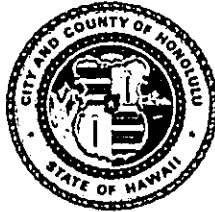


Wahiawa Botanical  
Garden Master Plan

DEPARTMENT OF PARKS AND RECREATION  
**CITY AND COUNTY OF HONOLULU**

650 SOUTH KING STREET  
HONOLULU, HAWAII 96813

JEREMY HARRIS  
MAYOR



RECEIVED

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OFC. OF ENVIRONMENTAL  
QUALITY CONTROL

DONA L. HANAIKE  
DIRECTOR

ALVIN K.C. AU  
DEPUTY DIRECTOR

January 7, 1997

Mr. Gary Gill, Director  
Office of Environmental Quality Control  
State Office Tower  
235 South Beretania Street, Room 702  
Honolulu, Hawaii 96813-2437

Dear Mr. Gill:

Having reviewed the comments received on the draft environmental assessment for the Wahiawa Botanical Garden Master Plan, located in Wahiawa, Oahu, TMK No. 7-4-17:01, during the thirty-day public review period which began on September 8, 1996, the Department of Parks and Recreation has determined that this project will have no significant environmental effect and with this letter issues a finding of no significant impact. We request that you publish this notice of determination in the January 23, 1997 issue of the Environmental Notice.

Enclosed are four copies of the final environmental assessment and a completed Bulletin publication form. Please call Brian Suzuki of our Advance Planning Branch at 527-6316 if there are any questions.

Sincerely,

A handwritten signature in cursive script, appearing to read "Dona L. Hanaike".

DONA L. HANAIKE  
Director

DLH:ct

Enclosures

cc: Gerald Park

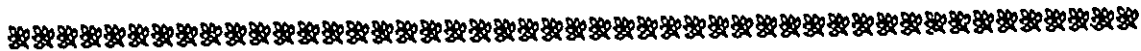
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Botanical Garden Master Plan

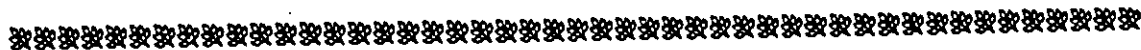
JAN 23 1997

FILE COPY

FINAL ENVIRONMENTAL ASSESSMENT



**WAHIAWA BOTANICAL GARDEN**  
**MASTER PLAN**  
*Wahiawa, Oahu, Hawaii*



Prepared for

DEPARTMENT OF PARKS AND RECREATION  
City and County of Honolulu  
650 South King Street  
Honolulu, Hawaii 96813

Prepared by

GERALD PARK URBAN PLANNER  
1400 Rycroft Street, Suite 876  
Honolulu, Hawaii 96814

December, 1996

FINAL ENVIRONMENTAL ASSESSMENT

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**WAHLAWA BOTANICAL GARDEN**

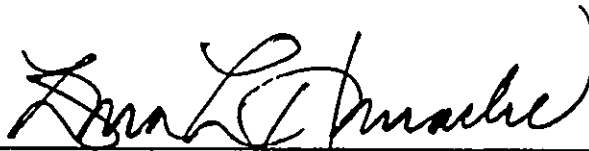
**MASTER PLAN**

Wahiawa, Oahu, Hawaii

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Prepared in Partial Fulfillment of the Requirements  
of Chapter 343, Hawaii Revised Statutes and  
Title I 1, Chapter 200, Hawaii Administrative Rules  
Department of Health, State of Hawaii

Responsible Official:



Dona L. Hanaïke, Director  
Department of Parks and Recreation  
City and County of Honolulu

JAN - 7 1997

Date:

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## SUMMARY INFORMATION

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Proposed Action: Wahiawa Botanical Garden Master Plan

Proposing Agency: Department of Parks and Recreation  
City and County of Honolulu

Determining Agency: Department of Parks and Recreation

Location: Wahiawa, Wahiawa District, Oahu

Tax Map Key: 7-4-17: 01

Land Area: 26.9177 acres

Approximate Area of Project: 22 acres

Land Owner: City and County of Honolulu

State Land Use District: Urban

General Plan: Urban Fringe

Development Plan Area: Central Oahu  
Land Use Map: Park and Recreation  
Public Facility Map: Park Modification w/in 6 years

Zoning: P-2 General Preservation

Special Management Area: Outside SMA

Existing Use: Botanical Garden, Drainage

Contact Person: Michael S. Kristiansen, Director  
Honolulu Botanical Gardens  
50 North Vineyard Boulevard  
Honolulu, Hawaii 96817

Telephone: 522-7060

Note: Revisions to the text of the Draft Environmental Assessment appear in *bold italic* type. Deleted text is shown in brackets.

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**Section 1**  
**DESCRIPTION OF THE PROPOSED ACTION**

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The Department of Parks and Recreation, City and County of Honolulu, proposes to implement the [recommendations of] *the improvements described in the Wahiawa Botanical Garden Master Plan*. The master plan has been adopted by the Department of Parks and Recreation as the long-range strategy for the development of the Wahiawa Botanical Garden located at Wahiawa, Oahu, Hawaii.

The Wahiawa Botanical Garden is situated in a narrow, steep, and densely vegetated gulch in the central area of Wahiawa Town. The garden is bordered by Glen Avenue to the north, California Avenue to the south, Wahiawa Recreation Center to the west, and residential developments along Uuku Street to the east. The nearly one mile long, V-shaped gulch is an unnamed branch of the south fork of Kaukonahua Stream which flows into Lake Wilson. Areas surrounding the garden can be described as suburban residential characterized by single-family residences, schools, playgrounds, and streets. A Location Map is shown in Figure 1.

**A. Purpose and Need for the Master Plan**

The Wahiawa Botanical Garden Master Plan is intended to protect and preserve the garden's natural and cultural resources and to expand the educational, interpretive, and recreational opportunities for the general public. [The garden's unique horticultural resources and its rain forest environment have remarkable education, aesthetic, and recreation appeal.] Improvements to and management of the resources at Wahiawa Botanical Garden are guided by the management goals of the Honolulu Botanical Garden (HBG). These goals are supported by objectives in the functional areas of science, horticulture, education, and recreation. The goals and objectives of the HBG are:

**Science:** Implement formal collections management polices and practices.

Ensure proper management of an orderly and carefully conceived plant collections policy and accessions system and provide for necessary scientific documentation of botanical garden resources.

**Horticulture:** Implement formal cultivation management standards and practices.

Ensure proper management of an exceptionally significant tropical plant collection and provide for optimum horticultural care of botanical garden resources.

Implement horticultural correct, labor saving techniques within the botanical garden.

Improve botanical garden entrance areas and overall aesthetic imagery.

**Education:** Develop quality interpretive programs and services.

Ensure public awareness of global resource management and conservation issues and provide for creative learning opportunities to enhance understanding of the significance and value of botanical garden resources.

**Recreation:** Develop relevant botanical garden recreational programs and services.



Ensure responsiveness in meeting community needs and provide for effectiveness and efficiency in the management of botanical garden program operations.

As the long-range document to guide development and in the context of the goals and objectives of the Honolulu Botanical Gardens, the purposes of the Wahiawa Botanical Garden Master Plan are to:

- protect, maintain, and properly manage all resources in the garden;
- provide botanical resources for scientific research;
- provide adequate facilities and staffing to properly manage, meet horticultural requirements, and increase public awareness of resource management and conservation.
- upgrade the environmental quality of the garden; and
- provide facilities to serve the recreational and cultural needs of the community.

### B. Background Master Plan Concepts

The Master Plan proposes several significant changes to the existing garden to achieve its objectives. [Included are] *These changes include* the construction of a Visitor Education Center building on a sloping section of the gulch, the development of an "activity core", and drainage improvements along the bottom of the gulch. The Master Plan is shown in Figure 2.

#### 1. Visitor Education Center

The Visitor Education Center will be [constructed] *located in the middle section of the Garden* on a section of flat land fronting Glen Avenue across its intersection with Crest Avenue. The proposed Center is envisioned to be a [four] *multi-level structure* with a total floor area of approximately 7,500 square feet. The [structure] *Center* will [house] *have space for:* administrative offices, a visitor information center, gift shop, classrooms for garden related studies and community use, a multi-purpose room, a reference center/library, kitchen, and restrooms.

The [structure] *proposed Center* will be [tiered and] *designed to* follow the terrain [down into] *of the* ravine. The building will be integrated into the ravine slope by stacking the [four] *floor levels* atop each other to minimize building mass and intrusion into the garden. *The multi-level Center design will minimize the amount of grading and excavation during the construction of the structure.* The *Center's* design is intended to preserve valuable flat land of the garden, allow multi-level viewing into the rain forest environment, and provide ready access to the bottom of the ravine. Ramps cut into the slope will provide [handicap] *persons with disabilities* access to all levels and to garden trails. In addition, a special elevator for the walking impaired [is] *will be provided within the Center.*

The Center will function as the [hub] *focal point* of garden activities and uses. Visitors will enter the garden from street level through a main entry at the Center. An information booth, plant exhibits, display area, and a gift shop will be located in the entry area. Lower levels will contain classrooms and a multi-purpose room will be available for demonstrations, seminars, social activities, and community group functions during day and evening hours.

Near the base of the Center at the bottom of the gulch, the Plan proposes the development of an "activity core" that would represent the highest concentration of activity and development in the garden (See Figures 3 and 4). Improvements proposed for this area include an outdoor amphitheater with seating for approximately 50 people, a refreshment and snack concession, a sensory garden, a landscape demonstration garden, a sculpture garden, and the existing Hawaiian garden.

## 2. Theme Garden Development

Existing plant collections will be intensified and new plant collections introduced to create theme gardens. While unique individual specimens will be displayed, future gardens will be developed in terms of forests and groves representing geographical environments. The theme gardens will be organized along the length of the gulch.

The beginnings of several such theme gardens already exist in the gulch but substantial landscape improvements and plant materials are needed to create the desired theme garden environments. In addition to the existing Hawaiian Garden, the themes may include a palm Garden, an Okinawan Garden, South American Forest, bamboo forest, and Australian Forest.

## 3. Pedestrian Pathway System

The existing pedestrian system of walks and trails will be improved. A main trail linking all points of the garden will be constructed along the bottom of the gulch following the waterway but outside the path of flooding. Secondary loop trails will branch from the main trail into the theme gardens. The main trail will be constructed of asphaltic concrete; secondary trails will be built using other surface materials, including gravel. Footbridges *at various points* will be built over the waterway so that pedestrians can traverse between different areas of the garden.

Access [by the handicapped] *for persons with disabilities* is an important consideration and [reasonable efforts will be made to provide a barrier free environment throughout most of the garden] *will be designed to comply with ADA standards*. Longitudinal slope of trails should not exceed 12:1 wherever possible, and cross slopes should not exceed 2%. Handrails will be provided where this grade is exceeded.

## 4. Drainage Improvements

The Wahiawa Gulch serves as a drainage channel for the surrounding streets and residential areas of upper Wahiawa Town during periods of heavy rainfall. Storm-water runoff is discharged into the gulch from several drain pipes, culverts and swales and makes its way to the southern end and is eventually discharged into Lake Wilson.

Discharge rates and quantities into the gulch have not been calculated *due to the inconsistency of rainfall in the area*. [As a regional drainage basin, t]The Master Plan proposes to help with the handling of regional stormwater runoff by maximizing the width of the waterway to increase its carrying capacity. [The waterway areas of the garden would slow runoff velocity by lining the bottom of the waterway with large boulders, and store runoff in detention basins located in the oxbow areas of the gulch. The basins could be designed as ponds and would introduce water as a design element into the garden environment.] *The improvements along the bottom of the gulch include improving the existing waterway. The waterway will be improved to increase its carrying capacity through the garden. In addition, several new ponds will be developed. These ponds will not only be an aesthetic feature for various theme areas of the garden but will also serve as stormwater detention basins for the region. The new ponds will be of sufficient depth to hold a limited volume of stormwater runoff. In addition, the ponds would reduce the amount of sediment and debris that currently flow through the gardens during heavy rainstorms.* It is also recommended that aquatic plants be used to aid in filtering pollutants from runoff water before it leaves the site.

#### 5. Signage and Graphic Improvements

In addition to labeling plants, signage will be used for orientation, identification, interpretation, and to reinforce the garden's character. Color coded maps will designate different parts of the garden with markers also bearing the same color codes. Graphic symbols will be used to identify the theme gardens, trails, and facilities throughout the garden.

#### 6. Parking Lot Improvements

The existing parking lot on Glen Avenue will be redesigned to city standards then graded, repaved, and landscaped based on the requirements of the Land Use Ordinance. The parking lot will be improved in phases and when completed will accommodate 50 vehicles. The existing parking lot on California Avenue also will be repaved and no change in the existing number of stalls (26 regular plus 2 handicap stalls) is anticipated.

#### 7. Utility System Improvements

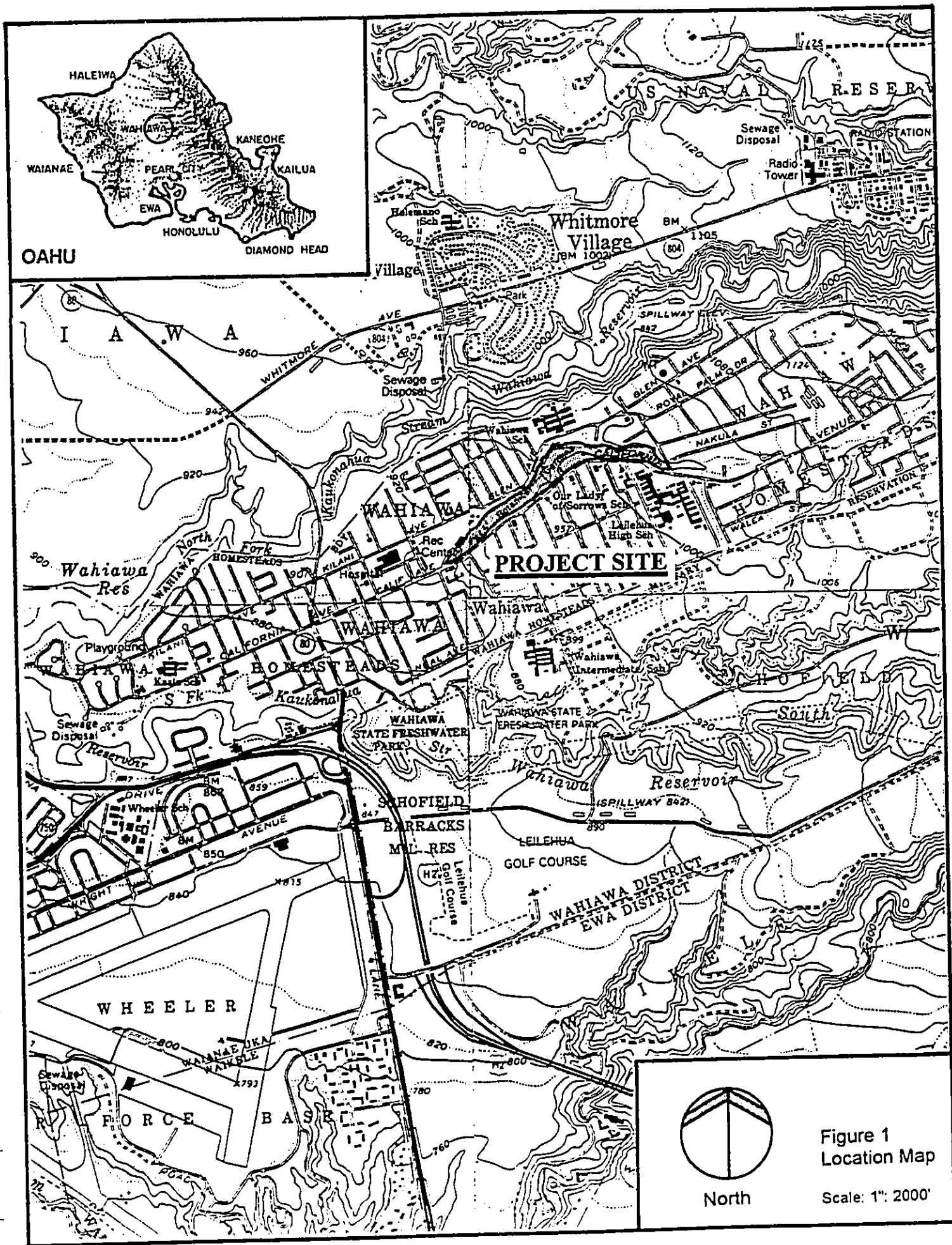
Existing utilities generally are adequate to accommodate the proposed improvements. The availability and adequacy of the respective utility systems will be confirmed by the respective authority during the design stage or at the time of building permit application. It should be pointed out that the Department of Wastewater Management will not approve new sewer connections until such time that the Wahiawa Wastewater Plant is expanded to accommodate additional flow.

#### C. Plan Implementation

Wahiawa Botanical Garden is owned and operated by the City and County of Honolulu. The garden is identified by tax map key 7-4-17: 01 encompassing an area of 26.917 acres. A narrow portion of the 27 acres located at the western end and adjacent to the Wahiawa Recreation Center is not anticipated to be functionally useful to the garden. This parcel is about 5 acres in size. It has been suggested that this land need not be developed or maintained by the Honolulu Botanical Garden and could be transferred to the Wahiawa Recreation Center for its future use.

The Master Plan does not address the possibility of assessing an entrance or parking fee for visitors.

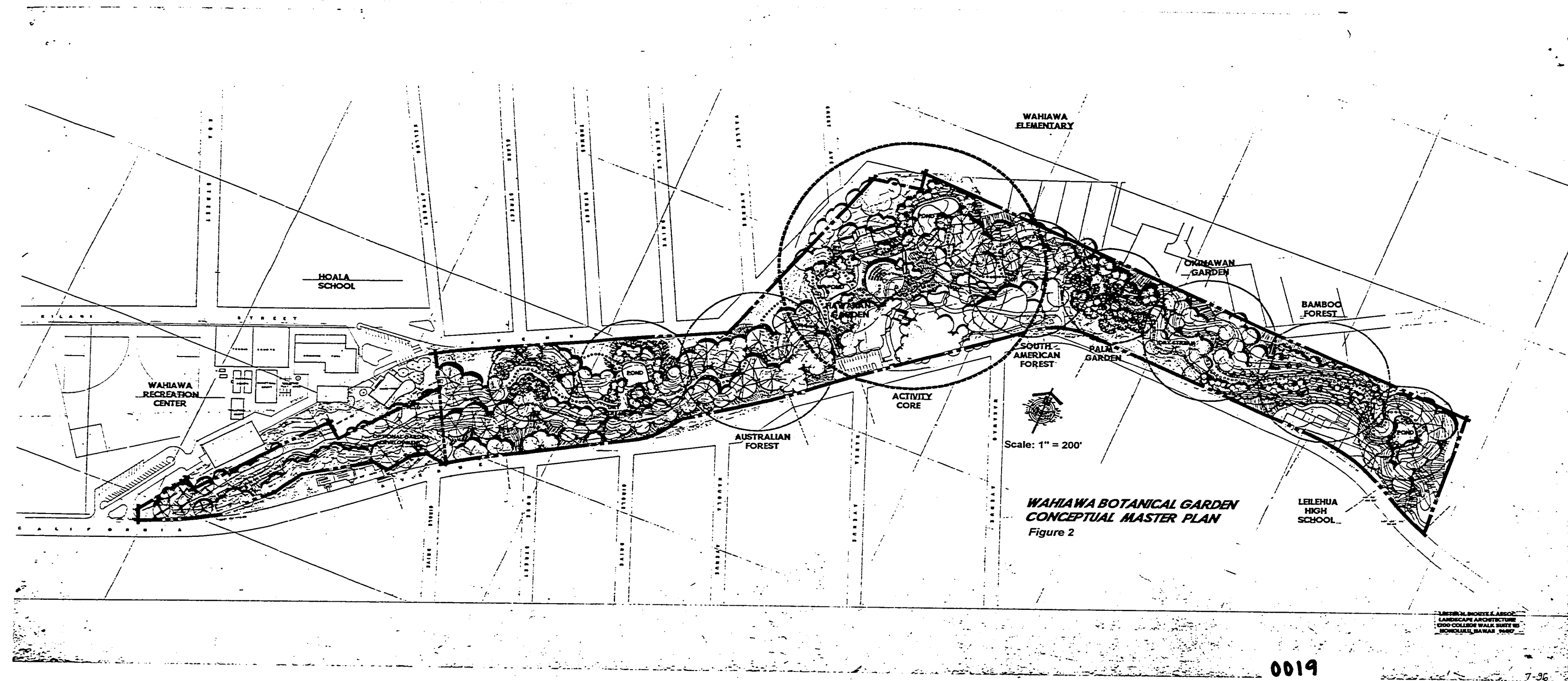
The total cost of improvements for Wahiawa Botanical Garden is estimated at \$6.5 million (\$1996) and will be funded by the City and County of Honolulu. A two phase construction schedule has been recommended with each phase projected to take two years to complete. Implementation of each phase is contingent on the availability of funds and budget approval by the City Council of Honolulu. Improvements by phases and projected costs are shown in Table 1.



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DRAWING/MAP**

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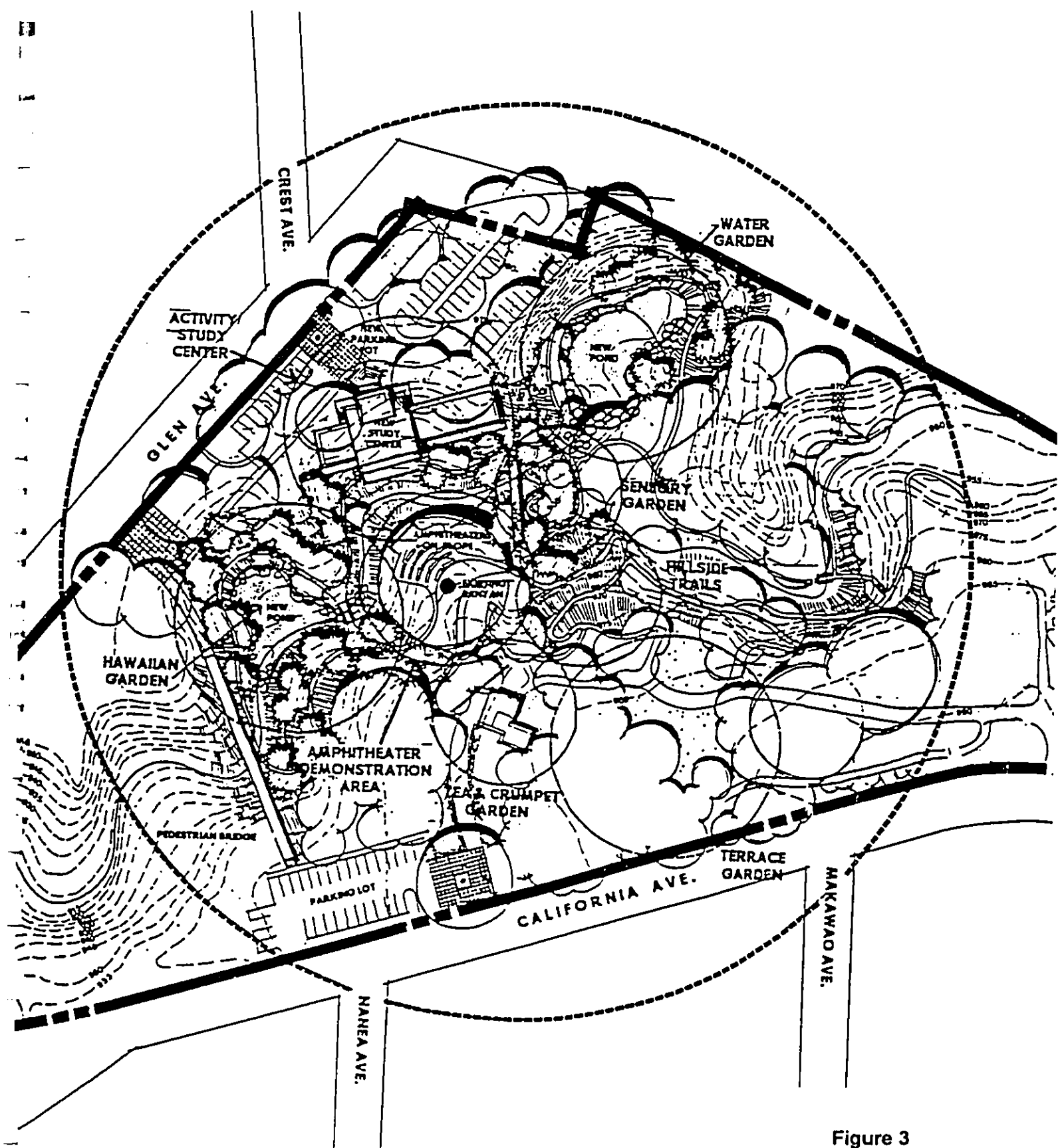
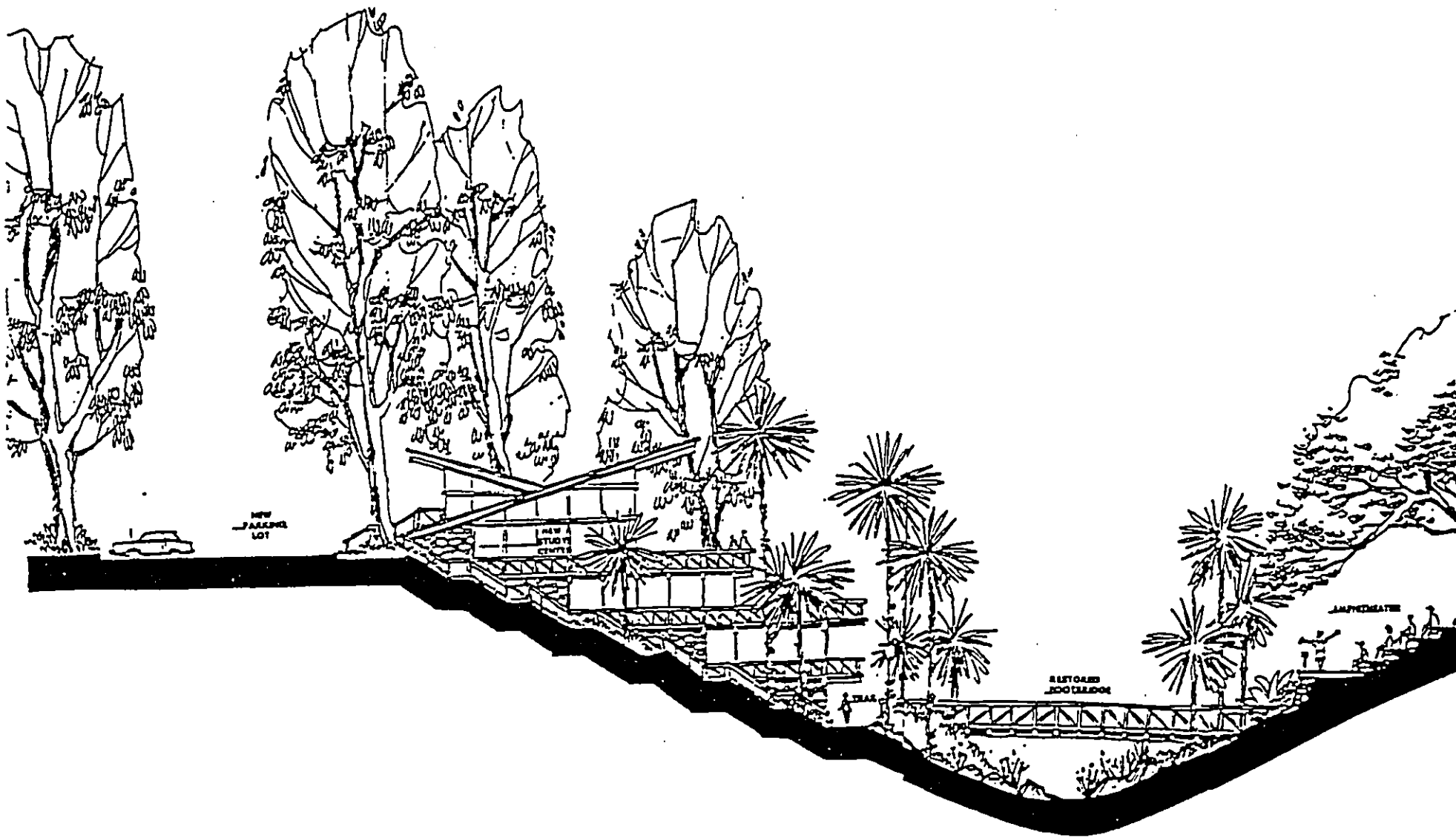


Figure 3  
Activity Core Plan View  
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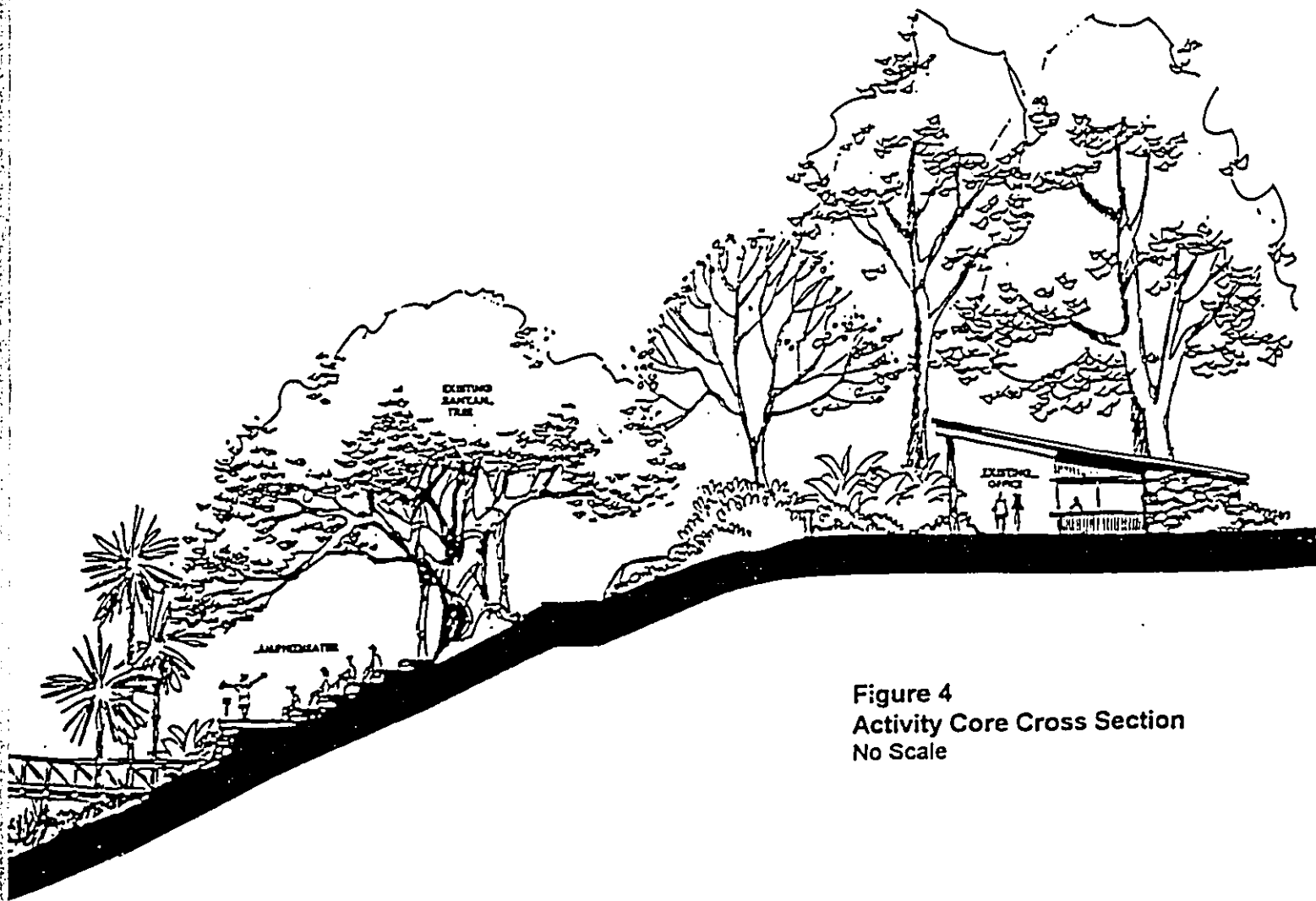


Figure 4  
Activity Core Cross Section  
No Scale

**TABLE I**  
**WAHIAWA BOTANICAL GARDEN**  
**PHASING AND COST PROJECTIONS**  
**(\$1996)**

**Phase I**

Planning and Engineering	\$ 320,000.00
Visitor Center (5,000 sf)	1,275,000.00
Visitor Parking and Roadway	575,000.00
Pathways and Pedestrian Circulation (800 LF)	89,000.00
Signage and Graphics	64,000.00
On-site Infrastructure (water, drainage, sewer, power)	320,000.00
Landscaping (Theme Garden Development)	708,000.00
Off-site Infrastructure	<u>268,000.00</u>

Phase I Total \$ 3,619,000.00

**Phase II**

Planning and Engineering	\$ 191,000.00
Visitor Center Expansion (2,500 sf)	478,000.00
Visitor Parking Expansion (20 new stalls)	268,000.00
Pathways and Circulation (6,500 LF)	523,000.00
Signage and Graphics	102,000.00
On-site Infrastructure	320,000.00
Landscaping	1,053,000.00

Phase II Total \$ 2,935,000.00

Total Phases I and II \$ 6,554,000.00

Source: Wahiawa Botanical Garden Master Plan  
Lester Inouye & Associates, 1991  
Cost Estimate Extended to 1996

## Section 2

### DESCRIPTION OF THE AFFECTED ENVIRONMENT

The town of Wahiawa is situated on the flat central plain of Oahu ( the Schofield Plateau) between the Waianae and Koolau Mountains about 24 miles northwest of downtown Honolulu. Encircled by the North and South Forks of Kaukonahua Stream and pineapple fields, Wahiawa was once touted as "The Pineapple Capital of the World". Wahiawa and the neighboring villages of Kunia, Whitmore, Poamoho, and Helemano were built and their populations grew in support of the pineapple industry.

Wahiawa Botanical Garden is one of five botanical gardens comprising the Honolulu Botanical Gardens. The other gardens are Foster, Lili'uokalani, Koko Head, and Ho'omaluhia. The living collection of the five gardens is being developed into one of the nation's most unique public garden complexes. Collectively, they offer a climatically diverse garden system not found in other botanical gardens in the world.

Wahiawa Botanical Garden dates back to the 1930's when it was one of the Hawaii Sugar Planters Association experimental arboreta. Its location at about the 1,000 foot elevation provides the conditions needed by plants from the cool, humid tropics. Foster Botanical Garden, the oldest of the gardens, has the most impressive and mature collection. All of its fourteen acres are planted with introduced vegetation and the site is optimum for the growth of plants requiring a sub-tropical climate. Lili'uokalani Botanical Garden, located mauka of Foster Garden (across the H- I Interstate Freeway), is planned as a native Hawaiian garden. Koko Crater Botanical Garden, located on Oahu's south shore is being developed with dryland plants or those suitable for and climates. Planting began in this 200 acre garden in 1957-58. It is still being developed. Ho'omaluhia Botanical Garden at the foot of the Koolau Mountain Range in Windward Oahu is a 400 acre high rainfall site. The garden was created as part of a federal flood control project.

A consultant's study concluded "that the Honolulu Botanical Gardens could become one of the world's leading botanic garden complexes in terms of site diversity, educational potential, training potential, and conservation potential. The City and County of Honolulu is to be complimented for having encouraged the development of these remarkable facilities" (Institute of Museum Services, 1990).

#### A. Existing Collection and Facilities

Wahiawa Botanical Garden is the second oldest of the five gardens comprising the Honolulu Botanical Gardens. The plant material in the garden includes a large collection of native palms and flowering plants and exotic species introduced to Hawaii. The plant materials range throughout the gulch but can be grouped generally into the theme areas described in the Master Plan.

The total land area of the gulch and garden is 27 acres of which about nine acres have been improved. The garden as it is evolved in the middle section of the gulch principally on its bottom and steep sloping sides. Several, small, flat terraces line the gulch along its sides. Visitors enter the garden from a single entry/exit adjacent to an off-street parking lot along California Avenue. A wide concrete walk leads to a one-story wood structure housing an information booth and restrooms for men and women. The booth is staffed daily by volunteers who answer questions about the garden, offer docent tours, and distribute pamphlets for self-guided tours. There is no gift shop or food concession on the premises.

From the visitor center, pathways lead visitors through plant displays along the terrace garden or down a meandering walk to the gulch floor. The upper terrace is planted primarily with trees and ferns and is well

maintained. Level walkways makes this area accessible to all and benches are provided for sitting and resting. Several footpaths descend to the gulch floor from the upper terrace but these are too steep for the handicapped. Although rugged and unpaved, the floor can be traversed on foot.

The garden is open daily from 9:00 am to 4:00 pm and there is no admission fee. Self-guided tours are the principal means of viewing the garden but groups can request for tours conducted by volunteer docents.

Attendance records (Data Book, 1994) show an increase in visitors from 19,238 in 1990 to a projected 30,000 in 1993. There are no records but it is presumed that most visitors arrive by car, small tour buses or vans, or TheBus.

Back of house activities are confined to a service area built on a flat terrace near the upper part of the gulch fronting California Avenue. Staff offices, a maintenance building, and a caretakers residence are housed in three detached structures. The buildings are of recent construction and appear to be in good condition. Off-street parking is provided for ten vehicles. Potted seedlings are propagated on make-shift racks in a corner of the maintenance area. Five full-time employees comprise the garden staff.

The garden is almost entirely enclosed by a 6-foot high chain link fence. Maintenance vehicles access the garden (and the gulch floor) from two locations. These entries are gated and secured at all times. Within areas actively developed as gardens or in the process of being developed, the gulch floor is used as a transportation corridor. In many places the soil has been amended with concrete rubble or crushed blue rock to facilitate vehicle movement during wet periods. This "road" serves as the only access to the outlet of a rather large culvert feeding into the head of the gulch off Uuku Street.

Other than the botanical garden and its support facilities, there has been almost no major structural improvements within the gulch. No roads cross the gulch but a steel/concrete pedestrian bridge was put in place in the late 1950s. One end of the bridge is located adjacent to the parking lot on California Avenue. A wooden pedestrian bridge crosses the bottom of the gulch in the vicinity of the Hawaiian Garden. The bridge is unsafe and has been cordoned off.

The oldest plantings in the garden date back to the 1920s when this was one of the Hawaii Sugar Planters Association (HSPA) experimental tree arboreta. Many of the larger trees on the site today date from that decade and were planted under the direction of Dr. Harold Lyon. The property was transferred to the City and County of Honolulu in 1950 and opened to the public as a park in 1957.

## **B. Environmental Conditions**

For descriptive purposes, Wahiawa Botanical Garden can be separated into improved and unimproved sections with the pedestrian bridge over the gulch representing the dividing line between sections. The bottom, sides, and flat areas mauka of the bridge have been and continue to be cleared, landscaped, and maintained by staff as the Wahiawa Botanical Garden (Photograph 1).

Makai of the pedestrian bridge, the gulch narrows and the vegetation forms a dense, lush tangle. Layers of storm debris, litter, wild grasses, fallen trees, and unruly plants cover the bottom. Mosquitoes abound. Large, well established trees stand on both sides of the gulch with broad intermixing canopies overhead. There is no access "road" for vehicles or marked foot paths and passage is difficult in some areas. Besides from chain link fencing around the perimeter and drainage outlets and culverts, this stretch of the gulch is generally unimproved.

### Topography

Ground elevation in the vicinity of the gulch rises from approximately 920 feet msl at Wahiawa Recreation Center to 1 000 feet msl at the western most end of the gulch. The depth of the gulch is not known but visual observations suggest a range of between 60 to 80 feet.

### Soils

Soil survey maps (Soil Conservation Service, 1972) record two soil types comprising the project area: Helemano silty clay (HLMG) and Leilehua silty clay (LeB). The entire ravine is mapped as Helemano clay which makes up about 85% of the soil. The remaining 15% is Leilehua clay which is found primarily on the flat lands bordering California Avenue.

Leilehua clay is characterized as moderate to rapidly permeable, of slight erosion hazard, and generally suitable for foundations for low buildings. Helemano clay is also moderate to rapidly permeable but the erosion hazard is severe to very severe and susceptible to sliding.

### Drainage

During periods of heavy rainfall, surface runoff discharges into the gulch from storm drains and grass and cement rubble masonry swales all along California and Glen Avenues. The exact tributary area is not known. A 7' X 7' box culvert is located at the western end of the gulch. This culvert drains the entire gulch southward under California Avenue towards Wahiawa Reservoir.

### Flood Hazards

The Flood Insurance Rate Map for this section of Oahu places all Wahiawa in Zone D which is defined as "areas in which flood hazards are undetermined" (Federal Emergency Management Agency, 1990).

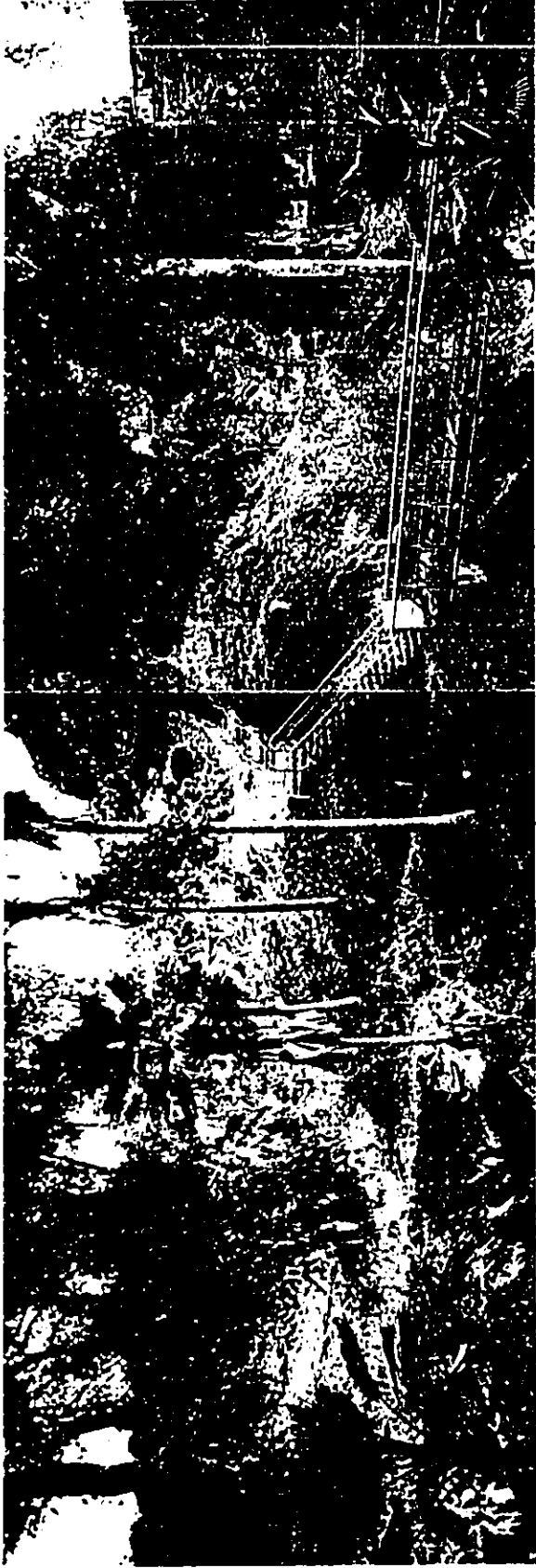
### Archaeology

Archaeological site maps and files at the Historic Sites Division, Department of Land and Natural Resources, depict no recorded archaeological features on the premises.

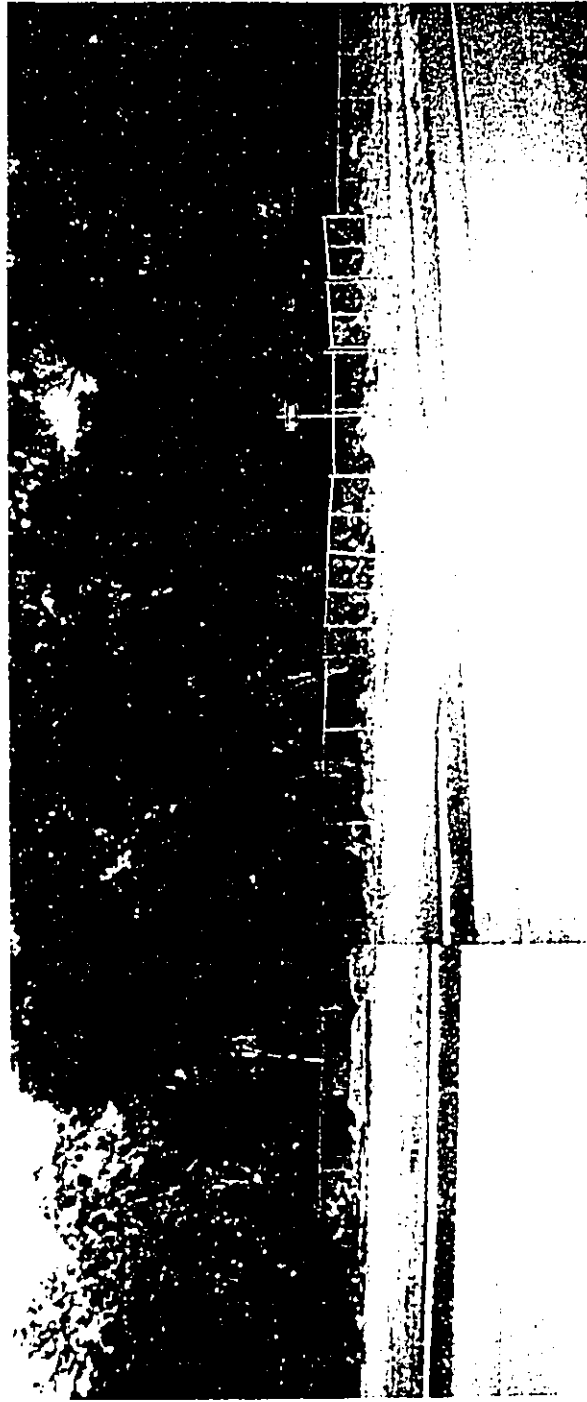
### Flora and Fauna

Staff botanists of the Honolulu Botanical Gardens conducted a botanical survey of the garden from the pedestrian bridge to Fred Wright Park. Areas mauka of the pedestrian bridge were not surveyed since this area is gradually being cleared and planted. New and existing plantings are being accessioned by staff. A plant checklist of the surveyed area is found in Appendix A. No exceptional trees identified by Article 13 "Protective Regulations for Exceptional Trees" are found in Wahiawa Botanical Garden.

A survey of fauna has not been completed because there does not appear to be habitats which are considered significant and/or compatible for endangered or threatened species of animals. The garden is located in an urban area which suggests that development has limited the value of wildlife use of the area.



Photograph 1. Site of Visitor Education Center and Portion of Existing Hawaiian Garden.



Photograph 2. Site of Visitor Education Center Fronting Glen Avenue.

## Land Use Controls

The 27 acre parcel is designated Urban on land use district boundary maps prepared by the State Land Use Commission.

The Oahu General Plan identifies central Oahu (including Wahiawa) as part of the "urban fringe" for the island of Oahu. "The relevant general plan policy is to manage physical growth and development in the urban fringe areas so that: 1) an undesirable spreading of development is prevented; and 2) their proportion of the island-wide resident population remains unchanged. The general plan population distribution guidelines for central Oahu provide for a population range of 12.8 to 14.2 percent of the island-wide total."

The Central Oahu Development Plan Land Use Map designates the site Parks and Recreation (P) and it is zoned P-2 General Preservation on the zoning map for Wahiawa. The garden has been symbolized on the Central Oahu Development Plan Public Facilities Map as "Park/Modification" government construction programmed for commencement within six years" (Ordinance No. 92-55). The Public Facilities Map also programs road improvements to California and Glen Avenues within six years.

The property is neither located in a Special District nor has such a designation been approved for any part of Wahiawa.

*The Department of the Army (Letter of September 11, 1996) indicated that the gulch "is a jurisdictional water of the U.S.; therefore a DA permit may be required for discharges of dredged or fill material into the gulch.*

## C. Public Facilities

### 1. Circulation

California Avenue is the only thoroughfare connecting lower and upper (Wahiawa Heights) Wahiawa. The two-lane, two-way road features a variable pavement width (between 35-45 feet) within a 50 foot right-of-way where it passes the botanical garden. The right-of-way is programmed for widening to 64 feet. Seven feet of garden property between Circle Drive and Uuku Street is needed for the widening.

Glen Avenue also carries mauka-makai traffic between Eames Street (about 0.5 miles above the botanical garden) and lower Wahiawa. The two-lane, two-way road has a variable pavement width (average of 40 feet) within a 50 foot right-of-way. The right-of-way is programmed for widening to 56 feet between Valley Avenue and Koa Street. Three feet of garden property between Kellogg Street and Valley Avenue is needed to accommodate the widening.

A city bus stop adjoins the parking lot on California Avenue.

### 2. Wastewater

Wastewater is discharged into an 8-inch line in California Avenue and conveyed to the Wahiawa Wastewater Treatment Plant at the lower end of California Avenue. Treated effluent is discharged into Lake Wilson.

### 3. Water

A 10-inch water main is located under California Avenue and 8-inch and 16-inch mains are located under Glen Avenue. Water for the garden is drawn through a 3 -inch meter; the maintenance facility and caretaker cottage is fed by an 1-1/2 inch meter. Both are serviced from the California Avenue main.

### 4. Power and Communication

Power and communication services are available on overhead lines from either California or Glen Avenues.

### 5. Schools

Schools bordering the garden include Wahiawa Elementary School (K-6) on Glen Avenue and Leilehua High School (9-12) and Our Lady of Sorrows School, a parochial school, on California Avenue.

### 6. Parks and Recreation

Wahiawa Recreation Center, a City and County of Honolulu facility, is the major community recreation facility in Wahiawa. Located at the western end of the gulch, its facilities include a 25 meter swimming pool, gymnasium, multi-purpose building, lighted tennis courts, outdoor basketball courts, playground equipment, lighted regulation softball and baseball fields, and off-street parking.

The possibility of constructing a two-mile long hiking trail between the botanical garden and Wahiawa Freshwater Park has been suggested. Plans for this trail are not part of the Master Plan for Wahiawa Botanical Garden.

## D. Public Services

### 1. Refuse

Solid waste is collected twice a week by municipal collection crews. Green waste is collected by garden staff and used for mulch.

### 2. Police

The Wahiawa Police Station is located on North Cane Street about three blocks south of the Wahiawa Recreation Center. The town is regularly patrolled by officers.

### 3. Fire

Fire protection originates from the Wahiawa Fire Station located on California Avenue about 1 mile south of the garden. Response time is estimated at under two minutes.



### Section 3

## SUMMARY OF POTENTIAL ENVIRONMENTAL IMPACTS AND MEASURES TO MITIGATE ADVERSE EFFECTS

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### A. Assessment Process

The scope of the project was discussed with staff of the Department of Parks and Recreation and Honolulu Botanical Gardens. State and County agencies were contacted for information relative to their areas of expertise. Time was spent in the field noting site conditions and conditions in the vicinity of the garden. Honolulu Botanical Garden staff conducted a botanical survey and the results are appended in this document. Water sampling and testing and identification of aquatic plants were conducted by AECOS, Inc. The sum total of consultations and field investigations and helped to identify existing conditions and features which could affect or be affected by the project. These conditions are:

- No rare, threatened, or endangered flora or fauna were observed growing in the wild;
- There are no known archaeological or cultural resources on the premises;
- The existing plant collection comprises the principal resources of the area;
- The environment has been altered by man beginning with an experimental arboreta in the 1930s, a park in the 1950s, and a botanical garden in the 1960s;
- The gulch functions as a drainageway for surrounding residential areas and streets, however, the property is not within a designated flood hazard zone.

Design and construction plans for the proposed improvements have not been prepared and a development timetable has not been established. In lieu of this information, environmental impacts are described in general terms and based in part on our experience with projects similar to the improvements proposed for Wahiawa Botanical Garden.

### B. Short-term Impacts

Sitework [is] *will* probably *be* the most disruptive construction activity on the environment. This first activity entails grubbing and clearing, grading to include cut and fill, excavation, backfilling, installing infrastructure, dirt stockpiling, and hauling. All are prerequisites for building the temporary and permanent improvements to follow.

Sitework is a persistent source of fugitive dust. Site contractors are aware that dust is a nuisance to both workers and people living near work sites and it is imperative to maintain stringent dust controls. Dust control measures to be employed by the Contractor may include frequent water sprinkling of the work area, limiting the amount of ground area that is exposed at any given time, erecting dust screens, and immediately landscaping or mulching exposed cuts and fills. Most construction will be confined to within the gulch where the soils are relatively moist and this should aid in controlling dust.

The Contractor will be responsible for general housekeeping of the project area and for keeping adjacent streets and properties free of mud, sediment, and construction litter and debris.

Construction noise, like fugitive dust, cannot be avoided. The total time that construction noise will be generated at a given location and the total time noise sensitive properties would be exposed to noise is not known. Noise sensitive properties are identified as residential uses directly adjoining the garden along upper Glen Avenue, Clark Place, and several dead end streets. Residential uses along lower Glen and California Avenues and nearby schools for our purposes are considered "less" sensitive to noise because they already are exposed to sounds of passing traffic. Although construction noise probably will be audible in all areas, exposure to noise and the duration of exposure is expected to be minimal. Most construction (except for the parking lot Improvements) will be done within the gulch below street level. In addition, noise can be attenuated by the distance between noise sensitive properties and the Job site, type and duration of construction activity, existing vegetation, and background noise (primarily traffic noise).

The allowable noise level for the preservation zoning district is 55 dBL between the hours of 7:00 am and 10:00 pm. Construction activities will produce noise in excess of the allowable daytime noise level and a noise permit will be needed. The Contractor will be responsible for obtaining the permit and complying with conditions attached to the permit. Work will be scheduled for normal working hours (7:00 am to 3:30 pm) Mondays through Fridays thus limiting noise producing activities to certain periods of the day.

Sitework will expose soil thus increasing the opportunities for runoff and erosion particularly on the gulch slopes. Construction of the Visitor Center and the amphitheater will *only minimally* alter the slope of the ravine at their respective building sites. *To minimize soil erosion possibilities, the Visitor Center will likely incorporate a "pole" design that would require excavation to construct foundations for steel and or concrete posts.* The quantity of material to be excavated is not known at this time. The erosion hazard of Heleman soils is severe and a soils study [should] *will* be prepared to address considerations of soil [stability] *suitability prior to construction.* It is anticipated that potential soil hazards [will] *can* be mitigated to an acceptable level. All grading will be done in accordance with erosion control ordinances of the City and County of Honolulu and approved grading plans. Best Management Practices (BMPS) for erosion and drainage control during construction will be prepared for approval by the Department of Public Works.

For the most part, construction work is not a new activity within the developed portion of the botanical garden. Slopes, the gulch bottom, and exhibit areas continue to be improved with small equipment and labor intensive efforts. Physical changes will be most pronounced along the bottom of the undeveloped section which has not been improved at all. This area will be cleared of unwanted vegetation, plant debris, and litter. The bottom will be widened and contoured to accommodate the waterway, main walkway, utilities, ponds, and exhibit areas. Construction activity along the bottom should not be visible to the public from street level and vegetation along the slopes will probably be cleared by hand thus minimizing opportunities for erosion.

Should subsurface archaeological or cultural features or burials be unearthed, work in the immediate area shall cease and historic authorities notified immediately for proper disposition of the finds. *The Historic Sites Division, DLNR commented "because it is unlikely that historic sites would be found along the steep slopes and gulch bottoms in this area, we believe this project will have no effect on historic sites".*

Adverse effects on flora are not anticipated. Unwanted plant stock to include trees, shrubs, invasive grasses, and weeds will be removed. Trees to be removed or relocated shall be tagged by garden staff. Hardy plant stock may be used in landscaping other city projects.

Utility lines or improvements passing through exhibit areas will be routed to avoid damaging plants on display. The Visitor Center and activity core are proposed in the area of the existing Hawaiian Garden. The collection of rare, native Hawaiian plants including *Gardenia brighami*, *Munroidendron racemosum*, *Pritchardia munroi*, and *P. remota* at this location may be affected by construction. Affected plants will be tagged, removed, and relocated elsewhere on-site.

Construction notices will be posted to warn visitors of construction activities. In some instances, the garden may be closed altogether to ensure the safety of the public. If the garden remains open during construction, visitor attendance is expected to decline. Visitors would be exposed to noise and dust, the movement of construction personnel and vehicles, and construction activities in general. The net impact is that one's visit and experience may not be as pleasant and enjoyable as anticipated.

Construction vehicles hauling men and material will contribute to traffic on adjoining streets. Material deliveries shall be scheduled for non-peak traffic hours and before or after schools are dismissed to minimize impacts on after school traffic.

### C. Long-term Impacts

As the most sizable addition to Wahiawa Botanical Garden, the Visitor Education Center will alter existing views of and into the garden from Glen Avenue (See Photograph 2). Many of the trees at this location will be removed and replaced by the four level structure. Only the top level will be visible from Glen Avenue giving the appearance of a low-rise structure. The full height and form of the structure will be visible from adjoining locations within the garden, the pedestrian footbridge over the gulch, and the parking lot on California Avenue. Existing trees and tropical foliage should help to screen the building on all sides. The exterior of the building facing the gulch should be offset to help break up its linear facade and to add architectural interest.

Inside the Center, the various levels should be designed with glass windows on the gulch side so will be able to view the land form, plant displays, and the activity core below as they descend into the gulch.

Asides from the Center, most of the planned improvements may not be visible from areas adjoining the garden. The theme gardens, amphitheater, and activity core are all located at the bottom of the gulch about 60 to 80 feet below street grade. Minimal changes in the density of trees on the slopes and flat lands are expected thus views into the gulch should remain generally unchanged from present conditions. However, selective pruning of trees and shrubs should be encouraged so that views into the garden can be enjoyed by the community.

The addition of a library/reference center will aid in plant curation, development of the living collection as scientific resources, research on tropical rainforest plants, and documentation of the collection. These activities currently are absent from the garden because of a lack of facilities on the premises. Asides from accommodating research and administrative functions, the Visitor Center will be available for group and community use. Small group activities such as social, educational, business, and community meetings can be accommodated on the premises. Aside from Wahiawa Recreation Center, there are not many municipal meeting facilities in Wahiawa. The garden itself can be used for group picnics or recreational outings. And like Foster Garden, the garden can be made available for wedding "photo shoots" or other photographic venues.

It is anticipated that the sum total of garden improvements will contribute to public knowledge about the scientific, botanical, and historical aspects of the collection and the garden as a whole. The theme gardens, informational displays, lectures, and functional classes can be used to promote awareness of plant conservation, protection of local endangered flora, or any number of programs that foster a greater understanding of plants and the environment in general and the tropical rainforest in particular.

Engineering analysis of the proposed drainage improvements has not been performed. The proposed improvements such as new building structures and the parking lot will marginally increase storm runoff by creating a net increase in impermeable surfaces. Whether generated by garden facilities or from adjoining areas storm runoff will continue to be discharged into Wahiawa Gulch. The proposed drainage improvements cannot prevent flooding but attempts to control runoff by confining it to a man-made waterway coursing through the gulch. This is an acceptable level of mitigation considering the existing drainage pattern where there is no runoff control. The addition of detention ponds at strategic locations would aid in retaining peak runoff volumes and provide sediment settling before the runoff is discharged into the waterway.

It was desirable to obtain baseline data about runoff water quality. However, during the time the EA was being prepared there were no significant rainfall events. When it did rain, water from several drain outlets had ceased to flow by the time a crew reached the field to collect water samples. What follows then is a generalized prediction of water quality characteristics in the runoff water based on studies of urban storm water quality at various urban locations on Oahu. The locations, parameters, and values are shown in Table 2.

Total solids, pH, conductance, chloride and at least some trace metals are not potential problem contaminants, being present in runoff in concentrations not much different from stream water. Total suspended solids (TSS) and turbidity can be high in any runoff where the watershed is undergoing disturbance (grading and grubbing for example). High values will essentially contribute sediment to the ponds hastening their infilling. The established neighborhoods in this Wahiawa watershed would not contribute large amounts of suspended material during most storm events, although the ponds can be expected to become turbid during rainy periods. Local runoff will also contribute suspended material if area of bare soil are not mulched or covered by ground covering vegetation.

A long term effect of sediment introductions to the ponds will be their conversion from relatively open bodies of water to marshes (vegetation-covered). A certain amount of this conversion will be tolerated and indeed encouraged by the planting of wetland species. When the process has gone too far, dredging of a pond will reverse the process creating deeper, open water in the pond and material to be applied to planting areas within the garden as a soil amendment.

Nutrients in runoff can be a concern in some situations, most particularly where these nutrients ultimately contribute to processes in natural bodies of water known as eutrophication. Eutrophication is marked by excessive growth of aquatic algae, either in the water column (phytoplankton) or as attached mats. Stagnant eutrophic systems can be unsightly and develop bad odors. The proposed ponds are expected to be at least mildly eutrophic, in part because of nutrients supplied in the source water. An abundance of streamside (riparian) vegetation and larger aquatic plants (such as reeds, water lilies) can act as nutrient sinks, converting excess nutrients into plant tissue, thereby countering algal growth. Unless there is an unrealistic desire for the proposed ponds to contain clear water at all times, mild eutrophication should not be a problem. Fertilizer applications to surrounding slopes could present a greater potential contribution to

Table 2 A summary of water quality characteristics from storm drain studies on O'ahu.

	Iwilei†	Manoa‡			Mililani*	
		A	B	C	A	B
Discharge (ft <sup>3</sup> /sec)					30	12
pH	6.5 - 6.7				7.2	7.0
Total solids (mg/l)	220 - 263				251	96
TSS (mg/l)	6 - 16	110	452	168	204	96
Turbidity (ntu)					35	20
DO (mg/l)	5.7 - 7.6					
Conductance (µmhos/cm)					79	52
Chloride (mg/l)	23 - 35					
Total hardness (mg/l CaCO <sub>3</sub> )	64 - 73					
COD (mg/l)	16.5 - 82.4	120	84	43	60	34
BOD (mg/l)	3.6 - 14.1	> 16	> 16	6.4		
Grease (mg/l)	0.3 - 2.1					
<b>NUTRIENTS: (mg/l)</b>						
ammonia		0.20	0.18	0.16		
NO <sub>3</sub> + NO <sub>2</sub>	1.00 - 1.31	2.71	2.14	0.03	0.21	0.10
TKN	0.08 - 6.97	4.01	3.28	1.92	1.2	1.4
Total N		6.72	5.42	1.95		
orthophosphate	0.50 - 1.88					
Total P	1.56 - 2.76	0.12	0.12	0.16	0.34	0.17
<b>METALS: (µg/l)</b>						
arsenic		ND	ND	ND		
cadmium		ND	ND	ND		
chromium	8 - 17	ND	ND	ND		
copper	12 - 28	74	15	40		
iron	26 - 88					
lead	129 - 4560	110	ND	630	20	10
mercury		3	ND	2	0.2	0.1
nickel		79	51	68		
zinc	315 - 1070	371	20	203		
<b>BACTERIA (mpn)</b>						
Total coliform	9700 - 14800					
Fecal coliform	287 - 835				26000	26000
Enterococcus	5100 - 1800					

† Fujiwara (1973). Range of flow weighted averages or flow proportioned composite values from three separate storm samplings in Iwilei District of Honolulu (industrial).

‡ DOH (1980). results of single samples representing runoff from A = HI-freeway, B = University commercial area, and C = Manoa mixed residential/commercial area.

\* Yamane & Lum (1985). Median values from two watersheds (A & B) in Mililani Town over four year period. Number of samples varied from 9 to 208.

eutrophication of these ponds than the water quality of the off-site runoff.

Trace metal concentrations in urban runoff are somewhat difficult to predict yet could have adverse impacts on aquatic biota in the proposed ponds. Only lead and mercury were assessed by Yamane and Lum (Table 2): small amounts of both were found in their study of runoff from Mililani. Different metals, particularly copper, nickel, and zinc were found in the other storm drain studies (Table 2).

No sources of concern for trace metals are associated with the watershed in this part of Wahiawa, although lead from automobiles and paints frequently does show up in streams draining watersheds dominated by residential use. Zinc from automobile tires and arsenic from certain herbicides are other domestic sources encountered in runoff. Because small ponds may be fairly dynamic with respect to sediment turnover and pH conditions favorable to dissolving metals attached to particulates, problems could develop, with metals accumulating in deeper anoxic sediment layers or in aquatic biota.

Bacterial counts (coliform/fecal coliform) are usually quite high in urban runoff and are expected to be the case at Wahiawa Botanical Garden. In general, high coliform-n counts would not constitute a problem particularly considering the ponds will not be used for swimming or bathing. Pathogens, such as Leptospirosis, constitute a more serious problem, less related to runoff than to the proximity of mammalian vectors, such as rats to the water features.

The subject of toxic organic substances in runoff is extremely complex and not easily generalized because of the wide range of substances potentially involved. Pesticides used in the neighborhood, particularly tennicides applied to soils, and toxic components of automobile fuels (mostly polynuclear aromatics) are chemical substances of greatest concern. These substances tend to bind to small particles in runoff and can be deposited in the ponds. Adverse impacts of toxics will mostly be expressed as subtle failures in populations of aquatic organisms. In general, such failures will not be noticed. If, however, problems develop with maintaining desired species of either plants or animals in the ponds, testing of the sediment for toxics should be undertaken. Testing also should be considered before pond dredging to evaluate the suitability of spreading the dredged spoil in particularly sensitive areas of the garden.

The Master Plan estimates that Wahiawa Botanical Garden could attract upwards of 60,000 visitors annually which averages to 155-170 persons per day (60,000/363 open days) in the long-term. This is about a threefold increase over recent counts between 1991 and 1993 when the number of visitors was estimated at 21,600 annually or between 58-64 people per day (21,600/363 open days). Daily counts fluctuate and there may be more or less people visiting the garden than the average on any given day (or for special events).

At this time, there are no plans to allow tour operators to schedule the garden as a commercial tour stop. There are no provisions for bus or commercial vehicle parking.

If projected visitor expectations are achieved, surrounding businesses in Wahiawa may benefit economically. The addition of up to 40,000 visitors annually --- visitors who probably would not visit the town if not for the botanical garden --- could contribute to the community's economy. This is not to suggest that Wahiawa would evolve into a tourist community. Rather, it suggests that the garden may be the stimulus for bringing people to Wahiawa and it is up to the local businesses to realize the opportunities this presents.

In general, botanical gardens are not significant trip generators. Volunteers at the garden informed us that the number of visitors cars varies daily but averages about 25-40 cars per weekday. All park in the California Avenue parking lot.

The anticipated increase in the number of visitors will increase vehicle traffic to/from the garden. The array of proposed activities to include office use, reference center, meeting facility, food concession, and the botanical garden are all traffic generators. A review of trip rates for the various uses suggests a common rate or range of rates is difficult to determine either because there are no rates for the activity or the use on which a rate is based may not apply to what is being proposed except in general terms. For example, there is no trip rate for a botanical garden and the rate for a government office in a suburban location is about 81 trips per day per thousand square feet of office area. In lieu of well defined trip generation rates, trip rates to and from the garden were estimated as follows:

Activity	Vehicle Trips Per Day	Estimated
Government Office	81/000 sf/gfa	60 trips per day (75%)
Food Concession	97/000 sf/gfa	38 trips per day (40%)
Botanical Garden	Surrogate	140-175 trips per day
Meeting Facility	No Rate	0
Classrooms	No Rate	0
Reference Room	No Rate	0

A surrogate estimate for the botanical garden was calculated using a turnover rate of 2.0 to 2.5 times per day for a parking space during visiting hours (9:00 am to 4:00 pm). This suggests that visitors would spend about two hours touring the garden. Multiplying this rate by the planned 70 parking stalls (76 less 6 stalls for staff parking) yielded an estimate of between 140-175 vehicles per day. About half these vehicles would be on-site during the late morning to early afternoon which is the peak visiting time.

The botanical garden office is assumed to be about 750 square feet and would generate traffic on the order of 75% of the rate for a thousand square feet of office space. Similarly, the food concession is estimated at about 400 square feet in area and would generate traffic on the order of about 40% of the rate for a one thousand square foot quality sitdown restaurant.

Trip rates for the meeting facility, classrooms, and reference room are undetermined. It is presumed these facilities would not be in use everyday and their use can be scheduled to minimize traffic conflicts.

In total, an estimated 235 to 275 vehicle trips per day can be expected when the improvements are completed. Because this figure applies to trips to/from the garden, the number of vehicles is half or between 120 to 140 vehicles per day. This amounts to an estimated net increase of up to 100 vehicles per day over current conditions. This increase is expected to take place during non-peak traffic hours.

Having two parking lots is expected to disperse traffic onto the two major roads adjoining the garden thus lessening its impact on the neighboring residential areas. Roadway and sight distance conditions at the California Avenue parking lot are considered acceptable and no significant design changes appear to be required. The Glen Avenue parking lot will be redesigned and expanded. The location of driveways should consider sight distance in both directions with concern for a curve in the road from the direction of Wahiwawa Elementary School. For safety purposes, some kind of traffic control measures should be exercised at the driveways after school is dismissed to minimize traffic hazards for school age children.

On occasions when the parking lots are at capacity, on-street parking is available on both sides of Glen Avenue fronting Wahiawa Elementary School. Alternatively arrangements could be made to use the school parking lot for overflow parking during non-school hours.

The level of development and projected increase in the number of visitors will increase the demand for water, wastewater, power, and other utility services. Estimates of average daily consumption have not been calculated but the existing systems generally are adequate to accommodate daily demand. One shortcoming is the availability of sewer capacity. Currently new hook-ups to the municipal system are not allowed.

Noise is not expected to have significant environmental consequences in the long-term. For the most part, botanical gardens are a quiet place to be enjoyed at a leisurely pace. Noise from maintenance equipment, vehicle traffic, and occasional evening functions can be expected.

The intent of the Master Plan is to improve environmental quality and enhance the scientific, educational, and recreational value of the flora. Some species may be moved to other locations within the garden to conform to garden objectives and growing conditions and new species planted to bolster available stock for the theme gardens. It is assumed that Honolulu Botanical Garden staff botanists (and others) would select exotic plant materials that could be grown, maintained, and controlled by garden staff and would not adversely affect Hawaiian flora.

Light and glare from light fixtures in the parking lots along California and Glen Avenues and the Visitor Center can be expected. Lighting is needed for security reasons and this impact cannot be avoided but can be minimized by shielding and directing light away from adjacent streets and residences.

The garden is enclosed by a chain link fence. As its collection of rare plants grow in numbers, it may be necessary to implement security measures to guard against theft and vandalism. Lighting will help but consideration should also be given to having the Honolulu Police Department increase routine patrolling of the area or hiring a security firm during night time hours.



**Section 4**  
**ALTERNATIVES TO THE PROPOSED ACTION**

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**A. No Action**

A no action alternative would maintain the status quo of the Wahiawa Botanical Garden and preclude the occurrence of all impacts, short and long-term, beneficial and adverse described in this document.

**B. Alternative Design**

Several designs were proposed by the consultant to the Department of Parks and Recreation. The Master Plan design selected by the Parks Department is the preferred alternative for the long-range development of the facility for scientific, horticultural, educational, and recreational purposes.

None of the improvements prescribed in the Master Plan have been designed. It is anticipated that the design of these facilities (to be done by others) will capture the spirit and underlying planning concepts articulated in the Master Plan.

**C. Alternate Uses**

Alternate uses of the undeveloped acreage was not investigated in the Master Plan. Development of the gulch as a botanical garden represents the best use of the property at this time.

The southernmost section of the property may be turned over to the Wahiawa Recreation Center for future expansion of that facility.

**Section 5**  
**AGENCIES AND ORGANIZATIONS [TO BE] CONSULTED**  
***DURING THE ASSESSMENT PROCESS***

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*Notice of the Draft Environmental Assessment of the Wahiawa Botanical Garden Master Plan was published in the Office of Environmental Quality Control Environmental Notice of September 8, 1996 and September 23, 1996. Copies of the Draft Environmental Assessment were mailed to the agencies and organizations listed below. Publication in the Environmental Notice initiated a 30-day public comment period which ended on October 8, 1996. An asterisk identifies agencies and organizations that submitted written comments. Comment letters and responses are found in Appendix C of the Final Environmental Assessment.*

**Federal**

- \*U.S. Corps of Engineers
- \*U.S. Fish and Wildlife Service  
Pacific Ecoregion

**State**

- \*Department of Education
- \*Department of Health
- Department of Land and Natural Resources
  - \*Historic Sites Division
- \*Office of Environmental Quality Control
- \* Office of Hawaiian Affairs

**County**

- \*Board of Water Supply
- Department of Land Utilization
- \*Planning Department
- \*Department of Public Works
- \*Department of Wastewater Management
- \*Department of Transportation Services
- \*Police Department
- \*Fire Department

**Others**

- \*Hawaiian Electric Company
- \*Hawaiian Telephone Company
- \*Wahiawa Community [and] & Business Association, Inc.
- Wahiawa Neighborhood Board No. 26
- Friends of Honolulu Botanical Gardens
- \*Representative Marcus R. Oshiro, House of Representatives

**Section 6**  
**LIST OF PERMITS AND APPROVALS**

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*The List of Permits and Approvals is suggestive rather than comprehensive. Design plans for the various garden improvements have not been prepared and implementation of the plans may require construction permits other than those listed below.*

*It has not been determined if a Department of the Army Permit is required for proposed drainage improvements. A determination will be sought prior to or at the time drainage improvement plans are prepared.*

<u>Permit/Approval</u>	<u>Approving Authority</u>
<u>City and County of Honolulu</u>	
<i>Environmental Assessment</i>	<i>Department of Parks and Recreation</i>
<i>Building Permits (Various)</i>	<i>Building Department</i>
<i>Connection to Storm Sewer</i>	<i>Department of Public Works</i>
<i>Street Usage Permit</i>	<i>Department of Transportation Services</i>
<i>Sewer Connection Permit</i>	<i>Department of Wastewater Management</i>
<u>State of Hawaii</u>	
<i>Noise Permit</i>	<i>Department of Health</i>
<i>NPDES Permits (Various)</i>	<i>Department of Health</i>
<u>United States</u>	
<i>Activities in US Waterways</i>	<i>Corps of Engineers, Dept. of the Army</i>

Section [6] 7  
**PRELIMINARY DETERMINATION OF SIGNIFICANCE**

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Chapter 200 (Environmental Impact Statement Rules) of Title 11, Administrative Rules of the State Department of Health, establishes criteria for determining whether an action may have significant effects on the environment (11-200-12). The relationship of the proposed project to these criteria is discussed below.

- 1) Involves an irrevocable commitment to loss or destruction of any natural or cultural resource;

There are no cultural resources on the premises to be lost as a result of this project. The plant collection is considered a natural resource although most of the species in the garden have been introduced by man.

- 2) Curtails the range of beneficial uses of the environment;

The proposed improvements will expand the use of Wahiawa Gulch for other than drainage purposes. The entire gulch has been designated a botanical garden since the 1950s and its development will fulfill this intended use.

- 3) Conflicts with the state's long-term environmental policies or goals and guidelines as expressed in chapter 344, Hawaii Revised Statutes, and any revisions thereof and amendments thereto, court decisions or executive orders;

The project does not conflict with long-term environmental policies, goals, and guidelines of the State of Hawaii.

- 4) Substantially affects the economic or social welfare of the community or State;

The project will not adversely affect the economic or social welfare of the community or State. In the long-term, it is believed that the anticipated increase in visitors to the garden could benefit merchants in Wahiawa.

- 5) Substantially affects public health;

Public health will not be adversely affected by the proposed project.

- 6) Involves substantial secondary impacts, such as population changes or effects on public facilities,

Substantial secondary impacts are not anticipated. Public facilities are adequate to serve the proposed improvements. There is a no new sewer connection policy in effect for Wahiawa and the proposed improvements may not be able to connect to the municipal sewer at this time.

- 7) Involves a substantial degradation of environmental quality;

The environment of the entire gulch has been altered by the planting of trees and the flow of runoff. Improvements will alter the unruly appearance of the undeveloped section of the gulch which already has been degraded by wanton dumping of litter, accretion of natural debris, and unwanted vegetation.

- 8) Is individually limited but cumulatively has considerable effect upon the environment or involves a commitment for larger actions;

The project is not the precursor for a larger action. It is, however, part of an on-going capital improvement program to upgrade, expand, repair, reconstruct, or replace facilities owned by the City and County of Honolulu for the benefit of its residents and visitors.

- 9) Substantially affects a rare, threatened or endangered species, or its habitat;

There are no rare, threatened or endangered flora or fauna on the premises

- 10) Detrimentially affects air or water quality or ambient noise levels; or

Ambient air quality will be affected by fugitive dust and combustion emissions but can be controlled by measures stipulated in this Assessment. Construction noise will be pronounced during site preparation work but should diminish once the building is erected. All construction activities will comply with air quality and noise pollution regulations of the State Department of Health. Best Management Plans will be prepared to minimize soil loss and construction runoff.

- 11) Affects an environmentally sensitive area such as a flood plain, tsunami zone, erosion prone area, geologically hazardous land, estuary, fresh water, or coastal waters.

Improvements to Wahiawa Botanical Garden are not proposed in identified flood hazard or erosion prone areas. There are no streams, estuaries, or lakes within the confines of the gulch. Kaukonahua Stream and Lake Wilson surround Wahiawa and Wahiawa Gulch discharges runoff into Lake Wilson.

The proposed drainage improvements will not negate flooding but will be designed to accommodate and confine runoff to a defined waterway through the gulch.

Based on the above criteria, the proposed improvements to Wahiawa Botanical Garden will not result in significant adverse environmental impacts and an Environmental Impact Statement should not be required.

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**APPENDIX A**

**SUMMARY OF PLANT INVENTORY:  
GULCH, WAHIAWA BOTANICAL GARDEN**

SUMMARY OF PLANT INVENTORY: GULCH, WAHIAWA BOTANICAL GARDEN

7 March 1996 - J. Sand & W. Singeo

**GULCH: PEDESTRIAN BRIDGE - FRED WRIGHT PARK**

The area covered in this botanical survey included the V-shaped gulch area from the new pedestrian bridge to Fred Wright Park. Elevation ranges from approximately 920 ft. at the bottom of the gulch to about 960 - 980 ft. at street level.

The general list of plants observed within the area surveyed is attached.

The bottom of the gulch is strewn with a sometimes thick layer of debris. Interspersed are small plants and seedlings which have been carried downstream during heavy rains and have taken hold at the gulch bottom (Ficus, Casuarina, Chrysophyllum, Cinnamomum, Coffea seedlings, small palms, weedy species such as Ruellia and Justicia, etc.)

Along both sides of the gulch are primarily the larger, well established trees. Predominant trees are: Eucalyptus sp. (20+ individuals); Albizia sp. (17+ ind.); Ficus benghalensis (15+ ind.); F. sp. (15+ ind.); Pittosporum pentandrum (12+ ind.); Eucalyptus robusta (10+ ind.); Melaleuca quinquenervia (10+ ind.); Grevillea robusta (9+ ind.); Ravenala madagascariensis (9+ ind.); E. microphylla (8+ ind.). The other species listed are present in smaller numbers.

Vines of Monstera, Pothos and Operculina climbing over the large trees are ubiquitous.

As seen from the plant list, there are no native Hawaiian plant species, and no endangered plant species growing in the area surveyed.

**SLOPE: AREA BORDERING KILANI ST., BETWEEN THE OLD PEDESTRIAN BRIDGE AND THE AROID AREA**

The area proposed as the site of the visitor center appears to be somewhere between the old, wooden pedestrian bridge, (now unsafe to use and cordoned off), and the aroid area.

This area is a part of what is called the "Hawaiian Garden" at Wahiawa Botanical Garden (WBG). The area is approximately represented in the Wahiawa Garden/Hawaiian Garden map, grids I-1,2,3 to L-1,2,3).



A list of plants in the Hawaiian Garden is attached. It should be noted that not all of them are growing within the grid areas mentioned above.

To summarize, the proposed construction site of the visitor center will be in an area planted with a few relatively common non-native plants (i.e., Cedrela odorata, Eucalyptus sp., Ficus sp., etc.).

However, the site is planted mostly with native Hawaiian plants. Many of the Hawaiian species are relatively rare, though not on the endangered species list. Of greatest concern is the direct impact on those endangered species growing within the grid site: Gardenia brighamii, Munroidendron racemosum, Pritchardia munroi and P. remota.

There are also numerous plants growing in the area which are identified only to the genus level; i.e., Pritchardia sp. Identification to the species level, which requires special sampling techniques and examination by plant specialists outside of Hawaii, could result in the determination of additional plants which are on the endangered species list.

PLANT INVENTORY: GULCH, WAHIAWA BOTANICAL GARDEN  
 (Area below new pedestrian bridge to Fred Wright Park)

7 March 1996 – J. Sand & W. Singeo

1	<i>Acacia sp.</i>	(possibly Formosan Koa, <i>A. confusa</i> )
2	<i>Agathis sp.</i>	
3	<i>Albizia sp.</i>	
4	<i>Aleurites moluccana</i>	Kukui Nut
5	<i>Amaryllis sp.</i>	Day Lily
6	<i>Caryota sp.</i>	Fishtail Palm
7	<i>Casuarina equisetifolia</i>	Ironwood
8	<i>Cecropia sp.</i>	
9	<i>Chrysophyllum oliviforme</i>	Satin Leaf
10	<i>Cinnamomum sp.</i>	(possibly Chinese Cinnamon, <i>C. aromaticum</i> )
11	<i>Clusia rosea</i>	Autograph Tree
12	<i>Coffea arabica</i>	Coffee
13	<i>Cordyline fruticosa</i>	Ti
14	<i>Dieffenbachia sp.</i>	Dumb Cane
15	<i>Dracaena sp.</i>	
16	<i>Erythrina sp.</i>	Coral Tree
17	<i>Eucalyptus robusta</i>	Swamp Mahogany
18	<i>Eucalyptus spp.</i>	
19	<i>Ficus benghalensis</i>	Indian Banyan
20	<i>Ficus microcarpa</i>	Chinese Banyan
21	<i>Ficus spp.</i>	Banyan Trees
22	<i>Grevillea robusta</i>	Silky Oak
23	<i>Heliconia sp.</i>	
24	Indet weeds	(1 vine; 1 herbaceous weed, probably Euphorbe)
25	Indet. Araceae	(probably <i>Alocasia sp.</i> )
26	Indet. Legume	
27	Indet. Palms	(probably <i>Areca sp.</i> & <i>Chamaedorea sp.</i> )
28	<i>Justicia betonica</i>	White Shrimp plant
29	<i>Melaleuca quinquenervia</i>	Paperbark
30	<i>Monstera deliciosa</i>	Monstera
31	<i>Musa sp.</i>	Banana
32	<i>Operculina turpethum</i>	Wood Rose
33	<i>Philodendron undulatum</i>	Philodendron
34	<i>Pittosporum pentandrum</i>	
35	<i>Pothos sp.</i>	Pothos
36	<i>Ravenala madagascariensis</i>	Traveller's Tree
37	<i>Ruellia graecizans</i>	
38	<i>Schinus terebinthifolius</i>	Christmas Berry
39	<i>Spathodea campanulata</i>	African Tulip
40	<i>Syzygium sp.</i>	
41	<i>Trema orientalis</i>	

**APPENDIX B**

**WATER QUALITY CONSIDERATIONS  
FOR PONDS INTERCEPTING URBAN RUN-OFF  
AT THE WAHIAWA BOTANICAL GARDENS**

## Water Quality Considerations for Ponds Intercepting Urban Run-Off at the Wahiawa Botanical Gardens

July 1996

### INTRODUCTION

The Wahiawa Botanical Garden is one of five botanical gardens operated by the City and County of Honolulu. Wahiawa is located on the Schofield Plateau between the Ko'olau and Waianae mountains in central O'ahu. The Wahiawa Botanical Garden is at elevations between 875 and 1000 feet (270 - 3050 m), in an area receiving between 52 and 80 inches (132 - 203 cm) of rainfall annually (Wahiawa Botanical Garden, undated). Rainfall maps in Taliaffero (1959) put the median annual rainfall at between 50 and 60 inches (127 - 152 cm). Development plans for the garden include the eventual construction of up to four ponds within the bottom of the ravine. These ponds would be fed by run-off during rainy periods and would serve both to store water and to provide wetland features as part of the desired ambiance of the garden. Source water for the ponds is envisioned as that derived from local run-off (including direct rainfall and irrigation) and that transported into the ravine by storm drains (drainage basin run-off).

The Wahiawa Botanical Garden occupies a portion of a narrow ravine, some 40 to 50 feet (12 to 15 m) deep, which is a short feeder branch of the South Fork of Kaukonahua Stream (Wahiawa Reservoir South Fork). The ravine resembles many in the area which are steep-sided erosion features cut into the gently sloping surface of the Koolau shield volcano, in sharp contrast to much of the surrounding land developed either for urban or agricultural uses. This ravine has been much modified by development and, in places, filled and channelized. Within the segment occupied by the gardens and downslope to the vicinity of Wright Field, the basic form of the ravine remains unchanged as a forested gulch. The ravine turns southward under California Avenue, eventually becoming the north trending branch of Wahiawa Reservoir seen at Wahiawa State Fresh Water Park.

This particular drainage of Kaukonahua Stream arises as an identifiable landscape feature around the 1080 feet (330 m) elevation, less than 0.5 mile (0.7 km) above the Wahiawa Botanical Garden in a swale between California Avenue and Nakula Street in the Wahiawa Homestead area of Wahiawa. Thus, it is a rather insignificant feeder branch of a stream system which drains the Ko'olau mountain crest at elevations above 2000 feet (600 m) and includes numerous perennial stream branches and segments.

The lands around the ravine are urban/residential in mostly older house lots with well-developed, vegetated yards. The exact contributory areas are not known, but could be obtained from the sophisticated CAD system used by the City and County of Honolulu, Department of Public Works. Single-family residence, school, and church properties comprise all or at least a high percentage of the drainage area. The ravine receives collected run-off contributions from storm drains all along California Avenue and Glen Avenue. These enter the ravine at a number of points. The larger drainage outlets include some form of concrete or concrete-rock-masonry (CRM) rip-rap apron to minimize erosion of the ravine at times of heavy discharge.

### PRESENT NATURE OF THE RAVINE FLOOR

Within areas actively developed as gardens or in the process of being developed as gardens, the ravine floor is utilized as a transportation corridor. In many places the soil on the ravine floor has been amended with concrete rubble or crushed bluerock (surge rock) to facilitate vehicular movement during wet periods. This "road" serves as the only access to the outlet of the rather large culvert feeding into the head of the ravine off Uuku Street. Within the middle of the ravine, in the area of present garden development, the ravine still serves as an access route for maintenance vehicles and/or a foot path. Below the pedestrian bridge, however, the ravine is undeveloped and a narrow foot-trail is present down to the opening of a 7' x 7' box culvert which drains the entire ravine southward under California Avenue towards Wahiawa Reservoir. The vegetation in this area is described by Sand and Singeo (1996).

State laws pertaining to streams (e.g., State water quality regulations, stream channel alteration permit requirements) attempt to establish jurisdiction on the basis of defining features that can be called "streams" and are thus to be included in State waters. These features need not be continuous flowing nor contain water all of the time, but must differ from erosion features which are not streams (nearly all land participates in run-off and is subject to some erosion). Recent attempts at clarifying the definition of a stream may be found in DOH (1996) and Bay Pacific Consulting (1996). In essence, for a drainageway to be defined as a stream, it must have a stream bed. A stream bed has two characteristics: alluvium, which is sorted and thus differs in character from the soil above the banks, and an ordinary high water mark (OHM) indicating the margin of the stream bed.

The situation at Wahiawa Botanical Garden is interesting because the bottom of the ravine is not a stream, but has the appearance in some areas of a stream channel, in part encouraged by grounds-keeping practices in the garden. In most places, the alluvium at the bottom of the ravine is little different from the soil eroding from the margins of the gulch, although minor sorting of soil particles can be found in a few places. In the undisturbed part of the ravine downslope from the pedestrian bridge, the main evidence

that water has recently flowed where a vegetation cover of mostly white shrimp plant (*Justicia betonica*) and tree seedlings forms a solid ground cover, consists of some areas of local gully erosion and vegetation debris piles. An ordinary high water mark is absent.

Curiously, within the developed garden, a small stretch of the ravine floor is exposed basalt, sufficiently dense to form an impermeable layer at the ground surface. Several small pools are present, probably fed by either local rain water or irrigation water. These pools were observed on a May 30, 1996 field reconnaissance to contain pond snails (Lymnaeidae), mosquito larvae (*Culex quinquefasciatus*), and water striders (not collected). The presence of snails and water striders suggest some permanence of the features as aquatic environments, although the total area involved less than 20 sq. feet (2 m<sup>2</sup>) under a few inches (0.05 m) deep. It is possible that snails initially washed in from permanent water features upslope, and the pools will, in the course of the summer, dry up with the subsequent loss of the aquatic fauna. However, natural permanent water features are unlikely to exist upslope. It may be that watering of plants in the vicinity may insure that the small pools are more or less permanent and fed by garden runoff during otherwise low rainfall periods. The presence of these snails is somewhat unusual in what would seem to be ephemeral pools.

#### URBAN STORM WATER QUALITY

A number of studies have been undertaken to characterize storm water runoff from urban areas (early reviews appear in FWPCA, 1969 and AVCO, 1970). Material from street runoff alone has been shown to contain a variety of pollutants, although the primary constituent of street surface contaminants is inorganic material, similar to silt and sand (Sartor and Boyd, 1972). The nature of the pollutants dissolved in the runoff water or associated with the solids will depend upon the kinds and extent of various activities that occur on or adjacent to the street. Pollutants associated with the operation of automobiles (petroleum hydrocarbons, certain heavy metals such as lead, nickel, and zinc) are typical. Observed concentrations of pollutants of all kinds in urban runoff vary widely. In general, contaminant concentrations will be greatest when a long interval has transpired since the last flow-generating rainfall or street cleaning effort (Sartor and Boyd, 1972). For some, but not all, constituents concentrations reach a maximum early after run-off starts, decreasing with continued precipitation.

Studies have been conducted in Hawai'i designed to characterize the quality of runoff from different types of watersheds (see Ching, 1972; Fujiwara, 1973, Matsushita, 1973; Yim and Dugan, 1975; DOH, 1980; Yamane & Lum, 1985). The study by Fujiwara (1973) sampled storm drain systems in central Honolulu. Included were urban-residential and industrial areas (Iwilei). The DOH (1980) study looked at runoff from different types of areas ranging from conservation to commercial and distributed from upper Manoa valley to the H-1 Freeway at the mouth of the valley. Only a few samples were collected to represent storm runoff. The study by Yamane and Lum (1985) is perhaps the most

detailed urban watershed study conducted in Hawai'i to date and reasonably pertinent to the situation at the Wahiawa Botanical Gardens. In this study, two watersheds were monitored in Mililani Town and analyses of over 300 samples of storm water runoff were made between 1980 and 1984. The Mililani areas were then mostly residential and suburban in character, similar to the drainage basin above the botanical garden.

Table 1. A summary of water quality characteristics from storm drain studies on O'ahu.

	Iwilei†	Manoa‡			Mililani*	
		A	B	C	A	B
Discharge (ft <sup>3</sup> /sec)					30	12
pH	6.5 - 6.7				7.2	7.0
Total solids (mg/l)	220 - 263				251	96
TSS (mg/l)	6 - 16	110	452	168	204	96
Turbidity (ntu)					35	20
DO (mg/l)	5.7 - 7.6					
Conductance (µmhos/cm)					79	52
Chloride (mg/l)	23 - 35					
Total hardness (mg/l CaCO <sub>3</sub> )	64 - 73					
COD (mg/l)	16.5 - 82.4	120	84	43	60	34
BOD (mg/l)	3.6 - 14.1	> 16	> 16	6.4		
Grease (mg/l)	0.3 - 2.1					
NUTRIENTS: (mg/l)						
ammonia		0.20	0.18	0.16		
NO <sub>3</sub> + NO <sub>2</sub>	1.00 - 1.31	2.71	2.14	0.03	0.21	0.10
TKN	0.08 - 6.97	4.01	3.28	1.92	1.2	1.4
Total N		6.72	5.42	1.95		
orthophosphate	0.50 - 1.88					
Total P	1.56 - 2.76	0.12	0.12	0.16	0.34	0.17
METALS: (µg/l)						
arsenic		ND	ND	ND		
cadmium		ND	ND	ND		
chromium	8 - 17	ND	ND	ND		
copper	12 - 28	74	15	40		
iron	26 - 88					
lead	129 - 4560	110	ND	630	20	10
mercury		3	ND	2	0.2	0.1
nickel		79	51	68		
zinc	315 - 1070	371	20	203		

Table 1 (continued).

	Iwilei†	Manoa‡			Mililani*	
		A	B	C	A	B
BACTERIA	(mpn)				(col./100 ml)	
Total coliform	9700 - 14800					
Fecal coliform	287 - 835				26000	26000
Enterococcus	5100 - 1800					

† Fujiwara (1973). Range of flow weighted averages or flow proportioned composite values from three separate storm samplings in Iwilei District of Honolulu (industrial).

‡ DOH (1980). results of single samples representing runoff from A = H1-freeway, B = University commercial area, and C = Manoa mixed residential/commercial area.

\* Yamane & Lum (1985). Median values from two watersheds (A & B) in Mililani Town over four year period. Number of samples varied from 9 to 208.

Summarizing the results of Hawai'i and/or various U.S. mainland studies is difficult because of the substantial range over which the concentration of each constituent can vary. The study in Mililani Town produced significant differences between adjacent drainage basins in water quality characteristics for all constituents measured except fecal coliforms, pH, and total Kjeldahl nitrogen (Yamane and Lum, 1985). Furthermore, considerable variation is expressed for many constituents from storm to storm, or from time to time during a single storm. Table 1 (from AECOS, 1991) provides selected results of constituent concentrations from three of the studies cited. Selected, were data sets thought to best represent urban settings in Hawai'i.

All three of the studies represented in Table 1 made comparisons with similar U.S. mainland results and some aspect of the State of Hawaii Water Quality Standards and/or EPA water quality criteria. The DOH (1980) study noted that nutrient concentrations and TSS (total suspended solids) in the Manoa storm-drain runoff were substantially higher than reported from many mainland urban areas. In fact, while total N values were relatively high at three of the sites sampled by DOH (those listed in Table 1), total P values were about the same as or less than levels reported by most mainland cities (data in DOH, 1980; see also Fujiwara, 1973). With regard to suspended solids, the DOH values were high relative to the Iwilei storm drain results, although well within the range of values reported by Yamane and Lum (1985) for Mililani drainages. The relationships between sediment transport and stream flow during flood events have been extensively studied in Hawaii as elsewhere (see Jones, Nakahara, and Chinn, 1971). The subject is complex, but suffice it to say that sediment loads would be lowest from developed watersheds (as at Iwilei) and greatest from watersheds with broad areas of exposed soils (agricultural areas, construction areas).



Fujiwara (1973) noted that the residential and commercial areas in Honolulu contributed organic matter, as measured by the COD, at higher levels than reported elsewhere. He attributed this difference to the greater coverage by vegetation and continuous growing season in Hawaii, factors which might also produce higher nutrient values in some drainage systems (Sartor and Boyd, 1972).

Given the considerable variability which attends results from different areas and from the same drainage system during different storms, predicting water quality characteristics of run-off catchment ponds in the garden is difficult. Using the Mililani results from Table 1, supplemented with other results where values were not obtained in the Mililani study we can make some generalizations as follows. These discussions include reference to water quality measurements made in both the north and south forks of Kaukonahua Stream immediately upstream from Wahiawa Reservoir in 1994 (AECOS, 1995). These water quality measurements should be characteristic of run-off collected from mostly undeveloped lands east of Wahiawa.

pH, total solids, conductance, chloride, and at least some trace metals are not indicated as potential problem contaminants, being present in concentrations not much different from stream water. Total suspended solids (TSS) and turbidity (both measures of fine particulates suspended in the water) can be high in any run-off where the watershed is undergoing disturbance (grading and grubbing, for example). High TSS values will essentially contribute sediment to the proposed ponds, hastening their infilling. The problem is, however, one of degree. The established residential neighborhoods on this Wahiawa watershed would not contribute large amounts of suspended material during most storm events, although the ponds can be expected to become turbid during rainy periods. Local runoff will also contribute suspended material if areas of bare soil are not mulched or covered by ground covering vegetation.

A long term effect of sediment introductions to the ponds will be their conversion from relatively open bodies of water to marshes (vegetation-covered). A certain amount of this conversion will be tolerated and indeed encouraged by plantings of wetland species. When the process has gone too far, dredging of a pond will reverse the process, creating deeper, open water in the pond and material to be applied to planting areas within the gardens as a soil amendment. Such maintenance of the ponds should not be subject to State or Federal permit requirements covering stream channel alteration or dredging in waters of the United States provided it is established that the ravine is not a stream under State or Federal definitions and the ponds are man-made features. Consultations with NRCS (formerly Soil Conservation Service) may prove beneficial as these features would be classifiable as either runoff catchment basins and/or agricultural ponds, providing a measure of benefit to the watershed downstream.

Nutrients in run-off can be a concern in some situations, most particularly where these nutrients ultimately contribute to processes in natural bodies of water known as

eutrophication. Eutrophication is marked by excessive growth of aquatic algae, either in the water column (phytoplankton) or as attached mats. Stagnant, eutrophic systems can be unsightly and develop bad odors. The proposed ponds in the garden are expected to be at least mildly eutrophic, in part because of nutrients supplied in the source water. An abundance of streamside (riparian) vegetation and larger aquatic plants (such as reeds, water lilies) will act as nutrient sinks, converting excess nutrients into plant tissue, thereby countering algal growth. Unless there is an unrealistic desire for the proposed ponds to contain clear water at all times, mild eutrophication should not be a problem. Fertilizer applications to surrounding slopes could present a greater potential contribution to eutrophication of these ponds than the water quality of the off-site runoff.

Trace metal concentrations in urban runoff are somewhat difficult to predict (see Table 1), yet could have adverse impacts on aquatic biota in the proposed ponds. Only lead and mercury were assessed by Yamane and Lum (1985; Table 1); small amounts of both were found in their study of runoff from Mililani. Different metals, particularly copper, nickel, and zinc were found in the other summarized O'ahu storm drain studies (Table 1). AECOS collected water and sediment samples from a tributary of Kaukonahua Stream in 1984 to assess metals accumulation in Ku Tree reservoir, 2.2 miles (3.6 km) from the Wahiawa Botanical Garden. Concentrations (in dry sediment) of arsenic varied from 2 to 17 mg/Kg, barium from 6.7 to 20.3, cadmium from undetected to 2, chromium from 208 to 403, lead from 21 to 34, mercury from 0.3 to 0.7, selenium from undetected to 2, and silver from undetected to 2. These values are generally comparable with natural concentrations in Hawaiian soils (Patterson, 1971) or compare with levels measured in Kahana Stream sediments (Lau, et al., 1973) and therefore simply suggest the levels of sediment trace metals that are likely in the absence of pollutant problems on the watershed.

No sources of concern for trace metals are associated with the watershed in this part of Wahiawa, although lead from automobiles (a problem particularly when leaded gasoline was available) and paints frequently does show up in streams draining watersheds dominated by residential use (for example, Manoa Valley). Zinc from automobile tires and arsenic from certain pesticides are other domestic sources encountered in runoff. Because small ponds may be fairly dynamic with respect to sediment turnover and pH conditions favorable to dissolving metals attached to particulates, problems could develop, with metals accumulating in deeper anoxic sediment layers or in aquatic biota.

Bacterial counts (coliform/fecal coliform) are usually quite high in urban runoff and are expected to be the case at Wahiawa Botanical Gardens. In general, high coliform counts would not constitute a problem, particularly considering the ponds will not be used for swimming or bathing. Pathogens, such as Leptospirosis, constitute a more serious problem, less related to runoff than to the proximity of mammalian vectors, such as rats, to the water features.

The subject of toxic organic substances in runoff is extremely complex and not easily generalized because of the wide range of substances potentially involved. Pesticides used in the neighborhood, particularly termiticides (such as chlordane) applied to soils, and toxic components of automobile fuels (mostly polynuclear aromatics) are chemical substances of greatest concern. These substances will tend to bind to small particulates in run-off and be deposited in the ponds (Sartor and Boyd, 1972). The organic-rich bottom sediments of the ponds will constitute environmental sinks for these substances. That is, after a period of time, one of the best place to look for persistent toxic organics in this watershed will be the pond sediments.

*Adverse impacts of toxics will mostly be expressed as subtle failures in populations of aquatic organisms. In general, such failures will not be noticed. If, however, problems develop with maintaining desired species of either plants or animals in the ponds, testing of the sediment for toxics should be undertaken. Testing should be considered before pond dredging as well, to evaluate the suitability of spreading the dredged spoils in particularly sensitive areas of the garden.*

## CONCLUSIONS

Because these ponds will accumulate both inert substances and pollutants from the watershed and may not be flushed very often, the potential exists for almost any potentially harmful substance to be retained, providing some measure of benefit to ecosystems downstream, but producing unpredictable consequences for the local aquatic flora and fauna. The unpredictability of this problem should not deter the City and County from proceeding with its plans to develop the ponds. These statements are not intended to imply that the proposed ponds are environmentally unsound or that passing watershed pollutants through the garden on occasional freshets (as is presently the case) is desirable. Detention ponds provide environmental benefit. However, where the interest in detention ponds is mostly or entirely pollution control, that benefit is realized only when the detention features are regularly maintained, usually on a schedule tied to their sediment capacity. In the case of the Wahiawa Botanical Garden, the primary purpose is not one of pollution control, but of specific use of the ponds as habitat. Nonetheless, the level of maintenance will still determine the level of benefit achieved. In this case, however, testing pond sediments for any accumulating contaminants should be used to set physical maintenance (i.e., cleaning, dredging, harvesting vegetation) schedules.

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**APPENDIX C**  
**COMMENT LETTERS AND RESPONSES**

**CITY AND COUNTY OF HONOLULU**  
POLICE DEPARTMENT  
901 SOUTH BERETANIA STREET  
HONOLULU, HAWAII 96813 - AREA CODE (808) 528-3111



JEREMY HARRIS  
MAYOR

MICHAEL S. NAKAMURA  
CHIEF  
MAROLO M. KAWASANI  
LEE DOMOHUE  
DEPUTY CHIEFS

OUR REFERENCE BS-DL

September 4, 1996



Mr. Gerald Park  
Gerald Park Urban Planner  
1400 Rycroft Street, Suite 876  
Honolulu, Hawaii 96814-3021

Dear Mr. Park:

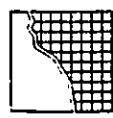
This is in response to your letter of August 28, 1996, requesting comments on the Draft Environmental Assessment for the Wahiawa Botanical Garden Master Plan.

This project should have no significant impact on the operations of the Honolulu Police Department.

Thank you for the opportunity to comment.

MICHAEL S. NAKAMURA  
Chief of Police

By *Eugene Uehura*  
EUGENE UEHURA, Assistant Chief  
Administrative Bureau



GERALD PARK  
Urban Planner

- Planning
- Land Use Research
- Environmental Studies

1400 Rycroft Street  
Suite 876  
HONOLULU, HAWAII  
96814-3021

Phone/Fax  
808 942-7484

December 19, 1996

Michael S. Nakamura  
Chief-of-Police  
Police Department  
City and County of Honolulu  
801 South Beretania Street  
Honolulu, Hawaii 96813

Dear Chief Nakamura:

Subject: Wahiawa Botanical Garden Master Plan

Thank you for your letter of September 4, 1996 with your comment indicating the project should have no significant impact on the operations of the Honolulu Police Department.

Your letter will be included in the Final Environmental Assessment. We appreciate your interest and participation in the consultation phase of the environmental assessment review process. The Department of Parks and Recreation will be issuing a Finding of No Significant Impact /Negative Declaration for the project.

Sincerely,

GERALD PARK URBAN PLANNER

*Gerald Park*

Gerald Park

cc: B. Suzuki, DPR

**GTE** Hawaiian Tel

*Beyond the call*

GTE Hawaiian Telephone Company

P.O. Box 2200 - Honolulu, HI 96841 - (808) 546-4511

September 5, 1996

Mr. Gerald Park  
Urban Planner  
1400 Rycroft Street Suite 876  
Honolulu, Hawaii 96814-3021

Dear Mr. Park:

Subject: **WAIKAWA BOTANICAL GARDEN MASTER PLAN**

Thank you for the opportunity to review and comment on the Environmental Assessment for the Waiawa Botanical Garden Master Plan.

GTE Hawaiian Tel, HTC, does not foresee any problems in providing telecommunication services to the proposed facilities. However, further review will be required by HTC during the design stages of the project.

If you have any questions, please call Les Loo at 831-4094.  
Sincerely,

*Garret T. Hayashi*

Garret T. Hayashi  
Operations Supervisor  
Outside Plant Engineering

c: L. Loo



GERALD PARK  
Urban Planner

Planning  
Land Use  
Research  
Environmental  
Studies

1400 Rycroft Street  
Suite 876  
Honolulu, Hawaii  
96814-3021

Phone/Fax  
808/947-7484

December 19, 1996

Garret T. Hayashi  
Operations Supervisor  
Outside Plant Engineering  
GTE Hawaiian Tel  
P.O. Box 2200  
Honolulu, Hawaii 96841

Dear Mr. Hayashi:

Subject: **Waiawa Botanical Garden Master Plan**

Thank you for your letter of September 5, 1996 with your comment indicating that GTE Hawaiian Tel does not foresee any problems in providing telecommunications service to the proposed facilities.

Your letter will be included in the Final Environmental Assessment. We appreciate your interest and participation in the consultation phase of the environmental assessment review process. The Department of Parks and Recreation will be issuing a Finding of No Significant Impact /Negative Declaration for the project.

Sincerely,

GERALD PARK URBAN PLANNER

*Gerald Park*

Gerald Park

cc: B. Suzuki, DPR





DEPARTMENT OF THE ARMY  
PACIFIC OCEAN DIVISION, CORPS OF ENGINEERS  
FORT SHAFTER, HAWAII 96858-5440

REF TO  
ATTENTION OF

September 11, 1996



Planning and Operations Division

Mr. Gerald Park  
Urban Planner  
1400 Rycroft Street, Suite 876  
Honolulu, Hawaii 96814-3021

Dear Mr. Park:

Thank you for the opportunity to review and comment on the Draft Environmental Assessment (DEA) for the Wahiawa Botanical Garden Master Plan, Wahiawa, Oahu. The following comments are provided pursuant to Corps of Engineers authorities to disseminate flood hazard information under the Flood Control Act of 1960 and to issue Department of the Army (DA) permits under the Clean Water Act; the Rivers and Harbors Act of 1899; and the Marine Protection, Research and Sanctuaries Act.

a. Based on the information provided, the Unnamed Gulch is a jurisdictional water of the U.S.; therefore, a DA permit may be required for discharges of dredged or fill material into the gulch. Please contact our Regulatory Section at 438-9258 for further information and refer to file number 960000357.

b. The flood hazard information provided on page 12 of the DEA is correct.

Sincerely,

*Lawrence O. Muraoka*

Lawrence O. Muraoka, P.E.  
Acting Chief, Planning  
and Operations Division



GERALD PARK  
Urban Planner

Planning  
Land Use  
Research  
Environmental  
Studies

1400 Rycroft Street  
Suite 876  
Honolulu, Hawaii  
96814-3021

Fax: (808) 942-7164

December 19, 1996

Lawrence O. Muraoka, P.E.  
Acting Chief, Planning and Operations Branch  
Department of the Army  
Pacific Ocean Division, Corps of Engineers  
Fort Shafter, Hawaii 96858-5440

Dear Mr. Muraoka:

Subject: Wahiawa Botanical Garden Master Plan

Thank you for reviewing the Draft Environmental Assessment prepared for the subject project. We offer the following response to your comment.

a. Drainage improvement plans will be submitted to your Regulatory Section for review. If it is determined that DA permits are required for discharge of dredged or fill materials into waters of the United States, the Department of Parks and Recreation will apply for the required permit(s).

Thank you for participating in the environmental review process. Your comment and our response will be incorporated into the Final Environmental Assessment.

Sincerely,

GERALD PARK URBAN PLANNER

*Gerald Park*

Gerald Park

cc: Brian Suzuki, DPR

DEPARTMENT OF PUBLIC WORKS  
CITY AND COUNTY OF HONOLULU

870 SOUTH KING STREET  
HONOLULU, HAWAII 96813



PERMITS  
9-12-96

KENNETH E. SPRAGUE  
DIRECTOR AND CHIEF ENGINEER  
GERALD PARK  
DEPUTY DIRECTOR  
ENV 96-217

September 12, 1996

Mr. Gerald Park  
1400 Rycroft Street, Ste. 876  
Honolulu, Hawaii 96814

Dear Mr. Park:

Subject: Draft Environmental Assessment (DEA)  
Wahiawa Botanical Garden Master Plan  
TRK: 7-4-171.1

We have reviewed the subject DEA and have the following comments:

1. Direct surface runoff from 50 car parking lot to planted area prior to discharging to street or lined channel.
2. Address ownership of the gulch.
3. List permit requirements; such as, State NPDES general permit, stream alteration permit, storm drain connection, etc., as applicable.

Should you have any questions, please contact Mr. Alex Ho, Environmental Engineer, at 523-4150.

Very truly yours,

KENNETH E. SPRAGUE  
Director and Chief Engineer



GERALD PARK  
Urban Planner

Planning  
Land Use  
Research  
Environmental  
Studies

1400 Rycroft Street  
Suite 876  
Honolulu, Hawaii  
96814-3021

Phone/Fax  
808 942-7484

December 19, 1996

Kenneth E. Sprague  
Director and Chief Engineer  
Department of Public Works  
City and County of Honolulu  
650 South King Street  
Honolulu, Hawaii 96813

Dear Mr. Sprague:

Subject: Wahiawa Botanical Garden Master Plan

Thank you for reviewing the Draft Environmental Assessment for the subject project. We offer the following responses to your comments.

1. This comment will be considered by the Department of Parks and Recreation and their design consultant for the parking lot.
2. The 26.917 acres comprising the gulch (or botanical garden) was turned over to the City and County of Honolulu from the State of Hawaii under Executive Order No. 1357.
3. A list of permits has been included in the Final Environmental Assessment. The list is suggestive because no design plans have been prepared for any of the proposed improvements. Additional permits may be required for individual improvements.

We appreciate your interest and participation in the consultation phase of the environmental assessment review process. The Department of Parks and Recreation will be issuing a Finding of No Significant Impact/Negative Declaration for the project.

Sincerely,

GERALD PARK URBAN PLANNER

Gerald Park

cc: B. Suzuki, DPR



United States Department of the Interior

FISH AND WILDLIFE SERVICE  
PACIFIC ISLANDS Ecoregion  
300 ALA MOANA BOULEVARD, ROOM 3108  
BOX 50088  
HONOLULU, HAWAII 96850  
PHONE: (808) 541-3441 FAX: (808) 541-3470



In Reply Refer To: TR

Gerald Park Urban Planner  
1490 Rycroft Street, Suite 876  
Honolulu, Hawaii 96814

SEP 16 1996

Re Wahiawa Botanical Garden Master Plan

Dear Mr. Park:

The U.S. Fish and Wildlife Service (Service) has reviewed the Draft Environmental Assessment (EA) for the Wahiawa Botanical Gardens Master Plan. The purpose of the proposed master plan is to protect and preserve the garden's natural and cultural resources and expand educational, interpretive, and recreational opportunities for the general public. The project sponsor is the Department of Parks and Recreation, City and County of Honolulu.

General Comments

The Service is generally pleased with the conceptual improvements proposed in the Wahiawa Botanical Garden Master Plan. The Honolulu Botanical Gardens are a valuable partner to our agency in the conservation and recovery of rare and endangered native Hawaiian plants, and an improvement in the facilities at Wahiawa will enhance the educational and scientific capabilities of the garden. We encourage the Honolulu Botanical Gardens to place an emphasis on education and science related to native Hawaiian flora.

Specific Comments

Section 1 - Description of the Proposed Action. Pg. 3-4

This section describes drainage improvements to Wahiawa Gulch. These improvements may consist of adding runoff detention basins and large boulders to the gulch. Other improvements include the development of a pedestrian pathway system. Other portions of the draft EA indicate that the planner is not certain whether the ravine is officially classified as a stream. The Service recommends that the planner contact the Army Corps of Engineers to determine if the gulch or any portions of the gulch where the Wahiawa Botanical Garden is situated are wetlands under the jurisdiction of the State or Federal government. This information should be included in the final EA.

The proposed action also includes a discussion of using water as a design element in the garden by creating ponds. Although the plan does not specifically mention introducing fish to these ponds, we would also like to remind you that it is against State law to release any non-native fish or other live non-native aquatic life into any waters of the State (HRS 187A-6.5). The created ponds should not contain alien fish or other non-native aquatic organisms if there is the potential that a flooding event could wash them from the ponds into Lake Wilson. The Service would like to encourage the use of native flora and fauna in the restoration or creation of ponds and wetlands within the garden. Many native fishes and damselfishes as well as native vegetation would provide not only an attractive setting but would add to the educational programs at the garden. Please contact our office for further information if you are interested in the potential use of these native organisms at Wahiawa Gardens.

Section 3- Summary of Potential Environmental Impacts and Measures to Mitigate Adverse Effects. Pg. 19

The Service is concerned about the potential impact of the proposed visitor center on endangered plant species present in Wahiawa Garden's collections. The draft EA states that the proposed visitor center will be in the area of the existing Hawaiian Garden, and that federally listed endangered plants such as *Gardenia brighamii*, *Munroidendron racemosum*, *Pritchardia munroi* and *Pritchardia remota* may be affected by construction and have to be removed and relocated. We would like to advise you that a State permit may be required to remove and relocate any endangered plants, and you should contact the State Division of Forestry and Wildlife for further information. Many of the endangered plants in the Hawaiian Garden are large and well established, and we believe this valuable collection of rare and endangered species may be difficult to successfully remove and relocate elsewhere. The Service recommends that the planner consider alternative site locations and design for the visitor center in order to avoid impacts to endangered plants in the Hawaiian Garden, and these alternatives should be discussed in the final EA.

The Service appreciates the opportunity to provide comments on the draft EA. If you have questions regarding these comments, please contact our Program Leader for Interagency Cooperation, Ms. Margo Stahl or Fish and Wildlife Biologist Christine Willis at 808/541-3441.

Sincerely,

Brooks Harper  
Field Supervisor  
Ecological Services

cc: DOFAW



GERALD PARK  
Urban Planner

- Planning
- Land Use
- Research
- Environmental
- Studies
- 1100 Konohe Street
- Suite 816
- Honolulu, Hawaii
- 96814-3021
- Honolulu
- 808 942-7184

December 19, 1996

Brooks Harper  
Field Supervisor, Ecological Services  
U.S. Department of the Interior  
Fish and Wildlife Service, Pacific Islands Ecoregion  
Box 50088  
Honolulu, Hawaii 96850

Dear Mr. Harper:

Subject: Wahiawa Botanical Garden Master Plan

Thank you for reviewing the Draft Environmental Assessment prepared for the subject project. We offer the following responses to your comments.

1. The Army Corps of Engineers has indicated that "the Unnamed Gulch is a jurisdictional water of the United States; therefore a DA permit may be required for discharge of dredged or fill material into the gulch" (Comment Letter of September 11, 1996).

In follow-up discussions with staff of the Regulatory Section, Corps of Engineers, we were informed that plans for garden improvements should be submitted to the Corps of Engineers for review. At that time if not sooner, the Corps will conduct a field check and make a firm determination if the gulch is under DA jurisdiction.

2. There are no plans to introduce fish into the ponds at this time.
3. Plants in the Hawaiian Garden that may be affected by construction of the Visitor Center will be tagged, removed, and relocated elsewhere on site. The Department of Parks and Recreation will procure the required permits to transplant endangered plants if such permits are required. It is anticipated that relocation work will be supervised by the staff botanist and horticulturist of the Honolulu Botanical Gardens.

Thank you for participating in the environmental assessment review process. Your comments and our responses will be included in the Final Environmental Assessment.

Sincerely,

GERALD PARK URBAN PLANNER

Gerald Park

cc: B. Suzuki, DPR

Benjamin J. Cayetano  
Governor



STATE OF HAWAII  
DEPARTMENT OF EDUCATION  
P. O. BOX 2160  
HONOLULU, HAWAII 96804

Herman M. Aizawa, Ph.D.  
SUPERINTENDENT



OFFICE OF THE SUPERINTENDENT

September 16, 1996

Mr. Gerald Park, Urban Planner  
1400 Rycroft Street, Suite 876  
Honolulu, Hawaii 96814

Dear Mr. Park:

SUBJECT: Draft Environmental Assessment  
Wahiawa Botanical Garden Master Plan  
Wahiawa, Oahu, Hawaii

We have reviewed the subject environmental assessment and have no comment on the proposed master plan.

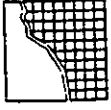
Thank you for the opportunity to respond.

Sincerely,

*Herman M. Aizawa*  
Herman M. Aizawa, Ph.D.  
Superintendent

HMA:hy

cc: A. Suga, OBS  
A. Hokama, CDO



GERALD PARK  
Urban Planner

Planning  
Land Use  
Research  
Environmental  
Studies

1400 Rycroft Street  
Suite 876  
Honolulu, Hawaii  
96814-3021

Phone/Fax  
808 947-7481

December 19, 1996

Herman M. Aizawa, Ph.D.  
Superintendent  
Department of Education  
State of Hawaii  
P.O. Box 2160  
Honolulu, Hawaii 96804

Dear Dr. Aizawa:

Subject: Wahiawa Botanical Garden Master Plan

Thank you for your letter of September 16, 1996 indicating that the Department of Education has no comment on the proposed master plan.

Your letter will be included in the Final Environmental Assessment. We appreciate your interest and participation in the consultation phase of the environmental assessment review process. The Department of Parks and Recreation will be issuing a Finding of No Significant Impact / Negative Declaration for the project.

Sincerely,

GERALD PARK URBAN PLANNER

*Gerald Park*  
Gerald Park

cc: B. Suzuki, DPR



September 19, 1996

Mr. Brian Suzuki  
Department of Parks & Recreation  
650 South King Street  
Honolulu, Hawaii 96813

Dear Mr. Suzuki:

The Wahiawa Community & Business Association (WCBA) supports the Wahiawa Botanical Garden Master Plan.

The Draft Environmental Assessment addressed the additional parking, plant removal, security and drainage concerns registered in the Wahiawa Town Master Plan Task Force Report dated July 1994 (pages 12-14). The draft states all trees affected by construction will be tagged, removed, and relocated. The WCBA recommends that two appropriate trees be planted for every tree that needs to be removed and cannot be relocated.

The multi purpose, multi level structure, visitor education center, should be designed to hug the slope of the ravine so that it fits into the site naturally. The center will be of a tremendous educational value for the schools in this area.

We believe that the importance of this project will be of great benefit not only for the merchants of Wahiawa Town but the community as a whole, resident and visitors alike. The community looks forward to the realization of a world class facility.

If copies of the Wahiawa Town Master Plan Task Force Report are needed, please contact Libby Smith, 621-7097. Thank you for this opportunity to make a statement.

Sincerely,

*Martin J. Petersen*  
for  
Walter Benavitz  
President

*Libby Smith*  
Libby Smith  
Master Plan Chairperson

cc: Gary Gill, Director OEQC  
Gerald Park Urban Planner

Wahiawa Community & Business Association, Inc.  
810-L California Avenue, Wahiawa, Hawaii 96786  
Phone: (808) 621-6531

December 19, 1996

Walter Benavitz, President  
Wahiawa Community & Business Association, Inc.  
830-L California Avenue  
Wahiawa, Hawaii 96786

Dear Mr. Benavitz:

Subject: Wahiawa Botanical Garden Master Plan

Thank you for your letter of September 19, 1996 supporting the Wahiawa Botanical Garden Master Plan. The Department of Parks and Recreation will make every effort to relocate the removed trees to other areas of the garden or the affected trees may be transported elsewhere for use in another City project.

Your petition will be taken into consideration prior to the removal of any trees from the garden. The long-term master plan for the gardens includes the addition of trees to the area as various phases are developed.

Your letter will be included in the Final Environmental Assessment. We appreciate your interest and participation in the consultation phase of the environmental assessment review process. The Department of Parks and Recreation will be issuing a Finding of No Significant Impact/Negative Declaration for the project.

Sincerely,

GERALD PARK URBAN PLANNER

*Gerald Park*  
Gerald Park

cc: B. Suzuki, DPR



GERALD PARK  
Urban Planner

- Planning
- Land Use
- Research
- Environmental
- Studies
- 1400 Kuykendall Street
- Suite 876
- Honolulu, Hawaii
- 96814-3021
- Phone/Fax
- 808 942-7184

Hawaiian Electric Company, Inc. • PO Box 2750 • Honolulu, HI 96840-0001



Patricia Uyehara Wong, Esq.  
Manager,  
Environmental Department

**RECEIVED**  
SEP 23 1996

September 23, 1996

Mr. Gerald Park  
Gerald Park Urban Planner  
1400 Rycroft St, Suite 878  
Honolulu, HI 96814

Dear Mr. Park:

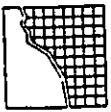
Subject: **Wahiawa Botanical Garden**

Thank you for the opportunity to comment on your August 1996 draft environmental assessment for the proposed Wahiawa Botanical Garden, as proposed by the Department of Parks and Recreation, City and County of Honolulu. We have reviewed the subject document and have no comments at this time on the proposed project. HECCO shall reserve further comments pertaining to the protection of existing powerlines bordering the project area until construction plans are finalized. Again, thank you for the opportunity to comment on this draft environmental assessment.

Sincerely,



WINNER OF THE ELVISON AWARDS  
FOR DISTINGUISHED INDUSTRY LEADERSHIP



GERALD PARK  
Urban Planner

• Planning  
• Land Use  
• Research  
• Environmental  
• Studies

• 1400 Rycroft Street  
Suite 878  
Honolulu, Hawaii  
96814-3021  
• Phone/Fax  
(808) 947-7481

December 19, 1996

Patricia Uyehara Wong, Esq.  
Manager, Environmental Department  
Hawaiian Electric Company, Inc.  
P.O. Box 2750  
Honolulu, Hawaii 96840-0001

Dear Ms. Wong:

Subject: **Wahiawa Botanical Garden Master Plan**

Thank you for your letter of September 23, 1996 indicating that Hawaiian Electric Company has no comments at this time on the proposed master plan.

Your letter will be included in the Final Environmental Assessment. We appreciate your interest and participation in the consultation phase of the environmental assessment review process. The Department of Parks and Recreation will be issuing a Finding of No Significant Impact / Negative Declaration for the project.

Sincerely,

GERALD PARK URBAN PLANNER

Gerald Park

cc: B. Suzuki, DPR

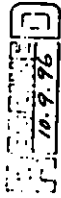
BENJAMIN J. CAVETANO  
DIRECTOR



STATE OF HAWAII  
OFFICE OF ENVIRONMENTAL QUALITY CONTROL

210 SOUTH KING STREET  
FOURTH FLOOR  
HONOLULU, HAWAII 96813  
TELEPHONE (808) 586-4100  
FACSIMILE (808) 586-4100

GARY GILL  
DIRECTOR



October 8, 1996

The Honorable Dona Hanaike, Director  
Department of Parks and Recreation  
City and County of Honolulu  
650 South King Street  
Honolulu, Hawaii 96813

Dear Ms. Hanaike:

We submit for your response (required by Section 343-5(b), Hawaii Revised Statutes) the following comment on a draft environmental assessment ("DEA") for the Wahiawa Botanical Garden Master Plan. The document was submitted to our office by your August 26, 1996, letter. Notice of availability of this DEA was published in the September 8, 1996, edition of the *Environmental Notice*.

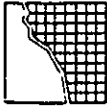
1. Please discuss the indirect and cumulative effects, if any, of the proposed project on Lake Wilson.

Please include a copy of this letter and your response (along with copies of all timely-received comment letters and responses) in the final environmental assessment and notice of determination for this project. If there are any questions, please call Mr. Leslie Segundo, Environmental Health Specialist at 586-4185. Thank you.

Sincerely,

GARY GILL  
Director

c: Mr. Brian Suzuki, Advance Planning Branch  
Mr. Gerald Park, Gerald Park Urban Planner



GERALD PARK  
Urban Planner

Planning  
Land Use  
Research  
Environmental  
Studies

1100 Byron Street  
Suite 876  
Honolulu, Hawaii  
96811-3021

Phone/Fax  
(808) 942-7481

December 19, 1996

Gary Gill, Director  
Office of Environmental Quality Control  
State Office Tower  
235 South Beretania Street, Room 702  
Honolulu, Hawaii 96813-2437

Subject: Wahiawa Botanical Garden Master Plan

Thank you for reviewing the Draft Environmental Assessment prepared for the subject project. We offer the following response to your comment.

The proposed improvements should result in beneficial impacts to areas below the botanical garden and hopefully Lake Wilson. The quantity of sediment and quality of water discharging into Lake Wilson following a major storm from this branch of Kaukonahua Stream has not been studied. The botanical garden forms part of the upper half of the stream branch and, at its nearest point, the garden is about one-half mile from Lake Wilson. The gulch below the garden receives urban runoff from the surrounding streets and residential developments (like the botanical garden) and also from commercial activities and perhaps military lands before discharging into Lake Wilson. This section of gulch was not surveyed as part of this effort.

One of the beneficial effects of the proposed drainage improvements would be to reduce the velocity of runoff water passing through the garden. By slowing the flow, suspended sediment should settle out of the water column and into the detention basins (or ponds). This should reduce the volume of sediment being deposited in areas below the botanical garden. Garden administrators also have suggested using aquatic plants as a means to filter the runoff water before it leaves the site. The objective is to have runoff leaving the garden to be "cleaner" than when it entered.

Thank you for participating in the environmental assessment review process. Your comment and our response will be included in the Final Environmental Assessment.

Sincerely,

GERALD PARK URBAN PLANNER

Gerald Park

cc: B. Suzuki, DPR

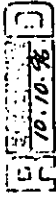


DEPARTMENT OF TRANSPORTATION SERVICES  
**CITY AND COUNTY OF HONOLULU**

PACIFIC PARK PLAZA  
711 KAPIOLANI BOULEVARD SUITE 1200  
HONOLULU HAWAII 96813



COMMUNICATIONS  
SECTION



CHARLES O. SWANSON  
DIRECTOR

8/96-04016R

October 9, 1996

Mr. Gerald Park  
Urban Planner  
1400 Rycroft Street, Suite 876  
Honolulu, Hawaii 96814-3021

Dear Mr. Park:

Subject: Wahiawa Botanical Garden Master Plan

In response to your letter dated August 28, 1996, the draft environmental assessment for the subject project was reviewed. We have the following comments for your consideration:

1. Full-frontage improvements should be provided along the parking/vehicular access areas on California Avenue and Glen Avenue with respect to the new property lines.
2. All vehicular access/egress points should be constructed as standard City dropped driveways.
3. Driveway grades should not exceed five percent (5%) for a minimum distance of 35 feet from the new curb line, and adequate sight distance should be provided and maintained.
4. Construction plans for all off-site work should be submitted to this department for review and approval.

Should you have any questions regarding these comments, please contact Faith Miyamoto of the Transportation System Planning Division at 527-6976.

Respectfully,

*C. Swanson*  
for CHARLES O. SWANSON  
Director

cc: Mr. Brian Suzuki, Department  
of Parks and Recreation



GERALD PARK  
Urban Planner

Planning  
Land Use  
Research  
Environmental  
Studies

1400 Rycroft Street  
Suite 876  
Honolulu, Hawaii  
96814-3021

Phone/Fax  
(808) 942-7181

December 19, 1996

Charles O. Swanson, Jr., Director  
Department of Transportation Services  
City and County of Honolulu  
Pacific Park Plaza  
711 Kapiolani Boulevard, Suite 1200  
Honolulu, Hawaii 96813

Dear Mr. Swanson:

Subject: Wahiawa Botanical Garden Master Plan

Thank you for reviewing the subject Draft Environmental Assessment. We have forwarded your letter to the Department of Parks and Recreation for consideration in the design of the proposed parking lots, driveways, and frontage improvements.

We appreciate your interest and participation in the environmental assessment review process. The Department of Parks and Recreation will be issuing a Finding of No Significant Impact/Negative Declaration for the project.

Sincerely,

GERALD PARK URBAN PLANNER

*Gerald Park*  
Gerald Park

cc: B. Suzuki, DPR



HOUSE OF REPRESENTATIVES

STATE OF HAWAII  
STATE CAPITOL  
HONOLULU, HAWAII 96813

MARCUS R. OSHIRO  
STATE REPRESENTATIVE

RECEIVED  
10. 7. 1996

1191011 AC  
KANE OLA, HONOLULU, HAWAII

Dept. Parks and Recreation  
Page 2  
October 7, 1996

At present, I also have reservations regarding the conveyance of lands located at the western end of the Wahiawa Recreation Center as it may preempt expansion of the Botanical Gardens at a later date.

Thank you for the opportunity to comment. If you have any questions or if I can be of any further assistance, please feel free to contact me at 506-6503

Very truly yours,

MARCUS R. OSHIRO  
State Representative

COPY

October 7, 1996

City and County of Honolulu  
Department of Parks and Recreation  
650 S. King Street  
Honolulu, Hawaii 96813  
attn: Brian Suzuki

Dear Sirs:

RE: Draft Environmental Assessment Comments for Wahiawa Botanical Gardens

The Wahiawa Botanical Gardens Master Plan proposes multi-phase improvements to the Gardens to sustain the facility's long term recreational goals. The multi phase improvements would include a Visitor Education Center, drainage improvements, and various infra structural improvements including utilities. Upon review of the proposed plans, I am in accord with the objectives proposed.

I note, however, that since the area is a natural drainage easement, particular attention should be given to the proposed Visitor Education Center to be erected on the sloping portion of the gulch. Any type of construction along the gulch areas of the Gardens should be designed to minimize the amount of erosion and soil run off in the area

It is also my understanding that portions of the Gardens within the gulch would be converted into ponds to handle drainage and to naturally filter pollutants. Due to the large amount of pests (i.e. mosquitos) that are present at the gardens, planners may wish to consider allowing the ponds to contain some fish that would naturally prey upon these pests

MO:gt

c. Gerald Park Urban Planner  
Office of Environmental Quality Control



GERALD PARK  
Urban Planner

Planning  
Land Use  
Research  
Environmental  
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1400 North Street  
Suite 816  
Honolulu, Hawaii  
96814-3021

Phone/Fax  
808 942-7184

December 19, 1996

The Honorable Marcus R. Oshiro  
House of Representatives  
State of Hawaii  
State Capitol  
Honolulu, Hawaii 96813

Dear Representative Oshiro:

Subject: Wahiawa Botanical Garden Master Plan

Thank you for reviewing and offering comments on the subject Draft Environmental Assessment. We offer the following responses to your comments:

1. Site work along the gulch slopes will increase the opportunities for erosion. Most of the gulch slopes are comprised of Helemano soils which is rated a severe erosion hazard. A soils study should be prepared to evaluate considerations of soil stability and erosion at the location of the Visitor Center. The study should also provide recommendations for minimizing erosion during and after construction.
2. We will pass on your suggestion about allowing the ponds to contain some fish that would naturally prey upon mosquitoes. The US Department of the Interior, Fish and Wildlife Service has commented that it is against State law to release any non-native fish or other live non-native aquatic life into the water of the State. There is concern that alien species could wash from the ponds into Lake Wilson if there is potential for a major flood event.
3. The Department of Parks and Recreation has been apprised of your concern about the conveyance of land at the western end of the park to the Wahiawa Recreation Center.

Thank you for participating in the environmental assessment review process. Your comments and our responses will be included in the Final Environmental Assessment.

Sincerely,

GERALD PARK URBAN PLANNER

  
Gerald Park

cc: B. Suzuki, DPR

FIRE DEPARTMENT  
CITY AND COUNTY OF HONOLULU  
3375 KOAPAKA STREET, SUITE 1425  
HONOLULU, HAWAII 96819-1869



ANTHONY J. LOPEZ, JR.  
FIRE CHIEF  
ATTILIO E. LEONARDI  
FIRE DEPARTMENT

October 8, 1996



Mr. Gerald Park  
Gerald Park Urban Planner  
1400 Rycroft Street, Suite 876  
Honolulu, Hawaii 96814-3021

Dear Mr. Park:

SUBJECT: Wahiawa Botanical Garden Master Plan  
Wahiawa, Oahu, Hawaii

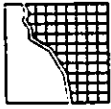
We have reviewed the application for the above subject. Fire protection services provided from the Wahiawa and Milliani engine companies with ladder service from Waiau are adequate.

Should you have any questions, please call Assistant Chief Arthur Ugalde of our Administrative Services Bureau at 831-7774.

Sincerely,

ANTHONY J. LOPEZ, JR.  
Fire Chief

AJL/MPN:ay



GERALD PARK  
Urban Planner

PLANNING  
Land Use  
Research  
Environmental  
Studies

1400 Rycroft Street  
Suite 876  
Honolulu, Hawaii  
96814-3021

Phone/Fax  
(808) 942-7484

December 19, 1996

Anthony J. Lopez, Jr., Fire Chief  
Fire Department  
City and County of Honolulu  
3375 Koapaka Street, Suite H425  
Honolulu, Hawaii 96819-1869

Dear Chief Lopez:

Subject: Wahiawa Botanical Garden Master Plan

Thank you for your letter of October 8, 1996 with your comment that fire protection services provided from the Wahiawa and Milliani engine companies with ladder service from Waiau are adequate.

Your letter will be included in the Final Environmental Assessment. We appreciate your interest and participation in the consultation phase of the environmental assessment review process. The Department of Parks and Recreation will be issuing a Finding of No Significant Impact /Negative Declaration for the project.

Sincerely,

GERALD PARK URBAN PLANNER

Gerald Park

cc: B. Suzuki, DPR

**BOARD OF WATER SUPPLY**

CITY AND COUNTY OF HONOLULU  
630 SOUTH BERETANIA STREET  
HONOLULU, HAWAII 96843  
TEL: 535-2200  
FAX: 535-2201



October 10, 1996

ARREY HARRIS, Mayor  
WALTERO WATSON, JR., Chairman  
MURICE H. YAMAGUCHI, Vice Chairman  
KAZUHIKO YAMADA  
MELISSA J. LUM  
FOREST C. MURPHY  
KEVIN T. SPRAGUE  
BARRIAM, JR. STATION  
RAYMOND H. SATO  
Manager and Chief Engineer



Mr. Gerald Park  
1400 Ryerfort Street, Suite 876  
Honolulu, Hawaii 96814-3021

Dear Mr. Park:

Subject: Your Letter of August 28, 1996 Regarding the Wahiawa Botanical Garden Master Plan, Wahiawa, Oahu, Hawaii. TMK: 7-4-17-01

Thank you for the opportunity to review and provide comments on the Wahiawa Botanical Garden Master Plan.

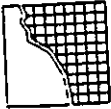
We have the following comments to offer:

1. There are two existing water meters (a 3-inch compound and a 2-inch) presently serving the subject project.
2. The existing water system is presently adequate to accommodate the proposed development.
3. The availability of water will be confirmed when the building permit application is submitted for our review and approval. When water is made available, the developer will be required to pay our Water System Facilities Charges for resource development, transmission and daily storage.
4. The on-site fire protection requirements should be coordinated with the Fire Prevention Bureau of the Honolulu Fire Department.
5. If a 3-inch or larger meter is required, the construction drawings showing the installation of the meter should be submitted for our review and approval.
6. The proposed project is subject to Board of Water Supply cross-connection control requirements prior to the issuance of the building permit application.

If there are any questions, please contact Barry Usagawa at 527-5235.

Very truly yours,

*Raymond H. Sato*  
RAYMOND H. SATO  
Manager and Chief Engineer



GERALD PARK  
Urban Planner

Planning  
Land Use  
Research  
Environmental  
Studies

1400 Ryerfort Street  
Suite 876  
Honolulu, Hawaii  
96814-3021

Phone/Fax  
808/947-7484

December 19, 1996

Raymond H. Sato  
Manager and Chief Engineer  
Board of Water Supply  
630 South Beretania Street  
Honolulu, Hawaii 96843

Dear Mr. Sato:

Subject: Wahiawa Botanical Garden Master Plan

We have forwarded your letter of October 10, 1996 to the Department of Parks and Recreation for their use when designing the proposed improvements.

Your letter will be included in the Final Environmental Assessment. We appreciate your interest and participation in the consultation phase of the environmental assessment review process. The Department of Parks and Recreation will be issuing a Finding of No Significant Impact / Negative Declaration for the project.

Sincerely,

GERALD PARK URBAN PLANNER

*Gerald Park*  
Gerald Park

cc: B. Suzuki, DPR

PLANNING DEPARTMENT  
**CITY AND COUNTY OF HONOLULU**  
810 SOUTH KING STREET 8TH FLOOR • HONOLULU HAWAII 96813 2017  
PHONE 18081523-4711 • FAX 18081523-4390



CHERYL D. SOON  
CHIEF PLANNING OFFICER  
CANDACE TAKEMASHI  
MULTI-TALENTED PLANNING OFFICERS  
LW 8/96-1799

October 11, 1996

**RECEIVED**  
10/11/96

Mr. Gerald Park  
Gerald Park Urban Planner  
1400 Rycroft Street, Suite 876  
Honolulu, Hawaii 96814-3021

Dear Mr. Park:

Draft Environmental Assessment for  
Wahiawa Botanical Garden Master Plan

We have reviewed the subject Draft Environmental Assessment and have no objections to the proposed project. The subject site is designated as Park on the Central Oahu Development Plan (DP) Land Use Map and Park/Modification, site determined, within 6 years on the Central Oahu DP Public Facilities Map.

For your information, we will be initiating an urban design plan for Wahiawa in November 1996. Completion of the Wahiawa Urban Design Plan is scheduled for fall of 1997.

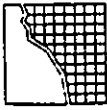
Thank you for the opportunity to comment. Should you have any questions, please contact Lin Wong of our staff at 523-4485.

Sincerely,

CHERYL D. SOON  
Chief Planning Officer

CDS:js

cc: Department of Parks and Recreation



GERALD PARK  
Urban Planner

Planning  
Land Use  
Research  
Environmental  
Studies

1400 Rycroft Street  
Suite 876  
Honolulu, Hawaii  
96814-3021

Phone/Fax  
(808) 942-7484

December 19, 1996

Cheryl Soon, Chief Planning Officer  
Planning Department  
City and County of Honolulu  
630 South King Street  
Honolulu, Hawaii 96813

Dear Ms. Soon:

Subject: Wahiawa Botanical Garden Master Plan

Thank you for your letter of October 11, 1996 indicating that your department has no objections to the proposed project.

Your letter will be included in the Final Environmental Assessment. We appreciate your interest and participation in the consultation phase of the environmental assessment review process. The Department of Parks and Recreation will be issuing a Finding of No Significant Impact/Negative Declaration for the project.

Sincerely,

GERALD PARK URBAN PLANNER

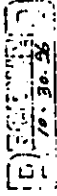
Gerald Park

cc: B. Suzuki, DPR

DEPARTMENT OF WASTEWATER MANAGEMENT  
**CITY AND COUNTY OF HONOLULU**  
650 SOUTH KING STREET  
HONOLULU, HAWAII 96813



1-808-535-3000



FELIX B. LIMITIACO, P.E.  
DIRECTOR  
CHERYL E. OJUMA-SEPE, D.A.S.  
DEPUTY DIRECTOR

In reply refer to:  
WCC 96-118

October 22, 1996

Mr. Gerald Park  
Gerald Park Urban Planner  
1400 Rycroft Street, Suite 876  
Honolulu, Hawaii 96814-3021

Dear Mr. Park:

Subject: Wahiawa Botanical Garden Master Plan  
Wahiawa, Oahu, Hawaii  
TMK: 7-4-17:01

Please note that the Wahiawa Wastewater Treatment Plant is the subject of a lawsuit in State court initiated by the State Department of Health against the City. This lawsuit may affect future sewer connections.

If you have any questions, please contact Ms. Tessa Yuen of the Service Control Branch at 523-4956.

Very truly yours,

*Felix B. Limitiaco*  
FELIX B. LIMITIACO  
Director

Attachment



GERALD PARK  
Urban Planner

Planning  
Land Use  
Reciprocity  
Environmental  
Studies

1400 Rycroft Street  
Suite 876  
Honolulu, Hawaii  
96814-3021

Phone/Fax  
808-942-7184

December 19, 1996

Felix Limitiaco, Director  
Department of Wastewater Management  
City and County of Honolulu  
650 South King Street  
Honolulu, Hawaii 96813

Dear Mr. Limitiaco:

Subject: Wahiawa Botanical Garden Master Plan

Thank you for your letter of October 22, 1996 and the information concerning future sewer connections in the Wahiawa area.

Your letter will be included in the Final Environmental Assessment. We appreciate your interest and participation in the consultation phase of the environmental assessment review process. The Department of Parks and Recreation will be issuing a Finding of No Significant Impact/Negative Declaration for the project.

Sincerely,

GERALD PARK URBAN PLANNER

*Gerald Park*  
Gerald Park

cc: B. Suzuki, DPR



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

LAWRENCE MIIKE  
DIRECTOR OF HEALTH

RECEIVED  
11/17/96

BY TELEPHONE UNIT

November 1, 1996

96-141/epo

Mr. Gerald Park  
GERALD PARK URBAN PLANNER  
1400 Rycroft Street, Suite 876  
Honolulu, Hawaii 96814-3021

Dear Mr. Park:

Subject: Draft Environmental Assessment  
Wahiawa Botanical Garden Master Plan  
Wahiawa, Oahu  
TMK: 7-4-17: 01

Thank you for allowing us to review and comment on the proposed master plan. We have the following comments to offer.

We have determined that the subject project is located within the County sewer service system of the Wahiawa Wastewater Treatment Plant. As the area is severed, we have no objections to the proposed plan to protect and preserve the garden's natural and cultural resources and to expand the educational, interpretive, and recreational opportunities for the general public, provided that the project is connected to the public sewer system.

The developer should work closely with the County to assure the availability of additional treatment capacity and adequacy for the Project. Non-availability of treatment capacity or distance from the City's sewer line will not be acceptable justification for use of any private treatment works.

Should you have any questions, please contact Ms. Lori Kajivara of the Wastewater Branch at 586-4294.

Sincerely,

*Bruce S. Anderson*

BRUCE S. ANDERSON, Ph.D.  
Deputy Director of Environmental Health

C: Wastewater Branch



GERALD PARK  
Urban Planner

Navigation  
Land Use  
Research  
Environmental  
Studies

1400 Rycroft Street  
Suite 876  
Honolulu, Hawaii  
96814-3021

Phone/Fax  
808 947-7484

December 19, 1996

Lawrence Miike, M.D.  
Director of Health  
State of Hawaii Department of Health  
P.O. Box 3378  
Honolulu, Hawaii 96801

Dear Dr. Miike:

Subject: Wahiawa Botanical Garden

Thank you for your letter of November 1, 1996 indicating your department has no objections to the subject master plan.

Your letter will be included in the Final Environmental Assessment. We appreciate your interest and participation in the consultation phase of the environmental assessment review process. The Department of Parks and Recreation will be issuing a Finding of No Significant Impact/Negative Declaration for the project.

Sincerely,

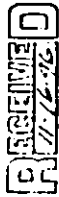
GERALD PARK URBAN PLANNER

*Gerald Park*

Gerald Park

cc: B. Suzuki, DPR





DEPUTY  
Gilbert Coloma-Agustin

- AGRICULTURE DEVELOPMENT PROGRAM
- ADULTIC RESOURCES
- CONSERVATION AND ENVIRONMENTAL AFFAIRS
- CONSERVATION AND RESOURCES ENFORCEMENT
- CONVEYANCES
- FORESTRY AND WILDLIFE
- LAND DIVISION
- LAND PRESERVATION
- STATE PLANNING
- WATER AND LAND DEVELOPMENT



STATE OF HAWAII

November 15, 1996 DEPARTMENT OF LAND AND NATURAL RESOURCES  
STATE HISTORIC PRESERVATION DIVISION  
33 SOUTH KING STREET, 6TH FLOOR  
HONOLULU, HAWAII 96813

Gerald Park  
Urban Planner  
1400 Rycroft Street, Suite 876  
Honolulu, Hawaii 96814-3021

LOG NO: 18491 ✓  
DOC NO: 9811EJ03

Dear Mr. Park:

**SUBJECT: Chapter 6E-8 Historic Preservation Review Draft Environmental Assessment: Wahiawa Botanical Garden Master Plan Wahiawa, Wahiawa, O'ahu**  
**TMK: 7-4-17:01**

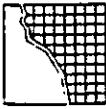
Thank you for the opportunity to review the DEA for the Wahiawa Botanical Garden Master Plan. The DEA correctly states that a review of our records shows that there are no known historic sites at this location. The Master Plan indicates that areas where ground disturbance will be most pronounced are along undeveloped sections of the garden along the gulch bottom. Areas will be cleared, the bottom widened and modified to accommodate waterways, walkways, ponds, utilities and exhibit areas. Because it is unlikely that historic sites would be found along the steep slopes and gulch bottoms in this area, we believe that this project will have "no effect" on historic sites.

In the event that historic sites, including human burials, are uncovered during routine construction activities, all work in the vicinity must stop and the Historic Preservation Division must be contacted at 587-0047.

Aloha,

  
DON HIBBARD, Administrator  
State Historic Preservation Division

E:jk



GERALD PARK  
Urban Planner

Planning  
Land Use  
Research  
Environmental  
Studies

Don Hibbard, Administrator  
State Historic Preservation Division  
Department of Land and Natural Resources  
State of Hawaii  
33 South King Street, 6th Floor  
Honolulu, Hawaii 96813

1400 Rycroft Street  
Suite 876  
Honolulu, Hawaii  
96814-3021

Phone/Fax  
808 942-7484

December 19, 1996

Dear Mr. Hibbard:

Subject: Wahiawa Botanical Garden Master Plan

Thank you for your letter of November 15, 1996 (LOG NO: 18491, DOC NO: 9611EJ03) indicating that implementation of the master plan will have "no effect" on historic sites because it is unlikely that historic sites would be found along the steep slopes and gulch bottom in the undeveloped areas of the garden. Should historic sites be uncovered during construction, work in the immediate area will cease and your office notified of the finds.

Your participation in the consultation phase of the environmental assessment review process is appreciated. The Department of Parks and Recreation will be issuing a Finding of No Significant Impact /Negative Declaration for the project.

Sincerely,

GERALD PARK URBAN PLANNER



Gerald Park

xc: B. Suzuki, DPR



STATE OF HAWAII  
 OFFICE OF HAWAIIAN AFFAIRS  
 711 KAPOLANI BOULEVARD, SUITE 500  
 HONOLULU, HAWAII 96813-5248  
 PHONE (808) 594-1188  
 FAX (808) 594-1085

October 06, 1996

Ms. Dona L. Hanaïke  
 Department of Parks and Recreation  
 City and County of Honolulu  
 650 South King St.  
 Honolulu, HI 96813

DEPT OF PARKS  
 & RECREATION  
 HONOLULU

Dear Ms. Hanaïke:

Thank you for the opportunity to review the Draft Environmental Assessment (DEA) for the Wahiawa Botanical Garden Master Plan, Island of Oahu. The master plan is intended to protect and preserve the garden's natural and cultural resources and to expand the capabilities for education and public outreach.

The Office of Hawaiian Affairs (OHA) finds the DEA generally informative on the City and County's plans to upgrade the Wahiawa Botanical Garden. But Section 1 is somewhat superficial in describing the Master Plan. Taking into account the size of the budget requested (\$6.5 million), OHA would like to see how proposed goals on Science, Horticulture, Education, and Recreation will be implemented. OHA is also concerned about the lack of data on public attendance (p. 11). Although the preparers contend that attendance has increased over the years, statistics are lacking to substantiate the need for improvements outlined in the master plan and to justify the size of the proposed budget.

96-7228  
 11/10/96

Letter to Ms. Hanaïke  
 Page 2

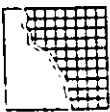
The description of soils in page 12 indicate that Helenano clay soils comprise 85% of the area. Helenano clay soils are described as highly susceptible to runoff and erosion. Although no data on rainfall occurrence is included in the DEA, the area is known for its high rainfall erosivity and high likelihood of runoff, soil losses, and sliding, particularly on steep surfaces. Given these conditions, OHA is concerned that no data on runoff, soil losses, and runoff water quality are included in the DEA. The DEA includes runoff water quality data for places other than Wahiawa. While this data is a valuable reference for comparison purposes, the lack of data for Wahiawa, and in particular for the garden, prevents OHA from truly assessing potential adverse impacts. OHA urges the preparers to gather field data and to re-evaluate the effects of runoff and soil losses on runoff water quality. Otherwise the narrative in pages 20 to 22 is just plain speculation. Please contact me, or Linda K. Delaney, (594-1938), or Luis A. Manrique (594-1755), should you have any questions on this matter.

Sincerely yours,

*Martha Ross*  
 Martha Ross  
 Deputy Administrator

LM:lm

SA  
 11/3



GERALD PARK  
URBAN PLANNER

Planning  
Land Use  
Permits  
Environmental  
50174

1609 Konocti Street  
Suite 876  
Honolulu, Hawaii  
96814-1521

Phone: 522  
Fax: 912-7144

December 19, 1996

Martha Ross, Deputy Administrator  
Office of Hawaiian Affairs  
711 Kapiolani Boulevard, Suite 500  
Honolulu, Hawaii 96813-5249

Dear Ms. Ross:

Subject: Wahiawa Botanical Garden Master Plan

Thank you for reviewing the Draft Environmental Assessment prepared for the subject project. In response to your comments, we offer the following:

1. The goals on Science and Horticulture will be implemented through the collection and accession policies of the Honolulu Botanical Gardens. Plant species displayed at the Wahiawa Botanical Garden are generally those found in a high level tropical rain forest and future expansion of the collection will continue this botanical theme. The public will be encouraged to visit the garden through education and recreation programs and activities. For example, there are plans to have musical entertainment in the garden during this Christmas season.

If the Visitor Center is constructed, it will be open for community uses, educational seminars, horticultural classes, and other activities or uses. The garden itself is a living laboratory for studying environmental processes and the contributions plants make to the human environment.

2. The estimated cost of improvements was not based on existing attendance and future projections. The Master Plan is a guide to what the garden could be and what is required to achieve that objective.

It would be desirable to build all the improvements described in the Master Plan. The budget presented in the master plan is a decision-making tool and construction of any of the improvements will depend on the availability of funds and the fiscal priorities of the City and County of Honolulu.

3. Runoff and soil loss quantities will be calculated during the design phases of the various improvements.

The reason for not including runoff water quality data was given in the assessment. The narrative on pages 20-22 was clearly stated as generalized predictions of water quality characteristics in the runoff water based on studies of urban storm water quality at various locations on Oahu. In the future, storm water quality studies may be

Martha Ross  
Page 2  
December 19, 1996

conducted as a requirement for NPDES permits or could be performed as part of an education program about natural environmental processes.

Your participation in the environmental review process is appreciated. The Department of Parks and Recreation will be filing a Negative Declaration/Finding of No Significant Impact for the project.

Sincerely,

GERALD PARK URBAN PLANNER

Gerald Park

cc: B. Suzuki, DPR