is very slow, and the erosion hazard is no more than slight. The available moisture capacity is about 2.1 inches per foot of soil. Roots penetrate to the water table. Flooding is a hazard.

Hanalei silty clay, 2 to 6 percent slopes (HnB) -
On this soil, runoff is slow and the erosion hazard is slight.

Figure 3 presents the distribution of these soils.

B. Climatical Characteristics

1. Rainfall. The annual rainfall at the general area of the project site ranges from over 100 inches at the crest of the Koolau Mountain Range to less than 50 inches at Kaneohe Bay, with the project site area being approximately 85 inches. Fifty percent of the rainfall is concentrated in the months of January, February, March, November, and December.
2. Wind. The prevailing wind, 90 percent of the year, is the northeasterly tradewind.
3. Temperature. The temperature varies between 68 and 80 degrees for the coolest and warmest months,

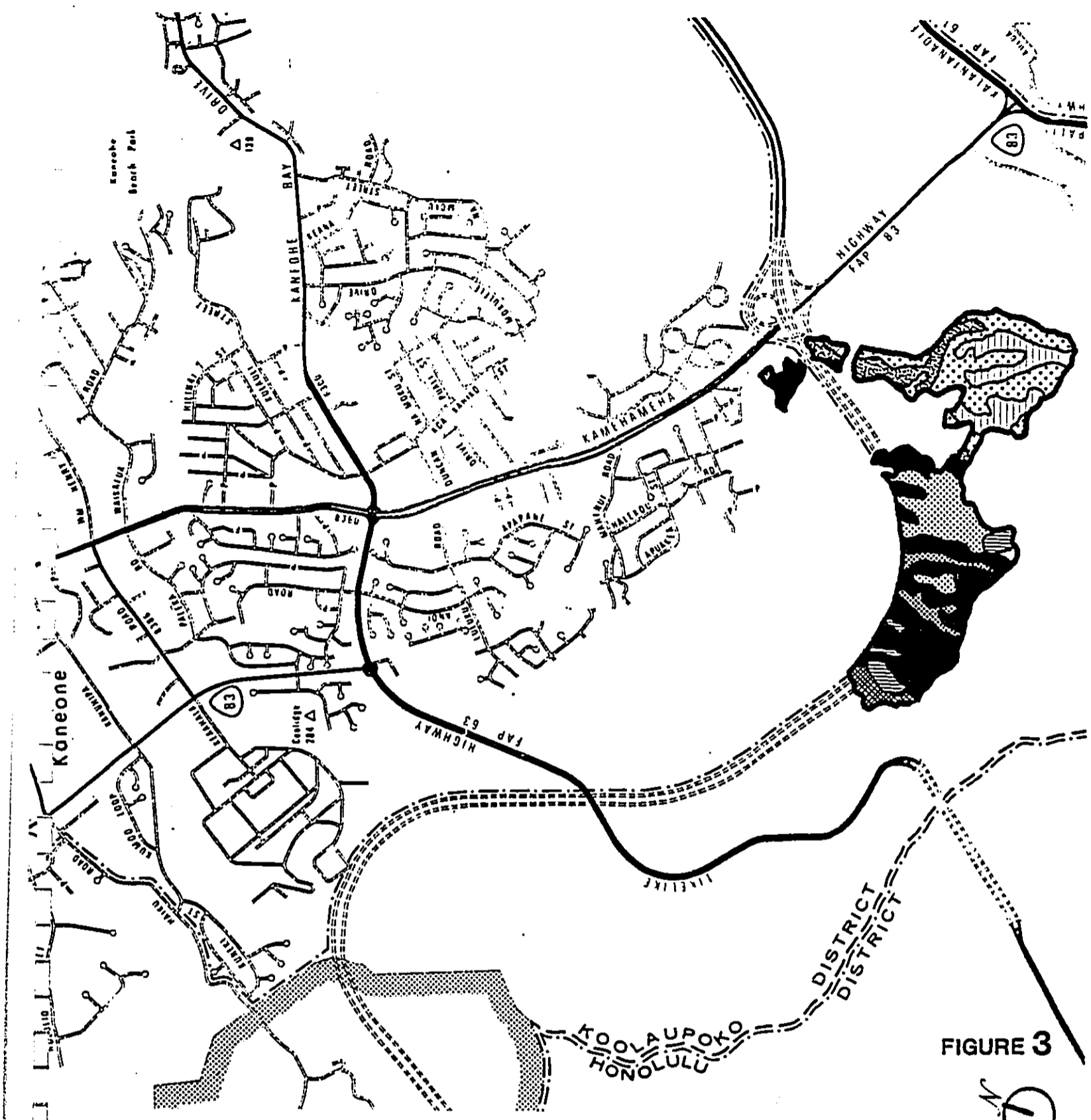


FIGURE 3

SC: 1 in. = 1000 Ft.



LoB		HnA		KHOF	
LoC		HnB		KgB	
LoD				KgC	
LoE					
LoF					

SOILS
Iolani School
Properties

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respectively. The mean annual average temperature is about 74 degrees. The extreme temperatures range from 58 to 90 degrees.

C. Environmental Characteristics

1. Air Quality. There exists no long-term air quality monitoring station in the immediate vicinity of the proposed project site. The only monitoring station on the windward side of Oahu is in Waimanalo, approximately 10 miles east-southeast of the project area. However, considering the project site is located on the windward side of the island, away from the industrial activity, and is characterized by a minimal amount of adjacent roadways, it is reasonable to assume that present air quality is in conformance with existing Federal and State of Hawaii Air Quality Standards (AQS). Table 1 present Federal and State of Hawaii AQS. A summary of air pollutant measurements from State of Hawaii long-term monitoring stations nearest the project site is presented in Table 2. Data from six different sampling stations are included in the summary. Data from the table indicate that particulate, sulfur dioxide, nitrogen dioxide and lead levels are well within allowable air quality standards. However, there could be a potential problem with carbon monoxide concentrations in the urban areas of Oahu.

2. Noise Quality. No estimation of noise measurements was taken for the purposes of this EIS. However, due to the absence of significant development in adjacent areas, it can be assumed that excessive noise levels are minimal.

TABLE 1
SUMMARY OF
STATE OF HAWAII AND FEDERAL AMBIENT AIR QUALITY STANDARDS

POLLUTANT	SAMPLING PERIOD	FEDERAL STANDARDS		STATE
		PRIMARY	SECONDARY	STANDARDS
1. Suspended Particulate Matter (micrograms per cubic meter)	Annual Geometric Mean	75	60	-
	Annual Arithmetic Mean	-	-	55
	Maximum Average in any 24 hours	260	150	100
2. Sulfur Dioxide (micrograms per cubic meter)	Annual Arithmetic Mean	80	-	20
	Maximum Average in any 24 hours	365	-	80
	Maximum Average in any 3 hours	1300	-	400
3. Carbon Monoxide (milligrams per cubic meter)	Maximum Average in any 8 hours	10	-	5
	Maximum Average in any 1 hour	40	-	10
4. Hydrocarbons (micrograms per cubic meter)	Maximum Average in any 3 hours	160	-	100
5. Ozone (micrograms per cubic meter)	Maximum Average in any 1 hour	240	-	100
6. Nitrogen Dioxide (micrograms per cubic meter)	Annual Arithmetic Mean	100	-	70
	Maximum Average in any 24 hours	-	-	150
7. Airborne Lead (micrograms per cubic meter)	Average Over 3 Months	1.5	-	1.5

Source: 40 Code of Federal Regulations, Part 50 and State of Hawaii Public Health Rule and Regulations, Chapter 42.

TABLE 2
SUMMARY OF AIR POLLUTANT MEASUREMENTS
AT NEAREST MONITORING STATIONS

<u>POLLUTANT</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>
PARTICULATE MATTER							
No. of Samples	86	71	51	60	59	57	57
Range of Values	13-65	12-69	14-59	15-61	12-61	10-90	14-78
Average Value	29	25	31	29	30	29	28
No. of times State AQS excd.	0	0	0	0	0	0	0
SULFUR DIOXIDE							
No. of Samples	81	68	45	57	54	59	56
Range of Values	5-34	5-32	5- 5	5- 7	5-16	5- 5	5- 5
Average Value	5	5	5	5	5	5	5
No. of times State AQS excd.	0	0	0	0	0	0	0
CARBON MONOXIDE							
No. of Samples	169	355	359	365	207	329	216
Range of Values	.9-27.4	.5-24.2	0-19.6	0-20.7	0-17.3	0-3.5	0-4.6
Average Value	6.6	5.4	3.5	3.1	2.9	0.6	1.2
No. of times State AQS excd.	35	41	22	19	10	0	0
OXIDANT (OZONE)							
No. of Samples	234	322	300	284	338	295	147
Range of Values	6-65	2-127	4-61	10-84	10-80	10-84	10-104
Average Value	25	40	25	33	39	48	37
No. of times State AQS excd.	0	1	0	0	0	0	1
NITROGEN DIOXIDE							
No. of Samples	88	21					46
Range of Values	5-64	24-61					6-77
Average Value	38	44					25
No. of times State AQS excd.	0	0					0
LEAD							
No. of Samples			4	1	4	4	1
Range of Values			.48-89	.72	.25-.42	.20-.41	.25
Average Value			.71	.72	.33	.26	.25
No. of times State AQS excd.			0	0	0	0	0

Source: Appendix B

D. Hydrological Characteristics

1. Surface Water Quality. The proposed project is situated in the 5.8 square mile Kamooalii-Kaneohe drainage area, which is the southern most of 10 defined drainage areas comprising the approximately 40 square mile Kaneohe Drainage Basin. Five streams, the Kamooalii, Luluku, Hooleinaiwa, Piho, and Kuou Streams, flow through or by the project site and discharge into Kaneohe Bay (Figure 4).

The streams are characterized by Class 2 waters. The uses to be protected by Class 2 waters are as follows:

"The uses to be protected in this class of waters are bathing, swimming, the support and propagation of aquatic life, compatible recreation, and agricultural and industrial water supply.

It is the objective for this class of waters that their use for recreational purposes, propagation of fish and other aquatic life, and agricultural and industrial water supply not be limited in any way. Such waters shall be kept clean of trash, solid materials or oils, and shall not act as receiving waters for any effluent which has not received the best degree of treatment or control practicable under existing technology and compatible with the standards established for this class (Department of Health)".

Kaneohe Bay is the largest embayment in the State of Hawaii. The bay is characterized by Class AA waters. The uses to be protected by Class AA waters are as follows:

"The uses to be protected in this class of waters are oceanographic research, the support and propagation of shellfish and other marine life, conservation of coral reefs and wilderness areas, compatible recreation, and aesthetic enjoyment.

It is the objective of this class of waters that they

remain in as nearly their natural, pristine state as possible with an absolute minimum of pollution from any source. To the extent possible, the wilderness character of such areas shall be protected. No zones of mixing will be permitted in these waters.

The classification of any water area as Class AA shall not preclude other uses of such waters compatible with these objectives and in conformance with the standards applicable to them (Department of Health)".

Table 3 presents a water quality summary of Kaneohe Bay. As indicated by the table, applicable water quality standards are exceeded for turbidity, ortho-phosphate, suspended solids and nutrients (Department of Health, 1981). High concentrations of the various nutrient parameters were found to occur during the winter months from October to February (Cox et al., 1973). It was also indicated that this period of the year produces most of the flow from the perennial streams in the drainage area, indicating that runoff from streams and land areas contributes considerably to the nutrient levels in the bay (United States Geological Survey, 1980). Precise figures as to how much, have not been accurately reported since sewage outfalls existed in Kaneohe Bay in the late 1970s.

What has been accurately determined was suspended loadings of the bay from Kamooalii Stream which empties into the poor circulated, southeast basin. Table 4 presents data from U.S.G.S. gauge station 16272200. Higher discharges were reported by Cox et al., in 1973. He reported an estimated 9,470 tons of sediment were discharged in a single 24-hour storm in February, 1969. This is not surprising considering the subdivision construction in the drainage area occurring at the time. Increased

TABLE 3

**WATER QUALITY SUMMARY
KANEIOHE BAY
January, 1973 - August, 1980**

	Ammonia Nitrogen (ug/l)	Nitrate-Nitrite-N (ug/l)	Total Kjeldahl-N (ug/l)	Ortho-Phosphate (ug/l)	Total Phosphorus (ug/l)	Turbidity (NTU)	Suspended Solids (ug/l)	Dissolved Oxygen (mg/l)
NUMBER OF VALUES	0	51	51	4	51	49	6	47
MEAN	0	84.1	199	17.2	41.5	3.745	30,420	6.791
MEDIAN	0	100.0	180	18.0	40.0	2.800	25,000	6.600
NUMBER OF VIOLATIONS	0	2	6	3	5	44	2	0
PERCENT VIOLATION	0	4	12	75	10	90	33	0
MINIMUM VIOLATION	0	100.0	430	18.0	68.0	1.600	39,000	0
MEAN VIOLATION	0	100.0	510	19.7	74.2	4.018	44,500	0
MAXIMUM VIOLATION	0	100.0	630	23.0	80.0	18.000	50,000	0
MAXIMUM CRITERIA	015.0	25.0	350	17.0	60.0	1.500	35,000	--

Source: Department of Health, 1981.

TABLE 4

U.S.G.S. (1980) SUSPENDED SOLIDS KAMOOALII STREAM

Period of Record: November, 1976 to current year.

Extremes for period of record:

Maximum daily discharge	694 tons
Minimum daily discharge	0.05 on

Extremes for current year:

Maximum daily discharge	217 tons
Minimum daily discharge	0.33 ton

Total for water year 1979	2,024.41 tons
---------------------------	---------------

Source: U.S. Geological Survey, 1981.

urbanization of the Kaneohe area, the decrease of farming and grazing lands, and the creation of large shopping centers with paved parking were also contributing factors to the runoff.

2. Groundwater. The project site is in a prime groundwater recharge area where annual rainfall averages 75 inches or more.

E. Biological Characteristics

1. Flora. A literature search and walk-through survey was conducted. Results of these activities have been included in Appendix C, entitled A Botanical Survey of Iolani School Lands Proposed for Residential Development, Kaneohe- Kailua, Oahu, prepared by Winona P. Char.

While there were no studies found that dealt specifically with the entire proposed project area, a number of studies have been done on adjacent areas and portions of the project sites. The "Interstate Route H-3 Environmental Impact Statement", prepared by the Department of Transportation in 1974, provided brief descriptions of vegetation types, largely banana fields, that were present within parts of the project site. The "Supplemental Environmental Impact Statement for Flood Control and Allied Purposes for the Kaneohe-Kailua Area, Oahu, Hawaii," prepared by the U.S. Army Corps of Engineers, in 1975, found that vegetation in the adjacent Ho'omaluhia Park Project area, except for the steeper slopes, has been under taro, rice, pineapple, sugar, or banana cultivation in the past.

The intensive walk-through survey that was completed, indicated an abundance of vegetation types. Specifically, five introduced species form most of the dominant vegetation. Figure 5 presents the location of the vegetation types. A description of each type is as follows:

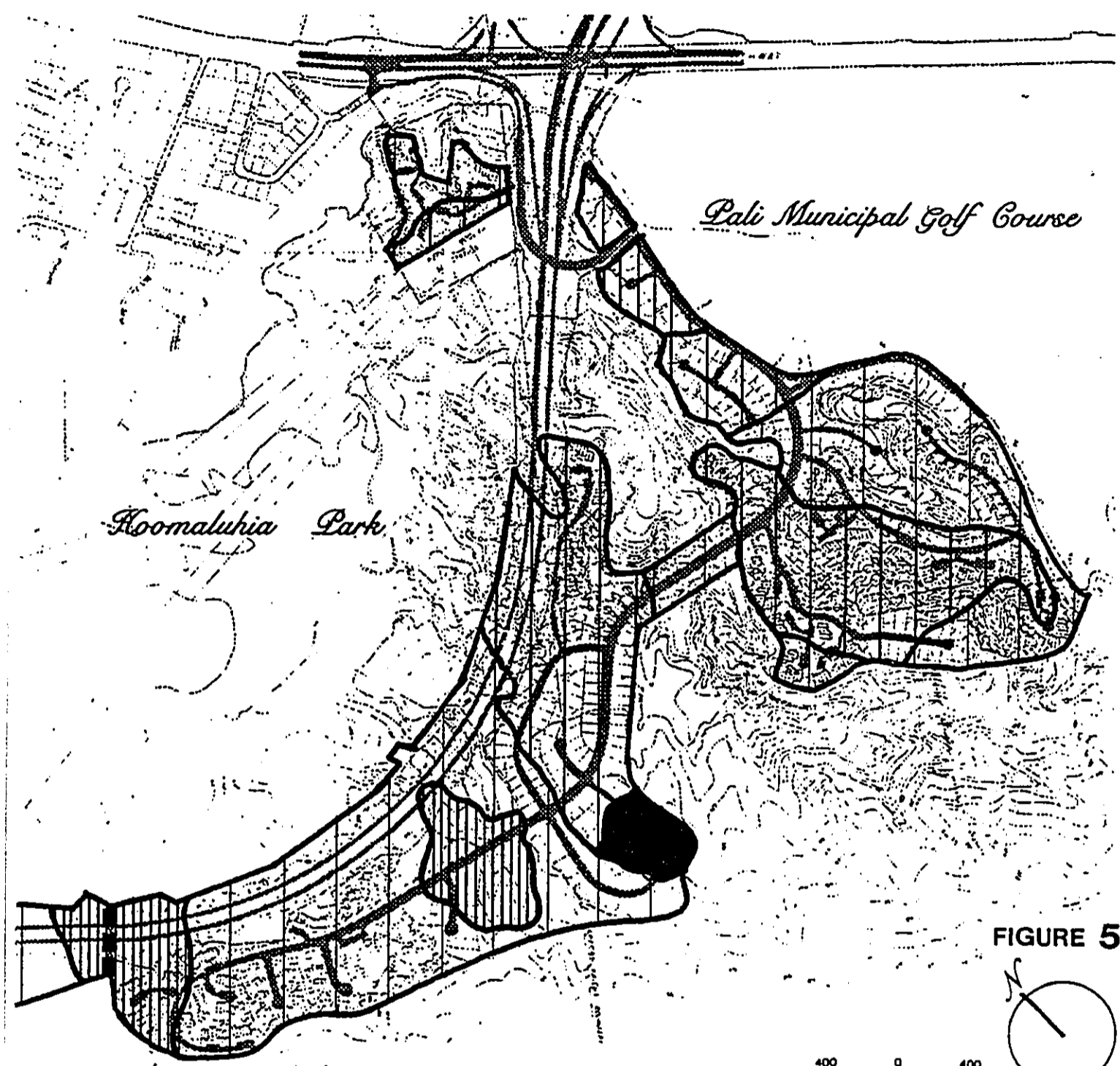
a. Banana farmland (B): Some fields of bananas are cultivated, on the less steep slopes. A number of small streams run through the fields. Steeper areas within the banana fields are not cultivated. These gully areas and steep banks usually support a mixture of tree species and shrubs. Approximately 5 acres of land is in banana cultivation.






b. Brachiaria grassland (Br-g): Brachiaria mutica or California grass occurs in both well-drained or in low-lying wet areas.

In the well-drained project site, extensive areas of Brachiaria grassland were once used for grazing cattle; remnants of barbed-wire fencing can be found around the peripheries of these grasslands. Rather extensive patches of molassesgrass (Melinis minutiflora) are found in association with Brachiaria. A few small shrubs of guava, 1 to 2 meters tall, and patches of swordfern (Nephrolepis exaltata) are found scattered throughout the grassland. In some areas scattered clumps of Java plum trees, 7 to 9 meters tall, form a cover of 30 to 40 percent and the grasslands become savannah-like.

c. Andropogon grassland (A-g): Andropogon virginicus or broomsedge grassland occurs only within one site of the project area--on the well-locates southeast of the Ho'omaluhia riding center. Neophrolepis ferns and a few scattered shrubs of guava and 'akia (Wikstroemia aff. oahuensis) are frequently found in this vegetation type.

d. Open scrubland (o-s): Open scrubland is confined to the knolls or hilltops occurring among the mixed forests. Roughly 70 percent of the vegetation cover is composed of the grasses Andropogon and Paspalum orbiculare (rice-grass) and the matforming 'uluhe cattleianum.



-  A-g
-  o-s
-  B
-  Br-g
-  m-f

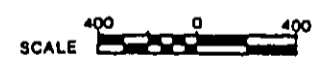
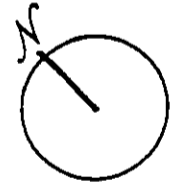


FIGURE 5



**BOTANICAL
SURVEY**
Iolani School
Properties

guava, and 'akia (Grevillea robusta), hala (Pandanus ordoratisissimus), and 'ohia (Metrosideros collina ssp. polymorpha), which form the remaining 30 percent cover, are scattered throughout the grass-uluhe association. Extensive areas are covered with 'uluhe and scattered Java plum and 'ohia trees.

- c. Mixed forests (m-f): The mixed forests usually consists of a mixture of several introduced tree species, 10 to 20 meters tall. Java plum is the most commonly occurring species with 30, to as much as 50 percent of the cover. The site may have at one time been occupied since numerous ornamental species such as Syngonium auritum, Philodendron andreanum, torch ginger (Phaeomeria magnifica), and a Heliconia species were found. Clusters of large, old mango trees (Mangifera indica) with their rounded crowns stand out above many of the other tree species. Large, almost impenetrable, thickets of hau (Hibiscus tiliaceus) occur in the drainage areas throughout the mixed forests.

2. Fauna. Appendix D, entitled Bird and Mammal Report for the Proposed Iolani School Project, prepared by Dr. Andrew J. Berger, was conducted to inventory the birds and mammals inhabiting the project site. No endangered Hawaiian birds or other vertebrate animals, either on, or adjacent to the pro-posed project site were observed. A total of fourteen (14) species of birds were identified as introduced to the region, whereas, only one bird species was identified as indigenous. The following details a description of each respective species:

a. Introduced Species

Cattle Egret (Bulbucus ibis), Order Ciconiiformes, Family Ardeidae:

This species was imported to Hawaii from Florida to aid in the battle to control house flies, horn flies, and other flies that damage hides and cause lower weight gains in cattle. A number of Cattle Egrets were released on Oahu in 1959 and 22 additional birds were released during July 1961. It has been estimated that 2,000 Cattle Egrets now roost in trees on Kaneohe Marine Corps Air Station (Appendix D).

Lace-necked or Spotted Dove (Streptopelia Chinensis), Order Columbiformes, Family Columbidae:

This Asian dove was introduced to the Hawaiian Islands at an early date; the exact date is unknown, but the birds are said to have been very common on Oahu by 1879. The species is still common on all islands and is classified as a game bird. Although this species occurs where rainfall exceeds 100 inches per year, the highest densities are found in drier areas where the introduced kiawe (mesquite) is one of the dominant plants.

Barred Dove (Geopelia striata), Order Columbiformes, Family Columbidae:

This species is called the Zebra Dove in its native habitat in Australia. This dove is said to have been introduced to Hawaii sometime after 1922. It is now commonly abundant on all of the main islands in the chain. The Barred Dove also prefers the drier areas where seeds are abundant.

Barn Owl (Tyto alba pratincola), Order Strigiformes, Family Tytonidae:

The first Barn Owls were imported from California and released on Hawaii island in 1958. Birds were released at Hauula, Oahu, on two different occasions. Seven birds were imported from the San Diego Zoo and released during September 1959; 11 additional owls were imported from the San Antonio Zoo, Texas, and released during October 1960. The Barn Owls, nocturnal in nature, were introduced in the hopes that they would prey upon the rats that were causing losses in sugarcane fields.

Melodious Laughing-thrush (Garrulax canorus), Order Passeriformes, Family Timaliidae:

This species, which is a babbler and not a thrush, was introduced to Hawaii from China or Formosa as a cage bird many years ago. A number obtained their freedom at the time of the great fire in the Oriental quarter of Honolulu in 1900, and took to the hills behind the city. No detailed study of this babbler has

been made on Oahu, so that little is known about its distribution or abundance. It now occurs, however, in both the Waianae and the Koolau mountains. It seems to prefer the wetter areas where there are thickets and clumps of vegetation. The birds have a loud, attractive song, and they are more often heard than seen.

Red-vested Bulbul (Pycnonotus cafer), Order Passeriformes, Family Pycnonotiadae:

The source of these birds in Hawaii is unknown. Several birds were first reported on the Oahu Plantation at Waipahu in 1966 (Elepaio, 27:55); by June of the following year, birds were seen near Fort Shafter, in Kailua, and at the Bellows Air Force Station. The members of this family are included in the "prohibited entry" list of the State Department of Agriculture, but this species is now a very common bird. More than 1,100 Red-vested Bulbuls were counted on the Audubon Society's 1980 Christmas Count. This bulbul was the most observed species during the survey. Bulbuls are largely fruit eaters and often become pests in fruit-growing areas.

Shama (Copysychus malabaricus), Order Passeriformes, Family Turidae:

This attractive thrush was first released on Oahu by the Hui Manu in 1932 and later became established in the Tantalus region. Although no study has been made of the distribution and abundance of this thrush on Oahu, it is now widely distributed on both sides of the Koolau Range. The birds are noted both for their attractive plumage and for their beautiful singing. Shama thrushes typically prefer dense vegetation, and they are more often heard than seen. In areas frequented by people (for example Waimea Falls Park, Paradise Park), however, the birds often perch in full view. The Shama is found throughout the slopes on the windward side of the Pali.

Japanese Bush Warbler (Cettia diphone cantans), Order Passeriformes, Family Sylviidae:

This warbler, which is native to Japan and Formosa, was first released on Oahu in 1929.

No detailed study of this species has ever been made in Hawaii but it is now found in scattered areas in both the Waianae and the Koolau mountain ranges, where the birds prefer dense undergrowth in moderate to very wet areas.

Japanese White-eye (Zosterops japonicus), Order Passeriformes, Family Zosteropidae:

The Japanese White-eye was first imported from Japan to Oahu by the Territorial Board of Agriculture and Forestry in 1929. Later importations were made by the Hui Manu and by private individuals. The White-eye rivals the House Sparrow and the European Starling in North America as a successful exotic species, and the White-eye now is undoubtedly the most common passerine species in Hawaii. It is found from sea level to tree line (on Maui and Hawaii) and it is found in the driest and the wettest habitats in the Hawaiian Islands. White-eyes were widely observed throughout the project site.

Common Indian Myna (Acridotheres tristis), Order Passeriformes, Family Sturnidae:

The Common Indian Myna is native to Ceylon, India, Nepal, adjacent regions and was introduced from India in 1865 by Dr. William Hillebrand. The Myna is abundant in lowland areas, being most common in residential and urban areas as well as in the vicinity of human habitation in rural areas.

Ricebird or Spotted Munia (Lonchura punctulata), Order Passeriformes, Family Ploceidae:

Ricebirds are common in any open areas where there are weed seeds or grains. Subsequently, the Ricebird has become a serious pest by eating the seeds of agricultural flora. A report by the senate Committee on Ecology, Environment, and Recreation stated that Ricebirds and linnets caused a 30 to 50 percent loss in the sorgum fields at Kailua on Kauai in 1980.

House Sparrow (Passer domesticus), Order Passeriformes:

The House Sparrow, also called the English Sparrow, also called the English Sparrow, was

first imported to Oahu in 1871 when nine birds were brought from New Zealand. The House Sparrow in North America became a serious pest and tens of thousands of dollars were spent attempting to control the population without much success. The House Sparrow, however, apparently never became a serious pest in Hawaii; it is omnivorous in diet, eating weed seeds as well as insects and their larvae; therefore, they are at least partly beneficial in food habits.

Cardinal (Cardinalis cardinalis), Order Passeriformes, Family Fringillidae:

This is the Red Cardinal, Kentucky Cardinal, or Virginia Cardinal of the eastern part of North America. The Cardinal was released several times in Hawaii between 1929 and 1931. The cardinal is a common species in both urban and rural areas and in both wet and dry areas. The Cardinal was widely distributed in the project site.

House Finch (Carpodacus mexicanus frontalis), Order Passeriformes:

The House Finch was introduced to Oahu from California. It is sometimes called the Papaya-bird in Hawaii, and, incorrectly the "linnet." This is an abundant species in both urban and rural areas, and probably is the second most common passerine bird in the Hawaiian Islands. Although House Finches do eat overripe papaya at times, the birds are primarily seed-eaters, hence their devastating effects on the experimental sorghum crops or on any other small grains. The House Finch does not inhabit dense forests but is common through grasslands.

b. Indigenous Species

Pacific Golden Plover (Pluvialis dominica fulva), Order Charadriiformes, Family Charadriidae:

This plover is a common winter resident on all of the Hawaiian Islands and is found from sea level to at least 10,000 feet elevation on Maui and Hawaii. This species inhabits pastures, golf courses, city lawns, cutover sugarcane fields, and other disturbed or weedy areas as long as there are open spaces.

No endemic mammals, amphibians, or reptiles were observed at the project site. Those species that were found, were introduced and considered serious pests to native birds, man, and his products. The following details a description of each respective species:

Roof rat or black rat (Rattus rattus):

This rat reached the Hawaiian Islands on sailing vessels during the 19th century. The roof rat is very common and is found from sea level well up into the mountains (as high as 9,800 feet on Haleakala, Maui). They are primarily nocturnal in habits and are serious predators of the eggs and young of tree-nesting birds in Hawaii.

Polynesian or Hawaiian rat (Rattus exulans):

The early Polynesians are presumed to have brought, inadvertently, this rat with them. The species is known to occur from sea level into the mountains.

This rat occurs in both native and introduced forests, grassy gulches, and shrub-grown areas, and is primarily nocturnal in habits.

House mouse (Mus musculus):

The date of introduction of the house mouse to Hawaii is unknown, but is said to have been common by 1825. It can be found inhabiting almost every biotic community that occurs from sea level to at least 6,500 feet. It is ubiquitous around human habitation and is found in sugarcane fields, fallow fields, and in forests and scrubland in fairly wet areas.

Small Indian Mongoose (Herpestes auropunctatus):

The mongoose was first imported to the Hamakua Coast of Hawaii during September 1883, to combat rats in the sugarcane fields. They were imported to Oahu and other islands about 1888. The mongoose is an abundant pest on all of the islands today, and is found from sea level to the highest mountain peaks on Oahu. Being diurnal in habit, they are often seen crossing roads.

Aquatic fauna which populate the streams within and adjacent to the project site should be similar to the freshwater fish and crustaceans that have been observed in the Kaneohe Bay Watershed. Table 5 presents an inventory of exotic and native aquatic fauna sighted. All species are typically found in Oahu freshwater streams and are not considered endangered or threatened.

Within the Kaneohe Flood Control Ponding Basin in Ho'omaluhia Park, various species of fauna were sighted. Included in the sightings were the Koloa ducks (Anas wyvilliana), Hawaiian coot (Fulica americana alai), and Hawaiian gallinule (Gallinula chloropus sandvicensis); tilapia, catfish, and swordtails; and prawns. The three bird species are listed as endangered species. On 7 April 1982, the Hawaii Division of Forestry and Wildlife released 38 Koloa into the Nature Study Pond adjacent to the Ho'omaluhia reservoir. Since Hurricane Iwa in November 1982, nine to twelve Koloa have been residing in the south basin of the reservoir and in the Pond. The Coot and Gallinule have been occasionally observed at the Park, but are not believed to be nesting there.

F. Flood Hazard

1. Tsunami Inundation. The project site is not subject to any tsunami inundation.
2. Surface Water Flood Hazard. The Kaneohe area has had a long history of intense rainstorms and frequent devastating floods. Since 1952, nine major floods have occurred causing considerable property damage and the loss of two lives.

TABLE 5
EXOTIC AND NATIVE
FRESHWATER FISH AND CRUSTACEANS
IN THE KANEOHE BAY WATERSHED

Exotic Species

<u>Common Name</u>	<u>Scientific Name</u>
Tahitian Prawn	<u>Macrobrachium lar</u>
Crayfish	<u>Procambarus clarkii</u>
Dojo	<u>Misgurnus anguillicaudatus</u>
Chinese Catfish	<u>Clarias fuscus</u>
Guppy	<u>Poecilia reticulata</u>
Top minnow	<u>P. vittata</u>
Mexican Mollie	<u>P. mexicana</u>
Swordtail	<u>Xiphophorus helleri</u>
Moonfish	<u>X. maculatus</u>
Tilapia	<u>Tilapia mossambica</u>

Native Species

Opae kalaole	<u>Atya bisulcata</u>
Opae oehaa	<u>Macrobrachium grandimanus</u>
Aholehole	<u>Kuhlia sandvicensis</u>
O'opu anihaniha	<u>Awaous genivittatus</u>
O'opu nakea	<u>Awaous stamineus</u>
O'opu akupa	<u>Eleotris sandwicensis</u>

Source: U.S. Department of the Interior, 1977

According to the "Flood Insurance Study" for the City and County of Honolulu prepared by the Federal Insurance Administration, the project site is located in an area of undetermined but possible flood hazards of Zone "D" designation. However, the U.S. Army Corps of Engineers, after the 1969 floods, implemented and completed the Kaneohe Flood Control Project, which created a retention dam and a reservoir at the headwaters on the Kamooalii tributary of Kaneohe Stream and channel improvements to the stream outlet at Kaneohe Bay, to provide flood protection for the highly urbanized areas in the Kaneohe region.

G. Archaeological Sites

A literature search and walk-through reconnaissance survey was completed for the project site. Results of the search and survey are included in Appendix E.

The literature search uncovered previous archaeological investigations in adjacent areas that were conducted in 1976, 1977, and 1982. These investigations included the 1976 Bernice P. Bishop Museum publication entitled Archaeological Investigations in Upland Kaneohe, edited by Paul H. Rosendahl; the 1976 report entitled "Archaeological Reconnaissance Survey of the Windward Portion of Route H-3" by Paul Cleghorn and Elaine Rogers-Jourdane; the 1977 manuscript entitled "Archaeological Phase I Survey of the Windward Portion of Proposed Interstate H-3: Halekou Interchange to Windward Portal of Koolau Tunnel, Oahu", by Thomas Dye; and the "Archaeological Reconnaissance Survey for Route H-3 (Alternative A)", by Charles Streck.

The following details a description of each archaeological site as provided by the various reports:

Site 53: Stone and Concrete Oven for Charcoal Manufacturing

This modern feature is an oval dome with stone lining in the

inner walls and a concrete dome ceiling with an iron plate sandwiched between the concrete. The whole structure, except for the upper part of the dome, is dug into a slope. It measures 6.4 meters long, 3.6 meters wide, and 2.25 meters high to the apex of the dome. There is one opening measuring 1.55 meters by 60 cm and the wall thickness is built out to 55 cm here. The rest of the structure has a thickness of about 18 cm. At the back, opposite the entrance, is a small rectangular opening 20 cm wide by 15 cm high and going back 30 cm into the wall; this was probably the chimney. The sides are lined with uniformly round stones and some larger basal stones. From the floor to the concrete ceiling are six to eight layers of stones of single thickness. Above the walls on either side are located three vent holes 12 cm in diameter. On the basis of large amounts of charcoal present on the floor and accounts of informants, it was verified that the function of this structure was a charcoal-making oven of recent historic origin.

Site 54: Large Terrace Complex

This site is the most extensive multiple-feature site found. At present six or more large, rock-wall-reinforced terrace areas can be seen. In addition, there are more than 10 other features that include smaller individual plots, terraces, platforms, and retaining walls.

Three Kamooalii tributaries flow through the complex, providing ample irrigation, and join at the lower margin of the complex. These streams divided the complex into two areas. One is a long, narrow strip defined on both sides by the stream gullies, and most of the smaller terraces are located here. On the opposite bank is a larger, somewhat higher, flat area with the larger terraces. Although purely hypothetical at this time, the locations of the smaller terraces which appear more suited for dry cultivation. It is quite possible that the upper reaches of this complex were destroyed during the construction of a jeep road that goes through there.

Site 56: Terrace Complex

This complex is comprised of four separate features situated on a flat at the base of a rise. They seem to be small terrace outlines with some disturbance.

Site 57: Terrace Complex

Probably associated with the Site 56 complex, this appears to be a large site, roughly in the shape of a quadrilateral, with several interrelated and interconnected features. The outer perimeter measures 4.3 by 18.7 by 17.3 by 25.5 meters. This quadrilateral runs downward along the slope of the land and ends at the flat fronted by the old jeep road. Most of the

features fall within the lower half of this area, which is covered by a grove of kukui and mountain apple (Eugenia mallaccensis) trees--sometimes also called Malay apple. The origin, date, and function of this site are unknown, but some of the features suggest agricultural forms.

Site 58: Possible Terrace and Two Rock Mounds or Piles

These features are located directly across the jeep road from Site 57, described above. An ill-defined alignment of stones 11 meters long with a width of 20 cm suggests a badly disturbed terrace. Two piles of small stones 1.65 meters apart and 1 meter from the stream bank are located 11.8 meters due S of this alignment. The larger pile measures 2 meters in diameter with a height of 25 cm, and the smaller measures 1.3 meters by 20 cm.

Site 59: Stone Alignment With Some Features

This site is probably a badly disturbed terrace border. Sporadic stones define two alignments, 3.8 and 6.5 meters long, respectively, with a width of about 15 cm. A mound of small stones lies in the middle of the longer alignment. A few other stones can be seen in a poorly defined alignment nearby.

Site 60: Retaining Wall

This is a poorly defined, discontinuous stone wall on the W bank of Kamooalii Stream at the inland margin of the first terracette above the stream. The wall is constructed of various-sized stones and is 60 cm (maximum) high.

Site 61: Stone and Concrete Oven for Charcoal Manufacture

This site is similar to Site 53, except that the dimensions are slightly smaller.

Site 62: Retaining Wall

This is an L-shaped retaining wall located 15 meters E of Site 61. Its perpendicular situation in relation to the stream suggests its being a terrace border. The longer portion of the wall (12.1 meters long) is oriented 110° W, but the remaining stonework measures only 7.6 meters in length. It is built of two layers of large, rectangular stones, 30 cm high, which slant into the higher earth bank. The other portion of the wall--2.7 meters long, 20 cm high, and 1 meter wide--shows a marked difference in construction, utilizing small stones.

Site 63: Terrace Complex

This complex--located across the stream from Site 62 and on a

point of land defined by a sharp bend in the stream--is comprised of two separate, very crude features that indicate small terraces and stone-bordered plots.

Site 64: Enclosure and Platform

This site is located at the edge of a large kukui grove near several small grassy clearings. Four stone walls roughly define a four-sided structure measuring 30 cm high by 2.9, 2.4, 3.2, and 2.9 meters.

Attached to the exterior of the SE wall is a low (10 cm), rectangular platform 2.1 meters in length by 1 meter in width, which borders a depression or pit 50 cm square. Another stone platform, 35 cm in height and L-shaped, lies 3.5 meters from the NE wall. The base of the L, nearest the enclosure, measures 2.4 meters in length; the longer arm, oriented 30° E, measures 6.5 meters long, and both are 1.5 meters wide. Intact sections indicate a two-layer construction of stones. On the eastern side of the longer segment, 4.5 meters from the base of the L, is an indentation 80 cm square.

The size of this site and the probable association between the enclosure and the platform suggest a religious function rather than an agricultural or habitational one. Its cultural origin is probably Hawaiian.

Site 65: Ditch System

North of the kukui grove mentioned in the description of Site 64 is a steep embankment about 3 meters high, which divides this upper area from the lower flood plain created by the stream flowing below the eastern side of the grove. Located atop this embankment is a ditch 30 meters long, 2 meters wide, and 50 cm deep. It starts at the lower margin of the kukui grove near the stream and parallels the embankment until the steepness modifies to a gradual slope. The ditch fronts a natural flat terrace area W of the kukui grove.

Two possible walls located along the ditch on the extremities of this terrace suggest its possible agricultural function, in addition to the various taro and 'ape that grow in the ditch and throughout the whole terrace area as well.

Another smaller channel flows perpendicularly into the larger ditch about 10 meters from the latter's point of origin.

The Streck document determined the possibility of the following two sites being located within the project boundaries:

Possible Site No. 1

Disturbed possible agricultural area.

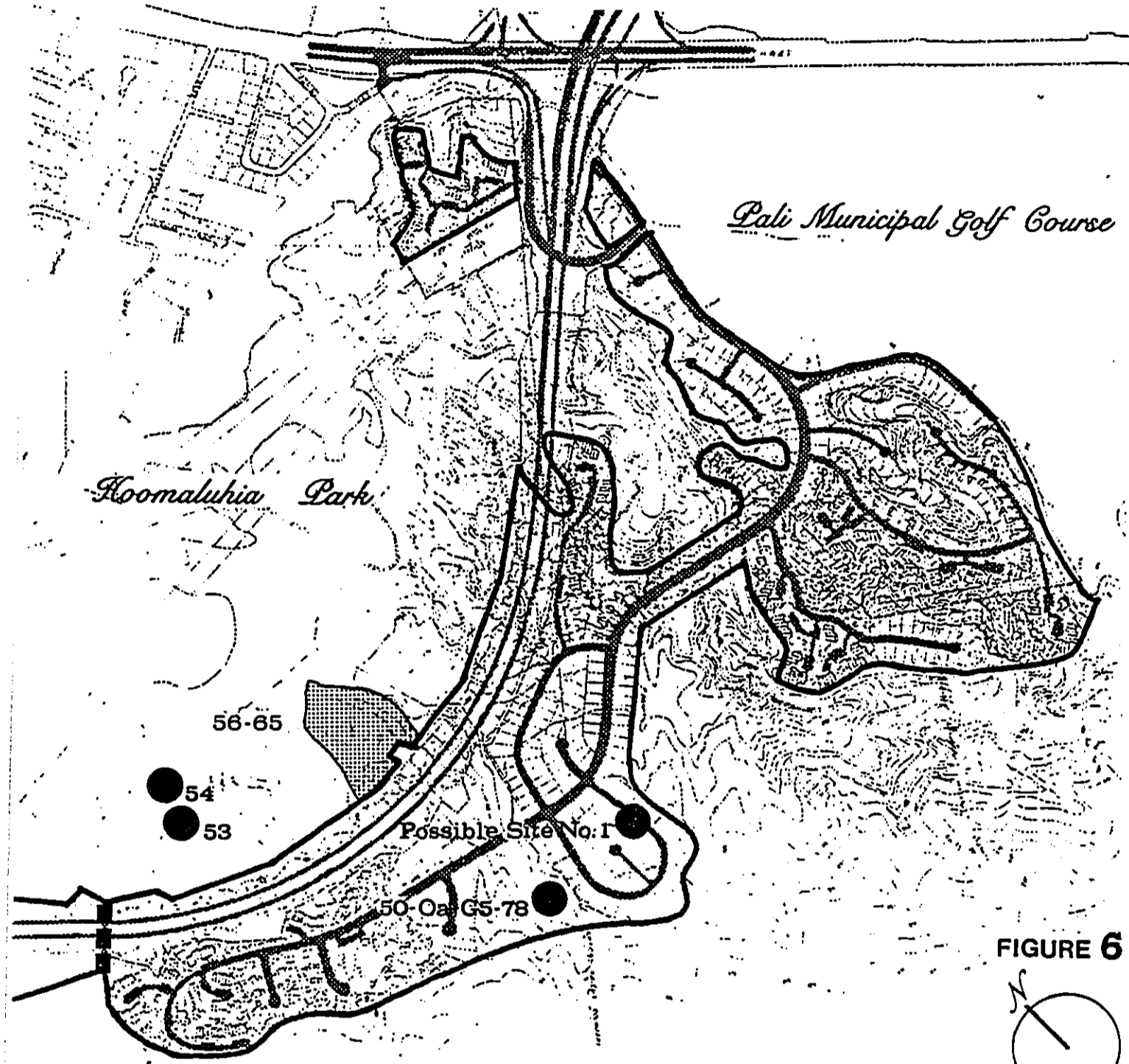
Site 50-Oa-G5-78

Probable agricultural terraces and alignments and two basalt-lined depressions.

Figure 6 presents the locations of these sites relative to the project area.

H. Public Utilities and Services

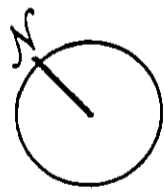
1. Drainage System. The stream-fed headwaters of Kamooalii Stream, the main tributary to Kaneohe Stream, originates near the 2,500 foot elevation. Five tributaries, most of which flow through or by the project site converge into Kamooalii Stream, which then flow through the previously mentioned Kaneohe Flood Control Project. The Project consists of a 76-foot high, 2,200-foot long dam on Kamooalii Stream and 1,274-feet of channel improvements near the outlet to Kaneohe Bay. The dam maintains a permanent 26-acre pool with a maximum reservoir surface area of 152 acres. The dam is designed to control a flood with a peak flow of 15,000 cfs and a volume of 3,450 acre-feet, which is approximately 1-1/2 times the peak discharge (at the location on Kamooalii Stream) and approximately 2 times the volume of the greatest flood on record.
2. Potable Water System. An existing 16-inch main from Kuou Well and a 12-inch pipeline from Luluku Tunnel pass the subject property over easements, connecting to the water system at Luluku Road (Figure 7).
3. Sewerage System. There are several existing City and County of Honolulu 8-inch sewer mains located within the




 Archaeological Sites

FIGURE 6

SCALE 400 0 400



ARCHAEOLOGICAL SITES

Iolani School Properties

— Water
 Powerline Easement

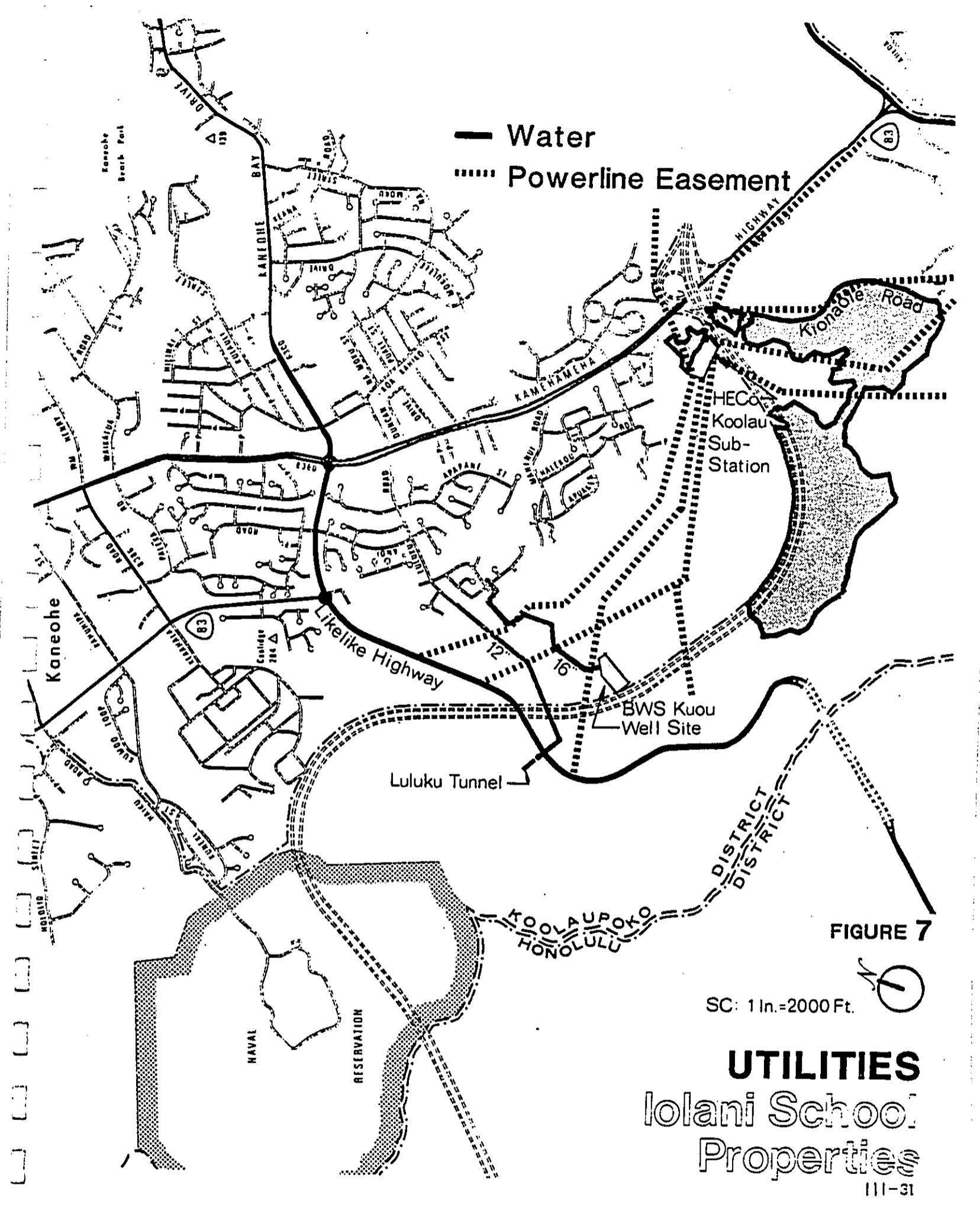
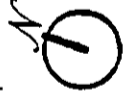


FIGURE 7

SC: 1 in.=2000 Ft. 

UTILITIES
 Iolani School
 Properties

adjacent Keapuka Subdivision. The Kaneohe Sewage Treatment Plant is also located in the general vicinity and is operating at capacity.

4. Solid Waste Collection and Disposal. Solid waste is collected and disposed twice a week by the Department of Public Works, Division of Refuse Collection and Disposal.

The disposal site for the refuse is at the Kapaa Sanitary Landfill.

5. Telephone System. Underground telephone systems can be found adjacent to the project site, within the Keapuka Subdivision.
6. Electrical System. Electrical systems can be found adjacent to the project site, within the Keapuka Subdivision. Primary electrical lines are located above grade and secondary lines, below grade. Hawaiian Electric Company powerline easements are located within the project site as well as through the Ho'omaluhia Park site (Figure 7).

I. Public Facilities and Services

1. Transportation Services and Access. Three major highways provide access to the project site. These include the Pali, Likelike, and Kamehameha Highways. Direct access to the project site is by Kionaole Road, which is located on the northeastern boundary of the project site.

An analysis was made of the traffic volume for Kamehameha Highway between Halekou Road and Likelike Highway and Kaneohe Bay Drive, and Kamehameha Highway between Kionaole Road and Castle Junction to determine impact the

traffic generated from the project will have upon Kamehameha Highway. Appendix F, entitled "Access Study for the Proposed Kamooalii Development," prepared by Community Planning, Inc., presents the results of this analysis. The total existing average daily traffic volume on Kamehameha Highway between Kionaole Road and the Kaneohe Bay Drive - Likelike Highway intersection is 24,660 vehicles.

This average count is based on volumes taken in 1979 and 1980 as presented in Table 6. The design capacity of Kamehameha Highway, a 4-lane divided highway, for this section between Kionaole Road and the Kaneohe Bay Drive and Likelike Highway Intersection is 38,400 vehicles per day (VPD), based on the premise that this type of roadway is capable of handling 800 vehicles per hour per lane for a 12-hour day under conditions of Level of Service "C" for stable flow.

The total daily volume of traffic on Kamehameha Highway between Kionaole Road and Castle Junction at Pali and Kalaniana'ole Highways is 21,370 cars as presented in Table 7. The capacity of this 4-lane section of Kamehameha Highway is 38,400 cars, based on the premise that this type of roadway is capable of handling 800 vehicles per hour per lane per 12-hour day under Level of Service "C" conditions for stable flow.

Existing traffic volume on Kionaole Road is nominal. The design capacity for portion of the 2-lane Kionaole Road as it approaches the Halekou Interchange is estimated to be 7,200 VPD, based on the premise that this type of roadway is capable of handling 300 vehicles per hour per lane for a 12-hour day under conditions of Level of Service "C" for stable flow.

TABLE 6

TOTAL EXISTING AVERAGE DAILY TRAFFIC VOLUME ON
 KAMEHAMEHA HIGHWAY - KIONAOLE ROAD TO
 KANEOHE BAY DRIVE/LIKELIKE HIGHWAY

	<u>Kamehameha Highway at Halekou Road</u>			<u>Kamehameha Highway at Likelike Highway and Kaneohe Bay Drive</u>		
	<u>24 Hr</u>	<u>AM Peak</u>	<u>PM Peak</u>	<u>24 Hr</u>	<u>AM Peak</u>	<u>PM Peak</u>
Northbound	11,560	360	1,180	14,690	1,100	1,390
Southbound	<u>10,630</u>	<u>1,000</u>	<u>710</u>	<u>12,440</u>	<u>890</u>	<u>1,060</u>
	22,190	1,360	1,890	27,130	2,370	2,320

Average = 24,660 vehicles per day

Source: Appendix F

TABLE 7

TOTAL EXISTING AVERAGE DAILY TRAFFIC
 VOLUME ON KAMEHAMEHA HIGHWAY - PALI
 GOLF COURSE NEAR CASTLE JUNCTION

	<u>24 Hr</u>	<u>AM Peak</u>	<u>PM Peak</u>
Outbound (Honolulu)	10,160	870	660
Inbound	<u>11,210</u>	<u>440</u>	<u>1,140</u>
	21,370	1,310	1,800

(Based on 1977 counts)

Source: Appendix F

2. Public Education. Currently, the general area is served by four public schools. Table 8 indicates the 1981 enrollment figures and design capacities for these schools.
3. Police Protection. The Honolulu Police Department currently provides service from the Kaneohe Substation. Response time to the project site will be approximately 2 minutes.
4. Fire Protection. Fire protection services for the subject project are available from Kaneohe Fire Station which possess a response time of approximately 4 minutes. Supportive services are available from Kailua Fire Station which houses an Engine Company and a Ladder Company, and has a response time of 6 minutes. In addition, capital improvements call for a new Olomana Fire Station at Kalani-anaole Highway adjacent to the Maunawili Elementary School. In accordance with the fire grading schedule established by the Insurance Services Office and the National Fire Protection Association, adequate protection for the subject project is available.
5. Emergency Medical Facilities. Several medical and emergency care facilities are available on the windward side. Kaiser Clinic is located within a few minutes from the project site to provide routine services. Ambulance service is located in Kaneohe to serve emergency-care patients and can transport them to Castle Memorial Hospital in Kailua, or to St. Francis and Kuakini Hospitals or Queen's Medical Center located in Honolulu.
6. Recreational Facilities. a wide range of recreational opportunities already exist within the Kaneohe area. Regional parks, State parks, playgrounds, and recreational centers are located in the immediate vicinity of

TABLE 8

PUBLIC EDUCATION FACILITIES

<u>School</u>	<u>1981 Enrollment</u>	<u>Design Capacity</u>
Kaneohe/Kapunahala Elementary	813	695
King Intermediate	1,260	1,384
Castle High School	2,202	2,034

Source: Department of Education, 1982

the project site and will be easily accessible to the residents of the proposed project.

7. Commercial/Retail Facilities. Currently, the Kaneohe Bay, Windward Mall and Windward City Shopping Centers provide commercial and retail services to the windward side.
8. Employment Centers. The proposed project is located approximately 9 1/2 miles from Honolulu, which will be the primary employment center for future residents of the project. Other major employment centers like Pearl Harbor, Honolulu International Airport, Hickam Air Base, Kaneohe Marine Base are readily accessible from the project area by way of major traffic routes.

J. Social Characteristics

The resident population of Kaneohe in 1970 was 29,903; in 1980 the population was 29,919, a marginal increase (Department of Planning and Economic Development, 1981).

K. Aesthetics, Scenic Views, and Visual Landscape

The project site is bounded on the west and south by the "palis," cliff-like remnants of the volcanic cones of the Koolau Mountain Range, on the east by the crenulated walls of the Halekou or Kaneohe volcanic cone, and on the north by the sloping coastal plains and Kaneohe Bay.

Z

**RELATIONSHIP TO LAND USE
PLANS, POLICIES, AND CONTROLS**

IV. THE RELATIONSHIP OF THE PROPOSED ACTION TO LAND USE PLANS, POLICIES, AND CONTROLS FOR THE AFFECTED AREA

A. City and County of Honolulu

1. General Plan. The General Plan for the City and County of Honolulu, a requirement of the City Charter, is a written commitment by the City and County to a future for the island of Oahu which it considers desirable and attainable. The General Plan is a guide for all levels of government, private enterprise, neighborhood and citizen groups, organizations, and individual citizens. The plan is a two-fold document: First, it is a statement of the long-range, social, economic, environmental, and design objectives. Secondly, the plan is a statement of broad policies which facilitate the attainment of the objectives. The following are applicable objectives and policies and a discussion of the proposed action's compliance with them.

"To provide decent housing for all the people of Oahu at prices they can afford". (Housing; Objective A)

"Provide financial and other incentives to encourage the private sector to build homes for low-and moderate-income residents". (Housing, Objective A, Policy 7)

"Encourage the production and maintenance of affordable rental housing". (Housing, Objective A, Policy 12)

"Encourage equitable relationships between landowners and leaseholders, between landlords and tenants, and between condominium developers and owners." (Housing, Objective A, Policy 14)

"Encourage the fair distribution of low-and moderate-income housing throughout the island". (Housing, Objective C, Policy 2)

The proposed project is intended to supply needed housing to all of Oahu, with special attention given to prospective purchasers from the Kaneohe area.

To meet the market demand, presently believed to be the low-and moderate-income purchaser, the petitioner desires to market the homes within the affordable price market. In order to meet this demand, the petitioner contemplates a leasehold arrangement for the land for a set period of time, with the right to purchase clause inserted into the lease.

"Encourage innovative residential development which will result in lower costs, added. Convenience and privacy, and the more efficient use of streets and utilities". (Housing, Objective A, Policy 3)

"Encourage residential developments that offer a variety of homes to people of different income levels and to families of various sizes". (Housing, Objective C, Policy 1)

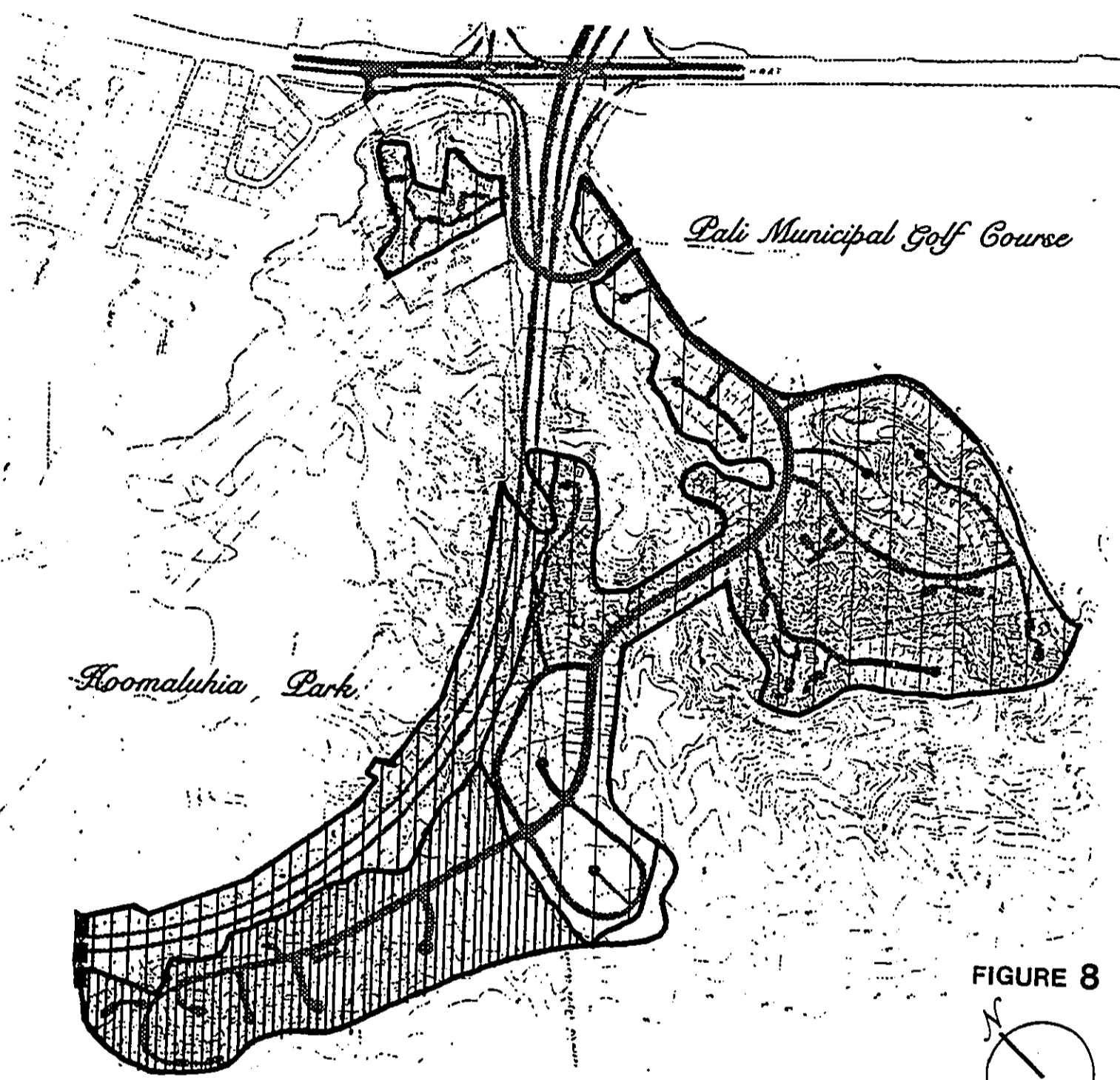
The design for the project is based on the premise of locating a variety of unit types on areas that are most able to handle varying densities. The design layout affords flexibility in siting, thereby, providing more privacy, and utilization of streets and utilities.

"Encourage residential development near employment centers". (Housing, Objective C, Policy 3)

The proposed project is located approximately 9½ miles from Honolulu, which will be the primary employment center for future residents of the project. Other employment centers such as Pearl Harbor, Honolulu International

Airport, Hickam Air Base, Kaneohe Marine Base are readily accessible from the project area by way of major traffic routes.

2. City and County Detailed Land Use Map (DLUM). The project site has been designated with the following uses: Agriculture, preservation, and highways (Figure 8). The proposed action is therefore, non-conforming and the applicant must request an amendment from the City and County of Honolulu for residential, park and major roadway uses.
3. Proposed City and County Development Plan. The project site is located within the proposed Development Plan for Koolaupoko and is designated as "Preservation." The proposed action is therefore, non-conforming and the applicant must request a Development Plan Amendment from the City and County of Honolulu Department of General Planning for residential, park and major roadway uses.
4. City and County Zoning. The project site is currently zoned P-1 Preservation District. The applicant must therefore, apply for a zoning district change, to allow for R-5 Residential District uses, of the project site from the City and County of Honolulu Department of Land Utilization.






Pali Municipal Golf Course

Koomaluhia Park

FIGURE 8

SCALE 400 0 400



-  Preservation
-  Highway
-  Agriculture

**DETAILED
LAND USE MAP**
Iolani School
Properties

B. State of Hawaii

1. State Land Use Classification. The project site is currently situated with "Conservation" District boundaries. Subsequently, the applicant must submit a petition to the Land Use Commission to redesignate the project site to "Urban", which would then allow the proposed action to be in conformance with provisions of the State Land Use law.

2. Agricultural Lands of Importance in the State of Hawaii (ALISH). The project site is characterized by "other important agriculture" and "prime agriculture" (Figure 9). Approximately 69.8 acres are in prime agriculture and 10.2 acres are in other important lands. However, these designated lands represent only a fraction of the Oahu total. Implementation of the proposed project will therefore, affect only an insignificant fraction of designated lands.

3. Interim Statewide Land Use Guidance Policies. The Interim Statewide Land Use Guidance Policies were established pursuant to Chapter 205, Hawaii Revised Statutes and are utilized by the State Land Use Commission as criterion for their decision-making. The following discusses how the proposed action complies with the policies:
 - a. "Land use amendments shall be approved only as reasonably necessary to accommodate growth and development, provided there are no significant adverse effects upon agricultural, natural, environmental, recreational, scenic, historic, or other resources of the area."

The project is consistent with this policy.
 - b. "Lands to be reclassified as an urban district shall have adequate public services and facilities or as can be so provided at reasonable cost to the petitioner."

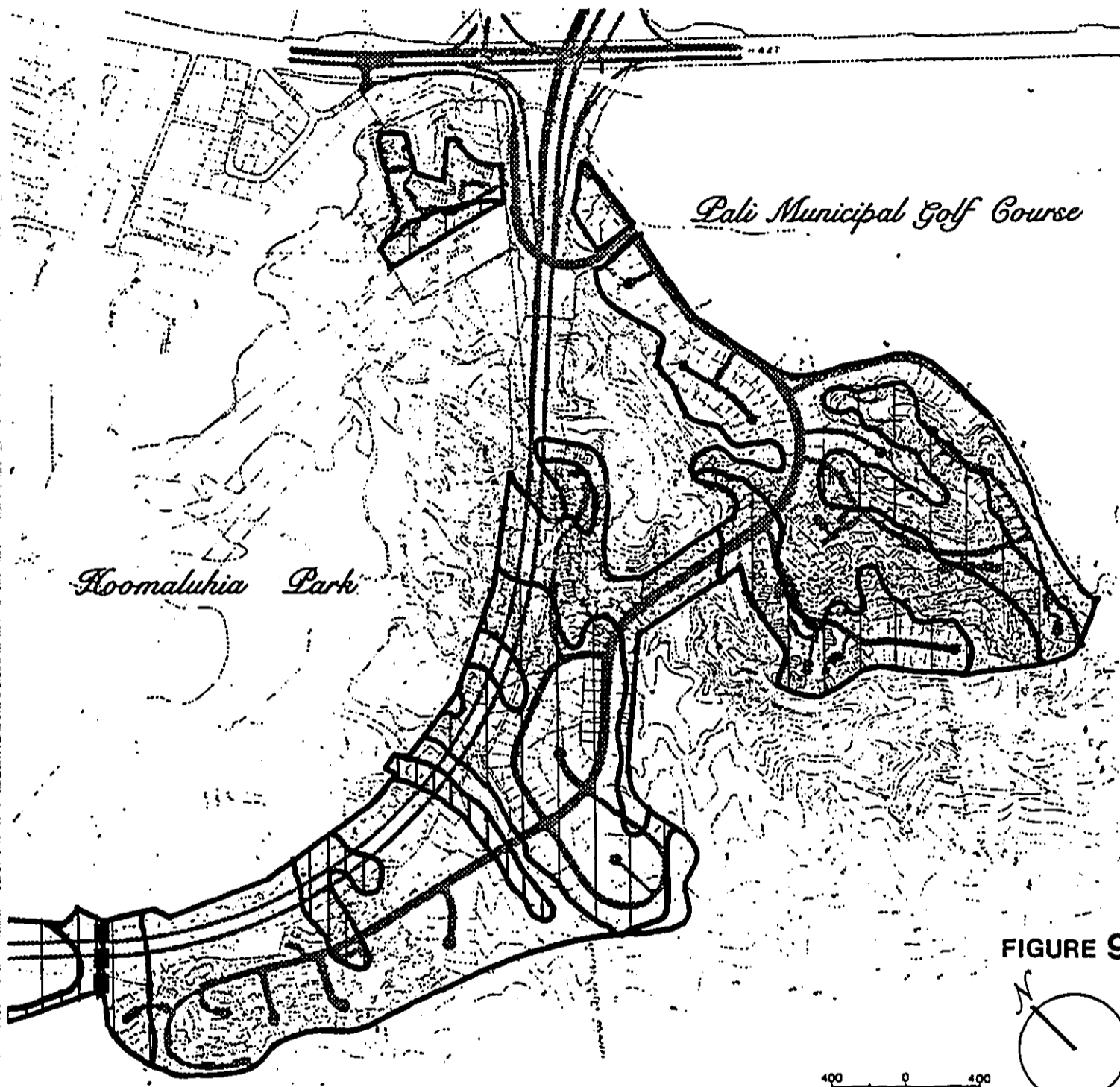
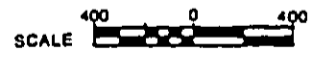
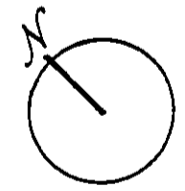

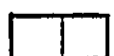


FIGURE 9



-  Other Important
-  Prime

ALISH
 Iolani School
 Properties
 IV-6

The project will utilize existing services and facilities and further expand these public improvements to service the project in accordance with all governmental standards and regulations. The cost of these improvements to serve the project area will be borne by the petitioner.

- c. "Maximum use shall be made of existing services and facilities, and scattered urban development shall be avoided."

As noted, this project will utilize existing services and facilities. The project does not represent a proposal for scattered urban development, since the adjacent Keapuka and Mahinui Subdivisions are located just north of the project site.

- d. "Urban districts shall be contiguous to an existing urban district or shall constitute all or part of a self-contained urban center."

The site is contiguous to an existing urban district as it is within close proximity to the urban centers of Kaneohe and Kailua town. It adjoins the Ho'omaluhia Park and the Pali Golf Course. It is in the vicinity of such residential areas as Keapuka, Luluku and Mahinui.

- e. "Preference shall be given to amendment petitions which will provide permanent employment, or needed housing accessible to existing or proposed employment centers, or assist in providing a balanced housing supply for all economic and social groups."

The aim is "affordable housing" and if necessary the petitioner has stated that at least ten percent of the proposed dwelling units will be targeted to lower income buyers and/or offered to State and County housing agencies on a cost plus basis. In summary, the petitioner is committed to provide a fair share of needed housing to the extent practical.

- f. "In establishing the boundaries of the districts in each county, the Commission shall give consideration to the general plan of the county."

The General Plan of the City and County of Honolulu designates this Koolaupoko area of Oahu for urban fringe use. Kaneohe is one of the two "urbanized" areas of this Koolaupoko area. The petitioner's property, located within minutes of Kaneohe town, is feasible for the proposed development.

- g. "Insofar as practicable conservation lands shall not be reclassified as urban lands."

The petitioner does in fact request reclassification of some conservation district lands to urban. The rationale for this request is described in the project proposal and is based partly on the topography, location and environment of the property. The petitioner's plan proposes substantial "open green space" within the project. In this way, the project is consistent with conservation-oriented land planning and development.

- h. "The Commission is encouraged to reclassify urban lands which are incompatible with the interim state-wide land use guidance policy or are not developed in a timely manner."

This policy is not applicable to the project site which lies adjacent to an area of existing residential subdivisions.

4. Hawaii State Plan. The Hawaii State Plan identifies the goals, objectives, and policies of the State of Hawaii and serves as a guide for future development. The following are relevant objectives and policies of the Hawaii State Plan and a discussion of how the proposed action relates to them:

"Greater opportunities for Hawaii's people to secure reasonable priced, safe, sanitary, livable homes located in suitable environments that satisfactorily accommodate the needs and desires of families and individuals." (Section 19; Objectives and Policies for Sociocultural Advancement-Housing; (a) (1))

The proposed project will increase housing inventory and will provide reasonably priced, safe, sanitary, and livable homes.

"Increase homeownership and rental opportunities and choices in terms of quality, location, cost, densities, style, and size of housing." (Section 19; Objectives and Policies for Sociocultural Advancement-Housing; (b) (3))

The development of the proposed action is sensitive to quality, location, cost, densities, style and size.

To meet the market demand for housing, presently believed to be the low-and moderate-income purchaser, the petitioner desires to market the homes within the affordable price market. In order to meet this demand, the petitioner contemplates a leasehold arrangement for the land for a set period of time, with the right to purchase clause inserted into the lease. The intent of this arrangement is to increase homeowners opportunities.

"Promote design and location of housing developments taking into account the physical setting, accessibility to public facilities and services, and other concerns of existing communities and surrounding areas." (Section 19; Objectives and Advancement-Housing; (b) (5))

The design for the project is based on the premise of locating a variety of unit types on areas that are most able to handle varying densities. Single-family detached units will be sited on the flattest portions of the site

where only minimal grading will be necessary. These areas generally exist along Kionaole Road at the entrance and at the northern end where open grasslands exist in gentle slopes. On-site areas that are narrow and possess a more varied terrain, will be utilized for neighborhood clusters characterized by higher density unit types, such as duplexes and townhouses. This unique design layout affords flexibility in siting the dwelling units, thereby providing more open space and generating only minimal disturbance to the natural terrain.

5. Proposed State Housing Plan. The proposed State Functional Plans are the primary guide-posts for implementing the Hawaii State Plan. They will further define and particularize the State Plan's comprehensive goals, objectives, policies and Priority Directions. Hence, while the Hawaii State Plan establishes overall directions for Hawaii, the proposed State Housing Plan delineates specific objectives, policies and high priority actions with respect to the housing industry to be addressed in seeking to achieve the ideals expressed in the Hawaii State Plan.

The following are relevant policies of the proposed State Housing Plan and a discussion of how the proposed action relates to them:

"Develop greater opportunities for Hawaii's people to secure reasonably priced, safe, sanitary, livable homes located in suitable environments that satisfactorily accommodate the needs and desires of families and individuals."
(Objective A)

According to the Hawaii State Plan Survey the needs and desires of Hawaii families and individuals relate to the provision of low-and moderate-income housing. The

proposed action will satisfy such needs and desires by providing housing which are reasonably priced, safe, sanitary, and livable.

"Stimulate and promote feasible approaches that increase housing choices for low-income, moderate-income and gap group households." (Objective A, Policy 2)

The proposed project is intended to supply needed housing to all of Oahu, with special attention given to prospective purchasers from the Kaneohe area.

To meet the market demand, presently believed to be the low-and moderate-income purchaser, the petitioner desires to market the homes within the affordable price market. In order to meet this demand, the petitioner contemplates a leasehold arrangement for the land for a set period of time, with the right to purchase clause inserted into the lease. The aims and goals of the petitioner are to provide affordable housing, particularly to meet the needs of the low- and moderate- income family.

"Increase homeownership and rental opportunities and choices in terms of quality, location, cost, densities, style, and size of housing." (Objective A, Policy 3)

"Assist the orderly development of residential area, sensitive to community needs and other land uses." (Objective B)

"Promote design and location of housing developments taking into account the physical setting, accessibility to public facilities and services, employment and other concerns of existing communities and surrounding areas." (Objective B, Policy 1)

The design for the project is based on the premise of locating a variety of unity types on areas that are most

able to handle varying densities. The design layout affords flexibility in siting, thereby, providing more privacy, and utilization of streets and utilities.

6. State Environmental Policy, Chapter 344, Hawaii Revised Statutes. The purpose of this chapter is to establish a state policy which will encourage productive and enjoyable harmony between man and his environment, promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man, and enrich the understanding of the ecological systems and natural resources important to the people of Hawaii. This Environmental Impact Statement represents the project's commitment in satisfying Chapter 344, HRS, since the document discloses the impacts resulting from the project and also provides measures and efforts which would prevent or eliminate damage to the environment. The petitioner will ensure compliance with the State Environmental Policy.

C. Federal

1976 Air Installation Compatibility Noise Zone (AICUZ). The proposed project will be in conformance with the AICUZ for the Kaneohe Marine Corps Air Station. According to official Navy criteria, residential land use is clearly compatible with noise levels of Ldn 65 dBA or less, and the project site is located outside of the 60 dBA contour line. Though the proposed action is in compliance with AICUZ regulations, the petitioner will give careful attention to aircraft noise to ensure that acceptable interior noise levels will be achieved.

10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

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ANTICIPATED ENVIRONMENTAL IMPACTS

V. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATIVE MEASURES TO MINIMIZE ADVERSE IMPACTS

A. Introduction

The proposed Iolani Schools Project will generate both short-term and long-term impacts. Short-term impacts, beneficial and adverse, generally result from construction-related activities. Consequently, these impacts are of short duration and should not last longer than the duration of the construction. Long-term impacts, beneficial and adverse, result from the implementation and operation of the proposed project.

B. Short-Term Impacts

1. Topography. The development plan for the project is based on the premise of locating a variety of dwelling unit types on areas that are most able to handle varying densities. Variables such as existing slopes and grades were therefore, major considerations when the plan was formulated. The plan indicates that development will be more intense in areas characterized by minimal slopes of 20 percent or less. Therefore, it is anticipated that only minor excavation and grading work will need to be done to implement the proposed action.

No hard basalt rocks exist to pose problems regarding construction of foundations, underground utilities or other facilities.

During grading and excavation activities, the site may become subjected to slight erosion problems. Adverse impacts may be mitigated by complying with the City and

County of Honolulu's Grading, Grubbing, and Stockpiling Ordinance No. 3968, 1972 and the U.S. Department of Agriculture Soil Conservation Service's Erosion and Sediment Control Guide for Hawaii, 1981. Impacts may also be mitigated by the construction of sediment basins and earth berms which will collect silt generated during construction. After the completion of the construction of improvements and landscaping of the graded area, the sediment basins and earth berms will be removed and the exposed area will be landscaped with ground cover.

2. Air Quality. During construction, it is inevitable that a certain amount of fugitive dust will be generated by the site preparation activities necessary to create suitable home sites in the project area. Assuming rates of dust generation for this project will be similar to other apartment and shopping center construction projects, a yield of approximately 1.2 tons of dust per acre per month will be generated (Appendix B).

Construction equipment used on site will emit some air pollutants in the form of engine exhausts. The largest equipment, is generally diesel-powered. However, for this equipment, individual carbon monoxide emission rates are no greater than those for an average automobile, still, nitrogen dioxide emissions can be quite high. Fortunately, nitrogen dioxide emissions from other sources in the area should be minimal and the overall pollutant emissions from construction equipment should be minor compared to existing levels generated on the nearby Likelike Highway and from the proposed Interstate Highway H-3.

Primary control of air quality impacts resulting from construction, consists of wetting down loose soil areas with

water, oil, or suitable chemicals. An effective watering program can reduce particulate emission levels from construction sites by as much as 50 percent (Appendix B). Other control measures include good housekeeping on the job site and pavement or landscaping of work areas as quickly as possible. Should these control measures fail to prevent nearby residents from being exposed to excessive levels of suspended particulate matter, then it might also be necessary to erect dust catching barriers between active work areas to mitigate impacts on affected residents.

3. Noise Quality. During construction, there is likely to be noise generated from excavation, foundation, erection of structures, and finishing activity. However, adverse noise impacts resulting from the proposed project are expected to be rather limited. Subsequently, few special noise mitigation measures appear necessary. However, four methods for minimizing noise may be undertaken during construction. These include the: placing of mufflers on construction machinery, equipment, etc.; instructing of workers to avoid unnecessary "gunning" of construction equipment and to turn off equipment when not in use; creating of earth berms which would absorb some of the noise; and limiting construction activity during daylight hours, between 8:00 a.m. to 5:00 p.m. In addition, construction activities must comply with the provisions of Title II, Administrative Rules, Chapter 43, Community Noise Control for Oahu. Equipment noise must be attenuated to meet allowable noise levels defined in the regulations, based on zoning districts. A noise permit for the proposed project will be required from the Noise and Radiation Branch of the Department of Health. The contractor will ensure that all construction equipment is in proper condition, will attempt to enforce the methods mentioned, and will comply with required State and Occupational Safety and Health Administration (OSHA) Standards.

Traffic noise from heavy vehicles traveling to and from the construction site must be minimized in residential areas and must comply with the provisions of Title II, Administrative Rules, Chapter 42, Vehicular Noise Control for Oahu.

4. Water Quality. During construction, impacts to surface and groundwater are anticipated to be minimal, since the soils found at the project site possess limited erosive characteristics.

The impact of construction activities on water quality can be further minimized by adhering to control measures, particularly those specified in the City and County of Honolulu's Grading, Grubbing, and Stockpiling Ordinance No. 3968, 1972; the State Department of Health's Water Quality Standards, Chapter 37-A, Public Health Regulations, 1968; and the USDA Soil Conservation Service's Erosion and Sediment Control Guide for Hawaii, 1981.

5. Flora. Due to the varied history of past land use within the project site, the vegetation consists largely of introduced species with scattered native species. However, despite the abundance of vegetation types, no rare or endangered plants can be found in the project site, thereby, eliminating the project's overall impact on Oahu's inventory of threatened plants.

Construction of the proposed project will eliminate the land currently under banana cultivation. Some adverse economic impact then, may arise which will affect agriculture consumption within the State. Adverse economic impacts stemming from the reduction of lands currently under banana cultivation can be mitigated by increasing banana production elsewhere. Mokiha Farm Enterprises,

a farming company, is currently planning to plant 500 acres of apple bananas on Kauai. Plans call for the planting of up to 200 acres in 1982 and the remainder in the following two years. If the plans are carried to completion, the total state acreage in bananas (all varieties) and market supply will double.

The immediate impact of the new plantings will be twofold. Import of bananas into the State will decline or cease, and the price of apple bananas will fall to the price Cavendish and imported varieties currently receive. This directly implies that existing plantings of apple bananas will become less valuable and that the impact of removing existing plantings from production, on the State, will decline proportionally. Appendix G, entitled The Agricultural Significance of the Lands in Kamooalii, Kapalai, and Luluku Areas of Kaneohe, prepared by Evaluation Research Consultants, examined the impacts on agriculture resulting from the proposed project.

6. Fauna. No endangered birds, mammals, amphibians, or reptiles were found at the project site. Moreover, the species observed were considered pests or potential pests to the existing agricultural practices and will continue to be to the proposed action. Impacts therefore, can not be considered significant.

Grading and grubbing activities will undoubtedly force the wildlife to relocate to adjacent areas. However, in some instances, they will return to the project site for food and shelter, thereby, further minimizing any adverse impacts to them.

7. Traffic. The project site is characterized by an abundance of open space and landscaping and only limited

adjacent urbanization. The impacts resulting from increased traffic due to construction activities shall, therefore, be minimal, since only a limited urbanized area will be affected.

Standard traffic control precautions will be included in the construction specifications to ensure safe movement of traffic during construction activities.

8. Archaeological Sites. Significant archaeological sites are situated adjacent to and within the project area. The petitioner will ensure that no harm come to these sites. It is recommended that archaeological surveys be conducted in all portions of the project site before any construction begins. No construction will take place until all adverse impacts on archaeological sites have been mitigated.

If any unknown sites are encountered during construction, work will be halted and the State Historic Preservation Officer will be notified.

9. Economical. Construction of the proposed project will require land clearing, installation of utilities and roadways, and development of residential structures. Subsequently, there will be an infusion of cash into the local economy resulting from increased tax revenue accrued from the sale of supplies. The project will also increase the number of construction-related employment opportunities.

C. Long-Term Impacts

1. Environmental Characteristics

- a. Air Quality. Long-term impacts resulting from the

completion of the proposed project and subsequent occupation will include the increased level of carbon monoxide, hydrocarbons, and nitrogen oxides into the air, since the project will serve as an origin for residential use. However, recent Federal mandates have been written to decrease such emissions originating from vehicles. The major control measure designed to reduce vehicular lead emissions is a Federal law requiring the use of unleaded gasoline in most new automobiles. As older cars are gradually removed from the vehicle fleet, lead emissions should decrease substantially. Federal control regulations also call for increased efficiency in removing carbon monoxide from vehicle exhausts. By the year 2000, carbon monoxide emissions from the vehicle fleet then operating should be about half the levels now emitted. Decreases in hydrocarbon and nitrogen oxide emissions have been mandated as well by Federal laws.

With increasing pressure to achieve greater fuel economy and to aid economically-troubled auto makers, there will be a continuing tendency on the part of the U.S. Congress to relax or even eliminate some existing air pollutant emission goals. It is thus difficult to forecast future vehicular emission rates with any degree of certainty. It seems logical, however, to conclude that if each year's supply of new vehicles burn less fuel to travel the same distance, then fleet emission rates should also decrease each year as older, less efficient vehicles are removed from the roadways.

The proposed Interstate Highway H-3 will be routed makai of the project area. The impact of this highway

in terms of expected worst case carbon monoxide concentration should then be discussed. Traffic volumes for peak hour conditions in the year 2000, at the project area, are estimated to be 10,891 in the peak direction and 3,556 in the off-peak direction (U.S. Department of Transportation and State of Hawaii Department of Transportation, 1982). For the purposes of analysis, these volumes can be combined with projected 1992 vehicular emissions rates to produce figures relating to worst case peak hour emissions, assuming vehicular speeds of 35 mph in unimpeded flow. Based on this analysis, the peak one-hour carbon monoxide concentration computed for 1992, will be 8 mg/m^3 and the peak eight-hour carbon monoxide concentration computed for 1992 will be 4.8 mg/m^3 .

These levels are within acceptable State and Federal Air Quality Standards.

In summary, once completed, the proposed project is expected to have minimal impact on the air quality of the surrounding region. The only potential long-term indirect air pollution contribution likely to be made by this project will be increased exhaust emissions from the traffic attracted to the project. However, except for periods of exceptional traffic congestion, these vehicular emissions in and around the project area are expected to be well within allowable air quality standards and no special mitigative measures seem necessary. It is worth noting, however, that landscaping of sufficient density to serve as windbreaks, can act as filters to screen some particles and carbon monoxide from the air. Early establishment of landscaping of this nature can, therefore, help to mitigate the potential impact of airborne contaminants in the project area.

The Pali Golf Course is sprayed with insecticide and herbicide a minimum of one day per month. Therefore, there may be concern regarding its impact on the residents of the proposed project. The State Department of Health controls all chemical spraying and subsequently, residents should remain unaffected. The proposed project will comply with all applicable DOH regulations governing air pollution control.

- b. Noise Quality. The State Department of Health does not have regulations which cover the impacts of vehicular noise impacts on adjacent residential sectors. The regulations that are of record, deal with vehicle noise as a problem of the vehicle itself and not from an impact to specific sectors such as residential, commercial, etc.

After completion of the project, the impact of noise levels are not expected to be significant, since increased noise levels will be generated only during peak hour traffic flows.

The inclusion of the State's H-3 Highway alignment on an adjacent corridor parallel to the proposed project, creates potential problems to the project in terms of highway noise impacts. A review of the EIS prepared for the H-3 route dated June 3, 1982 and titled FINAL SECOND SUPPLEMENT TO THE INTER STATE ROUTE H-3 ENVIRONMENTAL IMPACT 4 (f) STATEMENT (1982), Report Number FHWA-HI-EIS-82-01-D (S) INTERSTATE ROUTE H-3 HALAWA TO HALEKOU INTERCHANGE provided the following extracted data: Civil No. 72-3606 AFFIDAVIT OF MARTIN RUBIN, In The United States District Court

For The District Of Hawaii, in summary, stated "that a noise contour study has been conducted for the project and included an examination of the subject property that abuts the Ho'omaluhia area. The alignment along this section of the project traverses very irregular terrain. Due to this terrain, the roadway is located at a higher elevation than the terrain of Ho'omaluhia Park. This has the effect of attenuating noise levels emitted from vehicles on H-3. Thus the L₁₀₊₇₀dBA contour remains relatively close to the H-3 right-of-way, and at the maximum extends approximately 100 feet beyond the right-of-way." Table 9 defines the various dBA levels. The H-3 Highway should therefore, not adversely impact the proposed project, since noise generated will be within Exterior FHWA Standard.

The compatability of the highway corridor alignment and adjacent residential sectors are subject to review by the Department of Health however, and they will comment on the potential impacts and recommended mitigative measures based on their understanding of the potential impacts.

The proposed project will be in conformance with the AICUZ for the Kaneohe Marine Corps Air Station.

- c. Water Quality. The proposed project will increase the amount of stormwater runoff, since the proposed grading and ultimate development will create impervious surfaces that will reduce soil absorption activity. Appendix H, entitled "Environmental Aspects of Stormwater Runoff," prepared by Dr. Gordon L. Dugan, states that the development should increase the nitrogen and phosphorus output, while the suspended solids

TABLE 9

TYPICAL FLUCTUATING NOISE LEVELS

DBA ^L ₁₀	NOISES
120	Loud Band
110	
100	
90	
80	Noisy Urban Daytime Shouting at 3 feet
70	Exterior FHWA Standard Normal Speech at 3 feet
60	Quiet Urban Daytime Interior FHWA Standard
50	Quiet Urban Nighttime
40	
30	Quiet Rural Nighttime
20	
10	
0	

Source: U.S. and State Department of Transportation, 1982.

should increase for the low frequency/duration storms and then decrease somewhat for the higher frequency/duration storms. Dugan states that the constituent loads should not be considered as absolute, but rather as trends. There will also be potential changes in the output of biocides and heavy metals. However, impacts to the adjacent streams are anticipated to be minimal because biocides currently in use that may potentially adversely affect water quality tend to breakdown more readily in comparison to the more lasting types of a few years ago. Lead concentrations originating from automobiles should be steadily decreasing, since new automobiles have been designed to only utilize unleaded gasoline, which would reduce the output of lead into the environment. Therefore, though the amount of runoff would increase, adverse impacts resulting from increased constituents should not be significant.

To minimize increased runoff and siltation of Kaneohe Dam, the exposed areas not paved or used for building construction will be landscaped with ground cover. Most development areas are sited on the more level portions of the site and the flatter ridges. These conditions will minimize the amount of runoff.

Furthermore, grading work will be performed in increments of 15 acres or less, and the existing vegetation surrounding the site will be retained. Besides grassing of the exposed areas immediately after grading, other erosion control measures shall include the construction of temporary earth berms, sediment basins and underground drain pipes with risers and filter blankets.

The proposed project consists of the development of 201.4 acres, with approximately two-thirds being over

soils classified by the U.S. Soil Conservation Service (SCS) as "B," while the remaining one-third being classified as "C."

The soils of the United States have been classified by SCS into four designations (A,B,C, and D) in terms of surface runoff/infiltration potential, with "A" having the highest infiltration rate and "D" the lowest. Due to the underlying geological formations, the proposed developed project area is considered to be situated over a groundwater recharge area. Developments over a recharge area will, in most situations, unless provisions have been made otherwise, result in a decrease in groundwater recharge potential directly under the developed area.

Under natural and modified surface conditions, it is difficult to accurately estimate the quantity of surface applied water that is reaching the usable groundwater reservoir. The actual amount of groundwater recharge is basically a function of the local hydrologic cycle, which involves the interrelationships of precipitation, evaporation, runoff, and infiltration. The greater the intensity and/or quantity of precipitation (essentially rainfall on Oahu), the greater will be one or more of the other three hydrologic factors. The more intense and/or the longer the duration of the storm, the greater is the percentage of runoff in comparison to the infiltration.

All four interrelated hydrologic factors have literally thousands of combinations which alter their percentage quantities, based on rainfall. For example, infiltration is dependent on not only the intensity and/or amount of rainfall, but also on the soil type, antecedent soil moisture content, underlying geologic features, slopes,

and vegetation cover, just to mention a few. On a very simplistic basis, evaporation from a free water surface is primarily dependent on temperature, wind, and humidity. However, when vegetation is involved, a portion of the infiltrated water is taken up by the vegetative root system and evaporated from the plants surface. Vegetative evaporation is known as transpiration, but due to the mere impossibility of segregating evaporation from transpiration when vegetative surfaces are involved, the catch-all term evapo/transpiration is usually employed. On Oahu, studies have shown that evaporation rates approach or equal the rates from the standard class A U.S. Weather Bureau Evaporation Pan.

For comparative purposes, long-term recharge rates could be considered to be the difference between the annual rainfall and the evapo/transpiration rate (Evaporation pan percentage), less the resulting runoff. Low-intensity, short-duration rainfall on relatively dry soil would probably not produce any runoff or infiltration. Thus, for infiltration and/or runoff to occur, sufficient rainfall would have to be applied for the given set of conditions. The proposed project site is situated in an area that receives an average annual rainfall of approximately 85 inches. Published up-to-date pan evaporation rates for the region are not readily available, but comparison with the closest sites indicate that the rates should be at least 45 inches annually. Thus, the potential water for runoff and infiltration would be approximately 40 inches. However, it is not anticipated that all of this potential water would be lost since: (1) During dry weather conditions, the residents of the development would be expected to water their lawns, shrubbery etc., which could lead to additional infiltration;

(2) A sizeable portion of the water running off the areas of impervious surfaces within the development would flow onto adjacent pervious surfaces, such as lawns, gardens, etc., which should enhance infiltration over this area; (3) The runoff generated from the project flows into the newly constructed Kaneohe Flood Control Reservoir, behind a 76 ft. dam which maintains a permanent surface area of 26-acres and up to 152 acres under maximum reservoir conditions. Thus, additional infiltration should result unless the bottom surface is completely sealed; and (4) Over 70% of the water in the streams draining the Ko'olaupoko District, in which the project is located, originates from groundwater sources.

2. Biological Characteristics

- a. Flora. Some of the endemic plant species (Rhus sandwicensis Gray) occurring within the project site may be replaced by exotic flora following construction.

The proposed project will require landscaping in accordance with the Comprehensive Zoning Code (CZC). The relevant CZC requirements call for landscaping to minimize potential adverse influences on property in the same or neighborhood zoning districts (City and County of Honolulu, 1978). The net result should be one of replacing exotic flora species with other exotic vegetation.

- b. Fauna. No threatened or endangered species of birds or mammals were sited at the project site or adjacent

areas. Therefore, the proposed action will pose no significant adverse impacts to fauna species at the site.

The birds and aquatic fauna populating adjacent streams and the Kaneohe Flood Control Ponding Basin in Ho'omaluhia Park should not be adversely impacted due to increased storm runoff and sediment load originating from the proposed project. The type of runoff that will be directed into the basin will be similar to other residential runoff, currently being discharged, particularly from adjacent subdivisions. Secondly, the potential of increased sediment load would occur only during significant storms. It is anticipated that upon completion of the storm, the sediment loads of the streams and pond would return to its natural state. The fauna species will also remain unaffected by the project's generation of noise and air emissions.

During construction, avifauna and mammals in the immediate vicinity of the project site may relocate into adjacent areas. However, upon completion of construction, the fauna may adapt to the proposed action and return to the site for food and shelter.

3. Flood Hazards

The U.S. Army Corps of Engineers, after the 1969 floods, implemented and completed the Kaneohe Flood Control Project, which created a retention dam and a reservoir at the headwaters on the Kamooalii tributary of Kaneohe Stream and channel improvements to the stream outlet at Kaneohe Bay, to provide flood protection for the highly urbanized areas in the Kaneohe region.

4. Archaeological Sites

The existence of on-site archaeological sites would have been uncovered during the construction stage of the proposed action. Therefore, all necessary measures to minimize impacts on the sites would have been considered and undertaken at that time. Subsequently, there will be no adverse impacts on potential on-site archaeological sites during the operation of the Iolani Schools project.

5. Traffic

- a. Traffic Generation. Appendix F, entitled "Access Study for the Proposed Kamooalii Development", prepared by Community Planning, Inc., analyzed the traffic volume for Kamehameha Highway between Halekou Road and Likelike Highway and Kaneohe Bay Drive, and Kamehameha Highway between Kionaole Road and Castle Junction to determine the impact the traffic generated from the proposed project will have upon Kamehameha Highway. It is assumed that traffic originating from the development of 611 units will use Kionaole Road as the major access to Kamehameha Highway. The total existing average daily traffic volume on Kamehameha Highway between Kionaole Road and the Kaneohe Bay Drive-Likelike Highway intersection is 24,660 vehicles. The design capacity of Kamehameha Highway, a 4-lane divided highway, for the section between Kionaole Road and the Kaneohe Bay Drive and Likelike Highway intersection is 38,400 vehicles per day (VPD). Based on a daily generation rate of 6.3 external trips per unit, the proposed project will generate some 3,855 daily vehicle trips from the site. Kamehameha Highway

between Kionaole Road and Kaneohe Bay Drive-Likelike Highway can accommodate traffic for the planned 611 units and still have capacity for an additional 9,885 vehicles per day.

In addition, it is reasonable to assume that the traffic generated by the project destined to Honolulu will use Kamehameha Highway south of Kionaole Road and Pali Highway at Castle Junction. The total daily volume of traffic on Kamehameha Highway between Kionaole Road and Castle Junction at Pali and Kalaniana'ole Highways is 21,370 VPD. Again assuming that the total 611 units from the proposed project will use Kamehameha Highway south of Kionaole Road to Castle Junction and generate 3,855 VPD, it is concluded that Kamehameha Highway will accommodate the traffic generated from the development and still have an additional average capacity of 11,530 vehicles, based on an existing design capacity of 38,400 VPD.

The preferable route to service traffic from the project destined to Honolulu and/or Kailua is from Kionaole Road to Castle Junction and onto Pali or Kalaniana'ole Highway. Home-bound traffic will probably use Likelike Highway and Kaneohe Bay Drive. The above findings are substantiated by the fact that presently there is no medial opening at Kionaole Road and Kamehameha Highway and the grade separation is adverse to accommodate traffic movement across the median of the divided highway. However, with the construction of the Halekou Interchange on H-3 as planned by the State Department of Transportation, Highways Division, there will be a medial opening connecting Kionaole Service Road Extension and

Kamehameha Highway at Kahiko Street and permit traffic movement to flow in either direction on Kamehameha Highway.

Existing traffic volume on Kionaole Road is minimal. The design capacity for a portion of the 2-lane Kionaole Road as it approaches the Halekou Interchange is estimated to be 7,200 VPD. Kionaole Road is an existing two-lane City and County Road. Prior to the construction of the Pali Highway and Kamehameha Highway fronting Pali Golf Course, Kionaole Road was one of the major roads connecting Windward Oahu to Honolulu. Kionaole Road is presently used by maintenance vehicles of the Pali Golf Course. Therefore, the existing road structure can accommodate the anticipated traffic loads to be generated during and after construction of the project site.

Traffic analysis indicate that Kionaole Road and Kamehameha Highway possess adequate design capacity to accommodate the proposed project. It is therefore, doubtful that potential motorists will be utilizing Auloa Road to get from the project site to Pali Highway.

The relocation of the Kionaole Road and Kamehameha Highway junction to Kahiko Street is currently proposed as part of the Halekou Interchange improvements on H-3. Therefore, the design of this intersection will ensure that traffic on Kamehameha Highway will be clearly visible at a safe distance to drivers exiting Kionaole Road. Traffic signals will also be installed, if required or necessary. Figure 10 presents the Kionaole Road Alignment.

- b. Mass Transportation. Existing city bus and transit services that are provided on Kamehameha and Like-like Highways will also assist to minimize projected traffic volumes. It is anticipated that the existing bus routes may be extended to include the proposed development as the need arises. With adequate bus service provided for the proposed project, it is estimated that vehicles traveling to and from the project will be reduced by 10 or 15 percent, thereby minimizing traffic volumes and subsequent adverse impacts on the Likelike and Kamehameha Highways.

The project area is presently served by one (1) bus route, Route 52, Honolulu-Wahiawa-Kaneohe. Average headway is approximately 30 minutes during peak and off-peak periods with service available on Saturdays and Sundays. Route 52 provides around-the-island coverage. Buses from Honolulu proceed along Kamehameha Highway and serve Aiea, Pearl City, Mililani, Wahiawa, the North Shore, Kahaluu and Kaneohe and return to Honolulu via the Pali Highway. Service is also provided in the opposite direction. The travel time by public transportation from Honolulu (Ala Moana Center) to the project site is approximately one (1) hour.

- c. Interstate Highway H-3. The H-3 Highway alignment traverses the makai side of the project site adjacent to Ho'omaluhia Park. The proposed action will provide 31.4 acres of the total 201.4 acres for the highway's right-of-way and should not impede ultimate construction of the highway.

The current status of the highway is as follows: On

November 12, 1982, the Federal Highway Administration granted the State approval to complete the design and construction of the H-3. This action allowed the State to commence survey work for land appraisal. Expected completion of acquisition would be by mid-1983. Presently, construction of the Halekou Interchange has begun. Following the anticipated completion in early 1984, construction of the H-3 Highway section situated between Ho'omaluhia Park and the Iolani School Project is expected to commence.

6. Public Utilities and Improvements

- a. Drainage System. It was estimated that storm runoff for the 1-year/1-hour frequency/duration storm event for post-development conditions is over 7 time greater than for pre-development conditions (Appendix H). However, as the storm duration and recurrence interval increases, the difference reduces to 1.6:1 for the 100-year/24-hour storm event. The primary reason for the diminishing differences in runoff volume for pre-and post-development conditions is that soil permeability decreases as storm magnitude increases. With low intensity and short duration storm events, the existing land use allows significant percolation to occur (especially since over 70% of the project soils are rated well-drained), and relatively little runoff is generated. However, as the storm intensity and duration increases, the ability of the soil to accept water decreases and greater runoff occurs, and the soil becomes more impermeable. Multi-storm events that tend to saturate the soil also decrease the percolation rate and thus, increase the amount of runoff.

As would be expected, the greatest calculated incremental storm runoff volume, 91.9 acre-ft., resulted from the 100-year/24-hour storm event, while the least incremental increase (28.6 acre-ft.) occurred with the 1-year/1-hour event (Appendix H). The volume of the maximum event would be less than 3 percent of the maximum capacity of the Kaneohe Flood Control Ponding Basin.

Storm drainage runoff from the proposed project will be collected by catch basins located within the roadways, conveyed by underground pipe system, and discharged into existing streams and the ponding basin.

The project will increase government expenditures resulting from increased operation and municipal maintenance. However, operation and maintenance should not be significantly increased since the Interstate Highway H-3 will act as a permanent barrier between Kaneohe Dam and the proposed development. Since most of the improvements are proposed on the top of ridges, it is anticipated that the increase of silt deposits to Kaneohe Dam will be minimized by retaining the surrounding vegetation and the implementation of erosion control measures. Further, all costs will be offset by increased tax revenues resulting from development of the project.

All drainage improvements will be designed and constructed in conformance with the Drainage Standards of the City and County of Honolulu, and the applicable provisions of the Water Pollution Control Regulations, and Water Quality Standards, Department of Health.

- b. Potable Water System. Based on a total development of 611 units, demand for water will be approximately 305,500 gallons per day. However, since construction of the residential units will be completed incrementally, demand for water facilities will be on a phased schedule. An anticipated schedule may include 2 years for off-site improvements and 6 years for on-site improvements. This phasing will reduce impact on existing facilities, since the total demand for water will correspond with the schedule and not need to be accommodated at one time.

The City and County of Honolulu Board of Water Supply (BWS) has master planned well sites to be located within the vicinity of the proposed development (Figure 11). Therefore, the project may be provided with required water for domestic and for protection use, including well sources, storage, required pumps, pump station, transmission main, and a 0.5 million gallon reservoir.

In regards to the project impacts to the existing and proposed BWS wells, the proposed action will include an underground sewage system, which will minimize contamination of the ground-water basin. No improvements are proposed at the existing BWS well sites. The petitioner will coordinate this development with future well sites.

The BWS will not make advance water commitment for the project and will determine the availability of water when construction plans for the water service connections are submitted for BWS approval.

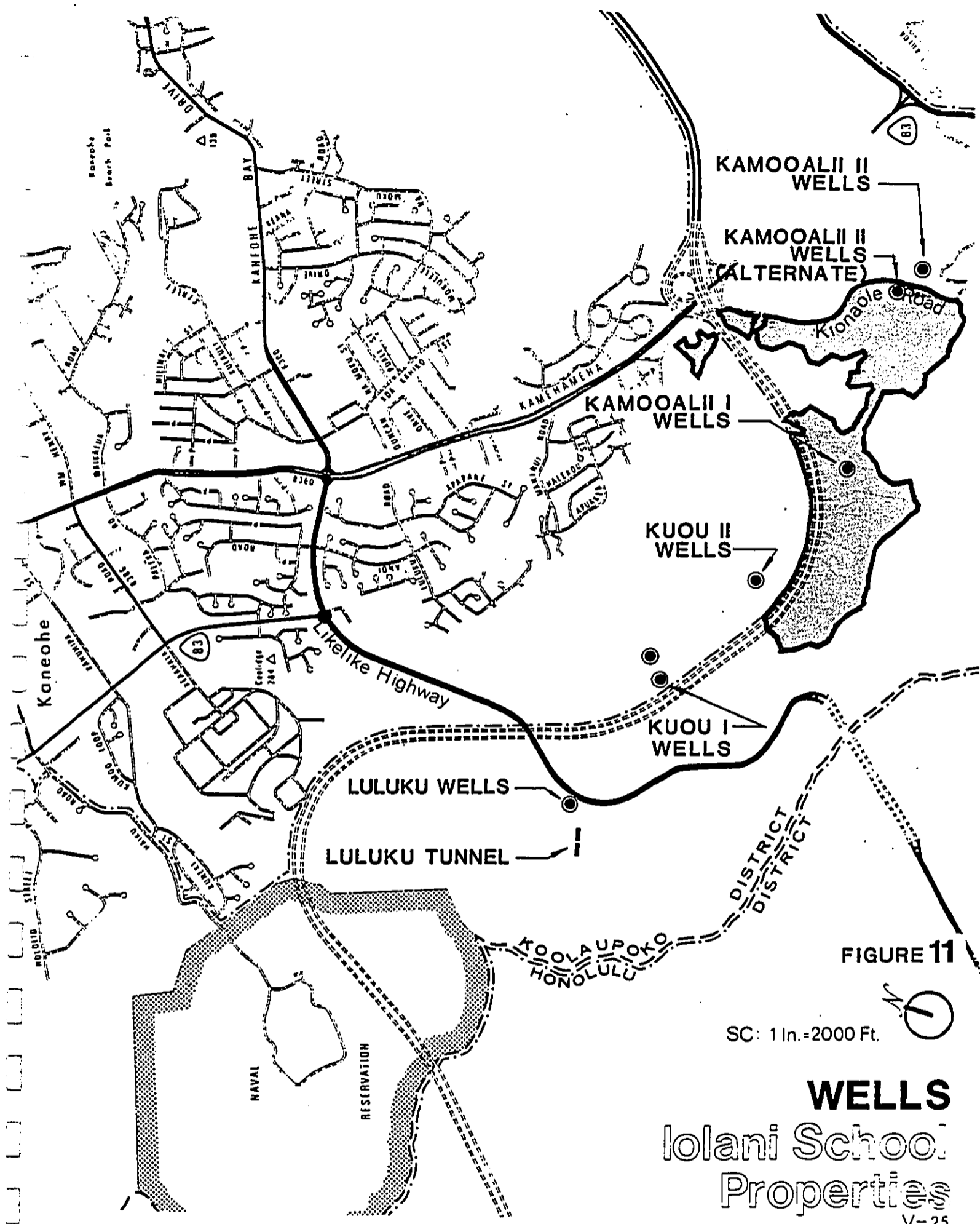


FIGURE 11

SC: 1 in. = 2000 Ft.



WELLS
Iolani School
Properties

- c. Sewerage System. The anticipated sewage to be generated by the total project is estimated to be 244,400 gallons per day. However, like discussions regarding water resource demands, sewerage demands will correspond to a phasing schedule and will not need to be accomodated at one time.

Measures to accomodate the increased sewage flows are currently being assessed.

Development of the property may require an upstream extension of the existing interceptor sewer main along Kamooalii Stream.

The City and County of Honolulu Department of Public Works has indicated that the Kaneohe Sewage Treatment Plant (STP) is nearing its installed capacity of 4.5 mgd (4.35 mgd in 81-82 FY) and will not be able to accomodate flows from the proposed development. A one-plant or two-plant sewer system is presently being considered for the Kaneohe-Kailua sewerage district under a study expected to be completed in mid 1983. If a one-plant system is adopted, Kaneohe sewage will be treated at the Kailua STP in expanded facilities. If the two-plant system is retained, the capacity of the Kaneohe plant will be expanded. Construction at either the Kaneohe and/or Kailua plant is tentatively scheduled to begin in Fiscal 1984-85. Construction can take at least two years to complete. If the existing facilities can not accomodate the proposed project, improvements will be made to increase capacity by the developer at his own expense.

There will, therefore, be adequate and available sanitary sewer services to accomodate the projected

estimated average flow from the total development.

- d. Solid Waste Collection and Disposal. The City's Division of Refuse Collection and Disposal has indicated that approximately 4.0 pounds of solid waste per person per day is generated on Oahu. The proposed project will increase existing population by 1,800 residents. Therefore, an estimated increase of 7,200 pounds or 3.6 tons of refuse per day will be generated. Disposal of refuse may be at the Kapaa or Kalaheo Landfills.

- e. Telephone and Electrical System. There are existing Hawaiian Telephone Co. and Hawaiian Electric Co. (HECO) facilities available in the area. The proposed electrical services will be obtained by extension of the distribution system from the Ko'olau Substation.

All high voltage transmission lines and proposed realignments will be identified and coordinated with HECO prior to any onsite work. This action will eliminate any adverse impact the transmission lines may have on the proposed project.

Depending on the future course of the proposed Hawaii Deep Water Cable project and subsequent development of Aniani Substation, at least two more 138 kv lines may be required between Ko'olau Substation and Aniani Substation, and one additional 138 kv line may be required between Ko'olau Substation and Halawa Substation. These requirements may affect the need for future 138 kv and 46 kv easements in the vicinity of Ko'olau Substation.

7. Public Services and Facilities

- a. Police Protection. Based on the present Oahu ratio of police employees per person, some additional police employees are needed to service the project site.
- b. Fire Protection. No additional fire stations or personnel will be required for this project.
- c. Emergency Medical Services. Minimal impact on medical services and facilities is foreseen.
- d. Recreational Facilities. The project's residents will be welcomed to fully utilize the regional recreational opportunities located adjacent to the project site.

The impact on the use of existing park and recreational facilities will be alleviated by inclusion of private park sites within the project in compliance with the City and County Park Dedication Ordinance No. 4621.

- e. Public Education Facilities. The Department of Education, in their letter of April 4, 1983, calculated the expected student enrollment due to the proposed project. Table 10 presents the results of these calculations. The department states "the secondary schools have sufficient capacity to accommodate the projected enrollment increase. As the development area abuts the service area assigned to Kaneohe and Kapunahala Elementary schools, the Windward District will be assigning the appropriate portions of the development to these two schools. The combined capacities of these two schools can accommodate the projected enrollment increase".

TABLE 10
EXPECTED STUDENT ENROLLMENT

<u>SCHOOL</u>	<u>GRADE</u>	<u>APPROXIMATE ENROLLMENT</u>
Kaneohe/Kapunahala Elementary	K-6	90 - 150 students
King Intermediate	7-8	25 - 50 students
Castle High	9-12	40 - 70 students

Source: Department of Education, 1983

8. Aesthetic and Scenic Views

Mauka and makai views will not be significantly altered, since no multi-family high-rise structures are being considered. The residential subdivision is consistent with the adjacent Keapuka subdivision and other residential areas to the north. The view plane corridor from the Pali Lookout encompasses a vast area stretching beyond the proposed project site.

9. Socio-Economical

The proposed project will supply housing to low-and moderate-income residents. However, to accomplish this, 5 acres currently in banana production will be lost. It is anticipated that the affected acreage in banana production could be offset by making available an equal amount of land in the vicinity of the project site. The two farmers residing on the site would be allowed to relocate into this area. Relocation costs would be the responsibility of the farmers. It is anticipated that lease rents would remain comparable with those at the time of relocation.

The results of the reduction in acreage would be an approximate loss of \$7000 worth of agricultural output and the loss of one job. After taking into account the multipliers, the total loss to the State would be approximately \$9,000 in total output and 1.5 jobs (Evaluation Research Consultants, 1983).

VI

**PROBABLE ADVERSE ENVIRONMENTAL
EFFECTS AND MITIGATION MEASURES**

VI. ANY PROBABLE ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED AND MITIGATION MEASURES PROPOSED TO MINIMIZE IMPACT

A. Introduction

The following are adverse environmental effects (both short- and long- term) which cannot be avoided and methods for mitigating them.

B. Short-Term

1. Noise Quality. Short-term noise originating from construction activity can be mitigated by limiting construction activities to regular work hours. Other noise reduction measures include installing mufflers on all construction equipment and trucks and discouraging the "gunning" of trucks and construction equipment. There are specific State, County, and OSHA Standards and Codes which must be complied with. Compliance with these standards will effectively reduce noise levels during construction, and will be included in the construction specifications.
2. Air Quality. There are several methods for reducing fugitive dust during construction. The most popular method is to frequently "water down" the disturbed area with water or oil. Other methods include good housekeeping and working only small areas at any one time. The proposed project will also regard construction specifications and the State Department of Health, Rules and Regulations, which stipulate control measures.
3. Traffic. Construction activities will partially affect the

normal flow on Kamehameha Highway. Standard precautions will be written into the construction specifications to ensure for safe movement of traffic during construction activities.

4. Archaeological Sites. Significant archaeological sites are situated adjacent to and within the project area. The petitioner has committed themselves into ensuring that no harm come to these sites. It is recommended that intensive archaeological surveys be conducted in all portions of the project site before any construction begins. No construction will take place until all adverse impacts on archaeological sites have been mitigated.

If any unknown sites are encountered during construction, work will be halted and the State Historic Preservation Officer will be notified.

C. Long-Term

1. Traffic. Traffic will increase because of the number of vehicles going to and from the proposed project. However, analysis indicate that the present and future highway system will adequately accommodate the traffic to be created.
2. Air Quality. Increased carbon monoxide from motor vehicles will be decreasing over the next several years due to Federal laws which will require automobile manufacturers to reduce air emissions from new automobiles. As the vehicular fleet replaces the cars on the road, the newer automobiles will contribute less to the air pollution.

VII

ALTERNATIVES

VII. ALTERNATIVES TO THE PROPOSED ACTION

A. Introduction

This section will discuss alternatives to the proposed action which have been considered.

- B. No Action. The no-action alternative would be to retain the site in its present vacant and undeveloped condition. The impact of this alternative would be that the project site remain as is and would likely be subject to severe erosion during heavy rainfall. Eventually, the weeds and grasses currently on the project site would become exceedingly dense and encroach into adjacent properties and public ways. In addition, the retention of the project site in its present state would eliminate the future income, annual real property and excise tax collections anticipated with the development. Finally, the no-action alternative would not obtain the objectives of the proposed action.

- C. Agricultural Use. The agricultural potential of the project site can be judged in terms of its present use, physical characteristics, climate, and location. The State of Hawaii Department of Agriculture has designated the majority of the site as having physical characteristics and climatic features that qualify as being either "prime agricultural", "other important" or "unique" lands. Evaluation Research Consultants, in their report entitled, "The Agricultural Significance of the Lands in the Kamooalii, Kapalai, and Luluku Areas of Kaneohe concluded that the lack of available irrigation water, soil type, climate, and topography make bananas, the most profitable crop for cultivation at the project site. The proposed action will reduce, somewhat, the amount of land currently under banana cultivation and with cultivation potential. Some adverse economic

impact then, may arise, which will affect agriculture consumption within the State. However, adverse economic impacts stemming from the reduction of lands currently under banana cultivation can be mitigated by increasing banana production elsewhere. Moki-hana Farm Enterprises, a farming company, is currently planning to plant 500 acres of apple bananas on Kauai. Plans call for the planting of up to 200 acres in 1982 and the remainder in the following two years. If the plans are carried to completion, the total state acreage in bananas (all varieties) and market supply will double.

The immediate impact of these new plantings will be twofold. Imports of bananas into the State will decline or cease, and the price of apple bananas will fall to the price Cavendish and imported varieties currently receive. This directly implies that existing plantings of apple bananas will become less valuable and that the impact of removing existing plantings from production, on the State, will decline proportionally. Subsequently, the potential of the project site for agriculture cultivation is greatly reduced.

- D. Postponement of Development. Postponing development will postpone effects that may be expected with the implementation of the proposed action.

This alternative is essentially no-action and would not obtain the objectives of the proposed action.

VIII

SHORT-TERM USES OF MAN'S
ENVIRONMENT AND THE ENHANCEMENT
OF LONG-TERM PRODUCTIVITY

VIII. THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF
MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCE-
MENT OF LONG-TERM PRODUCTIVITY

The proposed action will result in short-term impacts, such as increase in noise and fugitive dust; diversion of traffic; and disruption of normal access routes.

The long-term productivity of this project is considered to offset these adverse impacts as the proposed action will result in the provision of low- and moderate- income housing which will benefit Kaneohe and Oahu residents. The appearance of the project site will be altered from its present undeveloped appearance to that of a residential community, complete with infrastructure, parks, open space, roadways, and landscaping.

ix

**IRREVERSIBLE AND IRRETRIEVABLE
COMMITMENT OF RESOURCES**

IX. ANY IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF
RESOURCES

It is anticipated that the construction of the proposed project will commit the necessary construction materials and human resources (in the form of planning, designing, engineering, construction labor, landscaping, and personnel for the restaurants and sales management, services, and maintenance functions). Some of the construction materials could be reused if and when the project is demolished. However, at the present time and due to the state of our economy, it is felt that the reuse of much of these materials is not practical. Labor expended for this development is not retrievable. However, labor will be compensated during the various stages of the project by the petitioner.

The project development will result in a commitment of land for a long-term period. Once developed, it is unlikely that the land will be reverted to a lower use in the long-term future. Commitments of land for these purposes will also foreclose the future land use options of the land, such as recreational use and agricultural use. However, it should be noted that even if the proposed project did not occur, the high cost of the land would likely foreclose these less intense land uses.

X

**GOVERNMENT POLICY
OFFSETTING ADVERSE EFFECTS**

X. AN INDICATION OF WHAT OTHER INTERESTS AND CONSIDERATIONS OF GOVERNMENTAL POLICIES ARE THOUGHT TO OFFSET THE ADVERSE ENVIRONMENTAL EFFECTS OF THE PROPOSED ACTION

The height, setbacks, and use will be determined by zoning restrictions. Regulatory requirements (such as fire protection devices and equipment, building design and structural support, access to the highway, and internal access) are set forth in various standards, regulations, and codes. Subsequently, the petitioner must adhere to these requirements. It is felt that compliance of mitigation measures set by government are inherent in the present project plan.

XI

APPROVALS

XI. LIST OF NECESSARY CONSTRUCTION-RELATED APPROVALS

A. State of Hawaii

1. Department of Health: Noise Permit, Construction Plan Approval.
2. Department of Transportation: Approval of ingress and egress points.

B. City and County of Honolulu

1. Department of Public Works, Engineering Division: Grading Permit.
2. Department of Public Works, Division of Wastewater Management: Approval by Department to accept sewage generated by project into the Kaneohe Sewage Treatment Plant.
3. Department of Public Works: Compliance with street improvement ordinances.
4. Department of Transportation Services: Approval of ingress and egress points.
5. Board of Water Supply: Commitment of potable water supply.
6. Building Department: Building Permits must be obtained by the petitioner or the retained contractor or sub-contractor. Such permits involve the checking of the building plans by the Department of Health,

Department of Public Works, and Fire Department to ensure that governmental codes and standards have been incorporated.

C. Private

Utility easements, connections, and relocations must be approved by the respective utility companies.

XII. ORGANIZATIONS AND PERSONS CONSULTED DURING THE
PREPARATION NOTICE CONSULTATION PERIOD AND
REPRODUCTION OF COMMENTS AND RESPONSES MADE
DURING THE CONSULTATION PROCESS

The EIS Preparation Notice appeared in the EQC Bulletin of
January 8, 1983.

A total of 26 letters were received in response to the EIS Prepara-
tion Notice. In most cases, the comments identified specific
concerns that should be addressed in the EIS.

Table 11 identifies the agencies to whom copies of the EIS Prepara-
tion Notice were sent, the date of the comment, and the date of
the response to the comment (when necessary).

The EIS will be sent to parties from which, comments from the
Preparation Notice, were received.

Reduced, half-sized copies of the letters received and responses
to the comments are provided in the following section.

TABLE 11

COMMENTS RECEIVED ON THE EIS PREPARATION NOTICE

<u>ORGANIZATIONS/AGENCIES</u>	<u>Date of Comment Received</u>	<u>Date of Responses</u>
<u>City and County</u>		
Honolulu Fire Department	1/21/83	3/01/83
Department of General Planning	1/26/83	3/01/83
Department of Parks and Recreation	1/21/83	3/01/83
Board of Water Supply	1/12/83	3/01/83
Police Department	1/07/83	3/01/83
Department of Public Works	1/14/83	3/01/83
Department of Transportation Services	* 1/31/83	3/01/83
Department of Housing and Community Development	1/25/83	3/01/83
Department of Land Utilization		
Building Department	1/11/83	--
Councilman David Kahanu		
Health Department		
<u>State of Hawaii</u>		
Department of Transportation	* 2/09/83	3/01/83
Department of Planning & Economic Development	2/02/83	3/01/83
Department of Land and Natural Resources	1/12/83	3/01/83
Department of Health	1/26/83	3/01/83
Office of Environmental Quality Control		
Department of Agriculture	1/26/83	3/01/83
Environmental Center UH		
Water Resources Research Center, UH	2/04/83	3/01/83
Department of Social Services and Housing	1/06/83	3/01/83
Department of Hawaiian Home Lands	1/13/83	--
Senator Ralph Ajifu		
Representative Robert Nakata		

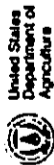
* Comments Received Passed Due Date

TABLE 11
(continued)

<u>ORGANIZATION/AGENCIES</u>	<u>Date of Comment Received</u>	<u>Date of Response</u>
<u>Federal</u>		
U.S. Army Corps of Engineers	2/03/83	3/01/83
U.S. Fish & Wildlife Service	1/26/83	3/01/83
U.S. Department of Agriculture, Soil Conservation Service	1/07/83	3/01/83
U.S. Marine Corp	1/19/83	3/01/83
<u>Community Organizations</u>		
Kaneohe Outdoor Circle American Lung Association Keapuka Community Association	* 2/11/83	3/01/83
Kaneohe Neighborhood Board No. 30 Kaneohe Community Council		
Kaneohe Business Group Hui Malama Aina O'Koolau The Sierra Club, Hawaii Chapter	2/08/83	3/01/83
Windward Community College Hawaii Loa College VTN Pacific	1/13/83	
Kahaluu Neighborhood Board No. 29	* 2/09/83	
<u>Interested Individuals</u> (Luluku Banana Growers)		
Stan Abe R. Deisseroth Aaron Fung Tet Choi Fung Kazu Ginoza Shigeo Higa	2/01/83	3/01/83

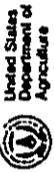
TABLE 11
(continued)

<u>ORGANIZATION/AGENCIES</u> (Luluku Banana Growers)	<u>Date of Comment Received</u>	<u>Date of Response</u>
Richard Horimoto		
Harry Iha		
Eric Kaneshiro		
A. Sanchez		
Reynold Shiroma		
Shige Shiroma		
Thelma Uechi		
Kenjiro Uehara		
Harry Yamashiro		
T. Sakamoto		



United States
Department of
Agriculture

P. O. Box 50004
Honolulu, Hawaii
96850



United States
Department of
Agriculture

P. O. Box 50004
Honolulu, Hawaii
96850

C O P Y

January 7, 1983

Mr. F. J. Rodriguez
Environmental Communications, Inc.
P.O. Box 536
Honolulu, HI 96809

Dear Mr. Rodriguez:

Subject: Preparation Notice for the Iolani School Properties Project
Location: Koolauoko District, Oahu

We have previously reviewed the above-mentioned notice at the request of the Department of Planning and Economic Development.

Enclosed is a copy of our comments to them for your information.

Sincerely,

Francis C. H. Lim
FRANCIS C. H. LIM
State Conservationist

XII-5

January 6, 1983

Mr. Hideto Kono, Director
Department of Planning and
Economic Development
P.O. Box 2359
Honolulu, HI 96804

Dear Mr. Kono:

Subject: Petition for an Amendment to the State Land Use District
Boundaries - AB2-544 (Iolani School Project) - Kaneohe, HI

Our comments are directed to phase I of this petition to classify 201.4 acres from conservation to urban district. We feel that the conversion of this land to residential purposes will increase soil erosion, may affect the operation and maintenance of the Hoomaluhia dam downstream, and have adverse effects on the aesthetics of Hoomaluhia Park.

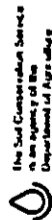
According to our soil survey, most of the soils are suitable for homesites. However, the soils in the valley bottoms are subject to flooding and the steep slopes on uplands need extreme care to minimize soil erosion.

The conversion of this land to subdivision will increase runoff and sedimentation. Was the Hoomaluhia flood control structure designed to take care of the increased runoff and sedimentation because of conversion of conservation land to housing? Would the conversion increase the operation and maintenance of the dam? We feel that these questions should be addressed before the petition is granted.

Thank you for the opportunity to review this petition.

Sincerely,

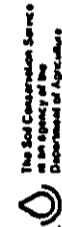
Francis C. H. Lim
FRANCIS C. H. LIM
State Conservationist



The Soil Conservation Service
is an agency of the
Department of Agriculture

SCS-AS-1
10-79

JAN 10 1983



The Soil Conservation Service
is an agency of the
Department of Agriculture

SCS-AS-1
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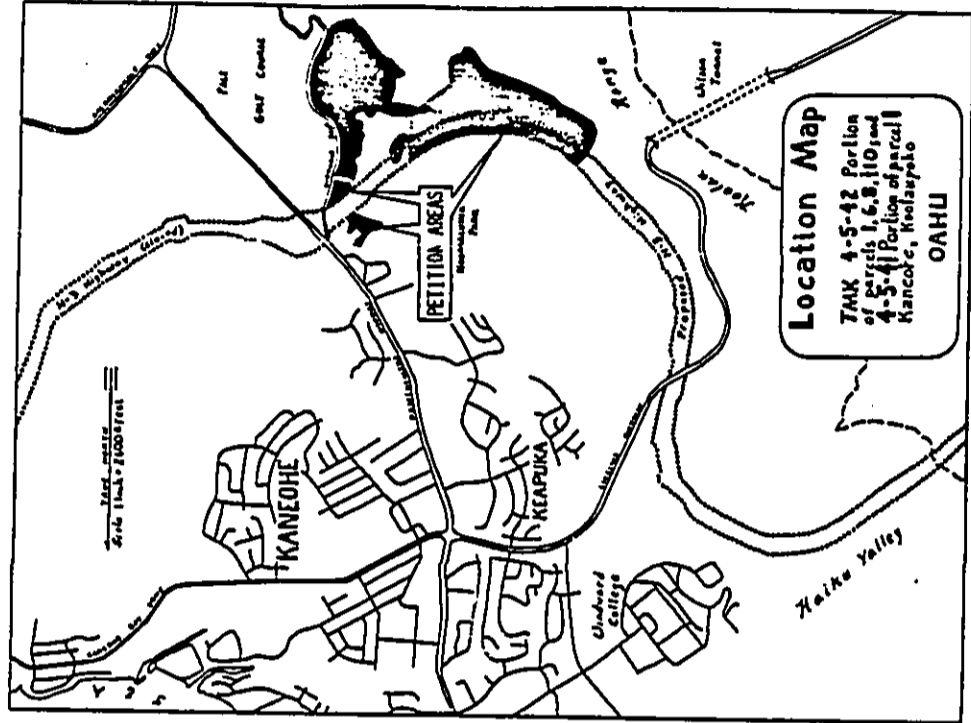
STATE OF HAWAII
 DEPARTMENT OF PLANNING
 AND ECONOMIC DEVELOPMENT

LAND USE COMMISSION

1001 Ala Moana Blvd., 21st Floor, Room 2101
 Honolulu, Hawaii 96813 Telephone 538-9811

January 4, 1983

MEMBER & ADDRESS
 Chairman
 Members & CLERK
 Vice Chairman
 COMMISSION MEMBERS
 Leonard P. Chan
 Robert H. Hays
 Thomas H. Hironaka
 James H. Kamae
 William L. Kamae
 William L. Kamae
 Executive Director



NOTIFICATION OF RECEIPT OF BOUNDARY ADJUSTMENT PETITION

This is to advise you that a petition to amend the State Land Use Boundaries with the following general information has been received by the State Land Use Commission:

- PETITIONER : IOLANI SCHOOL
- OWNER : IOLANI SCHOOL
- TAX MAP KEYS : 4-5-25; PORTION OF PARCEL 23;
4-5-31; PORTION OF PARCEL 1; 4-5-32; PORTION OF PARCELS 1, 2, 3, 4, 5, 6, 7, 8, 9 AND 10
- LOCATION : KANEOHE, HAWAII (KANEOHE, HAWAII)
- APPROXIMATELY 307 ACRES
- PRESENT DISTRICT : CONSERVATION
- PROPOSED USE : USDM
- RECLASSIFY TO : RESIDENTIAL DEVELOPMENT
- RECEIVED : DECEMBER 8, 1982
- DECKET NO. : A82-544

More detailed information on this request may be obtained by reviewing the petition and maps on file at the Land Use Commission office or the City and County of Honolulu, Department of General Planning.

Land Use Commission office hours are from 7:45 a.m. to 4:30 p.m., Mondays through Fridays.

A hearing on this matter will be scheduled within not less than sixty (60) and not more than one hundred eighty (180) days after receipt of this petition. You will be notified of the time, date and place of the hearing on this matter at a later date.

If you are interested in participating in the hearing and require information on how to proceed, please write or call the Commission staff. The telephone number is 538-3033.

Robert H. Hays
 ROBERT H. HAYS
 Executive Director

JAN 10 1983

ENVIRONMENTAL
COMMUNICATIONS
INC.

F. J. RODRIGUEZ,
PRESIDENT

March 1, 1983

Mr. Francis C.H. Lum
State Conservationist
USDA Soil Conservation Service
P.O. Box 50004
Honolulu, Hawaii 96850

Dear Mr. Lum:

Thank you for your comments on the Iolani School EIS Preparation Notice.

Adverse impacts resulting from erosion can be mitigated by complying with the City and County of Honolulu's Grading, Grubbing, and Stockpiling Ordinance No. 3988 and the U.S. Department of Agriculture Soil Conservation Service's Erosion and Sediment Control Guide for Hawaii.

The petitioner anticipated the importance of the project's impact on the Ho'omaluhia Dam and the adjacent stream flow and a study was completed regarding this very concern. The study, entitled "Environmental Aspects of Stormwater Runoffs", prepared by Dr. Gordon L. Dugan, states that the development should increase the nitrogen and phosphorus output, while the suspended solids should increase for the low frequency/ duration storms and then decrease somewhat for the higher frequency/ duration storms. Dugan states that the constituent loads should not be considered as absolute, but rather as trends. There will also be potential changes in the output of biocides and heavy metals. However, impacts to the adjacent streams are anticipated to be minimal because biocides currently in use that may potentially adversely affect water quality, tend to breakdown more readily in comparison to the more lasting types of a few years ago. Lead concentrations originating from automobiles should be steadily decreasing, since new automobiles have been designed to only utilize unleaded gasoline, which would reduce the output of lead into the environment.

Adverse effects on the aesthetics of Ho'omaluhia Park are not anticipated since the proposed project is consistent with adjacent residential subdivisions.

The project design provides sufficient flexibility in the siting of units with maximum open space and minimal disturbance to the natural terrain. The residences will be located on the flattest portions of the

1112 BUSHWICK BUILDING, SUITE 407, P. O. BOX 326, HONOLULU, HAWAII 96808 • TELEPHONE (808) 521-8781

Mr. Francis C.H. Lum
Page 2
March 1, 1983

site. Flooding is not anticipated to be a problem. Storm drainage runoff from the proposed project will be collected by catch basins located within the roadways, conveyed by underground pipe system, and discharged into existing streams and the Kaneohe Flood Control Ponding Basin in Ho'omaluhia Park.

The Kaneohe Flood Control Ponding Basin in Ho'omaluhia Park will be able to accommodate the proposed project. The project will result in increased government expenditures resulting from maintenance of the dam. These costs will be offset by increased tax revenue resulting from development of this project.

Thank you for your interest and concerns.

Yours very truly,



F. J. Rodriguez

FJR:ls



United States Department of the Interior

FISH AND WILDLIFE SERVICE
100 ALA MOANA BOULEVARD
P.O. BOX 5187
HONOLULU, HAWAII 96809

RECEIVED OFFICE OF
ES
ROOM 6307
JAN 26 1983

Mr. Fred Rodriguez
Environmental Communications, Inc.
P.O. Box 536
Honolulu, Hawaii 96809

Re: EIS Preparation Notices
Iolani School Properties
Project, Ko'olaupoko District
Oahu, Hawaii

Dear Mr. Rodriguez:

The Service has reviewed the Environmental Impact Statement (EIS) preparation notice for the proposed reclassification of 201.4 acres of land from Conservation to Urban in the Ko'olaupoko District, Oahu. We recommend that discussions of the following topics be substantially expanded in the EIS:

- a. Direct and secondary impacts of the proposed action including projected growth, and demand for sewerage and water.
- b. Source of water supplies and how additional supply may affect instream flows.
- c. Secondary impacts of this action which include land clearing, grading and construction upon Ho'omaluhia and water quality within the Kamoalii Stream system.
- d. Secondary impacts of this action which involve long-term discharge of urban storm-water effluents into Kamoalii Stream and Kaneohe Bay.

To the best of our knowledge, there are no species listed or eligible for listing as threatened or endangered which occur within the project boundaries. We suggest, however, that the EIS contain complete descriptions of the affected terrestrial and aquatic fauna.

We appreciate this opportunity to comment, and look forward to receipt of the EIS.

Sincerely yours,

Ernest Kosaka
Project Leader
Office of Environmental Services



cc: HDAR

Save Energy and You Serve America!

JAN 27 1983

ENVIRONMENTAL COMMUNICATIONS INC.

F. J. RODRIGUEZ
PRESIDENT

March 1, 1983

Mr. Ernest Kosaka
Project Leader
Fish and Wildlife Service
P.O. Box 50167
Honolulu, Hawaii 96850

Dear Mr. Kosaka:

Thank you for your comments on the Iolani School EIS Preparation Notice. We would respond to your concerns in the following:

- a. The proposed project will generate a demand for water of 305,500 gallons per day and for sewerage of 244,400 gallons per day at the time of completion. However, since construction of the residential units will be completed incrementally, demand for water and sewerage facilities will be on a phased schedule. An anticipated schedule may include 2 years for off-site improvements and 6 years for on-site improvements. This phasing will reduce impact on existing facilities, since the total demand for water and sewerage would correspond with the schedule and not need to be accommodated at one time.
- b. The City and County of Honolulu Board of Water Supply (BWS) has master planned several well sites to be located within the vicinity of the proposed development. Reference to the EIS written by BWS for the proposed wells should answer your comments regarding instream flows.
- c. During construction, impact to surface water is anticipated to be minimal, since the soils found at the project site possess limited erosive characteristics. The impact of construction activities on water quality can be further minimized by adhering to control measures, particularly those specified in the City and County of Honolulu's Grading, Grubbing, and Stockpiling Ordinance No. 3968, 1972; the State Department of Health's Water Quality Standards, Chapter 37-A, Public Health Regulations, 1968; and the USDA Soil Conservation Service's Erosion and Sediment Control Guide for Hawaii, 1981.

d. The petitioner anticipated the importance of the project's impact on the adjacent stream flow and a study was completed regarding this very concern. The study, entitled "Environmental Aspects of Storm-water Runoff," prepared by Dr. Gordon L. Dugan, states that the

1132 BISHOP BUILDING SUITE 407, P.O. BOX 536 • HONOLULU HAWAII 96809 • TELEPHONE (808) 521-0191

Mr. Ernest Kosaka
Page 2
March 1, 1983

development should increase the nitrogen and phosphorus output, while the suspended solids should increase for the low frequency/ duration storms and then decrease somewhat for the higher frequency/ duration storms. Dugan states that these constituent loads should not be considered as absolute, but rather as trends. There will also be potential changes in the output of biocides and heavy metals. However, impacts to the adjacent streams are anticipated to be minimal because biocides currently in use that may potentially adversely affect water quality, tend to breakdown more readily in comparison to the more lasting types of a few years ago. Lead concentrations originating from automobiles should be steadily decreasing, since new automobiles have been designed to only utilize unleaded gasoline, which would reduce the output of lead into the environment.

The Draft EIS will contain complete descriptions of the affected terrestrial and aquatic fauna.

Thank you for your comments and interests.

Yours very truly,

F. J. Rodriguez

FJR:ls

DEPARTMENT OF THE ARMY
PACIFIC OCEAN DIVISION, CORPS OF ENGINEERS
FT. SHAFTER, HAWAII 96888



February 3, 1983

Mr. F. J. Rodriguez
Environmental Communications, Inc.
P.O. Box 536
Honolulu, Hawaii 96809

Dear Mr. Rodriguez:

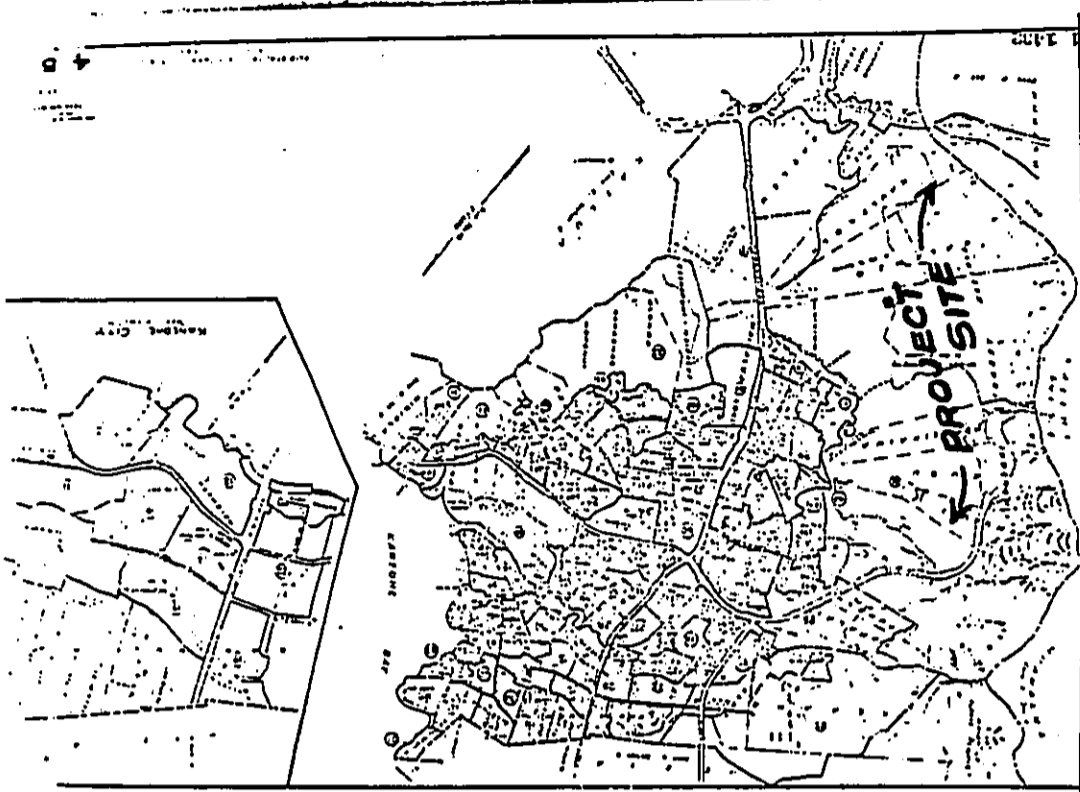
Thank you for the opportunity to review the Environmental Impact Statement (EIS) Preparation Notice for the proposed Iolani School Properties Project, Oahu, Hawaii. Based on our review, we offer the following comments for your use during preparation of the EIS:

a. The project site is located in an area of undetermined but possible flood hazards of Zone D designation, according to the Flood Insurance Study for the City and County of Honolulu by the Federal Insurance Administration (enclosure 1 and 2).

b. A Department of the Army (DA) permit may be required for the proposed development if any work involves the discharge of dredged or fill material into inland waters or wetland areas. We anticipate that project plans and site descriptions will be detailed in the EIS so that we may determine the extent of Corps regulatory jurisdiction.

c. The proposed development is located within the watershed area above the Corps' Kaneohe-Kaliua flood control project and related Hoonaluhia Park Project and may cause an increase in runoff downstream. Although at this time we do not anticipate major adverse effects to the flood control project, we recommend that the EIS clearly describe the proposed development in terms of drainage, sedimentation, and erosion control. We are also concerned that the proposed development may adversely affect the scenic integrity of view angles from the park. We look forward to discussion of this in the EIS including details of probable impacts and proposed mitigation.

d. Page 2 of the EIS Preparation Notice, paragraph E.1, states that "the project site varies in elevation from 25 to 175 feet above mean sea level." Since the City and County of Honolulu has a floodage



-2-

assessment to 217 feet above mean sea level, we recommend that the project sponsors reconfirm their project elevations.

Sincerely,

James H. Holman
 Chief, Engineering Division

Enclosure

XII-10

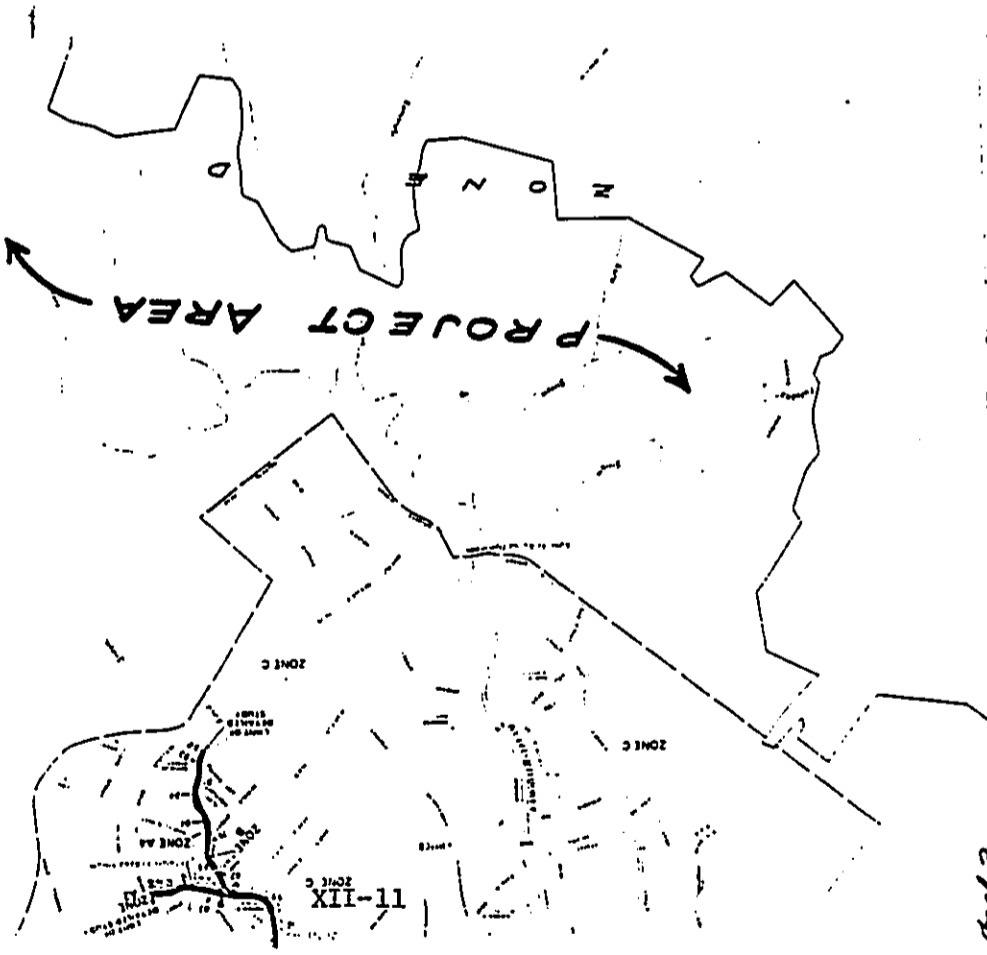
shell



REFERENCE:

Flood Insurance Rate Map
 Scale: 1" = 1000 ft.
 C & C of Honolulu, Community-Plan No. 150001-0001A
 (3 September 1980)

ZONE D



EXPLANATION OF ZONE DESIGNATIONS

ZONE	EXPLANATION
A	Areas of 100-year flood; base flood elevations and flood hazard factors not determined.
AD	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; average depths of foundation are shown, but no flood hazard factors are determined.
AM	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; base flood elevations are shown, but no flood hazard factors are determined.
A1-A30	Areas of 100-year flood, base flood elevations and flood hazard factors determined.
A39	Areas of 100-year flood to be protected by flood protection system under construction; base flood elevations and flood hazard factors not determined.
B	Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood. (Medium shading)
C	Areas of minimal flooding. (No shading)
D	Areas of undetermined, but possible, flood hazards.
V	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined.
VI-V30	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined.
*	The numerals indicate the magnitude of difference between the 100-year and 10-year flood elevations. For numerals between 1-20, the difference is one half of the value; for values greater than 20, the difference is 10 less than the numeral shown. This information is used in establishing insurance rates.
—15—	100-year tsunami or riverine elevation line, with elevation in feet above mean sea level.
—	Zone boundary line

ENVIRONMENTAL
COMMUNICATIONS
INC.

F. J. RODRIGUES
PRESIDENT

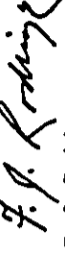
Mr. Klauk Cheung
Page 2
March 1, 1983

the project site is located mauka of the Interstate Highway H-3 alignment. Views from Ho'omaluhia Park, then, should not be obstructed by the proposed project, but rather from the H-3 alignment.

- d. Site elevations were rechecked and found to be between 200 feet and 525 feet.

Thank you for your concerns and interests.

Yours very truly,



F. J. Rodrigues

FJR:ls

March 1, 1983

Mr. Klauk Cheung
Chief Engineering Division
Department of the Army
Pacific Division, Corps of
Engineers
Ft. Shafter, Hawaii 96858

Dear Mr. Cheung:

We are in receipt of your comments on the Iolani School EIS Preparation Notice. We would respond to the comments made in your letter in the following:

- a. We appreciate receiving the information regarding existing flood hazard areas located in the project area and will include them in the Draft EIS.
- b. Please be assured that the petitioner will comply with Corps permit requirements.
- c. Storm drainage runoff from the proposed project will be collected by catch basins located within the roadways, conveyed by underground pipe system, and discharged into existing streams and the Kaneohe Flood Control Ponding Basin in Ho'omaluhia Park.
During grading and excavation activities, the site may be subjected to slight erosion and sedimentation problems. Adverse impacts may be mitigated by complying with the City and County of Honolulu's Grading, Grubbing, and Stockpiling Ordinance No. 3988, 1972 and the U.S. Department of Agriculture Soil Conservation Service's Erosion and Sediment Guide for Hawaii, 1981.

The residential subdivision being proposed is consistent with the prevailing land uses at the adjacent subdivision. There are no multi-family high-rise structures being considered. Therefore, views from any orientation should remain unaffected. In addition,

GEORGE B. ARISTON
DIRECTOR



STATE OF HAWAII
DEPARTMENT OF SOCIAL SERVICES AND HOUSING
HAWAII HOUSING AUTHORITY
P. O. BOX 17907
HONOLULU, HAWAII 96817

January 6, 1983

PAUL A. TOM
EXECUTIVE DIRECTOR

DE WERT REITER

IC: 82:DEV/50

F. J. RODRIGUEZ
PRESIDENT

ENVIRONMENTAL
COMMUNICATIONS
INC.

March 1, 1983

Mr. Paul A. Tom
Executive Director
Hawaii Housing Authority
Department of Social Services
and Housing
P.O. Box 17907
Honolulu, Hawaii 96817

Dear Mr. Tom:

Thank you for your agency's comments on the Iolani School EIS Preparation Notice.

We have reviewed the subject Environmental Impact Statement Preparation Notice and since this project is to meet the housing demands of the low and moderate income families, proposed leasehold sales prices, and the proposed purchase price of the fee value of the land should be included in the E.I.S.

Thank you for the opportunity to comment on this matter.

Sincerely,

PAUL A. TOM
Executive Director

XII-13

To meet the market demand, presently believed to be the low-and moderate-income purchaser, the petitioner desires to market the homes within the affordable price market. In order to meet this demand, the petitioner contemplates a leasehold arrangement for the land for a set period of time, with the right to purchase clause inserted into the lease. The actual proposed leasehold sales prices and the proposed purchase price of the fee value of the land have not been determined at this time. The petitioner understands the importance and necessity of these types of data, and is currently determining them.

Thank you for your concerns and interest.

Yours very truly,

F. J. Rodriguez

FJR:ls

JAN 11 1983

GEORGE R. ANTONIO
President



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF STATE PARKS
P. O. BOX 451
HONOLULU, HAWAII 96809

SHUNSU OHSU, CHAIRMAN
Board of Land & Natural Resources
EDGAR A. IMAMOTO
Member of the Commission
DIRECTIONS:
AGRICULTURE DEVELOPMENT
PROGRAM
ADAPTIVE RESOURCES
CONSERVATION AND
RECREATION DEVELOPMENT
CONTRACTS
FORESTRY AND WILDLIFE
LAND MANAGEMENT
PLANNING AND
MULTI-USE LAND DEVELOPMENT

ENVIRONMENTAL
COMMUNICATIONS
INC.

F. J. RODRIGUEZ
PRESIDENT

January 12, 1983

Mr. F. J. Rodriguez, President
Environmental Communications, Inc.
P. O. Box 536
Honolulu, HI 96809

Dear Mr. Rodriguez:

SUBJECT: Proposed State Land Use District Boundary
Conservation to Urban
Kaneohe, Oahu, TME 4-5-25; 23; 4-5-41; 1;
4-5-42; 1, 6, 8, 10

XII-14

Thank you for the opportunity to comment on the proposed under-taking.

Unfortunately, we are unable to do a proper review and evaluation of this proposal without a copy of the archaeological report addressing the results of the literature search and walk through reconnaissance survey mentioned on page 3 of your notice. Please send our office a copy.

If you have any questions, please contact Earl Neller, of our office, at 548-7460.

Sincerely yours,

Ralston H. Nagata
State Parks Assistant
Administrator

cc: Land Use Commission
Environmental Quality Commission

March 1, 1983

Mr. Ralston H. Nagata
State Parks Assistant
Administrator
Department of Land and
Natural Resources
P.O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Nagata:

Thank you for your agency's comments on the Iolani School EIS Preparation Notice. We will be including the requested data contained in your letter of January 12, 1983 in the draft EIS currently under preparation. You will be pleased to note that there has already been extensive archaeological work conducted in the project site for the State H-3 project. We have augmented this information with specific field reconnaissance work of our own, and this material will be made available in the draft EIS.

Thank you for your continuing interest.

Yours very truly,

F. J. Rodriguez

FJR:tl

JAN 14 1983

112 BISHOP BUILDING SUITE 407, P. O. BOX 336 - HONOLULU HAWAII 96809 - TELEPHONE (808) 521-6391

CLAUDE B. ARIZONIA
GOVERNOR



JACK K. SUWA
CHAIRMAN, BOARD OF AGRICULTURE
SUZANNE D. PETERSON
DEPUTY TO THE CHAIRMAN

State of Hawaii
DEPARTMENT OF AGRICULTURE
1428 So. King Street
Honolulu, Hawaii 96814
January 26, 1983

Mailing Address:
P. O. Box 21159
Honolulu, Hawaii 96822

Environmental Communications, Inc.
Page -2-
January 26, 1983

(3) Hanalei silty clay (HnA and HnB) with slopes ranging from 0 to 6 percent. Both soils are used for taro, pasture and sugarcane and have crop Capability Classifications of 1W (soils have moderate limitations because of excess water).

The subject parcels have Land Study Bureau Overall Productivity Ratings of "C" and "E". The subject parcels have fair to good productivity potential for vegetable, forage, grazing and orchard uses.

To our knowledge, parts of TMK: 4-5-42: por. 1 have been in banana cultivation. Any existing banana or other agricultural operations that will be directly or indirectly affected by the proposed residential development should be identified and the operators properly notified. The economic and social impacts of any loss in cultivated area, and/or the relocation of farmers and their operations should be thoroughly addressed.

Thank you for the opportunity to comment.

Jack K. Suwa
JACK K. SUWA
Chairman, Board of Agriculture

cc: DPED
LUC
EOC

MEMORANDUM

To: Environmental Communications, Inc.
Subject: Environmental Impact Statement (EIS) Preparation Notice
Iolani School Properties Project
Iolani School
TMK: 4-5-25: Por. 23, 4-5-41: Por. 1, 4-5-42: Por. 1, 6, and 10, Kaneohe, Oahu

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

According to the Preparation Notice, the applicant is petitioning the State Land Use Commission to reclassify approximately 201.4 acres of land from the Conservation District to the Urban District for the development of residential houselots and residential units. The report correctly identifies the subject properties as being of "Prime" and "Other Important" lands as classified according to the Agricultural Lands of Importance to the State of Hawaii (ALISH) system. The remaining property is not classified according to the ALISH system.

The Soil Conservation Service Soil Survey identifies the predominant soils on the subject parcels as:

- (1) Lolekaa silty clay (LoB, LoC, LoD, LoE, and LoF) with slopes ranging from 3 to 70 percent. LoB and LoC soils are used for pasture, truck crops, bananas and papayas and have crop Capability Subclasses of Iie and Iiie, respectively (soils are suspect to moderate to severe erosion if cultivated and not protected). The remaining soils are used for pasture.
- (2) Kaneohe silty clay (KGB and KHOF) with slopes ranging from 3 to 65 percent respectively (soils are suspect to moderate to very severe erosion if cultivated and not protected). Both soils are used for pasture and have crop Capability Subclasses of Iie and VIIe.

"Support Hawaiian Agricultural Products"

JAN 28 1983

ENVIRONMENTAL
COMMUNICATIONS
INC.

F. J. RODRIGUEZ
PH 510-111

March 1, 1983

Mr. Jack K. Suwa, Chairman
Department of Agriculture
1428 So. King Street
Honolulu, Hawaii 96814

Dear Mr. Suwa:

Thank you for your comments on the Iolani School EIS Preparation Notice.

The information provided by you regarding soils classification will be included in the Draft EIS.

We have made the EIS PN available to the banana farmers and also the elected representatives of the district. An analysis has been prepared which describes the economic cost benefits which will result from the taking of this land from active cultivation. This will be made available to your department in the draft EIS currently under preparation.

Thank you for your continuing interest and concern.

Yours very truly,

F. J. Rodriguez

F. J. Rodriguez

FJR:ls

XII-16



LAND USE COMMISSION
STATE OF HAWAII
JAN 31 9 40 AM '83

STATE OF HAWAII
DEPARTMENT OF HEALTH

P.O. BOX 3372
HONOLULU, HAWAII 96813

January 26, 1983

CHARLES G. CLARK
DIRECTOR

JOHN F. CALDWELL, M.D.
DEPUTY DIRECTOR

HERBERT W. THOMPSON, M.A.
DEPUTY DIRECTOR

MELVIN S. ROZUMBA
DEPUTY DIRECTOR

AMBERLE BISHOP-SHAW, M.A., P.D.
DEPUTY DIRECTOR

MASTERS, M.D.
PH: EPHS-55

Mr. Gordon Furutani
Executive Officer
Land Use Commission
335 Merchant St.
Honolulu, Hawaii 96813

Dear Mr. Furutani:

Subject: Request for Comments on Proposed Environmental Impact Statement (EIS) for State Land Use District Boundaries, Kaneohe, Oahu, TRK 4-5-25; 23; 4-5-41; 1; 4-5-42; 1, 6, 8, 10

Thank you for allowing us to review and comment on the subject proposed EIS.

We submit the following comments for your information and consideration:

Wastewater (Sewage) Disposal

The following questions need to be answered:

1. Where will the sewage be taken - Kailua STP or Kaneohe STP?
2. What are the impacts on the capacity of Kailua or Kaneohe STP?
3. Both of these questions should be resolved with the City and County of Honolulu Department of Public Works.

Noise

1. The proposed project must be designed to comply with the provisions of Title 11, Administrative Rules Chapter 43, Community Noise Control for Oahu. Equipment noise from the sewage pump station and the water pump station must be attenuated to meet the allowable noise levels of the regulations based on zoning districts.
2. Construction activities must comply with the provisions of Title 11, Administrative Rules Chapter 43, Community Noise Control for Oahu.
3. Traffic noise from heavy vehicles traveling to and from the construction site must be minimized in residential areas and must comply with the provisions of Title 11, Administrative Rules Chapter 42, Vehicular Noise Control for Oahu.

FEB 1 1983

ENVIRONMENTAL
COMMUNICATIONS
INC.

March 3, 1983

Mr. Melvin K. Koizumi, Deputy Director
Department of Health
P.O. Box 3378
Honolulu, Hawaii 96801

Dear Mr. Koizumi:

Thank you for your comments on the Iolani School EIS Preparation Notice. We have referred the specific comments expressed by your department to the engineering consultant for their review and can respond in the following:

Wastewater (Sewage) Disposal

1. As of this writing, it is anticipated that sewage will be disposed of at the Kaneohe STP.
2. The anticipated sewage to be generated by the proposed project at time of completion is estimated to be 244,400 gallons per day. However, since construction of the residential units will be completed incrementally, demand for sewerage facilities will be on a phased schedule. An anticipated schedule may include 2 years for off-site improvements and 6 years for on-site improvements. This phasing will reduce impact on existing facilities, since the total demand of 244,400 gallons per day will correspond with the schedule and not need to be accommodated at one time. All required improvements, including expansion of existing facilities, will be undertaken by the developer of the project at no expense to governmental agencies.
3. The Department of Public Works has indicated that capacity of the Kaneohe STP may be inadequate to accommodate the proposed project. Therefore, in order to accommodate the increased sewage flows, improvements will be made to increase capacity at the existing Kaneohe STP. Please be assured that the proposed project will be provided with adequate sewerage facilities.

Noise

- 1,2. The proposed project will comply with the provisions of the regulations mentioned.
- 3.

ENVIRONMENTAL COMMUNICATIONS INC.

January 26, 1983

-2-

Mr. Gordon Futani

4. The H-3 Freeway is proposed to be constructed adjacent to the area sought to be developed for residential purposes. The residents along the freeway must be shielded from the traffic noise.

We realize that the statements are general in nature due to preliminary plans being the sole source of discussion. We, therefore, reserve the right to impose future environmental restrictions on the project at the time final plans are submitted to this office for review.

Sincerely,

Melvin K. Koizumi
Melvin K. Koizumi
Deputy Director of Health

cc: DEPC

XII-17



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
1555 ALI'OLEA DRIVE
HONOLULU, HAWAII 96813

Mr. Melvin K. Kostrum
Page 2
March 1, 1983

4. The proposed project will be in compliance with all applicable DOH regulations governing noise control. It is anticipated that levels should not exceed those currently being measured at the adjacent residential subdivision and from the proposed Interstate Highway H-3.

Thank you for your concerns and interest.

Yours very truly,

F. J. Rodriguez

F. J. Rodriguez

FJR:ls

FEB 9 1983

Environmental Communications, Inc.
P.O. Box 536
Honolulu, Hawaii 96809

Attention: Mr. F. J. Rodriguez
Gentlemen:

Iolani School Properties Project
EIS Preparation Notice

Regarding the subject document, we submit the following comments:

1. Section E. Existing Land Use

The EIS to be prepared should expand on the H-3 as follows:

- a. On November 12, 1982, the Federal Highway Administration granted the State approval to complete the design and construction of H-3.
- b. Construction of the Halekou Interchange is already underway.
- c. Construction of that section of H-3 situated between Hoomaluha Park and Iolani School's project is expected to begin in early 1984.
- d. The State has commenced survey work for land appraisal and is expected to complete acquisition by mid-1983.

2. Section E.11. Air Quality

It should be noted that an extensive air quality study was performed as part of the H-3 EIS work. The results of this effort are published in the following:

FEB 11 1983

F. J. MORGAN, PRESIDENT

March 1, 1983

- a. Final North Halawa Valley Supplemental EIS, Vol. IV, Appendix C.
- b. Final North Halawa Valley Supplemental EIS Vol. VI, Appendix J.

Additionally, the use of the word "pristine" is questionable. The dictionary definition is "characteristic of the earliest period; unspoiled." It is unclear whether such a word can be used for this area, and whether it is based on actual air quality field measurements.

3. Section G.2. Hydrology and Drainage

The design of this section of H-3 is currently underway, including all stream crossings which are being designed for certain calculated flow rates from the areas mauka of H-3. A change in the upland drainage characteristics, and thus flow rates at the H-3 crossings, could affect the current design.

4. A traffic impact analysis should be prepared as part of the EIS. This analysis should evaluate the peak period conditions on the surrounding highway facilities, particularly at the intersection of Kionaole Road and Kamehameha Highway.

5. The map attached to the Prep Notice should reflect the H-3 right-of-way.

6. In view of the fact that a Conservation District Conditional Use Permit has been granted to the H-3 Project, the EIS should address the impact of the reclassification action on the H-3 Project.

In closing, we thank you for this opportunity to review and comment on your EIS Preparation Notice.

Very truly yours,
Ryokichi Higashionna
 Ryokichi Higashionna
 Director of Transportation

Mr. Ryokichi Higashionna, Director
 Department of Transportation
 869 Punchbowl Street
 Honolulu, Hawaii 96813

Dear Mr. Higashionna:

Thank you for your comments on the Iolani School Preparation Notice. We would respond to the comments made in your letter in the following.

1. The Draft EIS will address the H-3 alignment relative to the proposed project and will specifically detail the items mentioned.

2. An addendum to Barry D. Root's Air Quality Study for the Proposed Kapaemahu Development Project was completed when it was determined that the H-3 Highway would be routed adjacent to the project site. It was the intent of the addendum to discuss impacts of the highway on the Iolani School Project site. The methodology and assumptions used by Root in determining expected worst case carbon monoxide concentrations were as follows. For these computations, the nearest edge of the project site to a lane of traffic on the H-3 Freeway was determined to be a little over 20 meters. Traffic volumes for peak hour conditions in the year 2000, presented in the Final Second Supplement to the Interstate Route H-3 Environmental Impact/4(f) Statement, were 10,891 in the peak direction and 3,556 in the off-peak direction. These volumes were combined with projected 1992 vehicular emission rates to produce worst case peak hour emissions, assuming vehicular speeds of 35 mph in unimpeded flow. The minimum configuration for H-3 through the project area would likely be five lanes in each direction with a median of at least two lanes wide. The evening peak traffic condition would produce maximum impact on the Kapaemahu side of the highway with light tradewinds blowing at an angle of 45 degrees to the roadway.

Using these assumptions the following carbon monoxide concentrations were computed for 1992:

- PEAK ONE HOUR CARBON MONOXIDE CONCENTRATION: 8 mg/m3
- PEAK EIGHT HOUR CARBON MONOXIDE CONCENTRATION: 4.8 mg/m3

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DEPARTMENT OF PLANNING AND ECONOMIC DEVELOPMENT

GEORGE B. ANTONIA
JAMES H. HARRIS
HAROLD K. HARRIS
IRVING S. HARRIS
JAMES S. HARRIS

Mr. Ryokichi Higashinona
Page 2
March 1, 1983

These levels are within acceptable State and Federal Air Quality Standards. Therefore, the H-3 Highway should not adversely impact the proposed project.

The term "pristine" may be inappropriate when describing the area. Please be assured that a more appropriate term will be utilized when describing the project area.

3. The petitioner will be working with the State Department of Transportation, Hydraulic Section, to ensure the provision of adequate drain crossings on the H-3 highway.

4. Community Planning, Inc. has prepared an updated traffic impact analysis entitled "Access Study for the Proposed Kamooili Development, Kaneohe, Koolauapoko, Oahu, Hawaii." The analysis evaluates peak period conditions on the surrounding highway facilities, including the intersection of Kionaole Road and Kanehameha Highway.

5. The Draft EIS will provide an exhibit depicting the location of the H-3 alignment relative to the Iolani School Project.

6. The H-3 Highway alignment traverses the makai side of the project site adjacent to Ho'omaluhia Park. The proposed action will provide 31.4 acres of the total 201.4 acres for the highway's right-of-way and should not impede ultimate construction of the highway.

Thank you for your concerns and interests.

Yours very truly,
F. J. Rodriguez

F. J. Rodriguez

FJR:ib

Ref. No. 7042

February 2, 1983

Mr. F. J. Rodriguez
President
Environmental Communications, Inc.
P.O. Box 536
Honolulu, Hawaii 96809

Dear Mr. Rodriguez:

Subject: EIS Preparation Notice for Iolani Schools Properties Project, Koolauapoko, Oahu

We have reviewed the subject preparation notice and offer the following comments with respect to IPEP's programs. The first series of comments are made on the basis of the relevant objectives and policies of the Hawaii Coastal Zone Management Program.

Coastal Ecosystems: Minimize disruption or degradation of coastal water ecosystems by effective regulation of stream diversions, channelization, and similar land and water uses, recognizing competing needs.

The proposed subdivision will require grading and filling, site preparation and construction of streets and roadways in areas with gradients greater than 10%. Inasmuch as surface erosion and runoff from the area to the adjacent flood control basin and the Class AA waters of Kailua Bay may be substantial both during and following construction, the EIS should fully address all potential impacts on these systems and any proposed mitigating measures.

Scenic and Open Space: Insure that new developments are compatible with their visual environment by designing and locating such developments to minimize the alteration of natural landforms and existing public views to and along the shoreline.

The project proposes development on the Pali slopes above existing development and may thus impact vistas and viewplanes from points both mauka and makai of the proposed project. The EIS should evaluate such impacts and describe any proposed mitigating measures.

Historic Resources: Protect, preserve and where desirable, restore those natural and man-made historic and pre-historic resources in the coastal zone management area that are significant in Hawaiian and American history and culture.

FEB 8 - 1983

FEB 8 1983

Mr. F. J. Rodriguez
Page 2
February 2, 1983

In view of past archaeological surveys and identified sites in the area proposed for development, the EIS should fully describe existing sites, proposed pre-construction surveys and any archaeological monitoring, preservation and salvage methods as may be necessary in consultation with the State Historic Preservation Office.

We would also like the EIS to evaluate our following land use and public facilities concerns.

Based on information contained in the boundary change petition submitted by Iolani School, the proposed 201.4 acre development is the first phase of a total 384 acre planned development by the petitioner. The entire 384 acres lie within the State Conservation District. Because of the magnitude of the proposed development and the potential impacts, we feel that the proposed EIS should discuss the impacts of the 201.4 acre development and, in addition, the potential impacts of the additional approximately 183 acre development area, particularly since the development of the proposed 201.4 acres may create an impetus for the further development of the area.

The EIS should discuss the availability and adequacy of existing and proposed public infrastructure improvements in the area to accommodate the proposed development. This discussion should include the following: the adequacy of the existing Kaneohe flood control improvements to accommodate the additional runoff from the proposed development; the capacity of the Kaneohe Sewage Treatment Plant to accommodate the anticipated wastewater flows from the proposed development, and whether or not the proposed facilities were designed to accommodate the proposed development; the capacity of the existing highway system in the area to accommodate the projected traffic flows (the traffic analysis should include discussion of peak hour traffic projections as well as total traffic flows); the availability of water for the proposed development, and timetables for development of proposed water sources, storage facilities, and transmission lines.

The EIS should address the proposed developments for the area, such as the proposed construction of II-5, and impacts of these projects on the proposed development.

The proposed EIS should identify and address the impacts of the proposed development.

The EIS should address the conformity of the proposed development on existing plans, programs, and policies for the area, including the conformance with the Hawaii State Plan Objectives, Policies, and Priority Directions, and the City and County of Honolulu General Plan Objectives and Policies (including the population distribution policies) and the conformity with the existing and proposed development plan designations for the area.


Mr. F. J. Rodriguez
Page 3
February 2, 1983

The preparation notice stated that this project is aimed at meeting the housing demand of the low and moderate income housing. It would be helpful if the EIS would give the ranges of purchase prices for the townhouse, duplex and single family units that are envisioned for this project. In addition, the EIS should describe the range of family income that is necessary to purchase these different types of units.

The EIS should also consider the possible effect of the project on the stream flow of the Kamoalii, Luluku and Kaneohe Streams, and on the general area's water table because the Board of Water Supply proposes to drill some wells in this area.

Thank you for the opportunity to provide these comments. Should any questions arise, please feel free to contact us at any time. We would like to have the opportunity to review the draft EIS when it becomes available.

Sincerely,



Hideto Kono

cc: Office of Environmental Quality Control

ENVIRONMENTAL
COMMUNICATIONS
INC.

F. J. RODRIGUEZ,
PRESIDENT

March 1, 1983

Mr. Hideto Kono, Director
Department of Planning and
Economic Development
P.O. Box 2359
Honolulu, HI 96804

Dear Mr. Kono:

Thank you for your comments on the Iolani School EIS Preparation Notice. We would respond to the comments made in your letter in the following.

Adverse impacts resulting from erosion can be mitigated by complying with the City and County of Honolulu's Grading, Grubbing, and Stockpiling Ordinance No. 3968 and the U.S. Department of Agriculture Soil Conservation Service's Erosion and Sediment Control Guide for Hawaii.

Mauka and makai views will not be significantly altered, since no multi-family high-rise structures are being considered. Since the proposed residential project is consistent with the adjacent residential subdivisions, existing view corridors should remain unaffected.

Significant archaeological sites are situated adjacent to and within the project area. The petitioner has committed themselves into ensuring that no harm come to these sites. It is recommended that intensive archaeological surveys be conducted in all portions of the project site before any construction begins. No construction will take place until all adverse impacts on archaeological sites have been mitigated.

The proposed project represents the Phase I increment for the development of a total 383.8 acres. The proposed action for this project will develop 201.4 acres, while the balance of the acreage will be developed during the subsequent Phase IIA and IIB increments. This phasing scheme has been devised because the petitioner is aware that the overall development should be planned and geared to meet immediate needs as well as long-term demands for housing. The Draft Environmental Impact Statement does address the Phase I development increment of the total 383.8 acres. The scope of work and proposed action is included in the analysis.

Mr. Hideto Kono
Page 2
March 1, 1983

The proposed project will be accommodated with adequate drainage, sewerage, potable water, and roadway systems. Construction of all infrastructure improvements will be completed between 1986 and 1990. Construction of the residential units will be completed incrementally, therefore, demand on infrastructure improvements will be on a phased schedule.

The Draft EIS will address the H-3 alignment relative to the proposed project and will specifically discuss the H-3's impact regarding noise and air quality.

The Draft EIS will address the following regulatory constraints: The City and County of Honolulu General Plan, DLUM, proposed DP, and Zoning the State of Hawaii Land Use Classification, ALISH, Interim Land Use Guidance Policies, State Plan, Housing Plan, and the Federal AICUZ study.

To meet the market demand, presently believed to be the low-and moderate-income purchaser, the petitioner desires to market the homes within the affordable price market. In order to meet this demand, the petitioner contemplates a leasehold arrangement for the land for a set period of time, with the right to purchase clause inserted into the lease. The actual proposed leasehold sales price and the proposed purchase price of the fee value of the land have not been determined at this time. The petitioner understands the importance and necessity of these types of data, and is currently determining them. The aim and goals of the petitioner is to provide affordable housing, particularly to meet the needs of the low-and moderate-income family.

The petitioner anticipated the importance of the project's impact on the adjacent stream flow and a study was completed regarding this very concern. The study, entitled "Environmental Aspects of Stormwater Runoff," prepared by Dr. Gordon L. Dugan, states that the development should increase the nitrogen and phosphorus output, while the suspended solids should increase for the low frequency/duration storms and then decrease somewhat for the higher frequency/duration storms. Dugan states that the constituent loads should not be considered as absolute, but rather as trends. There will also be potential changes in the output of biocides and heavy metals. However, impacts to the adjacent streams are anticipated to be minimal because biocides currently in use that may potentially adversely affect water quality, tend to breakdown more readily in comparison to the more lasting types of a few years ago. Lead concentrations originating from automobiles should be steadily decreasing, since new automobiles have been designed to only utilize unleaded gasoline, which would reduce the output of lead into the environment.

Mr. Hideto Kono
Page 3
March 1, 1983

The proposed development will affect the available surface area due to the construction of some impervious areas; however, the groundwater recharge may not experience a significant change, due to the gentler slopes of the residential lots and the substantial landscaping of the project which will be regularly maintained. Further, although 201.4 acres are designated for urbanization, only a portion (120.4 acres) will actually be covered by impervious material, i.e. roadways and residential lots.

Thank you for your interest and concern.

Very truly yours,



F. J. Rodriguez

FJR:ls

XII-23



University of Hawaii at Manoa

Water Resources Research Center
1101 Iolani Mall, 283 • 25-90 Duke Street
Honolulu, Hawaii 96822

4 February 1983

Environmental Communications, Inc.
P. O. Box 536
Honolulu, Hawaii 96809

Gentlemen:

Subject: EIS Preparation Notice for a State Land Use District Boundary
Amendment: Iolani School, Kaneohe, Oahu, Tax Map Keys
4-5-25:23; 4-5-41:1; 4-5-42:1, 6, 8, and 10

We have reviewed the subject EISPH and offer the following comments:

1. The Honolulu Board of Water Supply has plans for installing well(s) to tap groundwater resources in the subject area. Therefore, the EIS should address in detail (a) possible contamination of those sources by urbanization, (b) possible reduction of groundwater recharge attributable to urbanization.
2. Since there are prime agricultural lands on the subject property, the effect of its conversion to urban use should be addressed.

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

Sincerely,



Edwin T. Murabayashi
EIS Coordinator

ETH:jm

cc: Environmental Center, UH

FEB 7 - 1983

AN EQUAL OPPORTUNITY EMPLOYER

ENVIRONMENTAL
COMMUNICATIONS
INC.

F. J. RODRIGUEZ
PRESIDENT

March 1, 1983

Mr. Edwin T. Murabayashi
Water Resources Research Center
University of Hawaii at Manoa
Holmes Hall 283
2540 Dole Street
Honolulu, Hawaii 96822

Dear Mr. Murabayashi:

Thank you for your comments on the Iolani School EIS Preparation Notice. We would respond to the comments made in your letter in the following:

- 1a. The proposed action will provide underground sewer pipe systems. Therefore, no contamination of the groundwater basin is anticipated.
- 1b. The proposed development will affect the available surface area due to the construction of some impervious areas; however, the ground-water recharge may not experience a significant change, due to the gentler slopes of the residential lots and the substantial landscaping of the project which will be regularly maintained. Further, although 201.4 acres are designated for urbanization, only a portion (120.4 acres) will actually be covered by impervious material, i.e. roadways and residential lots.
- 2b. The petitioner anticipated the importance of the project's impact on bananas and a study was completed regarding this very concern. As a summary, the proposed project will eliminate only 3.7 acres currently under banana cultivation. The study indicates and discusses other sites being considered for banana cultivation. This increased cultivation activity should offset the losses incurred due to the proposed project.

Thank you for your concerns and interests.

Yours very truly,

F. J. Rodriguez

F. J. Rodriguez

FJR:ls

110 SOUTH BIRCHWOOD DRIVE, SUITE 407, P. O. BOX 58 • HONOLULU, HAWAII 96809 • TELEPHONE (808) 531-8291



STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P. O. BOX 1479
HONOLULU, HAWAII 96810

January 13, 1983

LAURENCE R. ANTHONY
DIRECTOR

PROJECT OFFICES
HONOLULU OFFICE
P. O. BOX 1479
HONOLULU, HAWAII 96810
KAUNAOA OFFICE
P. O. BOX 433
HONOOLAHU, HAWAII 96720

Environmental Communications, Inc.
P. O. Box 536
Honolulu, Hawaii 96809

Gentlemen:

SUBJECT: Iolani School Properties Project

Please be advised that the Department of Hawaiian Home Lands has no comments to make on the subject project.

Thank you for including this agency in your survey.

Sincerely yours,

Georgiana K. Padeken
Georgiana K. Padeken
Chairman

GKP:RF:PD:jm

NO RESPONSE NECESSARY

JAN 14 1983

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813



EILEEN M. ANDERSON
MAILER

William A. Bonnet
DIRECTOR
MAIL ROOM
DEPT. 1001100

January 31, 1983

TE 1/83-004

Mr. F. J. Rodriguez
Environmental Communications, Inc.
P. O. Box 536
Honolulu, Hawaii 96809

Dear Mr. Rodriguez:

Subject: EIS Preparation Notice for Iolani School Properties
Project

A Traffic Impact Study should be included in the EIS that will be prepared for the proposed project.

The Traffic Impact Study should include:

1. The total number of vehicle trips that will be generated during the a.m. peak hours.
2. The peak hour traffic assignments at Kionaole Road and Kamehameha Highway.
3. A capacity analysis to determine the level of service and probable delay on Kionaole Road and Kamehameha Highway during the peak hours under the following conditions:
 - a. Existing road conditions and alignment.
 - b. Realignment of Kionaole Road as part of the Halekou I.C. service road improvements.

The traffic study should also assess the impact of the project on existing bus service and not rely on the expansion of future City Bus Service to reduce traffic from the project (as indicated in a draft access study for the project). Expansion of bus service to the area will depend on availability of equipment and funding.

Mr. F. J. Rodriguez
January 31, 1983
Page 2

Since access from the project will connect to facilities under the State Department of Transportation, the design of these connections should be coordinated with them.

Sincerely,

WILLIAM A. BONNET
Director

FEB 15 1983

ENVIRONMENTAL
COMMUNICATIONS
INC.

F. J. RODRIGUEZ,
PRESIDENT

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU
450 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE 533-3181



BILLYE ANDERSON
MAYOR

JOSEPH A. COMANT
DIRECTOR
CHARLES H. TORIBOE
DEPUTY DIRECTOR

March 1, 1983

Mr. William A. Bonnet, Director
Department of Transportation
Services
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Bonnet:

Thank you for your comments regarding the Iolani School EIS Prepa-
ration Notice. The items you mentioned will be addressed in the updated
Traffic Impact Study Analysis. The study has been attached for your
review and evaluation.

Thank you for your concerns and interests.

Yours very truly,

F. J. Rodriguez

FJR:ls

Attachment

112 BROADWAY, SUITE 407, P.O. BOX 56 • HONOLULU, HAWAII 96809 • TELEPHONE (808) 531-0201

January 25, 1983

Mr. F. J. Rodriguez
Environmental Communications, Inc.
P. O. Box 536
Honolulu, Hawaii 96809

Dear Mr. Rodriguez:

Subject: Iolani School Properties Project
EIS Preparation Notice

We have reviewed the subject notice and are pleased to note the provision
of housing for low- and moderate-income families. Should at least 50%
of the units be affordable to families, with annual incomes of \$23,760
or less, the City may be able to contribute Community Development Block
Grant (CDBG) monies for some of the off-site improvement costs. Please
be advised, however, that there are additional federal environmental
review requirements if CDBG funds are used.

Please have the developer contact Mr. James Miyagi of this Department at
523-4264.

Sincerely,

cc: Land Use Commission
Environmental Quality Commission

JAN 31 1983



DEPARTMENT OF GENERAL PLANNING
CITY AND COUNTY OF HONOLULU
450 SOUTH KING STREET
HONOLULU, HAWAII 96813



F. J. RODRIGUEZ,
PRESIDENT

ENVIRONMENTAL
COMMUNICATIONS
INC.

ELLEN M. GILBERTSON
DIRECTOR

WILLARD T. CHOR
CHIEF PLANNING OFFICER
MELVIN ROOSTROCK
DEPUTY CHIEF PLANNING OFFICER

March 1, 1983

January 26, 1983

DCPL/83-4454

Mr. Joseph K. Conant, Director
Department of Housing and Community
Development
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Conant:

Thank you for your comments on the Iolani School EIS Preparation Notice.

To meet the market demand, presently believed to be the low-and moderate-income purchaser, the petitioner desires to market the homes within the affordable price market. In order to meet this demand, the petitioner contemplates a leasehold arrangement for the land for a set period of time, with the right to purchase clause inserted into the lease. The actual proposed leasehold sales price and the proposed purchase price of the fee value of the land have not been determined at this time. The petitioner understands the importance and necessity of these types of data, and is currently determining them. The aim and goals of the petitioner is to provide affordable housing, particularly to meet the needs of the low-and moderate-income family.

We appreciate the availability of possible Federal CDBG funds and at the appropriate time, the decision to avail ourselves of this option will be made.

Thank you for your continuing interest and concern.

Yours very truly,

F. J. Rodriguez

FJR:ls

Land Use Commission
State of Hawaii
Room 104, Old Federal Building
335 Merchant Street
Honolulu, Hawaii 96813

Gentlemen:

EIS Preparation Notice for State Land Use
Boundary Amendment--Iolani School Request for
Rezoning from Conservation to Urban,
Windward Oahu, TRK 4-5-25, 41 & 42--201.4 Acres

We have reviewed the EIS Preparation Notice and would like to have the following concerns addressed.

View from Pali Lookout

The Pali Lookout offers a panoramic view that is significant. The impact of the proposed development on this view should be discussed. Sketches or slides of the existing view should be included in the EIS, together with superimposition of the proposed development on those views.

Drainage

There are several streams in the area, several of which are behind the Keapuka Dam. The EIS should include discussion, with quantification, of the impact of the proposed subdivision on the area behind the dam, as well as the area below the dam. The ultimate flow of drainage should be indicated, with discussion of the potential impact of drainage flows as they traverse the various areas before reaching Kaneohe Bay.

LAND USE COMMISSION
STATE OF HAWAII
JAN 28 10 16 AM '83

Soil Loss

The proposed development will result in loss of vegetative cover. Using Soil Conservation Service's soil loss equations, the EIS preparers should estimate soil loss and the resultant sedimentation load on Kaneohe Bay with and without the proposed development.

Loss of Agricultural Production

Part of the area is planted in a particular variety of bananas. The EIS should include discussion of the loss of banana production from this proposed project and from projects on immediately adjacent lands. The impact of this loss on the overall supply of local bananas should be discussed. The Hawaii Agricultural Reporting Service provides data on overall local banana production, i.e., acreage in bananas, bananas produced, and value of production.

Wind Impacts

The prevailing trade winds result in high winds at the base of the Koolaus where they tend to swoop upward. With high winds, the banana trees sometimes suffer heavy damage. With the loss of protective trees, the impact of high winds may be accentuated. Wind surveys should be conducted for this area.

Power Transmission Lines

The map accompanying the EIS Preparation Notice shows some Hawaiian Electric Company transmission lines in the area. These should be identified in greater detail, with indications as to what transmission voltages are. The impact of high voltage lines on adjacent development should be discussed.

Traffic Impacts

The impact of projected increases in traffic on the various streets providing the major access to the area should be discussed. Any impacts on major intersections with Kaneohe Highway or Likelike Highway should be discussed. A critical intersection is the Likelike-Kahakili intersection. The need for improvements, and the schedule for proposed improvements should be discussed. Traffic impacts on Luluku Road and Likelike Highway capacities should also be discussed.

Noise

With the proposed extension of Interstate Highway II-3 through the area, the impact of noise from the highway may be significant. The noise impact should be estimated, and the relationship of projected noise levels to recommended maximum noise levels for various land uses should be indicated.

Consistency with Local Land Use Plans

The proposed project will increase population in the area. The relationship of this increase to increases projected in the County General Plan and proposed redrafted Development Plan for the area should be discussed. The cumulative impact of development of this and other former Kanohe Ranch lands on the total population projected for Koolauoko should be indicated.

Flora and Fauna

Surveys of flora and fauna of the area should be conducted. With urbanization of the lowlands taking place since the end of World War II, bird life has been forced to move to mauka areas such as this. There is the possibility that the Hawaiian owl or pueo may be found in this area.

Thank you for affording us the opportunity of reviewing the EIS preparation notice.

Sincerely,



CLARENCE TOM
Planner

APPROVED:



HILLARD T. CIOH

cc: OEQC
DLMR
State Dept. of Agriculture
U.S. Soil Conservation Service

ENVIRONMENTAL
COMMUNICATIONS
INC.

F. J. RODRIGUEZ,
PRESIDENT

March 1, 1983

Mr. Willard T. Chow
Department of General Planning
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Chow:

Thank you for your comments on the Iolani School Preparation Notice. We are providing copies of your agency's concerns to the engineering consultant and also to the respective subconsultants working on this project. On a preliminary basis, we can respond to your points in the following:

- Pall Lookout View:** We share your concerns over the retention of a scenic view corridor looking makai from the Pall Lookout. As to the use of the graphics described in your letter, this method is under consideration at the present and will be decided during the development of the Draft EIS currently under way.
The residential subdivision being proposed is consistent with the adjacent subdivision. There are no multi-family high-rise structures being considered. Therefore, views from any orientation should remain unaffected.
- Drainage:** All drainage patterns will be designed to meet applicable County, State, and Federal code standards governing drainage impacts.
- Soil Loss:** All applicable controls mandated by government regarding the loss of soils during construction as well as in final grade will be provided by engineering design in compliance with the County Grading Ordinance, as well as other sound engineering design considerations.
- Agricultural Production:** The petitioner anticipated the importance of the project's impact on bananas and a study was completed regarding this very concern. The proposed project will eliminate only 3.7 acres currently under banana cultivation. The study indicates and discusses other sites being considered for banana cultivation. This increased cultivation activity should offset the losses incurred due to the proposed project.

Mr. Willard T. Chow
Page 2
March 1, 1983

- Wind Impacts:** Consideration of wind storm patterns for residential purposes is not considered to be a problem due to the scope of work. The units to be constructed are single-family, low-density, and of limited building height. Therefore, wind patterns should not affect the units.
- Power Transmission Lines:** All high voltage transmission lines will be clearly identified in conjunction with the Hawaiian Electric Company prior to any onsite work. All realignments considered necessary will be coordinated with HECO.
- Traffic Impacts:** Community Planning, Inc. has prepared an updated traffic impact analysis entitled "Access Study for the Proposed Kamooaili Development, Kaneohe, Koolauoko, Oahu, Hawaii." The analysis evaluates peak period conditions on the surrounding highway facilities, including impacts on major intersections on Kamehameha and Likelike Highways.
The phasing of the project and the long-range plans of the State DOT will be coordinated by the engineering consultant.
- Noise:** The State Department of Health shares your concerns on vehicular noise emanating from the proposed H-3 arterial as well as contributory noise from the project site. Compliance with applicable governmental regulations will be ensured.
- Consistency with Local Land Use Plans:** The proposed project will increase population within the Koolauoko area. This increase should be consistent with General Plan population percentages.
The Iolani School Project and other Kaneohe Ranch lands will provide housing for the increased population.
- Flora and Fauna:** A complete review of the project site is under way for the potential impacts to flora and fauna located on the site. A discussion will be included in the draft EIS. As a summary, no endangered or threatened flora and fauna species were found at the project site.

We appreciate your thorough review of the EIS PN and thank you for your continuing interest and concern.

Yours very truly,

F. J. Rodriguez
F. J. Rodriguez

FJR:ls

FIRE DEPARTMENT
CITY AND COUNTY OF HONOLULU

1455 S. METAFANIA STREET, ROOM 305
HONOLULU, HAWAII 96814



SILEEN R. ANDERSON
MAYOR

M. M. NONAKA
CHIEF

F. J. RODRIGUEZ
PRESIDENT

ENVIRONMENTAL
COMMUNICATIONS
INC.

January 21, 1983

Mr. F. J. Rodriguez
Environmental Communications, Inc.
P. O. Box 536
Honolulu, Hawaii 96809

Dear Mr. Rodriguez:

SUBJECT: Iolani School Properties Project

Fire protection services for the subject project are available from Kaneohe Fire Station with a response time of approximately 4 minutes. Supportive services are available from Kailua Fire Station which houses an Engine Company and a Ladder Company. The distance is approximately 4.7 miles away with a response time of 6 minutes. In addition, our CIP project calls for a new Olomana Fire Station at Kalaniana'ole Highway adjacent to the Maunawili Elementary School. In accordance with the fire grading schedule established by the Insurance Services Office and the National Fire Protection Association, adequate protection for the subject project is available.

We strongly recommend that all fire hydrants conform to standards established by the Board of Water Supply for the subject project.

Very truly yours,

Melvin M. Nonaka,
Fire Chief

MMH:et/WW

March 1, 1983

Mr. Melvin M. Nonaka, Fire Chief
Honolulu Fire Department
1455 S. Bereiana Street, Room 305
Honolulu, Hawaii 96814

Dear Chief Nonaka:

Thank you for your comments on the Iolani School EIS Preparation Notice. We share your concerns regarding compliance with applicable fire code regulations. The project will meet all applicable codes and regulations. We will be in contact with your office at the appropriate time to ensure that the fire hydrants and standards are in accordance with the Board of Water Supply Standards. Thank you for your continuing interest and concern.

Yours very truly,

F. J. Rodriguez

FJR:ls

JAN 24 1983

1132 BISHOP BUILDING, SUITE 407, P. O. BOX 24 • HONOLULU, HAWAII 96814 • TELEPHONE (808) 521-0991

DEPARTMENT OF PARKS AND RECREATION
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96809



GILSECH R. ANDERSON
MAYOR

EHIKO I. KUDO
DIRECTOR

EARL L. CARL
DEPUTY DIRECTOR
OSCAR M. ASANUMA
EXECUTIVE ASSISTANT

January 21, 1983

Mr. F. J. Rodriguez
Environmental Communications, Inc.
P. O. Box 536
Honolulu, Hawaii 96809

Dear Mr. Rodriguez:

SUBJECT: IOLANI SCHOOL PROPERTIES PROJECT

We have reviewed the EIS Preparation Notice and provide the following comments.

1. The construction of housing units will impair views from the Pali Lookout. The Pali Golf Course and Hoomaluhia Park were developed in their present locations to further enhance the views from one of the State's most strategic tourist destination areas.
2. Kamaoalii Stream and Kuou Stream waters feed into the Hoomaluhia Park lake and wildlife pond. What impact will the housing project have on water quality? Increased runoff and siltation will occur and affect the water areas at Hoomaluhia Park.
3. The natural mountain and wilderness setting of Hoomaluhia Park will be affected by increased noise levels. The emittance of hydrocarbon will affect park users and inhabitants of the lake and wildlife pond.
4. The Pali Golf Course is sprayed with insecticide and herbicide a minimum of one day per month. Since spraying is not restricted to days with little or no wind, fumes may have a detrimental impact on residents.

Thank you for the opportunity to review the Preparation Notice.

Sincerely yours,

(Mrs.) EMIKO I. KUDO, Director

EIK:VC

cc: Land Use Commission
Environmental Quality Commission

ENVIRONMENTAL
COMMUNICATIONS
INC.

March 1, 1983

Mrs. Emiko I. Kudo, Director
Department of Parks and
Recreation
650 South King Street
Honolulu, Hawaii 96813

Dear Mrs. Kudo:

We are in receipt of your comments on the Iolani School EIS Preparation Notice. We would respond to the comments made in your letter dated January 21, 1983 in the following:

1. The residential project being proposed by Iolani School is consistent with adjacent residential subdivisions. There are no multi-family high-rise structures being considered. The view plane corridor from the Pali Lookout encompasses a vast area stretching beyond the proposed project site and does not constitute an impact of significance that would be attributed to high density land use patterns as found in the Primary Urban Center.
2. The petitioner anticipated the importance of the project's impact on the adjacent stream flow and a study was completed regarding this very concern. The study, entitled "Environmental Aspects of Stormwater Runoff," prepared by Dr. Gordon L. Dugan, states that the development should increase the nitrogen and phosphorus output, while the suspended solids should increase for the low frequency/duration storms and then decrease somewhat for the higher frequency/duration storms. Dugan states that the constituent loads should not be considered as absolute, but rather as trends. There will also be potential changes in the output of biocides and heavy metals. However, impacts to the adjacent streams are anticipated to be minimal because biocides currently in use, that may potentially adversely affect water quality tend to breakdown more readily in comparison to the more lasting types of a few years ago. Lead concentrations originating from automobiles have been designed to only utilize unleaded gasoline, which would reduce the output of lead into the adjacent streams.
3. The proposed project will be in compliance with all applicable DOH regulations governing noise control. It is anticipated that levels should not exceed those currently being measured at the adjacent residential subdivision and from the proposed Interstate Highway H-3.

JAN 26 1983

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813



SILVER M. ANDERSON
DIRECTOR

MICHAEL J. CHUN, Ph.D.
DIRECTOR AND CHIEF ENGINEER

WILLIAM A. BOWNEY
SEWER DISTRICT

ENV 83-12

Mrs. Emiko I. Kudo
Page 2
March 1, 1983

4. The State Department of Health controls all chemical spraying. The proposed project will comply with all applicable DOH regulations governing air pollution control.

We appreciate your concerns and will address them more fully in the draft EIS currently under preparation. Thank you for your continuing interest.

Yours very truly,

F. J. Rodriguez

FJR:ls

January 14, 1983

Mr. Fred J. Rodriguez
Environmental Communications, Inc.
P. O. Box 536
Honolulu, Hawaii 96809

Dear Mr. Rodriguez:

Re: EIS Preparation Notice for State Land Use
District Boundary Amendment, Koolaukoko,
Oahu, Hawaii

In response to your letter dated December 29, 1982, regarding the proposed project, we have the following comments.

1. There are no municipal sewerage facilities in the proposed project areas. There are also no plans to provide sewer in the areas because of their P-1 zoning and preservation designation. Furthermore, the existing and proposed capacities of the Kaneohe sewage treatment plant are and will be inadequate to accommodate the flows from the proposed development.
2. The proposed development will increase storm runoff, erosion, sediment disposition and municipal maintenance. These matters should be addressed in the EIS.

Me ke aloha pumehana,

MICHAEL J. CHUN
Director and Chief Engineer

cc: Div. of Engineering
Div. of Wastewater Management

JAN 18 1983

F. J. RODRIGUEZ,
PRESIDENT

ENVIRONMENTAL
COMMUNICATIONS
INC.

March 1, 1983

Dr. Michael J. Chun
Director and Chief Engineer
Department of Public Works
650 South King Street
Honolulu, Hawaii 96813

Dear Dr. Chun:

Thank you for your comments regarding the Iolani School EIS Preparation Notice. We would respond to your concerns in the following:

1. The anticipated sewage to be generated by the proposed project at the time of completion is estimated to be 244,400 gallons per day. However, since construction of the residential units will be completed incrementally, demand for sewerage facilities will be on a phased schedule. An anticipated schedule may include 2 years for on-site improvements and 6 years for on-site improvements. This phasing will reduce impact on existing facilities, since the total demand of 244,400 gallons per day will correspond with the schedule and not need to be accommodated at one time. The phasing schedule will also provide time for the developer to expand existing services at his own expense as required by the demand for additional facilities.

If capacity of the Kaneohe STP is inadequate to accommodate the proposed project, improvements will be made to increase capacity to accommodate additional sewage at the existing Kaneohe STP. Please be assured that the proposed project will be provided with adequate sewerage facilities. All required improvements, including expansion of existing facilities, will be undertaken by the developer of the project at no expense to governmental agencies.

2. The petitioner anticipated the importance of the project's impact on storm runoff and sedimentation and a study was completed regarding these very concerns. The study, entitled "Environmental Aspects of Stormwater Runoff," prepared by Dr. Gordon L. Dugan, states that while the development should increase the nitrogen and phosphorus output, the suspended solids should increase for the low frequency/duration storms and then decrease somewhat for the higher frequency/duration storms. Dugan states that the constituent loads should not be considered as absolute, but rather as trends. There will also be potential changes in the output of biocides and heavy metals. However, impacts to the adjacent stream are anticipated to be minimal.

Dr. Michael J. Chun
Page 2
March 1, 1983

because: biocides currently in use that may potentially adversely affect water quality, tend to breakdown more readily in comparison to the more lasting types of a few years ago. Lead concentrations originating from automobiles should be steadily decreasing, since new automobiles have been designed to only utilize unleaded gasoline, which would reduce the output of lead into the environment.

Adverse impacts resulting from erosion can be mitigated by complying with the City and County of Honolulu's Grading, Grubbing, and Stockpiling Ordinance No. 3968 and the U.S. Department of Agriculture Soil Conservation Service's Erosion and Sediment Control Guide for Hawaii.

The Kaneohe Flood Control Ponding Basin in Ho'omaluhia Park will be able to accommodate the proposed project. Significant increase in operation and maintenance of the dam is not anticipated.

Thank you for your concerns and interest.

Yours very truly,

F. J. Rodriguez

FJR:ja

POLICE DEPARTMENT
CITY AND COUNTY OF HONOLULU

148 SOUTH BERETANIA STREET
HONOLULU, HAWAII 96814 • AREA CODE (808) 955-3111

EILEEN R. ANDERSON
MAYOR



FRANCIS KEALA
CHIEF

F. J. RODRIGUEZ
PRESIDENT

ENVIRONMENTAL
COMMUNICATIONS
INC.

OUR REFERENCE EFS-ES

January 7, 1983

March 1, 1983

Mr. F. J. Rodriguez
Environmental Communications Inc.
P. O. Box 536
Honolulu, Hawaii 96809

Mr. Francis Keala, Police Chief
Honolulu Police Department
1455 South Beretania Street
Honolulu, Hawaii 96814

Dear Mr. Rodriguez:

Dear Chief Keala:

Subject: Iolani School Properties Project

We are in receipt of your comments on the Iolani School Preparation Notice and would respond in the following:

We have no objections at this time to the proposed development outlined in your letter of December 29, 1982.

As we noted in two earlier letters to Community Planning Inc. on this proposal, our major reservations about the project concern traffic.

(1) We have been advised that the junction of Kionaole Road and Kamehameha Highway will be relocated, and we asked that it be designed so that traffic on the highway will be clearly visible at a safe distance to drivers leaving Kionaole Road. We also stated our belief that traffic signals at the junction are essential if left turns from and into Kionaole Road are to be permitted.

(2) We continue to have reservations about the potential use of Aulooa Road, which is in very poor condition. Until it is demonstrated that traffic will flow smoothly from Kamehameha Highway onto Pali Highway at all hours, we remain apprehensive that drivers will regularly attempt to use Kionaole Road and Aulooa Road to get from Kamehameha to Pali Highway.

Again, we would appreciate being kept informed of developments in planning for the above as they occur.

Sincerely,
FRANCIS KEALA
Chief of Police

By *Foy Maaa*
FOY MAHA
Acting Assistant Chief
Administrative Bureau

cc: Major Paul White

JAN 11 1983

1152 BISHOP BUILDING, SUITE 407 - P.O. BOX 14 • HONOLULU, HAWAII 96814 • TELEPHONE (808) 521-8991

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA
HONOLULU, HAWAII 96843

EILEEN R. ANDERSON, Mayor
YOSHIE H. FUJIMURA, Chairman
ROBERT A. SOUZA, Vice Chairman
MURRAY J. FURBER
MICHAEL J. CONNER
WALTER A. DODD, JR.
RYOKOCHI HIGASHIMURA
DONNA M. HOWARD

January 12, 1983

Mr. F. J. Rodriguez
Environmental Communications Inc.
P. O. Box 536
Honolulu, Hawaii 96809

Dear Mr. Rodriguez:

Subject: Your Letter of December 29, 1983
on the Environmental Impact Statement
(EIS) Preparation Notice for the Iolani
School Properties Project, TWK: 4-5-25;23
4-5-41;1 and 4-5-42: 1, 6, 8, 10

We have the following comments on the EIS Preparation
Notice for a State Land Use District Boundary Amendment by
Iolani School:

1. The project site is in a prime groundwater recharge
area where the annual rainfall averages 75 inches or
more. This rainfall, when applied over 201 acres,
could contribute about one million gallons per day
to the groundwater aquifer. The potential loss of
groundwater recharge should be discussed in the EIS.
2. A discussion on the project's impacts to our
existing and proposed wells in the area should be
included in the EIS.

If you have any questions, please contact Lawrence Whang
at 548-5221.

Very truly yours,

Kazu Hayashida
KAZU HAYASHIDA
Manager and Chief Engineer

ENVIRONMENTAL
COMMUNICATIONS
INC.

F. J. RODRIGUEZ
PRESIDENT

March 1, 1983

Mr. Kasu Hayashida
Manager and Chief Engineer
Board of Water Supply
630 South Beretania
Honolulu, Hawaii 96843

Dear Mr. Hayashida:

Thank you for your comments regarding the Iolani School EIS Prepa-
ration Notice. We would respond in the following:

1. The proposed development will affect the available surface area due
to the construction of some impervious area; however, the ground-
water recharge may not experience a significant change, due to the
gentler slopes of the residential lots and the substantial landscaping
of the project which will be regularly maintained. Further, although
201.4 acres are designated for urbanisation, only a portion (120.4
acres) will actually be covered by impervious material, i.e. roadways
and residential lots.
2. In regards to the project impacts to the existing and proposed BWS
wells, the proposed action will provide an underground sewage system,
which will minimise contamination of the groundwater basin. No
improvements are proposed at the existing BWS well sites. The
petitioner will coordinate this development with future well sites.

Thank you for your continuing interest. Your concerns will be
addressed in the Draft EIS currently under preparation.

Yours very truly,

F. J. Rodriguez
F. J. Rodriguez

FJR:ls

JAN 14 1983

BUILDING DEPARTMENT
CITY AND COUNTY OF HONOLULU
HONOLULU MUNICIPAL BUILDING
540 SOUTH KING STREET
HONOLULU, HAWAII 96813



SILVIA B. ANDERSON
MAILER

ROY H. TANJI
DIRECTOR AND BUILDING SUPERINTENDENT

WILLIAM P. REMULAN
SENIOR MANAGER

PB 83-30

January 11, 1983

Environmental Communications, Inc.
P. O. Box 536
Honolulu, Hawaii 96809

Dear Mr. Rodriguez:

Subject: Environmental Impact Statement
Preparation Notice
Iolani School Properties Project

We have reviewed the subject Preparation Notice and have no comments at this time.

Thank you for the opportunity to comment on the proposed development of 259 residential houselots and 352 residential units located mauka of Kamehameha Highway between the Pali Golf Course and Hoomaluhia Park.

Very truly yours,

Handwritten signature of Roy H. Tanji.

ROY H. TANJI
Director and Building Superintendent

cc: J. Harada
H. Muraoka

NO RESPONSE NECESSARY

JAN 13 1983



VTN PACIFIC, INC.

1155 Bishop Street, Suite 407
Honolulu, Hawaii 96813

January 13, 1983

JH 81-102

Mr. Fred J. Rodriguez
Environmental Communications, Inc.
1152 Bishop Street
Suite 407
Honolulu, Hawaii 96813

Subject: Iolani School Properties Project

Dear Fred:

Please send us a copy of the Draft EIS when it becomes available. As soon as it is possible, we would appreciate being furnished with a map showing where wells are proposed to service the aforementioned subject project.

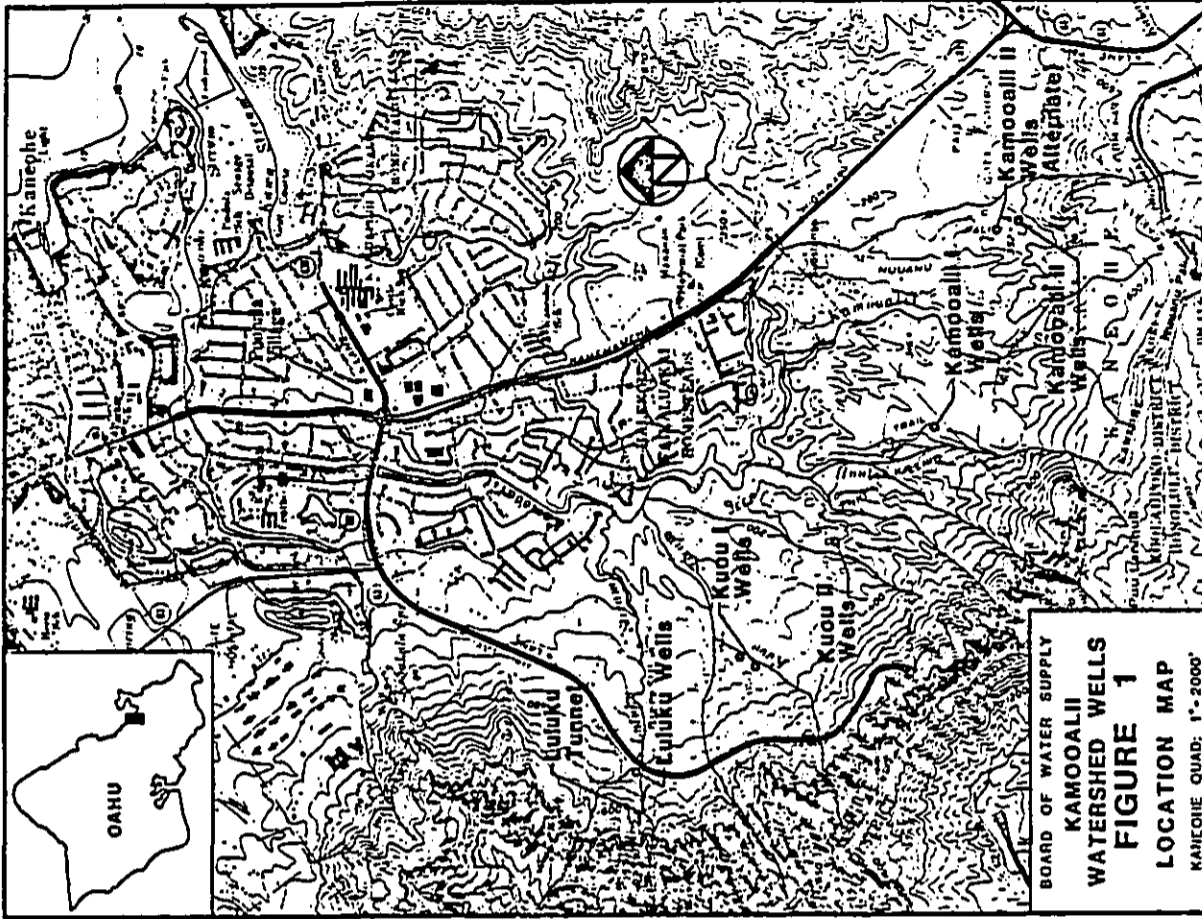
Enclosed for your information is a USGS Map showing the location of several proposed BUS well fields, which might be adversely affected if other wells are developed for the Iolani School project. Access to proposed BUS wells is also of concern.

Very truly yours,

Douglas Heller
Environmental Planner

DM:dab
Attachment

cc: Mike Shigetani



JAN 14 1983

245 North Kukui Street, Honolulu, Hawaii 96817, Telephone (808) 537-5966

ENVIRONMENTAL
COMMUNICATIONS
INC.

F. J. RODRIGUEZ
PRESIDENT

AMERICAN LUNG ASSOCIATION of Hawaii

February 11, 1983

F. J. Rodrigues
Environmental Communications Inc.
P.O. Box 536
Honolulu, Hawaii 96809

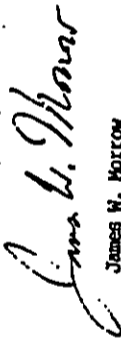
Dear Mr. Rodrigues:

Subject: Iolani School Properties Project

Thank you for requesting our input for the environmental impact statement on the subject project. Since the project constitutes an indirect source of air pollution due to its ability to generate vehicular traffic, we trust that adequate traffic and air quality studies will be conducted and reported in the EIS.

Would you kindly provide us with a copy of the EIS when it is available for review.

Sincerely yours,



James W. Morrow
Director
Environmental Health

JRH:jm
CJ/134

cc: Environmental Quality Commission
Land Use Commission

March 1, 1983

Mr. James W. Morrow, Director
American Lung Association of
Hawaii
245 North Kukui Street,
Honolulu, Hawaii 96817

Dear Mr. Morrow:

Thank you for your comments on the Iolani School EIS Preparation Notice. Community Planning, Inc. has prepared a traffic study entitled "Access Study for the Proposed Kamooalii Development, Kaneohe, Koolau-poko, Oahu, Hawaii" and Barry D. Root has prepared an air quality study entitled "Air Quality Study for the Proposed Kamooalii Development Project." The Draft EIS will discuss salient items raised in these studies.

A copy of the Draft EIS will be made available to you upon completion. Thank you for your interest and concern.

Yours very truly,



F. J. Rodriguez

FJR:is

Christmas Seals Fight TB, Asthma, & FEB 14 1983
Air Pollution

112 BISHOP BUILDING SUITE 407, P.O. BOX 536 • HONOLULU HAWAII 96809 • TELEPHONE (808) 537-5966



UNITED STATES MARINE CORPS
MARINE CORPS AIR STATION
KANEHOE BAY, HAWAII 96863

IN REPLY REFER TO:
OR/JBR/sk
11010
18 JAN 1983

Mr. F. J. Rodriguez
Environmental Communications, Inc.
P. O. Box 536
Honolulu, Hawaii 96809

Subj: Iolani School Properties Project


Dear Mr. Rodriguez:

This is in response to your December 29, 1982 correspondence to the Kaneohe Bay Community Association. Although no such organization exists, I have reviewed the subject Environmental Impact Statement (EIS) Preparation Notice, and wish to call to your attention the 1976 Air Installation Compatibility Noise Zone (AICUZ) study completed for Marine Corps Air Station, Kaneohe Bay. This study is presently being updated and the updated study has not been publicly released yet. However, subject property is outside of the 60 dBA contour line.

According to official Navy criteria, residential land use is clearly compatible with noise levels of Ldn 65 dBA or less. However, it is the position of some acoustical experts that due to Hawaii's outdoor lifestyle and light frame home construction, a more conservative criteria should be followed. For example, a recent land use compatibility study for the Honolulu International Airport suggested that sound insulation may need to be incorporated in new housing construction in areas exposed to Ldn 60-65 decibels. Therefore, we recommend that you give careful attention to aircraft noise and incorporate mitigation measures as necessary to achieve acceptable interior noise levels.

For further information, please contact our AICUZ Officer, Major Patrick H. Skeldon at 257-2716.

Sincerely,


C. V. ROBINSON
Colonel, U. S. Marine Corps
Commanding

ENVIRONMENTAL
COMMUNICATIONS
INC.

F. J. RODRIGUEZ
PH101011

March 1, 1983

Colonel C. D. Robinson
U.S. Marine Corps
Marine Corps Air Station
Kaneohe Bay, Hawaii 96863
Dear Colonel Robinson:

Thank you for your comments on the Iolani School EIS Preparation Notice. As you noted in your letter of January 18, 1983, there is concern on behalf of the Kaneohe MCAS regarding aircraft noise. Our proposed project is consistent with adjacent residential subdivisions and would be subjected to the same noise patterns that existing residential subdivisions are experiencing currently. We therefore anticipate that the proposed project would be in compliance with the AICUZ.

Your concerns are appreciated and will be addressed in the draft EIS currently under preparation. We would appreciate receiving a copy of the AICUZ for our review in conjunction with the various governmental reviews that this project will be undergoing in the next several months.

Thank you for your interest and concern.

Yours very truly,



F. J. Rodriguez

FJR:ls

JAN 19 1983

1132 BISHOP BLDG. SUITE 407, P. O. BOX 536, KANEHOE BAY, HAWAII 96863 • TELEPHONE (808) 231-8791



SIERRA CLUB, HAWAII CHAPTER
P.O. BOX 22897 HONOLULU, HAWAII 96822
(808) 946-8494

8 February 1983

Environmental Communications, Inc.
P. O. Box 536
Honolulu, Hawaii 96809

Re: EISP for Iolani School Properties Project

Gentlemen:

The Conservation Committee of the Honolulu Group of the Sierra Club, Hawaii Chapter appreciates the opportunity to comment on the subject proposal.

Our major concern with this proposal is the quality of the land being proposed for reclassification from Conservation District to Urban District. It must be recognized that some lands placed in the Conservation District may not have many values needing the protection of that classification. Other lands, however, do have such values.

We believe the subject lands fall in this latter category for the following reasons:

- (1) they are an integral part of the Kane'ole watershed and directly affect the water quality of Kane'ole Bay;
- (2) they are designated as "prime" and "other important" agricultural lands and presently support small agricultural enterprises which are a part of the "diversified agriculture" it is State policy to encourage; and
- (3) they are an essential component of the Ko'olau pali viewplane, contributing to the overall character of the Kane'ole area.

A reclassification from Conservation District to Urban District would entail the sacrifice of these values. In order to justify such action, we feel the Land Use Commission should consider, and the EIS must address, the following questions and concerns.

1. Since the "project is aimed at meeting the housing demand of the low and moderate income household", what is the actual cost range proposed for the units? Does this cost range meet the needs of the target population according to the standards of the Department of Housing & Community Development?

(From the figures given in the EISPW (611 units; site development cost estimate (maximum) 19 million dollars), site development cost alone will be over \$31,000 per unit.)

2. What is the true rainfall picture in the subject area?

(The EISPW states "approximately 65 inches of rainfall per year." However, Ho'omaluhia Botanic Gardens and Park, makai of the proposed site,

FEB 8 1983

Environmental Communications, Inc.
8 February 1983

Page 2

averages 75 inches of rainfall per year. In calendar year 1982, the measured rainfall in their gauges ranged from 100 to 150 inches and the gauges were often overflowing before they could be checked.)

3. How will the wetness of the area affect building costs and living in the project?

(Given the 1982 rainfall, the staff at Ho'omaluhia notes that the waterfalls and streams start running almost immediately after the start of a rainfall, an indication of ground saturation. In more normal years, it takes several closely-spaced rainfalls to set the falls and streams running. The persons residing in the staff house at Ho'omaluhia must have dehumidifiers running constantly to combat interior moisture.)

4. What will be the effect of turning the subject area from a water-resource area into a water-demand area?

5. Is the H-3 easement on Iolani lands included in the subject parcel? If so, how much remaining acreage would be available for the proposed development? What would be the actual density of structures within the developed areas?

6. What is the complete topography of the subject area? How will the proposed residences be situated relative to that topography?

(According to persons familiar with the topography, the slopes which are "predominately between 0 - 20 percent" comprise only 50% of the total area. Most of the remaining area is steeply sloped and gullied.)

7. What would be the effect of the proposed project on access to the Likeke Trail, which runs from Likelike to Pali Highway at the base of the Ko'olau?

8. How will the proposed development affect the drainage patterns in the lands makai of the subject area? Will further local, State, or federal expenditures be necessary to deal with increased water flows resulting from the urbanization of the subject area?

(The flood control project at Ho'omaluhia was necessitated because Keapuka was built in a flood plain.)

9. The viewplane question is raised in the EISPW. We feel that a model or, at minimum, superimposition of drawings over photographs of the area should be required to address this question. We would strongly recommend a site visit by the Land Use Commission if possible.

All the additional points raised in the EISPW and not addressed here are valid and should be adequately covered.

We will look forward to reviewing the draft EIS when it becomes available.

Sincerely, *Juan E. Miller*
Susan E. Miller for Conservation Committee
Honolulu Group, Sierra Club

cc: Land Use Commission
Environmental Quality Commission
Councilman David Kahani

ENVIRONMENTAL
COMMUNICATIONS
INC.

F. J. RODRIGUES,
PRESIDENT

March 1, 1983

Ms. Susan E. Miller
Sierra Club, Hawaii Chapter
P.O. Box 22897
Honolulu, Hawaii 96822

Dear Ms. Miller:

Thank you for your comments on the Iolani School EIS Preparation Notice. We would respond to the comments made in your letter, dated February 8, 1983, in the following:

1. We are not able at this early stage to describe the actual cost range proposed for the units. The aim and goal of the petitioner is to provide affordable housing, particularly to meet the needs of the low/moderate income family.
2. The stated figure of 85 inches of rainfall per year represents "mean annual rainfall" at the project site. Obviously then, there will be isolated incidents of rainfall less and greater than that figure.
3. The petitioner will provide housing that is similar with the adjacent residential subdivisions. Dehumidifiers, etc. would be provided by the residents, if necessary. Therefore, building costs should not be escalated due to the area's "wetness."
4. The demands for domestic water of the project site will be accomplished by utilization of required well sources and storage facilities, in keeping with the master plans of the Board of Water Supply.
5. The H-3 right-of-way will utilize approximately 31.4 acres of the total 201.4 acres, which comprise the project site.
Densities will vary from 5.0 to 5.5 units per acre.
6. The project design provides sufficient flexibility in the siting of units, with maximum open space and minimal disturbance to the natural terrain. The residences will be located on the flattest portions of the site. The project design relative to topography will be addressed in the EIS.
7. The Likeke Trail will not be impacted.

1157 KUPAHELE DRIVE, SUITE 407 • P.O. BOX 58 • HONOLULU HAWAII 96814 • TELEPHONE (808) 521-8261

Ms. Susan E. Miller
Page 2
March 1, 1983

8. It is anticipated that drainage patterns will remain unaffected. Run-off will be collected on-site by catch-basins and conveyed to the Kaneohe Ponding Basin in Ho'omaluhia Park.

The project will result in increased government expenditures resulting from maintenance. These costs will be offset by increased tax revenues resulting from development of this project.

9. The residential subdivision is consistent with the adjacent Kespuka subdivision and other residential areas to the north. There are no high-rise structures being considered. Viewplanes should not be adversely affected.

Your concerns are noted and will be addressed in the EIS currently being prepared. Thank you for your interest on this project.

Yours very truly,



F. J. Rodrigues

FJR:ls

XIII-41

c/o P. O. Box 475
Kaneohe, Hawaii 96704
February 1, 1983

Mr. J. J. Rodriguez
Environmental Communications, Inc.
P. O. Box 536
Honolulu, Hawaii 96809

Dear Mr. Rodriguez:

We the members of The Luluku Banana Growers would like to thank you for the opportunity to respond to the environmental impact statement preparation notice.

We would like you to address several concerns that the proposed project would have on us personally and on our surrounding environment. The major concerns are as follows:

1. Was the Kespuka flood control dam designed with future residential projects above it?
 - a. Can it handle the additional run-off from roofs and streets?
 - b. What about erosion and sedimentation and affects on the lake?
2. From what source was the annual rainfall statistics taken and over what time period?
 - a. Is the statistics for the area in general or by specific areas averaged?
3. Was consideration given to changes in wind storm patterns, even with minimal topographical alterations?
4. With deep wells being dug for water requirements for the development, what would be the affects on the present area's water table?
5. This area is unique to growing apple bananas and is the State's largest apple banana producing area, have any consideration been given to its loss?
6. What about the present residents and farmers, will they be offered comparable replacement land?
7. Does it affect the right-of-way for the construction of H-3?
8. What about the aesthetics of the area as it relates to tourism; such as relating to the Fall Lookout?
 - a. Is the project compatible with the wilderness park intent of Hoomaluhia Park?
9. What and where are the archeological sites?
10. Have there been any consideration to significant and historically valuable trees and plant life?

11-111

Again thank you for the opportunity to comment on your environmental impact statement preparation notice.

Yours respectfully,

The Luluku Banana Growers

<u>Richard S. Horimoto</u> Richard S. Horimoto	<u>Reynold Shiroma</u> Reynold Shiroma
<u>Eric S. Yaneshiro</u> Eric S. Yaneshiro	<u>Adam P.S. Yim</u> Adam P.S. Yim
<u>Stanley Aki</u> Stanley Aki	<u>Harop C. S. Pung</u> Harop C. S. Pung
<u>Tet Choi Fung</u> Tet Choi Fung	<u>Harry S. Iha</u> Harry S. Iha
<u>Tom Sakamoto</u> Tom Sakamoto	<u>Kenjiro Uehara</u> Kenjiro Uehara
<u>Dexter Dickson</u> Dexter Dickson	<u>George Fernandes</u> George Fernandes
<u>Ethel Y. Higa</u> Ethel Y. Higa	<u>Anthony Sanchez</u> Anthony Sanchez
<u>Frederick I. Shiroma</u> Frederick I. Shiroma	<u>George Fernandes</u> George Fernandes
	<u>William Connelly</u> William Connelly
	<u>R.H. DePaseroth</u> R.H. DePaseroth
	<u>Shigeharu Shiroma</u> Shigeharu Shiroma

FFA 9 1983

ENVIRONMENTAL
COMMUNICATIONS
INC.

F. J. RODRIGUEZ
PRESIDENT

March 1, 1983

The Luluku Banana Growers
C/O P.O. Box 475
Kaneohe, Hawaii 96744

Dear Farmers:

We are in receipt of your comments on the Iolani School Preparation Notice and would respond in the following:

1. The flood control dam at Ho'omaluhia Park was constructed so as to eliminate flooding hazards to Keapuka and to other future residential subdivisions. Therefore, the project's additional runoff can be accommodated by the dam. The sedimentation resulting from the proposed project should not adversely affect the lake, since the project's runoff will be similar to the residential-type runoff currently being generated from adjacent subdivisions.
2. Annual rainfall data is based on statistics provided by the State Department of Land and Natural Resources.
3. Wind storm patterns for residential purposes is not considered to be a problem due to the scope of work. The units to be constructed are single-family, low-density, and of limited building height. Therefore, wind patterns should not affect the units.
4. The effect of the proposed Board of Water Supply wells on the area's water table is being addressed in the EIS currently being prepared by the Board of Water Supply. All water commitments for the project site must be provided and approved by the Board of Water Supply prior to construction approvals.
5. The petitioner anticipated the importance of the project's impact on bananas and a study was completed regarding this very concern. As a summary, the proposed project will eliminate only 3.7 acres currently under banana cultivation. The study indicates and discusses other sites being considered for banana cultivation. This increased cultivation activity should offset the losses incurred due to the proposed project.
6. The concern for comparable replacement of banana leasers on the project site is not applicable. Consideration will be given to provide interim tenure on the land now under banana cultivation in the Phase II area.

XII-43

The Luluku Banana Growers

Page 2
March 1, 1983

7. The H-3 right-of-way traverses the makai side of the project site. The design for the proposed project will include the right-of-way for the highway.
8. The project will provide sufficient open space and park acreage, as defined by the City and County of Honolulu Park Dedication Ordinance. Mauka and makai views will not be significantly altered, since no multi-family high-rise structures are being considered. As the proposed residential project is consistent with the adjacent residential subdivision, existing view corridors should remain unaffected.
9. Several archaeological sites have been located within and adjacent to the project. The petitioner has committed themselves into ensuring that no harm come to these sites. It is recommended that intensive archaeological surveys be conducted in all portions of the project site before any construction begins. No construction will take place until all adverse impacts on archaeological sites have been mitigated.
10. Research and field reconnaissance were conducted so as to locate the existence of any significant and/or endangered trees and plant life. The EIS will discuss the results of this study and further address the project's impact upon them.

Thank you for your interest and concern.

Very truly yours,



F. J. Rodriguez

FJR:ls

KAHALUU NEIGHBORHOOD BOARD NO. 29
69 KAHALUU COMMUNITY CENTER
KANEHOHE ROAD
KANEHOHE, HAWAII 96744
MESA REA, KANELOU, MAINE, WAINALE, MAHOLE, MAHOLE, MAHOLE, MAHOLE, MAHOLE



"Let us not ever have
an unhappy minority"

February 9, 1982
NO USE COMMISSION
STATE OF HAWAII
FEB 15 1 33 PM '82

Mr. Gordon Furtani
Land Use Commission
State of Hawaii
Old Federal Building, Room 104
335 Merchant Street
Honolulu, Hawaii 96813

Preparation of Draft Environmental Impact Statement
Request for State Land Use District Boundary Amendment
Iolani School (201.4 Acres), Ko'olaupoko, O'ahu, Hawaii

Dear Mr. Furtani:

Proposed by N. B. Stevens
We have reviewed the above Draft Environmental Impact Statement and have decided
to defer comments until such time as the Kane'ohu Neighborhood Board No. 30
has expressed its position.

However, we request that we be included as a consulted party in any future
considerations relating to the Iolani School request.

Sincerely,

Edwin B. Stevens, Chairman
Kahalu'u Neighborhood Board No. 29

cc: Kane'ohu N.B.#30
Kahalu'u N.B.#29 - Chairman
Kahalu'u Community Resource Center
Neighborhood Commission

NO RESPONSE NECESSARY

REPRODUCTION OF COMMENTS AND RESPONSES MADE DURING THE
DRAFT EIS REVIEW

Pages XII-48 to XII-97 contain reduced sized copies of the comments and responses received during the Draft EIS Review Period. If a letter contained no comment, no response was drafted.

TABLE 12

COMMENTS RECEIVED ON THE DRAFT EIS FOR THE IOLANI SCHOOL PROJECT

<u>ORGANIZATIONS/AGENCIES</u>	<u>Date Comment Received</u>	<u>Date of Comment</u>	<u>Date of Response</u>
<u>City & County</u>			
Board of Water Supply	04/25/83	04/20/83	05/06/83
Building Department	04/15/83	04/12/83	
Department of General Planning	04/25/83	04/22/83	05/06/83
Department of Housing and Community Development	04/22/83	04/21/83	05/06/83
Department of Land Utilization	04/25/83	04/22/83	05/06/83
Department of Parks and Recreation	04/25/83	04/21/83	05/06/83
Department of Public Works	04/19/83	04/11/83	05/06/83 (2)
Department of Transportation Services	05/04/83	04/29/83	
Fire Department	04/08/83	04/05/83	
Police Department	04/01/83	03/30/83	05/06/83
Municipal Reference and Records Center			
<u>State</u>			
Department of Accounting and General Services	04/15/83	04/12/83	
Department of Defense	04/12/83	04/11/83	
Department of Agriculture	04/15/83	04/13/83	05/06/83
Department of Education	04/08/83	04/04/83	05/06/83
Department of Health			
Department of Land and Natural Resources	04/14/83	04/12/83	05/06/83
Department of Planning and Economic Development			
Department of Social Services and Housing	04/25/83	04/15/83	05/06/83
Department of Transportation	05/02/83	04/26/83	05/06/83
Environmental Center	04/25/83	04/22/83	05/06/83
Office of Environmental Quality Control			
State Historic Preservation Officer			
Water Resources Research Center	04/18/83	04/12/83	05/06/83
State Archives			
State Energy Office			

TABLE 12
(continued)

<u>ORGANIZATIONS/AGENCIES</u>	<u>Date Comment Received</u>	<u>Date of Comment</u>	<u>Date of Response</u>
<u>Federal</u>			
U.S. Army Corps of Engineers	04/25/83	not dated	05/06/83
U.S. Army-DAFE (Facilities- Eng.-USASCH)	03/31/83	03/29/83	
U.S. Fish & Wildlife Service	04/25/83	04/20/83	05/06/83
U.S. Department of Agriculture & Soil Conservation	04/12/83	04/06/83	
Department of the Air Force	03/28/83	03/24/83	
Naval Base Pearl Harbor	03/30/83	03/29/83	
United States Coast Guard	04/01/83	03/30/83	
<u>Private</u>			
Kaneohe Outdoor Circle			
Americal Lung Association of Hawaii			
Keapuka Community Association			
Kaneohe Neighborhood Board No. 30			
Kaneohe Community Council			
Kaneohe Business Group			
Kaneohe Marine Base			
Hui Malama Aina o Ko'olau	04/25/83	04/22/83	05/06/83
The Sierra Club, Hawaii Chapter			
Windward Community College			
Hawaii Loa College			
Hawaiian Electric	05/02/83	04/25/83	05/06/83
Kahaluu Neighborhood Board No. 29			
Luluku Banana Growers	04/25/83	04/21/83	05/06/83
Oahu Metropolitan Planning Org.	04/18/83	04/14/83	05/06/83
Office of Hawaiian Affairs			



United States Department of the Interior

FISH AND WILDLIFE SERVICE

100 ALA MOANA BOULEVARD
P O BOX 50187
HONOLULU, HAWAII 96850

MAIL ROOM

ES
Room 6307

APR 20 1983

Mr. Gordon Furutani
Land Use Commission
Room 104, Old Federal Building
335 Merchant Street
Honolulu, Hawaii 96813

Dear Mr. Furutani:

The U.S. Fish and Wildlife Service has reviewed the environmental impact statement (DEIS) for the proposed Iolani School Properties Project which was forwarded to us by the Environmental Quality Commission on March 18, 1983. We offer the following comments and recommendations for your consideration.

LAND USE COMMISSION
STATE OF HAWAII
APR 21 1983

General Comments

The discussion of cumulative environmental effects associated with the development of all increments (i.e. Phase I, Iia and Iib) of the property needs to be substantially expanded in the final environmental impact statement (EIS). The DEIS fails to identify the Koloa duck (*Anas wyvilliana*), Hawaiian coot (*Fulica americana alai*) and Hawaiian Gallinule (*Gallinula chloropus sandwicensis*) as listed endangered species occurring in the adjacent Ho'omaluhia Park. On 7 April 1982, the Hawaii Division of Forestry and Wildlife released 38 Koloa into the Nature Study Pond adjacent to the Ho'omaluhia reservoir. The reservoir was created by a retention dam built by the U.S. Corps of Engineers for the Kaneohe Flood Control Project. Since Hurricane Iwa in November 1982, nine to twelve Koloa are currently residing in the south basin of the reservoir and in the Pond. The Coot and Gallinule have been occasionally observed at the Park, but are not believed to be nesting there (EIS Preparation Notice for Kamo'oali'i Watershed Wells, 1982).

Water runoff from the project during construction and from subsequent storm drainage after project completion and from influence water level, water quality and wildlife in the Pond. The addition of storm drainage may cause rapid fluctuations in vertical water depth during storm conditions that could affect bird nesting and food availability. The anticipated increase in Ho'omaluhia Park users and feral dogs and cats associated with the adjacent residential development may also affect the Koloa population. The evaluation of these impacts should be included in the final EIS.



Save Energy and You Serve America!

Specific Comments

Page I-1, paragraph 1 and page I-2, paragraph 1. The EIS should address the environmental impacts of all increments to be developed in the Iolani School Properties Project. Cumulative effects from the total area planned for development should be evaluated in the EIS.

Page II-7, paragraph 3. Storm runoff should not be discharged into existing streams and Ho'omaluhia reservoir, without receiving the best possible treatment (in accordance with the Department of Health regulations for Class 2 waters).

Page III-9, figure 3. The map showing the three existing streams within the project area is incomplete. Please refer to the U.S. Geological Survey and Board of Water Supply for more detail.

Page III-16, paragraph 2. The reference on Page III-22, paragraph 2, to Kuoloa should be corrected to "Koloa". This species, the Hawaiian coot and Hawaiian Gallinule (identified as Mud Hens) are listed endangered species (50 CFR 17.11 and 17.12, Revised 1982) which are known to occur in the project area.

Page III-23, Table 5. The information provided was extracted from a FWS table (adapted from Brock, 1960) listing the exotic freshwater fish and crustaceans in the Kaneohe Bay Watershed. The EIS should include native freshwater species which are known to occur within the area. Channel catfish which were released by the State Division of Aquatic Resources for recreational fishing at Ho'omaluhia reservoir should also be included.

Page III-29, paragraph 3. This section should state that the Kaneohe Sewage Treatment Plant (KSTP) is presently operating at capacity as indicated by the Department of Public Works. Designs to increase the capacity of KSTP should be illustrated and discussed in the EIS. Evaluation of the direct and secondary effects of increased sewage volume to KSTP and to marine biological resources off Hokuapu Point should be addressed in the final EIS.

Page III-31, paragraph 1. It is estimated that the Kapaa Sanitary Landfill will reach its capacity by the end of 1984 (EIS for Kalaeo Sanitary Landfill). Alternative sites or methods for refuse disposal should be included in the EIS.

Page IV-3, paragraph 2. This section of the EIS should be expanded to include discussion in reference to the Hawaii State Environmental Policy, Chapter 344.

Page V-2, paragraph 4. The Service recommends restricting use of oil and chemicals to control dust resulting from construction. Erosion aggravated by grading and excavation may transfer such substances to waterways draining the project area. Impacts to aquatic resources affected by this activity should be addressed in the EIS.

Page V-4, paragraph 1. In Appendix H, "Environmental Aspects of Storm Water Runoff," Gordon L. Dugan states, "During construction, potential severe indices of water pollution could occur as a result of grading activities, especially during storm conditions, if proper erosion control measures are not intensively followed." Dugan's statement contradicts the discussion on Page V-4, paragraph 1, and should be incorporated into this section of the EIS with the expansion of mitigative measures.

Page V-4, paragraph 2. The effects of increased sediment load in the streams and Ho'omaluhia reservoir upon aquatic resources should be discussed in this section of the EIS.

Page V-12, paragraph 2. The cumulative effects of the total land development upon ground water recharge should be addressed in the EIS.

Page V-13, paragraph 1. Some of the endemic plant species (eg. *Rhus sandwicensis* Gray) occurring within the project site may be replaced by exotic flora following construction. This possibility should be noted in the EIS.

Page V-18, paragraph 2. The incremental storm runoff volume was calculated for land areas I, J and K only. These estimates should include storm runoff from all increments planned for development. Possible impacts to ground nesting waterbirds and to Park users within low, flood prone areas should be addressed in the EIS.

Section VII. The statement that impacts of the no-action alternative will result in "severe erosion" of the project site is not supported by the storm water runoff analysis prepared by Gordon L. Dugan. We suggest reevaluation of this alternative. Other possible alternative sites for the proposed project should also be identified.


Appendix 6. Dr. Berger's study methods, including data of field survey and location of sampling stations should be illustrated in the EIS Appendix to supplement his scientific report.

Summary

The FHS recommends that measures be implemented to minimize long term impacts upon fish and wildlife resources and water quality. Mitigative measures would involve actions to reduce potential impacts to the Koloa, aquatic stream resources and to the watershed. The storm drainage system should be redesigned to enhance water quality of runoff and to avoid discharge into streams or to the south basin of Ho'omaluhia reservoir.

The area of the proposed development and housing density should be reduced to optimize ground water recharge needed to supply the developing Kaneohe community and aquatic resources. Alternative actions to housing development should be further explored. We appreciate this opportunity to comment.

Sincerely,



John I. Ford
Acting Project Leader
Office of Environmental Services

cc: EPA, SFO
HDAR
HDFEW
MHFS - WPP0
EOC

ENVIRONMENTAL
COMMUNICATIONS
INC.

F. J. ROODHUISZ,
PRESIDENT

May 6, 1983

Mr. John I. Ford
Acting Project Leader
Fish and Wildlife Service
P.O. Box 50167
Honolulu, Hawaii 96850

Dear Mr. Ford:

Thank you for your comments regarding the Iolani School Draft EIS. We would respond to your concerns in the following:

General Comments

It is the opinion of the Environmental Quality Commission that the total scope of the project be disclosed to the public. Analysis of the impacts, however, may focus only on that segment of the project that is the subject of the Land Use Commission (LUC) petition. Therefore, the EIS will address only the 201.4 acre phase of the 975.6 acre total project. (See enclosure from EQC).

The EIS identifies the existence of the Koloa duck, Hawaiian coot, and Hawaiian gallinule on page III-23.

The project's impact on fauna wildlife in the pond has been addressed in the EIS on page V-16. Rapid fluctuations in vertical water depth of the pond is not anticipated, since stormwater runoff would not only be discharged into the pond. Storm drainage runoff would also be discharged into the adjacent streams. The proposed project may increase the number of users at the park. However, it is anticipated that any disturbance to the wildlife found there would be short-term and insignificant.

Specific Comments

Please refer to first paragraph of this letter regarding cumulative impacts.

All drainage improvements will be designed and constructed in conformance with the Drainage Standards of the City and County of Honolulu, and the applicable provisions of the Water Pollution Control Regulations and Water Quality Standards, Department of Health.

Figure 4 has been revised to present a more complete setting of the streams located in the area.

The spelling of "Koloa" has been corrected in the EIS.

1125 KULUWAU BUILDING, SUITE 407, P. O. BOX 234 • HONOLULU, HAWAII 96808 • TELEPHONE (808) 531-4201

Mr. John I. Ford
Page 2
May 6, 1983

Information regarding native freshwater species and catfish have been included in the EIS on page III-24.

Discussions regarding the KSTP have been included in the EIS. Designs to increase capacity of the KSTP are premature at this time. However, they will be completed and reviewed by the appropriate government agencies at a future date.

The City and County of Honolulu Department of Public Works, in their letter of April 22, 1983 has verified acceptance of the sewage generated by the project into the Kaneohe or Kailua Sewage Treatment Plant provided the petitioner be responsible for the upgrading of the necessary collection and transmission system to the plant and also any additional treatment facilities required.

It is anticipated that the marine biological resources off Mokapu Point would not be adversely impacted, since the discharge would be similar to existing discharges.

Since the project will provide residential use, the City and County of Honolulu Department of Public Works will collect and dispose all refuse. A possible landfill for disposal may be at Kalaheo.

A discussion of the project's relationship to the Hawaii State Environmental Policy, Chapter 344, HRS has been included on page IV-12.

Your recommendation regarding restricted use of oil and chemicals to control dust has been noted by the petitioner and will be relayed to the contractor, upon his selection. Impacts and mitigative measures relating to water quality has been discussed on page V-4.

Dr. Dugan states that the potential of water pollution may occur. However, that is not likely to occur since only minor excavation and grading work will need to be done, soils found at the project site possess limited erosive characteristics, and the project will adhere to several erosion control measures.

As was stated in the EIS on pages V-10 to V-15, the aquatic resources should not be adversely impacted due to increased runoff and sediment load originating from the proposed project. The type of runoff and the sediment load would be similar to other residential runoff currently being discharged, particularly from adjacent subdivisions. Secondly, the potential of increased sediment load would occur only during significant storms. It is anticipated that upon completion of the storm, the sediment load of the stream and pond would return to its natural state.

Your comments regarding infiltration and recharge were forwarded to Dr. Gordon L. Dugan, Environmental Consultant, on April 20, 1983 for his

Mr. John I. Ford
Page 3
May 6, 1983

response. Dr. Dugan has prepared the report entitled "Environmental Aspects of Storm Water Runoff for Iolani School Land", which is included in the EIS as Appendix H. It is Dugan's contention that the potential water for runoff and infiltration at the project site would be approximately 40 inches annually. However, it is not anticipated that all of this potential water would be lost since: (1) During dry weather conditions, the residents of the development would be expected to water their lawns, shrubbery etc., which could lead to additional infiltration; (2) A sizeable portion of the water running off the areas of impervious surfaces within the development would flow onto adjacent pervious surfaces, such as lawns, gardens, etc., which should enhance infiltration over this area; (3) The runoff generated from the project flows into the newly constructed Kaneohe Flood Control Reservoir, behind a 76 ft. dam which maintains a permanent surface area of 26 acres and up to 152 acres under maximum reservoir conditions. Thus, additional infiltration should result unless the bottom surface is completely sealed; and (4) Over 70% of the water in the streams draining the Ko'olaupoko District, in which the project is located, originates from groundwater sources.

Reference to the EIS on page V-13 will present the assumptions and methodology utilized by Dugan in his formulation of his conclusions.

We appreciate your indicating to us that some endemic plant species may be replaced by exotic flora following construction. This notation has been included in the EIS on page V-15.

As was stated earlier in this letter the EIS will address only Phase I. Ground nesting waterbirds and park users would not be impacted due to storm water runoff since drainage runoff from the proposed project would be collected by catch basins located within the roadways, conveyed by underground pipe system, and discharged into existing streams and the ponding basin.

The possibility of erosion is increased in undeveloped and vacant areas, when compared to urbanized areas. Erosion is further enhanced during heavy rainfall. There are obvious generalizations and there is no need for any supportive analysis by Dr. Dugan. Finally, the site is favorable for development due to its minimal impact on the environmental setting. The selection of alternative sites may not guarantee similar results.

Dr. Berger's study method, consisted of a walk-through reconnaissance survey. Therefore, it is his contention that inclusion of his study method in the EIS is unnecessary.

Thank you for your concerns on these matters.

Yours very truly,

F. J. Rodriguez

FJR:ls



STATE OF HAWAII
ENVIRONMENTAL QUALITY COMMISSION
808 HALEKUAHA ST.
ROOM 201
HONOLULU, HAWAII 96813

April 13, 1983

Mr. F. J. Rodriguez
Environmental Communications, Inc.
P.O. Box 536
Honolulu, Hawaii 96809

Dear Mr. Rodriguez:

Subject: Proposed Iolani School Properties Project

At your request, the following opinion was rendered by the Environmental Quality Commission in regards to the subject project:

Issue: The proposed action involves a number of phases. On the one hand, under the LUC Rules only that portion of the project that can be developed within five years can be applied for land use district reclassification. On the other hand, the State EIS Law (Chapter 343, HRS) and the EQC Regulations direct agencies and applicants to address the overall, long term impacts of a project. The issue raised by the applicant is whether the subject project is a special circumstance where there are compelling reasons to review related activities separately.

EQC Opinion and Rationale: The total scope of the project should be disclosed to the public. Analysis of the impacts, however, may focus only on that segment of the project that is the subject of the LUC application.

The rationale for this opinion is as follows:

- a) Future phases may not occur;
- b) Because of the tentativeness of future plans, sufficient information is not available that could enable a valid impact assessment;
- c) The present phase under application is not dependent upon nor in any way commits the approving agency to approve future phases;
- d) The applicant recognizes the need to prepare a supplemental EIS if a decision is made to proceed with the future phases.

DEPARTMENT OF THE ARMY
PACIFIC OCEAN DIVISION, CORPS OF ENGINEERS
FT. SHAFTER, HAWAII 96858



DEPT. OF THE ARMY
ATTENTION

Mr. F. R. Rodriguez
April 13, 1983
Page 2

This opinion rests on the truth of each statement presented in the rationale above. If any of the reasons are false or change at a future date, this opinion becomes invalid.

Status of Opinion: The opinion was issued solely as a recommendation to the applicant and the accepting authority, which in this case is the Land Use Commission. This should not be considered a declaratory ruling since the procedures, as specified in the EQC Rules of Practice and Procedure, require a petition to be filed with the EQC by the party desiring such a ruling.

Sincerely,

Roy R. Takemoto

Roy R. Takemoto
Chairman

cc: Land Use Commission

Mr. Gordon Furutani
Land Use Commission
Old Federal Building
335 Merchant Street, Room 104
Honolulu, Hawaii 96813

Dear Mr. Furutani:

Thank you for the opportunity to review the Environmental Impact Statement (EIS) for the Proposed Iolani School Properties Project, Kaeoalii, Koolaupoko, Kaneohe, Hawaii. Based on our review we provide the following comments:

a. Although the Kaneohe Flood Control Project by the Corps of Engineers provides flood protection for urbanized areas in Kaneohe that are downstream of the dam, the proposed project site which is located upstream of the Corps' project is not protected from any flooding activity. The EIS implies (Pages III-22, V-14) that the dam provides protection to the proposed residential development site. However, the Corps' project does not provide any measure of protection to possible flood-prone areas upstream of the Kaneohe Dam, including the proposed development. As mentioned in the Corps' February 3, 1983 letter, the urbanization of the project site may cause an increase in runoff downstream of the development.

b. A Department of the Army (DA) permit may be required for the proposed development if any work involves the discharge of dredged or fill material into inland waters or wetland areas. We recommend that the proposing party contact the Corps' Operations Branch at 438-9258, to discuss details of the proposed project and DA permit requirements.

c. The Corps of Engineers has carefully coordinated the design of H-3 drainage crossings with the State Highway Department for areas tributary to Kaneohe Dam. The Iolani School proposed major access road intercepts many of the same streams just upstream of the H-3 freeway. Iolani School drainage crossings must be designed to be compatible with the H-3 bridges or a major flood hazard condition could be created in areas just downstream of the proposed access road. A drainage map should be included to show all proposed drainage.

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APR 25 1983

ENVIRONMENTAL
COMMUNICATIONS
INC.

F. J. RODRIGUEZ
PRESIDENT

May 6, 1983

Mr. Clarence S. Fujii
Acting Chief, Engineering Division
Department of the Army
Pacific Ocean Division, Corps of Engineers
Ft. Shafter, Hawaii 96859


Dear Mr. Fujii:

Thank you for your comments on the Iolani School Draft EIS. We would respond to your concerns in the following:

- a. Storm drainage runoff from the proposed project will be collected by catch basins located within the roadways, conveyed by underground pipe system, and discharged into existing streams and the Kaneohe Flood Control Ponding Basin in Ho'omaluhia Park. Thus, the proposed project would be provided with adequate drainage systems to mitigate impacts resulting from flooding upstream from the Kaneohe Dam. Reference to Appendix H addresses environmental aspects of stormwater runoff resulting from the project.
- b. The proposed project will not discharge dredged or fill material into inland waters or wetland areas. Therefore, no DA Permit is required.
- c. Preparation of a drainage map appears premature at this stage of project implementation. Prior to the preparation of said map, the petitioner will contact the State Highways Division, to determine the design capacity of the H-3 crossings.
- d. We appreciate your indicating to us this oversight in consistency. The project will result in increased government expenditure resulting from maintenance of the dam. However, these costs will be offset by increased tax revenue resulting from development of this project. The EIS has been revised to indicate this.

Thank you for your concerns on these matters.

Very truly yours,



F. J. Rodriguez

FJR:ls

-2-

d. Two reply letters shown in chapter XII appear to be in conflict. In a reply to Dr. Michael Chun's letter (Department of Public Works, C&C of Honolulu), of January 14, 1983, Mr. Rodriguez states that as a result of the Iolani Project, a "significant increase in operation and maintenance of the dam is not anticipated." In his reply to Mr. Francis C. B. Lum's letter (State Conservationist, SCS), of January 6, 1983, Mr. Rodriguez states "the project will result in increased government expenditures resulting from maintenance of the dam. These costs will be offset by increased tax revenue resulting from development of this project."

Sincerely,

Clarence S. Fujii
Acting Chief, Engineering Division

Copy Furnished:
Mr. Fred Rodriguez
Environmental Communications, Inc.
P.O. Box 536
Honolulu, Hawaii 96809

Mr. Ryokichi Higashionna
Director
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813

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STATE OF HAWAII
DEPARTMENT OF EDUCATION
P. O. BOX 2209
HONOLULU, HAWAII 96810

OFFICE OF THE SUPERINTENDENT

April 4, 1983

Mr. Gordon Furutani
Land Use Commission
Room 104, Old Federal Building
335 Merchant Street
Honolulu, HI 96813

Dear Mr. Furutani:

SUBJECT: Environmental Impact Statement
Iolani School Properties Project
Kapaemahu, Koolaulopa, Kaneohe, Oahu

Our review of the subject EIS indicates that the scope of the project involves 611 units, representing Phase I of the development. These 611 units are expected to generate the following student enrollment.

SCHOOL	GRADE	APPROXIMATE ENROLLMENT
Kaneohe/Kapunahala Elementary	K-6	90 - 150 students
King Intermediate	7-8	25 - 50 students
Castle High	9-12	40 - 70 students

The secondary schools have sufficient capacity to accommodate the projected enrollment increase. As the development area abuts the service area assigned to Kaneohe and Kapunahala Elementary schools, the Windward District will be assigning the appropriate portions of the development to these two schools. The combined capacities of these two schools can accommodate the projected enrollment increase.

Should there be any questions, please contact Mr. Howard Lau at 737-5231.

Sincerely,

Donnis H. Thompson

Donnis H. Thompson
Superintendent of Education

DHT:HL:j1

cc: Mr. James Edgington
Mr. Fred Rodriguez
Windward District

AN EQUAL OPPORTUNITY EMPLOYER

APR 8 1983

ENVIRONMENTAL
COMMUNICATIONS
INC.

F. J. RODRIGUEZ
PRESIDENT

May 6, 1983

Ms. Donnis H. Thompson
Superintendent of Education
Department of Education
P.O. Box 2360
Honolulu, Hawaii 96804

Dear Ms. Thompson:

Thank you for your comments of April 4, 1983 regarding the Draft EIS for the Iolani School Properties Project. We appreciate receiving the information on capacity and enrollment for public schools in vicinity of the subject property and will include it in the EIS.

Thank you for your concerns on these matters.

Very truly yours,

F. J. Rodriguez

F. J. Rodriguez

FJR:ls

Mr. Gordon Furutani, LUC
Iolani School EIS
Page 2
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Edaphic Concerns:

Slopes within the project area range from 0-20%. Gulches and ridges are to be left in their natural state; in other areas, minor excavation and grading are proposed. We suggest that appropriate erosion and sedimentation control measures be utilized to prevent or minimize degradation of adjacent streams and the Hoomaluhia Park reservoir during and after construction.

Sincerely,

Susumu Oiro
SUSUMU OIRO
Chairman of the Board

State Historic Preservation Officer

cc: Environmental Communications, Inc.

APR 1 2 1983

Mr. Gordon Furutani
Land Use Commission
Room 104, Old Federal Building
335 Merchant Street
Honolulu, Hawaii 96813

Dear Mr. Furutani:

We have reviewed the environmental impact statement for the Iolani School properties project, and have a few concerns to express:

Recreation Concerns:

The only identifiable recreation concern is for pedestrian access to Hoomaluhia County Park and the pali foothills mauka of the proposed subdivision.

It is our understanding that the proposed H-3 highway will include pedestrian access from Hoomaluhia County Park to the lands mauka. These access points should be coordinated with any subdivision plans. Access from the subdivision to undeveloped lands at the base of the pali should also be provided to connect to existing trails and provide access for recreation and emergency use.

Historic Sites Concerns:

A complete, intensive archaeological survey has never been conducted in the project area. The area is reported to contain an unknown number of prehistoric Hawaiian ruins.

The environmental impact statement itself states that significant archaeological sites are situated within the project area and that the petitioner will ensure that no harm come to these sites. The statement also provides that no construction will take place until all adverse impacts on archaeological sites have been mitigated. The project description and maps in the environmental impact statement do not yet show which sites will be preserved and which sites will be studied scientifically prior to destruction. We recommend that where feasible sites slated for preservation be retained in the Conservation District. We also recommend that historic preservation measures be coordinated with our historic sites office, including plans to preserve or destroy archaeological sites, the study of sites prior to destruction, and distribution of all archaeological reports.

APR 1 4 1983

ENVIRONMENTAL
COMMUNICATIONS
INC.

F. J. RODRIGUEZ,
PRESIDENT

May 6, 1983

Mr. Susumu Ono, Chairman
Department of Land and Natural
Resources
1151 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Ono:

Thank you for your comments of April 12, 1983 regarding the Draft EIS for the Iolani School Properties Project. We would respond to your concerns in the following:

Recreational Concerns

We are pleased to note that your department understands that the H-3 Highway lies makai of the project site and will therefore, limit direct access from the project to the Ho'omaluhia Park. If the designs for the proposed highway includes pedestrian accesses to mauka lands at the base of the pali, please be assured that the petitioner will coordinate all subdivision plans with the DOT and provide connecting access to the highway's pedestrian access points. Access to existing trails and for recreational and emergency use will be provided if it is deemed necessary and/or required.

Historic Sites Concerns

A literature search and walk-through reconnaissance survey were completed for the project site. Two sites were uncovered and their locations have been included in the EIS, as Figure 6, on page III-30. As was stated in the EIS, no construction would take place until all adverse impacts on these sites have been mitigated. The two sites then, will be preserved. Your recommendation regarding coordination of historic preservation measures are satisfactory and the applicant will discuss these matters with your office at a future date. Your recommendation regarding the retention of sites in the Conservation District could be done on a site by site basis, utilizing the retained consultant and the SHPO staff.

Finally, results of the literature search and reconnaissance have been included in the EIS, as Appendix E and in the main body of the document on pages III-25 to III-30. All work regarding archaeological sites have been disclosed for your review.

1151 BISHOP BUILDING, SUITE 407, P. O. BOX 535 • HONOLULU, HAWAII 96809 • TELEPHONE (808) 531-6291

Mr. Susumu Ono
Page 2
May 6, 1983

Edaphic Concerns

Please be assured that appropriate erosion and sedimentation control measures will be utilized to prevent and minimize degradation of adjacent streams and the Ho'omaluhia Park reservoir during and after construction.

Thank you for your concerns on these matters.

Yours very truly,



F. J. Rodriguez

FJR:ls

XIII-56



University of Hawaii at Manoa

Mr. Gordon Furutani
Page 2
12 April 1983

Water Resources Research Center
Hodges Hall 203 • 2540 Hahaione Street
Honolulu, Hawaii 96822

17 April 1983

Mr. Gordon Furutani
Land Use Commission
Room 104, Old Federal Building
335 Merchant Street
Honolulu, Hawaii 96813

Dear Mr. Furutani:

Subject: Draft Environmental Impact Statement for the Proposed
Infant School Properties Project at Kamaoalii,
Koolauapoko, Kneecole, Oahu, March 1983.

We have reviewed the subject DEIS and offer the following comment.

The DEIS has not addressed what effect the project will have on infiltration and recharge of groundwater aquifers. The Honolulu Board of Water Supply is proposing to install several wells on and adjacent to the subject property (Fig. 9, p. V-21). The DEIS notes (p. III-13) that the project site is in a prime groundwater recharge area. The project will cover 120.4 acres of the total 201.4 acres with impervious material like roads, etc. (p. V-12). This is a 60 percent reduction in infiltrative surface. Studies in other areas have indicated that there is a reduction in infiltration when abandoned pineapple lands are converted to lawns (Kurobayashi, 1979). Also pasture lands have lower infiltration than forest on the same soil (Yamamoto, 1963). This would suggest that even lawns, although considered permeable, can have reduced infiltration as compared to long established natural cover.

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

Sincerely,

Edwin M. Mubayyidh

Edwin T. Mubayyidh
EIS Coordinator, WRRC

ETH:jm
cc: Fred Rodriguez & Env. Ctr., UI

Ref: Mubayyidh, E.T. and Y.S. Fok, 1979, Urbanization-Induced Impacts on Infiltration Capacity and on Rainfall-Runoff Ratio in an Hawaiian Urban Area, Tech. Rep. No. 127, Water Resources Research Center, UI.

APR 18 1983

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Ref: Yamamoto, T. and P. Duffy, 1963, Water Storage Capacity of Soil Under Four Different Land Uses in Hawaii, U.S. Forest Service Research Note PSW-5, Pacific Forest Research Experiment Station, Berkeley, California.



State of Hawaii
DEPARTMENT OF AGRICULTURE
1428 So. King Street
P. O. Box 22159
Honolulu, Hawaii 96822

GEORGE R. ANIYOSHI
GOVERNOR

ENVIRONMENTAL
COMMUNICATIONS
INC.

May 6, 1983

Mr. Edwin T. Murabayashi, EIS Coordinator
U. H. Water Resources Research Center
Holmes Hall 283
2540 Dole Street
Honolulu, Hawaii 96822

Dear Mr. Murabayashi:

Thank you for your concerns on the Iolani School Draft EIS. Your comments regarding infiltration and recharge were forwarded to Dr. Gordon L. Dugan, Environmental Consultant, on April 20, 1983 for his response. Dr. Dugan has prepared the report entitled "Environmental Aspects of Storm Water Runoff for Iolani School Land," which is included in the EIS as Appendix H. It is Dugan's contention that the potential water for runoff and infiltration at the project site would be approximately 40 inches annually. However, it is not anticipated that all of this potential water would be lost since: (1) During dry weather conditions, the residents of the development would be expected to water their lawns, shrubbery etc., which could lead to additional infiltration; (2) A sizeable portion of the water running off the areas of impervious surfaces within the development would flow onto adjacent pervious surfaces, such as lawns, gardens, etc., which should enhance infiltration over this area; (3) The runoff generated from the project flows into the newly constructed Kaneohe Flood Control Reservoir, behind a 76 ft. dam which maintains a permanent surface area of 26 acres and up to 152 acres under maximum reservoir conditions. Thus, additional infiltration should result unless the bottom surface is completely sealed; and (4) Over 70% of the water in the streams draining the Ko'olaupoko District, in which the project is located, originates from groundwater sources.

Reference to the EIS on page V-13 will present the assumptions and methodology utilized by Dugan in his formulation of his conclusions.

Thank you for your concerns on these matters.

Yours very truly,

F. J. Rodriguez

FJR:ls

1132 BISHOP BUILDING, SUITE 607 • P. O. BOX 136 • HONOLULU, HAWAII 96809 • TELEPHONE (808) 521-6281

MEMORANDUM

To: Mr. Gordon Furutani, Executive Secretary
State Land Use Commission

Subject: Draft Environmental Impact Statement (EIS) for
Proposed Iolani School Properties Project
Iolani School
TKK: 4-5-25; Por. 23; 4-5-41; Por. 1;
4-5-42; Por. 1, 6, 8, and 10
Kaneohe, Oahu

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

In our memorandum to Environmental Communications, Inc. dated January 26, 1983 (Section XII, Parties Consulted), we stated that "Any existing banana or other agricultural operations that will be directly or indirectly affected by the proposed residential development should be identified and the operators properly notified. The economic and social impacts of any loss in cultivated area, and/or the relocation of farmers and their operations should be thoroughly addressed." We feel that these concerns have not been adequately addressed in the Draft EIS.

According to the Draft EIS, the proposed project (Phase I of a larger project) would result in the removal of about 3.7 acres in banana cultivation (Section XII, Parties Consulted; letter to Luluku Banana Growers dated March 1, 1983; letter to Water Resources Research Center, University of Hawaii/Manoa dated March 1, 1983; letter to City and County Department of General Planning dated March 1, 1983). From the Botanical Survey (page III-15; Figure 4, page III-14) an area of banana cultivation appears to be in a single field located between the eastern edge of the Palii Golf Course and the proposed H-3 Freeway. However, we cannot find in the text of the Draft EIS any reference to the location and acreage of the total area of banana production on the subject property. Appendix G (Agricultural Significance) indicates that the banana production area amounts to 7.5 percent of Oahu's diversified crop land.

We feel that it is insufficient only to note that any lost banana production will be compensated for by the potential banana production of Hokihana Farm Enterprises, proposed operation on Kauai (page V-4 and 5), which according to our information, has yet to proceed with their planting schedule proposed for 1982.

"Support Hawaiian Agricultural Products" APR 15 1983

Mr. Gordon Furtant
Page -2-
April 13, 1983

We believe that the Draft EIS should clearly address the short- and long-term economic and social impacts of the removal of the 3.7 acres of bananas (i.e., the loss in actual production, lost product value) and displacement/relocation costs to farmer(s) residing on and/or working this particular field (i.e., availability of lands of comparative quality and rent in the area, availability of relocation assistance). Appendix G (Agricultural Significance), which describes the economic cost benefits which will result from the removal of all the banana producing lands affected by the proposed project does not specifically calculate the economic costs of removing the 3.7 acre site from banana cultivation, and the paragraphs on economic impact (pages V-6 and 25) make no mention of agriculture. Appendix G does state that "most of the Brazilian or Apple bananas going into Oahu markets are currently produced on the subject lands," and "the acreage could be more efficiently used, particularly if a firm time horizon of at least 10 years were available for investing and planning purposes".

We note on page III-13 (Biological Characteristics) that the general area has been in taro, rice, pineapple, sugar, or banana cultivation in the past. The Draft EIS should identify and describe all current and potential agricultural uses located on the subject and adjacent properties that may be affected by the proposed project. Appendix G states that "the site [is] one of the best locations currently being used for banana production in Hawaii."

The "Unique" land category found in Figure 8 on page IV-6 and referred to on page IV-5 and VII-1, should be deleted. The areas described as "Unique" are not classified according to the Agricultural Lands of Importance to the State of Hawaii (ALISH) system.

Finally, in regard to the removal of productive banana fields, it is stated in a letter from Environmental Communications, Inc. to the Luluku Banana Growers organization dated March 1, 1983, that "Consideration will be given to provide interim tenure on the land now under banana cultivation in the Phase II area" (Section XII, Parties Consulted). Will the banana farmer(s) cultivating the 3.7 acre field in fact be given "interim tenure", and if so, where, at what cost, and for what length of time?

Thank you for the opportunity to comment.

Jack K. Suwa

JACK K. SUWA
Chairman, Board of Agriculture

cc: Environmental Communications, Inc.
OEQC
Luluku Banana Growers

ENVIRONMENTAL
COMMUNICATIONS
INC.

F. J. RODRIGUEZ,
PRESIDENT

May 6, 1983

Mr. Jack K. Suwa, Chairman
Department of Agriculture
P.O. Box 22159
Honolulu, Hawaii 96822

Dear Mr. Suwa:

Thank you for your comments regarding the Iolani School Draft EIS.

Proper evaluation of the socio-economic impacts of any loss in a cultivated area and/or the relocation of farmers and their operations requires that the costs be compared with the benefits of the change. In this instance, the cost is simply the loss of income to the farmers. These costs have been computed and included in this document as Appendix G. Relocation costs should not be included in this calculation. Such costs are only relevant to the individuals in computing their own cost/benefit ratio in deciding whether or not or where to move.

Reference to page III-15 will identify the text and acreage relating to banana cultivation. The amount of land in banana cultivation on the project site is approximately 5 acres. This figure does not represent 7.5 percent of Oahu's diversified crop land. Appendix G refers to Phase I, Phase IIA, and Phase IIB. The 5 acre figure represents a much smaller percentage of Oahu's diversified crop land.

It is not the primary intent of the EIS to imply that any lost banana production could be compensated for by potential production from Mokihaana Farm Enterprises' proposed operation on Kaula. Inclusion of this in the report was to point out two factors: 1) Bananas could be grown elsewhere in the State, and 2) The agricultural industry in the State would be aware of this and could consider production elsewhere.

The data for the 5 acres in question can be easily obtained by multiplying the reported figures by -.0148. The result of the reduction in acreage would be an approximate loss of \$7,000 worth of agricultural output and the loss of one job. After taking into account the multipliers, the total loss to the State would be approximately \$9,000 in total output and 1.5 jobs.

Mr. Jack K. Suwa
Page 2
May 6, 1983

Agricultural cultivation for economic considerations are limited for the most part to bananas. There are no known parcels of adjacent lands that are being cultivated in other crops for economic consideration. In response to your request to identify the potential uses, agriculture use may range from vegetable truck farm crops, flowers, and ornamental nursery crops, and finally, orchard crops like guava, passion fruit, and perhaps papaya.

Dr. Peter Garrod in the report "The Agricultural Significance of the Lands in the Kamoalii, Kapala and Luluu Areas of Kaneohe", December 1981 states that "the lack of available irrigation water, the soil, the climate, and the topography of the Other Important Agricultural Land lead to our conclusion that bananas would continue to be the most profitable crop, and that only the best land not currently in production would be worth the costs of preparing it for cultivation".

It is an unfortunate fact of life that lands best suited for Agricultural use are often times also best suited for Urban uses since the parameters for highest and best use are compatible.

Garrod goes on to state, "In attempts to maximize income and efficiently use labor and equipment, we foresee the possibility that some farmers will also use some of the Other Important Agricultural Land to produce cut flowers and foliage plants. However, the cost of land preparation, harvesting, and cultural practices on such steeper slopes is quite likely to approach the possible revenues of about \$4000 per acre. Consequently, we would allow for only about 10 acres in the production of cut flowers, such as red ginger and bird of paradise, and foliage plants such as ti, papyrus, and asparagus ferns".

The "unique" land category has been deleted.

The proposed project will supply housing to low-and moderate-income residents. However, to accomplish this, 5 acres currently in banana production will be lost. It is anticipated that the affected acreage in banana production could be offset by making available an equal amount of land in the vicinity of the project site. The two farmers residing on the site would be allowed to relocate into this area. Relocation costs would be the responsibility of the farmers. It is anticipated that lease rents would remain comparable with those at the time of relocation. It is not known at this time if interim tenure will be provided, since negotiations will need to be conducted.

Thank you for your concerns on these matters.

Very truly yours,

F. J. Rodrigues
F. J. Rodrigues

FJR:ls



GEORGE R. ANTONIO
DIRECTOR

STATE OF HAWAII
DEPARTMENT OF SOCIAL SERVICES AND HOUSING
HAWAII HOUSING AUTHORITY

P. O. BOX 17887
HONOLULU, HAWAII 96817

April 15, 1983

The Honorable Jacqueline Parnell,
Director
Office of Environmental Quality
Control
550 Halekauwila Street, Room 301
Honolulu, Hawaii 96813

Dear Ms. Parnell:

Subject: Draft Environmental Impact Statement
Proposed Iolani School Properties Project
THK 4-5-25:23, 4-5-41:1; 4-5-42:1, 6, 8 and 10

We have reviewed the subject draft EIS and offer the following comments for your consideration:

1. Since the project is to meet the need of low- and moderate-income families, approximate leasehold sales prices and the proposed purchase price of the fee value of the land should be included in the EIS.
 2. The Hawaii Housing Authority has a proposed project in the vicinity with about 400 units. Despite the demand figures expressed, there could be a potential marketing problem for both projects (IHA's and Iolani), depending on market financing.
- Also, for your information the Authority has found it extremely difficult to produce "for sale" housing for low and moderate groups at today's development and financing costs; however, IHA has been able to produce units at prices for gap group buyers.

Thank you for the opportunity to comment on this matter.

Sincerely,

Paul A. Tom
PAUL A. TOM
Executive Director

cc: DSSH
Mr. Gordon Furutani

PAUL A. TOM
EXECUTIVE DIRECTOR

DEPUTY DIRECTOR

NO. 83:DEY/161

LAND USE COMMISSION
STATE OF HAWAII

APR 21 11 24 AM '83

XHH-60



University of Hawaii at Manoa

Environmental Center
Crawford 317 • 2550 Campus Road
Honolulu, Hawaii 96822
Telephone (808) 948-7301

April 22, 1983

RE:0373

ENVIRONMENTAL COMMUNICATIONS INC.

May 6, 1983

Mr. Paul A. Tom
Executive Director
Department of Social Services
and Housing
Hawaii Housing Authority
P.O. Box 17907
Honolulu, Hawaii 96817

Dear Mr. Tom:

Thank you for your comments regarding the Iolani School Draft EIS. We would respond to your concerns in the following:

1. The information on housing prices is contained in Appendix A, Demand Analysis. To ensure the project is competitive with housing prices for gap group buyers currently available at prices from \$80,000 to \$115,000, estimated prices could range from \$63,000 for townhouses up to \$111,000 for single family homes. This range is based on leasehold purchase, improvement district participation to finance off-site costs, and basic, no frills housing. The low-income group, with annual incomes under \$19,000 for a family of four, would not qualify for the estimated sales price without government subsidy. Such participation by government agencies would be pursued by the future developer. The fee value of the land is not available at this time. It will be determined at the time housing is offered to purchasers at fair market value. An option to purchase the fee will be offered to all prospective purchasers.

2. We appreciate your concerns over the potential competitive aspects of the Iolani School and HHA projects, which are in close proximity. We feel that to buy a home today is a personal preference based upon a house style, location, and other criteria. In the final analysis, we feel that the market place will be the final determining factor in selecting a home.

Since the precise timing for implementation of both projects has not been determined, it is possible they may not overlap in their marketing dates. If they do, the demand by gap group purchasers would still be significantly greater than housing supply for this group.

Thank you for your concerns on these matters.

Very truly yours,

F. J. Rodrigues

FJR/ib

Mr. Gordon Furutani
Land Use Commission
Room 109, Old Federal Building
335 Merchant Street
Honolulu, Hawaii 96813

Dear Mr. Furutani:

Draft Environmental Impact Statement
Proposed Iolani School Properties Project
Kamaoalii, Koolauipoko, Kaieohe, Oahu

The purpose of an EIS is to describe the environmental impacts that will occur should a given action take place in a particular setting. The document thus becomes an aide to the decision makers who must weigh the relative environmental costs and benefits in their determination of whether a project should be permitted (approved). Absence of information on highly significant issues would preclude its acceptance as an adequate description of the environmental impacts and hence render the document inappropriate for use in the permit-approval decision making process.

In the case of the Iolani School Properties Project, the EIS should describe the impacts that will occur should Conservation District land be converted to "Urban" use. In evaluating this land use change for this area, four topics seem to be the critical issues whose environmental impacts must be most carefully assessed:

1. The destruction or alteration of archeological sites.
2. The effect of urbanization on the water supply and groundwater recharge.
3. Urban use in a high rainfall, undetermined flood hazard area.
4. Loss of prime agricultural land.

The Environmental Center review of the above cited document has been prepared with the assistance of Paul Ekern, Agronomy and Soil; Peter Flacisbur, Urban and Regional Planning; Tyrone Reinhardt, Windward Community College-Hawaiian Culture; Matthew Spriggs, Anthropology; and Jacqueline Miller, Mark Ingoglia and Pamela Robinson, Environmental Center.

We understand, per a conversation between Fred Rodriguez, Environmental Communications, Inc. and myself, that this DEIS deals only with impacts for Phase I of this development and that there is no commitment to Phase IIA and III. Our review therefore is limited to the project's Phase I.

In general our reviewers have found the document to be significantly deficient in a number of areas and to contain unsubstantiated conclusions on matters dealing with highly significant aspects of the project. These deficiencies will require extensive revisions and additions to the document. In some cases, for example the omission of an archaeological survey of the area, the necessary revisions are of such magnitude and significance that additional public review must be considered necessary to assure that the impacts have been adequately assessed. Our specific comments and questions that we believe should be answered in the EIS are as follows.

1. Archaeological

The archaeological report (Appendix E) describes a brief literature search and "walk-through" reconnaissance. The author of the report makes it clear, as stated in the DEIS, that there are significant archaeological sites which will be impacted by the project. The archaeological sites description (pages III-24 through III-27) applies to areas outside of Phase I with the exception of two possible sites noted in the literature search described by Streck. Intensive surveys, as recommended by the consulted archaeologist, have not been conducted for this project and hence no results are available for public review and comment. This DEIS provides no information on site density or site significance within the 200 plus acres of the project. Until this information is included it is not possible to evaluate the adequacy of the document to describe the potential environmental impacts. A possible heiau (site 358), very roughly located in Sterling and Sumner (1978) "Sites of Oahu", may well be within the property, yet this is not commented on in the DEIS. Another important archaeological concern which should be addressed is the possibility of archaeological sites buried under alluvial deposits. The soils of the area contain many series consisting of recent alluvium. Any reconnaissance survey should include a program of coring and/or test pit excavation, as well as detailed examination of streambank exposures in the property, to determine the potential for subsurface remains.

We suggest that a major archaeological reconnaissance program, followed by a detailed consideration of mitigation procedures is necessary before acceptance be given to the EIS. In its present form the document is inadequate, failing to address archaeological concerns in a way which allows evaluation of their relative significance. Simply noting that there are an undefined number of sites on the property is not sufficient.

2. Groundwater

It is stated on page III-13 of the DEIS that "The project site is in a prime ground-water recharge area..." We note that "...over 70% of the project soils are rated well-drained, and relatively little runoff is generated" (page V-18). However, these comments pertain to present conditions. The proposed project will result in a considerable increase in paved and roofed area (120.4 acres, page V-12) no longer contributing to recharge. The consequences of the resulting decrease in ground-water recharge needs discussion,

especially estimated reductions of the sustainable yields of aquifers now developed or potentially developable (see Figure 9, V-21 showing well distribution).

There is discussion (page V-10 to V-12) of surface-water-quality impacts of the proposed project, but no discussion of ground-water-quality impacts except on page V-20 regarding sewage (para 2). Whether the proposed project will have significant impacts on the ground-water quality is a question that should be addressed.

3. Flood Hazard/Soils/Drainage System

Although most of the project-area soils are well-drained (as recognized above), the draft EIS lists soils of the Hanalei series as included in the project area (page III-3). These soils are in general poorly drained, and a Hanalei silty clay is, in addition, flood prone (page III-4). The distribution of these soils is not indicated. It is not clear whether the storm drainage estimate (page V-18) takes into account the distribution of these soils, which is not indicated in the draft, nor the effects of the road and pavement areas that will be created by the project.

What is referred to in the EIS as Kaneohe Stream is also known as Kealahala Stream but the flood-control dam and reservoir that the EIS refers to as on this stream (pages III-22, V-13, 14, and 18) are on the Kamooaili tributary to Kealahala Stream. These flood-control devices are downstream from the proposed project, and can have no effect on flooding of the project area. The statement that, "the project site is therefore, protected from any subsequent flooding activity" (page III-22, V 14) is therefore erroneous.

The effects of increased sediment transport from the proposed site on the flood-control reservoir and the capacity of the reservoir to accommodate any additional flood runoff are topics that should be addressed in the EIS.

4. Impacts of Agricultural Use

With respect to agriculture, this site has been characterized as important, prime, and unique by the State of Hawaii in its review of Agricultural Lands of Importance. Loss of prime agricultural lands due to the proposed development is contrary to State and Federal policy. In 1978 the Constitutional Convention issued a mandate that strongly promotes the conservation of agricultural lands, diversified agriculture, increases in agricultural self sufficiency and the assurance of the availability of agriculturally suitable lands. Governor Ariyoshi has supported and promoted this mandate while furthering the policy with the creation of agricultural parks and a state plan promoting diversified agriculture.

On page VII-1, it is stated, "The proposed action will reduce, somewhat, the amount of land currently under banana cultivation and with cultivation potential." Clearly this is an economic impact as well as a loss of prime agricultural land. The assumption that planned Maui banana production will mitigate the loss of agricultural land on Oahu is (page VIII-2) conjecture since the loss of land will be permanent and state policy is toward agricultural growth and self-sufficiency, not stabilization.

5. Additional concerns

The project is in close proximity to the Koolau Range. It should be noted that the cloud and mountain shadow characteristics greatly reduce the global solar radiation particularly the direct beam so that the practicality of use of solar heating to reduce the energy costs for these sites is problematic.

Mr. Gordon Furutani

April 22, 1983

-4-

The DEIS does not address the possibility of wind damage and this project. The funneling of winds on this windward coast has often caused high wind velocities and damages. The revised EIS should address the possible impacts these winds may have on the proposed structures and should also include mitigating measures that could be incorporated into the architectural design of these structures.

We appreciate the opportunity to comment on this DEIS and hope that you will find our comments useful in the preparation of the revised document.

Yours truly,



Deak C. Cox
Director

cc: OEQC
Fred Rodriguez, Environmental Communications, Inc.

Paul Ekem
Peter Flachsbart
Tyronne Reinhardt
Matthew Spriggs
Jacquelin Miller
Mark Ingoglia
Pamela Bainsen

ENVIRONMENTAL
COMMUNICATIONS
INC.

May 6, 1983

F. J. RODRIGUEZ
PRESIDENT

Dr. Deak C. Cox, Director
U.H. Environmental Center
Crawford Hall 317
2550 Campus Road
Honolulu, Hawaii 96822

Dear Dr. Cox:

Thank you for your comments regarding the Iolani School Draft EIS. We would respond to your concerns in the following:

1. Archaeological

The archaeological consultant has been notified of your concerns. His response is provided herein.

The literature search and walk-through reconnaissance survey have uncovered two sites within the project area. The petitioner has ensured that no construction would take place until all adverse impacts on these sites would have been mitigated. The two sites then, will be preserved. As recommended by the State Department of Land and Natural Resources, the petitioner will discuss and resolve historic preservation concerns.

2. Groundwater

Your comments regarding infiltration and recharge were forwarded to Dr. Gordon L. Dugan, Environmental Consultant, on April 20, 1983 for his response. Dr. Dugan has prepared the report entitled "Environmental Aspects of Storm Water Runoff for Iolani School Land", which is included in the EIS as Appendix H. It is Dugan's contention that the potential water for runoff and infiltration at the project site would be approximately 40 inches annually. However, it is not anticipated that all of this potential water would be lost since: (1) During dry weather conditions, the residents of the development would be expected to water their lawns, shrubbery etc., which could lead to additional infiltration; (2) A sizeable portion of the water running off the areas of impervious surfaces within the development would flow onto adjacent pervious surfaces, such as lawns, gardens, etc., which should enhance infiltration over this area; (3) The runoff generated from the project flows into the newly constructed Kaneohe Flood Control Reservoir, behind a 76 ft. dam which maintains a permanent surface area of 26 acres and up to 152 acres under

Dr. Doak C. Cox
Page 2
May 6, 1983

maximum reservoir conditions. Thus, additional infiltration should result unless the bottom surface is completely sealed; and (4) Over 70% of the water in the streams draining the Kō'olāupoko District, in which the project is located, originates from groundwater sources. Reference to the EIS on page V-13 will present the assumptions and methodology utilized by Dugan in the formulation of his conclusions. Impact to groundwater quality is anticipated to be minimal, since the project will not alter the water quality percolating into the soil.

3. Flood Hazard/Soils/Drainage System

The location and distribution of soils relative to the project site has been included in the EIS on page III-5. The storm runoff estimates detailed in the EIS has taken into account the characteristics of these soils.

We appreciate your notification that the flood-control dam and reservoir are on the Kāmoonili tributary of Kaneohe Stream. The EIS has been revised to indicate this. The statement "the project site is therefore, protected from any subsequent flooding activity" has been deleted from the report.

The effects of increased sediment transport and the capacity of the reservoir has already been addressed in the EIS on pages V-10, V-12, V-22, and V-23.

4. Impacts of Agricultural Use

The petitioner understands that the project would eliminate some land currently designated as "prime." However, it is his belief that the provision of low-and moderate-income housing necessary to assist in satisfying the stated demand for housing on Oahu in Kaneohe, as described in Appendix A, would be of a use which is more beneficial to the public.

It is not the primary intent of the EIS to imply that any lost banana production could be compensated for by potential production from Mokihana Farm Enterprises proposed operation on Kāua. Inclusion of this in the report was to point out two factors: 1) Bananas could be grown elsewhere in the State, and 2) The agricultural industry in the State would be aware of this and could consider production elsewhere.

5. Additional Concerns

If it is decided that the probable use of solar heating to reduce

Dr. Doak C. Cox
Page 3
May 6, 1983

energy costs is problematic and not feasible, then solar heating panels will not be included in the designs of the project. The final determination for the use of solar heating will be the option of the potential homeowner.

Your concern regarding potential damage to the residential structural improvements due to wind will be passed on to the developer once he has been selected.

We appreciate your concerns as expressed.

Very truly yours,

F. J. Rodriguez

FJR:is

Chiniago Inc.
Archaeological Consulting

1040-B SMITH STREET • HONOLULU, HAWAII 96817 • TELEPHONE: (808) 521-2785

April 25, 1983

Mr. Fred Rodriguez
Environmental Communications Inc.
1152 Bishop Building
Room 407
Honolulu, Hawaii 96813

Dear Mr. Rodriguez:

This is in response to your request to review certain comments regarding archaeological work at the location of the 200+ acre Iolani School Project. While I agree that further survey work, including sub-surface testing, is required, I differ with the reviewers as to the appropriate scheduling of that work. It would be premature to conduct an intensive archaeological survey before the developer has any assurances that the project will meet with all of the necessary approvals. I feel that there will be sufficient time to do the fieldwork, and for the developer to make any necessary adjustments in the development plan necessitated by the results of the fieldwork, if the archaeological survey were to be completed no later than the time of submission of the re-zoning request to the City and County of Honolulu. I therefore recommend that you accept this approach as a self-imposed condition.

If you have any further questions, please feel free to contact me.

Sincerely yours,


William Barrera, Jr.
President

XII-65

CHINIAGO INC.
HONOLULU



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
DEVELOPMENT, DESIGN
PERMITTING DIVISION

April 26, 1983

INTRODUCED BY
SHEILA

BY
WAYNE J. YAMAGUCHI

JAMES B. MCKENNA
JPM:JAN 21 1983

BY
BERNARD

6-0038

Mr. Gordon Furutani
Land Use Commission
Room 104, Old Federal Building
335 Merchant Street
Honolulu, Hawaii 96813

Dear Mr. Furutani:

Proposed Iolani School Properties Project,
Environmental Impact Statement,
Kamooalii, Koolau-poko, Oahu

Thank you for the opportunity to review and comment on the subject document.

The traffic assessment presented in the report appears to be reasonable. We suggest that the recommended mitigating measures at the intersection of Kaneohe Highway and Kaneohe Service Road (i.e. provision of accel/decel lanes) be a condition for granting of the land use change.

It should be noted that the portion of Kaneohe Road which is 24 feet wide with 2 feet unpaved shoulders, between Kaneohe Highway and the Iolani properties, is below the City standards for a subdivision road.

Please be informed that the access issue to Kikalea Highway from Phase II of the development has not been resolved and requires further coordination with our Department, Highways Division.

MAY 2 1983

ENVIRONMENTAL
COMMUNICATIONS
INC.

F. J. RODRIGUEZ
PRESIDENT

STP 0.9006

Mr. Gordon Purutani
Page 2
April 25, 1983

Coordination is also required regarding the development's effect on the drainage system for Interstate Route H-3, as mentioned in Environmental Communications, Inc. letter to our Department. (See Section XII, letter of March 1, 1983, item JJ.) The EIS should address this concern.

Very truly yours,

F. J. Rodriguez
Ryokichi Higashionna
Director of Transportation

JW:gn

cc: Mr. Fred Rodriguez (ECI)
HNY-D, -PA, -PS

May 6, 1983

Dr. Ryokichi Higashionna, Director
Department of Transportation
State of Hawaii
869 Punchbowl Street, 5th Floor
Honolulu, Hawaii 96813

Dear Dr. Higashionna:

Thank you for your comments of April 26, 1983 regarding the Iolani School Properties Project Draft EIS.

The recommendation to provide acceleration and deceleration lanes at the Kaneohe Highway and Konaole Service Road intersection will be considered by the petitioner as a condition for approvals of the project.

The portion of existing Konaole Road within the project boundary will be improved to City standards for a subdivision road.

The issue of access to Likelike Highway from Phase II of the development must be resolved at a later date by coordinating efforts with the State Highways Division.

Preparation of a drainage map appears premature at this stage of project implementation. Prior to the preparation of said map, the petitioner will contact the State Highways Division, to determine the design capacity of the H-3 crossings.

Thank you for your concerns on these matters.

Very truly yours,

F. J. Rodriguez

F. J. Rodriguez

FJR:ls

cc: Ah Leong Kam

POLICE DEPARTMENT
CITY AND COUNTY OF HONOLULU

1415 SOUTH BERETANIA STREET
HONOLULU, HAWAII 96814 - AREA CODE (808) 935-3111

GILEEN R. ANDERSON
MAYOR



FRANCIS KEALA
CHIEF
HAROLD FALK
DEPUTY CHIEF

F. J. RODRIGUEZ
PRESIDENT

ENVIRONMENTAL
COMMUNICATIONS
INC.

OUR REFERENCE EPS-JS

March 30, 1983

LAND USE COMMISSION
STATE OF HAWAII
APR 4 11 41 AM '83

Mr. Gordon Furutani
Land Use Commission
Room 104, Old Federal Building
335 Merchant Street
Honolulu, HI 96813

Dear Mr. Furutani:

We have reviewed the environmental impact statement for the proposed Iolani School properties project, which was forwarded to us on March 18, 1983. The statement and separate correspondence on this project have adequately addressed our concerns, and therefore we have no further comments on the project at this time.

Sincerely,

FRANCIS KEALA
Chief of Police

By *F. J. Rodriguez*
F. J. RODRIGUEZ
Acting Assistant Chief
Administrative Bureau

cc: Mr. Fred Rodriguez
Environmental Communications Inc.
P. O. Box 536
Honolulu, HI 96809

May 6, 1983

Mr. Roy Kasa
Acting Assistant Chief
Honolulu Police Department
1455 South Beretania Street
Honolulu, Hawaii 96814

Dear Mr. Kasa:

Thank you for your comments of March 30, 1983 regarding the Draft EIS for the Iolani School Properties Project. We appreciate your informing us that you have no further comments on the project.

Thank you for your concerns on these matters.

Very truly yours,

F. J. Rodriguez
F. J. Rodriguez

FJR:ls

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU
450 SOUTH KING STREET
HONOLULU, HAWAII 96813



MICHAEL J. CHUN, Ph.D.
DIRECTOR AND CHIEF ENGINEER

ENV 83-84

EILEEN M. ANDERSON
MAYOR

April 11, 1983

Mr. Gordon Furutani
Land Use Commission
Room 104, Old Federal Building
335 Merchant Street
Honolulu, Hawaii 96813

Dear Mr. Furutani:

Re: EIS for the Proposed Iolani School Properties
Project, Koolaupoko, Kaneohe, Oahu, Hawaii

We have received the subject EIS and have the following comments.

1. There is no mention of mitigative measures which will be taken for increased runoff and siltation of Kaneohe Dam. Making reference to the grading ordinance per se does not constitute a mitigative action.
2. Increased maintenance of Kaneohe Dam for the removal of silt will be experienced from the proposed project. Increasing the tax base will not necessarily mean that more money will be provided for additional maintenance.
3. Proposal to control and remove silt deposition generated by the project construction should be stated.
4. The traffic capacity on Kionaole Road has been addressed in the EIS. However, is the existing improvement structurally capable of handling the additional traffic loads during and after the construction period? Existing conditions of the road and any proposed improvement should be discussed.
5. Municipal refuse collection will be furnished for residential units; however, adequate access and

Mr. Gordon Furutani

- 2 -

April 11, 1983

grades must be provided for collection vehicles. The average cost of municipal collection service is approximately \$165 per household per year.

6. The Kaneohe STP is nearing its installed capacity of 4.5 mgd (4.35 mgd in 81-82 FY) and will not be able to accommodate flows from the proposed development. A one-plant or two-plant sewer system is presently being considered for the Kaneohe-Kailua sewerage district under a study expected to be completed in mid 1983.

If a one-plant system is adopted, Kaneohe sewage will be treated at the Kailua STP in expanded facilities. If the two-plant system is retained, the capacity of the Kaneohe plant will be expanded. However, proposed design flows for either systems cannot include flows for non-urban designated areas such as the proposed development. Construction at either the Kaneohe and/or Kailua plant is tentatively scheduled to begin in Fiscal 1984-85. Construction can take at least two years to complete.

7. The EIS should indicate how the sewage generated from the proposed development is going to be transported to the interceptor sewer. It is not known whether the existing interceptor sewer is adequate to handle the flows from the proposed sewage pump station.

Me ke aloha pumehana,

MICHAEL J. CHUN
Director and Chief Engineer

cc: Environmental Communications, Inc.
Div. of Engineering
Div. of Wastewater Management

APR 19 1983

XHH-68

ENVIRONMENTAL
COMMUNICATIONS
INC.

F. J. RODRIGUEZ,
PRESIDENT

Dr. Michael J. Chun
Page 2
May 6, 1983

May 6, 1983

Dr. Michael J. Chun
Director and Chief Engineer
Department of Public Works
City & County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Dr. Chun:

Thank you for your comments regarding the Iolani School Draft EIS. We would respond to your concerns in the following:

1. To minimize increased runoff and siltation of Kaneohe Dam, the exposed areas not paved or used for building construction will be landscaped with ground cover. Most development areas are sited on the more level portions of the site and the flatter ridges. These conditions will minimize the amount of runoff. Furthermore, grading work will be performed in increments of 15 acres or less, and the existing vegetation surrounding the site will be retained. Besides grassing of the exposed areas immediately after grading, other erosion control measures shall include the construction of temporary earth berms, sediment basins and underground drain pipes with risers and filter blankets.
2. The Interstate Highway H-3 will act as a permanent barrier between Kaneohe Dam and the proposed development. Since most of the improvements are proposed on the top of ridges, it is anticipated that the increase of silt deposits to Kaneohe Dam will be minimized by retaining the surrounding vegetation and by the implementation of erosion control measures.
3. The construction of on-site sediment basins and earth berms will collect silt generated during construction. After the completion of the construction of improvements and landscaping of the graded area, the sediment basins and earth berms will be removed and the exposed area will be landscaped with ground cover.
4. Kionaole Road is an existing two-lane City and County road. Prior to the construction of the Pali Highway and Kamehameha Highway fronting Pali Golf Course, Kionaole Road was one of the major roads connecting Windward Oahu to Honolulu. Kionaole

Road is presently used by maintenance vehicles of the Pali Golf Course. Therefore, the existing road structure can accommodate the anticipated traffic loads to be generated during and after construction of the project site.

5. Roads will be designed in accordance with design standards of the City and County Department of Transportation Services and the American Association of State Highway Transportation Officials. Therefore, refuse collection vehicles will have adequate access and minimal road grades to service the project site.

- 6 &
7. The information on STPs have been included in the EIS. We were informed by the Division of Wastewater Management on July 30, 1982 and April 11, 1983 that the existing interceptor sewer has the available capacity to accommodate the proposed development (See attachment provided herein).

The adequacy of the smaller collector lines will be analyzed when more detailed development plans are completed. If the existing lines are deemed to be inadequate to accommodate sewage generated by the proposed development, then future plans will include the installation of a new sewer line to connect with the existing interceptor sewer.

Thank you for your concerns on these matters.

Very truly yours,

F. J. Rodriguez

FJR:tlc

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU
DIVISION OF WASTEWATER MANAGEMENT
550 SOUTH KING STREET
HONOLULU, HAWAII 96813



EILEEN R. ANDERSON
MAYOR

MICHAEL J. CHUN, Ph.D.
DIRECTOR AND CHIEF ENGINEER
WILLIAM A. BONNEY
STAFF ENGINEER

MPP 82-205

July 30, 1982

Mr. George K. Houghtailing
Planning Consultant and Civil Engineer
Community Planning, Inc.
700 Bishop Street, Suite 608
Honolulu, Hawaii 96813

Dear Mr. Houghtailing:

Subject: Proposed Residential Development
Kamooalii, Kaneohe, Koolauapoko, Oahu, Hawaii
THK: 4-5-25: 23; 4-5-41: 1;
4-5-42: 1, 6, 8 and 10

We agree that the existing interceptor has the capacity for the proposed development; however, the smaller collector line capacities will have to be checked. Also, the Kaneohe Sewage Treatment Plant (STP) is nearing capacity and will not be able to accommodate the flow from the development. A facility plan, which is approximately 80 percent complete, is being prepared but does not include the subject properties in the Kaneohe STP service area. Unless steps are taken to change the Development Plan and the facility plan to include the area, our system may not be able to accommodate all of the flows generated by the proposed development.

If there are any questions, please call Mr. Jay Hamal at 523-4067.

Very truly yours,

George M. Uyena
GEORGE M. UYENA
Chief

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DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU
550 SOUTH KING STREET
HONOLULU, HAWAII 96813



EILEEN R. ANDERSON
MAYOR

MICHAEL J. CHUN, Ph.D.
DIRECTOR AND CHIEF ENGINEER
WILLIAM A. BONNEY
STAFF ENGINEER

MPP 83-174

April 11, 1983

Mr. F. J. Rodriguez, President
Environmental Communications Inc.
P. O. Box 536
Honolulu, Hawaii 96809

Dear Mr. Rodriguez:

Subject: Iolani School Properties Project

The City will accept the sewage generated by the project into the Kaneohe Sewage Treatment Plant or Kailua Sewage Treatment Plant provided the developer is responsible for the upgrading of the necessary collection, and transmission system to the plant and also any additional treatment facilities required.

If there are any questions, please call Mr. Jay Hamal at 523-4067.

Me ke aloha pumehana,

Michael J. Chun

MICHAEL J. CHUN
Director and Chief Engineer

APR 19 1983



April 20, 1983

Mr. Michael J. Chun
Director and Chief Engineer
Department of Public Works
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Chun:

Thank you for your comments of April 11, 1983 regarding the Draft EIS for the Iolani School Properties Project. We appreciate your indicating to us the provisions which sewage would be accepted into the Kaneohe and Kalia STPs. The applicant has committed himself to ensure that the project would be provided with adequate sewerage facilities. All required improvements, including expansion of existing facilities and appurtenances, would be undertaken by the developer of the project at no expense to governmental agencies.

Thank you for your concerns on these matters.

Yours very truly,

F. J. Rodriguez

FJR:ls

Mr. Gordon Furutani
Land Use Commission
Old Federal Building, Room 104
335 Merchant Street
Honolulu, Hawaii 96813

Dear Mr. Furutani:

Subject: Environmental Impact Statement
(EIS) for the Proposed Iolani
School Properties Project

We have the following comments on the EIS for your consideration:

1. Page II-7, Potable Water System: We have made no water commitment to the project. The developer will be required to install a complete water system including source, storage and transmission facilities. A water master plan should be submitted to us for approval.

The statement that existing waterlines on the project site are sufficient need to be clarified. We only have a 2-inch waterline on Kionaole Road.
2. Page III-13, Groundwater: More discussion is required on the recharge potential of the area. We are concerned whenever conservation lands with rainfall exceeding 50 inches a year are converted to urban use because of the potential decrease of recharge to our groundwater basins.

XIII-71

APR 25 1983

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ENVIRONMENTAL
COMMUNICATIONS
INC.

F. J. RODRIGUEZ,
PRESIDENT

Mr. Gordon Furutani
Page 2

April 20, 1983

The EIS should note that clearing and grading for the proposed development should be kept to a minimum. The developer is also requested to submit his overall development plan to the department to ensure that the proposed development will have no major adverse affects on our groundwater resources in that area.

If you have any questions, please contact Lawrence Whang at 548-5221.

Very truly yours,

Kazu Hayashida
KAZU HAYASHIDA
Manager and Chief Engineer

cc: Mr. Fred Rodriguez

XII-72

May 6, 1983

Mr. Kasu Hayashida
Manager and Chief Engineer
Board of Water Supply
City & County of Honolulu
630 South Beretania Street
Honolulu, Hawaii 96843

Dear Mr. Hayashida:

Thank you for your comments regarding the Iolani School Draft EIS. We would respond to your comments in the following:

1. The petitioner understands that the BWS has not made any water commitment to the project. The petitioner will install water source, storage, and transmission facilities. The water master plan, when completed, will be submitted for BWS approval.

The EIS has been revised to indicate that only a 2 inch waterline on Konohe Road exists on the project site and additional facilities would be extended from Kamehameha Highway to serve the needs of the development.

2. Your comments regarding infiltration and recharge were forwarded to Dr. Gordon L. Dugan, Environmental Consultant, on April 20, 1983 for his response. Dr. Dugan has prepared the report entitled "Environmental Aspects of Storm Water Runoff for Iolani School Land", which is included in the EIS as Appendix H. It is Dugan's contention that the potential water for runoff and infiltration at the project site would be approximately 40 inches annually. However, it is not anticipated that all of this potential water would be lost since: (1) During dry weather conditions, the residents of the development would be expected to water their lawns, shrubbery etc., which could lead to additional infiltration; (2) A sizeable portion of the water running off the areas of impervious surfaces within the development would flow onto adjacent pervious surfaces, such as lawns, gardens, etc., which should enhance infiltration over this area; (3) The runoff generated from the project flows into the newly constructed Kanohe Flood Control Reservoir, behind a 76 ft. dam which maintains a permanent surface area of 26 acres and up to 152 acres under maximum reservoir conditions. Thus, additional infiltration should result unless the bottom surface is completely sealed; and (4) Over 70% of the water in the streams draining the Ko'olaupoko District, in which the project is located, originates from groundwater sources.

Mr. Kasu Hayashida
Page 2
May 6, 1983

Reference to the EIS on page V-13 will present the assumptions and methodology utilized by Dugan in his formulation of his conclusions.

The EIS on page V-1 already states that only minor excavation and grading work will need to be done to implement the proposed action. The petitioner will submit his overall development plan for EWS review.

Thank you for your concerns on these matters.

Very truly yours,



F. J. Rodriguez

FJR:ls

April 21, 1983

Mr. Gordon Furutani
Land Use Commission
Old Federal Bldg., Room 104
335 Merchant Street
Honolulu, Hawaii 96813

Dear Mr. Furutani:

Subject: Proposed Iolani School Properties Project
Environmental Impact Statement (EIS)

We have reviewed the subject EIS and are pleased to note the developer's commitment to provide housing affordable to low- and moderate-income families.

However, the proposed site is designated for "preservation" use in the City's proposed Development Plan. The Plan represents a relatively detailed development scheme for implementing and accomplishing the objectives and policies of the Koolauoko district and until the Development Plan is amended to reflect the residential use of the subject property, Community Development Block Grant funds cannot be utilized for improvements.

If you have any questions relative to the use of CDBG funds, please contact the CDBG Branch at 527-5065.

Sincerely,

JOSEPH K. COWANT

✓cc: Mr. Fred Rodriguez
Environmental Communications, Inc.
P. O. Box 536
Honolulu, Hawaii 96809

ENVIRONMENTAL
COMMUNICATIONS
INC.

F. J. RODRIGUEZ,
PRESIDENT

DEPARTMENT OF PARKS AND RECREATION
CITY AND COUNTY OF HONOLULU
830 SOUTH KING STREET
HONOLULU, HAWAII 96813



EILEEN H. ANDERSON
SECRETARY

EHIKO I. KUDO
DIRECTOR
SAM L. CARL
DEPUTY DIRECTOR
OSCAR M. ABAMINA
EXECUTIVE ASSISTANT

May 6, 1983

Mr. Joseph K. Conant
Department of Housing &
Community Development
650 South King Street, 5th Floor
Honolulu, Hawaii 96813

Dear Mr. Conant:

Thank you for your comments of April 21, 1983 regarding the Iolani School Properties Project Draft EIS. The applicant has petitioned the State Land Use Commission and will seek a District Boundary Amendment from the State. The applicant has also undertaken the necessary steps with the City and County of Honolulu, to redesignate the proposed site on the Koolaupoko Development Plan. We appreciate your indicating to us the status of CDBG funds if the DP is not amended in conformity with the proposed project.

Very truly yours,

F. J. Rodriguez

FJR:is

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT
FOR THE PROPOSED IOLANI SCHOOL PROPERTIES PROJECT

We have reviewed the draft environmental impact statement and would like to reiterate our concerns.

1. Impairment of views from the Pali Lookout and the City parks.
We are aware that no high-rise structures will be developed; however, the housing development is proposed on sloping ground and the houses on the higher ground will be just as visible as a high-rise from the Pali Golf Course and Ho'omaluhia Park. The housing development, which will be located between these two public park areas, will be an undesirable intrusion in the lush greenery of the area and will be highly visible from both the Pali Lookout and the City parks.
2. On page V-5, it is mentioned that impacts on water quality will be mitigated by adhering to governmental regulations. This will not reduce the increased surface water runoff and resultant pollution from debris, soil sludge, pesticides, herbicides and animal waste from entering and polluting the streams and pond which was developed for fishing and boating at Ho'omaluhia Park.

Ho'omaluhia Park was planned and developed as a mountain type park for camping, fishing, boating, picnicking and horseback riding away from the urban development. In fact, we started with a 37-acre park around the pond and gradually expanded it to 400+ acres to include all lands between the original

APR 25 1983

ENVIRONMENTAL
COMMUNICATIONS
INC.

F. J. RODRIGUEZ
PRESIDENT

Mr. Gordon Furutani

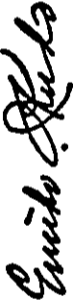
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April 21, 1983

park and the proposed highway. This we had hoped would preclude any urban development in the area and maintain a forest and mountain atmosphere inasmuch as the lands mauka of the proposed highway is designated conservation. The highway planners were even forced to include noise and visual barriers in their plans although their plans were initiated before ours.

Thank you for the opportunity to review the draft EIS.

Sincerely yours,



(Mrs.) EMIKO I. KUDO, Director

EIK:vc

cc: Mr. Fred Rodriguez /

XII-75

May 6, 1983

Mrs. Emiko I. Kudo, Director
Department of Parks and Recreation
City & County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mrs. Kudo:

Thank you for your comments regarding the Iolani School Draft EIS. We would respond to your concerns in the following:

1. We share your concerns over the retention of scenic views from the Pall Lookout and Ho'omaluhia Park. However, since no multi-family high-rise structures are being considered and the proposed project is consistent with the adjacent residential subdivisions, makai views from the Pall Lookout and mauka views from the park, should remain unaffected. The low-rise nature of the proposed housing, preservation of mature vegetation, and residential landscaping will obscure the visibility of the project from distant views and maintain the "lush greenery" of the area. Makai views from the park should also be unobstructed since the project site lies mauka of the park. Further, it is anticipated that the proposed Interstate H-3 Highway represents more of a scenic obstruction due to its greater scale of development.
2. As was stated in our previous letter to your department, Dr. Gordon L. Dugan believed that though surface water runoff would increase, potential pollution problems should not significantly result. Further, it should be noted that the original intent of the pond was not for fishing or boating, but as a flood control basin. The proposed project then, would be consistent with the operational intent of the pond basin, since runoff would be directed into it.

In regards to maintaining a "forest and mountain atmosphere" in the area, may we reiterate that the project lies not between the park and the highway, but is located mauka of the highway. Secondly, please be aware that the project does not advocate urban sprawl and that the proposed action would be compatible and contiguous to existing residential subdivisions. Thirdly, the project design will provide more than required acreage of open space and landscaping, so as to enhance and maintain a forest and mountain atmosphere.

DEPARTMENT OF LAND UTILIZATION
CITY AND COUNTY OF HONOLULU
630 SOUTH KING STREET
HONOLULU, HAWAII 96813 9 1001 922-0232



EILEEN R. ANDERSON
MAYOR

MICHAEL M. MCELROY
MAYOR

ROBERT R. JONES
DEPUTY MAYOR

April 22, 1983

LU3/83-1253(SH)

Mrs. Emiko I. Kudo
Page 2
May 6, 1983

Finally, it is our belief that irrespective of the project being implemented or not, the area would not possess a forest atmosphere, since a major highway would be traveling through it.

Thank you for your concerns on these matters.

Yours very truly,

F. J. Rodriguez
F. J. Rodriguez

FJR:ls

Mr. Gordon Furutani
Land Use Commission
Room 104, Old Federal Building
335 Merchant Street
Honolulu, Hawaii 96813

Dear Mr. Furutani:

Draft Environmental Impact Statement
Proposed Iolani School Properties Project
Kamaoalii, Koolauapoko, Kaneohe, Oahu
Tax Map Keys: 4-5-25: 23
4-5-41: 1
4-5-A2: 1, 6, 8, 10

We have reviewed the above, and have the following comments to offer:

1. Reference: Page II-8.

Comment: Who will be responsible for the improvements to increase the capacity of the Kaneohe Sewage Treatment Plant to accommodate the effluent from the proposed project?

2. Reference: Pages III-1 to III-4.

Comment: Discussions regarding both topography and soils should be referenced to clear, legible site topographic and soils maps, respectively.

3. Reference: Page III-27.

Comment: What is the recommended action, proposed by the applicant's archaeological consultant, for the various potential archaeological sites within the proposed development area?

APR 25 1983

Mr. Gordon Furutani
Page 2

4. Reference: Pages IV-3 to IV-5.

Comment: The proposed project is in direct conflict with the Development Plan (DP) and zoning designations for the project site. The DP for Koolauoko is slated for adoption at the end of April 1983, at which time Interim Development Controls may suspend any proposed development activities, which are not consistent with the DP designation. The proposed project is also contrary to the State Land Use "Conservation District" classification.

5. Reference: Page V-1 to V-24.

Comment: No where in the discussion of impacts is amount of earthwork (embankment and excavation) discussed, or the location of the necessary earthwork. Nor is the preliminary drainage scheme shown. We consider this a major deficiency in the EIS; because these topics are not fully disclosed, their impacts cannot be assayed.

6. Reference: Page V-22.

Comment: Is the rate of solid waste generation for the proposed project stated on a per day basis?

7. Reference: Page VII-1.

Comment: The discussion on alternatives to the proposed action is inadequate, because it does not discuss in detail housing alternatives, which could provide similar benefits, while creating different environmental impacts. Were alternatives to a conventional subdivision, i.e., planned development or cluster considered? If so, why were these alternatives rejected? Given the site's topography, relationship to expansive scenic, open areas, such as the Hoomaluha Park and Flood Control Area, and the archaeological findings, an alternative such as a cluster development could enhance the environmental quality, and reduce or mitigate potential adverse environmental impacts on archaeological sites, trees, streams, open space etc.

Mr. Gordon Furutani
Page 3

8. Reference: Appendix A - Page 15.

Comment: Do the prices for housing shown in this discussion approximate what is referred to in the text of the Draft EIS as "low-and moderate-income housing necessary to assist in satisfying the stated demand for housing in Oahu ..."? If not, please specify a range of costs for the various housing types proposed?

If there are any further questions, please contact Sampson Mar of our staff at 527-5038.

Very truly yours,



MICHAEL M. McELROY
Director of Land Utilization

MHM:sl

cc: Fred Rodriguez ✓
OEQC

ENVIRONMENTAL
COMMUNICATIONS
INC.

F. J. RODRIGUEZ,
PRESIDENT

Mr. Michael M. McElroy
Page 2
May 6, 1983

May 6, 1983

Mr. Michael M. McElroy, Director
Department of Land Utilization
City & County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. McElroy:

Thank you for your comments on the Iolani School Draft EIS. We would respond to your concerns in the following:

1. All required improvements, including expansion of existing facilities, will be undertaken by the developer of the project at no expense to governmental agencies.
2. The referenced soils and topographic maps will be provided as requested; the soils map will be included in the FEIS and the topographic map will be provided to your department for their information.
3. The literature search and walk-through reconnaissance survey have uncovered two sites within the project area. The petitioner has ensured that no construction would take place until all adverse impacts on these sites would have been mitigated. The two sites then, will be preserved. As recommended by the State Department of Land and Natural Resources, the petitioner will discuss and resolve historic preservation concerns.
4. The petitioner has petitioned the State Land Use Commission and will seek an Urban District Boundary Amendment. The petitioner has also undertaken the necessary steps with the City and County of Honolulu to amend the proposed Koolaupoko Development Plan. The petitioner is aware that the proposed project can not be implemented unless the area is redesignated in conformance with State and County plans.
5. It is premature at this time to have detailed engineering estimates of the drainage system and amount of earthwork involved in site development. Generally, site planning will minimize and balance the amount of cut and fill since gently sloping ridges and the flatter plateaus will be used as housing sites. Detailed site planning will also provide an acceptable drainage scheme in conformance with applicable standards. Retention of surrounding vegetation and landscaping of developed areas will be included as part of the detailed drainage plan.

1117 915-00P BUREAU, SUITE 407, P. O. BOX 136 • HONOLULU HAWAII 96809 • TELEPHONE (808) 521-8281

6. The rate of solid waste generation is based on a person per day estimate.
 7. The petitioner intends to develop a project necessary to assist in satisfying the demand for low-and moderate-income housing on Oahu in Kaneohe and also to provide a project design that is flexible in accommodating all needs. Subsequently, the proposed project will create a series of neighborhoods situated in small clusters and will provide 611 dwelling units, including 259 single-family units, 82 duplex units, and 270 townhouse units. The townhouse portions of the proposed plan will provide the site planning flexibility and retention of open space possible under a cluster housing approach.
 8. The petitioner feels that the proposed action already represents a mix of housing alternatives. Therefore, the EIS's discussions on alternatives and impacts are adequate.
- The range of housing prices presented in Appendix A indicate that the proposed project will provide housing for gap-group households. These price ranges are comparable with moderate income housing projects now available in the market.

Thank you for your concerns on these matters.

Very truly yours,

F. J. Rodriguez

FJR:ls

DEPARTMENT OF GENERAL PLANNING
CITY AND COUNTY OF HONOLULU

830 SOUTH KING STREET
HONOLULU, HAWAII 96813



SILKIN R. ANDERSON
MAYOR

WILLARD T. CHOW
CHIEF PLANNING OFFICER

RALPH PORTMORE
DEPUTY CHIEF PLANNING OFFICER

DGP3/83-5728
DGP3/83-5748

April 22, 1983

Mr. Gordon Furutani
Page 2

low/mod income group can afford. A reviewer would then be able to see whether this proposed development is likely to fill the need for low/mod housing, as claimed.

Soils and Topography

Maps are not provided for fundamental information which is readily available and easy to prepare, e.g., slopes, soils. There is no quantification in the EIS (pp. III-1 to III-4 and V-1). Discussion also seems inconsistent with information in Appendix G on agricultural land designations or categories.

The discussion of State agricultural land designations (pp. IV-5 and IV-6) is particularly inadequate without quantification. The statement that the prime and unique lands here represent only a fraction of the Oahu total may be true, but the discussion seems out of context, and is inconsistent with discussion of the agricultural significance of the lands in Appendix G (pp. 1-5).

The lands here are among the best lands in the State for bananas and account for a large portion of apple banana production. The use of the lands, or the areas in bananas, should be mapped so that the EIS reader can see the relationship of the proposed development to the banana lands.

The discussion that the 500 acres of banana production proposed for Kauai would offset the acreage taken out of production here seems somewhat facetious. One could stretch this logic to world banana production and prices, which would make the loss here inconsequential, by citing that Castle and Cooke took heavy losses in bananas and discontinued operations in Costa Rica. Extending this logic, it could be concluded, unreasonably, that there is no need on Oahu for any banana lands, or any other lands such as sugar, pineapple, and even diversified agriculture. We do not agree with this.

These sections should be revised, and adequate maps and quantification provided if the EIS is to be acceptable.

Drainage and Water Quality

This section is also inadequate. Figure 3 does not show the location of the Kaneohe Dam, and the extent of ponding in the maximum design storm. There is discussion of flood hazard, but without an adequate map it is difficult to visualize how the dam and the proposed project are related.

Mr. Gordon Furutani
Land Use Commission
Room 104, Old Federal Building
335 Merchant Street
Honolulu, Hawaii 96813

Dear Mr. Furutani:

EIS for the Proposed Iolani School
Properties Project at Kamaoalii, Koolaupoko

We offer the following comments on the EIS.

Focus

The focus of the EIS is on the 201.4 acres in the first phases of the project, rather than the 975.6 acres which is proposed to be developed. Whether or not this is proper is questioned by the Department of Planning and Economic Development (DPED) in its comments dated February 2, 1983 on the EIS Preparation Notice. We are in agreement with DPED.

The EIS has a "split personality," in that discussion in the EIS itself deals only with the 201.4 acres, but uses general statements based on studies of the entire 975.6 acres. There should be differentiation between the impacts of development of the 201.4 acres, and the balance of the project, as called for by DPED.

Cost

Information provided on costs seems to be for site development only. The \$18.6 million for 611 units (p. II-9) is an average of \$30,442 per unit. The expected cost of the housing package should be given, and related to what the

APR 25 1983

It should be noted, also, that the Kaneohe Dam was built mainly to protect development downstream, rather than behind the dam. The statement that the project site is protected by the Kaneohe Flood Control project) from any subsequent flooding activity (p. V-14) seems inconsistent with the Corps of Engineers' statement that "the project area is located in an area of undetermined but possible flood hazards of Zone D designation."

The EIS provides some quantification of storm runoff, and indicates that the volume of the maximum (flooding) event would be less than 3 percent of the maximum capacity of the Kaneohe Flood Control Flooding Basin (p. V-18). There is no map showing the extent of the flooding basin at maximum design capacity.

The Dugan report on storm runoff indicates that only a portion of the storm water runoff of Area I is actually planned to be discharged into water courses leading to the reservoir behind the dam (Appendix H, p. 23). This raises the question which we raised in our comments on the preparation notice: What is the ultimate fate of drainage from the project? And this should be quantified, water course-by-water course, insofar as possible.

Also, we question the validity of the inference that drainage and ground water impacts will be minimal because "only a portion (120.4 acres) of the 201.4-acre first phase development will actually be covered by impervious materials, i.e., roadways and residential lots" (p. V-12). It should be noted that the 120.4 acres amount to 60 percent of the first phase project area. Again, such statements about drainage should be backed up with quantification.

Noise

Noise contours are not provided though there is reference to a study prepared for Interstate H-3. The statement that H-3 noise should not adversely affect the proposed project (p. V-10) is not substantiated since the noise contours are not provided. A map showing noise contours would be more relevant than the Table 9 provided in the EIS (p. V-11).

Aesthetics and Views

Several agencies besides the Department of General Planning commented that views from the Pali Lookout should be discussed. In our comments of January 26, 1983, we were quite specific in what we wished discussed.

The response that

"the view plane corridor (sic) from the Pali Lookout encompasses a vast area stretching beyond the proposed project site" (p. V-24) is inadequate.

Access

Discussion here assumes completion of the Interstate H-3. Access is based on the relocation of the Kionaole Road and Kam Highway intersection to Kahiko Street (pp. V-15 & 16).

An appropriate map or maps should be provided in the EIS to illustrate what is proposed.

Sewage Disposal

The EIS acknowledges that the Kaneohe Sewage Treatment Plant is currently operating at capacity and is therefore inadequate to accommodate (sic) the proposed project."

The EIS indicates that "improvements will be made to increase capacity to accommodate (sic) additional sewage at the existing Kaneohe STP."

This second statement is inconsistent with the approved "208" Water Quality Management Plan which calls for phasing out the Kaneohe STP. The proposed development is not in the projected tributary area of the proposed sewerage system for the area.

Summary

We feel that the EIS for the proposed development is not acceptable as presented.

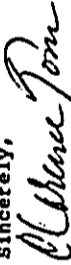
ENVIRONMENTAL
COMMUNICATIONS
INC.

F. J. HODGKINS,
PRESIDENT

Mr. Gordon Furutani
Page 5

May 6, 1983

Thank you for affording us the opportunity of reviewing the
impact statement.

Sincerely,

CLARENCE TOH
Planner

Mr. Willard T. Chow, Chief Planning Officer
Department of General Planning
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Chow:

Thank you for your comments regarding the Iolani School Draft EIS. We
would respond to your comments in the following:

Focus

It is the opinion of the Environmental Quality Commission that the total
scope of the project be disclosed to the public. Analysis of the impacts,
however, may focus only on that segment of the project that is the subject of
the Land Use Commission (LUC) petition. Therefore, the EIS will address
only the 201.4 acre phase of the 975.6 acre total project (See enclosure from
EQC).

As was stated in the EIS, the technical studies were completed for
inclusion into the Environmental Assessment that addressed the entire 975.6
acres of development and were submitted to the LUC as exhibits to the
petition. From the time the studies were completed to the preparation of
this document, the project has undergone several revisions of phasing
schemes. Subsequently, nomenclature regarding phasing designations have
been changed. However, it should be noted that only applicable and perti-
nent data was referred to, for the preparation of this document.

Cost

The estimated range of housing prices to meet the needs of moderate
income families is provided in Appendix A, Demand Analysis. This analysis
is based on a comparison with current projects which are priced for the
moderate income market. These estimates indicate that the proposed project
will provide affordable housing for gap group households.

Soils and Topography

A map presenting the various soil types has been prepared and included
in the EIS on page III-5. A topography and slope map has been enclosed for
your information. Preparation of a detailed study regarding soils appears to
be premature at this time. Please be assured that one will be prepared if it
is deemed necessary or required.

APPROVED:


WILLARD T. CHOW

cc: Environmental Communications, Inc.
EQC
DLU

XIII-81

Mr. Willard T. Chow
Page 2
May 6, 1983

Discussions on pages IV-5 and IV-6 of the EIS and page 1 of Appendix G represent only a review of the site according to the State ALISH. It merely is a description of the setting and is in no way intended to be a detailed analysis.

A map addressing your request has already been prepared and included in the EIS on page IV-6, as Figure 9. Prime Agriculture land is comprised of 69.8 acres and other important land is comprised of 10.2 acres.

The discussion on the proposed 500 acres of banana production represents a means by which to offset the loss due to development within the State. We regret that the references to the offsetting acres for banana production was so badly taken out of context. The reference was a sincere one and not considered facetious; the comments on expansion of our logic to worldwide proportions were unnecessary and bordered on unprofessionalism. We would redirect your attention to the scope and size of the acreage in question and permit the data to speak for itself.

Drainage and Water Quality

Figure 4 indicates stream location within the area and does not need to warrant it. Figure 2 indicates the flood control area relative to the project site. Due to the Kaneohe Ponding Basin, no flood hazard exist at the project site. The attached slope map also shows the ponding basin flood design limits based upon the condemnation taking by the City and County of Honolulu. Therefore, discussions relating to flood hazard appears to have been adequately addressed in the EIS.

The petitioner understands that the dam was built to protect development downstream. We concur with your statement regarding the site's protection from flooding activity and have revised the narrative on page V-16.

Storm drainage runoff will be collected by catch basins located within the roadways, conveyed by underground pipe system, and discharged into existing streams and the ponding basin. The type of quantified analysis recommended by you appears to be inappropriate at this time. The analysis will be conducted at a later date if it is necessary and/or required. However, please be assured that all drainage improvements will be designed and constructed in conformance with the Drainage Standards of the City and County of Honolulu, and the applicable provisions of the Water Pollution Control Regulations and Water Quality Standards, Department of Health.

We are not stating that drainage and groundwater impacts would be minimal since only 120.4 acres would be covered by impervious materials. The EIS addresses other reasons why drainage and groundwater impacts should be minimal and also offers several mitigative measures to offset these impacts. The intent of said statement is to clarify and make clear the fact that the entire site would not be covered with impervious materials and that open space areas would also be provided.

Mr. Willard T. Chow
Page 3
May 6, 1983

Noise

Noise contours were conducted for the Interstate H-3 Highway and not for the Iolani School Project. The conclusion that H-3 noise should not adversely affect the proposed project and the supportive data utilized in formulating such a conclusion were based on H-3 noise contours and appears to be logical and feasible.

Aesthetics and Views

Since no multi-family high-rise structures are being considered and the proposed project is consistent with the adjacent residential subdivisions, makai views from the Pall Lookout and mauka views from the park, should remain unaffected. The low-rise nature of the proposed housing, preservation of mature vegetation, and residential landscaping will obscure the visibility of the project from distant views and maintain the 'lush greenery' of the area. Makai views from the park should also be unobstructed since the project site lies mauka of the park. Further, it is anticipated that the proposed Interstate H-3 Highway represents more of a scenic obstruction due to its greater scale of development.

Access

It is premature at this point in time to have any graphic material detailing access improvements for public review. At a more appropriate time, the petitioner will submit said plans to the various governmental agencies for their respective review and evaluation. Refer to Figure 10 for proposed road alignment improvements.

Sewage Disposal

The City and County of Honolulu Department of Public Works, in their letter of April 11, 1983 has verified acceptance of the sewage generated by the project into the Kaneohe or Kailua Sewage Treatment Plant provided the petitioner be responsible for the upgrading of the necessary collection and transmission system to the plant and also any additional treatment facilities required.

Yours very truly,

F. J. Rodrigues

FJR:ls



GEORGE S. TAKEMOTO
Chairman

ROY R. TAKEMOTO
Chairman

STATE OF HAWAII
ENVIRONMENTAL QUALITY COMMISSION
800 MALEKUNUA ST.
ROOM 211
HONOLULU, HAWAII 96813

TELEPHONE NO.
522-1421

Mr. F. R. Rodriguez
April 13, 1983
Page 2

This opinion rests on the truth of each statement presented in the rationale above. If any of the reasons are false or change at a future date, this opinion becomes invalid.

Status of Opinion: The opinion was issued solely as a recommendation to the applicant and the accepting authority, which in this case is the Land Use Commission. This should not be considered a declaratory ruling since the procedures, as specified in the EQC Rules of Practice and Procedure, require a petition to be filed with the EQC by the party desiring such a ruling.

Sincerely,
Roy R. Takemoto
Roy R. Takemoto
Chairman

Mr. F. J. Rodriguez
Environmental Communications, Inc.
P.O. Box 536
Honolulu, Hawaii 96809

Dear Mr. Rodriguez:

Subject: Proposed Iolani School Properties Project

cc: Land Use Commission

At your request, the following opinion was rendered by the Environmental Quality Commission in regards to the subject project:

Issue: The proposed action involves a number of phases. On the one hand, under the LUC Rules only that portion of the project that can be developed within five years can be applied for land use district reclassification. On the other hand, the State EIS Law (Chapter 343, HRS) and the EQC Regulations direct agencies and applicants to address the overall, long term impacts of a project. The issue raised by the applicant is whether the subject project is a special circumstance where there are compelling reasons to review related activities separately.

EQC Opinion and Rationale: The total scope of the project should be disclosed to the public. Analysis of the impacts, however, may focus only on that segment of the project that is the subject of the LUC application.

The rationale for this opinion is as follows:

- a) Future phases may not occur;
- b) Because of the tentativeness of future plans, sufficient information is not available that could enable a valid impact assessment;
- c) The present phase under application is not dependent upon nor in any way commits the approving agency to approve future phases;
- d) The applicant recognizes the need to prepare a supplemental EIS if a decision is made to proceed with the future phases.

APR 14 1983

OMPO

Oahu
Metropolitan
Planning
Organization

F. J. RODRIGUEZ,
PRESIDENT

ENVIRONMENTAL
COMMUNICATIONS
INC.

Suite 1509
1164 Bishop Street
Honolulu, Hawaii 96813
(808) 531-4178
(808) 548-2338

April 14, 1983

Mr. Gordon Furutani
Land Use Commission
335 Merchant Street, Room 104
Honolulu, Hawaii 96813

Subject: EIS For The Proposed Iolani School Properties Project

Dear Mr. Furutani:

We have reviewed the above mentioned environmental impact statement with respect to transportation impacts, and found that the analysis used stringent assumptions (e.g. no directional split for peak hour traffic volume, no diversion to transit) and was still able to show traffic conditions at or better than level of service C. These assumptions and the analysis results would indicate that traffic impacts around the immediate project area are not a problem. OMPO has no other comments to offer.

Sincerely,

Cheryl D. Soon

Cheryl D. Soon
Executive Director

CDS:jsj

cc: Mr. Fred Rodriguez

May 6, 1983

Ms. Cheryl D. Soon
Executive Director
Oahu Metropolitan Planning
Organization
1164 Bishop Street, Suite 1509
Honolulu, Hawaii 96813

Dear Ms. Soon:

Thank you for your comments of April 14, 1983 regarding the Draft EIS for the Iolani School Properties Project. We appreciate your indicating to us that despite the stringent assumptions utilized in the traffic analysis, traffic conditions would be at level of service C or better and would therefore, not result in adverse traffic impacts to the immediate project area.

Thank you for your concerns on these matters.

Yours very truly,

F. J. Rodriguez

F. J. Rodriguez

FJR:ls

APR 18 1983

1132 BISHOP BUILDING, SUITE 407 • P O BOX 518 • HONOLULU HAWAII 96809 • TELEPHONE (808) 531-6191

XIII - 24

1132 BISHOP BUILDING, SUITE 407 • P O BOX 518 • HONOLULU HAWAII 96809 • TELEPHONE (808) 531-6191

Luluku Banana Growers
c/o P.O. Box 475
Kaneohe, Hawaii 96744
April 21, 1983

Mr. Gordon Furutani
Executive Secretary
State Land Use Commission
Room 104, Old Federal Building
335 Merchant Street
Honolulu, Hawaii 96913

Dear Mr. Furutani:

Re: Draft Environmental Impact Statement (EIS) for
the Proposed Iolani School Properties Project

The Luluku Banana Growers has reviewed the draft EIS and would like to make the following comments.

According to the draft EIS, construction of the proposed project will eliminate the land currently under banana cultivation and this adverse economic impact can be mitigated by banana production elsewhere (section V, pg V-4 and 5). Mokiha Para Enterprises on Kauai was mentioned as having the possible capability to replace the lost banana production. We feel that the draft EIS did not address the impact to the growers presently residing in and farming the area. Consequently we would like the following concerns addressed:

1. Will the farmer of the 3.7 acres banana producing area be offered comparable land with comparable rent?
2. If displacement occurs, will the farmers be assisted with relocation costs?

We also feel the following concerns were not adequately addressed:

1. The problem of drainage and flooding and their affects on the Kaneohe Flood Control Project
2. The inadequate capacity of the Kaneohe sewage treatment plant and the resolution to that problem for the proposed project
3. The affects of drilling deep wells for the water supply to the surrounding area's water table.

We greatly appreciate the opportunity to comment.

Yours respectfully,

Luluku Banana Growers

cc: Environmental Communications, Inc.
Hawaii Farm Bureau Federation
Department of Agriculture
Oahu Banana Growers Association

ENVIRONMENTAL
COMMUNICATIONS
INC.

F. J. RODRIGUEZ
PRESIDENT

May 6, 1983

Luluku Banana Growers
c/o P.O. Box 475
Kaneohe, Hawaii 96744

Dear Farmers:

Thank you for your comments regarding the Draft EIS for the Iolani School Project. We would respond to your concerns in the following:

1. The approximate 5 acres of banana production affected by the proposed project can be offset by making available an equal amount of land in the vicinity of the subject property.
2. Relocation costs of the farmers will remain their responsibility. It is anticipated that lease rents would remain comparable with those at the time of relocation.

Additional Comments

1. The impacts of drainage and flooding on the Kaneohe Flood Control Project have been discussed on pages V-16, V-22, and V-23.
2. The City and County of Honolulu Department of Public Works will accept the sewage generated by the project into the Kaneohe Sewage Treatment Plant or Kailua Sewage Treatment Plant provided the developer is responsible for the upgrading of the necessary collection and transmission system to the plant and also any additional treatment facilities required.
3. The effects of the BWS wells on the water table appears to be inappropriate for inclusion in the Iolani School EIS, since the wells are to be drilled by the BWS. May we refer you to the BWS EIS for the wells currently being prepared. Their document will address this concern on a wider scale than we could provide.

Thank you for your concern on these matters.

Very truly yours,

F. J. Rodriguez
F. J. Rodriguez

FJR:ls

APR 25 1983

LEGAL AID SOCIETY OF HAWAII

WINDWARD BRANCH OFFICE
47-200 Waieae Road
Room 104
Kaneohe, Hawaii 96744
808/239-5707

NATHAN T.K. APA, ESQ.
President, Board of Directors
ALLENE K. RICHARDSON, ESQ.
Executive Director

April 22, 1983

Mr. Gordon Furutani
Land Use Commission
Room 104, Old Federal Building
335 Merchant Street
Honolulu, Hawaii 96813

Re: Proposed Iolani School Properties Project

Dear Mr. Furutani:

I am writing on behalf of Hui Malama Aina o Ko'olau, a community association whose members reside in Windward Oahu. We hereby submit our comments on the inadequacy of the draft EIS, as follows:

1. Failure to Define "Low and Moderate Income"

While it is commendable that the applicant claims to intend to build "low and moderate income housing", there is a complete failure to define these terms. There is no analysis of the income levels of the low and moderate income groups or of the income necessary to qualify for the homes described in the EIS as selling for \$87,000 to \$115,000. While there may be a market for such homes, they are not within the reach of low income persons. Therefore, it is highly misleading to describe this as a low and moderate income project.

2. Failure to Discuss Socio-Economic Impacts

The EIS fails to discuss the socio-economic aspects of the project. The project will displace many farmers and their families who are long term residents of the area and who are the major producers of bananas for Oahu's people. They further the state's economic goals of supporting and expanding diversified agriculture, maintaining open space and productive agriculture land and creating economic self-sufficiency for the state. No mention is made whatsoever of the consequences for the banana farmers and their families. The EIS fails to

Page 2

analyze the impact of the project on the housing needs of these families, the effects of uprooting them from their homes, land, and friends, and the unemployment consequences they will suffer. EPC regulation §1.42 requires that these issues be discussed.

3. Failure To Determine Archaeological Significance

The EIS treatment of the archaeological properties located within or adjacent to the proposed project is woefully inadequate. The archaeological consultant indicates a "brevity of effort" such that no complete survey was made to determine the extent of archaeological properties which could be affected by the project. Furthermore, since the consultant indicates that there is a "high likelihood that significant archaeological sites are situated in the project area", it is imperative that an intensive archaeological survey be conducted and the results included in the EIS. Decisionmakers cannot properly evaluate the merits of this project if they are not fully informed of the consequences to archaeological features if the project is approved. The archaeological sites or the entire district may well be determined eligible for the state or national register of historic places. This information should be included in the final EIS.

4. Failure To Determine Water Availability

The EIS indicates that water will be available from "deep wells" and "pumps". There is no discussion of where these wells will be located, how much water will be available, the impact on stream flow, the impact that new wells might have on existing Board of Water Supply wells which are used to serve Oahu's domestic water needs. The EIS also mentions the fact that two Board of Water Supply water lines cross the property. This fact alone, however, does not mean that the Board of Water Supply is willing to commit water to the project at this time; thus, the statement is misleading.

5. Sewage Disposal Has Not Been Provided For

The EIS is inconsistent about the availability of sewerage. At two places in the EIS the Kaneohe Sewage Treatment Plant is described as inadequate to handle the additional sewage which this project will generate. In another place the EIS states that the same plant is under capacity. The statement is also made that the Kaneohe Sewage Treatment Plant will be improved to handle the additional sewage. Nothing is said as to whether the County will pay for the improvements or whether the developer will absorb these

Serving the State of Hawaii

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costs. The EIS also fails to state when the increased capacity will be available or what other projects are going to be serviced by the Kaneohe Plant.

6. The Project Will Interfere With Groundwater Recharge
At pg. III-13 the EIS indicates that the project site is a "prime groundwater recharge area where rainfall averages 75 inches or more" per year. The fact that this property is a prime recharge area undoubtedly accounts for the fact that this property is classified "conservation" and zoned "preservation". The EIS fails to analyze the losses of recharge due to runoff from roofs, driveways, and streets which will be associated with the project. There is also no examination of the possible pollution of the groundwater system due to pollution associated with urbanization of the property.

7. The Property Is Subject To Flooding

The EIS acknowledges that the average rainfall on the property is 85 inches per year and that about half of this occurs during a 4 month period. The EIS also notes a history of devastating floods in the Kaneohe area, including the project site. The EIS, concludes, however, that the property is protected from flooding by the dam constructed by the U.S. Army Corps of Engineers as a part of the Kaneohe Flood Control Project. Unfortunately, the EIS fails to recognize that the subject property is located upstream from the dam and has no flood protection.

8. The Proposed Project Is Inconsistent With Land Use Plans For The Area

The EIS claims that the project is consistent with the housing policies of the Oahu General Plan. First, as discussed above, the project will not meet the needs of low and moderate income families when the units will cost from \$87,000 to \$115,000. Second, the General Plan establishes policies as to where new housing should be located. Most new housing for Oahu is directed to the Ewa area under the General Plan. The proposed Development Plan for this area which implements the General Plan designates the area as "preservation" and further purposes to downzone many other areas already zoned for urban uses. Under the present planning policies, Windward Oahu is overzoned for residential uses so that this project would be totally inconsistent with present planning.

The proposed redistricting is also inconsistent with the land use guidance policies of Hawaii Revised Statutes Chapter 205. This property is not "reasonably necessary"

to accommodate growth since too much land is presently designated for urban uses under current land use policies. The project will also urbanize the area surrounding Hoomaluhia Park which is intended as a passive use wilderness area. This project will increase noise, air pollution, water pollution and traffic in the area and compromise the purpose of the park. Reclassification would also be inconsistent with the purpose of protecting the prime watershed lands involved in this proposed project.

9. The Project Will Overburden Public Facilities

When all phases of the project are completed, this one project will increase population in the area by over 4,000 persons. As noted above, there is no adequate sewage treatment plant available and availability of water has not been determined. In addition, the EIS acknowledges that there will be a 14.7% increase in traffic on Kamehameha Highway. The roads are already congested during peak hours and there will be a greater demand for public transportation which the EIS assumes will be increased to serve the project. Given that The Bus is already crowded during peak hours and that fares do not cover the cost of The Bus, the assumption that bus service will be increased is not justified. The EIS also indicates that Castle High School enrollment already exceeds design capacity and fails to suggest how the educational needs of new residents will be met.

10. Failure To Consider Alternatives

In a meager two page analysis, the EIS lists agriculture as an alternative use. However, instead of discussing what the agricultural alternatives are, this section assumes that the project as proposed will be approved and will diminish agriculture on the site. This brief discussion falls far short of discussing the potential agricultural uses of the site and what can be done to further agricultural uses here. It also fails to analyze the consistency of agriculture with land use plans and policies for the area. Thus, this section is totally inadequate.

CONCLUSION

This EIS is replete with factual errors of great magnitude and is little more than an attempt to justify an ill-considered proposal. The draft EIS is totally inadequate. Serious study must be made in accordance with EQC regulations and a new EIS prepared for this proposal.

Thank you for the opportunity to comment.

Sincerely,

Ronald Albu

RONALD ALBU, Attorney for Hui Malama Aina o Ko'olau

ENVIRONMENTAL
COMMUNICATIONS
INC.

F. J. RODRIGUEZ,
PRESIDENT

Mr. Ronald Albu
Page 2
May 6, 1983

May 6, 1983

Mr. Ronald Albu, Attorney for
Hui Malama Aina o Ko'olau
47-200 Waihee Road, Room 104
Kaneohe, Hawaii 96744

Dear Mr. Albu:

Thank you for your comments on the Draft EIS for the Iolani School Properties Project. We would respond to your concerns in the following:

1. Failure to Define "Low and Moderate Income"
The project is intended to serve "gap group" or moderate income households, whose incomes fall between the upper eligibility limits for government assisted housing and the minimum needed to purchase a home with conventional financing. The low-income group, with annual incomes under \$19,000 for a family of four, would not qualify for the estimated sales price without government subsidy. Such participation by government agencies would be pursued by the future developer.
2. Failure to Discuss Socio-Economic Impacts
There are three existing leases within the project area. Every effort will be made to make available lands in the vicinity of the project to relocate those who are displaced by the development.
3. Failure to Determine Archaeological Significance
The archaeological consultant was made aware of your concerns. His response has been provided herein.
The literature search and walk-through reconnaissance survey have uncovered two sites within the project area. The petitioner has ensured that no construction would take place until all adverse impacts on these sites would have been mitigated. The two sites then, will be preserved. As recommended by the State Department of Land and Natural Resources, the petitioner will discuss and resolve historic preservation concerns.
4. Failure to Determine Water Availability

Figure 11 on page V-25 locates existing and proposed BWS well sites,

112 815-00P BUILDING, SUITE 407, P O BOX 124 • HONOLULU, HAWAII 96819 • TELEPHONE (809) 571-9791

relative to the project. The EIS also states that based on a total development of 611 units, demand for water will be approximately 305,500 gallons per day.

It is not known at this time how much water will be available, since the BWS will not make advance water commitment for the project and will determine the availability of water when construction plans for the water service connections are submitted for BWS approval.

In regards to your concern on the impacts of the proposed wells on the existing BWS wells and stream flow, may we suggest you refer to the BWS EIS, currently being prepared for the proposed wells.

Mention of the two BWS water lines was not intended to infer that the project has been granted a water commitment. On the contrary, the EIS states clearly that BWS would not make any advance commitments until construction plans are submitted for their approval.

5. Sewage Disposal has not Been Provided For

We appreciate your notification of this inconsistency and the EIS has been revised. The City and County of Honolulu Department of Public Works has indicated that the Kaneohe Sewage Treatment Plant (STP) is currently operating at capacity and is therefore, inadequate to accommodate the proposed project.

Improvements will be made to increase capacity to accommodate additional sewage at the existing Kaneohe STP. The phasing schedule will provide time for the developer to expand existing services at his own expense as required by the demand for additional facilities. There will, therefore, be adequate and available sanitary sewer services to accommodate the projected estimated average flow from the total development.

Finally, it is unknown at this time when the increased capacity would be available or what other projects would be serviced by the Kaneohe STP. The petitioner will provide adequate capacity to accommodate the Iolani School Project, as required by the appropriate government agencies. It is assumed that other potential projects in the area would also adhere to the same commitment. The Development Schedule on page II-8 indicates that construction of improvements would be between 1986 and 1990 and occupancy would be between 1987 and 1992. Therefore, capacity would be increased during that period of time.

6. The Project will Interfere with Groundwater Recharge

Your comments regarding infiltration and recharge were forwarded

to Dr. Gordon L. Dugan, Environmental Consultant, on April 20, 1983 for his response. Dr. Dugan has prepared the report entitled "Environmental Aspects of Storm Water Runoff for Iolani School Land" which is included in the EIS as Appendix H. It is Dugan's contention that the potential water for runoff and infiltration at the project site would be approximately 40 inches annually. However, it is not anticipated that all of this potential water would be lost since: (1) During dry weather conditions, the residents of the development would be expected to water their lawns, shrubbery etc., which could lead to additional infiltrations; (2) A sizeable portion of the water running off the areas of impervious surfaces within the development would flow onto adjacent pervious surfaces, such as lawns, gardens, etc., which should enhance infiltration over this area; (3) The runoff generated from the project flows into the newly constructed Kaneohe Flood Control Reservoir, behind a 76 ft. dam which maintains a permanent surface area of 26 acres and up to 152 acres under maximum reservoir conditions. Thus, additional infiltration should result unless the bottom surface is completely sealed; and (4) Over 70% of the water in the streams draining the Ko'olaupoko District, in which the project is located, originates from ground-water sources.

Reference to the EIS on page V-13 will present the assumptions and methodology utilized by Dugan in the formulation of his conclusions.

The impact to groundwater quality is anticipated to be minimal, since the project will not alter the water quality percolating into the soil.

7. The Property is Subject to Flooding

The petitioner understands that the Kaneohe Flood Control Project will not provide flood protection for the project site since the subject property is located upstream from the dam. However, Dr. Gordon L. Dugan in his report entitled "Environmental Aspects of Stormwater Runoff," included in this document as Appendix H, states that the volume of the maximum storm event would be less than 3 percent of the maximum capacity of the Kaneohe Flood Control Basin. This is important since storm drainage runoff from the proposed project would be collected by catch basins located within the roadways, conveyed by underground pipe system, and discharged into existing streams and the ponding basin. The project then, would be provided with adequate drainage systems to mitigate impacts resulting from flooding.

8. The Proposed Project is Inconsistent with Land Use Plans for the Area

The petitioner intends to provide low- and moderate-income housing

necessary to assist in satisfying the stated demand for housing in Oahu and specifically, in Kaneohe, as defined in the "Demand Analysis" for the Iolani School Project, prepared by John Child & Co., Inc. and included in this document as Appendix A. According to the John Child's report there is a definite demand for housing in the Ko'olaupoko District.

In regards to inconsistency with the land use guidance policies, the petitioner feels that not enough land is designated for urban use within the Kaneohe area and that redistricting would be "reasonably necessary." Your statement that too much land is presently designated for urban uses reflect the entire island of Oahu and not only Kaneohe.

The project will not urbanize the area surrounding the park. Only the eastern face of the park will be provided with housing. It should be noted that the project is consistent and contiguous with existing residential subdivisions in the area and will not advocate urban sprawl. Secondly, the project design will provide more open space and landscaping that is required, so as to be more consistent with a "passive use wilderness area." Finally, it appears that the proposed Interstate H-3 Highway will represent more of a disturbance to the area than the project.

The EIS addresses in detail, impacts relating to noise, air pollution, water pollution, and traffic and discusses several mitigative measures to reduce such impacts.

The petitioner understands that the project is inconsistent with the land use designations for the area and will seek State and City land use amendments and zoning to redesignate the property to its highest and best use.

9. The Project will Overburden Public Facilities

The EIS addresses only the Phase I development increment. Analysis and impacts then, relate only to this phase. As noted in the above responses, the project can be provided with necessary infrastructure and utilities. According to the Department of Education, the project will be accommodated with adequate and sufficient public educational services.

10. Failure to Consider Alternatives

The alternative of "no action" has been covered in Section VII of the EIS as well as an agricultural use alternative based on economic

Mr. Ronald Albu
Page 4
May 6, 1983

CHINIAQO INC.
Archaeological Consulting

1040-B SMITH STREET • HONOLULU, HAWAII 96817 • TELEPHONE: (808) 521-2785
April 25, 1983

viability. Uses which would not be economically feasible were not considered.

Thank you for your concerns on these matters.

Yours very truly,



F. J. Rodriguez

FJR:ls

Mr. Fred Rodriguez
Environmental Communications Inc.
1152 Bishop Building
Room 407
Honolulu, Hawaii 96813

Dear Mr. Rodriguez:

This is in response to your request to review certain comments regarding archaeological work at the location of the 200+ acre Iolani School Project. While I agree that further survey work, including sub-surface testing, is required, I differ with the reviewers as to the appropriate scheduling of that work. It would be premature to conduct an intensive archaeological survey before the developer has any assurances that the project will meet with all of the necessary approvals. I feel that there will be sufficient time to do the fieldwork, and for the developer to make any necessary adjustments in the development plan necessitated by the results of the fieldwork, if the archaeological survey were to be completed no later than the time of submission of the re-zoning request to the City and County of Honolulu. I therefore recommend that you accept this approach as a self-imposed condition.

If you have any further questions, please feel free to contact me.

Sincerely yours,



William Barrera, Jr.
President

1040-B SMITH STREET • HONOLULU, HAWAII 96817 • TELEPHONE: (808) 521-2785

HAWAIIAN ELECTRIC COMPANY, INC.

Ms. Jacqueline Parnell, Director
Office of Environmental Quality Control
April 25, 1983
Page 2

HAWAIIAN ELECTRIC COMPANY, INC.

Box 2750, Honolulu, Hawaii / 96840

April 25, 1983

RICHARD L. O'CONNELL, P.E.
MANAGER, ENVIRONMENTAL DEPARTMENT
(808) 548-4400

EW 2-1
NV/G

LAND USE COMMISSION
STATE OF HAWAII

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Ms. Jacqueline Parnell, Director
Office of Environmental Quality Control
550 Halekauwila Street, Room 301
Honolulu, Hawaii 96813

Dear Ms. Parnell:

Subject: Environmental Impact Statement for the
Proposed Iolani School Properties Project

We have reviewed the above Environmental Impact Statement and offer the following comments:

1. II-F-2: Are transmission line relocation costs included in the on-site costs?
2. III-II-6: The last statement should be reworded as follows:
"Hawaiian Electric Company power line easements are located within the Proposed Project Areas as well as through the Ho'omaluhia Park site."
3. Figure 6 should also be revised to reflect the transmission line easements heading north and east out of Koolau Substation (see attached sketch).
4. V-C-6-e: It is possible that with the high cost of relocation, the transmission lines may be left in place and the subdivision designed around the lines. In that case, access must be provided to each structure site for maintenance and operation. Also, no buildings will be allowed to be erected within the easement area.
5. It appears that some part, if not all the IIECO transmission lines as well as new distribution lines to serve the proposed development, either presently pass through the State Conservation District or would lie in same. Any relocations required and/or new line construction would require Conservation District Approval. It is IIECO's position that it is the developer's responsibility to provide the necessary new easements as well as submit appropriate CDUA's on IIECO's behalf.

6. With reference to Page II-8, paragraph 4; "Electrical and Telephone System." This paragraph gives the reader the impression that the distribution circuits in the area are presently adequate to serve the proposed development. This is not true. IIECO's existing 12 kv circuits from the vicinity of Koolau Substation would require either overhead or underground extensions. Further, IIECO would have to maintain services to existing customers in the area as well as provide new services to the proposed development.
7. With reference to Page III-31, paragraph 6; "Electrical System." This paragraph indicates that IIECO would serve the proposed development from the existing distribution system now serving the Keapuka Subdivision. This is not true. The Keapuka Subdivision is located across the proposed II-3 and on the other side of the new Ho'omaluhia Park area from the proposed development, a long distance. Accordingly IIECO could not serve from this system but would need to develop a new system emanating from or near our Koolau Substation through the Conservation District.
8. Depending on the future course of the proposed Hawaii Deep Water Cable project and subsequent development of Aniani Substation, at least two more 138 kv lines may be required between Koolau Substation and Aniani Substation, and one additional 138 kv line may be required between Koolau Substation and Halawa Substation. These requirements may affect the need for future 138 kv and 46 kv easements in the vicinity of Koolau Substation.

Thank you for the opportunity to comment on this Environmental Impact Statement.

Sincerely,

Richard L. O'Connell
Manager, Environmental Department

JMP:cal
Enclosure

cc: Gordon Furutani (Land Use Commission)

MAY 2 1983

ENVIRONMENTAL
COMMUNICATIONS
INC.
May 6, 1983

Mr. Richard L. O'Connell, Manager
Environmental Department
Hawaiian Electric Company, Inc.
P.O. Box 2750
Honolulu, Hawaii 96840

Dear Mr. O'Connell:

Thank you for your comments of April 25, 1983 regarding the Draft EIS for the Iolani School Properties Project.

We respond to your comments as follows:

1. and 4. The relocation of electric transmission lines has not been considered in the cost estimates as the development will be designed to respect the location of existing major power lines into the Koolau Substation.

Access will be provided from proposed subdivision roadways and open space areas for maintenance and operation of the tower structures. No buildings will be constructed within easement areas.

2. The last sentence on page III-32 will be reworded as indicated.

3. Figure 7 on page III-31 has been revised to reflect the transmission line easements north and east of the Koolau Substation.

5. The provisions to create and/or relocate easements and obtain applicable CDUA permits will be negotiated at a future date according to stipulations of existing deed documents.

6. The EIS has been revised to indicate the concern that extension of electrical and telephone services to the project will be undertaken by the respective utility company.

7. The proposed electrical service to Phase I will be obtained by extension of the distribution system from the Koolau Substation.

It should be noted that Phase II will be serviced from the adjacent Kespuka Subdivision and/or Likelike Highway.

8. This information has been included in the EIS.

Thank you for our concerns on these matters.

Very truly yours,
F. J. Rodriguez
F. J. Rodriguez

FJR:is

1122 BRISBANE BUILDING, SUITE 407, P O BOX 134 • HONOLULU HAWAII 96801 • TELEPHONE (808) 531-8281

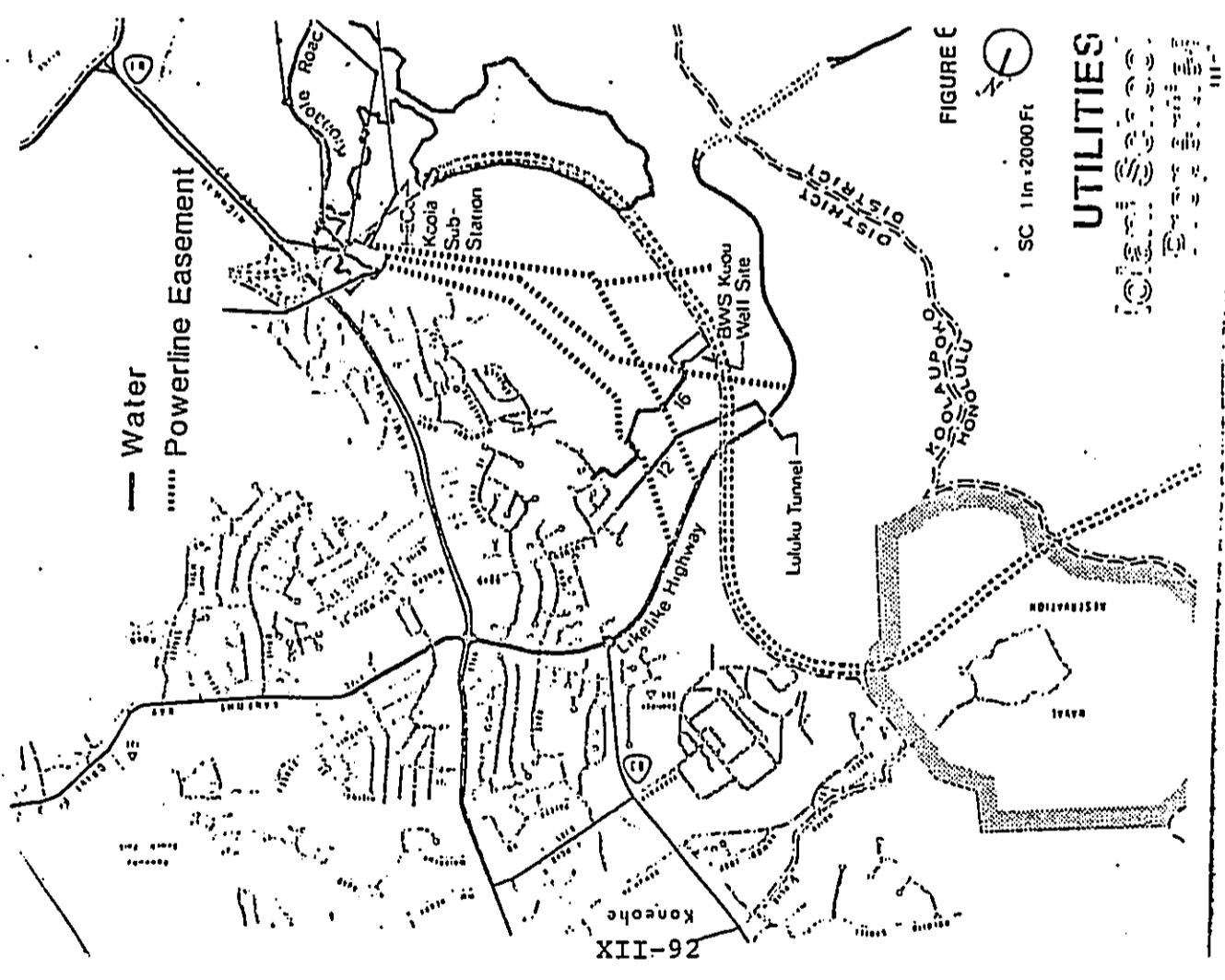
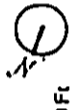


FIGURE C



26-11X
Konohe





DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 15TH AIR REF WING (FACAF)
HICKAM AIR FORCE BASE, HAWAII 96813

REPLY TO
ATTN: DEEV (Mr. Hanaoka, 449-1831)

24 MAR 1983

SUBJECT: Environmental Impact Statement for the Proposed Iolani School Properties Project

TO: Mr. Gordon Furtani
Land Use Commission
335 Merchant Street
Room 104, Old Federal Building
Honolulu, Hawaii 96813

1. This office has reviewed the subject EIS and has no comment to render relative to the proposed project. The EIS is returned for your retention.
2. We greatly appreciate your cooperative efforts in keeping the Air Force apprised of your project and thank you for the opportunity to review the document.

Robert M. Okazaki

ROBERT M. OKAZAKI
Chief, Engrg & Envmtl Ping Div
Directorate of Civil Engineering

1 Atch
EIS

Cy to: Mr. Fred Rodriguez
Environmental Communications
P.O. Box 536
Honolulu, Hawaii 96809 w/ Atch

XII-93

BUILDING DEPARTMENT
CITY AND COUNTY OF HONOLULU
HONOLULU MUNICIPAL BUILDING
500 SOUTH KING STREET
HONOLULU, HAWAII 96813



SILEEN R. ANDERSON
WATER

ROY H. TANJI
DIRECTOR AND BUILDING SUPERINTENDENT
WILLIAM P. REMULAR
DEPUTY DIRECTOR

PB 83-267

April 12, 1983

LAND USE COMMISSION
STATE OF HAWAII
APR 15 11 38 AM '83

Mr. Gordon Furtani
Land Use Commission
Old Federal Building, Room 104
335 Merchant Street
Honolulu, Hawaii 96813

Dear Mr. Furtani:

Subject: Draft Environmental Impact Statement
Proposed Iolani School Properties Project
Kamooalii, Koolaupoko, Kaneohe, Oahu

We have reviewed the subject draft Environmental Impact Statement for the Proposed Iolani School Properties Project and have no comments.

Thank you for the opportunity to review the draft EIS.

Very truly yours,

Roy H. Tanji

ROY H. TANJI
Director and Building Superintendent

NO RESPONSE NECESSARY

cc: J. Harada
Environmental Communications, Inc.

NO RESPONSE NECESSARY

MAR 28 1983

GEORGE R. ARTHUR
Governor



STATE OF HAWAII
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
P. O. BOX 111, HONOLULU, HAWAII 96810

APR 12 1983

Mr. Gordon Furutani
Land Use Commission
Room 104, Old Federal Building
335 Merchant Street
Honolulu, Hawaii 96813

Dear Mr. Furutani:

Subject: Environmental Impact Statement
for the Proposed Iolani School
Properties Project

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

Very truly yours,

Hideo Murakami
HIDEO MURAKAMI
State Comptroller

NO RESPONSE NECESSARY

APR 15 1983

HIDEO MURAKAMI
Comptroller
MAIL ROOM
MAIL ROOM
LETTER NO (P) 1346.3

LAND USE COMMISSION
STATE OF HAWAII
APR 13 11 26 AM '83

State of Hawaii
DEPARTMENT OF DEFENSE
OFFICE OF THE ADJUTANT GENERAL
3949 Diamond Head Road
Honolulu, Hawaii 96816

HLENG

11 APR 1983

Mr. Gordon Furutani
Land Use Commission
Room 104, Old Federal Building
335 Merchant Street
Honolulu, Hawaii 96813

Dear Mr. Furutani:

Proposed Iolani School Properties Project

Thank you for providing us the opportunity to review the proposed project,
"Iolani School Properties" Environmental Impact Statement.

We have completed our review and have no comments to offer at this time.

Yours truly,

JERRY M. MATSUDA
Captain, HANG
Contr & Regt Officer

CC: Mr. Fred Rodriguez/Env. Com., Inc.
Env Quality Commission w/EIS

NO RESPONSE NECESSARY

APR 12 1983



United States
Department of
Agriculture

Soil
Conservation
Service

COPY

P. O. Box 50004
Honolulu, Hawaii
96850

April 6, 1983

Mr. Gordon Furutani
Land Use Commission
Room 104, Old Federal Building
335 Merchant Street
Honolulu, HI 96813

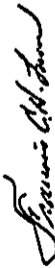
Dear Mr. Furutani:

Subject: EIS for the Proposed Iolani School Properties Project
Kamooalii, Koolaupoko, Kaneohe, Oahu, HI

We have reviewed the subject environmental impact statement and have
no comments to make.

Thank you for the opportunity to review this document.

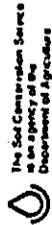
Sincerely,


FRANCIS C. H. LIM
State Conservationist

cc:
Jacqueline A. Parnell, Director
Office of Environmental Quality Control
550 Halekauwila St., Room 301
Honolulu, HI 96813

F. J. Rodriguez
Environmental Communications, Inc.
P. O. Box 536
Honolulu, HI 96809

NO RESPONSE NECESSARY



The Soil Conservation Service
is an agency of the
Department of Agriculture

SCS-AS-1
10-75

APR 12 1983



HEADQUARTERS
NAVAL BASE PEARL HARBOR
BOX 1110
PEARL HARBOR, HAWAII 96860

IN REPLY REFER TO:
OOZA:QLB:jam
Ser 627

29 MAR 1983

Mr. Gordon Furutani
Land Use Commission
Room 104, Old Federal Bldg.
355 Merchant Street
Honolulu, HI 96813

Dear Mr. Furutani:

Environmental Impact Statement
Proposed Iolani School Properties Project

The EIS for the Proposed Iolani School Properties Project has been reviewed
and the Navy has no comments to offer. As this command has no further use
for the EIS, the EIS is being returned to the Environmental Quality Commission,
by copy of this letter.

Thank you for the opportunity to review the EIS.

Sincerely,

M. M. DALLAM
CAPTAIN, U. S. NAVY
FACILITIES ENGINEER
BY DIRECTION OF THE COMMANDER

Enclosure

Copy to:
Environmental Communications, Inc.
Environmental Quality Commission



NO RESPONSE NECESSARY

MAR 30 1983



DEPARTMENT OF THE ARMY
HEADQUARTERS UNITED STATES ARMY SUPPORT COMMAND, HAWAII
FORT SHAFTER, HAWAII 96809

March 29, 1983

REPLY TO
ATTENTION OF:
Directorate of Facilities Engineering



DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

COMMANDER (dpl)
Fourteenth Coast Guard District
Prince Kaimemole Federal Bldg.
300 Ala Moana Blvd.
Honolulu, Hawaii 96850
(808) 546-2861

11000
Serial 531
30 March 1983

LAND USE COMMISSION
STATE OF HAWAII
MAR 31 11 17 AM '83

Mr. Gordon Furutani
Land Use Commission
Room 104, Old Federal Building
335 Merchant Street
Honolulu, Hawaii 96813

Dear Mr. Furutani:

The Draft Environmental Impact Statement (DEIS) for the Proposed Iolani School Properties Project at Kamaoalii, Koolaukoko, Kaneohe, Oahu has been reviewed and we have no comments to offer. There are no Army installations or activities in the vicinity of the proposed project.

Thank you for the opportunity to comment on the DEIS.

Sincerely,

Alvin S. ...

MAURICE M. FUJIMOTO
Acting Director of Facilities
Engineering

Copy Furnished:
Mr. Fred Rodriguez
Environmental Communications, Inc.
P.O. Box 536
Honolulu, Hawaii 96809

NO RESPONSE NECESSARY

Mr. Gordon Furutani
Land Use Commission
Room 104, Old Federal Building
335 Merchant Street
Honolulu, Hawaii 96813

Dear Mr. Furutani:

The Fourteenth Coast Guard District has reviewed the Environmental Impact Statement on the Proposed Iolani School Properties Project and has no objection or constructive comments to offer at the present time.

Sincerely,

J. E. Schwartz

J. E. SCHWARTZ
Commander, U. S. Coast Guard
District Planning Officer
By direction of

Commander, Fourteenth Coast Guard District

NO RESPONSE NECESSARY

APR 1 1983

REFERENCES

FIRE DEPARTMENT
CITY AND COUNTY OF HONOLULU

1485 S. BERETANIA STREET, ROOM 303
HONOLULU, HAWAII 96814



SILKEM R. ANDERSON
SALES

M. M. NONAKA
CHIEF

April 5, 1983

Mr. Gordon Furutani
Land Use Commission
ROOM 104, Old Federal Building
335 Merchant Street
Honolulu, Hawaii 96813

Dear Mr. Furutani:

We have reviewed the EIS that was prepared for the proposed Iolani School Properties Project and have no further comments at this time.

Very truly yours,

Melvin M. Nonaka,
Fire Chief

MNN:ct/NW
Attachment

cc: Mr. Fred Rodriguez ✓

NO RESPONSE NECESSARY

APR 8 1983

XIII. REFERENCES

1. Bernice P. Bishop Museum, edited by Paul H. Rosendahl; Archaeological Investigations in Upland Kaneohe; 1976.
2. City & County of Honolulu; Comprehensive Zoning Code; 1978.
3. City and County of Honolulu; General Plan; 1977.
4. City and County of Honolulu; Grading, Grubbing, and Stockpiling Ordinance No. 3968; 1972.
5. Cleghorn, Paul and Rogers-Jourdane, Elaine; "Archaeological Reconnaissance Survey of the Windward portion of Route H-3," 1976.
6. Cox, D.C. et.al; Estuarine Pollution in the State of Hawaii Volume 2: Kaneohe Bay Study, Technical Report No. 31, Water Resources Research Center University of Hawaii; 1973.
7. Department of Education; Telephone Conversation, 1982.
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9. Department of Health, State of Hawaii; "Title II, Administrative Rules, Chapter 42, Vehicular Noise Control for Oahu."
10. Department of Health, State of Hawaii; "Title II, Administrative Rules, Chapter 43, Community Noise Control for Oahu."
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15. Evaluation Research Consultants; Analysis Regarding Socio-Economic Impacts of Iolani School Properties Project; 1983.
16. Hawaii Housing Authority, Department of Social Services and Housing; State of Hawaii; Draft State Housing Plan; August, 1982.
17. Land Use Commission, State of Hawaii; Rules of Practice and Procedure and District Regulations; 1975.

18. Marine Corps Air Station, Kaneohe Bay; Air Installation Compatibility Noise Zone (AICUZ) Study; 1976.
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22. U.S. Department of Transportation, Federal Highway Administration and Department of Transportation, State of Hawaii; Final Second Supplement to the Interstate Route H-3 Environmental Impact/4(f) Statement; 1982.
23. U.S. Geological Survey; Water Resources Data for Hawaii Water-Data Report HI-81-1; 1981.
24. Streck, Charles; "Archaeological Reconnaissance Survey for Route H-3 (Alternative A)."

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

APPENDICES

APPENDICES

The petitioner owns a total of 975.6 acres of land at Kamooalii, Kaneohe, Koolaupoko, Oahu and envisions a final development of 383.8 acres of said total. Planned are approximately 1,243 units of mixed residential use (single family, duplexes, and townhouses). Since the petitioner is aware that the overall development of its land should be planned and geared to meet immediate needs, as well as long-term demand for housing, the time frame for developing these lands has been divided into two phases. The Phase I area totals 201.4 acres of the entire 975.6 acres and is presently vacant and undeveloped except for three dwellings. A total of 611 residences consisting of 259 single family units, 82 duplex units, and 270 townhouse units are planned.

The petitioner is seeking reclassification of said 201.4 acres from Conservation to Urban so the property may be developed for residential purposes. An Environmental Assessment, which discussed the entire 965.6 acres, was prepared and submitted to the Land Use Commission (LUC) with the petition, as an exhibit. This Environmental Impact Statement was prepared in support of this request as a requirement of the LUC.

The following technical studies were completed for inclusion into the Environmental Assessment and the analyses extended over the entire 975.6 acres and not only the 201.4 acres of Phase I.

Secondly, from the time the studies were completed to the preparation of this document, the project has undergone several revisions of phasing schemes. Subsequently, nomenclature regarding phasing designations have been changed. However, it should be noted that only applicable and pertinent data was referred to, for the preparation of this document. The balance of the analyses in the technical studies relating to the remaining phases will be referred to at a future time when the petitioner requests reclassification of those areas.

**APPENDIX A
DEMAND ANALYSIS**

DEMAND ANALYSIS

COVERING

A PROPOSED 611-UNIT
RESIDENTIAL DEVELOPMENT

TO BE LOCATED ON

A 201.4-ACRE SITE LOCATED ADJACENT TO
HOOMALUHILA PARK AND THE PALI MUNICIPAL GOLF COURSE,
KANEHE, KOOLAUPOKO, OAHU, HAWAII

FOR

IOLANI SCHOOL
C/O MR. HAN KWONG AU
1495 SOUTH KING STREET
ROOM 3
HONOLULU, HAWAII 96813

OCTOBER 18, 1982

**John
Child**

& COMPANY, INC.



Real Estate Consultants and Appraisers
 FINANCIAL PLAZA OF THE PACIFIC
 SUITE 1040 • 130 MERCHANT STREET
 HONOLULU, HAWAII 96813 • TELEPHONE (808) 533-2851

Richard J. Thomas, M.A., C.R.E.
 President, Member, N.A.A.U.
 Charles J. Jones, M.A.
 Real Estate Consultant, N.A.A.U.
 Robert D. Greenbaum, M.A.
 Member, N.A.A.U.
 Paul D. Cook
 Real Estate Consultant, N.A.A.U.

October 18, 1982

Iolani School
 c/o Mr. Man Kwong Au
 1495 South King Street, Room 3
 Honolulu, Hawaii 96813

Gentlemen:

In accordance with your request we have prepared, and are herewith submitting a compendium report covering the demand for affordable housing on the 201.4-acre site located adjacent to the City and County Hoomaluhia Park and Pali Municipal Golf Course in Kaneohe, Kamoalii, Koolauopoko, Oahu, Hawaii, and further identified as Tax Map Key 4-5-42; portion of Parcels 01 and 06 of the First Taxation Division.

Iolani School owns the fee-simple interest in this property along with a substantial amount of the adjacent acreage, and is petitioning the State Land Use Commission, as Applicant, for a reclassification of the site from conservation to urban. Iolani School has retained the services of John Child & Company, Inc., an independent real estate service corporation, to evaluate the demand for the 611 housing units comprising the residential subdivision proposed for this 201.4-acre property. The proposed project is Phase I of a two-phase residential development plan envisioned by Iolani School for their Kamoalii properties, and consists of 259 single-family units, 82 duplex units, and 270 townhouse units.

PURPOSE AND FUNCTION

The purpose of this report is to evaluate the supply and demand forces influencing the market for affordable housing on Oahu and in the Kaneohe area in particular, and to estimate the probable absorption rate which could be achieved in the proposed residential development. The function of the study is to provide market findings and supporting data which can be incorporated as an exhibit to Iolani School's petition to the State Land Use Commission.

METHODOLOGY

This analysis included a review of State and County policies regarding the direction and rate of growth for Oahu's resident population over the next two decades, policies relating to the

Real Estate Appraisals • Market, Marketability, and Feasibility Studies • Land Use Patterns • Analysis • Consulting
 Commercial, Industrial, Residential, and Resort Properties

Iolani School
 October 18, 1982
 Page 2

need and support of housing developments oriented to all segments of the community with particular emphasis on housing for the low and moderate income families. The review encompassed past, current, and proposed efforts by both State and County agencies to assist in providing affordable housing for these low and moderate income families through a variety of joint venture subsidies with private development, as well as individual programs such as HHA's Hula Mae financing plan. The analysis also reviewed the efforts of private developers to construct and sell housing units which are marketable to this group, yet provide sufficient profit to be economically feasible. After considering the results of various surveys on the need for affordable housing on Oahu, and the official State and County positions supporting and encouraging the development of additional housing which will meet these needs, our analysis focused on the ability of Iolani School to provide a product which would fulfill part of Oahu's demand for affordable housing. The demand for affordable housing has been well documented from a variety of sources, the most recent being: an Affordable Housing Issue Paper prepared for the State Department of Planning and Economic Development 1/, the Hawaii State Plan Survey, also commissioned by DPED 2/, Draft State Housing Plan prepared by HHA as one of the 12 State functional plans provided for by Chapter 226, Hawaii Revised Statutes 3/, Housing Location Study prepared for the Department of Housing and Community Development of the City and County of Honolulu 4/, and the Final Report: Housing Concensus Legislation Workshop convened by Lt. Governor Jean King 5/. All of these plans, workshops, and surveys conclude that there is a critical need for affordable housing, and that it will take a joint effort on the part of both government and private business in varying capacities to achieve the goal of affordable housing for all of Hawaii's people.

This analysis evaluated the competitiveness of the proposed residential development, and based on the direct on- and off-site costs provided by Community Planning, Inc., the

- 1/ Daly & Associates, Inc. Affordable Housing Issue Paper, December, 1981.
- 2/ Hawaii, DPED, Hawaii State Plan Survey, July, 1981.
- 3/ Hawaii, Hawaii Housing Authority, State Housing Plan, Draft, August, 1982, also "Technical Reference Document", October, 1981.
- 4/ Phillips, Brandt, Reddick, and SMS Research, Housing Location Study - Phase I Summary, 1981.
- 5/ Hawaii, Office of the Lt. Governor, Housing Concensus Legislation Workshop: Final Report, December, 1981.

Applicants agent, planning consultant and civil engineer, and direct construction costs for the building improvements experienced in similar residential developments on Oahu, we were able to estimate the probable selling prices which could be achieved in the proposed project. Once the selling prices were estimated, we were then able to compare the proposed project with other existing and proposed residential developments which are oriented toward the moderate income families i/.

SUMMARY OF FINDINGS

A number of interim findings were made in the process of evaluating market demand for the 611 housing units comprising Phase I of the Iolani School development. These findings relate to the demand for, and supply of housing on Oahu and in the Koolauapoko area in particular. The findings are summarized by category as follows:

Population

	Koolauapoko Development		Kaneohe-Ahuimanu	
	Oahu	Plan Area #5	Kaneohe-Ahuimanu	G.P. Area #6
	Residents	% of Oahu	Residents	% of Oahu
1970 Census	630,528	14.3%	43,995	7.0%
1975 QED Census Update	704,455	14.3%	51,394	7.3%
1980 Census	762,874	14.3%	58,913	7.7%
1985 DGP Projection	803,800	17.0%	62,223	7.8%
2000 Revised G.P. Projection	917,400	13.0%	60,548	6.6%
Projection ± 5%:				
Low	871,500	12.4%	57,521	6.3%
High	963,000	13.6%	63,576	6.9%

i/ The Iolani School project will attempt to develop affordable housing with the minimum of government support. Since low income families require substantial subsidies in order to buy, Iolani School, like the rest of the private sector, will only be able to market projects oriented to moderate income. Gap group households without extensive governmental subsidies.

The majority of the proposed project lies within the Kaneohe District as defined as Census Tracts 103.02 and 105.01 through 107.02. While the Kaneohe Neighborhood (No. 30) area covers a slightly larger area (portions of Census Tracts 103.01 and 110), the Census Tracts included above contain virtually all of the residents in the Kaneohe Neighborhood. This district has increased from 30,246 residents (33.6% of the Koolauapoko DP area population) in 1970 to 33,958 residents (31.0% of the Koolauapoko DP area population) in the 1980 census. While the percentage share of the Koolauapoko DP area population being attracted to the Kaneohe District is declining, there continues to be a net increase in the number of persons choosing to reside in Kaneohe. There has been no exodus from Kaneohe, and it is reasonable to expect there would be continued growth in the area as long as there are opportunities for additional housing.

As shown above, the projected resident population for the Koolauapoko and Kaneohe-Ahuimanu areas, indicated in the recently reviewed General Plan for the City and County of Honolulu, are very conservative in light of the historic rates of growth experienced over the past decade, and the relative share of Oahu's population which have chosen to settle in these areas. It does not seem reasonable that an area which has attracted almost 20,000 residents over the past decade should require the next two decades to attract another 10,000 residents. Why would an area that has been attracting an average of 2,000 new residents per year only be able to attract 500 new residents per year in the foreseeable future? It is also unreasonable to assume that an area which has steadily attracted an increasing share of the Island's population, should suddenly reverse this trend and attract less than the share it had a decade ago.

The relatively poor reliability of these projections can be seen by comparing the 1985 projection which was prepared by the Department of General Planning in June, 1978 i/ and based upon the DPED Series II-F projections, with the projections made in the General Plan (as revised) 2/. In 1978, DGP had projected

i/ City and County of Honolulu, Department of General Planning, Land Use Forecast For Oahu, 1975-1985, June, 1978.
2/ City and County of Honolulu Department of General Planning, General Plan Five Year Review, Final Report, February, 1982; Office of Council Services response/recommendations to Planning and Zoning Committee Report No. 736, August 11, 1982; IGP Proposed General Plan Revisions in response to OCS recommendations, September 2, 1982.

significantly larger populations for these areas based on past trends and the GP guidelines. Yet, four years later, we see that while the Series II-F projections have not changed, the anticipated growth in population projected for 1985 is very much out of line with the most recent projections of policy guidelines. The population guidelines reflected in the recent GP reviews are intended as a numerical expression of other GP policies regarding Oahu's population growth, and are based on DCP's Development Plan Land Use Analysis 1/, and Land Supply Review 2/ which measured the capacity of the DP areas to accommodate additional growth.

Capacity Of Koolauapoko To Accommodate Growth

The DCP Land Supply Review is the most recent analysis conducted by the DCP to measure the capacity of each DP area to support/accommodate future residential growth in relation to the "targeted" population distributions by the year 2000. This study updated the Development Plan Land Use Analysis, and both of these studies estimate the total resident population which each of the Development Plan areas can support based on land which was currently vacant and available for development or redevelopment to higher order residential uses. In the Land Supply Review, the DCP estimates that the Koolauapoko area has a potential to support an additional 14,782 residents based on a combination of developed vacant land, redeveloped underutilized land, and Ohana zoning. This estimate assumes 100% of the existing, vacant, residentially zoned land will be developed by the year 2000 and that specific household sizes ranging from 2.0 persons in apartment developments to 3.3 persons in single-family residential units will be achieved in order to accommodate 9,830 of the projected additional population. The estimate also assumes that 50% of the "underutilized" land will be redeveloped into higher density use under the same household size assumptions, and that these redeveloped lands will accommodate another 1,952 residents. The remaining 3,000 residents estimated to be accommodated in Koolauapoko in the next 18 years, represent 15% of the total potential population projected to result from the Ohana zoning plan yet to be adopted by the City Council.

- 1/ City and County of Honolulu, Department of General Planning, Development Plan Land Use Analysis, April, 1980.
- 2/ City and County of Honolulu, Department of General Planning, Land Supply Review, April, 1982.

It is reasonable to observe that these estimates are not fact, and that there is a possibility that these projections may be in error. The estimated population in the Koolauapoko DP area based on this Land Supply Review totals 124,155 which is almost at the high end of the targeted population for Koolauapoko based on the most recent General Plan revisions. Therefore, one could argue that no additional land need be urbanized in order to accommodate the amount of future population growth projected as desirable for the area. We disagree with that conclusion. There are significant questions regarding the reliability and prudence of targeting the DP areas with specific population sizes as done in the General Plan as a means of planning for future growth. However, if we work within the framework of this target population, it is unreasonable to assume that all of the assumptions made in the Land Supply Review projection will occur over the next 18 years. If, for any number of reasons, the target date had been the year 2025, would DCP be promoting the idea of massive rezoning and urbanization to correct the undersupply of land which would be apparent in comparison with projected population growth? Other specific assumptions which cannot be accepted as fact include the presumption that all of the vacant, residential land will be fully developed over the next 18 years. If only 80% were developed instead of the 100% assumed in the DCP analyses, there would be a decrease of almost 2,000 persons in the DCP population projection. Similar arguments would have the same impact on the arbitrary estimates of 50% development of the underutilized land, and 15% development of potential Ohana zoning additions. If all of these estimates made by DCP were overstated by only 20%, that would reduce the 14,782 projection by 2,955 persons, significantly more persons than the Phase I development proposed by Iolani School would add to the Koolauapoko population over the next decade.

Additionally, a small change in the household size assumptions used by DCP would result in errors of similar magnitude. There is historic evidence that households have been steadily declining in size, and that a 3.3 person per household average for single-family units over the next 18 years may be somewhat high. The intent of Ohana zoning is to accommodate members of the immediate family, as such you would expect relatively small houses for grandparents, married children, retired parents, etc. The 3.0 person per Ohana unit seems too high.

All of this points to the conclusion that while the DCP has concluded through their Land Supply Review that there appears to be sufficient urban land available to accommodate anticipated/targeted future growth, these conclusions must be

evaluated based on the reasonableness of their assumptions, and the latitude for possible error. We have determined that there is a good possibility that their assumptions could be wrong, as is probable in any long-term projection. Therefore the DGP projection may significantly overstate the capacity of the area to provide sufficient housing on currently urbanized lands to accommodate the future resident population which may be attracted to the Koolauoko Development Plan area. With relatively minor adjustments to the DGP assumptions, we have demonstrated that the area could easily accommodate the number of additional residents which would be added by the proposed development and still be within the targeted population by the year 2000.

Demand For Affordable Housing

Daly & Associates, Inc. recently completed a comprehensive study on affordable housing for the State Department of Planning and Economic Development (DPEd) entitled Affordable Housing Issue Paper 1/. Among the many observations and conclusions reached in that analysis were the following factors which have contributed to a growing demand for affordable housing 2/:

- Sales prices of homes have risen faster than increases in household income.
- An estimated 92,390 or 31.4% of all households in Hawaii are low income households, i.e. are characterized as lacking sufficient income to obtain adequate shelter at reasonable rates.
- An additional 49,489 households or 16.8% of the State's households are in the gap group - moderate income households who presently rent, but would like to purchase homes. Incomes fall in the gap between upper eligibility limits for government assisted housing, and the minimum needed to purchase a home with conventional financing.

1/ Hawaii, Department of Planning and Economic Development, Affordable Housing Issue Paper, December, 1981.
2/ Ibid. pp. 1-40

- Specific needs of the gap group desiring to become homeowners include: smaller, lower cost "starter homes", and/or reduced initial cost to enable them to qualify to purchase.
- Affordability will remain the primary housing problem in Hawaii for the foreseeable future.
- Estimated housing production requirement on Oahu over the next decade = 77,357 units or almost 8,000 units per annum.
- Estimated gap group households on Oahu in 1980 = 39,366 households, of which 27,292 are renting.
- Future perspective: Problem of housing affordability shows no sign of dissipation in the near future since factors influencing both supply and demand are expected to continue pushing the cost of housing further out of reach of the average household.
- Current pent up demand for affordable housing (about 27,300 renter gap group households on Oahu) will increase due to increasing numbers of household formations, with the resultant competition pushing prices further upward.
- The outlook from the production side or supply is not encouraging: Rising material costs, coupled with the increasing cost and shrinking supply of suitable land, can be expected to continue pushing the costs of production higher.
- Over the past decade, various governmental agencies have shouldered the burden of providing affordable housing through direct construction or subsidies. However, these agencies cannot meet the continuously growing demand for affordable housing as is evidenced by the pent up demand of 57,544 low income and 27,292 gap group renters on Oahu alone.

This comprehensive report indicates an existing pent up demand for over 27,000 affordable housing units for moderate income families on Oahu, and projects that this group of potential homeowners will increase faster than any other segment of Hawaii's population in the future. Since the public sector alone cannot provide sufficient housing to accommodate the

growing need for affordable housing for all groups, and the low income groups definitely require government subsidies in order to obtain adequate shelter, it is obvious that much of the affordable housing will have to be built by the private sector with possible assistance from government in the form of subsidized land, construction costs, or financing.

The Affordable Housing Issue Paper concludes with a series of recommendations to appropriate governmental agencies. Among these recommendations aimed at reducing the costs of housing production and facilitating the production of sufficient supplies of affordable housing needed to accommodate all need groups, are the following points which relate to Iolani School's land use reclassification petition and desire to produce a residential development which will be affordable without a lot of governmental subsidy 1/:

- Encourage the production of new multi-family housing projects for purchase by moderate income residents.
- Facilitate reduction of housing development, production, and operating costs.
- Ensure the judicious use of non-urban lands reclassified or used for residential purposes.

The need for private industry to produce and market housing units which will be affordable to the moderate income families comprising the gap group is very apparent in light of the limited number of housing units which the government agencies have produced, and will continue to produce for the gap group families. Over the 1981-1990 period, the Department of Housing and Community Development (DHCD) projects a total of 2,182 2/ publically assisted housing units will be built on Oahu for the gap group. Approximately 1,034 units have already been scheduled for specific sites and are supposed to be completed by 1986. There are no plans for the other 1,148 units although the DHCD anticipates construction on these units would commence no earlier than 1983. 3/ The 2,182 projected units represent

1/ Affordable Housing Issue Paper, pp. 112-115.
2/ City and County of Honolulu, Department of Housing and Community Development, Housing Location Study, A Summary Report Of Phase I Activities, 1981, Table 3.

3/ Idem. Housing Location Study, Table 3. The 1,034 scheduled units represent projects by the Department of Housing and Community Development, Hawaii Housing Authority, and Department of Hawaiian Home Lands.

less than 10% of the 27,292 gap group households on Oahu who are currently renting because of the lack of affordable purchasing opportunities.

The existing unfulfilled demand for about 27,300 housing units for Oahu's gap group household estimated in the Affordable Housing Issue Paper was not distributed within the county. However, it is reasonable to assume that most neighborhoods and districts on Oahu have their share of residents that fall within the moderate income, gap group definitions. A review of the 1975 OEO Census Update Survey indicated that approximately 3% of the Kaneohe District households fell within the income levels IIIA used to define the moderate income, gap group households. While the proportion of gap group households in the 25 Oahu Districts identified in the 1975 survey varied significantly, all districts had some households which fell into these categories. It would not be unreasonable, therefore, to distribute the estimated 27,300 gap group housing units among the various districts based on a "fair-share" concept, or based on their proportionate shares of the Island-wide population. In this way, we estimate that 14.3% of the Oahu total, or 3,903 units, would be needed in the Koolauoko DP area, and about 31% of that amount, or 1,210 units, would be needed in Kaneohe.

The Housing Location Study indicated that there were 388 publically assisted units planned to be constructed in the Koolauoko area by 1986, but no other projects slated for the area during the 1981-1990 period. Even though 388 units are planned for the gap group, it is questionable whether these projects will come to fruition. As stated in the report: "Most housing agency officials agree that it is necessary to plan for more units than actually are constructed because a variety of implementation problems often arise, requiring the cancellation of projects." 1/ It is clear that the Technical Advisory Group, a group comprised of City, State, and Federal planning and housing agencies which was formed to provide technical input, and to establish a cooperative effort in addressing the needs for publically assisted housing on Oahu, 2/ believes that there is a need for housing which is affordable to the gap group, that the public sector cannot meet all of this need alone, and that a significant portion of the affordable housing should be built in the Koolauoko Planning area. With 1,210 housing units needed for the gap group in Kaneohe in 1980, with the gap group steadily increasing in size

1/ Idem. Housing Location Study, p. 9.
2/ Ibid. p. 1.

each year, and with government agencies planning, at most, 388 units for all of Koolauapoko over the next decade, it is clear that affordable housing developments provided by the private sector, like the 611-unit project proposed by Iolani School, are needed and will continue to be needed in Kaneohe over the foreseeable future.

Competitiveness Of Proposed Development

Over the years there have been numerous single-family and multi-family residential developments oriented to the moderate income gap market. In the majority of these developments, the Hawaii Housing Authority, Department of Hawaiian Homelands, or the County Housing Agencies have been involved either directly or through substantial subsidy programs. Recently, a number of private developers on Oahu have begun marketing housing units oriented to the moderate income households by achieving selling prices which are within "affordability limits" based on the Hula Mae financing qualifications and the FHA Section 245 graduated payment programs. Typically, these programs can provide financing for homes priced below the \$110,000 - \$120,000 level depending on family size and income under current interest rates.

The homes being marketed to the first time buyer by the private developers are typically smaller in size, situated on smaller sized lots, and contain fewer amenities than the other houses being marketed to the buyer who has built up equity through the ownership of previous homes. A survey of the residential developments currently on the market which have been developed without government subsidies (other than Hula Mae financing) indicates that the first time buyers prefer a detached single-family home over any attached multi-family unit, and are willing to pay more for less living area if they can afford to purchase the single-family house. In order to make the single-family house more affordable, developers have made them smaller (fewer bedrooms and baths) and have found that the market will accept a 3-bedroom, 2-bath house of about 900sq.

A minimum appliance package of range and oven, water heater, and garbage disposal are typically included in order to minimize the purchase price. These changes to the dwelling, along with a reduction in the lot area, have enabled developers to sell detached single-family homes in the \$100,000 to \$115,000 range.

By the same attention to cost savings, developers have been able to bring the selling prices of multi-family housing units down to \$80,000 with a 2-bedroom, 1-bath townhouse of about 750sq. The response from first time buyers to both the single-family and multi-family projects has been very good, and despite the current soft real estate market and relatively high interest rates, first time buyers are purchasing these privately developed housing units.

In order to evaluate the competitiveness of the residential development proposed for the Iolani School property, it was necessary to estimate the probable selling prices which could be achieved after consideration of all of the costs inherent in developing the project. The cost of all direct off-site improvements were provided to the consultant by Community Planning, Inc. Indirect off-site costs were estimated based on the expenses of private developers on similar residential projects, and on the consultants experience in valuing these types of projects. Direct and indirect costs for the building improvements were estimated based on current costs being experienced by other developers, discussions with professional cost estimators, and the consultants past experience and ongoing involvement in the appraisal and evaluation of similar projects. Based on these cost estimates, and after including a reasonable profit for the developer on the houses, we estimate a 3-bedroom, 2-bath single-family home of 1,000sq could be marketed at \$110,600, a 3-bedroom, 2-bath duplex of 1,000sq could be sold for \$104,800, and a 3-bedroom, 2-bath townhouse of 1,000sq could be sold for \$87,700. All of these prices are very competitive in relation to the products being marketed by competing private developers, and if marketed under current financing packages, would result in the proposed project achieving a very significant share of the affordable housing market.

However, the intent of Iolani School is to develop a project that not only can compete with other developers, but will maximize the number of families who could purchase their own home. To this end, they have indicated that they would not charge the developer a premium for the right to develop their land, and will be marketing the units in leasehold in order to keep the price of the house down. A further decision, not already reflected in the aforementioned prices, would be to proceed with a petition to the City Council to create an Improvement District 1/ covering the proposed project. While

I/ See Chapter 24, Revised Ordinances of Honolulu as amended.

there are additional costs inherent in funding a large portion of the off-site project costs (roads, curbs, gutters, sidewalks, drainage, water, and electrical systems, etc.) through an Improvement District, the net result is that the original selling price of the various units could be reduced substantially. The costs of the majority of the project's site improvements would be financed through the sale of tax exempt bonds secured by a lien against the lands within the Improvement District. While the home purchasers will end up paying for their pro-rata share of the cost of these improvements over a 20-year period, the interest rate charged would be substantially lower than the mortgage interest rates which will be charged in financing the purchase of their home. 1/ Therefore, the purchaser benefits from the lower initial purchase price in terms of qualifying income, and the repayment of the improvement district assessment over the 20-year period will be financed at a lower interest rate. The prices which the various units would sell for, assuming much of the project site costs are financed through an Improvement District, are as follows:

Unit Type	Selling Price	Average Annual Assessment 2/
Single-family: 3-bedroom, 2-bath	\$83,600	\$2,336
Duplex: 3-bedroom, 2-bath	\$79,900	\$2,114
Townhouse: 3-bedroom, 2-bath	\$68,200	\$1,671

1/ The City and County Finance Director may defer improvement district assessment principal and interest payments for low income households (in accordance with City Council Resolution 77-437).

2/ Chapter 24, R.O. 1969 as amended, limits the bond yield rate to 10% per annum which is reasonable in today's bond market. The average annual assessment is based on a principal cost of \$11,995,200, 10% interest on a declining balance over 20 years, and total principal and interest payments of \$24,590,160. This total assessment is allocated to the 611 units based upon land area: Single-family at 49.2%, Duplex at 14.1% and Townhouse at 36.7%.

At these prices, the proposed project would attract a very significant proportion of the moderate income, first time buyer market, which was estimated to total over 27,000 in 1980. At these prices the proposed projects would be almost as attractive as some of the government subsidized developments which have been recently marketed. Earlier this year, a project located near the Iolani School property in Kaneohe offered 108 3-bedroom, 2-bath single-family homes at prices between \$79,900 and \$88,500 in leasehold. The project, Nani Lehua, was a joint venture between Herbert Morita, the developer who had previously completed much of the off-site improvements, and HHA, which provided interim construction financing at 7.5%. There were 452 applicants for the 108 units available, and the project sold out quickly.

A similar indication of the level of demand generated at these prices can be seen in the response to an HHA project developed last year. In the first quarter of 1981, the first of the lucky buyers in the HHA Kuliouou housing project moved into their homes. These 3-bedroom, 2-bath homes were 900 to 1,200 sq ft in size, and were priced from \$80,000 to \$100,000 in leasehold. HHA offered an option to purchase the leased-fee interest for between \$15,200 and \$18,800 and about 20% of the buyers exercised that option at the time of purchase. The 197 families who ultimately purchased in the subdivision were lucky in relation to the 1400 applicants who had expressed interest in the project. Because of the overwhelming response, HHA was required to hold a lottery in order to ensure that all interested parties were given an equal chance to buy. Based on these and similar experiences in developments priced in this range, we are of the opinion that there will be very strong demand for the housing units proposed in the Iolani School development, and that the project would meet a portion of the housing needs of the 27,000+ moderate income families comprising Oahu's gap group. Demand for residential units in the proposed project is conservatively estimated at 150 units per year, assuming that selling prices will escalate at rates sufficient to offset increases in the costs of construction in order to maintain profit margin.

These conclusions are predicated on the marketing of the 1,000+ 3-bedroom, 2-bath units under the most favorable financing plans available in the open market. Currently, buyers within the moderate income range have utilized the Hula Hae program and the FIA 245 graduated payment program. Prices could be brought lower to ensure maximum market penetration by reducing the size of the dwelling units. Since there has been ample

market evidence that the first time buyers will accept a 900+ square foot 3-bedroom, 2-bath home, the developer(s) may decide to build a number of these units. Based on our analysis, these 900+ units could be marketed at the following prices while still being profitable for the developer:

Unit Types (900+)	Prices Without Improvement District		With Improvement District	
	Improvement District	Selling Prices	Selling Prices	Average Annual Assessment 1/
Single-family	\$104,200	\$77,200	\$77,200	\$2,136
Duplex	\$ 98,800	\$73,900	\$73,900	\$2,114
Townhouse	\$ 82,400	\$62,900	\$62,900	\$1,671

Concluding Remarks

The State has identified the "lack of affordable, suitable shelter as one of Hawaii's most widespread social problems". 2/ The State Housing Plan, one of 12 functional plans prepared in accordance with Chapter 226, Hawaii Revised Statutes to establish long-range planning guidelines and policies for the State, focuses on the problems of providing affordable housing for all of Hawaii's people. It was structured to implement the Hawaii State Plan housing objectives and policies, and directly supports the State Plan objectives and policies of "greater housing opportunities", "increased housing choices", and "increased homeownership and rental opportunities". In particular, these plans promote the policy to "stimulate and promote feasible approaches that increase housing choices for low income, moderate income, and gap group households". 3/ It is appropriate to this petition that the State Functional Plans provide policy direction to the Land Use Commission in their decisions regarding the reclassification of lands for urban use, since one of the primary objectives of the State Housing

1/ Note that average annual assessment per unit type does not change since density of development has not changed. Additional savings could be achieved if the property were developed to a higher density.
 2/ State of Hawaii, State Housing Plan Technical Reference Document, October 1981, p. III-66.
 3/ Idem, State Housing Plan, p. II-3.

Plan is to provide housing which is affordable to the moderate income and gap group families.

The State is now in the process of developing a means of resolving differences between the various functional plans when their objectives and policies are in conflict. A significant input into this process is the Hawaii State Plan Survey. The Survey was prepared for the Department of Planning and Economic Development (DPED) to assist the State Plan Policy Council in their required review of the Hawaii State Plan. The most recent Survey was completed in July, 1981. Among the questions asked of Hawaii's residents was a request to prioritize the areas that they thought our State Government should give the most attention to over the next few years. While "safety and protection from crime" headed the list with 73% of the population selecting it as one of these areas in need of attention, "affordable housing" was the second most selected area. Fully, 54% of Hawaii's residents surveyed (55% in Oahu) felt that the State should put more time and money into affordable housing. 1/ Affordable housing was followed by "quality of education" (49%), and "having good jobs for residents" (32%).

The survey also addressed the difficult choices that sometimes have to be made in resolving conflicts between the various functional plans. In relation to the issue of affordable housing, residents were asked to choose the more important of the following: "lower housing costs" or "preserving agricultural land". Statewide, 60% selected lower housing costs as the more important objective, while only 36% chose preservation of agricultural lands. There were several choices of this nature offered to the residents, and based on the responses to the survey, it is likely that while residents support the efforts to save agricultural and conservation lands and to control urban growth, they would likely accept some loss of agricultural and conservation lands for more affordable housing.

While the proposed County Development Plan for Koolauapoko does not project a need for further urbanization to accommodate targeted population growth in the area, our analysis has shown that the projected capacity of the area's existing land

1/ Hawaii, Department of Planning and Economic Development, The Hawaii State Plan Survey, July, 1981, p. 34-35.

inventory to accommodate even the scaled down population targeted for the area 1/ is open to question. Population distribution is just one of ten areas of concern addressed by the General Plan for the City and County of Honolulu, although it played a major part in the land use recommendations contained in the Development Plans. An equally important area of concern is housing. Objective A for housing is "to provide decent housing for all the people of Oahu at prices they can afford", and in the most recent revision process an effort was made to develop more specific policies which will encourage the development of "affordable" housing. The Department of General Planning has recommended the following revisions to the General policies which demonstrate this increased emphasis on affordable housing:

Policy 6 - Provide financial and other incentives to encourage the private sector to build homes for low and moderate income residents. 2/

Policy 7 - Encourage and participate in joint public-private development of low and moderate income housing. 3/

It is clear that the State Plan, the State Housing Plan, and the County General Plan all support and encourage the development of affordable housing, and have specific policies which are designed to assist the private sector in accomplishing this goal. The most recent Hawaii State Plan Survey indicates that Hawaii's residents believe affordable housing to be the second most important area of concern after crime on which the State government should spend its efforts and money. The residents also expressed a willingness to accept some loss of agricultural and conservation lands if the net result would be more affordable housing.

1/ The "target" population projected by the DCP revisions to the General Plan and reflected in the proposed Development Plan for Koolaupoko represents a significant reduction in the number of residents who have been attracted to Koolaupoko over the past 20 years, both in the rate of increase in residents each year, and in the proportion of Oahu's population residing in Koolaupoko.
2/ Revised Policy No. 4.
3/ New policy.

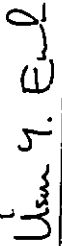
The residential development proposed by Iolani School for the property in this petition is oriented to the moderate income and gap group families identified as need groups by State and County housing agencies. The proposed project will provide 611 homes which would be affordable to the estimated 27,300 families on Oahu in the gap group who are currently renting. The combined efforts of State and County housing agencies currently project the construction of only 2,182 additional housing units for these Oahu families through 1990, and based on past experience, it is probable that many of these projected units will not be built. We have estimated that about 3,900 of the 27,300 gap group housing units are needed in Koolaupoko, with 1,200 units within Kaneohe alone. In relation to these existing needs, the State and County housing agencies have planned for the construction of only 388 units in Koolaupoko through 1990. There is a clear need for more affordable housing, and the project proposed by Iolani School will meet a portion of this need at virtually no cost to government.

We appreciate having had the opportunity to prepare this letter report for you, and are prepared to discuss our analysis and findings with you at your convenience. Your attention is directed to the "Limiting Conditions and Underlying Assumptions" contained in the Addenda which govern the findings and use of this report. This report and its findings are invalid if presented without the John Child & Company, Inc. seal embossed over the original signature(s) recorded below.

Very truly yours,

JOHN CHILD & COMPANY, INC.


Robert J. Vernon, M.A., CRE
President & Chief Appraiser


Union Y. Ewart
Market Analyst & Staff Appraiser

ADDENDA

Limiting Conditions And Underlying Assumptions
References Employed In The Analysis
Qualifications of John Child & Company, Inc.

LIMITING CONDITIONS AND UNDERLYING ASSUMPTIONS

LIMITING CONDITIONS AND UNDERLYING ASSUMPTIONS

This demand analysis is circumscribed by the following limiting conditions and underlying assumptions:

1. The information which was furnished to John Child & Company, Inc. by the project sponsor and by others is assumed to be reliable. No responsibility is assumed for its accuracy.
2. Possession of this study, or a copy thereof, does not carry with it the right of publication or reproduction. It may not be used for any purpose by anyone other than the "Client" without the previous written consent of the "Client" and then, only with proper qualification.
3. This report may not be reproduced in part or in whole without the written consent of John Child & Company, Inc. and is invalid if presented without exhibits as furnished in this report. It is furthermore invalid if the seal of John Child & Company, Inc. is not embossed over the original signature(s) recorded on the letter of transmittal.
4. Disclosure of the contents of this report is governed by the by-Laws and Regulations of the American Institute of Real Estate Appraisers and the American Society of Real Estate Counselors of the National Association of Realtors, the International Society of Real Estate Appraisers, and the American Society of Appraisers.
Neither all nor any part of the contents of this report (especially any conclusions as to value, the identity of the appraisers or the firm with which they are connected, or any reference to the American Institute of Real Estate Appraisers, the American Society of Real Estate Counselors, the International Society of Real Estate Appraisers, and the American Society of Appraisers or to their respective designations) shall be disseminated to the public through advertising media, public relations media, news media, sales media, or any other public means of communication.
5. No adverse subsurface or drainage conditions exist which will significantly influence the design and/or construction cost of the development. It is assumed that no unanticipated geological voids or structures, or adverse ground water conditions will be experienced that will produce conditions that will significantly affect construction costs.

6. Cost estimates for off-site and on-site improvements for the mixed use development (single-family, duplex, and townhouse) with or without improvement district designation, were prepared by Community Planning, Inc. in November 1982. Allocation of costs which could be covered by the Improvement District Assessments were also made by Community Planning, Inc.
7. The 611 residential units comprising the proposed project represent the first of a two-phase development which Iolani School envisions for their land holdings mauka of Hoomaluhia Park. The total development will include 971 residential units. This petition, however, addresses just the initial increment of the two-phase development plan.
8. The proposed project assumes the construction of the H-3 freeway along the alignment indicated on the maps contained elsewhere in the petition.
9. The detailed description of the property and project proposed for development normally included as part of an evaluation report is included elsewhere in the Iolani School petition. It is assumed that a complete copy of the data normally included in the report covering portions of the analysis has been retained in the consultant's files, and is available for review upon request.
10. The function of this report is to provide market findings and supporting data relative to the demand for the proposed project which can be incorporated as an exhibit to a boundary amendment and reclassification petition to the State Land Use Commission. Use of this report for any other purpose may invalidate the report's findings and conclusions, and is prohibited without the written authorization of John Child & Company, Inc.

REFERENCES EMPLOYED IN THE ANALYSIS:

State Of Hawaii:

1. State Land Use Commission - Rules Of Practice And Procedure And District Regulations, December 21, 1973.
2. Hawaii State Plan, Department Of Planning And Economic Development, 1978.
3. The Hawaii State Plan Survey, Department Of Planning And Economic Development, July, 1981.
4. Brief State Housing Plan, Hawaii Housing Authority, August, 1982.
5. State Housing Plan, Technical Reference Document, Hawaii Housing Authority, October, 1981.
6. Housing Consensus Legislation Workshop, Final Report, Office Of The Lieutenant Governor, December, 1981.
7. Affordable Housing Issue Paper, prepared for Department Of Planning And Economic Development by Daly & Associates, Inc., December, 1981.
8. Housing For Hawaii's People, prepared for Hawaii Housing Authority by Daly & Associates, Inc., January, 1977.
9. The State Of Hawaii Data Book 1981, Department Of Planning And Economic Development, November, 1981.
10. OEO 1975 Census Update Survey, Oahu, Community Services Administration, September, 1976.
11. Annual Reports, Hawaii Housing Authority, fiscal years 1978-1979, 1979-1980, and 1980-1981.
12. Hawaii Housing Authority Composite Report, Hawaii Housing Authority, fiscal years 1978-1979 and 1979-1980.
13. Quarterly Statistical And Economic Report, Third Quarter 1982, Department Of Planning And Economic Development.

REFERENCES EMPLOYED IN THE ANALYSIS

City And County Of Honolulu:

14. General Plan, Objectives And Policies, Exhibit A, Resolution No. 238, January, 1977.
15. General Plan Five-Year Review, Final Report, Department Of General Planning, February, 1982.
16. Report On Evaluation Of Proposed Revisions To The 1977 Urban General Plan, Office Of Council Services, August, 1982.
17. DGP Response To OCS Recommendations, Department Of General Planning, September, 1982.
18. Development Plans Redraft, Part A: Changes Applicable To All Six Development Plans, Department Of General Planning, April, 1982.
19. Development Plans Redraft, Part B: Changes Applicable To The Koolapoko Development Plan, Department Of General Planning, April, 1982.
20. Proposed Development Plan - Koolapoko, Department Of General Planning, April, 1982.
21. Agency And Public Review Package FY 1982-83 Development Plan Annual Review For Koolapoko, Department Of General Planning, July, 1982.
22. Housing Location Study, A Summary Report Of Phase I Activities, prepared for Department Of Housing And Community Development by Phillips, Brandt, Reddick, and SMS Research, 1981.
23. Inclusionary Zoning, Department Of Land Utilization and Department Of Housing And Community Development, July, 1980.
24. Land Use Forecast For Oahu 1975-1985, Department Of General Planning, June, 1978.
25. Land Supply Review, Department Of General Planning, April, 1982.

Others:

26. Construction In Hawaii, Bank Of Hawaii, 1980-1982.
27. Housing Vacancy Survey - Honolulu, Hawaii, Federal Home Loan Bank Of Seattle, March, 1982.

QUALIFICATIONS OF JOHN CHILD & COMPANY, INC.

**APPENDIX B
AIR QUALITY**

I. PROJECT DESCRIPTION

The proposed Kamoalii Development Project involves site preparation and construction of approximately 1,138 residential dwelling units on 376.4 acres of land located mauka of Hoomalahia Park and Keapuka subdivision between Kamehameha and Likelike Highways in Kaneohe as depicted in Figure 1.

The project is to be undertaken in three phases. Phase I (525 units) will be constructed between 1986 and 1990 with full occupancy by 1992. Phase II (265 units) is to be constructed from 1986 to 1988 with full occupancy in 1990, and Phase III (348 units) to be constructed between 1993 and 1995 with full occupancy in 1997.

The main access for Phase I will be by way of Klonsole Road onto Kamehameha Highway. Access to Phase II will be via a permitted access point on the makai side of Likelike Highway. It is assumed that Phase III traffic will be split between these two main access points. The project site also has access through Lulu Road, but this and other potential access routes through the existing Keapuka subdivision will not be used.

II. AIR QUALITY STANDARDS

State of Hawaii and Federal Ambient Air Quality Standards (AQS) have been established for seven classes of pollutants as shown in Table 1. An AQS is a concentration not to be exceeded over specified sampling time periods which vary for each pollutant depending upon the type of exposure necessary to cause adverse effects. Each of the regulated pollutants has the potential to cause some form of adverse health effect or to produce environmental degradation when

present in sufficiently high concentration. Federal AQS have been divided into Primary and Secondary levels. Primary AQS are designed to prevent adverse health impacts while Secondary AQS refer to welfare impacts such as decreased visibility, diminished comfort levels, damage to vegetation, animals or property, or a reduction in the overall aesthetic quality of the atmosphere. State of Hawaii AQS have been set at a single level which in most cases is significantly more stringent than the lowest comparable Federal limit.

The Federal research regarding the adequacy of current AQS is ongoing. At present there is a U.S. Environmental Protection Agency (EPA) proposal to lower the one-hour level of carbon monoxide from 40 milligrams per cubic meter to 25 parts per million (about 29 milligrams per cubic meter).

On the other hand, the State of Hawaii Department of Health is currently considering changes to the State Air Quality Regulations which would raise the State AQS for particulates and sulfur dioxide to Federal Primary levels, eliminate the State hydrocarbon AQS, and drop the State 24 hour AQS for nitrogen dioxide.

A public hearing has also been called to accept comments regarding the State Plan for implementing the relatively new quarterly AQS for airborne lead. The proposed control strategy assumes that federally mandated limits on the production of lead-containing fuels and curbs on new-car leaded-fuel usage will be sufficient to maintain Hawaii's airborne lead levels well below the allowable AQS.

III. PRESENT AIR QUALITY

There are no ambient air quality monitoring stations within the immediate vicinity of the proposed project. For a windward Oahu location such as this with no industrial activity upwind for thousands of miles it seems reasonable to assume that present air pollutant levels are very low. There are no major air pollutant emission sources within the project area. The only significant sources of man-made air pollutants are motor vehicles traveling along Kamehameha and Likelike highways adjacent to project boundaries.

Natural air pollutant producers which might affect air quality in the project area include the ocean (sea spray), plants (aero-allergens), dust, or perhaps a volcanic eruption on the island of Hawaii. Concentrations of air pollutants from these sources should be fairly uniform for most windward Oahu locations. There is no agricultural activity requiring open field burning in the project area.

A summary of air pollutant measurements from State of Hawaii long-term monitoring stations nearest the project site is presented in Table 2. Data from six different sampling stations are included in the summary.

Particulate measurements are from the Waimanalo sampling station (about 8 miles east southeast of the project site). This is the only monitoring station located on the windward site of Oahu and only particulates are measured there.

Sulfur dioxide measurements are from the Kalihi station (about 7 miles southwest of the project) on the other side of the Koolau Mountains.

Carbon monoxide measurements through 1979 are from the Department of Health building at Punchbowl and Beretania Streets in urban Honolulu (about 7.5 miles south southwest of the project). After 1979 carbon monoxide readings are from Leahi Hospital in Kaimuki (about 8.5 miles south).

Ozone levels were also measured at the Department of Health building until December, 1980, when the monitor was relocated to Sand Island (about 8 miles southwest of the project site).

Until April, 1976, nitrogen dioxide was measured at Ala Moana Park (about 8.5 miles south southwest of the project), but in February, 1981, a new nitrogen monitoring station was established at the Sand Island location.

Unfortunately, there are no long-term measurements of hydrocarbons anywhere in Hawaii so that little can be said about past or present levels of this pollutant. Hydrocarbons are primarily important because of the precursor role that they play in the formation of photochemical pollutants such as ozone. Judging from ozone measurements presented in Table 2 it would appear that photochemical pollutants, and, by inference, hydrocarbons, are not a major problem on Oahu.

Data from Table 2 also show that particulate, sulfur dioxide, nitrogen dioxide and lead levels are well within allowable AQS at those long-term sampling stations nearest to the project site.

On the other hand, Table 2 indicates that there could be a potential problem with carbon monoxide concentrations in urban areas of Oahu. During the years from 1975 to 1979 when carbon monoxide was measured at the Department of Health building there were numerous violations of the State of Hawaii

projects such as this one are discussed later in this report.

It is also inevitable that construction equipment will emit some air pollutants in the form of engine exhausts. The largest equipment is generally diesel-powered. For this type of equipment individual carbon monoxide emissions are generally no more than those of the average automobile, but nitrogen dioxide emissions can be quite high. Fortunately, nitrogen dioxide emissions from other sources in the area should be relatively small and overall impact of pollutant emissions from construction equipment should be minor compared to levels generated on nearby highways.

V. AIR QUALITY IMPACT OF INCREASE ENERGY UTILIZATION

Assuming that average floor space per unit in the completed development is 1,200 square feet, the 1,138 units would have a total residential floor space of about 1.37 million square feet. Using an average annual BTU consumption of 7,000 per square foot yields total annual energy requirements of 9.56×10^9 BTU per year. If all this demand is to be met by burning fuel oil to generate electricity and fuel can be assumed to deliver about 1.38×10^5 BTU per gallon, then the fuel requirements for this project would be about 69,000 gallons per year or about 1,260 barrels of oil at 55 gallons per barrel.

This energy requirement could be cut nearly in half if all units in the complex are equipped with solar water heaters when they are built. Hawaiian Electric Company also has some future options available to meet this demand other than burning fuel oil. These options include Wind Farms further up the windward coast at Kahuku and the possibility of an Ocean Thermal Energy Conversion Plant off the leeward coast.

peak one-hour AQS for this pollutant. There was, however, an encouraging trend toward fewer violations each year and decreasing average peak values until the monitor was moved to Kaimuki in late 1979. The Kaimuki site is low density residential and readings there are probably indicative of background levels at sites well removed from major highways and urban traffic.

In any case the data in Table 2, clearly show that carbon monoxide is the pollutant most likely to cause difficulty in meeting allowable State of Hawaii AQS as a result of new development on Oahu.

IV. DIRECT AIR QUALITY IMPACT OF PROJECT CONSTRUCTION

During the site preparation and construction phases of this project it is inevitable that a certain amount of fugitive dust will be generated. Field measurements of such emissions from apartment and shopping center construction projects has yielded an estimated emission rate of 1.2 tons of dust per acre of construction per month of activity. This figure assumes medium level activity in a semi-arid climate with a moderate soil-silt content. Actual emissions of fugitive dust from this project can be expected to vary daily depending on the amount of activity and the moisture content of the exposed soil in work areas.

One major generator of fugitive dust is heavy construction equipment moving over unpaved roadways. This problem can be substantially mitigated by completing and paving roadways as early in the development process as possible. Applicable control regulations and other mitigative measures that can be employed to curb emissions of fugitive dust from construction

The major impact of any fuel oil burned to supply the needs of this project, however, will be increased sulfur dioxide and particulate levels in the vicinity of present Hawaiian Electric power plants, primarily the Kahe plant on the Waianae coast.

VI. INDIRECT AIR QUALITY IMPACT OF INCREASED TRAFFIC

One construction is completed the proposed project will not in itself constitute a significant direct source of air pollutants other than minor air conditioner losses and fugitive cooking aromas. By serving as an attraction for increased motor vehicle traffic in the area, however, the project must be considered to be a significant indirect air pollution source.

Motor vehicles, especially those with gasoline-powered engines, are prodigious emitters of carbon monoxide. They also produce significant quantities of hydrocarbons and nitrogen dioxide. Those burning fuel which contains lead as an additive also contribute some lead particles to the atmosphere. The major control measure designed to limit lead emissions is a Federal law requiring the use of unleaded fuel in most new automobiles. As older cars are removed from the vehicle fleet, lead emissions should continue to fall. Federal control regulations also call for increased efficiency in removing carbon monoxide, hydrocarbons and nitrogen dioxide from vehicle exhausts. By 1995, carbon monoxide emissions from the vehicle fleet then operating are mandated to be about half the amounts now emitted.

In order to evaluate the air quality impact of increased traffic and decreasing emission levels per vehicle in the project area a detailed carbon monoxide modeling study has been carried out. This study is designed to yield predicted carbon monoxide concentrations that can be directly compared to allowable State and Federal air quality standards.

A. CARBON MONOXIDE DIFFUSION MODELING

Two critical receptor sites were selected for analysis. Site 1 is on the mauka side of Kamehameha Highway near the Kionzole Road intersection. Site 2 is on the makai side of Likelike Highway adjacent to the proposed new access road for Phase II of the project. The locations of these two sites are indicated on Figure 1. Expected worst case concentrations of carbon monoxide at these receptor points was computed as described below for the present case and for future years with and without the proposed project.

Existing traffic levels on Kamehameha Highway are described in the traffic study for the project. A morning peak hour traffic count on Likelike Highway was carried out on Monday, March 8, 1982. Forecast future volumes on these roadways were estimated using trend line analysis with published traffic volumes for the years 1969-1973 along with the 1979, 1980, and 1982 counts. Morning peak hour volumes were estimated for the years 1992 and 2002 assuming a morning peak hour to average daily traffic (ADT) ration of 6.9 percent for Kamehameha Highway and 10 percent for Likelike Highway.

The present vehicular mix on Kamehameha and Likelike Highways is 83 percent automobiles, 15 percent light duty trucks and vans, 1 percent heavy duty gas trucks, and 1 percent diesel trucks and buses. This mix is not expected to change significantly over the years studied. Vehicle mix from the project is likely to be 90 percent automobiles and 10 percent light trucks and vans.

By 1992, both Phase I and Phase II of the project will have been completed and fully occupied. By 2002, Phase III will be completed and occupied as well. Expected traffic volumes for each of these phases are presented in the traffic study

Traffic on the project access road is expected to be moving at an average of 5 mph upstream from the red light and 15 mph downstream. On Likelike Highway Kanohe-bound traffic is expected to move at an average speed of 35 mph, slowing to 5 mph when the light is red. Honolulu-bound traffic on Likelike Highway is expected to move at an average speed of 25 mph, slowing to 5 mph for the red light.

A 75 percent outbound, 25 percent inbound split is expected for project-related traffic, with 75 percent of the outbound traffic headed for Honolulu. All outbound traffic from the project and about 20 percent of the traffic on Likelike Highway is expected to be operating in the cold start mode.

Vehicular carbon monoxide emission rates for the years studied were determined using the latest version of EPA's computerized Mobile Source Emissions Model (MOBILE 2). Morning rush hour temperature was assumed to be 68° F.

The EPA computer model HWAY-2 was used to calculate estimated carbon monoxide concentrations at both receptor sites. Stability category E (5) was used for determining diffusion coefficients. This stability category represents the most stable (least favorable) atmospheric condition that is likely to exist in a suburban area such as this.

To simulate worst case wind conditions a uniform wind speed of one meter per second is assumed. The worst case wind direction at Site 1 is due east while that for Site 2 is west northwest.

Background contributions of carbon monoxide from sources or distant roadways not directly considered in the analysis were assumed to be about 1 milligram per cubic meter (mg/m³) in 1982, and 0.8 mg/m³ in 1992 and 2002. The decrease in background level for future years reflects the expected

for the project. All Phase I traffic is assumed to enter and leave the project via the Kionaole Road access; all Phase II traffic via the Likelike Highway access; and Phase III traffic is assumed to take a 50/50 split between these two access points. No alternate routes through the Kespuka subdivision are considered.

At the Kionaole Road access point all traffic leaving the project must turn right since there is no crossover of the divided Kamehameha Highway at this point. It is assumed that this right turn traffic will be regulated only by a stop sign. Morning peak hour traffic from the project is further assumed to take a 75/25 split with 25 percent of the traffic making a U-turn on Kamehameha Highway at a permitted turn lane upstream from the project access and then proceeding back past the access point toward the Likelike Highway intersection. Of the project related traffic it is also assumed that 75 percent will be outbound during the morning rush with the other 25 percent inbound.

Average vehicle speeds on Kionaole Road upstream from the stop sign are assumed to be 5 mph, while right turn traffic is assumed to be traveling at 15 mph. All cars leaving the project are assumed to be operating in the cold start mode. On Kamehameha Highway, Kanohe-bound traffic is assumed to be moving at 35 mph, while Pali-bound traffic moves at a slower 25 mph. Of these vehicles 20 percent are assumed to be operating in a cold start mode.

At the intersection of Likelike Highway and the new access route to Phase II it is likely that a stoplight will be needed to allow traffic from the project to exit safely. Relative to Likelike Highway traffic volumes the flow of traffic from the project should be low enough that this light would be red for Likelike traffic only about 5 percent of the time.

Increase in emission control effectiveness for the vehicle fleet that is operating in those years.

Results of the peak hour carbon monoxide analysis are presented in Table 3. Concentrations of carbon monoxide are predicted to be within allowable State and Federal AQS with or without the proposed Kamoalii Project at both critical receptor sites. These sites were selected because they would be likely to have the highest project-related carbon monoxide concentrations in the area and the analysis was carried out for worst case meteorological diffusion conditions. Each receptor site was located about 3 meters from the nearest traffic lane at a breathing level of about 1.5 meters.

Predicted worst case eight hour values of carbon monoxide for these receptor sites are presented in Table 4. These values are based on the results for the peak hour analysis as modified by the application of a meteorological persistence factor of 0.6 as recommended in EPA guidelines to account for the fact that meteorological dispersion conditions are likely to be more variable (and hence more favorable) over an eight hour period than they are for a one hour period. Once again the predicted concentrations are well within allowable Federal and State AQS.

VII.

MITIGATION MEASURES

A. SHORT TERM

As indicated by the foregoing analysis, the only direct adverse air quality impact that the proposed Kamoalii Development is likely to create is the emission of fugitive dust during the construction phase of the project. State of Hawaii Department of Health Rules and Regulations stipulate the control measures

that are to be employed to reduce this type of emissions. Primary control consists of wetting down loose soil areas with water or suitable chemicals. An effective watering program can reduce particulate emission levels from construction sites by as much as 50 percent. Other control measures include good housekeeping on the jobsite and pavement or landscaping of bare soil areas as quickly as possible.

B. LONG TERM

Once completed, the Kamoalii Development is expected to have little direct impact on the air quality of the surrounding region. The only potential long-term indirect air pollution contributions will be in the form of increased power plant emissions to provide electricity to residences within the development and increased automobile emissions from vehicles arriving and departing the project area.

It is possible to cut down electrical requirements considerably by installing solar water heaters in all new residential units, but project planners can do very little to decrease emission levels from vehicles operating within or near the project area. Reductions in these emissions depend on actions by the Federal government and given the currently troubled economic state of the U.S. automobile industry it is difficult to tell if the stringent emissions reduction program now being pursued will in fact be followed in coming years. It is possible that the emission values used here to predict future pollutant concentrations will prove to be too optimistic. On the other hand this analysis did not consider the possibility that technological innovation may lead to new vehicular power systems which produce little or none of the air pollutants that are currently of concern.

In any case the modeling study carried out for this project indicates that with the possible exception of a period of extreme traffic congestion such as might occur as a result of an accident in the Wilson Tunnel, pollutant concentrations from vehicular sources in and around the project can be expected to be within allowable air quality standards. Thus no special mitigation measures seem necessary in this regard.

VIII. SUMMARY

1. The proposed Kamooalii Development Project involves construction of approximately 1,138 residential units on 376.4 acres of land located mauka of Hoomaluhia Park in Kaneohe.
2. Present air quality in the project area is estimated to be very good since there are no major contributing sources other than vehicles traveling on Kamehameha and Likelike Highways adjacent to the project site.
3. Except for short term dust emissions during the construction phase of the project no significant direct air quality impacts are expected.
4. Indirect air quality impacts are likely to result from demands for electrical energy. This impact is likely to occur in the Waianae area near the Kahe Power Plant where increased particulate and sulfur dioxide emissions can be expected.
5. Increased traffic generated by the project will increase emissions of carbon monoxide, hydrocarbons and nitrogen dioxide in the project area. Except during periods of severe traffic congestion, however, predicted concentrations of these pollutants are expected to be within allowable State and Federal Ambient Air Quality Standards.

6. Adequate mitigative measures are available to control emissions of fugitive dust from construction activities, solar water heating can help reduce electrical demand, but no special mitigative measures are available to control emissions from vehicles operating in the project area.

REFERENCES

1. Community Planning, Inc., Traffic Impact Analysis, Kamoalii Development, March, 1982.
2. U.S. Environmental Protection Agency, User's Guide to MOBILE 2: Mobile Source Emissions Model, February, 1981.
3. U.S. Environmental Protection Agency, User's Guide for HIWAY 2, A Highway Air Pollution Model, March, 1980.
4. U.S. Environmental Protection Agency, Guidelines for Air Quality Maintenance Planning and Analysis Volume 9: Evaluating Indirect Sources, January, 1975.
5. California Department of Transportation, Energy and Transportation Systems, December, 1978.

TABLE I
SUMMARY OF
STATE OF HAWAII AND FEDERAL AMBIENT AIR QUALITY STANDARDS

POLLUTANT	SAMPLING PERIOD	FEDERAL STANDARDS		STATE STANDARDS
		PRIMARY	SECONDARY	
1. Suspended particulate matter (micrograms per cubic meter)	Annual Geometric Mean	75	60	-
	Annual Arithmetic Mean	-	-	55
	Maximum Average in any 24 hours	260	150	100
2. Sulfur Dioxide (micrograms per cubic meter)	Annual Arithmetic Mean	80	-	20
	Maximum Average in any 24 hours	365	-	80
	Maximum Average in any 3 hours	-	1300	400
3. Carbon Monoxide (milligrams per cubic meter)	Maximum Average in any 8 hours	-	10	5
	Maximum Average in any 1 hour	-	40	10
	Maximum Average in any 3 hours	-	160	100
5. Ozone (micrograms per cubic meter)	Maximum Average in any 1 hour	-	240	100
	Annual Arithmetic Mean	-	100	70
6. Nitrogen Dioxide (micrograms per cubic meter)	Maximum Average in any 24 hours	-	-	150
	Average Over 3 Months	-	1.5	1.5

Sources: 10 Code of Federal Regulations, Part 50 and State of Hawaii Public Health Rule and Regulations, Chapter 42.

TABLE 2

SUMMARY OF AIR POLLUTANT MEASUREMENTS
AT NEAREST MONITORING STATIONS

POLLUTANT	1975	1976	1977	1978	1979	1980	1981
PARTICULATE MATTER							
No. of Samples	86	71	51	60	59	57	57
Range of Values	13-65	12-69	14-59	15-61	12-61	10-90	14-78
Average Value	29	25	31	29	30	29	28
No. of times State AQS exceeded	0	0	0	0	0	0	0
SULFUR DIOXIDE							
No. of Samples	81	68	45	57	54	59	56
Range of Values	<5-34	<5-32	<5-45	<5-16	<5-16	<5-5	<5-45
Average Value	<5	<5	<5	<5	<5	<5	<5
No. of times State AQS exceeded	0	0	0	0	0	0	0
CARBON MONOXIDE							
No. of Samples	169	355	359	365	207	329	216
Range of Values	.9-27.4	.5-24.2	0-19.6	0-20.7	0-17.3	0-3.5	0-4.6
Average Value	6.6	5.4	3.5	3.1	2.9	0.6	1.2
No. of times State AQS exceeded	35	41	22	19	10	0	0
OXIDANT (OZONE)							
No. of Samples	234	322	300	284	338	295	147
Range of Values	6-85	2-127	4-61	10-84	10-80	10-84	10-104
Average Value	25	40	25	33	39	48	37
No. of times State AQS exceeded	0	1	0	0	0	0	1
NITROGEN DIOXIDE							
No. of Samples	88	21					46
Range of Values	5-64	24-61					6-77
Average Value	38	44					25
No. of times State AQS exceeded	0	0					0
LEAD							
No. of Samples			4	1	4	4	1
Range of Values			.48-.89	.72	.25-.42	.20-.41	.25
Average Value			.71	.72	.33	.26	.25
No. of times State AQS exceeded			0	0	0	0	0

NOTES: See text for locations of monitoring stations. Carbon monoxide reported in milligrams per cubic meter; other pollutants in micrograms per cubic meter. Carbon monoxide and ozone readings are daily peak one hour values; lead is quarterly; other pollutant values are for a 24 hour sampling period.

SOURCE: State of Hawaii Department of Health

TABLE 3

RESULTS OF PEAK HOUR CARBON MONOXIDE ANALYSIS
(milligrams per cubic meter)

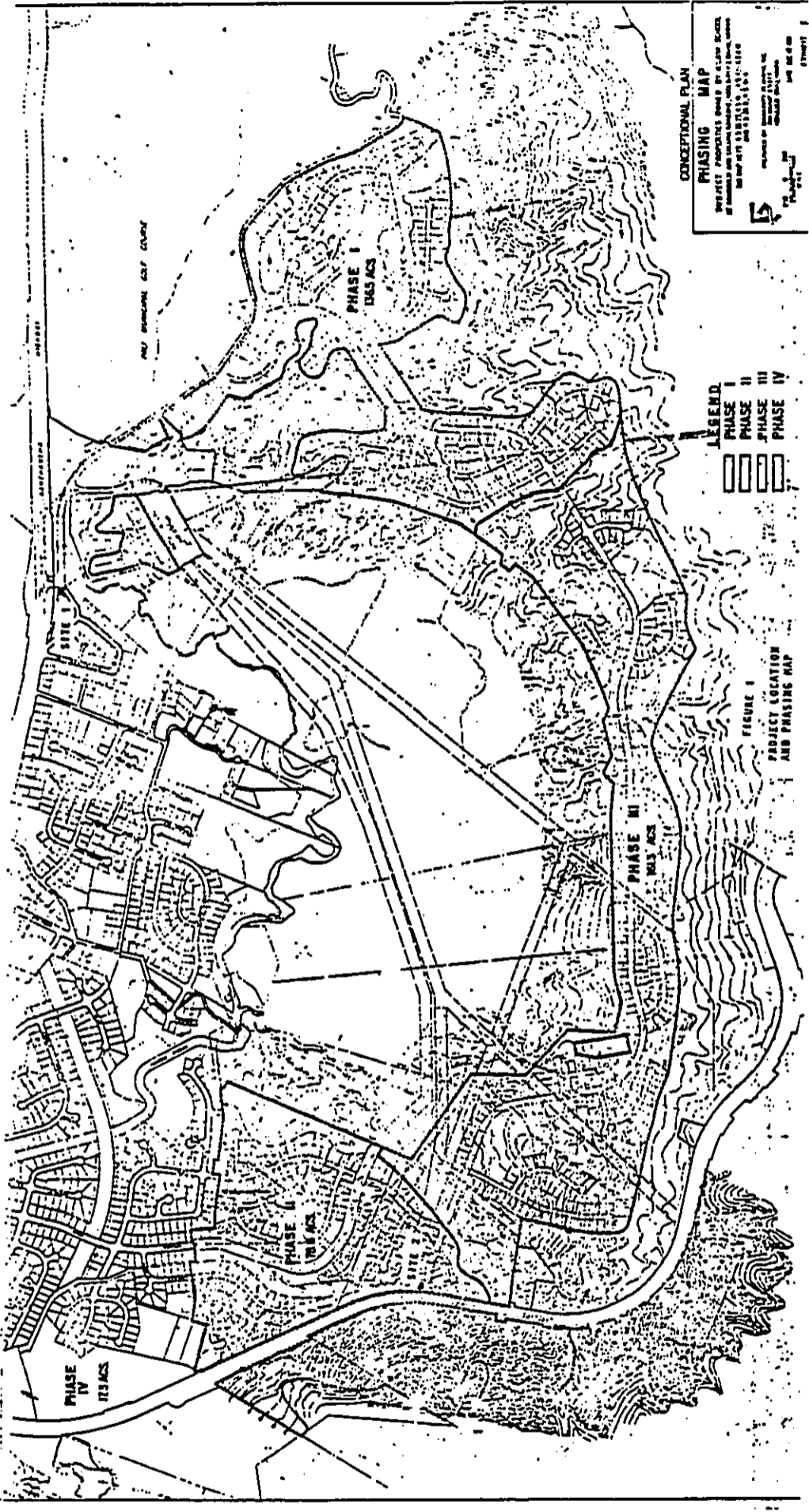
SITE	CONFIGURATION	1982	1992	2002	STATE OF HAWAII AQS	FEDERAL AQS
1	WITHOUT KAHOOALII	3.8	2.8	3.0	10	40
	WITH KAHOOALII		4.5	5.0		
2	WITHOUT KAHOOALII	4.6	3.5	3.6		
	WITH KAHOOALII		4.6	4.9		

TABLE 4

RESULTS OF 8-HOUR CARBON MONOXIDE ANALYSIS
(milligrams per cubic meter)

SITE	CONFIGURATION	1982	1992	2002	STATE OF HAWAII AQS	FEDERAL AQS
1	WITHOUT KAHOOALII	2.7	2.0	2.1	5	10
	WITH KAHOOALII		3.0	3.3		
2	WITHOUT KAHOOALII	3.2	2.4	2.5		
	WITH KAHOOALII		3.1	3.3		

NOTE: See Figure 1 for location of receptor sites.



APPENDIX C
FLORA

A BOTANICAL SURVEY OF 'IOLANI SCHOOL LANDS
PROPOSED FOR RESIDENTIAL DEVELOPMENT,
KAHE'OHE - KAILUA, O'AHU

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A BOTANICAL SURVEY OF 'IOLANI
SCHOOL LANDS PROPOSED FOR
RESIDENTIAL DEVELOPMENT,
KAHE'OHE - KAILUA, O'AHU

January, 1982

Prepared By:
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I. INTRODUCTION

The proposed project area is bordered on the east by Kionaole Road, on the south by the summit of the Ko'olau Range, on the north by Ho'omaluhia Park, and on the west by Likelike Highway and part of the Ko'olau Range. The land in the Kamo'oali'i site (Area "I") is largely uncultivated and vegetation consists of large areas of Brachyaria grassland and mixed forests. The majority of the land in the Kapalai (Area "K") and Luluku (Area "J") sites are used for raising bananas.

A botanical survey of the proposed project area was undertaken in January 1982 to map and describe the vegetation types, to inventory the flora, and to search for plants on the proposed lists of rare and endangered plants (Federal Register 1976, 1980).

II. LITERATURE REVIEW

While there are no studies that deal directly with the entire proposed project area proper, a number of studies have been done on adjacent areas and a part of the project area.

The State's proposed Interstate Highway H-3 alignment will pass through a portion of the Luluku (Area "J") site. The EIS prepared for this project (Department of Transportation 1974) gives a brief description of the vegetation types, largely banana fields, present within parts of the Luluku site.

The Corps of Engineers (1974, 1975) prepared a study of the flora for the adjacent Ho'omaluhia Park project. They found that the vegetation consisted largely of introduced species. The area, except for the steeper slopes, has been under taro, rice, pineapple, sugar or banana cultivation in the past.

III. METHODOLOGY

Prior to field investigations recent aerial maps were studied for existing roads and trails to provide access into the project area. Kionaole Road, Likelike Highway, and especially the Ho'omaluhia Access Road provided ready access into most of the study area.

An intensive walk-through survey was made of the areas proposed for residential use. The areas immediately adjacent to these sites were also surveyed as they will be indirectly affected by the disturbance of construction.

Tentative vegetation types delineated from recent aerial photographs were verified by ground check and correlated with the photographs. Boundaries of the different vegetation types were also confirmed. Notes on representative vegetation types were made and species observed in each vegetation type were recorded. Collections were made of plants which could not be positively identified in the field for later determination in the herbarium and laboratory.

IV. VEGETATION TYPES

The lands within the project area have been in use since pre-Cook times (Corps of Engineers 1974). Archeological studies conducted by Bishop Museum for the Corps of Engineers have shown that the uplands in the project area were used and then abandoned until the late 1800's when limited activities such as charcoal making (using guava wood) took place. Taro, rice, sugar cane, pineapple, and banana were grown in some parts of the project area. Today large fields of banana occupy most of the lands in the Luluku and Kapalai sites. Bracharia grassland is the most common vegetation type within the Kamo'oali'i site. The grasslands were formerly used for grazing and fences can usually be found along the peripheries of these grasslands.

Five vegetation types are recognized within the proposed project area. Introduced species form most of the dominant vegetation. The varied history of past land use by man has resulted in a mixture of different vegetation patterns. Vegetation map presented in Figure 1.

1. Banana farmland (B)

Large fields of banana are cultivated in the Luluku and Kapalai areas on the less steep slopes. A number of small streams run through the fields. A few small areas contain truck gardens. The residences of the local farmers and storage areas for farm equipment can also be found.

Guava (Psidium guajava) and Java plum (Eugenia cumini) thickets are found along the fields bordering the highway. Steeper areas within the banana fields are not cultivated. These gully areas and steep

banks usually support a mixture of tree species and shrubs. Large patches of Bracharia grassland are found in marshy, low-lying areas within the banana fields.

2. Bracharia grassland (Br-g)

Bracharia mutica or Californiagrass occurs in both well-drained areas or in low-lying, wet areas.

In the well-drained Kamo'oali'i site, extensive areas of Bracharia grassland were once used for grazing cattle; remnants of barbed-wire fencing can be found around the peripheries of these grasslands. Rather extensive patches of molassesgrass (Melinis minutiflora) are found in association with Bracharia. A few small shrubs of guava, 1 to 2 meters tall, and patches of swordfern (Nephrolepis exaltata) are found scattered throughout the grassland. In some areas scattered clumps of Java plum trees, 7 to 9 meters tall, form a cover of 30 to 40% and the grasslands become savannah-like.

Bracharia grasslands can usually be found in wet or low-lying areas within the Luluku and Kapalai sites. Standing or moving water is always found. Plant species associated with wetlands such as the primrose willow (Ludwigia octovalvis), Job's tears (Coix lacryma-jobi), and paco (Athyrium esculentum) are frequently found. The native pink hibiscus (Hibiscus youngianus) can be found along the peripheries of Bracharia grassland located across from the Ho'omaluhia Park headquarters.

3. Andropogon grassland (A-g)

Andropogon virginicus or broomsedge grassland occurs only within one site of the project area--on the well-drained slopes above the large

Brachiaria grassland located southeast of the Ho'omaluhia riding center. Neophtolepis ferns and a few scattered shrubs of guava and 'akia (Mikstroemia aff. oahuensis) are frequently found in this vegetation type.

4. Open scrubland (o-s)

Open scrubland is confined to the knolls or hilltops occurring among the mixed forests. Roughly 70% of the vegetation cover is composed of the grasses Andropogon and Paspalum orbiculare (rice-grass) and the mat-forming 'uluhe fern (Dicranopteris linearis). Strawberry guava (Psidium cattleianum), guava, and 'akia shrubs as well as small trees of Java plum, silk oak (Grevillea robusta), hala (Pandanus odoratissimus), and 'ohi'a (Metrosideros collina ssp. polynorpha), which form the remaining 30% cover, are scattered throughout the grass-'uluhe association. Extensive areas are covered with 'uluhe and scattered Java plum and 'ohi'a trees near the steep foothills at the base of the Pali.

5. Mixed forests (m-f)

The mixed forests usually consist of a mixture of several introduced tree species, 10 to 20 meters tall. Java plum is the most commonly occurring species with 30 to as much as 50% of the cover. The mixed forests also exhibit a number of variations. Sometimes almost pure stands of one species may occur. For example, in the lower Kionaole Road area, African tulip trees (Spathodea campanulata) cover a small area. The site may have at one time been occupied since numerous ornamental species such as Syngonium auritum, Philodendron andreaeanum, torch

ginger (Phaemaria magnifica), and a Heliconia species were found.

Clusters of large, old mango trees (Mangifera indica) with their rounded crowns stand out above many of the other tree species.

Large, almost impenetrable, thickets of hau (Hibiscus tiliaceus) occur in the drainage areas throughout the mixed forests.

A Java plum-hala forest association can be found in the area south of the Ho'omaluhia Park water tank.

Understory vegetation under these mixed forests consists of seedlings of the tree species present and shade tolerant herbaceous species such as shampoo ginger (Zingiber zerumbet), basketgrass (Oplismenus hirtellus), and various fern species.

V. DISCUSSION AND RECOMMENDATIONS

Due to the varied history of past land use within the project area, the vegetation consists largely of introduced species with scattered native species. Native species are usually found on the more inaccessible, steeper areas.

No rare or endangered plants were found in the sites proposed for development.

The proposed project will largely affect lands presently under banana cultivation. Most of the lands formerly used for grazing (Brachiaria grassland) in the Kamo'oali'i site will also be affected.

Since the proposed project site lies in an area of high rainfall and rugged terrain, it is recommended that grading and grubbing be kept to a minimum. Keeping vegetation removal confined to a small

VI. CHECKLIST OF VASCULAR PLANTS

scale will greatly reduce erosion and run-off problems. Areas cleared for house sites should be grassed-over as soon as possible.

The open scrubland and mixed forest parcels which lie south of the Ho'oma'uhia Park riding center and water tank may be too steep for development.

Families are listed alphabetically within each of three groups: Pteridophyta (Ferns and Fern Allies), Monocotyledonae, and Dicotyledonae. Genera and species are arranged alphabetically. Taxonomy and nomenclature of Pteridophytes follow Wagner's unpublished Checklist of Hawaiian Pteridophytes except where more commonly accepted names are used. Taxonomy and nomenclature of flowering plants follow St. John (1973) except where more commonly used names are listed. Hawaiian names used in the checklist are in accordance with St. John (1973) or Porter (1972).

For each species the following information is provided:

1. Scientific name.
2. Common name or Hawaiian name, when known.
3. Status of the species. The following symbols are employed:
E = endemic to the Hawaiian Islands, i.e., occurring naturally nowhere else in the world.
I = indigenous, i.e., native to the Hawaiian Islands but also occurring naturally elsewhere.
X = exotic, i.e., plants of accidental or deliberate introduction after the Western discovery of the islands.
P = Polynesian introduction; it includes those plants brought by the Polynesian immigrants previous to Captain Cook's discovery of the islands.

4. The presence of a particular species within each of five recognized vegetation types within the study area is indicated by a plus (+) sign. The five vegetation types recognized are:

B = Banana farmland
 Br-g = Bracharia grassland
 A-g = Andropogon grassland
 o-s = open scrubland
 m-f = mixed forests

BOTANICAL SURVEY : SPECIES CHECKLIST
 IOLANI SCHOOL LANDS - KANE'ŌHE

SCIENTIFIC NAME	COMMON NAME	STATUS	B	Br-g	A-g	o-s	m-f
PTERIDOPHYTA							
ADIANTACEAE							
<i>Pityrogramma calomelanos</i> (L.) Link	Gold fern	X	+	+	+	+	+
ATHYRIACEAE							
<i>Athyrium esculentum</i> (Retz.) Copel.	Paco	X	-	+	+	+	+
DAVALLIACEAE							
<i>Nephrolepis exaltata</i> (L.) Schott	'Okupukupu, pamoho, ni'ani'au, swordfern	I	-	+	+	+	+
GLEICHENIACEAE							
<i>Dicranopteris linearis</i> (Burm.) Undrev.	Uluha, enuha	I	-	+	+	+	+
LINDSAEACEAE							
<i>Sphenomeris chusana</i> (L.) Copel.	Fala'a, palapala'a	I	+	-	+	+	+
LYCOPODIACEAE							
<i>Lycopodium cernuum</i> L.	Waiwae-'iole, club moss	I	-	-	+	+	+
POLYPODIACEAE							
<i>Microsorium scolopendrium</i> (Burm.) Copel.	Lau'a, lauwa'a	X	-	+	+	+	+
<i>Pleopeltis thunbergiana</i> Kaulf.	Pakahakaha, 'ekaha-'akolea	E	-	-	+	+	+
PSILOTACEAE							
<i>Psilotum nudum</i> (L.) Beauv.	Hoa, pipi	I	-	-	-	+	+
THELYPTERIDACEAE							
<i>Christella dentata</i> (Forsk.) Brownsey & Jermy	Downy woodfern	X	+	+	-	-	+

BOTANICAL SURVEY : SPECIES CHECKLIST

IOLANI SCHOOL LANDS - KANE'OHE

SCIENTIFIC NAME	COMMON NAME	STATUS	B	Br-g	A-g	O-S	m-f
MONOCOTYLEDONAE							
AMARYLLIDACEAE							
<i>Crinum</i> sp.	Crinum	X	+	-	-	-	+
ARACEAE							
<i>Alocasia cucullata</i> (Lour.) G. Don	Chinese taro	X	+	-	-	-	+
<i>Alocasia macrorrhiza</i> (L.) Sweet	'Ape, apii	P	+	-	-	-	+
<i>Anthurium</i> hybrid	Anthurium	X	+	-	-	-	+
<i>Colocasia esculenta</i> var. <i>antiquorum</i> (Schott) Hubb. & Rehd.	Taro, kalo	P	+	-	-	-	+
<i>Philodendron andreaeanum</i> Devansaye	Velvet-leaf philodendron	X	-	-	-	-	+
<i>Syngonium auritum</i> (L.) Schott	Syngonium	X	-	-	-	-	+
COMMELINACEAE							
<i>Commelina benghalensis</i> L.	Hairy honohono	X	+	+	-	-	+
<i>Commelina diffusa</i> Burm. f.	Honohono	X	+	+	-	-	+
<i>Dichorisandra thyrisiflora</i> Mikan	Blue ginger	X	+	-	-	-	+
CYPERACEAE							
<i>Cyperus brevifolius</i> (Rottb.) Hassk.	Kyllinga, kili'o'opu	X	+	-	-	-	+
<i>Cyperus kyllinga</i> Endl.	White-headed kyllinga	X	+	-	-	-	+
<i>Fimbristylis dichotoma</i> (L.) Vahl.	Tall fringe rush	I	-	-	+	-	+
DIOSCOREACEAE							
<i>Dioscorea bulbifera</i> L.	Pi'oi, ho'i, bitter yan	P	-	-	-	-	+
GRAMINEAE (POACEAE)							
<i>Andropogon virginicus</i> L.	Broomsedge	X	-	-	+	+	+
<i>Axonopus compressus</i> (Sw.) Beauv.	Broad-leaved carpetgrass	X	-	+	+	+	+
<i>Brachiaria nutica</i> (Forsk.) Stapf	Californiagrass, paragrass	X	+	+	+	+	+
<i>Chloris radiata</i> (L.) Sw.	Radiate fingergrass	X	+	+	+	+	+
<i>Coix lachryma-jobi</i> L.	Job's tears, pupu-kolea	X	+	+	-	-	+
<i>Digitaria sanguinalis</i> (L.) Scop.	Large crabgrass, kukaipua'a	X	+	-	-	-	+

BOTANICAL SURVEY : SPECIES CHECKLIST

IOLANI SCHOOL LANDS - KANE'OHE

SCIENTIFIC NAME	COMMON NAME	STATUS	B	Br-g	A-g	O-S	m-f
<i>Eleusine indica</i> (L.) Gaertn.	Wiregrass, manienie-ali'i	X	+	-	-	-	+
<i>Melinis minutiflora</i> Beauv.	Molassesgrass	X	-	+	+	+	+
<i>Oplismenus hirtellus</i> (L.) Beauv.	Basketgrass, honohono-kukui	X	-	+	+	+	+
<i>Paspalum conjugatum</i> Berg.	Hilo grass, mau'u Hilo	X	+	+	+	+	+
<i>Paspalum dilatatum</i> Poir.	Paspalum grass, Dallia grass	X	+	+	+	+	+
<i>Paspalum fimbriatum</i> HBK.	Panama paspalum	X	+	+	+	+	+
<i>Paspalum orbiculare</i> Forst. f.	Ricegrass, mau'u-laiki	X	-	+	+	+	+
<i>Pennisetum purpureum</i> Schumach.	Napiergrass	X	+	+	+	+	+
<i>Pennisetum</i> sp.		X	+	+	+	+	+
<i>Sacciolepis indica</i> (L.) Chase	Glenwoodgrass	X	-	+	+	+	+
<i>Setaria glauca</i> (L.) Beauv.	Yellow foxtail	X	-	+	+	+	+
<i>Setaria palmaefolia</i> (Koen.) Stapf	Palgrass	X	-	+	+	+	+
<i>Sorghum halepense</i> (L.) Pers.	Johnson grass	X	+	+	+	+	+
<i>Sporobolus africanus</i> (Poir.) Robyns & Tourney		X	-	+	-	-	+
HELICONIACEAE							
<i>Heliconia</i> sp.		X	-	-	-	-	+
LILIACEAE							
<i>Cordyline terminalis</i> (L.) Kunth	Ti, ki	P	+	-	-	-	+
<i>Cordyline terminalis</i> var. <i>ferra</i> (L.) J. G. Baker	Red ti	X	-	-	-	-	+
MUSACEAE							
<i>Musa Xparadisica</i> L.	Banana, mai'a	P/X	+	+	-	-	+
ORCHIDACEAE							
<i>Arundina bambusaefolia</i> (Roxb.) Lindl.	Bamboo orchid	X	-	-	-	+	-
<i>Phaius tankervilleae</i> (Banks ex L'Her') Bl.		X	-	-	-	-	+
<i>Spathoglottis plicata</i> Bl.	Chinese orchid	X	+	+	+	+	+

BOTANICAL SURVEY : SPECIES CHECKLIST

IOLANI SCHOOL LANDS - KANE'OHE

SCIENTIFIC NAME	COMMON NAME	STATUS	B	Br-g	A-g	O-S	m-f
PALMAE							
<i>Roystonea elata</i> (Bartr.) Harper	Florida royal palm	X	-	-	-	-	+
PANDANACEAE							
<i>Pandanus odoratissimus</i> L. f.	Hala, pandanus, screw pine	I	-	-	+	+	+
ZINGIBERACEAE							
<i>Alpinia purpurata</i> (Vieill.) K. Schum.	Red ginger, 'awapuhi-'ula'ula	X	+	+	+	+	+
<i>Hedychium flavescens</i> Carey	Yellow ginger, 'awapuhi-melemele	X	+	+	+	+	+
<i>Phaenaria speciosa</i> (Bl.) Koord.	Torch ginger, 'awapuhi-ko'oko'o	X	-	-	-	-	+
<i>Zingiber zerumbet</i> (L.) Roscoe	'Awapuhi kua hivi, 'opuhi	P	-	-	-	-	+
DICOTYLEDONAE							
ACANTHACEAE							
<i>Odontonema strictum</i> (Nees) Ktze.	Odontonema	X	-	-	-	-	-
ANACARDIACEAE							
<i>Mangifera indica</i> L.	Mango, manako	X	+	+	+	+	+
<i>Rhus sandwicensis</i> Gray	Neneleau, Hawaiian sumach	E	+	+	+	+	+
<i>Schinus terebinthifolius</i> Raddi	Christmas berry, wileleiki	X	+	+	+	+	+
ARALIACEAE							
<i>Brassia actinophylla</i> Endl.	Octopus tree, umbrella tree	X	+	-	-	+	+
BIGNONIACEAE							
<i>Spathodea campanulata</i> Beauv.	African tulip tree	X	+	+	-	-	+
CARICACEAE							
<i>Carica papaya</i> L.	Papaya, mikaus	X	+	-	-	-	-

BOTANICAL SURVEY : SPECIES CHECKLIST

IOLANI SCHOOL LANDS - KANE'OHE

SCIENTIFIC NAME	COMMON NAME	STATUS	B	Br-g	A-g	O-S	m-f
CARYOPHYLLACEAE							
<i>Drymaria cordata</i> (L.) R. & S.	Drymaria, pipili	X	+	-	-	-	-
COMBRETACEAE							
<i>Terminalia catappa</i> L.	False kamani, tropical almond	X	-	-	-	-	+
COMPOSITAE (ASTERACEAE)							
<i>Ageratum conyzoides</i> L.	Ageratum, maile hohono	X	+	+	-	-	-
<i>Bidens pilosa</i> L.	Bidens, Spanish needle, ko'oko'olau	X	+	+	-	-	-
<i>Crassocephalum crepidioides</i> (Benth.) S. Moore		X	+	+	-	-	-
<i>Eclipta alba</i> (L.) Hassk.	False daisy	X	+	+	-	-	-
<i>Elephantopus mollis</i> HBK.	Elephant's foot	X	+	+	-	-	-
<i>Emilia javanica</i> (Burm. f.) C. B. Robins.	Red pualele	X	+	+	-	-	-
<i>Emilia sonchifolia</i> (L.) DC.	Lilac pualele	X	+	+	-	-	-
<i>Erechtites hieracifolia</i> (L.) Raf.	Fireweed	X	+	+	-	-	-
<i>Erigeron canadensis</i> L.	Flasbana, horseweed	X	+	+	-	-	-
<i>Eupatorium riparium</i> Regel	Paukani	X	+	+	-	-	-
<i>Pluchea odorata</i> (L.) Cass.	Pluchea, shrubby fleabane	X	+	+	-	-	-
<i>Siegesbeckia orientalis</i> L.	Siegesbeckia	X	+	+	-	-	-
<i>Sonchus oleraceus</i> L.	Sow-thistle, pualele	X	+	+	-	-	-
<i>Synedrella nodiflora</i> (L.) Gaertn.	Synedrella	X	+	+	-	-	-
<i>Vernonia cinerea</i> (L.) Less.	Ironweed	X	+	+	-	-	-
<i>Wedelia trilobata</i> (L.) Hitchc.	Wedelia	X	+	+	-	-	-
<i>Youngia japonica</i> (L.) DC.	Oriental hawkbeard	X	+	+	-	-	-
CONVOLVULACEAE							
<i>Ipomoea alba</i> L.	Moon flower, koalipahu	X	+	-	-	-	-
<i>Ipomoea cairica</i> (L.) Sweet	Koali	I	-	+	-	-	-
<i>Ipomoea triloba</i> L.	Little bell	X	+	-	-	-	-

BOTANICAL SURVEY : SPECIES CHECKLIST

IOLANI SCHOOL LANDS - KANE'OHE

SCIENTIFIC NAME	COMMON NAME	STATUS	B	Br-g	A-g	O-S	m-f
CRUCIFERAE (BRASSICACEAE)							
<i>Nasturtium sarmentosum</i> (DC.) Schinz & Guillaumin	Pa'ihii, 'ihii-ku-kepau	P	+	-	-	-	-
EUPHORBIACEAE							
<i>Aleurites moluccana</i> (L.) Willd.	Kukui, tutui, candlenut tree	P	+	+	+	+	+
<i>Codiaeum variegatum</i> (L.) Bl.	Croton	X	+	+	+	+	+
<i>Euphorbia glomerifera</i> (Millsp.) L. C. Wheeler		X	+	+	+	+	+
<i>Euphorbia hirta</i> L.	Garden spurge, hairy spurge	X	+	+	+	+	+
<i>Euphorbia prostrata</i> Ait.	Prostrate spurge	X	+	+	+	+	+
<i>Phyllanthus debilis</i> Willd.	Phyllanthus weed	X	+	+	+	+	+
<i>Ricinus communis</i> L.	Castor bean, koli	X	-	+	-	-	-
GOODENIACEAE							
<i>Scaevola gaudichaudiana</i> Cham.	Naupaka-kuahivi	E	-	-	-	+	+
LABIATAE (LAMIACEAE)							
<i>Hyptis pectinata</i> (L.) Poit.	Coab hyptis	X	+	-	-	-	-
LAURACEAE							
<i>Persea americana</i> Mill	Avocado	X	+	-	-	-	+
LEGUMINOSAE (FABACEAE)							
<i>Cassia leschenaultiana</i> DC.	Partridge pea, lauki	X	-	+	+	+	+
<i>Crotalaria incana</i> L.	Fuzzy rattlepod	X	+	+	+	+	+
<i>Desmanthus virgatus</i> (L.) Willd.	Virgate mimosa	X	+	+	+	+	+
<i>Desmodium triflorum</i> (L.) DC.	Three-flowered beggarweed	X	+	+	+	+	+
<i>Desmodium uncinatum</i> (Jacq.) DC.	Spanish clover	X	+	+	+	+	+
<i>Indigofera suffruticosa</i> Mill.	Indigo, 'iniko	X	+	+	+	+	+
<i>Leucaena leucocephala</i> (Lam.) de Wit	Koa-haole	X	+	+	+	+	+
<i>Lotus</i> sp.		X	+	+	+	+	+
<i>Mimosa pudica</i> var. <i>unijuga</i> (Duchass. & Walp.) Griseb.	Sensitive plant, pua-hila-hila	X	+	+	+	+	+
<i>Peltophorum inerme</i> (Roxb.) Naves	Yellow poinciana	X	-	+	-	-	-

BOTANICAL SURVEY : SPECIES CHECKLIST

IOLANI SCHOOL LANDS - KANE'OHE

SCIENTIFIC NAME	COMMON NAME	STATUS	B	Br-g	A-g	O-S	m-f
LYTHRACEAE							
<i>Cuphea carthagenensis</i> (Jacq.) Macbride	Cuphea, puakanoli	X	+	+	+	+	+
MALVACEAE							
<i>Hibiscus tiliaceus</i> L.	Hau	I	+	+	+	+	+
<i>Hibiscus youngianus</i> H. & A.	Hau-hale, 'akiohala, native pink hibiscus	E	-	+	+	+	+
<i>Malvastrum coromandelianum</i> (L.) Garcke	False mallow, hauuoi	X	+	-	-	-	-
<i>Sida meyaniana</i> Walp		E	-	+	-	-	-
MELASTOMATACEAE							
<i>Dissotis plumosa</i> Hook. f.	Dissotis	X	-	-	-	-	+
MORACEAE							
<i>Artocarpus altilis</i> (Parkins. ex Z) Fosb.	'Ulu, breadfruit	P	+	-	-	-	+
<i>Ficus microcarpa</i> L. f.	Chinese banyan	X	-	+	-	-	+
MYRSINACEAE							
<i>Ardisia crispa</i> (Thunb.) A. DC.	Hens eyes, Hilo holly	X	-	-	-	-	+
MYRTACEAE							
<i>Eucalyptus</i> sp.	Eucalyptus, gum tree, pale- piwa	X	-	-	-	-	+
<i>Eugenia cumini</i> (L.) Druce	Java plum, palama	X	+	+	+	+	+
<i>Eugenia jambos</i> L.	Rose apple, 'ohi'a-loke	X	+	+	+	+	+
<i>Eugenia malaccensis</i> L.	'Ohii'a-'ai, mountain apple	P	-	-	-	+	+
<i>Metrosideros collina</i> ssp. <i>polymorpha</i> (Gaud.) Rock	'Ohii'a-lehua, 'ohii'a	E	-	-	-	+	+
<i>Psidium cattleianum</i> Sabine	Strawberry guava, waiawi- 'ulu'ula	X	+	+	-	+	+
<i>Psidium cattleianum</i> f. <i>lucidum</i> Deg.	Yellow strawberry guava, waiawi	X	-	-	-	-	+

BOTANICAL SURVEY : SPECIES CHECKLIST
 IOLANI SCHOOL LANDS - KANE'OHE

SCIENTIFIC NAME	COMMON NAME	STATUS	B	Br-g	A-g	O-S	m-f
<i>Psidium guajava</i> L.	Guava, kuava	X	+	+	+	+	+
ONAGRACEAE							
<i>Ludwigia octivalvis</i> (Jacq.) Raven	Primrose willow, kamole	I	-	+	-	-	-
OXALIDACEAE							
<i>Oxalis corniculata</i> L.	Yellow wood sorrel, 'ihi	I	+	-	-	-	+
<i>Oxalis maritima</i> Zucc.	Pink wood sorrel, 'ihi pehu	X	+	-	-	-	+
PASSIFLORACEAE							
<i>Passiflora edulis</i> f. <i>flavicarpa</i> Deg.	Yellow liliko'i	X	+	-	-	-	-
<i>Passiflora ligularis</i> Juss.		X	-	-	-	-	++
<i>Passiflora</i> sp.		X	-	-	-	-	++
PLANTAGINACEAE							
<i>Plantago virginica</i> L.	Dwarf plantain	X	+	-	-	-	-
PORTULACACEAE							
<i>Portulaca oleracea</i> L.	Pigweed, common purslane	X	+	-	-	-	-
PROTEACEAE							
<i>Grevillea robusta</i> A. Cunn.	Silk oak, 'oka-kilika	X	+	-	-	+	-
ROSACEAE							
<i>Rubus rosasfolius</i> Sm.	Thimbleberry, roseleaf raspberry	X	-	+	-	-	-
RUBIACEAE							
<i>Borreria laevis</i> (Lam.) Griseb.	Buttonweed, spermacoco	X	+	+	-	+	+
<i>Morinda citrifolia</i> L.	Noni	P	+	+	-	+	+
<i>Paeperia foetida</i> L.	Maile pilau, stink vine	X	+	+	-	+	+

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BOTANICAL SURVEY : SPECIES CHECKLIST
 IOLANI SCHOOL LANDS - KANE'OHE

SCIENTIFIC NAME	COMMON NAME	STATUS	B	Br-g	A-g	O-S	m-f
SOLANACEAE							
<i>Solandra hartwegi</i> N. E. Br.	Cup of gold, golden cup	X	+	-	-	-	+
<i>Solanum nigrum</i> L.	Black nightshade, popolo	I?	+	-	-	-	-
THYMELAEACEAE							
<i>Wikstroemia</i> aff. <i>oahuensis</i> (Gray) Rock	'Akia	E	-	-	+	+	+
TILIACEAE							
<i>Triumfetta semitriloba</i> (L.) Jacq.	Bur bush	X	-	+	-	-	+
UMBELLIFERAE (APIACEAE)							
<i>Centella asiatica</i> (L.) Urban	Asiatic pennywort, pohékula	X	+	+	+	+	+
URTICACEAE							
<i>Pilea microphylla</i> (L.) Liemb.	Rockweed, artillery plant	X	+	-	-	-	-
VERBENACEAE							
<i>Citharexylum spinosum</i> L.	Fiddlawood	X	+	+	-	+	+
<i>Stachytarpheta jamaicensis</i> (L.) Vahl	Oi, ovi	X	+	+	-	+	+
<i>Stachytarpheta urticifolia</i> Sims	Oi, ovi	X	+	+	-	+	+
<i>Verbena litoralis</i> HBK.	Weed verbena, ha'uovi	X	+	+	-	+	+

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Figure 1. Vegetation map. Approximate boundaries of proposed residential areas are indicated by heavy line.

B = Banana farmland
Br-g = Brachiaria grassland
A-g = Andropogon grassland
o-s = open scrubland
m-f = mixed forests

APPENDIX D
FAUNA

GENERAL VEGETATION AND TOPOGRAPHY

Although some koa (Acacia koa) trees have been planted in the park itself, there is very little, native vegetation in the park or on the proposed construction sites. A detailed list of this vegetation will be prepared by Ms. Winona Chat, but certain comments are necessary in order to understand the comments on birds that will follow. Some of the more conspicuous introduced plants in the area include Christmas berry (Schinus terebinthifolius), koa haole (Leucaena glauca), guava (Psidium guajava), mango (Mangifera indica), Java plum (Eugenia cuminii), octopus tree (Brassia actinophylla), sensitive plant (Mimosa pudica), Jamaica vervain (Stachytarpheta jamaicensis), ginger, and a wide variety of grasses (e.g., California, molasses, foxtail, etc.). Kukul or candlenut trees (Aleurites moluccana) are widely scattered in the park area but grow most profusely at the higher elevations primarily maoka of the proposed construction sites. Hau (Hibiscus tiliaceus) and pandanus (Pandanus odoratissimus) are widely distributed in the region.

Much of the area consists of rolling land but there also are some steep gullies. The flat land closest to the HECO substation consists of a parklike area with little undergrowth and with java plum trees being a dominant species there. An extensive grassland area west of that site consists of a wide variety of introduced grasses. Banana is the dominant plant in the Luluku area "J". There is, therefore, no semblance of any native ecosystem in the park itself or on the proposed construction sites.

BIRDS

I. Endemic Species

I neither saw nor heard any endemic bird species on or near the proposed construction sites. Only a few endemic forest bird species remain on Oahu and there really is no habitat for them on the proposed construction sites.

BIRD AND MAMMAL REPORT
FOR THE PROPOSED
IOLANI SCHOOL PROJECT

November 1981

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Honolulu, Hawaii 96822

II. Indigenous Species

These are birds that spend their breeding season in Alaska or Siberia and winter on islands in the Pacific Ocean. Only one of these wintering shorebirds would be expected in the study area.

Order Charadriiformes

Family Charadriidae

Pacific Golden Plover (*Pluvialis dominica fulva*)

This plover is a common winter resident on all of the Hawaiian Islands and it is found from sea level to at least 10,000 feet elevation on Maui and Hawaii. This species inhabits pastures, golf courses, city lawns, cutover sugarcane fields, and other disturbed or weedy areas as long as there are open spaces. I saw only one plover during my field work, thus suggesting that the project area so does not provide much foraging for this winter visitor.

III. Introduced Species

More than 170 different species of birds have been introduced to the Hawaiian Islands since 1796 (Berger, 1981). Approximately 50 species have become established. I identified the following on or adjacent to the proposed construction sites.

A. Order Ciconiiformes

Family Ardeidae

1. Cattle Egret (*Bubucus ibis*).

This species was imported to Hawaii from Florida to aid "in the battle to control house flies, horn flies, and other flies that damage hides and cause lower weight gains in cattle" (Breese, 1959). A number of Cattle Egrets were released on Oahu in 1959 and 22 additional birds were released during July 1961. It has been estimated that 2,000 Cattle Egrets now roost in trees on Kaneohe Marine Corps Air Station (Berger, 1981). I saw one Cattle Egret near the park headquarters buildings.

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B. Order Columbiformes

Family Columbidae

2. Lace-necked or Spotted Dove (*Streptopelia chinensis*).

This Asian dove was introduced to the Hawaiian Islands at an early date; the exact date is unknown, but the birds are said to have been very common on Oahu by 1879 (Carr, 1933). The species is still common on all islands and is classified as a game bird. Although this species occurs where rainfall exceeds 100 inches per year, the highest densities are found in drier areas where the introduced kiawe (mesquite) is one of the dominant plants. Schwart and Schwartz (1949), for example, reported densities as great as 200 birds per square mile in dry areas on Molokai. Although far less common than that in the study area, this large dove is widely distributed except in densely wooded areas at the higher elevations.

3. Barred Dove (*Geopelia striata*)

This species is called the Zebra Dove in its native habitat in Australia. This dove is said to have been introduced to Hawaii sometime after 1922 (Bryan, 1958). It is now common to abundant on all of the main islands in the chain. The Barred Dove also prefers the drier areas where seeds are abundant. Schwartz and Schwartz (1949) reported densities as high as 400 to 800 birds per square mile in some areas on Oahu (e.g. Barbers Point to Makaha). Flocks of 10 to 15 birds were flushed repeatedly from the weeds along the margins of the banana patches.

C. Order Strigiformes

Family Tytonidae

4. Barn Owl (*Tyto alba pratincola*)

The first Barn Owl was imported from California and released on Hawaii Island in 1958. Birds were released at Hualala, Oahu, on two different occasions. Seven birds were imported from the San Diego Zoo and released during September 1959; 11 additional owls were imported

3

from the San Antonio Zoo, Texas, and released during October 1960 (Tomich, 1962). The Barn Owls were introduced in the hopes that they would prey upon the rats that were causing losses in sugarcane fields. No food habits study of the Barn Owls on Oahu have been conducted. On Hawaii, Tomich (1971) found that almost 90 percent of Barn Owl pellets contained only the remains of house mice. Barn Owls are nocturnal in habits, and I did not see any during my daytime field trips. It is quite possible, however, that one or more pairs feed over the area at night.

D. Order Passeriformes

Family Timaliidae

5. Melodious Laughing-thrush (Garrulax canorus)

This species, which is a babbler and not a thrush, was introduced to Hawaii from China or Formosa as a cage bird many years ago. "A number obtained their freedom at the time of the great fire in the Oriental quarter of Honolulu in 1900, and took to the hills behind the city" (Caum, 1933). No detailed study of this babbler has been made on Oahu, so that little is known about its distribution or abundance (Berger, 1981). It now occurs, however, in both the Waianae and the Koolau mountains. It seems to prefer the wetter areas where there are thickets and clumps of vegetation. The birds have a loud, attractive song, and they are more often heard than seen. This laughing-thrush is widely distributed along the Pali and I heard several birds' song and call from the more wooded areas of the project area.

Family Pycnonotidae

6. Red-vented Bulbul (Pycnonotus cafer)

The source of these birds in Hawaii is unknown. Several birds were first reported on the Oahu Plantation at Waipahu in 1966 (Elepaio, 27:55); by June of the following year, birds were seen near Fort Shafter, in Kailua, and at the Bellows Air Force Station (Berger, 1981). The members of this family are included in the "prohibited entry" list of the State Department of Agriculture, but this species is now a very

common bird. Berger (1975a) summarized the distribution and spread of this bulbul on Oahu as of 1975. More than 1,100 Red-vented Bubbles were counted on the Audubon Society's 1980 Christmas Count. This bulbul was the most conspicuous species during my field trips in the park and at the proposed construction sites. It may well be more common in these areas than is the Japanese White-eye. Bubbles are largely fruit eaters and they often become pests in fruit-growing areas.

Family Turdidae

7. Shama (Copsychus malabaricus)

According to Caum (1933), this attractive thrush was first released on Oahu by the Hui Manu in 1932; Bryan (1958) said that this species was introduced to Kaula in 1931 and that it was established on that island and in the Tantalus region of Oahu. Although no study has been made of the distribution and abundance of this thrush on Oahu, it is now widely distributed on both sides of the Koolau Range. The birds are noted both for their attractive plumage and for their beautiful singing. Shama thrushes typically prefer dense vegetation, and they are more often heard than seen. In areas frequented by people (for example Waianae Falls Park, Paradise Park), however, the birds often perch in full view. The Shama is found throughout the slopes on the windward side of the Pali.

Family Sylviidae

8. Japanese Bush Warbler (Cettia diphone cantana)

This warbler, which is native to Japan and Formosa, was first released on Oahu in 1929. No detailed study of this species has ever been made in Hawaii but it is now found in scattered areas in both the Waianae and the Koolau mountain ranges, where the birds prefer dense undergrowth in moderate to very wet areas (Berger, 1975b). The birds are very conspicuous during the period of the year when they sing and inconspicuous when they do not sing. I identified only one bush warbler but assume that they are generally distributed at the higher elevations.

Family Zosteropidae

9. Japanese White-eye (Zosterops japonicus)

Caus (1933) wrote that the Japanese White-eye was first imported from Japan to Oahu by the Territorial Board of Agriculture and Forestry in 1929. Later importations were made by the Hui Manu and by private individuals. The White-eye rivals the House Sparrow and the European Starling in North America as a successful exotic species, and the White-eye now is undoubtedly the most common passerine species in Hawaii. It is found from sea level to tree line (on Maui and Hawaii) and it is found in the driest and the wettest habitats in the Hawaiian Islands. White-eyes were conspicuous throughout the project sites and the park.

Family Sturnidae

10. Common Indian Hyna (Acridothera tristis)

The Common Indian Hyna is native to Ceylon, India, Nepal, and adjacent regions. It was introduced from India in 1865 by Dr. William Hillebrand to combat the plague of gray worms that was ravaging the pasture lands of the islands. It has spread and multiplied to an amazing extent; reported to be abundant in Honolulu in 1879, it is now extremely common throughout the territory" (Caus, 1933). The Hyna is still common to abundant in lowland areas, being most common in residential and urban areas as well as in the vicinity of human habitation in rural areas. Hynas occur in the park, in some of the project sites, and around the edges of the banana patches.

Family Ploceidae

11. Ricebird or Spotted Munia (Lonchura punctulata)

This Asian species also was released in Hawaii by Dr. Hillebrand about 1865 (Caus, 1933). Caus wrote that the Ricebird "feeds on the seeds of weeds and grasses and does considerable damage to green rice." Although rice is no longer grown in Hawaii, the Ricebird has become a serious pest by eating the seeds of sorghum. For example, "A report by the Senate Committee on Ecology, Environment, and Recreation says

that rice birds and linnets caused a 30 to 50 percent loss in the sorghum fields at Kailua on Kauai last year seed-eating birds at Kohala ate about 50 tons of sorghum grain in a 30-acre experimental field that was expected to produce 60 tons" (Honolulu Advertiser, March 14, 1972, p. B-2). Ricebirds are common in any open areas where there are weed seeds or grains, such as along roads and the edges of banana patches. They do not occur, therefore, in the proposed construction sites that are now covered with heavy vegetation.

12. House Sparrow (Passer domesticus)

The House Sparrow (also called the English Sparrow) was first imported to Oahu in 1871 when nine birds were brought from New Zealand (where the species had previously been introduced from England.) Caus (1933) wrote that "whether or not there were further importations is not known, but the species was reported to be numerous in Honolulu in 1879." The House Sparrow in North America (first introduced to Brooklyn, New York, in 1952) became a serious pest and tens of thousands of dollars were spent attempting to control the population--without much success. The House Sparrow, however, apparently never became a serious pest in Hawaii; it is omnivorous in diet, eating weed seeds as well as insects and their larvae; therefore, they are at least partly beneficial in food habits. House Sparrows typically are associates of man and his buildings, so that the birds are uncommon in the study areas.

Family Fringillidae

13. Cardinal (Cardinalis cardinalis)

This is the Red Cardinal, Kentucky Cardinal, or Virginia Cardinal of the eastern part of North America. The Cardinal was released several times in Hawaii between 1929 and 1931 (Caus, 1933). The Cardinal is a common species in both urban and rural areas and in both wet and dry areas. The Cardinal is widely distributed in the project sites.

14. House Finch (Carpodacus mexicanus frontalis)

The House Finch was introduced to Oahu from California "prior to 1870, probably from San Francisco" (Carr, 1933). It is sometimes called the Papayabird in Hawaii, and, incorrectly the "linnet." This is an abundant species in both urban and rural areas, and probably is the second most common passerine bird in the Hawaiian Islands. Although House Finches do eat overripe papaya at times, the birds are primarily seed-eaters, hence their devastating effects on the experimental sorghum crops or on any other small grains. The House Finch does not inhabit dense forests but is common through grasslands or park-like forests of the proposed construction sites.

MAMMALS

The only endemic land mammal in Hawaii is the Hawaiian bat (Lasiurus cinereus). Kramer (1971) wrote that "to date, it appears that the Hawaiian bat occurs primarily on the island of Hawaii, and appears only irregularly on the islands of Maui, Oahu, and Kauai." For Maui, Oahu, and Kauai, "the bats seem to appear only during the months from August to December." I did not see any bats in the study area, nor did I expect to find any there.

All other land mammals in Hawaii are introduced species and most of them are serious pests. This includes the three nocturnal rodents that are discussed below.

- i. Roof rat or black rat (Rattus rattus). This rat reached the Hawaiian Islands on sailing vessels during the 19th century; three different color types occur in Hawaii. The roof rat is very common and is found from sea level well up into the mountains (as high as 9,800 feet on Haleakala, Maui). They are primarily nocturnal in habits and I did not see any during my field work. Roof rats are serious predators on the eggs and young of tree-nesting birds in Hawaii (Atkinson, 1977; Berger, 1981).

2. Polynesian or Hawaiian rat (Rattus exulans). The early Polynesians are presumed to have brought, inadvertently, this rat with them. The species is known to occur from sea level into the mountains (Tomich, 1969). This rat occurs in both native and introduced forests, grassy gulches, and shrub-grown areas. This species, too, is primarily nocturnal in habits, and, even though I did not see any, they undoubtedly inhabit this region.

3. House mouse (Mus musculus). The date of introduction of the house mouse to Hawaii is unknown, but it is said to have been common by 1825. It "can be found inhabiting almost every biotic community that occurs from sea level to at least 6,500 feet" (Kraemer, 1971). It is ubiquitous around human habitation, and, in Hawaii, also is found in sugarcane fields, fallow fields, and in forests and scrub-land in fairly wet areas. I did not attempt to determine the distribution of the house mouse by trapping because of its general distribution in the islands and because its occurrence is not significant with regard to an environmental impact statement.

4. Small Indian Mongoose (Herpestes erpuncatus). The mongoose was first imported to the Hawaiian Coast of Hawaii during September 1883, to combat rats in the sugarcane fields. They were imported to Oahu and other islands about 1888. The mongoose is an abundant pest on all of the islands today, and is found from sea level to the highest mountain peaks on Oahu. Being diurnal in habit, they are often seen crossing roads. I saw an adult female with a small young.

SUMMARY

There are no endangered Hawaiian birds or other vertebrate animals either on or adjacent to the proposed construction sites and roads for the Iolani Schools project, nor is the vegetation that of an endemic or native ecosystem. All of the 14 species of birds identified in the region are introduced species, several of which have already proven to be pest species. Ricebirds and House Finches have caused considerable damage to experimental sorghum crops; bulbuls and white-eyes have caused damage to small fruits and/or to flower buds; mynas, doves, and the white-eye especially, have been shown to carry blood and other parasites that can be transmitted to endemic species or to domestic chickens; fungus that grows in the accumulated droppings at roosts of mynas also poses a public health problem because some species of fungus cause serious human diseases. Hence, the possible effects of any construction on these introduced species should not be considered a detrimental effect. Moreover, clearing and the development of residential areas actually would increase the habitat for certain of the introduced bird species.

Because there are no endemic mammals (or amphibians or reptiles) in the project areas, those that are present are introduced species and all are serious pests on native birds and on man and his products: the two species of rats and the mouse cause great damage to agriculture as well as in homes and industrial plants, and the rats prey on both ground-nesting and tree-nesting birds. Their "welfare," therefore, should be irrelevant to an environmental impact statement.

In brief, therefore, there is no way in which the proposed development project can have a detrimental effect on any endemic animal or on any native ecosystem. Its effect on any introduced species would be irrelevant, in part because many of the introduced species are now pests or are potential pests with changing agricultural practices.

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CHINIAO INC.

Archaeological Consulting

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1040 B Smith Street Room #7 Honolulu, Hawaii 96817

January 15, 1981

Mr. Fred Rodriguez
Environmental Communications Inc.
1152 Bishop Building, Room 407
Honolulu, Hawaii 96813

Dear Mr. Rodriguez:

We have completed a literature search and walk-through reconnaissance survey of the Iolani School lands adjacent to the Ho'omaluhia Park at Kaneohe, Oahu.

Previous archaeological investigations in adjacent areas have been reported on in a 1976 Bernice P. Bishop Museum publication entitled Archaeological Investigations in Upland Kaneohe edited by Paul H. Rosendahl, a 1976 report entitled Archaeological Reconnaissance Survey of the Windward Portion of Route H-3 by Paul Cleghorn and Elaine Rogers-Jourdane, and a 1977 manuscript entitled Archaeological Phase I Survey of The Windward Portion of Proposed Interstate H-3: Halekolu Interchange to Windward Portal of Koolau Tunnel, Oahu by Thomas Dye.

In the Rosendahl volume McCoy reported on a brief field reconnaissance and noted the presence of archaeological sites on the border of the Iolani School lands. These are indicated on the enclosed map as Sites 53, 54, and 56 through 65, and consist of terrace complexes, rock mounds, a stone alignment, a retaining wall and an oven for manufacturing charcoal.

The Cleghorn and Rogers-Jourdane report notes the discovery of two tentatively prehistoric sites in or near the project area, indicated on the map as Sites 68 and 71. Later investigations, described in Dye's report, determined that Site 68 is of no archaeological value, and that Site 71, which is outside of the present project area, might contain human burials.

Our field reconnaissance determined that the archaeological cluster discussed in Rosendahl's report is still present and apparently extends into our project area. No new sites were discovered, but the brevity of our effort did not allow a complete survey of the property.

In conclusion, both the literature search and the field inspection have indicated a high likelihood that significant archaeological sites are situated in the project area. There

is a virtually 100% probability that the site cluster reported by McCoy extends into the Iolani School lands, and its existence suggests strongly that other such clusters will be found. We recommend, therefore, that intensive archaeological surveys be conducted in all project areas before any construction begins.

Sincerely yours,



William Barrera, Jr.
President

JAN 15 1982

**APPENDIX F
TRAFFIC**

I. PROJECT DESCRIPTION

Community Planning, Inc. has been authorized to prepare for Iolani School preliminary development plans for approximately 383.8 acres out of the total of 975.6 acres located at Kamooolii, Kaneohe. This analysis takes into consideration the topography of land the proposed right-of-way for the Interstate H-3 Highway, access roads, streams and gulches. Based on this study, it is determined that approximately 381.4 acres could be urbanized and 186.0 acres developed for residential and park uses. Included in the 383.8 acres are approximately 197.8 acres for roadways, drainageways, open space and right-of-way for the Interstate Highway H-3 as noted on Exhibit D. Approximately 971 units of mixed residential use, including single-family, duplex and townhouse units could be developed. The estimated population for this proposed development of 971 units is 2,900 people. It is intended to use the land of the Kamooolii project to the maximum economic potential. This goal may be achieved by developing internal street patterns and external access roads which are in harmony with the traffic capacity of the ultimate street and highway network serving this project and adjacent areas. However, the owner/developer visualizes that the overall development should be planned and geared to meet the immediate needs and long-term demand for housing, and the

ACCESS STUDY FOR THE
PROPOSED KAMOOLII DEVELOPMENT
KANEHOE, KOOLAUPOKO, OAHU, HAWAII
TAX MAP KEYS: 4-5-25: 23; 4-5-41: 1;
4-5-42: 1, 6, 8 AND 10
OWNER: IOLANI SCHOOL

PREPARED BY
COMMUNITY PLANNING, INC.
700 BISHOP STREET, SUITE 603
HONOLULU, HAWAII

FEBRUARY 1983 (REVISED)

II. PURPOSE OF REPORT

The purpose of this traffic study for Phase I includes:

- A. The development of the traffic generating characteristics of the project based on the preliminary land use plans
- B. The evaluation of access routes between the project and the existing and proposed network of streets, highways and major thoroughfares
- C. The evaluation of the impact of the traffic generated by Phase I of the Kamoaalii project upon the network of access road to the project

III. TRAFFIC ANALYSIS

Phase I

- A. Two major highways provide access to the project site. They are Kamehameha and Pali Highways. A service road off the Halekou Interchange on Interstate Highway H-3 will provide access to the subject property from Kamehameha Highway.
Under the program to develop Phase I containing 201.4 acres adjacent to the Pali Golf Course, Kionaole Road will serve as the primary access to Kamehameha Highway, the major traffic route serving the parcel of land proposed for development.
Under this phase of development, consideration is given to the proposed right-of-way for Interstate Highway H-3; but because the time for completion of the construction

time required for implementing the project proposes the development of the property in two phases with due consideration given to the fact that the construction of the Interstate Highway H-3 will become a reality in accordance with plans approved by the State Department of Transportation. Also, it should be noted on Exhibit D the H-3 Highway bisects the developable property of 383.8 acres so that Phase I of the development will have access over Kionaole Road onto Kamehameha Highway and for Phase II, access will be at a permitted point onto Likelike Highway and/or via Lulukū Road within the Keapuka Subdivision.

Phase I

Phase I is the subject matter of the petition to the State Land Use Commission for urbanization at this time. Hence, the traffic analysis as submitted in this report deals with the boundary amendment of Phase I comprising an area of 201.4 acres from conservation to urban; and if so reclassified, the property will be developed for residential purposes. A total of 611 residences consisting of 259 single-family units, 82 duplex units and 270 townhouses are planned. Located alongside Pali Golf Course, Phase I of the project site also abuts a portion of the Ho'omaluhia Park. The land slopes generally from north to south and a majority of the area has slopes of under 20 percent. Those areas in excess of 20 percent slope are generally ridges and gulches which form natural drainage areas and open space.

is uncertain at this time, this analysis is based on assessing the traffic impact on the existing street and highway system.

An analysis was made of the traffic volume for Kamehameha between Halekou Road and Likelike Highway and Kaneohe Bay Drive, and Kamehameha Highway between Kionaole Road and Castle Junction to determine the impact the traffic from the Kamaoalii development will have upon Kamehameha Highway.

1. Kamehameha Highway: Halekou Road to Likelike Highway-Kaneohe Bay Drive

It is assumed that for this portion of the analysis, traffic originating from Phase I of the development of 611 units will use Kionaole Road as the major access to Kamehameha Highway.

- a. 24-Hour Projections

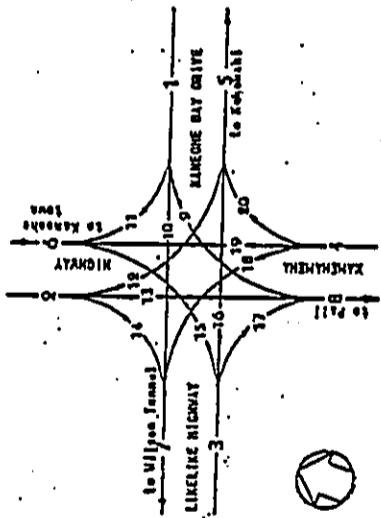
The total existing average daily traffic volume on Kamehameha Highway between Kionaole Road and the Kaneohe Bay Drive-Likelike Highway intersection is 24,660 vehicles. This average count on Kamehameha Highway is based on volumes taken in 1979 and 1980 as noted below:

Kamehameha Highway at Halekou Road		Kamehameha Highway at Likelike Highway and Kaneohe Bay Drive*	
24 Hr	PM Peak	24 Hr	PM Peak
Northbound	11,560	14,690	1,390
Southbound	10,630	12,440	1,060
	22,190	27,130	2,320

Average = 24,660 vehicles per day

*See 1980 turning movement counts on Table 1, page 5A.

KAMEHAMEHA HIGHWAY AT LIKELINE HIGHWAY AND KANEHOE BAY DRIVE
 TRAFFIC MOVEMENT COUNT
 DECEMBER 1980



Movement	24-HR	AH Peak	PH Peak
1	12,387	1,107	804
2	14,272	1,211	863
3	14,029	1,798	1,457
4	14,685	1,096	1,394
5	13,645	962	1,092
6	14,209	797	1,504
7	15,078	1,567	860
8	12,441	886	1,062
9	2,117*	162	163
10	7,204*	774	398
11	3,066*	171	243
12	4,603*	337	281
13	6,651*	514	510
14	3,018*	360	72
15	2,892*	129	377
16	7,148*	459	691
17	3,989*	210	389
18	5,051*	433	390
19	8,078*	497	884
20	1,556*	166	120

*Projected

The design capacity of Kamehameha Highway, a 4-lane divided highway, for the section between Kionaole Road and the Kaneohe Bay Drive and Likeline Highway intersection is 38,400 vehicles per day (VPD), based on the premise that this type of roadway is capable of handling 800 vehicles per hour per lane for a 12-hour day under conditions of level of Service "C" for stable flow. Kamehameha Highway now has an average daily traffic flow of 24,660 cars, the remaining existing capacity is 13,740 VPD (38,400 VPD - 24,660 VPD).

Based on a daily generation rate of 6.3 external trips per unit, the proposed 611 units of Phase I will generate some 3,855 daily vehicle trips from the Kamaoalii development. Kamehameha Highway between Kionaole Road and Kaneohe Bay Drive-likelike Highway can accommodate traffic for the planned 611 units and still have capacity for additional 9,885 vehicles per day (13,740 VPD - 3,855 VPD).

b. Peak Hour Projections

In order to adequately assess the impact of additional traffic generated from proposed 611 units of Phase I during the peak hour, the following projections are made. All peak hour trips are assumed to be headed in one direction, and 10 percent or 390 trips of the total daily traffic of

3,855 trips will be generated during the peak hour. The directional capacity of Kamehameha Highway is 1,600 vehicles per hour (VPH) based upon the design of 800 vehicles per hour per lane for two lanes under a Level of Service "C" for stable uninterrupted flow.

- 1) Kamehameha Highway and Kionaole Road Extension (Halekoku Interchange Service Road) at Kahiko Street

When compared with the smaller peak hour traffic volume assignments for the year 2003 projected by the State Highways Division, the remaining traffic capacity of Kamehameha Highway at Kionaole Road Extension will increase as a result of the completion of Interstate Highway

II-3.

a) AM Peak

-Northbound (toward Likelike Highway):

Existing volume = 360 VPH

Proposed volume = 390 VPH

Total = 750 VPH, which is less than design capacity of 1,600 VPH

State projection (year 2003) = 380 VPH

Proposed volume = 390 VPH

770 VPH < 1,600 VP

-Southbound (toward Pali Highway):

Existing volume = 1,000 VPH

Proposed volume = 390 VPH

Total = 1,390 VPH < 1,600 VPH

State Projection (year 2003) = 840 VPH

Proposed volume = 390 VPH

1,230 VPH < 1,600 VPH

b) PM Peak

-Northbound (from Pali Highway):

Existing volume = 1,180 VPH

Proposed volume = 390 VPH

Total = 1,570 VPH < 1,600 VPH

State projection (year 2003) = 840 VPH

Proposed volume = 390 VPH

1,230 VPH < 1,600 VPH

-Southbound (from Likelike Highway):

Existing volume = 710 VPH

Proposed volume = 390 VPH

Total = 1,100 VPH < 1,600 VPH

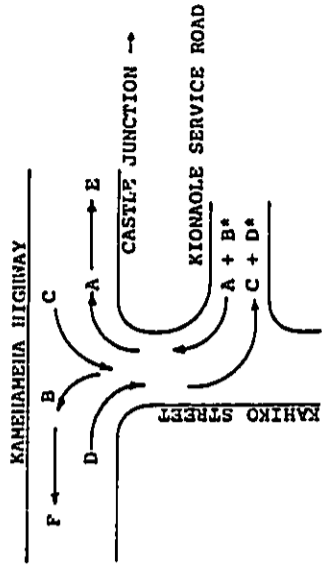
State projection (year 2003) = 490 VPH

Proposed volume = 390 VPH

880 VPH < 1,600 VPH

It is estimated that cross traffic interruption for the above intersection will amount to 18 percent during the AM peak and 21 percent in the PM peak as a result of the

PEAK HOUR CROSS TRAFFIC ANALYSIS
 KAMEHAMEHA HIGHWAY AND KIONAOLE SERVICE ROAD AT KAHIKO STREET



	A + B*	C + D*	E	F
AM PEAK	390	--	1390	750
PM PEAK	--	390	710	1180

*BASED ON ONE DIRECTIONAL FLOW

AM PEAK

$$\begin{aligned} \text{CROSS TRAFFIC \%} &= A + B/E + F \\ &= 390/2140 \\ &= 18\% \end{aligned}$$

PM PEAK

$$\begin{aligned} \text{CROSS TRAFFIC \%} &= C + D/E + F \\ &= 390/1890 \\ &= 21\% \end{aligned}$$

development of the subject property based upon existing traffic flow conditions. (See diagram on page 9A). This is based on the worst condition when the total cross traffic flow is in one direction, either northbound or southbound, although traffic flow is generally assigned directional percentages.

Full occupancy of the proposed development is estimated to be completed by the year 1991 or thereabouts. During this period, the need for traffic signals is not warranted. However, with the construction of the Halekou Interchange on Kamehameha Highway, it is projected that there will be a reduction in the traffic flow on Kamehameha Highway during the peak hour. This situation may affect the traffic movement through the subject intersection and may warrant the installation of a traffic signal in the future. Because of this uncertain condition, the traffic flow pattern must be monitored during the period the project is in progress until it attains full occupancy in 1991. For the next eight years, it may be safe to assume that no traffic signal is warranted to take care of the cross traffic at Kamehameha Highway and the Kionaole Service Road intersection. It is recommended that the intersection at Kahiko Street should be redesigned to permit a minimum storage of four cars on the decelerating lane in the Kamehameha Highway median. Accordingly, the southbound acceleration lane should be widened to provide for four vehicles in order to create a better merging condition.

2) Kamehameha Highway at Kaneohe Bay Drive and Likelike Highway (south leg)

- a) AH Peak (northbound)
Existing volume = 1,100 VPH
Proposed volume = 390 VPH
Total = 1,490 VPH < 1,600 VPH
- b) PM Peak (southbound)
Existing volume = 1,060 VPH
Proposed volume = 390 VPH
Total = 1,450 VPH < 1,600 VPH

2. Kamehameha Highway: Kionaole Road to Castle Junction (Pali Highway)

It is also reasonable to assume that the traffic generated from the Kamoalii project destined to Honolulu will use Kamehameha Highway south of Kionaole Road and Pali Highway at Castle Junction.

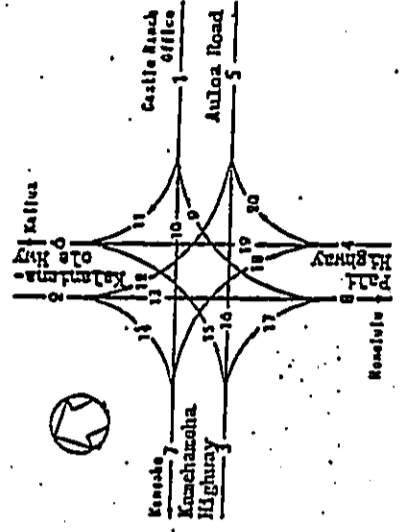
a. 24-Hour Projections

The total daily volume of traffic on Kamehameha Highway between Kionaole Road and Castle Junction at Pali and Kalaniana'ole Highways is 21,370 cars as noted below.* This volume is based on 1980 projections of 1977 counts.

Kamehameha Highway at Pali Golf Course Near Castle Junction			
	24 hr	AH Peak	PM Peak
Outbound (Honolulu)	10,160	870	660
Inbound	11,210	440	1,140
	21,370	1,310	1,800

*See 1980 turning movement count projections at Castle Junction on page II, page 10A.

TRAFFIC MOVEMENT COUNTS
KAMEHAMEHA HIGHWAY AT CASTLE JUNCTION*



Movement	24-HR	AH Peak	PM Peak
1	587	121	33
2	22,795	2,837	1,144
3	10,158	870	660
4	22,656	689	2,987
5	22,419	8	54
6	22,428	766	2,659
7	11,211	442	1,141
8	22,139	3,301	965
9	398	103	15
10	143	18	9
11	46	--	9
12	48	--	1
13	17,062	2,557	722
14	5,685	280	421
15	5,102	228	409
16	131	1	18
17	4,925	641	229
18	5,473	144	711
19	16,914	538	2,241
20	269	7	35

*1980 projection of 1977 counts

The capacity of this 4-lane section of Kamehameha Highway is 38,400 cars, based on the premise that this type of roadway is capable of handling 800 vehicles per hour per lane per 12-hour day under Level of Service "C" conditions for stable flow. The remaining capacity available to accommodate other developments is 17,030 VPD (38,400 VPD - 21,370 VPD).

Again, assuming that the total 611 units from Phase I of the Kamoalii project will use Kamehameha Highway south of Kionaole Road to Castle Junction and generate 3,855 VPD, it is concluded that Kamehameha Highway will accommodate the traffic generated from Phase I of the Kamoalii development and still have an additional average capacity of 11,530 vehicles ([17,030 VPD + 13,740 VPD : 2] - 3,855 VPD) for further increments of the Kamoalii project.

b. Peak Hour Projections

All trips between Kionaole Road Extension and Castle Junction are assumed to be headed in one direction with 390 vehicles to be generated during the peak hour. The directional capacity of Kamehameha Highway is 1,600 vehicles per hour based on a design standard of 800 vehicles per hour per

lane for two lanes under a level of Service "C" for stable, uninterrupted flow.

Kamehameha Highway at Castle Junction (north leg)

1) AM Peak (southbound to Pali Highway)

Existing volume = 870 VPH
Proposed volume = 390 VPH
Total = 1,260 VPH < 1,600 VPH

State Projection (year 2003) = 760 VPH
Proposed volume = 390 VPH
1,050 VPH < 1,600 VPH

2) PM Peak (northbound to project)

Existing volume = 1,140 VPH
Proposed volume = 390 VPH
Total = 1,530 VPH < 1,600 VPH

State Projection (year 2003) = 1,130 VPH
Proposed volume = 390 VPH
1,520 VPH < 1,600 VPH

The preferable route to service traffic from Phase I destined to Honolulu and/or Kailua is from Kionaole Road to Castle Junction and onto Pali or Kalaniana'ole Highway. Home-bound traffic will probably use Likelike Highway and Kaneohe Bay Drive. The above findings are substantiated by the fact that presently there is no medial opening at Kionaole Road and Kamehameha Highway and the

grade separation is adverse to accommodate traffic movement across the median of the divided highway. However, with the construction of the Halekou Interchange on H-3 as planned by the State Department of Transportation, Highways Division, there will be a medial opening connecting Kionaole Service Road Extension and Kamehameha Highway at Kahiko Street and permit traffic movement to flow in either direction on Kamehameha Highway.

3. Kionaole Road

Existing traffic volume on Kionaole Road is nominal. The design capacity for portion of the 2-lane Kionaole Road as it approaches the Halekou Interchange is estimated to be 7,200 VPD, based on the premise that this type of roadway is capable of handling 300 vehicles per hour per lane for a 12-hour day under conditions of Level of Service "C" for stable flow (300 V/H/L x 2L x 12 H/D). Therefore, Kionaole Road will have more than adequate capacity to handle the 3,855 vehicles generated from Phase I of the Kamooolii development (7,200 VPD - 3,855 VPD = 3,345 VPD).

When Kionaole Road is extended to Kamehameha Highway at Kahiko Street as part of the Halekou Interchange service road improvements, the design capacity of the 24-foot wide, 2-lane collector road will be able to accommodate any future increases in density from the project.

4. From current observations, it is noted that traffic congestion and delay are experienced by the automobile driver during the peak hours. This delay in traffic movement cannot be attributed to the design capacity as outlined herein. Traffic signal timing, accidents, slow moving vehicles, such as buses and trucks are, no doubt, the contributing factors of congestion and delay. Hence, the volume of traffic generated by the planned development of Iolani School lands at Kamooolii should not be considered a constraint to the proposed project.

B. Mass Transit

Presently, there are mass transit facilities provided by the City on the windward side of the island utilizing Kamehameha Highway and Likelike Highway. The existing bus system will be accessible for use by the proposed project, and it is reasonable to assume that service will be expanded to meet the demand of the population increase in this area. With adequate bus service provided for this project, it is estimated that vehicle travel from the project will be reduced between 10 and 15 percent, thereby lessening the traffic volume impact onto Kamehameha and Likelike Highways.

Therefore, it may be assumed that a 10 percent of the 3,855 vehicles generated from Phase I or a 390 trip reduction in the number of vehicles generated will occur from the project with adequate transit service.

C. Conclusion

On the basis of the traffic projection and analysis developed in this report it may be concluded that: Kamehameha Highway and Kionaole Road have adequate capacity to take care of 14.7 percent traffic increase generated from Phase I (3,855/21,370 + 24,660 : 2) of the development for 611 units during peak and off-peak hours. The construction of the Halekou Interchange as planned by the State Department of Transportation, Highways Division, will improve the traffic flow from the project onto Kamehameha Highway.

Peak hour projections released by the State Highways Division for the year 2003 indicate a smaller traffic directional assignment for Kamehameha Highway at the intersection of Kionaole Road Extension and Kahiko Street due to use of the Interstate Highway H-3 by motorists destined to and from Honolulu and Leeward Oahu. Therefore, the traffic volume generated from Phase I of the Kamoalii project can be accommodated by the existing network of streets and highways and not affect future plans for the improvement of traffic in the area by the construction of Interstate Highway H-3.

IV. PHASE II (PHASES IIA AND IIB)

The development of Phase II of the project will be the subject of a separate traffic report and analysis at the time application is made for urbanization of 180.0 acres, as the proposed Interstate Highway H-3 bisects the property to a degree that connections by the originally proposed major circulatory road (see Exhibit "C") for this portion of the property to Kionaole Road and the remaining lands of Kamoalii in Phase I cannot be achieved. Therefore, it is only reasonable to assume that access from Phase II will be permitted onto Likelike Highway. This portion of Kamoalii also has access over and across Luluku Road and other streets within Keapuka Subdivision. This portion of the report is submitted for informational purpose only in order to assess the traffic from an overall review of the development plan of the Kamoalii lands. It is assumed that access from Phase II will be available at a permitted point onto Likelike Highway. This will result in minimizing traffic impacts on the existing streets within the Keapuka Subdivision. For this traffic analysis, Phases IIA and IIB, as noted on Exhibit "D," are combined as a single increment for future development.

Existing traffic counts taken in 1980 on Likelike Highway in the vicinity of the portals of the Wilson Tunnel show a total volume of 41,260 VPD (east: 20,320 VPD + west: 20,940 VPD). The design capacity of Likelike Highway, a 4-lane divided highway, is 57,600 cars based on the premise that this type

of highway can accommodate 1,200 cars per hour per lane for a 12-hour period on a Level of Service "C." Phase II which is located adjacent to the Keapuka Subdivision and Likelike Highway envisions the development of 182.4 acres for approximately 360 single-family, duplex and townhouse units. The proposed 360 units from the Phase II development will generate 2,270 daily vehicle trips based on 6.3 external vehicular trips per unit. Comparing the existing traffic count of 41,260 VPD and the design capacity of 57,600 VPD, it is noted that the remaining capacity on Likelike Highway is 16,340 VPD (57,600 VPD - 41,260 VPD). Therefore, it is concluded that the traffic generated from Phase II of the proposed development can be accommodated on Likelike Highway without impeding the main traffic flow, except perhaps during the peak hours when short delays will be incurred. The volume of traffic generated by the Kamooolii project is not large and will not create any unusual traffic problems. From current observations, it is noted that traffic congestion and delay are experienced by the automobile driver during the peak hour. This delay in traffic movement cannot be attributed to the design capacity. Traffic signal timing, accidents, slow moving vehicles such as buses and trucks are no doubt the contributing factors for the delay. Hence, the volume of traffic generated by the planned development of Iolani School land at Kamooolii should not be considered a constraint to the proposed project.

Traffic volumes on Likelike Highway will continue to increase as development takes place in Windward Oahu. Construction of the H-3 highway will improve the level of transportation service for Windward Oahu and as such will not significantly affect the traffic assignment developed in this study. Therefore, it is safe to assume for Phase II that acceptable access can be developed from the project site to Likelike Highway with proper intersection design and regulatory control measures. The planned 360 units will generate a total of 2,270 vehicle trips per day or a 5.5 percent (2,270/41,260) increase in the existing traffic volume on Likelike Highway. Therefore, Phase II of the Kamooolii project of Iolani School as planned should not impact the street network surrounding the project area.

APPENDIX G
AGRICULTURAL SIGNIFICANCE

THE AGRICULTURAL SIGNIFICANCE OF THE LANDS
IN THE KAWOOLII, KAPALAI, AND LULUKU AREAS OF KANEHOHE

The agricultural significance of the subject lands can be judged in terms of their present use and their physical characteristics, climate, and location. The State of Hawaii Department of Agriculture has designated the majority of the subject lands as having physical characteristics and climatic features that qualify as being either "Prime Agricultural Lands" or "Other Important Agricultural Lands." Details of these physical characteristics are presented in the accompanying report on the physical production potential of the land. In brief, the more productive land is fairly level, it is fairly sheltered from high winds, and there is usually adequate rainfall, thus avoiding the costs of irrigation. The location is important in the sense that it is near the major Oahu market, which means that transportation costs give these growers a 2 cents per pound advantage over growers on the Neighbor Islands. These factors have made the site one of the best locations currently being used for banana production in Hawaii.

Significance can be examined in terms of the total amount of existing lands of similar quality. As shown in Table 1, the subject lands constitute a very small percentage of such lands. The Prime Lands are about .3 percent of the Prime Lands on Oahu and .7 percent of the Other Important category. The "Prime" designation means that all physical and climatic conditions exist which permit sustained high yields under economically advantageous operating conditions. This land is characterized by high yields with relatively low costs and little risk of damage to the physical environment. The category of "Other Important" land exhibits production problems such as flooding, erosion, etc. that require greater production costs, such as drainage, more fertilizers, etc. The acreage in question appears more significant as a percentage of the state's agricultural cropland if the two overwhelmingly major crops of pineapple and sugarcane are excluded. The acreage currently being used to produce crops (excluding pineapple and sugarcane) on Oahu would be reduced by 7.5 percent if the land on the subject parcel were to be removed from banana production. This is substantially less important when equivalent statewide acreage is considered, for only a 0.85 percent reduction would occur. Most

THE AGRICULTURAL SIGNIFICANCE
OF THE LANDS IN THE KAWOOLII,
KAPALAI AND LULUKU AREAS OF KANEHOHE

Kaneohe, Oahu, Hawaii

December 1981

Prepared By:
Evaluation Research Consultants
Socioeconomic Planning
Project Evaluation

significantly, most of the Brazilian or Apple bananas going into Oahu markets are currently produced on the subject lands. The conversion of this land to alternative uses would not mean that Brazilian bananas would disappear from the marketplace, although in the short run they would likely be more scarce and higher priced. Such higher prices would induce increased consumption of other varieties and increased production of the Brazilian variety in other locations, such as the Neighbor Islands.

The current production practices on the subject lands vary widely. Only Brazilian or Apple varieties are cultivated. Several producers are experiencing low production levels due to a failure to thin or fertilize. We presume that the uncertainty of the existing short-term leases has discouraged investments in improved cultural practices. However, some of the plots near the west entrance to Hoomaluhia Park and two small plots in the interior appear to have been well cultivated and very productive. We estimate that total production on the subject lands averages about 1.6 million pounds per year, with a value of about \$548,000 at the current farm-gate price of 34 cents per pound. Given the current practices and yields, we estimate that about 60 people would be employed on a full-time equivalent basis in cultivating, harvesting, ripening and packing at this level of production. The employment and incomes generated in other parts of the State's economy result in a total impact of about \$644,000 annually in terms of Gross Domestic Product and about 97 full-time equivalent jobs.

In a sense, the above discussion of the productive value of the subject lands understates the value of the land in agricultural production, for it is evident that the acreage could be more efficiently used, particularly if a firm time horizon of at least 10 years were available for investing and planning purposes. In attempting to estimate the production capabilities of the subject lands, we have used the following premises which we consider to be the most reasonable: (1) the land currently being used for banana production would remain in bananas, although there would be a gradual shift to the higher yielding Cavendish varieties; (2) the Prime Agricultural Land not currently being used for production would be planted in bananas; (3) the Other Important Agricultural Land would continue to be used much as it is at present, e.g. most of the cultivated portions would not be brought into cultivation. The lack of

TABLE 1

Agricultural Land Designations Related to the Subject Lands

Agricultural Land Designations	Statewide	Oahu	Subject Lands
Prime	304,310	55,563	169.2
Unique	31,320	9,006	0
Other Important	<u>642,544</u>	<u>22,990</u>	<u>152.8</u>
TOTAL	978,174	87,559	322.0

available irrigation water, the soil, the climate, and the topography of the Other Important Agricultural Land lead to our conclusion that bananas would continue to be the most profitable crop, and that only the best land not currently in production would be worth the costs of preparing it for cultivation.

Under these more favorable conditions, per-acre yields of the Brazilian bananas would be expected to double to about 12,500 pounds as the result of improved cultivation practices. The conversion to the Williams Hybrid or Valery would further double this production to about 25,000 pounds per acre. This scenario would result in about 300 acres being newly planted in bananas, presumably in the Cavendish varieties, 100 acres being converted to Cavendish plantings, and about 200 acres remaining in Brazilian varieties.

In attempts to maximize income and efficiently use labor and equipment, we foresee the possibility that some farmers also will use some of the Other Important Agricultural Land to produce cut flowers and foliage plants. However, the costs of land preparation, harvesting, and cultural practices on such steeper slopes is quite likely to approach the possible revenues of about \$4,000 per acre. Consequently, we would allow for only about 10 acres in the production of cut flowers, such as red ginger and bird of paradise, and foliage plants such as ti, papyrus, and asparagus ferns.

The preceding scenario of long-term, optimal agricultural use would result in about \$1.4 million worth of agricultural production annually. Approximately 120 full-time-equivalent employees would be required to achieve these production levels under current management practices. If highly capital intensive technologies were to be used in harvesting, ripening and packing the bananas, this labor requirement could be as low as 20 full-time-equivalent employees. However, this level of technology is not currently used in Hawaii, and furthermore it would only be feasible in an operation of 100 acres or larger. The expansion of banana production on the subject land as just postulated would result in an increase by 70 percent in the state's total production of bananas.

Perhaps the most revealing means of estimating the significance of removing the subject lands from agriculture is to try to estimate how many farm families could reasonably make a living from the land under somewhat ideal leasehold arrangements. These potential living arrangements can then be balanced against the living arrangements of families involved in alternative uses of the land. We estimate that about 15 acres is needed for a farm family to earn a decent living by producing bananas. The key figures used in reaching this estimate are shown in Table 2. The three levels of production and income reflect differing levels of input, including hired labor. The net return per acre from producing Cavendish varieties would result in approximately equal net returns from the production of Brazilian varieties, since the price per pound is less and the costs are somewhat related to the higher level of production. These calculations suggest that under long-term leasehold conditions, about 40 families could earn a decent living by producing bananas on the subject lands. In a very real sense, this is the most significant opportunity cost of converting the land into alternative uses, such as housing.

The previous analyses and statements were necessarily based on the existing situation and assume that the only change is the change in the use of the subject parcels. If the agricultural situation in the State changes, the relative importance of the subject lands to the State of Hawaii will also change. It has recently come to our attention that a farming company, Hokihana Farm Enterprises, is planning to plant 500 acres of apple bananas on Kauai. Current plans call for the planting of up to 200 acres this year (1982) and the remainder in the following two years. If the plans are carried to completion, the total State acreage in bananas (all varieties) would nearly double and the acreage in apple bananas in the State would more than double. If the planned production goals are met, the market supply of all varieties of bananas produced in the State of Hawaii would be more than doubled.

The immediate impact of the new plantings (if planned planting are completed) will be twofold. Imports of bananas into the State will decline or cease entirely and the price of apple bananas will fall to the price Cavendish and imported varieties currently received. This directly implies that existing plantings of apple bananas will become less valuable

and that the impact of removing existing planting from production on the State will decline proportionally. For example, the value of bananas currently produced on the subject lands would fall from the current level of \$548,000 to approximately \$222,000 and the importance of this production to the consumers would be completely replaced by the planned new plantings on Kauai.

TABLE 2

Cost and Returns from Producing Brazilian Bananas

	High	Medium	Low
Acres	15	15	15
Owner and Family Labor (FTE's)	1.5	1.5	1.5
Yield/acre	12,500 lbs	8,000 lbs	6,000 lbs
Production, Harvesting, and Marketing costs (net of labor and lease rent)	\$1,000/acre	\$720/acre	\$640/acre
Hired Labor (FTE's)	2	1	0.5
Cost of Hired Labor	\$18,000	\$9,600	\$4,800
Return to family labor and management net of lease rent	\$30,000	\$20,400	\$16,200

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**APPENDIX H
STORMWATER RUNOFF**

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ENVIRONMENTAL ASPECTS
OF
STORM WATER RUNOFF
FOR

IOLANI SCHOOL, LAND AREAS I, J, AND K
Windward Oahu, Hawaii

May 1982

Prepared By
Gordon L. Dugan, Ph.D.
Environmental Consultant

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INTRODUCTION

The proposed Iolani School Lands Development, located in windward Oahu, Hawaii, as shown in Figure 1, is situated in the 5.8 square mile Kamoowili-Kaneohe drainage area, which is the most southern of the 10 defined drainage areas that comprise the approximately 40 square mile Kaneohe Bay Drainage Basin. The development consists of 3 discontinuous development areas, I, J, and K, which are outlined in Figure 2. On Figure 2, Area J is the 17 acre parcel makai of the Likelike Highway, while Area K consists of 52 acres makai of Likelike Highway. The remaining 234 acres are Area I.

Out of the total 1,461 acres for the 3 separate areas, 303 acres are proposed to be developed into 1,248 residential lots, 5 agricultural lots (2 acres/each), and 2 parks (8 acres total), with the remainder to be primarily placed in preservation status. The proposed developed areas are within the 0 to 20 percent range, which is considered a prerequisite for residential development. The slope of most of the remaining areas is in excess of 30 percent. Some of the project areas (Figure 2) are within one-third of a mile from the crest of the sharp rising Koolau Mountain Range (also referred to as the "Pali") which separates the windward from the leeward areas of Oahu.

The vegetation of the project sites could best be described primarily as a densely vegetated forest setting, with various species of herbaceous scrub, and forest types, approximately 80 percent being exotic (Corps of Engineers, 1975). Limited banana culturing is also conducted. The 10.3 acre site in Area J, which is scheduled to be established into five 2-acre agriculture lots, is presently used for banana culturing. The recently completed U.S. Corps of Engineers Kaneohe Flood Control Project, which includes 76-foot high earth filled dam that can control the flow of Kamoowili Stream, is just makai of the major portion of Area I. The average annual rainfall for the project site is near 85-inches, as can be seen on Figure 1. The high average rainfall promotes the dense vegetation of the area.

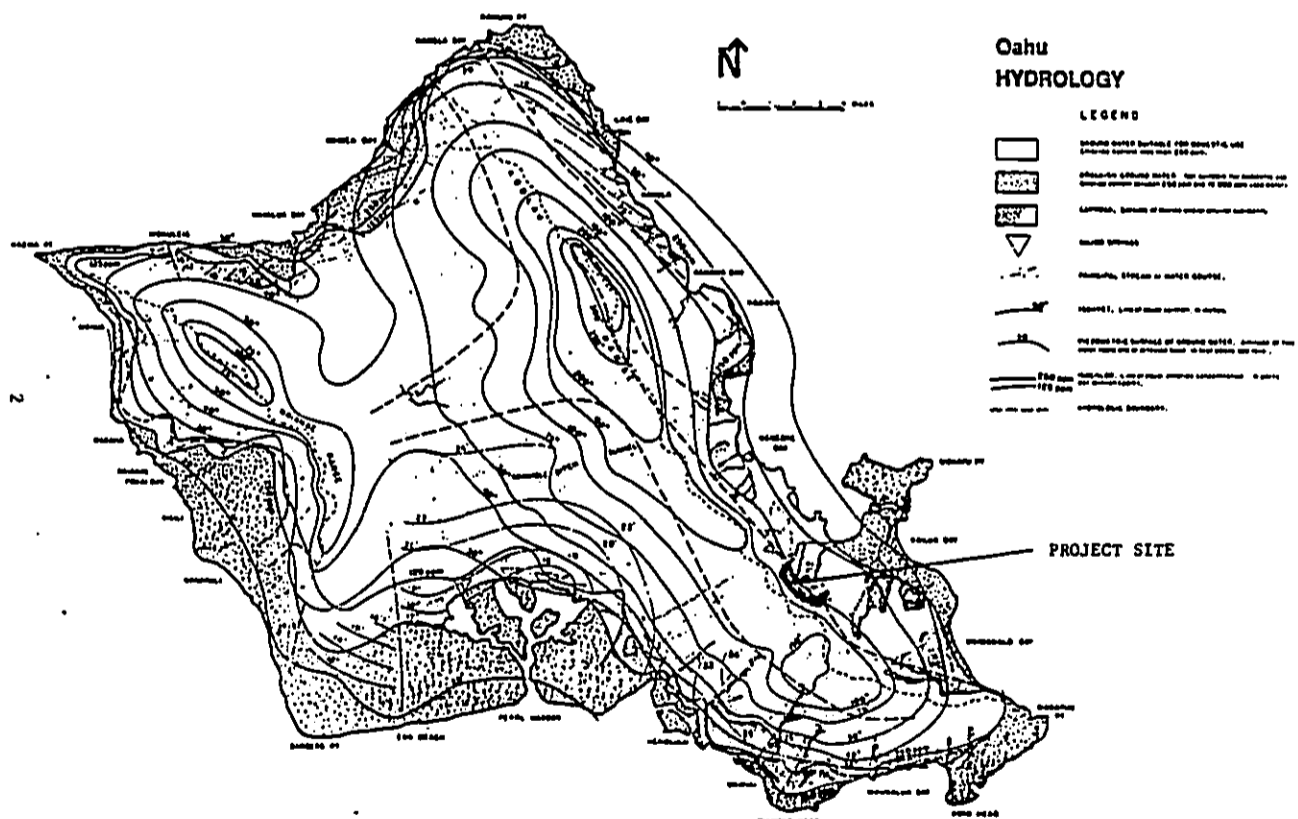


Figure 1, Hydrologic and Geologic Characteristics of Oahu (from "2020 Plan," Board of Water Supply, City and County of Honolulu, pg 13, February 1971)

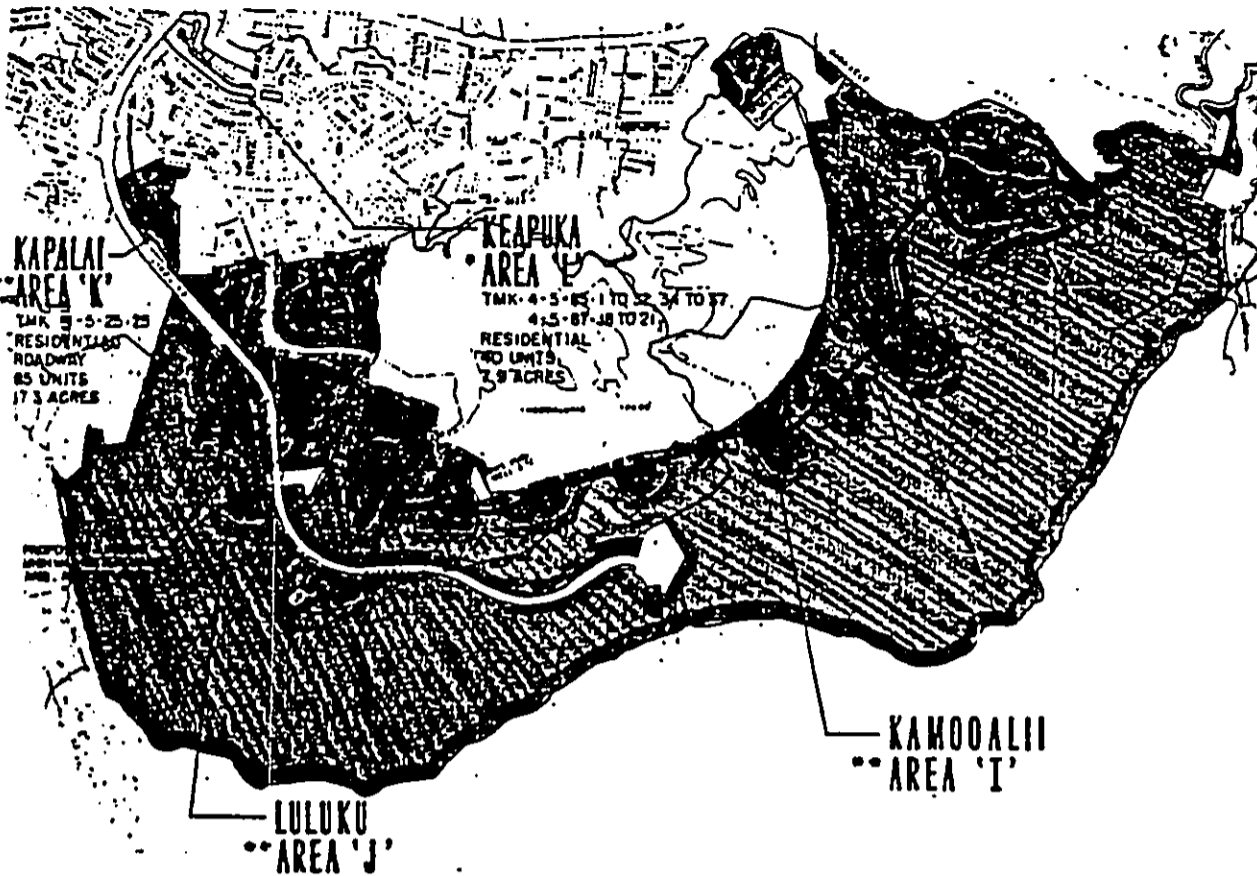


Figure 2. Site Location, Iolani School Land Areas I, J, and K, Windward Oahu, Hawaii
 (Adapted from a map by Community Planning, Inc., Honolulu, Hawaii)

The concern with residential (urban) development of basically undeveloped land, with some agricultural-rural land, such as herein proposed, is the potential changes in the quantity and quality of surface water (primarily storm water) that generally results from increasing the area of impervious surfaces, such as roof tops, roadways, parking lots, etc. There are two main concerns relating to changes in surface water runoff: 1) public safety and property damage; and 2) environmental impact. The first concern requires the determination of changes in peak discharge rates, the magnitudes of which are necessary for designing adequate drainage structures to prevent flooding; while the second concern requires identification of the changes in total runoff volume, as well as sediment, nutrient, and other constituent loads, and the effects these will have on the ecosystem of the natural resources serving as the "sink", which in this situation would be the ocean via Kaneohe Bay. It is this second concern, environmental impact, and its probable effect on the subsequent receiving waters, that is under study in the present investigation.

PURPOSE AND SCOPE

The purpose of this study is to evaluate the environmental impact of the proposed Iolani School Lands Areas I, J, and K development as it relates to surface water runoff. From an assemblage of available baseline hydrologic and water quality data, an estimate of the existing and projected volume and quality characteristics of surface water runoff from the project site will be made, along with an assessment of the environmental impact resulting from this runoff. This study was conducted with the assumption that Interstate H-3 would not be constructed. The construction of Interstate H-3 would significantly decrease the amount of available land for residential development.

METHODOLOGY

The environmental impact of the proposed project, as it relates to storm water runoff, was evaluated by estimating the changes in storm runoff volume and specific constituent loads (nitrogen, phosphorus, and suspended solids) for only the 303 acres of project sites, rather than comparing changes to the full 1461 acres of project areas (I, J, and K), or even the entire 5.8 square mile Kamoalii-Kaneohe drainage area. To estimate these changes, it was necessary to identify those factors that affect storm runoff generation and runoff quality for both pre- and post-development conditions. This required the determination of:

- storm runoff volumes for existing and developed conditions -
- storm runoff quality and constituent loads for existing and developed conditions -

Heavy metal and pesticide data from available sources within and/or from adjacent areas are also considered.

Storm Water Runoff Volume Alterations

Methods currently available to estimate surface water runoff volume from a specific storm event over a drainage area require the use of rainfall-runoff coefficients which are a function of storm intensity, storm duration, and hydrology factors such as land management practices, vegetative cover, soil type, soil moisture conditions, etc. This means that over a drainage area, a number of different rainfall-runoff coefficients would need to be determined to account for the varying hydrologic factors that would exist. More commonly, however, these differences are ignored in favor of a single coefficient for a particular land use over a given rainfall intensity range. While this approach is convenient, it is less representative of the actual situation.

In order to gain more representative estimates of storm runoff volume, a method developed by the Hawaii Environmental Simulation Laboratory (HESL) of the University of Hawaii was utilized (Lopez, 1974; Lopez and Hagan, 1978).

The HESL method incorporates data from the U.S. Soil Conservation Service (SCS) and the U.S. Weather Bureau (1962). The SCS data includes soil maps (Foote et al., 1972) and curve numbers for various soil groups. These curve numbers have been obtained from empirical data (including) precipitation, soil, changing soil moisture conditions, and vegetative cover generated from the classification of thousands of soils throughout the nation. These soils have been classified into four groups, labeled A, B, C, D, with Class A having the highest water intake rates and Class D the lowest. These curve numbers, modified for Hawaiian conditions, pertain only to non-urban conditions. For urban conditions, the HESL method utilizes information published by Miller and Viessman (1973).

Storm Water Runoff Quality Alterations

Kamooalii, Luluku, and Kaneohe Streams, all within the Kamooalii-Kaneohe drainage area, have been some of the most extensively studied streams for water quality on Oahu. Kamooalii Stream and its tributaries, including Luluku, flows through or by the project site and converges with Kaneohe Stream approximately 1 mile prior to discharging into Kaneohe Bay.

As previously mentioned, the 76-foot high dam of the Kaneohe Flood Control Project can control the flow of Kamooalii Stream, which forms a 26-acre permanent pool as it flows through it uncontrolled, except when the impoundment of water is desired (i.e. during potential flooding conditions).

The area affected by the project was extensively studied, including the geology and water quality data, for background information as a prelude to constructing the dam (C.O.E., 1975). In addition, a USGS continuous gaging station has been in operation on the lower section of Kamooalii Stream since 1969; however it was discontinued in January 1980. Also two other stream gage recording sites were established on Kamooalii Stream, (USGS, 1970-1980). Several water quality studies have been conducted on these streams, but apparently only a study involving 4 sites, by the State Department of Health in 1972-73 was performed for the specific purpose of obtaining a data for the Kaneohe Flood Control Project (C.O.E., 1975).

The Kaneohe Flood Control Project, could potentially affect the quality of the water flowing through the dam, especially since at least a 26-acre pool is formed, which will create a situation that could lead to additional suspended solids settling, and the growth of aquatic organisms (especially algae). Aquatic growths could alter the nitrogen and phosphorus concentrations of the water. Thus, for comparative baseline values (existing conditions) the quality of the waters of Luluku and Kamooalii Stream will be considered prior to the construction of the flood control dam (up to 1976).

The most pertinent water quality studies for Kamooalii and Luluku Streams, besides the previously discussed 1972-73 Department of Health study involved two studies by the Water Resources Research Center (WRRC) (Young, et al., 1976; Lau, et al., 1976) and one study by the Hawaii Environmental Simulation Laboratory (HESL) (Dugan, 1977). Both WRRC and HESL are part of the University of Hawaii at Manoa. All three investigations monitored the major streams flowing into Kaneohe Bay with the Kamooalii-Kaneohe drainage area being just one of the studied drainage areas. One of the WRRC studies is considered a dry weather study (including pesticide and heavy metal data which will be presented in the result section); while the other was a wet weather monitoring study.

The HESL study involved both normal flow monitoring of Kamooalii and Luluku Streams, among others, and a special storm-induced surface water study of Kamooalii Stream. The storm-induced water quality study site on Kamooalii Stream was located approximately 1,200 feet above its convergence with Kaneohe Stream and about 1/2 mile below the most makai positioned project site. This sampling site also receives some drainage from the existing surrounding residential area.

The U.S. Geological Survey (USGS) continuous flow recording gage is approximately 600 feet downstream of the storm-induced sampling site. Normal flow samples for Kamooalii Stream were collected at the same site. The storm-induced samples were collected by an automatic sampler that was float activated when the stream reached a predetermined depth, which was equivalent to approximately 28 cfs. The long term average flow of Kamooalii Stream is approximately 15 cfs, up to 1976; however, the average is slightly lower since the completion of the dam (USGS, 1970-1980). The sampler had the capacity to collect up to 24 samples at adjustable time intervals (initially set at 15 min. and later increased to 20 min.).

A total of 14 storm-induced events were collected in the HESL study between November 1974 through March 1975, two of which were a 2-year and 4-year storm induced stream flow (DLNR, 1970). Both dissolved and particulate nitrogen and phosphorus values were determined. Collecting particulate samples requires special equipment, but it is considered more accurate than trying to determine total unfiltered nitrogen and phosphorus values and subtracting out the dissolved portion. Median values for Luluku and Kamoalii Streams for the 1972-73 Department of Health Study, the two WRRC studies, and the normal and storm-induced HESL study ranged from 0.44 to 1.25 mg/L for total nitrogen and from 0.024 to 0.170 mg/L for total phosphorus. However, since the data is to be used with storm-induced events it appears that the most emphasis should be placed on constituent values derived under these conditions.

A plot of the constituents for one of the 14 sampled storms is shown in Figure 3. Of particular note is the fairly steady concentration values for total dissolved nitrogen (organic, NH_3 , and NO_2+NO_3), and with the exception of one point, a fairly steady dissolved $\text{PO}_4\text{-P}$ value. The organic phosphorus values were not plotted in Figure 3, but the median value was only 0.008 mg/L. Particulate phosphorus results were not determined for this storm-induced flow, but the median values for other storms ranged from 0.012 to 0.018 mg/L. The plot of particulate nitrogen for Figure 3 reveals that unlike its dissolved counterparts it appears to be related to flow, which is in turn related to suspended solids. This aspect will be subsequently discussed.

In view of the foregoing an average of the median values for a low, median, and high (4-year) storm-induced flow resulted in projected total nitrogen and total phosphorus values (dissolved and particulate) of 0.75 and 0.07 mg/L, respectively, for existing conditions. These values are near the mid-range of the median values from the other previously mentioned studies of Luluku and Kamoalii Streams.

Suspended solid values for existing conditions are generally difficult to determine due to the typical lack of data during storm events. It is commonly presumed, by mainly indirect methods, that the majority of the annual suspended solid load is carried by the heavy storm runoff events, which tend to occur on an infrequent basis. For the present situation, the suspended solids data

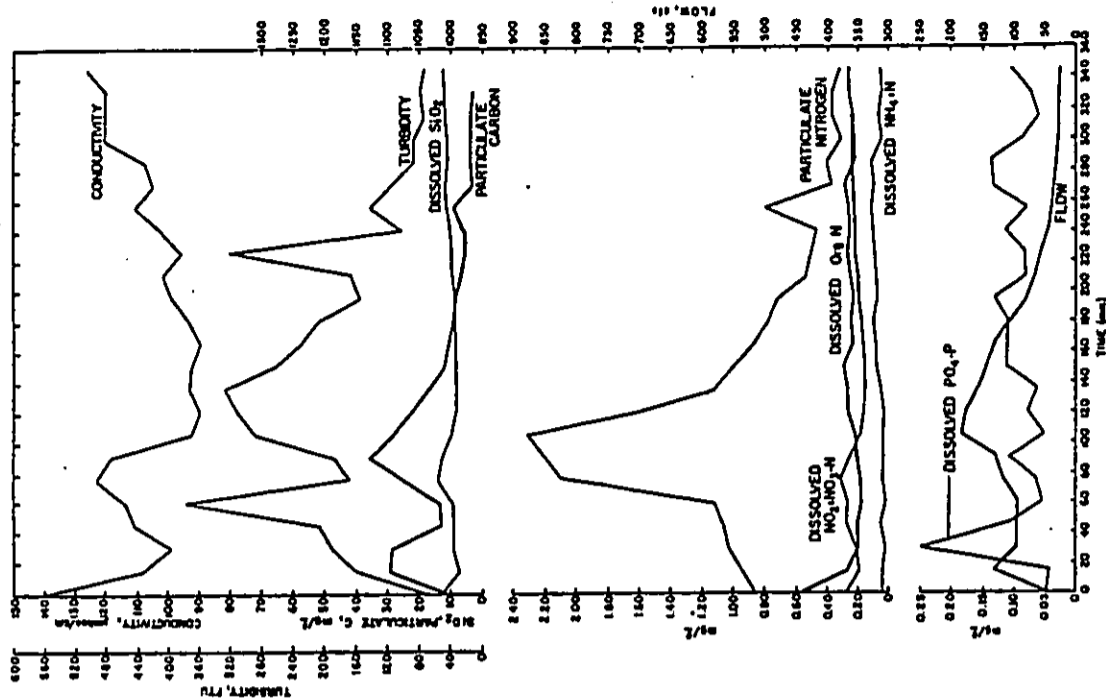


Figure 3, Water Quality Constituents of Kamoalii Stream During the Storm-Induced High Water Flows of 17 November 1976, Oahu, Hawaii

determined from the storm-induced sampling site was utilized. As expected, the suspended solids and total solids increase with increasing flow, as shown by the log-log plot of the data on Figure 4. From Figure 4, a total solids concentration of 1,000 mg/L would be equal to flow in excess of 1,000 cfs, which would represent an approximate 1.1 year storm-induced stream flow event (DLNR, 1970).

Two USGS continuous flow recording sites with an accompanying automatic pumping sediment sampler were installed on Kamoalii Stream just below the new Kaneohe Flood Control Project Dam. One site was located 100 feet downstream from Kuou Stream, with the sediment sampler being operated from January 1972 until the site was discontinued in September 1976 (USGS, 1970-1980). This period would generally represent pre-dam construction conditions. Another site was installed on Kamoalii Stream 300 feet downstream from Luluku Stream in November 1976, and thus would represent dam, reservoir, channel improvements, etc., construction and post-construction conditions. The two suspended sampling sites are approximately 800 feet apart. In the first automatic sediment sampling site (1972-1976) the highest maximum daily mean suspended sediment value was 420 mg/L, on May 14, 1974, but no corresponding peak instantaneous suspended sediment samples and/or peak flow values were reported (USGS, 1970-1980). However, another storm event on November 25, 1975 produced a mean daily flow of 73 cfs and a mean suspended sediment sampling value of 400 mg/L, while the instantaneous values were 350 cfs and 844 mg/L, respectively. Values at the second automatic suspended sediment sampling site (since 1976) were much higher, as expected, since the dam construction was in progress. Suspended sediment values as high as 14,700 mg/L were reported in early 1980 (USGS, 1970-1980). As previously mentioned, only sediment values prior to 1976 will be considered. In view of the storm events which will be compared to, the 1,000 mg/L suspended solids value appears to represent a conservative value for "existing" conditions.

Quality data for urban storm water (post-development conditions) is sparse, both locally and nationally. Furthermore, the reported data have been highly variable and diverse. Lochr (1974) compiled urban storm runoff quality data collected from throughout the United States, as well as from a few international locations. Locally, Fujizawa (1973) reported urban storm water quality data collected from storm drains in different drainage areas of Honolulu, as shown in

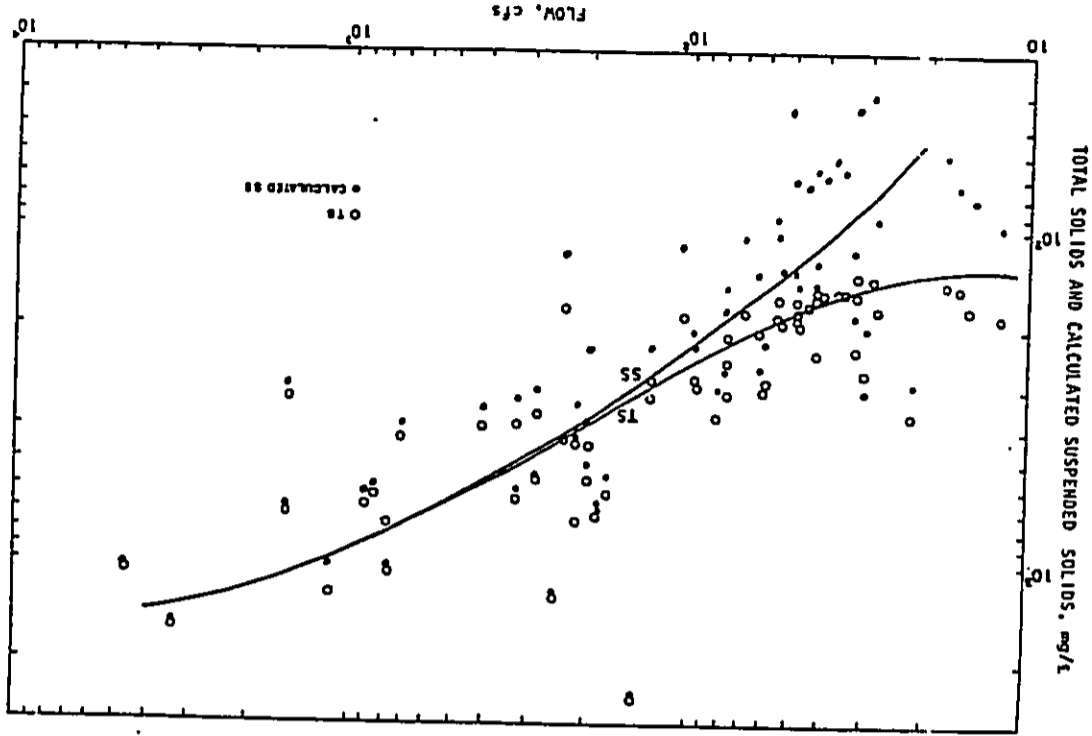


Figure 4. Total Solids and Calculated Suspended Solids vs. Storm-Induced Stream Water Runoff, Kamoalii Stream, Oahu, Hawaii

Table 1. Representative Storm Water Quality Data for Honolulu

Parameter	Residential ¹	Commercial ²	Industrial ³
	----- (mg/l) -----		
Total Solids	511	278	246
Suspended Solids	252	142	12
COD	142	209	40
BOD ₅	10	19	7
Dissolved Oxygen	7.1	5.7	6.7
NO ₃ -N	0.211	0.045	1.1
TKN	0.381	0.272	2.70
Total Phosphorus	0.57	0.53	2.17
Orthophosphate	0.27	0.19	1.27
Grease	2.8	1919	2.2
Lead	0.407	0.987	1.657
Chromium	0.013	0.021	0.013
Zinc	0.512	0.792	0.729
Copper	0.036	0.036	0.021
Iron	0.377	0.295	0.049
	----- (no./100 ml) -----		
Total Coliform	83,300	33,500	11,500
Fecal Coliform	1,565	463	580
Fecal Streptococcus	6,393	7,900	7,350

SOURCE: Fujitara (1973).

¹Storm water samples collected on Aupuni Street near Mokualewa Stream.

²Storm water samples collected at Beretania Street between Maunakea

and River streets.

³Storm water samples collected near Iwilei and Pacific streets.

Table 1. For the present study, Fujitara's residential results were used to simulate post-development runoff quality, which were, respectively, 0.60, 0.57, and 250 mg/L, for nitrogen, phosphorus and suspended solids. Attention is likewise drawn to the heavy metal content measured in residential runoff.

DRAINAGE ASPECTS

The 5.8 square mile Kamoalii-Kaneohe drainage area, the most southern of the 10 defined drainage areas of the Kaneohe Drainage Basin, is bounded by the steep rising "palis" of the Koolau Mountain Range on the west and south, the Halekolu Volcanic Dome on the east and the gently sloping coastal plain and Kaneohe Bay. The stream-fed headwaters of Kamoalii Stream, the main tributary to Kaneohe Stream, which drains into Kaneohe Bay, originates near the 2,500-foot elevation. Five tributary streams, most of which flow through or by the project sites, converge into Kamoalii Stream. The Luluku Tunnel, located near the head of the drainage area, is used to obtain a water supply source. The water from this tunnel may decrease the overall surface water runoff to the drainage area somewhat, but information or even estimates of this quantity are lacking. Within the Kamoalii-Kaneohe drainage area the annual rainfall ranges from over 100 inches at the crest of the Koolau's to less than 50 inches at Kaneohe Bay.

The Kamoalii-Kaneohe drainage area is principally underlain by alluvium with volcanic rocks, free of dikes, located near the crest of the Koolau's. The aforementioned Luluku Tunnel is positioned on the apparent dividing line between the alluvium and the volcanic rocks (Takasaki, Hirahima, and Lubke, 1969). The soils of the project site consists of approximately 175 acres of Loleka Series, 40 acres of Kaneohe Series, and 80 acres of Hanalei Series. Both the Loleka and Kaneohe Series are referred to as well-drained soils, and in terms of the previously discussed runoff classification they are termed as Class "g"; whereas, the Hanalei Series is referred to as somewhat poorly drained to poorly drained soils, and termed as Class "c" (Foote, et al., 1972; Lopez and Dugan, 1978).

The previously mentioned Kaneohe Flood Control Project consists not only of the 76-foot high, 2,200-foot long dam on Kamoalii Stream, just makai of a large portion of the proposed development, but also 1,274 feet of channel improvements near the outlet to Kaneohe Bay. The dam maintains a permanent 26 acre pool with a maximum reservoir surface area of 152 acres. The dam is designed to control a flood with a peak flow of 15,000 cfs and a volume of 3,450 acre-foot, which is about one and one-half times the peak discharge (at

that location on Kamoalii Stream) and about two times the volume of the greatest flood on record, which occurred on 1 February 1969 (C.O.E., 1975). At the USGS continuous flow gaging site on Kamoalii Stream, farther downstream (where the flow for the previously discussed storm-induced study was obtained) a flow of 12,000 cfs was recorded for this same flood.

The proposed development's storm water drainage from Areas J and K are planned to be collected and conveyed underground to public drainage facilities; whereas Area I is also to be collected and conveyed underground, but the conveyed storm water is to be discharged to existing streams and the Kaneohe Flood Control Ponding Basin.

RESULTS

The estimated storm water runoff and constituent changes due to the proposed development of Iolani School Lands Areas I, J, and K are shown in Table 2. The values presented, it must be emphasized, are for comparative purposes only, and are not intended to be representative of the accuracy implied by the practice of reporting results to one decimal place. This was done primarily for convenience of calculations and balancing.

Storm Water Runoff Volume Alterations

From Table 2, it can be observed that storm runoff for the 1-year/1-hour frequency/duration storm event for post-development (Full) conditions is nearly 7 times greater than for pre-developed (1981) conditions; however, as the storm duration and recurrence interval increases, this difference reduces to 1.6:1 for the 100-year/24-hour storm event. The primary reason for the diminishing differences in runoff volume for pre- and post-development conditions is that soil permeability decreases as storm magnitude increases. With low intensity and short duration storm events, the existing land use allows significant percolation to occur (especially since approximately 2/3 of the project soils are rated well drained-Class B), and relatively little runoff is generated. However, as the storm intensity and duration increases, the ability of the soil to accept water decreases and greater runoff occurs, i.e., the soil becomes more impermeable. Thus, as the storm events increase in magnitude, the permeability conditions under the existing land use approaches, but does not reach, that representative of fully developed conditions. Multi-storm events that tend to saturate the soil also decrease the percolation and thus increase the runoff for a particular storm event.

As would be expected, the greatest calculated incremental storm runoff volume, 73.4 acre-ft, resulted from the 100-year/24-hour storm event, while the least incremental increase (23.2 acre-ft) occurred with the 1-year/1-hour event. The volume of the maximum event would be less than 3 percent of the maximum capacity of the new (aka) Kaneohe Flood Control Dam; however, only a portion of the storm water runoff from Area I is actually planned to be discharged into the water courses leading to the reservoir behind the dam.

TABLE 2

Estimated Storm Water Runoff Volume and Constituent Changes due to the Proposed Iolani School Lands, Areas I, J, and K, Kaneohe, Oahu, Hawaii

Storm ^a			Storm Water Runoff											
Duration hrs	Recurrence Interval yr	Quantity in.	Hydraulic			Nitrogen ^b			Phosphorus ^c			Suspended Solids ^d		
			Development		Δ AF EVENT	Development		Δ lb EVENT	Development		Δ lb EVENT	Development		Δ ton EVENT
			1981 AF EVENT	Full AF EVENT		1981 lb EVENT	Full lb EVENT		1981 lb EVENT	Full lb EVENT		1981 ton EVENT	Full ton EVENT	
1	1	2.2	3.9	27.1	+ 23.2	8.0	44.3	+ 36.3	0.8	42.1	+ 41.3	5.36	9.23	+ 3.87
1	5	3.0	9.9	41.9	+ 32.0	20.2	68.4	+ 48.2	1.9	65.0	+ 63.1	13.44	14.25	+ 0.81
1	10	3.6	15.6	53.3	+ 37.7	31.8	86.9	+ 55.1	3.0	82.6	+ 79.6	22.23	18.10	- 4.13
1	25	4.1	21.1	63.0	+ 41.9	42.9	102.8	+ 59.9	4.0	97.6	+ 93.6	28.87	21.41	- 7.46
1	50	4.4	24.6	68.9	+ 44.3	50.1	112.4	+ 62.3	4.7	106.7	+ 102.0	33.42	23.41	- 10.01
1	100	5.0	32.1	80.6	+ 48.5	65.4	131.5	+ 66.1	6.1	125.0	+ 118.9	43.59	27.40	- 16.19
24	1	3.9	18.8	59.1	+ 40.3	38.4	96.5	+ 58.1	3.6	91.7	+ 88.1	25.60	20.10	- 5.50
24	5	6.2	48.5	104.3	+ 55.8	99.0	170.2	+ 71.2	9.2	161.7	+ 152.5	66.00	35.46	- 30.54
24	10	7.3	65.0	126.2	+ 61.2	132.6	205.9	+ 73.3	12.4	195.6	+ 183.2	88.37	42.89	- 45.48
24	25	8.6	85.6	152.1	+ 66.5	174.7	248.2	+ 73.5	16.3	235.8	+ 219.5	116.46	51.71	- 64.75
24	50	9.7	103.9	174.2	+ 70.3	211.9	284.2	+ 72.3	19.8	270.0	+ 250.2	141.29	59.21	- 82.02
24	100	10.7	121.0	194.4	+ 73.4	246.8	317.2	+ 70.4	23.0	301.4	+ 278.4	164.55	66.10	- 98.55

- a) From U.S. Weather Bureau "Rainfall Frequency Atlas of the Hawaii Islands" (1962).
- b) Based on a Nitrogen value of 0.75 mg/L for '1981' conditions and 0.60 mg/L for "Full" development.
- c) Based on a Phosphorus value of 0.07 mg/L for '1981' conditions and 0.57 mg/L for "Full" development.
- d) Based on a Suspended Solids value of 1000 mg/L for '1981' conditions and 250 mg/L for "Full" development.

Storm Water Runoff Quality Alterations

The changes in the quantity of the various constituents being transported in the storm water runoff are of equal if not more importance than the changes in the volume of storm runoff for the particular storm event under review. The nitrogen, phosphorus, and suspended solid loads under both pre- and post-development conditions for storms of 1-hour and 24-hour duration at recurrence intervals of 1, 5, 10, 25, 50, and 100-year are shown in Table 2. It can be noted from Table 2 that the net change in nitrogen loads range from an incremental increase of 36.3 to 73.5 lb/event for the 1-year/1-hour and 25-year/24-hour storm events, respectively. A slight decrease in nitrogen load occurs when progressing on to the 100-year/24-hour storm. For phosphorus, the incremental changes increase from 41.3 to 278.4 lb/event for the 1-year/1-hour and 100-year/24-hour storms, respectively. Suspended solids on the other hand indicate an initial increase of 3.07 and 0.81 ton/event for the 1-year/1-hour and 5-year/1-hour storms, respectively, and then a steady decrease to 98.55 ton/event for the 100-year/24-hour storm. Based only on the 253 acres of project development the incremental increase in nitrogen would range from 0.14 to 0.28 lb/acre; the increase in phosphorus from 0.16 to 1.1 lb/acre; and the suspended solids would initially range from an initial increase of 31 lb/acre to a decrease of 779 lb/acre.

It must be pointed out that the contaminant loads presented in this study are for comparative purposes only, and should not be taken as absolute values. They are intended to demonstrate 1) whether an increase or decrease in loads might be expected, and 2) the relative magnitude of these increases and decreases. The results of this study suggests that the output of nitrogen and phosphorus can be expected to increase, while the suspended solids are estimated to increase slightly for the low intensity/duration storms and then decrease for the higher intensity/duration storms.

Other water quality constituents of general concern include biocides and heavy metals. In general, the biocides in use today tend to break down more readily in comparison to the more long lasting types of a few years ago. Consequently, except for agricultural runoff, the types and concentrations are usually considered insignificant. Biocide (pesticides) data were collected

from Kamoalii Stream (July to December, 1975) in one of the aforementioned WRRC studies (Young, et al., 1976) and the highest average pesticide constituent recorded was only 0.00062 mg/L for PCP.

The long-term effects of heavy metals at the concentrations reported in Table 1 are not well defined, despite the numerous studies on Kaneohe Bay water quality. The median heavy metal concentrations for upper Kamoalii Stream in 1975, prior to the construction of the Kaneohe Flood Control Project are presented in Table 3. Although it is sometimes difficult to compare heavy metals from different time periods, locations, and possibly different analytical procedures and techniques it is apparent that the values from Table 1 for residential areas are significantly higher than those from Luluku and Kamoalii Streams (Table 3). Also included in Table 3 are the results of a heavy metal analysis of a grab sample (May 1976) from Luluku Stream (USGS, 1970-1980). To gain an insight into the significance of heavy metals in storm runoff from residential areas a comparison can be made to the values required for potable (drinking) water.

In terms of heavy metals (Table 1) for post-residential development conditions: the chromium values of .013 mg/L are 1/4 the 0.05 mg/L maximum concentration limit for drinking water, as specified in the State of Hawaii "Potable Water Systems" regulations (PHB, 1977) (which were based on the Federal Safe Drinking Water Act); the copper concentration of 0.36 mg/L is only a fraction of the 1.0 mg/L limit suggested in the National Secondary Drinking Water Regulations (USEPA, 1979) (Copper is not called out in the State of Hawaii regulations); the zinc concentrations at 0.512 mg/L is about 1/10 of the 5.0 mg/L suggested limit in the National Secondary Drinking Water Regulations (not listed in the State of Hawaii regulations); the iron value of 0.377 mg/L is slightly above the 0.3 mg/L limit, for aesthetic reasons (color and taste), of the National Secondary Drinking Water Regulations (not listed in the State of Hawaii regulations); and the lead concentrations of 0.407 mg/L is significantly higher than the State of Hawaii limit of 0.05 mg/L for drinking water. It is ultra-conservative to compare storm water runoff quality to that required for drinking water, but the prospective can be seen that lead is the metal of concern in storm water runoff.

Table 3
Heavy Metal Concentrations, Luluku and
Kamooalii Streams, Windward Oahu, Hawaii

Constituent	Kamooalii Stream ¹ Jul-Dec, 1975 (Median values) mg/L	Luluku Stream ² May 6, 1976 (Grab Sample)	
		Total mg/L	Dissolved mg/L
Cadmium	0.005	0.010	0
Chromium	0.004	0	0
Copper	0.005	0.010	0.003
Iron	--	0.180	0.010
Lead	0.003	0.100	0.001
Manganese	--	0.010	0
Mercury	0.003	0	0.0
Nickel	0.003	--	--
Zinc	0.005	0	0

1/ Source: Table 15, page 28, (Young et al., 1976)

2/ Source: Page 404, 1976, (USGS, 1970-1980)

With the national effort to remove or reduce the exposure of lead to the environment the largest potential source (presently) is generally alleged to be from the burning of leaded gasoline in internal combustion engines. However, new cars, especially since 1974, have been designed to use only unleaded gasoline, which is intended to reduce the output of lead to the environment. Thus, reported data is presently lacking, but the supposition is advanced that the concentration of lead from storm water runoff should be steadily decreasing. Although the information is apparently not published and not readily available to the public, a heavy metal analysis of the Manoa Drainage Basin, in Leeward Oahu, conducted by the State of Hawaii Department of Health (rough draft report dated June 1980) revealed that lead concentration in storm water runoff from a residential area in upper Manoa Valley was less than one-half that reported in Table 1. This is not conclusive evidence but the supposition of decreasing lead concentrations in storm water runoff from residential streets is indicated.

From the existing information on Kaneohe Bay, therefore, no detectable impacts attributable to heavy metals from the project site are expected. Furthermore, from most studies to date, Kaneohe Bay appears to be more sensitive to nutrient and sediment contamination.

This study has addressed the long-term impacts of the proposed project on storm water runoff and contaminant loads carried by the runoff. It is recognized that during construction, severe incidences of water pollution can occur as a result of grading activities, especially during wet weather periods. This is especially evidenced by the high suspended solids concentrations in Kamooalii Stream during 1980, which was apparently a result of the upstream construction activities for the Kaneohe Flood Control Project (USGS, 1970-1980). The primary pollutant would be suspended solids. The impact of construction activities can be minimized by adhering to strict erosion control measures, particularly those specified in the City and County of Honolulu's Grading Ordinance (1972) and in the State of Hawaii Department of Health's Water Quality Standards, Chapter 37-A (1979).

SUMMARY AND CONCLUSIONS

The proposed Iolani School Lands Development, located in Windward Oahu, Hawaii, is situated in the 5.8 square mile Kamoalii-Kaneohe drainage area, which is the most southern of the 10 defined drainage areas that comprise the approximately 40 square mile Kaneohe Bay Drainage Basin. The project consists of 3 discontinuous areas, I, J, and K, which call for the development of 303 acres out of 1461 acres, for a total of 1248 residential lots, 5 agricultural lots (2 acres/each); and 2 parks (8 acres), with the remainder to be primarily placed in preservation status. The vegetation of the project area is best described as a densely vegetated forest setting, with 80 percent being exotic, including some banana culturing.

The annual rainfall of the drainage basin ranges from over 100-inches at the crest of the Koolau Mountain Range to less than 50-inches at Kaneohe Bay, with the project site area being approximately 85-inches. The drainage basin contains 5 tributaries (which flow through or by the project site) that flow into Kamoalii Stream which in turn converges with Kaneohe Stream before discharging into Kaneohe Bay. A recently completed 76-foot high earth filled dam is located on Kamoalii Stream, just makai of the project site, as part of the Kaneohe Flood Control Project.

The purpose of this study was to evaluate the environmental impact that the proposed Iolani School Lands Development Areas I, J, and K, is estimated to have on the quality of storm water runoff for 1-hour and 24-hour storms at several recurrence intervals that range from 1-year to 100-year. The development of the 303 acre site is projected to increase the volume of storm water runoff from 23.2 acre-ft for the 1-year/1-hour event to 73.4 acre-ft for the 100-year/ 24-hour event. The volume of the latter would be less than 1% of the maximum capacity of the new (makai) Kaneohe Flood Control Dam; however, only a portion of the storm water runoff of Area I is actually planned to be discharged into water courses leading to the reservoir behind the dam.

Based on several local studies (including streams in the Kaneohe-Kamoalii drainage area), and reasonable assumptions, the quality of the major constituents studied (nitrogen, phosphorus, and suspended solids) for both undeveloped and developed conditions were ascertained to respectively be: 0.75 and 0.60 mg/L for nitrogen; 0.07 and 0.57 mg/L for phosphorus; and 1,000 and 250 mg/L for suspended solids. The incremental changes for nitrogen showed an increase of 36.3 to 73.5 lb for the 1-year/1-hour and 25-year/24-hour storm event, respectively, with a slight decrease in the nitrogen load when progressing on to the 100-year/24-hour storm event. Phosphorus likewise incrementally increased from 42.1 to 278.4 lb for the 1-year/1-hour and 100-year/24-hour storm event. Suspended solids, on the other hand, increased from 3.87 ton for the 1-year/1-hour storm event to a decrease of 98.55 ton for the 100-year/24-hour storm event.

The constituent loads, it needs to be emphasized, are not considered as absolute, but rather they should be utilized to demonstrate trends. Following this, the development of the proposed project site should increase the nitrogen and phosphorus output, while the suspended solids should increase for the low frequency/duration storms and then decrease somewhat for the higher frequency/duration storms.

Besides the aforementioned constituents there are concerns over potential changes in the output of biocides and heavy metals. Biocide data is quite limited for natural and urban runoff situations. In general, the biocides presently in use tend to breakdown more readily in comparison to the more lasting types of a few years ago; consequently, except for agricultural runoff, the types and concentrations are usually considered insignificant. Analysis for Kamoalii Stream during 1975 showed the highest pesticide value to be PCP, with an average concentration of only 0.000062 mg/L.

The long-term effects of heavy metals at the concentrations reported in this study are not well-defined, despite the numerous studies on Kaneohe Bay water quality. However, with the exception of lead most of the analyzed heavy metals are below the limits required or recommended for drinking water. Based on local derived storm water data, for 1972-1973, the concentration of lead is significantly higher than that acceptable for drinking water, although comparing the quality to storm water to drinking water is ultra-conservative. However, new

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cars, especially since 1974, have been designed to only use unleaded gasoline, which is intended to reduce the output of lead to the environment. Thus, reported data is presently lacking in Hawaii, but the supposition is advanced that the concentration of lead from storm water runoff should be steadily decreasing. Unpublished data (1980) on heavy metals, by the State Department of Health, from a residential area in upper Manoa seemed to support this supposition. No detectable impacts attributable to heavy metals are expected. From most studies to date, Kaneohe Bay appears to be more sensitive to nutrient and sediment contamination.

This study has addressed the long-term (full) developed impacts of the proposed project on storm water runoff and the contained constituents loads. It is recognized, however, that during construction, potential severe incidences of water pollution could occur as a result of grading activities, especially during storm conditions if proper erosion control measures are not intensively followed.

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