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COUNTY OF KAUAI
DEPARTMENT OF PUBLIC WORKS
3021 UMI STREET
LIHUE, KAUAI, HAWAII 96766

OFC. OF ENVIRONMENTAL
QUALITY CONTROL

June 13, 1990

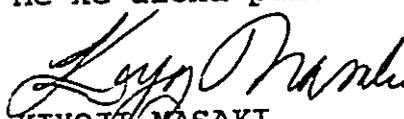
Dr. Marvin Miura, Director
Office of Environmental Quality Control
State of Hawaii
450 South King Street
Honolulu, Hawaii 96813

RE: LIHUE REFUSE TRANSFER STATION

Dear Mr. Miura:

We hereby transmit the final Environmental Assessment for the Lihue Refuse Transfer Station where we have incorporated the response to comments from interested parties. An EIS is not required; we request that you refer to the Notice to Negative Declaration that was transmitted to you in our letter dated September 11, 1989.

Me ke aloha pumehana,


KIYOJI MASAKI
Acting County Engineer

JH/cu

Attachment

1990-07-08-KA-FEA

FILE COPY

FINAL ENVIRONMENTAL ASSESSMENT
FOR
LIHUE REFUSE TRANSFER STATION

PREPARED BY:
GMP ASSOCIATES, INC.
FOR
KAUAI COUNTY PUBLIC WORKS DEPARTMENT

Prepared per Section 11-200-10
of Title 11 Department of Health Chapter 200
ENVIRONMENTAL IMPACT STATEMENT RULES pages 200-13



MARCH 1990

FINAL ENVIRONMENTAL ASSESSMENT
FOR
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PREPARED BY: GMP ASSOCIATES, INC.
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FINAL ENVIRONMENTAL ASSESSMENT

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FINAL ENVIRONMENTAL ASSESSMENT
LIHUE REFUSE TRANSFER STATION - KAUAI

1. AGENCY PROPOSING THE PROJECT

Kauai County - Public Works Department

2. APPROVING AGENCY

Kauai County - Mayor's Office

3. AGENCIES CONSULTED IN MAKING THE ASSESSMENT

Kauai County - Public Works Department

Kauai County - Planning Department

State Department of Health and Kauai District DOH

State Department of Transportation

4. DESCRIPTION OF PROJECT

Guidelines

A municipal solid waste (MSW) transfer station is to be built in the Lihue District of Kauai. It will be designed in accordance with the following guidelines:

- o The proposed transfer station is to accommodate MSW, which is the normal, nonhazardous solid waste generated in residential and commercial sectors of a community. MSW does not include heavy industrial wastes, nor high volume agricultural wastes.
- o Population and forecasted waste generation for the years 1990 to 2010 are to be used as a basis for planning and design.

- o The facility is to accommodate three major types of MSW delivery, i.e., that from:
 - a. Kauai County refuse collection trucks, principally, but not limited to, rear-load compaction trucks.
 - b. Citizen delivery vehicles, principally pick-up trucks and passenger cars.
 - c. Commercial front-load refuse collection vehicles. Commercial roll-on, roll-off containers are not to be accommodated at the transfer station.
- o The transfer facility, upon opening, must immediately accommodate Type a. and b. deliveries, but within three years after opening, should be able to handle Type c. deliveries from commercial sources. The decision to service commercial sources is dependent upon AMFAC's development of the industrial area and provisions of alternate access from Kapule Highway.
- o The site and design are to facilitate and encourage maximum recycling of MSW components to the extent that such recycling is appropriate to the economics and interests of the residents of Kauai in the coming decade.
- o Mixed MSW will be taken from the Lihue Transfer Station to Kekaha Landfill for final disposal.

Site Size and Configuration

The transfer station will occupy 3.8 acres and will be located north by northeast of the Lihue Airport on a parcel of land described by Tax Map Key 03-07-02 (see Figures 3 and 4). This location was referred to as Site No. 3 in the Site Feasibility and Selection Report, which determined the most suitable site.

Figures 1, 2, 3, and 4 show the Lihue District, the proposed location, site plan, and the proposed conceptual plan.

Need and Urgency

The Halehaka Landfill, which is one mile west of Lihue, must close by December 1990. The extended lease on the property expires at that time, and the physical capacity of that site will have been exhausted. It has been determined that Kekaha Landfill at the southwest end of the island will be the sole disposal point for Kauai's mixed MSW. The Kekaha Landfill, at its present location, is expected to close in the year 2015. After this date, a site adjacent to the present location will be opened to provide continued MSW disposal. Accordingly, a transfer station should be in place and ready to operate in the Lihue District on or before December 1990.

5. THE AFFECTED ENVIRONMENT - SETTING

Geography

The Lihue District, as seen in Figure 1, is located in the southeast quadrant of Kauai, bound on the north by the Wailua River and on the south by Hoary Head Range.

The area contains some of the best agricultural soils of Hawaii, extensive beaches along its shoreline, Kauai's principal ports, two major resorts, and scenic areas, both coastal and upland. Lihue is located about mid-way between the Kalalau Lookout at the south end of Kauai's principal highway and Haena at the north end.

Climate

Rainfall averages about 60 inches/year, with upland portions getting about 100 inches and coastal areas getting about 50 inches. Rainfall in the residential areas averages about 60 inches per year.

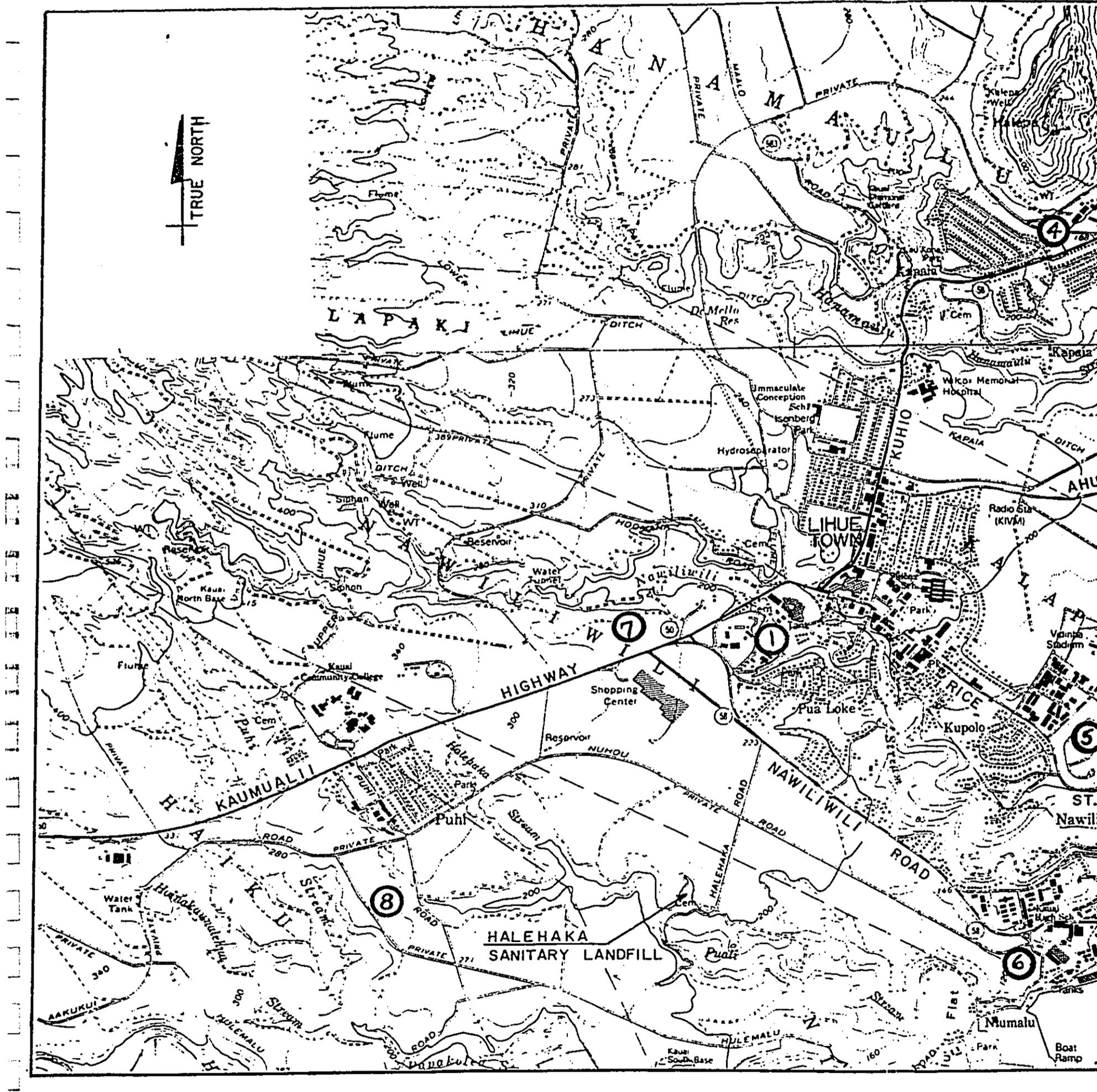
November - March: Wettest months

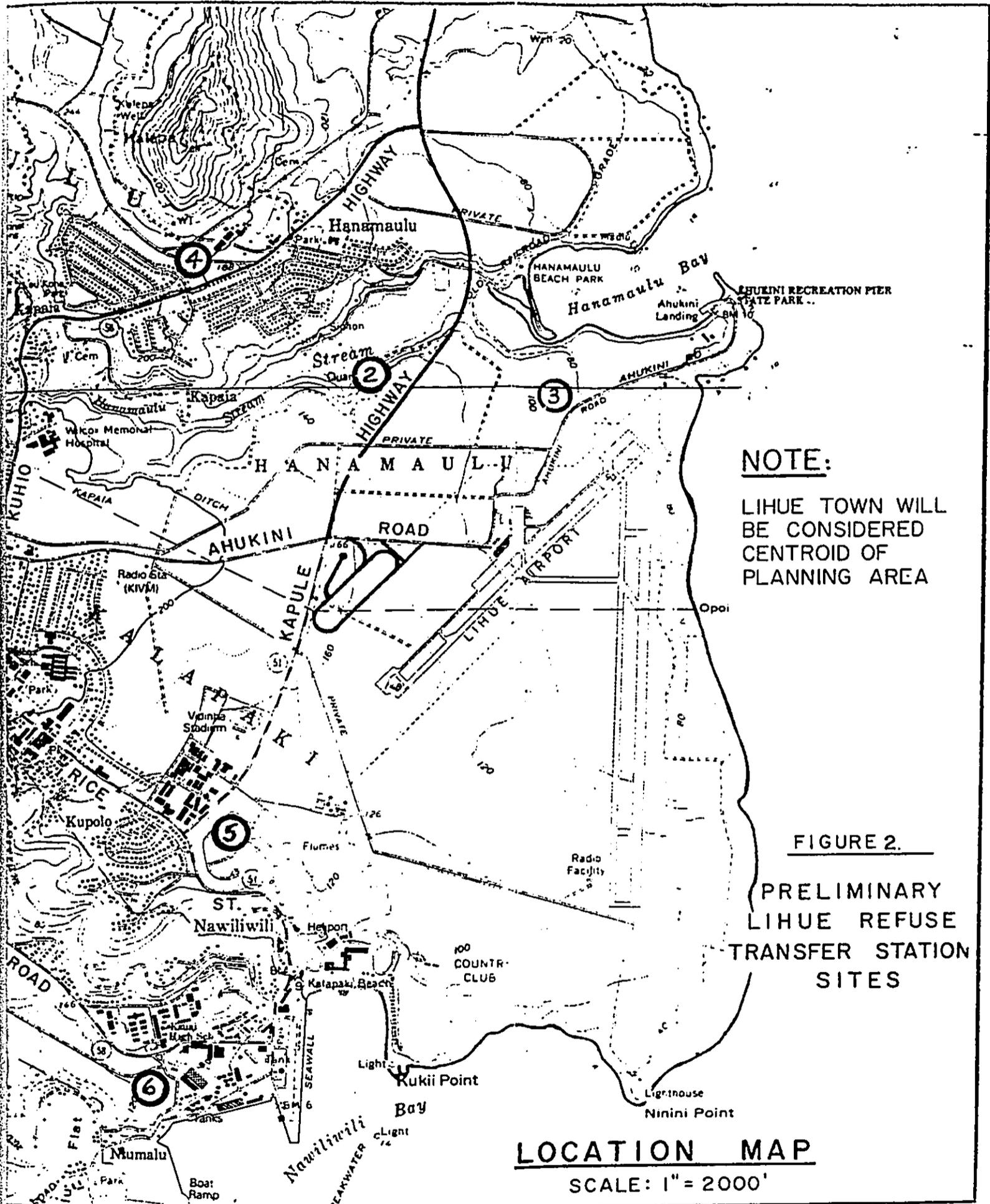
May - September: Driest months

Winds are true trades and prevail from the northeast for better than 75 percent of time and usually at between 13 to 24 mph, with some lessening of wind strength during wetter months.

Historical and Archeological Sites

A recent archeological survey by Cultural Surveys Hawaii (Ref. 1) of the area south and east of the new Lihue Runway, 17-35, has revealed five sites of cultural significance. These include a shell midden scatter,





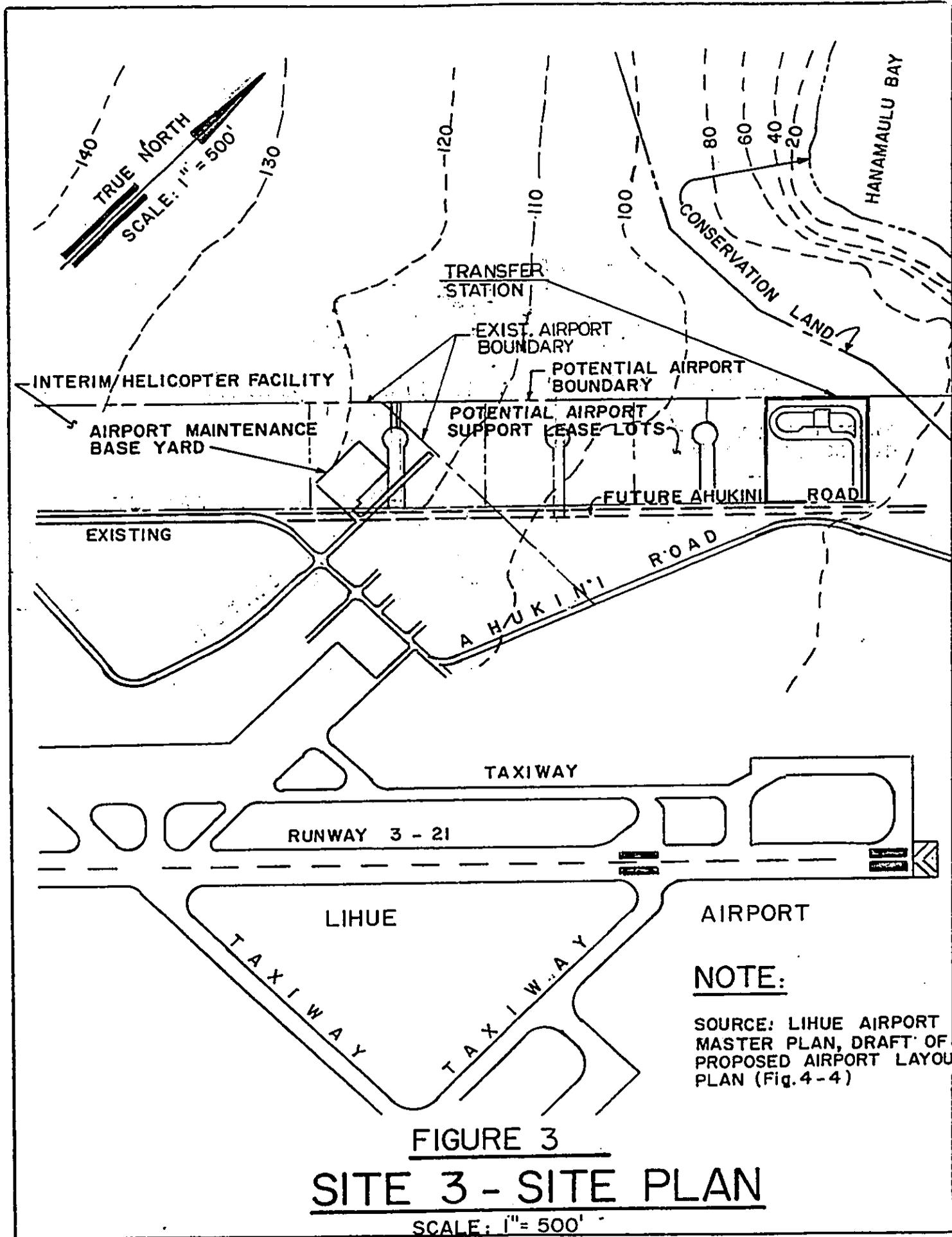
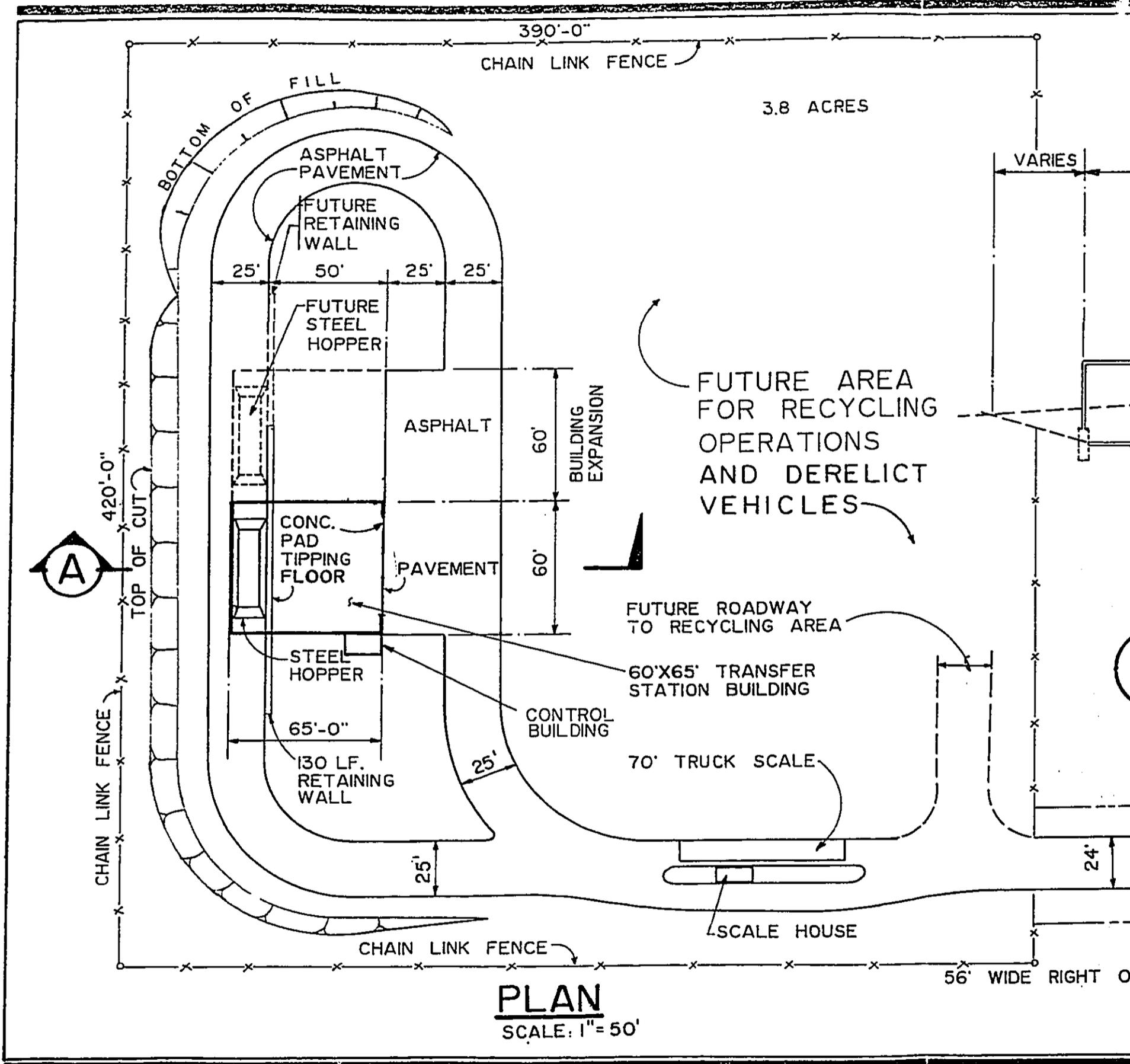


FIGURE 3
SITE 3 - SITE PLAN
SCALE: 1" = 500'



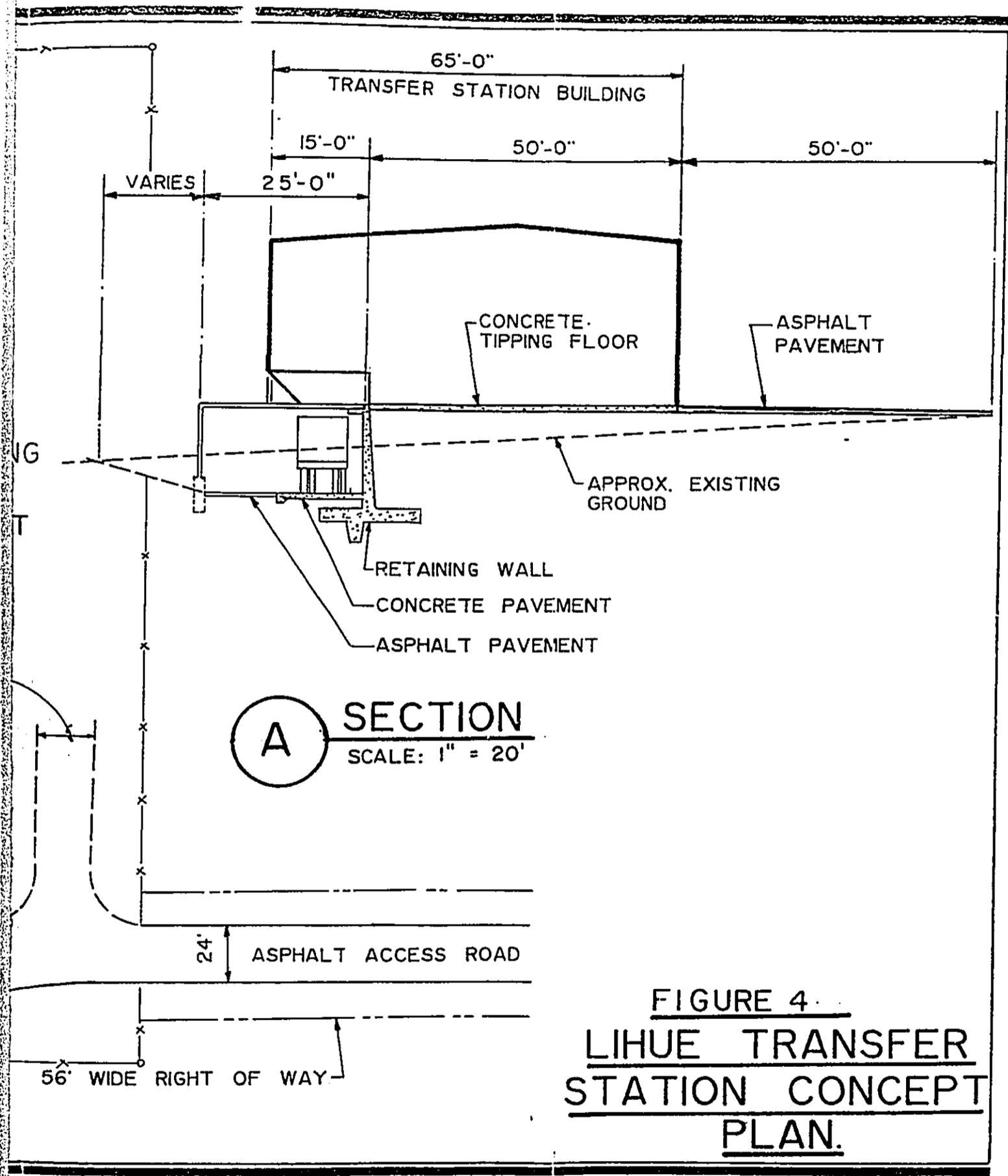


FIGURE 4.
LIHUE TRANSFER
STATION CONCEPT
PLAN.

two old wall remnants, an oval alignment or terrace, and a 400-foot long wall. Previous studies of the area had identified two ancient heiau sites (both destroyed), one at Ninini Point and one at Ahukini Point.

None of the identified sites lies within the project boundaries. The project site is currently in cane sugar cultivation.

Land Use

Land use in the Lihue Area is predominantly agricultural, with large open areas. There are less than 3,000 acres of land in uses other than agriculture and open space in the Lihue Area, which, altogether, has about 48,000 acres.

The vast majority of land in the Lihue District is held by two landowners - Grove Farm Co. and Lihue Plantation Inc. Residential uses are predominantly single-family subdivisions, with a few multifamily complexes. During the years 1990 to 2010, substantial new residential developments are expected, first on Grove Farm Co. lands and, subsequently, on Lihue Plantation Inc. lands.

Commercial uses are concentrated in Lihue Town on Rice Street and Kuhio Highway, and at the Harbor area. Limited neighborhood commercial areas are at Hanamaulu and Kapaia. A major neighborhood commercial area has recently opened southwest of Lihue Town Center.

The major industrial area is adjacent to the harbor. Industrial uses not related directly to the harbor or to sugar cane production are primarily in the industrial area on Rice Street. Sugar-related industrial areas are located in Hanamaulu and Lihue. The sugar mill is located in Lihue Town and represents Lihue's largest industrial facility. An industrial area is being planned as part of an imminent, major land development project near Puhi. Another industrial area is expected northwest of the new north-south airport runway.

Agricultural land is predominantly used for sugar cane, which covers much of the land not in urban use.

Two major resorts are located in the Lihue District; one just south of Lihue Town Center and one several miles north of Lihue Town Center.

Population Growth and Refuse Generation

MSW (refuse) generation in the Lihue District is projected to grow from about 50 tons per day in 1990 to about 100 tons per day in 2010. The increase in refuse generation will be principally due to resident population growth from about 11,000 to 21,000 in those years, but also partly due to tourism-related activities.

Pertinent Related Infrastructure

The newly-expanded airport is a major generator of vehicular traffic, and this traffic is expected to continually increase during the years 1990 to 2010. Road improve-

ments are planned, but currently such improvements have not been able to keep up with increasing traffic demands.

6. SUMMARY OF IMPACTS

With the closing of Halehaka Landfill by December 1, 1990, the proposed new transfer station will facilitate convenient and economical disposal of Lihue Municipal Solid Waste. A transfer station located central to businesses in the Lihue District would minimize traffic impacts from many waste-carrying vehicles traveling to and from the Kekaha Landfill.

Favorable Impacts

The existence of the new transfer station will result in several favorable impacts. The most favorable economic impact will be the cost savings resulting from the fewer number of trucks transporting refuse over a 45- to 50-mile round trip distance between the Lihue District and Kekaha Landfill. As a corollary, the most favorable environmental impact will be the reduction in traffic on the two-lane Lihue to Kekaha highway. Upon opening the transfer station, the daily traffic "avoided" by the transfer station will include at least four rear-load compaction trucks and up to 150 pickup trucks or equivalent. When commercial refuse is accepted at the transfer station, the daily "avoidance" will be at least five commercial refuse

trucks. By the year 2010, this traffic "avoidance" will approximately double.

An additional favorable economic impact will be dollar savings in maintenance costs to County of Kauai and private citizen's vehicles. Unpaved roadways at the sanitary landfill are more damaging to vehicles, than the paved roads that will be constructed at the transfer station.

The most favorable social impact will be the convenience for residents using the transfer station. Disposal at the transfer station will be safer and cleaner for the residents of the Lihue District, than at the sanitary landfill. With paved roads and no windblown dust and litter, the transfer station will be utilized by a greater number of residents, thus, decreasing roadside dumping.

Environmental Impacts

Environmental impacts of primary concern are traffic noise, dust, blowing debris, odor, and visual perception. Since the site will be in an industrial zone, the impacts are not significantly more severe than those one might expect from other facilities in an industrial zone.

Noise Impacts

The transfer station will be located on land zoned light industrial and adjacent to land zoned agricultural and light industrial.

Sources of noise generation at the transfer station site are collection vehicles, the compactors installed in some of those vehicles, a front-end loader and tractors pulling the transfer trailer.

Noise emissions from these sources (Ref. 2, Appendix A) will not exceed the allowable noise levels, 70 dBA, and the allowable impulsive noise levels, 80 dBA, for agricultural and industrial zones (Ref. 3) at the boundary of the transfer station. Noise generated by various refuse transfer operations, unloading and trash transfer by front-end loaders, will occur within the confines of the transfer station building and, as such, will be attenuated below the allowable noise levels by the building walls themselves. A previous engineering report, Koloa Transfer Station (Ref. 2) addressed the noise levels generated by residential vehicles and commercial trash trucks. The noise levels measured, without attenuation, did not exceed 85 dBA.

Similarly, noise emissions from transportation of the transfer trailers will not exceed allowable noise levels, 88 dBA, for commercial vehicles operating on designated truck routes (Ref. 4). A previous engineering report (Ref. 2), addressing the noise generated by refuse truck operations, found the maximum noise levels to be less than 85 dBA. Operation of the transfer trailer will incorporate a tractor for towing and will not use compaction equipment.

Dust Impacts

Dust from transfer station operations will be minimal for several reasons, the first being that Kauai County expects to divert demolition debris and similar noncombustibles, so they will not go to the transfer station or Kekaha Landfill. Dust from refuse will be minimal, because refuse will be disposed of in containers. Roadside fugitive dust will be minimal, because transfer station road surfaces will be paved.

Wind-Blown Debris Impacts

Wind-blown debris will be minimized by putting disposal operations within a building, and by proper County supervision and operations, i.e., by ensuring that transfer trailers are covered when the trailer is in use, and by daily policing of grounds, perimeter fences and access roads. The roads will be policed by Department of Public Works in the morning, throughout the day, and in the evening at closure of the transfer station to check for wind-blown debris.

Wastewater Discharge Impacts

Station wastewater will be channeled into a septic tank with a leaching field. Washdown water will be disposed of in a holding tank, and subsequently transported via a pumper truck to the wastewater treatment plant. This temporary operation will be discontinued when a connection to the municipal sewer is available.

Odor Impacts

Based on observations at transfer stations on Oahu, no significant odors are expected at property boundaries of the transfer station.

Traffic Impacts

There will be a minor impact on traffic from daily transportation of two to three large transfer trailers traveling to and from the Kekaha Landfill. Additionally, there will be minor traffic impacts from four county trash trucks and approximately 150 private vehicles who will be using the transfer station. Increases in traffic congestion resulting from transportation of refuse trailers will be minimized by transporting them during off-peak hours, such as mid-morning and mid-afternoon.

Impacts from increased commercial and residential vehicular traffic will also be minimal. The percentage of vehicles using the transfer station will be small, compared to the total number of vehicles traveling on the affected road systems. The addition of 154 vehicles to current traffic flows on Kapule Highway and Ahukini Road (as determined by the DOT, Kauai, Hawaii, October 1989) would result in a 1.7 percent increase in two-way traffic. The greatest impact, a 1.7 percent increase, would be on Ahukini Road. The least impact, 1.05 percent increase, would be on Kapule Highway. Improvements to the existing Kapule and Ahukini Road systems will occur as part of the airport expansion and will mitigate the cumulative impacts

resulting from minor increases in traffic to and from the transfer station.

General Impacts

The MSW handling activities, which include unloading and transportation by a front-end loader, will be conducted inside an industrial building; therefore, there will be no risk of attracting birds and visual impacts of the trash will not be negative.

The transfer station will be located off of a proposed realignment of Ahukini Road, within an industrially zoned area. Ahukini Road and the future businesses associated with this area, such as ground transport and airport support, will be zoned industrial and, therefore, will not be out of character with the transfer station, which, itself, is an industrial facility.

In summary, because the above mentioned adverse impacts occur within industrial-zoned areas and because these impacts can and will be mitigated, the impacts are not considered to be severe.

7. ALTERNATIVES TO THE PROPOSED ACTION

Principal alternatives to construction of the proposed Lihue Refuse Transfer Station north of the airport are:

1. No action.
2. Siting at a different location, than north of the airport.

With respect to Alternative No. 1, the no-action alternative would result in higher refuse collection costs for the community (both public and private), and substantial truck traffic increase on the two-lane road from Lihue to the Kekaha Landfill. The lack of a convenient disposal site will contribute to roadside dumping by residents.

With respect to Alternative No. 2, the rationale for the selection of the site near the airport is documented in a Site Selection and Feasibility Report.

Seven other sites were considered as seen in Figure 2. Site Nos. 7 and 8 were considered essentially equivalent to the proposed Site No. 3, with respect to environmental impact, but there has been opposition to locating the transfer station at either of these sites. Site No. 3 has received no opposition. Site selection evaluation and relevant testimony from public meetings regarding opposition to Site Nos. 7 and 8 is given in Appendix B. Site descriptions are given in the Site Feasibility and Selection Report, GMP Associates, October 1989.

8. MITIGATION

Design, construction, and operating measures will be taken to minimize those adverse impacts which cannot be avoided. Clearing and grading operations will conform to the requirements of County Ordinances, and all exposed areas will be planted with suitable ground cover as soon as practicable. Additionally, trees and other plantings will

be provided to reduce negative visual impacts. Asphalt roadways will be provided for all-weather use and for minimizing dust. The site will also be fenced for safety and control reasons, and for confining wind-blown debris. Care will be taken to locate and design highway access intersections to assure safe entry and exit of vehicles.

Locating the transfer station on proposed industrial-zoned land is the principal mitigating measure.

9. DETERMINATION WITH FINDINGS AND SUPPORTING REASONS

The County of Kauai has reviewed the "significance criteria" in paragraph 11-200-12 of the State Environmental Impact Statement Rules, Chapter 200 of the State Administrative Rules (Department of Health Regulations) and has determined that a Negative Declaration is appropriate.

The transfer station will be located in a proposed industrial zone, where this and other industrial facilities are appropriate. Minor adverse impacts can, and will be, mitigated by design, construction, and operating measures.

/S/ Kiyoji Masaki
Acting Director
Department of Public Works
County of Kauai

REFERENCES

REFERENCES

1. Belt Collins and Associates, Archaeological Reconnaissance Survey of 15-Acres of Coastal Land Kalapaki, Kaua'i Island. Hammatt, Hallett, H. Ph.D., Cultural Surveys Hawaii, July 1988.
2. Ronald A. Darby and Associates, Noise Impact Study of the Proposed Trash Transfer Station in Koloa. Engineering Report for the Koloa Refuse Transfer Station, County of Kauai, Austin Tsutsumi and Associates, Inc., May 1979.
3. State of Hawaii Department of Health, Chapter 43, Community Noise Control for Oahu, Title II, Administrative Rules, November 6, 1981.
4. State of Hawaii Department of Health, Chapter 42, Vehicular Noise Control for Oahu, Title II, Administrative Rules, November 6, 1981.

APPENDICES

APPENDIX A

APPENDIX A

NOISE IMPACT STUDY OF THE PROPOSED
TRASH TRANSFER STATION IN KOLOA

Ronald A. Darby And Associates

Acoustical Consulting & Environmental Studies
Suite A, 354 Uluni Street • Kailua, Hawaii 96734
(808) 261-3727

RADA 8-25P

May 16, 1979

Austin, Tsutsumi & Associates, Inc.
745 Fort Street, #900
Honolulu, Hawaii 96813

Attention: Mr. Caesar S. Tsutsumi

Subject: NOISE IMPACT STUDY OF THE PROPOSED
TRASH TRANSFER STATION IN KOLOA

Dear Mr. Tsutsumi:

I am pleased to submit the following report:

1.0 SUMMARY

The relative noise impact caused by implementation of a Trash Transfer Station at one of the four proposed sites shown in Figure 2-1 can be summarized as follows using Table 4-1:

- a. The noise from citizen usage of a Transfer Station at any of the sites should never be audible in nearby housing except on rare occasions from Site 2 (Location 2C).
- b. The noise from County trash truck dump events and payloader clean-up operations in the morning would always be audible at housing near Sites 2 and 3, particularly at locations 2C, 2D, and 3A.
- c. On very quiet mornings, it is probable that the County noise events would be detectable from Sites 1 and 4, particularly at locations 1A, 1D, and 4B.

- d. Because of existing topography and foliage near Site 1, and because of the relatively higher background noise levels at the housing near Maluhia Road, Wailaau Road, and the major cane haul road, there is the least probability of Transfer Station noise events being intrusive.

Increased traffic noise generated by the Transfer Station would not be perceptible from Koloa and Maluhia Roads, but could be noticeable along Wailaau and Omao Roads.

At this time, the use of noise barriers is not recommended as a cost effective noise abatement measure. If there are noise conflicts after a facility is implemented, the most effective noise reduction effort would be to limit the payload clean-up operation to after 10:00 a.m.

2.0 INTRODUCTION, OBJECTIVES, AND METHODOLOGY

The purpose of this study is to estimate the potential noise impact caused by implementing a Trash Transfer Station at one of the four proposed sites in the Koloa area (see Figure 2-1). More specifically, the objectives are to:

- a. Determine the relative noise impact from the trash transfer operations considering usage by both the County and citizens.
- b. Determine the relative noise impact from increased vehicular activity caused by the facility on the roads near the facility.
- c. Recommend any practical noise abatement actions that may be taken.

The methodology used to conduct this study involved the following steps:

- a. Assuming that the operations at the existing Hanapepe Trash Transfer Station are similar to those at the proposed facility, make noise measurements to establish typical noise source levels.
- b. Determine the sound propagation characteristics between the proposed sites and nearby residences using an artificial sound source.
- c. Determine typical background noise levels in the potentially affected areas accenting relative differences between the areas.
- d. Predict the relative intrusive noise levels at the various locations using the sources levels from (a); the sound propagation characteristics from (b); and the background noise levels from (c).

3.0 DATA COLLECTION

This section presents the findings resulting from two visits made to Kauai on March 5 and 6, 1979 and on April 1 and 2, 1979. These efforts involved observations and noise measurements of the operations at the Hanapepe Trash Transfer Station as well as noise measurements at the four proposed sites in the Koloa area involving sound propagation loss and background noise.

3.1 Hanapepe Trash Transfer Stations Operations

The noise events associated with the Hanapepe Trash Transfer Station (shown in Figure 3-1) are classified and discussed below.

3.1.1 Citizens Usage

Citizens use of the transfer station involved individuals unloading vehicles with trash either into the hopper or into the bulk storage area shown in Figure 3-1. Also some citizens sorted through items in the bulk storage area and loaded their vehicles with selected items. The frequency of dumping events varied considerably. In a fifteen-minute period ending at 5:00 p.m. on March 5, 1979, a total of 12 events occurred. Between 1:20 p.m. to 5:00 p.m. on April 1, 1979 (Sunday), there was a total of 43 events comprising 17 automobiles and 26 other vehicles including pickup trucks, vans, and jeeps. A typical event involved the noise of the vehicle pulling in, door closing, sometimes voices, the unloading of items, start up of the motor, and the vehicle pull out.

Continuous noise measurements were made at Location I shown in Figure 3-1 during the 43 citizen trash transfer events noted above on April 1, 1979. Location I is about equal distance from the centroid of the bulk storage area and from the center of the road. The hourly L_{eq} ranged from 57 dBA to 61 dBA and was dominated by noise from passing vehicles, rather than trash transfer events. For example, in one typical ten-minute period, the total Single Event Level (SEL) of all events exceeding 60 dBA was 63.8 dBA with highway events causing 63.6 dBA and trash events 50.3 dBA. Similarly in a later twenty-minute period, the total SEL was 56.8 dBA with traffic causing 54.5 dBA

and trash events 46.4 dBA. During a 2 1/2 hour period, seven trash events caused instantaneous maximum dBA levels in excess of 80 (dBA ranging from 82 to 87 dBA).

Generally, it can be said that the noise exposure generated by citizens use of the Trash Transfer Station varies greatly and is less, on the average, than the noise exposure caused by traffic on the fronting road. However, at times certain types of noise may be more annoying compared to motor vehicular noise; e.g., the unloading of a few sheets of corrugated roofing. Based on the measurements obtained and observations of the varying distances to the microphones during many events, citizen's usage of the Station will be characterized by noise events causing maximum noise levels of 70 dBA at 50 feet from the centroid of the Station. It is estimated that 90% of the citizen's trash transfer events will be less than this value.

3.1.2 County Trash Truck Usage

It is understood that two county trash trucks usually use the Hanapepe Station 5 days per week. Typically, each truck unloads twice/day at about 7:00 to 7:30 a.m. and at about 10:00 to 10:30 a.m. A typical event involves the truck backing up to the hopper, the dumping operation which includes banging noises, and the truck pull out. During unloading, maximum noise levels ran 75 to 78 dBA at Location I over a one-minute period. Recordings at Location II of the truck dumping show maximum noise levels 85 to 90 dBA. Based on

these data, the county trash truck noise event will be characterized by maximum noise levels of 85 dBA at 50 feet from the centroid of the Station.

3.1.3 Compactor Operation

The large compactor at the Transfer Station is operated by an attendant, as required, apparently 7 days per week. It is also operated each time that County trash trucks dump. Measured noise levels were less than 62 dBA at Location I when the compactor was operating. This noise source is not considered significant compared to the noise from associated events and compared to any normal motor vehicle traffic movement.

3.1.4 Payloader Clean-up Operations

Typically, a payloader and a truck are involved in removing trash from the bulk storage area about once or twice per week. The payloader, or dumpster, loads a dump truck or a trailer (see Figure 3-1) requiring about 1 to 3 hours. The primary noises associated with the operation are from the payloader engine and exhaust, the back-up alarm of the dump truck, and the initial loading of items into the empty dump truck or trailer. Typically, this operation may begin at 7:30 a.m. Figure 3-2 shows a plot of dBA versus time during the clean-up operation. This event will be also characterized as having maximum noise level of 85 dBA at 50 feet from the centroid of the Station.

3.2 Sound Propagation at the Proposed Sites

Theoretical prediction of the excess attenuation in the sound propagation paths between the proposed transfer station sites and populated areas was considered too unreliable. This is because topographical features cause complex acoustical shielding, and the scattering and absorption of sound waves by dense flora is not very predictable. Thus a series of tests were made using a loud calibrated sound source situated at the estimated centroid of each proposed transfer station site and sound recordings were made in the potentially affected populated areas. Following is a summary of the results of these tests.

3.2.1 Calibration of the Sound Source

A Remington Super 754 chain saw (without blade) served as the sound source. "Calibration" was accomplished at the Port Allen airport in a flat, clear area and involved finding a quadrant in which the saw had omnidirectional acoustic output. The directional noise level of the saw, when supported at about 5 feet above the ground on a wooden pedestal and operated in a steady-state condition at full throttle, is shown in Figures 3-3 and 3-4. Based on the octave band spectra at 100 feet, the noise source is considered a reasonable compromise to spectrally represent the variety of noise sources emanating from a transfer station; e.g., diesel engines, metal-to-metal impacts, voices, back-up warning signals, etc. Note that the chain saw produced 99 dBA at 50 feet which is 14 dB greater

than the maximum noise assumed for transfer station events. The chain saw noise is considered to be reproducible within ± 2 dB from test to test within the "calibrated" quadrant.

3.2.2 Propagation Loss Measurements

At each proposed site for the Transfer Station, the chain saw was placed on the pedestal at the estimated centroid of the transfer station, was oriented so the radiated noise quadrant shown in Figure 3-3 included the nearest populated area, and was operated for 10 to 15 second bursts at full throttle. CB radios allowed communication between personnel recording data in the populated areas and the chain saw operator.

Figure 2-1 shows the locations of the noise source and where the samples of received noise were obtained in the populated environs.

Table 3-1 presents the measured noise levels (L_2) in the populated areas as well as the average typical background noise (L_B). The column " L_2-L_B " is an expression of the intrusiveness of the source (chain saw) noise in overcoming the background noise. When L_2-L_B is less than 5 dB, the chain saw was barely audible; while when L_2-L_B is 10 dB or greater, it was very noticeable. The column in Table 3-1 headed "PL" is the measured Propagation Loss and obtained by subtracting the received levels L_2 from the source level, 99 dBA.

The column in Table 3-1, headed " $20 \log D/50$," represents the spherical spreading loss between the source and receiver. The column

"Excess Attenuation" is the difference between measured PL and spherical spreading loss and represents the excess attenuation caused by topographical shielding, buildings, foliage, and atmospheric conditions.

Figure 3-5 shows samples of dBA versus time plots obtained at typical receiving locations with the chain saw source both operating and not operating.

It is to be noted that as the propagation loss measurements were being made, the atmospheric conditions were changing. It is believed that no significant atmospheric focusing or excess losses occurred during the propagation loss measurements at Sites 1, 2, and 3 while at Site 4 the tradewinds were causing excess losses due to refraction.

4.0 Noise Level Predictions

In this section, the noise impact on neighboring residences located near each proposed Trash Transfer Site is predicted for two cases: (a) the noises from the Trash Transfer Site itself and (b) the noise from any additional traffic created by implementing the Trash Transfer Station.

4.1 Predicted Trash Transfer Noise Levels in the Community

Figure 4-1 represents the layout of a portion of a typical Trash Transfer Station that is proposed for the Koloa area. Assuming that noise events and levels will be similar to those measured at Hanapepe, predicted noise levels in the community are made based on the propagation loss

measurements outlined in Section 3.2. The noise source levels from each basic type of noise event in Section 3.1 are assumed to originate from the centroid of the proposed layout shown in Figure 4-1.

Table 4-1 summarizes the relative predicted noise levels for the four proposed sites. The columns under "County Operations" assume that the County trash truck dump event and the payloader clean-up operation are generating maximum instantaneous noise levels of 85 dBA at 50 feet from the centroid of the proposed transfer facility. The "Citizen Usage" columns assume typical maximum instantaneous levels of 70 dBA occur from citizen usage at the centroid of the transfer station. The L_2 values are the predicted maximum dBA levels in the various locations and for the two different noise events and for two different propagation conditions. The L_2-L_B data represent the predicted amount of noise level that trash transfer operations would cause above background noise. When L_2-L_B is negative, the trash noise events would not generally be detectable. When L_2-L_B is less than +5 dBA the events would be barely detectable, while when in excess of +5 dBA, they would generally be readily audible.

Two propagation conditions are shown in Table 4-1, spherical spreading and the actually measured values including excess attenuation. For Site 3, it can be seen that the effect of excess attenuation was negligible due to the line-of-sight conditions. For locations A and B at Site 2, note that considerable excess attenuation exists due to the hill between the source and the receivers. This hill is presently being excavated, and

should it be entirely removed, then higher noise levels would exist at Sites 2A and 2B. The excess attenuation associated with Site 4 is believed to be primarily due to refraction caused by the tradewind blowing when measurements were made in the afternoon. Thus noise levels at location 4B could then increase from 39 dBA to 54 dBA when no winds are blowing.

It must be realized that the above predicted data are not necessarily to be used as absolute values, but as indications of the relative difference between the sites. The following considerations are made referring to the "clouded values" in Table 4-1 as being comparable worst case conditions:

- a. For Site 1, the predicted L_2-L_B values are always negative because it is assumed that the Transfer Facility is located in the depression off the cane haul road and because of the relatively high background noise experienced by neighbors due to the traffic on Maluhia Road and the main cane haul road as well as the irrigation flumes along Wailaau Road.
- b. For locations 2A and 2B, the L_2-L_B are negative as long as the hill behind the houses is not excavated completely away. Locations 2C and 2D always have essentially positive values because of no topographic shielding.
- c. Locations 3A, 3B, 4A, and 4B have positive L_2-L_B levels for County trash operations due to the direct line of sight (i.e. no major topographic acoustic shielding).

3.2 Noise from Increased Traffic

Because there are no known projections of the usage for/proposed the Transfer Station, the data from Section 3.1.1 is utilized. It is assumed that 10 users/hour represents a maximum hourly average use and equates to $120 \times 2 = 240$ vehicle passes per 12 hour day.

Allowing a 10% traffic increase over State Highway Division traffic counts taken in 1977, the daily traffic count for Maluhia Road is 4,486 vehicles per day (both directions).

At 10:00 a.m. to 11:00 a.m., the hourly traffic count on Maluhia Road would be about 245 vehicles. This traffic would cause an hourly noise level, $L_{eq} = 66.7$ dBA at 50 feet from the center of the road (reference 3-1). If the number of vehicles increased by 10% (or 24/hour), the average hourly level would increase only 0.2 dB, which would not be a perceptible noise increase. Thus residents living along or near Maluhia Road should not perceive any increase in traffic noise due to the implementation of a Transfer Station, such as at Site 1.

Between 10:00 a.m. and 11:00 a.m., the traffic count on Koloa Road is about 266 vehicles. Thus, the increase in traffic caused by a Transfer Station; e.g., at Site 4, should not cause perceptible traffic noise increase to residents; e.g., at locations 4A and 4B.

No traffic count data were available for Wailaau Road and Omao Road. Thus, no quantitative estimates of traffic noise increase are made for the effect of locating the Transfer Station at Site 2 or Site 3.

However, it can be stated that compared to all the other sites, a Transfer Station at Site 2 should cause the greatest increase in traffic noise to the most people. A Transfer Station at Site 3 should cause the next greatest impact by increased traffic noise to residents living on Omao Road.

5.0 DISCUSSION

The largest variable affecting the amount of noise exposure emanating from any given Trash Transfer site is the time of the day. For example, the early morning time periods have the highest probability of having sounds propagate long distances easily (therefore low excess attenuation or even gains due to focusing) in combination with having minimum background noise (which tends to mask the trash event noises). These types of propagation conditions are caused by no (or light) winds and a thermal inversion which bends sound rays towards the ground over long distances. Thus, if minimizing the noise from Trash Transfer operations was of great importance, then administrative controls should be exercised such that the facility could not be used until late in the morning.

The effectiveness of noise barriers at a Trash Transfer Facility depends upon the unique geometry existing at each proposed facility and its environs. For example, no practical noise barrier can be foreseen for Site 3 because of the relatively high elevations of the housing; whereas, a noise barrier at Site 1 may be cost effective. However, it is to be noted that thermal inversions can cause sound to bend over the noise

Austin, Tsutsumi & Associates, Inc.
May 16, 1979
Page 14

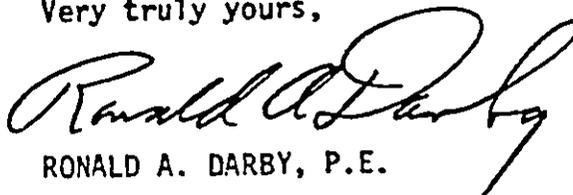
barrier making the barrier ineffective at long distances. It is recommended at this time that benefits from noise barriers not be considered in the site selection process.

On August 12, 1977, EPA approved proposed regulations for new truck mounted solid waste compactors which would reduce noise levels from 4 to 11 dBA below current average noise levels (reference 5-1). Thus, if the County purchases new trash collection trucks, citizens would benefit from the lower source noise levels.

6.0 INSTRUMENTATION

The following instrumentation was used in this study: BBN Type 614 Sound Monitoring System; General-Rad (GR) Type 1933 Sound Level Meter (SLM); GR Type 1558BP Octave Band Analyzer; GR Type 1565A-SLM; GR Type 1562A SLM Calibrator; Bruel and Kjaer (B&K) Type 2112 Audio Frequency Spectrometer; B&K Type 2305 Graphic Level Recorder; Uher Type 4400 Magnetic Tape Recorder; and a Sims BT Anemometer.

Very truly yours,



RONALD A. DARBY, P.E.

RAD:ss

Enclosures: Ref. 3-1, 5-1
Fig. 2-1, 3-1, 3-2, 3-3, 3-4, 3-5, 4-1
Table 3-1, 4-1

REFERENCES

- 3-1.....FHWA Highway Traffic Noise Prediction Model, FHWA
RD-77-108, December, 1978
- 5-1.....EPA Proposed Noise Emission Standards for New Truck--
Mounted Solid Waste Compactors [42 FR43226, August 26, 1977]

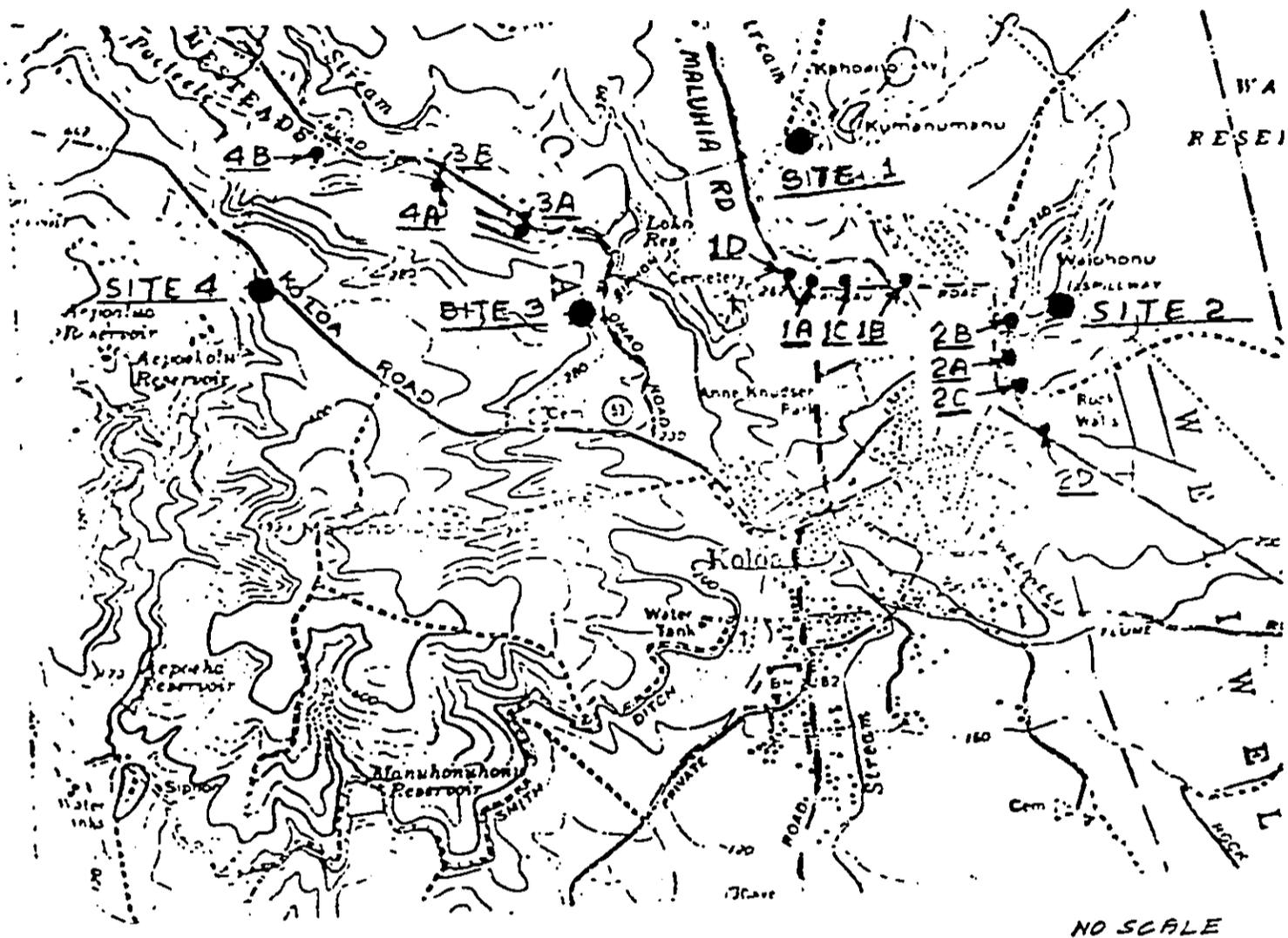


FIGURE 2-1 PROPOSED TRASH TRANSFER SITES AND NOISE MEASUREMENT LOCATIONS

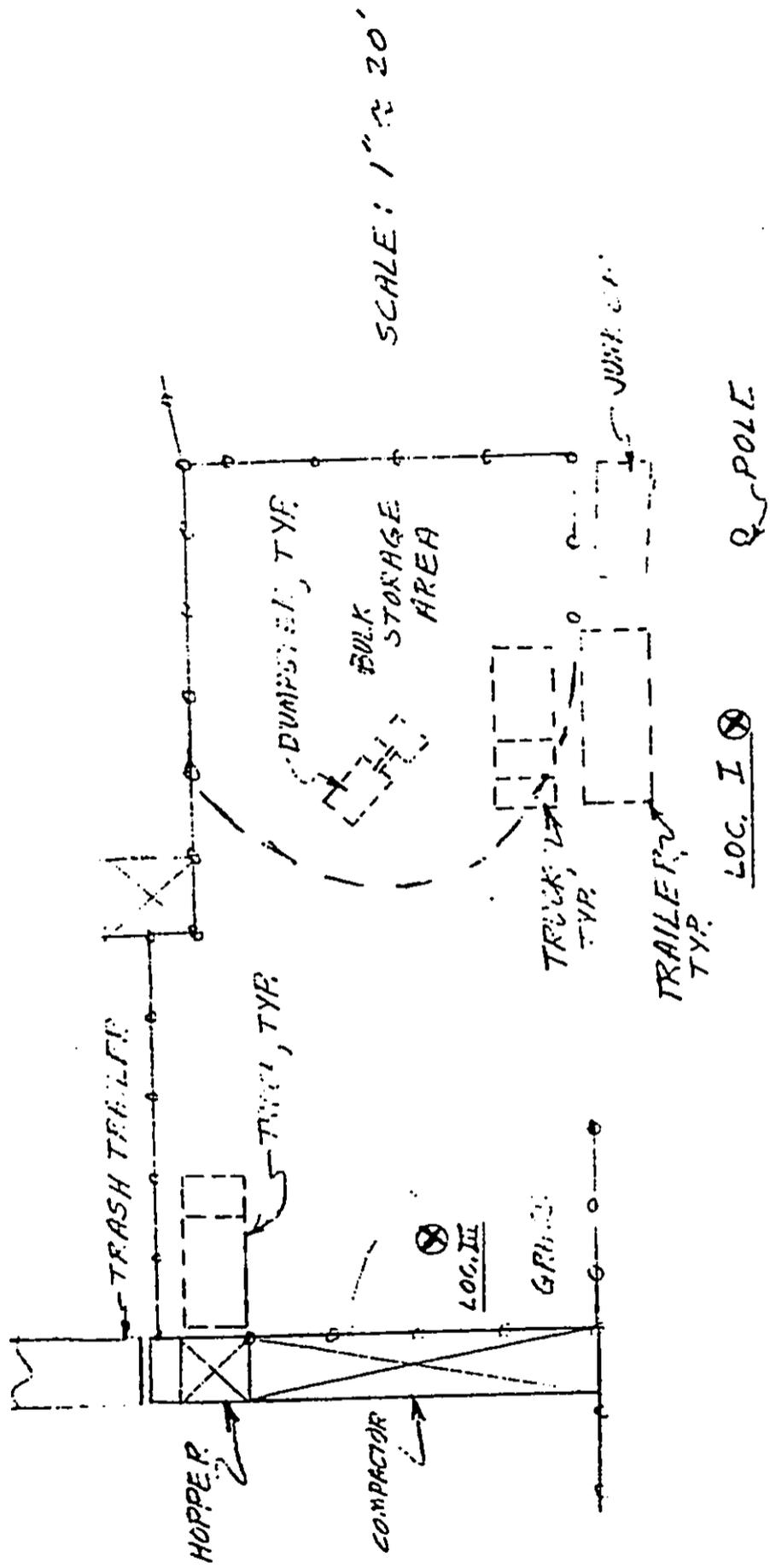


FIG. 3-1 NGISE MEMS-
UMENT LOCATIONS
AT HANAPEPE TRASH
TRANSFER STATION

LOC. IV ⊗

LOC. II ⊗

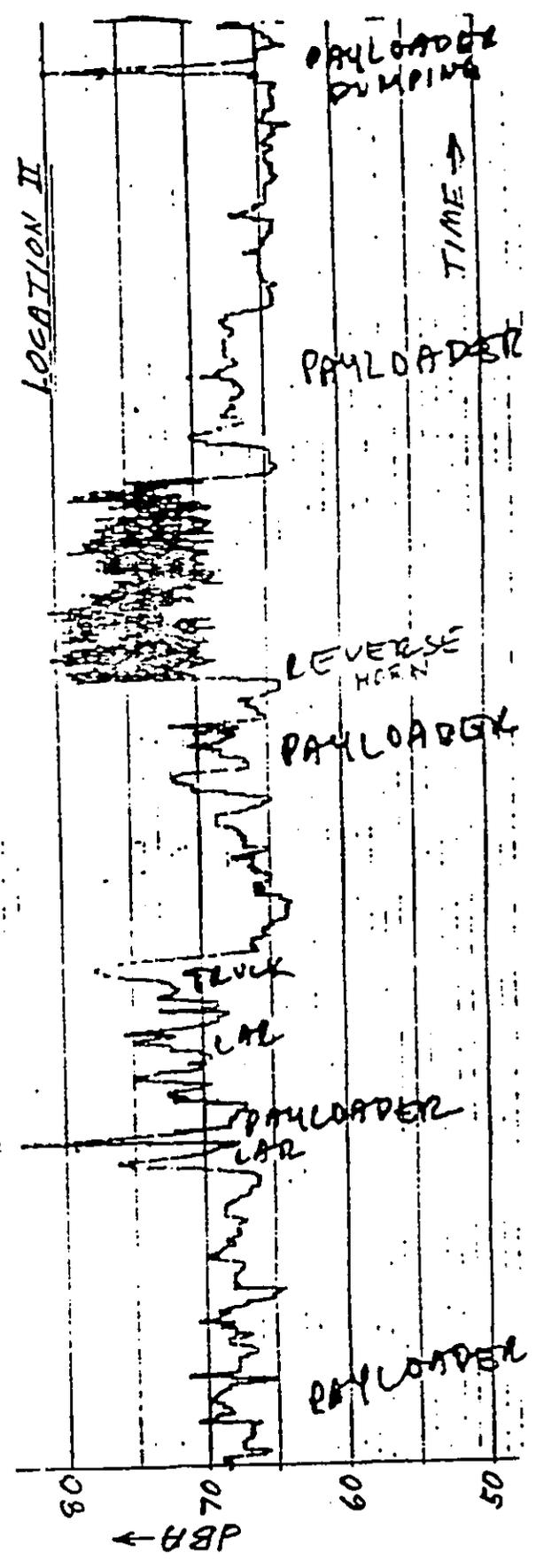
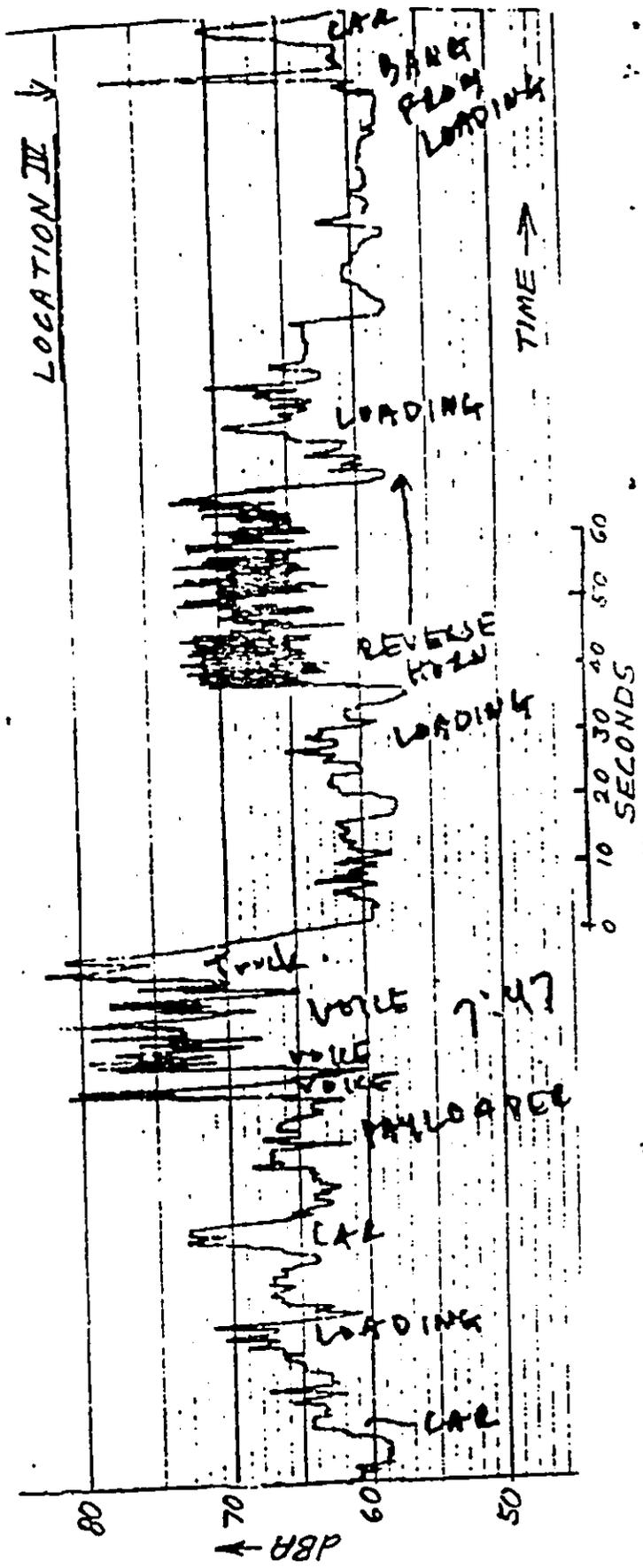


FIGURE 3-2 - DBA VS. TIME PLOTS OF PAYLOADER CLEAN-UP OPERATION AT

FIGURE B-23
POLAR COORDINATE
CALIBRATION OF CHAIN SAW
AS NOISE SOURCE, dBC VS
AZIMUTH - HORIZONTAL DIRECTIVITY

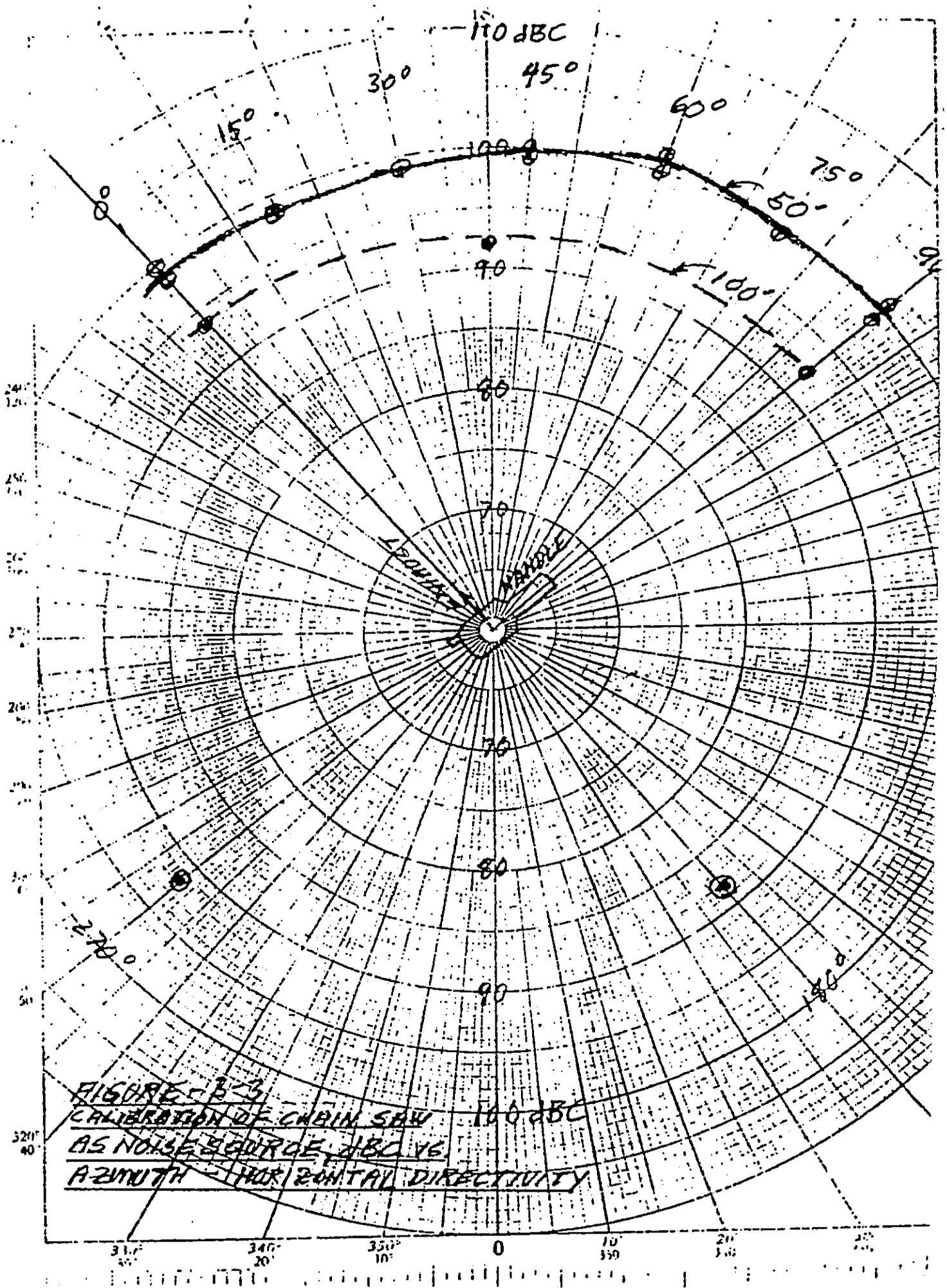


FIGURE B-23
CALIBRATION OF CHAIN SAW
AS NOISE SOURCE, dBC VS
AZIMUTH - HORIZONTAL DIRECTIVITY

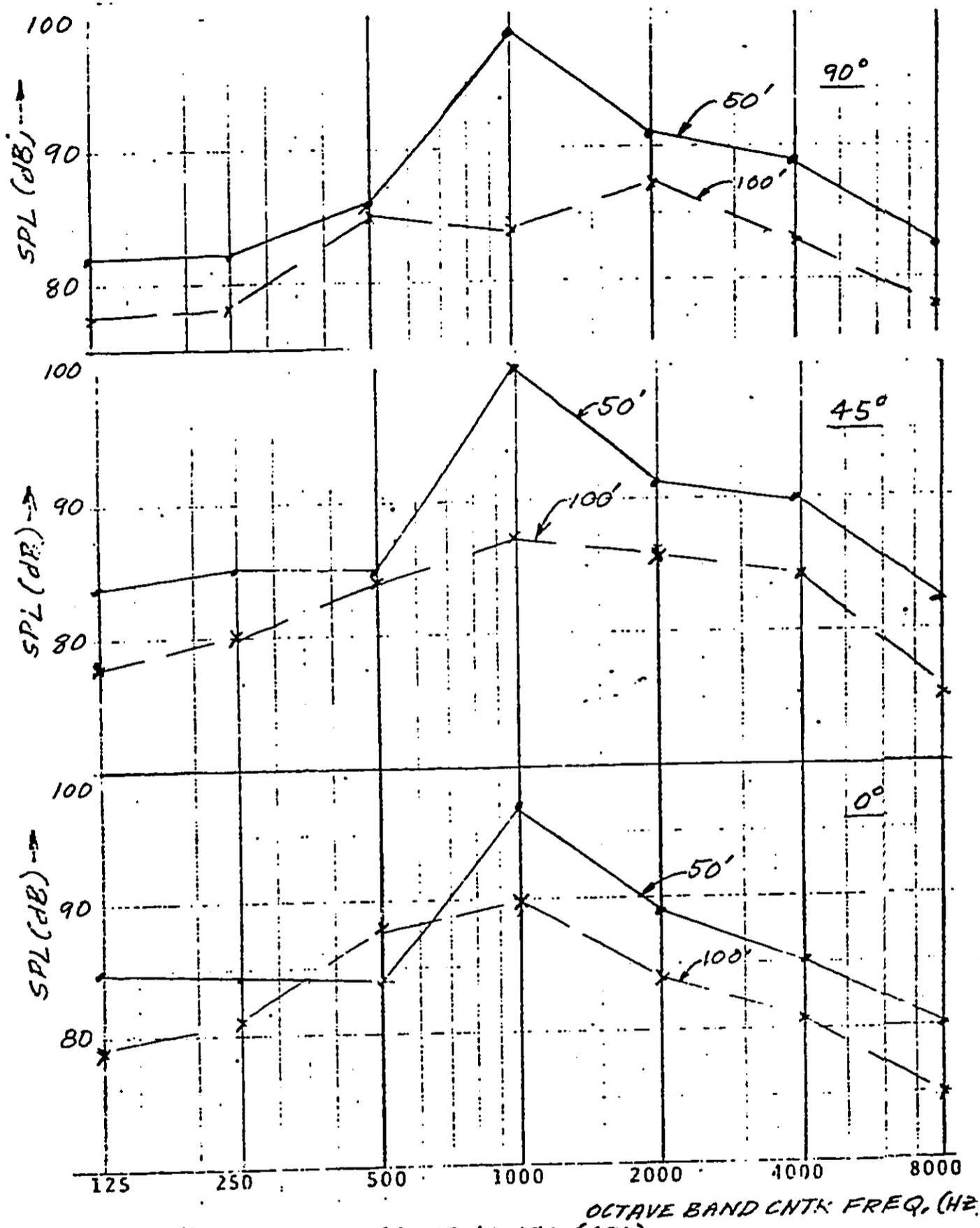


FIGURE 3-4 • SOUND PRESSURE LEVEL (SPL)
 IN OCTAVE BANDS FOR DIFFERENT AZIMUTHS "CALIBRATION" OF
 CHAIN SAW AS NOISE SOURCE.

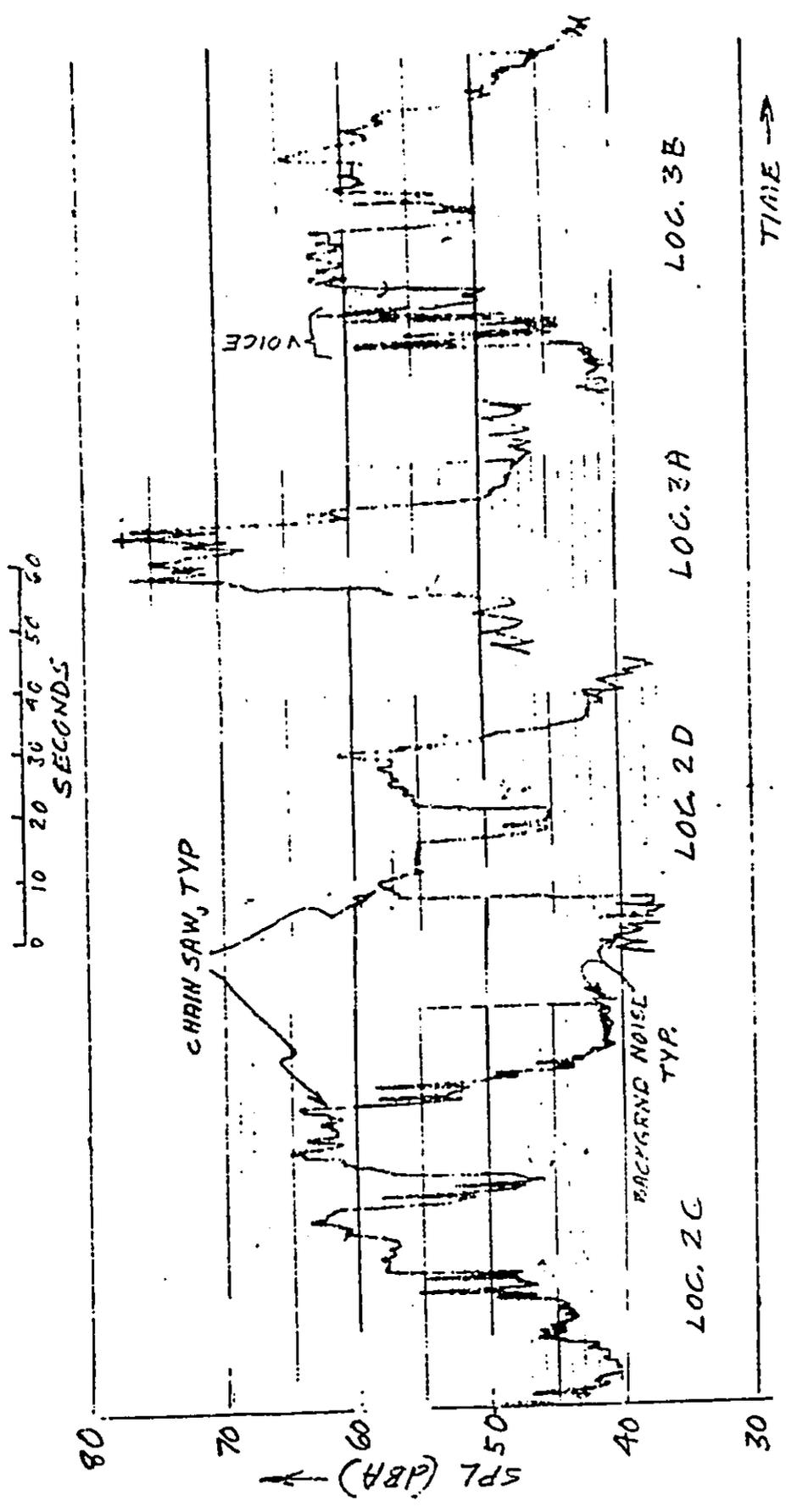


FIGURE 3-5- dBA VS. TIME PLOTS SHOWING CHAIN SAW NOISE MEASURED AT LOCATIONS NEAR PROPOSED TRASH TRANSFER FAC. SITES

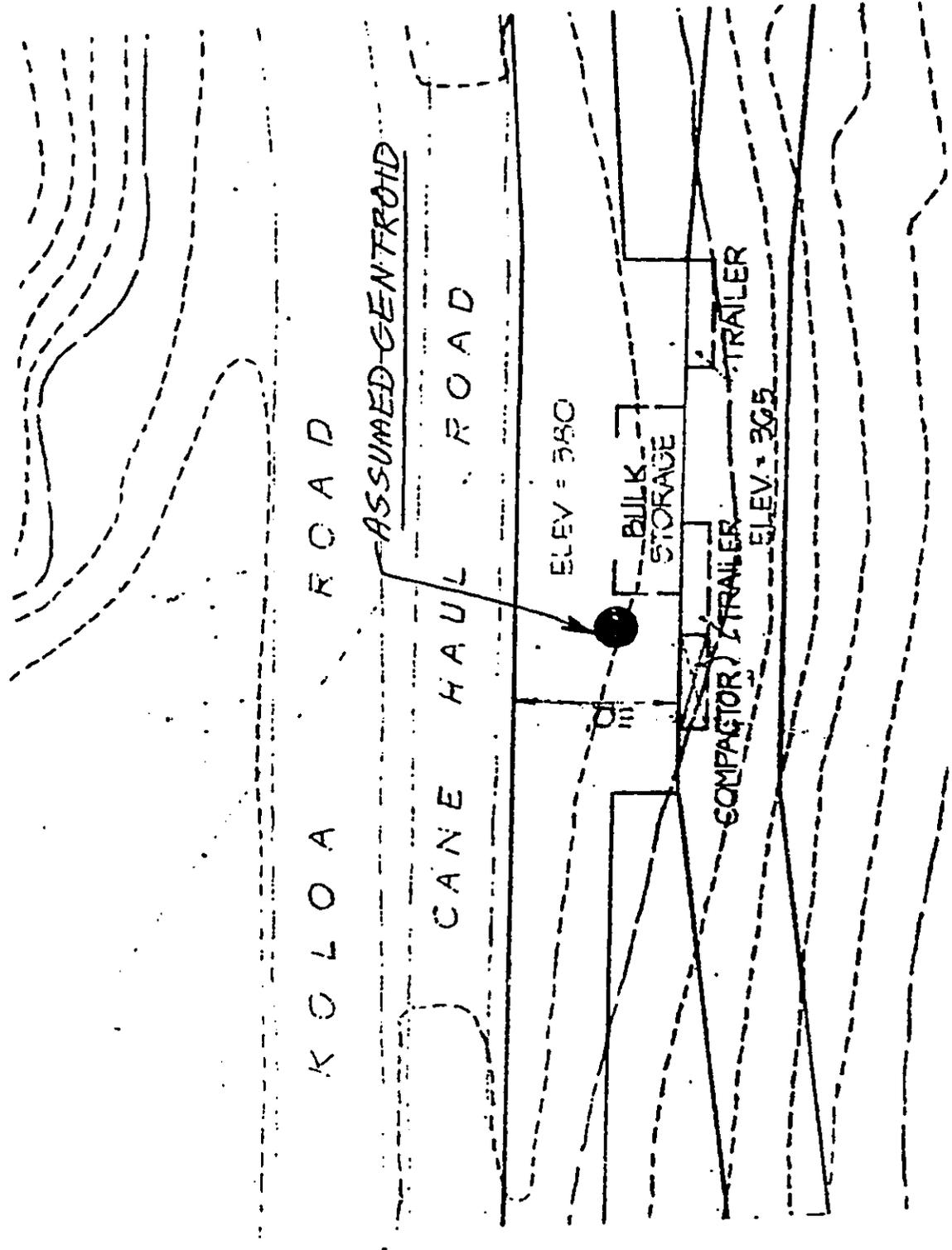


FIGURE 4-1. TYPICAL LAYOUT FOR PROPOSED TRASH TRANSFER STATION AND ASSUMED CENTROID OF NOISE EVENTS

T A B L E 3 - 1

MEASURED AND CALCULATED PROPAGATION LOSS DATA
FOR THE FOUR PROPOSED TRASH TRANSFER SITES AND AFFECTED RECEIVER LOCATIONS

Site No.	Receiver Location	(dBA) L ₂	(dBA) L _B	(dBA) L ₂ -L _B	(dBA) PL	(feet) Distance-D	D / 50	(dBA) 20 log D / 50	(dBA) Excess Attenuation
1	A	49	45	4	50	1670	33	30	20
	B	51	50	1	48	2050	41	32	16
	C	52	51	1	47	1800	36	31	16
	D	50	45	5	49	1500	30	30	19
2	A	52	45	7	47	700	14	23	24
	B	48	41	7	51	750	15	24	27
	C	62	41	21	37	850	17	25	12
	D	59	42	17	40	1300	26	28	12
3	A	72	50	22	27	1100	22	27	0
	B	66	52	13	34	2050	41	32	-2
4	A	-	-	-	-	2350	47	33	-
	B	53	43	10	46	1700	34	31	15

T A B L E 4 - 1

PREDICTED RECEIVED NOISE LEVELS (L₂) AND AMOUNTS TYPICALLY ABOVE BACKGROUND NOISE (L₂-LB) FOR MEASURED PROPAGATION LOSS AND FOR SPHERICAL SPREADING

Site No.	Receiver Location	COUNTY OPERATIONS (dBA)				CITIZEN USAGE (dBA)			
		P.L. w/Excess Atten. L ₂	L ₂ -LB	Spherical Sprg. L ₂	Spherical Sprg. L ₂ -LB	P.L. w/Excess Atten. L ₂	L ₂ -LB	Spherical Sprg. L ₂	Spherical Sprg. L ₂ -LB
1	A	35	-10	55	+10	20	-25	40	-5
	B	37	-13	53	+3	22	-28	38	-12
	C	38	-13	54	+3	23	-28	39	-12
	D	36	-9	55	+10	21	-24	40	-5
2	A	38	-7	62	+17	23	-22	47	+2
	B	34	-7	61	+20	19	-22	46	+5
	C	48	+7	60	+19	33	-8	45	+4
	D	45	+3	57	+13	30	-12	42	-2
3	A	58	+8	58	+8	43	-7	43	-7
	B	51	-1	53	+1	36	-16	38	-14
4	A	-	-	52	-	-	-	37	-
	B	39	-4	54	+11	24	-19	39	-4

APPENDIX B

APPENDIX B

MEMORANDA OF PUBLIC MEETINGS



COPY

M E M O R A N D U M

TO: File

FROM: TAC

RE: Lihue Refuse Transfer Station
Public Information Meeting: June 7, 1989, 7:00 p.m.
War Memorial and Convention Center, Lihue

Mr. John Harder chaired this public information meeting. Mr. Harder described the site selection process and rationale in determining the potential sites. He identified the three (3) potential sites selected and solicited questions regarding the selection process from the audience in attendance. There were no questions on the selection process.

Mr. Harder described the transfer station design concept and discussed the potential for commercial use and recycling.

Mr. Wayne Mitter further elaborated on the three (3) potential sites, described the matrix process and identified pros and cons on each of the selected site. Mr. Mitter reiterated the design concept and briefly described the use of an enclosed building and the potential for allowing commercial refuse disposal at the transfer station.

No written testimony were provided at the this meeting. Spokesmen for both AmFac and Grove Farm voiced their concerns.

AmFac's representative identified their concerns regarding vehicular traffic, the exiting County water system and visual impact. Amfac indicated that site #7 is incompatible with their long term development plans. Amfac's representative requested that other government owned sites be investigated.

Grove Farm's representative elaborated on topics regarding negotiations with the County, land use approvals, residential subdivisions, traffic, and substandard State highways.

Mr. Harder indicated that there are no County nor State lands available for the transfer station site.



Lihue Refuse Transfer Station

Public Information Meeting
June 7, 1989
Lihue, Kauai

List of Attendees

Joe Munechika	Kauai County Council
Michael Furukawa	AmFac
Michael Burke	AmFac
James Shinno	AmFac
Mark Hubbard	Grove Farm
Hideo Toyama	Grove Farm
Danny Creamer	Kauai Times
David Bice	Radio Station FM 97
K. Palmer	The Garden Island
Jan Robinson	State Little Office
Jerry Silva	Kauai County-Labor Department
Clyde Takekuma	State Dept. of Health
Bryan Mamaclay	Kauai County Planning Dept.
Noho Marchesi	BFI
John Harder	Kauai County DPW
Harry Funamura	Kauai County DPW
Wayne Mitter	GMP Associates, Inc.
Charles Pignataro	GMP Associates, Inc.
Tom Camarillo	GMP Associates, Inc.



M E M O R A N D U M

TO: Mr. Harry Funamura
 FROM: T. Camarillo
 DATE: May 1, 1989
 RE: Lihue Refuse Transfer Station

The following is a summary of our project team's (Wayne Mitter and Charles Pignataro) trip report during April 20 and 21, 1989, to Kauai to participate in the public informational meeting for the above-referenced project.

April 20, 1989:

1. GMP visit to Site No. 3 - Airport Area
 Access from Ahukini Road. Agricultural lands with cane, relatively level, located on the north side of roadway, with the airport on the south side of roadway. Existing derelict vehicle yard is located near the state park.
2. GMP meeting with AmFac
 Attendees: Michael Burke, Am Fac
 Michael Furukawa, Am Fac
 John Harder, Kauai County
 W. Mitter, GMP
 C. Pignataro, GMP
 - A. M. Burke stated that Am Fac requested this meeting with GMP to discuss the Preliminary Transfer Station sites that are located on Am Fac properties prior to the public meeting scheduled for the evening of April 20.
 - B. M. Burke stated that preliminary Site Nos. 1, 2, 3, 4, 6 and 7 are located on Lihue Plantation (Am Fac) properties.
 - C. Site No. 1 - Lihue Mill Area
 M. Burke stated that a transfer station in this location would interfere with mill operations and that there is not much land available. W. Mitter stated



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that the main reason for locating the transfer station in this area resulted from the 1982 Resource Recovery Report by Hirai & Associates, which suggested this site for the location of a resource recovery facility. M. Burke stated that, at this time, Refuse Derived Fuel (RDF) is not feasible for burning at the mill. During the growing season, which is 8 or 9 months of the year, there is more than enough bagasse to burn. Fuel would only be needed during the 3 or 4 months off-season to keep the mill's boiler at capacity. Also, in order to burn RDF at Lihue Mill, the mill's burner would have to be retrofitted; an expense Lihue Plantation will not want to absorb.

D. Site No. 2 - Hanamaulu Stream Area

M. Burke indicated that this site would be a problem for access. Present access is by cane haul road with steep grades. There is not much available land. Whatever land available is on wet lands. Also, residents have been trying to remove the quarry operations from this area. M. Burke feels that locating a transfer station in this area could invite some problems.

E. Site No. 3 - Airport Area

M. Burke indicated that Am Fac's long-range plans for this area is industrial use. Am Fac considers this the best of all sites. Ahukini Road has access, water and utilities. State DOT is presently doing a study on expanding the airport clear zone and might affect the actual location of Site No. 3 (GMP will consult with DOT-Airports on their plans for the airfield).

J. Harder indicated that Steve Kyono, County Engineer, is concerned with salt spray on equipment at this site.



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Page 3

M. Burke indicated that Am Fac is working on a master plan for Hanamaulu Area north of the airport.

F. Site No. 4 - Hanamaulu Equipment Yard Area

M. Burke indicated that Am Fac is planning to have this area rezoned from agricultural to industrial; however, he indicated that there are some existing residential pockets within this area and that Am Fac is also planning to increase the residential areas.

G. Site No. 5 - Lihue Commercial/Industrial Lots

J. Harder indicated that this is prime industrial land and probably would be expensive to obtain. The traffic impact to this area would probably not be acceptable to the present tenants. Also, the lots that are available now may not be available in the future.

H. Site No. 6 - Niimalu Road Industrial Area

M. Burke stated that the sugar warehouse in this area is essential to Lihue Plantation sugar productions, therefore, this site would not be acceptable due to lack of available land.

I. Site No. 7 - Puhi, Lihue Plantation Area

M. Burke indicated that this is a large area and actual planning is not specific; however, Am Fac was considering this area to be residential development. Am Fac has not ruled out this site.

J. M. Furukawa questioned the amount of acreage needed for the transfer station.

J. Harder indicated that 2 to 4 acres would be required, depending on the type of facilities to be located on the site. He stated that the County is planning a transfer station and that resource recovery will not govern the site.



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Page 4

- K. J. Harder discussed the advantages of a tipping floor, but is not sure if the available County funds are sufficient for this type of facility. He inspected tipping floor operations on his recent trip to California. Land owners may request an enclosed facility to improve the appearance of the facility in the industrial area.

J. Harder indicated that the County's Preliminary Construction Cost Estimate is approximately \$1.5 million.

- L. M. Burke indicated that Am Fac engineers and planners will investigate if other potential sites are available.

3. GMP Meeting with J. Harder at Kauai County DPW

- A. Discussed presentation for the evening's meeting. J. Harder will moderate and introduce GMP engineers. W. Mitter and C. Pignataro will present the preliminary sites, the planning and construction schedules and the transfer station objectives.
- B. J. Harder indicated that The Trash Company is a new company. He indicated that The Trash Company has been in existence for about a year and that they handle construction debris and haul it to the Kekaha SLF. J. Harder indicated that The Trash Company's need to use the Lihue Transfer Station is unlikely.
- C. J. Harder indicated that the County is considering expansion of the Kapaa Transfer Station in order to accept commercial refuse from BFI.
- D. J. Harder received islandwide collection quantities for March 1989 from BFI. The following information were given to GMP: 32,000 C.Y./month uncompacted front-end loader, 3,700 C.Y./month uncompacted roll-offs.



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Mr. Harry Funamura
May 1, 1989
Page 5

4. Meeting with the Office of Economic Development
GMP met with Herman Texiera and obtained updated resident population projections for the Lihue District.
5. Department of Water, County of Kauai
GMP met with Ed Doi and obtained the following Lihue Water System Maps.
 - A. Puhi
 - B. Lihue-Kapaa
 - C. Nawiliwili-Niumalu
 - D. Hanamaulu

6. Public Information Meeting

Date : April 20, 1989, 7:00 p.m. - 9:00 p.m.
Location : War Memorial and Convention Center, Lihue
Attendees: J. Harder, KC DPW - Moderator
W. Mitter, GMP
C. Pignataro, GMP
(See attached list for people in the audience)

J. Harder opened the meeting by explaining that the need for the transfer station is due to the imminent closing of the Halehaka SLF by the end of December 1990. He also handed out to the audience the Public Participation Meeting Report prepared by GMP and mentioned that eight preliminary sites have been chosen and that the County requests comments from the audience concerning the eight sites shown or to comment on the inclusion of additional sites. J. Harder then introduced W. Mitter and C. Pignataro as the consultants assisting the County in the planning and design of the Lihue Transfer Station.

W. Mitter briefly discussed each of the eight preliminary sites, the planning process and the tight schedule that is required. C. Pignataro discussed the preliminary sizing of the transfer station and the quantities of refuse that is generated in the Lihue District.



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A recess was taken for people to ask informal questions of the County or GMP and to prepare for formal questions or statements when the meeting resumes.

J. Harder opened the meeting again after the recess and encouraged the audience to make any comments or ask any questions.

No formal statements were made by the people in the audience.

The few questions asked were answered by J. Harder. J. Harder closed the meeting and informed the audience that he would be available at his Public Works Office to those wishing to speak to him concerning the Lihue Transfer Station or other solid waste matters. After the meeting, there were a few informal questions presented to J. Harder and GMP.

April 21, 1989:

1. GMP Visit to Hanalei Transfer Station

Transfer Station is manned during operating hours and has a neat and clean appearance. We observed that the washdown water does not run off into the catch basins, but bypasses the catch basins and runs off down the slope and into the brush.

2. Visit to Site No. 8 - Puhi, Grove Farm

J. Harder, W. Mitter and C. Pignataro:

Land level with sloped areas near stream.

3. Visit to Kekaha SLF

J. Harder, W. Mitter and C. Pignataro:

Present limits of landfill reaching capacity. Need for lateral expansion for continuing disposal.



ASSOCIATES, INC.
Consulting Engineers

Memorandum
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4. Visit to Site No. 7 - Puhi, Lihue Plantation

J. Harder, W. Mitter and C. Pignataro

Land mostly level; there is land sloping to gulch approximately 1,500 feet mauka of Kaumualii Highway.

5. Meeting with BFI

Location : BFI Office
Attendees: Noho Marchesi, BFI
Randy Castillo, BFI
J. Harder, KC DPW
W. Mitter, GMP
C. Pignataro, GMP

- A. R. Castillo gave to GMP quantity of refuse disposed, per district and islandwide.
- B. N. Marchesi stated that the major supermarkets bale their cardboard. It is not collected or disposed of by BFI.
- C. J. Harder stated that the County would consider one of the following systems:
 - 1. Stationary Compactor
 - 2. Open Top
 - 3. Tipping Floor - Open Pit
- D. N. Marchesi suggested that there should be an area for resident refuse dropoff that is separate from County and commercial vehicle disposal. He stated that an enclosed facility would be nice to hide the transfer operations.
- E. J. Harder indicated that he favored the idea of a tipping floor mainly from the recycling end where the different types of refuse can be separated.

KAUAI TRANSFER STATION
20 APRIL PUBLIC MEETING ATTENDEES

File
2177/00

NAME	ADDRESS	PHONE
Jilda Loomis - DOW	P.O. Box 165, Anahola 96703	822-0948
Mark Hubbard GROWS FOR	2770 Kanani ST. Lihue	245-3678
Kevin McMahon KING SEED	P.O. Box 237 Waimea	338-1357
CARMEN M. BOSTICK " "	P.O. Box 245 Eleele	338-1467
Clyde Tatekuma HEALTH	Box 3040 Umi St. Lihue	245-4929
MICHAEL BURKE A/F/C	P.O. Box 3230 Hmdulu 96801	945-8265
Michael Furukawa " "	2970 KELE ST.	245-7325
RANDY CASTILLO BFI	2666 NIUMOLA RD LIHUE	245-2561
NOAH MARCHESI " "	2666 NIUMOLA RD LIHUE	245-2563
1. JIMMY FUNAMURA DFW	4444 Rice ST. Lihue	245-4751
Stanley Doi " "	4444 Rice st. Rm 23 Lihue	245-4751
STEVEN KYONO " "	" " " "	245-3818
Kiyoji Masaki " "	" " " "	245-4757
E. MARTINO DUTERTE ?	P.O. Box 141 Hanalei	245-6325
H. M. ... NAME ASST	P.O. Box 706 Lihue	245-5895
W. ...	P.O. Box 97, Lihue	266-1197
Christine Sands	Box 97, Lihue	246-1197
FRED SNYDER (CO. TEE-2 ENG)	RR2, BOX 321 H10 KAPAA	822-2537
Stephen Ray (The Garden Island)		

APPENDIX C

APPENDIX C

RESPONSE TO REVIEW COMMENTS



University of Hawaii at Manoa

Environmental Center
Crawford 317 • 2550 Campus Road
Honolulu, Hawaii 96822
Telephone (808) 948-7361

June 8, 1990

Mr. Kiyoji Masaki
Department of Public Works
3021 Umi Street
Lihue, Kauai, Hawaii 96766

Dear Mr. Masaki:

Response to our Comments
Environmental Assessment/Negative Declaration
Lihue Refuse Transfer Station, Lihue Kauai

Thank you for your response to the comments we submitted on the above cited Environmental Assessment. I apologize for this tardy reply to your letter. During the legislative session other members of our staff pick up on the reviews and apparently your letter of February 27 slipped through the cracks! In any case, hoping that these comments will be helpful, I will proceed to respond to your letter.

As you probably surmised from the tone of our initial review, we were quite concerned with the quality of the original EA for this project. The information provided clearly was insufficient to demonstrate that environmental issues were being considered in the decisionmaking. Furthermore, we were particularly concerned that such a deficient EA would set a precedent leading to substandard content of future documents. I am pleased to report however, that your response to our concerns as expressed in your letter of February 27, 1990, and the final EA document quite responsibly address the deficiencies we had noted. Your response and the additional materials provided in the EA clearly are major improvements to the initial EA and provide the reader with a far more complete understanding of the project proposed and the potential impacts that can be expected to occur.

Thank you for such a comprehensive response to our comments and your obvious effort to assure that the much needed Lihue Transfer Station will be sited, developed, and maintained in an environmentally responsible manner.

Yours truly,

Jacquelin N. Miller
Associate Environmental Coordinator

cc: OEQC
Marshall Mock
Carolyn D. Cook

U.S. DEPARTMENT OF THE INTERIOR

AN EQUAL OPPORTUNITY EMPLOYER

JOANN A. YUKIMURA
MAYOR



COUNTY OF KAUAI
DEPARTMENT OF PUBLIC WORKS
3021 UMI STREET
LIHUE, KAUAI, HAWAII 96766

February 27, 1990

KIYOJI MASAKI
Acting COUNTY ENGINEER
TELEPHONE 245-3318

ARNOLD W.F. LEONG
DEP. COUNTY ENGINEER
TELEPHONE 245-3602

MAILING ADDRESS
4444 RICE STREET, RM. 230
LIHUE, HI 96766

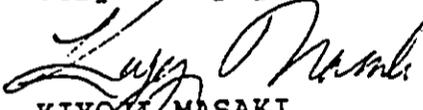
Ms. Jacquelin Miller
Associate Environmental Coordinator
University of Hawaii at Manoa
Environmental Center
Crawford 317, 2550 Campus Road
Honolulu, Hawaii 96822

RE: LIHUE REFUSE TRANSFER STATION

Dear Ms. Miller:

Attached is the Final Environmental Assessment for the Lihue Transfer Station in which we have incorporated the appropriate responses to your comments (11/30/89). We trust this document adequately addresses your concerns and would appreciate a response indicating your concurrence.

Very truly yours,


KIYOJI MASAKI
Acting County Engineer

JH/cu

Attachment

cc: Tom Camarillo, G.M.P. Assoc.
Dr. Marvin Miura, O.E.Q.C.

COMMENTS AND RESPONSES

Responses to comments given November 20, 1989, RN: 0243 by Ms. Jacquelin Miller, Associate Environmental Coordinator, University of Hawaii at Manoa, Environmental Center.

SECTION

SPECIFICITY

- C - On pages 13 and 14 of the document, it is disclosed that sites 7 and 8 were "essentially equivalent" but not selected because of certain "opposition". No criteria is presented regarding in what way the sites were "essentially equivalent", nor the general gist of the opposition and why there was none for site 3. This does not adequately address the issue of site selection.
- R - Section 6 - Site Evaluation of Three Sites, from Lihue Refuse Transfer Station Site Feasibility and Selection, Report, October 1989, is included in Appendix E of this Final Environmental Assessment. This section presents the detail criteria and evaluations for site selection. Appendix D of this Final Environmental Assessment includes correspondence, dated April 25, 1989, from Grove Farm Company regarding opposition to Site 8 and correspondence dated May 2, 1989, from AMFAC recommending Sites 3 and 8. By the State of Hawaii Department of Transportation's letter, dated September 18, 1989, they indicated their concerns regarding access from Sites 7 and 8. Site No. 3 is the recommended site. Site 3 is not in a residential area; has the least highway impact; is on land that is the least expensive as compared to Sites 7 and 8; contains topography conducive to site layout; and is compatible to future commercial land use with its adjacent area. No adverse comments on Site 3 have been voiced.

REF: 2177/00-6365c/389c

C - Terms such as "shortly" (page 2, middle of page) and "just north" (page 2, last paragraph) are evasive in a document such as an Environmental Assessment as they are subjective terms which only have clear meaning to the user. An approximate value gives the reviewer, and most importantly the decision maker, a clearer picture of intended meaning. In the case of location, a Tax Map Key number is generally provided in Environmental Assessment documents. It is also difficult to understand why the proposed area of the project can only be described as "about two to four acres". This surely is more accurately known than the document indicates, especially if the plans have been completed.

R - Tax Map Key and size of project site are noted in the final EA report: TMK 3-7-02, 3.8 acres. Revised Figure 3 of the final EA depicts the proposed location for the transfer station. The term "shortly" was revised to "within three years." The term "just north" was revised to "north by northeast." At the time the EA was submitted in September 1989, the exact parcel for the transfer station in the vicinity of the airport area was not identified. Since then, the exact location, metes and bounds for the parcel have been determined.

C - How will the wastewater be transported to the wastewater treatment plant according to the "temporary system" (page 12, paragraph 3)?

R - Wastewater will be transported via a pumper truck. Response noted in final EA report.

C - The document states (on page 14, section 7) that "trees and other plantings can be provided to shield the site from direct public view", but will they be provided - are they planned?

R - Trees and other plants will be provided to offset negative visual impacts. Response noted in final EA report. Landscaping is included in the design and construction budgets.

TRAFFIC
IMPACTS

- C - The first paragraph on page 13 states that "there will be some adverse impact from the traffic of two to three large transfer trailers daily going around Lihue Town to and from the Kekaha Landfill", but does not indicate what this impact will be or how it might be mitigated.
- R - The impacts will be general traffic congestion due to slow-moving and large trash trailers. Impacts will be mitigated by transporting the trailers off-peak hours -- midmorning and midafternoon. Response noted in final EA report.
- C - The issue of impacts from additional traffic to and from the transfer station itself is not addressed. Information should be available from the Department of Transportation regarding current volumes and capacities of the current road system, indicating which segments and intersections are already under stress. Issues which should be addressed in the EA are: 1) whether the additional traffic will affect local routes and in what way, 2) cumulative impacts, including projections from the newly expanded airport facility, and 3) any mitigative measures which could be incorporated to offset these impacts on a road system already under stress (as indicated at the top of page 10).
- R - 1. Utilizing DOT traffic data, additional traffic due to the transfer station will increase at most 1.7 percent on Ahukini Road.
2. Cumulative impacts from a 1.7 percent increase in traffic are minor. Projections from newly expanded airport facility addressing cumulative impacts will be available from a traffic study to be conducted by the DOT.
3. Mitigative measures will be addressed by the airport traffic study to be conducted by the DOT. Future access will be provided from Kapule Highway through the industrial subdivision when AMFAC develops their property.

OTHER
ISSUES

- C - Historic/Archaeological Sites. Assessment of potential historic or archaeological significance of the project site should be provided in the EA.
- R - A paragraph on Archaeological sites has been included in Section 5 of the final EA report.
- C - Maintenance Scheduling. "Occasional cleanup of perimeter fences, if and when necessary" is an inadequate mitigative measure to offset wind-blown debris (page 12, par. 2). Scheduled maintenance - weekly/monthly/quarterly - should be included and budgeted for the operational plans.
- R - Transfer station will be policed daily. Roads to and from transfer station will be policed morning, throughout the day and in the evening at closure by the Department of Public Works.
- C - Noise. The above referenced document does not address the issue of noise sufficiently. The bottom of page 11 lists vehicle sources which will produce noise generated from the implementation of this project, and the only information regarding possible impacts provided is completely unqualified. This document provides no information regarding measured values for noise levels of the sources, or any noise standards for the industrial zone. It is not appropriate in an Environmental Assessment to omit the address of impacts, such as noise, because of assumptions based on subjectively perceived information (relative proximity to the airport).
- R - Measured values are provided in Appendix A of final EA report. Noise standards for industrial/agricultural zones are 70 dBA for noise and 80 dBA for impulsive noise. Noise limit standards for trash trucks traveling on truck routes is 88 dBA.

Impacts from activities performed at the transfer station will be minor since all operations -- unloading and loading -- will occur within the confines of the transfer station building. Noise generated from back-up warning sirens are exempt from noise standards. Noise contours approximate 70 Ldn from noise generated from Runway 3-21. For compatibility, the American National Standard recommends 70 Ldn or less for areas serving wholesale, industries, manufacturing or utilities, Appendix F.

C - Neighbors. The Environmental Assessment should provide information regarding the presence or absence of neighboring businesses which might be affected by noise, dust or debris.

R - Information about neighboring businesses is provided in the paragraph, General Impacts, of the final EA report.

C - Lifespan. What is projected closure date for the Kekaha Landfill? Since it is the only remaining landfill in Kauai, are there any plans for future MSW disposal? As MSW generation in the Lihue District is expected to double in the next twenty years (page 9) this may be an important consideration affecting current plans.

R - Projected closure date at present location is 2015. At this time an adjacent site will be opened.

C - Waste Reduction. According to statements on page 9, MSW generation in the Lihue district is projected to double in the next twenty years; how much of this additional volume of MSW can be expected to be reduced by the methods of recycling, waste-avoidance, -minimization, and -diversion (from the top of page 10)? Are there any predictive statistics? And what qualifies the apparent inference that traffic demands/impacts will be reduced because of this supposed waste reduction?

R - Statement from top of page 10 was removed. Reduction of MSW and inference to traffic demands will be addressed in the County of Kauai Solid Waste Management Plan. A pilot program for the plan is expected to be implemented in early-1990.



University of Hawaii at Manoa

Environmental Center
Crawford 317 • 2550 Campus Road
Honolulu, Hawaii 96822
Telephone (808) 948-7361

November 20, 1989
RN:0243

Mr. Steven M. Kyono
County Engineer
County of Kauai
Department of Public Works
3021 Umi Street
Lihue, Kauai, Hawaii 96766

Dear Mr. Kyono:

Environmental Assessment/Negative Declaration
Lihue Refuse Transfer Station
Lihue, Kauai

The above referenced project proposes to construct a municipal solid waste (MSW) transfer station on "about two to four acres" of land "just north of the Lihue Airport" in the Lihue District of Kauai to accommodate MSW delivery from rear-load compaction trucks, "citizen delivery vehicles", and commercial front-load collection vehicles. The MSW collected at the proposed transfer station is to be transported to the Kekaha Landfill in southwestern Kauai for final disposal. The proposed station is intended to help offset the loss of the Halehaka Landfill one mile west of Lihue which must close by December 1990.

We have briefly reviewed the Environmental Assessment (EA) for this project with the assistance of Harriett Kessinger of the Environmental Center. We would like to call your attention to the following areas of concern.

Specificity

The information presented in the above document is, in general, too vague. It does not provide sufficient explanations to substantiate the conclusions drawn, thus disallowing the reviewer to follow the intended rationales for the decisions made.

On pages 13 and 14 of the document, it is disclosed that sites 7 and 8 were "essentially equivalent" but not selected because of certain "opposition". No criteria is presented regarding in what way the sites were

UNIVERSITY OF HAWAII ENVIRONMENTAL RESEARCH CENTER

AN EQUAL OPPORTUNITY EMPLOYER

CORRECTION

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



University of Hawaii at Manoa

Environmental Center
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November 20, 1989
RN:0243

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County Engineer
County of Kauai
Department of Public Works
3021 Umi Street
Lihue, Kauai, Hawaii 96766

Dear Mr. Kyono:

Environmental Assessment/Negative Declaration
Lihue Refuse Transfer Station
Lihue, Kauai

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AN EQUAL OPPORTUNITY EMPLOYER

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Terms such as "shortly" (page 2, middle of page) and "just north" (page 2, last paragraph) are evasive in a document such as an Environmental Assessment as they are subjective terms which only have clear meaning to the user. An approximate value gives the reviewer, and most importantly the decision maker, a clearer picture of intended meaning. In the case of location, a Tax Map Key number is generally provided in Environmental Assessment documents. It is also difficult to understand why the proposed area of the project can only be described as "about two to four acres". This surely is more accurately known than the document indicates, especially if the plans have been completed.

How will the wastewater be transported to the wastewater treatment plant according to the "temporary system" (page 12, paragraph 3)?

The document states (on page 14, section 7) that "trees and other plantings can be provided to shield the site from direct public view.", but will they be provided - are they planned?

Traffic Impacts

The first paragraph on page 13 states that "there will be some adverse impact from the traffic of two to three large transfer trailers daily going around Lihue Town to and from the Kekaha Landfill", but does not indicate what this impact will be or how it might be mitigated.

The issue of impacts from additional traffic to and from the transfer station itself is not addressed. Information should be available from the Department of Transportation regarding current volumes and capacities of the current road system, indicating which segments and intersections are already under stress. Issues which should be addressed in the EA are: 1) whether the additional traffic will affect local routes and in what way, 2) cumulative impacts, including projections from the newly expanded airport facility, and 3) any mitigative measures which could be incorporated to offset these impacts on a road system already under stress (as indicated at the top of page 10).

Other Issues

Historic/Archaeological Sites. Assessment of potential historic or archaeological significance of the project site should be provided in the EA.

Maintenance Scheduling. "Occasional cleanup of perimeter fences, if and when necessary" is an inadequate mitigative measure to offset wind-blown debris (page 12, paragraph 2). Scheduled maintenance - weekly/monthly/quarterly - should be included and budgeted for in the operational plans.

Noise. The above referenced document does not address the issue of noise sufficiently. The bottom of page 11 lists vehicle sources which will produce noise generated from the implementation of this project, and the only information regarding possible impacts provided is completely unqualified. This document provides no information regarding measured values for noise levels of the sources, or any noise standards for the industrial zone. It is not appropriate in an Environmental Assessment to omit the address of impacts, such as noise, because of assumptions based on subjectively perceived information (relative proximity to the airport).

Neighbors. The Environmental Assessment should provide information regarding the presence or absence of neighboring businesses which might be affected by noise, dust or debris.

Lifespan. What is the projected closure date for the Kekaha Landfill? Since it is the only remaining landfill on Kauai, are there any plans for future MSW disposal? As MSW generation in the Lihue District is expected to double in the next twenty years (page 9) this may be an important consideration affecting current plans.

Waste Reduction. According to statements on page 9, MSW generation in the Lihue district is projected to double in the next twenty years; how much of this additional volume of MSW can be expected to be reduced by the methods of recycling, waste-avoidance, -minimization, and -diversion (from the top of page 10)? Are there any predictive statistics? And what qualifies the apparent inference that traffic demands/impacts will be reduced because of this supposed waste reduction?

We find the above referenced Environmental Assessment to be lacking in substance, and inadequate in terms of identification of potential environmental impacts which may be generated by the proposed project and pertinent mitigative measures. Impacts and mitigation plans need to be realistically addressed at this planning stage in order to avoid future costs associated with rectifying mistakes and clean-up.

While a negative determination may be appropriate for this particular project, the information on which the determination is based is significantly deficient. As such, a serious precedent is set for the use of substandard Environmental Assessments in decision-making with regard to whether or not an Environmental Impact Statement should be prepared.

We urge that the issues we have noted in this review be reevaluated in a revised Environmental Assessment document.

Thank you for the opportunity to comment on this EA.

Yours truly,

Jacquelin N. Miller
Jacquelin Miller
Associate Environmental Coordinator

cc: OEQC
L. Stephen Lau
Marshall Mock
Harriett Kessinger

APPENDIX D

APPENDIX D
CORRESPONDENCE



April 25, 1989

Mr. John Harder
Solid Waste Coordinator
County of Kauai
Department of Public Works
3021 Umi Street
Lihue, HI 96766

Dear Mr. Harder:

Re: Comments on the Lihue Refuse Transfer Station

The following comments are in regards to the eight proposed sites that you are seeking community input on:

Site 2 seems to be the best in regards to access, minimal impact on surrounding community and central location.

Site 6 would have a negative impact on our proposed housing development in that area.

Site 7 would also be a good location if it were removed slightly from the highway. Access, minimal impact and central location are good.

Site 8 would not be very desirable because of its distance from the main highway, possible impact on Komohana Subdivision residents, lack of adequate slope of the property and its distance from the population center.

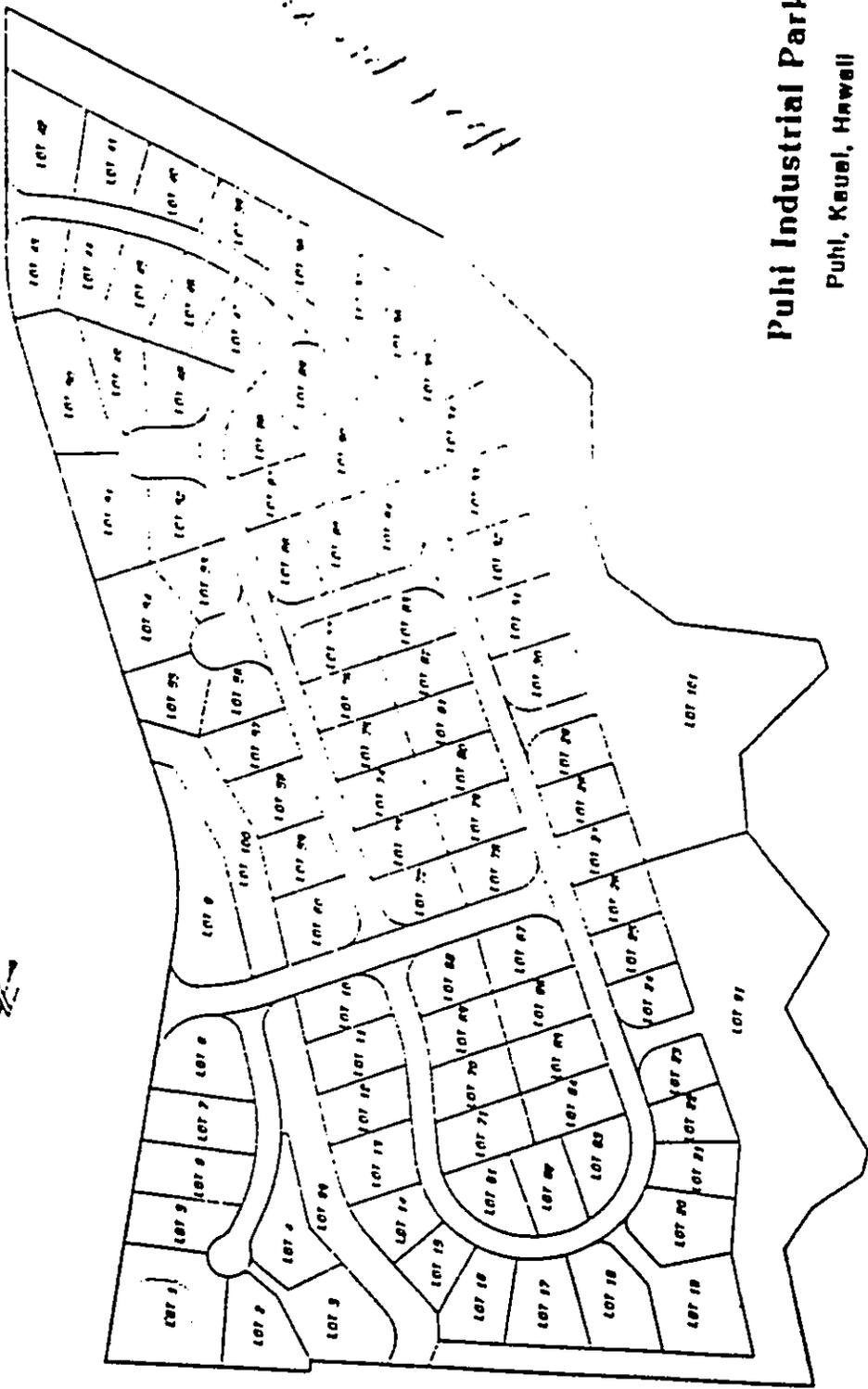
Sincerely,

GROVE FARM COMPANY, INCORPORATED

A handwritten signature in cursive script that reads "David W. Pratt".

David W. Pratt, President
and Chief Executive Officer

MSH/ac



Puhī Industrial Park

Puhī, Kaula, Hawaii

NO SCALE



ASSOCIATES, INC.
Consulting Engineers

M E M O R A N D U M

TO: Mr. Harry Funamura
FROM: T. Camarillo
DATE: May 1, 1989
RE: Lihue Refuse Transfer Station

The following is a summary of our project team's (Wayne Mitter and Charles Pignataro) trip report during April 20 and 21, 1989, to Kauai to participate in the public informational meeting for the above-referenced project.

April 20, 1989:

1. GMP visit to Site No. 3 - Airport Area

Access from Ahukini Road. Agricultural lands with cane, relatively level, located on the north side of roadway, with the airport on the south side of roadway. Existing derelict vehicle yard is located near the state park.

2. GMP meeting with AmFac

Attendees: Michael Burke, Am Fac
Michael Furukawa, Am Fac
John Harder, Kauai County
W. Mitter, GMP
C. Pignataro, GMP

A. M. Burke stated that Am Fac requested this meeting with GMP to discuss the Preliminary Transfer Station sites that are located on Am Fac properties prior to the public meeting scheduled for the evening of April 20.

B. M. Burke stated that preliminary Site Nos. 1, 2, 3, 4, 6 and 7 are located on Lihue Plantation (Am Fac) properties.

C. Site No. 1 - Lihue Mill Area

M. Burke stated that a transfer station in this location would interfere with mill operations and that there is not much land available. W. Mitter stated

REF: 2177/00-5262c/324c



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that the main reason for locating the transfer station in this area resulted from the 1982 Resource Recovery Report by Hirai & Associates, which suggested this site for the location of a resource recovery facility. M. Burke stated that, at this time, Refuse Derived Fuel (RDF) is not feasible for burning at the mill. During the growing season, which is 8 or 9 months of the year, there is more than enough bagasse to burn. Fuel would only be needed during the 3 or 4 months off-season to keep the mill's boiler at capacity. Also, in order to burn RDF at Lihue Mill, the mill's burner would have to be retrofitted; an expense Lihue Plantation will not want to absorb.

D. Site No. 2 - Hanamaulu Stream Area

M. Burke indicated that this site would be a problem for access. Present access is by cane haul road with steep grades. There is not much available land. Whatever land available is on wet lands. Also, residents have been trying to remove the quarry operations from this area. M. Burke feels that locating a transfer station in this area could invite some problems.

E. Site No. 3 - Airport Area

M. Burke indicated that Am Fac's long-range plans for this area is industrial use. Am Fac considers this the best of all sites. Ahukini Road has access, water and utilities. State DOT is presently doing a study on expanding the airport clear zone and might affect the actual location of Site No. 3 (GMP will consult with DOT-Airports on their plans for the airfield).

J. Harder indicated that Steve Kyono, County Engineer, is concerned with salt spray on equipment at this site.



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May 1, 1989
Page 3

M. Burke indicated that Am Fac is working on a master plan for Hanamaulu Area north of the airport.

F. Site No. 4 - Hanamaulu Equipment Yard Area

M. Burke indicated that Am Fac is planning to have this area rezoned from agricultural to industrial; however, he indicated that there are some existing residential pockets within this area and that Am Fac is also planning to increase the residential areas.

G. Site No. 5 - Lihue Commercial/Industrial Lots

J. Harder indicated that this is prime industrial land and probably would be expensive to obtain. The traffic impact to this area would probably not be acceptable to the present tenants. Also, the lots that are available now may not be available in the future.

H. Site No. 6 - Niualu Road Industrial Area

M. Burke stated that the sugar warehouse in this area is essential to Lihue Plantation sugar production, therefore, this site would not be acceptable due to lack of available land.

I. Site No. 7 - Puhi, Lihue Plantation Area

M. Burke indicated that this is a large area and actual planning is not specific; however, Am Fac was considering this area to be residential development. Am Fac has not ruled out this site.

J. M. Furukawa questioned the amount of acreage needed for the transfer station.

J. Harder indicated that 2 to 4 acres would be required, depending on the type of facilities to be located on the site. He stated that the County is planning a transfer station and that resource recovery will not govern the site.



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May 1, 1989
Page 4

- K. J. Harder discussed the advantages of a tipping floor, but is not sure if the available County funds are sufficient for this type of facility. He inspected tipping floor operations on his recent trip to California. Land owners may request an enclosed facility to improve the appearance of the facility in the industrial area.

J. Harder indicated that the County's Preliminary Construction Cost Estimate is approximately \$1.5 million.

- L. M. Burke indicated that Am Fac engineers and planners will investigate if other potential sites are available.

3. GMP Meeting with J. Harder at Kauai County DPW

- A. Discussed presentation for the evening's meeting. J. Harder will moderate and introduce GMP engineers. W. Mitter and C. Pignataro will present the preliminary sites, the planning and construction schedules and the transfer station objectives.
- B. J. Harder indicated that The Trash Company is a new company. He indicated that The Trash Company has been in existence for about a year and that they handle construction debris and haul it to the Kekaha SLF. J. Harder indicated that The Trash Company's need to use the Lihue Transfer Station is unlikely.
- C. J. Harder indicated that the County is considering expansion of the Kapaa Transfer Station in order to accept commercial refuse from BFI.
- D. J. Harder received islandwide collection quantities for March 1989 from BFI. The following information were given to GMP:
- | | | |
|-------------------|------------------|-------------|
| 32,000 C.Y./month | uncompacted | |
| front-end loader, | 3,700 C.Y./month | uncompacted |
| roll-offs. | | |



Memorandum
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Page 5

4. Meeting with the Office of Economic Development

GMP met with Herman Texiera and obtained updated resident population projections for the Lihue District.

5. Department of Water, County of Kauai

GMP met with Ed Doi and obtained the following Lihue Water System Maps.

- A. Puhī
- B. Lihue-Kapaa
- C. Nawiliwili-Niumalu
- D. Hanamaulu

6. Public Information Meeting

Date : April 20, 1989, 7:00 p.m. - 9:00 p.m.
Location : War Memorial and Convention Center, Lihue
Attendees: J. Harder, KC DPW - Moderator
W. Mitter, GMP
C. Pignataro, GMP
(See attached list for people in the audience)

J. Harder opened the meeting by explaining that the need for the transfer station is due to the imminent closing of the Halehaka SLF by the end of December 1990. He also handed out to the audience the Public Participation Meeting Report prepared by GMP and mentioned that eight preliminary sites have been chosen and that the County requests comments from the audience concerning the eight sites shown or to comment on the inclusion of additional sites. J. Harder then introduced W. Mitter and C. Pignataro as the consultants assisting the County in the planning and design of the Lihue Transfer Station.

W. Mitter briefly discussed each of the eight preliminary sites, the planning process and the tight schedule that is required. C. Pignataro discussed the preliminary sizing of the transfer station and the quantities of refuse that is generated in the Lihue District.



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May 1, 1989
Page 6

A recess was taken for people to ask informal questions of the County or GMP and to prepare for formal questions or statements when the meeting resumes.

J. Harder opened the meeting again after the recess and encouraged the audience to make any comments or ask any questions.

No formal statements were made by the people in the audience.

The few questions asked were answered by J. Harder. J. Harder closed the meeting and informed the audience that he would be available at his Public Works Office to those wishing to speak to him concerning the Lihue Transfer Station or other solid waste matters. After the meeting, there were a few informal questions presented to J. Harder and GMP.

April 21, 1989:

1. GMP Visit to Hanalei Transfer Station
Transfer Station is manned during operating hours and has a neat and clean appearance. We observed that the washdown water does not run off into the catch basins, but bypasses the catch basins and runs off down the slope and into the brush.
2. Visit to Site No. 8 - Puhi, Grove Farm
J. Harder, W. Mitter and C. Pignataro:
Land level with sloped areas near stream.
3. Visit to Kekaha SLF
J. Harder, W. Mitter and C. Pignataro:
Present limits of landfill reaching capacity. Need for lateral expansion for continuing disposal.



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Mr. Harry Funamura
May 1, 1989
Page 7

4. Visit to Site No. 7 - Puhi, Lihue Plantation

J. Harder, W. Mitter and C. Pignataro

Land mostly level; there is land sloping to gulch approximately 1,500 feet mauka of Kaunualii Highway.

5. Meeting with BFI

Location : BFI Office
Attendees: Noho Marchesi, BFI
Randy Castillo, BFI
J. Harder, KC DPW
W. Mitter, GMP
C. Pignataro, GMP

- A. R. Castillo gave to GMP quantity of refuse disposed, per district and islandwide.
- B. N. Marchesi stated that the major supermarkets bale their cardboard. It is not collected or disposed of by BFI.
- C. J. Harder stated that the County would consider one of the following systems:
 - 1. Stationary Compactor
 - 2. Open Top
 - 3. Tipping Floor - Open Pit
- D. N. Marchesi suggested that there should be an area for resident refuse dropoff that is separate from County and commercial vehicle disposal. He stated that an enclosed facility would be nice to hide the transfer operations.
- E. J. Harder indicated that he favored the idea of a tipping floor mainly from the recycling end where the different types of refuse can be separated.

AMFAC HAWAII INC
700 Bishop Street
PO Box 3230
Honolulu Hawaii 96801
(808) 945-8111



May 2, 1989

Mr. John Harder
Solid Waste Coordinator
County of Kauai
Department of Public Works
4396 Rice Street
Lihue, Kauai 96766

RECEIVED
MAY 10 1989
COUNTY OF KAUAI

Subject: Proposed Lihue Transfer Station

Dear Mr. Harder:

After reviewing the County's proposal to construct a refuse transfer station in the Lihue vicinity, Amfac/JMB Hawaii and The Lihue Plantation Company would like to make the following comments:

-Any site which is chosen should be compatible with current and future land use patterns in the close proximity to the site.

-We have reviewed the eight proposed sites currently under consideration and of the sites located on Amfac land, we find that site 3 is the only site which is compatible with our future plans. In the near future, we plan to submit for a land use change to light industrial uses in this area. Additionally, site 8 located on Grove Farm land appears to be a good choice with respect to location and compatibility to other land uses.

-The site which is ultimately selected must have County access and utilities. We cannot accept any site which proposes dual use of Lihue Plantation Company roads or utilities.

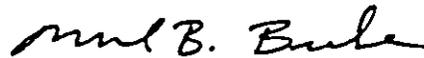
-When more definite details become available regarding size requirement and type of station, we would like to be informed of such so that our understanding of this project can be increased.

-Another site which should be considered is one located on State land in the vicinity of the airport. As you know, the State is doing a Master Plan for the airport property and the transfer facility may be a compatible use in that area.

Mr. John Harder
May 2, 1989
Page 2

When further comments arise, we will certainly forward them to your office. Please call me at 945-8265 should you have any questions.

Very truly yours,



Michael B. Burke
Project Manager

MBB/kk

xc: M. Furukawa
C. Kanazawa
GMP Associates, Inc.



ASSOCIATES, INC.
Consulting Engineers

M E M O R A N D U M

TO: John Harder
FROM: Charles Pignataro
DATE: May 18, 1989
RE: Lihue Refuse Transfer Station

The following is the information we received by telecon on May 18, 1989, with John Lee (telephone number 5234775) of the City and County of Honolulu, Department of Public Works, Division of Refuse Collection and Disposal concerning the use of an open top refuse trailer system at the Kawaihoa Transfer Station on Oahu. Mr. Lee stated that the City and County of Honolulu is satisfied with the operations of the transfer station and that trailer weighing at the landfill indicates that the 103 cubic yard open top trailers used at the Kawaihoa facility are hauling 21 tons of refuse. Mr. Lee stated that the refuse is not compacted in the open top trailers, the stationary clamshell in use at Kawaihoa Transfer Station is used only for load leveling since over compaction will result in the trailers exceeding the allowable highway loading. As a comparison, Mr. Lee indicated that the 75 cubic yard closed compactor trailers in use and weighed at Keehi Transfer Station are hauling between 16 and 17 tons of refuse to the landfill.



ASSOCIATES, INC.
Consulting Engineers

June 20, 1989

Mr. Owen Miyamoto
Airports Administrator
State of Hawaii
Department of Transportation
Airports Division
869 Punchbowl Street
Honolulu, Hawaii 96813

Re: Lihue Refuse Transfer Station

Dear Mr. Miyamoto:

The County of Kauai Public Works Department is planning a Lihue District Refuse Transfer Station to be sited just north of the Lihue Airport in accordance with the attached Figure 6-1. Refuse transfer operations will be enclosed in a prefabricated industrial type building about 25 to 30 feet in height. We approximate that 150 vehicles per day (passenger cars, pickup sized trucks, county refuse trucks and large sized front load refuse trucks) will bring refuse to the transfer station. Two to three large sized transfer trailers daily will take the consolidated refuse in enclosed (all covered) containers westward to Kekaha Sanitary Landfill.

Please advise whether the Airports Division foresees any potential interference with airport operations. If there are any questions regarding this matter, please call the undersigned or Mr. Charles Pignataro at 521-4711 at GMP Associates, Inc., the consultant for the transfer station planning and engineering.

Sincerely,

GMP ASSOCIATES, INC.

Tommy A. Camarillo, P.E.
Project Manger

TAC:ly

c.c. County of Kauai DPW, John Harder
Wilson Okamoto & Associates, Earl Matsukawa

REF: 2177/00-5488c/324c

841 Bishop Street - Suite 1501 - Honolulu, Hawaii 96813 • Tel: (808) 521-4711 • Fax: (808) 538-3269 • Telex 6502990013(MCI)

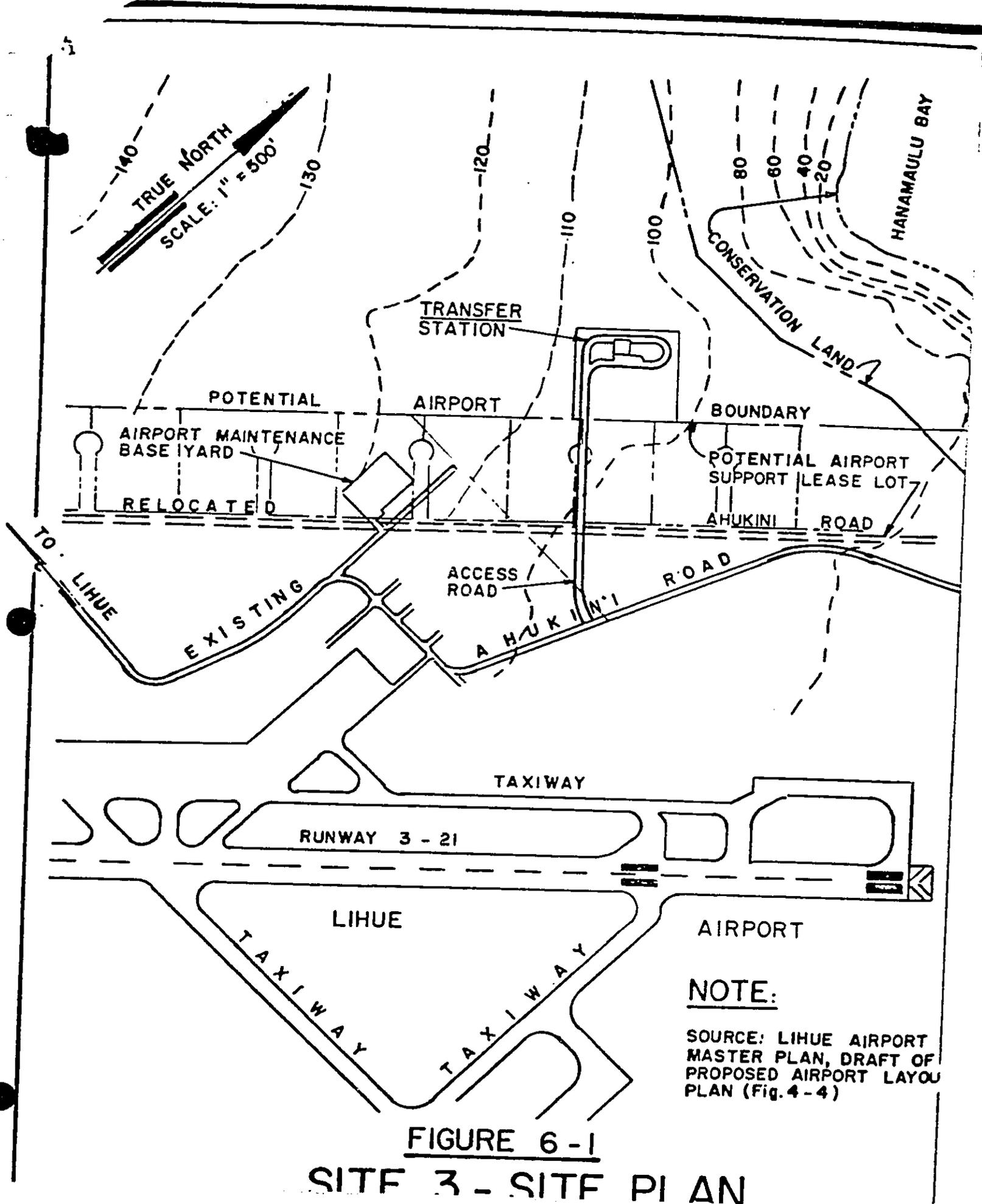


FIGURE 6-1
SITE 3 - SITE PLAN

JOHN WAIHEE
GOVERNOR



RECEIVED
JUL 07 1989

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
AIRPORTS DIVISION

GMP ASSOCIATES, INC.

HONOLULU INTERNATIONAL AIRPORT • HONOLULU HAWAII 96819

EDWARD Y. HIRATA
DIRECTOR

DEPUTY DIRECTORS
JOHN K. UCHIMA
RONALD N. MIRANO
DAN T. KOCHI
JEANNE K. SCHULTZ

IN REPLY REFER TO

July 5, 1989

AIR-EW
89.2239

Mr. Tommy A. Camarillo, P.E.
GMP Associates Inc.
841 Bishop St., Suite 1501
Honolulu, Hawaii 96813

Dear Mr. Camarillo:

Subject: Proposed Refuse Transfer Station at Lihue Airport

Thank you for the opportunity to review the subject Refuse Transfer Station proposal.

We have two concerns regarding the installation of a Refuse Transfer Station at the location described in your letter of June 20, 1989:

- 1) The potential for attracting birds to the facility may worsen an existing problem at the airport, and
- 2) An increase in non-airport related traffic within Airport boundaries. We understand that 150 or more vehicles per day would use Ahukini Road as a result of the proposed use.

As for the potential of attracting birds at the proposed facility, the design of the enclosure should be discussed in more detail with our staff. A more detailed description of the proposed facility (e.g., plans, photos of existing transfer stations, etc.) would facilitate our review of the proposal.

Regarding the use of airport roads, we prefer that an alternate off-airport route be used and recommend an existing cane road that would directly access Kapule Highway north of the Airport across AMFAC property.

Mr. Tommy A. Camarillo, P.E.
Page 2
July 5, 1989

AIR-EW 89.2239

If there are any questions regarding this matter, please call Mr. Dean Nakagawa of our staff, or Mr. Earl Matsukawa of Wilson Okamoto and Associates.

Sincerely,


Owen Miyamoto
Airports Administrator

cc: Mr John Harder, DPW, County of Kauai
Mr. Chris Kanizawa, AMFAC
Wilson Okamoto & Associates, Inc.



July 11, 1989

Mr. James Ikeda
Acting Chief EPHSD
State of Hawaii
Department of Health
P.O. Box 3378
Honolulu, Hawaii 96801

Re: Lihue Refuse Transfer Station

Dear Mr. Ikeda:

The County of Kauai, Department of Public Works is planning a Lihue Refuse Transfer Station to be sited just north of the Lihue Airport, as shown on the attached Figures 4-1 and 6-1. Refuse transfer operations will be enclosed in a prefabricated industrial type building. Toilet facilities for transfer station personnel will be provided within the building. Also proposed as part of the transfer station operations will be the washdown of transfer trailers and refuse compaction equipment outside the building.

The proposed disposal of domestic wastewater from the toilet facilities will be through the use of an on-site septic tank with leaching cesspool or tile drains. Since the composition of the washdown water from the refuse compaction equipment is not definite, this wash water shall be considered non-domestic and will be disposed of into a holding tank and periodically pumped and transported to the wastewater treatment plant (WWTP) approximately two miles away.

There are no existing public sanitary sewers in the vicinity of the proposed transfer station. The land surrounding the proposed site is presently cane fields owned by Lihue Plantation Company. This area will be developed into industrial sites in the near future by AmFac Hawaii Inc., the owners of Lihue Plantation Company. The future development will include a sanitary sewer system and the proposed transfer station will connect to this sewer system when the development is complete. Therefore, the proposed disposal of wastewater and washdown water into septic and holding tanks, respectively will be on a temporary basis.

REF: 2177/00-5569c/324c



Mr. James Ikeda
July 11, 1989
Page 2

The only existing sanitary sewer system in the area is operated and maintained by the Airports Division. The sewage is collected into a wetwell and pumped to the wastewater treatment plant. We have contacted the State of Hawaii, Department of Transportation Airports Division, concerning disposal of the proposed transfer station wastewater and washdown water into the airport sanitary sewer system but have been informed that they will not permit any connections into their private airport system.

Please review the wastewater and washdown water disposal solution presented above and advise us of your approval or recommendations. If there are any questions regarding this matter, please call the undersigned or Mr. Charles J. Pignataro at 521-4711 at GMP Associates, Inc., the consultant for the transfer station planning and engineering.

Sincerely,

GMP ASSOCIATES, INC.

Tommy A. Camarillo, P.E.
Project Manager

TAC:CJP:ly

Attachments

c.c. Mr. John Harder, County of Kauai

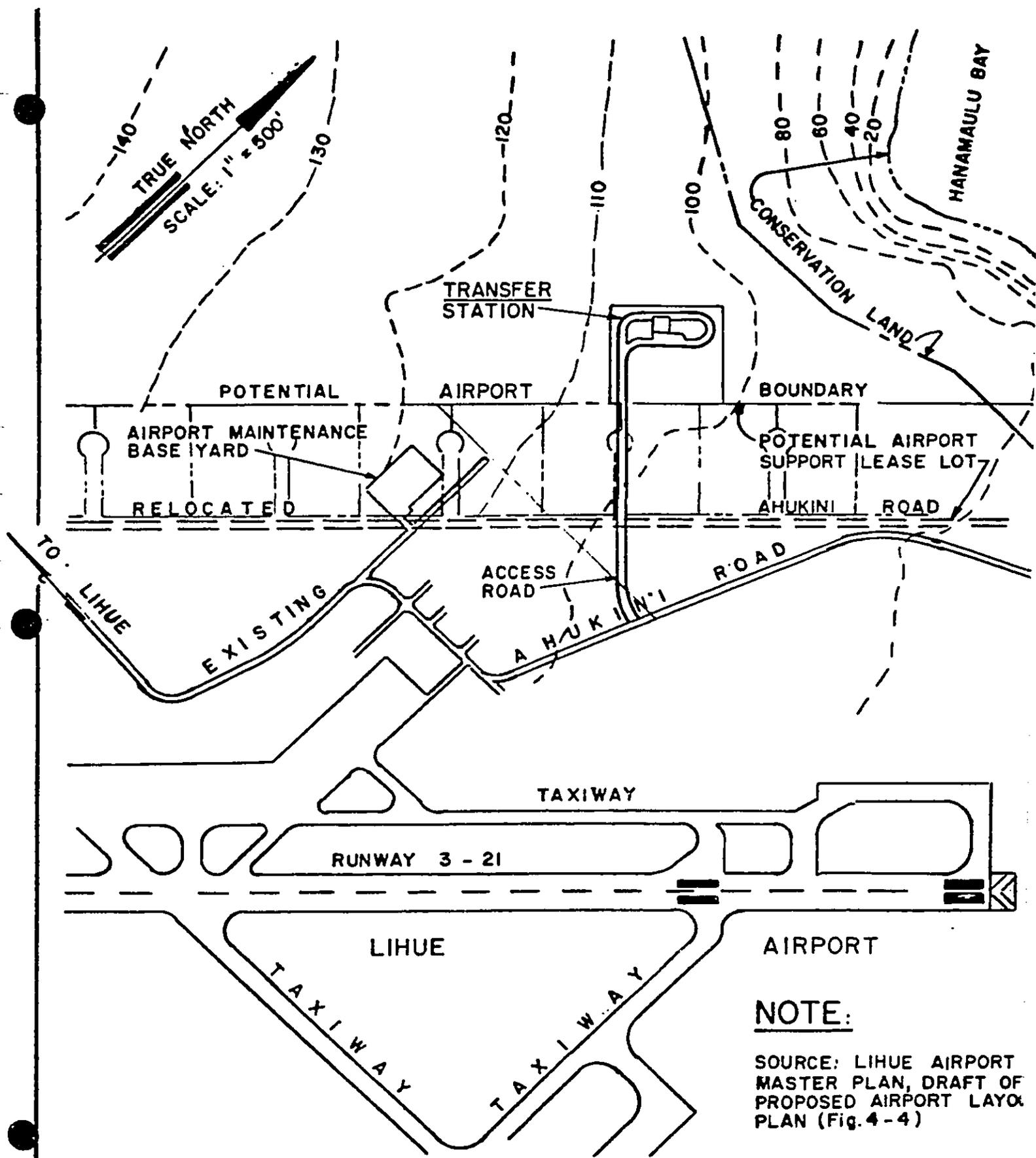


FIGURE 6-1
SITE 3 - SITE PLAN

SCALE: 1" = 500'
 6-3



M E M O R A N D U M

TO: John Harder
FROM: T. Camarillo
DATE: July 18, 1989
RE: Lihue Refuse Transfer Station

A meeting was held at the State of Hawaii Department of Transportation Airports Division conference room on Monday, July 17, 1989, to discuss their letter of July 5, 1989.

ATTENDEES:

Walter Nishigata	- State DOT
Dean Nakagawa	- State DOT
Earl Matsukawa	- Wilson Okamoto & Associates (WOA)
Mike Baker	- WOA
Charles Pignataro	- GMP Associates, Inc. (GMP)
Tommy Camarillo	- GMP

ITEMS DISCUSSED:

1. The State DOT expressed concerns that the refuse transfer facility will attract birds (egrets) and worsen an existing problem at the airport.
2. GMP informed the State DOT that the major portion of the facility will be in an industrial type building and assured the State that the trash will not be left exposed.
3. State DOT proposes to develop the lease lots for tourist related service industries (helicopter rides, car rentals, etc.) along Ahukini Road. The State DOT objects to the quantity and quality of traffic that the refuse transfer station will generate along Ahukini Road. The State DOT feels that the refuse activity related traffic is not compatible with the tourist related activities.

REF: 2177/00-5594c/324c



Memorandum
John Harder
July 18, 1989
Page 2

4. GMP emphasized that the refuse transfer station generated traffic is but a small portion of the traffic on Ahukini Road.
5. GMP suggested that the State DOT permit temporary use of Ahukini Road until the State's lease lots are fully developed. State DOT indicated that construction of lease lots is in progress and will be available by 1990.



JOHN C. LEWIN, M.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH

P. O. BOX 3378
HONOLULU, HAWAII 96801

In reply, please refer to:
EPHSD-WTVCG

July 27, 1989

Mr. Tommy Camarillo
Project Manager
GMP Associates, Inc.
841 Bishop St., Suite 1501
Honolulu, Hawaii 96813

Dear Mr. Camarillo:

Subject: Lihue Refuse Transfer Station

We have received your letter of July 11, 1989 regarding wastewater from the subject project. Please be informed that Individual Wastewater Systems (IWS) which include septic tanks, are limited to a total wastewater flow of 800 gallons per day. Furthermore, the use of holding tanks to contain non-domestic wastewater is prohibited under the provisions of Chapter 11-62, "Wastewater Systems."

The Department's position is that we would like to encourage the disposal of wastewater through the County of Kauai's sewer system. This not being possible either through connection to the Lihue Airport sewer system or non-availability of sewers, the only recourse to a holding tank is to apply for an administrative variance from the specific provisions of Chapter 11-62.

Enclosed for your use is an application for variance. Should you have any questions, please feel free to contact Harold Yee of the Wastewater Branch.

Sincerely,

JAMES K. IKEDA, ACTING CHIEF
Environmental Protection and
Health Services Division

HKY/eo
Attachment

RECEIVED
AUG 04 1989

GMP ASSOCIATES, INC.

JOHN WAIHEE
GOVERNOR



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION

HIGHWAYS DIVISION
KAUAI DISTRICT
P.O. BOX 1950
LIHUE, HAWAII 96766

September 18, 1989

EDWARD Y. HIRATA
DIRECTOR

DEPUTY DIRECTORS
JOHN K. UCHIMA
RONALD N. HIRANO
DAN T. KOCHI
JEANNE K. SCHULTZ

IN REPLY REFER TO:

HWY-KE 4.4607

Mr. Steven Kyono, County Engineer
Department of Public Works
3021 Umi Street
Lihue, HI. 96766

Dear Mr. Kyono:

This is in response to your letter dated August 28, 1989 regarding comments to the siting of the proposed Lihue Refuse Transfer Station.

Our Comments are:

1. For Proposed Site No. 3 - no improvements will be necessary on the State Highways. The signalized Kapule Hwy/Ahukini Rd. intersection is sufficient to accommodate the potential traffic impact;
2. Proposed Site No. 7 - is not recommended. No left-turns will be allowed into or out of the site. Substantial dedication of R/W for the right-turn lanes and future highway improvements will be required. The potential traffic impacts is not acceptable;
3. For Amfac Proposal A - improvements to Maalo Road from the site to Kuhio Highway will be required to mitigate the potential traffic impacts;
4. For Grove Farm Proposal B - intersection improvements with left-turn and right-turn lanes will be required with substantial access road improvements. The cane road access across the site should be closed until future development dictate improvements on Kaunualii Highway.

Very truly yours,

A handwritten signature in cursive script, reading "Shigeto Yamaguchi".

SHIGETO YAMAGUCHI
District Engineer

APPENDIX E

APPENDIX E

SECTION 6 OF LIHUE REFUSE TRANSFER STATION
SITE FEASIBILITY AND SELECTION REPORT - OCTOBER 1989
SITE EVALUATION OF THREE SITES

SECTION 6

SITE EVALUATION OF THREE SITES

6.1 INTRODUCTION

Having completed initial evaluation of 8 sites and reducing the potential sites to three, each of these, Nos. 3, 7 and 8, were subject to further scrutiny. Details of this further evaluation are presented in this section.

Land acquisition will be a major cost element in this project. In this report, no attempt has been made to consider land costs among the evaluation factors, since many external factors, not presently known, will bear on acquisition negotiations. However, at a later date, before final site selection by the County of Kauai, land costs may indeed become a major consideration.

6.2 SITE NUMBER 3

Site No. 3 is located northeast of Lihue Town and north of Lihue Airport. It is makai of Kapule Highway between Ahukini Road and Hanamaulu Bay. Until permanent access to Kapule Highway is available, temporary access to the site will be from Ahukini Road, as shown on Figure 6-1. About 1.2 acres will be required for the access road right-of-way. The land is relatively flat, sloping toward the ocean at 2 to 5 percent. Soil classification for this area is of the Lihue Series (LhB)

and is silty clay, gravelly in places, with moderate shrink-swell potential and suitable for road fill. The land is presently zoned agricultural and is owned by Lihue Plantation Company. Water and electrical connections are available from Ahukini Road. Until there is access to a sanitary sewer, washdown water will be disposed of in a holding tank, to be subsequently transported to the wastewater treatment plant. Development costs for the recommended concept in Section 8, excluding land acquisition, are estimated to be \$1,100,000 and are summarized in Table 6.1.

Major advantages of Site No. 3 include its proximity to Lihue Airport, which make the surrounding land suitable for industrial zoning and development, and therefore make the site more acceptable for use as a refuse transfer station. Also, its visual exposure is not severe, due to its location off the main highway and away from populated areas. Vehicular ingress and egress to the site are safe due to the signalized intersection at Kapule Highway and Ahukini Road and the present low volume of traffic on Ahukini Road at the proposed temporary access to the site. Land availability for expansion is also an advantage of this site.

Disadvantages of Site No. 3 include its distance from the centroid of Lihue Town, and the routes the transfer trailer trucks will take through Lihue traveling to and from Kekaha Sanitary Landfill. Another disadvantage is its proximity to the ocean and exposure to ocean spray, which can cause detrimental effects on equipment and metal structures.

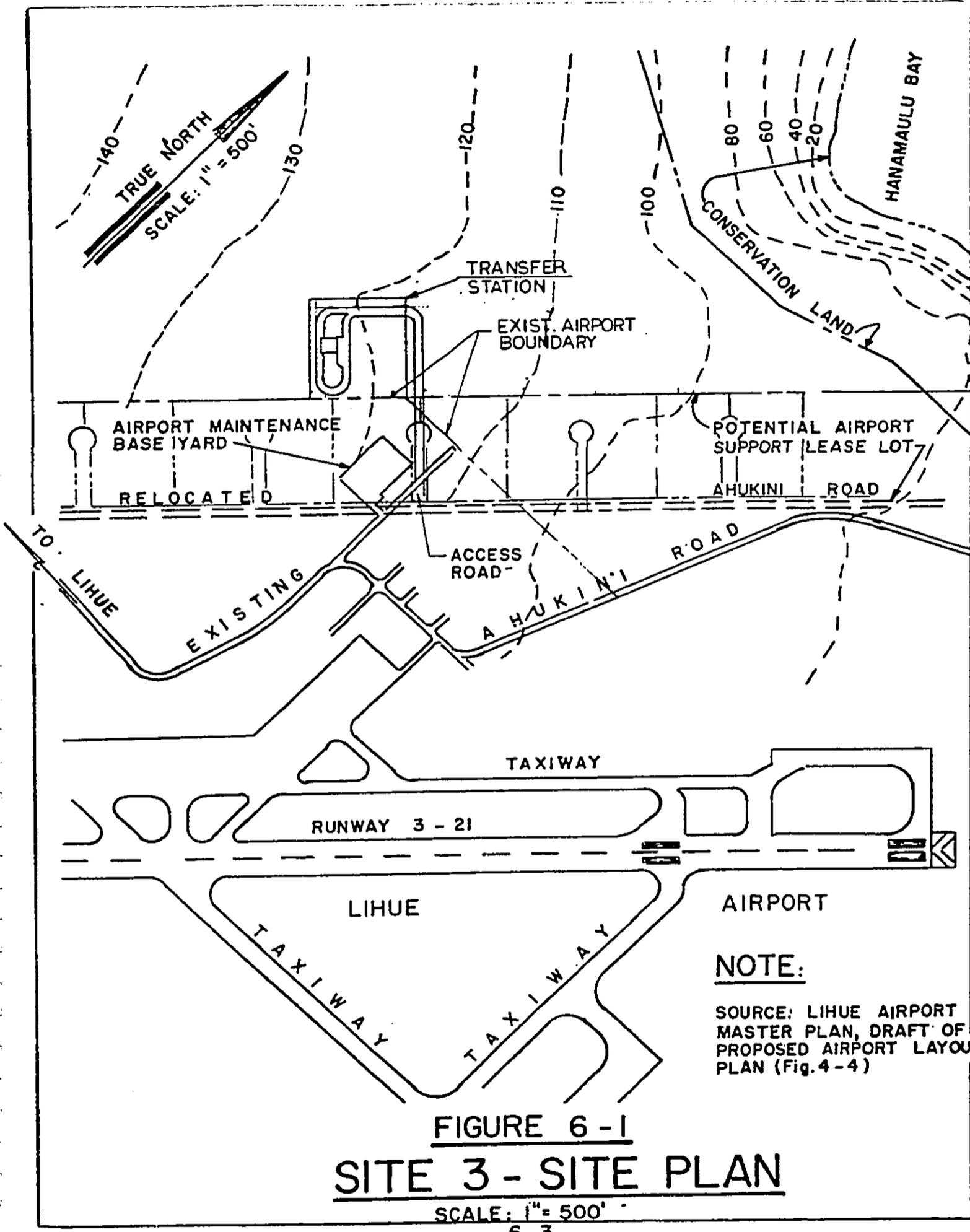


TABLE 6.1

SITE NO. 3 ESTIMATED CONSTRUCTION COSTS

<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total Amount</u>
Clearing, Grubbing and Mobilization	L.S.	L.S.	\$ 15,000	\$ 15,000
Excavation and Embankment	C.Y.	7,300	15	109,500
Asphalt Concrete Access Road	S.Y.	2,600	15	39,000
Asphalt Concrete Onsite Pavement	S.Y.	3,400	15	51,000
Reinforced Concrete Pavement (7" thick)	S.Y.	100	50	5,000
Reinforced Concrete Slab (10" thick)	S.Y.	340	70	23,800
Storm Water Drainage Onsite	L.S.	L.S.	50,000	50,000
Water System (offsite)	L.F.	900	40	36,000
Water System (onsite)	L.S.	L.S.	10,000	10,000
Reinforced Concrete Wall	L.F.	130	1,200	156,000
Trailer-Length Steel Hopper	L.S.	L.S.	25,000	25,000
Pre-Engineered Metal Building	S.F.	3,900	50	195,000
Control Building	S.F.	150	60	9,000
Chain Link Fence (6' high)	L.F.	1,620	20	32,400
Septic Tank for Domestic Wastewater	L.S.	L.S.	15,000	15,000
Holding Tank for Washdown Water	L.S.	L.S.	20,000	20,000
Overhead Electric (offsite)	L.F.	900	30	27,000
Electric (onsite)	L.S.	L.S.	10,000	10,000
Planting	L.S.	L.S.	5,000	5,000
Grassing	S.F.	106,000	0.20	21,200
Truck Scale and Concrete Pit	L.S.	L.S.	60,000	60,000
Scale House	L.S.	L.S.	3,600	<u>3,600</u>
				918,500
				<u>183,700</u>
				Total Estimated Cost \$ <u>1,102,000</u>
				SAY \$ 1,102,000

Site No. 7 is located southwest of Lihue Town approximately 1,000 feet mauka of Kaumualii Highway, opposite the proposed intersection of Kaumualii Highway and proposed Nawiliwili Road Extension. Access to the site will be from Kaumualii Highway, as shown on Figure 6-2. About 0.5 acre will be required for right-of-way. The land is relatively flat, sloping at 2 to 5 percent. Soil classification for this area is of the Lihue Series (LhB) and is silty clay, gravelly in places, with moderate shrink-swell potential and suitable for road fill. The land is presently zoned agricultural and is owned by Lihue Plantation Company. Water and electrical connections are available from Kaumualii Highway. Until there is access to a sanitary sewer, washdown water will be disposed of in a holding tank, to be subsequently transported to the wastewater treatment plant. Development costs for the recommended concept in Section 8, excluding land acquisition, are estimated to be approximately \$1,000,000 and are summarized in Table 6.2.

Advantages of Site No. 7 include its proximity to the centroid of Lihue Town and safe ingress and egress to the site upon completion of Nawiliwili Road Extension to Kaumualii Highway and signalization of the intersection. The State of Hawaii, Department of Transportation, has completed design of the extension and intersection. Estimated completion of construction is November 1990. Another advantage is that its location on the west side of Lihue eliminates transfer trailer

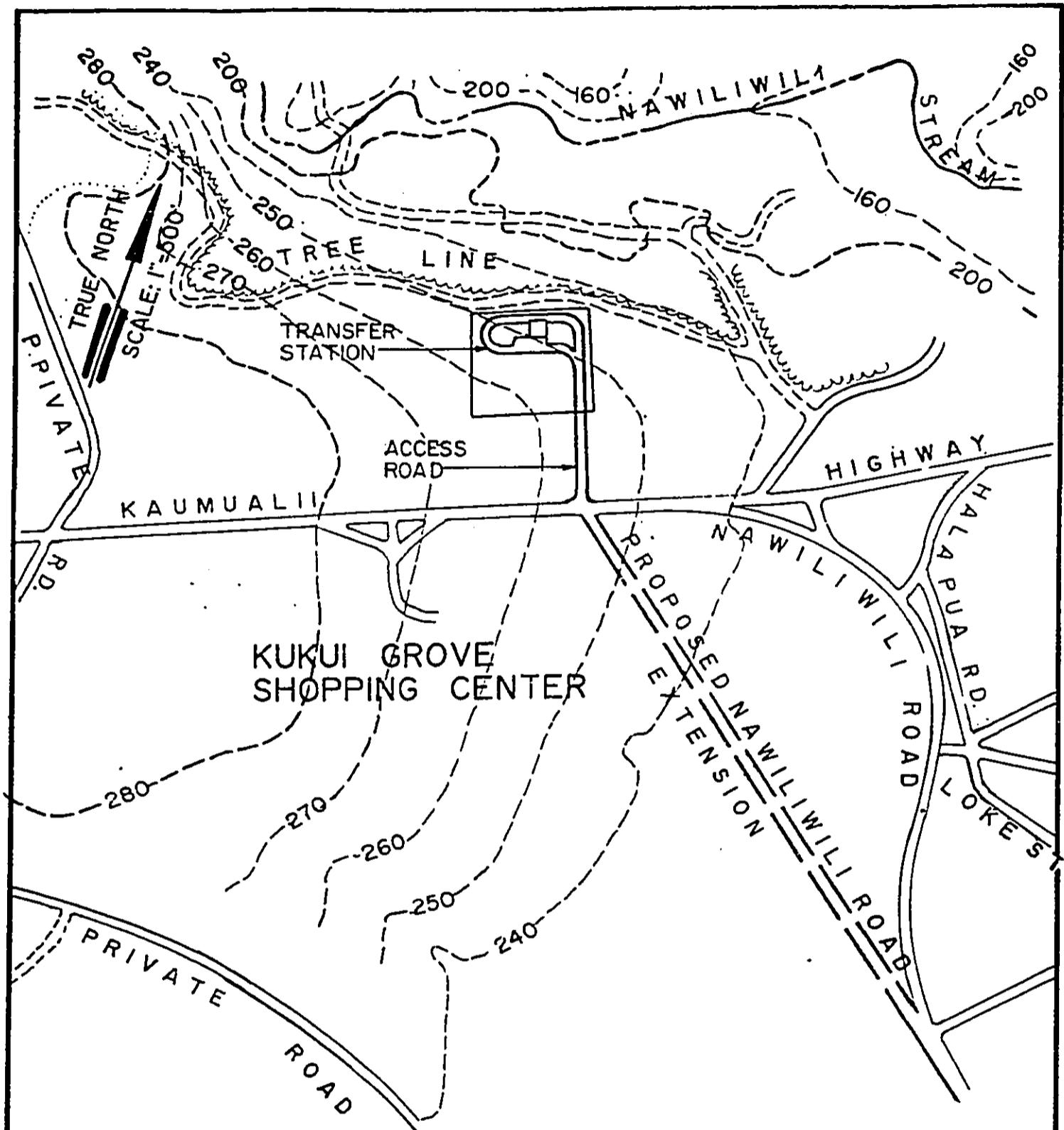


FIGURE 6-2
SITE 7 - SITE PLAN

SCALE: 1"=500'

TABLE 6.2

SITE NO. 7 ESTIMATED CONSTRUCTION COSTS

<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total Amount</u>
Clearing, Grubbing and Mobilization	L.S.	L.S.	\$ 12,000	\$ 12,000
Excavation and Embankment	C.Y.	6,900	15	103,500
Asphalt Concrete Access Road	S.Y.	1,000	15	15,000
Asphalt Concrete Onsite Pavement	S.Y.	3,400	15	51,000
Reinforced Concrete Pavement (7" thick)	S.Y.	100	50	5,000
Reinforced Concrete Slab (10" thick)	S.Y.	340	70	23,800
Storm Water Drainage Onsite	L.S.	L.S.	50,000	50,000
Water System (offsite)	L.F.	350	40	14,000
Water System (onsite)	L.S.	L.S.	10,000	10,000
Reinforced Concrete Wall	L.F.	130	1,200	156,000
Trailer-Length Steel Hopper	L.S.	L.S.	25,000	25,000
Pre-Engineered Metal Building	S.F.	3,900	50	195,000
Control Building	S.F.	150	60	9,000
Chain Link Fence (6' high)	L.F.	1,620	20	32,400
Septic Tank for Domestic Wastewater	L.S.	L.S.	15,000	15,000
Holding Tank for Washdown Water	L.S.	L.S.	20,000	20,000
Overhead Electric (offsite)	L.F.	350	30	10,500
Electric (onsite)	L.S.	L.S.	5,000	5,000
Planting	L.S.	L.S.	5,000	5,000
Grassing	S.F.	90,000	0.20	18,000
Truck Scale and Concrete Pit	L.S.	L.S.	60,000	60,000
Scale House	L.S.	L.S.	3,600	<u>3,600</u>
			Subtotal	843,800
			Contingency @ 20%	<u>168,760</u>
			Total Estimated Cost	\$ <u>1,012,560</u>
			SAY	\$ 1,013,000

truck traffic through Lihue and congested areas when traveling to and from Kekaha Sanitary Landfill. Land availability for expansion is also an advantage of this site.

The major disadvantage of Site No. 7 is the uncertain future land use of adjacent and surrounding property.

6.4 SITE NUMBER 8

Site No. 8 is located southwest of Lihue Town and southwest of Puhi. The site is 2,000 feet makai of Kaunualii Highway and access will be from Puhi Road, as shown in Figure 6-3. About 0.8 acre must be acquired for access right-of-way. Soil classification for this area is of the Puhi Series (PnB) and is silty clay loam and silty clay with moderate shrink-swell potential and suitable for road fill. The land is presently zoned agricultural and is owned by Grove Farm Company. Water and electric connections are available from Puhi Road. Until there is access to a sanitary sewer, washdown water will be disposed of in a holding tank, to be subsequently transported to the wastewater treatment plant. Development costs for the recommended concept in Section 8, excluding land acquisition, are estimated to be \$1,050,000 and are summarized in Table 6.3.

Advantages of Site No. 8 include the status of the proposed land use for this area. Grove Farm Properties has developed the Lihue Puhi Master Plan from Nawiliwili Road out to and including Puhi. The area surrounding Site No. 8 is in

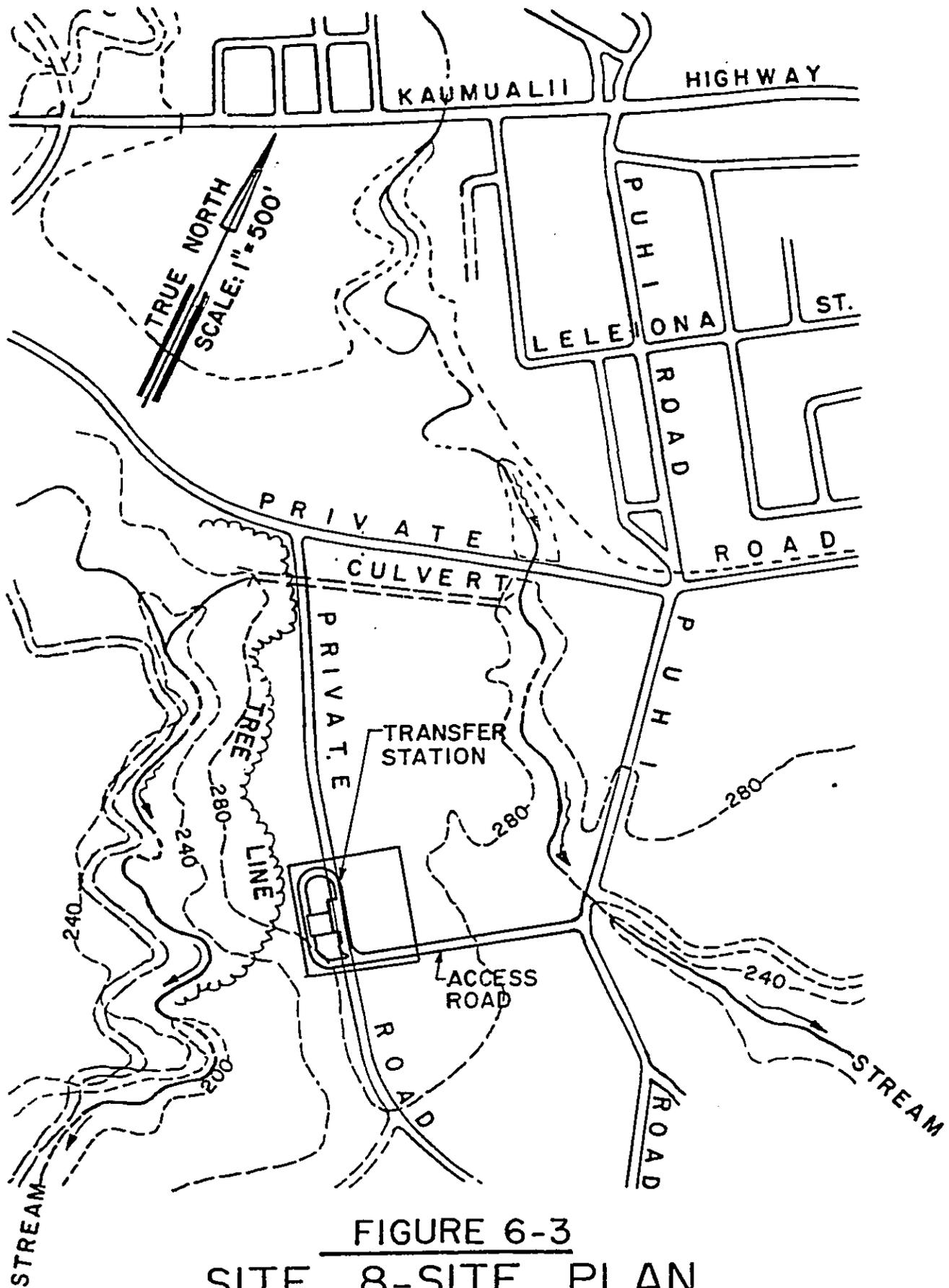


FIGURE 6-3
 SITE 8-SITE PLAN
 SCALE: 1"=500'
 6-9

TABLE 6.3

SITE NO. 8 ESTIMATED CONSTRUCTION COSTS

<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total Amount</u>
Clearing, Grubbing and Mobilization	L.S.	L.S.	\$ 13,000	\$ 13,000
Excavation and Embankment	C.Y.	7,100	15	106,500
Asphalt Concrete Access Road	S.Y.	1,700	15	25,500
Asphalt Concrete Onsite Pavement	S.Y.	3,400	15	51,000
Reinforced Concrete Pavement (7" thick)	S.Y.	100	50	5,000
Reinforced Concrete Slab (10" thick)	S.Y.	340	70	23,800
Storm Water Drainage Onsite	L.S.	L.S.	50,000	50,000
Water System (offsite)	L.F.	600	40	24,000
Water System (onsite)	L.S.	L.S.	10,000	10,000
Reinforced Concrete Wall	L.F.	130	1,200	156,000
Trailer-Length Steel Hopper	L.S.	L.S.	25,000	25,000
Pre-Engineered Metal Building	S.F.	3,900	50	195,000
Control Building	S.F.	150	60	9,000
Chain Link Fence (6' high)	L.F.	1,620	20	32,400
Septic Tank for Domestic Wastewater	L.S.	L.S.	15,000	15,000
Holding Tank for Washdown Water	L.S.	L.S.	20,000	20,000
Overhead Electric (offsite)	L.P.	600	30	18,000
Electric (onsite)	L.S.	L.S.	5,000	5,000
Planting	L.S.	L.S.	5,000	5,000
Grassing	S.F.	96,000	0.20	19,200
Truck Scale and Concrete Pit	L.S.	L.S.	60,000	60,000
Scale House	L.S.	L.S.	3,600	<u>3,600</u>
				877,000
				<u>175,400</u>
				\$ 1,052,400
				\$ 1,053,000

the process of being zoned industrial. Therefore, transfer station operations will be compatible with future land use. Another advantage is that its location on the west side of Lihue eliminates transfer trailer truck traffic through Lihue and congested areas when traveling to and from Kekaha Sanitary Landfill.

Disadvantages of Site No. 8 are its anticipated high land acquisition costs, its distance from the centroid of Lihue Town, and use of Puhi Road past several blocks of Puhi's residential area for access to the site. Another disadvantage may be the limited amount of land available for expansion.

APPENDIX F

APPENDIX F

EXCERPTS FROM LIHUE AIRPORT NOISE COMPATIBILITY PROGRAM
VOLUME 1, MAY 1989



SECTION 2.1 NOISE DESCRIPTORS

The noise descriptor currently used by the FAA to relate aircraft noise levels to land use compatibility, and to assess environmental noise in general, is the Day-Night Average Sound Level (Ldn). Appendix H contains a glossary describing this and other acoustical descriptors, symbols, and terminology.

The Ldn descriptor is a 24-hour average of instantaneous A-Weighted sound levels (recorded under conditions that simulate the human ear) as read on a standard Sound Level Meter; these readings are normally referred to as "dBA". The maximum A-Weighted sound level occurring while an aircraft is flying past a listener (i.e., the maximum sound level from a single event) is referred to as the "Lmax value". The mathematical product (or integral) of the instantaneous sound level times the duration of the event is known as the Sound Exposure Level, or "Lse"; it is analogous to the energy of the time-varying sound levels associated with a single event.

When computing the Ldn, sound levels which occur during the night (defined as the hours between 10:00 P.M. and 7:00 A.M.) are increased by 10 decibels (dB) prior to computing the 24-hour average. Because of the averaging used, Ldn values in urbanized areas typically range between 50 and 75 Ldn. In comparison, the typical range of intermittent noise events may have maximum Sound Level Meter readings between 75 and 105 dBA.

Ldn exposure levels of 55 or less are typical of quiet rural or suburban areas. Ldn exposure levels of 55 to 65 are typical of urbanized areas with medium to high levels of activity and street traffic. Ldn exposure levels above 65 are representative of densely developed urban areas and areas fronting high volume roadways.

2.1.1 FAA STANDARDS

Table 2-1 presents current FAA standards and criteria for various land uses exposed to various levels of environmental noise as measured by the Ldn descriptor. As indicated in the footnotes to Table 2-1, an outdoor-to-indoor Noise Level Reduction of 20 dB was assumed in establishing the compatibility criteria for residential uses.

For the purposes of determining noise acceptability for funding assistance from federal agencies Federal Housing Authority/Housing and Urban Development and the Veterans's Administration (FHA/HUD and VA), an exterior noise level of 65 Ldn or lower is considered acceptable for all dwelling units (residences and apartments). This standard is applied nationally (see Reference 2).

2.1.2 OTHER NOISE COMPATIBILITY GUIDELINES AND NOISE STANDARDS

Because a predominance of Hawaii's residences are naturally ventilated, the outdoor-to-indoor sound reduction afforded by such structures is relatively low (nominally 9 dB). Thus, an exterior noise level of 65 Ldn does not eliminate all risks of adverse noise impacts. For these reasons, and as recommended by the U.S. Environmental Protection Agency (Reference 3), a lower level of 55 Ldn is regarded as the "Unconditionally Acceptable" (or "Near-Zero Risk") level of exterior noise. Land use compatibility guidelines suggested in the American National Standard Institute (ANSI) S3.23-1980 (Reference 4) incorporate the lower outdoor-to-indoor Noise Level Reduction characteristics of naturally ventilated structures and provide additional weight to extensive outdoor land uses; these are shown in Figure 2-1.

Federal agencies, such as FHA/HUD and VA, recognize that noise levels between 55 Ldn and 65 Ldn do have an adverse impact on communities. However, after considering the cost and feasibility of applying the lower level of 55 Ldn, they have selected 65 Ldn as a more appropriate regulatory standard.

On Oahu, the State Department of Health limits noise from on-site activities to approximately 55 Ldn where they are adjacent to residentially zoned property and to approximately 60 Ldn where they are adjacent to parcels zoned for apartment or hotel use (Title 11, Chapter 43). However, these regulations do not apply to aircraft in flight or to the Neighbor Islands.

The County of Kauai does not regulate aircraft noise. The City and County of Honolulu is the only county in the State which has any general noise regulations. The Honolulu Land Use Ordinance noise standard, which is applicable to all

Table 2-1. FAR PART 150 RECOMMENDATIONS FOR LAND USE COMPATIBILITY* IN YEARLY DAY-NIGHT AVERAGE SOUND LEVELS (Ldn)

LAND USE	***** Yearly Day-Night Average Sound Level *****				
	Below 65	65-70	70-75	75-80	80-85 Over 85
Residential					
Residential, other than mobile homes and transient lodgings	Y	N(1)	N(1)	N	N
Mobile home parks	Y	N	N	N	N
Transient lodgings	Y	N(1)	N(1)	N(1)	N
Public Use					
Schools	Y	N(1)	N(1)	N	N
Hospitals and nursing homes	Y	25	30	N	N
Churches, auditoriums, and concert halls	Y	25	30	N	N
Government services	Y	Y	25	30	N
Transportation	Y	Y	Y(2)	Y(3)	Y(4)
Parking	Y	Y	Y(2)	Y(3)	Y(4)
Commercial Use					
Offices, business and professional	Y	Y	25	30	N
Wholesale and retail - building materials, hardware and farm equipment	Y	Y	Y(2)	Y(3)	Y(4)
Retail trade - general	Y	Y	25	30	N
Utilities	Y	Y	Y(2)	Y(3)	Y(4)
Communication	Y	Y	25	30	N

Table 2-1.FAR PART 150 RECOMMENDATIONS FOR LAND USE COMPATIBILITY* IN YEARLY DAY-NIGHT AVERAGE SOUND LEVELS (Ldn) - (CONTINUED)

LAND USE	***** Yearly Day-Night Average Sound Level *****				
	Below 65	65-70	70-75	75-80	80-85 Over 85
Manufacturing and Production					
Manufacturing, general	Y	Y	Y(2)	Y(3)	N
Photographic and optical	Y	Y	25	30	N
Agriculture (except livestock) and forestry	Y	Y(6)	Y(7)	Y(8)	Y(8)
Livestock farming and breeding	Y	Y(6)	Y(7)	N	N
Mining and fishing, resource production and extraction	Y	Y	Y	Y	Y
Recreational					
Outdoor sports arenas and spectator sports	Y	Y(5)	Y(5)	N	N
Outdoor music shells, amphitheaters	Y	N	N	N	N
Nature exhibits and zoos	Y	Y	N	N	N
Amusement, parks, resorts and camps	Y	Y	Y	N	N
Golf courses, riding stables and water recreation	Y	Y	25	30	N

Numbers in parentheses refer to notes.

* The designations contained in this table do not constitute a Federal determination that any use of land covered by the program is acceptable or unacceptable under Federal, State, or local law. The responsibility for determining the acceptable and permissible land uses and the relationship between specific properties and specific noise contours rests with the local authorities. FAA determinations under Part 150 are not intended to substitute federally determined land uses for those determined to be appropriate by local authorities in response to locally determined needs and values in achieving noise compatible land uses.

Table 2-1.FAR PART 150 RECOMMENDATIONS FOR LAND USE COMPATIBILITY* IN YEARLY DAY-NIGHT AVERAGE SOUND LEVELS (Ldn) - (CONTINUED)

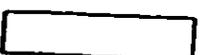
KEY TO TABLE 1:

- SLUCM = Standard Land Use Coding Manual.
- Y(Yes) = Land Use and related structures compatible without restrictions.
- N(No) = Land Use and related structures are not compatible and should be prohibited.
- NLR = Noise Level Reduction (outdoor to indoor) to be achieved through incorporation of noise attenuation into the design and construction of the structure. 25, 30, or 35 = Land use and related structures generally compatible; measures to achieve NLR of 25, 30, or 35 dB must be incorporated into design and construction of structure.

NOTES FOR TABLE 1:

- (1) Where the community determines that residential or school uses must be allowed, measures to achieve outdoor to indoor Noise Level Reduction (NLR) of at least 25 dB and 30 dB should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide a NLR of 20 dB, thus, the reduction requirements are often stated as 5, 10, or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year round. However, the use of NLR criteria will not eliminate outdoor noise problems.
- (2) Measures to achieve NLR 25 must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.
- (3) Measures to achieve NLR of 30 must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.
- (4) Measures to achieve NLR 35 must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.
- (5) Land use compatible provided special sound reinforcement systems are installed.
- (6) Residential buildings require a NLR of 25.
- (7) Residential buildings require a NLR of 30.
- (8) Residential buildings not permitted.

LAND USE	YEARLY DAY-NIGHT AVERAGE SOUND LEVEL IN DECIBELS				
	50	60	70	80	90
Residential - Single Family, Extensive Outdoor Use	Compatible	Marginally Compatible	Incompatible	Incompatible	Incompatible
Residential - Multiple Family, Moderate Outdoor Use	Compatible	Marginally Compatible	Incompatible	Incompatible	Incompatible
Residential - Multi Story Limited Outdoor Use	Compatible	Marginally Compatible	Incompatible	Incompatible	Incompatible
Transient Lodging	Compatible	Marginally Compatible	Incompatible	Incompatible	Incompatible
School Classrooms, Libraries, Religious Facilities	Compatible	Marginally Compatible	Incompatible	Incompatible	Incompatible
Hospitals, Clinics, Nursing Homes, Health Related Facilities	Compatible	Marginally Compatible	Incompatible	Incompatible	Incompatible
Auditoriums, Concert Halls	Compatible	Marginally Compatible	Incompatible	Incompatible	Incompatible
Music Shells	Compatible	Marginally Compatible	Incompatible	Incompatible	Incompatible
Sports Arenas, Outdoor Spectator Sports	Compatible	Marginally Compatible	Incompatible	Incompatible	Incompatible
Neighborhood Parks	Compatible	Marginally Compatible	Incompatible	Incompatible	Incompatible
Playgrounds, Golf Courses, Riding Stables, Water Rec., Cemeteries	Compatible	Marginally Compatible	Incompatible	Incompatible	Incompatible
Office Buildings, Personal Services, Business and Professional	Compatible	Marginally Compatible	Incompatible	Incompatible	Incompatible
Commercial - Retail, Movie Theaters, Restaurants	Compatible	Marginally Compatible	Incompatible	Incompatible	Incompatible
Commercial - Wholesale, Some Retail, Ind., Mfg., Utilities	Compatible	Marginally Compatible	Incompatible	Incompatible	Incompatible
Livestock Farming, Animal Breeding	Compatible	Marginally Compatible	Incompatible	Incompatible	Incompatible
Agriculture (Except Livestock)	Compatible	Marginally Compatible	Incompatible	Incompatible	Incompatible
Extensive Natural Wildlife and Recreation Areas	Compatible	Marginally Compatible	Incompatible	Incompatible	Incompatible

 Compatible
  Marginally Compatible
 With Insulation per Section A.3
  Incompatible

LIHUE AIRPORT NOISE COMPATIBILITY PROGRAM
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AMERICAN NATIONAL STANDARD:
SOUND LEVEL RECOMMENDATIONS

Prepared for:
DEPARTMENT OF TRANSPORTATION
AIRPORTS DIVISION

FIGURE 2-1

Prepared by:
WILSON OKAMOTO
& ASSOCIATES, INC.



properties where dwellings are permitted, is roughly equivalent to 57 Ldn. Like the State standards, these limits are not applicable to aircraft in flight or to the Neighbor Islands.

2.1.3 STATE DOT POLICY AND RECOMMENDED LAND USE GUIDELINES

After reviewing all available noise compatibility standards, the Airports Division of the Hawaii State Department of Transportation, has concluded that an aircraft noise limit of 60 Ldn should be utilized as a planning level for noise sensitive land uses which normally involve naturally ventilated structures (see Table 2-2). Applicable uses are dwellings, and public use structures such as schools, libraries, churches, clinics, and meeting rooms. This position represents a compromise between the near zero risk level of 55 Ldn and the significant risk level of 65 Ldn for naturally ventilated structures. [Note that the State DOT's noise compatibility criteria for other uses are also about 5 Ldn units lower than the Part 150 criteria (see Table 2-1).]

In conjunction with this determination, the State DOT consulted with the FAA as to whether noise mitigation measures in areas subject to noise levels between 60 and 65 Ldn would be eligible for Federal funding under the Part 150 Noise Compatibility Program. After reviewing the request (including coordination with the Regional Airports Division Office in Los Angeles), the FAA's Honolulu District Office responded that:

"Based upon our review [and specific assumptions cited from FAA noise and land use planning circulars], we have determined that the 60 Ldn noise contour may be included in the five FAR Part 150 studies [including Lihue Airport]. However, a more specific case-by-case review of recommended noise mitigation measures will be required prior to any Federal funding for these proposed measures, especially within the 60 to 65 Ldn contours. These reviews will be accomplished at the time funding is requested for particular mitigation measures."

Table 2-2. STATE DEPARTMENT OF TRANSPORTATION RECOMMENDATIONS FOR LOCAL LAND USE COMPATIBILITY EXPRESSED IN YEARLY DAY-NIGHT AVERAGE SOUND LEVELS (Ldn)

	Yearly Day-Night Average Sound Level				
	Below 65	65-70	70-75	75-80	80-85 Over 85
I. LAND USE					
Residential					
Low density residential, resorts, and hotels with extensive outdoor use	Y(a)	N(h)	N	N	N
Low density apartment with moderate outdoor use	Y	N(h)	N	N	N
High density apartment with limited outdoor use	Y	N(h)	N(b)	N	N
Transient lodgings with limited outdoor use	Y	N(h)	N(h)	N	N
Public Use					
Schools, day-care centers, libraries, and churches	Y	N(c)	N(c)	N(c)	N
Hospitals, nursing homes, clinics, and health facilities	Y	Y(d)	Y(d)	Y(d)	N
Indoor auditoriums and concert halls	Y(c)	Y(c)	N	N	N
Government services and office buildings serving the general public	Y	Y	Y(d)	Y(d)	N
Transportation and Parking	Y	Y	Y(d)	Y(d)	Y(d)
Commercial and Government Use					
Offices - government, business, and professional	Y	Y	Y(d)	Y(d)	N
Wholesale and retail - building materials, hardware and heavy equipment	Y	Y	Y(d)	Y(d)	Y(d)
Airport businesses - car rental, tours, lei stands, ticket offices, etc.	Y	Y	Y(d)	Y(d)	N
Retail trade, restaurants, shopping centers, financial institutions, etc.	Y	Y	Y(d)	Y(d)	N
Power plants, sewage treatment plants, and base yards	Y	Y	Y(d)	Y(d)	N
Studios without outdoor sets, broadcasting, production facilities, etc.	Y(c)	Y(c)	N	N	N

Table 2-2. STATE DEPARTMENT OF TRANSPORTATION RECOMMENDATIONS FOR LOCAL LAND USE COMPATIBILITY EXPRESSED IN YEARLY DAY-NIGHT AVERAGE SOUND LEVELS (Ldn) - (CONTINUED)

LAND USE	Yearly Day-Night Average Sound Level				
	Below 65	65-70	70-75	75-80	80-85 Over 85
Manufacturing, Production, and Storage					
Manufacturing, general	Y	Y	Y(d)	Y(d)	N
Photographic and optical	Y	Y	Y(d)	N	N
Agriculture (except livestock) and forestry	Y	Y(e)	Y(e)	Y(e)	Y(e)
Livestock farming and breeding	Y	Y(e)	Y(e)	N	N
Mining and fishing, resource production and extraction	Y	Y	Y	Y	Y
Recreational					
Outdoor sports arenas and spectator sports	Y	Y(f)	Y(f)	N	N
Outdoor music shells, amphitheaters	Y(f)	N	N	N	N
Nature exhibits and zoos, neighborhood parks	Y	Y	Y	N	N
Amusements, beach parks, active playgrounds, etc.	Y	Y	Y	Y	N
Public golf courses, riding stables, cemeteries, gardens, etc.	Y	Y	N	N	N
Professional/resort sport facilities, locations of media events, etc.	Y(f)	N	N	N	N
Extensive natural wildlife and recreation areas	Y(f)	N	N	N	N

Numbers in parentheses refer to notes.

KEY TO TABLE 1A:

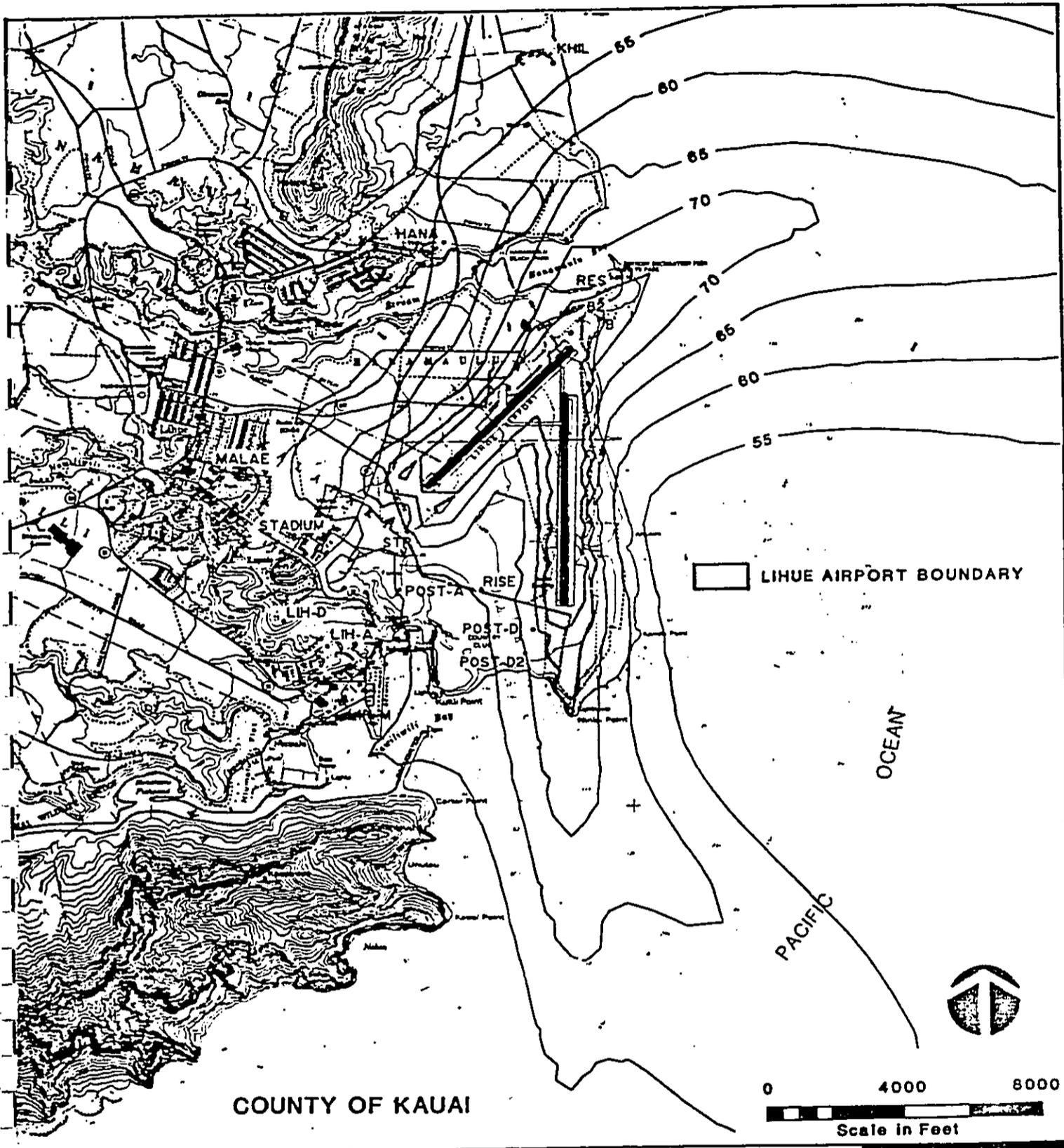
Y(Yes) = Land Use and related structures compatible without restrictions.

N(No) = Land Use and related structures are not compatible and should be prohibited.

Table 2-2. STATE DEPARTMENT OF TRANSPORTATION RECOMMENDATIONS FOR LOCAL LAND USE COMPATIBILITY EXPRESSED IN YEARLY DAY-NIGHT AVERAGE SOUND LEVELS (Ldn) - (CONTINUED)

NOTES FOR TABLE 1A:

- (a) A noise level of 60 Ldn does not eliminate all risks of adverse noise impacts from aircraft noise. However, the 60 Ldn planning level has been selected by the State Airports Division as an appropriate compromise between the minimal risk level of 55 Ldn and the significant risk level of 65 Ldn.
- (b) Where the community determines that these uses must be allowed, Noise Level Reduction (NLR) measures to achieve interior levels of 45 Ldn or less should be incorporated into building codes and be considered in individual approvals. Normal local construction employing natural ventilation can be expected to provide an average NLR of approximately 9 dB. Total closure plus air conditioning may be required to provide additional outdoor to indoor NLR, and will not eliminate outdoor noise problems.
- (c) Because the Ldn noise descriptor system represents a 24-hour average of individual aircraft noise events, each of which can be unique in respect to amplitude, duration, and tonal content, the NLR requirements should be evaluated for the specific land use, interior acoustical requirements, and properties of the aircraft noise events. NLR requirements should not be based solely upon the exterior Ldn exposure level.
- (d) Measures to achieve required NLR must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.
- (e) Residential buildings require NLR. Residential buildings should not be located where noise is greater than 65 Ldn.
- (f) Impact of amplitude, duration, frequency, and tonal content of aircraft noise events should be evaluated.



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BASE YEAR NOISE MAP (1986)

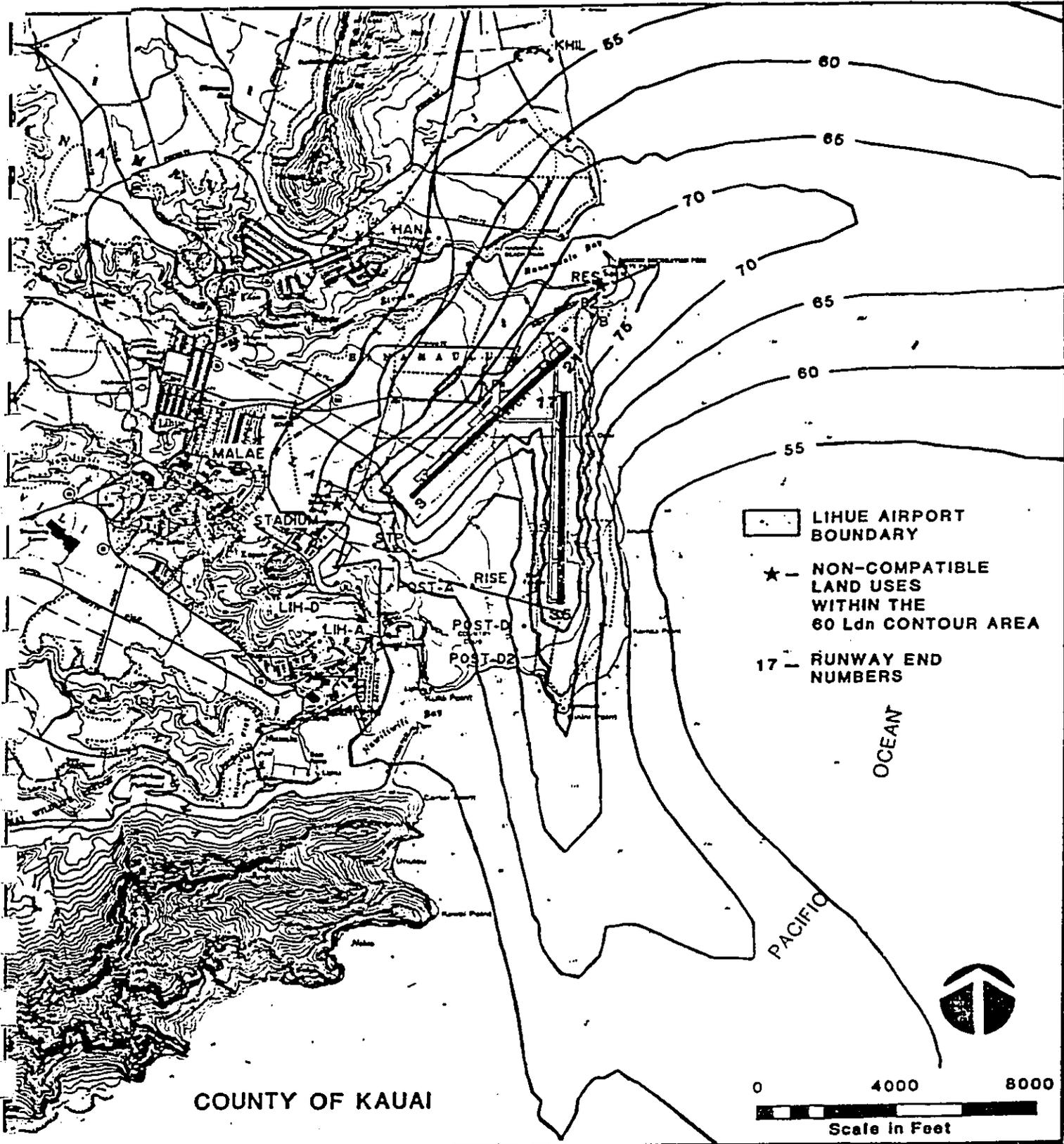
Prepared for:
**DEPARTMENT OF TRANSPORTATION
AIRPORTS DIVISION**

FIGURE 4-1

Prepared by:
**WILSON OKAMOTO
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Airports Division



**LIHUE AIRPORT NOISE COMPATIBILITY PROGRAM
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5 YEAR NO MITIGATION SCENARIO NOISE EXPOSURE MAP **FIGURE 6-4**

Prepared for:
**DEPARTMENT OF TRANSPORTATION
AIRPORTS DIVISION**

Prepared by:
**WILSON OKAMOTO
& ASSOCIATES, INC.**



Airports Division

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 $L_{c,dn}$ with the $L_{A,dn}$.

Although not included in the tables, it is also recommended that " L_{PN} " and " L_{EPN} " be used as symbols for perceived noise levels and effective perceived noise level, 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 (L_A) was measured before and after the installation of acoustical treatment. The measured L_A 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, L_{eq} is designated the "equivalent sound level". For L_c , L_n , and L_{dn} , "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.

TABLE I: A-Weighted Recommended Descriptor List

<u>Term</u>	<u>Symbol</u>
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_{Apt}
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.

TABLE II: Recommended Descriptor List

TERM	A-WEIGHTING	ALTERNATIVE ⁽¹⁾ A-WEIGHTING	OTHER WEIGHTING	⁽²⁾ UNWEIGHTED
1. Sound (Pressure) (3) Level	L_A	L_{pA}	L_B, L_B	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)	L_{Apt}		L_{Bpt}	L_{pt}
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_{Sf}
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 $L_{eq(1)}$). Time may be specified in non-quantitative terms (e.g., could be specified as $L_{eq(WASH)}$ to mean the washing cycle noise for a washing machine).

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 (L_{PN} was found to be 75 dB. $L_{PN} = 75$ 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 Weighted Loss of Hearing" (PHL) shall be used consistent with CHABA Working Group 69 Report Guidelines for Preparing Environmental Impact Statements (1977).