DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU
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JEREMY HARRIS
MAYOR

RONALD S. LIM
DIRECTOR

ROLAND D. LIBBY, JR.
DEPUTY DIRECTOR

August 25, 1995

Mr. Gary Gill, Director
Office of Environmental Quality Control
Central Pacific Plaza
220 South King Street, Suite 400
Honolulu, Hawaii 96813

Dear Mr. Gill:

Subject: Final Environmental Assessment (Negative Declaration)
for Hausten Street Elderly Housing Project
Tax Map Keys: 2-7-9: 13 & 14; 2-7-10: 8 & 9
Honolulu, Oahu, Hawaii

The Department of Housing and Community Development has reviewed the Final Environmental Assessment (EA) for the subject project and wishes to submit a negative declaration. Please publish notice of availability for this project in the September 8, 1995 OEQC Bulletin.

We have enclosed a completed OEQC Bulletin Publication Form and four copies of the Final EA. Please contact Mr. Jason Ching at 523-4368 if you have any questions.

Sincerely,

RONALD S. LIM
Director

Enclosures

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1995-09-08-OA-FEA - Hausten Street Elderly Housing

FINAL ENVIRONMENTAL ASSESSMENT (NEGATIVE DECLARATION)

FOR THE

HAUSTEN STREET ELDERLY HOUSING DEVELOPMENT

Department of Housing and Community Development
City and County of Honolulu
July 1995

ENVIRONMENTAL ASSESSMENT

ADMINISTRATIVE INFORMATION

A. Name of Project: Hausten Street Elderly Housing Development

B. Type of Action: ___ Applicant
X Agency

Department of Housing and Community Development
City and County of Honolulu
650 South King Street, 5th floor
Honolulu, Hawaii 96813
Ronald S. Lim, Director

C. Approving Agencies:

Planning Department
City and County of Honolulu
650 South King Street, 8th Floor
Honolulu, Hawaii 96813
Cheryl D. Soon, Chief Planning Officer

State of Hawaii
Office of Environmental Quality Control
220 South King Street, 4th Floor
Honolulu, Hawaii 96813

D. Environmental Assessment Prepared by:

Department of Housing and Community Development
July 1995

DESCRIPTION OF PROPOSED ACTIONS

A. Proposed Actions: X Single Activity
___ Aggregation of activities
___ Multi-year Activities

ENVIRONMENTAL ASSESSMENT PREPARED FOR COMPLIANCE WITH HUD REQUIREMENTS AND ENVIRONMENTAL REVIEW REQUIREMENTS OF OTHER LEVELS OF GOVERNMENT AS FOLLOWS:

A. X State of Hawaii, Supplemental Form EA-S-SOH
B. ___ Guam, Supplemental Form EA-S-Guam
C. ___ Northern Mariana Islands, Supplemental Form EA-S-NMI
D. ___ Trust Territories of the Pacific Islands, Form EA-S-TTPI
E. ___ American Samoa, Supplemental Form EA-S-ASG

FINDINGS AND CONCLUSIONS RESULTING FROM THE ENVIRONMENTAL REVIEW

A. Environmental Findings

_X_ Finding of No Significant Impact on the Environment (FONSI).
___ An Environmental Impact Statement is required.

B. Agencies/Interested Parties Consulted
(See Appendix A.)

C. Publication Notification
1. Finding of No Significant Impact on the Environment and Request Release of Funds (Combined Notice)

a. Date FONSI/RROF published in local Newspaper _____
b. Last day for recipient to receive comments _____
c. Last day for HUD to receive comments _____
d. Date FONSI transmitted to Federal, State, or local government agencies of interested groups or individuals

_____

e. Date HUD released grant conditions _____

2. Negative Declaration (Hawaii Only)

a. Date Negative Declaration published in OEQC Bulletin September 8, 1995
b. Date on which 30-day waiting period expires October 7, 1995
c. Documentation attached: _X_ Yes ___ No

PROPOSED PROJECT

The Department of Housing and Community Development (DHCD) is proposing to acquire four properties on Hausten Street which contain the former Willows Restaurant and parking lot in Moiliili. The owner has filed for bankruptcy and the City has initiated due diligence studies to determine the feasibility of acquiring the properties. Federal Community Development Block Grant (CDBG) and possibly HOME program funds will be used for acquisition and development of the project. The DHCD proposes to develop housing and related services for the elderly. 80-100 rental units in a 10- to 11-story structure are proposed for independent elderly living on the two diamond head parcels. The second structure will consist of a 3- to 4-story structure with 30-40 assisted living units on the two ewa parcels. Parking will be provided at a ratio of 1 stall per 4 units.

The design of the project will include natural ventilation in the corridors and both outdoor and indoor gathering places as suggested by a citizens' advisory committee. The project will also be designed to retain as much of the Willows' character as possible, which will include a water feature similar to the existing pond located at the front of the property.

Improvements fronting the project site will be required in compliance with City standards as well as the Americans with Disabilities Act to make the building accessible.

An advisory committee has been formed to assist DHCD in planning the subject project. The committee is comprised of representatives from the Moiliili community, including the McCully/Moiliili Neighborhood Board, elected officials, representatives from the Moiliili Community Center and area residents. Issues such as unit management, building security and common area facilities will be dealt with by the committee during the planning stages.

NEED FOR PROJECT

The DHCD's goal is to provide a project which will fulfill the need for elderly living units in Honolulu as well as fit into the neighborhood. There are over 1,000 seniors registered for programs at the Moiliili Community Center which is in close proximity to the proposed project site.

There is an overall need on Oahu to provide affordable independent and assisted living units for the elderly. The population, in general, is getting older. Since 1960, the median age of Hawaii residents has steadily increased from 24.3 years of age to 32.6 years in 1990. The elderly population (65 years and older) has been the fastest growing age cohort. In 1960, there were 28,304 senior citizens who comprised 4.5 percent of the total State population of 632,800. By 1990, the number of elderly quadrupled to 125,005 and made up 11 percent of the total State population of 1,108,229. These trends are expected to continue as medical advancements are made and people become more health conscious.

ALTERNATIVES CONSIDERED

1. No Project

   If this project is not implemented, the vacant properties will be sold at public auction and developed in accordance with applicable zoning and land use regulations or left vacant. The opportunity to provide much needed affordable housing units for elderly individuals will not be realized. If the City does not acquire this property, the community may not have an opportunity to participate in the design and development of the property.

2. Alternative Location

   The DHCD investigates sites around the island for potential housing projects. Where feasible, the Department attempts to develop those sites to house low-income families or people with special living needs.

   The proposed site is considered to be a very desirable location for prospective clients due to its size, topography, proximity to bus lines, shopping areas, public and private facilities, and immediate availability.

3. Alternative Uses

There is a tremendous need for housing of all types on Oahu, particularly for people with special living needs, such as the physically and mentally handicapped, troubled youth, AIDS victims and single parent families. Considering the general character of the area, community and location, some kind of special need housing designed to assist the elderly would be deemed the most appropriate use of the site.

Based on an analysis of the alternatives considered, it is determined that there are no practical alternatives other than to develop the project as proposed at the subject site.

SITE INSPECTION

A site inspection was conducted on September 22, 1994 by Karen Iwamoto, Planner, Tony Ching, Architect, and Jason Ching, Planner, all of the Department of Housing and Community Development.

SITE DATA

Tax Map Key:	2-7-9: 13 & 14; 2-7-10: 8 & 9 (Exhibit 1)
Land Owner:	Emma A Hausten Limited
Location:	828, 822, 817 and 821 Hausten Street
Land Area:	9,600 Square Feet (parcel 13) 4,800 Square Feet (parcel 14) 4,800 Square Feet (parcel 8) 29,955 Square Feet (parcel 9) 49,155 Square Feet Total

LAND USE DATA

	TMK: 2-7-9: 13 & 14	TMK: 2-7-10: 8 & 9
State Land Use:	Urban	Urban
Development Plan Designation:	Medium Density Apartment	Commercial
Zoning:	A-2, Medium Density Apartment	B-2, Community Business District
Existing Uses:	Parcels 13 & 14 contain an asphalt parking lot at grade and parcels 8 & 9 contain an abandoned restaurant facility.	
Flood Zone:	Flood Zone X (Area outside of 500-year flood plain)	

SMA:	Not in Special Management Area
Height Limit:	150 Feet 60 Feet
Street Setback:	± 5' street setback on the rear of Parcel 9 (opposite of Hausten Street) - DTS Map PUC-13.
Surrounding Uses:	Multi-family structures ranging from 2 to 7 stories, single-family dwellings, commercial and retail.

IMPACT CATEGORIES

The following criteria are used to rate the level of impact the project will have on the various categories:

1 - Potentially beneficial impact.
2 - No impact anticipated.
3 - Minor adverse impacts anticipated.
  a. Short Term
  b. Long Term
4 - Adverse impact. Requires mitigation.
5 - Adverse impact. Requires modification to project/activity.

A. Land Development

1. Conformance with Comprehensive Plans and Zoning

Rating:	4 - Adverse impact. Requires mitigation.
Sources:	Department of Land Utilization letter dated May 30, 1995
	Department of Public Works letter dated April 21, 1995
	Planning Department letter dated April 21, 1995
	State Land Use Commission letter dated April 19, 1995

The subject site has the following land use designations:

	TMK: 2-7-9: 13 & 14	TMK: 2-7-10: 8 & 9
State Land Use:	Urban	Urban
Development Plan Designation:	Medium Density Apartment	Commercial

Zoning:	A-2 Medium Density Apartment	B-2 Community Business District

The project area is within the McCully-Moiliili Special Area of the Primary Urban Center Development Plan (DP). The proposed development is generally consistent with the urban design principles and controls specified under Article 2, Section 24-2(b)(3) of the DP Special Provisions which address the McCully-Moiliili Special Area.

Parcels 13 & 14 have a Medium Density Apartment Development Plan (DP) designation and are within an A-2 Medium Density Apartment zoning district. Parcels 8 & 9 have a Commercial DP designation and are within a B-2 Community Business zoning district. The maximum building heights in the A-2 and B-2 districts are 150 feet and 60 feet, respectively.

The proposed project would require an exemption to the existing development plan, zoning and height designations for parcels 8 & 9 to allow the construction of the project.

The DHCD will request City Council approval to waive some of these land use restrictions under the provisions of Sections 201E-210 and 46-15.1, Hawaii Revised Statutes (HRS), where necessary to allow development of the proposed project, provided public health and safety standards are met.

2. Compatibility and Urban Impact

Rating: 2 - No impact anticipated.

Sources: Department of Public Works letter dated April 21, 1995

Site Inspection, September 22, 1994

Department of Land and Natural Resources, State Historic Preservation Division letters dated May 2, 1995, November 25, 1994 and January 17, 1994

Advisory Committee Meetings held on March 7, 1995, February 7, 1995 and September 8, 1994

The following are among the concerns raised by elected representatives, representatives of the Moiliili Community Center and Department of Land and Natural Resources, State Historic Preservation Division regarding compatibility and urban impact.

- The Willows Restaurant was renovated to its current form by Vladimir Ossipoff, an award winning Hawaii architect who promoted architecture suitable to the Island's climate and culture.

- It is important to retain as much of the Willows' character as possible. One of the pavilions should be salvaged or reconstructed into a lobby where an interpretation of the site's historic past can be seen by residents and visitors.

- It is important to obtain copies of the original drawings to document the existing pavilions using the standards set by the State Historic Preservation Division. DLNR staff has reviewed a copy of the original plans and feels that they provide a adequate record of the Willows architecture.

- The State Historic Preservation Division believes that the major spring on the property is no longer eligible for listing on the State or National Registers of Historic Places as a traditional cultural property because its integrity has been substantially altered. However, DLNR staff believe that the landscape design should incorporate a spring and pond in their current location to commemorate what was once a very important cultural and historic feature of the neighborhood.

- Major trees such as the willow, breadfruit, kukui and large plumeria trees should be kept.

One of the goals of the project is to preserve as much of the Willows' character as possible, which will include a water feature and the preservation of as many of the significant trees, like the Willow tree, as possible.

3. Hazards, Nuisances and Site Safety

Rating: 2 - No impact anticipated.

Source: Site Inspection, September 22, 1994

Phase I Environmental Site Assessment prepared by Dames and Moore (Appendix B) dated July 8, 1994.

Phase II Environmental Site Assessment prepared by Dames and Moore (Appendix C) dated May 19, 1995.

A site investigation revealed no evidence of the presence of thermal or explosive hazards on or near the project site. The site is not located in an airport clear zone. There is no evidence of natural hazards such as geologic faults, flooding, volcanic activity or landslide.

A Phase I site assessment study prepared for the site raised several concerns relating to the use, storage and/or disposal of hazardous materials both onsite and offsite.

A Phase II site investigation was then undertaken by Dames and Moore. Based on the results from the chemical test results for the soil and groundwater samples which were analyzed, the consultant does not recommend any further soil and/or groundwater sampling at this time. However, should indications of impacts to soil and groundwater be encountered during future demolition and/or development activities conducted at the site, the need for further sampling at the site will be re-evaluated. Based on the recommendations of the July, 8, 1994 Phase I study, the environmental records for five offsite properties were reviewed at the Department of Health. The review of the records indicated no indications of environmental impacts on the Willows property from these five sites.

4. Slope, Erosion and Soil Suitability

Rating: 2 - No impact anticipated.

Source: United States Soil Conservation Service: "Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai and Lanai, State of Hawaii" August 1972

Foundation Investigation prepared by Dames and Moore (Appendix D) dated June 28, 1995.

The foundation investigation indicated that the project is feasible from a geotechnical standpoint. The coralline gravels and coralline rock at about 5 feet below the existing surface are dense and strong and, therefore, the proposed buildings may be supported on conventional shallow spread or continuous footings. Two separate solution cavities encountered in the borings were at depths greater than 19 feet and are not expected to impact the load carrying capacity of the bearing materials below the footings. Groundwater was encountered at about 4 to 6 feet below the existing surface and should be anticipated during footing excavations. Construction footings can be accomplished in the dry by placing a trimie mud slab below the footing areas to displace the water.

The U.S. Soil Conservation Service classifies the soil as Ewa silty clay loam, moderately shallow, 0 to 2 percent slopes (EmA). This series consists of well-drained soils in basins and on alluvial fans on the islands of Maui and Oahu. These soils developed in alluvium derived from basic igneous rock. They are nearly level to moderately sloping. Elevations range from near sea level to 150 feet. The surface layer is dark reddish-brown silty clay loam about 18 inches thick. The subsoil, about 20 to 50 inches thick, is dark reddish-brown and dark-red silty clay loam that has subangular blocky structure. The substratum is coral limestone, sand, or gravelly alluvium. The soil is neutral in the surface layer and subsoil. Runoff is very slow, and the erosion hazard is no more than slight.

5. Energy Consumption

Rating: 2 - No Impact Anticipated

The project will receive electrical, gas, cable and telephone services from the respective utility companies.

6. Noise

Rating: 3 - Minor adverse impacts anticipated (Short Term).
2 - No impact anticipated (Long Term).

Sources: Noise Study prepared by Y. Ebisu & Associates (Appendix E) dated June 1995.

Site Inspection, September 22, 1994

Existing Land Use Map

The Noise Study indicated that the project traffic should not cause any noticeable increase in traffic noise or adverse traffic noise impacts along the high volume streets. The increases in traffic noise levels on the low volume streets are also considered to be insignificant and are not expected to generate adverse noise impacts. Because adverse impacts from traffic noises are not anticipated at the proposed project dwelling units in the future, special noise mitigation measures are not required. It should be possible to locate the project's living units as proposed in the preliminary plans and meet the 65 Ldn FHA/HUD noise standard.

Short term increases in ambient noise levels resulting from construction related activities are anticipated. The building contractor will be required to comply with Title 11, Department of Health Administrative Rules, Chapter 43, "Community Noise Controls for Oahu" and Chapter 42, "Vehicular Noise Control for Oahu."

A site inspection revealed no evidence of stationary noise sources such as air conditioning units, compressors, industrial machinery or power generating stations which would create excessive noise for project residents.

B. Air Quality

Rating: 3 - Minor adverse impacts anticipated (Short Term).
2 - No impact anticipated (Long Term).

Sources: Air Impact Assessment (Appendix F) by B.D. Neal & Associates, May 22, 1995

Site Inspection, September 22, 1994

1989 Air Quality Assessment for the UH Arena project at the Makai Campus by Barry D. Root and Barry D. Neal

Present air quality in the project area is mostly affected by exhaust from motor vehicles, with carbon monoxide being the most abundant of the air pollutants emitted.

The Air Impact Assessment Report for the Hausten Street Elderly Housing Project by B.D. Neal & Associates indicated possible short-term direct and indirect impacts on air quality which could occur during the construction of the project. The direct impacts during construction could come in the form of fugitive dust from site preparation and construction activities and exhaust emissions from on-site construction equipment. However, frequent watering of the site during grading and excavation in accordance with Title 11, Department of Health Administrative Rules, Chapter 60, "Air Pollution Controls," Section 5, "Fugitive Dust," will minimize the release of fugitive dust into the immediate environment. Indirect impacts could also occur due to the disruption of traffic caused by slow-moving construction equipment traveling to and from the project site and from a temporary increase in local traffic caused by commuting construction workers. Based on the small predicted net change in peak-hour traffic volumes and the good level-of-service at nearby intersections forecast with or without the project, the proposed project should have no significant long-term impacts on maximum air pollution levels in the area.

The 1989 Air Quality Assessment for the UH Arena project at the Makai Campus by Barry D. Root and Barry D. Neal made reference to records of carbon monoxide concentrations at the DOH monitoring station in Waikiki, at Kalakaua Avenue, near the intersection with Saratoga Avenue. The report stated that carbon monoxide concentrations recorded at the Waikiki station "are likely indicative of concentrations that occur at traffic congested locations in the project area due to the relatively short distance between the two locations and the similarity of dispersal conditions." The report also stated, "No exceedances of the State 1-hour or 8-hour AAQS for carbon monoxide were recorded during 1986 and 1987."

C. Environmental Design and Historic Values

1. Visual Quality - Coherence, Diversity, Compatible Use and Scale

Rating: 2 - No impact anticipated.

Sources: Site Inspection, September 22, 1994

Department of Land and Natural Resources, State Historic Preservation Division letters dated May 2, 1995, November 25, 1994 and January 17, 1994

The project will be designed to complement the neighborhood and be sensitive to the surrounding buildings.

The project will preserve as much of the Willows' character as possible, which will include a water feature and the preservation of as many of the significant trees, like the willow tree, as possible.

2. Historic, Cultural and Archaeological Resources

Rating: 2 - No impact anticipated.

Sources: Department of Land and Natural Resources, State Historic Preservation Division letter dated May 2, 1995, November 25, 1994 and January 17, 1994.

"An Archaeological Assessment of Four Hausten Street Lots in Moiliili, Manoa, Waikiki Ahupua'a, O'ahu, Hawaii, TMK: 2-7-9: 13 & 14 and 2-7-10: 8 & 9" (Appendix G) by Scientific Consultant Services dated July 1994.

The project site is not listed on the State or National Registers of Historic Sites, nor has it been nominated for inclusion on said registers. The Department of Land and Natural Resources (DLNR), Division of Historic Preservation, has stated that it is unlikely that there are any significant subsurface archaeological remains on the site. However, if any archaeological or skeletal remains are found during construction, the contractor will be required to stop construction and notify DLNR immediately.

It has been noted that the Willows Restaurant was renovated to its current form by Vladimir Ossipoff, an award winning Hawaii architect who promoted architecture suitable to the Island's climate and culture.

DLNR staff has reviewed a copy of the original plans and feels that they provide a adequate record of the Willows architecture.

An archaeological study was undertaken by Scientific Consultant Services for the City. DLNR concurred with the finding that historic sites are unlikely to be found at these four previously developed parcels.

D. Socioeconomic

1. Demographic/Community Character Impacts

Rating: 2 - No impact anticipated.

Source: State of Hawaii Data Book, 1993-94

U.S. Department of Commerce, Bureau of Census, 1960, 1990

The proposed project will add roughly 170 to 200 persons to the McCully/Moiliili community. This is considered a negligible increase to the 28,466 people living within the boundaries of the McCully/Moiliili neighborhood board area as of 1990.

The population, in general, is getting older. Since 1960, the median age of Hawaii residents has steadily increased from 24.3 years of age to 32.6 years in 1990. The elderly population (65 years and older) has been the fastest growing age cohort. In 1960, there were 28,304 senior citizens who comprised 4.5 percent of the total State population of 632,800. By 1990, the number of elderly quadrupled to 125,005 and made up 11 percent of the total State population of 1,108,229. These trends are expected to continue as medical advancements are made and people become more health conscious.

2. Displacement

Rating: 1 - Potentially beneficial impact.

Source: Site Inspection, September 22, 1994

Development of the proposed project will not cause displacement of residents or commercial tenants. The proposed project will make use of parcels which are currently vacant and provide much needed affordable housing.

3. Employment and Income Patterns

Ratings: 1 - Potentially beneficial impact.

Source: Site Inspection, September 22, 1994

The proposed project will result in short term employment in construction related trades during construction of the project as well as create long term employment opportunities for management of the property and the provision of services.

The project residents will also provide income for the area businesses which provide services and products. The commercial

area located within close proximity to the project site, including Star Supermarket, Puck's Alley, as well as various banks, shops and restaurants will likely benefit from the patronage of the residents and employees of the project.

...

E. Community Facilities

1. Educational Facilities

Rating: 2 - No impact anticipated.

Source: Department of Education letter dated April 25, 1995

The Department of Education stated that the proposed development will have no enrollment impact on the public schools in the area.

Educational and other enrichment courses for tenants are available at the Moiliili Community Center and the University of Hawaii - Manoa Campus.

2. Commercial Facilities

Rating: 2 - No impact anticipated.

Sources: Site Inspection, September 22, 1994

There are several commercial areas located within close proximity to the project site including Star Supermarket, Puck's Alley, as well as various banks, shops and restaurants. The Manoa Marketplace and Ala Moana Shopping Center are easily accessible by public transportation.

3. Health Care
4. Emergency Medical

Rating: 2 - No impact anticipated.

Sources: Site Inspection, September 22, 1994

Existing Land Use Map

The central location of the site enables quick and easy access to most of the major medical facilities on the island, including:

Queens Hospital on Punchbowl Street
Straub Hospital and Clinic on Ward Avenue and King Street

Both of these facilities provide a full range of medical services, including 24-hour emergency service, and are 5 to 10 minutes away from the site. There are also private medical, dental and shiatsu/chiropractic offices in the area.

5. Social Services

Rating: 1 - Potentially beneficial impact.

Sources: Department of Human Resources letter dated April 26, 1995

Site Inspection, September 22, 1994

Existing Land Use Map

The Moiliili Community Center (MCC) which is located in close proximity to the project site offers educational, leisure and health activities. MCC also offers bilingual (Japanese/English) services, daily reassurance telephone calls for seniors living alone and a lunch program. The Manoa Marketplace and Ala Moana Shopping Center are easily accessible by public transportation.

The Department of Human Resources (DHR) recognizes that there is a great need for elderly living units in the Honolulu area and therefore is in favor of the proposal. DHR is particularly pleased with the inclusion of assisted living units in the project.

6. Sanitary Sewer and Solid Waste

Rating: 2 - No impact anticipated.

Sources: Department of Wastewater Management letter dated May 17, 1995

The Department of Wastewater Management (DWM) indicated that the existing 48-inch sewer line in Lewers Avenue is inadequate to accommodate this development. The DWM plans to address this problem through the Ala Wai Trunk Sewer Relief project. However, this project is suspended pending a decision on the location for the new Beachwalk Pump Station. The final location of the new pump station will determine the need for the Ala Wai Trunk Sewer Relief project. The DWM's tentative schedule is to allocate the funds necessary to construct the new pump station in the year 2000 and complete the construction in the year 2002. DHCD will pursue acceptable sewer system improvements which will enable the project to hook-up to the public sewer system prior to the Lewers/Ala Wai improvements.

The Department of Public Works currently provides trash pick-up on Hausten Street twice a week from the Honolulu Refuse Collection Yard.

7. Storm Water

Rating: 4 - Adverse impact. Requires mitigation.

Sources: Site Inspection, September 22, 1994

DPW Storm Drainage System Maps

Department of Public Works letter dated April 21, 1995

The site inspection and DPW Storm Drainage System Maps revealed that there is no storm water drainage system serving the project site. There is a 8'-10' wide drainage easement which runs along the Kapaakea Lane side of parcels 8 and 9.

Drainage improvements will be provided for the proposed site. Prior to construction, a drainage report will be submitted to the Drainage Section, Division of Engineering, for review and approval. To minimize the impact on the surrounding area, Best Management Practices (BMP's) will be utilized throughout the construction, specifically if any dewatering should occur.

8. Water Supply

Rating: 2 - No impact anticipated.

Sources: Board of Water Supply letter dated May 9, 1995

City and County Water Maps

There are three existing domestic meters serving the proposed project site.

The existing water system is presently adequate to accommodate the proposed elderly housing project.

The availability of water will be confirmed when the building permit application is submitted for review and approval. When water is made available, the applicant will be required to pay the Water Systems Facilities Charge for resource development, transmission and daily storage. The City and County Water Map for the areas shows that there is a 8" water main located on Hausten Street.

If a three-inch or larger meter is required, construction drawings showing the installation of the meter should be submitted for review and approval by the Board of Water Supply (BWS).

Approved reduced pressure principle backflow preventers will be required after the property valves of all domestic meters and prior to any branch piping. The proposed project is subject to

BWS cross-connection control requirements prior to the issuance of the building permit application.

Hausten Springs is located on the proposed project site which was used as a fish pond in more recent times. The spring's source should be utilized for nonpotable irrigation for the housing project. Upon further investigation it was found that the Hausten Springs have been dry for quite some time.

9. Public Safety

a. *Police*

Rating: 2 - No impact anticipated.

Source: Honolulu Police Department letter dated May 1, 1995

Police service is available for the proposed project. The Honolulu Police Department does not expect a substantial increase in calls for police service as a result of the proposed project.

b. Fire

Rating: 2 - No impact anticipated.

Source: Honolulu Fire Department Fire Alarm Bureau phone call May 19, 1995

Response to a major fire at the project site would come from the McCully Fire Station (engine and ladder company), the Pawaa Fire Station (engine company) and the Battalion Two Fire Chief. The second alarm response would be provided by the Makiki Fire Station (engine company), Waikiki Fire Station (engine company) and the Pawaa Fire Station (ladder and rescue company). The third alarm response would be provided by the Kakaako Fire Station (engine and snorkel company) and Kaimuki Fire Station (engine company)

As mandated by the Honolulu Fire Department, all access for fire apparatus, water supply and building renovation shall be in conformance with existing fire codes and standards.

10. Open Space, Recreation

Rating: 3 - Minor Adverse Impacts

Sources: Department of Parks and Recreation letter dated April 19, 1995

Department of Parks and Recreation "Index of Parks and Facilities," January 1993

The proposed project is subject to compliance with the City's Park Dedication Ordinance No. 4261 and street tree planting requirements. DHCD will consult with the Departments of Parks and Recreation and Land Utilization on appropriate recreational facilities. If the planned amenities are determined not to meet park dedication requirements, exemptions to the requirements may be requested from the City Council.

The Moiliili Community Center offers senior activity programs which are within walking distance from the project site.

The nearest public recreation areas are the Moiliili Neighborhood Park, Old Stadium Park and McCully District Park. Both the Moiliili Neighborhood and Old Stadium Parks are located approximately two-blocks away, while the McCully District Park is approximately 1/2 mile from the project site respectively. The 3.439 acre Moiliili Neighborhood Park contains one comfort station and one lighted baseball/softball field. The 9.17 acre Old Stadium Park contains one comfort station, one maintenance building, 33 parking stalls and landscaped children's play apparatus. The 1.433 acre McCully District Park contains a large recreation building with a kitchen, six multiple-purpose rooms, office and rest rooms; a gymnasium/pool complex with one gym containing one basketball center court, two basketball cross courts, one volleyball court, three badminton courts with a bleacher capacity of 100; one arts and crafts room, one kiln/drying room, one physical fitness room, one martial arts area, one gymnastics area, two offices, one aquatics office, two shower/changing rooms, one comfort station, one 25-yard swimming pool, one combination basketball/volleyball court, 42 parking stalls and three handicapped stalls are located under the gym.

The 0.28 acre Isenberg Street Community Garden which contains 66 community garden plots is located approximately one block from the project location.

11. Transportation

Rating: 2 - No impact anticipated.

Sources: Department of Transportation Services letter dated May 3, 1995

Department of Transportation letter dated April 28, 1995

Draft Traffic Impact Analysis Report (Appendix H) prepared by The Traffic Management Consultant dated June 21, 1995.

Moiliili Community Center letter dated April 18, 1995

Site Inspection, September 22, 1994

The traffic study indicated that the proposed elderly housing project on Hausten Street is not considered a significant traffic generator. The level of service at the intersections contained in the study area are not expected to change with the addition of this housing project. Hausten Street is a low-volume, local roadway and is not expected to be significantly impacted by traffic generated by the proposed project. Traffic mitigation measures were not recommended at this time. The traffic operations, in the vicinity of the proposed project, are not expected to be affected by the development of the elderly housing project.

The State Department of Transportation (DOT) stated that the proposed project will have no significant impact on State highway facilities.

The Department of Transportation Services (DTS) stated that there is a road widening setback affecting Parcel 9, which varies from 0 to 3 feet along Kapaakea Lane. Members of the community are reported to be opposed to the required road widening. The project plans to do the required improvements.

All vehicular access points should be constructed as standard City dropped driveways. Driveway grades should not exceed 5 percent (5%) for a minimum distance of 35 feet from the curb line, and adequate sight distance to pedestrians and other vehicles should be provided and maintained. Driveways should be aligned directly across from each other and away from the pedestrian walkways leading to/from the lobby areas to minimize the conflicts between pedestrians and vehicles. The driveway on the Ewa side of Hausten Street should have a minimum clear width of 20 feet for two-way traffic.

Landscaping should be placed in locations where it does not obstruct vehicular sight lines.

Due to the limited amount of on-street parking available in the area, additional on-site parking is recommended. Based on parking usage at other elderly housing complexes in the urban core which shows a 1:4 parking stall to unit ratio, DHCD intends to request exemptions from the Land Use Ordinance to allow provision of only 35 stalls.

All vehicular maneuvering for loading and trash pick-up activities should occur on site.

Appropriate measures will be taken to help alleviate traffic congestion within the area, especially during construction. Construction plans for all off-site work will be submitted to DTS for review and approval.

The project is located close to bus lines on University Avenue, Beretania Street and King Street, making public transportation easily accessible to project residents.

The proposed project will be designed to address the concerns raised and provide the necessary on site parking.

F. Natural Features

1. Water Supply

Rating: 2 - No Impact Anticipated

Sources: Board of Water Supply, "Oahu Water Plan," July 1982

Site Inspection, September 22, 1994

The proposed project is located in the Honolulu Water Use District which encompasses 88 square miles from Makapuu point to Moanalua. The Honolulu Water Use District is reliant on water developed in other water use districts and imported via the BWS's transmission system.

The proposed project is not located near any streams, lakes, rivers or wells and does not involve the discharge of wastewater into the ground which could affect water quality or yields.

The Hausten Springs which are located on the proposed project site and were used as a fishpond have been dry for quite some time.

2. Floodplain Management

Rating: 2 - No impact anticipated.

Sources: Department of the Army letter dated April 19, 1995

Federal Emergency Management Agency, "Flood Insurance Rate Map, City and County of Honolulu," Panel No. 150001 0120 C, September 4, 1987

The project site is located in flood zone X (unshaded), an area determined to be outside of the 500-year floodplain (see FIRM Map, Exhibit 2). According to the Department of the Army, a permit under the Clean Water Act; the Rivers and Harbors Act of 1899; and

the Marine Protection, Research and Sanctuaries Act will not be required.

3. Wetlands Protection

Rating: 2 - No impact anticipated.

Source: Site Inspection, September 22, 1994

The proposed project is located in an area which has been in urban use for an extended period of time and there are no wetlands or other important wildlife in the area.

4. Coastal Zone Management

Rating: 2 - No Impact Anticipated

Source: Chapter 205A, Hawaii Revised Statutes

A review indicated that the proposed project does not conflict with the objectives of the Hawaii Coastal Zone Management Program as provided in Chapter 205A, HRS.

5. Unique Natural Features
6. Vegetation and Animal Life

Rating: 2 - No impact anticipated.

Source: Site Inspection, September 22, 1994

The project site and surrounding area has been in urban use for an extended period of time. As the entire area has been developed, there are no endangered and threatened species or unique natural features in the project area.

7. Agricultural Lands

Rating: 2 - No impact anticipated.

Source: Site Inspection, September 22, 1994

The proposed project is in an area which has been in urban use for an extended period of time. The proposed project will not result in the conversion of agricultural lands to nonagricultural uses.

DETERMINATION

It is determined that the proposed actions will have no significant impact on the human environment and that an Environmental Impact Statement is not required. The reasons supporting this determination are as follows:

1. The number of units to be emplaced by the proposed project is far below the threshold (2,500 units) which would require the preparation and dissemination of an environmental impact statement under the provisions of Section 58.37, Federal Register, Volume 47, No. 70 dated April 12, 1982.

2. The proposed project will not generate a significant amount of additional vehicular traffic which would result in an increase in vehicle generated air pollution or ambient noise levels.

3. Short term increases in ambient noise levels generated by construction activities will be mitigated through compliance with Title 11, Department of Health Administrative Rules, Chapter 43, "Community Noise Controls for Oahu."

4. The escape of fugitive dust into the environment will be mitigated by frequent watering of the project site.

5. Development of a medium density apartment building will require waivers from the B-2 zoning and commercial Development Plan designation on Parcels 8 & 9. DHCD will seek exemptions to allow development of the project.

6. The project is located in an area that has long been urbanized and is expected to have no significant archaeological remains. However, should such remains or artifacts be found, construction activities will be stopped and DLNR will be notified immediately.

7. All infrastructure, with the exception of municipal sewer, is available and adequate to support the proposed project. The necessary improvements to the wastewater system to accommodate the proposed project will be included in the project plans. The availability of water will be confirmed when the building permit application is submitted for review and approval.

8. Community services, including social services, public transportation, medical care, police and fire protection, are available to project residents.

9. The project will provide approximately 35 parking stalls and one loading space for the project. The rate of car ownership among the proposed project tenants is expected to be low. An exemption from residential parking requirements will be requested pursuant to Section 201E-210, HRS.

10. The project will have on-site recreation amenities and several parks are located in close proximity to the project. If the planned amenities are determined not to meet park dedication requirements, exemptions to the requirements may be requested pursuant to Section 201E-210, HRS.

11. The proposed project is located in an area that has been in urban use for an extended period of time and will have no impact on fish and wildlife resources, vegetation, natural features and views.

12. The proposed project will have the positive benefits of providing affordable rental units and programs for the elderly.

A negative declaration will be published in the Office of Environmental Quality Control Bulletin and a Finding of No Significant Impact will be published in a newspaper of general circulation.

EXHIBIT 1

LOCATION MAP

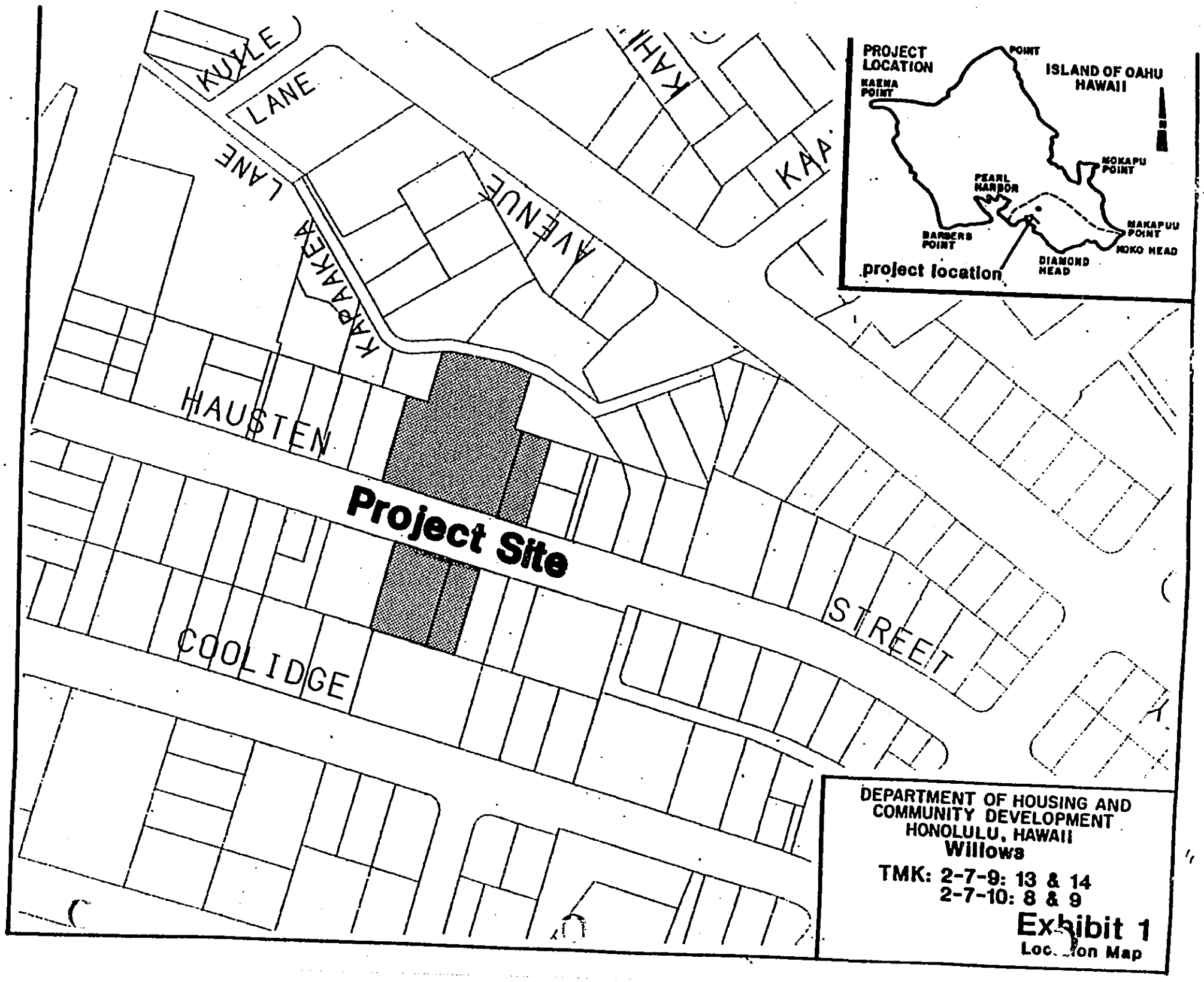
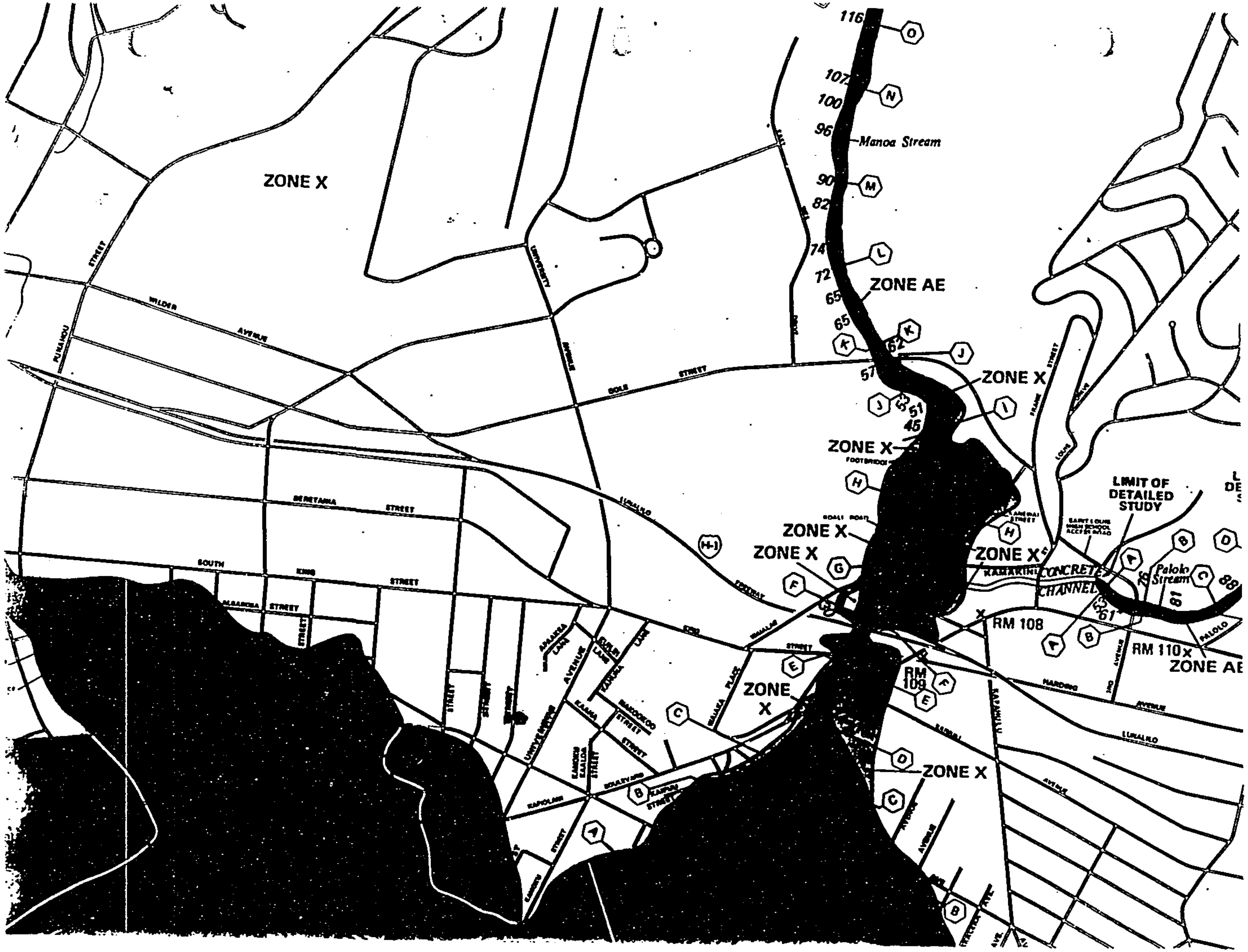

KUKLE
LANE
LANE
KAPAAKEA
AVENUE
KAHI
KAA
HAUSTEN
Project Site
STREET
COOLIDGE
PROJECT LOCATION
ISLAND OF OAHU
HAWAII
KAENA POINT
POINT
MOKAPU POINT
PEARL HARBOR
BARBERS POINT
MAKAPUU POINT
KOKO HEAD
DIAMOND HEAD
project location
DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
HONOLULU, HAWAII
Willows
TMK: 2-7-9: 13 & 14
2-7-10: 8 & 9
Exhibit 1
Location Map

EXHIBIT 2

FIRM MAP


ZONE X
Manoa Stream
ZONE AE
ZONE X
ZONE X
LIMIT OF DETAILED STUDY
ZONE X
ZONE X
ZONE X
CONCRETE CHANNEL
Palolo Stream
RM 108
RM 110x
ZONE AE
RM 109
ZONE X
ZONE X
WILDER AVENUE
DOLE STREET
BERETANIA STREET
SOUTH KING STREET
UNIVERSITY AVENUE
FRANK STREET
116
107
100
96
90
82
74
72
65
65
62
57
53
51
45
61
76
81
88

APPENDIX A

AGENCY RESPONSE

AGENCY RESPONSE

Federal	Date of Response
U.S. Department of Housing and Community Development	
U.S. Army Corps of Engineers	4/19/95
U.S. Department of the Interior, Fish and Wildlife Service	
U.S. Soil Conservation Services	

State	
Department of Education	4/25/95
Department of Business, Economic Development and Tourism	
Office of State Planning, Governor's Office	
Department of Health	12/14/94
Department of Land and Natural Resources	6/7/95
Department of Land and Natural Resources, Historic Preservation Division	5/2/95
	11/25/94
Department of Transportation	1/17/94
Department of Agriculture	4/28/95
Housing Finance and Development Corporation	4/28/95
Hawaii Housing Authority	
University of Hawaii Environmental Center	
Office of Environmental Quality Control	4/19/95
Land Use Commission	4/19/95

City	
Planning Department	4/21/95
Department of Land Utilization	5/30/95
Department of Transportation Services	5/3/95
Building Department	4/26/95
Department of Public Works	4/21/95
Department of Parks and Recreation	4/19/95
Board of Water Supply	5/9/95
Honolulu Fire Department	
Honolulu Police Department	5/1/95
Department of Human Resources	4/26/95
Department of Finance	4/20/95
Department of Wastewater Management	5/17/95

Others	
Honorable Andy Mirikitani, City Council	
Honorable Scott K. Saiki, State House of Representatives	
Honorable Brian T Taniguchi, State Senate	
McCully/Moiliili NB No.8	
Moiliili Community Center	4/18/95

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 5TH FLOOR
HONOLULU, HAWAII 96813
PHONE: (808) 523-4427 • FAX: (808) 527-5498

JEREMY HARRIS
MAYOR

RONALD S. LIM
DIRECTOR

ROLAND D. LIBBY, JR.
DEPUTY DIRECTOR

August 23, 1995

Mr. Gary Gill, Director
Office of Environmental Quality Control
Central Pacific Plaza
220 South King Street, Suite 400
Honolulu, Hawaii 96813

Dear Mr. Gill:

Subject: Draft Environmental Assessment (EA)
for Hausten Street Elderly Housing Project
Tax Map Keys: 2-7-9: 13 & 14; 2-7-10: 8 & 9
Honolulu, Oahu, Hawaii

Thank you for your letter of July 21, 1995 regarding the subject Draft EA. The following has been prepared in response to your comments.

1. As noted in the proposed project description on Page 2, Federal Community Development Block Grant (CDBG) and possibly HOME program funds will be used for acquisition and development.

2. Construction of the project is projected to begin in late 1997.

We appreciate your participation in reviewing the Draft EA for the proposed Hausten Street Elderly Housing Project. Please contact Mr. Jason Ching at 523-4368 if you have any questions.

Sincerely,

FOR RONALD S. LIM
Director

BENJAMIN J. CAYETANO
GOVERNOR

GARY GILL
DIRECTOR

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
220 SOUTH KING STREET
FOURTH FLOOR
HONOLULU, HAWAII 96813
TELEPHONE (808) 586-4185
FACSIMILE (808) 586-3452

FILE COPY

July 21, 1995

Mr. Roland Libby, Jr.
Department of Housing and Community Development
650 South King Street
Honolulu, Hawaii 96813

Attention: Jason Ching

Dear Mr. Libby:

Subject: Draft Environmental Assessment (EA) for Hausten Street Elderly Housing Development, Honolulu; TMK 2-7-9: 13 & 14; 2-7-10: 8 & 9

In the final EA please discuss the project timeline and the amount of state funding for the proposed project.

Also please submit only bound copies of the final document; non-bound copies are not acceptable.

If you have any questions, please call Nancy Heinrich at 586-4185.

Sincerely,

GARY GILL
Director

GG/NH:kk

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

REPLY TO
ATTENTION OF

April 19, 1995

Planning Division

Mr. Ronald S. Lim, Director
City and County of Honolulu
Department of Housing and Community Development
650 South King Street, 5th Floor
Honolulu, Hawaii 96813

Dear Mr. Lim:

Thank you for the opportunity to review and comment on the Environmental Assessment Preparation Notice for the Hausten Street Elderly Project, Honolulu, Oahu (TMKs 2-7-9: 13 and 14; 2-7-10: 8 and 9). 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, a DA permit will not be required for the project.

b. The flood hazard information provided on the Project Fact Sheet is correct.

Sincerely,

Ray H. Jyo, P.E. for
Director of Engineering

'95 APR 21 P2:03
DEPT. OF HOUSING
& COMM. DEVELOPMENT

Benjamin J. Cayetano
GOVERNOR

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

HERMAN M. AIZAWA, PH.D.
SUPERINTENDENT

OFFICE OF THE SUPERINTENDENT

April 25, 1995

Mr. Ronald S. Lim, Director
Department of Housing and Community Development
City and County of Honolulu
650 South King Street, 5th Floor
Honolulu, Hawaii 96813

Dear Mr. Lim:

SUBJECT: Hausten Street Elderly Project
TMK: 2-7-9: 13 & 14; 2-7-10: 8 & 9

We have reviewed the proposed elderly housing project and have determined that the 80-100 rental units will have no impact on the schools in the area.

Thank you for the opportunity to comment.

Sincerely,

Herman M. Aizawa, Ph.D.
Superintendent

HMA:jml

cc: A. Suga
J. Sosa

'95 MAY -1 P1:24
DEPT. OF HOUSING
& COMM. DEVELOPMENT

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

LAWRENCE MIKE
DIRECTOR OF HEALTH

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

In reply, please refer to:

December 14, 1994

TO: Those Persons Requesting Comments on Land Use Documents

FROM: June Harrigan-Lum, Manager
Environmental Planning Office

SUBJECT: Temporary Discontinuance of Land Use Reviews

Because of the lack of funds and resources this year, we are not able to hire someone to coordinate our 1995 legislative activities. As a result, we are using one of our existing staff members to do this work on a full time basis during the legislative session.

The legislative coordinator selected, Mr. Art Bauckham, is also the person who was coordinating the land use reviews and responses. Therefore, starting on January 1, and continuing until May 1, 1995, the Environmental Planning Office (EPO) will not be accepting any land use documents for coordinated replies.

If you would like staff in a specific branch or office (for instance, the Wastewater Branch) to comment on your proposal, you are welcome to contact the staff directly. A list of the Branch/Office names are attached for your reference. If you have already sent a copy of the document to the EPO, and you wish to have us send it to a specific branch, you may call 586-4337 and ask the clerical staff to send it to the appropriate branch. Please describe the document and the date of your cover letter.

Remember, on May 1, 1995 we will again start preparing coordinated responses throughout the Environmental Health Administration.

Thank you for your cooperation and patience in this matter.

Ref: Environmental Assessment for Hausten Street Elderly Project
TMK: 2-7-9: 13 & 14
2-7-10: 8 & 9

95 MAY -1 A9:16
DEPT. OF HOUSING & COMM. DEVELOPMENT

2-47

BENJAMIN J. CAYETANO
Governor of Hawaii

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

P. O. Box 621
Honolulu, Hawaii 96809

Chairperson
MICHAEL D. WILSON
Board of Land and Natural Resources

Deputy Director
GILBERT COLOMA-AGARAN

Aquaculture Development
Aquatic Resources
Boating and Ocean Recreation
Bureau of Conveyances
Conservation and Environmental Affairs
Conservation and Resources Enforcement
Forestry and Wildlife
Historic Preservation
Land Management
State Parks
Water and Land Development

REF:OCEA:ST

JUN - 7 1995

FILE NO.: 95-501
DOC. ID.: 5441

'95 JUN -9 A7:34

DEPT. OF HOUSING
& COMM. DEVELOPMENT

The Honorable Ronald S. Lim, Director
Department of Housing and Community Development
City and County of Honolulu
650 S. King St., 5th floor
Honolulu, Hawaii 96813

Dear Mr. Lim:

SUBJECT: Proposed Environmental Assessment (EA) for an Elderly Housing Project: Hausten Street Elderly Project, Honolulu, Oahu
TMKs: 2-7-09: 13 & 14; 2-7-10: 8 & 9

We have reviewed the information for the subject project transmitted by your letter dated April 10, 1995, and have no comments to offer at this time. However, we look forward to reviewing the EA when it becomes available.

Thank you for the opportunity to comment in this process. Please feel free to call Steve Tagawa at our Office of Conservation and Environmental Affairs at 587-0377, should you have any questions.

Aloha,

Gilbert S. Coloma-Agaran
MICHAEL D. WILSON

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
33 SOUTH KING STREET, 6TH FLOOR
HONOLULU, HAWAII 96813

MICHAEL D. WILSON, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DEPUTY
GILBERT COLOMA-AGARAN

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

May 2, 1995

LOG NO: 14328
DOC NO: 9505TM01

Mr. Ronald S. Lim
Department of Housing and Community Development
City and County of Honolulu
650 South King Street, 5th Floor
Honolulu, Hawaii 96813

Dear Mr. Lim:

SUBJECT: Former Willows Restaurant
Hausten Street Elderly Project
TMK: 2-7-9:13&14, 2-7-10:08,09

Thank you for your transmittal on the Department of Housing and Community Development's (DCHD) plan to purchase the former Willows Restaurant property to develop elderly housing. Please refer to the enclosed letter from our office to Mr. Jason Ching of your office regarding the measures that need to be undertaken to mitigate the adverse effect of the restaurant demolition. With this submittal, it appears as though parts of the conditions will be satisfied. However, it does not appear that any of the pavilions will be retained or reconstructed; nor is there any indication of the existing entrance or salvaged parts. In addition, it is difficult to tell from the site plan if the willow tree is being kept. If the conditions we specified have been considered, please explain how they will be incorporated into the plans. If they have not been considered, please make sure that the consultant receives a copy of the previous letter.

Also for your information, the number of stories listed in the fact sheet for both buildings does not coincide with the number of stories noted on the site plan submitted.

Thank you for the opportunity to comment. Should you have any questions, please call Tonia Moy at 587-0005.

Very truly yours,

DON HIBBARD, Administrator
State Historic Preservation Division

TM:ab

enclosure

JOHN WAIHEE
GOVERNOR OF HAWAII

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

November 25, 1994

Mr. Jason Ching
Department of Housing and Community Development
650 South King Street, 5th Floor
Honolulu, HI 96813

LOG NO: 13282
DOC NO: 9411tm13

Dear Mr. Ching:

SUBJECT: Four Hausten Street Lots including Former Willows Restaurant
Honolulu, Oahu
TMK: 2-7-9: 13, 14; 2-7-10: 8, 9

Thank you for the opportunity to visit the property which was once the Willows Restaurant and is now being considered for a proposed housing project by the City and County of Honolulu. We requested this site inspection after reviewing the archaeological survey report (*An Archaeological Assessment of Four Hausten Street Lots in Mo'ili'ili, Manoa, Waikiki Ahupua'a*, Chaffee and Spear 1994) because we were concerned that the Kumulae Spring, if still extant, could be significant as a traditional cultural property and that the restaurant pavilions could be significant for their architectural value.

Although the current Willows Restaurant pavilions are not over 50 years old, the business was started at that location in 1944. It was renovated to its current form in the early 1950s by Vladimir Ossipoff, an award-winning Hawaii architect who promoted architecture suitable to the Island's climate and culture. The Willows Restaurant has been a part of the image of Hawaii for many years and is a rare example of this Hawaiian style of architecture. As such, the restaurant buildings could be considered eligible for the Hawaii and National Registers and its demolition an "adverse effect". We understand the economic problems of maintaining Willows as a restaurant and believe that the following steps should be taken to mitigate the "adverse effect" that future use of the property will have on this property.

1. Before demolition to any part of the restaurant, obtain copies of the original drawings or document existing pavilions using HABS standards. (Contact our office for details.) Original drawings may still exist at the office of Ossipoff Snyder and

Rowland Architects Inc. One set should be sent to our office for review before transmitting to Hamilton Library Hawaiian collection.

2. Salvage as many architectural details as possible, especially the large tree columns in the back pavilion and other tree rafters, posts and beams.

3. Retain one of the pavilions by the pond or, if these pavilions are beyond repair, reuse salvaged material to reconstruct one as an example. The pavilion should be used as a lobby where interpretation of the site's historic past can be seen by residents and visitors.

4. As for the major spring on the property, we believe that it would no longer be eligible for listing on the State or National Registers as a traditional cultural property because the integrity of the site has been substantially altered. The underground source of the spring has been badly disrupted and polluted by urbanization and gunnite has been used to seal the spring and the surrounding pond that it once fed. The place, however, may still be of cultural and historical value for its associated with the Kumulae Springs, the springs once thought to have curative value. The exact location of the Kumulae Springs is apparently still uncertain. While some sources indicated that this spring was located at the site of the Willows Restaurant, some Board of Water Supply Records suggest that it was actually on the property owned by the St. Louis Alumni Club on Isenberg Street. The spring located on the Alumni property was also disrupted and the spring sealed. Another possibility is that both springs (and possibly others) contributed to surface flows which were collectively called the Kumulae Springs. This additional information on the location of Kumulae Spring was provided by Scientific Consultant Services, Inc. (Lt. Chaffee and Dye, Nov. 15, 1994) in response to our review of their archaeological assessment (Chaffee and Spear, 1994) in which we asked for further documentation on the location of the famed spring.

   Regardless of these ambiguities, we believe that the landscape design for the proposed housing development should incorporate a spring and pond in their current location to commemorate what was once a very important cultural and historical feature of this neighborhood. In addition to the pre-contact and early historic importance of these rich water sources to Hawaiian agriculture and aquaculture, many older residents of Honolulu recall stories of the underground waterways in this neighborhood and the Willows Restaurant's spring in particular. The artificial recreation of the spring should include interpretive displays that recount both the distant and recent history of the springs and the irrigated landscape they helped create as well as the remembrances of individuals who were raised in the area.

5. Major trees such as the willow, breadfruit, *kukui* and large plumeria trees should be kept.

6. If possible, we would also like to see the existing entrance incorporated into the new housing project.

Also, we would appreciate the opportunity to review plans of the new project during schematic and design development stages. Should you have any questions, please call Holly McEldowney or Tonia Moy at 587-0047.

Very truly yours,

DON HIBBARD, Administrator
State Historic Preservation Division.

TM:ab

Post-it™ brand fax transmittal memo 7671 | # of pages ▸ 3

To JASON CHING	From ANABEL
Co.	Co. HIST SITES
Dept.	Phone # 587-0047
Fax # 527-5498	Fax #

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
33 SOUTH KING STREET, 6TH FLOOR
HONOLULU, HAWAII 96813

MICHAEL D. WILSON, CHAIRPERSON
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GILBERT COLOMA-AGARAN

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

January 17, 1994

Mr. Jason Ching
Department of Housing and Community Development
650 South King Street, 5th Floor
Honolulu, HI 96813

LOG NO: 13694
DOC NO: 9501TM05
ARCHITECTURE

Dear Mr. Ching:

SUBJECT: Former Willows Restaurant
TMK: 2-7-9.10, Honolulu, Oahu

Thank you for obtaining copies of the original drawings of the former Willows Restaurant from the office of Ossipoff Snyder and Rowland Architects Inc. The plans adequately depict the restaurant's architecture and meets the first condition of our letter dated November 25, 1994. We concur with your plans to investigate soil and other site considerations by entry with heavy equipment via the back of the property. Please insure that care will be taken not to damage the front pavilions and entrance until we have had the opportunity to review your future plans.

Thank you for the opportunity to comment and we look forward to reviewing the plans for the new project. Should you have any questions, please call Tonia Moy at 587-0005.

Very truly yours,

DON HIBBARD, Administrator
State Historic Preservation Division

TM:ab

BENJAMIN CAYETANO
GOVERNOR

KAZU HAYASHIDA
DIRECTOR

DEPUTY DIRECTORS
SAM CALLEJO
GLENN M. OKIMOTO

IN REPLY REFER TO:
HWY-PS
2.5447

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

APR 28 1995

'95 MAY -2 A7:51

DEPT. OF HOUSING
& COMM. DEVELOPMENT

Mr. Ronald S. Lim, Director
Department of Housing and
Community Development
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Lim:

Subject: Hausten Street Elderly Project, McCully, Oahu
TMK: 2-7-9: 13 & 14; 2-7-10: 8 & 9

Thank you for requesting our comments. The proposed elderly housing project will not adversely affect State highway facilities.

Very truly yours,

Kazu Hayashida

KAZU HAYASHIDA
Director of Transportation

BENJAMIN J. CAYETANO
GOVERNOR

ROY S. OSHIRO
ACTING EXECUTIVE DIRECTOR

STATE OF HAWAII
DEPARTMENT OF BUDGET AND FINANCE
HOUSING FINANCE AND DEVELOPMENT CORPORATION
677 QUEEN STREET, SUITE 300
HONOLULU, HAWAII 96813
FAX (808) 587-0600

IN REPLY REFER TO:
95:PPE/2902

April 28, 1995

'95 MAY -4 P4:25

DEPT. OF HOUSING
& COMM. DEVELOPMENT

Mr. Ronald S. Lim
Director
Department of Housing and
Community Development
650 South King Street, 5th Floor
Honolulu, Hawaii 96813

Dear Mr. Lim:

Re: Hausten Street Elderly Project

Thank you for the opportunity to provide input on the preparation of the environmental assessment for the subject project.

We are generally supportive of your efforts to increase affordable rental housing opportunities for the elderly. Please keep us apprised of your efforts.

Sincerely,

ROY S. OSHIRO
Acting Executive Director

HFDC

BENJAMIN J. CAYETANO
GOVERNOR

GARY GILL
DIRECTOR

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
220 SOUTH KING STREET
FOURTH FLOOR
HONOLULU, HAWAII 96813
TELEPHONE (808) 586-4185
FACSIMILE (808) 586-3452

April 19, 1995

'95 APR 21 A8:08

DEPT. OF HOUSING
& COMM. DEVELOPMENT

Mr. Ronald S. Lim
Director
Department of Housing and Community Development
City and County of Honolulu
650 South King Street, 5th Floor
Honolulu, Hawaii 96813

Dear Mr. Lim:

Subject: Hausten Street Elderly Project

This is in response to your request for comments on the proposed project. We do not have any specific comments on the project at this time. However, we have a collection of environmental assessments and impact statements prepared for elderly housing projects that you may be interested in examining. The following is a list of recent documents done for elderly housing projects.

1. Kailua Elderly Housing Project, May 1991, Final EIS
2. Palama Elderly Housing Project, November 1993, Final EA
3. Manoa Elderly Housing Project, August 1988, EA
4. Joseph Brun Elderly Housing Project, April 1995, Final EA
5. Lihue Theater Elderly Housing Project, November 1994, Draft EA

If you have any questions, please call Jeyan Thirugnanam at 586-4185. Thank you.

Sincerely,

Gary Gill
Director

c: Planning Department, C & C Honolulu

BENJAMIN J. CAYETANO
GOVERNOR

ESTHER UEDA
EXECUTIVE OFFICER

STATE OF HAWAII
DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM
LAND USE COMMISSION
Room 104, Old Federal Building
335 Merchant Street
Honolulu, Hawaii 96813
Telephone: 587-3822

April 19, 1995

'95 APR 21 A8:23

DEPT. OF HOUSING
& COMM. DEVELOPMENT

Mr. Ronald S. Lim, Director
Department of Housing and
Community Development
City and County of Honolulu
650 South King Street, 5th Floor
Honolulu, Hawaii 96813

Dear Mr. Lim:

Subject: Hausten Street Elderly Project

We have reviewed the fact sheet and accompanying material for the proposed Hausten Street Elderly Project as transmitted by your letter dated April 10, 1995 and confirm that the subject area, identified as TMKs: 2-7-09: 13 & 14; 2-7-10: 08 & 09, are within the State Land Use Urban District.

We have no other comments to offer at this time.

Thank you for the opportunity to provide comments on this matter.

If you have any questions in regards to this matter, please feel free to contact me or Leo Asuncion of my staff at 587-3822.

Sincerely,

ESTHER UEDA
Executive Officer

EU:th

cc: DBEDT (Dir. Referral No. 95-045-P)

PLANNING DEPARTMENT

CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813

JEREMY HARRIS
MAYOR

CHERYL D. SOON
CHIEF PLANNING OFFICER

CAROLL TAKAHASHI
DEPUTY CHIEF PLANNING OFFICER

TH 4/95-0742

April 21, 1995

MEMORANDUM

TO: RONALD S. LIM, DIRECTOR
DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT

FROM: CHERYL D. SOON, CHIEF PLANNING OFFICER
PLANNING DEPARTMENT

SUBJECT: REQUEST FOR COMMENTS - HAUSTEN STREET ELDERLY HOUSING PROJECT, HONOLULU, OAHU, HAWAII, TAX MAP KEYS: 2-7-9: 13, 14; 2-7-10: 8, 9

In response to your memorandum of April 10, 1995, we have reviewed the subject proposal and offer the following comments:

1. The project area is within the McCully-Moiliili Special Area. The proposed development is generally consistent with its urban design principles and controls as specified under Article 2, Section 24-2.2(b)(3) of the DP Special Provisions for the Primary Urban Center.

2. Parcels 2-7-10: 8 and 9 are designated "Commercial" on the Primary Urban Center Development Plan (DP) Land Use Map with a general height limit of 60 feet. The proposed elderly housing project is inconsistent with the requirements for this designation as specified under Article 1, Section 24-1.3(e), and Article 2, Section 24-2.2(a)(3). Therefore, the following exemptions from the DP Common and Special Provisions will be required in order to develop the proposed project under the standards consistent with Medium Density Apartment:

   a. DP Land Use Map for the Primary Urban Center (Ordinance 81-79, as amended) to allow construction of a 10-11 story structure consisting of approximately 80-100 rental units in an area designated for "Commercial" use.

b. Article 2, Section 24-2.2(a)(3) DP Special Provisions, Height Controls to allow the proposed project to exceed the general height limit of 60 feet.

c. Article 2, Section 24-2.2(a)(4) DP Special Provisions, Density Controls to allow the proposed project to be developed under "Medium-Density Apartment" guidelines in an area designated for Commercial use.

3. The number of proposed floors and living units stated in the Summary Sheet and indicated on the Site Plan (Scheme 1) differ, and should be reconciled.

4. The Draft Environmental Assessment (DEA) Location Map should include a North arrow orientation and major streets for easier identification. The Site Plan Map should include cross-section views indicating scale and proposed building heights.

Thank you for the opportunity to comment on this matter. Please let us know if you need assistance with developing the needed exemptions from the DP Common and Special Provisions. We would appreciate the opportunity to review the DEA and offer additional comments. Should you have any questions, please contact Tim Hata at 527-6070.

Cheryl D. Soon

CHERYL D. SOON
Chief Planning Officer

CDS:ft

95-5-676

DEPARTMENT OF LAND UTILIZATION

CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813 • (808) 523-4432

JEREMY HARRIS
MAYOR

95 MAY 31 A9:38
DEPT. OF HOUSING
COMM. DEVELOPMENT

PATRICK T. ONISHI
DIRECTOR

LORETTA K.C. CHEE
DEPUTY DIRECTOR

95-02011(AS)

May 30, 1995

MEMORANDUM

TO: RONALD LIM, DIRECTOR
DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT

FROM: PATRICK T. ONISHI, DIRECTOR
DEPARTMENT OF LAND UTILIZATION

SUBJECT: HAUSTEN STREET ELDERLY PROJECT
TAX MAP KEYS 2-7-9: 13 & 14; 2-7-10: 8 & 9

This is in response to your letter dated April 10, 1995 requesting comments on the above-referenced project. The Department of Housing and Community Development (DHCD) is preparing an environmental assessment for a proposed elderly housing project to determine whether an environmental impact statement is necessary.

The DHCD proposes to acquire and develop four properties on Hausten Street. The parcels identified as TMK 2-7-9: 13 and 14 are zoned A-2 Medium Density Apartment District, and TMK 2-7-10: 8 and 9 are zoned B-2 Community Business District. A three-to-four story structure of 30-40 assisted living units is proposed on the two A-2 zoned parcels, and the other two parcels are proposed to be developed with 80-100 independent elderly living units. Parking will be provided at a ratio of one parking stall per four units. Exemptions from certain development standards will be required, and these will be addressed in the environmental assessment.

We have no substantive comments about the project at this time. Our preliminary review shows that there appears to be no adverse effects of the project on the surrounding properties. Since the two parcels zoned B-2 are surrounded by properties zoned A-2, developing this property under A-2 zoning would be appropriate. In addition, we recommend that the properties do not exceed the maximum allowable density for an A-2 district.

Should you have any questions, please contact Adrian Siu-Li of our staff at extension 5072.

PATRICK T. ONISHI
Director of Land Utilization

PTO:fm
hausten.ape

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
PACIFIC PARK PLAZA
711 KAPIOLANI BOULEVARD, SUITE 1200
HONOLULU, HAWAII 96813

JEREMY HARRIS
MAYOR

CHARLES O. SWANSON
DIRECTOR

95 MAY -3 P 1:07
DEPT. OF HOUSING & COMM. DEVELOPMENT

TE-1803
PL95.1.114

May 3, 1995

MEMORANDUM

TO: RONALD S. LIM, DIRECTOR
DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT

FROM: CHARLES O. SWANSON, DIRECTOR

SUBJECT: HAUSTEN STREET ELDERLY PROJECT
PREPARATION OF ENVIRONMENTAL ASSESSMENT
TMK: 2-7-9: 13 AND 14; 2-7-10: 8 AND 9

This is in response to your memorandum dated April 10, 1995 requesting our comments on the proposed project.

Based on our review, we have the following concerns:

1. All vehicular access points should be constructed as standard City dropped driveways.

2. Driveway grades should not exceed 5 percent (5%) for a minimum distance of 35 feet from the curb line, and adequate sight distance to pedestrians and other vehicles should be provided and maintained.

3. Driveways should be aligned directly across from each other and away from the pedestrian walkways leading to/from the lobby areas to minimize the conflicts between pedestrians and vehicles.

4. The driveway on the Ewa side of Hausten Street should have a minimum clear width of 20 feet for two-way traffic.

5. Landscaping should be placed in locations where it does not obstruct vehicular sight lines.

6. There is a road widening setback, affecting Parcel 9, which varies from 0 to 3 feet on Kapaakea Lane. Full frontage improvements should be provided with respect to the new property line. Frontage improvements should also be provided along both sides of Hausten Street.

7. Due to the limited amount of on-street parking available in the area, we recommend providing additional on-site parking to adequately serve the residents, employees and guests of the project. Similar developments which have used the parking ratio of one stall per four units have been inadequate. A parking assessment should be provided with future submittals to help determine the amount of parking stalls required.

8. All vehicular maneuvering for loading and trash pick-up activities should occur on-site.

9. Construction plans for all off-site work should be submitted to our department for review and approval.

Should you have any questions, please contact Lance Watanabe of my staff at local 4199.

Peter H-P-Vo

for CHARLES O. SWANSON

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

JEREMY HARRIS
MAYOR

RANDALL K. FUJIKI
DIRECTOR AND BUILDING SUPERINTENDENT

ISIDRO M. BAQUILAR
DEPUTY DIRECTOR AND BUILDING SUPERINTENDENT

April 26, 1995

'95 APR 27 A7:47

DEPT. OF HOUSING
& COMM. DEVELOPMENT

MEMORANDUM

TO: Ronald S. Lim, Director
Roland Libby, Deputy
Housing & Community Development

FROM: Randall K. Fujiki, Director and Superintendent RKF
Building Department

SUBJECT: Request for Comments
Hausten Street Elderly Project
Tax Map Key: 2-7-9: 13 & 14; 2-7-10: 8 & 9

This is in response to your memorandum of April 10, 1995 relative to the subject matter. We have no comments to offer. Thank you for allowing us to review the project information.

RF:vb

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

JEREMY HARRIS
MAYOR

KENNETH E. SPRAGUE
DIRECTOR AND CHIEF ENGINEER

DARWIN J. HAMAMOTO
DEPUTY DIRECTOR

ENV 95-141

April 21, 1995

MEMORANDUM:

TO: RONALD S. LIM, DIRECTOR
DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT

FROM: KENNETH E. SPRAGUE
DIRECTOR AND CHIEF ENGINEER

SUBJECT: HAUSTEN STREET ELDERLY PROJECT
TMK: 2-7-9: 13 & 14; 2-7-10: 8 & 9

In response to your memo of April 10, 1995, we provide the following comments:

1. A drainage report should be submitted to the Drainage Section, Division of Engineering, for review and approval.

2. Frontage improvement will be required.

3. The Environmental Assessment (EA) should address implementation of best management practices (BMPs) during construction, specifically the dewatering operation. The EA should also address high groundwater table springs in the area.

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

DEPARTMENT OF PARKS AND RECREATION
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

JEREMY HARRIS
MAYOR

DONA L. HANAIKE
DIRECTOR

ALVIN K.C. AU
DEPUTY DIRECTOR

April 19, 1995

TO: RONALD LIM, DIRECTOR
DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT

FROM: DONA L. HANAIKE, DIRECTOR

SUBJECT: REQUEST FOR COMMENTS FOR THE
HAUSTEN STREET ELDERLY HOUSING PROJECT
MOILILI, OAHU, HAWAII
TAX MAP KEYS 2-7-9: 13 & 14; 2-7-10: 8 & 9

Thank you for the opportunity to review the preliminary information and site plan for the Hausten Street elderly housing project. We have no objection to the project, however, it will need to comply with street tree and park dedication requirements.

If you have any questions regarding street tree requirements, please contact Michael Creagh of our Landscape Section at extension 4885. For any other questions, contact Lester Lai of our Advance Planning Branch at extension 4696.

DONA L. HANAIKE
Director

DLH:ei

95 MAR 21 P3:31
DEPT. OF HOUSING & COMM. DEVELOPMENT

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU

630 SOUTH BERETANIA STREET

HONOLULU, HAWAII 96843

May 9, 1995

TO: RONALD S. LIM, DIRECTOR
DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT

FROM: RAYMOND H. SATO, MANAGER AND CHIEF ENGINEER
BOARD OF WATER SUPPLY

SUBJECT: YOUR LETTER OF APRIL 10, 1995 REGARDING THE PROPOSED HAUSTEN STREET ELDERLY HOUSING PROJECT, HONOLULU, OAHU, HAWAII, TMK: 2-7-09: 8 AND 9

Thank you for the opportunity to review and comment on the proposed Hausten Street Elderly Housing project. We have the following comments to offer:

1. There are three existing domestic meters serving the proposed project site.

2. The existing water system is presently adequate to accommodate the proposed elderly housing project.

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 applicant will be required to pay our Water System Facilities Charges for resource development, transmission, and daily storage.

4. If a three-inch or larger meter is required, the construction drawings showing the installation of the meter should be submitted for our review and approval.

5. Approved reduced pressure principle backflow preventers will be required after the property valves of all domestic meters and prior to any branch piping. The proposed project is subject to our cross-connection control requirements prior to the issuance of the building permit.

6. Hausten Springs is located on the proposed project site which was used as a fish pond in more recent times. The spring's source should be utilized for nonpotable irrigation for the housing project.

If you have any questions, please contact Barry Usagawa at 527-5235.

POLICE DEPARTMENT

CITY AND COUNTY OF HONOLULU

801 SOUTH BERETANIA STREET
HONOLULU, HAWAII 96813 - AREA CODE (808) 529-3111

JEREMY HARRIS
MAYOR

MICHAEL S. NAKAMURA
CHIEF

HAROLD M. KAWASAKI
DEPUTY CHIEF

OUR REFERENCE BS-DL

May 1, 1995

'95 MAY -2 P1:59

DEPT. OF HOUSING
& COMM. DEVELOPMENT

TO: RONALD S. LIM, DIRECTOR
DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT

FROM: MICHAEL S. NAKAMURA, CHIEF OF POLICE
HONOLULU POLICE DEPARTMENT

SUBJECT: REQUEST FOR COMMENTS
HAUSTEN STREET ELDERLY PROJECT
TAX MAP KEY: 2-7-9: 13 & 14; 2-7-10: 8 & 9

This is in response to your memorandum of April 10, 1995, requesting comments on a proposed elderly housing project in Moiliili.

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

For By Maj. James H. Neely

EUGENE UEMURA, Assistant Chief
Administrative Bureau

DEPARTMENT OF HUMAN RESOURCES
CITY AND COUNTY OF HONOLULU
STANDARD FINANCE PLAZA
715 SOUTH KING STREET
HONOLULU, HAWAII 96813

JEREMY HARRIS
MAYOR

SALVATORE S. LANZILOTTI, ED.D.
DIRECTOR

ROBERT AGRES, JR.
DEPUTY DIRECTOR

ADMINISTRATION
2ND FLOOR: (808) 527-5311
FAX: (808) 523-4074

ELDERLY AFFAIRS DIVISION
HONOLULU COMMITTEE ON AGING
5TH FLOOR: (808) 523-4761

WORKHAWAII DIVISION
5TH FLOOR: (808) 523-4102

SPECIAL PROJECTS SECTION
HONOLULU COUNTY COMMITTEE ON THE STATUS OF WOMEN
MAYOR'S COMMITTEE FOR PERSONS WITH DISABILITIES
MAYOR'S CHILD CARE ADVISORY BOARD
5TH FLOOR: (808) 527-6264

April 26, 1995

'95 APR 28 A7:54

DEPT. OF HOUSING
& COMM. DEVELOPMENT

Ronald S. Lim, Director
Department of Housing and Community Development
650 S. King St. 5th floor
Honolulu, HI 96813

Dear Mr. Lim:

Re: Hausten Street Elderly Center Project

Thank you for the opportunity to comment on your proposal for the Hausten Street Elderly Project. Elderly Affairs Division has reviewed this proposal with input from the Honolulu Committee on Aging (HCOA) at their last meeting on April 21, 1995.

We agree that there is a great need for elderly living units in the Honolulu area and therefore are in favor of the proposal. We are particularly pleased with the inclusion of assisted living units in the project.

The members of the HCOA voiced two concerns which we are relaying to you. First, members noticed that there were four properties named in your memo and wondered if residents would be displaced. Second, members felt that the one parking stall per four units ratio may not be sufficient for residents.

We would be happy to provide any assistance and support in the development of this project and would be interested in being kept apprised of its status.

Sincerely yours,

Salvatore S. Lanzilotti, Ed.D.
Director
Department of Human Resources

CMY:et

DEPARTMENT OF FINANCE

CITY AND COUNTY OF HONOLULU

HONOLULU, HAWAII 96813

JEREMY HARRIS
MAYOR

RUSSELL W. MIYAKE
DIRECTOR

VICTOR D. GUILLERMO, JR.
DEPUTY DIRECTOR

April 20, 1995

'95 APR 21 P3:29

DEPT. OF HOUSING
& COMM. DEVELOPMENT

TO: RONALD S. LIM, DIRECTOR
DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT

FROM: RUSSELL W. MIYAKE, DIRECTOR OF FINANCE

SUBJECT: (1) ENVIRONMENTAL ASSESSMENT
CHINATOWN COMMUNITY SERVICE CENTER PROJECT,
TAX MAP KEY: 1-7-003: 14, 15

(2) REQUEST FOR COMMENTS
HAUSTEN STREET ELDERLY PROJECT,
TAX MAP KEY: 2-7-9: 13 & 14; 2-7-10: 8 & 9

The Property Management Section of the Purchasing Division has no comments on the two subject projects.

RUSSELL W. MIYAKE
Director of Finance

RWM:jw

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

JEREMY HARRIS
MAYOR

FELIX B. LIMTIACO
DIRECTOR

CHERYL K. OKUMA-SEPE
DEPUTY DIRECTOR

WPP 95-183

May 17, 1995

'95 MAY 18 P1:49

TO: MR. RONALD S. LIM, DIRECTOR
DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT

DEPT. OF HOUSING & COMMUNITY DEVELOPMENT

FROM: FELIX B. LIMTIACO, DIRECTOR
DEPARTMENT OF WASTEWATER MANAGEMENT

SUBJECT: HAUSTEN STREET ELDERLY PROJECT
(TMK: 2-7-9: 13 & 14; 2-7-10: 8 & 9)

We have reviewed the proposal to develop elderly housing on the old Willows Restaurant and parking lot in Moiliili. The existing 48-inch sewer line in Lewers Avenue is inadequate to accommodate this development.

The Department of Wastewater Management plans to address this problem through the Ala Wai Trunk Sewer Relief project. However, this project is suspended pending a decision on the location for the new Beachwalk Pump Station. The final location of the new Beachwalk Pump Station will determine the need for the Ala Wai Trunk Sewer Relief project.

A private developer has also expressed an interest in relieving the inadequate Lewers Avenue sewer with private funding to accommodate his project. No definitive plans or time frame have been set.

If you have any questions, please contact Ms. Tessa Yuen of the Division of Planning and Service Control at Extension 6732.

for Cheryl K. Okuma-Sepe
FELIX B. LIMTIACO
Director

95-A-419

MOILIILI COMMUNITY CENTER

April 18, 1995

Mr. Ronald S. Lim, Director
Department of Housing and Community
Development
City and County of Honolulu
650 South King Street, 5th Floor
Honolulu, Hawaii 96813

Dear Mr. Lim:

Subject: Request for Comments
Hausten Street Elderly Project
Tax Map Key: 2-7-9: 13 & 14; 2-7-10; 8 & 9

Thank you for requesting comment on the proposed Hausten Street Elderly Project being considered by the city. As stated in your letter of April 10, 1995, the project will fulfill a need for Senior housing as well as fit into the neighborhood. We hope the city will retain as much of the Willows' character as possible as it was the site of swimming ponds for the community's children in the early days. The water feature is most important to those from Moiliili who may one day live there.

A major concern we have is the parking ratio of 1 stall per 4 units. It appears to be rather extreme as many of the residents may want to keep a car for as long as possible as evidence of their independence. Parking in the area is already a problem with which the Center contends. If parking is severely limited for the residents, it will mean that their cars may be lining the streets and at some distance from their units. Visitors and families would have trouble parking. This area is currently used for parking by many who work or attend events in the area (such as MCC).

We strongly suggest you reconsider the parking allowance. We look forward to the progress of the Hausten Street Elderly Project.

Sincerely,

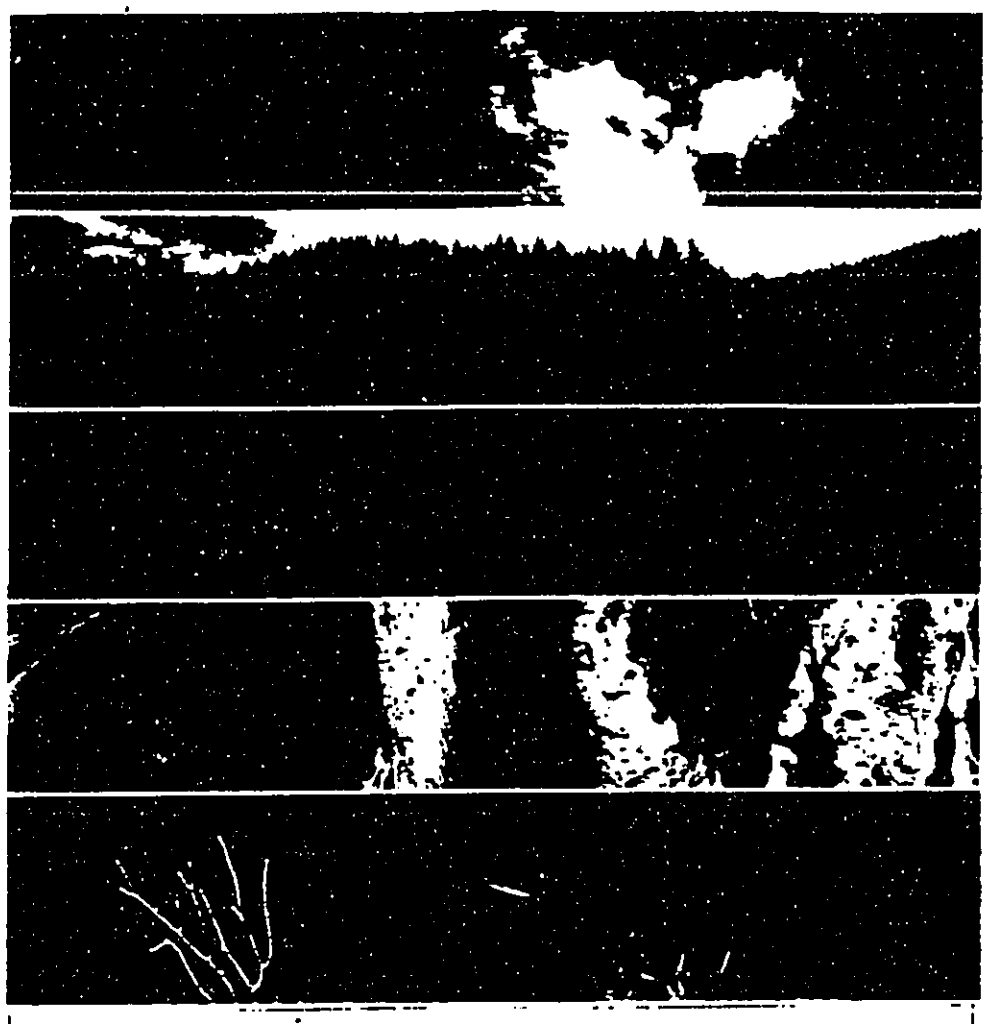
E. Rebecca Ryan
Executive Director

ERR:bt

95 APR 20 P1:57
DEPT. OF HOUSING & COMM. DEVELOPMENT

APPENDIX B

PHASE I ENVIRONMENTAL SITE ASSESSMENT



DAMES & MOORE

REPORT
PHASE I ENVIRONMENTAL SITE ASSESSMENT
FORMER WILLOWS RESTAURANT
TMK 02-07-09:13, 14 AND 02-07-10:08, 09
HONOLULU, OAHU, HAWAII
FOR FIRST HAWAIIAN BANK
Job No. 03741-008-037
July 8, 1994

DAMES & MOORE

(876:03741-008-037)

DAMES & MOORE
1050 QUEEN STREET, SUITE 204, HONOLULU, HAWAII 96814
(808) 593-1116 FAX: (808) 593-1198

July 8, 1994

Mr. Frederick J. Shine, III
Vice President
First Hawaiian Bank
P.O. Box 3200
Honolulu, Hawaii 96847

Report
Phase I Environmental Site Assessment
TMK 02-07-09:13,14 and 02-07-10:08,09
Former Willows Restaurant
Honolulu, Oahu, Hawaii
For First Hawaiian Bank
Job Number 03741-008-037

Dear Mr. Shine:

Dames & Moore is pleased to present to First Hawaiian Bank two copies of our Phase I Environmental Site Assessment (ESA) report prepared for the former Willows Restaurant in Moiliili, Honolulu, Oahu, Hawaii. We trust this report provides First Hawaiian Bank with the information required at this time. Should you have any questions about the information presented in this ESA, please contact us.

Very Truly Yours,

DAMES & MOORE

Carol Mitsuyasu
Staff Geologist

Kenton Beal, R.G., C.H.M.M.
Senior Geologist

(876:03741-008-037)

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TABLES

FIGURES

APPENDICES

REPORT
PHASE I ENVIRONMENTAL SITE ASSESSMENT
FORMER WILLOWS RESTAURANT
TAX MAP KEY 02-07-09:13,14 AND 02-07-10:08,09
HONOLULU, OAHU, HAWAII

1.0 INTRODUCTION

Presented in this report are the results of Dames & Moore's Phase I Environmental Site Assessment (ESA) conducted at the former Willows Restaurant and parking lot (Site) located on Hausten Street in Honolulu, Oahu, Hawaii (Figure 1). The Site is identified as Tax Map Key (TMK) 2-07-09:13, 14 and 02-07-10:08, 09. The Site currently consists of a closed restaurant and parking lot, covering an area of 34,755 and 14,400 square feet, respectively.

This ESA has been prepared upon the request of Mr. Frederick J. Shine, III, Vice President, First Hawaiian Bank, to evaluate the current environmental conditions existing at the Site. This ESA was conducted in accordance with Dames & Moore's proposal to First Hawaiian Bank dated May 19, 1994, which was approved by Mr. Ray Almeida, Assistant Vice President, on June 9, 1994. The scope of services of this ESA is presented below.

2.0 PURPOSE AND SCOPE OF SERVICES

The purpose of this ESA was to review past and present land use practices, Site operations and conditions, and nearby off-site land uses to evaluate the potential presence of hazardous substances, and soil and/or groundwater contamination at the Site. The collection of soil or groundwater samples or performance of analytical laboratory testing for the presence of contaminants was not included. This ESA was accomplished by, and limited to, the following specific tasks:

- Reviewing pertinent, available documents and maps regarding local physiographic and hydrogeologic conditions in the Site vicinity (studies to specifically identify landslides or other geologic hazards in the Site vicinity were not included);

- Reviewing and interpreting available historical aerial photographs of the Site and vicinity from the years 1949, 1954, 1959, 1974, 1985, and 1994 from R.M. Towill Corporation in Honolulu, Oahu, Hawaii. Flight and frame numbers and the approximate scale for each photograph reviewed are listed in the References Section of this report. The review consisted of an examination of these available photographs for evidence of previous Site activities and development which may suggest the potential for storage and/or disposal of hazardous substances at, or adjacent to, the Site;

- Reviewing and interpreting available Dames & Moore's archival U.S. Geological Survey (USGS) topographic maps of the Honolulu Quadrangle from the years 1953, 1959, and 1983;

- Reviewing and interpreting historic fire insurance maps from Sanborn Mapping and Geographic Information Service in New York, New York, for the years 1927, 1949, 1951, 1955, and 1993, of the Site and the immediate vicinity area for information regarding historical land use potentially involving the manufacture, generation, use, storage, and/or disposal of hazardous substances;

- Reviewing City & County of Honolulu Building Department permits for information regarding storage and/or disposal of hazardous materials at the Site or adjacent properties;

- Reviewing available Chain of Title reports provided by First Hawaiian Bank;

- Reviewing readily available historical business directories (Polk Directories) regarding historical occupancy of the Site;

- Performing a reconnaissance survey of the Site to make visual observations of existing Site conditions and activities, and a drive-by survey of the area within 1/4-mile radius of the Site to observe types of general land use within the search area;

- Conducting an interview with Mr. Michael Lee, former Willows Restaurant Manager, to evaluate Site history, and operation and maintenance procedures;

- Evaluating the Site for the presence of electrical transformers or hydraulic equipment which have the potential to contain polychlorinated biphenyl-type (PCB-type) cooling oils;

- Reviewing the federal, state, and local database list search generated by VISTA Environmental Information, Inc. of San Diego, California (Appendix A), of known or potential hazardous waste sites or landfills, and sites currently under investigation for environmental violations in the Site vicinity. The list search conducted by VISTA included the following:

  - United States Environmental Protection Agency (U.S. EPA), Resource Conservation and Recovery Act (RCRA) Notifiers List (RCRA Generators) (July 1993) (Site and adjoining properties);
  - U.S. EPA, National Priorities Listing ("Federal Superfund") for Region IX (January 1994) (1-mile search radius);
  - U.S. EPA, Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS) list for Region IX (January 1994) (one-half mile search radius);
  - State of Hawaii, Department of Health (DOH), Registered Underground Storage Tank List (May 1993) (one-quarter mile search radius); and
  - DOH, Registered Underground Storage Tank (UST) Release List (July 1993) (one-half mile search radius).

  The following lists, not included in the VISTA database search, were reviewed by Dames & Moore:

  - DOH Hazard Evaluation and Emergency Response (HEER) Section Incidents Response List (see References Section at the end of this report) (one-quarter mile search radius); and
  - Honolulu City and County Fire Department Incident Listings (see References Section at the end of this report) (one-quarter mile search radius).

- Conducting inquiries by telephone and in writing to the State of Hawaii, Department of Health for information regarding environmental permits, violations or incidents, and/or the status of enforcement actions at the Site; and

- Preparing this report describing the research performed and presenting Dames & Moore's findings and professional opinions regarding the potential for environmental contamination at the Site.

Based on the scope of services outlined herein, this ESA specifically did not include an evaluation for the presence of asbestos, radon gas, lead-based paint, lead in the drinking water, geologic hazards and/or geotechnical constraints.

3.0 PHYSICAL SETTING

Dames & Moore reviewed pertinent maps and readily available literature for information on the physiography and hydrogeology of the site. A summary of this information is presented in the following subsections.

3.1 PHYSIOGRAPHY

Information obtained by Dames & Moore from a review of the United States Geologic Survey (USGS) Honolulu Quadrangle, Oahu, Hawaii, 7.5 minute topographic map, 1983, indicates the following:

- Approximate Site Elevation: 8 feet above mean sea level (MSL);
- Topographic Gradient: 10 feet per mile to the south;
- Nearest Surface Water: Ala Wai Canal, approximately 2000 feet to the southwest.

3.2 HYDROGEOLOGY

The Site is located within a coastal plain between Punchbowl and Diamond Head Craters. This area is underlain by a coralline limestone formation formed during previous marine transgressions. Portions of the coralline limestone formation have been dissolved and eroded by groundwater flow which has created cavities. Small cavities from three to six inches in diameter have been observed at nearby properties (Dames & Moore Report, April 4, 1975). Large caves are known to exist in this coralline limestone formation at the intersection of King Street and University Avenue (Dames & Moore Letter Report, August 11, 1983).

Available subsurface information in the Site vicinity suggests that the uppermost fill layer consists of silty sand to sandy silt in varying thicknesses. The fill in the vicinity has been found to be underlain by dense gravel and at further depth, by medium dense, sandy coral gravel (Dames & Moore Letter Report, August 11, 1983).

From the review of historic maps of the area which will be presented in Section 5.0, a stream once passed over the Site and flowed to taro patches located south of the property. The Site has been graded to the present elevation for development.

Groundwater in the vicinity of the Site is approximately six feet below ground surface. The water level is expected to rise during periods of heavy storm runoff (Dames & Moore Report, April 4, 1975). Groundwater is anticipated to mimic surface topography and flow towards the Ala Wai Canal, approximately 2000 feet to the southwest. Groundwater quality within the coralline formation in the Site vicinity is interpreted to be brackish (Swain, L., 1973).

One groundwater well is located on the Site within the fishpond area. Water from this well reportedly became brackish in 1986, and was not used after that time (Mr. Michael Lee, personal communication, June 9, 1994).

4.0 PRESENT SITE CONDITIONS

4.1 SITE RECONNAISSANCE

Dames & Moore personnel conducted a reconnaissance of the Site on June 9, 1994. The reconnaissance consisted of the observation and documentation of the present condition of the Site and neighboring properties. In addition, an interview was conducted with Mr. Michael Lee, former Willows Restaurant Manager, for information regarding the history of the Site and the use and handling of potentially hazardous substances on-site. A brief history of the Site was described by Mr. Lee and will be presented in Section 5.0. Site activities presented below represent those which have occurred on the Site since 1980, when Mr. Lee began work at the former Willows Restaurant.

The Site consists of land parcels on both sides of Hausten Street. The property on the western side of Hausten Street consists of an asphalt-paved parking area. The property on the eastern side of Hausten Street has been developed with numerous buildings formerly used as a restaurant; however, Mr. Lee could not recall the dates of construction. A layout of the restaurant facilities

is shown on Figure 2. Numbered areas described in the following text are referenced by location in Figure 2.

The Site consists of five major buildings with a cocktail lanai and several open-air style dining areas. Two storage areas were observed on the eastern side of the property, constructed of wood and corrugated building materials. The major buildings appeared to be constructed of either concrete tile and/or tongue and groove wood panels with concrete foundations. Most floor areas in the major buildings were bare; however, some areas of the flooring were carpeted. Floorings in the upstairs office (area #4), and downstairs bedroom (area #17), were covered with vinyl floor tiles.

Gas stoves and ovens were observed in the three kitchens located in the restaurant. Mr. Lee was not aware of any underground storage tanks on the property used to fuel the kitchen appliances or vehicles in the past. A grease trap was connected with the sink drains in the Luau Kitchen (area #15). A grease trap was also observed outside the areas where two kitchens are located (areas #12 and #13). According to Mr. Lee, a contractor cleaned out the grease from the traps monthly. In addition, an exterminator was hired to spray the kitchen for insect control, approximately three times a year. Mr. Lee could not recall the name of the exterminator, but indicated that none of these chemicals were stored on Site. A valve was observed on the floor adjacent to the stove in the Luau Kitchen. This valve appeared to be the gas control for the stove.

The property manager was living in an upstairs bedroom (area #20) at the time of the reconnaissance. An adjacent lanai (area #18) served as an employee dining area. A 3/4-inch diameter metal pipe was observed next to the lanai protruding vertically out of the ground approximately six feet. Although Mr. Lee had noticed the pipe before, he did not know what the pipe was used for.

Several storage areas were observed on the restaurant property. The Fern House (area #25) contained storage for gardening supplies and other miscellaneous items. A storage room adjacent to the Luau Kitchen (area #16) was used to store kitchen items and office files. A storage area was located southeast of the Lean-To (area #19). Some chemicals observed included a partially filled 5-gallon container of D-Sect B-20 insecticide, a few one-gallon cans of paint and lacquer thinner, various household cleaners, a partially filled 5-gallon container of asphalt emulsion, and a partially filled five-gallon container of wet-patch roof cement. Two partially filled one-gallon containers of gasoline were observed in a cabinet in storage area #19. Mr. Lee could not recall what the gasoline was used for. The only type of gardening equipment he recalled in use on-site

was an electric blower used to assist with the clean up of leaves. Evidence of spills or stains was not observed in the storage areas during the reconnaissance.

A large concrete-lined fishpond is located on the western side of the restaurant property. At the time of the reconnaissance, the pond was virtually empty except for a few hundred gallons of algal water that had accumulated in the northwest portion of the pond. According to Mr. Lee, a natural spring once supplied water to the pond, but after construction of the H-1 freeway north of the Site, the spring no longer provided sufficient water for the pond. A water well fitted with a dedicated submersible pump is located within the pond; however, no information regarding the date of installation or well construction details were available. According to Mr. Lee, the water from the well became brackish, and water from the City and County of Honolulu has been used to fill the pond since 1986. According to Mr. Lee, the well is still intact but has not been used since 1986. Chemicals were purchased in single use quantities to treat the fish for illnesses periodically. Mr. Lee could not recall the types of chemicals used, but none of these chemicals were reported to be stored on-site.

The storage area located on the southern side of the property west of the carport (area #23) contained several rusted metal 55-gallon drums. The labels on two of the drums were legible and indicated that the original contents were general liquid cleansers. Two additional drums of this cleanser were observed east of the carport. Mr. Lee did not know why the drums were there or their contents at the time of the reconnaissance. Evidence of stains or discoloration from these drums was not observed during the reconnaissance.

An incinerator (area #24) was identified by location on the eastern end of the map provided by Mr. Lee; however, Mr. Lee was unaware of the history of this feature. No evidence of an incinerator was observed in this portion of the Site during the reconnaissance. Mr. Lee could not recall the presence of an incinerator or its use during his years with the restaurant (since 1980).

According to Mr. Lee, no electrical transformers or hydraulic equipment are located on the property. Dames & Moore did not observe any transformers or hydraulic equipment on the Site during the reconnaissance.

A subgrade earthen oven (imu) located between Dining Room #5 and the Luau Kitchen was reportedly used once or twice a year. Mr. Lee indicated that kerosene may have been used to start the fire in the imu.

An asphalt-paved parking lot is located across Hausten Street to the west of the restaurant property. A chain-linked fence separates the parking lot from the properties to the north, south, and west. An empty three-gallon container of grease was observed in a parking stall. No spills were observed next to the container in the parking lot area.

4.2 VICINITY SURVEY

Land use immediately adjacent to the Site consists of single and multiple residential dwellings. Various small commercial businesses are located to the north and east of the Site. Several service stations were observed in the vicinity. A clothing cleaners store (Nucleaners) was observed at 917 Hausten Street, approximately 150 feet north of the restaurant property. The business appeared closed. Businesses located in the vicinity will be further discussed in Sections 5.0 and 6.0.

4.3 ELECTRICAL TRANSFORMERS

Three pole-mounted electrical transformers were observed along Hausten Street outside the restaurant property. Hawaiian Electric Company (HECO), which owns and maintains these units, was contacted regarding the potential for PCB-type cooling oils in the transformers. As of the date of this report, HECO has not responded to our request for information relating to the transformers.

5.0 HISTORICAL LAND USE

5.1 INTERVIEW WITH FORMER RESTAURANT MANAGER

Dames & Moore interviewed Mr. Michael Lee, former manager of Willows Restaurant, for information regarding historic land use at the Site. Mr. Lee indicated the property had been occupied since at least the 1890's as a summer retreat for Hawaiian royalty. The surrounding area was reportedly covered with taro patches grown in spring-fed waters that once flowed freely over the property. In 1944, newly constructed buildings on the property were opened as a club. A dining area was located over the spring. In 1955, the club was closed and a restaurant was opened. The spring reportedly has not produced water since the construction of the H-1 freeway in the 1960's. This freeway is located approximately 1/4-mile north of the property. The restaurant was closed in July 1993.

5.2 AERIAL PHOTOGRAPH REVIEW AND SANBORN MAP REVIEW

Dames & Moore reviewed available historical aerial photographs, archival topographic maps, and Sanborn fire insurance maps for information regarding past land use of the Site and surrounding area, as detailed in Section 2.0. An interpretation of the Site and vicinity history from these references is presented below:

The Site is partially developed in the 1927 Sanborn Map. A single dwelling and detached garage are located in the northeastern-most portion of the 901 Hausten Street address. A stream (unnamed on map) is shown transecting this same property (future restaurant location - eastern side of the Site). No structures or other features are noted on the parking lot (western side of the Site). The properties located to the north, east, and southeast of the Site appear partially developed with residential dwellings, a church, and a school. The area west of the Site is undeveloped. Taro patches are noted in the area south of the Site, fed by the stream mentioned previously.

The Site appears developed with a few buildings in the 1949 Sanborn Map and aerial photograph. Numerous trees and plants are present on the restaurant property in the aerial photograph. A large pond on the restaurant property is also present. On the Sanborn Map, a dwelling and detached garage are noted on part of the parking lot across the street from the restaurant. Single-story buildings are noted in the vicinity around the Site. The area to the east of the Site in the aerial photograph appears to be only partially developed. In the 1949 Sanborn Map, part of the stream identified in 1927 has been filled in and partially developed with residential dwellings.

The Site and vicinity remain essentially unchanged as interpreted from the 1949 through 1955 references. The 1974 aerial photograph indicates that the area to the east of the Site has been further developed with residential and commercial structures since 1959.

The 1993 Sanborn Map indicates that most of the former restaurant structures observed from 1949 to 1955 have been relocated and rebuilt, with the restaurant expanded towards the east into the property of TMK 02-07-10-04. The pond is still present on the restaurant property. The dwelling and detached garage observed on the parking lot property of the Site from 1949 to 1955 have been removed. Several single-story residences have been replaced by multiple-story residential units in the Site vicinity. No part of the stream observed in the 1955 Sanborn Map remains in 1993.

Several features and building uses in the Site vicinity were identified in the aerial photographs and on the Sanborn Maps which may have involved the use, storage, and/or disposal of hazardous materials. A summary of nearby property information as related to hazardous materials is presented in Table 1. The following is a list of the properties interpreted as being hydraulically upgradient of the Site, that in our opinion may have used hazardous materials with the potential to impact soil and/or groundwater beneath their properties:

- Clothing cleaner at 917 Hausten Street, located approximately 150 feet north of the restaurant;
- Auto repair shop at 2445 S. King Street, located approximately 450 feet north of the parking lot;
- Grease shop at 2461 S. King Street, located approximately 450 north of the parking lot;
- A large structure (non-residential) was observed on the southeast corner of King and Isenberg Streets, located approximated 650 feet northwest of the site;
- Gas and oil storage at 2457 S. King Street, located approximately 450 feet north of the parking lot; and
- Some discolored soils of an unknown origin were observed on a property approximately 100 feet northeast of the site, along Kapaakea Lane.

5.3 BUILDING PERMIT REVIEW

Dames & Moore reviewed available building permits at the City & County of Honolulu Building Department, which covered the period from the 1950's to the present. None of the available permits indicated any storage and/or disposal of hazardous materials at the Site or adjacent properties.

5.4 CHAIN OF TITLE REVIEW

Dames & Moore reviewed the Chain of Title reports provided by First Hawaiian Bank. A summary of the land owners and dates of ownership is included in Appendix A. The primary purpose of this review was to search for past property owners or lessees which are suspected, by virtue of their legal name and implied type of business (e.g., J. Doe's Drycleaning, Plating, & Gas), of potentially generating, storing, and/or disposing of hazardous materials on the respective properties during their historical ownership/lease of the Site. Opinions as to the potential for a listed owner or tenant to have generated, stored, and/or disposed of hazardous materials on the property are based strictly upon inferences derived from their legal names as

presented on the Title Documents. Based on our interpretation of the Title Documents, there were no indications that any previous owners used, stored, and/or disposed of any hazardous materials on the Site.

5.5 POLK DIRECTORY REVIEW

Dames & Moore reviewed Polk Directories (historic business directories) at the State of Hawaii Public Library, Main Branch, for information regarding past occupancy of the Site. Polk Directories were available once every two years from 1933 to 1941. No Polk Directories were available from 1942 through 1948. Annual Polk Directories exist from 1949 until 1994. The Willows Restaurant was listed at the 901 Hausten Street address from 1939 until 1994. No information regarding the parking lot of the Site was available in the Polk Directories.

6.0 AGENCY LISTS REVIEW

During the last fifteen years, federal and state governments have developed legislation relating to environmental concerns. As a result of this legislation, laws and regulations which govern hazardous and/or toxic wastes and materials, and the manufacture, generation, use, storage, release, and/or disposal of such materials have been promulgated. As a consequence of these laws and regulations, numerous agencies collect and disseminate information for use in evaluating potential environmental problems.

As part of the assessment of the potential for soil and groundwater contamination at the Site or on nearby properties, Dames & Moore reviewed documents provided by a variety of federal, state, and local regulatory agencies. Section 2.0 presents a descriptive list of the agency documents reviewed for this investigation.

6.1 INTERPRETATION OF VISTA REPORT

The VISTA Report consists of a database review of the agency listings as described in our Scope of Services (Section 2). A copy of the VISTA Report is included in Appendix B.

Dames & Moore reviewed this report and found that the search radius of the RCRA lists conducted by VISTA included an area beyond our intended Scope (i.e., the Site and adjacent properties). The RCRA Large and Small Quantity Generators Lists and RCRA Transporters List were searched by VISTA to one-quarter mile radius and the RCRA Treatment, Storage, and/or

Disposal Sites List was searched by VISTA to one-mile radius. The Site and adjacent properties were not identified on these databases. For the purpose of this report, the properties identified by VISTA which are outside the search area as specified in our scope of work are not included in the following discussion.

No NPL, CERCLIS, or State of Hawaii Landfill sites were identified within the specified search radius of the Site.

Eleven properties were identified on the agency listings within the specified search radius of the Site by VISTA, as summarized on Table 2. Of these, seven were reported as having leaking underground storage tanks. Four of the seven properties with leaking underground storage tanks are interpreted as being located hydraulically upgradient (north to northeast) of the Site. These properties include:

- Lindsey's Chevron at 2404 S. Beretania Street;
- Japanese Cultural Center of Hawaii at 2454 S. Beretania Street;
- Unocal/Kyle's Service Station/Moiliili Service Station (several business names were identified at 2550 S. Beretania Street); and
- University Texaco Service/Texaco Station (two business names were identified at 1119 University Avenue).

Specific information regarding the type of release and potential for soil and groundwater contamination at and offsite of these properties were not provided in the VISTA Report. No other information regarding these properties was obtained from the VISTA Report.

6.2 MANUAL LIST SEARCH

The following lists, as described in Section 2.0, were manually reviewed by Dames & Moore:

State of Hawaii, Department of Health (DOH) Hazard Evaluation and Emergency Response (HEER) Section Incidents Response Lists

The DOH HEER Section Incidents Response Lists for the years covering 1988 through 1993 were reviewed. Four incidents within one-quarter mile of the Site were identified from these lists, and are presented in Table 3. Of these, one incident at 845 University Avenue was interpreted as being located hydraulically cross-gradient of the Site with potential soil

contamination. The list does not indicate whether groundwater has been impacted at this property. No other information regarding this property was obtained for this report.

City & County of Honolulu Fire Department (HFD) Incidents List

The HFD Incidents Lists regarding spills and chemical emergencies for the years 1983-1992 were reviewed. Fifteen incidents within one-quarter mile of the Site were identified from these lists and are presented in Table 4. An additional incident was identified on the 1993 list reviewed by Mr. Ed Yee of the City & County of Honolulu Fire Department (personal communication, July 5, 1994) and is also included in Table 4. Of all incidents identified within one-quarter mile of the Site, the following four properties where spill incidents have occurred are interpreted as being located hydraulically upgradient of the Site:

- 2470 S. King Street;
- 2615 S. King Street;
- 2671 S. King Street (two incidents); and
- 1015 University Avenue.

The listings do not indicate what types of spill incidents occurred at these addresses. No other information regarding these properties was obtained for this report.

7.0 AGENCY CONTACTS

Dames & Moore has contacted the State of Hawaii, Department of Health to obtain information on the environmental condition of the Site. Requests for information from this agency have not been acknowledged as of the date of this report. It should be noted that this inquiry was conducted as a routine part of completing a Phase I ESA. Dames & Moore will transmit outstanding environmental information, if any, obtained from these agencies when it becomes available.

8.0 CONCLUSIONS AND RECOMMENDATIONS

Dames & Moore has completed an ESA of the former Willows Restaurant property located in Honolulu, Oahu, Hawaii. Several concerns relating to the use, storage and/or disposal of hazardous materials both onsite and offsite were identified during this ESA and are summarized below.

Kerosene was apparently used to start fires in the subgrade barbecue pit (imu) located on the Site. Dames & Moore recommends that a limited soil sampling and chemical testing program be conducted to assess the possible impact to the soil from the reported handling of kerosene in this area.

Interviews with former employees of the restaurant should be made to acquire information regarding the precise location and management of burn materials and ash at the incinerator identified on the plot plan of the restaurant (Figure 2). The origin of the vertical pipe observed adjacent to the lanai should be determined. The nature of the valve observed on the floor of the Luau Kitchen should also be determined.

The 55-gallon drums observed in storage areas next to the carport should be properly disposed of once the nature of their contents have been evaluated. Chemicals, paints, and fuels observed on-site should be properly used and/or disposed of. A determination should be made regarding the potential for PCB-type cooling oils in the pole-mounted transformers.

Based on the review of historical land use information within the Site vicinity, in our interpretation, several properties are likely to have used, stored, and/or disposed of hazardous materials in the past. The potential for soil and groundwater impacts to the Site from these offsite properties is unknown. Dames & Moore recommends that public or private inquiries be conducted in an attempt to attain historical hazardous materials management information relative to the following properties:

- The clothing cleaner (NuCleaners) at 917 Hausten Street;
- Auto repair shop at 2445 S. King Street;
- Grease shop at 2461 S. King Street;
- The large structure observed at the southeast corner of King and Isenberg Streets;
- Gas and oil storage at 2457 S. King Street; and
- Discolored soils of an unknown origin approximately 100 feet northeast of the site, along Kapaakea Lane.

The potential use and handling of hazardous materials at the clothing cleaner is of particular concern due to its proximity to the Site. Should information not be forthcoming regarding the historical hazardous materials management practices at these sites, it may be prudent to conduct a limited soil and groundwater investigation at the Site.

Review of regulatory agency information, as detailed in the VISTA report, indicates that several properties with leaking underground storage tanks are interpreted as being located hydraulically upgradient of the Site. To evaluate if the underground storage tank releases have impacted or have the potential to impact soil and/or groundwater beneath the Site, the DOH Solid and Hazardous Waste Branch files for the following sites should be reviewed:

- Lindsey's Chevron at 2404 S. Beretania Street;
- Japanese Cultural Center of Hawaii at 2454 S. Beretania Street;
- Unocal/Kyle's Service Station/Moiliili Service Station at 2550 S. Beretania Street; and
- University Texaco Service/Texaco Station at 1119 University Avenue.

Review of the DOH HEER Incidents Response List indicated that one property (845 University Avenue) interpreted as being located hydraulically upgradient of the Site may have had an impact to soil and/or groundwater. Additional communication with the HEER office should be made to evaluate the nature and extent of contamination identified at the 845 University Avenue site.

Review of the HFD Incidents List indicated that several properties interpreted as being located hydraulically upgradient of the Site have had some type of spill. A follow-up with the HFD should be performed to evaluate the nature and extent of contamination (if any) at the following sites:

- 2470 S. King Street;
- 2615 S. King Street;
- 2671 S. King Street (two incidents); and
- 1015 University Avenue.

9.0 LIMITATIONS

The conclusions presented in this report are professional opinions based solely upon indicated data described in this report, visual observations of the Site and vicinity, and our interpretation of the available historical information and documents reviewed, as described in this report. They are intended exclusively for the purpose outlined herein and the Site locations and project indicated. This report is intended for the sole use of First Hawaiian Bank. The scope of services performed in execution of this investigation may not be appropriate to satisfy the needs of other users, and any use or reuse of this document or the findings, conclusions, or recommendations presented herein is at the sole risk of said user without the express written consent of Dames & Moore.

It should be recognized that this study was not intended to be a definitive investigation of contamination at the subject property and the recommendations provided are not necessarily inclusive of all the possible conditions. Given that the scope of services for this investigation was limited and that exploratory borings, soil and/or groundwater sampling or analytical testing were not undertaken, it is possible that currently unrecognized subsurface contamination may exist at the Site.

Services performed by Dames & Moore were conducted in a manner consistent with that level of care and skill ordinarily exercised by members of the same profession currently practicing in the same locality under similar conditions. It is important to recognize that even the most comprehensive scope of services may fail to detect the environmental liabilities on a particular Site. Therefore, Dames & Moore cannot act as insurers and cannot "certify" that a Site is free of environmental contamination. No expressed or implied representation of warranty is included or intended in our reports, except that our services were performed, within the limits prescribed by our client, with the customary thoroughness and competence of our profession.

Opinions and recommendations presented herein apply to the Site conditions existing at the time of our investigation and cannot necessarily apply to Site changes of which Dames & Moore is not aware and has not had the opportunity to evaluate. Changes in the conditions of this property may occur with time due to natural processes or the works of man on the subject Site or adjacent properties. Changes in applicable standards may also occur as a result of legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated, wholly or in part, by changes beyond our control.

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10.0 REFERENCES

Aerial Photographs reviewed at R.M. Towill Corporation:

Date	Flight Number	Frame Number	Approximate Scale
02/16/49	22	18,19	1:650
12/18/54	1265	4,5	1:1400
01/19/59	1816	6	1:1200
06/11/74	6276	2,3,4	1:250
8/07/85	8379	61,62	1:1000
02/28/94	8925	16,17	1:1200

City & County of Honolulu Fire Department Incident Listings, Version 6/10/91, 18 pages.

City & County of Honolulu Fire Department Incident Listings, Version 9/19/91, 44 pages.

City & County of Honolulu Fire Department Incident Listings, Version 3/23/92, 18 pages.

City & County of Honolulu Fire Department Incident Listings, Version 2/02/93, 1992 Incidents List,26 pages.

Dames & Moore Report, April 4, 1975, Foundation Investigation, Proposed Moiliili Substation, Honolulu, Oahu, Hawaii, Job No. 01269-053-011.

Dames & Moore Letter Report, August 11, 1983, Foundation Engineering Consultation, Conceptual Design Phase, Proposed 6-Story Apartment Building, Moiliili, Oahu, Hawaii, Job No. 13475-001-011.

Lee, Michael, former Willows Manager, June 9, 1994, personal communication.

Sanborn Fire Insurance Maps provided by Sanborn Mapping and Geographic Information Service of New York:

Date	Area	Volume	Sheet Number
1927	Honolulu	3	314
1949	Honolulu	3	314
1951	Honolulu	3	314
1955	Honolulu	3	314
1993	Honolulu	3	314

State of Hawaii, Department of Health, Hazard Evaluation and Emergency Response (HEER) Section Incidents Response List, 1980-1991 List, 58 pages.

State of Hawaii, Department of Health, Hazard Evaluation and Emergency Response (HEER) Section Incidents Response List, version 2/3/94, 1992 List, 74 pages.

State of Hawaii, Department of Health, Hazard Evaluation and Emergency Response (HEER) Section Incidents Response List, version 2/3/94, 1993 List, 42 pages.

Swain, Lindsay A., 1973. Chemical Quality of Ground Water in Hawaii, Report R48, in cooperation with the United States Geologic Survey, 54 pages.

U.S. Department of the Interior, Geological Survey, 1953. Honolulu Quadrangle, 7.5 Minute Topographic Map, Oahu, Hawaii.

U.S. Department of the Interior, Geological Survey, 1959. Honolulu Quadrangle, 7.5 Minute Topographic Map, Oahu, Hawaii.

U.S. Department of the Interior, Geological Survey, 1983. Honolulu Quadrangle, 7.5 Minute Topographic Map, Oahu, Hawaii.

Yee, Ed, Administrative Officer, July 5, 1994, City & County of Honolulu, Fire Department, personal communication.

TABLE 1
SUMMARY OF VICINITY PROPERTIES
HISTORICAL LAND USE REVIEW

LAND USE	ADDRESS/LOCATION	APPROXIMATE DISTANCE FROM SITE	POSSIBLE HAZARDOUS MATERIALS	DATE(S) OBSERVED
Clothing Cleaner	917 Hausten Street	150 feet	Perchloroethylene (PCE), Stoddard Solvents, other solvents	1949-1994
Auto Repair Shop	2445 S. King Street	450 feet	Hydrocarbon products, solvents	1949-1955
Grease Shop	2461 S. King Street	450 feet	Hydrocarbon products, solvents	1949-1955
Possible Manufacturing	Southeast corner of Isenberg & King Streets	750 feet	Unknown	1949
Paint Storage	Behind building at 914 Kapaakea Lane	150 feet	Solvents, lead	1951-1955
Paint Storage	810 Hausten Street	120 feet	Solvents, lead	1955
Soil Piles	East of Site, along University Avenue	300 feet	Unknown	1959
Depressions in Ground	King Street	450 feet	Unknown	1974
Gas & Oil Storage	2457 S. King Street	450 feet	Hydrocarbons	1993
Paint Storage	Behind building at 918 Kapaakea Lane	150 feet	Solvents, lead	1993
Discolored Soils	Kapaakea Lane	150 feet	Unknown	1994

TABLE 2

SUMMARY OF VISTA AGENCY LIST REVIEW

MAP ID	PROPERTY NAME	ADDRESS	LISTS(1)	APPROXIMATE DISTANCE FROM SITE	COMMENTS
6	Lindsey's Chevron	2404 S. Beretania Street Honolulu 96826	A, B	.24 mile	7 USTs (gas, used oil)
5	Japanese Cultural Center of Hawaii	2454 S. Beretania Street Honolulu 96826	A, B	.20 mile	1 UST (used oil)
5	Varsity Motors Ltd.	2482 S. Beretania Street Honolulu 96826	B	.18 mile	3 USTs (gas, used oil)
3	Unocal/Kyle's Service Station/ Moiliili Service Station	2550 S. Beretania Street Honolulu 96826	A, B	.16 mile	3 USTs (gas, used oil)
3	Commercial Building	2586 S. Beretania Street Honolulu 96826	B	.17 mile	1 UST
7	McCully Fire Station	2425 Date Street Honolulu 96826	A, B	.18 mile	2 USTs (diesel)
4	Moiliili Mochi Inc.	2563 S. King Street Honolulu 96826	B	.14 mile	1 UST (diesel)
2	711 University	2646 S. King Street Honolulu 96826	B	.22 mile	3 USTs (gas)
3	University Texaco Service/ Texaco Station	1119 University Avenue Honolulu 96826	A, B	.22 mile	5 USTs (gas, used oil)
9	Tom Ishii's Union	2114 S. King Street Honolulu 96826	A	.31 mile	None
10	Punahou Central Office	2054 Young Street Honolulu 96826	A	.41 mile	None

(1) AGENCY LIST NOTES:

A = State of Hawaii, Department of Health (DOH), Solid and Hazardous Waste Branch Leak Report

B = DOH, Solid and Hazardous Waste Branch, Listing of Facility Data - UST Records

TABLE 3
SUMMARY OF HEER LIST SEARCH

DATE	ADDRESS	CASE NUMBER	APPROXIMATE DISTANCE FROM SITE	COMMENTS
October 17, 1990	1110 University Avenue	None	<1/4 mile	Ethylene glycol dumped in drain. Owner warned and given regulations.
May 30, 1991	Kuilei & Kahalos Streets	None	<1/4 mile	Drums on property for years. Final action not specified.
February 12, 1992	845 University Avenue	920212-2	<1/8 mile	Dumping of used oil on ground for over 5 years. Solid Waste Office to take further action.
July 23, 1993	S. King and University Streets	930723	1/8 mile	Girl stepped on needle. HEER report indicates that a private citizen disposed of the syringe properly.

TABLE 4

SUMMARY OF HFD INCIDENTS LIST SEARCH

DATE	ADDRESS	DISTANCE/ GRADIENT	CASE NUMBER
02/11/83	742 HAUSTEN ST.	<1/4 mile/ down	001166
03/31/83	500 UNIVERSITY AVE.	<1/2 mile/ down	002525
05/14/83	KAPIOLANI BLVD. & UNIVERSITY AVE.	<1/4 mile/ down	003823
02/07/84	2100 DATE ST.	<1/4 mile/ down	000845
09/27/86 *	2752 KAAHA ST.	<1/4 mile/ cross	6942
04/10/87	KAPIOLANI BLVD./ UNIVERSITY AVE.	<1/4 mile/ down	2862
06/30/87	2615 S. KING ST.	<1/4 mile/ up	005078
03/01/88	2671 S. KING ST.	<1/4 mile/ up	001699
02/27/88	2716 S. KING ST.	<1/4 mile/ up	001611
01/05/89	2334 S. KING ST.	<1/4 mile/ cross	000174
05/13/89	KAPIOLANI BLVD. & DATE ST.	<1/4 mile/ down	003510
06/25/89	2470 S. KING ST.	<1/8 mile/ up	004941
11/15/91	2220 S. KING ST.	<1/4 mile/ cross	009392
02/19/92	KAPIOLANI BLVD. & DATE ST.	<1/4 mile/ down	001569
10/15/92	1015 UNIVERSITY AVE.	<1/8 mile/ up	009907
03/28/93	2626 KUILEI ST.	<1/8 mile/ up	2991

Note:

* Indicates a chemical incident

Reference:
U.S.G.S. Topographic Map (1983)
Honolulu Quadrangle
Honolulu, Oahu, Hawaii

North

VICINITY MAP

FORMER WILLOWS RESTAURANT
AND PARKING LOT
HAUSTEN STREET
HONOLULU, OAHU, HAWAII

Dames & Moore

FIGURE 1

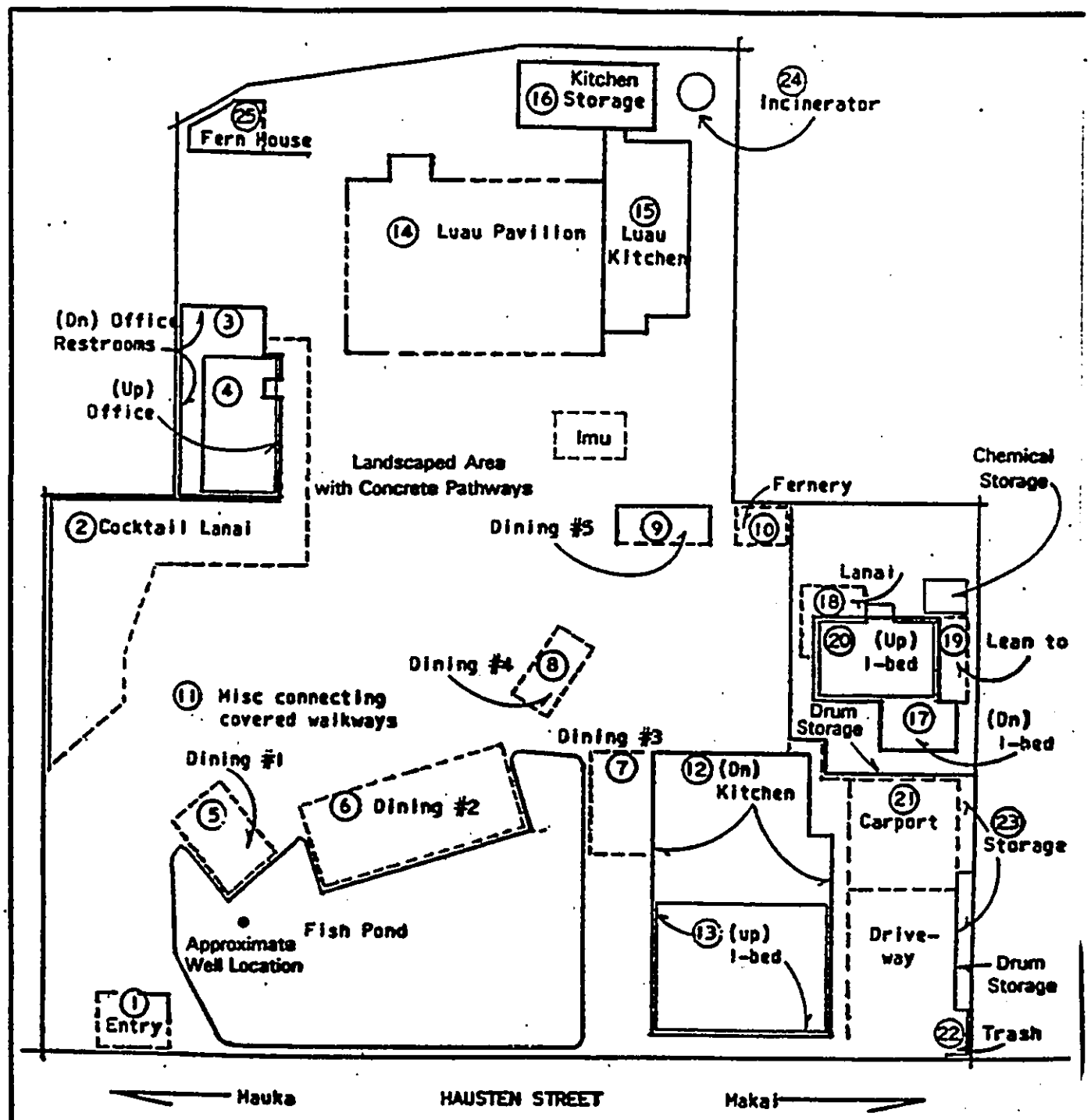

Figure Provided By Mr. Michael Lee,
The Willows Restaurant on June 9, 1994

Parking Lot
Asphalt-Paved

North

SCHEMATIC PLOT PLAN

FORMER WILLOWS RESTAURANT
AND PARKING LOT
HAUSTEN STREET
HONOLULU, OAHU, HAWAII

Not To Scale

Dames & Moore

Figure 2

APPENDIX A

SUMMARY OF TITLE REVIEW

APPENDIX A
SUMMARY OF TITLE REVIEW

TMK PARCEL	YEAR ACQUIRED	OWNER
02-07-09-13	1939	Emma A. Hausten
	1946	Emma A. Hausten Ltd.
02-07-09-14	1940	K. Yamashita & Wife
	1960	J. T. Yamashita & Wife
	1968	Emma A. Hausten Ltd.
02-07-10-08	1938	David Thomson
	1938	Emma A. Hausten & Husband
	1938	Emma A. Hausten
	1946	Emma A. Hausten Ltd.
02-07-10-09	1938	Henry T. Hausten Estate
	1942	Emma A. Hausten
	1946	Emma A. Hausten Ltd.
	1956	Acquired TMK 02-07-10-04.
	1980	RML Ltd.

APPENDIX B

VISTA REPORT

VISTA
NATIONAL RADIUS PROFILE

VISTA Report #: 6/047435-001 Date of Report: 6/23/94

Ref/Loan #: FORMER WILLOWS RESTAURANT
Client: CAROL MITSUYASU; DAMES & MOORE - HONOLULU
1050 QUEEN ST STE 204; HONOLULU, HI 96814

Subject
Property: 901 HAUSTEN ST
HONOLULU, HI 96826

SUMMARY OF FEDERAL RECORDS FOUND

Database & Date	Agency and Type of Records	0 to 1/8 mi	1/8 to 1/4 mi	1/4 to 1/2 mi	1/2 to 1 mi	TOTAL
NPL 01/94	US EPA Superfund Sites	0	0	0	0	0
CERCLIS 01/94	US EPA Potential Superfund Sites	0	0	0	--	0
RCRA-LgGen 07/93	US EPA RCRA Large Quantity Generators	1	1	--	--	2
RCRA-SmGen 07/93	US EPA RCRA Small and Very Small Quantity Generators	0	1	--	--	1
RCRA-TSD 07/93	US EPA RCRA Treatment,Storage,and/or Disposal Sites	0	0	0	1	1
RCRA-Transp 07/93	US EPA RCRA Transporters	0	0	--	--	0
ERNS 09/93	US EPA	0	--	--	--	0
	FEDERAL RECORDS Sub-total:	1	2	0	1	4

Note: 1) A dash (--) indicates the list is not searched at that distance.
2) Sites often have a record in more than one database.

 For more information call: (619) 450-6100

VISTA
NATIONAL RADIUS PROFILE

VISTA Report #: 6/047435-001 Date of Report: 6/23/94

Ref/Loan #: FORMER WILLOWS RESTAURANT
Client: CAROL MITSUYASU, DAMES & MOORE - HONOLULU
1050 QUEEN ST STE 204, HONOLULU, HI 96814

Subject
Property: 901 HAUSTEN ST
HONOLULU, HI 96826

SUMMARY OF STATE RECORDS FOUND

Database & Date	Agency and Type of Records	0 to 1/8 mi	1/8 to 1/4 mi	1/4 to 1/2 mi	1/2 to 1 mi	TOTAL
LUST 07/93	Department of Health, Solid & Hazardous Waste Branch Leak Report	0	5	2	--	7
SWLF 12/93	Department of Health, Solid & Hazardous Waste Branch Sanitary Landfill, Transfer Station, & Incinerator Facilities Database	0	0	0	0	0
UST's 05/93	Department of Health, Solid & Hazardous Waste Branch Listing of Facility Data-UST Records	0	9	--	--	9
STATE RECORDS Sub-total:		0	14	2	0	16
TOTAL:		1	16	2	1	20

Note: 1) A dash (--) indicates the list is not searched at that distance.
2) Sites often have a record in more than one database.

 For more information call: (619) 450-6100

RCRA-LgGen

MAP REF #	EPA ID / AGENCY ID	SITE NAME AND ADDRESS		
WITHIN 1/8 MILE				
8		CYCLE PLAZA 903 ISENBERG ST	HONOLULU 96826	Distance: .12 mi. Direction: NW Vista ID: 110665
	HID981674450	Generator Class	:Generators who generate at least 1000 kg./month of non-acutely hazardous waste (or 1 kg./month of acutely hazardous waste).	
WITHIN 1/8 TO 1/4 MILE				
3		UNOCAL 76 SS L 0995 2550 S BERETANIA ST	HONOLULU 96826	Distance: .16 mi. Direction: NE Vista ID: 3756958
	HID984468801	Generator Class	:Generators who generate at least 1000 kg./month of non-acutely hazardous waste (or 1 kg./month of acutely hazardous waste).	

RCRA-SmGen

MAP REF #	EPA ID / AGENCY ID	SITE NAME AND ADDRESS		
		WITHIN 1/8 TO 1/4 MILE		
3		UNIVERSITY TEXACO SERVICE 1119 UNIVERSITY AVE	HONOLULU 96826	Distance: .22 mi. Direction: NE Vista ID: 439393
	HID981638117	Generator Class	:Generators who generate 100 kg./month but less than 1000 kg./month of non-acutely hazardous waste	

RCRA-TSD

MAP REF #	EPA ID / AGENCY ID	SITE NAME AND ADDRESS

WITHIN 1/2 TO 1 MILE

1 UNIVERSITY OF HAWAII AT MANOA
2500 CAMPUS RD
HONOLULU
96822
Distance: .73 mi.
Direction: NE
Vista ID: 439090

HID087190542

LUST

MAP REF #	EPA ID / AGENCY ID	SITE NAME AND ADDRESS			
WITHIN 1/8 TO 1/4 MILE					
3		TEXACO STATION 1119 UNIVERSITY AVE.		HONOLULU 96826	Distance: .22 mi. Direction: NE Vista ID: 439393
	9-100342	Owner Name Owner Address Leak Cause	: TEXACO REFINING & MA : 1602 MUUANU AVE SUITE 201 HONOLULU , HI 96817 : UNAVAILABLE		
3		KYLE'S SERVICE STA. L-G995 2550 S. BERETANIA ST.		HONOLULU 96826	Distance: .16 mi. Direction: NE Vista ID: 3430308
	9-100036	Owner Name Owner Address Leak Cause	: UNOCAL : P.O. BOX 659 HONOLULU , HI 96809 : UNAVAILABLE		
5		JAPANESE CULTURAL CENTER OF HAWA 2454 S. BERETANIA ST		HONOLULU 96826	Distance: .20 mi. Direction: N Vista ID: 3994114
	9-102721	Owner Name Owner Address Leak Cause	: JAPANESE CULTURAL CE : 2454 S. BERETANIA ST HONOLULU , HI 96826 : UNAVAILABLE		
6		LINDSEY'S CHEVRON SERVICE 2404 S. BERETANIA ST.		HONOLULU 96826	Distance: .24 mi. Direction: N Vista ID: 3430306
	9-101230	Owner Name Owner Address Leak Cause	: CHEVRON U.S.A. INC : 1001 BISHOP ST. HONOLULU , HI 96813 : UNAVAILABLE		
7		MCCULLY FIRE STATION 2425 DATE ST.		HONOLULU 96826	Distance: .18 mi. Direction: S Vista ID: 3430321
	9-100080	Owner Name Owner Address	: C & C OF HONOLULU : 3375 KOAPAKA ST. SUITE H-402		

LUST

MAP REF #	EPA ID / AGENCY ID	SITE NAME AND ADDRESS		
WITHIN 1/8 TO 1/4 MILE				
7		MCCULLY FIRE STATION 2425 DATE ST.	HONOLULU 96826	Distance: .18 mi. Direction: S Vista ID: 3430321
		HONOLULU	, HI 96819	
		Leak Cause : UNAVAILABLE		
WITHIN 1/4 TO 1/2 MILE				
9		TOM ISHII'S UNION L-4462 2114 SOUTH KING ST.	HONOLULU 96826	Distance: .31 mi. Direction: NW Vista ID: 3430439
	9-100042	Owner Name : UNOCAL		
		Owner Address : P.O. BOX 659		
		HONOLULU	, HI 96809	
		Leak Cause : UNAVAILABLE		
10		PUNAHOU CENTRAL OFFICE 2054 YOUNG ST.	HONOLULU 96826	Distance: .41 mi. Direction: NW Vista ID: 3430600
	9-100525	Owner Name : GTE HAWAIIAN TELEPHO		
		Owner Address : 1177 BISHOP ST.		
		HONOLULU	, HI 96813	
		Leak Cause : UNAVAILABLE		

UST's

MAP REF #	EPA ID / AGENCY ID	SITE NAME AND ADDRESS		
		WITHIN 1/8 TO 1/4 MILE		
2		7-11 UNIVERSITY 2646 SO. KING STREET	HONOLULU 96826	Distance: .22 mi. Direction: E Vista ID: 3439346
	9-101173	Number of Underground Tanks: 3 Contents:GASOLINE (UNSPECIFIED),		
3		UNIVERSITY TEXACO SERVICE 1119 UNIVERSITY AVE	HONOLULU 96826	Distance: .22 mi. Direction: NE Vista ID: 439393
	9-100342	Number of Underground Tanks: 5 Contents:GASOLINE (UNSPECIFIED),USED OIL,		
3		MOILIILI SERVICE STA. L-0995 2550 S. BERETANIA ST.	HONOLULU 96826	Distance: .16 mi. Direction: NE Vista ID: 3430308
	9-100036	Number of Underground Tanks: 3 Contents:GASOLINE (UNSPECIFIED),USED OIL,		
3		COMMERCIAL BUILDING 2586 BERETANIA ST.	HONOLULU 96826	Distance: .17 mi. Direction: NE Vista ID: 3438289
	9-101219	Number of Underground Tanks: 1		
4		MOILIILI MOCHI INC. 2563 S KING STREET	HONOLULU 96826	Distance: .14 mi. Direction: NE Vista ID: 3439344
	9-101522	Number of Underground Tanks: 1 Contents:DIESEL,		
5		VARSITY MOTORS LTD. 2482 S. BERETANIA ST.	HONOLULU 96826	Distance: .18 mi. Direction: NE Vista ID: 3430307
	9-100855	Number of Underground Tanks: 3 Contents:GASOLINE (UNSPECIFIED),USED OIL,		

UST's

MAP REF #	EPA ID / AGENCY ID	SITE NAME AND ADDRESS		
WITHIN 1/8 TO 1/4 MILE				
5		JAPANESE CULTURAL CENTER OF HAWA 2454 S. BERETANIA ST	HONOLULU 96826	Distance: .20 mi. Direction: N Vista ID: 3994114
	9-102721	Number of Underground Tanks: 1 Contents:USED OIL,		
6		LINDSEY'S CHEVRON SERVICE 2404 S. BERETANIA ST.	HONOLULU 96826	Distance: .24 mi. Direction: N Vista ID: 3430306
	9-101230	Number of Underground Tanks: 7 Contents:GASOLINE (UNSPECIFIED),USED OIL,		
7		MCCULLY FIRE STATION 2425 DATE ST.	HONOLULU 96826	Distance: .18 mi. Direction: S Vista ID: 3430321
	9-100080	Number of Underground Tanks: 2 Contents:DIESEL,		

UNMAPPABLE SITES

Unmappable sites are environmental risk sites that cannot be geocoded, but can be located by zip code or city name.

In general, a site cannot be geocoded because of inaccurate or missing locational information in the record provided by the agency. For many of these records, VISTA has corrected or added locational information by using U.S. Postal address validation files and proprietary programming that adds locational information from private industry address files. However, many site addresses cannot be corrected using these techniques and those sites cannot be mapped.

Of the sites that cannot be mapped, VISTA identifies those that have complete zip code or city name information. All ungeocoded sites that have a ZIP code in the radius are considered for inclusion. Ungeocoded sites that do not have a ZIP code but do have a street name are considered for inclusion if they have a city in the radius. An ungeocoded record may be excluded if it can be determined to be outside the relevant radius searched for a particular database.

 For more information call: (619) 450-6100

VISTA NATIONAL RADIUS PROFILE

6/23/94

VISTA Report #: 6/047435-001

UNMAPPABLE SITES

SURP

SITE NAME AND ADDRESS	VISTA ID	EPA ID / AGENCY ID
NANAKULI LANDFILL: , HONOLULU	4664296	
Facility Type : SANITARY LANDFILL		
WEST HAWAII LANDFILL: , HONOLULU	4664297	
Facility Type : SANITARY LANDFILL		

DESCRIPTION OF DATABASES SEARCHED

Below are general descriptions and search parameters of the federal and state databases that VISTA searches for the National Radius Report.

FEDERAL DATABASES

Please check the "Summary of Environmental Risks Found" matrix on the cover of this profile to determine the specific dates of the federal databases searched for this profile.

U.S. EPA: NPL

The National Priorities List (NPL) is the EPA's database of uncontrolled or abandoned hazardous waste sites identified for priority remedial action under the Superfund Program. A site, to be included on the NPL, must either meet or surpass a predetermined hazard ranking systems score, or be chosen as a state's top-priority site, or meet all three of the following criteria:

1) The US Department of Health and Human Services issues a health advisory recommending that people be removed from the site to avoid exposure.
2) The EPA determines that the site represents a significant threat.
3) The EPA determines that remedial action *is* more cost-effective than removal action.

U.S. EPA: CERCLIS

The CERCLIS List is a compilation by the EPA of the sites which the EPA has investigated or is currently investigating for a release or threatened release of hazardous substances pursuant to the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA or Superfund Act).

U.S. EPA: RCRA (RCRIS/HWDMS)

The EPA's Resource Conservation and Recovery Act (RCRA) Program identifies and tracks hazardous waste from the point of generation to the point of disposal. The RCRA Facilities database is a compilation by the EPA of reporting facilities that generate, transport, treat, store or dispose of hazardous waste.

U.S. EPA: ERNS

The Emergency Response Notification System (ERNS) is a national database used to collect information on reported accidental releases of oil and hazardous substances. The database contains information from spill reports made to federal authorities including the EPA, the US Coast Guard, the National Response Center and the Department of Transportation.

STATE DATABASES

Please check the "Databases Searched" to determine if the following type of databases are available from VISTA for the state in which the subject property of this report is located. Please note that if the Summary does not list one of the following databases, it is not currently available. You may also determine the specific names and dates of the databases searched for this profile in the summary.

STATE: SPL

The State Priority List is a generic name for databases maintained by many states that contain sites considered to be actually or potentially contaminated and presenting a possible threat to human health and the environment. These sites are generally listed by the state to warn the public or as a part of an investigation and cleanup program managed by the state.

STATE: LUST

This is a database maintained by state or local agencies of known or suspected leaking underground storage tanks.

STATE: UST

This is a database maintained by state or local agencies of registered underground storage tanks.

STATE: SWLF

This is a database maintained by state or local agencies of Solid Waste Landfills, Incinerators, and transfer stations.

APPENDIX C

PHASE II ENVIRONMENTAL SITE ASSESSMENT

REPORT
PHASE 2 SITE INVESTIGATION
PROPOSED HAUSTEN STREET ELDERLY HOUSING
TMK 02-07-10:08, 09
HONOLULU, OAHU, HAWAII
FOR AM PARTNERS, INC.
Job No. 04402-141-037
May 19, 1995

DAMES & MOORE

DAMES & MOORE

1050 QUEEN STREET, SUITE 204, HONOLULU, HAWAII 96814
(808) 593-1116 FAX: (808) 593-1198

June 19, 1995

Mr. Brian Takahashi, AIA
Principal
AM Partners, Inc.
1164 Bishop Street, Suite 1000
Honolulu, Hawaii 96813

Report
Phase 2 Site Investigation
TMK 02-07-10:08,09
Proposed Hausten Street Elderly Housing
817 & 821 Hausten Street
Honolulu, Oahu, Hawaii
Job Number 04402-141-037

Dear Mr. Takahashi:

Dames & Moore is pleased to present to AM Partners one copy of our Phase 2 Site Investigation (SI) report prepared for the proposed Hausten Street Elderly Housing Project in Moiliili, Honolulu, Oahu, Hawaii. We trust this report provides AM Partners with the information required at this time. Should you have any questions about the information presented in this SI, please contact us.

Very truly yours,

DAMES & MOORE

Carol Mitsuyasu
Project Geologist

Robin J. Ferber, R.G.
Manager of Honolulu Geosciences

cc: Ms. Karen Iwamoto, Department of Housing and Community Development

(HON-539:04402-141-037)

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

1.0 INTRODUCTION

Presented in this report are the results of a Phase 2 Site Investigation (SI) conducted at the proposed Hausten Street Elderly Housing Project (the former Willows Restaurant) (Site) located on 817 & 821 Hausten Street in Honolulu, Oahu, Hawaii (Figure 1). The Site is identified as Tax Map Key (TMK) 02-07-10:08, 09. The Site currently consists of a closed restaurant, covering an area of approximately 34,755 square feet.

This SI has been prepared upon the request of Mr. Brian Takahashi, Principal of AM Partners (AMP), to evaluate environmental issues of concern identified in Dames & Moore's Phase 1 Environmental Site Assessment dated July 8, 1994. This SI was conducted in accordance with Dames & Moore's proposal to AMP dated March 15, 1995, which was approved by Mr. Brian Takahashi of AMP. The scope of services for this SI is presented below.

2.0 PURPOSE AND SCOPE OF SERVICES

The purpose of this SI was to provide AMP with additional information regarding the potential presence of hazardous materials in soil and groundwater beneath the Site as discussed in our July 8, 1994 Phase 1 ESA. This SI was accomplished by, and limited to, the following specific tasks:

- Review of our July 8, 1994 Phase 1 ESA prepared for the site for information regarding previous site conditions as related to potential hazardous impacts;

- Contacted the following government agencies for information regarding the potential release of hazardous materials to soil and groundwater at nearby properties identified during the July 8, 1994 ESA list review:

  - State of Hawaii, Department of Health (DOH) Solid and Hazardous Waste Branch. Reviewed available files for additional information regarding the following four nearby properties:
    - 2404 S. Beretania Street;
    - 2454 S. Beretania Street;
    - 2550 S. Beretania Street; and
    - 1119 University Avenue.

- DOH Hazard Evaluation and Emergency Response (HEER). Received information over the phone regarding the following nearby property:
  - 845 University Avenue.

- City & County of Honolulu Fire Department (HFD). Reviewed available files for additional information regarding the following four nearby properties:
  - 2470 S. King Street;
  - 2615 S. King Street;
  - 2671 S. King Street; and
  - 1015 University Avenue.

- Developed a site-specific Health and Safety Plan (HSP) for Dames & Moore environmental personnel conducting field work at the site. Onsite environmental personnel were required to review the HSP and conduct all field activities in accordance with plan specifications. Federal (OSHA) and state (DOSH) regulations were adhered to at all times during environmental field activities;

- The base of the vertical pipe observed during the ESA was excavated to evaluate the possible use and/or origin for the pipe;

- The valve lid in the Luau Kitchen observed during the ESA was opened to evaluate the possible use and or origin of the valve;

- Conducted limited field sampling at the site:

  - Drilled with a pre-cleaned, stainless steel hand auger and collected two soil samples with the auger from the location of the former imu pit (Figure 2) to evaluate for the potential presence of hydrocarbons in soil based on the reported handling of kerosene in the area;

  - Drilled with a truck-mounted drill rig to groundwater and collected one grab groundwater sample from each of three locations along the boundaries of the site (Figure 2). Analysis of the grab groundwater samples was conducted to assess for the presence of hazardous materials that may have originated from offsite source areas; and

- Monitored organic vapors emanating from soil cuttings generated during drilling activities using a PhotoVac™ photoionization detector (PID);

- Submitted all soil and grab groundwater samples to D&M Laboratories (DML) in Petaluma, California for analytical testing. Sample analysis included:

  - Two soil samples collected from the former imu pit location were analyzed for the following chemical constituents:
    - Total petroleum hydrocarbons fuel scan identification - quantified (TPH-IDQ) using the U.S. Environmental Protection Agency (EPA) Method 8015, modified;
    - Benzene, toluene, and ethylbenzene (BTE) using EPA Method 8020; and
    - Selected polynuclear aromatic hydrocarbons (PAHs) constituents (acenaphthene, naphthalene, fluoranthene, and benzo(a)pyrene) using EPA Method 8310.

  - Three grab groundwater samples from three different borings were analyzed for the following chemical constituents:
    - TPH-IDQ using EPA Method 8015M;
    - BTE using EPA Method 8020;
    - PAHs - acenaphthene, naphthalene, fluoranthene, and benzo(a)pyrene using EPA Method 8310;
    - Halogenated volatile organic compounds (HVOCs) using EPA Method 8010; and
    - Cadmium and lead using EPA Method 6010/7000.

- Prepared this report summarizing our findings, conclusions, and recommendations.

Based on the scope of services outlined herein, this SI specifically did not include an evaluation for the presence of asbestos, radon gas, lead-based paint, lead in the drinking water, geologic hazards, and/or geotechnical constraints.

3.0 PHYSICAL SETTING

3.1 PHYSIOGRAPHY

Information obtained by Dames & Moore from a review of the United States Geologic Survey (USGS) Honolulu Quadrangle, Oahu, Hawaii, 7.5 minute topographic map, 1983, indicates the following:

- Approximate Site Elevation: 8 feet above mean sea level (MSL);
- Topographic Gradient: 10 feet per mile to the south;
- Nearest Surface Water: Ala Wai Canal, approximately 2,000 feet to the southwest.

3.2 HYDROGEOLOGY

The Site is located within a coastal plain between Punchbowl and Diamond Head Craters. This area is underlain by a coralline limestone formation formed during previous marine transgressions. Portions of the coralline limestone formation have been dissolved and eroded by groundwater flow which has created cavities. Small cavities from three to six inches in diameter have been observed at nearby properties (Dames & Moore, 1975). Solution cavities are known to exist in this coralline limestone formation at the intersection of King Street and University Avenue (Dames & Moore, 1983).

Available subsurface information in the Site vicinity suggests that the uppermost fill layer consists of silty sand to sandy silt in varying thicknesses. The fill in the vicinity has been found to be underlain by dense gravel and at further depth, by medium dense, sandy coral gravel (Dames & Moore, 1983).

A stream once passed over the Site and flowed to taro patches located south of the property. The Site has been graded to its present elevation of approximately eight feet above mean sea level for development purposes (Dames & Moore, 1994).

Groundwater in the vicinity of the Site is approximately six feet below ground surface. The water level is expected to rise during periods of heavy storm runoff (Dames & Moore, 1975). Groundwater movement is anticipated to mimic surface topography and flow towards the Ala Wai Canal, approximately 2,000 feet to the southwest. Groundwater quality within the coralline formation in the Site vicinity is interpreted to be brackish (Swain, L., 1973).

One groundwater well is located on the Site within the fishpond area. Water from this well reportedly became brackish in 1986, and was not used after that time (Mr. Michael Lee, personal communication, June 9, 1994).

4.0 RESULTS OF REVIEW OF AGENCY RECORDS

4.1 DOH SOLID AND HAZARDOUS WASTE BRANCH

The State of Hawaii, Department of Health (DOH) Solid and Hazardous Waste Branch (SHWB) was contacted on March 22, 1995 for information regarding leaking underground storage tanks (LUST) files at four properties identified hydraulically upgradient and within a 1/4-mile radius of the site (Dames & Moore, 1994) (Figure 3). According to DOH records, two of the LUST properties, Lindsey's Chevron and Kyle's Unocal, have satisfactorily met DOH clean-up criteria as of July 29, 1993 and September 15, 1994, respectively. The two remaining properties, University Texaco Service (Texaco) and the Japanese Cultural Center are presently considered active LUST properties. Information obtained from the DOH is summarized in Table 1 and presented below.

2404 South Beretania Street (Lindsey's Chevron)

A 550-gallon waste-oil underground storage tank (UST) was removed from Lindsey's Chevron, which is located approximately 1,250 feet northwest of the site. Approximately 3,000 gallons of groundwater and two quarts of free petroleum product were removed from the waste-oil UST excavation pit. Free product was not observed during an approximately eight week monitoring period of the water table in the excavation pit. Groundwater samples were collected from 12 onsite monitoring wells and from the standing water in the excavation pit. Analyses from these groundwater samples indicated levels of chemical constituents were below DOH clean-up criteria and EPA drinking water standards (Harding Lawson Associates, 1992). According to a note in the DOH file dated July 29, 1993, clean-up at the property was completed. No other information was available for this property at the time this report was prepared.

2454 South Beretania Street (Japanese Cultural Center of Hawaii)

DOH records indicated that upon excavation of an abandoned 1,000-gallon waste-oil tank from the Japanese Cultural Center property (located approximately 1,050 feet northeast of the site), holes were observed in the shell of the tank. According to an UST Closure report dated

April 12, 1993 prepared by Muranaka Environmental Consultants, two soil samples were collected from the bottom of the excavation pit. Cadmium, at 12 parts per million (ppm) and 16 ppm, was the only constituent reported above the DOH interim recommended cleanup criteria of 2.0 ppm for cadmium. The report indicated that groundwater was not encountered during the excavation, and no groundwater samples were collected (Muranaka Environmental Consultants, 1993).

On August 4, 1994 the DOH requested a progress report from the owners of the Japanese Cultural Center property. No response from the owners was found in the DOH file.

2550 South Beretania Street (Unocal/Kyle's Service Station/Moiliili Service Station

Two 6,000-gallon gasoline underground storage tanks (UST) and one 550-gallon waste-oil UST were removed from the Kyle's Unocal property, which is located approximately 840 feet southeast of the site. Approximately 1,300 cubic yards of soil were excavated from the three UST excavation pits and removed from the property. Soil samples collected from the three excavations indicated levels were below DOH clean-up requirements. Groundwater collected onsite from the three excavation pits and from a downgradient offsite monitoring well indicated levels of were below DOH clean-up requirements (Harding Lawson Associates, 1993). According to a September 15, 1994 note in the DOH file, clean-up at the property was completed.

1119 University Avenue (University Texaco/Texaco Station)

According to DOH records, peripheral groundwater monitoring wells were installed approximately 1,160 feet northeast of the site in 1994 to evaluate the extent of off-site migration of petroleum constituents. Petroleum constituents were not detected at or above laboratory detection limits in groundwater tested from these wells (Walker Environmental Consultants, Ltd., 1993). On December 27, 1994, an inspection of the Texaco property was conducted by DOH personnel. The results and/or conclusions from that inspection were not available in the DOH records reviewed.

4.2 DOH HAZARD EVALUATION AND EMERGENCY RESPONSE

The DOH Hazard Evaluation and Emergency Response (HEER) group was contacted on March 23, 1995 for information regarding the one property identified hydrogeologically upgradient and within a 1/4-mile radius of the site (Dames & Moore, 1994) (Figure 3). Information obtained from the DOH HEER records is summarized in Table 2 and presented below.

845 University Avenue

According to HEER files, a complaint was registered with the HEER office concerning the dumping of waste-oil on the grounds of that property over a five-year period. The incident was reportedly turned over to the Solid and Hazardous Waste Branch of the DOH. According to Ms. Rhonda Randolph, of the Solid and Hazardous Waste Branch, no action has yet been taken by their office in regards to this incident (personal communication, 1995). No other information was available from the HEER office regarding this property.

4.3 CITY AND COUNTY OF HONOLULU FIRE DEPARTMENT

The City & County of Honolulu Fire Department (HFD) provided copies of incident reports on April 4, 1995 for the four properties described below where spill incidents have been identified and are interpreted as being located hydraulically upgradient of the site (Dames & Moore, 1994) (Figure 3). Information obtained from the HFD is summarized in Table 3 and presented below.

2470 South King Street

An incident registered at 2470 South King Street, Star Market Grocery, on June 25, 1989, reportedly involved removal of a hazard according to HFD. No other information regarding this incident was available from HFD files, as part of the report had been lost by the HFD.

2615 South King Street and 2671 South King Street

Two incidents occurred at 2615 South King Street (June 30, 1987) and 2671 South King Street, (March 1, 1988) and involved gasoline spills resulting from automobile accidents. According to HFD Hawaii State Emergency/Casualty Reports, the gasoline was washed down by HFD personnel and no further action was taken at these properties.

1015 University Avenue

A spill of benzonitrile and isocyanate (quantity unknown) occurred at 1015 University Avenue, Mama Mia's Pizza Restaurant on October 15, 1992. The spill was reportedly contained and removed by HFD personnel. No other information regarding this incident was available from HFD files.

5.0 FIELD METHODOLOGY

Dames & Moore personnel conducted the field work on March 17 and 30, 1995.

5.1 HEALTH AND SAFETY PLAN

A Site Health and Safety Plan (HSP) was established for Dames & Moore environmental worker safety for activities conducted at the site. The plan identified and described potentially hazardous substances and conditions that were anticipated during the soil and groundwater investigation, specified protective equipment for onsite activities, and outlined measures to have been implemented in the event of an emergency. Dames & Moore onsite personnel reviewed the HSP prior to commencement of field activities.

5.2 FIELD ACTIVITIES

Field activity locations, including soil and grab groundwater sampling locations, are shown in Figure 2.

5.2.1 Vertical Pipe near Lanai

The 3/4-inch diameter metal pipe identified in the 1994 ESA protruding vertically out of the ground near the dining area #5 lanai (Figure 2) was excavated to approximately one foot below ground surface (bgs). At this point, the pipe became loose enough to be pulled from the ground by hand. The top of the pipe was flared outward as if it had been hammered into the ground and the tip was tapered inward. No pipe threads were visible, indicating a connection to another pipe. The area where the pipe base was in the ground was further excavated to a total depth of 1.5 feet bgs. No other pipes or connections were observed below grade.

5.2.2 Luau Kitchen Valve Box

The valve box lid observed on the floor adjacent to the stove in the Luau Kitchen was opened and appeared to be a 12 1/2-inch X 15-inch grease trap. The grease trap appeared dry and no evidence of grease or oil was observed. Although an outlet was observed on the bottom of the grease trap, a connection to the sanitary sewer was not observed and may be located under the concrete slab.

5.2.3 Organic Vapor Monitoring

Organic vapors emanating from the boreholes and soil cuttings on the auger were monitored with a MicroTip™ photoionization detector (PID). The PID was calibrated daily using 0 parts per million (ppm) and 100 ppm isobutylene standards.

5.2.4 Soil Sampling

Soils were observed from each boring for stratigraphic interpretation. Two soil samples from the former imu pit location were chemically tested. Soils encountered during the investigation were classified according to the Unified Soil Classification System (USCS) and recorded on boring logs (Appendix A).

A four-inch diameter hand auger with a five-foot extension rod was used to collect grab soil samples from the location of the Imu (buried oven) pit (Figure 2). The borehole was located approximately in the center of the Imu pit. The cuttings were removed from the auger body, placed into 8-ounce glass jars, and labeled with the following information: job number, client name, site location, sample number, sample depth, date, time of sampling, and sample collector's initials. The samples were then placed in individual ziploc bags and stored in a cooler with ice. Samples were sent by overnight courier to DML for chemical testing as described in Section 2.0.

To minimize the potential for cross-contamination between sampling events, the sampler was washed using a dilute solution of alconox and rinsed with tap water followed by a final rinse with distilled water.

5.2.5 Grab Groundwater Sampling

A Simco skid-mounted drill rig was used to drill below groundwater at three boring locations (B-1, B-2, and B-3) (Figure 2). One grab groundwater sample was collected from each drilled boring location, however, no soil samples were submitted. All down-hole drilling equipment was steam-cleaned prior to drilling.

Each groundwater sample consisted of the following set of sample bottles: six 1-liter glass amber bottles, four 40 milliliter volatile organic analysis (VOA) vials, and two polyethylene bottles. The grab groundwater samples were collected using a dedicated polyethylene bailer, labeled as described previously for the soil samples, placed in a cooler with ice, and sent by an overnight courier to DML for chemical testing as described in Section 2.0.

Soil cuttings and decontamination rinsate generated during the sampling activities were placed in Department of Transportation (DOT)-approved metal 55-gallon drums, labeled with the following information: client name, date of collection and contents (i.e., soil or water), and left onsite. Following sampling activities, the borings were filled with a cement slurry and finished flush to grade.

5.3 CHAIN-OF-CUSTODY PROCEDURES

Chain-of custody (COC) procedures consisted of labeling the samples and filling out the chain-of-custody records with the following information: sample number, sample date and time collected, sample matrix (i.e., soil or water), preservation method, number of sample containers, and chemical analyses to be conducted. All soil and grab groundwater samples were handled and transported to the laboratory under appropriate COC procedures. Copies of COC forms are included in Appendix B for all samples collected and submitted for analyses.

5.4 SAMPLE DOCUMENTATION AND CONTROL

Sample documentation and control consisted of recording appropriate sampling information on field notes and checklists, and following chain-of-custody procedures. The depth, soil type, and time of collection of soil samples were recorded by the site geologist on the field notes and checklists. The original copies of these forms and checklists were maintained in the job file by the project manager.

6.0 RESULTS OF INVESTIGATION

6.1 AGENCY FILE REVIEW

6.1.1 DOH Solid and Hazardous Waste Branch

Of the four properties investigated at the DOH SHWB, Lindsey's Chevron and Kyle's Service Station apparently have been cleaned up, and the University Texaco Service and the Japanese Cultural Center properties are presently considered active LUSTs properties. At the Japanese Cultural Center property, cadmium was detected in soil and it is not known if any impacts to groundwater have occurred. Groundwater does not appear to have been impacted at the University Texaco Service property.

6.1.2 DOH HEER

The incident which occurred at 845 University Avenue property has been turned over to the DOH Solid and Hazardous Waste Branch. The status of this property is unknown at this time.

6.1.3 HFD

Based on information provided by the HFD, none of the properties investigated from HFD files appear to have contributed to releases to soil and/or groundwater which would impact the site.

6.2 FIELD OBSERVATIONS

6.2.1 Vertical Pipe

The vertical pipe observed near the dining area #5 lanai appeared to be hammered into the ground and was not observed to be attached to anything.

6.2.2 Valve in Luau Kitchen

The valve box in the Luau Kitchen appeared to be a floor grease trap that was disconnected from the sink and appeared to be abandoned.

6.2.3 Soil Characteristics

The soils encountered during drilling ranged from a dark-brown to brown silty to clayey sands with dark-gray to brownish-yellow, fresh to moderately weathered basaltic gravel to a depth of 2-3 feet bgs and light-brown, silty coralline sand with coralline gravel from 2-3 feet bgs until the boring was terminated. Borings B-2 and B-3 were terminated at 10 feet bgs. In Boring B-1, a loose, moist, brownish-olive gray basaltic coarse sand was encountered from 0.75 feet bgs to a depth of 4.5 feet bgs. From 4.5 feet bgs to 5.75 feet bgs, yellowish-brown, moderately weathered cobbles up to 6-inches and slightly weathered basaltic rocks were encountered. Loose, light-brown, sandy coralline gravel was then encountered until the boring was terminated at 13 feet bgs. Boring B-1 was extended to thirteen feet in depth to insure that enough of the borehole would stay open to accumulate water for a grab groundwater sample.

The moisture content of the subsurface soil ranged from moist to saturated at water level. No evidence of grossly contaminated soil or groundwater was observed during the investigation. Groundwater was encountered at a depth of approximately 5.5 feet bgs in Borings B-1, B-2, and B-3.

6.2.4 Grab Groundwater

The groundwater in Borings B-1, B-2, and B-3 contained light-brown, fine coralline silts and sand from the drilling process. No odors or hydrocarbon sheen was observed during the collection of grab groundwater samples. All groundwater samples reacted with the hydrochloric acid in the VOA vials by effervescing, creating unwanted air bubbles within the vials. To provide the laboratory with acceptable sample volumes, additional VOA vials of groundwater were collected: one from Boring B-1 and two from Boring B-2. The grab groundwater samples were silty. Boring B-1 was so silty that a temporary polyvinyl chloride well casing was installed to filter out the fine sands during water sampling.

6.2.5 Organic Vapor Monitoring

PID readings obtained in the field are presented on the boring logs in Appendix C. The highest PID reading of organic vapors from the open boreholes was 11.1 parts per million (ppm) in Boring B-3.

6.2.6 Waste Containers and Drums

Several storage areas were observed on the restaurant property. Approximately seven one gallon cans of paint were observed on the southern most corner of the property (Figure 2, near area #19). A container of malathion was also observed near the cans of paint. The storage area located near the carport (Figure 2, area #23) contained eight metal 55-gallon drums. Evidence of stains or discoloration from these paint cans and drums were not observed during the SI.

Two drums of waste were generated during this investigation (one soil and one decontamination rinsate water). The drums were left near the trash area of the carport.

6.3 CHEMICAL TEST RESULTS

Results of chemical tests performed by DML on the soil and grab groundwater samples are presented in Tables 4 and 5 along with the IRCC established in the State of Hawaii Department of Health's (DOH's) August 1992, Technical Guidance Manual (TGM). The cleanup criteria cited are for sites located topographically above the Underground Injection Control (UIC) line. The UIC line is a geographic divider separating aquifers used for human consumption from those that are not. The values from the DOH's TGM are cited for reference purposes only, as they pertain to cleanup levels associated with underground storage tank removals. Copies of the analytical reports provided by the laboratory and the chain-of-custody documentation are presented in Appendix B for all samples.

6.3.1 Soil Samples

Chemical test results for the two soil samples are summarized in Table 4 and discussed below.

TPH-IDQ

Heavy oil was detected in one soil sample at a depth of 1 foot bgs at a concentration of 68 milligrams per kilogram (mg/kg). There is no DOH IRCC for heavy oil. The other fuel types tested as part of the scan (gas, mineral spirits, jet fuel, kerosene, and diesel) were not detected in either of the soil samples.

BTE

Benzene, toluene, and ethylbenzene were not detected at or above laboratory detection limits in any of the soil samples.

PAHs

Fluoranthene was detected in both soil samples at concentrations of 0.015 mg/kg at a depth of 1 foot bgs and 0.016 mg/kg at a depth of 3 feet bgs. Benzo(a)pyrene was detected in both soil samples at concentrations of 0.0096 mg/kg at one foot bgs and 0.0077 mg/kg at a depth of 3 feet bgs. These concentrations are below the DOH's IRCC of 500 mg/kg for fluoranthene and 1.0 mg/kg for benzo(a)pyrene.

Naphthalene and acenaphthene were not detected at or above laboratory detection limits in any soil sample analyzed.

Total Cadmium and Lead

Lead was detected in both soil samples at concentrations of 130 mg/kg at 1 foot bgs and 26 mg/kg at 3 feet bgs. These concentrations are below the DOH IRCC of 400 mg/kg for lead. Cadmium was detected in one soil sample at a depth of 1 foot bgs at a concentration of 0.44 mg/kg, which is below the DOH IRCC of 2.0 mg/kg.

6.3.2 Grab Groundwater Samples

Chemical test results for the grab groundwater samples are summarized in Table 5.

TPH-IDQ

Heavy oil was detected in one grab groundwater sample (GS-3) at a concentration of 0.32 mg/l. Diesel was detected in one grab groundwater sample (GS-1) at a concentration of 0.070 mg/l. There are no DOH IRCCs for heavy oil or diesel. The other fuel types tested as part of the scan (gas, mineral spirits, jet fuel, and kerosene) were not detected in the other grab groundwater samples.

BTE

Benzene, toluene, and ethylbenzene were not detected at or above laboratory detection limits in any of the three groundwater samples.

PAHs

PAHs were not detected at or above the laboratory detection limits in any of the three groundwater samples.

HVOCs

HVOCs were not detected at or above the laboratory detection limits in any of the three groundwater samples.

Total Cadmium and Lead

Total cadmium was detected in two grab groundwater samples at concentrations ranging from 0.0083 milligrams per liter (mg/l) in Sample GS-3 to 0.022 mg/l in Sample GS-1. The DOH IRCC for cadmium is 0.005 mg/l. Total lead was detected in all grab groundwater samples at concentrations ranging from 0.017 mg/l in Sample GS-3 to 0.078 mg/l in Sample GS-1. The DOH IRCC for lead is 0.05 mg/l.

According to Ms. Barbara Brooks of the DOH Hazard Evaluation and Emergency Response office, the slightly elevated levels of metals detected may be due to the fact that the grab groundwater samples were not filtered. Ms. Brooks was aware of other instances where metals were detected in unfiltered groundwater samples at concentrations higher than those detected at this site (personal communication, 1995).

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7.0 CONCLUSIONS AND RECOMMENDATIONS

Dames & Moore has completed a Phase 2 Environmental Site Investigation of the proposed Hausten Street Elderly Housing property located in Honolulu, Oahu, Hawaii.

Based on the results of our limited field investigation, none of the chemical constituents detected in soil samples exceeded the DOH's IRCC. Lead and cadmium were each detected in two of three groundwater samples at concentrations above the DOH's IRCC. Based on conversations with DOH's HEER personnel, these metals concentrations appear to be elevated due to the fact that the samples were analyzed unfiltered. None of the other chemical constituents detected in the groundwater samples exceeded the DOH's IRCC.

Based on our review of the chemical test results for the soil and groundwater samples analyzed from the site during this investigation, Dames & Moore does not recommend any further soil and/or groundwater sampling at this time. However, should indications of impacts to soil and groundwater be encountered during future demolition and/or development activities conducted at the site, the need for further sampling at the site should be re-evaluated.

Based on the recommendation of our July 8, 1994 Phase 1 ESA, environmental records for five (5) offsite properties were reviewed at the DOH (see Tables 1 and 2). Our review of DOH records indicated no indications of impacts to the site from these properties. The status of the two properties, 845 University Avenue and 2454 South Beretania Street (Japanese Cultural Center of Hawaii) should be monitored in the future for information regarding possible impacts to the site.

The 55-gallon drums observed in storage areas next to the carport should be properly disposed of once the nature of their contents have been evaluated. The small quantity of commercial chemicals and paints observed onsite can be used as designed or should be recycled, or disposed of properly.

Based on review of the chemical test results obtained during this study, soil cuttings contained within the 55-gallon drum onsite (generated during our investigation) can be used as clean fill onsite. The decontamination rinsate contained within a separate 55-gallon drum onsite may also be emptied onto exposed soil on the subject property. The plastic and refuse inside of the drum containing decontamination rinsate may be set aside for municipal solid waste collection. Upon request, Dames & Moore will coordinate proper disposal of the above-described 55-gallon drums and their contents.

8.0 LIMITATIONS

The conclusions presented in this report are professional opinions based solely upon indicated data described in this report, visual observations of the Site and vicinity, and our interpretation of the available historical information and documents reviewed, as described in this report. They are intended exclusively for the purpose outlined herein and the Site locations and project indicated. This report is intended for the sole use of AM Partners, Inc. The scope of services performed in execution of this investigation may not be appropriate to satisfy the needs of other users, and any use or reuse of this document or the findings, conclusions, or recommendations presented herein is at the sole risk of said user without the express written consent of Dames & Moore.

It should be recognized that this study was not intended to be a definitive investigation of contamination at the subject property and the recommendations provided are not necessarily inclusive of all the possible conditions. Given that the scope of services for this investigation was limited and that exploratory borings, soil and/or groundwater sampling or analytical testing were not undertaken, it is possible that currently unrecognized subsurface contamination may exist at the Site.

Services performed by Dames & Moore were conducted in a manner consistent with the level of care and skill ordinarily exercised by members of the same profession currently practicing in the same locality under similar conditions. It is important to recognize that even the most comprehensive scope of services may fail to detect the environmental liabilities on a particular Site. Therefore, Dames & Moore cannot act as insurers and cannot "certify" that a Site is free of environmental contamination. No expressed or implied representation of warranty is included or intended in our reports, except that our services were performed, within the limits prescribed by our client, with the customary thoroughness and competence of our profession.

Opinions and recommendations presented herein apply to the Site conditions existing at the time of our investigation and cannot necessarily apply to Site changes of which Dames & Moore is not aware and has not had the opportunity to evaluate. Changes in the conditions of this property may occur with time due to natural processes or the works of man on the subject Site or adjacent properties. Changes in applicable standards may also occur as a result of legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated, wholly or in part, by changes beyond our control.

9.0 REFERENCES

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TABLE 1
SUMMARY OF DOH SOLID AND HAZARDOUS WASTE FILE REVIEW

PROPERTY NAME	ADDRESS	APPROXIMATE DISTANCE FROM SITE	STATUS OF PROPERTY
Lindsey's Chevron	2404 S. Beretania Street Honolulu 96826	1,270 feet	A 550-gallon waste oil UST was removed. Some free product recovered from water in the excavation. Excavation monitored for 8 weeks, no free product observed. Groundwater samples collected from 12 onsite monitoring wells indicated chemical constituents below DOH IRCC and EPA Drinking Water Standards. Cleanup completed 7/29/93 (DOH note). No site closure on file.
Japanese Cultural Center of Hawaii	2454 S. Beretania Street Honolulu 96826	1,055 feet	1,000-gallon abandoned UST was removed. Soil samples indicated slightly elevated levels of cadmium and lead. Groundwater was not encountered in the excavation and not sampled. DOH requests Progress Report from owners in 8/94. No other information available in file.
Unocal/Kyle's Service Station/ Moiliili Service Station	2550 S. Beretania Street Honolulu 96826	845 feet	Two 6,000-gallon gasoline UST and one 550-gallon waste oil UST were removed approximately in 1993. Concentrations of chemicals detected were below DOH IRCC. Cleanup completed 9/94 (DOH note). No site closure on file.
University Texaco Service/ Texaco Station	1119 University Avenue Honolulu 96826	1,160 feet	One 550-gallon waste oil UST was removed in August 1990. Peripheral onsite wells sampled in 1994. No detections of chemicals in the wells. DOH inspected the site in December 1994. No other information available in the file.

TABLE 2
SUMMARY OF DOH HEER FILE REVIEW

DATE OF INCIDENT	CASE NUMBER	ADDRESS	APPROXIMATE DISTANCE FROM SITE	STATUS OF PROPERTY
02/12/92	92-0212-2	845 University Avenue	< 1/8 mile	Dumping of used oil on ground for over 5 years. Solid Waste Office to take further action. No additional information available.

TABLE 3
SUMMARY OF HFD FILE REVIEW

DATE	CASE NUMBER	ADDRESS	APPROXIMATE DISTANCE FROM SITE	STATUS OF PROPERTY
06/25/89	004941	2470 S. King Street	<1/8 mile	HFD respond to Star Market call. Portion of HFD file lost. No other information available.
06/30/87	005078	2615 S. King Street	<1/4 mile	Gasoline spill due to automobile accident. HFD washes down spill. No further action taken by HFD.
03/01/88	001699	2671 S. King Street	<1/4 mile	Gasoline spill due to automobile accident. HFD washes down spill. No further action taken by HFD.
10/15/92	009907	1015 University Avenue	<1/8 mile	Container spill at Mama Mia Pizza. Chemicals listed as benzonitrile, sulfur organics, and isocyanates. Spill contained and cleaned up by Hazmat personnel. No further action taken by HFD.

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03/01/88	001699	2671 S. King Street	<1/4 mile	Gasoline spill due to automobile accident. HFD washes down spill. No further action taken by HFD.
10/15/92	009907	1015 University Avenue	<1/8 mile	Container spill at Mama Mia Pizza. Chemicals listed as benzonitrile, sulfur organics, and isocyanates. Spill contained and cleaned up by Hazmat personnel. No further action taken by HFD.

TABLE 4
SUMMARY OF CHEMICAL
SOIL SAMPLES FROM EXPLO
PROPOSED HAUSTEN STREET
HONOLULU, OAHU
(values in mg/

				EPA METHOD 8015 –TPH–IDQ						EPA
				GAS	MINERAL SPIRITS	JET FUEL	KEROSENE	DIESEL	HEAVY OIL	BENZENE	ETHYI
DETECTION LIMITS				5.0	5.0	5.0	5.0	5.0	50	0.005	
BORING NUMBER	SAMPLE NUMBER	DATE COLLECTED	DEPTH (feet bgs)								
B–4	SB–4–1	3/17/95	1	ND	ND	ND	ND	ND	68	ND	
	SB–4–3	3/17/95	3	ND	ND	ND	ND	ND	ND	ND	
DOH Interim Recommended Cleanup Criteria[1]				•	•	•	•	•	•	0.05	

Notes

mg/kg	=	milligrams per kilogram
ND	=	Not detected
PAHs	=	Polynuclear aromatic hydrocarbons
TPH–IDQ	=	Total petroleum hydrocarbons – fuel scan quantified
1	=	DOH Interim Recommended Cleanup Criteria (IRCC) for soil cited are for areas topographically above the UIC line.
•	=	DOH IRCC for this constituent (in soil) currently does not exist

(HON–539.WK3:04402–141–037)

TABLE 4
HEMICAL TEST RESULTS
OM EXPLORATORY BORINGS
N STREET ELDERLY HOUSING
LU, OAHU, HAWAII
ues in mg/kg)

EPA METHOD 8020			PAHS – EPA METHOD 8310				METALS 6010	
ENZENE	ETHYLBENZENE	TOLUENE	NAPHTHALENE	ACENAPHTHENE	FLUORANTHENE	BENZO[a]PYRENE	LEAD	CADMIUM
0.005	0.005	0.005	0.100	0.200	0.010	0.005	2.0	0.25
ND	ND	ND	ND	ND	**0.015**	**0.0096**	**130**	**0.44**
ND	ND	ND	ND	ND	**0.016**	**0.0077**	**26**	ND
0.05	7.0	10.0	100	100	500	1.0	400	2.0

line.

TABLE 5
SUMMARY OF CHEMICAL T
GRAB GROUNDWATER SAMPLES FROM
PROPOSED HAUSTEN STREET
HONOLULU, OAHU,
(values in mg/

			EPA 8015M – TPH – IDQ						EPA Method 8020	
			GAS	MINERAL SPIRITS	JET FUEL	KEROSENE	DIESEL	HEAVY OIL	BENZENE	ETHYLBENZENE
DETECTION LIMITS			0.15	0.15	0.050	0.050	0.050	0.50	0.0005	0.0005
BORING NUMBER	SAMPLE NUMBER	DATE COLLECTED								
B-1	GS-1	3/30/95	ND	ND	ND	ND	0.070	ND	ND	ND
B-2	GS-2	3/30/95	ND	ND	ND	ND	ND	ND	ND	ND
B-3	GS-3	3/17/95	ND	ND	ND	ND	ND	0.32[1]	ND	ND
DOH Interim Cleanup Criteria[2]			•	•	•	•	•	•	0.005	0.7

Notes

HVOCs = Halogenated volatile organ

mg/L = milligrams per liter

ND = not detected at or above laboratory detection limits

PAHs = Polynuclear aromatic hydrocarbons

TPH–IDQ = Total petroleum hydrocarbons – fuel scan quantified

1 = The detection limit for this sample was 0.25 mg/Kg.

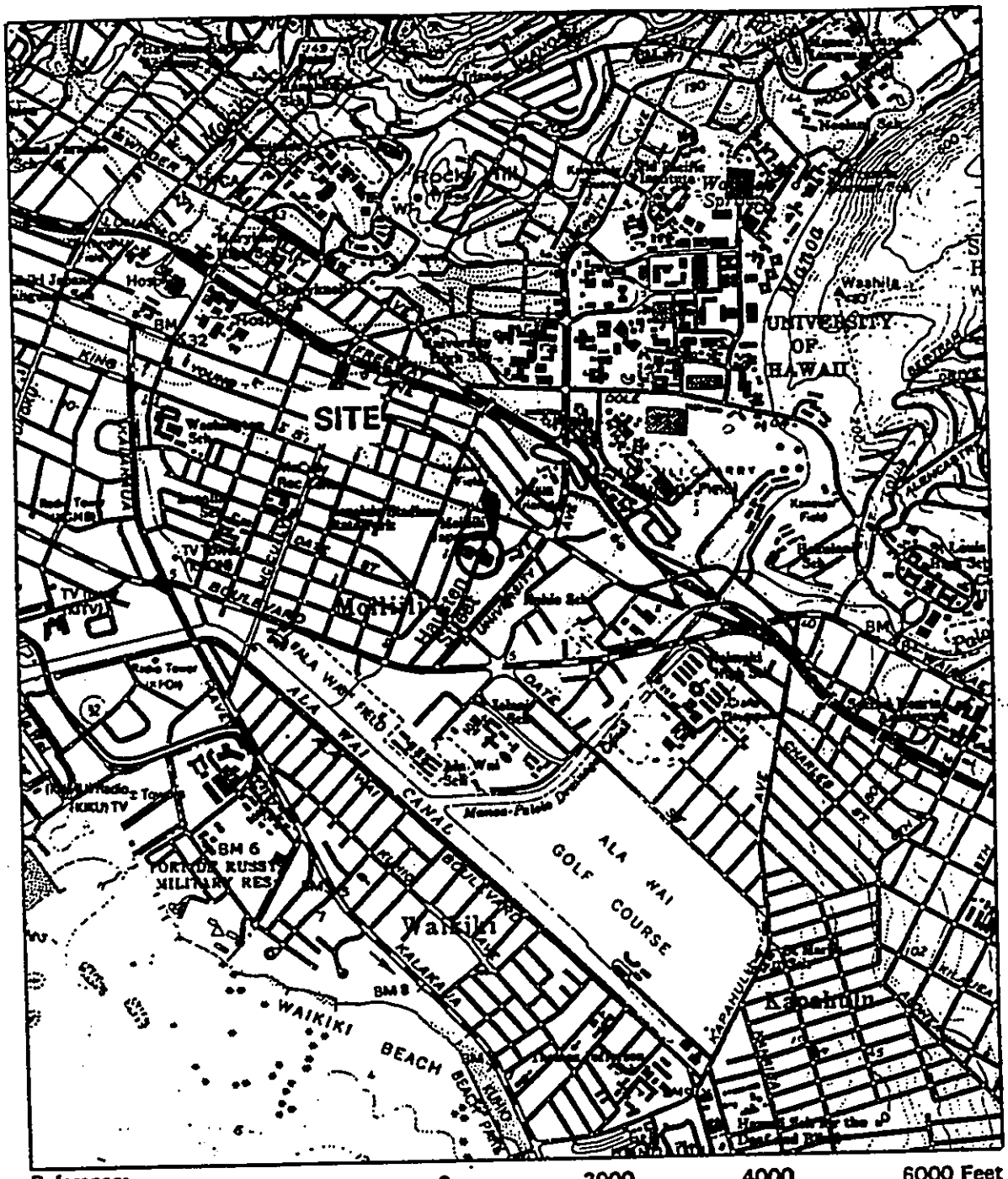
2 = DOH Interim Recommended Cleanup Criteria (for groundwater) cited are for areas topographically above the UIC line

• = DOH Interim Recommended Cleanup Criteria for this constituent (in groundwater) currently does not exist

Shaded cells represent chemical concentrations above the DOH Interim Recommended Cleanup Criteria

TABLE 5
CHEMICAL TEST RESULTS
MPLES FROM EXPLORATORY BORINGS
EN STREET ELDERLY HOUSING
ULU, OAHU, HAWAII
alues in mg/L)

EPA Method 8020		PAHS – EPA METHOD 8310				EPA Method 8010	METALS – EPA METHOD 6010	
ETHYLBENZENE	TOLUENE	NAPHTHALENE	ACENAPHTHENE	FLUORANTHENE	BENZO[a]PYRENE	HVOCs	LEAD	CADMIUM
0.0005	0.0005	0.001	0.002	0.0001	0.00005	0.0005–0.001	0.005	0.005
ND	ND	ND	ND	ND	ND	ND	0.078	0.022
ND	ND	ND	ND	ND	ND	ND	0.052	ND
ND	ND	ND	ND	ND	ND	ND	0.017	0.0083
0.7	1.0	•	•	•	0.0002	0.005 – 0.2	0.05	0.005



Reference:
U.S.G.S. Topographic Map (1983)
Honolulu Quadrangle
Honolulu, Oahu, Hawaii

0 2000 4000 6000 Feet

North

VICINITY MAP

PHASE 2 SITE INVESTIGATION
PROPOSED HAUSTEN STREET ELDERLY HOUSING
HONOLULU, OAHU, HAWAII

Dames & Moore

FIGURE 1

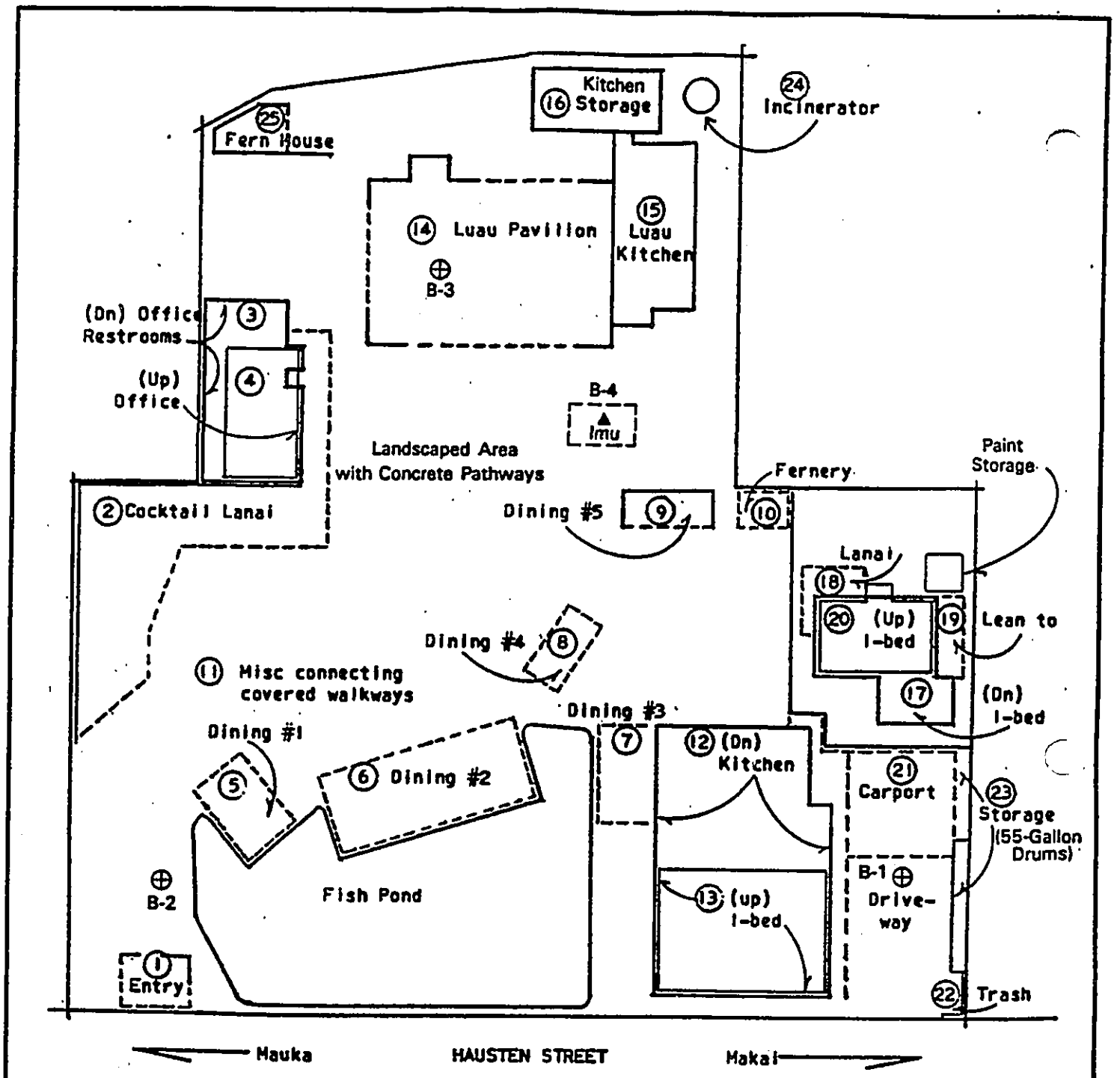


Figure Provided By Mr. Michael Lee,
The Willows Restaurant on June 9, 1994;
Modified By Dames & Moore, March 1995

Parking Lot
Asphalt-Paved

Legend:

B-4 ▲ Approximate Soil Sampling Location

B-1 ⊕ Approximate Grab Groundwater Sampling Location

North

SAMPLING LOCATIONS

PHASE 2 SITE INVESTIGATION
PROPOSED HAUSTEN STREET ELDERLY HOUSING
HONOLULU, OAHU, HAWAII

Not To Scale

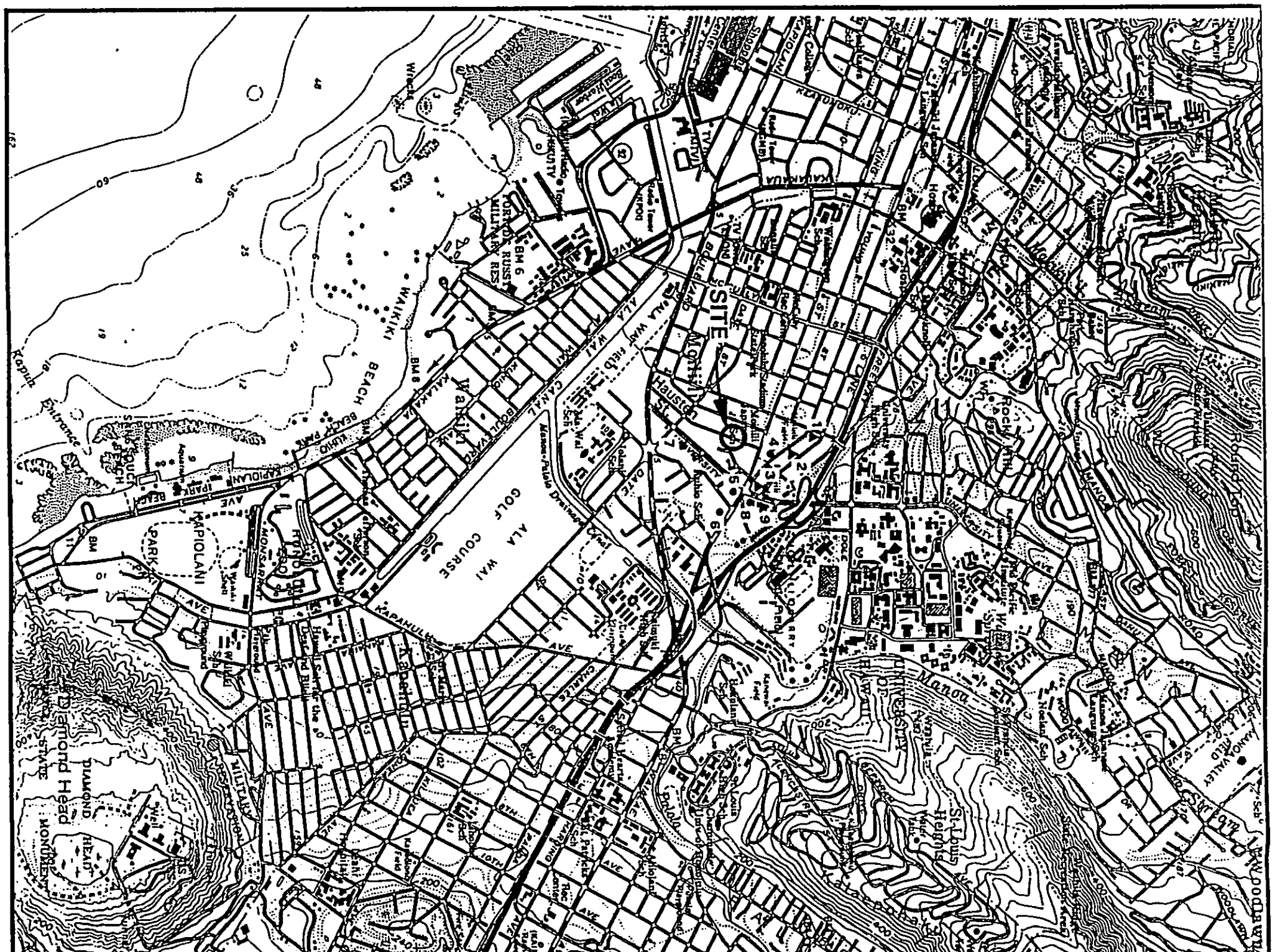
Dames & Moore

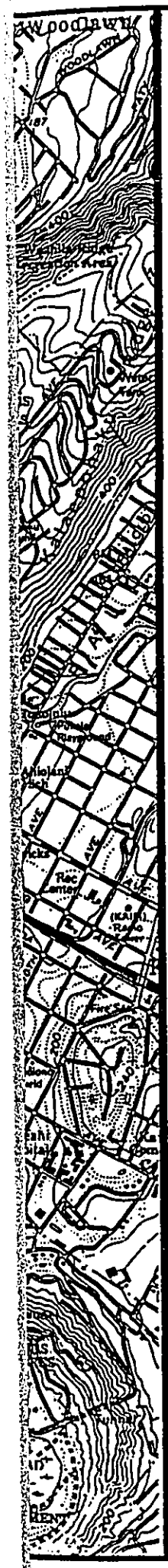
Figure 2

46612 (11-82)

FILE 04402-141-037
Hausten Ecology Housing
BY JSA DATE
CHECKED BY DATE

REVISIONS
BY DATE
BY DATE
PLATE OF





Key

- ▲ DOH File Listing
- ■ HEER File Listing
- • HFD File Listing

Property Addresses

1 2404 S. Beretania Street (Lindsey's Chevron)
2 2454 S. Beretania Street (Japanese Cultural Center of Hawaii)
3 2550 S. Beretania Street (Unocal/Kyle's Service Station)
4 2470 S. King Street (Star Market)
5 2615 S. King Street
6 2671 S. King Street
7 845 University Avenue
8 1015 University Avenue (Mama Mia Pizza)
9 1119 University Avenue (University Texaco)

0 2000 4000
Feet

PROPERTIES IDENTIFIED ON AGENCY LISTS

PHASE 2 SITE INVESTIGATION
PROPOSED HAUSTEN STREET ELDERLY HOUSING
HONOLULU, OAHU, HAWAII

Reference:
U.S.G.S. Topographic Map (1983)
Honolulu Quadrangle
Honolulu, Oahu, Hawaii

Dames & Moore

Figure 3

APPENDIX A

UNIFIED SOIL CLASSIFICATION SYSTEMS
BORING LOGS

CORRECTION

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

APPENDIX A

UNIFIED SOIL CLASSIFICATION SYSTEMS
BORING LOGS

UNIFIED
SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			GRAPHIC SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	SAND AND SANDY SOILS	CLEAN SAND (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION PASSING NO. 4 SIEVE	SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND-SILT MIXTURES
				SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

PROJECT Hausten Street Elderly Housing JOB No. 04402-141-037

LOCATION Honolulu, Oahu, Hawaii DRAWN BY jsb (04-19-95)

BORING B-1 (Page 1 of 1)

DRILLING METHOD: 4" Solid Stem Auger

SAMPLING METHOD: Grab Groundwater

ORGANIC VAPOR READING PID - (ppm) AUGER	ORGANIC VAPOR READING PID - (ppm) SAMPLE	ORGANIC VAPOR READING PID - (ppm) CUTTINGS	BLOWS/FT. ON SAMPLE	SAMPLE No.	SAMPLE DEPTH (feet)	USCS	SYMBOLS	DESCRIPTION
								4" asphalt pavement.
								3" concrete.
0					1		SP	Brown sand, slightly weathered cinder, moist, loose.
					2			
					3			
					4			
0					5			Brown to yellowish brown basaltic cobbles with brown to yellowish borwn sandy clay, soft, moist, 2"-4" in size, loose, moist.
					6		GM	Light brown sandy coralline fine gravel, moist to wet, loose (Water level at 1428 hours on 03-30-95)
					7			
					8			
					9			
					10			
					11			
					12			
					13			

Boring completed at 13.0 feet on 03-30-95
Collected grab groundwater sample GS-1 on 03-30-95

LOG OF BORING
Dames & Moore

FIGURE 1

PROJECT *Hausten Street Elderly Housing* JOB No. *04402-141-037*

LOCATION *Honolulu, Oahu, Hawaii* DRAWN BY *jsb (04-19-95)*

BORING B-2 (Page 1 of 1)

DRILLING METHOD: *4" Solid Stem Auger*

SAMPLING METHOD: *Grab Groundwater*

ORGANIC VAPOR READING PID - (ppm) AUGER	SAMPLE	CUTTINGS	BLOWS/FT. ON SAMPLE	SAMPLE No.	SAMPLE DEPTH (feet)	USCS	SYMBOLS	DESCRIPTION
0					1		SC	2" asphalt. Brown clayey sand with gravels, moist, loose (fill).
					2		SM	Light brown silty coralline sand with dark gray to brownish yellow moderately weathered gravels, moist to wet, medium, dense.
2.6					5			(Water level at 1113 hours on 03-30-95)
					10			Boring completed at 10.0 feet on 03-30-95 Collected grab groundwater sample GS-2 on 03-30-95

LOG OF BORING
Dames & Moore

FIGURE 2

PROJECT Hausten Street Elderly Housing JOB No. 04402-141-037

LOCATION Honolulu, Oahu, Hawaii DRAWN BY jsd (04-19-95)

BORING B-3 (Page 1 of 1)

DRILLING METHOD: 4" Solid Stem Auger

SAMPLING METHOD: Grab Groundwater

ORGANIC VAPOR READING PID - (ppm) AUGER	SAMPLE	CUTTINGS	BLOWS/FT. ON SAMPLE	SAMPLE No.	SAMPLE	DEPTH (feet)	USCS	SYMBOLS	DESCRIPTION
									6" thick concrete slab
			100/3"	1	⊠	1 2 3	SM		Dark brown silty sand with dark gray to brownish yellow fresh to moderately weathered basaltic gravel, moist, dense, some coralline silty gravel (fill).
11.1	2.5								
						4	SM GM		
0.8	0.8		100/3"	2	⊠	5			Light brown coralline sand with gravel, moist to wet, dense.
						6		▽	(Water level at 1147 hours on 03-17-95)
						7 8 9 10			
17		17							Boring completed at 10.0 feet on 03-17-95 Collected grab groundwater sample GS-3 on 03-17-95. Resumed drilling for geotechnical drilling and sampling purposes only.

NOTES:

■ - Undisturbed sample
⊠ - Disturbed sample
□ - Sample lost during extraction
◪ - Standard penetration test sample (split-spoon sampler)
☑ - Standard penetration test sample no recovery
I - Core run
DRIVING ENERGY:

LOG OF BORING
Dames & Moore

FIGURE 3

PROJECT *Hausten Street Elderly Housing* JOB No. *04402-141-037*

LOCATION *Honolulu, Oahu, Hawaii* DRAWN BY *jsb (04-19-95)*

BORING B-4 (Page 1 of 1)

DRILLING METHOD: *4" Hand Auger*

SAMPLING METHOD: *Grab Soil Sample*

ORGANIC VAPOR READING PID - (ppm) AUGER	ORGANIC VAPOR READING PID - (ppm) SAMPLE	ORGANIC VAPOR READING PID - (ppm) CUTTINGS	BLOWS/FT. ON SAMPLE	SAMPLE No.	SAMPLE	DEPTH (feet)	USCS	SYMBOLS	DESCRIPTION
0								SM	Brown silty sand, dry, loose with charcoal bits 1/4" size
0	0				☒	1			Brown silty sand, ash-like odor, moist, loose
						2			
0	0				☒	3			Increased moisture, moist to wet, loose, coralline silty sand with coralline gravels

Boring terminated at 3.0 feet bgs at 1326 hour on 03-17-95 due to refusal. Groundwater not encountered.

NOTES:
- ■ – Undisturbed sample
- ☒ – Disturbed sample
- ☐ – Sample lost during extraction
- ◪ – Standard penetration test sample (split-spoon sampler)
- ⊠ – Standard penetration test sample no recovery
- I – Core run

DRIVING ENERGY:

LOG OF BORING
Dames & Moore

FIGURE 4

APPENDIX B

CHEMICAL TEST RESULTS

D&M LABORATORIES
ENVIRONMENTAL AND INDUSTRIAL HYGIENE SERVICES

3700 Lakeville Highway, Petaluma, CA 94954
Telephone: (707) 763-8245
FAX (707) 763-4065

Carol Mitsuyasu
Dames & Moore - Honolulu
1050 Queen Street, Suite 204
Honolulu, HI 96814

March 30, 1995

Customer Project: 04402-141-037 Proposed Housing On Housten St.
Laboratory Job: L9503178

On March 18, 1995 we received 3 sample(s) for analysis. Samples were analyzed by the following method(s):

PNA's by HPLC (EPA 8310)
BTEX (EPA 8020A)
Cadmium (EPA 6010)
Lead (EPA 6010)
TPH Quantified Identification (EPA 8015M)

Project Manager

Laboratory Director
Robert Peak

D&M Laboratories
ANALYTICAL DATA REPORT
Prepared for: Dames & Moore - Honolulu

Project Id: 04402-141-037

Reported: 12-APR-95

Lab Id: L9503178-1 Sample Id: GS-3 Collected: 17-MAR-95 Received: 18-MAR-95

METALS-TJA EPA 6010					
Cadmium-6010	0.0083	0.0050	mg/L	22-MAR-95	22-MAR-95
Lead-6010	0.017	0.010	mg/L	22-MAR-95	22-MAR-95
Quantitative Petroleum Hydrocarbons					
Gas	ND <	0.15	mg/L	22-MAR-95	24-MAR-95
Mineral Spirits	ND <	0.15	mg/L	22-MAR-95	24-MAR-95
Jet Fuel	ND <	0.050	mg/L	22-MAR-95	24-MAR-95
Kerosene	ND <	0.050	mg/L	22-MAR-95	24-MAR-95
Diesel	ND <	0.050	mg/L	22-MAR-95	24-MAR-95
Heavy Oil	0.32	0.25	mg/L	22-MAR-95	24-MAR-95
Surrogate					
o-Terphenyl	104.	-	%	22-MAR-95	24-MAR-95
Comments:	Hydrocarbons in range of heavy oil resemble a hydraulic fluid fingerprint.				
BTEX					
Benzene	ND <	0.50	ug/L	23-MAR-95	23-MAR-95
Ethyl Benzene	ND <	0.50	ug/L	23-MAR-95	23-MAR-95
Toluene	ND <	0.50	ug/L	23-MAR-95	23-MAR-95
Surrogate					
Bromofluorobenzene	98.3	-	%	23-MAR-95	23-MAR-95
Polynuclear Aromatic Hydrocarbons					
Naphthalene	ND <	1.0	ug/L	21-MAR-95	23-MAR-95
Acenaphthene	ND <	2.0	ug/L	21-MAR-95	23-MAR-95
Fluoranthene	ND <	0.10	ug/L	21-MAR-95	23-MAR-95
Benzo(a)Pyrene	ND <	0.050	ug/L	21-MAR-95	23-MAR-95
Surrogate:					
2-Fluorobiphenyl	73.3	-	% Recovery	21-MAR-95	23-MAR-95
Benzo(e)Pyrene	93.9	-	% Recovery	21-MAR-95	23-MAR-95

O&M Laboratories
ANALYTICAL DATA REPORT
Prepared for: Dames & Moore - Honolulu

Project Id: 04402-141-037

Reported: 30-MAR-95

Lab Id: L9503178-2 Sample Id: SB-4-1 Collected: 17-MAR-95 Received: 18-MAR-95

Parameter	Result		Detection Limit	Units	Extracted	Analyzed
METALS - TJA EPA 6010						
Cadmium-6010	0.45		0.25	mg/Kg	22-MAR-95	22-MAR-95
Lead-6010	130		2.0	mg/Kg	22-MAR-95	22-MAR-95
Quantitative Petroleum Hydrocarbons						
Gas	ND	<	5.0	mg/Kg	22-MAR-95	24-MAR-95
Mineral Spirits	ND	<	5.0	mg/Kg	22-MAR-95	24-MAR-95
Jet Fuel	ND	<	5.0	mg/Kg	22-MAR-95	24-MAR-95
Kerosine	ND	<	5.0	mg/Kg	22-MAR-95	24-MAR-95
Diesel	ND	<	5.0	mg/Kg	22-MAR-95	24-MAR-95
Heavy Oil	68.		50.	mg/Kg	22-MAR-95	24-MAR-95
Surrogate						
o-Terphenyl	100.		-	%	22-MAR-95	24-MAR-95
Comments:	Hydrocarbons found in the diesel range at 17 ppm, did not match diesel standard.					
BTEX						
Benzene	ND	<	5.0	ug/Kg	29-MAR-95	29-MAR-95
Ethyl Benzene	ND	<	5.0	ug/Kg	29-MAR-95	29-MAR-95
Toluene	ND	<	5.0	ug/Kg	29-MAR-95	29-MAR-95
Surrogate:						
Bromofluorobenzene	65.6		-	%	29-MAR-95	29-MAR-95
Polynuclear Aromatic Hydrocarbons						
Naphthalene	ND	<	100	ug/Kg	21-MAR-95	23-MAR-95
Acenaphthene	ND	<	200	ug/Kg	21-MAR-95	23-MAR-95
Fluoranthene	15.		10.	ug/Kg	21-MAR-95	23-MAR-95
Benzo(a)Pyrene	9.6		5.0	ug/Kg	21-MAR-95	23-MAR-95
Surrogate:						
2-Fluorobiphenyl	77.9		-	%	21-MAR-95	23-MAR-95
Benzo(e)Pyrene	77.1		-	%	21-MAR-95	23-MAR-95

D&M Laboratories
ANALYTICAL DATA REPORT
Prepared for: Dames & Moore - Honolulu

Project Id: 04402-141-037

Reported: 30-MAR-95

Lab Id: L9503178-3 Sample Id: SB-4-3 Collected: 17-MAR-95 Received: 18-MAR-95

Parameter	Value	RDL	Units	Extracted	Analyzed
METALS - TJA EPA 6010					
Cadmium-6010	ND <	0.25	mg/Kg	22-MAR-95	22-MAR-95
Lead-6010	26.	0.50	mg/Kg	22-MAR-95	22-MAR-95
Quantitative Petroleum Hydrocarbons					
Gas	ND <	5.0	mg/Kg	22-MAR-95	24-MAR-95
Mineral Spirits	ND <	5.0	mg/Kg	22-MAR-95	24-MAR-95
Jet Fuel	ND <	5.0	mg/Kg	22-MAR-95	24-MAR-95
Kerosine	ND <	5.0	mg/Kg	22-MAR-95	24-MAR-95
Diesel	ND <	5.0	mg/Kg	22-MAR-95	24-MAR-95
Heavy Oil	ND <	50.	mg/Kg	22-MAR-95	24-MAR-95
-					
Surrogate					
o-Terphenyl	95.0	-	%	22-MAR-95	24-MAR-95
BTEX					
Benzene	ND <	5.0	ug/Kg	27-MAR-95	27-MAR-95
Ethyl Benzene	ND <	5.0	ug/Kg	27-MAR-95	27-MAR-95
Toluene	ND <	5.0	ug/Kg	27-MAR-95	27-MAR-95
-					
Surrogate:					
Bromofluorobenzene	77.0	-	%	27-MAR-95	27-MAR-95
Polynuclear Aromatic Hydrocarbons					
Naphthalene	ND <	100	ug/Kg	21-MAR-95	24-MAR-95
Acenaphthene	ND <	200	ug/Kg	21-MAR-95	24-MAR-95
Fluoranthene	16.	10.	ug/Kg	21-MAR-95	24-MAR-95
Benzo(a)Pyrene	7.7	5.0	ug/Kg	21-MAR-95	24-MAR-95
-					
Surrogate:					
2-Fluorobiphenyl	48.4	-	%	21-MAR-95	24-MAR-95
Benzo(e)Pyrene	75.2	-	%	21-MAR-95	24-MAR-95

D&M Laboratories
QUALITY CONTROL REPORT

Reported: 23-MAR-95

QC for: METALS BY EPA 6010

Lab Id: WG7079-10 Sample Id: Method Blank

Parameter	Value	RDL	Units	Extracted	Analyzed
Cadmium-6010	ND <	0.0050	mg/L	22-MAR-95	22-MAR-95
Lead-6010	ND <	0.010	mg/L	22-MAR-95	22-MAR-95
Comments:	NONE.				

Lab Id: WG7079-11 Sample Id: Method Blank Spike

Parameter	Value	Units	Spike	Units	% Rec	Extracted	Analyzed
Cadmium-6010	0.105	mg/L	.1	mg/L	105.%	22-MAR-95	22-MAR-95
Lead-6010	0.106	mg/L	.1	mg/L	106.%	22-MAR-95	22-MAR-95
Comments:	NONE.						

Lab Id: WG7079-1 Sample Id: MX

Parameter	Value	RDL	Units	Extracted	Analyzed
Antimony-6010	ND <	0.010	mg/L	03-MAR-95	03-MAR-95
Barium-6010	0.0973	0.010	mg/L	03-MAR-95	03-MAR-95
Beryllium-6010	ND <	0.0010	mg/L	03-MAR-95	03-MAR-95
Cadmium-6010	ND <	0.0050	mg/L	03-MAR-95	03-MAR-95
Calcium-6010	26.6	0.10	mg/L	03-MAR-95	03-MAR-95
Chromium-6010	0.414	0.0050	mg/L	03-MAR-95	03-MAR-95
Cobalt-6010	0.0375	0.0050	mg/L	03-MAR-95	03-MAR-95
Copper-6010	0.231	0.0050	mg/L	03-MAR-95	03-MAR-95
Iron-6010	210.	1.0	mg/L	03-MAR-95	03-MAR-95
Lead-6010	0.119	0.010	mg/L	03-MAR-95	03-MAR-95
Magnesium-6010	12.5	0.050	mg/L	03-MAR-95	03-MAR-95
Manganese-6010	3.33	0.0050	mg/L	03-MAR-95	03-MAR-95
Molybdenum-6010	0.0835	0.0050	mg/L	03-MAR-95	03-MAR-95
Nickel-6010	0.284	0.010	mg/L	03-MAR-95	03-MAR-95
Phosphorus-6010	0.154	0.010	mg/L	03-MAR-95	03-MAR-95
Selenium-6010	ND <	0.010	mg/L	03-MAR-95	03-MAR-95
Silver-6010	ND <	0.0050	mg/L	03-MAR-95	03-MAR-95
Thallium-6010	0.0145	0.010	mg/L	03-MAR-95	03-MAR-95
Vanadium-6010	0.0262	0.010	mg/L	03-MAR-95	03-MAR-95
Zinc-6010	105.	0.20	mg/L	03-MAR-95	03-MAR-95
Comments:	MX=L9502215-1				

D&M Laboratories
QUALITY CONTROL REPORT

Reported: 23-MAR-95

DC for: Hardness (CaCO3)

Lab Id: WG7079-2 Sample Id: Matrix Spike

Parameter	Value	Units	Spike	Units	% Rec	Extracted	Analyzed
Antimony-6010	0.110	mg/L	.1	mg/L	110.%	03-MAR-95	03-MAR-95
Barium-6010	1.10	mg/L	1	mg/L	101.%	03-MAR-95	03-MAR-95
Beryllium-6010	0.102	mg/L	.1	mg/L	102.%	03-MAR-95	03-MAR-95
Cadmium-6010	0.101	mg/L	.1	mg/L	101.%	03-MAR-95	03-MAR-95
Calcium-6010	36.3	mg/L	10	mg/L	97.%	03-MAR-95	03-MAR-95
Chromium-6010	1.41	mg/L	1	mg/L	100%	03-MAR-95	03-MAR-95
Cobalt-6010	1.03	mg/L	1	mg/L	100%	03-MAR-95	03-MAR-95
Copper-6010	1.23	mg/L	1	mg/L	100.%	03-MAR-95	03-MAR-95
Iron-6010	221.	mg/L	10	mg/L	108.%	03-MAR-95	03-MAR-95
Lead-6010	0.222	mg/L	.1	mg/L	102.%	03-MAR-95	03-MAR-95
Magnesium-6010	21.8	mg/L	10	mg/L	93.%	03-MAR-95	03-MAR-95
Manganese-6010	4.30	mg/L	1	mg/L	97.%	03-MAR-95	03-MAR-95
Molybdenum-6010	1.11	mg/L	1	mg/L	103.%	03-MAR-95	03-MAR-95
Nickel-6010	0.382	mg/L	.1	mg/L	98.%	03-MAR-95	03-MAR-95
Phosphorus-6010	1.14	mg/L	1	mg/L	99.%	03-MAR-95	03-MAR-95
Selenium-6010	0.102	mg/L	.1	mg/L	102.%	03-MAR-95	03-MAR-95
Silver-6010	0.106	mg/L	.1	mg/L	106.%	03-MAR-95	03-MAR-95
Thallium-6010	0.116	mg/L	.1	mg/L	102.%	03-MAR-95	03-MAR-95
Vanadium-6010	1.00	mg/L	1	mg/L	98.%	03-MAR-95	03-MAR-95
Zinc-6010	105.	mg/L	1	mg/L	77.%	03-MAR-95	03-MAR-95

Comments: Fe and Zn - See note 9.

Lab Id: WG7079-3 Sample Id: Matrix Spike Dup

Parameter	Value	Units	% Rec	RPD	Extracted	Analyzed
Antimony-6010	0.111	mg/L	111.%	1.6	03-MAR-95	03-MAR-95
Barium-6010	1.12	mg/L	102.%	1.2	03-MAR-95	03-MAR-95
Beryllium-6010	0.102	mg/L	102.%	0.59	03-MAR-95	03-MAR-95
Cadmium-6010	0.101	mg/L	101.%	0.30	03-MAR-95	03-MAR-95
Calcium-6010	36.6	mg/L	100.%	0.87	03-MAR-95	03-MAR-95
Chromium-6010	1.42	mg/L	101.%	0.76	03-MAR-95	03-MAR-95
Cobalt-6010	1.04	mg/L	100.%	0.68	03-MAR-95	03-MAR-95
Copper-6010	1.25	mg/L	102.%	1.3	03-MAR-95	03-MAR-95
Iron-6010	223.	mg/L	128.%	0.91	03-MAR-95	03-MAR-95
Lead-6010	0.227	mg/L	108.%	2.5	03-MAR-95	03-MAR-95
Magnesium-6010	22.0	mg/L	95.%	0.99	03-MAR-95	03-MAR-95
Manganese-6010	4.34	mg/L	101.%	0.94	03-MAR-95	03-MAR-95
Molybdenum-6010	1.12	mg/L	104.%	0.82	03-MAR-95	03-MAR-95
Nickel-6010	0.384	mg/L	101.%	0.70	03-MAR-95	03-MAR-95
Phosphorus-6010	1.16	mg/L	101.%	1.8	03-MAR-95	03-MAR-95
Selenium-6010	0.104	mg/L	104.%	2.5	03-MAR-95	03-MAR-95
Silver-6010	0.107	mg/L	107.%	1.2	03-MAR-95	03-MAR-95
Thallium-6010	0.114	mg/L	100%	2.0	03-MAR-95	03-MAR-95
Vanadium-6010	1.01	mg/L	98.%	0.66	03-MAR-95	03-MAR-95
Zinc-6010	107.	mg/L	280.%	1.9	03-MAR-95	03-MAR-95

Comments: Fe and Zn - See note 9.

D&M Laboratories
QUALITY CONTROL REPORT

Reported: 30-MAR-95

[redacted] for Quantitative Petroleum Hydrocarbons

Lab Id: WG7200-9 Sample Id: Method Blank

Parameter	Value	RDL	Units	Extracted	Analyzed
Gas	ND <	0.15	mg/L	22-MAR-95	24-MAR-95
Mineral Spirits	ND <	0.15	mg/L	22-MAR-95	24-MAR-95
Jet Fuel	ND <	0.050	mg/L	22-MAR-95	24-MAR-95
Kerosene	ND <	0.050	mg/L	22-MAR-95	24-MAR-95
Diesel	ND <	0.050	mg/L	22-MAR-95	24-MAR-95
Heavy Oil	ND <	0.25	mg/L	22-MAR-95	24-MAR-95
-	-				
Surrogate	-				
o-Terphenyl	102.		%	22-MAR-95	24-MAR-95

Lab Id: WG7200-10 Sample Id: Method Blank Spike

Parameter	Value	Units	Spike	Units	% Rec	Extracted	Analyzed
Gas	ND <	mg/L				22-MAR-95	24-MAR-95
Mineral Spirits	ND <	mg/L				22-MAR-95	24-MAR-95
Jet Fuel	ND <	mg/L				22-MAR-95	24-MAR-95
Kerosene	ND <	mg/L				22-MAR-95	24-MAR-95
Diesel	0.988	mg/L	1	mg/L	99.%	22-MAR-95	24-MAR-95
Heavy Oil	ND <	mg/L				22-MAR-95	24-MAR-95
-	-						
Surrogate	-						
o-Terphenyl	104.	%				22-MAR-95	24-MAR-95

Lab Id: WG7200-5 Sample Id: Water Spike

Parameter	Value	Units	Spike	Units	% Rec	Extracted	Analyzed
Gas	ND <	mg/L				14-MAR-95	16-MAR-95
Mineral Spirits	ND <	mg/L				14-MAR-95	16-MAR-95
Jet Fuel	ND <	mg/L				14-MAR-95	16-MAR-95
Kerosene	ND <	mg/L				14-MAR-95	16-MAR-95
Diesel	1.11	mg/L	1	mg/L	111.%	14-MAR-95	16-MAR-95
Heavy Oil	ND <	mg/L				14-MAR-95	16-MAR-95
-	-						
Surrogate	-						
o-Terphenyl	87.0	%				14-MAR-95	16-MAR-95

Lab Id: WG7200-6 Sample Id: Water Spike Duplicat

Parameter	Value	Units	% Rec	RPD	Extracted	Analyzed
Gas	ND <	mg/L			14-MAR-95	16-MAR-95
Mineral Spirits	ND <	mg/L			14-MAR-95	16-MAR-95
Jet Fuel	ND <	mg/L			14-MAR-95	16-MAR-95
Kerosene	ND <	mg/L			14-MAR-95	16-MAR-95
Diesel	1.18	mg/L	118.%	6.1	14-MAR-95	16-MAR-95
Heavy Oil	ND <	mg/L			14-MAR-95	16-MAR-95
-	-					
Surrogate	-					
o-Terphenyl	86.0	%			14-MAR-95	16-MAR-95

D&N Laboratories
QUALITY CONTROL REPORT

Reported: 28-MAR-95

Lab Id: WG7269-4 Sample Id: Method Blank

Parameter	Value		RDL	Units	Extracted	Analyzed
Benzene	ND	<	0.50	ug/L	23-MAR-95	23-MAR-95
Ethyl Benzene	ND	<	0.50	ug/L	23-MAR-95	23-MAR-95
Toluene	ND	<	0.50	ug/L	23-MAR-95	23-MAR-95
Xylene	ND	<	0.50	ug/L	23-MAR-95	23-MAR-95
Surrogate Bromofluorobenzene	85.9		-	%	23-MAR-95	23-MAR-95
Comments:	None					

Lab Id: WG7269-5 Sample Id: Method Blank Spike

Parameter	Value	Units	Spike	Units	% Rec	Extracted	Analyzed
Benzene	27.3	ug/L	25	ug/L	109.%	23-MAR-95	23-MAR-95
Ethyl Benzene	26.8	ug/L	25	ug/L	107.%	23-MAR-95	23-MAR-95
Toluene	27.1	ug/L	25	ug/L	108.%	23-MAR-95	23-MAR-95
Xylene	84.6	ug/L	75	ug/L	113.%	23-MAR-95	23-MAR-95
Surrogate Bromofluorobenzene	98.9	%				23-MAR-95	23-MAR-95
Comments:	None						

Lab Id: WG7269-1 Sample Id: MX

Parameter	Value		RDL	Units	Extracted	Analyzed
Benzene	ND	<	0.50	ug/L	23-MAR-95	23-MAR-95
Ethyl Benzene	ND	<	0.50	ug/L	23-MAR-95	23-MAR-95
Toluene	21.0		0.50	ug/L	23-MAR-95	23-MAR-95
Xylene	ND	<	0.50	ug/L	23-MAR-95	23-MAR-95
Surrogate Bromofluorobenzene	95.3		-	%	23-MAR-95	23-MAR-95
Comments:	MX = L9503161-9					

Lab Id: WG7269-2 Sample Id: Matrix Spike

Parameter	Value	Units	Spike	Units	% Rec	Extracted	Analyzed
Benzene	26.4	ug/L	25	ug/L	106.%	23-MAR-95	23-MAR-95
Ethyl Benzene	25.4	ug/L	25	ug/L	102.%	23-MAR-95	23-MAR-95
Toluene	46.0	ug/L	25	ug/L	101.%	23-MAR-95	23-MAR-95
Xylene	74.4	ug/L	75	ug/L	99.%	23-MAR-95	23-MAR-95
Surrogate Bromofluorobenzene	99.2	%				23-MAR-95	23-MAR-95
Comments:	None						

D&M Laboratories
QUALITY CONTROL REPORT

Reported: 28-MAR-95

Lab Id: WG7269-3 Sample Id: Matrix Spike Dup

Parameter	Value	Units	% Rec	RPD	Extracted	Analyzed
Benzene	26.4	ug/L	106.%	0.0	23-MAR-95	23-MAR-95
Ethyl Benzene	25.1	ug/L	101.%	0.92	23-MAR-95	23-MAR-95
Toluene	44.8	ug/L	96.%	4.7	23-MAR-95	23-MAR-95
Xylene	72.5	ug/L	97.%	2.5	23-MAR-95	23-MAR-95
Surrogate						
Bromofluorobenzene	99.9	%			23-MAR-95	23-MAR-95
Comments:	None					

D&M Laboratories
QUALITY CONTROL REPORT

Reported: 28-MAR-95

QC for: Polynuclear Aromatic Hydrocarbons

Lab Id: WG7174-6 Sample Id: Method Blank

Parameter	Value		RDL	Units	Extracted	Analyzed
Naphthalene	ND	<	1.0	ug/L	21-MAR-95	23-MAR-95
Acenaphthylene	ND	<	2.0	ug/L	21-MAR-95	23-MAR-95
Acenaphthene	ND	<	2.0	ug/L	21-MAR-95	23-MAR-95
Fluorene	ND	<	0.20	ug/L	21-MAR-95	23-MAR-95
Phenanthrene	ND	<	0.50	ug/L	21-MAR-95	23-MAR-95
Anthracene	ND	<	0.50	ug/L	21-MAR-95	23-MAR-95
Fluoranthene	ND	<	0.10	ug/L	21-MAR-95	23-MAR-95
Pyrene	ND	<	0.10	ug/L	21-MAR-95	23-MAR-95
Benzo(a)Anthracene	ND	<	0.10	ug/L	21-MAR-95	23-MAR-95
Chrysene	ND	<	0.10	ug/L	21-MAR-95	23-MAR-95
Benzo(b)Fluoranthene	ND	<	0.050	ug/L	21-MAR-95	23-MAR-95
Benzo(k)Fluoranthene	ND	<	0.050	ug/L	21-MAR-95	23-MAR-95
Benzo(a)Pyrene	ND	<	0.050	ug/L	21-MAR-95	23-MAR-95
Dibenz(ah)Anthracene	ND	<	0.10	ug/L	21-MAR-95	23-MAR-95
Benzo(ghi)Perylene	ND	<	0.10	ug/L	21-MAR-95	23-MAR-95
Indeno(123cd)Pyrene	ND	<	0.10	ug/L	21-MAR-95	23-MAR-95
Surrogate:						
2-Fluorobiphenyl	69.0		-	% Recovery	21-MAR-95	23-MAR-95
Benzo(e)Pyrene	104.		-	% Recovery	21-MAR-95	23-MAR-95

Lab Id: WG7174-7 Sample Id: Method Blank Spike

Parameter	Value	Units	Spike	Units	% Rec	Extracted	Analyzed
Naphthalene	12.4	ug/L	20	ug/L	62.%	21-MAR-95	23-MAR-95
Acenaphthene	15.3	ug/L	20	ug/L	76.%	21-MAR-95	23-MAR-95
Pyrene	1.66	ug/L	2	ug/L	83.%	21-MAR-95	23-MAR-95
Benzo(k)Fluoranthene	0.171	ug/L	.2	ug/L	85.%	21-MAR-95	23-MAR-95
Surrogate:							
2-Fluorobiphenyl	69.4	% Recovery				21-MAR-95	23-MAR-95
Benzo(e)Pyrene	93.8	% Recovery				21-MAR-95	23-MAR-95

D&M Laboratories
QUALITY CONTROL REPORT

Reported: 28-MAR-95

GC for Polynuclear Aromatic Hydrocarbons

Lab Id: WG7174-1 Sample Id: MX

Parameter	Value		RDL	Units	Extracted	Analyzed
Naphthalene	ND	<	1.0	ug/L	15-MAR-95	17-MAR-95
Acenaphthylene	ND	<	2.0	ug/L	15-MAR-95	17-MAR-95
Acenaphthene	ND	<	2.0	ug/L	15-MAR-95	17-MAR-95
Fluorene	ND	<	0.20	ug/L	15-MAR-95	17-MAR-95
Phenanthrene	ND	<	0.50	ug/L	15-MAR-95	17-MAR-95
Anthracene	ND	<	0.50	ug/L	15-MAR-95	17-MAR-95
Fluoranthene	ND	<	0.10	ug/L	15-MAR-95	17-MAR-95
Pyrene	ND	<	0.10	ug/L	15-MAR-95	17-MAR-95
Benzo(a)Anthracene	ND	<	0.10	ug/L	15-MAR-95	17-MAR-95
Chrysene	ND	<	0.10	ug/L	15-MAR-95	17-MAR-95
Benzo(b)Fluoranthene	ND	<	0.050	ug/L	15-MAR-95	17-MAR-95
Benzo(k)Fluoranthene	ND	<	0.050	ug/L	15-MAR-95	17-MAR-95
Benzo(a)Pyrene	ND	<	0.050	ug/L	15-MAR-95	17-MAR-95
Dibenz(ah)Anthracene	ND	<	0.10	ug/L	15-MAR-95	17-MAR-95
Benzo(ghi)Perylene	ND	<	0.10	ug/L	15-MAR-95	17-MAR-95
Indeno(123cd)Pyrene	ND	<	0.10	ug/L	15-MAR-95	17-MAR-95
-	-					
Surrogate:	-					
2-Fluorobiphenyl	78.6	-		% Recovery	15-MAR-95	17-MAR-95
Benzo(e)Pyrene	90.4	-		% Recovery	15-MAR-95	17-MAR-95
-	-					
Comments:	MX = L9503112-4					

Lab Id: WG7174-2 Sample Id: Matrix Spike

Parameter	Value	Units	Spike	Units	% Rec	Extracted	Analyzed
Naphthalene	14.7	ug/L	20	ug/L	74.%	15-MAR-95	17-MAR-95
Acenaphthene	19.2	ug/L	20	ug/L	96.%	15-MAR-95	17-MAR-95
Pyrene	1.58	ug/L	2	ug/L	79.%	15-MAR-95	17-MAR-95
Benzo(k)Fluoranthene	0.169	ug/L	.2	ug/L	85.%	15-MAR-95	17-MAR-95
-	-						
Surrogate:	-						
2-Fluorobiphenyl	77.2	% Recovery				15-MAR-95	17-MAR-95
Benzo(e)Pyrene	88.6	% Recovery				15-MAR-95	17-MAR-95

Lab Id: WG7174-3 Sample Id: Matrix Spike Dup

Parameter	Value	Units	% Rec	RPD	Extracted	Analyzed
Naphthalene	14.6	ug/L	73.%	0.46	15-MAR-95	17-MAR-95
Acenaphthene	17.5	ug/L	88.%	8.9	15-MAR-95	17-MAR-95
Pyrene	1.59	ug/L	80.%	1.0	15-MAR-95	17-MAR-95
Benzo(k)Fluoranthene	0.168	ug/L	84.%	0.59	15-MAR-95	17-MAR-95
-	-					
Surrogate:	-					
2-Fluorobiphenyl	76.6	% Recovery			15-MAR-95	17-MAR-95
Benzo(e)Pyrene	86.8	% Recovery			15-MAR-95	17-MAR-95

D&M Laboratories
QUALITY CONTROL REPORT

Reported: 23-MAR-95

QC FOR METALS - ITJA EPA 6010

Lab Id: WG7237-4 Sample Id: Method Blank

Parameter	Value	RDL	Units	Extracted	Analyzed
Barium-6010	ND <	0.50	mg/Kg	22-MAR-95	22-MAR-95
Cadmium-6010	ND <	0.25	mg/Kg	22-MAR-95	22-MAR-95
Chromium-6010	ND <	0.25	mg/Kg	22-MAR-95	22-MAR-95
Lead-6010	ND <	0.50	mg/Kg	22-MAR-95	22-MAR-95
Silver-6010	ND <	0.25	mg/Kg	22-MAR-95	22-MAR-95

Comments: NONE.

Lab Id: WG7237-5 Sample Id: Method Blank Spike

Parameter	Value	Units	Spike	Units	% Rec	Extracted	Analyzed
Barium-6010	51.7	mg/Kg	50	mg/Kg	103.%	22-MAR-95	22-MAR-95
Cadmium-6010	5.04	mg/Kg	5	mg/Kg	101.%	22-MAR-95	22-MAR-95
Chromium-6010	52.4	mg/Kg	50	mg/Kg	105.%	22-MAR-95	22-MAR-95
Lead-6010	5.07	mg/Kg	5	mg/Kg	101.%	22-MAR-95	22-MAR-95
Silver-6010	4.52	mg/Kg	5	mg/Kg	90.%	22-MAR-95	22-MAR-95

Comments: NONE.

Lab Id: WG7237-1 Sample Id: MX

Parameter	Value	RDL	Units	Extracted	Analyzed
Barium-6010	155.	0.50	mg/Kg	22-MAR-95	22-MAR-95
Cadmium-6010	ND <	0.25	mg/Kg	22-MAR-95	22-MAR-95
Chromium-6010	29.5	0.25	mg/Kg	22-MAR-95	22-MAR-95
Lead-6010	7.93	0.50	mg/Kg	22-MAR-95	22-MAR-95
Silver-6010	0.555	0.25	mg/Kg	22-MAR-95	22-MAR-95

Comments: MX=L9503185-15

Lab Id: WG7237-2 Sample Id: Matrix Spike

Parameter	Value	Units	Spike	Units	% Rec	Extracted	Analyzed
Barium-6010	206.	mg/Kg	50	mg/Kg	102.%	22-MAR-95	22-MAR-95
Cadmium-6010	3.96	mg/Kg	5	mg/Kg	79.%	22-MAR-95	22-MAR-95
Chromium-6010	74.2	mg/Kg	50	mg/Kg	89.%	22-MAR-95	22-MAR-95
Lead-6010	12.2	mg/Kg	5	mg/Kg	87.%	22-MAR-95	22-MAR-95
Silver-6010	5.05	mg/Kg	5	mg/Kg	90.%	22-MAR-95	22-MAR-95

Comments: Cd-See notes 8 and 10.

D&M Laboratories
QUALITY CONTROL REPORT

Reported: 23-MAR-95

QC FOR METALS - SW EPA 6010

Lab Id: WG7237-3 Sample Id: Matrix Spike Dup

Parameter	Value	Units	%Rec	RPD	Extracted	Analyzed
Barium-6010	205.	mg/Kg	101.%	0.25	22-MAR-95	22-MAR-95
Cadmium-6010	4.01	mg/Kg	80.%	1.4	22-MAR-95	22-MAR-95
Chromium-6010	74.0	mg/Kg	89.%	0.29	22-MAR-95	22-MAR-95
Lead-6010	12.2	mg/Kg	86.%	0.37	22-MAR-95	22-MAR-95
Silver-6010	5.39	mg/Kg	97.%	6.5	22-MAR-95	22-MAR-95

Comments: Cd-See notes 8 and 10.

D&M Laboratories
QUALITY CONTROL REPORT

Reported: 28-MAR-95

Lab Id: WG7162-8 Sample Id: Method Blank

Parameter	Value	RDL	Units	Extracted	Analyzed
Gas	ND <	5.0	mg/Kg	22-MAR-95	24-MAR-95
Mineral Spirits	ND <	5.0	mg/Kg	22-MAR-95	24-MAR-95
Jet Fuel	ND <	5.0	mg/Kg	22-MAR-95	24-MAR-95
Kerosine	ND <	5.0	mg/Kg	22-MAR-95	24-MAR-95
Diesel	ND <	5.0	mg/Kg	22-MAR-95	24-MAR-95
Heavy Oil	ND <	50.	mg/Kg	22-MAR-95	24-MAR-95
-	-				
Surrogate	-				
o-Terphenyl	95.0	-	%	22-MAR-95	24-MAR-95
-	-				
Comments:	None				

Lab Id: WG7162-10 Sample Id: Method Blank Spike

Parameter	Value	Units	Spike	Units	% Rec	Extracted	Analyzed
Gas	ND <	mg/Kg				22-MAR-95	24-MAR-95
Mineral Spirits	ND <	mg/Kg				22-MAR-95	24-MAR-95
Jet Fuel	ND <	mg/Kg				22-MAR-95	24-MAR-95
Kerosine	ND <	mg/Kg				22-MAR-95	24-MAR-95
Diesel	111.	mg/Kg	100	mg/Kg	111.%	22-MAR-95	24-MAR-95
Heavy Oil	ND <	mg/Kg				22-MAR-95	24-MAR-95
-	-						
Surrogate	-						
o-Terphenyl	94.0	%				22-MAR-95	24-MAR-95
-	-						
Comments:	None						

D&M Laboratories
QUALITY CONTROL REPORT

Reported: 28-MAR-95

Modified Quantitative Petroleum Hydrocarbon

Lab Id: WG7162-1 Sample Id: MX

Parameter	Value		RDL	Units	Extracted	Analyzed
Gas	ND	<	5.0	mg/Kg	10-MAR-95	13-MAR-95
Mineral Spirits	ND	<	5.0	mg/Kg	10-MAR-95	13-MAR-95
Jet Fuel	ND	<	5.0	mg/Kg	10-MAR-95	13-MAR-95
Kerosine	ND	<	5.0	mg/Kg	10-MAR-95	13-MAR-95
Diesel	ND	<	5.0	mg/Kg	10-MAR-95	13-MAR-95
Heavy Oil	ND	<	50.	mg/Kg	10-MAR-95	13-MAR-95
-	-					
Surrogate						
o-Terphenyl	111.		-	%	10-MAR-95	13-MAR-95
-	-					
Comments:	MX=L9503045-2, client i.d.= 9504060M/FNSR0008T8.					

Lab Id: WG7162-2 Sample Id: Matrix Spike

Parameter	Value		Units	Spike	Units	% Rec	Extracted	Analyzed
Gas	ND	<	mg/Kg				10-MAR-95	13-MAR-95
Mineral Spirits	ND	<	mg/Kg				10-MAR-95	13-MAR-95
Jet Fuel	ND	<	mg/Kg				10-MAR-95	13-MAR-95
Kerosine	ND	<	mg/Kg				10-MAR-95	13-MAR-95
Diesel	128.		mg/Kg	100	mg/Kg	128.%	10-MAR-95	13-MAR-95
Heavy Oil	ND	<	mg/Kg				10-MAR-95	13-MAR-95
-	-							
Surrogate								
o-Terphenyl	146.		%				10-MAR-95	13-MAR-95
-	-							
Comments:	None							

Lab Id: WG7162-3 Sample Id: Matrix Spike Dup

Parameter	Value		Units	% Rec	RPD	Extracted	Analyzed
Gas	ND	<	mg/Kg			10-MAR-95	13-MAR-95
Mineral Spirits	ND	<	mg/Kg			10-MAR-95	13-MAR-95
Jet Fuel	ND	<	mg/Kg			10-MAR-95	13-MAR-95
Kerosine	ND	<	mg/Kg			10-MAR-95	13-MAR-95
Diesel	115.		mg/Kg	115.%	11.	10-MAR-95	13-MAR-95
Heavy Oil	ND	<	mg/Kg			10-MAR-95	13-MAR-95
-	-						
Surrogate							
o-Terphenyl	134.		%			10-MAR-95	13-MAR-95
-	-						
Comments:	None						

D&M Laboratories
QUALITY CONTROL REPORT

Reported: 30-MAR-95

GC for BTEX

Lab Id: WG7277-4 Sample Id: Method Blank

Parameter	Value	RDL	Units	Extracted	Analyzed
Benzene	ND <	5.0	ug/Kg	23-MAR-95	23-MAR-95
Ethyl Benzene	ND <	5.0	ug/Kg	23-MAR-95	23-MAR-95
Toluene	ND <	5.0	ug/Kg	23-MAR-95	23-MAR-95
Xylene	ND <	5.0	ug/Kg	23-MAR-95	23-MAR-95
Surrogate: Bromofluorobenzene	85.8	-	%	23-MAR-95	23-MAR-95
Comments:	None				

Lab Id: WG7277-5 Sample Id: Method Blank Spike

Parameter	Value	Units	Spike	Units	% Rec	Extracted	Analyzed
Benzene	98.5	ug/Kg	100	ug/Kg	98.%	23-MAR-95	23-MAR-95
Ethyl Benzene	98.3	ug/Kg	100	ug/Kg	98.%	23-MAR-95	23-MAR-95
Toluene	98.8	ug/Kg	100	ug/Kg	99.%	23-MAR-95	23-MAR-95
Xylene	296.	ug/Kg	300	ug/Kg	99.%	23-MAR-95	23-MAR-95
Surrogate: Bromofluorobenzene	85.7	%				23-MAR-95	23-MAR-95
Comments:	None						

Lab Id: WG7277-6 Sample Id: Method Blank

Parameter	Value	RDL	Units	Extracted	Analyzed
Benzene	ND <	5.0	ug/Kg	27-MAR-95	27-MAR-95
Ethyl Benzene	ND <	5.0	ug/Kg	27-MAR-95	27-MAR-95
Toluene	ND <	5.0	ug/Kg	27-MAR-95	27-MAR-95
Xylene	ND <	5.0	ug/Kg	27-MAR-95	27-MAR-95
Surrogate: Bromofluorobenzene	85.9	-	%	27-MAR-95	27-MAR-95
Comments:	None				

D&M Laboratories
QUALITY CONTROL REPORT

Reported: 30-MAR-95

QC for BTEX

Lab Id: WG7277-7 Sample Id: Method Blank Spike

Parameter	Value	Units	Spike	Units	% Rec	Extracted	Analyzed
Benzene	99.9	ug/Kg	100	ug/Kg	100%	27-MAR-95	27-MAR-95
Ethyl Benzene	102.	ug/Kg	100	ug/Kg	102.%	27-MAR-95	27-MAR-95
Toluene	102.	ug/Kg	100	ug/Kg	102.%	27-MAR-95	27-MAR-95
Xylene	312.	ug/Kg	300	ug/Kg	104.%	27-MAR-95	27-MAR-95
Surrogate:							
Bromofluorobenzene	93.9	%				27-MAR-95	27-MAR-95
Comments:	None						

Lab Id: WG7277-8 Sample Id: Method Blank

Parameter	Value	RDL	Units	Extracted	Analyzed
Benzene	ND <	5.0	ug/Kg	29-MAR-95	29-MAR-95
Ethyl Benzene	ND <	5.0	ug/Kg	29-MAR-95	29-MAR-95
Toluene	ND <	5.0	ug/Kg	29-MAR-95	29-MAR-95
Xylene	ND <	5.0	ug/Kg	29-MAR-95	29-MAR-95
Surrogate:					
Bromofluorobenzene	87.9	-	%	29-MAR-95	29-MAR-95
Comments:	None				

Lab Id: WG7277-9 Sample Id: Method Blank Spike

Parameter	Value	Units	Spike	Units	% Rec	Extracted	Analyzed
Benzene	98.0	ug/Kg	100	ug/Kg	98.%	29-MAR-95	29-MAR-95
Ethyl Benzene	98.8	ug/Kg	100	ug/Kg	99.%	29-MAR-95	29-MAR-95
Toluene	99.3	ug/Kg	100	ug/Kg	99.%	29-MAR-95	29-MAR-95
Xylene	298.	ug/Kg	300	ug/Kg	99.%	29-MAR-95	29-MAR-95
Surrogate:							
Bromofluorobenzene	91.6	%				29-MAR-95	29-MAR-95
Comments:	None						

D&M Laboratories
QUALITY CONTROL REPORT

Reported: 30-MAR-95

QC for: GAS/BTEX

Lab Id: WG7277-1 Sample Id: MATRIX

Parameter	Value	RDL	Units	Extracted	Analyzed
Benzene	ND <	5.0	ug/Kg	23-MAR-95	23-MAR-95
Ethyl Benzene	ND <	5.0	ug/Kg	23-MAR-95	23-MAR-95
Toluene	ND <	5.0	ug/Kg	23-MAR-95	23-MAR-95
Xylene	ND <	5.0	ug/Kg	23-MAR-95	23-MAR-95
Surrogate: Bromofluorobenzene	88.8		%	23-MAR-95	23-MAR-95
Comments:	None				

Lab Id: WG7277-2 Sample Id: MATRIX SPIKE

Parameter	Value	Units	Spike	Units	% Rec	Extracted	Analyzed
Benzene	100.	ug/Kg	100	ug/Kg	100%	23-MAR-95	23-MAR-95
Ethyl Benzene	99.0	ug/Kg	100	ug/Kg	99.%	23-MAR-95	23-MAR-95
Toluene	100.	ug/Kg	100	ug/Kg	100%	23-MAR-95	23-MAR-95
Xylene	301.	ug/Kg	300	ug/Kg	100%	23-MAR-95	23-MAR-95
Surrogate: Bromofluorobenzene	94.9	%				23-MAR-95	23-MAR-95
Comments:	None						

Lab Id: WG7277-3 Sample Id: Matrix Spike Dup

Parameter	Value	Units	% Rec	RPD	Extracted	Analyzed
Benzene	99.1	ug/Kg	99.%	1.3	23-MAR-95	23-MAR-95
Ethyl Benzene	98.6	ug/Kg	99.%	0.76	23-MAR-95	23-MAR-95
Toluene	99.9	ug/Kg	100%	0.43	23-MAR-95	23-MAR-95
Xylene	299.	ug/Kg	100%	0.60	23-MAR-95	23-MAR-95
Surrogate: Bromofluorobenzene	94.2	%			23-MAR-95	23-MAR-95
Comments:	None					

D&M Laboratories
QUALITY CONTROL REPORT

Reported: 28-MAR-95

Polynuclear Aromatic Hydrocarbons

Lab Id: WG7222-4 Sample Id: Method Blank

Parameter	Value		RDL	Units	Extracted	Analyzed
Naphthalene	ND	<	100	ug/Kg	21-MAR-95	23-MAR-95
Acenaphthylene	ND	<	200	ug/Kg	21-MAR-95	23-MAR-95
Acenaphthene	ND	<	200	ug/Kg	21-MAR-95	23-MAR-95
Fluorene	ND	<	20.	ug/Kg	21-MAR-95	23-MAR-95
Phenanthrene	ND	<	50.	ug/Kg	21-MAR-95	23-MAR-95
Anthracene	ND	<	50.	ug/Kg	21-MAR-95	23-MAR-95
Fluoranthene	ND	<	10.	ug/Kg	21-MAR-95	23-MAR-95
Pyrene	ND	<	10.	ug/Kg	21-MAR-95	23-MAR-95
Benzo(a)Anthracene	ND	<	10.	ug/Kg	21-MAR-95	23-MAR-95
Chrysene	ND	<	10.	ug/Kg	21-MAR-95	23-MAR-95
Benzo(b)Fluoranthene	ND	<	5.0	ug/Kg	21-MAR-95	23-MAR-95
Benzo(k)Fluoranthene	ND	<	5.0	ug/Kg	21-MAR-95	23-MAR-95
Benzo(a)Pyrene	ND	<	5.0	ug/Kg	21-MAR-95	23-MAR-95
Dibenz(ah)Anthracene	ND	<	10.	ug/Kg	21-MAR-95	23-MAR-95
Benzo(ghi)Perylene	ND	<	10.	ug/Kg	21-MAR-95	23-MAR-95
Indeno(123cd)Pyrene	ND	<	10.	ug/Kg	21-MAR-95	23-MAR-95
-						
Surrogate:						
2-Fluorobiphenyl	83.7		-	%	21-MAR-95	23-MAR-95
Benzo(e)Pyrene	100.		-	%	21-MAR-95	23-MAR-95

Lab Id: WG7222-5 Sample Id: Method Blank Spike

Parameter	Value	Units	Spike	Units	% Rec	Extracted	Analyzed
Naphthalene	1620	ug/Kg	2000	ug/Kg	81.%	21-MAR-95	23-MAR-95
Acenaphthene	2160	ug/Kg	2000	ug/Kg	108.%	21-MAR-95	23-MAR-95
Pyrene	179.	ug/Kg	200	ug/Kg	90.%	21-MAR-95	23-MAR-95
Benzo(k)Fluoranthene	18.7	ug/Kg	20	ug/Kg	93.%	21-MAR-95	23-MAR-95
-							
Surrogate:							
2-Fluorobiphenyl	88.4	%				21-MAR-95	23-MAR-95
Benzo(e)Pyrene	101.	%				21-MAR-95	23-MAR-95

O&M Laboratories
QUALITY CONTROL REPORT

Reported: 28-MAR-95

QC for Polynuclear Aromatic Hydrocarbons

Lab Id: WG7222-1 Sample Id: MX

Parameter	Value	RDL	Units	Extracted	Analyzed
Naphthalene	ND <	100	ug/Kg	21-MAR-95	23-MAR-95
Acenaphthylene	ND <	200	ug/Kg	21-MAR-95	23-MAR-95
Acenaphthene	ND <	200	ug/Kg	21-MAR-95	23-MAR-95
Fluorene	ND <	20.	ug/Kg	21-MAR-95	23-MAR-95
Phenanthrene	ND <	50.	ug/Kg	21-MAR-95	23-MAR-95
Anthracene	ND <	50.	ug/Kg	21-MAR-95	23-MAR-95
Fluoranthene	15.	10.	ug/Kg	21-MAR-95	23-MAR-95
Pyrene	43.	10.	ug/Kg	21-MAR-95	23-MAR-95
Benzo(a)Anthracene	ND <	10.	ug/Kg	21-MAR-95	23-MAR-95
Chrysene	ND <	10.	ug/Kg	21-MAR-95	23-MAR-95
Benzo(b)Fluoranthene	11.	5.0	ug/Kg	21-MAR-95	23-MAR-95
Benzo(k)Fluoranthene	5.1	5.0	ug/Kg	21-MAR-95	23-MAR-95
Benzo(a)Pyrene	9.6	5.0	ug/Kg	21-MAR-95	23-MAR-95
Dibenz(ah)Anthracene	ND <	10.	ug/Kg	21-MAR-95	23-MAR-95
Benzo(ghi)Perylene	16.	10.	ug/Kg	21-MAR-95	23-MAR-95
Indeno(123cd)Pyrene	13.	10.	ug/Kg	21-MAR-95	23-MAR-95
-	-				
Surrogate:	-				
2-Fluorobiphenyl	77.9	-	%	21-MAR-95	23-MAR-95
Benzo(e)Pyrene	77.1	-	%	21-MAR-95	23-MAR-95
-	-				
Comments:	MX = L9503178-2				
-	-				

Lab Id: WG7222-2 Sample Id: Matrix Spike

Parameter	Value	Units	Spike	Units	% Rec	Extracted	Analyzed
Naphthalene	1440	ug/Kg	2000	ug/Kg	72.%	21-MAR-95	23-MAR-95
Acenaphthene	2290	ug/Kg	2000	ug/Kg	114.%	21-MAR-95	23-MAR-95
Pyrene	188.	ug/Kg	200	ug/Kg	72.%	21-MAR-95	23-MAR-95
Benzo(k)Fluoranthene	20.4	ug/Kg	20	ug/Kg	76.%	21-MAR-95	23-MAR-95
-	-						
Surrogate:	-						
2-Fluorobiphenyl	82.6	%				21-MAR-95	23-MAR-95
Benzo(e)Pyrene	89.1	%				21-MAR-95	23-MAR-95

Lab Id: WG7222-3 Sample Id: Matrix Spike Dup

Parameter	Value	Units	% Rec	RPD	Extracted	Analyzed
Naphthalene	1260	ug/Kg	63.%	13.	21-MAR-95	23-MAR-95
Acenaphthene	2350	ug/Kg	117.%	2.6	21-MAR-95	23-MAR-95
Pyrene	174.	ug/Kg	66.%	8.1	21-MAR-95	23-MAR-95
Benzo(k)Fluoranthene	18.7	ug/Kg	68.%	8.7	21-MAR-95	23-MAR-95
-	-					
Surrogate:	-					
2-Fluorobiphenyl	76.2	%			21-MAR-95	23-MAR-95
Benzo(e)Pyrene	82.6	%			21-MAR-95	23-MAR-95

LABORATORY FOOTNOTES

(1) Sample containers were received broken.
(2) The samples were not properly refrigerated during transport to the laboratory.
(3) The samples were not properly preserved.
(4) The information on the chain-of-custody does not match the information on the sample containers.
(5) The samples were received after the required holding time.
(6) This analyte was detected in the method blank above the reporting limit.
(7) This analyte was detected in the trip blank above the reporting limit.
(8) The recovery of the matrix spike indicates the presence of matrix effects. The MBS recovery was acceptable.
(9) The matrix spike recovery is not significant due to the high concentration of the analyte in the sample relative to the amount of spike added.
(10) The method of standard additions was performed and confirmed a matrix interference.
(11) The variation in spike recoveries reflects the nonhomogeneity of the sample.
(12) Accurate quantitation of the surrogate was not possible due to the extent of sample dilution.
(13) The surrogate recovery was high due to the presence of interfering compounds in the sample.
(14) The surrogate recovery was low due to matrix effects. The analysis was repeated with similar results.
(15) The detection limit was raised due to the insufficient amount of sample available for analysis.
(16) The detection limit was raised due to the dilution required by high-level analytes in the sample.
(17) The detection limit was raised due to the dilution required by high-level non-target analytes in the sample.
(18) These compounds co-elute; therefore, a total value is reported for both.
(19) The sample was tentatively identified and semi-quantitated based on the best chromatographic fit from the available standards.
(20) The sample chromatograph resembled an "aged" hydrocarbon product.
(21) Hydrocarbons were found in the range of gasoline and diesel but did not resemble a gasoline or diesel fingerprint.
(22) This sample was extracted outside of the required holding time.
(23) This sample was analyzed outside of the required holding time.
(24) The variation in duplicate results reflects the nonhomogeneity of the sample.
(25) The recovery of the matrix spike(s) reflects the nonhomogeneity of the sample. The MBS recovery was acceptable.
(26) The sample was not analyzed on a second column.
(27) The presence of di-n-butyl phthalate may be due to laboratory contamination.
(28) This sample was analyzed outside of the required holding time per client request.
(29) The detection limit was raised due to the high background from matrix interferences.

Please note that only items 8, 9, 10 of this laboratory reference list apply to the Phase 2 Hausten Street Project. Items 8, 9, 10 relate to matrix spike recovery. The soil and groundwater samples submitted as a part of the Hausten Street Project were properly shipped and analyzed within the appropriate holding time.

QUALITY CONTROL REPORT

In order to provide you with the means of assessing the quality of the data in our report, D&M Laboratories reports the results of Quality Control samples analyzed with your samples.

The Quality Control samples provide the following QC information:

The Method Blank (MB) monitors the level of contamination introduced by reagents or glassware. A minimum of one MB is run per batch of 20 samples or less.

The Method Blank Spike (MBS) measures the accuracy of analytical techniques and is not subject to matrix effects. A minimum of one MBS is run per batch of 20 samples or less.

The Matrix Spike (MS) measures the accuracy of the method for a matrix type. Due to the high variability within matrix types and the necessity of batching samples from varied sources, matrix spike information from one sample is not necessarily relevant to other samples on the batch. A minimum of two matrix spikes, MS and MSD, are run per batch of 20 samples or less. The sample selected for the matrix spike is designated MX, and may or may not have been submitted by the recipient of this report.

The Matrix Spike Duplicate (MSD), along with the MS, is used to monitor the precision (RPD) of the method and to indicate possible non homogeneity of the sample matrix.

Equations used for determining percent recovery and relative percent difference (RPD) are as follows:

$$\text{MBS \% Recovery} = (\text{MBS result} / \text{MBS spike level}) \times 100$$

$$\text{MS \% Recovery} = [(\text{MS result} - \text{MX result}) / \text{MS spike level}] \times 100$$

$$\text{RPD} = \{ | \text{MS result} - \text{MSD result} | \ / [(\text{MS result} + \text{MSD result}) / 2] \} \times 100$$

We continue to strive to improve the quality of service to our clients. We welcome any questions or comments you may have about this information, or about D&M Laboratories in general. Please contact a Project Manager for further information.

[illegible]

0062

CHAIN-OF-CUSTODY RECORD

WHITE COPY - Original (Accompanies Samples) YELLOW COPY - Collector PINK COPY - Project Manager

Sample Number	Depth	Time	Sample Type	Container Type	HVOCs 601/8010	BTE Only 602/8020	VOCs 624/8240	SVOCs 625/8270	TRPH 418.1	TPH 8015(M)-G	TPH 8015(M)-D	PCBs 8080	Total Pb/Cd 6010	PAHs 8310	TCLP	TPH-IRG	FIELD NOTES:	Total Number Of Containers	Laboratory Note Number
GS-3		1155	water	40 mL VOA	X												HCl pres.	4	
↓		1157	water	500 mL poly									X				HNO3 pres.	2	
↓		1203	water	1L amber												X		3	
↓		1205	water	1L amber										X				3	
SB-4-1	1'	1318	soil	8oz glass	X								X	X		X		1	
SB-4-3	3'	1326	soil	8oz glass	X								X	X		X		1	

RECEIVED D&M LABORATORIES 1995 MAR 18 AM 11:58

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
Ryan Sueyoshi	3/17/95 1658	DHL Airbill # 793 7907554
DHL Airbill 793 7907554	3/18/95 11:00 AM	S. Robert Peck
S. Robert Peck	3/18/95 11:55 AM	[illegible]

ANALYTICAL LABORATORY: D&M Laboratory

LABORATORY CONTACT: Donna Breaux

D&M CONTACT: Carol Mitsuyasu PHONE: 808 593 1116

DAMES & MOORE
1050 QUEEN STREET, SUITE 204
HONOLULU, HAWAII 96814
(808) 593-1116 FAX: (808) 593-1198

LABORATORY NOTES: PAH - EPA 8310 for acenaphthlene, naphthlene, fluoroanthene and benzo(a)pyrene only.

6-1 Lamb
2-500 poly
2-SOILS

JOB NO.: 04402-141-037 SHEET 1 OF 1

PROJECT: Proposed Houston St Elderly Housing

LOCATION: Houston St Honolulu HI

COLLECTOR: R. Sueyoshi DATE OF COLLECTION: 3/17/95

D&M LABORATORIES
ENVIRONMENTAL AND INDUSTRIAL HYGIENE SERVICES

3700 Lakeville Highway, Petaluma, CA 94954
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Carol Mitsuyasu
Dames & Moore - Honolulu
1050 Queen Street, Suite 204
Honolulu, HI 96814

April 5, 1995

Customer Project: 004402-141-037 Hausten St. Housing
Laboratory Job: L9504015

On April 3, 1995 we received 1 sample(s) for analysis. Samples were analyzed by the following method(s):

Halogenated Volatile Organics (EPA 8010A)

Project Manager

Laboratory Director
Robert Peak

O&M Laboratories
ANALYTICAL DATA REPORT
Prepared for: Dames & Moore - Honolulu

Project Id: 004402-141-037

Reported: 04-APR-95

Lab Id: L9504015-1 Sample Id: GS-3 Collected: 17-MAR-95 Received: 03-APR-95

Parameter	Value		MDL	Units	Extracted	Analyzed
Volatile Halogenated Hydrocarbons						
Bromodichloromethane	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
Bromoform	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
Bromomethane	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
Carbon Tetrachloride	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
Chlorobenzene	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
Chloroethane	ND	<	1.0	ug/L	31-MAR-95	31-MAR-95
Chloroform	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
Chloromethane	ND	<	1.0	ug/L	31-MAR-95	31-MAR-95
Dibromochloromethane	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
1,2-Dichlorobenzene	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
1,3-Dichlorobenzene	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
1,4-Dichlorobenzene	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
1,1-Dichloroethane	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
1,2-Dichloroethane	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
1,1-Dichloroethene	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
1,2-Dichloroethene (Total)	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
1,2-Dichloropropane	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
Cis-1,3-Dichloropropene	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
Trans-1,3-Dichloropropene	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
Methylene Chloride	ND	<	1.0	ug/L	31-MAR-95	31-MAR-95
1,1,2,2-Tetrachloroethane	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
Tetrachloroethene	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
1,1,1-Trichloroethane	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
1,1,2-Trichloroethane	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
Trichloroethene	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
Trichlorofluoromethane	ND	<	1.0	ug/L	31-MAR-95	31-MAR-95
Vinyl Chloride	ND	<	1.0	ug/L	31-MAR-95	31-MAR-95
Surrogate: 4-Bromofluorobenzene	91.5			%	31-MAR-95	31-MAR-95

D&M Laboratories
QUALITY CONTROL REPORT

Reported: 04-APR-95

Lab Id: WG7338-1 Sample Id: MX

Parameter	Value		RDL	Units	Extracted	Analyzed
Benzene	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
Bromodichloromethane	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
Bromoform	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
Bromomethane	ND	<	1.0	ug/L	31-MAR-95	31-MAR-95
Carbon Tetrachloride	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
Chlorobenzene	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
Chloroethane	ND	<	1.0	ug/L	31-MAR-95	31-MAR-95
Chloroform	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
Chloromethane	ND	<	1.0	ug/L	31-MAR-95	31-MAR-95
Dibromochloromethane	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
1,2-Dichlorobenzene	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
1,3-Dichlorobenzene	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
1,4-Dichlorobenzene	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
1,1-Dichloroethane	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
1,2-Dichloroethane	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
1,1-Dichloroethene	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
1,2-Dichloroethene (Total)	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
1,2-Dichloropropane	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
Cis-1,3-Dichloropropene	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
Trans-1,3-Dichloropropene	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
Ethyl Benzene	ND	<	1.0	ug/L	31-MAR-95	31-MAR-95
Methylene Chloride	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
1,1,2,2-Tetrachloroethane	0.63		0.50	ug/L	31-MAR-95	31-MAR-95
Tetrachloroethene	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
Toluene	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
1,1,1-Trichloroethane	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
1,1,2-Trichloroethane	0.89		0.50	ug/L	31-MAR-95	31-MAR-95
Trichloroethene	ND	<	1.0	ug/L	31-MAR-95	31-MAR-95
Trichlorofluoromethane	ND	<	1.0	ug/L	31-MAR-95	31-MAR-95
Vinyl Chloride	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
Xylenes (Total)						
Surrogate:						
4-Bromofluorobenzene (8010)	91.6			%	31-MAR-95	31-MAR-95
4-Bromofluorobenzene (8020)	99.3			%	31-MAR-95	31-MAR-95

Comments: MX = L9503240-1

D&M Laboratories
QUALITY CONTROL REPORT

Reported: 04-APR-95

QC for 8010/8020 DC

Lab Id: WG7338-2 Sample Id: Matrix Spike

Parameter	Value	Units	Spike	Units	% Rec	Extracted	Analyzed
1,1-Dichloroethene	16.6	ug/L	20	ug/L	83.%	31-MAR-95	31-MAR-95
Trichloroethene	18.4	ug/L	20	ug/L	88.%	31-MAR-95	31-MAR-95
Chlorobenzene-601	19.6	ug/L	20	ug/L	98.%	31-MAR-95	31-MAR-95
Benzene	20.6	ug/L	20	ug/L	103.%	31-MAR-95	31-MAR-95
Toluene	19.8	ug/L	20	ug/L	99.%	31-MAR-95	31-MAR-95
Chlorobenzene-602	20.4	ug/L	20	ug/L	102.%	31-MAR-95	31-MAR-95
Surrogate:							
4-Bromofluorobenzene (8010)	90.9	%				31-MAR-95	31-MAR-95
4-Bromofluorobenzene (8020)	98.9	%				31-MAR-95	31-MAR-95

Lab Id: WG7338-3 Sample Id: Matrix Spike Dup

Parameter	Value	Units	% Rec	RPD	Extracted	Analyzed
1,1-Dichloroethene	15.1	ug/L	76.%	9.5	31-MAR-95	31-MAR-95
Trichloroethene	16.4	ug/L	78.%	12.	31-MAR-95	31-MAR-95
Chlorobenzene-601	16.8	ug/L	84.%	15.	31-MAR-95	31-MAR-95
Benzene	18.6	ug/L	93.%	10.	31-MAR-95	31-MAR-95
Toluene	17.1	ug/L	86.%	15.	31-MAR-95	31-MAR-95
Chlorobenzene-602	17.7	ug/L	88.%	14.	31-MAR-95	31-MAR-95
Surrogate:						
4-Bromofluorobenzene (8010)	88.1	%			31-MAR-95	31-MAR-95
4-Bromofluorobenzene (8020)	95.2	%			31-MAR-95	31-MAR-95

D&M Laboratories
QUALITY CONTROL REPORT

Reported: 04-APR-95

QC for: 8010/8020

Lab Id: WG7338-6 Sample Id: Method Blank

Parameter	Value		RDL	Units	Extracted	Analyzed
Benzene	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
Bromodichloromethane	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
Bromoform	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
Bromomethane	ND	<	1.0	ug/L	31-MAR-95	31-MAR-95
Carbon Tetrachloride	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
Chlorobenzene	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
Chloroethane	ND	<	1.0	ug/L	31-MAR-95	31-MAR-95
Chloroform	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
Chloromethane	ND	<	1.0	ug/L	31-MAR-95	31-MAR-95
Dibromochloromethane	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
1,2-Dichlorobenzene	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
1,3-Dichlorobenzene	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
1,4-Dichlorobenzene	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
1,1-Dichloroethane	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
1,2-Dichloroethane	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
1,1-Dichloroethene	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
1,2-Dichloroethene (Total)	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
1,2-Dichloropropane	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
Cis-1,3-Dichloropropene	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
Trans-1,3-Dichloropropene	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
Ethyl Benzene	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
Methylene Chloride	ND	<	1.0	ug/L	31-MAR-95	31-MAR-95
1,1,2,2-Tetrachloroethane	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
Tetrachloroethene	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
Toluene	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
1,1,1-Trichloroethane	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
1,1,2-Trichloroethane	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
Trichloroethene	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
Trichlorofluoromethane	ND	<	1.0	ug/L	31-MAR-95	31-MAR-95
Vinyl Chloride	ND	<	1.0	ug/L	31-MAR-95	31-MAR-95
Xylenes (Total)	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
-	-					
Surrogate:	-					
4-Bromofluorobenzene (8010)	89.1		-	%	31-MAR-95	31-MAR-95
4-Bromofluorobenzene (8020)	99.0		-	%	31-MAR-95	31-MAR-95

Lab Id: WG7338-7 Sample Id: Method Blank Spike

Parameter	Value	Units	Spike	Units	% Rec	Extracted	Analyzed
1,1-Dichloroethene	18.7	ug/L	20	ug/L	94.%	31-MAR-95	31-MAR-95
Trichloroethene	17.6	ug/L	20	ug/L	88.%	31-MAR-95	31-MAR-95
Chlorobenzene-601	18.1	ug/L	20	ug/L	90.%	31-MAR-95	31-MAR-95
Benzene	19.2	ug/L	20	ug/L	96.%	31-MAR-95	31-MAR-95
Toluene	18.9	ug/L	20	ug/L	94.%	31-MAR-95	31-MAR-95
Chlorobenzene-602	18.9	ug/L	20	ug/L	94.%	31-MAR-95	31-MAR-95
-	-						
Surrogate:	-					31-MAR-95	31-MAR-95
4-Bromofluorobenzene (8010)	104.	%				31-MAR-95	31-MAR-95
4-Bromofluorobenzene (8020)	104.	%					

QUALITY CONTROL REPORT

In order to provide you with the means of assessing the quality of the data in our report, **D&M Laboratories** reports the results of Quality Control samples analyzed with your samples.

The Quality Control samples provide the following QC information:

The Method Blank (MB) monitors the level of contamination introduced by reagents or glassware. A minimum of one MB is run per batch of 20 samples or less.

The Method Blank Spike (MBS) measures the accuracy of analytical techniques and is not subject to matrix effects. A minimum of one MBS is run per batch of 20 samples or less.

The Matrix Spike (MS) measures the accuracy of the method for a matrix type. Due to the high variability within matrix types and the necessity of batching samples from varied sources, matrix spike information from one sample is not necessarily relevant to other samples on the batch. A minimum of two matrix spikes, MS and MSD, are run per batch of 20 samples or less. The sample selected for the matrix spike is designated MX, and may or may not have been submitted by the recipient of this report.

The Matrix Spike Duplicate (MSD), along with the MS, is used to monitor the precision (RPD) of the method and to indicate possible non homogeneity of the sample matrix.

Equations used for determining percent recovery and relative percent difference (RPD) are as follows:

MBS % Recovery = (MBS result / MBS spike level) x 100
MS % Recovery = [(MS result - MX result) / MS spike level] x 100
RPD ={ | MS result - MSD result | / [(MS result + MSD result) / 2]} x 100

We continue to strive to improve the quality of service to our clients. We welcome any questions or comments you may have about this information, or about **D&M Laboratories** in general. Please contact a Project Manager for further information.

CHAIN-OF-CUSTODY RECORD

0027

WHITE COPY - Original (Accompanies Samples) YELLOW COPY - Collector PINK COPY - Project Manager

Sample Number	Depth	Time	Sample Type	Container Type	ANALYSES: HVOCs 601(8010)	BTE Only 602/8020	VOCs 624/8240	SVOCs 625/8270	TRPH 418.1	TPH 8015(M)-G	TPH 8015(M)-D	PCBs 8080	Total Pb/Cd 6010	PAHs 8100	TCLP	FIELD NOTES:	Total Number Of Containers	Laboratory Note Number
GS-3		1203	Water	1 L amber	X												2	

RELINQUISHED BY: (Signature) DATE/TIME RECEIVED BY: (Signature)
3/17/95 1658 DH airbill 7537907554

RELINQUISHED BY: (Signature) DATE/TIME RECEIVED BY: (Signature)

RELINQUISHED BY: (Signature) DATE/TIME RECEIVED BY: (Signature)

ANALYTICAL LABORATORY: D&M Laboratory

LABORATORY CONTACT: Donna Breaux Quote#7768

D&M CONTACT: G. Mitsuyasu PHONE: (808) 593-1116

DAMES & MOORE
1050 QUEEN STREET, SUITE 204
HONOLULU, HAWAII 96814
(808) 593-1116 FAX: (808) 593-1198

LABORATORY NOTES:

Additional analyses request - 3/31/95

JOB NO.: 009402-141-037 SHEET 1 OF 1

PROJECT Proposed Hansten St. Elderly Housing

LOCATION Hansten St., Honolulu, HI

COLLECTOR R Sueyoshi DATE OF COLLECTION 3/17/95

03/31/85 14:43 ☎808 593 1198 DAMES&MOORE 002

D&M LABORATORIES
ENVIRONMENTAL AND INDUSTRIAL HYGIENE SERVICES

3700 Lakeville Highway, Petaluma, CA 94954
Telephone: (707) 763-8245
FAX (707) 763-4065

Carol Mitsuyasu
Dames & Moore - Honolulu
1050 Queen Street, Suite 204
Honolulu, HI 96814

April 12, 1995

Customer Project: 04402-141-037 Proposed Housing On Housten St.
Laboratory Job: L9503314

On March 31, 1995 we received 2 sample(s) for analysis. Samples were analyzed by the following method(s):

Halog. & Aromatic Volatiles (EPA 8010A/8020A)

PNA's by HPLC (EPA 8310)

Cadmium (EPA 6010)

Lead (EPA 6010)

TPH Quantified Identification (EPA 8015M)

Project Manager

Laboratory Director
Robert Peak

D&M Laboratories
ANALYTICAL DATA REPORT
Prepared for: Dames & Moore - Honolulu

Project Id: 04402-141-037 Reported: 12-APR-95

Lab Id: L9503314-1 Sample Id: GS-2 Collected: 30-MAR-95 Received: 31-MAR-95

Parameter				Units	Analyzed	Extracted
METALS-TJA EPA 6010						
Cadmium-6010	ND	<	0.0050	mg/L	03-APR-95	03-APR-95
Lead-6010	0.052		0.010	mg/L	03-APR-95	03-APR-95
Quantitative Petroleum Hydrocarbons						
Gas	ND	<	0.15	mg/L	31-MAR-95	04-APR-95
Mineral Spirits	ND	<	0.15	mg/L	31-MAR-95	04-APR-95
Jet Fuel	ND	<	0.050	mg/L	31-MAR-95	04-APR-95
Kerosene	ND	<	0.050	mg/L	31-MAR-95	04-APR-95
Diesel	ND	<	0.050	mg/L	31-MAR-95	04-APR-95
Heavy Oil	ND	<	0.50	mg/L	31-MAR-95	04-APR-95
Surrogate						
o-Terphenyl	90.0		-	%	31-MAR-95	04-APR-95
8010/8020						
Benzene	ND	<	0.50	ug/L	05-MAR-95	05-MAR-95
Bromodichloromethane	ND	<	0.50	ug/L	05-MAR-95	05-MAR-95
Bromoform	ND	<	0.50	ug/L	05-MAR-95	05-MAR-95
Bromomethane	ND	<	1.0	ug/L	05-MAR-95	05-MAR-95
Carbon Tetrachloride	ND	<	0.50	ug/L	05-MAR-95	05-MAR-95
Chlorobenzene	ND	<	0.50	ug/L	05-MAR-95	05-MAR-95
Chloroethane	ND	<	1.0	ug/L	05-MAR-95	05-MAR-95
Chloroform	ND	<	0.50	ug/L	05-MAR-95	05-MAR-95
Chloromethane	ND	<	1.0	ug/L	05-MAR-95	05-MAR-95
Dibromochloromethane	ND	<	0.50	ug/L	05-MAR-95	05-MAR-95
1,2-Dichlorobenzene	ND	<	0.50	ug/L	05-MAR-95	05-MAR-95
1,3-Dichlorobenzene	ND	<	0.50	ug/L	05-MAR-95	05-MAR-95
1,4-Dichlorobenzene	ND	<	0.50	ug/L	05-MAR-95	05-MAR-95
1,1-Dichloroethane	ND	<	0.50	ug/L	05-MAR-95	05-MAR-95
1,2-Dichloroethane	ND	<	0.50	ug/L	05-MAR-95	05-MAR-95
1,1-Dichloroethene	ND	<	0.50	ug/L	05-MAR-95	05-MAR-95
1,2-Dichloroethene (Total)	ND	<	0.50	ug/L	05-MAR-95	05-MAR-95
1,2-Dichloropropane	ND	<	0.50	ug/L	05-MAR-95	05-MAR-95
Cis-1,3-Dichloropropene	ND	<	0.50	ug/L	05-MAR-95	05-MAR-95
Trans-1,3-Dichloropropene	ND	<	0.50	ug/L	05-MAR-95	05-MAR-95
Ethyl Benzene	ND	<	0.50	ug/L	05-MAR-95	05-MAR-95
Methylene Chloride	ND	<	1.0	ug/L	05-MAR-95	05-MAR-95
1,1,2,2-Tetrachloroethane	ND	<	0.50	ug/L	05-MAR-95	05-MAR-95
Tetrachloroethene	ND	<	0.50	ug/L	05-MAR-95	05-MAR-95
Toluene	ND	<	0.50	ug/L	05-MAR-95	05-MAR-95
1,1,1-Trichloroethane	ND	<	0.50	ug/L	05-MAR-95	05-MAR-95
1,1,2-Trichloroethane	ND	<	0.50	ug/L	05-MAR-95	05-MAR-95
Trichloroethene	ND	<	0.50	ug/L	05-MAR-95	05-MAR-95
Trichlorofluoromethane	ND	<	1.0	ug/L	05-MAR-95	05-MAR-95
Vinyl Chloride	ND	<	1.0	ug/L	05-MAR-95	05-MAR-95
Xylenes (Total)	ND	<	0.50	ug/L	05-MAR-95	05-MAR-95
Surrogate:						
4-Bromofluorobenzene (8010)	70.8		-	%	05-MAR-95	05-MAR-95
4-Bromofluorobenzene (8020)	91.2		-	%	05-MAR-95	05-MAR-95

D&M Laboratories
ANALYTICAL DATA REPORT
Prepared for: Dames & Moore - Honolulu

Project Id: 04402-141-037

Reported: 12-APR-95

Lab Id: L9503314-1 Sample Id: GS-2 Collected: 30-MAR-95 Received: 31-MAR-95

Parameter						
Polynuclear Aromatic Hydrocarbons						
Naphthalene	ND	<	1.0	ug/L	03-APR-95	05-APR-95
Acenaphthene	ND	<	2.0	ug/L	03-APR-95	05-APR-95
Fluoranthene	ND	<	0.10	ug/L	03-APR-95	05-APR-95
Benzo(a)Pyrene	ND	<	0.050	ug/L	03-APR-95	05-APR-95
-						
Surrogate:						
2-Fluorobiphenyl	90.2		-	% Recovery	03-APR-95	05-APR-95
Benzo(e)Pyrene	90.8		-	% Recovery	03-APR-95	05-APR-95

D&M Laboratories
ANALYTICAL DATA REPORT
Prepared for: Dames & Moore - Honolulu

Project Id: 04402-141-037

Reported: 12-APR-95

Lab Id: L9503314-2 Sample Id: GS-1 Collected: 30-MAR-95 Received: 31-MAR-95

METALS-TJA EPA 6010					
Cadmium-6010	0.022	0.0050	mg/L	03-APR-95	03-APR-95
Lead-6010	0.078	0.010	mg/L	03-APR-95	03-APR-95
Quantitative Petroleum Hydrocarbons					
Gas	ND <	0.15	mg/L	31-MAR-95	04-APR-95
Mineral Spirits	ND <	0.15	mg/L	31-MAR-95	04-APR-95
Jet Fuel	ND <	0.050	mg/L	31-MAR-95	04-APR-95
Kerosene	ND <	0.050	mg/L	31-MAR-95	04-APR-95
Diesel	ND <	0.050	mg/L	31-MAR-95	04-APR-95
Heavy Oil	ND <	0.50	mg/L	31-MAR-95	04-APR-95
-					
Surrogate					
o-Terphenyl	97.0	-	%	31-MAR-95	04-APR-95
8010/8020					
Benzene	ND <	0.50	ug/L	05-MAR-95	05-MAR-95
Bromodichloromethane	ND <	0.50	ug/L	05-MAR-95	05-MAR-95
Bromoform	ND <	0.50	ug/L	05-MAR-95	05-MAR-95
Bromomethane	ND <	1.0	ug/L	05-MAR-95	05-MAR-95
Carbon Tetrachloride	ND <	0.50	ug/L	05-MAR-95	05-MAR-95
Chlorobenzene	ND <	0.50	ug/L	05-MAR-95	05-MAR-95
Chloroethane	ND <	1.0	ug/L	05-MAR-95	05-MAR-95
Chloroform	ND <	0.50	ug/L	05-MAR-95	05-MAR-95
Chloromethane	ND <	1.0	ug/L	05-MAR-95	05-MAR-95
Dibromochloromethane	ND <	0.50	ug/L	05-MAR-95	05-MAR-95
1,2-Dichlorobenzene	ND <	0.50	ug/L	05-MAR-95	05-MAR-95
1,3-Dichlorobenzene	ND <	0.50	ug/L	05-MAR-95	05-MAR-95
1,4-Dichlorobenzene	ND <	0.50	ug/L	05-MAR-95	05-MAR-95
1,1-Dichloroethane	ND <	0.50	ug/L	05-MAR-95	05-MAR-95
1,2-Dichloroethane	ND <	0.50	ug/L	05-MAR-95	05-MAR-95
1,1-Dichloroethene	ND <	0.50	ug/L	05-MAR-95	05-MAR-95
1,2-Dichloroethene (Total)	ND <	0.50	ug/L	05-MAR-95	05-MAR-95
1,2-Dichloropropane	ND <	0.50	ug/L	05-MAR-95	05-MAR-95
Cis-1,3-Dichloropropene	ND <	0.50	ug/L	05-MAR-95	05-MAR-95
Trans-1,3-Dichloropropene	ND <	0.50	ug/L	05-MAR-95	05-MAR-95
Ethyl Benzene	ND <	1.0	ug/L	05-MAR-95	05-MAR-95
Methylene Chloride	ND <	0.50	ug/L	05-MAR-95	05-MAR-95
1,1,2,2-Tetrachloroethane	ND <	0.50	ug/L	05-MAR-95	05-MAR-95
Tetrachloroethene	ND <	0.50	ug/L	05-MAR-95	05-MAR-95
Toluene	ND <	0.50	ug/L	05-MAR-95	05-MAR-95
1,1,1-Trichloroethane	ND <	0.50	ug/L	05-MAR-95	05-MAR-95
1,1,2-Trichloroethane	ND <	0.50	ug/L	05-MAR-95	05-MAR-95
Trichloroethene	ND <	0.50	ug/L	05-MAR-95	05-MAR-95
Trichlorofluoromethane	ND <	1.0	ug/L	05-MAR-95	05-MAR-95
Vinyl Chloride	ND <	1.0	ug/L	05-MAR-95	05-MAR-95
Xylenes (Total)	ND <	0.50	ug/L	05-MAR-95	05-MAR-95
-					
Surrogate:					
4-Bromofluorobenzene (8010)	74.2	-	%	05-MAR-95	05-MAR-95
4-Bromofluorobenzene (8020)	94.0	-	%	05-MAR-95	05-MAR-95

D&M Laboratories
ANALYTICAL DATA REPORT
Prepared for: Dames & Moore - Honolulu

Project Id: 04402-141-037 Reported: 12-APR-95

Lab Id: L9503314-2 Sample Id: GS-1 Collected: 30-MAR-95 Received: 31-MAR-95

Parameter	Value		RDL	Units	Extracted/Analyzed	
Polynuclear Aromatic Hydrocarbons						
Naphthalene	ND	<	1.0	ug/L	03-APR-95	05-APR-95
Acenaphthene	ND	<	2.0	ug/L	03-APR-95	05-APR-95
Fluoranthene	ND	<	0.10	ug/L	03-APR-95	05-APR-95
Benzo(a)Pyrene	ND	<	0.050	ug/L	03-APR-95	05-APR-95
-						
Surrogate:						
2-Fluorobiphenyl	70.8	-		% Recovery	03-APR-95	05-APR-95
Benzo(e)Pyrene	46.4	-		% Recovery	03-APR-95	05-APR-95

D&M Laboratories
QUALITY CONTROL REPORT

Reported: 04-APR-95

QC FOR METALS-TJA EPA 6010

Lab Id: WG7325-4 Sample Id: Method Blank

Parameter	Value	RDL	Units	Extracted	Analyzed
Barium-6010	ND <	0.010	mg/L	03-APR-95	03-APR-95
Cadmium-6010	ND <	0.0050	mg/L	03-APR-95	03-APR-95
Chromium-6010	ND <	0.0050	mg/L	03-APR-95	03-APR-95
Copper-6010	ND <	0.0050	mg/L	03-APR-95	03-APR-95
Lead-6010	ND <	0.010	mg/L	03-APR-95	03-APR-95
Nickel-6010	ND <	0.010	mg/L	03-APR-95	03-APR-95
Silver-6010	ND <	0.0050	mg/L	03-APR-95	03-APR-95
Zinc-6010	ND <	0.010	mg/L	03-APR-95	03-APR-95

Lab Id: WG7325-5 Sample Id: Method Blank Spike

Parameter	Value	Units	Spike	Units	% Rec	Extracted	Analyzed
Barium-6010	1.08	mg/L	1	mg/L	108.%	03-APR-95	03-APR-95
Cadmium-6010	0.108	mg/L	.1	mg/L	108.%	03-APR-95	03-APR-95
Chromium-6010	1.08	mg/L	1	mg/L	108.%	03-APR-95	03-APR-95
Copper-6010	1.00	mg/L	1	mg/L	100.%	03-APR-95	03-APR-95
Lead-6010	0.108	mg/L	.1	mg/L	108.%	03-APR-95	03-APR-95
Nickel-6010	0.108	mg/L	.1	mg/L	108.%	03-APR-95	03-APR-95
Silver-6010	0.100	mg/L	.1	mg/L	100.%	03-APR-95	03-APR-95
Zinc-6010	1.09	mg/L	1	mg/L	109.%	03-APR-95	03-APR-95

Lab Id: WG7325-1 Sample Id: MX

Parameter	Value	RDL	Units	Extracted	Analyzed
Barium-6010	0.0109	0.010	mg/L	03-APR-95	03-APR-95
Cadmium-6010	ND <	0.0050	mg/L	03-APR-95	03-APR-95
Chromium-6010	ND <	0.0050	mg/L	03-APR-95	03-APR-95
Copper-6010	0.233	0.0050	mg/L	03-APR-95	03-APR-95
Lead-6010	0.0128	0.010	mg/L	03-APR-95	03-APR-95
Nickel-6010	0.0662	0.010	mg/L	03-APR-95	03-APR-95
Silver-6010	ND <	0.0050	mg/L	03-APR-95	03-APR-95
Zinc-6010	2.47	0.010	mg/L	03-APR-95	03-APR-95

Comments: MX=L9503306-1

Lab Id: WG7325-2 Sample Id: Matrix Spike

Parameter	Value	Units	Spike	Units	% Rec	Extracted	Analyzed
Barium-6010	1.08	mg/L	1	mg/L	107.%	03-APR-95	03-APR-95
Cadmium-6010	0.107	mg/L	.1	mg/L	107.%	03-APR-95	03-APR-95
Chromium-6010	1.07	mg/L	1	mg/L	107.%	03-APR-95	03-APR-95
Copper-6010	1.24	mg/L	1	mg/L	101.%	03-APR-95	03-APR-95
Lead-6010	0.115	mg/L	.1	mg/L	102.%	03-APR-95	03-APR-95
Nickel-6010	0.172	mg/L	.1	mg/L	106.%	03-APR-95	03-APR-95
Silver-6010	0.0998	mg/L	.1	mg/L	100%	03-APR-95	03-APR-95
Zinc-6010	3.48	mg/L	1	mg/L	101.%	03-APR-95	03-APR-95

D&N Laboratories
QUALITY CONTROL REPORT

Reported: 04-APR-95

QC for METALS by EPA 6010

Lab Id: WG7325-3 Sample Id: Matrix Spike Dup

Parameter	Value	Units	%Rec	RPD	Extracted	Analyzed
Barium-6010	1.08	mg/L	107.%	0.10	03-APR-95	03-APR-95
Cadmium-6010	0.107	mg/L	107.%	0.28	03-APR-95	03-APR-95
Chromium-6010	1.07	mg/L	107.%	0.40	03-APR-95	03-APR-95
Copper-6010	1.24	mg/L	101.%	0.22	03-APR-95	03-APR-95
Lead-6010	0.117	mg/L	104.%	1.1	03-APR-95	03-APR-95
Nickel-6010	0.171	mg/L	105.%	0.64	03-APR-95	03-APR-95
Silver-6010	0.0989	mg/L	99.%	0.91	03-APR-95	03-APR-95
Zinc-6010	3.47	mg/L	100%	0.27	03-APR-95	03-APR-95

D&M Laboratories
QUALITY CONTROL REPORT

Reported: 05-APR-95

QC for: Quantitative Petroleum Hydrocarbons

Lab Id: WG7281-4 Sample Id: Method Blank

Parameter	Value	RDL	Units	Extracted	Analyzed
Gas	ND <	0.15	mg/L	04-APR-95	05-APR-95
Mineral Spirits	ND <	0.15	mg/L	04-APR-95	05-APR-95
Jet Fuel	ND <	0.050	mg/L	04-APR-95	05-APR-95
Kerosene	ND <	0.050	mg/L	04-APR-95	05-APR-95
Diesel	ND <	0.050	mg/L	04-APR-95	05-APR-95
Heavy Oil	ND <	0.50	mg/L	04-APR-95	05-APR-95
-					
Surrogate					
o-Terphenyl	72.0	-	%	04-APR-95	05-APR-95

Lab Id: WG7281-5 Sample Id: Method Blank Spike

Parameter	Value	Units	Spike	Units	% Rec	Extracted	Analyzed
Gas	ND <	mg/L				04-APR-95	05-APR-95
Mineral Spirits	ND <	mg/L				04-APR-95	05-APR-95
Jet Fuel	ND <	mg/L				04-APR-95	05-APR-95
Kerosene	ND <	mg/L				04-APR-95	05-APR-95
Diesel	0.681	mg/L	1	mg/L	68.1%	04-APR-95	05-APR-95
Heavy Oil	ND <	mg/L				04-APR-95	05-APR-95
-							
Surrogate							
o-Terphenyl		%				04-APR-95	05-APR-95

Lab Id: WG7281-1 Sample Id: Method Blank

Parameter	Value	RDL	Units	Extracted	Analyzed
Gas	ND <	0.15	mg/L	24-MAR-95	28-MAR-95
Mineral Spirits	ND <	0.15	mg/L	24-MAR-95	28-MAR-95
Jet Fuel	ND <	0.050	mg/L	24-MAR-95	28-MAR-95
Kerosene	ND <	0.050	mg/L	24-MAR-95	28-MAR-95
Diesel	ND <	0.050	mg/L	24-MAR-95	28-MAR-95
Heavy Oil	ND <	0.50	mg/L	24-MAR-95	28-MAR-95
-					
Surrogate					
o-Terphenyl	91.0	-	%	24-MAR-95	28-MAR-95
-					
Comments:	None				

D&M Laboratories
QUALITY CONTROL REPORT

Reported: 05-APR-95

Lab Id: WG7281-2 Sample Id: Water Spike

Parameter	Value	Units	Spike	Units	% Rec.	Extracted	Analyzed
Gas	ND <	mg/L				24-MAR-95	28-MAR-95
Mineral Spirits	ND <	mg/L				24-MAR-95	28-MAR-95
Jet Fuel	ND <	mg/L				24-MAR-95	28-MAR-95
Kerosene	ND <	mg/L				24-MAR-95	28-MAR-95
Diesel	0.867	mg/L	1	mg/L	87.%	24-MAR-95	28-MAR-95
Heavy Oil	ND <	mg/L				24-MAR-95	28-MAR-95
-	-						
Surrogate	-						
o-Terphenyl	87.0	%				24-MAR-95	28-MAR-95
-	-						
Comments:	None						

Lab Id: WG7281-3 Sample Id: Water Spike Duplicat

Parameter	Value	Units	% Rec	RPD	Extracted	Analyzed
Gas	ND <	mg/L			24-MAR-95	28-MAR-95
Mineral Spirits	ND <	mg/L			24-MAR-95	28-MAR-95
Jet Fuel	ND <	mg/L			24-MAR-95	28-MAR-95
Kerosene	ND <	mg/L			24-MAR-95	28-MAR-95
Diesel	0.892	mg/L	89.%	2.8	24-MAR-95	28-MAR-95
Heavy Oil	ND <	mg/L			24-MAR-95	28-MAR-95
-	-					
Surrogate	-					
o-Terphenyl	84.0	%			24-MAR-95	28-MAR-95
-	-					
Comments:	None					

D&M Laboratories
QUALITY CONTROL REPORT

Reported: 11-APR-95

Lab Id: WG7338-16 Sample Id: Method Blank

Parameter	Value		RDL	Units	Extracted	Analyzed
Benzene	ND	<	0.50	ug/L	05-MAR-95	05-MAR-95
Bromodichloromethane	ND	<	0.50	ug/L	05-MAR-95	05-MAR-95
Bromoform	ND	<	0.50	ug/L	05-MAR-95	05-MAR-95
Bromomethane	ND	<	1.0	ug/L	05-MAR-95	05-MAR-95
Carbon Tetrachloride	ND	<	0.50	ug/L	05-MAR-95	05-MAR-95
Chlorobenzene	ND	<	0.50	ug/L	05-MAR-95	05-MAR-95
Chloroethane	ND	<	1.0	ug/L	05-MAR-95	05-MAR-95
Chloroform	ND	<	0.50	ug/L	05-MAR-95	05-MAR-95
Chloromethane	ND	<	1.0	ug/L	05-MAR-95	05-MAR-95
Dibromochloromethane	ND	<	0.50	ug/L	05-MAR-95	05-MAR-95
1,2-Dichlorobenzene	ND	<	0.50	ug/L	05-MAR-95	05-MAR-95
1,3-Dichlorobenzene	ND	<	0.50	ug/L	05-MAR-95	05-MAR-95
1,4-Dichlorobenzene	ND	<	0.50	ug/L	05-MAR-95	05-MAR-95
1,1-Dichloroethane	ND	<	0.50	ug/L	05-MAR-95	05-MAR-95
1,2-Dichloroethane	ND	<	0.50	ug/L	05-MAR-95	05-MAR-95
1,1-Dichloroethene	ND	<	0.50	ug/L	05-MAR-95	05-MAR-95
1,2-Dichloroethene (Total)	ND	<	0.50	ug/L	05-MAR-95	05-MAR-95
1,2-Dichloropropane	ND	<	0.50	ug/L	05-MAR-95	05-MAR-95
Cis-1,3-Dichloropropene	ND	<	0.50	ug/L	05-MAR-95	05-MAR-95
Trans-1,3-Dichloropropene	ND	<	0.50	ug/L	05-MAR-95	05-MAR-95
Ethyl Benzene	ND	<	0.50	ug/L	05-MAR-95	05-MAR-95
Methylene Chloride	ND	<	1.0	ug/L	05-MAR-95	05-MAR-95
1,1,2,2-Tetrachloroethane	ND	<	0.50	ug/L	05-MAR-95	05-MAR-95
Tetrachloroethene	ND	<	0.50	ug/L	05-MAR-95	05-MAR-95
Toluene	ND	<	0.50	ug/L	05-MAR-95	05-MAR-95
1,1,1-Trichloroethane	ND	<	0.50	ug/L	05-MAR-95	05-MAR-95
1,1,2-Trichloroethane	ND	<	0.50	ug/L	05-MAR-95	05-MAR-95
Trichloroethene	ND	<	0.50	ug/L	05-MAR-95	05-MAR-95
Trichlorofluoromethane	ND	<	1.0	ug/L	05-MAR-95	05-MAR-95
Vinyl Chloride	ND	<	1.0	ug/L	05-MAR-95	05-MAR-95
Xylenes (Total)	ND	<	0.50	ug/L	05-MAR-95	05-MAR-95
Surrogate:						
4-Bromofluorobenzene (8010)	86.8		-	%	05-MAR-95	05-MAR-95
4-Bromofluorobenzene (8020)	96.0		-	%	05-MAR-95	05-MAR-95

Lab Id: WG7338-17 Sample Id: Method Blank Spike

Parameter	Value	Units	Spike	Units	% Rec	Extracted	Analyzed
1,1-Dichloroethene	17.6	ug/L	20	ug/L	88.%	05-MAR-95	05-MAR-95
Trichloroethene	17.5	ug/L	20	ug/L	88.%	05-MAR-95	05-MAR-95
Chlorobenzene-601	18.8	ug/L	20	ug/L	94.%	05-MAR-95	05-MAR-95
Benzene	18.8	ug/L	20	ug/L	94.%	05-MAR-95	05-MAR-95
Toluene	18.3	ug/L	20	ug/L	92.%	05-MAR-95	05-MAR-95
Chlorobenzene-602	19.0	ug/L	20	ug/L	95.%	05-MAR-95	05-MAR-95
Surrogate:							
4-Bromofluorobenzene (8010)	96.0	%				05-MAR-95	05-MAR-95
4-Bromofluorobenzene (8020)	99.4	%				05-MAR-95	05-MAR-95

D&M Laboratories
QUALITY CONTROL REPORT

Reported: 11-APR-95

QC for: 8010/8020

Lab Id: WG7338-1 Sample Id: MX

Parameter	Value		RDL	Units	Extracted	Analyzed
Benzene	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
Bromodichloromethane	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
Bromoform	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
Bromomethane	ND	<	1.0	ug/L	31-MAR-95	31-MAR-95
Carbon Tetrachloride	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
Chlorobenzene	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
Chloroethane	ND	<	1.0	ug/L	31-MAR-95	31-MAR-95
Chloroform	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
Chloromethane	ND	<	1.0	ug/L	31-MAR-95	31-MAR-95
Dibromochloromethane	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
1,2-Dichlorobenzene	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
1,3-Dichlorobenzene	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
1,4-Dichlorobenzene	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
1,1-Dichloroethane	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
1,2-Dichloroethane	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
1,1-Dichloroethene	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
1,2-Dichloroethene (Total)	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
1,2-Dichloropropane	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
Cis-1,3-Dichloropropene	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
Trans-1,3-Dichloropropene	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
Ethyl Benzene	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
Methylene Chloride	ND	<	1.0	ug/L	31-MAR-95	31-MAR-95
1,1,2,2-Tetrachloroethane	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
Tetrachloroethene	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
Toluene	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
1,1,1-Trichloroethane	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
1,1,2-Trichloroethane	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
Trichloroethene	0.89		0.50	ug/L	31-MAR-95	31-MAR-95
Trichlorofluoromethane	ND	<	1.0	ug/L	31-MAR-95	31-MAR-95
Vinyl Chloride	ND	<	1.0	ug/L	31-MAR-95	31-MAR-95
Xylenes (Total)	ND	<	0.50	ug/L	31-MAR-95	31-MAR-95
-	-					
Surrogate:	-					
4-Bromofluorobenzene (8010)	91.6	-		%	31-MAR-95	31-MAR-95
4-Bromofluorobenzene (8020)	99.3	-		%	31-MAR-95	31-MAR-95
-	-					
Comments:	MX = L9503240-1					

D&M Laboratories
QUALITY CONTROL REPORT

Reported: 11-APR-95

QC for: 8010/8020-SC

Lab Id: WG7338-2 Sample Id: Matrix Spike

Parameter	Value	Units	Spike	Units	% Rec	Extracted	Analyzed
1,1-Dichloroethene	16.6	ug/L	20	ug/L	83.%	31-MAR-95	31-MAR-95
Trichloroethene	18.4	ug/L	20	ug/L	88.%	31-MAR-95	31-MAR-95
Chlorobenzene-601	19.6	ug/L	20	ug/L	98.%	31-MAR-95	31-MAR-95
Benzene	20.6	ug/L	20	ug/L	103.%	31-MAR-95	31-MAR-95
Toluene	19.8	ug/L	20	ug/L	99.%	31-MAR-95	31-MAR-95
Chlorobenzene-602	20.4	ug/L	20	ug/L	102.%	31-MAR-95	31-MAR-95
Surrogate:							
4-Bromofluorobenzene (8010)	90.9	%				31-MAR-95	31-MAR-95
4-Bromofluorobenzene (8020)	98.9	%				31-MAR-95	31-MAR-95

Lab Id: WG7338-3 Sample Id: Matrix Spike Dup

Parameter	Value	Units	%Rec	RPD	Extracted	Analyzed
1,1-Dichloroethene	15.1	ug/L	76.%	9.5	31-MAR-95	31-MAR-95
Trichloroethene	16.4	ug/L	78.%	12.	31-MAR-95	31-MAR-95
Chlorobenzene-601	16.8	ug/L	84.%	15.	31-MAR-95	31-MAR-95
Benzene	18.6	ug/L	93.%	10.	31-MAR-95	31-MAR-95
Toluene	17.1	ug/L	86.%	15.	31-MAR-95	31-MAR-95
Chlorobenzene-602	17.7	ug/L	88.%	14.	31-MAR-95	31-MAR-95
Surrogate:						
4-Bromofluorobenzene (8010)	88.1	%			31-MAR-95	31-MAR-95
4-Bromofluorobenzene (8020)	95.2	%			31-MAR-95	31-MAR-95

D&M Laboratories
QUALITY CONTROL REPORT

Reported: 06-APR-95

Polynuclear Aromatic Hydrocarbons

Lab Id: WG7174-8 Sample Id: Method Blank

Parameter	Value	RDL	Units	Extracted	Analyzed
Naphthalene	ND <	1.0	ug/L	03-APR-95	05-APR-95
Acenaphthylene	ND <	2.0	ug/L	03-APR-95	05-APR-95
Acenaphthene	ND <	2.0	ug/L	03-APR-95	05-APR-95
Fluorene	ND <	0.20	ug/L	03-APR-95	05-APR-95
Phenanthrene	ND <	0.50	ug/L	03-APR-95	05-APR-95
Anthracene	ND <	0.50	ug/L	03-APR-95	05-APR-95
Fluoranthene	ND <	0.10	ug/L	03-APR-95	05-APR-95
Pyrene	ND <	0.10	ug/L	03-APR-95	05-APR-95
Benzo(a)Anthracene	ND <	0.10	ug/L	03-APR-95	05-APR-95
Chrysene	ND <	0.10	ug/L	03-APR-95	05-APR-95
Benzo(b)Fluoranthene	ND <	0.050	ug/L	03-APR-95	05-APR-95
Benzo(k)Fluoranthene	ND <	0.050	ug/L	03-APR-95	05-APR-95
Benzo(a)Pyrene	ND <	0.050	ug/L	03-APR-95	05-APR-95
Dibenz(ah)Anthracene	ND <	0.10	ug/L	03-APR-95	05-APR-95
Benzo(ghi)Perylene	ND <	0.10	ug/L	03-APR-95	05-APR-95
Indeno(123cd)Pyrene	ND <	0.10	ug/L	03-APR-95	05-APR-95
-	-				
Surrogate:					
2-Fluorobiphenyl	79.1	-	% Recovery	03-APR-95	05-APR-95
Benzo(e)Pyrene	104.	-	% Recovery	03-APR-95	05-APR-95

Lab Id: WG7174-9 Sample Id: Method Blank Spike

Parameter	Value	Units	Spike	Units	% Rec	Extracted	Analyzed
Naphthalene	15.3	ug/L	20	ug/L	77.%	03-APR-95	05-APR-95
Acenaphthene	18.5	ug/L	20	ug/L	93.%	03-APR-95	05-APR-95
Pyrene	1.58	ug/L	2	ug/L	79.%	03-APR-95	05-APR-95
Benzo(k)Fluoranthene	0.185	ug/L	.2	ug/L	93.%	03-APR-95	05-APR-95
-	-						
Surrogate:							
2-Fluorobiphenyl	80.1	% Recovery				03-APR-95	05-APR-95
Benzo(e)Pyrene	100.	% Recovery				03-APR-95	05-APR-95

D&H Laboratories
QUALITY CONTROL REPORT

Reported: 06-APR-95

QC for: Polynuclear Aromatic Hydrocarbons

Lab Id: WG7174-1 Sample Id: MX

Parameter	Value		RDL	Units	Extracted	Analyzed
Naphthalene	ND	<	1.0	ug/L	15-MAR-95	17-MAR-95
Acenaphthylene	ND	<	2.0	ug/L	15-MAR-95	17-MAR-95
Acenaphthene	ND	<	2.0	ug/L	15-MAR-95	17-MAR-95
Fluorene	ND	<	0.20	ug/L	15-MAR-95	17-MAR-95
Phenanthrene	ND	<	0.50	ug/L	15-MAR-95	17-MAR-95
Anthracene	ND	<	0.50	ug/L	15-MAR-95	17-MAR-95
Fluoranthene	ND	<	0.10	ug/L	15-MAR-95	17-MAR-95
Pyrene	ND	<	0.10	ug/L	15-MAR-95	17-MAR-95
Benzo(a)Anthracene	ND	<	0.10	ug/L	15-MAR-95	17-MAR-95
Chrysene	ND	<	0.10	ug/L	15-MAR-95	17-MAR-95
Benzo(b)Fluoranthene	ND	<	0.050	ug/L	15-MAR-95	17-MAR-95
Benzo(k)Fluoranthene	ND	<	0.050	ug/L	15-MAR-95	17-MAR-95
Benzo(a)Pyrene	ND	<	0.050	ug/L	15-MAR-95	17-MAR-95
Dibenz(ah)Anthracene	ND	<	0.10	ug/L	15-MAR-95	17-MAR-95
Benzo(ghi)Perylene	ND	<	0.10	ug/L	15-MAR-95	17-MAR-95
Indeno(123cd)Pyrene	ND	<	0.10	ug/L	15-MAR-95	17-MAR-95
-	-					
Surrogate:						
2-Fluorobiphenyl	78.6		-	% Recovery	15-MAR-95	17-MAR-95
Benzo(e)Pyrene	90.4		-	% Recovery	15-MAR-95	17-MAR-95
-	-					
Comments:	MX = L9503112-4					

Lab Id: WG7174-2 Sample Id: Matrix Spike

Parameter	Value	Units	Spike	Units	% Rec	Extracted	Analyzed
Naphthalene	14.7	ug/L	20	ug/L	74.%	15-MAR-95	17-MAR-95
Acenaphthene	19.2	ug/L	20	ug/L	96.%	15-MAR-95	17-MAR-95
Pyrene	1.58	ug/L	2	ug/L	79.%	15-MAR-95	17-MAR-95
Benzo(k)Fluoranthene	0.169	ug/L	.2	ug/L	85.%	15-MAR-95	17-MAR-95
-	-						
Surrogate:							
2-Fluorobiphenyl	77.2	% Recovery				15-MAR-95	17-MAR-95
Benzo(e)Pyrene	88.6	% Recovery				15-MAR-95	17-MAR-95

Lab Id: WG7174-3 Sample Id: Matrix Spike Dup

Parameter	Value	Units	% Rec	RPD	Extracted	Analyzed
Naphthalene	14.6	ug/L	73.%	0.46	15-MAR-95	17-MAR-95
Acenaphthene	17.5	ug/L	88.%	8.9	15-MAR-95	17-MAR-95
Pyrene	1.59	ug/L	80.%	1.0	15-MAR-95	17-MAR-95
Benzo(k)Fluoranthene	0.168	ug/L	84.%	0.59	15-MAR-95	17-MAR-95
-	-					
Surrogate:						
2-Fluorobiphenyl	76.6	% Recovery			15-MAR-95	17-MAR-95
Benzo(e)Pyrene	86.8	% Recovery			15-MAR-95	17-MAR-95

QUALITY CONTROL REPORT

In order to provide you with the means of assessing the quality of the data in our report, D&M Laboratories reports the results of Quality Control samples analyzed with your samples.

The Quality Control samples provide the following QC information:

The Method Blank (MB) monitors the level of contamination introduced by reagents or glassware. A minimum of one MB is run per batch of 20 samples or less.

The Method Blank Spike (MBS) measures the accuracy of analytical techniques and is not subject to matrix effects. A minimum of one MBS is run per batch of 20 samples or less.

The Matrix Spike (MS) measures the accuracy of the method for a matrix type. Due to the high variability within matrix types and the necessity of batching samples from varied sources, matrix spike information from one sample is not necessarily relevant to other samples on the batch. A minimum of two matrix spikes, MS and MSD, are run per batch of 20 samples or less. The sample selected for the matrix spike is designated MX, and may or may not have been submitted by the recipient of this report.

The Matrix Spike Duplicate (MSD), along with the MS, is used to monitor the precision (RPD) of the method and to indicate possible non homogeneity of the sample matrix.

Equations used for determining percent recovery and relative percent difference (RPD) are as follows:

MBS % Recovery = (MBS result / MBS spike level) x 100
MS % Recovery = [(MS result - MX result) / MS spike level] x 100
RPD ={ | MS result - MSD result | / [(MS result + MSD result) / 2]} x 100

We continue to strive to improve the quality of service to our clients. We welcome any questions or comments you may have about this information, or about **D&M Laboratories** in general. Please contact a Project Manager for further information.

CHAIN-OF-CUSTODY RECORD

WHITE COPY - Original (Accompanies Samples) YELLOW COPY - Collector PINK COPY - Project Manager

Sample Number	Depth	Time	Sample Type	Container Type	HVOCs 601/8010	BTE Only 602/8020	VOCs 624/8240	SVOCs 625/8270	TRPH 418.1	TPH 8015(M)-G	TPH 8015(M)-D	PCBs 8080	Total Pb/Cd 6010	PAHs 8100	TCLP	TPH-IDQ ETA 8015M	*PAHs 8310	FIELD NOTES:	Total Number Of Containers	Laboratory Note Number
GS-2		1055	water	40mL VOA		X												HCl Preserved	6	
			water	500mL Poly								X						HNO3 Preserved	2	
				1L amber	X														2	
				1L amber											X				2	
				1L amber												X			2	
GS-1		1555		40mL VOA		X												HCl Preserved (1)	5	
				500mL Poly								X						HNO3 Preserved	2	
				1L amber	X														2	
				1L amber											X				2	
			water	1L amber												X			2	

COOLER CUSTODY SEALS INTACT ☐ NOT INTACT ☐ N/A

COOLER TEMPERATURE: COLD °C

SAMPLES RECEIVED IN GOOD CONDITION
NO BROKEN OR LEAKING CONTAINERS

DHL +

12-1L Amber Glass # 4-500mL PC # 11 VOAs

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
Ryan Seipel	3/30/95 1706	DHL AIRBILL 865 312 760
DHL AIRBILL 865 312 760	3/31/95 11:05	
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)

LABORATORY NOTES:

*PAHs - acenaphthene, naphthalene, fluoranthene and benzo(a) pyrene

(1) use bottles marked "X" on cap test - couldn't get rid of sm. bubbles.

ANALYTICAL LABORATORY: DM Laboratories.

LABORATORY CONTACT: Dana Breaux Quote # 7788

D&M CONTACT: Carol Mitsuyasu PHONE: 523-1116 ext 32

DAMES & MOORE.
1050 QUEEN STREET, SUITE 204
HONOLULU, HAWAII 96814
(808) 593-1116 FAX: (808) 593-1198

JOB NO.: 04402-141-037 SHEET 1 OF 1

PROJECT: Proposed Hauula St Elderly Housing

LOCATION: Hauula St, Honolulu Hi

COLLECTOR: R. Seipel DATE OF COLLECTION: 3/30/95

APPENDIX D

FOUNDATION INVESTIGATION

FOUNDATION INVESTIGATION
PROPOSED HAUSTEN STREET ELDERLY HOUSING
HONOLULU, OAHU, HAWAII
TMK: 2-7-09:13, 14 AND 2-7-10:08, 09

Job Number 04402-140-011
June 28, 1995

DAMES & MOORE

DAMES & MOORE
1050 QUEEN STREET, SUITE 204, HONOLULU, HAWAII 96814
(808) 593-1116 FAX: (808) 593-1198

June 28, 1995

Mr. Brian Takahashi, AIA
Principal
AM Partners, Inc.
1164 Bishop Street, Suite 1000
Honolulu, Hawaii 96813

Dear Mr. Takahashi:

Transmitted herewith are one copy of our report entitled "Foundation Investigation, Proposed Hausten Street Elderly Housing, Honolulu, Oahu, Hawaii, TMK: 2-7-09:13, 14 and 2-7-10:08, 09."

Our investigation was performed in accordance with the scope of services outlined in our revised proposal dated December 29, 1994.

The proposed project is feasible from a geotechnical standpoint. The coralline gravels and coralline rock at about 5 feet below the existing surface are dense and strong and, therefore, the proposed buildings may be supported on conventional shallow spread or continuous footings. Two separate solution cavities encountered in our borings were at depths greater than 19 feet and are not expected to impact the load carrying capacity of the bearing materials below the footings. Groundwater was encountered at about 4 to 6 feet below the existing surface and should be anticipated during footing excavations. Construction of footings can be accomplished in the dry by placing a tremie mud slab below the footing areas to displace the water. This report summarizes our investigation and presents detailed geotechnical recommendations for design and construction of the project.

Selected soil and rock samples were used in laboratory testing, and the remaining ones will be kept for a period of time for possible inspection and examination. Unless requested otherwise, they will be discarded three months from this date.

-oOo-

(HON-570:04402-140-011)

It has been a pleasure performing this assignment for you. If you have any questions regarding this report, please feel free to contact us for clarification.

Very truly yours,

DAMES & MOORE

C. Garry Lay, P.E.
Manager of Honolulu office

CGL/ln

cc: Ms. Karen Iwamoto, City and County of Honolulu
Department of Housing and Community Development

(HON-570:04402-140-011)

TABLE OF CONTENTS

FOUNDATION INVESTIGATION
PROPOSED HAUSTEN STREET ELDERLY HOUSING
HONOLULU, OAHU, HAWAII
TMK: 2-7-09:13, 14 AND 2-7-10:08, 09

1.0 INTRODUCTION

This report presents the results of a foundation investigation for the proposed Hausten Street Elderly Housing project. The City and County of Honolulu plans to construct two mid-rise buildings and other associated site improvements on two land parcels on both sides of Hausten Street. The general location of the site is shown on the Map of Area, Plate 1.

2.0 PROJECT DESCRIPTION

Based on information provided by the City and County of Honolulu and their architects, AM Partners, Inc., the project site consists of two land parcels on both sides of Hausten Street. The parcel on the western side of Hausten Street consists of an asphaltic concrete paved parking lot with an area of 14,400 square feet. The parcel on the eastern side of Hausten Street encompasses an area of 34,755 square feet and is currently occupied by several buildings formerly known as the Willows Restaurant.

The proposed project will consist of a five-story apartment building for the westerly parcel and an eleven-story apartment building for the easterly parcel. The preliminary plans indicate that the five-story and the eleven-story buildings will have footprint dimensions of approximately 45 feet by 95 feet and 50 feet by 125 feet, respectively. Type of construction and structural loads are not available at this time. We understand that both proposed buildings will have the first floor close to street level and no basement is planned. Other site improvements will likely include paved parking lots and landscaping. The project layout is shown on the Plot Plan, Plate 2.

3.0 PURPOSE AND SCOPE OF WORK

The purpose of this foundation investigation is to explore the subsurface conditions, evaluate the engineering characteristics of the materials encountered, and develop appropriate foundation recommendations for the design and construction of the proposed Hausten Street Elderly Housing project.

The following scope of services were provided in general accordance to our revised proposal dated December 29, 1994.

1. Reviewed available published and unpublished reports and geologic maps of the area. Dames & Moore have performed subsurface investigations for several projects in the vicinity of the subject site. These proposed projects include Moiliili Apartments on Coolidge Street (Dames & Moore Job No. 12349-001-011), a tower at the corner of University Avenue and Coyne Street (06101-005-011), a building between University Avenue and Kahuna Lane (08658-001-011), and Kaaha Banyan Condominium on the corner of Kaaha Street and Kapiolani Boulevard (12141-001-011). The boring logs for these projects and geologic data of the general area were reviewed to further assess the subsurface condition beneath the project site.
2. Drilled, logged, and sampled five exploratory borings (two borings to depths of 30 to 50.5 feet below existing ground surface on the western parcel and three borings to depths of 51.5 to 71.5 feet below existing surface on the eastern parcel).
3. Performed laboratory testing on selected soil and rock samples for identification and engineering properties.
4. Performed engineering analyses for foundation design.
5. Prepared this report to summarize the findings, conclusions, and recommendations.

4.0 FIELD EXPLORATION AND LABORATORY TESTING

4.1 FIELD EXPLORATION

A total of five exploratory borings were drilled, two (Borings B-1 and B-2) on the western parcel and three (Borings B-3 through B-5) on the eastern parcel. These borings were drilled within the footprint of the two proposed buildings. A Mobile Drill B-53 truck-mounted rig was used to drill two borings in the westerly parcel. In the easterly parcel, where access was limited, a skid-mounted SIMCO 2400 drill rig was used to drill three borings.

The boring locations are shown on the Plot Plan, Plate 2. A more detailed description of the field exploration program and the Logs of Borings are presented in Appendix A.

The soil samples obtained from the borings were transported to the Dames & Moore soil mechanics laboratory for further examination and testing.

4.2 LABORATORY TESTING

A laboratory testing program was performed to verify visual field classifications and to determine pertinent geotechnical engineering properties of the soil and rock materials encountered in our borings. A description of the laboratory test procedures and the results of the laboratory testing are presented in the Appendix A. The tests performed included in-situ moisture content and dry density determinations, triaxial compression tests, California Bearing Ratio (CBR), and consolidation tests.

5.0 SITE CONDITIONS

5.1 GEOLOGIC SETTING

The site is located within a coastal plain existing between Punchbowl and Diamond Head Craters. This area is underlain by a coral reef formation formed during previous marine transgressions. Portions of the coral reef formation have been dissolved and eroded by groundwater flow which has created cavities. Large caves are known to exist in this coral reef formation near the intersection of King Street and University Avenue. Further, in the early 1900's, this area was a wetland used for rice cultivation, indicating some surface materials in the general area may be weak and unsuitable for foundation support. More recently, the area was filled to the present elevation for development.

5.2 SURFACE CONDITIONS

The project site is located on two land parcels on both sides of Hausten Street. The parcel on the western side of Hausten Street consists of an asphaltic concrete paved parking lot with an area of 14,400 square feet. Currently, Diamond Parking Service is operating the lot as a park-and-pay parking. A three-foot wide and 84-foot long planter filled with large hedges is approximately in the central location of the parking lot. Two metal light posts are also located in the planter.

The parcel on the eastern side of Hausten Street encompasses an area of 34,755 square feet and is currently occupied by several small buildings and covered walkways formerly known as the Willows Restaurant. At the time of exploration, this restaurant was vacant with the exception of a caretaker still living on the site. Walls consisting of concrete masonry units, concrete rubble masonry, corrugated iron fence, and chain link fence surround the eastern parcel. A concrete-lined fish pond with standing water fronts Hausten Street with the largest dimensions of approximately 85 feet by 65 feet. We understand from the caretaker that the standing water in the pond is the infiltrating groundwater as a result of a leaking pond bottom. We also understand that a water well of unknown depth exists in the pond. The eastern parcel is vegetated with numerous bushes and small trees and several large trees such as Monkey Pod, Breadfruit, Plumeria, Kukui, and Willow.

The ground surface of both parcels is relatively level. Surface elevations on the western parcel range from 4.7 feet above Mean Sea Level (MSL) at the southern corner adjacent to Hausten Street to 5.5 feet above MSL at the western corner. Surface elevations on the eastern parcel range from 4.3 feet above MSL at the southern corner to 8.1 feet above MSL at the eastern corner with the lowest elevation of 0.4 foot above MSL in the concrete-lined fish pond. The surface drainage is generally toward the easterly direction.

5.3 SUBSURFACE CONDITIONS

Western Parcel

Beneath the existing asphaltic concrete pavement and base course, near the vicinity of Borings B-1 and B-2, the western parcel is underlain by 2 to 3 feet thick of man-made fill consisting of dark-brown, medium dense to medium stiff, silty sand and sandy silt with some coralline gravels. The fill is underlain by a one to two feet layer of olive-gray, soft, clayey silt alluvium. Beneath the alluvium (at close to zero MSL), medium dense to dense coralline gravels underlie the

western parcel to a depth of about 45 feet beneath the existing surface. No coralline rock was encountered in our borings at this parcel. A solution cavity was encountered in Boring B-1 at a depth of 29 to 34.5 feet below the existing ground surface. No evidence of infill material was observed in this cavity. Dark-brown, stiff clayey silt alluvium was encountered in Boring B-1 below this coralline gravel zone to the end of boring at 50.5 feet deep.

Eastern Parcel

A one to two feet thick rubble fill consisting of concrete, brick, sand, and coralline gravel was encountered beneath the concrete paved areas in the vicinity of Borings B-3 and B-5. Below the rubble fill layer, recent alluvium consisting of brown to yellowish-red, soft to firm, clayey to sandy silt was encountered in Borings B-4 and B-5 to a depth of approximately 2.5 to 3.5 feet below the surface. In Borings B-4 and B-5, approximately 2 feet thick of light-brown, loose to dense coralline gravel underlie the recent alluvium. A layer of coralline rock approximately 10 feet thick was encountered at 2.5 to 5.5 feet below the surface. The coralline rock is generally light-brown to white, moderately strong to very strong, moderate to strongly cemented, and slightly to highly weathered. Below the coralline rock, light-brown to brown, medium dense to dense coralline gravels with sand were encountered to depths of 29 to 33 feet below the surface. A solution cavity infilled with soft silt was encountered within this coralline gravels zone at a depth of about 19 to 27.5 feet deep in Boring B-3. However, there are no evidence to connect this cavity with the one encountered in Boring B-1 at the western parcel. The coralline gravels are underlain by stiff to very stiff, dark-brown, clayey silt alluvium to depths of about 46 to 51 feet deep. The remaining soils below this depth consists of alternating layers of light-brown, medium dense coralline gravels; brown, medium dense coralline sand; and brown to dark-brown, firm clayey silt to the maximum explored depth of 71.5 feet in Boring B-4.

Groundwater

Groundwater was encountered at depths of four to six feet below ground level (approximately one foot above MSL). The groundwater level would also be affected by tidal fluctuation, weather conditions, and any groundwater pumping activities in the areas. Higher groundwater can be anticipated following a heavy rain.

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 GENERAL

Based on our foundation investigation, we concluded from a geotechnical standpoint that it is feasible to construct the Hausten Street Elderly Housing project at the subject site, provided the recommendations presented in this report are fully incorporated into the design and implemented during site grading and construction. The proposed buildings can be supported on conventional shallow spread or continuous footings founded on the competent coralline gravels or coralline rock, at a depth of about 5 to 6 feet below the existing surface. The coralline rock encountered below the eastern parcel is expected to have a higher bearing capacity than the coralline gravels encountered below the western parcel. Two solution cavities were encountered in our borings at depths of 19 and 29 feet below the surface. Cavities at these depths are not expected to affect the performance of shallow footings. A foundation probing and grouting program will be required to detect for shallow cavities within the influence zone below the footings. Typical construction difficulties for this foundation scheme may include potential variations of the undulating surface of the coral materials, shallow cavities within the coral materials, and shallow groundwater table. However, these constraints can be mitigated by proper planning, design, and sound construction practices. Recommendations to mitigate these constraints are presented in the following sections.

6.2 FOUNDATION DESIGN AND CONSTRUCTION

6.2.1 Bearing Values

Footings for the proposed 11-story building at the eastern parcel can be designed to impose a dead plus live load bearing pressure of 7,000 pounds per square foot (psf). Footings for the proposed 5-story building at the western parcel should be designed to impose a dead plus live load bearing pressure of 3,000 psf. A ⅓ increase in the bearing values may be used for wind or seismic loads. Lateral loads may be resisted by friction and by the passive resistance of the footing subgrade materials. A coefficient of friction of 0.4 may be used between the bottom of the footings and the supporting materials. The passive resistance of the properly compacted footing backfill may be assumed to be equal to 300 pcf above groundwater table and 150 pcf below groundwater table. The frictional resistance may be combined without reduction in determining total lateral resistance.

6.2.2 Footing Depth

Conventional spread or continuous footings should have a minimum footing depth of 24 inches below the lowest adjacent grade. To maintain adequate thickness of competent coral material below footing bottom and to minimize construction difficulties below groundwater table, footing bottoms should be at or close to MSL. Preliminary probing in the footing areas may be considered to ascertain the top of the competent coralline materials prior to construction.

6.2.3 Settlement

The estimated total settlement of the building footings will be on the order of one inch at the western parcel and ¾ inch at the eastern parcel. Differential settlement between similarly loaded footings is expected to be about ½ inch. The majority of settlements are expected to occur during construction. The above settlement estimates are based on the assumption that the footings will be sized in accordance with our recommended bearing values.

6.2.4 Foundation Probing and Grouting

Due to the potential existence of other cavities beneath the site not detected by our exploratory borings, we recommend that probing be performed during construction at each footing location as follows:

1. One probe should be made for each spread footing and at approximately 15-foot on-center along continuous footing.
2. The probes should have a minimum diameter of 3 inches and should be advanced by percussion or rotary drills capable of penetrating the coral deposits.
3. All probes should extend a minimum of 15 feet below the planned footing subgrade. Where cavities are encountered, the probes should be extended to the bottom of the cavities.
4. When cavities are encountered, additional probes should be drilled a distance of 5 feet from the first probe in four directions to define the extent of the cavities. This process should be repeated until no additional cavities are encountered.
5. The probed holes should be subsequently backfilled with mortar-like grout (one part sand to one part cement) injected at low to moderate pressures in an upstage fashion (i.e., from the bottom of the probe hole up to the top). If cavities are encountered during probing and grout intake exceeds ½ cubic yard, it should be stopped and let set first prior to continuation of remaining grouting/backfilling operations. The process should be repeated until the cavity is completely filled.

6. The foundation probing and grouting operations should be observed by Dames & Moore's representatives.

6.2.5 Foundation Construction Below Groundwater Table

Since the top of the coralline gravels or coralline rock is at 5 to 6 feet below the existing surface, footing excavation may be required to be extended up to 2 feet below the groundwater table. For this situation, a tremie mud slab should be poured to above water level to displace the water so that the construction of the footings can be accomplished in the dry. The concrete for the footings can then be poured directly over the mud slab. The displaced water should be disposed of through onsite recharge trenches excavated into the coral materials so that no NPDES permit will be required.

6.3 SLABS-ON-GRADE

All concrete slabs should be designed for any special loads by the structural engineer. As a minimum, slabs-on-grade for light floor loadings can consist of four inches of concrete and for commercial or industrial vehicular loads can consist of seven inches of concrete. Slabs-on-grade should be supported on a minimum of four inches of clean, free-draining crushed rock, such as locally available No. 3B-Fine rock aggregate (ASTM #67) over compacted subgrade or structural fill. A moisture barrier (6-mil Visqueen plastic membrane) should be provided between the slab and the rock in areas where moisture susceptible floor coverings are used or where dampness in the slab is undesirable. Although the recently revised Building Code of Honolulu no longer requires the sand layer above the plastic membrane, we recommended that a one inch cushion of sand be placed over and under the plastic membrane to protect it from puncturing and to provide for a more uniform concrete curing.

6.4 SEISMIC DESIGN

All buildings should be designed for seismic conditions in accordance with UBC Zone 2A earthquake resistance requirements. A soil factor of 1.0 should be utilized for seismic design purposes.

6.5 EARTHWORK

6.5.1 Site Preparation

Site preparation for this project will include demolition of existing structures, clearing, grubbing, and stripping. We recommend stripping all existing vegetation other than the designated trees and plants to be saved, removing roots, boulders, debris, and all deleterious materials from the project site. Efforts should be made to locate any underground structures and utility lines. Those items, if encountered, should be removed or relocated if they interfere with the proposed construction. The resulting voids should be properly backfilled and compacted.

6.5.2 Excavation

No exceptional difficulties are expected in excavating onsite silty, clayey, and uncemented gravelly soils. Conventional earth moving equipments can be used to perform this operation. Excavation or trenching into coralline rock will require heavy hoe-ram excavator or hydraulic rock splitter.

6.5.3 Proofrolling

Proofrolling will be required for the structural slab-on-grade areas as well as pavement areas. After clearing, the ground should be proofrolled to reveal the soft and hard spots. The proofroll should be observed by our field representatives.

Soft spots revealed by the proofroll should be removed to a minimum depth of 18 inches below the finish grade and backfilled with compacted structural fill.

6.5.4 Site Grading

Site grading is expected to be minimal. The onsite clean sand and gravel can be used as a structural fill. The other silty and clayey soil onsite will not be suitable for use as structural fill below structures and pavement areas. A select structural fill may be required to be imported for the foundation and pavement areas. Fill material should not contain expansive soils, debris, rocks greater than three inches in largest dimension, and organic matter and should satisfy the select borrow requirements of the City and County of Honolulu's Standard Specification for Public Works Construction.

Prior to fill placement, subgrade for all structural (including footing backfill) and pavement areas should be scarified to a minimum of six inches and compacted to a minimum of 90 percent of the maximum dry density as determined by the ASTM D1557-78 method. Fill should be compacted to a minimum of 95 percent of the maximum dry density with a sheepsfoot roller of enough weight to achieve the compaction. Fill should be moisture conditioned to within two percent of the optimum moisture content and placed in horizontal lifts not to exceed eight inches.

6.5.5 Dust Control, Drainage, and Erosion Control

Dust control, temporary drainage, and erosion control measures should be specified by the civil engineer and implemented by the grading contractor.

6.6 TEMPORARY EXCAVATIONS

The excavation for foundation would extend to the top of coralline material at about 5 feet below existing surface. All excavations should comply with applicable safety regulations. All cuts greater than 5 feet in depth should be sloped or shored. Heavy construction equipment, excavated materials, and vehicular traffic should not be allowed within 5 feet from top of the excavation.

6.7 ASPHALTIC CONCRETE PAVEMENT

Asphaltic concrete pavements for light automobile traffic and parking should be designed with 2½ inches of asphaltic concrete supported on six inches of aggregate base course over 12 inches of compacted subgrade or structural fill. For areas subject to commercial or industrial vehicular loads, only concrete pavement should be used (see Section 6.3).

6.8 ABANDONMENT OF EXISTING WATER WELL

The groundwater well located within the existing fish pond area of the former Willows Restaurant (eastern parcel) should be abandoned in accordance with the latest procedures and requirements in effect at the time of abandonment. Based on our recent conversation on June 27, 1995, with representatives at the State Department of Land and Natural Resources, we understand that the Division of Water Resources is currently in the process of updating the requirements for well abandonment. Therefore, we recommend that they be contacted for permitting requirements, as well as the applicable procedures to abandon the well at the subject site.

7.0 REVIEW OF PLAN AND SERVICES DURING CONSTRUCTION

The project plans and specifications should be reviewed by Dames & Moore prior to finalization to see that the intent of these recommendations and design considerations are properly reflected in the final design.

Dames & Moore should provide observation and testing during earthwork/construction of the project. A final geotechnical report should be prepared to summarize the conditions encountered and any field modification provided herein. Geotechnical observation and testing should be provided:

- After demolition of the site and completion of site clearing;
- During removal and overexcavation operations;
- During excavation for footings;

- During probing and grouting operations for the footings;
- During selection of import fill materials;
- During compaction of fill or backfill materials;
- During construction of slab-on-grade floors;
- During construction of pavements; and
- When any unusual conditions are encountered.

8.0 LIMITATIONS

This report has been prepared for the City and County of Honolulu and their designated architects and engineers for the purpose of designing the presently contemplated Hausten Street Elderly Housing. Recommendations have been prepared in accordance with generally accepted foundation engineering practices. No other warranty, expressed or implied, is made as to the professional advice contained in this report. This report has not been prepared for other parties and may not contain sufficient information for other purposes or other uses.

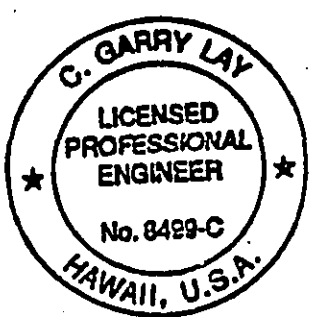
This report is written based on subsurface information obtained from borings drilled for the Hausten Street Elderly Housing project. It does not reflect variations which may occur in the subsurface conditions between the borings. The nature and extent of variations in the subsurface conditions may not become evident until construction. Should subsurface conditions differ from those encountered during this study, Dames & Moore should be notified immediately so that appropriate construction modifications can be developed and implemented, if necessary.

The following Plates and Appendix are attached to complete this report:

Plate 1	-	Map of Area
Plate 2	-	Plot Plan
Appendix A	-	Field Investigation and Laboratory Test Results

Respectfully submitted,

DAMES & MOORE

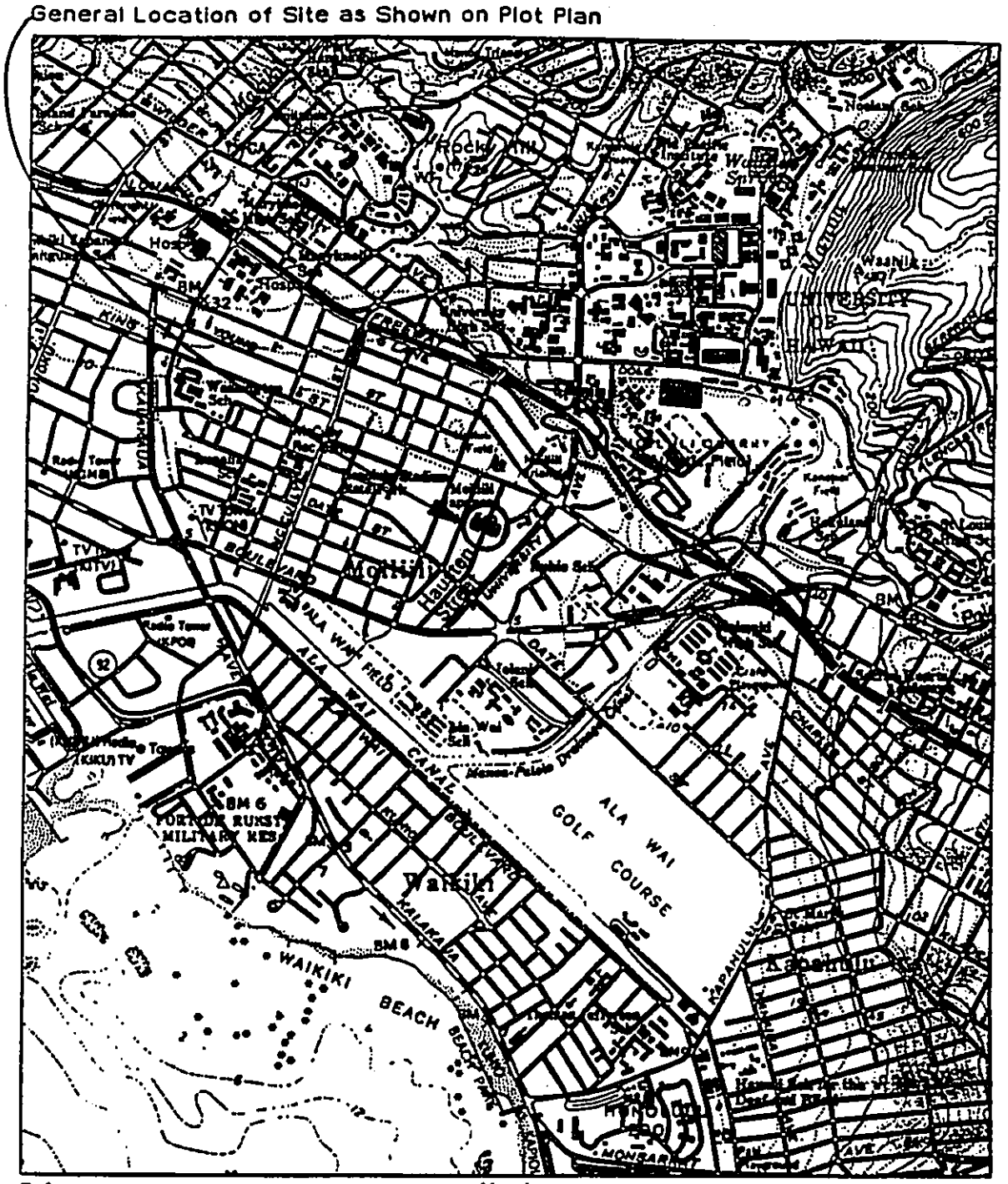


C. Garry Lay, P.E.
Manager of Honolulu office

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

SKD/CGL/ln
(one copy submitted)

General Location of Site as Shown on Plot Plan



Reference:
U.S.G.S. Topographic Map (1983)
Honolulu Quadrangle
Honolulu, Oahu, Hawaii

North

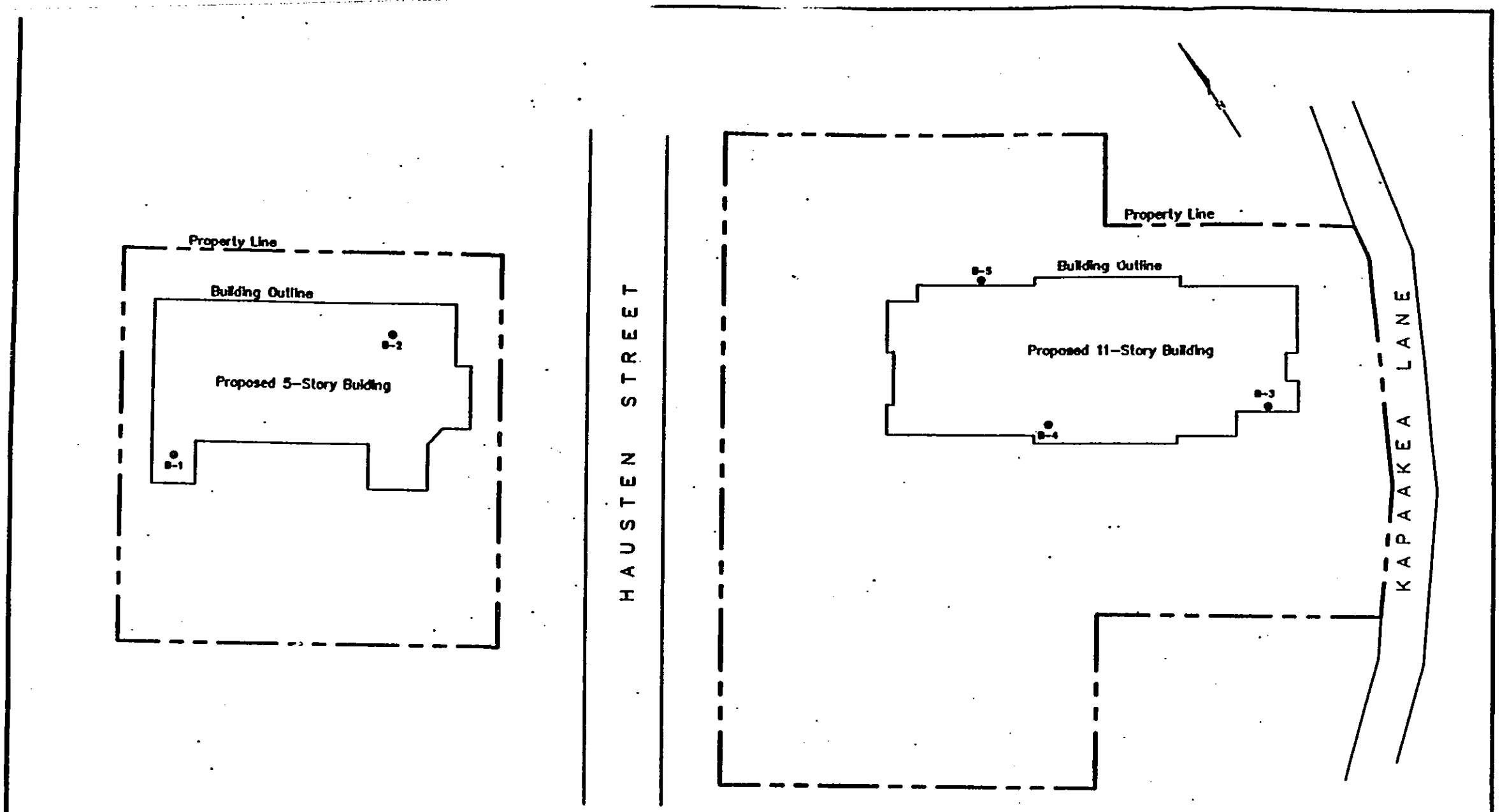
0 2000 4000 Feet

0 .5 1 Kilometer

MAP OF AREA

Dames & Moore

PLATE 1



Legend:

⊕ Dames & Moore Boring Location

0 30 60
Feet

PLOT PLAN

Note: Existing Structures Not Shown

Reference:
AM Partner, Inc.
Hausten Street Elderly Housing
Site Plan, Scheme B: Alternate B1
Dated February 1995
T.M.K.: 2-7-09:13, 14
And 2-7-10:08, 09

DAMES & MOORE

APPENDIX A

FIELD INVESTIGATION

To obtain the subsurface information, five exploratory borings (B-1 through B-5) were drilled from March 14, 1995 to March 24, 1995. Boring depths ranged from 30.0 to 71.5 feet. The boring locations are shown on the Plot Plan, Plate 2.

Due to the site access difficulty in the former Willows Restaurant area, two different drilling rigs were used for this project. A Mobile Drill B-53 truck-mounted rig was used to drill two borings (B-1 through B-2) in the westerly parcel. In the easterly parcel, where access was limited, a skid-mounted SIMCO 2400 drill rig was used to drill three borings (B-3 through B-5).

Continuous flight augers were used in the upper five to ten feet of soil and rotary wash was used to depth in the coralline formation and alluvial deposit. Soil samples were obtained from the borings using a Dames & Moore "U" type sampler driven by a 140-pound drop hammer falling 30 inches per blow. The Dames & Moore "U" type sampler is shown in Exhibit A-1. Some bulk bag samples were also taken within the upper two feet. A NX-size core barrel was used to obtain coralline rock samples. The rock quality designation (RQD) for the NX cores along with the percentage of core recovery were recorded on the logs of borings. The RQD is defined as the percentage of the overall length of the core run, and is an indication of the degree of soundness of the rock.

One of our field engineers observed the drilling operation and logged each boring. The retrieved soil and core samples were packaged and returned to our Honolulu laboratory for testing. The borings were then backfilled with gravel and in-situ material. The two borings in the parking lot were topped off with asphaltic concrete to match the existing conditions.

The logs of borings are presented in this Appendix on Plates A-1.1 through A-1.5. The soils encountered were classified according to the Unified Soil Classification System described on Plate A-2. The coralline rock was classified according to the Calcareous Rock Classification System for Hawaii described on Plate A-3 and Terms Used for Physical Description of Rock, Plate A-4.

LABORATORY TEST RESULTS

Selected soil samples were tested to evaluate pertinent classification and engineering properties. The tests included moisture content and dry density determinations, consolidation tests, triaxial compression tests, unconfined compression test, and California Bearing Ratio (CBR) test. All testing procedures were performed in accordance to the American Society for Testing and Materials (ASTM) standards. The results of the laboratory tests are presented in the following sections.

Moisture Content and Dry Density

Moisture content and dry density determinations (ASTM D2216-80) were performed on 43 selected soil samples. The results of these tests are presented on the Logs of Borings, Plates A-1.1 through A-1.5 in this Appendix.

Triaxial Compression Test

Three unconsolidated-undrained triaxial compression tests (ASTM D2850-87) were performed on relatively undisturbed samples of the coralline deposits. The method of performing these tests are described in Exhibit A-2, Methods of Performing Unconfined Compression and Triaxial Compression Tests. The results are graphically presented on Plate A-5, Triaxial Shear Test Report.

Unconfined Compression Test

The unconfined compression test (ASTM D2938-86) was performed on one intact coralline rock core sample and one clayey silt alluvium sample. The method for performing the unconfined compression test is also described in Exhibit A-2. The results of the unconfined compression test are summarized below. The results of the unconfined compression test for the alluvium sample are also graphically presented on Plate A-6, Unconfined Compression Test.

Boring No.	Sample Description	Depth (ft.)	Unconfined Compressive Strength (psi)
B-4	coralline rock	8	159
B-5	clayey silt alluvium	40.4	3.3

Consolidation Tests

Two consolidation tests (ASTM D2435-80) were performed on selected soil samples. The test results are presented on Plates A-7.1 through A-7.2, Consolidation Test Data. The method of performing this test is explained on Exhibit A-3, Method of Performing Consolidation Tests.

California Bearing Ratio Test

One California Bearing Ratio (CBR) test (ASTM D1883-87) was performed on a surficial bulk sample. The test results are presented below:

Sample Source	Moisture Content at Compaction (%)	Dry Density (pcf)	CBR Values at Penetration of	
			0.1 inch	0.2 inch
combination of surface bulk samples at 0-2'	13.5	124.0	75	90

-oOo-

The following Plates and Exhibits are attached to complete the Appendix:

Plates A-1.1 through A-1.5	-	Log of Borings B-1 to B-5
Plate A-2	-	Unified Soil Classification System
Plate A-3	-	Calcareous Rock Classification System for Hawaii
Plate A-4	-	Terms Used for Physical Description of Rock
Plate A-5	-	Triaxial Shear Test Report
Plate A-6	-	Unconfined Compression Test
Plate A-7.1 to A-7.2	-	Consolidation Tests Data
Exhibit A-1	-	Dames & Moore Soil Sampler Type U
Exhibit A-2	-	Methods of Performing Unconfined Compression and Triaxial Compression Tests
Exhibit A-3	-	Method of Performing Consolidation Test

PROJECT Hausten Street Elderly Housing JOB No. 04402-140-011

LOCATION Honolulu, Oahu, Hawaii DRAWN BY wmk (04-04-95)

BORING B-1 (Page 1 of 2)

SURFACE ELEVATION 5.29 ± Feet

DATUM Mean Sea Level

MOISTURE CONTENT %	DRY DENSITY (pcf)	RQD % or (RQI) %	RECOVERY %	CORE TYPE	BLOWS/FT.	SAMPLE	DEPTH (feet)	GRAPHIC LOG	SOIL CLASS	DESCRIPTION
							0			4" thick asphaltic concrete
									SM	8" thick base course
12.3	91.6				41	■				Dark brown silty medium grained coralline sand with trace coarse grained subangular basaltic gravel, medium dense, moist (fill)
									MH	Olive gray clayey silt, soft, very moist (alluvium)
78.8	83.7				166/9.5"	■	5			(Water level at 1415 hours on 03/14/95)
23.9	100.3								GM	grades shell fragments and fine grained coralline sand
									GP	White to light brown silty fine to coarse subangular coralline gravel with some fine to medium grained coralline sand, very dense, wet
23.4	70.3				166/11"	⊠	10			Light olive gray to white fine to coarse subangular coralline gravel, very dense, wet Some inter-layers of coralline rock (type II)
									GM	Brown to brownish yellow fine to coarse grained sandy silty fine to coarse subangular coralline gravel, dense to very dense, wet Some inter-layers of coralline rock (type II)
17.7	99.9				121	■	15			
14.7	102.3									
11.8	92.3				47	■	20			grades light brown to white, medium dense
14.3	93.8				84	■	25			grades brown to brownish yellow, dense
							30			29 feet to 34.5 feet – cavity
					9	▬	35		GP	Brown to white medium to coarse grained coralline sand and fine subangular coralline gravel, very loose, wet, possibly coral rubble zone
					6	⊠	40			grades brown fine to coarse subangular coralline gravel

NOTES:
- ■ – Relatively undisturbed sample
- ⊠ – Disturbed sample
- □ – Sample lost during extraction
- ◪ – Standard penetration test sample (split-spoon sampler)
- ⊠ – Standard penetration test sample no recovery
- I – Core run

DRIVING ENERGY: 140-lb. weight dropping 30 inches
Soil Classification: Laboratory (L) or Visual (V)

LOG OF BORING

Dames & Moore

PLATE A-1.11

PROJECT Haüsten Street Elderly Housing JOB No. 04402-140-011

BORING B-1 (Page 2 of 2)

LAB DATA		CORE INFO							
MOISTURE CONTENT %	DRY DENSITY (pcf)	RQD % or (RQI) %	RECOVERY %	CORE TYPE	BLOWS/FT.	SAMPLE	DEPTH (feet)	GRAPHIC LOG	SOIL CLASS	DESCRIPTION
									GP	
43.1	77.8				4	■	45		MH	Dark brown clayey silt, soft wet (alluvium)
48.7	74.2				33	■	50			grades more clayey, stiff
										Boring completed at 50.5 feet on 03-14-95

NOTES:
- ■ – Relatively undisturbed sample
- ⊠ – Disturbed sample
- □ – Sample lost during extraction
- ◪ – Standard penetration test sample (split-spoon sampler)
- ☑ – Standard penetration test sample no recovery
- I – Core run

DRIVING ENERGY: 140-lb. weight dropping 30 inches
Soil Classification: Laboratory (L) or Visual (V)

LOG OF BORING
Dames & Moore

PLATE
A-1.1.2

PROJECT Hausten Street Elderly Housing JOB No. 04402-140-011

LOCATION Honolulu, Oahu, Hawaii DRAWN BY wmk (04-04-95)

BORING B-2 (Page 1 of 1)

SURFACE ELEVATION 5.02 ± Feet

DATUM Mean Sea Level

LAB DATA		CORE INFO								
MOISTURE CONTENT %	DRY DENSITY (pcf)	RQD % or (RQI) %	RECOVERY %	CORE TYPE	BLOWS/FT.	SAMPLE	DEPTH (feet)	GRAPHIC LOG	SOIL CLASS	DESCRIPTION
										10" thick asphaltic concrete
									ML	1" thick base course Dark brown to brown sandy silt and clay, medium stiff, moist (fill)
					9	■			MH	Olive gray clayey silt, soft, wet (alluvium) (Water level at 0825 hours on 03/15/95)
42.7	78.8				11	■	5			grades dark brown, medium stiff
									GP	Light brown to white silty fine to coarse subangular coralline gravel, medium dense, wet
									GM	Brown to brownish yellow silty fine to coarse subangular coralline gravel and fine to coarse grained coralline sand, medium dense, wet
32.4	88.8				38	■	10			
									GM	Light brown to brown silty fine to coarse grained coralline sandy fine to coarse subangular coralline gravel, medium dense, wet
21.4	98.3				32	⊠	15			
									GP	White to brown coarse grained coralline sandy fine to coarse subangular coralline gravel, medium dense, wet
13.2	89.7				29	■	20			
										grades trace silt
18.1	94.3				53	■	25		GM	Brown silty fine and coarse grained coralline sandy fine to coarse subangular coralline gravel, medium dense, wet
11.1	108.3				33	■	30			Boring completed at 30.0 feet on 03-15-95

NOTES:
- ■ – Relatively undisturbed sample
- ⊠ – Disturbed sample
- □ – Sample lost during extraction
- ◪ – Standard penetration test sample (split-spoon sampler)
- ⊘ – Standard penetration test sample no recovery
- I – Core run

DRIVING ENERGY: 140-lb. weight dropping 30 inches
Soil Classification: Laboratory (L) or Visual (V)

LOG OF BORING

Dames & Moore

PLATE A-1.2

PROJECT Hausten Street Elderly Housing JOB No. 04402-140-011

LOCATION Honolulu, Oahu, Hawaii DRAWN BY wmk (04-04-95)

BORING B-3 (Page 1 of 2)

SURFACE ELEVATION 7.2 ± Feet

DATUM Mean Sea Level

LAB DATA		CORE INFO								
MOISTURE CONTENT %	DRY DENSITY (pcf)	RQD % or (RQI) %	RECOVERY %	CORE TYPE	BLOWS/FT.	SAMPLE	DEPTH (feet)	GRAPHIC LOG	SOIL CLASS	DESCRIPTION
										3.5" thick concrete
					100/2.5"					1'-4" thick rubble fill with dark brown silty medium grained coralline sand and trace coarse subangular coralline gravel, moist
										Light brown to white coralline rock (type II), strong, slightly weathered, trace moist
					100/2"		5			(Water level at 1610 hours on 03/20/95)
15.5	73.3				104/6"		10			grades brown, moderately strong
									GP	Light brown to brown medium to coarse grained coralline sandy fine to coarse subangular coralline gravel with trace silt, medium dense, wet
18.3	90.1				27		15			
							20		MH	19 feet to 25.3 feet - cavity infilled with dark gray to olive gray silt with trace fine subangular coralline gravel, very soft, wet
142.9	38.1				1		25		GM	Brown silty coarse subangular coralline gravel, very loose, wet (possible coral rubble zone)
100.2	50.5								MH	25.5 feet to 27.5 feet - cavity infilled with silt
									GP	Light brown to brown medium to coarse grained coralline sandy fine to coarse subangular coralline gravel with some silt, medium dense, wet
22.2	87.7				27		30			
									MH	Dark brown sandy clayey silt, stiff, moist to very moist (alluvium)
49.7	76.0				29		35			
							40			

NOTES:
- ■ - Relatively undisturbed sample
- ⊠ - Disturbed sample
- □ - Sample lost during extraction
- ◪ - Standard penetration test sample (split-spoon sampler)
- Ø - Standard penetration test sample no recovery
- I - Core run

DRIVING ENERGY: 140-lb. weight dropping 30 inches
Soil Classification: Laboratory (L) or Visual (V)

LOG OF BORING

Dames & Moore

PLATE A-1.3.1

PROJECT *Hausten Street Elderly Housing* JOB No. *04402-140-011*

BORING B-3 (Page 2 of 2)

LAB DATA		CORE INFO							
MOISTURE CONTENT %	DRY DENSITY (pcf)	ROD % or (RQD) %	RECOVERY %	CORE TYPE	BLOWS/FT.	SAMPLE	DEPTH (feet)	GRAPHIC LOG	SOIL CLASS	DESCRIPTION
42.3	81.5				80	■			MH	grades more clayey, very stiff to hard, moist
83.5	88.7				51	■	45			grades dark brown to olive gray with trace brownish yellow and yellowish red mot, more clayey, very stiff
									GM	Light brown to brown fine to coarse subangular coralline gravel with coarse subrounded tuff and basaltic sand, medium dense, wet
19.3	82.9				52	■	50			

Boring completed at 51.5 feet on 03-20-95

NOTES:
- ■ - Relatively undisturbed sample
- ⊠ - Disturbed sample
- □ - Sample lost during extraction
- ◪ - Standard penetration test sample (split-spoon sampler)
- ⊡ - Standard penetration test sample no recovery
- I - Core run

DRIVING ENERGY: 140-lb. weight dropping 30 inches
Soil Classification: Laboratory (L) or Visual (V)

LOG OF BORING

Dames & Moore

PLATE

A-1.3.2

PROJECT Hausten Street Elderly Housing JOB No. 04402-140-011

LOCATION Honolulu, Oahu, Hawaii DRAWN BY wmk (04-04-95)

BORING B-4 (Page 1 of 2)

SURFACE ELEVATION 5.03 ± Feet

DATUM Mean Sea Level

LAB DATA		CORE INFO							
MOISTURE CONTENT %	DRY DENSITY (pcf)	RQD % or (RQI) %	RECOVERY %	CORE TYPE	BLOWS/FT.	SAMPLE	DEPTH (feet)	GRAPHIC LOG	SOIL CLASS	DESCRIPTION
							0		MH	3" thick concrete
									MH	Dark brown clayey silt with trace medium grained sand, medium stiff to soft, moist (alluvium)
62.0	63.1				11	■			GP	Light brown to brown clayey silt with some medium to coarse grained coralline sand and fine to coarse subangular coralline gravel, trace rootlets, medium stiff, very moist (alluvium)
		85	100	NX	100/4.5"	⊠	5			Light brown to white fine to coarse grained coralline sandy fine to coarse subangular coralline gravel, loose to medium dense, very moist to wet
										(Water level at 0905 hours on 03/23/95)
										Light brown to white coralline rock (type II), moderately strong to strong, moderately to highly weathered, pea sized vugs throughout, wet
		0	22	NX			10			
25.2	98.9				28	■	15		GM	Brown silty coarse grained coralline sandy fine to coarse subangular coralline gravel, medium dense, wet
11.1	120.2				42	■	20			
10.2	101.8				29	■	25			
							30		MH	Dark brown fine to medium grained sandy clayey silt, stiff, very moist to wet (alluvium)
52.8	73.9				24	■				
58.1	71.8				18	■	35			grades trace sand, more clayey
							40			

NOTES:
- ■ – Relatively undisturbed sample
- ⊠ – Disturbed sample
- □ – Sample lost during extraction
- ◪ – Standard penetration test sample (split-spoon sampler)
- ⊠ – Standard penetration test sample no recovery
- I – Core run

DRIVING ENERGY: 140-lb. weight dropping 30 inches
Soil Classification: Laboratory (L) or Visual (V)

LOG OF BORING

Dames & Moore

PLATE A-1.4.1

PROJECT *Hausten Street Elderly Housing* JOB No. *04402-140-011*

BORING B-4 (Page 2 of 2)

LAB DATA		CORE INFO							
MOISTURE CONTENT %	DRY DENSITY (pcf)	ROD % or (RQI) %	RECOVERY %	CORE TYPE	BLOWS/FT.	SAMPLE	DEPTH (feet)	SOIL CLASS	DESCRIPTION
54.4	72.9				29	■		MH	grades dark brown with gray to dark gray mot, more clayey
64.1	85.7				25	■	45	MH	Mottled olive gray and brownish yellow to yellowish red clayey silt, stiff, moist to very moist
25.2	93.3				39	■	50	GM	Light brown to brown silty fine to coarse subangular coralline gravel, medium dense, wet
25.4	82.0				17	■	55		grades brown, more clayey silty coralline sand, trace shell fragments and coarse grained subrounded basaltic sand, loose
28.0	93.8				19	■	60	SP	Brown fine to coarse grained coralline sand with trace silty shell fragments, coarse grained subrounded basaltic sand, and fine subangular coralline gravel, loose to medium dense, wet
54.4	73.2				9	■	65	MH	Brown to dark brown clayey silt with some fine to coarse subangular coralline gravel, firm (cemented fine grained coralline sand gravel)
49.8	89.4				15	■	70	SP	Brown to brownish yellow silty fine to coarse grained coralline sand with some fine subangular coralline gravel, loose, wet
									Boring completed at 71.5 feet on 03-22-95

NOTES:
- ■ - Relatively undisturbed sample
- ⊠ - Disturbed sample
- □ - Sample lost during extraction
- ◪ - Standard penetration test sample (split-spoon sampler)
- ☑ - Standard penetration test sample no recovery
- I - Core run

DRIVING ENERGY: 140-lb. weight dropping 30 inches
Soil Classification: Laboratory (L) or Visual (V)

LOG OF BORING

Dames & Moore

PLATE A-1.4.2

PROJECT Hausten Street Elderly Housing JOB No. 04402-140-011
LOCATION Honolulu, Oahu, Hawaii DRAWN BY wmk (04-04-95)

BORING B-5 (Page 1 of 2)

SURFACE ELEVATION 5.45 ± Feet
DATUM Mean Sea Level

LAB DATA		CORE INFO								
MOISTURE CONTENT %	DRY DENSITY (pcf)	RQD % or (RQI) %	RECOVERY %	CORE TYPE	BLOWS/FT.	SAMPLE	DEPTH (feet)	GRAPHIC LOG	SOIL CLASS	DESCRIPTION
										3" thick concrete
									ML	7.5" thick rubble fill
32.9	87.8				15	■				Yellowish red sandy silt, medium stiff, trace moist (alluvium)
24.4	98.1				88	■	5		GM	Light brown to brown fine to coarse subangular coralline gravel, dense, moist (Water level at 1230 hours on 03/24/95)
										White to brownish yellow coralline rock (type II), strong to very strong, moderate to strongly cemented, slightly weathered, trace pea to thumb sized vugs
		0	100	NX		▮	10			
										grades light brown to brown coralline rock (cemented type II – sandstone and type I coral), moderately strong, moderately cemented, slightly weathered, trace thumb sized vugs
12.4	115.7				84	■	15		GM	Light brown to brown silty medium to coarse grained coralline sandy fine to coarse subangular coralline gravel, dense, wet
10.1	108.1				37	■	20			grades more cemented coralline sand, medium dense
11.8	75.2				38	■	25			
19.3	103.8				22	■	30		SM	Brown to brownish yellow silty fine to coarse grained coralline sand with fine subangular coralline gravel, medium dense, wet
									MH	Dark brown fine to medium grained sandy clayey silt, very stiff, moist to very moist (alluvium)
46.7	80.5				43	■	35			grades less sandy
									SP	Dark brown fine to coarse grained subrounded basaltic sand with trace coralline sand and silt, loose, wet
							40			

NOTES:
■ – Relatively undisturbed sample
⊠ – Disturbed sample
□ – Sample lost during extraction
◪ – Standard penetration test sample (split-spoon sampler)
◪ – Standard penetration test sample no recovery
I – Core run
DRIVING ENERGY: 140-lb. weight dropping 30 inches
Soil Classification: Laboratory (L) or Visual (V)

LOG OF BORING
Dames & Moore

PLATE
A-1.5.1

PROJECT *Hausten Street Elderly Housing* JOB No. *04402-140-011*

BORING B-5 (Page 2 of 2)

LAB DATA		CORE INFO								
MOISTURE CONTENT %	DRY DENSITY (pcf)	ROD % or (RQD) %	RECOVERY %	CORE TYPE	BLOWS/FT.	SAMPLE	DEPTH (feet)	GRAPHIC LOG	SOIL CLASS	DESCRIPTION
					22	■			SP	
									MH	Dark brown medium grained clayey to sandy silt, stiff, wet (alluvium)
							45			grades more dark brown to olive gray clayey silt, very stiff, moist
45.5	79.2				39	■				grades dark brown to yellowish red, more clayey
									MH	Mottled olive gray to gray and yellowish red clayey silt, stiff, moist (alluvium)
							50			
72.6	59.5				25	■				Brown to olive gray coralline rock (type II), moderately strong, strongly cemented with shell fragments, slightly to moderately weathered
										Boring completed at 51.5 feet on 03-24-95

NOTES:
- ■ – Relatively undisturbed sample
- ⊠ – Disturbed sample
- □ – Sample lost during extraction
- ◪ – Standard penetration test sample (split-spoon sampler)
- ◪ – Standard penetration test sample no recovery
- I – Core run

DRIVING ENERGY: 140-lb. weight dropping 30 inches
Soil Classification: Laboratory (L) or Visual (V)

LOG OF BORING
Dames & Moore

PLATE
A-1.5.2

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			GRAPHIC SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS — MORE THAN 50% OF MATERIAL IS LARGER THAN NO 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS — MORE THAN 50% OF COARSE FRACTION RETAINED ON NO 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY GRADED GRAVELS, GRAVEL SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL SAND-SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL SAND CLAY MIXTURES
	SAND AND SANDY SOILS — MORE THAN 50% OF COARSE FRACTION PASSING NO 4 SIEVE	CLEAN SAND (LITTLE OR NO FINES)		SW	WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND-SILT MIXTURES
				SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS — MORE THAN 50% OF MATERIAL IS SMALLER THAN NO 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, MUSKS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

FOR LABORATORY CLASSIFICATION OF FINE-GRAINED SOILS

NOTES:

1. DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE CLASSIFICATIONS
2. WHEN SHOWN ON THE BORING LOGS, THE FOLLOWING TERMS ARE USED TO DESCRIBE THE CONSISTENCY OF COHESIVE SOILS AND THE RELATIVE COMPACTNESS OF COHESIONLESS SOILS

COHESIVE SOILS	(APPROXIMATE UNCONFINED STRENGTH - KSF)
VERY SOFT	LESS THAN .25
SOFT	0.25 TO 0.5
MEDIUM STIFF	0.5 TO 1.0
STIFF	1.0 TO 2.0
VERY STIFF	2.0 TO 4.0
HARD	GREATER THAN 4.0

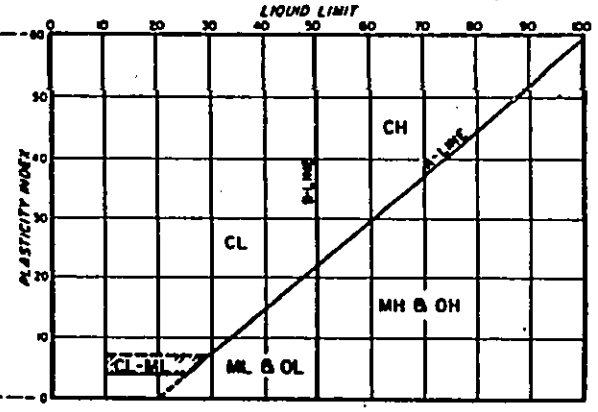
COHESIONLESS SOILS	
VERY LOOSE	THESE ARE ERRATIC GUESSES ON AN EXAMINATION OF SOIL SAMPLES, PENETRATION RESISTANCE, AND SOIL DENSITY DATA.
LOOSE	
MEDIUM DENSE	
DENSE	
VERY DENSE	

GRADATION CHART

MATERIAL SIZE		PARTICLE SIZE — LOWER LIMIT		PARTICLE SIZE — UPPER LIMIT	
		MILLIMETERS	SIEVE SIZE*	MILLIMETERS	SIEVE SIZE*
SAND					
	FINE	0.074	#200*	0.42	#40*
	MEDIUM	0.42	#40*	2.00	#10*
	COARSE	2.00	#10*	4.76	#4*
GRAVEL					
	FINE	4.76	#4*	19.1	3/4"*
	COARSE	19.1	3/4"*	76.2	3"*
COBBLES		76.2	3"*	304.8	12"*
BOULDERS		304.8	12"*	914.4	36"

*U.S. STANDARD *CLEAR SQUARE OPENINGS

PLASTICITY CHART



SAMPLES

- INDICATES UNDISTURBED SAMPLE
- INDICATES DISTURBED SAMPLE
- INDICATES SAMPLING ATTEMPT WITH NO RECOVERY
- INDICATES LENGTH OF CORING RUN

NOTE:
DEFINITIONS OF ANY ADDITIONAL DATA REGARDING SAMPLES ARE ENTERED ON THE FIRST LOG ON WHICH THE DATA APPEARS

UNIFIED SOIL CLASSIFICATION SYSTEM

Dames & Moore

PLATE A-2

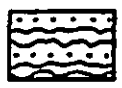
CALCAREOUS ROCK CLASSIFICATION SYSTEM FOR HAWAII

BASIC TYPES OF CALCAREOUS ROCK

TYPE I — INSITU REEF ROCK

COMPOSED LARGELY OF UNDISTURBED *CORALLINE SKELETONS. THE SKELETONS ARE CEMENTED TOGETHER DURING ACCRETION. THE CEMENTING AGENTS ARE CALCIUM COMPOUNDS SECRETED BY THE MARINE ORGANISMS. THE JOINED SKELETONS FORM A STRUCTURAL FRAMEWORK. CORALLINE AND OTHER CALCAREOUS DEBRIS COMMONLY FILL THE FRAMEWORK INTERSTICES.

TYPE II — SECONDARY ROCK



COMPOSED ESSENTIALLY OF CEMENTED FRAGMENTS OF CORALLINE SKELETONS AND/OR CALCAREOUS SHELLS. CEMENTATION IS BELIEVED TO OCCUR PRIMARILY AFTER ACCRETION IS COMPLETED AND THE MARINE DEPOSIT BEGINS TO EMERGE ABOVE SEA LEVEL. THE COMMON TYPES OF SECONDARY ROCK ARE LISTED BELOW.

1. CONGLOMERATE - CEMENTED, NON-UNIFORM SAND- AND GRAVEL-SIZE PARTICLES OF CEMENTED CORALLINE SKELETONS AND/OR CALCAREOUS SHELLS. THE SKELETONS AND SHELLS ARE ORIGINALLY DEPOSITED IN NEAR-SHORE WATERS. THE CEMENTING AGENT IS CALCIUM CARBONATE PRECIPITATED PRIMARILY FROM PERCOLATING GROUND WATER.

2. SHELL ROCK - CEMENTED SHELLS AND SHELL FRAGMENTS THAT HAVE ACCUMULATED IN PROTECTED SHALLOW SEA WATER. THE SHELLS ARE OFTEN CEMENTED IN A CLAY- AND SILT-SIZE MATRIX. CEMENTATION DEVELOPS FROM CALCIUM CARBONATE DEPOSITED BY GROUND WATER.

3. DUNE ROCK - CEMENTED DUNE SAND. THE CEMENTING AGENT IS GENERALLY CALCIUM CARBONATE PRECIPITATED FROM PERCOLATING GROUND WATER. DUNE ROCK GENERALLY HAS A RELATIVELY LOW DENSITY BECAUSE THE CONSTITUENT SAND GRAINS ARE LOOSELY PACKED AND OFTEN POORLY CEMENTED.

TYPE III — CHALK

POORLY CEMENTED MASS OF CALCAREOUS CLAY- AND SILT-SIZE PARTICLES, BELIEVED TO BE PRECIPITATED FROM SHALLOW SEA WATER AND ASSOCIATED WITH NEAR-SHORE ENVIRONMENTS.

* THE TERM CORALLINE IS USED TO INDICATE CORAL AND/OR OTHER CALCIUM COMPOUND SECRETING ORGANISMS.

(M-004)

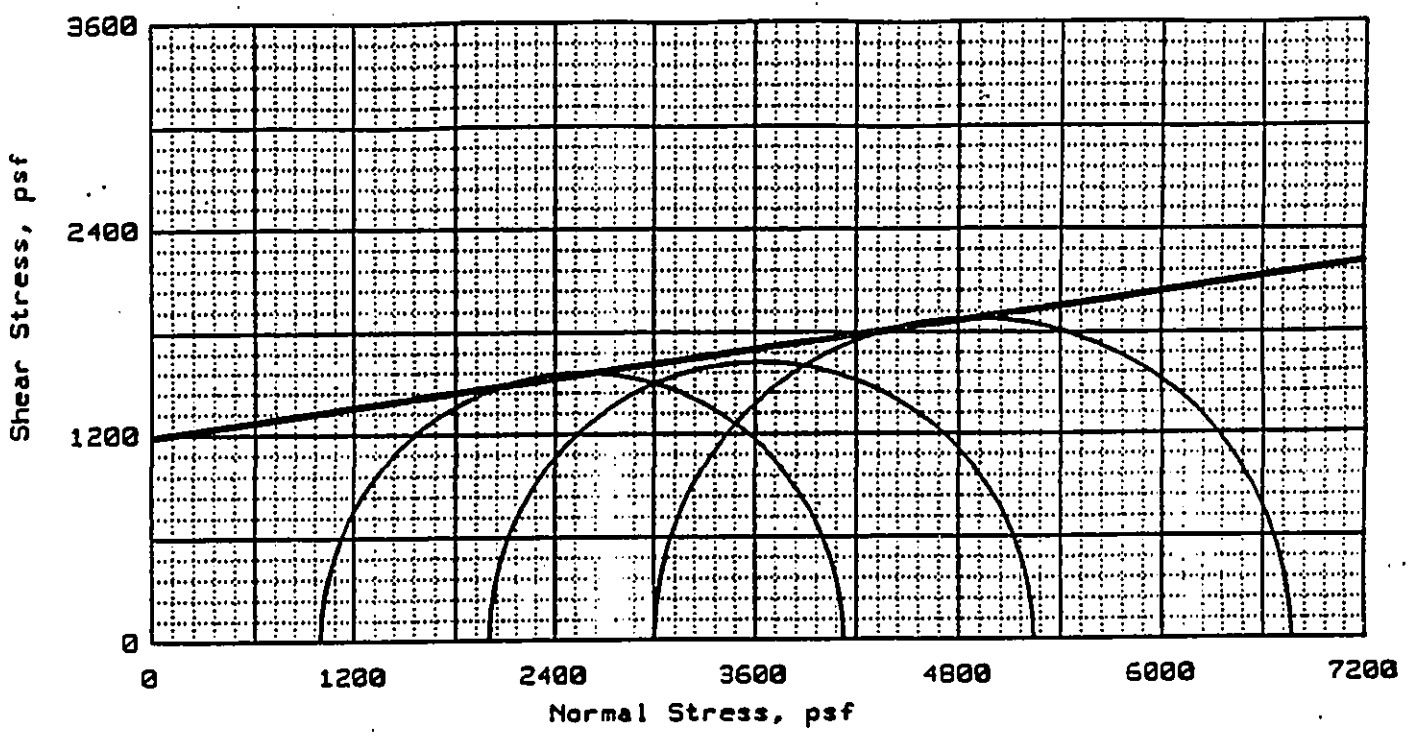
TERMS USED FOR PHYSICAL DESCRIPTION OF ROCK

Class	Strength	Field Test	Approximate Range of Uniaxial Compression Strength kg/cm^2 (tons/ft^2)
I	Extremely Strong	Many blows with geologic hammer required to break intact specimen.	>2000
II	Very Strong	Hand held specimen breaks with hammer end of pick under more than one blow.	2000 - 1000
III	Strong	Cannot be scraped or peeled with knife, hand held specimen can be broken with single moderate blow with pick.	1000 - 500
IV	Moderately Strong	Can just be scraped or peeled with knife. Indentations 1mm to 3mm show in specimen with moderate blow with pick.	500 - 125
V	Moderately Weak to Weak	Material crumbles under moderate blow with sharp end of pick and can be peeled with a knife, but is too hard to hand trim for triaxial test specimen.	125 - 12

Grade	Symbol	Diagnostic Features
Fresh	F	No visible sign of decomposition or discoloration. Rings when struck by hammer.
Slightly Weathered	WS	Slight discoloration inwards from open fractures, otherwise similar to F.
Moderately Weathered	WM	Discoloration throughout. Weaker minerals such as feldspar decomposed. Strength somewhat less than fresh rock but cores cannot be broken by hand or scraped by knife. Texture preserved.
Highly Weathered	WH	Most minerals somewhat decomposed. Specimens can be broken by hand with effort or shaved with knife. Core stones present in rock mass. Texture becoming indistinct but fabric preserved.
Completely Weathered	WC	Minerals decomposed to soil but fabric & structure preserved (Saprolite). Specimens easily crumbled or penetrated.
Residual Soil	RS	Advanced state of decomposition resulting in plastic soils. Rock fabric and structure completely destroyed. Large volume change.

Description for Structural Features: Bedding, Foliation, or Flow Banding	Spacing	Description for Joints, Faults or Other Fractures
Very Thickly (bedded, foliated or banded)	More than 6 feet	Very Widely (fractured or jointed)
Thickly	2 – 6 feet	Widely
Medium	8 – 24 inches	Medium
Thinly	2-1/2 – 8 inches	Closely
Very Thinly	3/4 – 2-1/2 inches	Very Closely
Description for Microstructural Features: Lamination, Foliation, or Cleavage		**Description for Joints, Faults or Other Fractures**
Intensely (laminated, foliated or cleaved)	1/4 – 3/4 inch	Extremely Close
Very Intensely	Less than 1/4 inch	

TRIAXIAL SHEAR TEST REPORT



Type of Test: Unconsolidated undrained Sample Type: Undisturbed

No.	FLUID PRESS. psi		MAX. STRENGTH psf		ULT. STRENGTH psf		PRINCIPAL STRESSES AT FAILURE psf	
	Cell	Back	Deviator	Pore	Deviator	Pore	σ_1	σ_3
1	6.944	0	3124	0			4124	1000
2	13.888	0	3242	0			5242	2000
3	20.833	0	3768	0			6768	3000

No.	SAMPLE PARAMETERS						
	% Water Content	Dry Dens. pcf	Saturation	Void Ratio	Diameter in	Height in	Strain rate in/min.
1	42.7	76.6	96.0 %	1.1997	2.42	5.80	0.0500
2	25.2	96.9	92.1 %	0.7394	2.42	5.70	0.0500
3	19.3	103.6	83.0 %	0.6265	2.42	6.00	0.0500

MOHR-COULOMB STRENGTH PARAMETERS	Total
Strength intercept, c=	1181 psf
Friction angle, ϕ =	8.1 deg
Tangent ϕ =	0.14

MATERIAL DESCRIPTION

Tan Coralline sand and coral gravel. Dense

LL= PI=

CLIENT: City & County Of Honolulu

PROJECT: Hausten Elderly Housing

LOCATION: 1)Boring 2 sample 2@ 5'
2)Boring 4 Sample 3@ 15.5'

TRIAXIAL SHEAR TEST REPORT

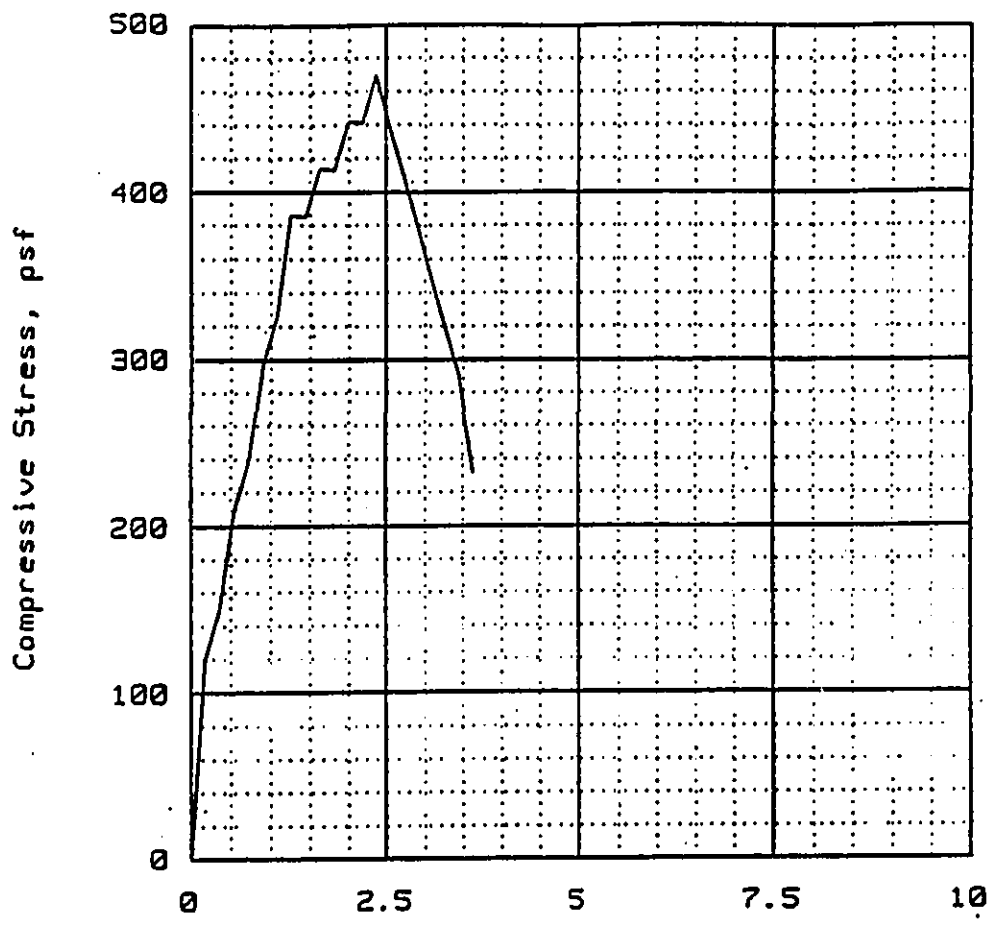
DAMES AND MOORE

DATE: April 14, 1995
File: C&CHON
REMARKS:
Top and bottom was capped with plaster of Paris
3)Boring 5 Sample 6@ 30.5'

Proj. No.: 04402-140
Page 1/2

PLATE A-5

UNCONFINED COMPRESSION TEST



Sample number:	1			
Unconfined strength, psf	470			
Undrained shear strength, psf	235			
Strain rate, in/min	0.050			
Water content, %	58.5			
Wet density, pcf	106.6			
Dry density, pcf	67.3			
Saturation, %	1.5055			
Void ratio	104.9			
Specimen diameter, in	2.42			
Specimen height, in	5.50			

Description: Dark Brown Clayey Silt & weathered basalt rock

LL =	PL =	PI =	GS = 2.70	Type: undisturbed

Project No.: 04402-140
Date: April 14, 1995
Remarks:
Very Moist

Client: City & County Of Honolulu

Project: Hausten Elderly Housing

Location: Boring 5 Sample 8 @ 40.4'

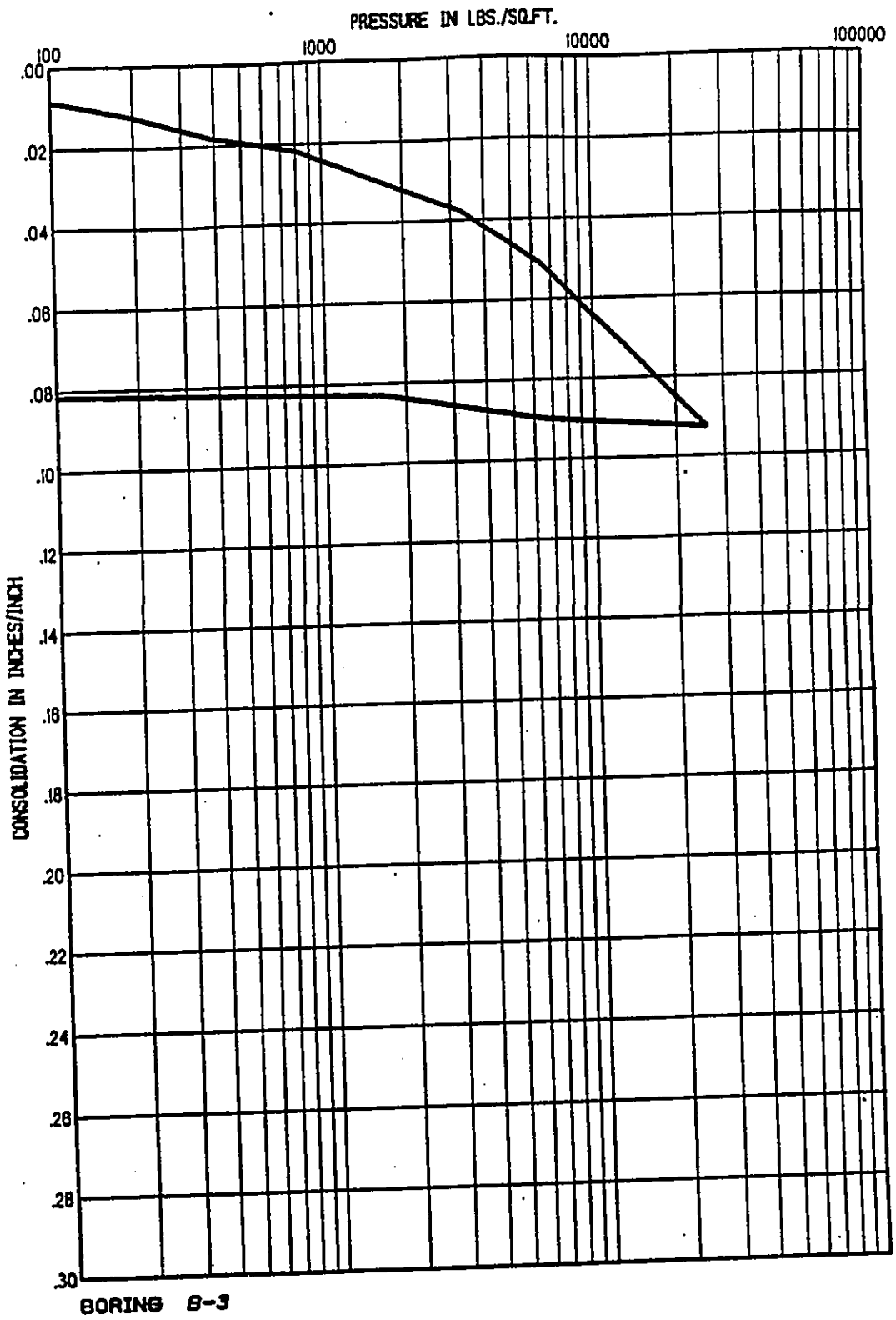
UNCONFINED COMPRESSION TEST

DAMES AND MOORE

PLATE A-6

PROJECT Hansten Street Elderly Housing

JOB NUMBER 04402-140-01I DATE 08-28-95 DRAWN BY JSD



BORING *B-3*

SAMPLE DEPTH *15.5 feet*

SOIL DESCRIPTION *Tan coral sand and gravel*

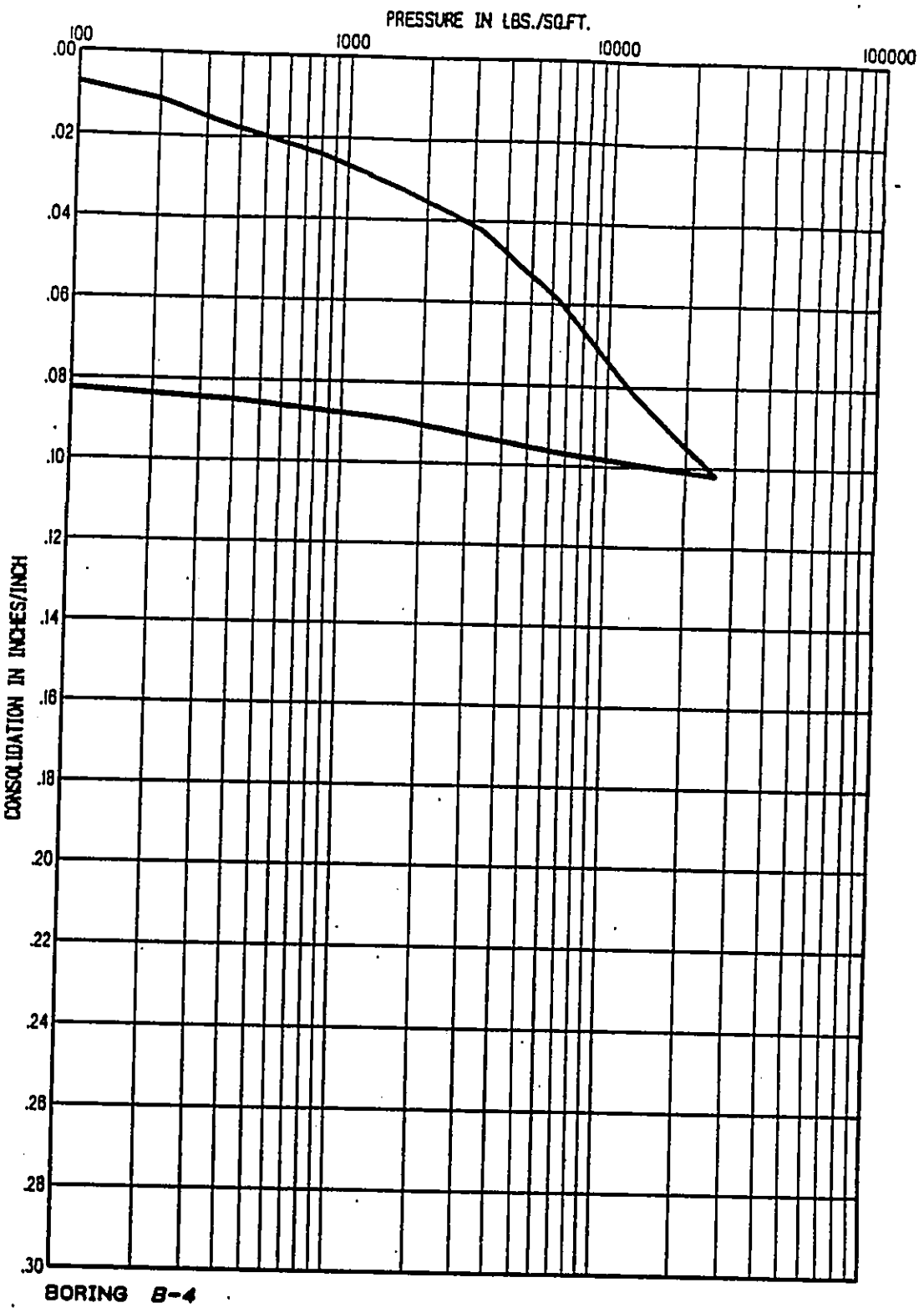
	BEFORE TEST	AFTER TEST
MOISTURE CONTENT (%)	17.5	21.8
DRY DENSITY (pcf)	92.0	100.3

CONSOLIDATION TEST DATA

Dames & Moore

Plate A-7.1

PROJECT Haslen Street Elderly Housing JOB NUMBER 04402-140-01I DATE 08-28-95 DRAWN BY JSD



BORING *B-4*

SAMPLE DEPTH *30.5 feet*

SOIL DESCRIPTION *Brown clayey silt (alluvium)*

	BEFORE TEST	AFTER TEST
MOISTURE CONTENT (%)	51.7	47.0
DRY DENSITY (pcf)	72.8	79.1

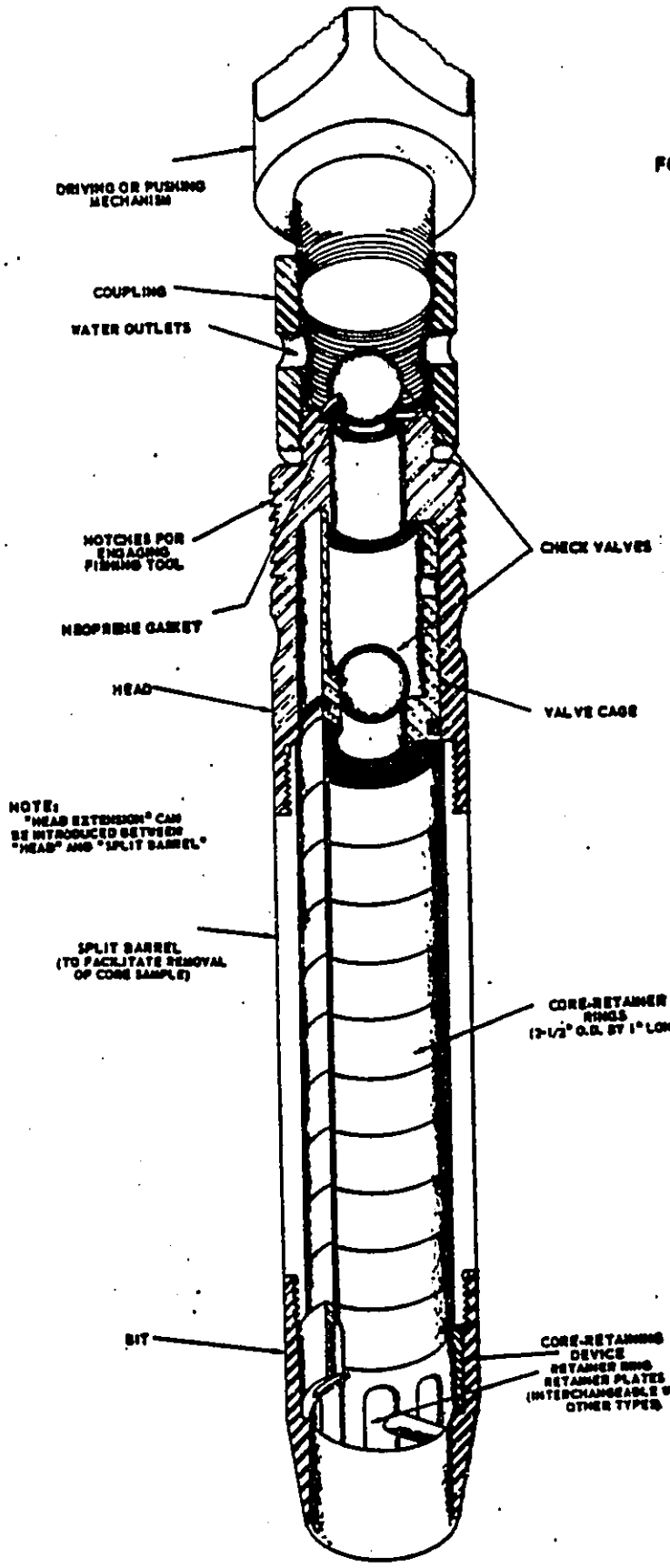
CONSOLIDATION TEST DATA

Dames & Moore

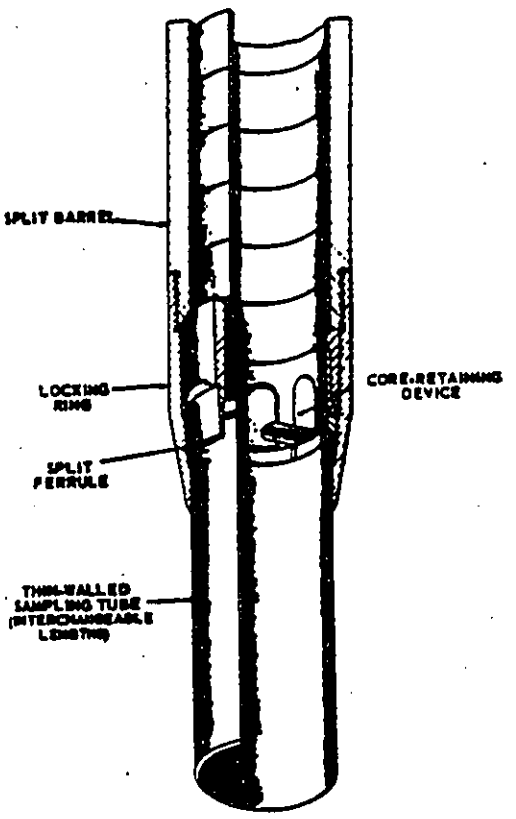
Plate A-7.2

SOIL SAMPLER TYPE U

FOR SOILS DIFFICULT TO RETAIN IN SAMPLER



ALTERNATE ATTACHMENTS

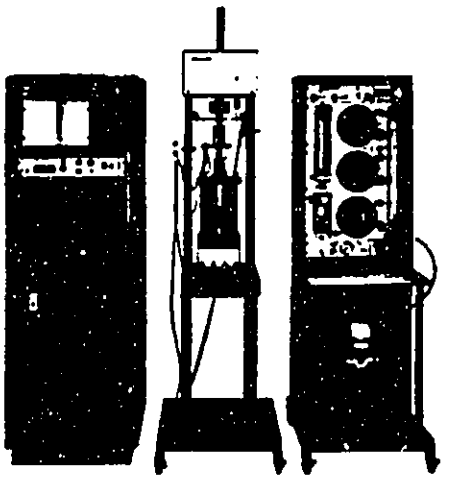


417.9 (5-68)

DAMES & MOORE
EXHIBIT A-1

METHODS OF PERFORMING UNCONFINED COMPRESSION AND TRIAXIAL COMPRESSION TESTS

THE SHEARING STRENGTHS OF SOILS ARE DETERMINED FROM THE RESULTS OF UNCONFINED COMPRESSION AND TRIAXIAL COMPRESSION TESTS. IN TRIAXIAL COMPRESSION TESTS THE TEST METHOD AND THE MAGNITUDE OF THE CONFINING PRESSURE ARE CHOSEN TO SIMULATE ANTICIPATED FIELD CONDITIONS.



TRIAXIAL COMPRESSION TEST UNIT

UNCONFINED COMPRESSION AND TRIAXIAL COMPRESSION TESTS ARE PERFORMED ON UNDISTURBED OR REMOLDED SAMPLES OF SOIL APPROXIMATELY SIX INCHES IN LENGTH AND TWO AND ONE-HALF INCHES IN DIAMETER. THE TESTS ARE RUN EITHER STRAIN-CONTROLLED OR STRESS-CONTROLLED. IN A STRAIN-CONTROLLED TEST THE SAMPLE IS SUBJECTED TO A CONSTANT RATE OF DEFLECTION AND THE RESULTING STRESSES ARE RECORDED. IN A STRESS-CONTROLLED TEST THE SAMPLE IS SUBJECTED TO EQUAL INCREMENTS OF LOAD WITH EACH INCREMENT BEING MAINTAINED UNTIL AN EQUILIBRIUM CONDITION WITH RESPECT TO STRAIN IS ACHIEVED.

YIELD, PEAK, OR ULTIMATE STRESSES ARE DETERMINED FROM THE STRESS-STRAIN PLOT FOR EACH SAMPLE AND THE PRINCIPAL STRESSES ARE EVALUATED. THE PRINCIPAL STRESSES ARE PLOTTED ON A MOHR'S CIRCLE DIAGRAM TO DETERMINE THE SHEARING STRENGTH OF THE SOIL TYPE BEING TESTED.

UNCONFINED COMPRESSION TESTS CAN BE PERFORMED ONLY ON SAMPLES WITH SUFFICIENT COHESION SO THAT THE SOIL WILL STAND AS AN UNSUPPORTED CYLINDER. THESE TESTS MAY BE RUN AT NATURAL MOISTURE CONTENT OR ON ARTIFICIALLY SATURATED SOILS.

IN A TRIAXIAL COMPRESSION TEST THE SAMPLE IS ENCASED IN A RUBBER MEMBRANE, PLACED IN A TEST CHAMBER, AND SUBJECTED TO A CONFINING PRESSURE THROUGHOUT THE DURATION OF THE TEST. NORMALLY, THIS CONFINING PRESSURE IS MAINTAINED AT A CONSTANT LEVEL, ALTHOUGH FOR SPECIAL TESTS IT MAY BE VARIED IN RELATION TO THE MEASURED STRESSES. TRIAXIAL COMPRESSION TESTS MAY BE RUN ON SOILS AT FIELD MOISTURE CONTENT OR ON ARTIFICIALLY SATURATED SAMPLES. THE TESTS ARE PERFORMED IN ONE OF THE FOLLOWING WAYS:

UNCONSOLIDATED-UNDRAINED: THE CONFINING PRESSURE IS IMPOSED ON THE SAMPLE AT THE START OF THE TEST. NO DRAINAGE IS PERMITTED AND THE STRESSES WHICH ARE MEASURED REPRESENT THE SUM OF THE INTERGRANULAR STRESSES AND PORE WATER PRESSURES.

CONSOLIDATED-UNDRAINED: THE SAMPLE IS ALLOWED TO CONSOLIDATE FULLY UNDER THE APPLIED CONFINING PRESSURE PRIOR TO THE START OF THE TEST. THE VOLUME CHANGE IS DETERMINED BY MEASURING THE WATER AND/OR AIR EXPELLED DURING CONSOLIDATION. NO DRAINAGE IS PERMITTED DURING THE TEST AND THE STRESSES WHICH ARE MEASURED ARE THE SAME AS FOR THE UNCONSOLIDATED-UNDRAINED TEST.

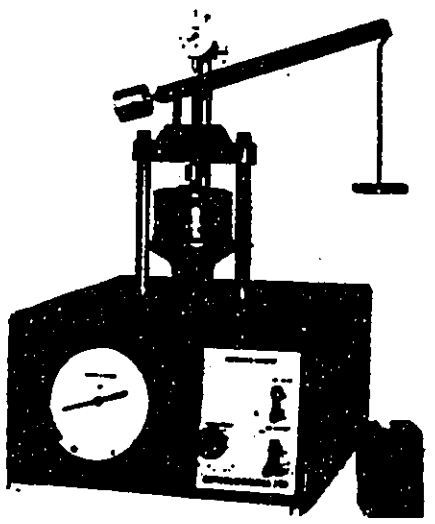
DRAINED: THE INTERGRANULAR STRESSES IN A SAMPLE MAY BE MEASURED BY PERFORMING A DRAINED, OR SLOW, TEST. IN THIS TEST THE SAMPLE IS FULLY SATURATED AND CONSOLIDATED PRIOR TO THE START OF THE TEST. DURING THE TEST, DRAINAGE IS PERMITTED AND THE TEST IS PERFORMED AT A SLOW ENOUGH RATE TO PREVENT THE BUILDUP OF PORE WATER PRESSURES. THE RESULTING STRESSES WHICH ARE MEASURED REPRESENT ONLY THE INTERGRANULAR STRESSES. THESE TESTS ARE USUALLY PERFORMED ON SAMPLES OF GENERALLY NON-COHESIVE SOILS, ALTHOUGH THE TEST PROCEDURE IS APPLICABLE TO COHESIVE SOILS IF A SUFFICIENTLY SLOW TEST RATE IS USED.

AN ALTERNATE MEANS OF OBTAINING THE DATA RESULTING FROM THE DRAINED TEST IS TO PERFORM AN UNDRAINED TEST IN WHICH SPECIAL EQUIPMENT IS USED TO MEASURE THE PORE WATER PRESSURES. THE DIFFERENCES BETWEEN THE TOTAL STRESSES AND THE PORE WATER PRESSURES MEASURED ARE THE INTERGRANULAR STRESSES.

METHOD OF PERFORMING CONSOLIDATION TESTS

CONSOLIDATION TESTS ARE PERFORMED TO EVALUATE THE VOLUME CHANGES OF SOILS SUBJECTED TO INCREASED LOADS. TIME-CONSOLIDATION AND PRESSURE-CONSOLIDATION CURVES MAY BE PLOTTED FROM THE DATA OBTAINED IN THE TESTS. ENGINEERING ANALYSES BASED ON THESE CURVES PERMIT ESTIMATES TO BE MADE OF THE PROBABLE MAGNITUDE AND RATE OF SETTLEMENT OF THE TESTED SOILS UNDER APPLIED LOADS.

EACH SAMPLE IS TESTED WITHIN BRASS RINGS TWO AND ONE-HALF INCHES IN DIAMETER AND ONE INCH IN LENGTH. UNDISTURBED SAMPLES OF IN-PLACE SOILS ARE TESTED IN RINGS TAKEN FROM THE SAMPLING DEVICE IN WHICH THE SAMPLES WERE OBTAINED. LOOSE SAMPLES OF SOILS TO BE USED IN CONSTRUCTING EARTH FILLS ARE COMPACTED IN RINGS TO PREDETERMINED CONDITIONS AND TESTED.



DEAD LOAD-PNEUMATIC CONSOLIDOMETER

IN TESTING, THE SAMPLE IS RIGIDLY CONFINED LATERALLY BY THE BRASS RING. AXIAL LOADS ARE TRANSMITTED TO THE ENDS OF THE SAMPLE BY POROUS DISKS. THE DISKS ALLOW DRAINAGE OF THE LOADED SAMPLE. THE AXIAL COMPRESSION OR EXPANSION OF THE SAMPLE IS MEASURED BY A MICROMETER DIAL INDICATOR AT APPROPRIATE TIME INTERVALS AFTER EACH LOAD INCREMENT IS APPLIED. EACH LOAD IS ORDINARILY TWICE THE PRECEDING LOAD. THE INCREMENTS ARE SELECTED TO OBTAIN CONSOLIDATION DATA REPRESENTING THE FIELD LOADING CONDITIONS FOR WHICH THE TEST IS BEING PERFORMED. EACH LOAD INCREMENT IS ALLOWED TO ACT OVER AN INTERVAL OF TIME DEPENDENT ON THE TYPE AND EXTENT OF THE SOIL IN THE FIELD.

APPENDIX E

NOISE STUDY

NOISE STUDY
FOR THE
HAUSTEN STREET ELDERLY HOUSING PROJECT
HONOLULU, OAHU, HAWAII

Prepared for:

AM PARTNERS, INC.

Prepared by:

Y. EBISU & ASSOCIATES
1126 12th Avenue, Room 305
Honolulu, Hawaii 96816

JUNE 1995

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CHAPTER I. SUMMARY

The existing and future traffic noise levels in the vicinity of the proposed Hausten Street Elderly Housing Project in Honolulu were evaluated for their potential impacts and their relationship to current FHA/HUD noise standards. The traffic noise level increases along access roadways to and surrounding the project site were calculated. These roadways were: Hausten Street; King Street; Date Street; University Avenue; Isenberg Street; and Kapiolani Boulevard. Following project buildout by CY 1997, increases in traffic noise of 0.1 to 0.8 Ldn units are predicted to occur as a result of project plus non-project traffic.

Along the high volume streets (King Street, University Avenue, Isenberg Street, Date Street, and Kapiolani Boulevard), traffic noise levels are expected to increase by 0.1 to 0.2 Ldn as a result of non-project traffic by CY 1997. Project traffic should not cause any noticeable increase in traffic noise or adverse traffic noise impacts along these high volume streets. Along Hausten Street, traffic noise levels are expected to increase by 0.8 Ldn, with 0.5 to 0.6 Ldn increase attributable to project traffic. These increases in traffic noise levels are considered to be insignificant, will be difficult to measure, and are not expected to generate adverse noise impacts.

It should be possible to locate the project's living units as proposed under both Scheme A (Point Tower) and Scheme 3 (Mid-Rise) and meet the 65 Ldn FHA/HUD noise standard. Predicted noise levels at all of the living units of both Scheme A and Scheme 3 are expected to be less than 65 Ldn by CY 1997, and through CY 2005 if area traffic volumes increase at an average annual rate of two percent. Because of this, adverse impacts from traffic noise are not anticipated at the proposed project dwelling units in the future, and special noise mitigation measures are not required.

Unavoidable, but temporary, noise impacts will occur during the construction of the proposed project, particularly during the

excavation and pile driving activities on the project site. Because construction activities are predicted to be audible within the project and at adjoining properties, the quality of the acoustic environment may be degraded to unacceptable levels during periods of construction. Mitigation measures to reduce construction noise to inaudible levels will not be practical in all cases, but the use of quiet equipment and the implementation of the State Department of Health construction noise permit procedures are recommended as mitigation measures.

CHAPTER II. PURPOSE

The primary objective of this study was to describe the existing and future traffic noise environment in the environs of the proposed Hausten Street Elderly Housing Project in the Moiliili District of Honolulu on the island of Oahu. Traffic noise level increases and impacts associated with the proposed development were to be determined within the project site as well as along the public roadways expected to service the project traffic. A specific objective was to determine future traffic noise level increases associated with both project and non-project traffic, and the potential noise impacts associated with these increases. Assessments of possible future impacts from short term construction noise at the project site were also included as noise study objectives. Recommendations for minimizing identified noise impacts were also to be provided as required.

CHAPTER III. NOISE DESCRIPTORS AND THEIR RELATIONSHIP TO LAND USE COMPATIBILITY

The noise descriptor currently used by federal agencies (such as FHA/HUD) to assess environmental noise is the Day-Night Average Sound Level (Ldn). This descriptor incorporates a 24-hour average of instantaneous A-Weighted Sound Levels as read on a standard Sound Level Meter. By definition, the minimum averaging period for the Ldn descriptor is 24 hours. Additionally, sound levels which occur during the nighttime hours of 10:00 PM to 7:00 AM are increased by 10 decibels (dB) prior to computing the 24-hour average by the Ldn descriptor. A more complete list of noise descriptors is provided in **APPENDIX B** to this report.

TABLE 1, derived from **Reference 1**, presents current federal noise standards and acceptability criteria for residential land uses. Land use compatibility guidelines for various levels of environmental noise as measured by the Ldn descriptor system are shown in **FIGURE 1**. As a general rule, noise levels of 55 Ldn or less occur in rural areas, or in areas which are removed from high volume roadways. In urbanized areas which are shielded from high volume streets, Ldn levels generally range from 55 to 65 Ldn, and are usually controlled by motor vehicle traffic noise. Residences which front major roadways are generally exposed to levels of 65 Ldn, and as high as 75 Ldn when the roadway is a high speed freeway. In the project area, traffic noise levels are less than 65 Ldn along Hausten Street due to the low volume of traffic along Hausten Street. The ranges of background ambient noise levels at other urbanized areas on Oahu are shown in **FIGURE 2**.

For the purposes of determining noise acceptability for funding assistance from federal agencies (FHA/HUD and VA), an exterior noise level of 65 Ldn or lower is considered acceptable. This standard is applied nationally (**Reference 2**), including Hawaii. Because of our open-living conditions, the predominant use of naturally ventilated dwellings, and the relatively low exterior-to-

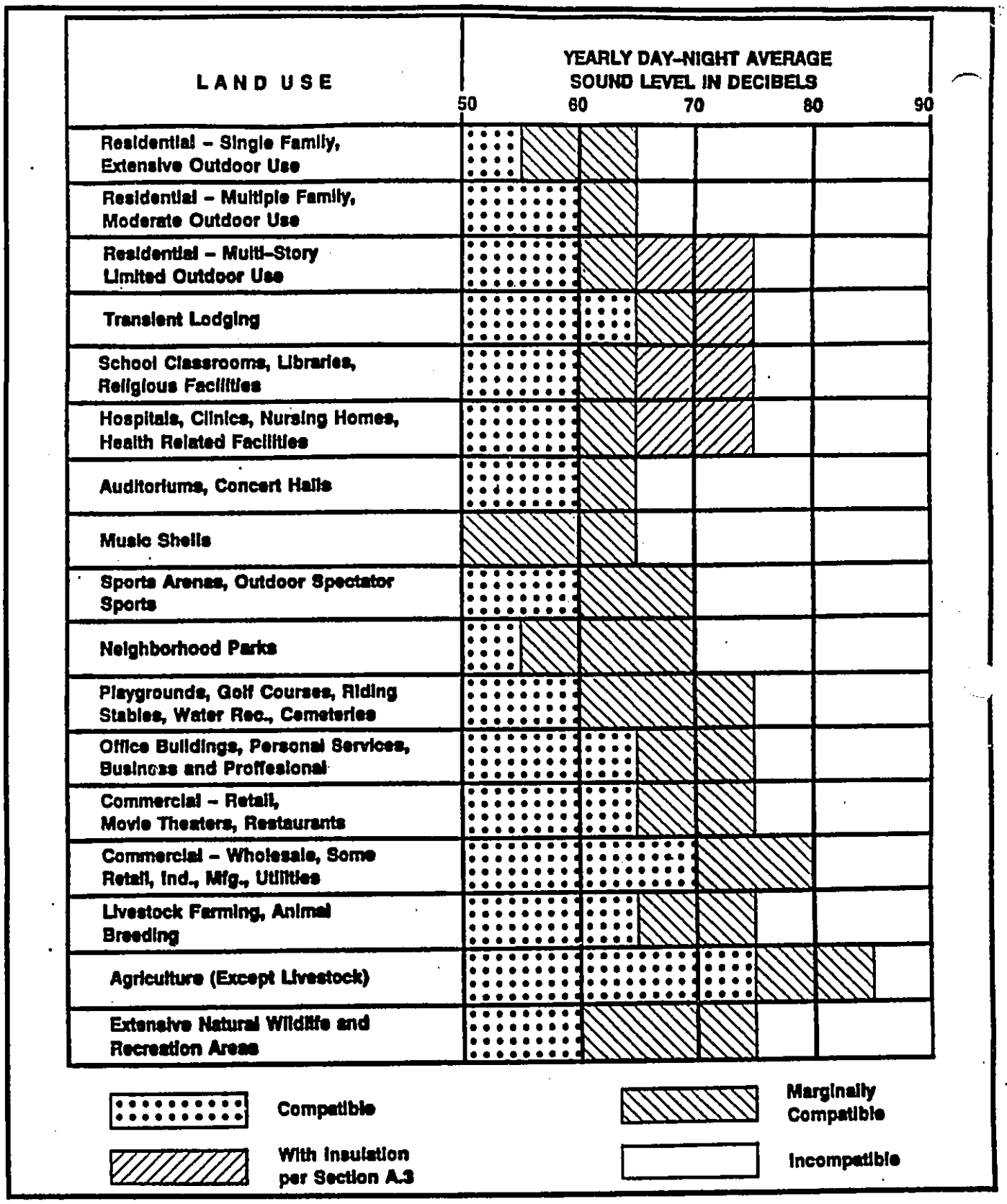
TABLE 1

EXTERIOR NOISE EXPOSURE CLASSIFICATION
(RESIDENTIAL LAND USE)

NOISE EXPOSURE CLASS	DAY-NIGHT SOUND LEVEL	EQUIVALENT SOUND LEVEL	FEDERAL[1] STANDARD
Minimal Exposure	Not Exceeding 55 L_{dn}	Not Exceeding 55 L_{eq}	Unconditionally Acceptable
Moderate Exposure	Above 55 L_{dn} But Not Above 65 L_{dn}	Above 55 L_{eq} But Not Above 65 L_{eq}	Acceptable[2]
Significant Exposure	Above 65 L_{dn} But Not Above 75 L_{dn}	Above 65 L_{eq} But Not Above 75 L_{eq}	Normally Unacceptable
Severe Exposure	Above 75 L_{dn}	Above 75 L_{eq}	Unacceptable

Notes: (1) Federal Housing Administration, Veterans Administration, Department of Defense, and Department of Transportation.

(2) FHWA uses the L_{eq} instead of the L_{dn} descriptor. For planning purposes, both are equivalent if: (a) heavy trucks do not exceed 10 percent of total traffic flow in vehicles per 24 hours, and (b) traffic between 10:00 PM and 7:00 AM does not exceed 15 percent of average daily traffic flow in vehicles per 24 hours. The noise mitigation threshold used by FHWA for residences is 67 L_{eq}.

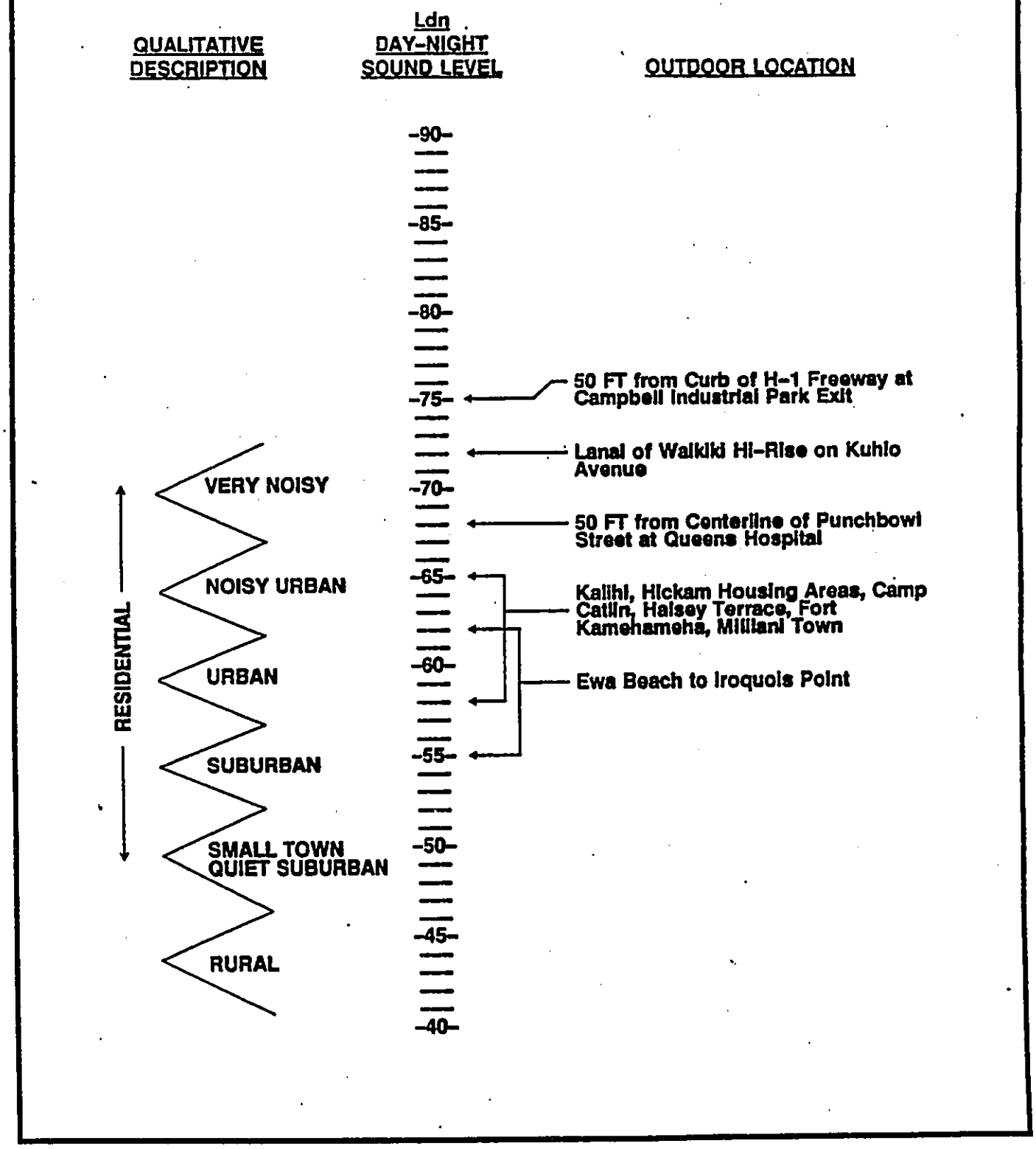


LAND USE COMPATIBILITY
WITH YEARLY DAY–NIGHT AVERAGE SOUND LEVEL
AT A SITE FOR BUILDINGS AS COMMONLY CONSTRUCTED
(Source: American National Standards Institute S12.40–1990)

FIGURE 1

FIGURE 2

RANGE OF EXTERIOR BACKGROUND AMBIENT NOISE LEVELS



interior sound attenuation afforded by these naturally ventilated structures, an exterior noise level of 65 Ldn does not eliminate all risks of noise impacts. Because of these factors, and as recommended in **Reference 3**, a lower level of 55 Ldn is considered as the "Unconditionally Acceptable" (or "Near-Zero Risk") level of exterior noise. However, after considering the cost and feasibility of applying the lower level of 55 Ldn, government agencies such as FHA/HUD and VA have selected 65 Ldn as a more appropriate regulatory standard.

For commercial, industrial, and other non-noise sensitive land uses, exterior noise levels as high as 75 Ldn are generally considered acceptable. Exceptions to this occur when naturally ventilated office and other commercial establishments are exposed to exterior levels which exceed 65 Ldn.

On the island of Oahu, the State Department of Health (DOH) regulates noise from construction activities, through the issuance of permits for allowing excessive noise during limited time periods. State DOH noise regulations are expressed in maximum allowable property line noise limits rather than Ldn (see **Reference 4**). Although they are not directly comparable to noise criteria expressed in Ldn, State DOH noise limits for residential, commercial, and industrial lands equate to approximately 55, 60, and 76 Ldn, respectively.

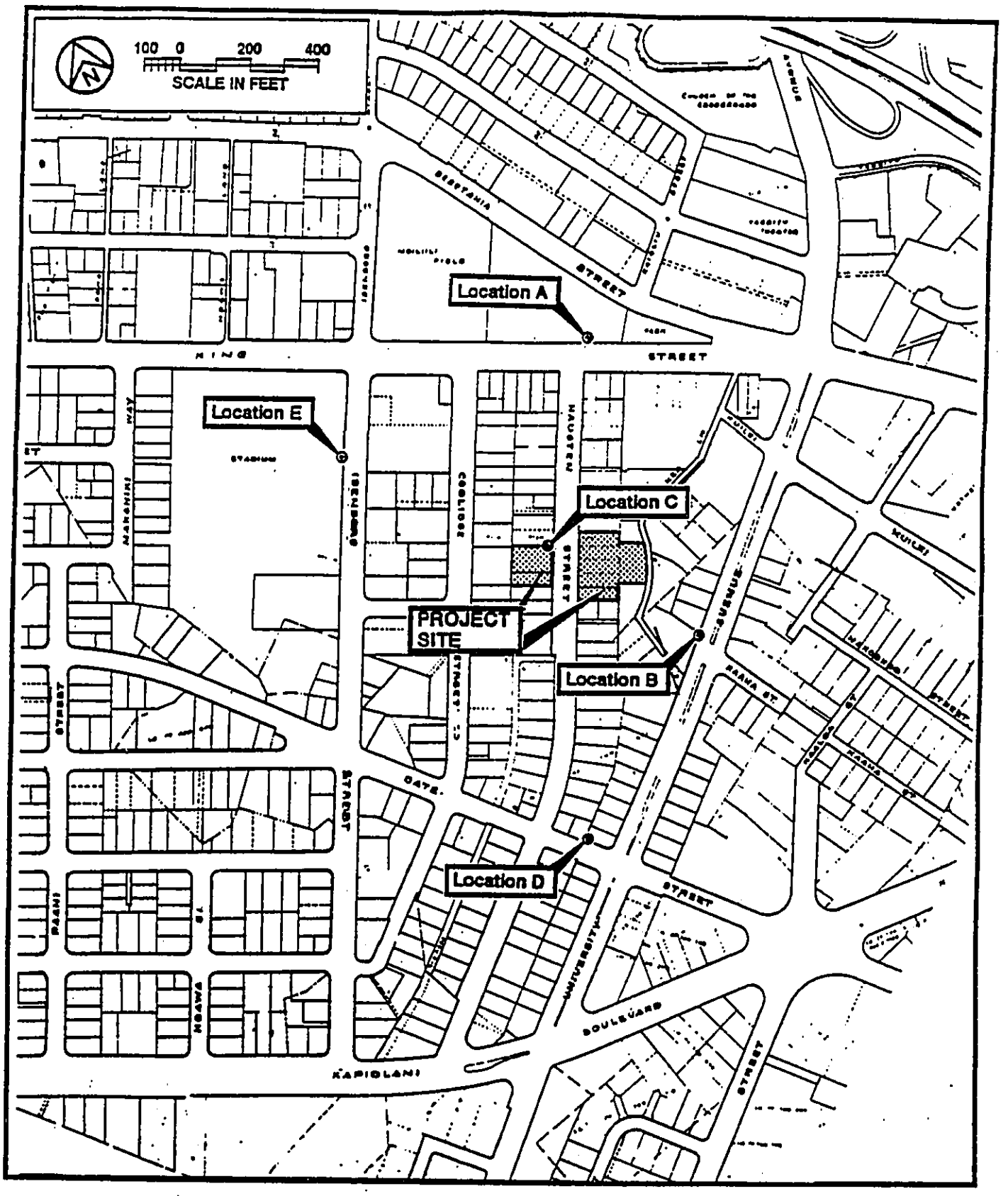
It should be noted that the noise compatibility guidelines and relationships to the Ldn noise descriptor may not be applicable to impulsive noise sources such as pile drivers. The use of penalty factors (such as adding 10 dB to measured sound levels or the use of C-Weighting filters) have been proposed. However, the relationships between levels of impulsive noise sources and land use compatibility have not been as firmly established as have the relationships for non-impulsive sources. The State DOH limits for impulsive sounds which exceed 120 impulses in any 20 minute period are 10 dB above the limits for non-impulsive sounds. If impulsive sounds do not exceed 120 impulses in any 20 minute time period,

there are no regulatory limits on their sound levels under the State DOH regulations.

CHAPTER IV. GENERAL STUDY METHODOLOGY

Existing traffic noise levels were measured at five locations in the project environs to provide a basis for developing the project's traffic noise contributions along the roadways which will service the proposed development, and to calculate future traffic noise levels at the proposed mid-rise and high-rise dwelling units of the project. The locations of the noise measurement sites are shown in **FIGURE 3.** Noise measurements were performed during the month of May 1995 before the school summer vacation period. The results of the traffic noise measurements were compared with calculations of existing traffic noise levels to validate the computer model used. The traffic noise measurement results, and their comparisons with computer model predictions of existing traffic noise levels are summarized in **TABLE 2.**

Traffic noise calculations for the existing conditions as well as noise predictions for the Year 1997 were performed using the Federal Highway Administration (FHWA) Noise Prediction Model (**Reference 5**). Traffic data entered into the noise prediction model were: hourly traffic volumes, average vehicle speeds, estimates of traffic mix, and hard ground propagation loss factor. The traffic assignments for the project (**Reference 6**), plus Honolulu Department of Transportation Services traffic counts on University Avenue, Isenberg Street, King Street, and Kapiolani Boulevard (**References 7 thru 12**) were the primary sources of data inputs to the model. Where current (1995) and future (1997) traffic counts were not available, the available counts of background traffic volumes were scaled upward using a two percent annual growth rate. For existing and future traffic on Kapiolani Boulevard, it was assumed that the average noise levels, or Leq(h), during the PM peak hour were 2.7 dB less than the 24-hour Ldn along the boulevard. For the other primary access roadways to the project, it was assumed the average noise levels during the PM peak hour were equal to the 24-hour Ldn. These assumptions were



LOCATIONS OF NOISE MEASUREMENT SITES | **FIGURE 3**

TABLE 2

RESULTS OF NOISE MEASUREMENTS

LOCATION	Time of Day (HRS)	Ave. Speed (MPH)	--Hourly Traffic Volume -- AUTO	M.TRUCK	H.TRUCK	Measured Leq (dB)	Predicted Leq (dB)
A. 40 FT from the Center–line of King Street. (5/16/95)	0945 TO 1045	35	923	10	17	67.8	67.6
B. 35 FT from the Center–line of University Ave. (5/16/95)	1100 TO 1200	35	735	7	11	67.9	67.4
C. 25 FT from the Center–line of Hausten St. (5/16/95)	1215 TO 1315	30	67	0	0	57.9	52.7
C. 25 FT from the Center–line of Hausten St. (5/16/95)	1600 TO 1700	30	112	3	0	59.1	56.3
D. 30 FT from the Center–line of Date St. (5/16/95)	1330 TO 1430	35	683	9	6	67.0	67.0
E. 30 FT from the Center–line of Isenberg St. (5/16/95)	1445 TO 1545	35	697	2	5	67.0	67.2

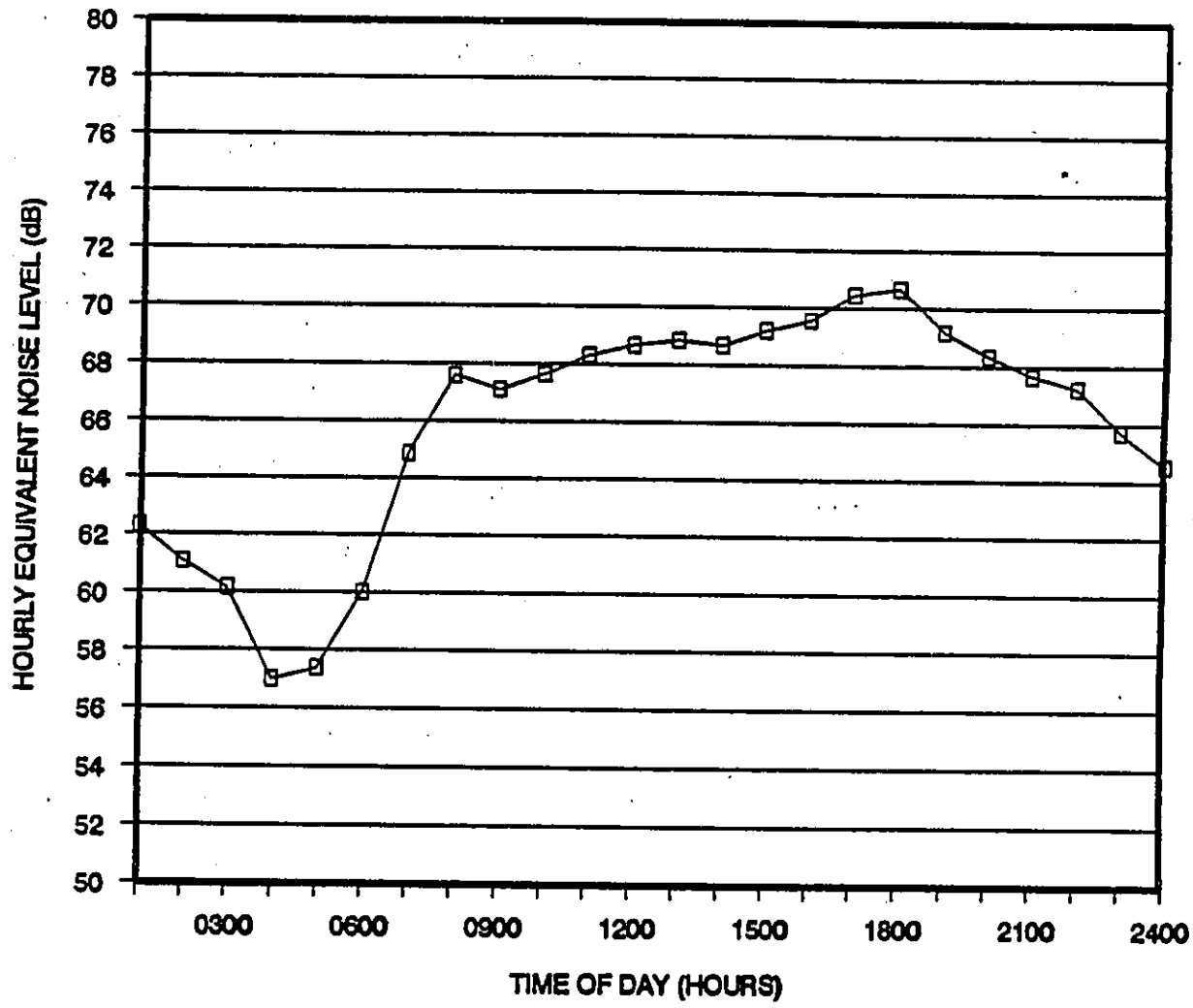
based on computations of both the hourly Leq and the 24-hour Ldn of traffic noise on the access roadways to the project site (see FIGURE 4).

Traffic noise calculations for both the existing and future conditions in the project environs were developed for ground level and elevated receptors with and without the benefit of shielding effects. Traffic noise levels were calculated for future conditions with and without the proposed elderly housing project. The forecasted changes in traffic noise levels over existing levels were calculated for both future scenarios, and noise impact risks evaluated. The relative contributions of non-project and project traffic to the total noise levels were also calculated, and an evaluation of possible traffic noise impacts was made.

Calculations of average exterior and interior noise levels from construction activities were performed for typical naturally ventilated and air conditioned dwellings. Predicted noise levels were compared with existing background ambient noise levels, and the potential for noise impacts was assessed. Potential noise impacts from pile driving operations were also discussed, and mitigation measures recommended.

FIGURE 4

HOURLY VARIATIONS OF TRAFFIC NOISE AT 50 FT SETBACK DISTANCE FROM THE CENTERLINE OF KING STREET NORTHWEST OF UNIVERSITY AVENUE (MAY 12–13, 1994)



CHAPTER V. EXISTING NOISE ENVIRONMENT

The existing traffic noise levels at ground level locations on the project site are in the "Moderate Exposure, Acceptable" category at 55 to 60 Ldn. At high-rise receptor elevations (100 to 130 FT) on the project site, existing traffic noise levels approach 65 Ldn, but are still in the "Moderate Exposure, Acceptable" category.

The results of the May 1995 traffic and background ambient noise measurements are summarized in TABLE 2, with measurement locations identified in FIGURE 3. Sites "A" thru "E" were all located at street level. As shown in TABLE 2, correlation between measured and predicted traffic noise levels was good except at Location "C," where distant traffic noise and other non-traffic noise sources were similar in level to noise from Hausten Street traffic.

Results of calculations of existing (CY 1995) traffic noise levels during the PM peak hour period are shown in TABLE 3. The results of the calculations apply at 50 FT distances from the centerlines of the roadway sections in the project environs. Calculated setback distances from these roadways to the existing 60, 65, and 70 Ldn contours are shown in TABLE 4. As indicated in the TABLE 3, the existing noise levels from the high volume roadways (King Street, Date Street, Isenberg Street, University Avenue, Date Street, and Kapiolani Boulevard) are relatively high when compared to the noise levels from Hausten Street. At ground level, the FHA/HUD standard of 65 Ldn is not exceeded on the project site due to adequate setbacks from the high volume streets as well as the noise attenuation effects of intervening structures between the high volume streets and the project site. At higher elevations of 100 to 130 FT, the shielding effects of intervening structures between the high volume streets and the high-rise receptors diminish, and the existing noise levels over the project site at these elevations are approximately equal to the 65 Ldn

TABLE 3

COMPARISONS OF EXISTING AND CY 1997 TRAFFIC NOISE LEVELS
ALONG ACCESS ROADS TO PROJECT SITE
(PM PEAK HOUR AND 50 FT FROM ROADWAY CENTERLINES)

LOCATION	SPEED (MPH)	VPH	****** HOURLY LEQ IN dB ****** AUTO	MT	HT	ALL VEH
EXISTING (CY 1995) PM PEAK HR. TRAFFIC:						
Hausten St. North of Project	30	116	51.6	43.5	50.0	54.2
Hausten St. South of Project	30	122	51.8	43.8	50.2	54.5
King Street	35	2,756	67.8	61.4	68.4	71.6
Date Street	35	1,106	63.9	57.4	63.2	67.1
University Avenue	35	1,414	64.9	58.5	64.3	68.1
Isenberg Street	35	977	63.4	55.1	60.9	65.7
Kapiolani Boulevard	34	3,300	67.2	58.9	66.6	70.3
CY 1997 PM PEAK HR. TRAFFIC WITH THE PROJECT:						
Hausten St. North of Project	30	139	52.4	44.3	50.8	55.0
Hausten St. South of Project	30	143	52.5	44.5	50.9	55.2
King Street	35	2,876	68.0	61.5	68.6	71.8
Date Street	35	1,147	64.0	57.5	63.4	67.2
University Avenue	35	1,471	65.1	58.6	64.4	68.3
Isenberg Street	35	1,016	63.6	55.3	61.1	65.9
Kapiolani Boulevard	34	3,431	67.3	59.1	66.8	70.4

Note:

The following assumed traffic mixes of autos, medium trucks, and heavy vehicles were used for existing and future conditions:

(a) Hausten Street: 98% autos, 1% medium trucks, and 1% heavy trucks and buses.
(b) King Street: 96.5% autos, 1.5% medium trucks, and 2% heavy trucks and buses.
(c) Date Street: 97% autos, 1.5% medium trucks, and 1.5% heavy trucks and buses.
(d) University Avenue: 97% autos, 1.5% medium trucks, and 1.5% heavy trucks and buses.
(e) Isenberg Street: 98% autos, 1% medium trucks, and 1% heavy trucks and buses.
(f) Kapiolani Boulevard: 97.5% autos, 1.0% medium trucks, and 1.5% heavy trucks and buses.

TABLE 4

EXISTING AND CY 1997 DISTANCES TO 60, 65, AND 70 Ldn CONTOURS

STREET SECTION	60 Ldn SETBACK (FT) EXISTING	60 Ldn SETBACK (FT) CY 1997	65 Ldn SETBACK (FT) EXISTING	65 Ldn SETBACK (FT) CY 1997	70 Ldn SETBACK (FT) EXISTING	70 Ldn SETBACK (FT) CY 1997
Hausten St. North of Project	13	16	4	5	1	2
Hausten St. South of Project	14	16	4	5	1	2
King Street	718	749	227	237	72	75
Date Street	254	263	80	83	25	26
University Avenue	325	338	103	107	32	34
Isenberg Street	187	194	59	61	19	19
Kapiolani Boulevard	987	1,027	312	325	99	103

Notes:

(1) All setback distances are from the roadways' centerlines.
(2) See TABLE 3 for traffic volume, speed, and mix assumptions.
(3) Ldn assumed to be equal to PM Peak Hour Leq along Hausten Street, University Avenue, Date Street, Isenberg Street, and King Street.
(4) Ldn assumed to be equal to PM Peak Hour Leq plus 2.7 dB along Kapiolani Boulevard.
(5) Setback distances are for unobstructed line-of-sight conditions.
(6) Hard ground conditions assumed along all roadways.

FHA/HUD standard.

The traffic noise levels shown in the tables and figures only apply when unobstructed line-of-sight conditions exist to the roadways. These conditions would generally occur at short (50 to 100 FT) distances to a roadway, within any flat, open space along the roadway, and at distant, but elevated locations above the roadway. The existing traffic noise levels shown in the tables and figures should be reduced by 3 to 5 dB (or Ldn) if partial shielding (line-of-sight obstruction) exists between the roadway and the receptor location. If the receptor is located behind a major obstruction (large building), the noise levels in the tables and figures should be reduced by 5 to 10 dB.

CHAPTER VI. FUTURE TRAFFIC NOISE ENVIRONMENT

Predictions of future traffic noise levels were made using the traffic volume assignments of **Reference 6** for CY 1997 with and without the proposed project. The future projections of project plus non-project traffic noise levels on the roadways which would service the project are shown in **TABLE 3** for the PM peak hour of traffic. These predictions assume that average vehicle speeds and traffic mix will not change from current conditions.

As indicated in **TABLE 3**, traffic noise levels are predicted to increase by 0.1 to 0.8 dB during the PM peak hour, with the largest increase expected along Hausten Street. However, future traffic noise levels along Hausten Street will remain low, and the high volume roadways (King Street, Date Street, Isenberg Street, University Avenue, Date Street, and Kapiolani Boulevard) will continue to be the dominant traffic noise sources in the project area.

TABLE 4 summarizes the predicted setback distances to the 60, 65, and 70 Ldn traffic noise contour lines along the roadways servicing the project and attributable to both project plus non-project traffic by CY 1997. The setback distances in **TABLE 4** do not include the beneficial effects of noise shielding from buildings, or the detrimental effects of additive contributions of noise from intersecting streets or reflections from building walls. As indicated in **TABLE 4**, setback distances to the 65 Ldn contour from the centerline of Hausten Street will continue to be essentially non-existent, while those from the high volume roadways are orders of magnitude larger and are expected to increase slightly from current values.

TABLES 5 and 6 present the predicted traffic noise levels at project dwelling unit window locations for Schemes A and 3, respectively, following build-out in CY 1977. The locations of the dwelling units window locations are shown in **FIGURES 5 and 6** for Schemes A and 3, respectively. The beneficial effects of shield-

TABLE 5

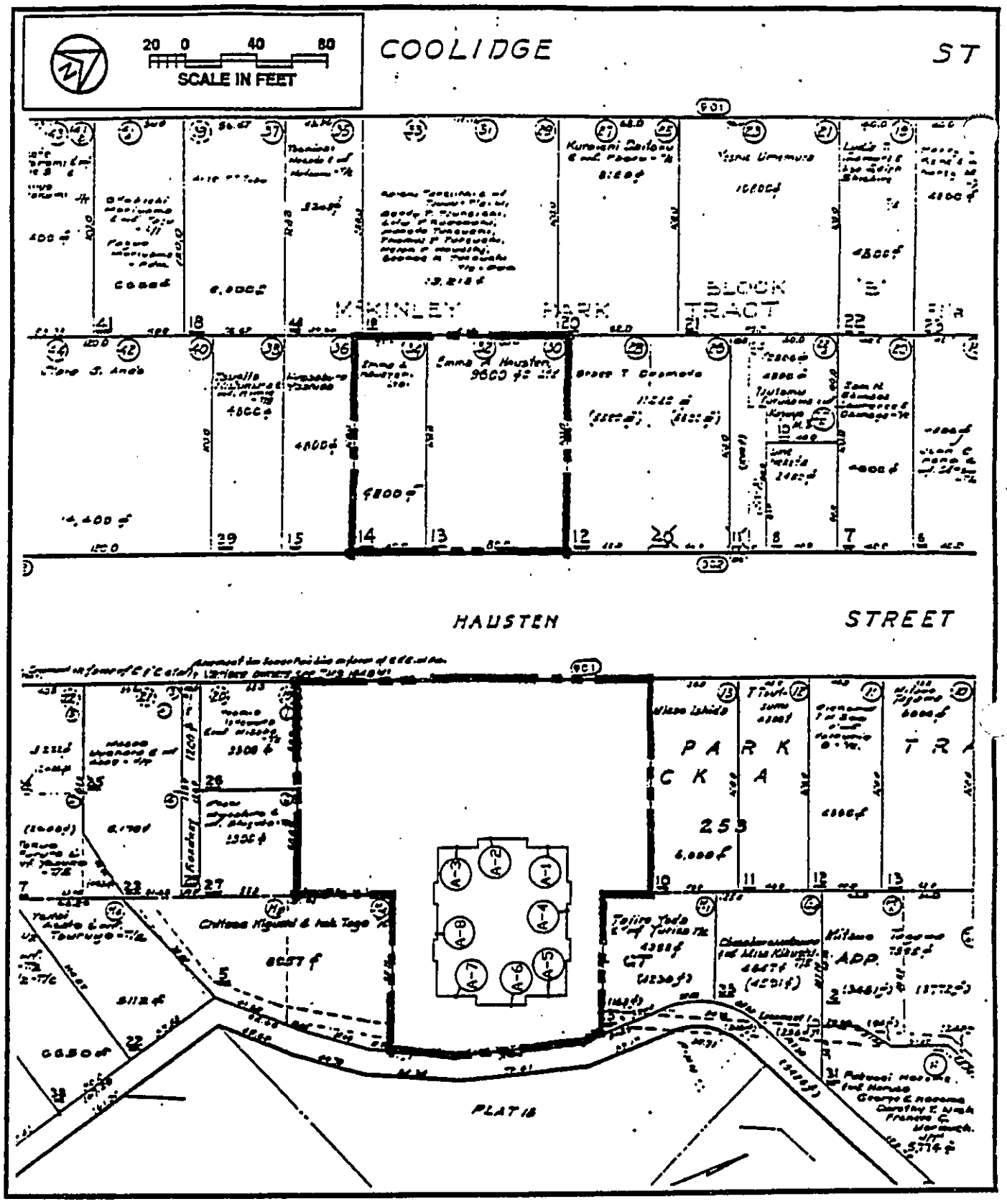
PREDICTED CY 1997 TRAFFIC NOISE LEVELS AT
PROPOSED DWELLING UNITS OF SCHEME A

		TRAFFIC NOISE CONTRIBUTIONS (IN LDN)					
LOCATION	FLOOR	KING STREET	DATE STREET	UNIVERSITY AVENUE	ISENBERG STREET	KAPIOLANI BOULEVARD	TOTAL LDN
A – 1	2	52.0	44.1	N/A	49.8	N/A	54.5
	6	52.7	44.7	N/A	50.1	N/A	55.0
	10	56.2	44.9	N/A	50.4	N/A	57.5
	13	56.3	45.0	N/A	53.2	N/A	58.2
A – 2	2	51.9	45.8	N/A	50.7	N/A	54.9
	6	52.3	46.4	N/A	51.1	N/A	55.3
	10	55.9	46.6	N/A	51.4	N/A	57.6
	13	56.1	46.6	N/A	54.1	N/A	58.5
A – 3	2	N/A	46.1	N/A	45.9	N/A	49.0
	6	N/A	46.6	N/A	50.3	N/A	51.8
	10	N/A	46.8	N/A	50.6	N/A	52.1
	13	N/A	46.8	N/A	53.4	N/A	54.3
A – 4	2	54.1	N/A	48.8	45.8	N/A	55.7
	6	54.5	N/A	53.0	46.1	N/A	57.2
	10	58.4	N/A	55.3	46.3	N/A	60.3
	13	58.6	N/A	55.3	49.0	N/A	60.6
A – 5	2	51.1	N/A	52.4	N/A	48.9	55.8
	6	51.7	N/A	59.2	N/A	49.4	60.3
	10	55.9	N/A	59.2	N/A	49.6	61.2
	13	56.1	N/A	59.2	N/A	49.7	61.2
A – 6	2	50.9	43.2	53.6	N/A	49.9	56.7
	6	51.5	43.8	60.4	N/A	50.5	61.4
	10	55.8	44.0	60.4	N/A	50.7	62.1
	13	56.0	44.1	60.4	N/A	50.7	62.1
A – 7	2	49.6	43.3	53.5	N/A	50.0	56.4
	6	50.1	43.8	60.3	N/A	50.5	61.2
	10	54.2	44.1	60.3	N/A	50.7	61.7
	13	54.4	44.1	60.3	N/A	50.6	61.7
A – 8	2	N/A	45.3	50.8	46.9	49.1	54.5
	6	N/A	45.9	57.4	47.2	49.6	58.6
	10	N/A	46.0	57.4	47.5	49.8	58.7
	13	N/A	46.0	57.4	50.3	49.9	59.0

TABLE 6

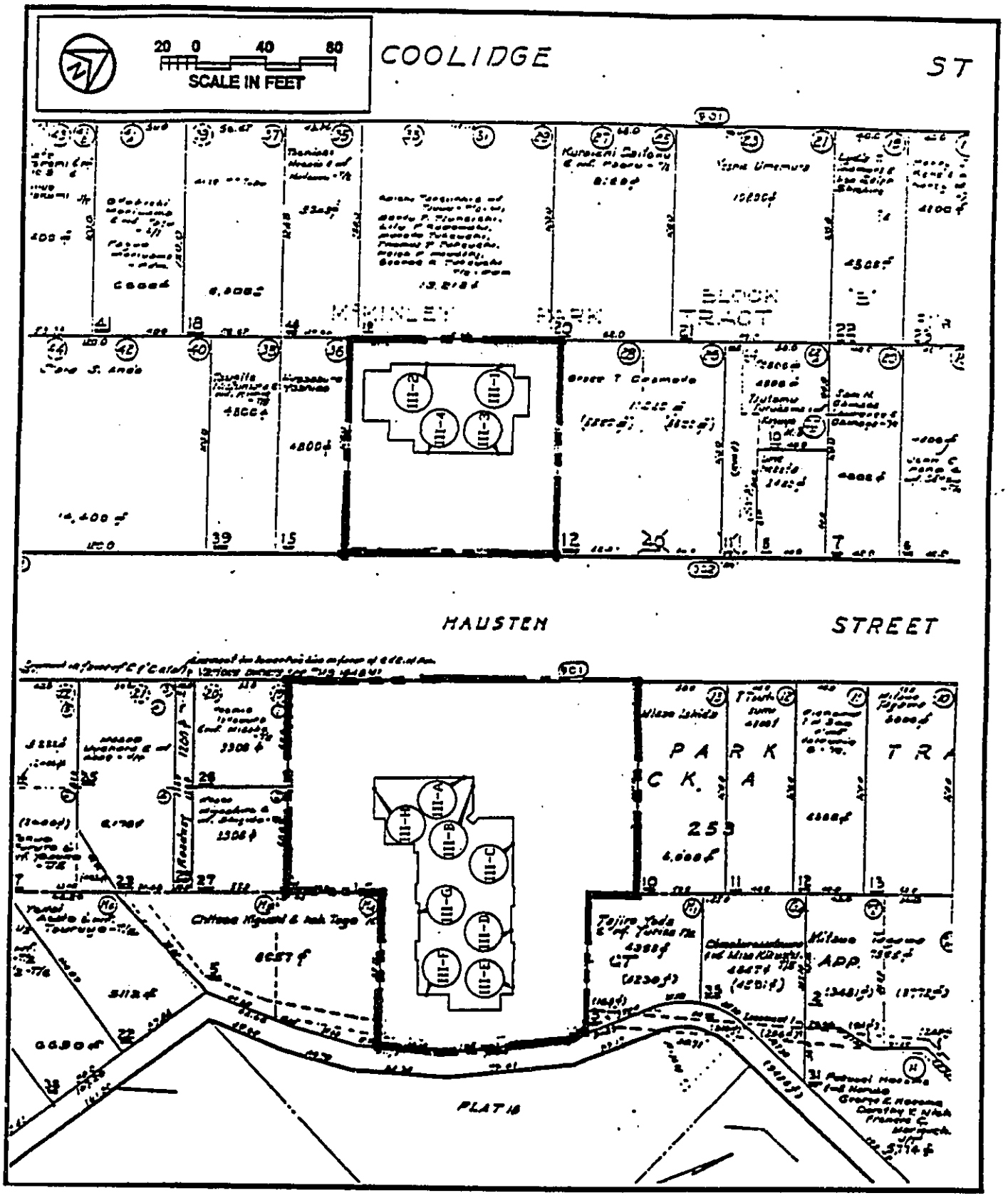
PREDICTED CY 1997 TRAFFIC NOISE LEVELS AT PROPOSED DWELLING UNITS OF SCHEME 3

LOCATION	FLOOR	TRAFFIC NOISE CONTRIBUTIONS (IN LDN) KING STREET	DATE STREET	UNIVERSITY AVENUE	ISENBERG STREET	KAPIOLANI BOULEVARD	TOTAL LDN
III – 1	2	51.0	45.6	N/A	42.8	N/A	52.6
	5	51.5	46.2	N/A	53.2	N/A	55.9
	9	55.7	46.4	N/A	56.1	N/A	59.2
III – 2	2	50.7	45.9	N/A	52.8	N/A	55.4
	5	51.2	46.5	N/A	53.2	N/A	55.9
	9	55.4	46.7	N/A	56.1	N/A	59.0
III – 3	2	52.0	44.6	50.1	N/A	46.5	55.2
	5	52.4	45.0	50.7	N/A	47.0	55.7
	9	55.9	45.2	54.6	N/A	47.3	58.8
III – 4	2	51.1	45.3	48.0	N/A	47.4	54.5
	5	51.4	45.6	48.6	N/A	47.9	54.9
	9	54.8	45.8	52.7	N/A	48.2	57.7
III – A	2	51.4	44.2	N/A	50.3	N/A	54.3
	5	51.8	44.6	N/A	50.5	N/A	54.7
	9	55.2	44.8	N/A	50.8	N/A	56.8
III – B	2	52.5	N/A	43.4	47.4	N/A	54.1
	5	53.0	N/A	46.8	47.7	N/A	54.9
	9	56.8	N/A	49.1	48.0	N/A	57.9
III – C	2	53.8	N/A	48.9	47.6	N/A	55.7
	5	54.2	N/A	53.0	47.8	N/A	57.2
	9	58.1	N/A	60.5	48.1	N/A	62.6
III – D	2	53.6	N/A	48.8	47.3	N/A	55.5
	5	54.1	N/A	52.8	47.5	N/A	57.0
	9	58.0	N/A	55.1	47.8	N/A	60.1
III – E	2	54.2	N/A	50.2	47.1	N/A	56.2
	5	54.6	N/A	54.3	47.3	N/A	57.9
	9	58.5	N/A	51.6	47.6	N/A	59.6
III – F	2	48.7	43.3	53.1	N/A	50.1	56.0
	5	49.1	43.7	57.7	N/A	50.5	59.1
	9	53.2	44.0	59.9	N/A	50.8	61.2
III – G	2	N/A	46.2	51.0	46.2	49.0	54.6
	5	N/A	46.7	55.3	46.4	49.5	57.1
	9	N/A	46.9	57.7	46.6	49.9	58.9
III – H	2	N/A	47.6	50.5	47.9	51.3	55.6
	5	N/A	48.1	54.8	48.2	51.7	57.6
	9	N/A	48.4	57.4	48.5	52.0	59.3



SCHEME A (POINT TOWER) DWELLING UNIT WINDOW LOCATIONS WHERE FUTURE TRAFFIC NOISE CALCULATIONS WERE PERFORMED

FIGURE 5



SCHEME 3 (MID-RISE) DWELLING UNIT WINDOW LOCATIONS WHERE FUTURE TRAFFIC NOISE CALCULATIONS WERE PERFORMED

FIGURE 6

ing from the project's mid- and high-rise structures are included in the results of **TABLES 5 and 6**, and the additive traffic noise contributions from the surrounding streets are also included. As indicated in **FIGURE 5 and TABLE 5**, all of the dwelling unit window locations should be clear (or outside) the CY 1997 65 Ldn traffic noise contour, and should be in the "Moderate Exposure, Acceptable" category with traffic noise levels less than 65 Ldn.

As indicated in **FIGURE 6 and TABLE 6**, all of the dwelling unit window locations should be clear (or outside) the CY 1997 65 Ldn traffic noise contour, and should be in the "Moderate Exposure, Acceptable" category with traffic noise levels less than 65 Ldn. However, at the upper floor units of the Scheme A tower building, future traffic noise levels will begin to approach 65 Ldn, particularly at the corner dwelling units which have more panoramic line-of-sight views to the high volume streets.

TABLE 7 presents the predicted increases in traffic noise levels associated with non-project and project traffic by CY 1997, and as measured by the Ldn descriptor system. Project traffic will increase traffic noise levels along Hausten Street by 0.5 to 0.8 Ldn. These changes will be difficult to measure and are considered to be insignificant. As indicated in **TABLE 7**, the increases in traffic noise along the high volume access roadways to the project are predicted to be associated with non-project traffic rather than project traffic. Minimal increases in traffic noise levels of essentially zero Ldn are expected to result from project traffic along King Street, Date Street, University Avenue, Isenberg Street, and Kapiolani Boulevard.

TABLE 7

CALCULATIONS OF PROJECT AND NON-PROJECT TRAFFIC NOISE CONTRIBUTIONS (CY 1997)

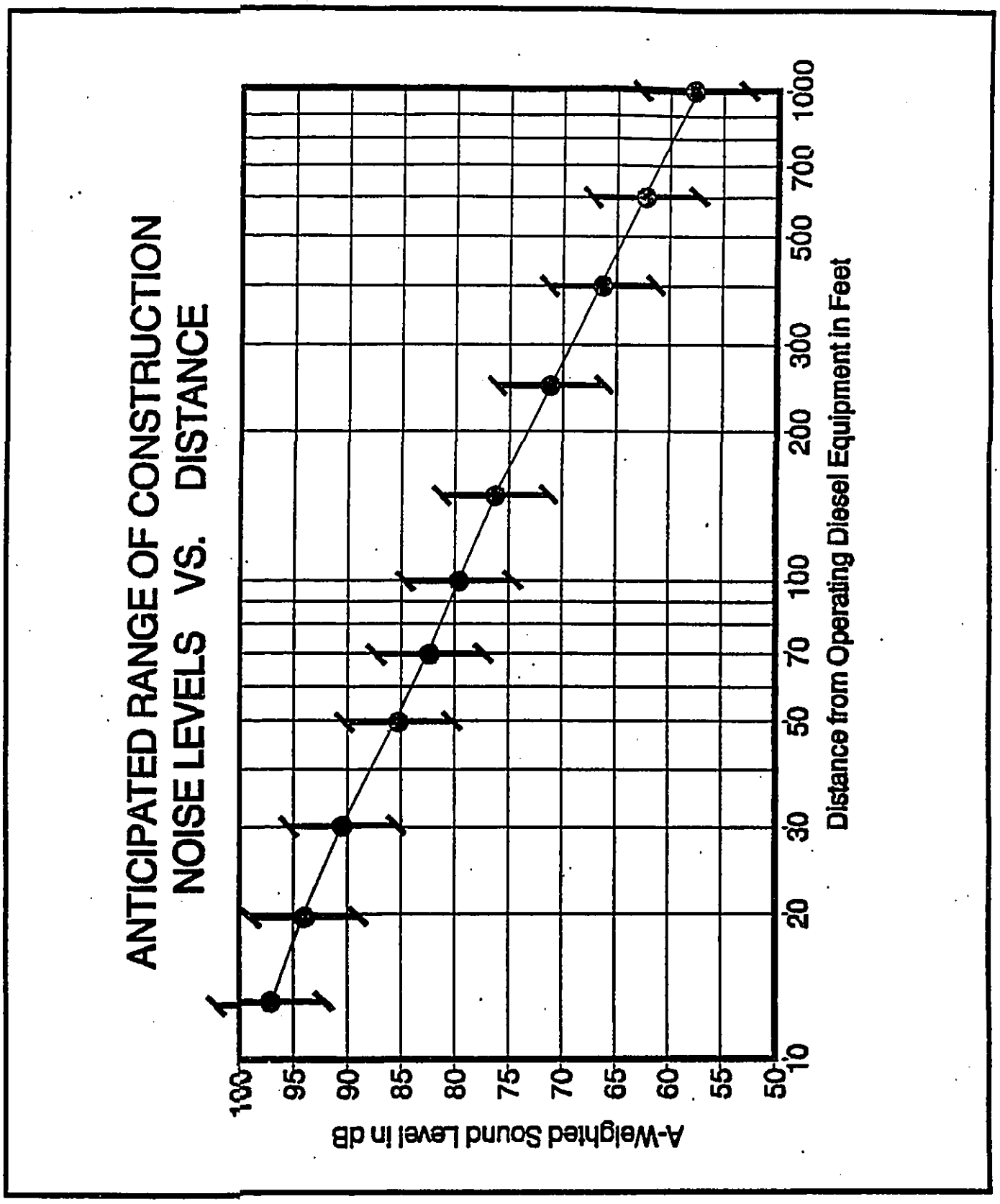
STREET SECTION	NOISE LEVEL INCREASE (Ldn) DUE TO NON-PROJECT TRAFFIC	PROJECT TRAFFIC
Hausten St. North of Project	0.2	0.6
Hausten St. South of Project	0.1	0.5
King Street	0.2	0.0
Date Street	0.1	0.0
University Avenue	0.2	0.0
Isenberg Street	0.2	0.0
Kapiolani Boulevard	0.2	0.0

CHAPTER VII. DISCUSSION OF PROJECT RELATED NOISE IMPACTS AND POSSIBLE MITIGATION MEASURES

Traffic Noise. Project traffic should not cause adverse traffic noise impacts along the access roadways to the project site, due to the very small increases in traffic noise levels attributable to project traffic. For this reason, traffic noise mitigation measures should not be required along these roadways.

Traffic noise levels at the project's proposed dwelling units under both Schemes A and 3 are not expected to exceed the 65 Ldn FHA/HUD standard by CY 1997. If the average annual growth rate of traffic volumes on the major streets in the project area continues at two percent per year beyond 1997, the 65 Ldn standard should also be met by CY 2005. The necessity for special sound attenuation measures can be avoided. The upper floors of the proposed high-rise dwelling units of Scheme A, and particularly those units at the east side of the Point Tower building fronting University Avenue, will tend to be the noisiest units. If possible, the planned units at the northeast and southeast corners of the tower building should have solid east walls without operable windows.

General Construction Noise. Audible construction noise will probably be unavoidable during the entire project construction period. The total time period for construction is unknown, but it is anticipated that the actual work will be moving from one location on the project site to another during that period. Actual length of exposure to construction noise at any receptor location will probably be less than the total construction period for the entire project. Typical levels of exterior noise from construction activity (excluding pile driving activity) are shown in FIGURE 7. The impulsive noise levels of impact pile drivers are approximately 15 dB higher than the levels shown in FIGURE 7, while the intermittent noise levels of vibratory pile drivers are at the upper end of the noise level ranges depicted in the figure. Typical levels of construction noise inside naturally ventilated and



CONSTRUCTION NOISE LEVELS VS. DISTANCE

FIGURE 7

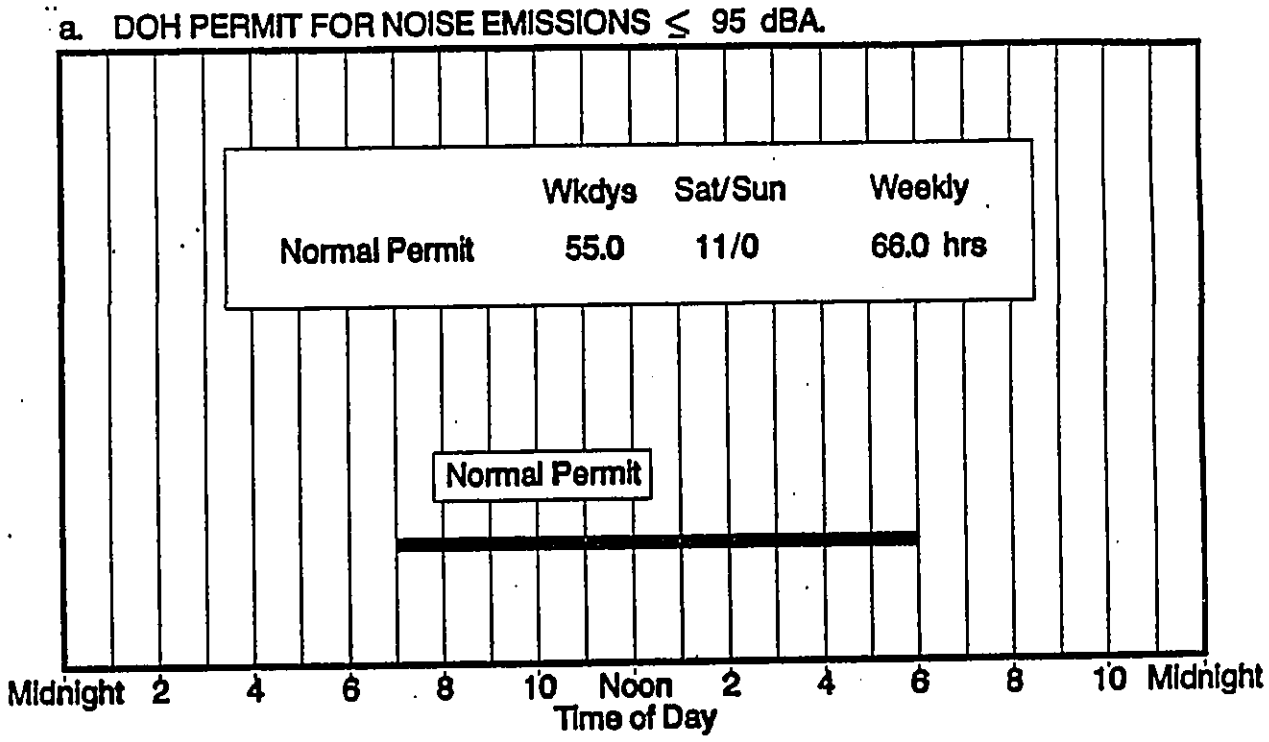
air conditioned structures are approximately 10 and 20 dB less, respectively, than the levels shown in **FIGURE 7**. The existing residential and apartments within the neighboring buildings surrounding the project site are predicted to experience the highest noise levels during construction activities due to their close proximity to the construction site. Adverse impacts from construction noise are not expected to be in the "public health and welfare" category due to the temporary nature of the work and due to the administrative controls available for regulation of construction noise. Instead, these impacts will probably be limited to the temporary degradation of the quality of the acoustic environment in the immediate vicinity of the project site.

Mitigation of construction noise to inaudible levels will not be practical in all cases due to the intensity of construction noise sources (80 to 90+ dB at 50 FT distance), and due to the exterior nature of the work (pile driving, grading and earth moving, trenching, concrete pouring, hammering, etc.). The use of properly muffled construction equipment should be required on the job site.

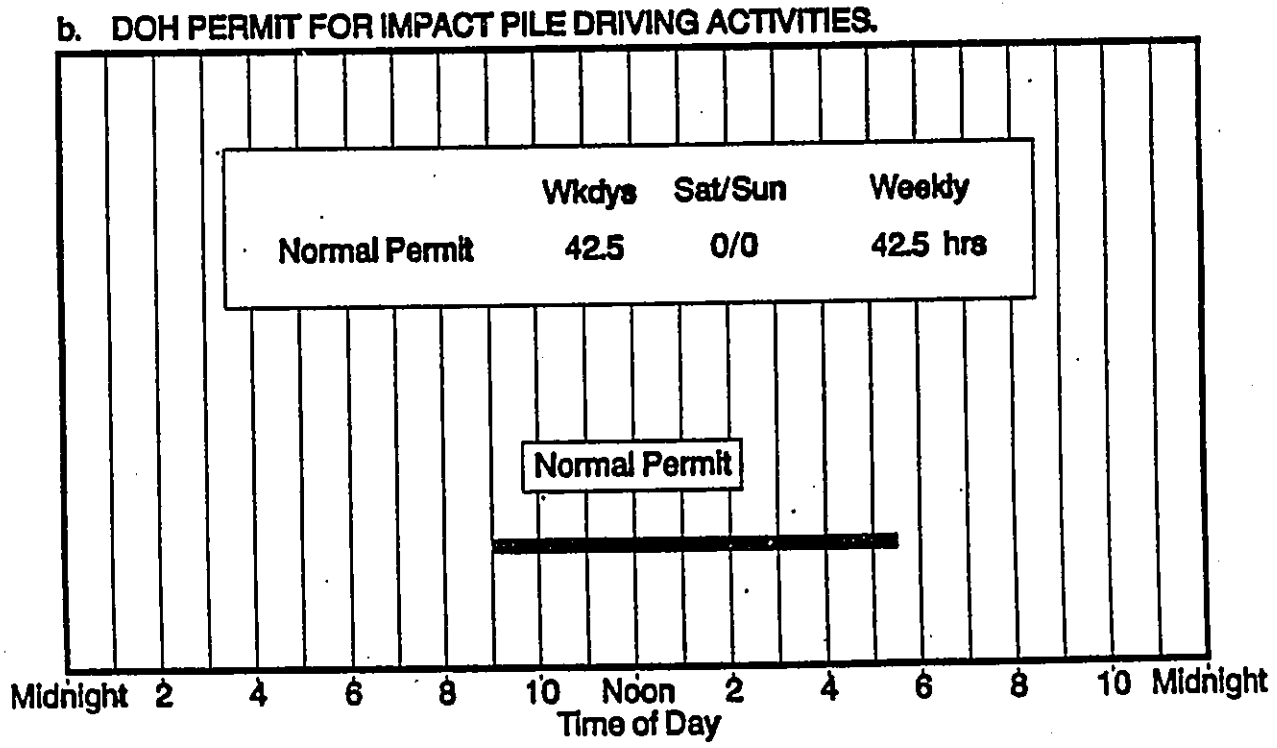
The incorporation of State Department of Health construction noise limits and curfew times, which are applicable on the island of Oahu (**Reference 4**), is another noise mitigation measure which is normally applied to construction activities, primarily to minimize construction noise impacts on residences. **TABLE 8** depicts the allowed hours of construction for normal construction noise (levels which do not exceed 95 dB at the project's property line) and for construction noise which exceeds 95 dB at the project's property line. Noisy construction activities are not allowed on holidays, Saturdays, Sundays, during the early morning, and during the late evening periods under the DOH permit procedures.

TABLE 8
AVAILABLE WORK HOURS UNDER DOH PERMIT PROCEDURES FOR CONSTRUCTION NOISE

a. DOH PERMIT FOR NOISE EMISSIONS ≤ 95 dBA.



b. DOH PERMIT FOR IMPACT PILE DRIVING ACTIVITIES.



APPENDIX A. REFERENCES

(1) "Guidelines for Considering Noise in Land Use Planning and Control"; Federal Interagency Committee on Urban Noise; June 1980.

(2) "Environmental Criteria and Standards, Noise Abatement and Control, 24 CFR, Part 51, Subpart B"; U.S. Department of Housing and Urban Development; July 12, 1979.

(3) "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety"; Environmental Protection Agency (EPA 550/9-74-004); March 1974.

(4) "Title 11, Administrative Rules, Chapter 43, Community Noise Control for Oahu"; Hawaii State Department of Health; November 6, 1981.

(5) Barry, T. and J. Reagan, "FHWA Highway Traffic Noise Prediction Model"; FHWA-RD-77-108, Federal Highway Administration; Washington, D.C.; December 1978.

(6) Existing and Future Traffic Assignments in the Hausten Street Elderly Housing Project Environs; Transmittals from The Traffic Management Consultant, Inc.; May 11 and 16, 1995.

(7) May 12-13, 1994, 24-Hour Traffic Counts; Meter #110, King Street Northwest of Beretania Street/University Avenue, Southeast Bound; Honolulu Department of Transportation Services.

(8) March 19-20, 1992, 24-Hour Traffic Counts; Meters #226, #227, Isenberg Street at King Street, Northeast Bound; Honolulu Department of Transportation Services.

(9) March 30-31, 1992, 24-Hour Traffic Counts; Meters #226, #330, Isenberg Street at Citron Street/Date Street, Southwest Bound; Honolulu Department of Transportation Services.

(10) May 9-10, 1994, 24-Hour Traffic Counts; Meter #331, #223, #226, University Avenue at Beretania Street/King Street, Northeast Bound; Honolulu Department of Transportation Services.

(11) October 15-16, 1990, 24-Hour Traffic Counts; Meter #330, #1557, University Avenue at Date Street, Southwest Bound; Honolulu Department of Transportation Services.

(12) May 19-20, 1992, 24-Hour Traffic Counts of All Inbound Traffic at Kalakaua Avenue and Kapiolani Boulevard Intersection; Honolulu Department of Transportation Services.

APPENDIX B

EXCERPTS FROM EPA'S ACOUSTIC TERMINOLOGY GUIDE

Descriptor Symbol Usage

The recommended symbols for the commonly used acoustic descriptors based on A-weighting are contained in Table I. As most acoustic criteria and standards used by EPA are derived from the A-weighted sound level, almost all descriptor symbol usage guidance is contained in Table I.

Since acoustic nomenclature includes weighting networks other than "A" and measurements other than pressure, an expansion of Table I was developed (Table II). The group adopted the ANSI descriptor-symbol scheme which is structured into three stages. The first stage indicates that the descriptor is a level (i.e., based upon the logarithm of a ratio), the second stage indicates the type of quantity (power, pressure, or sound exposure), and the third stage indicates the weighting network (A, B, C, D, E.....). If no weighting network is specified, "A" weighting is understood. Exceptions are the A-weighted sound level and the A-weighted peak sound level which require that the "A" be specified. For convenience in those situations in which an A-weighted descriptor is being compared to that of another weighting, the alternative column in Table II permits the inclusion of the "A". For example, a report on blast noise might wish to contrast the LCdn with the LAdn.

Although not included in the tables, it is also recommended that "Lpn" and "LepN" be used as symbols for perceived noise levels and effective perceived noise levels, respectively.

It is recommended that in their initial use within a report, such terms be written in full, rather than abbreviated. An example of preferred usage is as follows:

The A-weighted sound level (LA) was measured before and after the installation of acoustical treatment. The measured LA values were 85 and 75 dB respectively.

Descriptor Nomenclature

With regard to energy averaging over time, the term "average" should be discouraged in favor of the term "equivalent". Hence, Leq, is designated the "equivalent sound level". For Ld, Ln, and Ldn, "equivalent" need not be stated since the concept of day, night, or day-night averaging is by definition understood. Therefore, the designations are "day sound level", "night sound level", and "day-night sound level", respectively.

The peak sound level is the logarithmic ratio of peak sound pressure to a reference pressure and not the maximum root mean square pressure. While the latter is the maximum sound pressure level, it is often incorrectly labelled peak. In that sound level meters have "peak" settings, this distinction is most important.

"Background ambient" should be used in lieu of "background", "ambient", "residual", or "indigenous" to describe the level characteristics of the general background noise due to the contribution of many unidentifiable noise sources near and far.

With regard to units, it is recommended that the unit decibel (abbreviated dB) be used without modification. Hence, DBA, PNdB, and EPNdB are not to be used. Examples of this preferred usage are: the Perceived Noise Level (Lpn was found to be 75 dB. Lpn = 75 dB). This decision was based upon the recommendation of the National Bureau of Standards, and the policies of ANSI and the Acoustical Society of America, all of which disallow any modification of bel except for prefixes indicating its multiples or submultiples (e.g., deci).

Noise Impact

In discussing noise impact, it is recommended that "Level Weighted Population" (LWP) replace "Equivalent Noise Impact" (ENI). The term "Relative Change of Impact" (RCI) shall be used for comparing the relative differences in LWP between two alternatives.

Further, when appropriate, "Noise Impact Index" (NII) and "Population Weighed Loss of Hearing" (PHL) shall be used consistent with CHABA Working Group 69 Report Guidelines for Preparing Environmental Impact Statements (1977).

APPENDIX B (CONTINUED)

TABLE I

A-WEIGHTED RECOMMENDED DESCRIPTOR LIST

TERM	SYMBOL
1. A-Weighted Sound Level	L_A
2. A-Weighted Sound Power Level	L_{WA}
3. Maximum A-Weighted Sound Level	L_{max}
4. Peak A-Weighted Sound Level	L_{Apk}
5. Level Exceeded x% of the Time	L_x
6. Equivalent Sound Level	L_{eq}
7. Equivalent Sound Level over Time (T) (1)	$L_{eq(T)}$
8. Day Sound Level	L_d
9. Night Sound Level	L_n
10. Day-Night Sound Level	L_{dn}
11. Yearly Day-Night Sound Level	$L_{dn(Y)}$
12. Sound Exposure Level	L_{SE}

(1) Unless otherwise specified, time is in hours (e.g. the hourly equivalent level is $L_{eq(1)}$). Time may be specified in non-quantitative terms (e.g., could be specified a $L_{eq(WASH)}$ to mean the washing cycle noise for a washing machine).

SOURCE: EPA ACOUSTIC TERMINOLOGY GUIDE, BNA 8-14-78, NOISE REGULATION REPORTER.

APPENDIX B (CONTINUED)

TABLE II

RECOMMENDED DESCRIPTOR LIST

TERM	A-WEIGHTING	ALTERNATIVE[1] A-WEIGHTING	OTHER[2] WEIGHTING	UNWEIGHTED
1. Sound (Pressure)[3] Level	L_A	L_{pA}	L_B, L_{pB}	L_p
2. Sound Power Level	L_{WA}		L_{WB}	L_W
3. Max. Sound Level	L_{max}	L_{Amax}	L_{Bmax}	L_{pmax}
4. Peak Sound (Pressure) Level	L_{Apk}		L_{Bpk}	L_{pk}
5. Level Exceeded x% of the time	L_x	L_{Ax}	L_{Bx}	L_{px}
6. Equivalent Sound Level	L_{eq}	L_{Aeq}	L_{Beq}	L_{peq}
7. Equivalent Sound Level Over Time(T)[4]	$L_{eq(T)}$	$L_{Aeq(T)}$	$L_{Beq(T)}$	$L_{peq(T)}$
8. Day Sound Level	L_d	L_{Ad}	L_{Bd}	L_{pd}
9. Night Sound Level	L_n	L_{An}	L_{Bn}	L_{pn}
10. Day-Night Sound Level	L_{dn}	L_{Adn}	L_{Bdn}	L_{pdn}
11. Yearly Day-Night Sound Level	$L_{dn(Y)}$	$L_{Adn(Y)}$	$L_{Bdn(Y)}$	$L_{pdn(Y)}$
12. Sound Exposure Level	L_S	L_{SA}	L_{SB}	L_{Sp}
13. Energy Average value over (non-time domain) set of observations	$L_{eq(e)}$	$L_{Aeq(e)}$	$L_{Beq(e)}$	$L_{peq(e)}$
14. Level exceeded x% of the total set of (non-time domain) observations	$L_{x(e)}$	$L_{Ax(e)}$	$L_{Bx(e)}$	$L_{px(e)}$
15. Average L_x value	L_x	L_{Ax}	L_{Bx}	L_{px}

(1) "Alternative" symbols may be used to assure clarity or consistency.

(2) Only B-weighting shown. Applies also to C,D,E,.....weighting.

(3) The term "pressure" is used only for the unweighted level.

(4) Unless otherwise specified, time is in hours (e.g., the hourly equivalent level is Leq(1). Time may be specified in non-quantitative terms (e.g., could be specified as Leq(WASH) to mean the washing cycle noise for a washing machine.

APPENDIX F

AIR IMPACT ASSESSMENT

B. D. NEAL & ASSOCIATES
Applied Meteorology • Air Quality • Computer Science

May 22, 1995

Mr. Taeyong M. Kim
AM Partners, Inc.
1164 Bishop Street, Suite 1000
Honolulu, Hawaii 96813

Subject: Hausten Street Elderly Housing Project
Air Quality Impact Assessment

Dear Mr. Kim:

In accordance with your request, we have examined the potential impacts on air quality from the construction and use of the proposed Hausten Street Elderly Housing Project. The results of our examination are summarized below.

Existing Conditions

Air quality in the vicinity of the proposed project is currently mostly affected by emissions from motor vehicles. Distant industrial, agricultural and/or natural sources of air pollution may also affect the air quality of the site on occasion. The state Department of Health operates a network of air quality monitoring stations located at various sites around Oahu and elsewhere in the state. Based on data from these stations, it appears likely that both state and national ambient air quality standards are currently being met in the project area except possibly for occasional exceedances of the more stringent state standards pertaining to ambient ozone and carbon monoxide concentrations.

Short-Term Impacts

Short-term direct and indirect impacts on air quality could potentially occur due to project construction. For a project of this nature, there are two potential types of air pollution emissions that could directly result in short-term air quality impacts during project construction: (1) fugitive dust from site preparation work and other construction activities; and (2) exhaust emissions from on-site construction equipment. Indirectly, there also could be short-term impacts from the disruption of traffic caused by slow-moving construction equipment traveling to and from the project site and from a temporary increase in local traffic caused by commuting construction workers.

P.O. BOX 6239, OCEAN VIEW, HAWAII 96737-6239 • TELEPHONE (808) 939-9317 • FAX (808) 939-7390

The emission rate for fugitive dust emissions from construction activities is difficult to estimate accurately because of its elusive nature of emission and because the potential for its generation varies greatly depending upon the type of soil at the construction site, the amount and type of dirt-disturbing activity taking place, the moisture content of exposed soil in work areas, and the wind speed. The U.S. EPA has provided a rough estimate for uncontrolled fugitive dust emissions from construction activity of 1.2 tons per acre per month under conditions of "medium" activity, moderate soil silt content (30%), and precipitation/evaporation (P/E) index of 50. Uncontrolled fugitive dust emissions in the project area would likely be somewhere near this level or possibly higher due to the dry climate and the high soil silt content in the project area. In any case, State of Hawaii Air Pollution Control Regulations prohibit visible emissions of fugitive dust from construction activities at the property line. Thus, an effective dust control plan for the project construction phase is essential.

Adequate fugitive dust control of active construction areas can usually be accomplished by the establishment of a frequent watering program. In sensitive or dust-prone areas, limiting the area that can be disturbed at any given time and/or using wind screens may also be required. Wind erosion of inactive areas can be controlled by mulching or by the use of chemical soil stabilizers. Haul trucks tracking dirt onto paved streets from unpaved areas is oftentimes a significant source of dust in construction areas. Some means to alleviate this problem, such as tire washing or road cleaning, may be appropriate. Control regulations further stipulate that open-bodied trucks be covered at all times when in motion if they are transporting wind-erodible materials. Paving of parking areas and/or establishment of landscaping as early in the construction schedule as possible can also lower the potential for fugitive dust emissions.

On-site mobile and stationary construction equipment also will emit air pollutants from engine exhausts. The largest of this equipment is usually diesel-powered. Nitrogen oxides emissions from diesel engines can be relatively high compared to gasoline-powered equipment, but the standard for nitrogen dioxide is set on an annual basis and is not likely to be violated by short-term construction equipment emissions. Carbon monoxide emissions from diesel engines, on the other hand, are low and should be relatively insignificant compared to vehicular emissions on nearby roadways.

Indirectly, slow-moving construction vehicles on roadways leading to and from the project site could obstruct the normal flow of traffic to such an extent that overall vehicular emissions are increased, but this impact can be mitigated by moving heavy construction equipment during periods of low traffic volume. Likewise, the schedules of commuting construction workers can be adjusted to avoid peak hours in the project vicinity. Thus, most potential short-term air quality impacts from project construction can be mitigated.

Long-Term Impacts

After construction, long-term impacts on air quality from motor vehicle exhausts can potentially occur at or near any facility that attracts large volumes of vehicular traffic as a result of day-to-day operations and use. Public areas near traffic-congested intersections are the main problem. For this project, the proposed driveway intersections on Hausten Street and Hausten Street intersections with Date Street and with King Street are of most concern. Traffic projections indicate that this project will generate at most a net increase of only about 15 to 20 vehicles during peak traffic hours at each of these intersections. Based on our experience in assessing traffic-related air quality impacts, traffic volume increases of less than about 5 percent or about 100 vehicles per hour or traffic approach volumes of less than about 1000 vehicles per hour do not cause any significant impacts on air quality if adequate level-of-service is provided. Level-of-service estimates for intersections near the project indicate that traffic volumes currently are and will continue to be well within capacity with or without the project during peak traffic periods.

Based on the small predicted net change in peak-hour traffic volumes and the good level-of-service at nearby intersections forecast with or without the project, the proposed project should have no significant long-term impacts on maximum air pollution levels in the area. Although a detailed air quality modeling study could be performed to predict project impacts, in this case such an analysis is unwarranted in our opinion.

Very truly yours,

Barry D. Neal

Barry D. Neal
Certified Consulting
Meteorologist

APPENDIX G

ARCHAEOLOGICAL ASSESSMENT

AN ARCHAEOLOGICAL ASSESSMENT OF FOUR HAUSTEN STREET LOTS IN MO'ILI'ILI MANOA, WAIKIKI *AHUPUA'A*, O'AHU, HAWAI'I [TMK: 2-7-9: 13,14 AND 2-7-10: 8,9]

By

David B. Chaffee, B.A.

and

Robert L. Spear Ph.D.

July, 1994

For

Department of Housing and Community Development
City and County of Honolulu

SCIENTIFIC CONSULTANT SERVICES Inc.

47-269 D HUI IWA STREET KANEOHE, HAWAII 96744

INTRODUCTION

At the request of the Department of Housing and Community Development, City and County of Honolulu, Scientific Consultant Services, Inc. (SCS) conducted an archaeological assessment of four parcels of land, two on each side of Hausten Street, Me'ili'ili, Waikiki *ahupua'a*, Kona District, Island of O'ahu (Figure 1). These parcels are further identified by Tax Map Key [TMK] 2-7-9:13, and 14; and 2-7-10:8 and 9 (Figure 2). Lot 8 is 4,800 sq. ft. and lot 9 is 29,955 sq.ft. Both are zoned B-2 (community business district) and together they make up the site of the now closed Willows Restaurant (Figure 3). Lot 13 is 9,600 sq. ft. and lot 14 is 4,800 sq. ft. Both are zoned A-2 (medium density apartment) and together these asphalt paved lots served as a parking lot for the aforementioned restaurant (Figure 4). Lots 8, 13, and 14 are owned by Emma A. Hausten Ltd. Lot 9 is owned by RML Ltd.

This assessment included discussions with the State Historic Preservation Division and a review of relevant archaeological reports prepared for projects in the *ahupua'a*. A field inspection of the project area was conducted on June 17th, 1994 by Robert L. Spear, Ph.D., Principal Investigator, and Field Assistant David B. Chaffee.

ENVIRONMENTAL SETTING

The four Hausten Street lots are approximately 10 ft. (2.2 m) above mean sea level and are situated approximately 1.0 mile (1.6 km) north of Kuhio Beach Park in Waikiki.

The mean annual rainfall at this location is approximately 20.0 inches (525 milliliters) (Armstrong 1973:62). Soil in the project area is an Ewa silty clay loam (EmA), 0-2 percent slope where runoff is very slow and the erosion hazard is no more than slight (Foote et al. 1972:30).

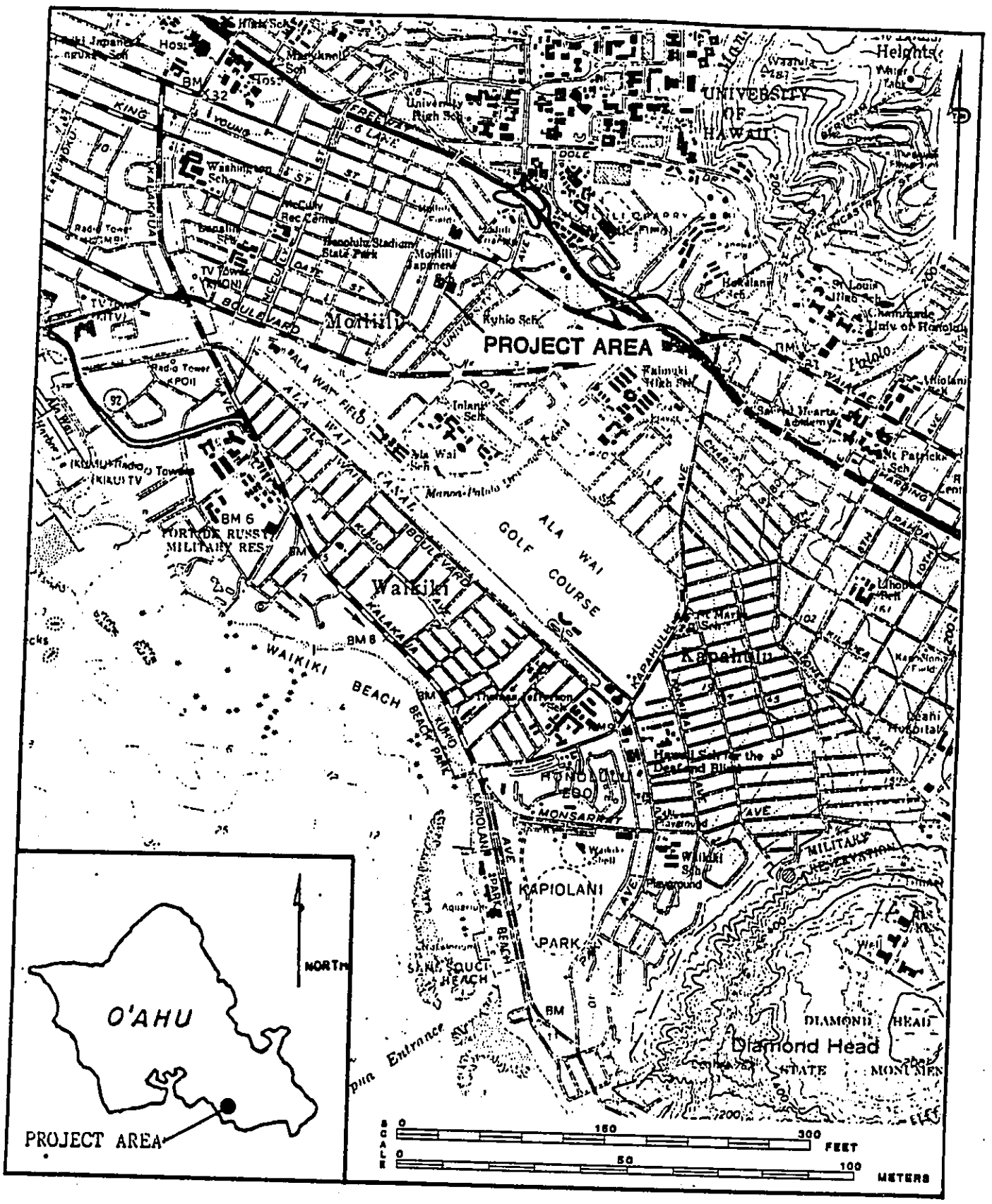


FIGURE 1: USGS HONOLULU QUADRANGLE SHOWING PROJECT AREA (SHADED).

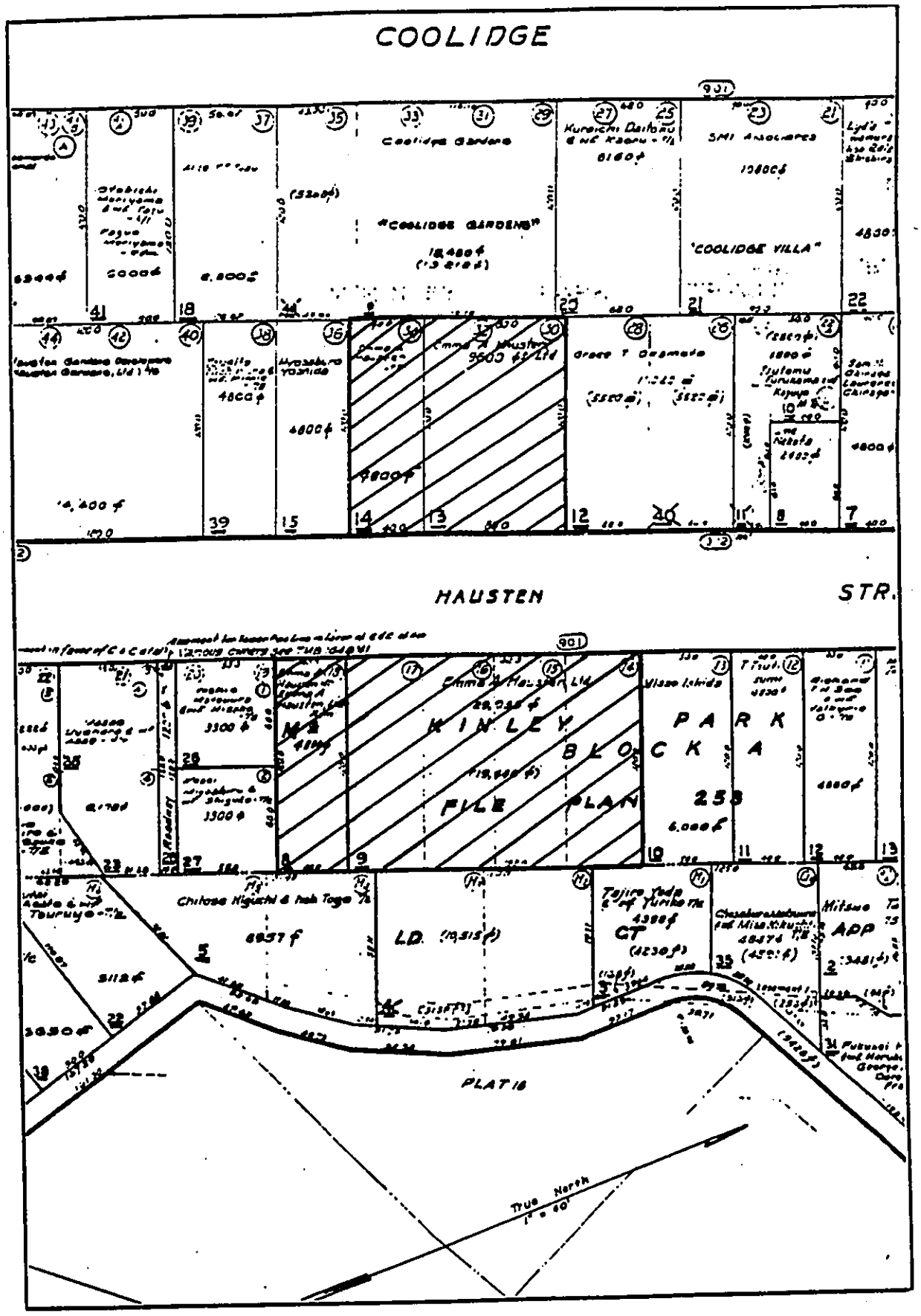


FIGURE 2: TAX MAP SHOWING PROJECT AREA (SHADED). [TMK 2-7-9: 13, 14 AND TMK 2-7-10: 8, AND 9]

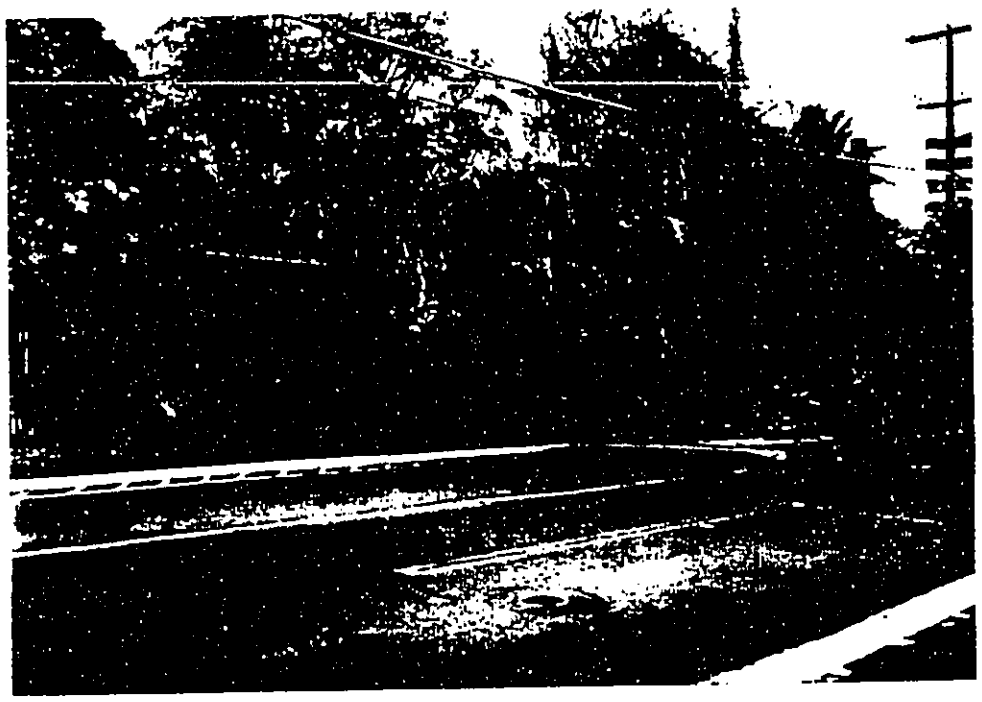


FIGURE 3: THE WILLOW'S RESTAURANT SITE, NOW CLOSED. VIEW TO SOUTH.

FIGURE 4: THE WILLOW'S RESTAURANT PARKING AREA ON HAUSTEN ST. VIEW TO WEST.

ARCHAEOLOGICAL FRAMEWORK

No Land Commission Awards (LCAs) were found within the project area nor on neighboring lots.

No archaeological sites in close proximity to the project area are known to have been assigned state site numbers. Sterling and Summers however describe two archaeological sites in the area that are noteworthy (Sterling and Summers 1962: 281,282):

> **Kanewai**- Kanewai was the name of a large underground pool on the *mauka* side of King Street, near what is now the quarry. Its waters, the "healing waters of Kane," were much sought by Hawaiians. Queen Liliuokalani was much interested in the pool. The ancient Hawaiians said that wise fish from the sea used to swim up to this pool, over hear the plans of the native fishermen, who frequented the vicinity and then float back to the ocean to warn their finny friends.
>
> Williams, John
> The romance of Honolulu's Prehistoric Caves
> Star Bulletin, Jan.5, 1935

> **Kumulae Spring**- ...The water was said to hold some healing properties, and besides it was a fine supply of clean water in an otherwise arid plain. The pool, too, from its overflow was full of plump fish.
>
> Proof that it was a popular place was found when Mr. Hausten started to clear the property. He found hand carved images...Then too, Mr. Hausten found stone lamps in which the Hawaiians burned the oil of *kukui* nuts. By this primitive golden light the natives washed the bodies of their afflicted and the glistening bodies of their sturdy believers, and with the water they mixed medicines of pounded roots in medicine bowls, many of which Hausten found. By day there were sports held on the banks of the pool. They played the equivalent of our modern bowling with stones fash ioned by hand to a perfect roundness. While some played, others fished. Mr. Hausten found small stone anchors which they used to set bait and catch squid.
>
> Williams, John
> The romance of Honolulu's Prehistoric Caves
> Star Bulletin, Jan.5, 1935

Kumulae spring is located at the Willows restaurant site.

Archaeological investigations conducted on the Waikiki Plain and in Mo'ili'ili in particular are few. Schilz in 1991 performed two archaeological literature and archival reviews of the Mo'ili'ili District of Honolulu, one covering TMK numbers 2-6 and 2-7 and the other, both 2-7-16, and 17 in conjunction with the Kuilei Street Drainage Improvement Project. He found that; "there exists the potential for significant buried historic and prehistoric resources within the proposed pipeline corridor."

Closer to the sea, in 1989 Davis conducted historical and archival research and excavated 20 backhoe trenches and 9, 2.0 by 1.0 m hand excavated units within the Fort DeRussy area. His study found that fishponds, *'auwai*, and associated habitation deposits were once located in the area.

Archaeological investigations up Manoa Valley include an assessment of two Vancouver Drive lots by Chaffee and Spear in 1993 that produced negative findings. An inventory survey and preservation plan was done for Kukao'o *Heiau* (site number 50-80-14-64) by Cleghorn and Anderson in 1992 in which they conclude "Traditional sources, in the form of legends, date Kukao'o Heiau to the prehistoric era. These sources also give it considerable significance, given its association with menehune, the owl god, and ali'i personages" (Cleghorn and Anderson 1992:27).

Kukao'o Heiau was first recorded by McAllister as "a small *heiau* measuring 50 by 40 feet overall" (McAllister 1933:79).

Prehistoric land use in the present project area was likely recreational and for exploitation of freshwater fishing resources. Historic land use of the project area was likely to have been agricultual before the residences and the restaurant of Hausten Street were built.

CULTURAL CONTEXT

Land use in historic times in Manoa Valley saw a variety of use with taro cultivation being the most prominent. Looking down on Manoa Valley, Thrum stated: "At the summit of the road the whole valley opens out to view, the extensive flat area set out in taro, looking like a huge checker-board, with its symmetrical emerald squares in the middle ground, surrounded by pasture fields on the slopes at the base of the guarding hills" (Thrum 1892:110-111).

Manoa Valley is the location of O'ahu's first sugar plantation, established by John Wilkinson in 1825 (Cleghorn and Anderson 1992:7). Some coffee was planted in Manoa Valley foothills in conjunction with Wilkinson's agricultural endeavors as well (Thrum 1892:114).

For a two year period of time beginning is 1882 some Chinese companies attempted to shift their taro agriculture to rice cultivation. High winds, cold rains and rice birds confounded those early attempts at diversification, and the fields were once again used to grow taro (Thrum 1892:116).

Manoa Valley was also utilized as pasture land in historic times for the "stock of more than one dairy enterprise" (Thrum 1892:110).

Eventually taro fields gave way to residential land use. "Some of the lower portions of the old taro area inland from the slightly elevated land southwest of Rocky Hill is now covered by streets and houses" (Handy 1940:77).

FINDINGS AND RECOMMENDATIONS

No evidence of significant archaeological surface architectural features remain in the project area. We believe that the surface and subsurface cultural deposits representing the two known sites within the project area were disturbed due to residential and commercial development and have been destroyed.

The possibility of deeply buried archaeological features within the project area seems remote. The type of soil in the project area precludes the likelyhood that cultiral deposits were buried under colluvial and alluvial accumulation because erosion in the area is considered slight. Therefore, we recommmend that no further archaeological work need be performed at this location and that further developement of these parcels will have "no effect" on significant archaeological sites.

Although the chances of encountering human burials is low, the possibility does exist. Should this happen, all work in the vicinity is to stop and Dr. Tom Dye, Staff Archaeologist for O'ahu Island at the Historic Preservation Division must be notified at 587-0014.

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APPENDIX H

TRAFFIC ASSESSMENT

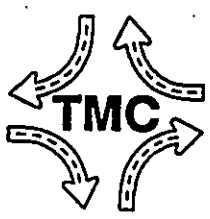
FINAL TRAFFIC IMPACT ANALYSIS REPORT FOR THE PROPOSED

HAUSTEN STREET ELDERLY HOUSING

PREPARED FOR

AM PARTNERS, INC.

JULY 12, 1995



PREPARED BY

THE TRAFFIC MANAGEMENT CONSULTANT

RANDALL S. OKANEKU, P. E., PRINCIPAL • 1188 BISHOP STREET, SUITE 1907 • HONOLULU, HAWAII 96813

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I. Introduction

A. Purpose of Study

The purpose of this study is to identify and analyze the traffic impacts resulting from the redevelopment of the former Willows Restaurant site to an elderly housing project by the City & County of Honolulu Department of Housing and Community Development. This report presents the findings and recommendations of this study.

B. Scope of Study

The scope of this study includes:

1. Conducting a field investigation during the morning and afternoon peak periods of weekday traffic in the vicinity of the project to establish the existing conditions.
2. An evaluation of existing roadway and traffic conditions.
3. Development of trip generation characteristics of the proposed project, using generally accepted techniques developed by the Institute of Transportation Engineers.
4. Estimating of future traffic conditions and analyzing traffic operations without the proposed project.
5. Analyzing site-generated traffic superimposed over the projected traffic conditions.
6. Assessing the traffic impacts resulting from the site-generated traffic.
7. Recommendation of improvements that would mitigate the traffic impacts identified in this study.

II. Project Description

A. Location and Access

The proposed elderly housing project is located on Hausten Street, between South King Street and Date Street. The proposed project would be constructed on two separate parcels on opposite sides of Hausten Street. The Ewa parcel (Lot B) is identified as Tax Map Key 2-7-9:13 & 14, and the Koko Head parcel (Lot A) is identified as Tax Map Key 2-7-10:8 & 9. Primary access would be provided by a single driveway for each parcel. Figure 1 depicts the project vicinity.

B. Land Use Intensity

The preferred plan is being developed at this writing. However, for the purpose of this traffic impact analysis, the following development plan is used. The proposed elderly housing project would consist of a 30-unit "assisted living housing" and a 100-unit "ambulatory elderly housing", totaling approximately 130 dwelling units. About 50 parking stalls are planned for the site. Figure 2 illustrates the site plan.

III. Existing Conditions

A. Existing Land Uses

As described earlier, the proposed project is located on the former Willows Restaurant site, which recently closed. In the interim, the restaurant parking lot on the Ewa parcel is being used for public parking, containing 60 stalls.

Surrounding land uses consist of a mix of single-family, low-rise, and high-rise residential dwelling units. Commercial uses are located on Hausten Street near South King Street. Land uses along South King Street are primarily commercial, including Star Market. Land uses along Date Street are primarily residential.

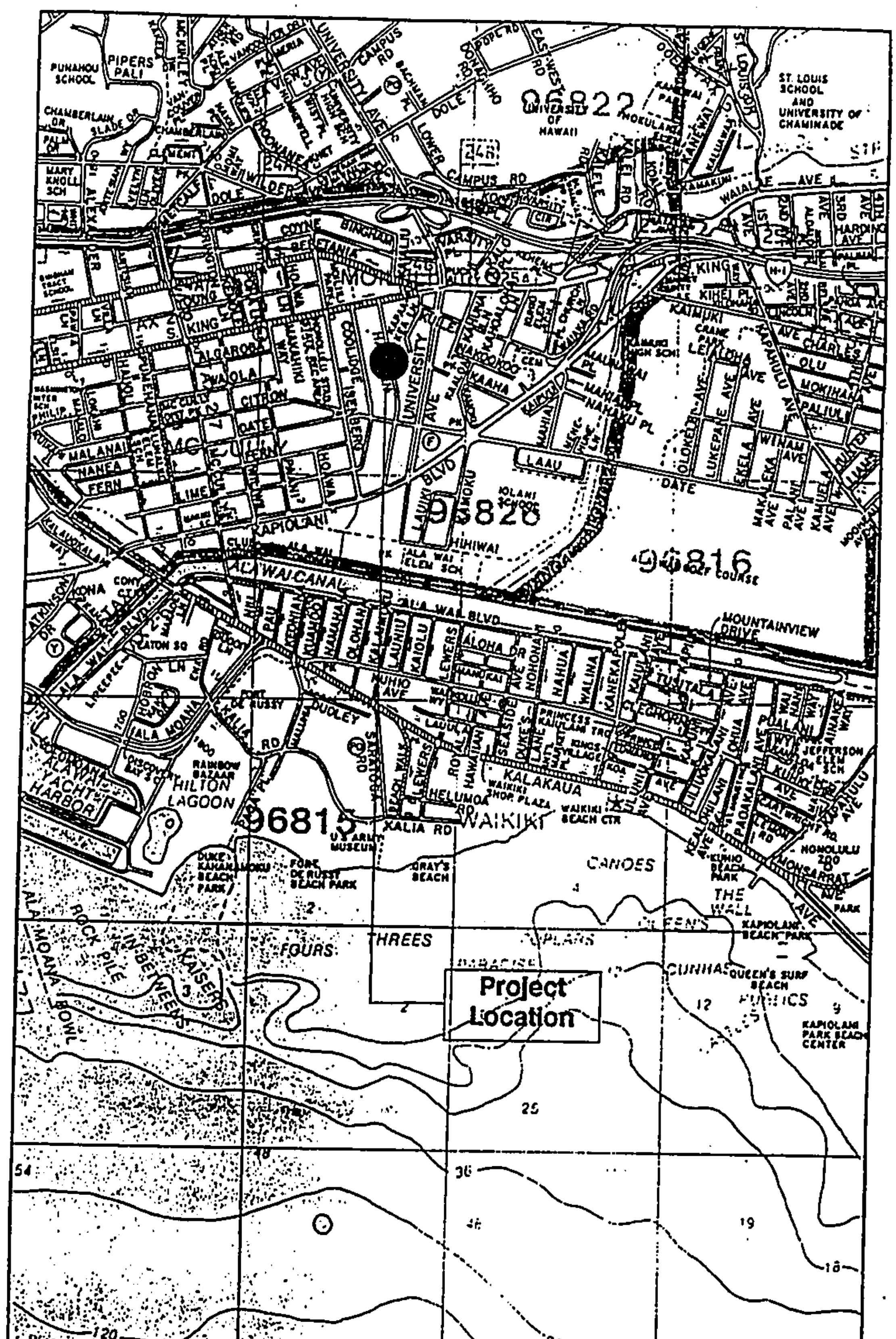
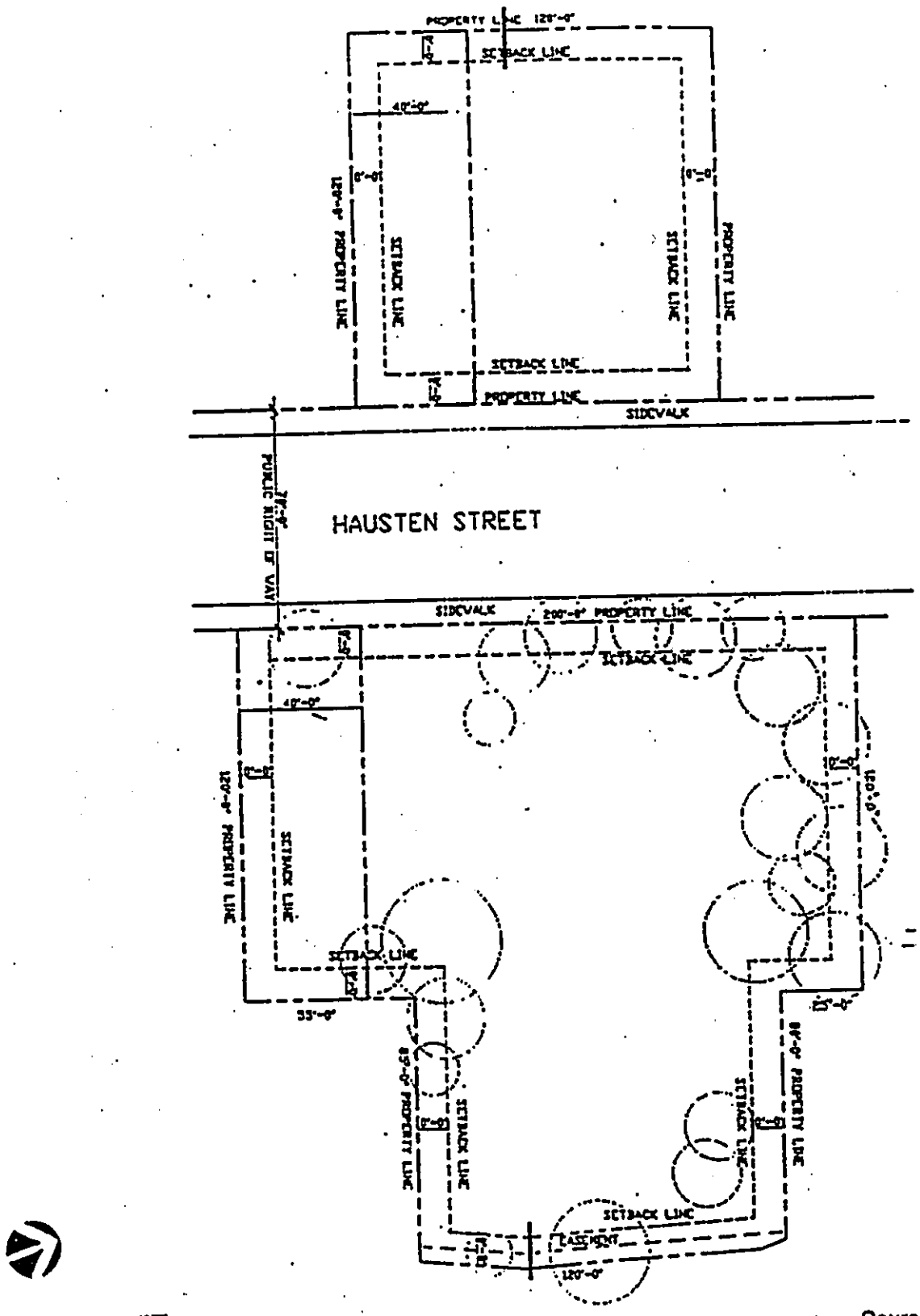


Figure 1 - Project Location



Source: AM Partners, Inc.
April 1995

Figure 2 - Site Plan

B. Site Accessibility

1. Area Roadway System

Hausten Street is a two way, two lane roadway, extending from South King Street to Kapiolani Boulevard. On street parking is permitted on both sides of Hausten Street. Hausten Street is stop-controlled at its Tee-intersection with South King Street and at its four-legged intersection with Date Street.

South King Street is the eastbound leg of a one way couplet that includes westbound South Beretania Street. The South King Street/South Beretania Street couplet extends from University Avenue through Downtown Honolulu. South King Street consists of five (5) through traffic lanes.

In the vicinity of the project, Date Street is a two way, two lane roadway, with on street parking on both sides of the street. Date Street extends from Isenberg Street to Kapahulu Avenue.

2. Transit Service

The project vicinity is well served by public transit. TheBus routes run along South King Street, South Beretania Street, Date Street, University Avenue, and Kapiolani Boulevard. HandiVan service is also available in the area.

C. Existing Traffic Volumes and Conditions

1. General

a. Field Investigation

A manual traffic count survey was conducted in April, 1995 during the peak periods of traffic from 6:30 AM to 8:30 AM and from 3:30 PM to 6:00 PM. The study area for this traffic impact analysis is defined along Hausten Street, between South King Street and Date Street. The survey was conducted at the intersections of South King Street and Hausten Street, Date Street and Hausten Street, and on Hausten Street at the project site frontage. The field observations indicate that Hausten Street is a low-volume roadway, used primarily by residents and businesses

along this local street. Spot counts of parked vehicles were taken at the existing parking lot on the project site prior to and immediately after the peak hour of traffic.

b. Capacity Analysis Methodology

The highway capacity analysis performed for this study is based upon procedures presented in the "Highway Capacity Manual" (HCM), Special Report 209, Transportation Research Board, as amended and the "Highway Capacity Software", Federal Highways Administration.

Level of Service (LOS) is "defined as a qualitative measure describing operational conditions within a traffic stream". Several factors are included in determining LOS such as: speed, delay, vehicle density, freedom to maneuver, traffic interruptions, driver comfort, and safety. LOS "A", "B", and "C" are considered satisfactory levels of service. LOS "D" is generally considered a "desirable minimum" operating level of service. LOS "E" is an undesirable condition and LOS "F" is an unacceptable condition.

2. Existing AM Peak Hour Traffic

The AM peak hour of traffic generally occurs from 7:15 AM to 8:15 AM. The AM peak hour traffic volumes on Hausten Street are relatively low, i.e., about 100 vehicles per hour (vph), total for both directions. Both approaches on Hausten Street at Date Street operate at LOS "D" during the AM peak hour of traffic. Figure 3 depicts the existing AM peak hour traffic and the results of the Level of Service analysis.

Seven (7) parked vehicles were observed in the existing parking lot on the site prior to the AM peak hour of traffic. Thirteen (13) parked vehicles were observed immediately after the AM peak hour of traffic.

3. Existing PM Peak Hour Traffic

The PM peak hour of traffic generally occurs from 4:45 PM to 5:45 PM. The PM peak hour volumes on Hausten Street are again relatively low, i.e., about 120 vph, total for both directions. The intersection operations within

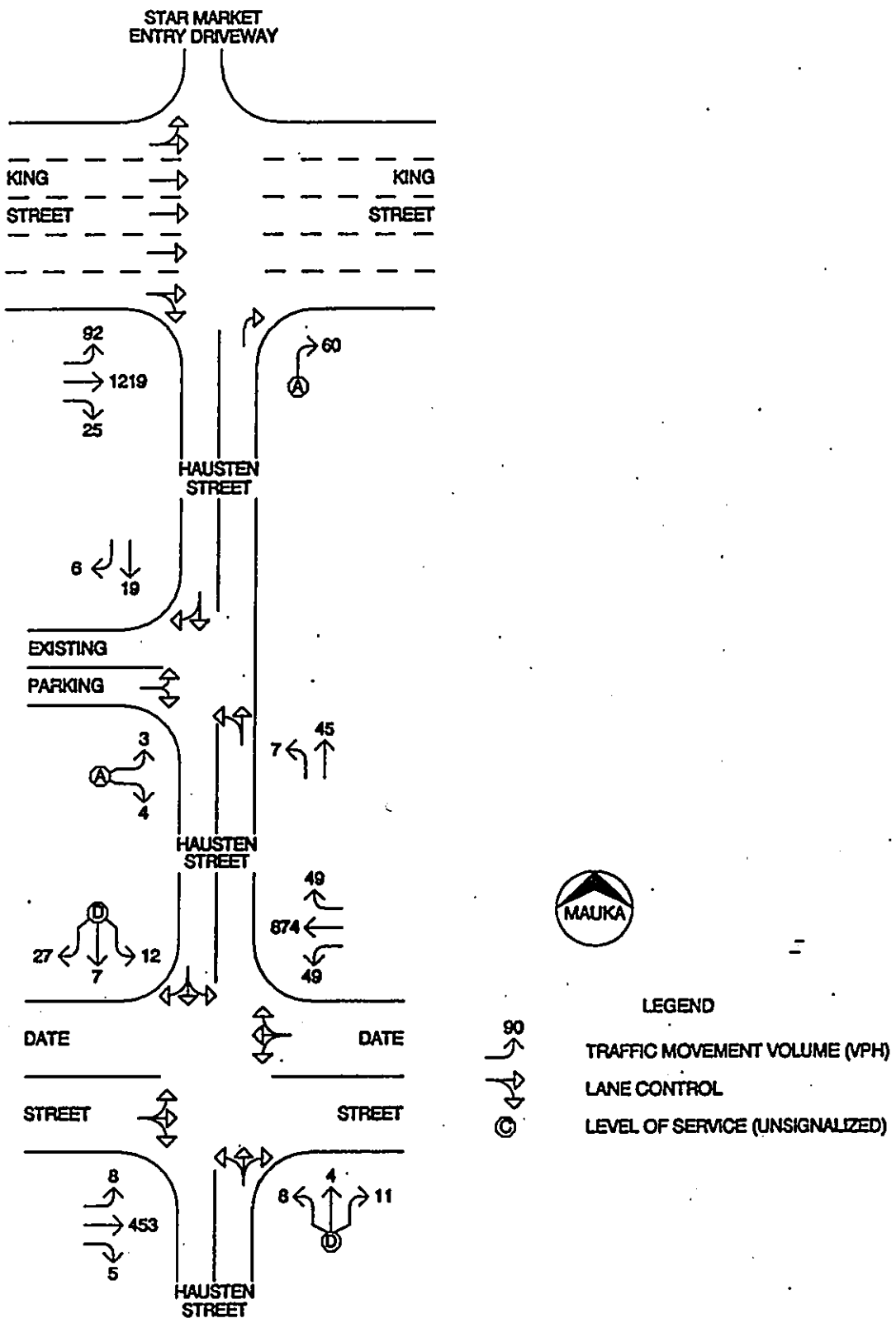


Figure 3 - Existing AM Peak Hour Traffic

the study area operate at satisfactory LOS during the PM peak hour of traffic. Figure 4 depicts the existing PM peak hour traffic and the results of the Level of Service analysis.

Fourteen (14) parked vehicles were observed in the existing parking lot on the site prior to the PM peak hour of traffic. Seven (7) parked vehicles were observed immediately after the PM peak hour of traffic.

IV. Projected Traffic

A. Site-Generated Traffic

1. Trip Generation Methodology

The trip generation methodology used in this study is based upon generally accepted techniques developed by the Institute of Transportation Engineers (ITE) and published in "Trip Generation", 5th Edition, 1991. The ITE trip rates for an elderly housing project are developed by correlating the vehicle trip generation data with various land use characteristics, such as vehicle trips per dwelling unit. Taking a conservative approach, the "maximum" trip rates, developed by ITE, are used in this analysis.

2. Trip Generation Characteristics

The trip generation analysis is based upon a total of 130 elderly housing units. Because of the wide variation in trip generation rates for elderly housing developments, presented by ITE, a conservative approach is taken in this analysis by using the maximum peak hour trip rates in this analysis, thereby overstating potential traffic impacts.

The proposed elderly housing project is expected to generate a total of 36 vph during the AM peak hour of traffic, 18 vph entering the site and 18 vph exiting the site. During the PM peak hour of traffic, the proposed project is expected to generate 34 vph, 21 vph entering the site and 13 vph exiting the site. Table 1 summarizes the trip generation characteristics of the proposed elderly housing project.

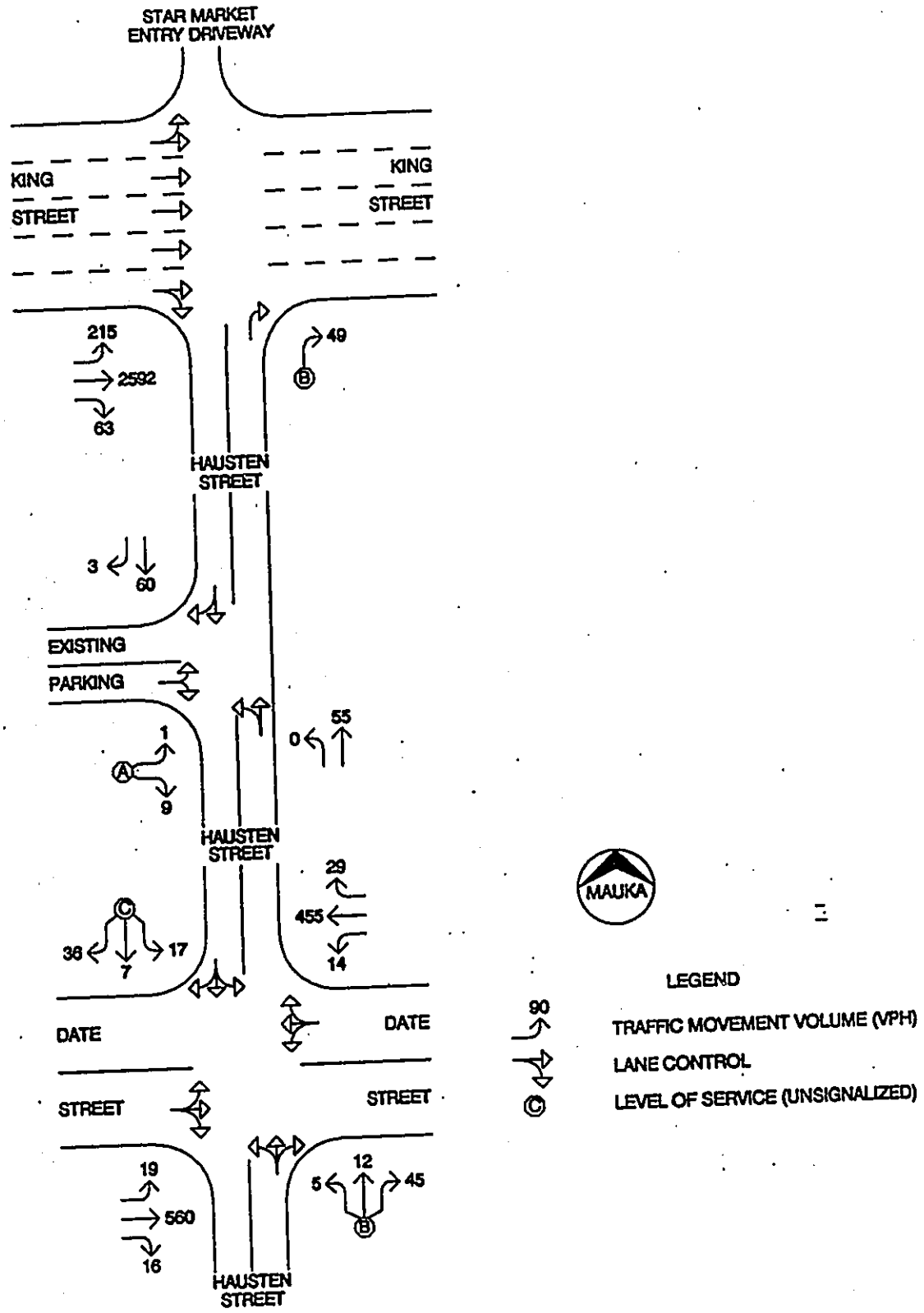


Figure 4 - Existing PM Peak Hour Traffic

Table 1. Trip Generations Characteristics				
Unit Total = 130 Dwelling Units			ITE Trip Rate	Vehicle Trips
Peak Hour of Adjacent Street Traffic.	AM	Enter	0.135	18
		Exit	0.135	18
		Total	0.270	36
	PM	Enter	0.155	21
		Exit	0.095	13
		Total	0.250	34

B. External Traffic

Historical traffic count data, dating back to 1985, were obtained from the State Department of Transportation (DOT). The DOT traffic count data were taken at the Manoa-Palolo Stream screenline count station, located about one half mile east of the project site. Linear regression techniques were applied to DOT traffic count data, taken along the surface streets crossing the Manoa-Palolo Stream, to determine the average rate of the growth in traffic in the vicinity. This analysis indicates an annual growth in traffic of about 2% per year in the area. The proposed project is expected to be constructed and fully-occupied by the Year 1997. A growth factor of 1.04 is applied to the existing traffic volumes to estimate the Year 1997 traffic without the proposed project.

C. Total Traffic Volumes Without Project

The Year 1997 AM and PM peak hour traffic operations, without the proposed project, are not significantly affected by the background growth in traffic. Figures 5 and 6 depict the Year 1997 AM and PM peak hour traffic without the proposed project and the results of the Level of Service analysis, respectively. The cumulative traffic impact analysis, which includes the project-generated traffic, is discussed in the following section.

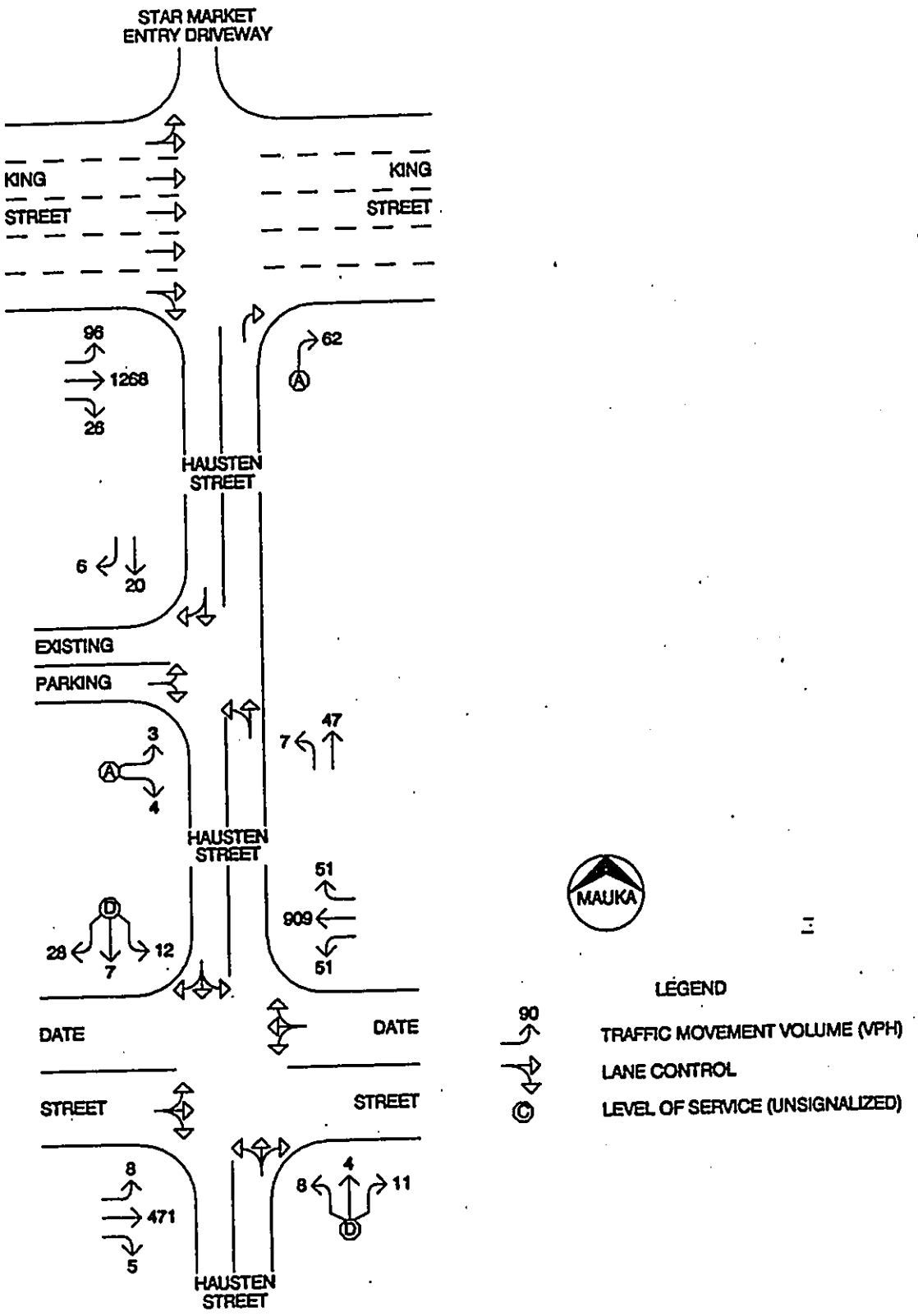


Figure 5 - Year 1997 AM Peak Hour Traffic Without Project

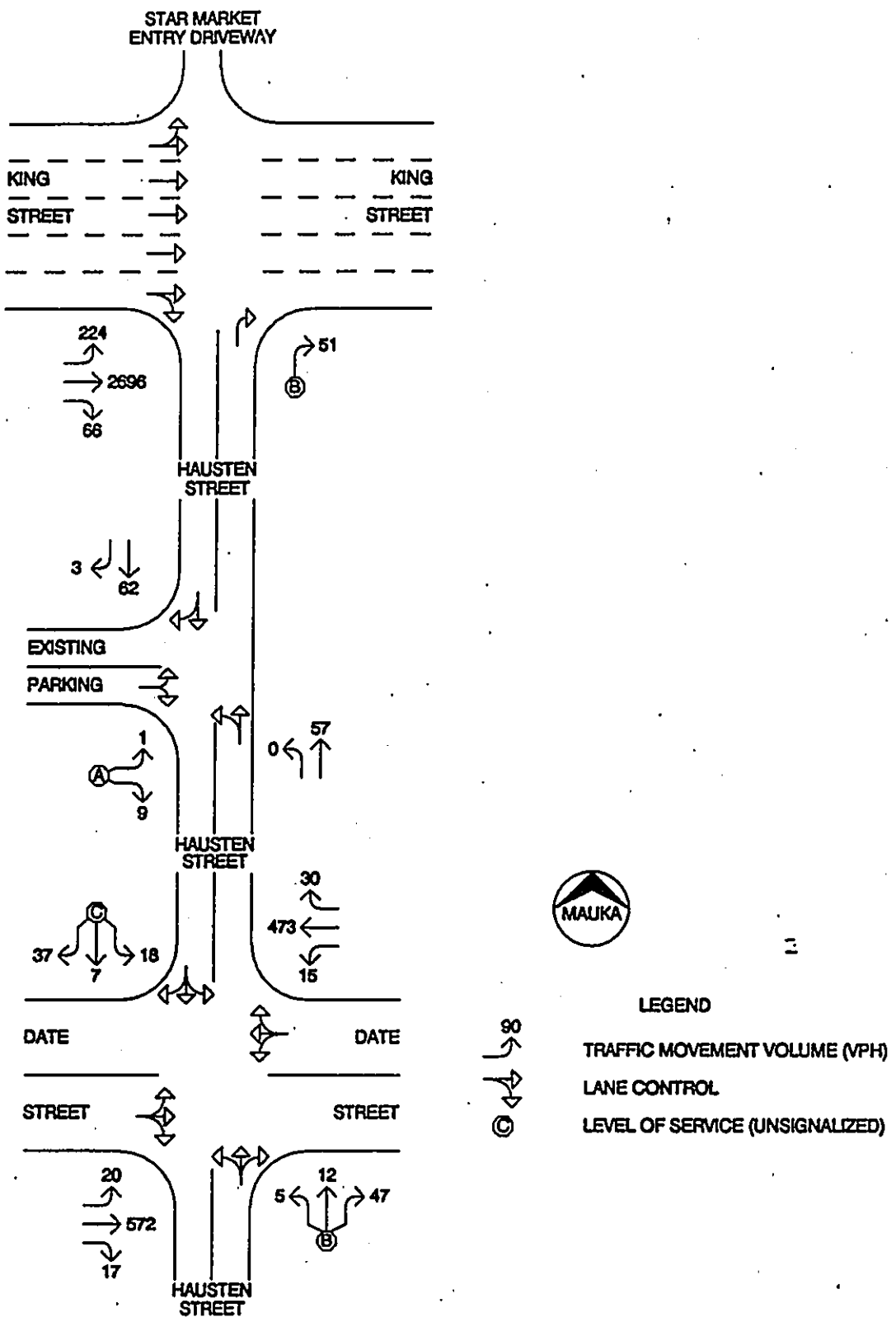


Figure 6 - Year 1997 PM Peak Hour Traffic Without Project

V. Traffic Impact Analysis

A. Traffic Impacts

The traffic, generated by the proposed project, is distributed in proportion to the existing Hausten Street traffic patterns during the peak hours of traffic. The traffic operations within the study, with the increase in traffic generated by the proposed elderly housing development, are unaffected by the project traffic. Figures 7 and 8 depict the Year 1997 AM and PM peak hour traffic with the proposed project and the results of the Level of Service analysis, respectively.

B. Parking Impacts

The City and County of Honolulu's elderly housing projects have demonstrated that the use of the 1 stall per 6 dwelling unit parking ratio has proved to be successful. The attached tables show parking ratios for comparable projects.

The existing 60 stall parking lot on Lot B would be redeveloped into the assisted living housing component of the proposed project. No provisions are made for replacement of the existing off street parking. Based upon the field observations, up to 20 vehicles would be affected by the loss of parking. Since the former Willows Restaurant parking lot is used as public parking only on an interim basis, the loss of off-street parking is not considered to be significant.

On street parking is not expected to be significantly impacted by the proposed project. On street parking may be relocated, depending upon where the new access driveways are located. However, since three (3) driveways already exist on the project site, the net loss of on street parking, resulting from the proposed project, should be neglible.

VI. Conclusions

The proposed elderly housing project on Hausten Street is not considered a significant traffic generator. Hausten Street is a low-volume, local roadway and is not expected to be significantly impacted by traffic generated by the proposed project. The traffic operations, in the vicinity of the proposed project, are not expected to be affected by the development of the elderly housing project, therefore traffic mitigation measures are not recommended at this time.

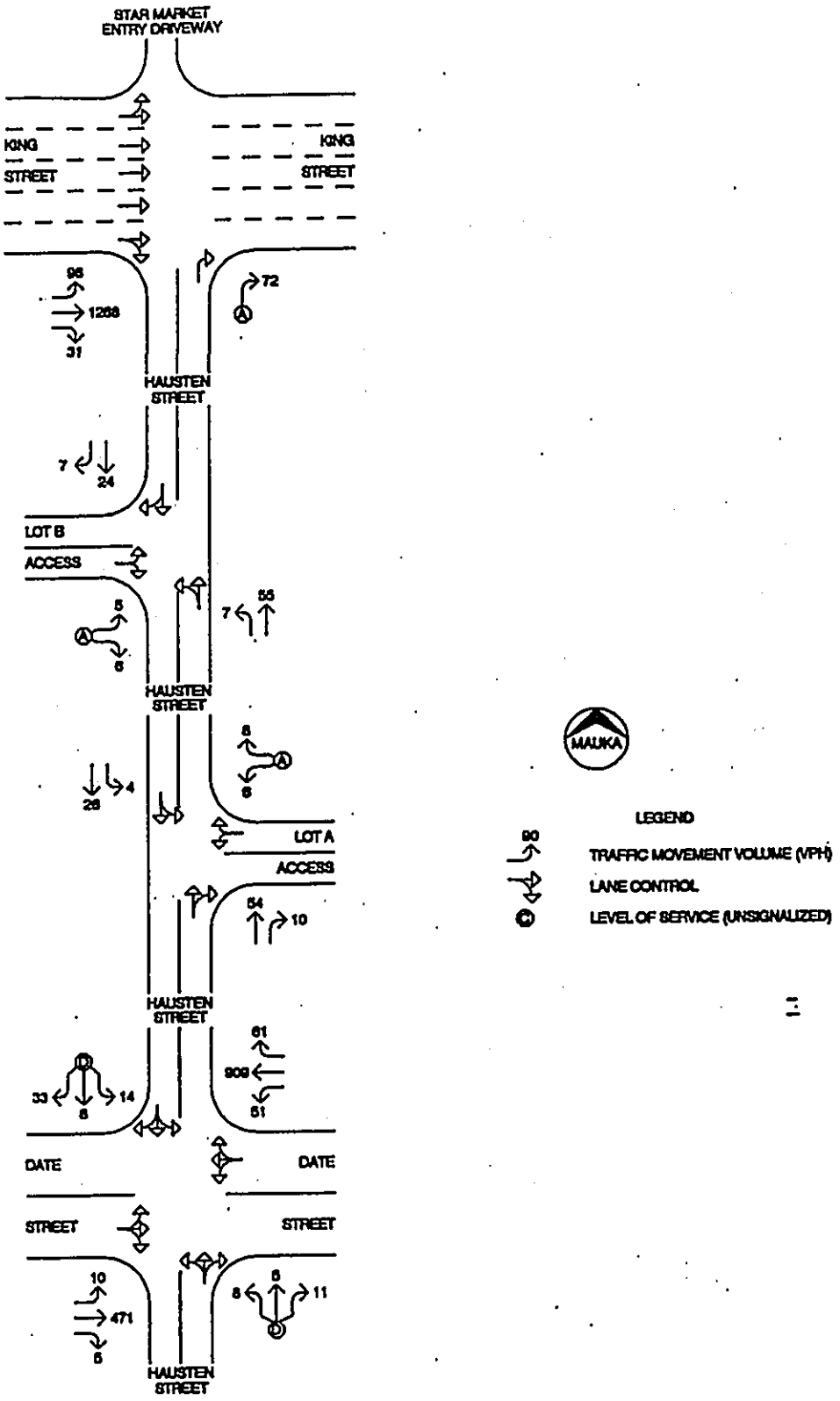


Figure 7 - Year 1997 AM Peak Hour Traffic With Project

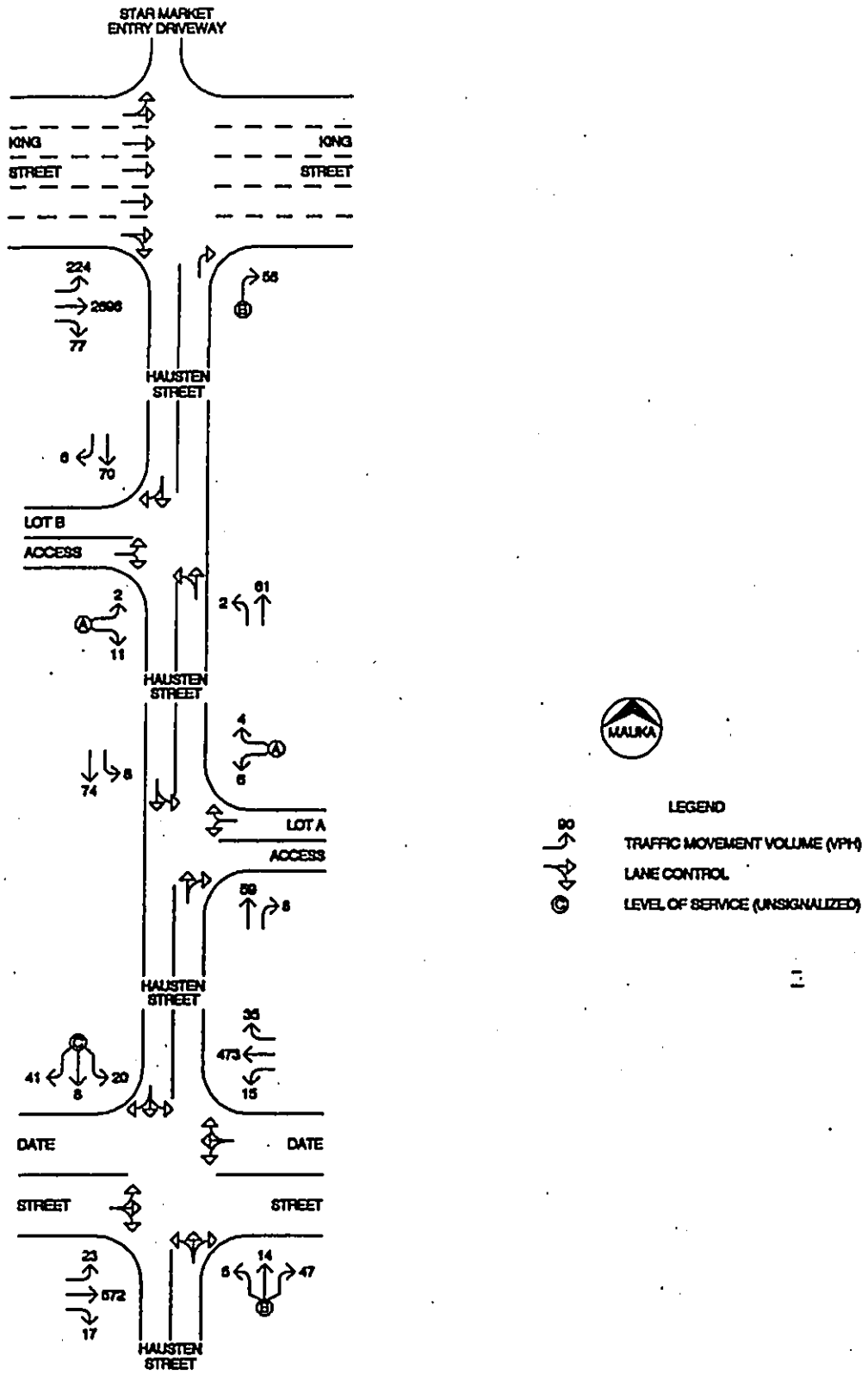


Figure 8 - Year 1997 PM Peak Hour Traffic With Project

PARKING STALL USAGE AT URBAN ASSITED LIVING HOUSING PROJECTS

PROJECT/ Area	Total Beds	STALLS PROVIDED	ACTUAL USE OF STALLS Visitors/Staff	RATIO (Stalls/Unit)
HALE NANI HEALTH CENTER 1677 Pensacola St.	288	80	80 a	1: 4
ISLAND NURSING HOME 1205 Alexander St.	42	8	8 b	1: 5
LILIHA HEALTH CARE CENTER 1814 Liliha St.	92	29	29 c	1: 3
OAHU CARE FACILITY 1808 S. Beretania St.	82	20	20 d	1: 4
TOTAL	504	137	137	1: 4

a – 200 staff during day shift, parking overflows into the surrounding neighborhood
b – Double park six cars, parking also overflows into surrounding neighborhood
c – Parking overflows into the surrounding neighborhood.
d – Parking overflows into the surrounding neighborhood.

elderass.WK3

PARKING STALL USAGE AT URBAN ELDERLY HOUSING PROJECTS

(5/95)

PROJECT/ Area	UNITS			STALLS	ACTUAL USE OF STALLS			RATIO
	Studios	1--Bdrms	Total	PROVIDED	Tenants	Visitors	Other	(Stalls/Unit)
KALUNIHUIA Aala Park	61	90	151	42	19	19	4 a	1: 8
MAKAMAE Nuuanu	108	16	124	27	10	11	6 b	1: 12
PUNCHBOWL HOMES Kalihi	0	97 1--BD 46 2--BD 1 3--BD	144	69	30	13	26 c	1: 5
MAKUA ALII Kalakaua	0	210	210	49	23	11	15	1: 9
PAOKALANI Kalakaua	90	60	150	28	9 d	14	5	1: 17
MIDRISE Kalakaua	0	123	123	40	28	8	4	1: 4
KAPUNA I Liliha	0	162	162	57	42 e	12	3 f	1: 4
Hale Poai (KAPUNA II) Liliha	80	126	206	82	70 g	12	0	1: 3
MANOA GARDENS Manoa Valley	48	32	80	40	37 h	3	0	1: 2
Pauahi Elderly Chinatown	12	36	48	12	12 i	0	0	1: 4
TOTAL			1398	446	280	103	63	1: 5

a – Two HHA and two handicapped.
b – Six HHA.
c – Staff, handicapped, reserved service workers.
d – Tenants take visitor parking as needed.
e – 22 residents w/cars. For the past three years they have had 10 stalls extra.
f – Visitor/handicaped.
g – Includes 4 handicapped residents.
h – Need 14–15 more stalls.
i – Parking ordinace gives project priority to 12 stalls in Hale Pauahi Parking structure across the street.
Two residents own cars but do not park in lot. Resident manager and maintanance person park on driveway.

PARKING.WK1

APPENDIX I

COMMENT LETTERS AND RESPONSES

PLANNING DEPARTMENT
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650 SOUTH KING STREET
HONOLULU, HAWAII 96813

JEREMY HARRIS
MAYOR

CHERYL D. SOON
CHIEF PLANNING OFFICER

CAROLL TAKAHASHI
DEPUTY CHIEF PLANNING OFFICER

TH 8/95-1540

August 11, 1995

'95 AUG 15 P3:20

DEPT. OF HOUSING
& COMM. DEVELOPMEN

MEMORANDUM

TO: RONALD S. LIM, DIRECTOR
DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT

FROM: CHERYL D. SOON, CHIEF PLANNING OFFICER
PLANNING DEPARTMENT

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT (EA) FOR THE HAUSTEN STREET ELDERLY HOUSING DEVELOPMENT, HONOLULU, OAHU, HAWAII, TAX MAP KEYS: 2-7-9: 13 & 14 AND 2-7-10: 8 & 9

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Chief Planning Officer

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RONALD S. LIM
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ROLAND D. LIBBY, JR.
DEPUTY DIRECTOR

August 23, 1995

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Director

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GOVERNOR

GARY GILL
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STATE OF HAWAII
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TELEPHONE (808) 586-4185
FACSIMILE (808) 586-3452

July 21, 1995

'95 JUL 26 A8:12

DEPT. OF HOUSING
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Department of Housing and Community Development
650 South King Street
Honolulu, Hawaii 96813

Attention: Jason Ching

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