VOLUME 2

~~DRAFT~~ FINAL ENVIRONMENTAL IMPACT STATEMENT

FOR

PI'ILANI PROMENADE

APPENDICES E- I

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June 2017

~~August 2014~~

CHRIS HART & PARTNERS, INC.

APPENDIX E

Acoustic Study dated February 2014

ACOUSTIC STUDY FOR THE PIILANI PROMENADE PROJECT KIHEI, MAUI

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FEBRUARY 2014

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CHAPTER I. SUMMARY

The existing and future traffic noise levels in the vicinity of the planned Piilani Promenade in Kihei, Maui were evaluated for their potential impacts and their relationship to current FHA/HUD noise standards for noise sensitive land uses. The traffic noise level increases along the roadways servicing the project site (see Figure 1) were calculated. Significant increases in traffic noise levels at noise sensitive properties are not expected to occur as a result of project traffic following project build-out by CY 2018.

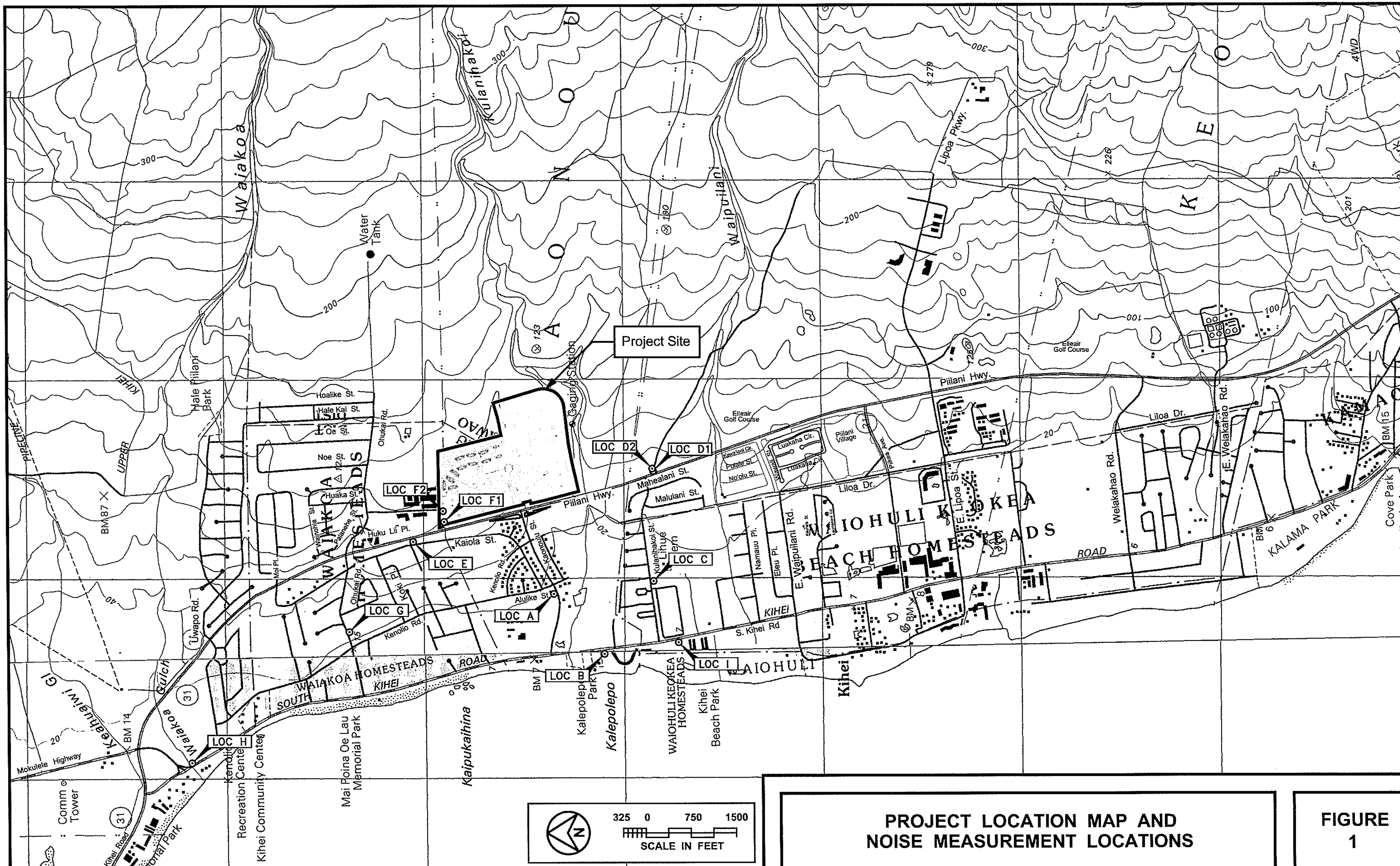
The dominant traffic noise sources in the project environs will continue to be traffic along Piilani Highway and South Kihei Road. Future traffic noise levels along Piilani Highway by CY 2018 are expected to remain in the "Significant Exposure, Normally Unacceptable" category, and at or greater than 65 DNL at the first row of existing homes on the makai side of the highway. The future traffic noise levels in the project environs along South Kihei Road are expected to be in the "Significant Exposure, Normally Unacceptable" category, and at or greater than 65 DNL within 60 to 63 feet of the roadway's centerline. Along the lower volume connector streets between Piilani Highway and South Kihei Road, future traffic noise levels are expected to remain in the "Moderate Exposure, Acceptable" category, and less than 65 DNL at 50 feet or greater distance from the roadways' centerlines.

Along Piilani Highway fronting the project site, traffic noise levels of approximately 68 to 69 DNL (Day-Night Average Sound Level) are expected to increase to approximately 69 to 70 DNL at 100 foot distance from the centerline of the highway by CY 2018 as a result of project and non-project traffic. Increases of 0.6 to 0.7 DNL are associated with non-project traffic, and increases of 0.8 DNL are associated with project traffic.

The largest increases (2.3 to 2.6 DNL) in project related traffic noise are predicted to occur along Kaonoulu Street between Piilani Highway and Alulike Street. Non-project traffic is expected to add 2.7 to 4.0 DNL of traffic noise to this section of Kaonoulu Street. Adverse traffic noise impacts along Kaonoulu Street are not expected to occur by CY 2018 since existing noise sensitive residences currently have adequate setbacks from the centerline of Kaonoulu Street and should remain in the "Moderate Exposure, Normally Acceptable" category. For these reasons, traffic noise mitigation measures should not be required.

The project site is planned such that future noise sensitive residential uses of the project are situated at very large setback distances from Piilani Highway, where existing and future traffic noise levels from Piilani Highway are predicted to be less than 60 DNL. The large buffer distances to the highway will allow for the use of naturally ventilated buildings on the project site.

However, the addition of the proposed extension of Kaonoulu Street mauka of



PROJECT LOCATION MAP AND NOISE MEASUREMENT LOCATIONS

FIGURE 1

Piilani Highway will increase the existing background ambient noise levels along the center portion of the project site. Through project build-out in CY 2018, noise levels at the project's planned residential buildings fronting East Kaonoulu Street should not exceed the 65 DNL federal standard or the Hawaii State Department of Transportation (HDOT) 66 Leq noise abatement criteria as long as the residential buildings are located at least 51 feet from the centerline of East Kaonoulu Street. Following completion of the Upcountry Highway by CY 2025, a setback distance of 81 feet from the centerline of East Kaonoulu Street is required for 65 DNL and 66 Leq to not be exceeded at these residential buildings. Noise mitigation measures in the form of a sound attenuating wall or closure and air conditioning would be required if adequate setback distances are not available. The future traffic noise levels at all planned residential buildings will not exceed the HDOT's "15 dB increase" noise abatement criteria.

In order to minimize the potential for noise conflicts between the project's residential units and the project's light industrial, business, and commercial tenants, the inclusion of various provisions within the land conveyance documents are recommended. These include limits on noise emissions from the light industrial, business, and commercial tenants to levels allowed by the State Department of Health (DOH) for multifamily dwellings; and disclosure of potential noise from adjoining nonresidential uses to owners of the project's residential units. In addition, the use of project driveways at maximum setback from the project's residential units by nighttime and early morning delivery trucks, and the use of broadband backup alarms instead of beeper type backup alarms within the non-residential lots were recommended.

Unavoidable, but temporary, noise impacts may occur during construction of the proposed project, particularly during the excavation and earth moving activities on the project site. Because construction activities are predicted to be audible within the project site and at nearby properties, the quality of the acoustic environment may be degraded to unacceptable levels during periods of construction. Mitigation measures to reduce construction noise to inaudible levels will not be practical in all cases, but the use of quiet equipment and compliance with State Department of Health construction noise regulations are recommended as standard mitigation measures.

CHAPTER II. PURPOSE

The primary objective of this study was to describe the existing and future traffic noise levels in the environs of the proposed Piilani Promenade in Kihei on the island of Maui (see Figure 1). Traffic forecasts for 2018 were used. Traffic noise level increases and impacts associated with the proposed development were to be determined within the project site as well as along the public roadways which are expected to service the project traffic. A specific objective was to determine future traffic noise level increases associated with both project and non-project traffic, and the potential noise impacts associated with these increases.

Impacts from on-site activities and short term construction noise at the project site were also included as noise study objectives. Recommendations for minimizing identified noise impacts were also to be provided as required.

CHAPTER III. NOISE DESCRIPTORS AND THEIR RELATIONSHIP TO LAND USE COMPATIBILITY

The noise descriptor currently used by federal agencies (such as FHA/HUD) to assess environmental noise is the Day-Night Average Sound Level (DNL). This descriptor incorporates a 24-hour average of instantaneous A-Weighted Sound Levels as read on a standard Sound Level Meter. By definition, the minimum averaging period for the DNL descriptor is 24 hours. Additionally, sound levels which occur during the nighttime hours of 10:00 PM to 7:00 AM are increased by 10 decibels (dB) prior to computing the 24-hour average by the DNL descriptor. A more complete list of noise descriptors is provided in APPENDIX B to this report.

Table 1, derived from Reference 1, presents current federal noise standards and acceptability criteria for residential land uses. Table 2, also extracted from Reference 1, presents the general effects of noise on people in residential use situations. Land use compatibility guidelines for various levels of environmental noise as measured by the DNL descriptor system are shown in Figure 2 (from Reference 2). As a general rule, noise levels of 55 DNL or less occur in rural areas, or in areas which are removed from high volume roadways. In urbanized areas which are shielded from high volume streets, DNL levels generally range from 55 to 65 DNL, and are usually controlled by motor vehicle traffic noise. Residences which front major roadways are generally exposed to levels of 65 DNL, and as high as 75 DNL when the roadway is a high speed freeway. In the project area, traffic noise levels associated with Piilani Highway and South Kihei Road are typically greater than 65 DNL along the Right-of-Way due to the relatively large volumes of traffic on these major thoroughfares.

For purposes of determining noise acceptability for funding assistance from federal agencies (FHA/HUD and VA), an exterior noise level of 65 DNL or less is considered acceptable for residences. This standard is applied nationally (Reference 3), including Hawaii. Because of our open-living conditions, the predominant use of naturally ventilated dwellings, and the relatively low exterior-to-interior sound attenuation afforded by these naturally ventilated structures, an exterior noise level of 65 DNL does not eliminate all risks of noise impacts. Because of these factors, and as recommended in Reference 4, a lower level of 55 DNL is considered as the "Unconditionally Acceptable" (or "Near-Zero Risk") level of exterior noise. However, after considering the cost and feasibility of applying the lower level of 55 DNL, government agencies such as FHA/HUD and VA have selected 65 DNL as a more appropriate regulatory standard.

For commercial, industrial, and other non-noise sensitive land uses, exterior noise levels as high as 75 DNL are generally considered acceptable. Exceptions to this occur when naturally ventilated office and other commercial establishments are exposed to exterior levels which exceed 65 DNL.

On the island of Maui, the State Department of Health (DOH) regulates noise from construction activities through the issuance of permits for allowing excessive

TABLE 1

EXTERIOR NOISE EXPOSURE CLASSIFICATION (RESIDENTIAL LAND USE)

NOISE EXPOSURE CLASS	DAY–NIGHT SOUND LEVEL	EQUIVALENT SOUND LEVEL	FEDERAL (1) STANDARD
Minimal Exposure	Not Exceeding 55 DNL	Not Exceeding 55 Leq	Unconditionally Acceptable
Moderate Exposure	Above 55 DNL But Not Above 65 DNL	Above 55 Leq But Not Above 65 Leq	Acceptable(2)
Significant Exposure	Above 65 DNL But Not Above 75 DNL	Above 65 Leq But Not Above 75 Leq	Normally Unacceptable
Severe Exposure	Above 75 DNL	Above 75 Leq	Unacceptable

Notes: (1) Federal Housing Administration, Veterans Administration, Department of Defense, and Department of Transportation.

(2) FHWA uses the Leq instead of the Ldn descriptor. For planning purposes, both are equivalent if: (a) heavy trucks do not exceed 10 percent of total traffic flow in vehicles per 24 hours, and (b) traffic between 10:00 PM and 7:00 AM does not exceed 15 percent of average daily traffic flow in vehicles per 24 hours. The noise mitigation threshold used by FHWA for residences is 67 Leq.

TABLE 2

EFFECTS OF NOISE ON PEOPLE
(Residential Land Uses Only)

EFFECTS[1] / DAY-NIGHT AVERAGE SOUND LEVEL IN DECIBELS	Hearing Loss	Speech Interference		Annoyance[2]	Average Community Reaction[4]	General Community Attitude Towards Area
		Indoor	Outdoor			
	Qualitative Description	%Sentence Intelligibility	Distance in Meters for 95% Sentence Intelligibility	% of Population Highly Annoyed[3]		
75 and above	May Begin to Occur	98%	0.5	37%	Very Severe	Noise is likely to be the most important of all adverse aspects of the community environment.
70	Will Not Likely Occur	99%	0.9	25%	Severe	Noise is one of the most important adverse aspects of the community environment.
65	Will Not Occur	100%	1.5	15%	Significant	Noise is one of the important adverse aspects of the community environment.
60	Will Not Occur	100%	2.0	9%	Moderate to Slight	Noise may be considered an adverse aspect of the community environment.
55 and below	Will Not Occur	100%	3.5	4%		Noise considered no more important than various other environmental factors.

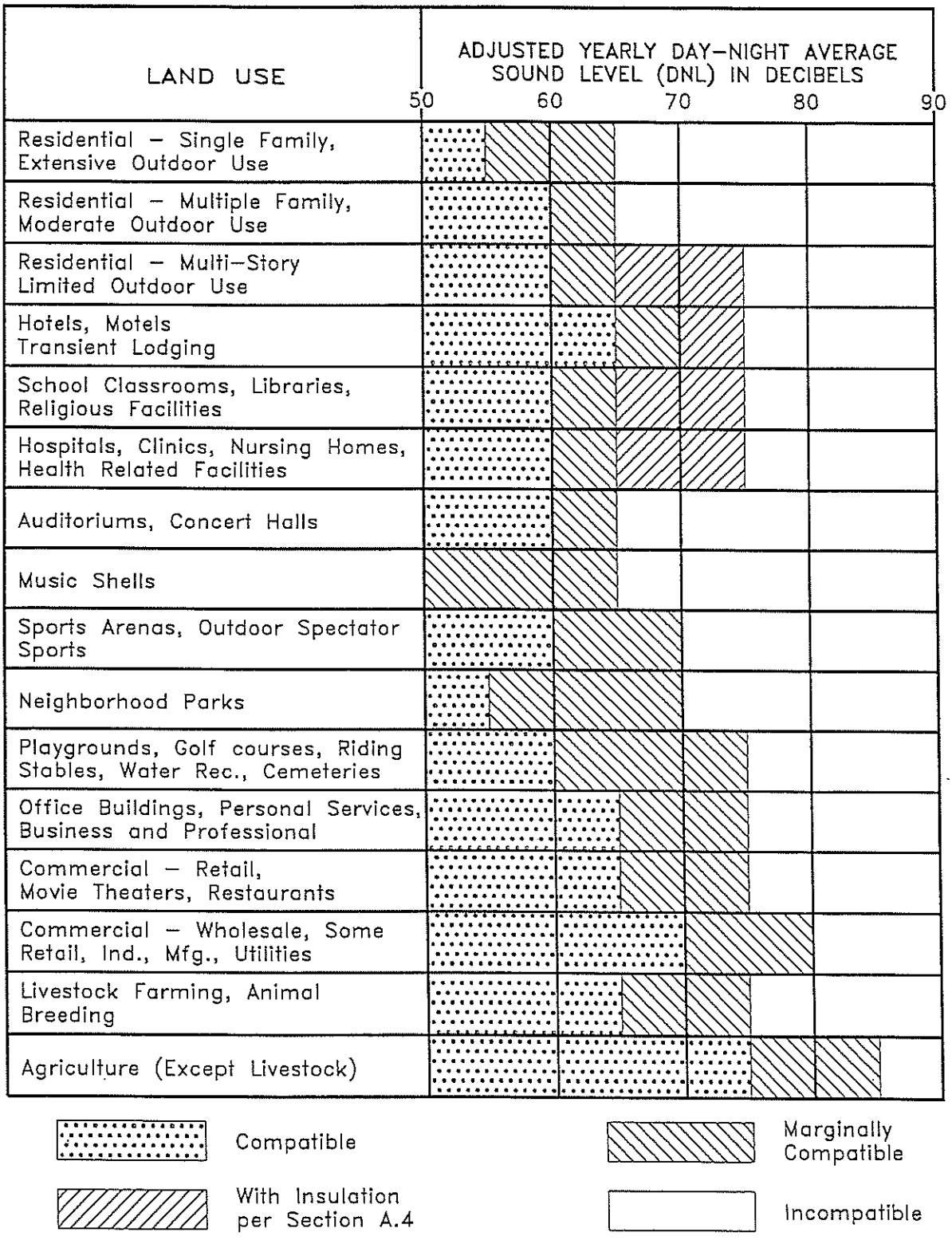
1. "Speech Interference" data are drawn from the following tables in EPA's "Levels Document": Table 3, Fig. D-1, Fig. D-2, Fig. D-3. All other data from National Academy of Science 1977 report "Guidelines for Preparing Environmental Impact Statements on Noise, Report of Working Group 69 on Evaluation of Environmental Impact of Noise."

2. Depends on attitudes and other factors.

3. The percentages of people reporting annoyance to lesser extents are higher in each case. An unknown small percentage of people will report being "highly annoyed" even in the quietest surroundings. One reason is the difficulty all people have in integrating annoyance over a very long time.

4. Attitudes or other non-acoustic factors can modify this. Noise at low levels can still be an important problem, particularly when it intrudes into a quiet environment.

NOTE: Research implicates noise as a factor producing stress-related health effects such as heart disease, high-blood pressure and stroke, ulcers and other digestive disorders. The relationships between noise and these effects, however, have not as yet been quantified.



LAND USE COMPATIBILITY WITH YEARLY AVERAGE DAY–NIGHT AVERAGE SOUND LEVEL (DNL) AT A SITE FOR BUILDINGS AS COMMONLY CONSTRUCTED.
(Source: American National Standards Institute S12.9–1998/Part 5)

FIGURE 2

noise during limited time periods. State DOH noise regulations are expressed in maximum allowable property line noise limits rather than DNL (see Reference 5). Although they are not directly comparable to noise criteria expressed in DNL, State DOH noise limits for residential, commercial, and industrial lands equate to approximately 55, 60, and 76 DNL, respectively.

CHAPTER IV. GENERAL STUDY METHODOLOGY

Existing traffic noise levels were measured at eight locations (A, B, C, D1, D2, E, G, and H) along public roadways in the project environs to provide a basis for developing the project's traffic noise contributions along the roadways which will service the proposed development. In addition, existing background noise levels were obtained at two locations (F1 and F2) within the proposed project site to validate the traffic noise model used for predicting future traffic noise levels from Piilani Highway within the project area. The locations of the measurement sites are shown in Figure 1. Noise measurements were performed during the month of November 2013. The results of the traffic noise measurements were compared with calculations of existing traffic noise levels to validate the computer model used. The traffic noise measurement results and their comparisons with computer model predictions of existing traffic noise levels are summarized in Table 3.

Traffic noise calculations for the existing conditions as well as noise predictions for the Year 2018 were performed using the Federal Highway Administration (FHWA) Traffic Noise Model (Reference 6). Traffic data entered into the noise prediction model were: roadway and receiver locations; hourly traffic volumes; average vehicle speeds; estimates of traffic mix; and "Loose Soil" propagation loss factor. The traffic data and forecasts for the project (Reference 7), plus the spot traffic counts obtained during the noise measurement periods were the primary sources of data inputs to the model. Appendices C1 and C2 summarize the weekday AM and PM peak hour traffic volumes and the Saturday peak hour traffic volumes for CY 2013 and 2018 which were used to model existing and future traffic noise along the streets in the vicinity of the project site. For existing and future traffic along the streets in the vicinity of the project site, it was assumed that the average noise levels, or Leq(h), during the weekday AM or PM peak traffic hour were equal to the 24-hour DNL along those roadways. This assumption was based on computations of both the hourly Leq and the 24-hour DNL of traffic noise on Piilani Highway (see Figure 3) and South Kihei Road (see Figure 4) using Hawaii State Department of Transportation hourly traffic counts from References 8 and 9.

Traffic noise calculations for both the existing and future conditions in the project environs were developed for ground level receptors with and without the benefit of shielding from natural terrain features or man made obstructions. Traffic noise levels were also calculated for future conditions with and without the proposed project. The forecasted changes in traffic noise levels over existing levels were calculated with and without the project, and noise impact risks evaluated. The relative contributions of non-project and project traffic to the total noise levels were also calculated, and an evaluation of possible traffic noise impacts was made.

Calculations of average exterior and interior noise levels from construction activities were performed for typical naturally ventilated and air conditioned dwellings. Predicted noise levels were compared with existing background ambient noise levels, and the potential for noise impacts was assessed.

TABLE 3

TRAFFIC AND BACKGROUND NOISE MEASUREMENT RESULTS

LOCATION	Time of Day (HRS)	Ave. Speed (MPH)	Hourly Traffic Volume AUTO	M.TRUCK	H.TRUCK	Measured Leq (dB)	Predicted Leq (dB)
A. 50 FT from the center-line of Kaonoulu St. (Saturday, 11/9/13)	0728 TO 0824	34	152	0	0	55.4	55.3
B. 50 FT from the center-line of S. Kihei Rd. (Saturday, 11/9/13)	0841 TO 0941	37	821	6	5	63.4	63.3
C. 50 FT from the center-line of Kulanihakoi St. (Saturday, 11/9/13)	1010 TO 1055	35	165	1	1	58.9	57.9
D1. 50 FT from the center-line of Piilani Highway (Saturday, 11/9/13)	1118 TO 1216	55	2,487	31	10	74.5	74.2
D2. 93 FT from the center-line of Piilani Highway (Saturday, 11/9/13)	1118 TO 1216	55	2,487	31	10	68.6	68.3

TABLE 3 (CONTINUED)

TRAFFIC AND BACKGROUND NOISE MEASUREMENT RESULTS

LOCATION	Time of Day (HRS)	Ave. Speed (MPH)	Hourly Traffic Volume AUTO	M.TRUCK	H.TRUCK	Measured Leq (dB)	Predicted Leq (dB)
E. 63 FT from the center-line of Piilani Highway (Saturday, 11/9/13)	1237 TO 1337	46	2,375	26	10	69.9	70.0
F1. 112 FT from the center-line of Piilani Highway (Saturday, 11/9/13)	1403 TO 1500	N/A	N/A	N/A	N/A	64.3	N/A
F2. 289 FT from the center-line of Piilani Highway (Saturday, 11/9/13)	1416 TO 1431	N/A	N/A	N/A	N/A	54.0	N/A
G. 50 FT from the center-line of Ohukai St. (Saturday, 11/9/13)	1528 TO 1628	30	219	0	0	56.1	56.1
H. 50 FT from the center-line of S. Kihei Rd. (Saturday, 11/9/13)	1643 TO 1743	39	791	3	4	63.9	63.7

TABLE 3 (CONTINUED)

TRAFFIC AND BACKGROUND NOISE MEASUREMENT RESULTS

LOCATION	Time of Day (HRS)	Ave. Speed (MPH)	Hourly Traffic Volume AUTO	M.TRUCK	H.TRUCK	Measured Leq (dB)	Predicted Leq (dB)
H. 50 FT from the center-line of S. Kihei Rd. (Wednesday, 11/13/13)	0642 TO 0742	41	829	8	5	65.4	65.1
G. 50 FT from the center-line of Ohukai St. (Wednesday, 11/13/13)	0752 TO 0852	30	198	3	0	55.5	55.5
I. 50 FT from the center-line of S. Kihei Rd. (Wednesday, 11/13/13)	1002 TO 1102	39	930	16	8	64.9	65.0
C. 50 FT from the center-line of Kulanihakoi St. (Wednesday, 11/13/13)	1122 TO 1222	35	124	1	0	58.9	58.9
E. 63 FT from the center-line of Piilani Highway (Wednesday, 11/13/13)	1317 TO 1417	46	2,600	36	34	70.5	70.8

TABLE 3 (CONTINUED)

TRAFFIC AND BACKGROUND NOISE MEASUREMENT RESULTS

LOCATION	Time of Day (HRS)	Ave. Speed (MPH)	Hourly Traffic Volume AUTO	M.TRUCK	H.TRUCK	Measured Leq (dB)	Predicted Leq (dB)
A. 50 FT from the center-line of Kaonoulu St. (Wednesday, 11/13/13)	1442 TO 1542	34	189	2	0	57.2	57.2
D1. 50 FT from the center-line of Piilani Highway (Wednesday, 11/13/13)	1607 TO 1707	55	3,311	16	10	75.2	75.1
D2. 93 FT from the center-line of Piilani Highway (Wednesday, 11/13/13)	1607 TO 1707	55	3,311	16	10	69.9	69.3
D1. 50 FT from the center-line of Piilani Highway (Wednesday, 11/13/13)	1710 TO 1810	55	2,838	18	7	74.5	74.2
D2. 93 FT from the center-line of Piilani Highway (Wednesday, 11/13/13)	1710 TO 1810	55	2,838	18	7	69.1	68.5

FIGURE 3
HOURLY TRAFFIC NOISE LEVELS VS. TIME OF DAY
STA. B74003100000, PIILANI HIGHWAY BETWEEN KAONOULU ST. AND KULANIHAKOI RD., 9/28/11

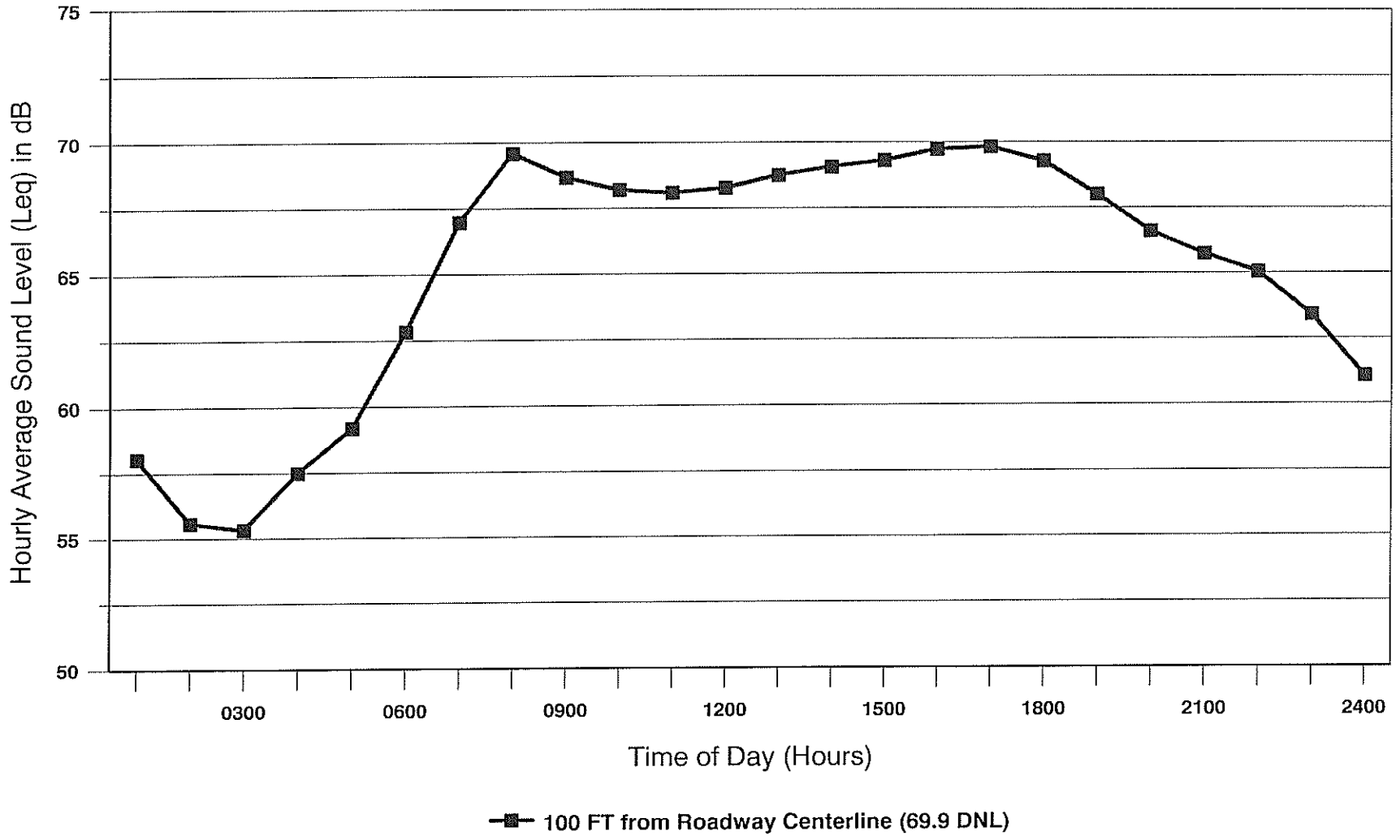
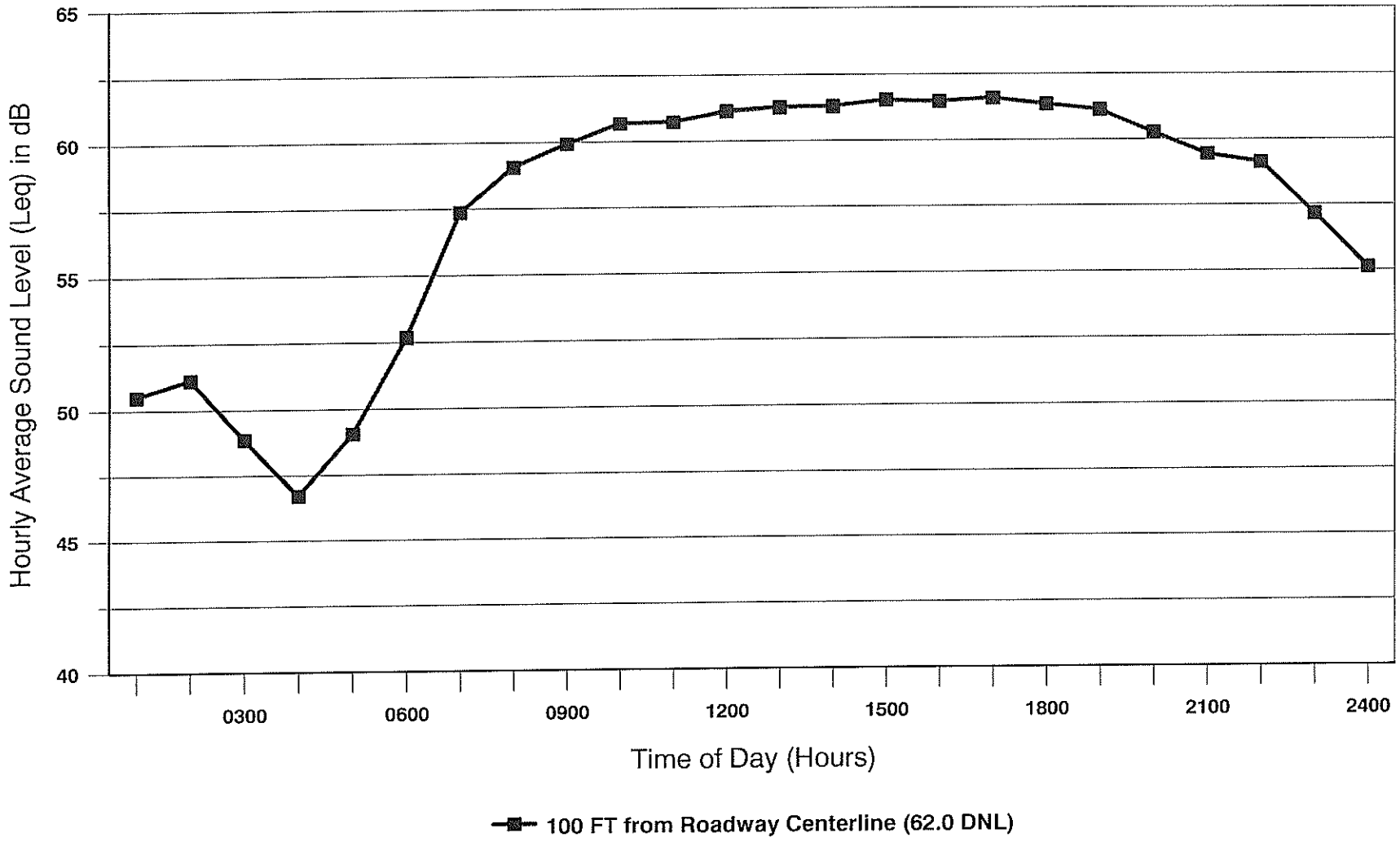


FIGURE 4
HOURLY TRAFFIC NOISE LEVELS VS. TIME OF DAY
STA. B74310000013, SOUTH KIHEI ROAD BETWEEN NOHOKAI ST. AND PIIKEA AVE., 8/19/10



V. EXISTING ACOUSTICAL ENVIRONMENT

The existing background ambient noise levels within the project site are relatively low at the mauka (east) end and high on the makai (west) end of the site. Traffic along Piilani Highway controls the background noise levels at the makai end of the project site, and diminishes to inaudible levels at the mauka end of the project site. On the makai side of Piilani Highway, existing traffic noise levels also diminish with increasing distances from Piilani Highway, and are controlled by the traffic on connector roads and South Kihei Road in areas between Piilani Highway and the shoreline.

Traffic and background ambient noise measurements along the public roadways in the project environs were obtained on a Saturday (September 9, 2013) and on a Wednesday (September 13, 2013 at eleven locations (A, B, C, D1, D2, E, F1, F2, G, H, and I) in the project environs. These locations are shown in Figure 1. The results of these traffic and background ambient noise measurements are summarized in Table 3, with measurement locations identified in Figure 1. The measurement locations were typically located at street level. As shown in Table 3, correlation between measured and predicted traffic noise levels was good. The Traffic Noise Model's "Loose Soil" propagation loss factor was used to obtain the good correlation.

Calculations of existing traffic noise levels along the public roadways in the project environs during the weekday PM peak traffic hour are presented in Table 4A. The hourly Leq (or Equivalent Sound Level) contribution from each roadway section in the project environs was calculated for comparison with forecasted traffic noise levels with and without the project. In Table 4A, the Leq values shown also represent the DNL values for the roadways shown. The existing setback distances from the roadways' centerlines to their associated 65 and 75 DNL contours were also calculated as shown in Table 5A for the weekdays. The contour line setback distances do not take into account noise shielding effects or the additive contributions of traffic noise from intersecting street sections. Tables 4B and 5B present similar calculations of existing traffic noise levels and setback distances to the 65 and 75 DNL contours for the Saturday peak hours.

The existing traffic noise levels in the project environs along Piilani Highway are in the "Significant Exposure, Normally Unacceptable" category, and at or greater than 65 DNL at the first row of existing homes on the makai side of the highway. The existing traffic noise levels in the project environs along South Kihei Road are in the "Significant Exposure, Normally Unacceptable" category, and at or greater than 65 DNL within 53 to 55 feet of the roadway's centerline. Along the lower volume connector streets, existing traffic noise levels are in the "Moderate Exposure, Acceptable" category, and less than 65 DNL at 50 feet or greater distance from the roadways' centerlines.

The existing background noise levels at the project site were estimated by measuring existing background noise levels at Locations F1 and F2, and by using these

TABLE 4A

EXISTING (CY 2013) TRAFFIC VOLUMES AND NOISE LEVELS ALONG ROADWAYS IN PROJECT AREA (PM PEAK HOUR, WEEKDAYS)

LOCATION	SPEED (MPH)	TOTAL VPH	****** VOLUMES (VPH) ******** AUTOS	M TRUCKS	H TRUCKS	50' Leq	100' Leq	200' Leq
Mokulele Hwy., N. of N. Kihei Rd.	55	2,761	2,711	28	22	75.0	68.3	61.2
Piilani Hwy., Between Uwapo & N. Kihei *	50	2,916	2,864	29	23	74.1	70.6	61.1
Piilani Hwy., Between Uwapo & Ohukai	46	3,056	3,001	31	24	72.5	66.2	60.5
Piilani Hwy., Between Ohukai & Kaonoulu	46	3,083	3,027	31	25	72.7	67.7	62.3
Piilani Hwy., Between Kaonoulu & Kulanihakoi	55	3,273	3,214	33	26	75.2	68.7	62.9
Piilani Hwy., Between Kulanihakoi & Piikea	55	3,275	3,216	33	26	75.3	70.3	64.8
Piilani Hwy., South of Piikea	55	3,054	2,999	31	24	75.0	70.0	64.5
N. Kihei Rd., West of South Kihei	50	1,421	1,398	14	9	70.7	64.1	57.1
N. Kihei Rd., Between Piilani & S. Kihei	46	1,083	1,066	11	6	68.8	63.0	56.8
S. Kihei Rd., South of N. Kihei Rd.	41	1,004	988	10	6	65.6	59.4	53.2
Uwapo Rd., W. of Piilani	30	320	315	5	0	57.2	51.1	45.1
Ohukai Rd., W. of Piilani	30	471	464	7	0	58.9	52.8	46.8
Ohukai Rd., E. of Piilani	30	708	691	11	6	61.5	55.6	50.8
Kaonoulu St., Between Piilani & Kenolio	34	290	287	3	0	59.3	53.1	48.1
Kaonoulu St., Between Kenolio & Alulike	34	159	157	2	0	56.7	50.6	45.5
Kaonoulu St., Between Alulike & S. Kihei	34	250	247	3	0	58.7	52.5	47.5
S. Kihei Rd. N. of Kaonoulu	39	1,068	1,041	18	9	65.5	59.4	53.3
S. Kihei Rd. S. of Kaonoulu	39	1,172	1,143	20	9	65.9	59.8	53.7
E. Kaonoulu St. E. of Piilani	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Kulanihakoi Rd. W. of Piilani	35	292	290	2	0	62.5	56.3	50.0
Kulanihakoi Rd. E. of Piilani	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Piikea Ave. W. of Piilani	35	1,120	1,111	9	0	63.7	57.5	51.3

*Piilani Hwy., Between Uwapo & N. Kihei's Leq shown in "50' Leq" column was calculated at 75' instead of 50'.

TABLE 4B

EXISTING (CY 2013) TRAFFIC VOLUMES AND NOISE LEVELS ALONG ROADWAYS IN PROJECT AREA (PEAK HOUR, SATURDAY)

LOCATION	SPEED (MPH)	TOTAL VPH	****** VOLUMES (VPH) ******** AUTOS	M TRUCKS	H TRUCKS	50' Leq	100' Leq	200' Leq
Mokulele Hwy., N. of N. Kihei Rd.	55	2,160	2,125	26	9	73.8	67.1	59.9
Piilani Hwy., Between Uwapo & N. Kihei *	50	2,403	2,364	29	10	73.1	69.6	60.1
Piilani Hwy., Between Uwapo & Ohukai	46	2,267	2,231	27	9	71.1	64.7	59.0
Piilani Hwy., Between Ohukai & Kaonoulu	46	2,151	2,116	26	9	71.0	66.0	60.5
Piilani Hwy., Between Kaonoulu & Kulanihakoi	55	2,212	2,176	27	9	73.4	66.9	61.0
Piilani Hwy., Between Kulanihakoi & Piikea	55	2,213	2,177	27	9	73.5	68.5	63.0
Piilani Hwy., South of Piikea	55	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N. Kihei Rd., West of South Kihei	50	1,064	1,052	6	6	69.4	62.7	55.7
N. Kihei Rd., Between Piilani & S. Kihei	46	859	849	5	5	67.6	61.9	55.7
S. Kihei Rd., South of N. Kihei Rd.	39	787	777	5	5	63.9	57.7	51.6
Uwapo Rd., W. of Piilani	30	236	236	0	0	56.3	50.1	44.0
Ohukai Rd., W. of Piilani	30	485	485	0	0	59.4	53.2	47.2
Ohukai Rd., E. of Piilani	30	408	408	0	0	58.8	52.7	47.6
Kaonoulu St., Between Piilani & Kenolio	34	239	239	0	0	57.4	51.2	46.1
Kaonoulu St., Between Kenolio & Alulike	34	122	122	0	0	54.5	48.3	43.1
Kaonoulu St., Between Alulike & S. Kihei	34	202	202	0	0	56.7	50.4	45.3
S. Kihei Rd. N. of Kaonoulu	37	958	946	6	6	64.1	58.0	51.9
S. Kihei Rd. S. of Kaonoulu	37	1,093	1,079	7	7	64.7	58.6	52.5
E. Kaonoulu St. E. of Piilani	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Kulanihakoi Rd. W. of Piilani	35	226	224	1	1	59.0	52.9	46.9
Kulanihakoi Rd. E. of Piilani	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Piikea Ave. W. of Piilani	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Piilani Hwy., Between Uwapo & N. Kihei's Leq shown in "50' Leq" column was calculated at 75' instead of 50'.

TABLE 5A

EXISTING AND CY 2018 DISTANCES TO 65 AND 75 DNL CONTOURS (WEEKDAYS)

STREET SECTION	65 DNL SETBACK (FT) EXISTING	65 DNL SETBACK (FT) CY 2018	75 DNL SETBACK (FT) EXISTING	75 DNL SETBACK (FT) CY 2018
Mokulele Hwy., N. of N. Kihei Rd.	138	151	50	55
Piilani Hwy., Between Uwapo & N. Kihei	150	165	70	77
Piilani Hwy., Between Uwapo & Ohukai	116	136	38	44
Piilani Hwy., Between Ohukai & Kaonoulu	141	170	36	44
Piilani Hwy., Between Kaonoulu & Kulanihakoi	156	184	51	59
Piilani Hwy., Between Kulanihakoi & Piikea	195	233	52	63
Piilani Hwy., South of Piikea	188	218	50	59
N. Kihei Rd., West of South Kihei	91	107	32	37
N. Kihei Rd., Between Piilani & S. Kihei	79	91	24	28
S. Kihei Rd., South of N. Kihei Rd.	53	60	17	20
Uwapo Rd., W. of Piilani	21	26	< 12	< 12
Ohukai Rd., W. of Piilani	25	29	< 12	< 12
Ohukai Rd., E. of Piilani	33	35	< 12	< 12
Kaonoulu St., Between Piilani & Kenolio	26	46	< 12	15
Kaonoulu St., Between Kenolio & Alulike	19	41	< 12	13
Kaonoulu St., Between Alulike & S. Kihei	25	41	< 12	14
S. Kihei Rd. N. of Kaonoulu	53	60	17	19
S. Kihei Rd. S. of Kaonoulu	55	63	18	20
E. Kaonoulu St. E. of Piilani	N/A	88	N/A	30
Kulanihakoi Rd. W. of Piilani	38	42	12	14
Kulanihakoi Rd. E. of Piilani	N/A	24	N/A	< 12
Piikea Ave. W. of Piilani	43	48	14	16

Notes:

(1) All setback distances are from the roadways' centerlines.
(2) See Tables 4A and 6A for traffic volume, speed, and mix assumptions.
(3) Setback distances are for ground level receptors.

TABLE 5B

EXISTING AND CY 2018 DISTANCES TO 65 AND 75 DNL CONTOURS (SATURDAY)

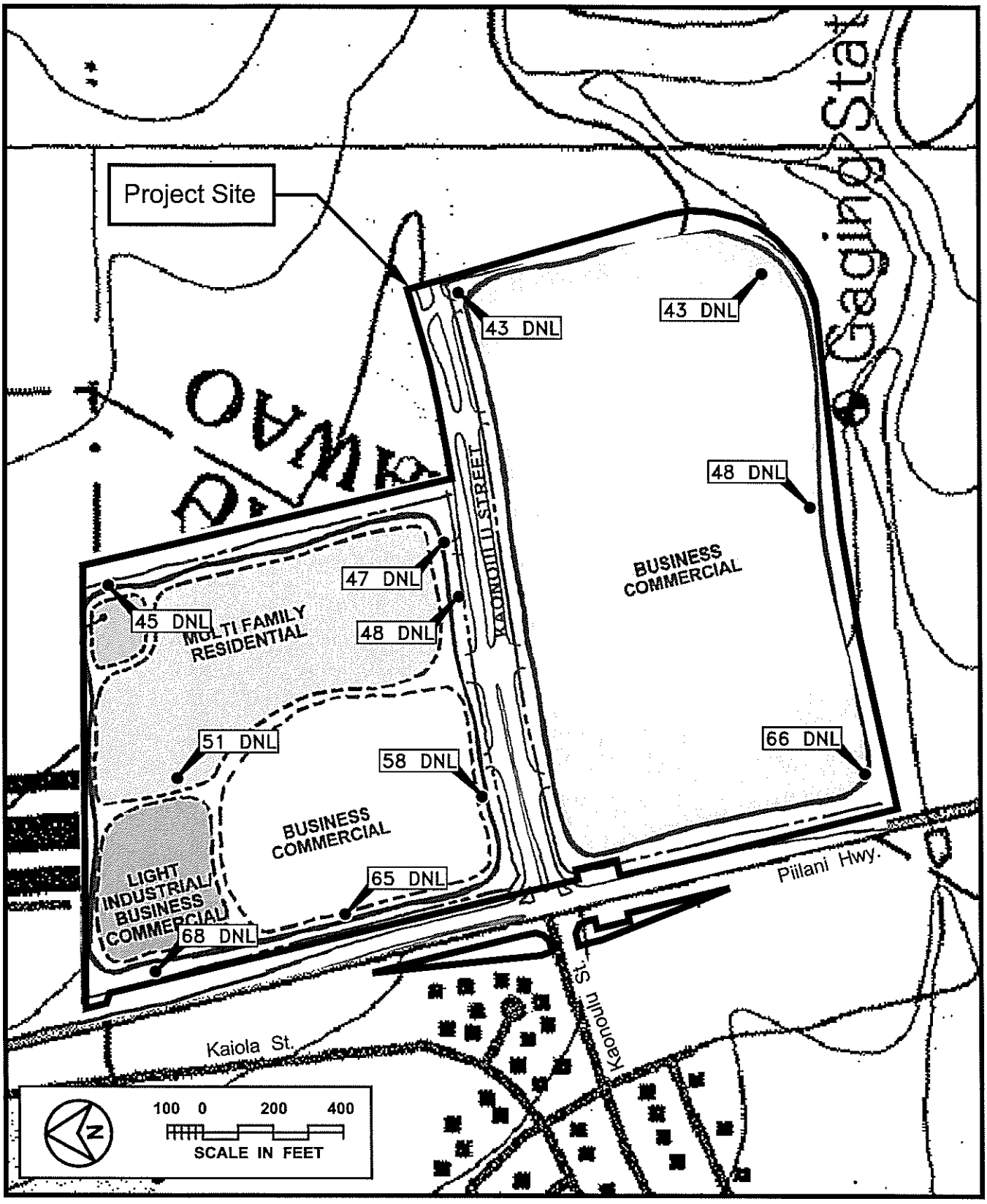
STREET SECTION	65 DNL SETBACK (FT) EXISTING	65 DNL SETBACK (FT) CY 2018	75 DNL SETBACK (FT) EXISTING	75 DNL SETBACK (FT) CY 2018
Mokulele Hwy., N. of N. Kihei Rd.	122	139	44	51
Piilani Hwy., Between Uwapo & N. Kihei	140	158	64	74
Piilani Hwy., Between Uwapo & Ohukai	96	124	33	41
Piilani Hwy., Between Ohukai & Kaonoulu	113	152	29	40
Piilani Hwy., Between Kaonoulu & Kulanihakoi	125	162	42	54
Piilani Hwy., Between Kulanihakoi & Piikea	155	203	41	54
Piilani Hwy., South of Piikea	N/A	N/A	N/A	N/A
N. Kihei Rd., West of South Kihei	79	100	28	35
N. Kihei Rd., Between Piilani & S. Kihei	69	84	20	25
S. Kihei Rd., South of N. Kihei Rd.	44	52	14	17
Uwapo Rd., W. of Piilani	19	25	< 12	< 12
Ohukai Rd., W. of Piilani	27	32	< 12	< 12
Ohukai Rd., E. of Piilani	25	28	< 12	< 12
Kaonoulu St., Between Piilani & Kenolio	21	43	< 12	14
Kaonoulu St., Between Kenolio & Alulike	15	39	< 12	13
Kaonoulu St., Between Alulike & S. Kihei	20	38	< 12	12
S. Kihei Rd. N. of Kaonoulu	45	53	14	17
S. Kihei Rd. S. of Kaonoulu	48	57	16	18
E. Kaonoulu St. E. of Piilani	N/A	83	N/A	29
Kulanihakoi Rd. W. of Piilani	25	30	< 12	< 12
Kulanihakoi Rd. E. of Piilani	N/A	N/A	N/A	N/A
Piikea Ave. W. of Piilani	N/A	N/A	N/A	N/A

Notes:

(1) All setback distances are from the roadways' centerlines.
(2) See Tables 4B and 6B for traffic volume, speed, and mix assumptions.
(3) Setback distances are for ground level receptors.

measurements in conjunction with the FHWA Traffic Noise Model to calculate existing traffic noise level contributions from Piilani Highway at various locations within the Piilani Promenade Project site. The results of these existing traffic noise calculations are shown in Figure 5. From Figure 5, existing traffic noise levels on the project site are estimated to range from 65 to 68 DNL at the westernmost (makai) side of the project site to 43 to 47 DNL at the easternmost (mauka) corners of the project site. At the planned multifamily residential units, existing traffic noise levels are very low and less than 55 DNL at both ground floor and second floor dwelling units.

While existing traffic noise levels are very low (less than 55 DNL) at the planned residential portion of the project, noise emissions from the existing commercial buildings north of the planned multifamily residences were greater than 50 dBA (59 DNL) and could be a source of potential noise complaints from the project residents. Suggestions for reducing these noise emissions are provided in Chapter VII of this report.



PROJECT LOCATION MAP AND EXISTING TRAFFIC NOISE LEVELS

FIGURE 5

CHAPTER VI. FUTURE NOISE ENVIRONMENT

Predictions of future traffic noise levels were made using the traffic volume assignments of Reference 7 for CY 2018 with and without the proposed project. The future projections of project plus non-project traffic noise levels for CY 2018 also included traffic on the new section of Kaonoulu Street east (mauka) of Piilani Highway through the project site. Appendices C1 and C2 summarize the traffic volumes for weekday AM and PM peak hours and for the Saturday peak hour for 2018 which were used to model future traffic noise along the streets in the vicinity of the project site. In general, the Saturday peak hour traffic volumes are lower than the weekday PM peak hour volumes, so the corresponding traffic noise levels are also lower during Saturdays.

Future traffic noise levels at distances of 50, 100, and 200 feet from the centerlines of the roadways which would service the project are shown in Tables 6A and 6B for the weekday PM peak and Saturday peak hours of traffic, under the Build Alternative. Predicted increases in the setback distances to the 65 and 75 DNL contours are shown in Tables 5A and 5B. The separate non-project and project traffic noise contributions for the Build Alternative for 2018 are shown in Tables 7A and 7B.

From Table 7A, increases in future traffic noise levels of 0.2 to 0.8 DNL are expected along Piilani Highway in the project environs by 2018 as a result of project traffic. The growth in non-project traffic by CY 2018 is predicted to result in traffic noise level increases of 0.6 to 0.8 DNL along Piilani Highway. Similar increases in future traffic noise levels due to non-project traffic are predicted to occur along South Kihei Road by CY 2018, with project traffic adding 0.3 to 0.6 DNL to the non-project noise levels by CY 2018. The largest total increase (6.6 DNL) in traffic noise level is anticipated to occur along Kaonoulu Street between Kenolio and Alulike Streets, and is primarily associated with non-project traffic. The next largest total increase (5.0 DNL) in traffic noise is anticipated to occur along Kaonoulu Street between Piilani Highway and Kenolio Street. Predicted increases in traffic noise by CY 2018 due to project traffic along Kaonoulu Street are 2.6 DNL or less. Along the other remaining roadways in the project environs, predicted increases in traffic noise by CY 2018 due to project traffic are 1.0 DNL or less.

Future traffic noise levels along Piilani Highway by CY 2018 are expected to remain in the "Significant Exposure, Normally Unacceptable" category, and at or greater than 65 DNL at the first row of existing homes on the makai side of the highway. The future traffic noise levels in the project environs along South Kihei Road are expected to be in the "Significant Exposure, Normally Unacceptable" category, and at or greater than 65 DNL within 60 to 63 feet of the roadway's centerline. Along the lower volume connector streets between Piilani Highway and South Kihei Road, future traffic noise levels are expected to remain in the "Moderate Exposure, Acceptable" category, and less than 65 DNL at 50 feet or greater distance from the roadways' centerlines.

TABLE 6A

FUTURE (CY 2018) TRAFFIC VOLUMES AND NOISE LEVELS ALONG ROADWAYS IN PROJECT AREA (PM PEAK HOUR, WEEKDAYS, BUILD)

LOCATION	SPEED (MPH)	TOTAL VPH	****** VOLUMES (VPH) ******** AUTOS	M TRUCKS	H TRUCKS	50' Leq	100' Leq	200' Leq
Mokulele Hwy., N. of N. Kihei Rd.	55	3,399	3,338	34	27	75.9	69.2	62.1
Piilani Hwy., Between Uwapo & N. Kihei *	50	3,887	3,817	39	31	75.3	71.8	62.4
Piilani Hwy., Between Uwapo & Ohukai	46	4,189	4,113	42	34	73.9	67.5	61.9
Piilani Hwy., Between Ohukai & Kaonoulu	46	4,335	4,257	43	35	74.1	69.2	63.7
Piilani Hwy., Between Kaonoulu & Kulanihakoi	55	4,491	4,410	45	36	76.6	70.1	64.3
Piilani Hwy., Between Kulanihakoi & Piikea	55	4,473	4,392	45	36	76.7	71.7	66.2
Piilani Hwy., South of Piikea	55	3,973	3,901	40	32	76.2	71.2	65.7
N. Kihei Rd., West of South Kihei	50	1,989	1,957	20	12	72.2	65.6	58.6
N. Kihei Rd., Between Piilani & S. Kihei	46	1,427	1,404	14	9	70.0	64.2	58.0
S. Kihei Rd., South of N. Kihei Rd.	41	1,248	1,229	12	7	66.6	60.4	54.1
Uwapo Rd., W. of Piilani	30	496	489	7	0	59.1	53.0	47.0
Ohukai Rd., W. of Piilani	30	623	614	9	0	60.1	54.0	48.0
Ohukai Rd., E. of Piilani	30	799	781	12	6	61.9	56.1	51.2
Kaonoulu St., Between Piilani & Kenolio	34	922	913	9	0	64.3	58.1	53.1
Kaonoulu St., Between Kenolio & Alulike	34	739	732	7	0	63.3	57.2	52.1
Kaonoulu St., Between Alulike & S. Kihei	34	733	726	7	0	63.3	57.1	52.1
S. Kihei Rd. N. of Kaonoulu	39	1,376	1,342	23	11	66.6	60.5	54.4
S. Kihei Rd. S. of Kaonoulu	39	1,554	1,516	26	12	67.1	61.0	54.9
E. Kaonoulu St. E. of Piilani	34	2,459	2,414	25	20	70.3	63.8	57.3
Kulanihakoi Rd. W. of Piilani	35	365	362	3	0	63.5	57.3	51.0
Kulanihakoi Rd. E. of Piilani	35	104	103	1	0	58.4	52.1	45.7
Piikea Ave. W. of Piilani	35	1,398	1,387	11	0	64.7	58.5	52.2

*Piilani Hwy., Between Uwapo & N. Kihei's Leq shown in "50' Leq" column was calculated at 75' instead of 50'.

TABLE 6B

FUTURE (CY 2018) TRAFFIC VOLUMES AND NOISE LEVELS ALONG ROADWAYS IN PROJECT AREA (PEAK HOUR, SATURDAY, BUILD)

LOCATION	SPEED (MPH)	TOTAL VPH	****** VOLUMES (VPH) ******** AUTOS	M TRUCKS	H TRUCKS	50' Leq	100' Leq	200' Leq
Mokulele Hwy., N. of N. Kihei Rd.	55	2,935	2,888	35	12	75.2	68.4	61.2
Piilani Hwy., Between Uwapo & N. Kihei *	50	3,556	3,499	43	14	74.8	71.3	61.8
Piilani Hwy., Between Uwapo & Ohukai	46	3,643	3,584	44	15	73.2	66.8	61.0
Piilani Hwy., Between Ohukai & Kaonoulu	46	3,666	3,607	44	15	73.3	68.3	62.8
Piilani Hwy., Between Kaonoulu & Kulanihakoi	55	3,685	3,626	44	15	75.7	69.1	63.2
Piilani Hwy., Between Kulanihakoi & Piikea	55	3,596	3,539	43	14	75.6	70.6	65.1
Piilani Hwy., South of Piikea	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N. Kihei Rd., West of South Kihei	50	1,773	1,751	11	11	71.6	65.0	58.0
N. Kihei Rd., Between Piilani & S. Kihei	46	1,243	1,229	7	7	69.3	63.6	57.3
S. Kihei Rd., South of N. Kihei Rd.	39	1,122	1,108	7	7	65.4	59.3	53.1
Uwapo Rd., W. of Piilani	30	430	430	0	0	58.9	52.7	46.6
Ohukai Rd., W. of Piilani	30	686	686	0	0	60.9	54.7	48.7
Ohukai Rd., E. of Piilani	30	521	521	0	0	59.9	53.7	48.7
Kaonoulu St., Between Piilani & Kenolio	34	1,016	1,016	0	0	63.7	57.5	52.3
Kaonoulu St., Between Kenolio & Alulike	34	813	813	0	0	62.7	56.5	51.4
Kaonoulu St., Between Alulike & S. Kihei	34	783	783	0	0	62.5	56.3	51.2
S. Kihei Rd. N. of Kaonoulu	37	1,320	1,304	8	8	65.5	59.3	53.3
S. Kihei Rd. S. of Kaonoulu	37	1,526	1,508	9	9	66.1	60.0	53.9
E. Kaonoulu St. E. of Piilani	34	3,177	3,177	0	0	69.8	63.2	56.2
Kulanihakoi Rd. W. of Piilani	35	318	314	2	2	60.7	54.7	48.7
Kulanihakoi Rd. E. of Piilani	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Piikea Ave. W. of Piilani	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Piilani Hwy., Between Uwapo & N. Kihei's Leq shown in "50' Leq" column was calculated at 75' instead of 50'.

TABLE 7A

CALCULATIONS OF PROJECT AND NON-PROJECT TRAFFIC NOISE CONTRIBUTIONS (WEEKDAYS, CY 2018)

STREET SECTION	NOISE LEVEL INCREASE DUE TO NON-PROJECT TRAFFIC	PROJECT TRAFFIC	
Mokulele Hwy., N. of N. Kihei Rd.	0.7	0.2	
Piilani Hwy., Between Uwapo & N. Kihei	0.8	0.4	
Piilani Hwy., Between Uwapo & Ohukai	0.7	0.6	
Piilani Hwy., Between Ohukai & Kaonoulu	0.7	0.8	
Piilani Hwy., Between Kaonoulu & Kulanihakoi	0.6	0.8	
Piilani Hwy., Between Kulanihakoi & Piikea	0.7	0.7	
Piilani Hwy., South of Piikea	0.6	0.6	
N. Kihei Rd., West of South Kihei	0.8	0.7	
N. Kihei Rd., Between Piilani & S. Kihei	0.6	0.6	
S. Kihei Rd., South of N. Kihei Rd.	0.7	0.3	
Uwapo Rd., W. of Piilani	1.0	0.9	
Ohukai Rd., W. of Piilani	0.5	0.7	
Ohukai Rd., E. of Piilani	0.0	0.5	
Kaonoulu St., Between Piilani & Kenolio	2.7	2.3	
Kaonoulu St., Between Kenolio & Alulike	4.0	2.6	
Kaonoulu St., Between Alulike & S. Kihei	2.9	1.7	
S. Kihei Rd. N. of Kaonoulu	0.6	0.5	
S. Kihei Rd. S. of Kaonoulu	0.6	0.6	
E. Kaonoulu St. E. of Piilani	N/A	63.8	*
Kulanihakoi Rd. W. of Piilani	0.0	1.0	
Kulanihakoi Rd. E. of Piilani	52.1	0.0	*
Piikea Ave. W. of Piilani	0.4	0.6	

Notes:

1. "*" Large DNL values result from comparisons of future roadway DNL values with currently non-existing roadways.
2. "N/A" results from lack of applicable traffic data for that roadway.

TABLE 7B

CALCULATIONS OF PROJECT AND NON-PROJECT TRAFFIC NOISE CONTRIBUTIONS (SATURDAY, CY 2018)

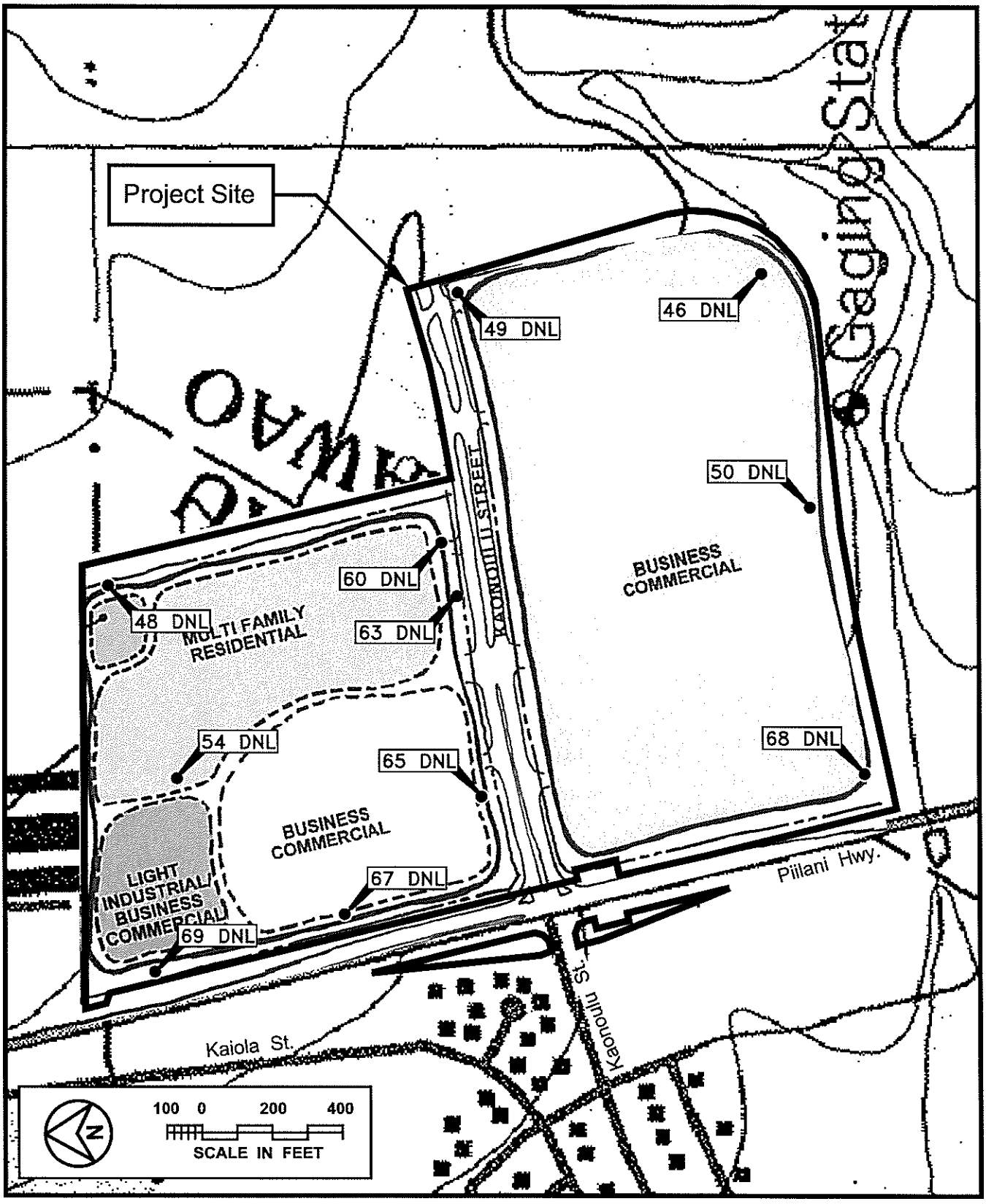
STREET SECTION	NOISE LEVEL INCREASE DUE TO NON-PROJECT TRAFFIC	PROJECT TRAFFIC	
Mokulele Hwy., N. of N. Kihei Rd.	1.0	0.3	
Piilani Hwy., Between Uwapo & N. Kihei	1.1	0.6	
Piilani Hwy., Between Uwapo & Ohukai	1.2	0.9	
Piilani Hwy., Between Ohukai & Kaonoulu	1.1	1.2	
Piilani Hwy., Between Kaonoulu & Kulanihakoi	1.0	1.2	
Piilani Hwy., Between Kulanihakoi & Piikea	1.0	1.1	
Piilani Hwy., South of Piikea	N/A	N/A	
N. Kihei Rd., West of South Kihei	1.4	0.9	
N. Kihei Rd., Between Piilani & S. Kihei	0.8	0.9	
S. Kihei Rd., South of N. Kihei Rd.	1.1	0.5	
Uwapo Rd., W. of Piilani	1.3	1.3	
Ohukai Rd., W. of Piilani	0.8	0.7	
Ohukai Rd., E. of Piilani	0.0	1.0	
Kaonoulu St., Between Piilani & Kenolio	3.5	2.8	
Kaonoulu St., Between Kenolio & Alulike	5.2	3.0	
Kaonoulu St., Between Alulike & S. Kihei	3.7	2.2	
S. Kihei Rd. N. of Kaonoulu	0.6	0.7	
S. Kihei Rd. S. of Kaonoulu	0.8	0.6	
E. Kaonoulu St. E. of Piilani	N/A	63.2	*
Kulanihakoi Rd. W. of Piilani	0.0	1.8	
Kulanihakoi Rd. E. of Piilani	N/A	N/A	
Piikea Ave. W. of Piilani	N/A	N/A	

Notes:

1. "*" Large DNL value results from comparisons of future roadway DNL values with currently non-existing roadways.
2. "N/A" results from lack of applicable traffic data for that roadway.

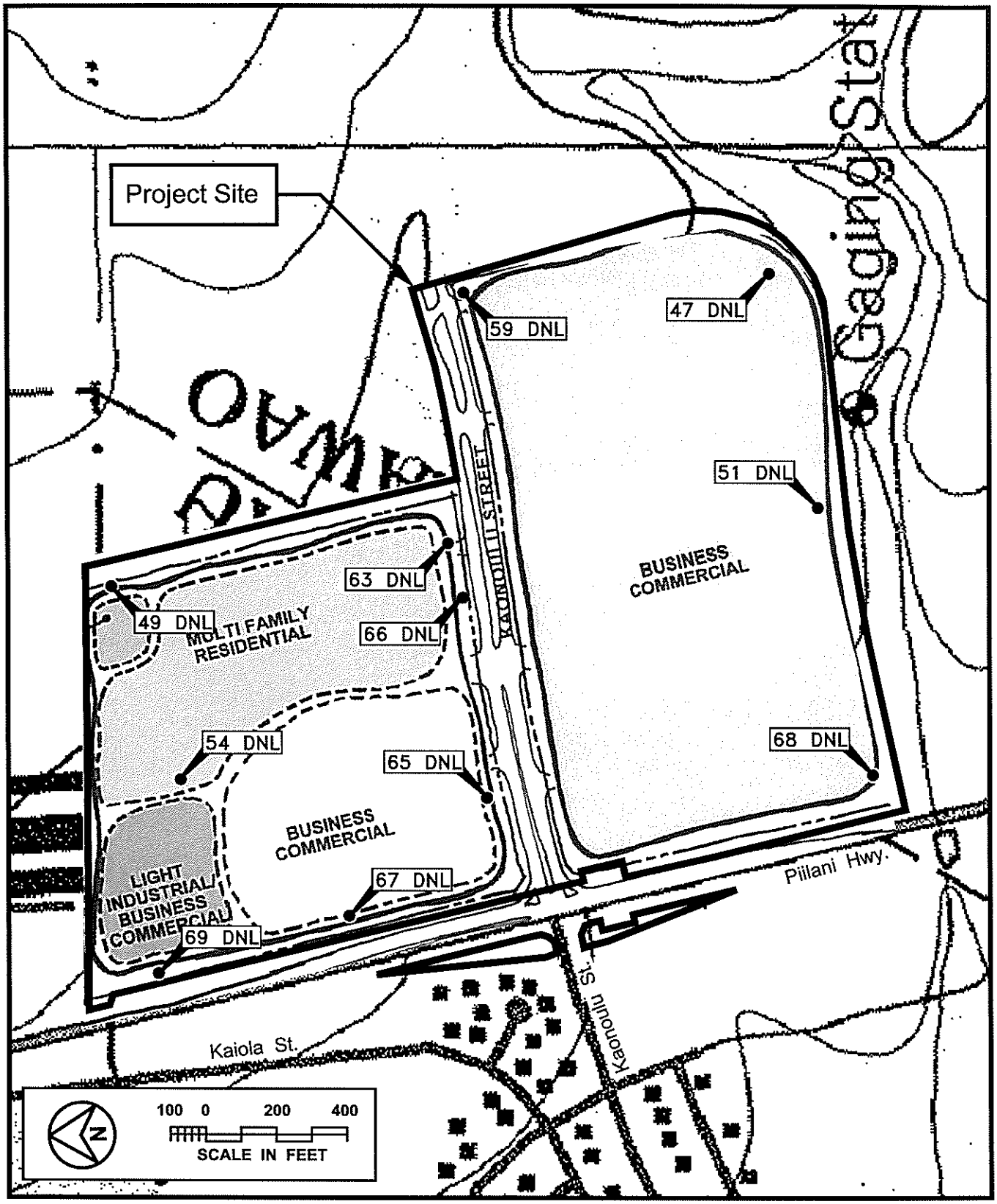
The dominant traffic noise sources in the project environs will continue to be traffic along Piilani Highway and South Kihei Road. The new section of Kaonoulu Street east of Piilani Highway will also be a dominant traffic noise source on the mauka side of Piilani Highway. Figure 6 depicts the predicted traffic noise levels over the project site under the Build Alternative by CY 2018. The planned multifamily residences of the project fronting East Kaonoulu Street should not experience future traffic noise levels greater than the 65 DNL FHA/HUD standard or the 66 Leq noise abatement criteria of the HDOT by 2018 as long as their setback distances from the centerline of Kaonoulu Street are at least 51 feet. While the predicted future traffic noise levels exceed 65 DNL at the project's lots which front Piilani Highway, these predicted levels are compatible with the planned business, commercial, or light industrial uses. The traffic noise levels shown in Figure 6 will probably increase from the values shown after CY 2018 following completion of the Upcountry Highway, particularly at the locations near the new section of Kaonoulu Street.

Figure 7 depicts the potential traffic noise levels over the project site following completion of the Upcountry Highway and with Kaonoulu Street accommodating the additional traffic from the Upcountry Highway. In Figure 7, the potential traffic noise contributions from Kaonoulu Street were increased in accordance with the traffic forecasts for Kaonoulu Street from Figure 22 of the traffic study (Reference 7). While the traffic noise contributions from Piilani Highway may decline following the completion of the Upcounty Highway, the higher CY 2018 values shown in Table 6A were used to develop the potential traffic noise levels shown in Figure 7 for the post-2018 period. As shown in Figure 7, the potential traffic noise levels along Kaonoulu Street will be approximately 3 DNL higher than those shown in Figure 6. The traffic noise levels at all units of the proposed multifamily residential parcel will not exceed the HDOT's "15 dB increase" noise abatement criteria by CY 2025. For the southernmost buildings of the residential parcel, a minimum setback distance of 81 feet from the centerline of Kaonoulu is required so that traffic noise levels do not exceed 65 DNL or the 66 Leq HDOT noise abatement criteria by CY 2025.



PROJECT LOCATION MAP AND FUTURE (CY 2018) TRAFFIC NOISE LEVELS

FIGURE 6



PROJECT LOCATION MAP AND FUTURE TRAFFIC NOISE LEVELS WITH UPCOUNTRY HIGHWAY

FIGURE 7

CHAPTER VII. DISCUSSION OF PROJECT-RELATED NOISE IMPACTS AND POSSIBLE MITIGATION MEASURES

Traffic Noise. Existing traffic noise levels along Piilani Highway and South Kihei Road are very high, and are expected to remain so through CY 2018. Traffic noise impacts along those two roadways will continue to occur at noise sensitive receptors which are not provided with noise mitigation measures such as sound attenuating walls and/or closure and air conditioning.

Project related traffic along Piilani Highway and South Kihei Road are not expected to cause significant increases in future traffic noise levels. Increases in future traffic noise levels along Piilani Highway resulting from project traffic are expected to range from 0.2 to 0.8 DNL by CY 2018. The largest increases (1.7 to 2.6 DNL) in project related traffic noise are predicted to occur along Kaonoulu Street. Adverse traffic noise impacts along Kaonoulu Street are not expected to occur since existing traffic noise levels are very low, and the addition of both project plus non-project traffic is not expected to cause traffic noise levels to exceed 65 DNL at existing residences along Kaonoulu Street by CY 2018. The noise sensitive residential buildings along Kaonoulu Street have adequate setback distances such that predicted CY 2018 traffic noise levels should remain in the "Moderate Exposure, Normally Acceptable" category at these buildings. For these reasons, traffic noise mitigation measures should not be required.

Potential Noise Impacts At Project's 226 Residential Units. Because the Piilani Promenade Project includes proposed residential units within the industrial zoned lands, noise impacts at the residential units from activities associated with the light industrial, business, and commercial uses are possible. In addition, traffic noise impacts from the future traffic on the new mauka section of Kaonoulu Street following completion of the Upcountry Highway are possible. Figure 6 indicted that the project's residential units should not experience traffic noise levels greater than 65 DNL by CY 2018. In order to examine the potential traffic noise levels following completion of the Upcountry Highway, Figure 7 was developed using data contained in Reference 7. Future traffic noise levels following completion of the Upcountry Highway could exceed 65 DNL at the southern end of the residential parcel at setback distances less than 81 feet from the centerline of East Kaonoulu Street. If this minimum setback distance cannot be achieved, the application of other traffic noise mitigation measures, such as the addition of sound attenuating walls or the use of closure with air conditioning should be considered.

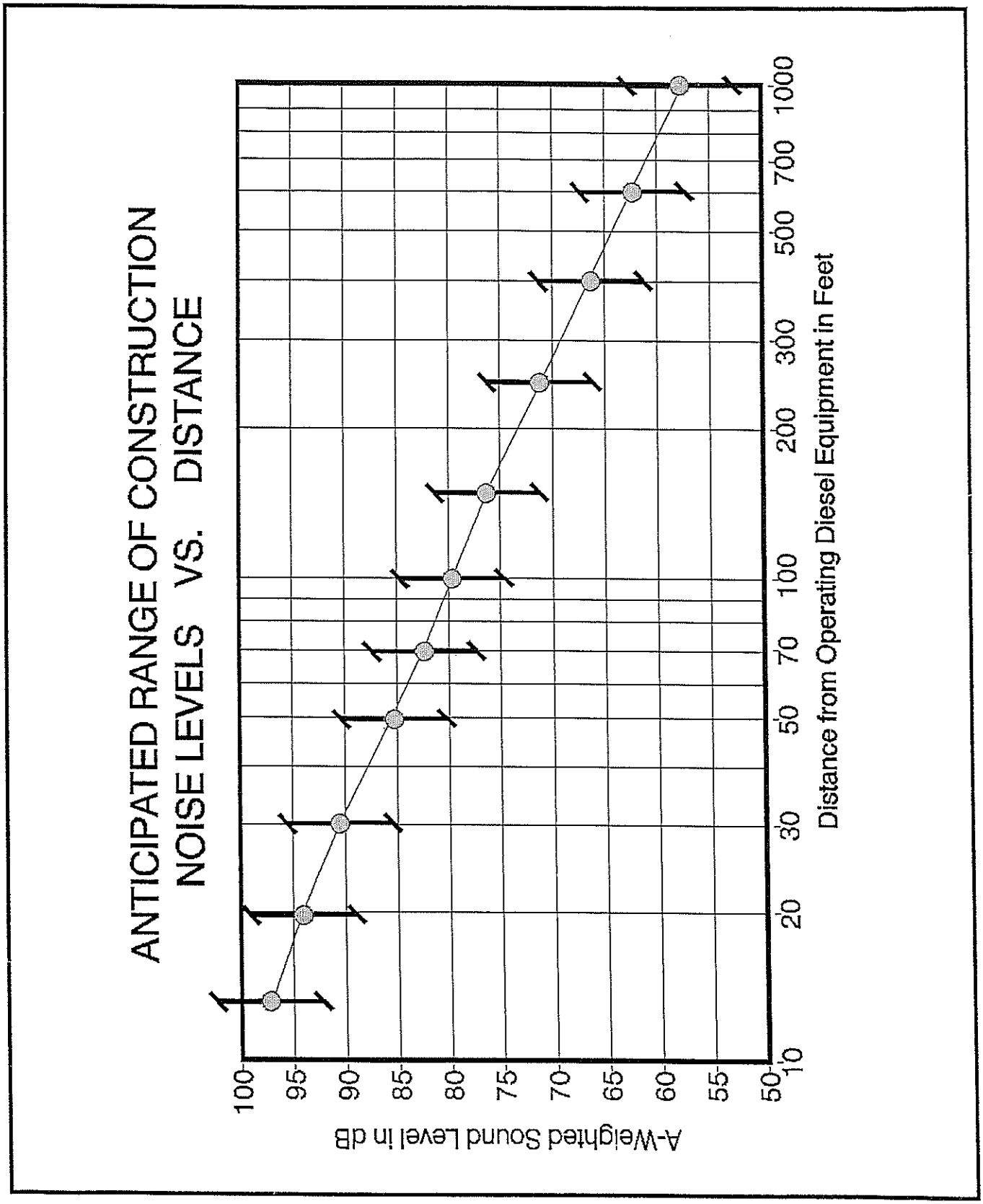
Because the project's residential parcel is adjacent to existing and future nonresidential uses, potential noise impacts and noise complaints may occur due to audible noise emanating from these nonresidential uses. For multifamily residences, the State DOH noise limits are 60 dBA during the daytime (7:00 am to 10:00 pm) and 50 dBA during the nighttime (10:00 pm to 7:00 am). However, because the allowable State DOH noise limits are determined by the lot zoning at the source of the noise, a

higher noise limit of 70 dBA during the daytime and nighttime will apply at the proposed residences in accordance with State DOH rules. Both the project and existing parcel north of the planned residential units are zoned Light Industrial, with applicable limits of 70 dBA during the daytime and nighttime periods. A steady noise level of 56 dBA during the daytime and nighttime would equate to the 65 DNL FHA/HUD standard for noise sensitive properties, so the potential exists for exceeding the 65 DNL standard by 14 dBA at the project's residential units. In situations like this, it would be prudent to include noise limits within the land conveyance documents to limit noise emissions from the tenants of the light industrial, business, and commercial lots to the State DOH limits for multifamily residential properties. These limits are 60 dBA and 50 dBA for the daytime and nighttime periods, respectively. These limits are also identical to the State DOH limits for business and commercial zoned lands.

It would also be prudent to include provisions for nighttime and early morning delivery trucks to ingress and egress the nonresidential lots via internal roadways which maximize the distances between the trucks and the project's residential buildings. These roadways could also include the circulation driveways within the parking areas. The use of beeper type backup alarms should be discouraged, and the use of broadband noise type backup alarms should be encouraged, primarily because the beeper type backup alarms are audible at longer distances than are the broadband noise backup alarms.

A noise conflict situation between light industrial zoned lands and residential uses on adjacent spaces may occur at the project's residential buildings at the north end of the project due to existing noise emissions from the existing light industrial subdivision to the north of the proposed residential buildings. Current noise emissions from the existing light industrial subdivision may be exceeding 50 dBA during the daytime and nighttime periods. These noise emission levels are probably in compliance with the State DOH noise limit of 70 dBA, but may be too high for future residences of the three project buildings. In situations like these, it may be prudent to include disclosure of the potential 70 dBA noise levels within the land conveyance documents of the proposed residential parcels. In addition, it may also be mutually beneficial to apply noise mitigation measures to the noise sources within the existing light industrial parcel(s) which exceed 50 dBA at the proposed residential dwellings.

General Construction Noise. Audible construction noise will probably be unavoidable during the entire project construction period. The total time period for construction is unknown, but it is anticipated that the actual work will be moving from one location on the project site to another during that period. Actual length of exposure to construction noise at any receptor location will probably be less than the total construction period for the entire project. Typical levels of exterior noise from construction activity (excluding pile driving activity) at various distances from the job site are shown in Figure 8. The impulsive noise levels of impact pile drivers are approximately 15 dB higher than the levels shown in Figure 8, while the intermittent noise levels of vibratory pile drivers are at the upper end of the noise level ranges depicted in the figure.



CONSTRUCTION NOISE LEVELS VS. DISTANCE

FIGURE 8

Figure 8 is useful for predicting exterior noise levels at short distances (within 100 FT) from the work when visual line of sight exists between the construction equipment and the receptor. Direct line-of-sight distances from the construction equipment operating on the mauka side of Piilani Highway to existing residential buildings will range from 150 FT to 1,850 FT, with corresponding average noise levels of 77 to 52 dBA (plus or minus 5 dBA). Typical levels of construction noise inside naturally ventilated and air conditioned structures are approximately 10 and 20 dB less, respectively, than the levels shown in Figure 8.

An existing residence located approximately 900 feet north of the project and south of Ohukai Road is the closest existing residence to the north of the project site. A large number of residences are located beyond 1,200 feet north of the project site across Ohukai Road. The highest noise levels at these residences from construction activities of 58 to 52 dBA are expected to occur during earthwork and site preparation activities near the north end of the Piilani Promenade development. The noise from construction activities on the project site will be audible at long distances from the Ohukai Road residences due to the relatively low (40 to 55 dBA) background noise levels at these residences.

The existing residences across Piilani Highway west of the project site would probably hear any construction activities involving earthwork or landscaping within the State Right-of-Way (ROW) on the makai side of Piillani Highway near the Kaonoulu Street intersection. The noise levels from these close-in construction activities may range from 80 to 95 dBA at existing residences along the makai ROW. Existing residences along the makai ROW may also hear the construction activities within the main project site mauka of Piilani Highway. The highest noise levels from construction activities of 75 to 77 dBA are expected to occur at these residences during earthwork and site preparation activities near the mauka ROW of Piilani Highway. The noise from construction activities will decrease and be masked by traffic noise along Piilani Highway at these residences along Piilani Highway as project construction activities move toward the east end of the project site. Adverse impacts from construction noise are not expected to be in the "public health and welfare" category due to the temporary nature of the work, and due to the administrative controls available for regulation of construction noise. Instead, these impacts will probably be limited to the temporary degradation of the quality of the acoustic environment in the immediate vicinity of the project site.

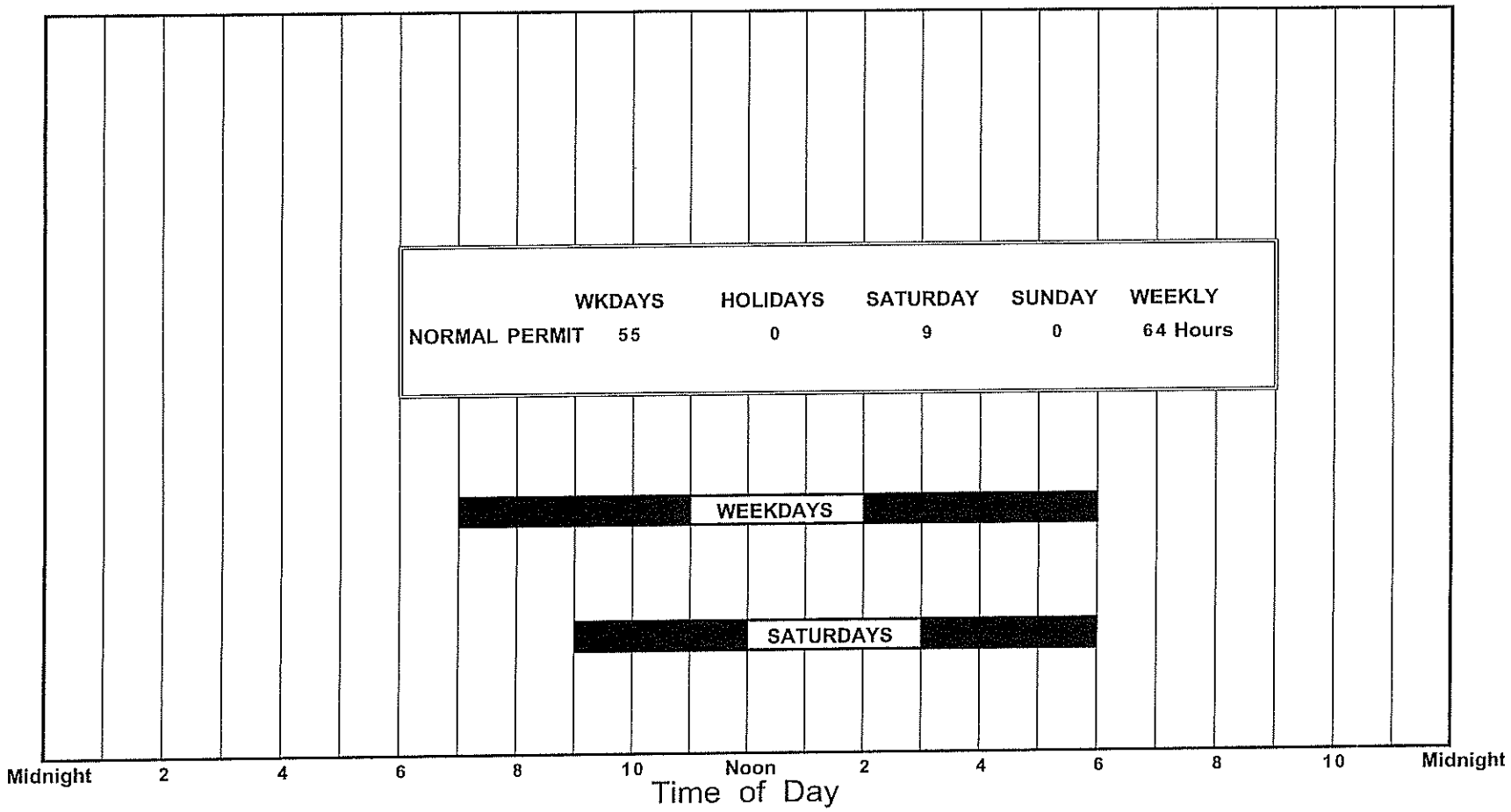
Mitigation of construction noise to inaudible levels will not be practical in all cases due to the intensity of construction noise sources (80 dBA at 100 FT distance), and due to the exterior nature of the work (rock breaking, grading and earth moving, trenching, concrete pouring, hammering, etc.). The use of properly muffled construction equipment should be required on the job site.

Peak airborne noise levels from pile diving may be as much as 15 dBA greater than noise levels shown in Figure 8 for non-impulsive (steady) construction noise sources. Although the pile driving can produce more intense noise levels, each pulse is

of short individual duration (less than one second). Therefore, its impact on speech communication is not as severe as that of a steady source of the same noise level.

Severe noise impacts are not expected to occur inside air conditioned structures which are beyond 200 FT from the project construction site. Inside naturally ventilated structures, interior noise levels (with windows or doors opened) are estimated to range between 65 to 53 dBA at 200 FT to 600 FT distances from the construction site. Closure of all doors and windows facing the construction site would generally reduce interior noise levels by an additional 5 to 10 dBA.

The incorporation of State Department of Health construction noise limits and curfew times, which are applicable throughout the State of Hawaii (Reference 5), is another noise mitigation measure which is normally applied to construction activities. Figure 9 depicts the normally permitted hours of construction. Noisy construction activities are not allowed on Sundays and holidays, during the early morning, and during the late evening and nighttime periods under the DOH permit procedures.



AVAILABLE WORK HOURS UNDER DOH PERMIT PROCEDURES FOR CONSTRUCTION NOISE

FIGURE 9

APPENDIX A. REFERENCES

(1) "Guidelines for Considering Noise in Land Use Planning and Control;" Federal Interagency Committee on Urban Noise; June 1980.

(2) American National Standard, "Sound Level Descriptors for Determination of Compatible Land Use," ANSI S12.9-1998/ Part 5; Acoustical Society of America.

(3) "Environmental Criteria and Standards, Noise Abatement and Control, 24 CFR, Part 51, Subpart B;" U.S. Department of Housing and Urban Development; July 12, 1979.

(4) "Information on Levels of Environmental Noise Requisite to Protect the Public Health and Welfare with an Adequate Margin of Safety;" U.S. Environmental Protection Agency; EPA 550/9-74-004; March 1974.

(5) "Title 11, Administrative Rules, Chapter 46, Community Noise Control;" Hawaii State Department of Health; September 23, 1996.

(6) "FHWA Highway Traffic Noise Model User's Guide;" FHWA-PD-96-009, Federal Highway Administration; Washington, D.C.; January 1998 and Version 2.5 Upgrade (April 14, 2004).

(7) "Traffic Impact Analysis Report for Piilani Promenade;" Phillip Rowell and Associates; December 23, 2013.

(8) Hourly Traffic Counts At Station B74003100000, Piilani Highway Between Kaonoulu Street and Kulanihakoi Road; Hawaii State Department of Transportation; September 28, 2011.

(9) Hourly Traffic Counts At Station B74310000013, South Kihei Road Between Nohokai Street and Piikea Avenue; Hawaii State Department of Transportation; August 19, 2010.

APPENDIX B

EXCERPTS FROM EPA'S ACOUSTIC TERMINOLOGY GUIDE

Descriptor Symbol Usage

The recommended symbols for the commonly used acoustic descriptors based on A-weighting are contained in Table I. As most acoustic criteria and standards used by EPA are derived from the A-weighted sound level, almost all descriptor symbol usage guidance is contained in Table I.

Since acoustic nomenclature includes weighting networks other than "A" and measurements other than pressure, an expansion of Table I was developed (Table II). The group adopted the ANSI descriptor-symbol scheme which is structured into three stages. The first stage indicates that the descriptor is a level (i.e., based upon the logarithm of a ratio), the second stage indicates the type of quantity (power, pressure, or sound exposure), and the third stage indicates the weighting network (A, B, C, D, E.....). If no weighting network is specified, "A" weighting is understood. Exceptions are the A-weighted sound level and the A-weighted peak sound level which require that the "A" be specified. For convenience in those situations in which an A-weighted descriptor is being compared to that of another weighting, the alternative column in Table II permits the inclusion of the "A". For example, a report on blast noise might wish to contrast the LCdn with the LAdn.

Although not included in the tables, it is also recommended that "Lpn" and "LepN" be used as symbols for perceived noise levels and effective perceived noise levels, respectively.

It is recommended that in their initial use within a report, such terms be written in full, rather than abbreviated. An example of preferred usage is as follows:

The A-weighted sound level (LA) was measured before and after the installation of acoustical treatment. The measured LA values were 85 and 75 dB respectively.

Descriptor Nomenclature

With regard to energy averaging over time, the term "average" should be discouraged in favor of the term "equivalent". Hence, Leq, is designated the "equivalent sound level". For Ld, Ln, and Ldn, "equivalent" need not be stated since the concept of day, night, or day-night averaging is by definition understood. Therefore, the designations are "day sound level", "night sound level", and "day-night sound level", respectively.

The peak sound level is the logarithmic ratio of peak sound pressure to a reference pressure and not the maximum root mean square pressure. While the latter is the maximum sound pressure level, it is often incorrectly labelled peak. In that sound level meters have "peak" settings, this distinction is most important.

"Background ambient" should be used in lieu of "background", "ambient", "residual", or "indigenous" to describe the level characteristics of the general background noise due to the contribution of many unidentifiable noise sources near and far.

With regard to units, it is recommended that the unit decibel (abbreviated dB) be used without modification. Hence, DBA, PNdB, and EPNdB are not to be used. Examples of this preferred usage are: the Perceived Noise Level (Lpn was found to be 75 dB. Lpn = 75 dB). This decision was based upon the recommendation of the National Bureau of Standards, and the policies of ANSI and the Acoustical Society of America, all of which disallow any modification of bel except for prefixes indicating its multiples or submultiples (e.g., deci).

Noise Impact

In discussing noise impact, it is recommended that "Level Weighted Population" (LWP) replace "Equivalent Noise Impact" (ENI). The term "Relative Change of Impact" (RCI) shall be used for comparing the relative differences in LWP between two alternatives.

Further, when appropriate, "Noise Impact Index" (NII) and "Population Weighed Loss of Hearing" (PHL) shall be used consistent with CHABA Working Group 69 Report Guidelines for Preparing Environmental Impact Statements (1977).

APPENDIX B (CONTINUED)

TABLE I

A-WEIGHTED RECOMMENDED DESCRIPTOR LIST

	TERM	SYMBOL
1.	A-Weighted Sound Level	L_A
2.	A-Weighted Sound Power Level	L_{WA}
3.	Maximum A-Weighted Sound Level	L_{max}
4.	Peak A-Weighted Sound Level	L_{Apk}
5.	Level Exceeded x% of the Time	L_x
6.	Equivalent Sound Level	L_{eq}
7.	Equivalent Sound Level over Time (T) (1)	$L_{eq(T)}$
8.	Day Sound Level	L_d
9.	Night Sound Level	L_n
10.	Day-Night Sound Level	L_{dn}
11.	Yearly Day-Night Sound Level	$L_{dn(Y)}$
12.	Sound Exposure Level	L_{SE}

(1) Unless otherwise specified, time is in hours (e.g. the hourly equivalent level is $L_{eq(1)}$). Time may be specified in non-quantitative terms (e.g., could be specified a $L_{eq(WASH)}$ to mean the washing cycle noise for a washing machine).

SOURCE: EPA ACOUSTIC TERMINOLOGY GUIDE, BNA 8-14-78,

APPENDIX B (CONTINUED)

TABLE II

RECOMMENDED DESCRIPTOR LIST

	TERM	A-WEIGHTING	ALTERNATIVE[1] A-WEIGHTING	OTHER[2] WEIGHTING	UNWEIGHTED
1.	Sound (Pressure)[3] Level	L_A	L_{pA}	L_B, L_{pB}	L_p
2.	Sound Power Level	L_{WA}		L_{WB}	L_W
3.	Max. Sound Level	L_{max}	L_{Amax}	L_{Bmax}	L_{pmax}
4.	Peak Sound (Pressure) Level	L_{Apk}		L_{Bpk}	L_{pk}
5.	Level Exceeded x% of the Time	L_x	L_{Ax}	L_{Bx}	L_{px}
6.	Equivalent Sound Level	L_{eq}	L_{Aeq}	L_{Beq}	L_{peq}
7.	Equivalent Sound Level[4] Over Time(T)	$L_{eq(T)}$	$L_{Aeq(T)}$	$L_{Beq(T)}$	$L_{peq(T)}$
8.	Day Sound Level	L_d	L_{Ad}	L_{Bd}	L_{pd}
9.	Night Sound Level	L_n	L_{An}	L_{Bn}	L_{pn}
10.	Day-Night Sound Level	L_{dn}	L_{Adn}	L_{Bdn}	L_{pdn}
11.	Yearly Day-Night Sound Level	$L_{dn(Y)}$	$L_{Adn(Y)}$	$L_{Bdn(Y)}$	$L_{pdn(Y)}$
12.	Sound Exposure Level	L_S	L_{SA}	L_{SB}	L_{Sp}
13.	Energy Average Value Over (Non-Time Domain) Set of Observations	$L_{eq(e)}$	$L_{Aeq(e)}$	$L_{Beq(e)}$	$L_{peq(e)}$
14.	Level Exceeded x% of the Total Set of (Non-Time Domain) Observations	$L_{x(e)}$	$L_{Ax(e)}$	$L_{Bx(e)}$	$L_{px(e)}$
15.	Average L_x Value	L_x	L_{Ax}	L_{Bx}	L_{px}

(1) "Alternative" symbols may be used to assure clarity or consistency.

(2) Only B-weighting shown. Applies also to C,D,E,.....weighting.

(3) The term "pressure" is used only for the unweighted level.

(4) Unless otherwise specified, time is in hours (e.g., the hourly equivalent level is Leq(1). Time may be specified in non-quantitative terms (e.g., could be specified as Leq(WASH) to mean the washing cycle noise for a washing machine.

APPENDIX C1

SUMMARY OF BASE YEAR AND YEAR 2018 WEEKDAY TRAFFIC VOLUMES

ROADWAY LANES	**** CY 2013 ***** AM VPH	PM VPH	CY 2018 (NO BUILD) AM VPH	PM VPH	CY 2018 (BUILD) AM VPH	PM VPH
Mokulele Hwy., N. of N. Kihei Rd. (NB)	1,292	1,447	1,410	1,657	1,437	1,751
Mokulele Hwy., N. of N. Kihei Rd. (SB)	1,106	1,314	1,283	1,561	1,316	1,648
Two-Way	2,398	2,761	2,693	3,218	2,753	3,399
Piilani Hwy., Between Uwapo & N. Kihei (NB)	1,448	1,495	1,617	1,773	1,670	1,962
Piilani Hwy., Between Uwapo & N. Kihei (SB)	1,266	1,421	1,492	1,751	1,558	1,925
Two-Way	2,714	2,916	3,109	3,524	3,228	3,887
Piilani Hwy., Between Uwapo & Ohukai (NB)	1,278	1,601	1,369	1,904	1,448	2,189
Piilani Hwy., Between Uwapo & Ohukai (SB)	1,455	1,456	1,780	1,740	1,880	2,000
Two-Way	2,733	3,056	3,149	3,643	3,328	4,189
Piilani Hwy., Between Ohukai & Kaonoulu (NB)	1,115	1,548	1,181	1,820	1,288	2,199
Piilani Hwy., Between Ohukai & Kaonoulu (SB)	1,596	1,536	1,880	1,789	2,014	2,136
Two-Way	2,710	3,083	3,061	3,608	3,302	4,335
Piilani Hwy., Between Kaonoulu & Kulanihakoi (NB)	1268	1,679	1,340	1,944	1,469	2,282
Piilani Hwy., Between Kaonoulu & Kulanihakoi (SB)	1,782	1,595	2,059	1,840	2,162	2,209
Two-Way	3,050	3,273	3,399	3,783	3,631	4,491
Piilani Hwy., Between Kulanihakoi & Piikea (NB)	1,298	1,704	1,510	1,992	1,626	2,296
Piilani Hwy., Between Kulanihakoi & Piikea (SB)	1,894	1,572	2,198	1,846	2,291	2,178
Two-Way	3,191	3,275	3,708	3,838	3,917	4,473
Piilani Hwy., South of Piikea (NB)	1,109	1,625	1,288	1,880	1,371	2,097
Piilani Hwy., South of Piikea (SB)	1,659	1,429	1,900	1,639	1,966	1,876
Two-Way	2,768	3,054	3,188	3,519	3,337	3,973
N. Kihei Rd., West of South Kihei (EB)	464	835	614	1,013	664	1,143
N. Kihei Rd., West of South Kihei (WB)	788	586	929	704	969	846
Two-Way	1,252	1,421	1,543	1,717	1,633	1,989
N. Kihei Rd., Between Piilani & S. Kihei (EB)	478	559	547	652	580	739
N. Kihei Rd., Between Piilani & S. Kihei (WB)	466	524	558	594	585	688
Two-Way	944	1,083	1,105	1,246	1,165	1,427
S. Kihei Rd., South of N. Kihei Rd. (NB)	555	414	624	472	637	520
S. Kihei Rd., South of N. Kihei Rd. (SB)	263	590	364	685	381	728
Two-Way	818	1,004	988	1,157	1,018	1,248

APPENDIX C1 (CONTINUED)

SUMMARY OF BASE YEAR AND YEAR 2018
WEEKDAY TRAFFIC VOLUMES

ROADWAY LANES	**** CY 2013 *****		CY 2018 (NO BUILD)		CY 2018 (BUILD)	
	AM VPH	PM VPH	AM VPH	PM VPH	AM VPH	PM VPH
Uwapo Rd., W. of Piilani (EB)	259	169	283	217	300	260
Uwapo Rd., W. of Piilani (WB)	64	151	106	188	119	236
Two-Way	323	320	389	405	419	496
Ohukai Rd., W. of Piilani (EB)	244	245	253	275	270	318
Ohukai Rd., W. of Piilani (WB)	109	226	146	257	159	305
Two-Way	353	471	399	532	429	623
Ohukai Rd., E. of Piilani (EB)	295	270	295	270	308	318
Ohukai Rd., E. of Piilani (WB)	427	438	428	438	445	481
Two-Way	722	708	723	708	753	799
Kaonoulu St., Between Piilani & Kenolio (EB)	225	159	322	283	392	466
Kaonoulu St., Between Piilani & Kenolio (WB)	87	131	209	257	265	456
Two-Way	312	290	531	540	657	922
Kaonoulu St., Between Kenolio & Alulike (EB)	73	98	146	218	206	374
Kaonoulu St., Between Kenolio & Alulike (WB)	49	62	223	194	271	365
Two-Way	121	159	368	412	476	739
Kaonoulu St., Between Alulike & S. Kihei (EB)	82	170	162	281	222	438
Kaonoulu St., Between Alulike & S. Kihei (WB)	95	81	255	210	279	295
Two-Way	176	250	417	491	501	733
S. Kihei Rd. N. of Kaonoulu (NB)	523	525	609	604	633	689
S. Kihei Rd. N. of Kaonoulu (SB)	367	543	428	608	458	687
Two-Way	890	1,068	1,037	1,212	1,091	1,376
S. Kihei Rd. S. of Kaonoulu (NB)	554	626	678	748	708	827
S. Kihei Rd. S. of Kaonoulu (SB)	427	546	512	642	536	727
Two-Way	981	1,172	1,190	1,390	1,244	1,554
E. Kaonoulu St. E. of Piilani (EB)	N/A	N/A	N/A	N/A	356	1,191
E. Kaonoulu St. E. of Piilani (WB)	N/A	N/A	N/A	N/A	290	1,268
Two-Way	N/A	N/A	N/A	N/A	646	2,459
Kulanihakoi Rd. W. of Piilani (EB)	173	131	178	132	191	166
Kulanihakoi Rd. W. of Piilani (WB)	67	161	71	161	81	199
Two-Way	240	292	249	293	272	365
Kulanihakoi Rd. E. of Piilani (EB)	N/A	N/A	228	49	228	49
Kulanihakoi Rd. E. of Piilani (WB)	N/A	N/A	108	55	108	55
Two-Way	N/A	N/A	336	104	336	104
Piikea Ave. W. of Piilani (EB)	439	509	472	542	505	629
Piikea Ave. W. of Piilani (WB)	459	611	527	675	554	769
Two-Way	898	1,120	999	1,217	1,059	1,398

APPENDIX C2

SUMMARY OF BASE YEAR AND YEAR 2018 SATURDAY TRAFFIC VOLUMES

ROADWAY LANES	CY 2013 VPH	CY 2018 (NO BUILD) VPH	CY 2018 (BUILD) VPH
Mokulele Hwy., N. of N. Kihei Rd. (NB)	1,026	1,269	1,377
Mokulele Hwy., N. of N. Kihei Rd. (SB)	1,134	1,439	1,558
Two-Way	2,160	2,708	2,935
Piilani Hwy., Between Uwapo & N. Kihei (NB)	1,107	1,424	1,640
Piilani Hwy., Between Uwapo & N. Kihei (SB)	1,296	1,679	1,916
Two-Way	2,403	3,103	3,556
Piilani Hwy., Between Uwapo & Ohukai (NB)	1,076	1,406	1,729
Piilani Hwy., Between Uwapo & Ohukai (SB)	1,191	1,558	1,914
Two-Way	2,267	2,964	3,643
Piilani Hwy., Between Ohukai & Kaonoulu (NB)	1,009	1,303	1,734
Piilani Hwy., Between Ohukai & Kaonoulu (SB)	1,142	1,457	1,932
Two-Way	2,151	2,760	3,666
Piilani Hwy., Between Kaonoulu & Kulanihakoi (NB)	1,070	1,369	1,833
Piilani Hwy., Between Kaonoulu & Kulanihakoi (SB)	1,142	1,432	1,853
Two-Way	2,212	2,801	3,685
Piilani Hwy., South of Kulanihakoi (NB)	1,109	1,408	1,824
Piilani Hwy., South of Kulanihakoi (SB)	1,104	1,394	1,772
Two-Way	2,213	2,802	3,596
N. Kihei Rd., West of South Kihei (EB)	548	768	946
N. Kihei Rd., West of South Kihei (WB)	516	665	827
Two-Way	1,064	1,433	1,773
N. Kihei Rd., BetweenPiilani & S. Kihei (EB)	449	532	651
N. Kihei Rd., BetweenPiilani & S. Kihei (WB)	411	485	593
Two-Way	859	1,016	1,243
S. Kihei Rd., South of N. Kihei Rd. (NB)	380	460	514
S. Kihei Rd., South of N. Kihei Rd. (SB)	407	549	608
Two-Way	787	1,009	1,122

APPENDIX C2 (CONTINUED)

SUMMARY OF BASE YEAR AND YEAR 2018
SATURDAY TRAFFIC VOLUMES

ROADWAY LANES	CY 2013 VPH	CY 2018 (NO BUILD) VPH	CY 2018 (BUILD) VPH
Uwapo Rd., W. of Piilani (EB)	126	169	228
Uwapo Rd., W. of Piilani (WB)	110	148	202
Two-Way	236	317	430
Ohukai Rd., W. of Piilani (EB)	327	363	422
Ohukai Rd., W. of Piilani (WB)	158	210	264
Two-Way	485	573	686
Ohukai Rd., E. of Piilani (EB)	242	242	296
Ohukai Rd., E. of Piilani (WB)	166	166	225
Two-Way	408	408	521
Kaonoulu St., Between Piilani & Kenolio (EB)	139	277	527
Kaonoulu St., Between Piilani & Kenolio (WB)	100	263	489
Two-Way	239	540	1,016
Kaonoulu St., Between Kenolio & Alulike (EB)	77	206	420
Kaonoulu St., Between Kenolio & Alulike (WB)	45	199	393
Two-Way	122	405	813
Kaonoulu St., Between Alulike & S. Kihei (EB)	114	244	458
Kaonoulu St., Between Alulike & S. Kihei (WB)	89	229	326
Two-Way	202	472	783
S. Kihei Rd. N. of Kaonoulu (NB)	503	589	686
S. Kihei Rd. N. of Kaonoulu (SB)	455	527	634
Two-Way	958	1,116	1,320
S. Kihei Rd. S. of Kaonoulu (NB)	575	711	818
S. Kihei Rd. S. of Kaonoulu (SB)	518	611	708
Two-Way	1,093	1,322	1,526
E. Kaonoulu St. E. of Piilani (EB)	N/A	N/A	1,645
E. Kaonoulu St. E. of Piilani (WB)	N/A	N/A	1,532
Two-Way	N/A	N/A	3,177
Kulanihakoi Rd. W. of Piilani (EB)	125	125	173
Kulanihakoi Rd. W. of Piilani (WB)	101	101	145
Two-Way	226	226	318
Kulanihakoi Rd. E. of Piilani (EB)	N/A	N/A	N/A
Kulanihakoi Rd. E. of Piilani (WB)	N/A	N/A	N/A
Two-Way	N/A	N/A	N/A

APPENDIX E-1

Acoustic Study Update dated March 2016

ACOUSTIC STUDY FOR THE PIILANI PROMENADE PROJECT KIHEI, MAUI

Prepared for:

SAROFIM REALTY ADVISORS

Prepared by:

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MARCH 2016

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CHAPTER I. SUMMARY

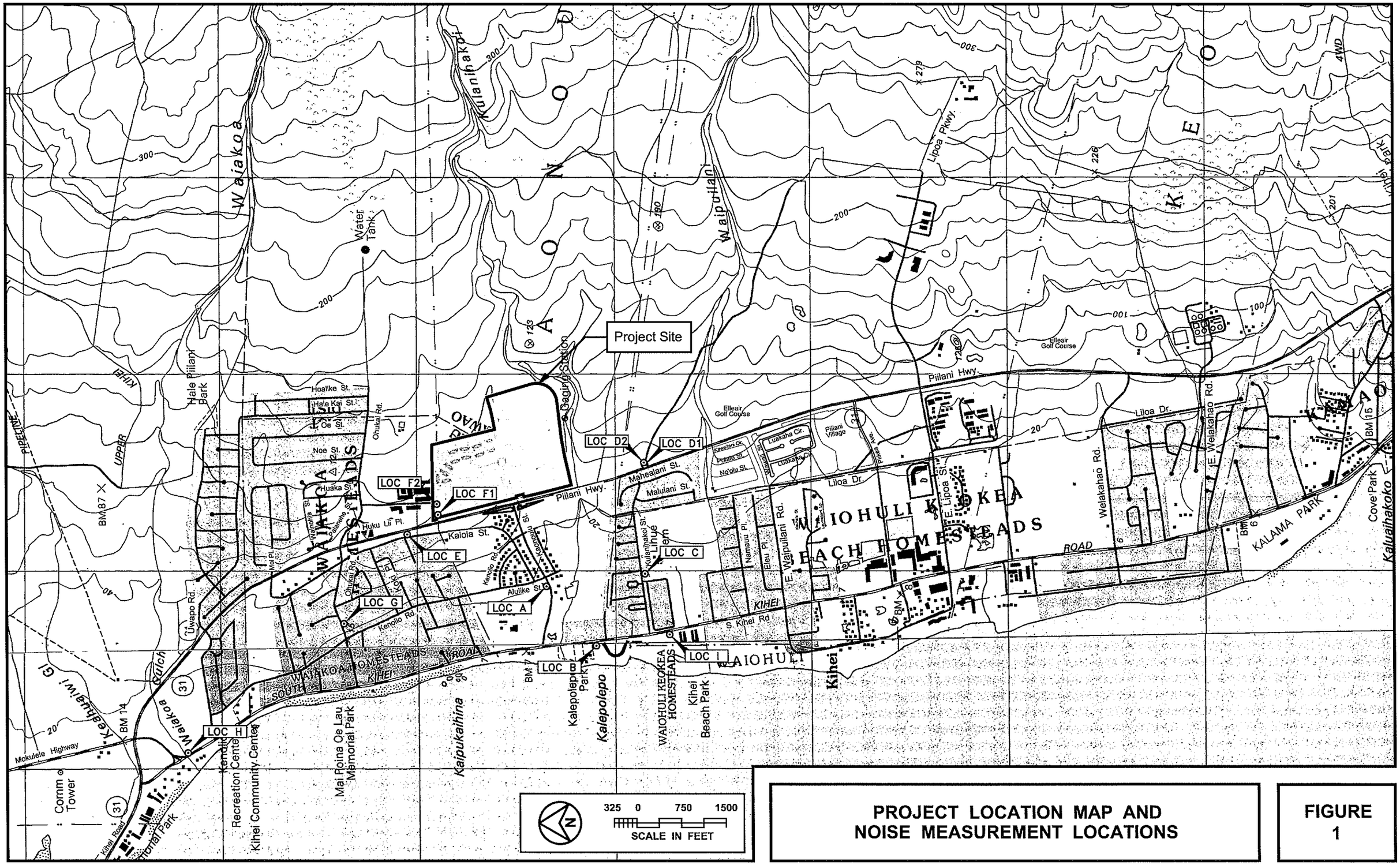
The existing and future traffic noise levels in the vicinity of the planned Piilani Promenade in Kihei, Maui were evaluated for their potential impacts and their relationship to current FHA/HUD noise standards for noise sensitive land uses. The traffic noise level increases along the roadways servicing the project site (see Figure 1) were calculated based upon the Traffic Impact Analysis Report (TIAR) by SSFM. Significant increases in traffic noise levels at noise sensitive properties are not expected to occur as a result of project traffic following project build-out by CY 2032.

The dominant traffic noise sources in the project environs will continue to be traffic along Piilani Highway and South Kihei Road. Future traffic noise levels along Piilani Highway by CY 2032 are expected to remain in the "Significant Exposure, Normally Unacceptable" category, and at or greater than 65 DNL at the first row of existing homes on the makai side of the highway. The future traffic noise levels in the project environs along South Kihei Road are expected to be in the "Significant Exposure, Normally Unacceptable" category, and at or greater than 65 DNL within 78 to 84 feet of the roadway's centerline. Along the lower volume connector streets between Piilani Highway and South Kihei Road, future traffic noise levels are expected to remain in the "Moderate Exposure, Acceptable" category, and less than 65 DNL at 53 feet or greater distance from the roadways' centerlines.

Along Piilani Highway fronting the project site, existing traffic noise levels of approximately 68 to 71 DNL (Day-Night Average Sound Level) are expected to increase to approximately 69 to 72 DNL at 100 foot distance from the centerline of the highway by CY 2032 as a result of project and non-project traffic. Increases of 0.0 to 1.4 DNL are associated with non-project traffic, and increases of 0.4 to 0.7 DNL are associated with project traffic.

The largest increases (2.9 to 3.6 DNL) in project related traffic noise are predicted to occur along Kaonoulu Street between Piilani Highway and South Kihei Road. Non-project traffic is expected to add 2.9 to 5.1 DNL of traffic noise to this section of Kaonoulu Street. Adverse traffic noise impacts along Kaonoulu Street east of Aulike Street are not expected to occur by CY 2032 since existing noise sensitive residences currently have adequate setbacks from the centerline of Kaonoulu Street and should remain in the "Moderate Exposure, Normally Acceptable" category. Along Kaonoulu Street west of Aulike Street, traffic noise levels are predicted to be 1 DNL unit above the FHA/HUD 65 DNL standard by CY 2032, with equal contributions from project and non-project traffic.

The project site is planned such that future noise sensitive residential uses of the project are situated at very large setback distances from Piilani Highway, where existing and future traffic noise levels from Piilani Highway are predicted to be less than 60 DNL. The large buffer distances to the highway will allow for the use of naturally ventilated buildings on the project site.



PROJECT LOCATION MAP AND NOISE MEASUREMENT LOCATIONS

FIGURE 1

However, the addition of the proposed extension of Kaonoulu Street mauka of Piilani Highway will increase the existing background ambient noise levels along the center portion of the project site. Through project build-out in CY 2032, noise levels at the project's planned residential buildings fronting Kaonoulu Street should not exceed the 65 DNL federal standard or the Hawaii State Department of Transportation (HDOT) 66 Leq noise abatement criteria as long as the residential buildings are located at least 51 feet from the centerline of Kaonoulu Street. Based on the best available taffic forecasts available for future conditions following completion of the Upcountry Highway, a setback distance of 70 feet from the centerline of Kaonoulu Street is required for 65 DNL and 66 Leq to not be exceeded at these residential buildings. Noise mitigation measures in the form of a sound attenuating wall or closure and air conditioning would be required if adequate setback distances are not available. The future traffic noise levels at all planned residential buildings will not exceed the HDOT's "15 dB increase" noise abatement criteria.

In order to minimize the potential for noise conflicts between the project's residential units and the project's light industrial, business, and commercial tenants, the inclusion of various provisions within the land conveyance documents are recommended. These include limits on noise emissions from the light industrial, business, and commercial tenants to levels allowed by the State Department of Health (DOH) for multifamily dwellings; and disclosure of potential noise from adjoining nonresidential uses to owners of the project's residential units. In addition, the use of project driveways at maximum setback from the project's residential units by nighttime and early morning delivery trucks, and the use of broadband backup alarms instead of beeper type backup alarms within the nonresidential lots were recommended.

Unavoidable, but temporary, noise impacts may occur during construction of the proposed project, particularly during the excavation and earth moving activities on the project site. Because construction activities are predicted to be audible within the project site and at nearby properties, the quality of the acoustic environment may be degraded to unacceptable levels during periods of construction. Mitigation measures to reduce construction noise to inaudible levels will not be practical in all cases, but the use of quiet equipment and compliance with State Department of Health construction noise regulations are recommended as standard mitigation measures.

CHAPTER II. PURPOSE

The primary objective of this study was to describe the existing and future traffic noise levels in the environs of the proposed Piilani Promenade in Kihei on the island of Maui (see Figure 1). Traffic forecasts for 2032 were used based upon the TIAR prepared by SSFM. Traffic noise level increases and impacts associated with the proposed development were to be determined within the project site as well as along the public roadways which are expected to service the project traffic. A specific objective was to determine future traffic noise level increases associated with both project and non-project traffic, and the potential noise impacts associated with these increases.

Impacts from on-site activities and short term construction noise at the project site were also included as noise study objectives. Recommendations for minimizing identified noise impacts were also to be provided as required.

CHAPTER III. NOISE DESCRIPTORS AND THEIR RELATIONSHIP TO LAND USE COMPATIBILITY

The noise descriptor currently used by federal agencies (such as FHA/HUD) to assess environmental noise is the Day-Night Average Sound Level (DNL). This descriptor incorporates a 24-hour average of instantaneous A-Weighted Sound Levels as read on a standard Sound Level Meter. By definition, the minimum averaging period for the DNL descriptor is 24 hours. Additionally, sound levels which occur during the nighttime hours of 10:00 PM to 7:00 AM are increased by 10 decibels (dB) prior to computing the 24-hour average by the DNL descriptor. A more complete list of noise descriptors is provided in APPENDIX B to this report.

Table 1, derived from Reference 1, presents current federal noise standards and acceptability criteria for residential land uses. Table 2, also extracted from Reference 1, presents the general effects of noise on people in residential use situations. Land use compatibility guidelines for various levels of environmental noise as measured by the DNL descriptor system are shown in Figure 2 (from Reference 2). As a general rule, noise levels of 55 DNL or less occur in rural areas, or in areas which are removed from high volume roadways. In urbanized areas which are shielded from high volume streets, DNL levels generally range from 55 to 65 DNL, and are usually controlled by motor vehicle traffic noise. Residences which front major roadways are generally exposed to levels of 65 DNL, and as high as 75 DNL when the roadway is a high speed freeway. In the project area, traffic noise levels associated with Piilani Highway and South Kihei Road are typically greater than 65 DNL along the Right-of-Way due to the relatively large volumes of traffic on these major thoroughfares.

For purposes of determining noise acceptability for funding assistance from federal agencies (FHA/HUD and VA), an exterior noise level of 65 DNL or less is considered acceptable for residences. This standard is applied nationally (Reference 3), including Hawaii. Because of our open-living conditions, the predominant use of naturally ventilated dwellings, and the relatively low exterior-to-interior sound attenuation afforded by these naturally ventilated structures, an exterior noise level of 65 DNL does not eliminate all risks of noise impacts. Because of these factors, and as recommended in Reference 4, a lower level of 55 DNL is considered as the "Unconditionally Acceptable" (or "Near-Zero Risk") level of exterior noise. However, after considering the cost and feasibility of applying the lower level of 55 DNL, government agencies such as FHA/HUD and VA have selected 65 DNL as a more appropriate regulatory standard.

For commercial, industrial, and other non-noise sensitive land uses, exterior noise levels as high as 75 DNL are generally considered acceptable. Exceptions to this occur when naturally ventilated office and other commercial establishments are exposed to exterior levels which exceed 65 DNL.

On the island of Maui, the State Department of Health (DOH) regulates noise from construction activities through the issuance of permits for allowing excessive

TABLE 1

EXTERIOR NOISE EXPOSURE CLASSIFICATION (RESIDENTIAL LAND USE)

NOISE EXPOSURE CLASS	DAY–NIGHT SOUND LEVEL	EQUIVALENT SOUND LEVEL	FEDERAL (1) STANDARD
Minimal Exposure	Not Exceeding 55 DNL	Not Exceeding 55 Leq	Unconditionally Acceptable
Moderate Exposure	Above 55 DNL But Not Above 65 DNL	Above 55 Leq But Not Above 65 Leq	Acceptable(2)
Significant Exposure	Above 65 DNL But Not Above 75 DNL	Above 65 Leq But Not Above 75 Leq	Normally Unacceptable
Severe Exposure	Above 75 DNL	Above 75 Leq	Unacceptable

Notes: (1) Federal Housing Administration, Veterans Administration, Department of Defense, and Department of Transportation.

(2) FHWA uses the Leq instead of the Ldn descriptor. For planning purposes, both are equivalent if: (a) heavy trucks do not exceed 10 percent of total traffic flow in vehicles per 24 hours, and (b) traffic between 10:00 PM and 7:00 AM does not exceed 15 percent of average daily traffic flow in vehicles per 24 hours. The noise mitigation threshold used by FHWA for residences is 67 Leq.

TABLE 2

EFFECTS OF NOISE ON PEOPLE
(Residential Land Uses Only)

EFFECTS[1] / DAY-NIGHT AVERAGE SOUND LEVEL IN DECIBELS	Hearing Loss	Speech Interference		Annoyance[2]	Average Community Reaction[4]	General Community Attitude Towards Area
		Indoor	Outdoor			
	Qualitative Description	%Sentence Intelligibility	Distance in Meters for 95% Sentence Intelligibility	% of Population Highly Annoyed[3]		
75 and above	May Begin to Occur	98%	0.5	37%	Very Severe	Noise is likely to be the most important of all adverse aspects of the community environment.
70	Will Not Likely Occur	99%	0.9	25%	Severe	Noise is one of the most important adverse aspects of the community environment.
65	Will Not Occur	100%	1.5	15%	Significant	Noise is one of the important adverse aspects of the community environment.
60	Will Not Occur	100%	2.0	9%	Moderate to Slight	Noise may be considered an adverse aspect of the community environment.
55 and below	Will Not Occur	100%	3.5	4%		Noise considered no more important than various other environmental factors.

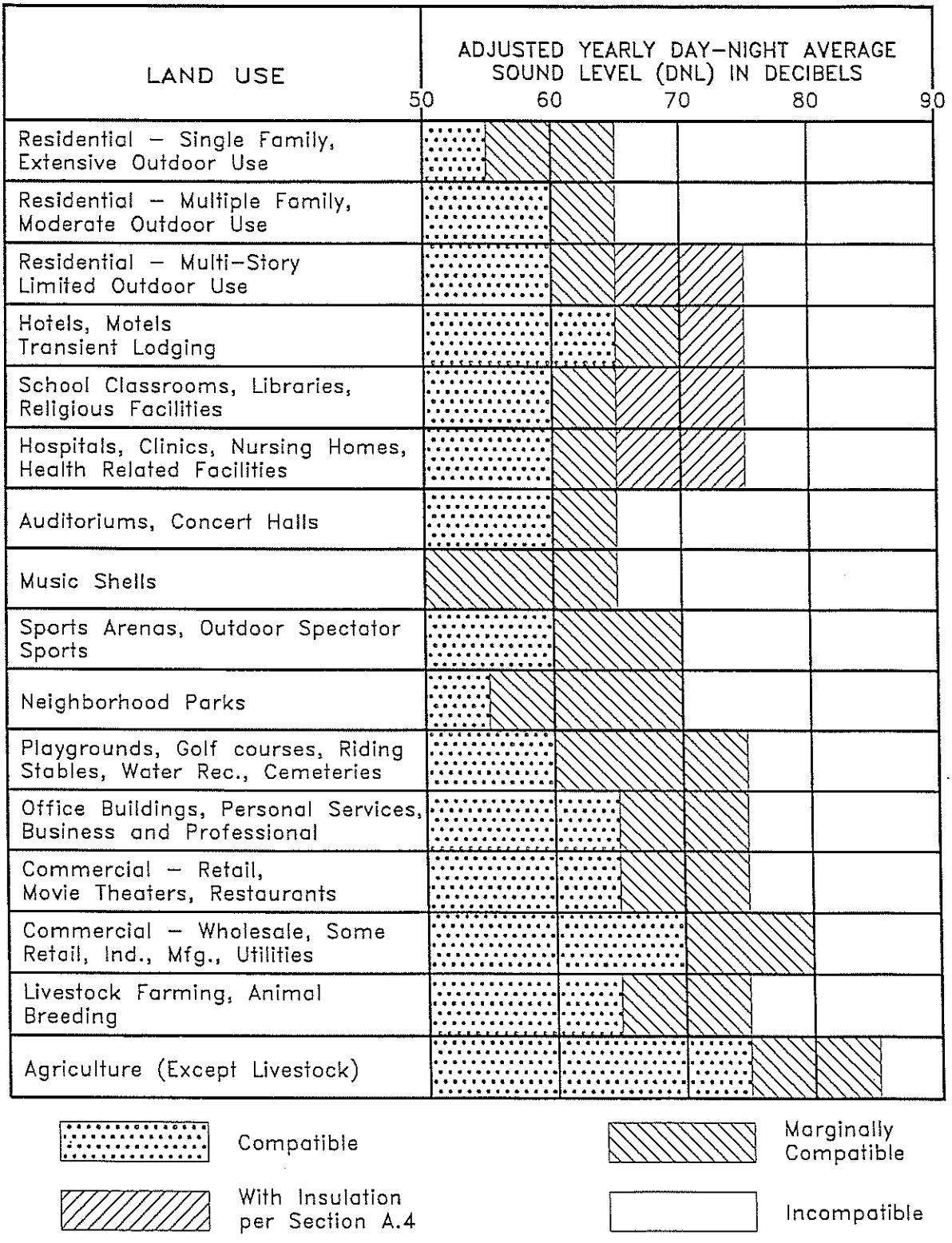
1. "Speech Interference" data are drawn from the following tables in EPA's "Levels Document": Table 3, Fig. D-1, Fig. D-2, Fig. D-3. All other data from National Academy of Science 1977 report "Guidelines for Preparing Environmental Impact Statements on Noise, Report of Working Group 69 on Evaluation of Environmental Impact of Noise."

2. Depends on attitudes and other factors.

3. The percentages of people reporting annoyance to lesser extents are higher in each case. An unknown small percentage of people will report being "highly annoyed" even in the quietest surroundings. One reason is the difficulty all people have in integrating annoyance over a very long time.

4. Attitudes or other non-acoustic factors can modify this. Noise at low levels can still be an important problem, particularly when it intrudes into a quiet environment.

NOTE: Research implicates noise as a factor producing stress-related health effects such as heart disease, high-blood pressure and stroke, ulcers and other digestive disorders. The relationships between noise and these effects, however, have not as yet been quantified.



LAND USE COMPATIBILITY WITH YEARLY AVERAGE DAY–NIGHT AVERAGE SOUND LEVEL (DNL) AT A SITE FOR BUILDINGS AS COMMONLY CONSTRUCTED.
(Source: American National Standards Institute S12.9–1998/Part 5)

FIGURE 2

noise during limited time periods. State DOH noise regulations are expressed in maximum allowable property line noise limits rather than DNL (see Reference 5). Although they are not directly comparable to noise criteria expressed in DNL, State DOH noise limits for residential, commercial, and industrial lands equate to approximately 55, 60, and 76 DNL, respectively.

CHAPTER IV. GENERAL STUDY METHODOLOGY

Existing traffic noise levels were measured at eight locations (A, B, C, D1, D2, E, G, and H) along public roadways in the project environs to provide a basis for developing the project's traffic noise contributions along the roadways which will service the proposed development. In addition, existing background noise levels were obtained at two locations (F1 and F2) within the proposed project site to validate the traffic noise model used for predicting future traffic noise levels from Piilani Highway within the project area. The locations of the measurement sites are shown in Figure 1. Noise measurements were performed during the month of November 2013. The results of the traffic noise measurements were compared with calculations of existing traffic noise levels to validate the computer model used. The traffic noise measurement results and their comparisons with computer model predictions of corresponding traffic noise levels are summarized in Table 3.

Traffic noise calculations for the existing conditions as well as noise predictions for the Year 2032 were performed using the Federal Highway Administration (FHWA) Traffic Noise Model (Reference 6). Traffic data entered into the noise prediction model were: roadway and receiver locations; hourly traffic volumes; average vehicle speeds; estimates of traffic mix; and "Loose Soil" propagation loss factor. The traffic data and forecasts for the project (Reference 7), plus the spot traffic counts obtained during the noise measurement periods were the primary sources of data inputs to the model. Appendices C1 and C2 summarize the weekday AM and PM peak hour traffic volumes and the Saturday peak hour traffic volumes for CY 2016 and 2032 which were used to model existing and future traffic noise along the streets in the vicinity of the project site. For existing and future traffic along the streets in the vicinity of the project site, it was assumed that the average noise levels, or Leq(h), during the weekday AM or PM peak traffic hour were equal to the 24-hour DNL along those roadways. This assumption was based on computations of both the hourly Leq and the 24-hour DNL of traffic noise on Piilani Highway (see Figure 3) and South Kihei Road (see Figure 4) using Hawaii State Department of Transportation hourly traffic counts from References 8 and 9.

Traffic noise calculations for both the existing and future conditions in the project environs were developed for ground level receptors with and without the benefit of shielding from natural terrain features or man made obstructions. Traffic noise levels were also calculated for future conditions with and without the proposed project. The forecasted changes in traffic noise levels over existing levels were calculated with and without the project, and noise impact risks evaluated. The relative contributions of non-project and project traffic to the total noise levels were also calculated, and an evaluation of possible traffic noise impacts was made.

Calculations of average exterior and interior noise levels from construction activities were performed for typical naturally ventilated and air conditioned dwellings. Predicted noise levels were compared with existing background ambient noise levels, and the potential for noise impacts was assessed.

TABLE 3

TRAFFIC AND BACKGROUND NOISE MEASUREMENT RESULTS

LOCATION	Time of Day (HRS)	Ave. Speed (MPH)	Hourly Traffic Volume AUTO	M.TRUCK	H.TRUCK	Measured Leq (dB)	Predicted Leq (dB)
A. 50 FT from the center-line of Kaonoulu St. (Saturday, 11/9/13)	0728 TO 0824	34	152	0	0	55.4	55.3
B. 50 FT from the center-line of S. Kihei Rd. (Saturday, 11/9/13)	0841 TO 0941	37	821	6	5	63.4	63.3
C. 50 FT from the center-line of Kulanihakoi St. (Saturday, 11/9/13)	1010 TO 1055	35	165	1	1	58.9	57.9
D1. 50 FT from the center-line of Piilani Highway (Saturday, 11/9/13)	1118 TO 1216	55	2,487	31	10	74.5	74.2
D2. 93 FT from the center-line of Piilani Highway (Saturday, 11/9/13)	1118 TO 1216	55	2,487	31	10	68.6	68.3

TABLE 3 (CONTINUED)

TRAFFIC AND BACKGROUND NOISE MEASUREMENT RESULTS

LOCATION	Time of Day (HRS)	Ave. Speed (MPH)	Hourly Traffic Volume			Measured Leq (dB)	Predicted Leq (dB)
			AUTO	M.TRUCK	H.TRUCK		
E. 63 FT from the center-line of Piilani Highway (Saturday, 11/9/13)	1237 TO 1337	46	2,375	26	10	69.9	70.0
F1. 112 FT from the center-line of Piilani Highway (Saturday, 11/9/13)	1403 TO 1500	N/A	N/A	N/A	N/A	64.3	N/A
F2. 289 FT from the center-line of Piilani Highway (Saturday, 11/9/13)	1416 TO 1431	N/A	N/A	N/A	N/A	54.0	N/A
G. 50 FT from the center-line of Ohukai St. (Saturday, 11/9/13)	1528 TO 1628	30	219	0	0	56.1	56.1
H. 50 FT from the center-line of S. Kihei Rd. (Saturday, 11/9/13)	1643 TO 1743	39	791	3	4	63.9	63.7

TABLE 3 (CONTINUED)

TRAFFIC AND BACKGROUND NOISE MEASUREMENT RESULTS

LOCATION	Time of Day (HRS)	Ave. Speed (MPH)	Hourly Traffic Volume AUTO	M.TRUCK	H.TRUCK	Measured Leq (dB)	Predicted Leq (dB)
H. 50 FT from the center-line of S. Kihei Rd. (Wednesday, 11/13/13)	0642 TO 0742	41	829	8	5	65.4	65.1
G. 50 FT from the center-line of Ohukai St. (Wednesday, 11/13/13)	0752 TO 0852	30	198	3	0	55.5	55.5
I. 50 FT from the center-line of S. Kihei Rd. (Wednesday, 11/13/13)	1002 TO 1102	39	930	16	8	64.9	65.0
C. 50 FT from the center-line of Kulanihakoi St. (Wednesday, 11/13/13)	1122 TO 1222	35	124	1	0	58.9	58.9
E. 63 FT from the center-line of Piilani Highway (Wednesday, 11/13/13)	1317 TO 1417	46	2,600	36	34	70.5	70.8

TABLE 3 (CONTINUED)

TRAFFIC AND BACKGROUND NOISE MEASUREMENT RESULTS

LOCATION	Time of Day (HRS)	Ave. Speed (MPH)	Hourly Traffic Volume AUTO	M.TRUCK	H.TRUCK	Measured Leq (dB)	Predicted Leq (dB)
A. 50 FT from the center-line of Kaonoulu St. (Wednesday, 11/13/13)	1442 TO 1542	34	189	2	0	57.2	57.2
D1. 50 FT from the center-line of Piilani Highway (Wednesday, 11/13/13)	1607 TO 1707	55	3,311	16	10	75.2	75.1
D2. 93 FT from the center-line of Piilani Highway (Wednesday, 11/13/13)	1607 TO 1707	55	3,311	16	10	69.9	69.3
D1. 50 FT from the center-line of Piilani Highway (Wednesday, 11/13/13)	1710 TO 1810	55	2,838	18	7	74.5	74.2
D2. 93 FT from the center-line of Piilani Highway (Wednesday, 11/13/13)	1710 TO 1810	55	2,838	18	7	69.1	68.5

FIGURE 3
HOURLY TRAFFIC NOISE LEVELS VS. TIME OF DAY
STA. B74003100000, PIILANI HIGHWAY BETWEEN KAONOULU ST. AND KULANIHAKOI RD., 9/28/11

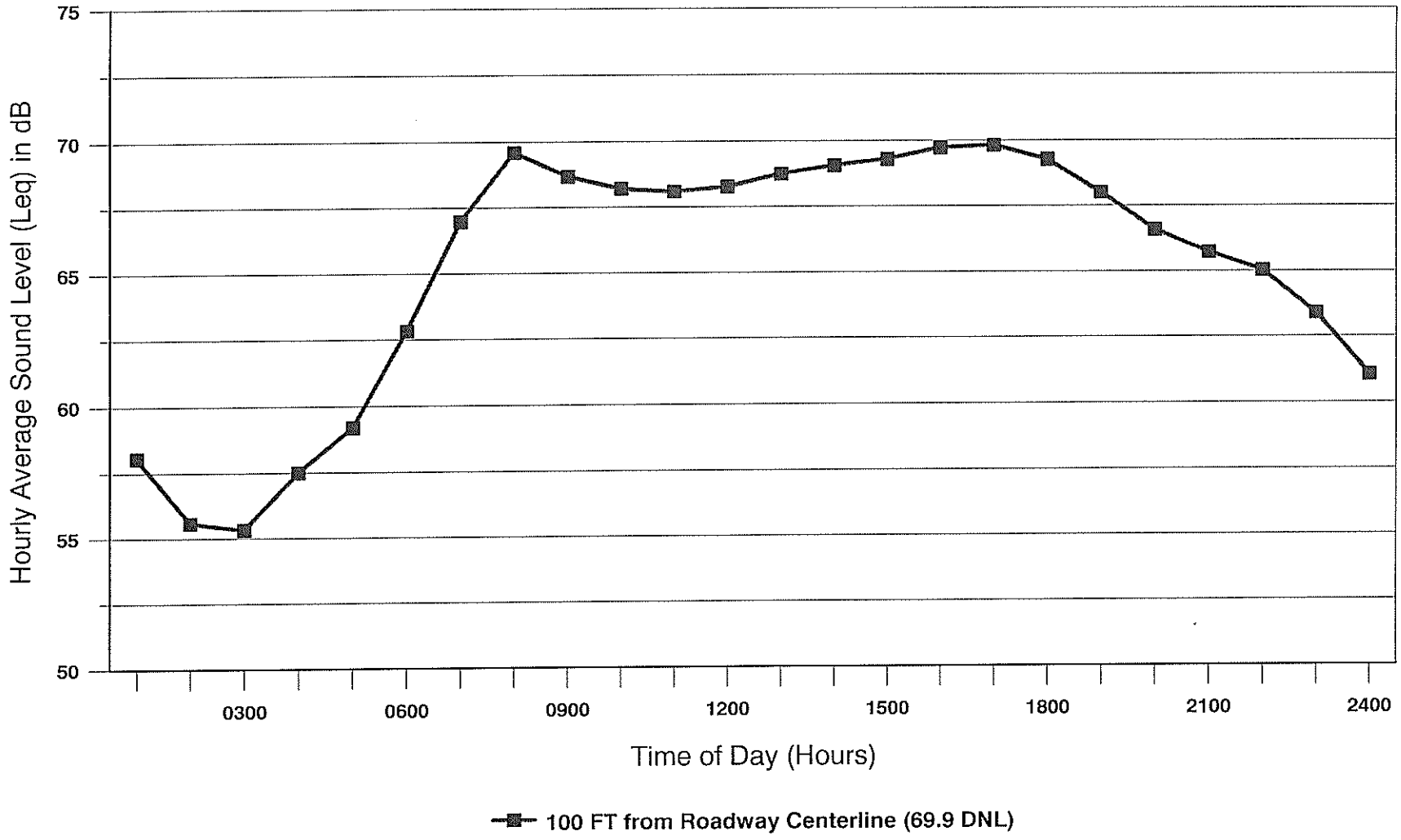
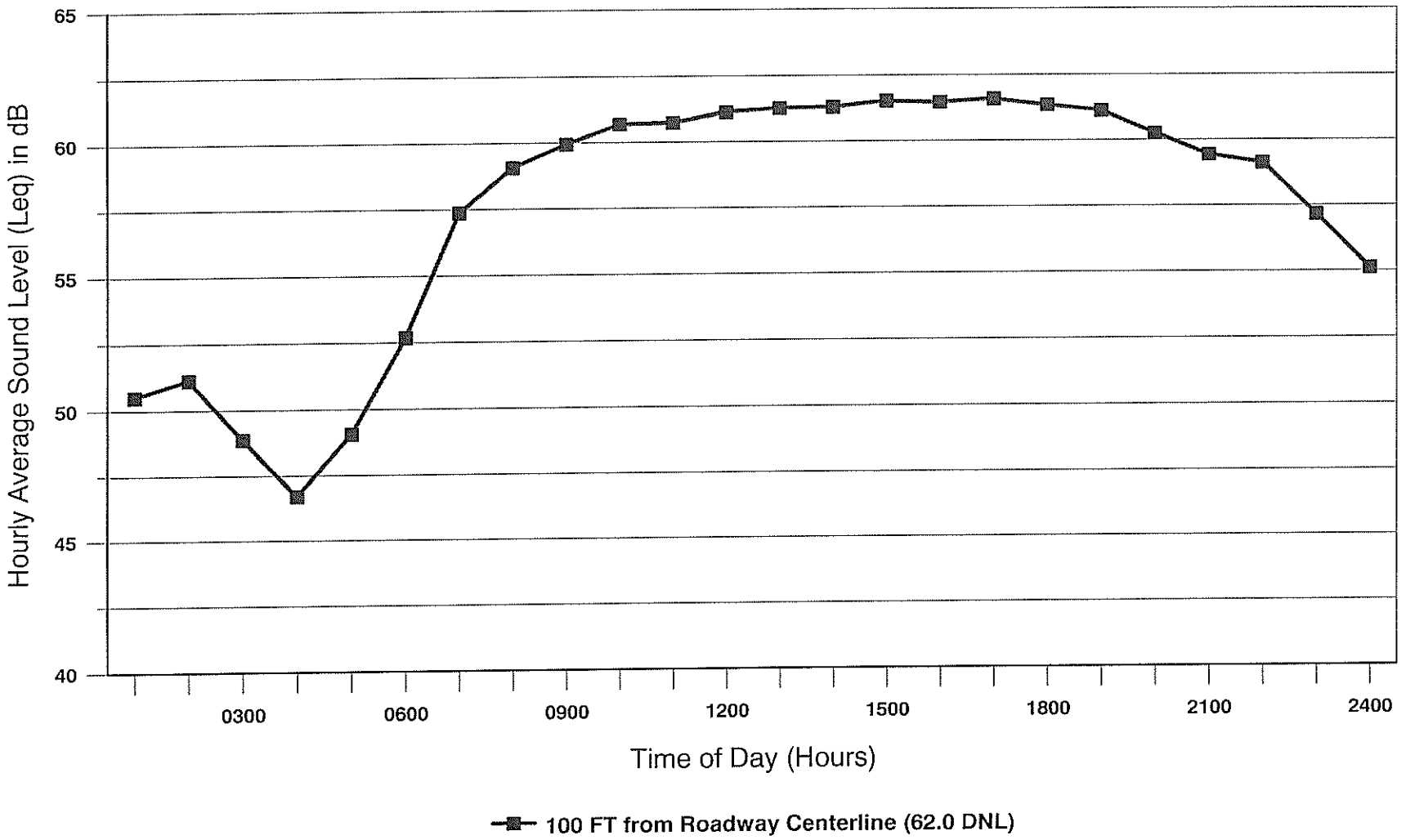


FIGURE 4
HOURLY TRAFFIC NOISE LEVELS VS. TIME OF DAY
STA. B74310000013, SOUTH KIHEI ROAD BETWEEN NOHOKAI ST. AND PIIKEA AVE., 8/19/10



V. EXISTING ACOUSTICAL ENVIRONMENT

The existing background ambient noise levels within the project site are relatively low at the mauka (east) end and high on the makai (west) end of the site. Traffic along Piilani Highway controls the background noise levels at the makai end of the project site, and diminishes to inaudible levels at the mauka end of the project site. On the makai side of Piilani Highway, existing traffic noise levels also diminish with increasing distances from Piilani Highway, and are controlled by the traffic on connector roads and South Kihei Road in areas between Piilani Highway and the shoreline.

Traffic and background ambient noise measurements along the public roadways in the project environs were obtained on a Saturday (September 9, 2013) and on a Wednesday (September 13, 2013 at eleven locations (A, B, C, D1, D2, E, F1, F2, G, H, and I) in the project environs. These locations are shown in Figure 1. The results of these traffic and background ambient noise measurements are summarized in Table 3, with measurement locations identified in Figure 1. The measurement locations were typically located at street level. As shown in Table 3, correlation between measured and predicted traffic noise levels was good. The Traffic Noise Model's "Loose Soil" propagation loss factor was used to obtain the good correlation.

Calculations of existing traffic noise levels along the public roadways in the project environs during the weekday PM peak traffic hour are presented in Table 4A. The hourly Leq (or Equivalent Sound Level) contribution from each roadway section in the project environs was calculated for comparison with forecasted traffic noise levels with and without the project. In Table 4A, the Leq values shown also represent the DNL values for the roadways shown. The existing setback distances from the roadways' centerlines to their associated 65 and 75 DNL contours were also calculated as shown in Table 5A for the weekdays. The contour line setback distances do not take into account noise shielding effects or the additive contributions of traffic noise from intersecting street sections. Tables 4B and 5B present similar calculations of existing traffic noise levels and setback distances to the 65 and 75 DNL contours for the Saturday peak hours.

The existing traffic noise levels in the project environs along Piilani Highway are in the "Significant Exposure, Normally Unacceptable" category, and at or greater than 65 DNL at the first row of existing homes on the makai side of the highway. The existing traffic noise levels in the project environs along South Kihei Road are in the "Significant Exposure, Normally Unacceptable" category, and at or greater than 65 DNL within 57 to 60 feet of the roadway's centerline. Along the lower volume connector streets, existing traffic noise levels are in the "Moderate Exposure, Acceptable" category, and less than 65 DNL at 50 feet or greater distance from the roadways' centerlines.

The existing background noise levels at the project site were estimated by measuring existing background noise levels at Locations F1 and F2, and by using these

TABLE 4A

EXISTING (CY 2016) TRAFFIC VOLUMES AND NOISE LEVELS ALONG ROADWAYS IN PROJECT AREA (PM PEAK HOUR, WEEKDAYS)

LOCATION	SPEED (MPH)	TOTAL VPH	****** VOLUMES (VPH) ******** AUTOS	M TRUCKS	H TRUCKS	50' Leq	100' Leq	200' Leq
Mokulele Hwy., N. of N. Kihei Rd.	55	3,051	2,996	31	24	75.8	69.1	62.5
Piilani Hwy., Between Uwapo & N. Kihei *	50	3,402	3,341	34	27	71.4	69.4	63.7
Piilani Hwy., Between Uwapo & Ohukai	46	3,443	3,381	34	28	73.1	68.3	62.7
Piilani Hwy., Between Ohukai & Kaonoulu	46	3,461	3,398	35	28	73.1	68.4	62.7
Piilani Hwy., Between Kaonoulu & Kulanihakoi	55	3,599	3,534	36	29	75.1	70.9	65.1
Piilani Hwy., Between Kulanihakoi & Piikea	55	3,625	3,560	36	29	75.7	70.9	65.1
Piilani Hwy., South of Piikea	55	3,520	3,457	35	28	75.6	70.8	65.0
N. Kihei Rd., West of South Kihei	50	1,576	1,551	16	9	70.4	64.4	58.0
N. Kihei Rd., Between Piilani & S. Kihei	46	1,236	1,217	12	7	68.2	62.2	56.0
S. Kihei Rd., South of N. Kihei Rd.	41	1,072	1,055	11	6	66.1	60.2	54.1
Uwapo Rd., W. of Piilani	30	218	215	3	0	55.7	49.9	44.0
Kaiwahine St. E. of Piilani	30	321	316	5	0	57.3	51.8	45.8
Ohukai Rd., W. of Piilani	30	392	386	6	0	58.3	52.5	46.6
Ohukai Rd., E. of Piilani	30	819	800	12	7	62.1	56.5	51.0
Kaonoulu St., Between Piilani & Kenolio	34	270	267	3	0	59.1	53.2	47.1
Kaonoulu St., Between Kenolio & Alulike	34	135	134	1	0	56.0	50.1	44.0
Kaonoulu St., Between Alulike & S. Kihei	34	230	228	2	0	58.3	52.4	46.4
S. Kihei Rd. N. of Kaonoulu	39	1,169	1,140	20	9	66.1	60.3	54.3
S. Kihei Rd. S. of Kaonoulu	39	1,293	1,261	22	10	66.5	60.7	54.7
E. Kaonoulu St. E. of Piilani	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Kulanihakoi St. W. of Piilani	35	253	251	2	0	62.1	56.2	50.1
Kulanihakoi St. E. of Piilani	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Piikea Ave. W. of Piilani	35	1,130	1,121	9	0	64.5	58.0	52.5

*Piilani Hwy., Between Uwapo & N. Kihei's Leq shown in "50' Leq" column was calculated at 75' instead of 50'.

TABLE 4B

EXISTING (CY 2016) TRAFFIC VOLUMES AND NOISE LEVELS ALONG ROADWAYS IN PROJECT AREA (PEAK HOUR, SATURDAY)

LOCATION	SPEED (MPH)	TOTAL VPH	****** VOLUMES (VPH) ******** AUTOS	M TRUCKS	H TRUCKS	50' Leq	100' Leq	200' Leq
Mokulele Hwy., N. of N. Kihei Rd.	55	2,421	2,382	29	10	74.7	68.0	61.3
Piilani Hwy., Between Uwapo & N. Kihei *	50	2,574	2,533	31	10	70.3	68.3	62.5
Piilani Hwy., Between Uwapo & Ohukai	46	2,636	2,593	32	11	71.8	67.0	61.4
Piilani Hwy., Between Ohukai & Kaonoulu	46	2,578	2,537	31	10	71.7	66.9	61.2
Piilani Hwy., Between Kaonoulu & Kulanihakoi	55	2,677	2,634	32	11	74.3	69.5	63.7
Piilani Hwy., Between Kulanihakoi & Piikea	55	2,684	2,641	32	11	74.3	69.5	63.7
Piilani Hwy., South of Piikea	55	2,531	2,491	30	10	74.1	69.2	63.4
N. Kihei Rd., West of South Kihei	50	1,262	1,248	13	1	69.3	63.2	56.7
N. Kihei Rd., Between Piilani & S. Kihei	46	990	979	10	1	67.1	61.0	54.7
S. Kihei Rd., South of N. Kihei Rd.	39	927	917	9	1	64.6	58.7	52.5
Uwapo Rd., W. of Piilani	30	213	210	3	0	56.5	50.7	44.8
Kaiwahine St. E. of Piilani	30	240	236	4	0	57.0	51.5	45.5
Ohukai Rd., W. of Piilani	30	319	314	5	0	58.3	52.5	46.6
Ohukai Rd., E. of Piilani	30	552	543	8	1	60.8	55.1	49.2
Kaonoulu St., Between Piilani & Kenolio	34	236	234	2	0	57.6	51.7	45.7
Kaonoulu St., Between Kenolio & Alulike	34	134	133	1	0	55.1	49.2	43.2
Kaonoulu St., Between Alulike & S. Kihei	34	205	203	2	0	57.0	51.2	45.1
S. Kihei Rd. N. of Kaonoulu	37	1,017	994	17	6	64.7	58.9	53.0
S. Kihei Rd. S. of Kaonoulu	37	1,138	1,112	19	7	65.2	59.4	53.5
E. Kaonoulu St. E. of Piilani	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Kulanihakoi St. W. of Piilani	35	205	203	2	0	58.7	52.8	46.7
Kulanihakoi St. E. of Piilani	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Piikea Ave. W. of Piilani	35	1,026	1,017	8	1	64.1	57.6	52.2

*Piilani Hwy., Between Uwapo & N. Kihei's Leq shown in "50' Leq" column was calculated at 75' instead of 50'.

TABLE 5A

EXISTING AND CY 2032 DISTANCES TO 65 AND 75 DNL CONTOURS (WEEKDAYS)

STREET SECTION	65 DNL SETBACK (FT) EXISTING	65 DNL SETBACK (FT) CY 2032	75 DNL SETBACK (FT) EXISTING	75 DNL SETBACK (FT) CY 2032
Mokulele Hwy., N. of N. Kihei Rd.	154	180	54	63
Piilani Hwy., Between Uwapo & N. Kihei	171	213	45	58
Piilani Hwy., Between Uwapo & Ohukai	150	159	38	40
Piilani Hwy., Between Ohukai & Kaonoulu	151	162	38	41
Piilani Hwy., Between Kaonoulu & Kulanihakoi	202	229	51	63
Piilani Hwy., Between Kulanihakoi & Piikea	202	226	55	62
Piilani Hwy., South of Piikea	200	215	55	59
N. Kihei Rd., West of South Kihei	93	115	29	36
N. Kihei Rd., Between Piilani & S. Kihei	72	89	23	27
S. Kihei Rd., South of N. Kihei Rd.	57	69	18	21
Uwapo Rd., W. of Piilani	16	22	< 12	< 12
Kaiwahine St. E. of Piilani	19	36	< 12	< 12
Ohukai Rd., W. of Piilani	22	22	< 12	< 12
Ohukai Rd., E. of Piilani	35	34	< 12	< 12
Kaonoulu St., Between Piilani & Kenolio	25	49	< 12	15
Kaonoulu St., Between Kenolio & Alulike	17	48	< 12	14
Kaonoulu St., Between Alulike & S. Kihei	23	47	< 12	14
S. Kihei Rd. N. of Kaonoulu	57	78	17	24
S. Kihei Rd. S. of Kaonoulu	60	84	18	25
E. Kaonoulu St. E. of Piilani	N/A	79	N/A	24
Kulanihakoi St. W. of Piilani	36	45	< 12	14
Kulanihakoi St. E. of Piilani	N/A	28	N/A	< 12
Piikea Ave. W. of Piilani	47	53	16	18

Notes:

(1) All setback distances are from the roadways' centerlines.
(2) See Tables 4A and 6A for traffic volume, speed, and mix assumptions.
(3) Setback distances are for ground level receptors.

TABLE 5B

EXISTING AND CY 2032 DISTANCES TO 65 AND 75 DNL CONTOURS (SATURDAY)

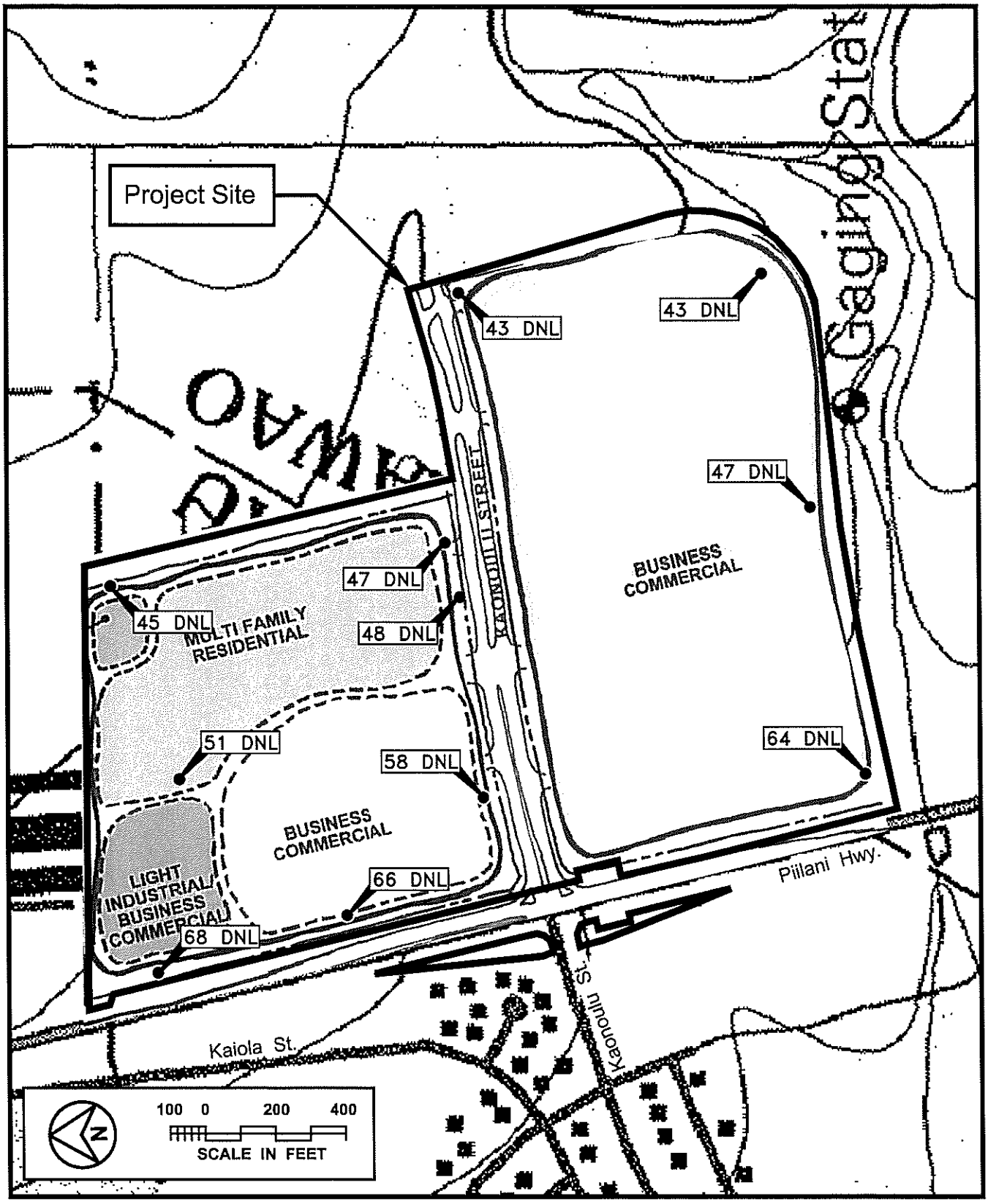
STREET SECTION	65 DNL SETBACK (FT) EXISTING	65 DNL SETBACK (FT) CY 2032	75 DNL SETBACK (FT) EXISTING	75 DNL SETBACK (FT) CY 2032
Mokulele Hwy., N. of N. Kihei Rd.	136	162	48	57
Piilani Hwy., Between Uwapo & N. Kihei	148	184	38	50
Piilani Hwy., Between Uwapo & Ohukai	128	138	31	34
Piilani Hwy., Between Ohukai & Kaonoulu	126	140	31	35
Piilani Hwy., Between Kaonoulu & Kulanihakoi	171	198	45	53
Piilani Hwy., Between Kulanihakoi & Piikea	171	193	45	52
Piilani Hwy., South of Piikea	165	182	44	49
N. Kihei Rd., West of South Kihei	82	103	26	33
N. Kihei Rd., Between Piilani & S. Kihei	63	79	20	25
S. Kihei Rd., South of N. Kihei Rd.	48	59	15	18
Uwapo Rd., W. of Piilani	18	21	< 12	< 12
Kaiwahine St. E. of Piilani	18	30	< 12	< 12
Ohukai Rd., W. of Piilani	22	24	< 12	< 12
Ohukai Rd., E. of Piilani	30	40	< 12	12
Kaonoulu St., Between Piilani & Kenolio	21	42	< 12	13
Kaonoulu St., Between Kenolio & Alulike	16	42	< 12	13
Kaonoulu St., Between Alulike & S. Kihei	19	40	< 12	12
S. Kihei Rd. N. of Kaonoulu	48	67	15	20
S. Kihei Rd. S. of Kaonoulu	51	72	16	22
E. Kaonoulu St. E. of Piilani	N/A	73	N/A	18
Kulanihakoi St. W. of Piilani	24	30	< 12	< 12
Kulanihakoi St. E. of Piilani	N/A	N/A	N/A	N/A
Piikea Ave. W. of Piilani	45	53	16	18

Notes:

(1) All setback distances are from the roadways' centerlines.
(2) See Tables 4B and 6B for traffic volume, speed, and mix assumptions.
(3) Setback distances are for ground level receptors.

measurements in conjunction with the FHWA Traffic Noise Model to calculate existing traffic noise level contributions from Piilani Highway at various locations within the Piilani Promenade Project site. The results of these existing traffic noise calculations are shown in Figure 5. From Figure 5, existing traffic noise levels on the project site are estimated to range from 64 to 68 DNL at the westernmost (makai) side of the project site to 43 to 47 DNL at the easternmost (mauka) corners of the project site. At the planned multifamily residential units, existing traffic noise levels are very low and less than 55 DNL at both ground floor and second floor dwelling units.

While existing traffic noise levels are very low (less than 55 DNL) at the planned residential portion of the project, noise emissions from the existing commercial buildings north of the planned residences were greater than 50 dBA (59 DNL) and could be a source of potential noise complaints from the project residents. Suggestions for reducing these noise emissions are provided in Chapter VII of this report.



PROJECT LOCATION MAP AND EXISTING TRAFFIC NOISE LEVELS

FIGURE 5

CHAPTER VI. FUTURE NOISE ENVIRONMENT

Predictions of future traffic noise levels were made using the traffic volume assignments of Reference 7 for CY 2032 with and without the proposed project. Future projections of project plus non-project traffic noise levels for CY 2032 on the new sections of Kaonoulu Street east (mauka) of Piilani Highway through the project site were estimated using the prior 2018 traffic forecasts from Reference 10, and scaling them up to 2032 using the East Kaonoulu Street forecasts at Piilani Highway from Reference 7. Appendices C1 and C2 summarize the traffic volumes for weekday AM and PM peak hours and for the Saturday peak hour for 2032 which were used to model future traffic noise along the streets in the vicinity of the project site. In general, the Saturday peak hour traffic volumes are lower than the weekday PM peak hour volumes, so the corresponding traffic noise levels are also lower during Saturdays.

Future traffic noise levels at distances of 50, 100, and 200 feet from the centerlines of the roadways which would service the project are shown in Tables 6A and 6B for the weekday PM peak and Saturday peak hours of traffic, under the Build Alternative. Predicted increases in the setback distances to the 65 and 75 DNL contours are shown in Tables 5A and 5B. The separate non-project and project traffic noise contributions for the Build Alternative for 2032 are shown in Tables 7A and 7B.

From Table 7A, increases in future traffic noise levels of 0.4 to 0.7 DNL are expected along Piilani Highway in the project environs by 2032 as a result of project traffic. The growth in non-project traffic by CY 2032 is predicted to result in traffic noise level increases of 0.0 to 1.4 DNL along Piilani Highway. Larger increases in future traffic noise levels due to non-project traffic are predicted to occur along South Kihei Road by CY 2032, with project traffic adding 0.3 to 0.6 DNL to the non-project noise levels by CY 2032. The largest total increase (8.7 DNL) in traffic noise level is anticipated to occur along Kaonoulu Street between Kenolio and Alulike Streets, and is primarily associated with non-project traffic. The next largest total increase (6.2 DNL) in traffic noise is anticipated to occur along Kaonoulu Street between Alulike Street and South Kihei Road. Predicted increases in traffic noise by CY 2032 due to project traffic along Kaonoulu Street are 3.6 DNL or less. Along the other remaining roadways in the project environs, predicted increases in traffic noise by CY 2032 due to project traffic are 2.0 DNL or less.

Future traffic noise levels along Piilani Highway by CY 2032 are expected to remain in the "Significant Exposure, Normally Unacceptable" category, and at or greater than 65 DNL at the first row of existing homes on the makai side of the highway. The future traffic noise levels in the project environs along South Kihei Road are expected to be in the "Significant Exposure, Normally Unacceptable" category, and at or greater than 65 DNL within 78 to 84 feet of the roadway's centerline. Along the lower volume connector streets between Piilani Highway and South Kihei Road, future traffic noise levels are generally expected to remain in the "Moderate Exposure, Acceptable"

TABLE 6A

FUTURE (CY 2032) TRAFFIC VOLUMES AND NOISE LEVELS ALONG ROADWAYS IN PROJECT AREA (PM PEAK HOUR, WEEKDAYS, BUILD)

LOCATION	SPEED (MPH)	TOTAL VPH	****** VOLUMES (VPH) ******** AUTOS	M TRUCKS	H TRUCKS	50' Leq	100' Leq	200' Leq
Mokulele Hwy., N. of N. Kihei Rd.	55	4,320	4,242	43	35	77.3	70.6	64.0
Piilani Hwy., Between Uwapo & N. Kihei *	50	5,152	5,059	52	41	73.2	71.2	65.5
Piilani Hwy., Between Uwapo & Ohukai	41	5,253	5,158	53	42	73.5	68.7	63.2
Piilani Hwy., Between Ohukai & Kaonoulu	41	5,437	5,340	54	43	73.6	68.9	63.3
Piilani Hwy., Between Kaonoulu & Kulanihakoi	50	5,922	5,816	59	47	76.6	71.8	66.1
Piilani Hwy., Between Kulanihakoi & Piikea	50	5,794	5,690	58	46	76.5	71.7	66.0
Piilani Hwy., South of Piikea	50	5,355	5,258	54	43	76.1	71.3	65.6
N. Kihei Rd., West of South Kihei	50	2,392	2,354	24	14	72.2	66.2	59.8
N. Kihei Rd., Between Piilani & S. Kihei	46	1,839	1,810	18	11	69.9	64.0	57.8
S. Kihei Rd., South of N. Kihei Rd.	41	1,566	1,541	16	9	67.8	61.9	55.8
Uwapo Rd., W. of Piilani	30	373	367	6	0	58.1	52.3	46.4
Kaiwahine St. E. of Piilani	30	1,046	1,030	16	0	62.4	57.0	51.0
Ohukai Rd., W. of Piilani	28	457	450	7	0	58.2	52.4	46.6
Ohukai Rd., E. of Piilani	28	894	874	13	7	61.8	56.2	50.7
Kaonoulu St., Between Piilani & Kenolio	32	1,231	1,219	12	0	64.8	59.0	53.0
Kaonoulu St., Between Kenolio & Alulike	34	981	971	10	0	64.6	58.8	52.7
Kaonoulu St., Between Alulike & S. Kihei	34	944	935	9	0	64.4	58.6	52.5
S. Kihei Rd. N. of Kaonoulu	39	2,148	2,094	37	17	68.7	62.9	57.0
S. Kihei Rd. S. of Kaonoulu	39	2,439	2,378	41	20	69.3	63.5	57.5
E. Kaonoulu St. E. of Piilani	32	2,653	2,605	27	21	68.8	63.1	57.4
Kulanihakoi St. W. of Piilani	33	484	480	4	0	64.1	58.3	52.3
Kulanihakoi St. E. of Piilani	31	230	228	2	0	60.1	54.3	48.4
Piikea Ave. W. of Piilani	33	1,716	1,702	14	0	65.5	59.1	53.7

*Piilani Hwy., Between Uwapo & N. Kihei's Leq shown in "50' Leq" column was calculated at 75' instead of 50'.

TABLE 6B

FUTURE (CY 2032) TRAFFIC VOLUMES AND NOISE LEVELS ALONG ROADWAYS IN PROJECT AREA (PEAK HOUR, SATURDAY, BUILD)

LOCATION	SPEED (MPH)	TOTAL VPH	****** VOLUMES (VPH) ******** AUTOS	M TRUCKS	H TRUCKS	50' Leq	100' Leq	200' Leq
Mokulele Hwy., N. of N. Kihei Rd.	55	3,552	3,495	43	14	76.3	69.6	63.0
Piilani Hwy., Between Uwapo & N. Kihei *	50	4,108	4,043	49	16	72.1	70.0	64.3
Piilani Hwy., Between Uwapo & Ohukai	41	4,259	4,191	51	17	72.4	67.6	62.0
Piilani Hwy., Between Ohukai & Kaonoulu	41	4,310	4,241	52	17	72.5	67.7	62.1
Piilani Hwy., Between Kaonoulu & Kulanihakoi	50	4,679	4,604	56	19	75.4	70.6	64.9
Piilani Hwy., Between Kulanihakoi & Piikea	50	4,475	4,403	54	18	75.3	70.4	64.7
Piilani Hwy., South of Piikea	50	4,014	3,950	48	16	74.8	70.0	64.2
N. Kihei Rd., West of South Kihei	50	2,043	2,021	20	2	71.4	65.3	58.8
N. Kihei Rd., Between Piilani & S. Kihei	46	1,532	1,515	15	2	69.0	63.0	56.6
S. Kihei Rd., South of N. Kihei Rd.	39	1,410	1,395	14	1	66.4	60.5	54.3
Uwapo Rd., W. of Piilani	30	285	281	4	0	57.7	52.0	46.1
Kaiwahine St. E. of Piilani	30	527	518	8	1	60.9	55.5	49.6
Ohukai Rd., W. of Piilani	28	451	444	7	0	59.0	53.3	47.4
Ohukai Rd., E. of Piilani	28	1,134	1,116	17	1	63.1	57.4	51.6
Kaonoulu St., Between Piilani & Kenolio	32	1,096	1,084	11	1	63.6	57.8	51.9
Kaonoulu St., Between Kenolio & Alulike	34	895	885	9	1	63.5	57.7	51.7
Kaonoulu St., Between Alulike & S. Kihei	34	848	839	8	1	63.2	57.4	51.4
S. Kihei Rd. N. of Kaonoulu	37	1,913	1,869	33	11	67.5	61.7	55.7
S. Kihei Rd. S. of Kaonoulu	37	2,181	2,131	37	13	68.1	62.3	56.3
E. Kaonoulu St. E. of Piilani	32	2,815	2,784	28	3	67.7	62.7	56.8
Kulanihakoi St. W. of Piilani	33	389	386	3	0	60.7	54.9	48.8
Kulanihakoi St. E. of Piilani	31	0	0	0	0	N/A	N/A	N/A
Piikea Ave. W. of Piilani	33	1,680	1,665	13	2	65.6	59.1	53.7

*Piilani Hwy., Between Uwapo & N. Kihei's Leq shown in "50' Leq" column was calculated at 75' instead of 50'.

TABLE 7A

CALCULATIONS OF PROJECT AND NON-PROJECT TRAFFIC NOISE CONTRIBUTIONS (WEEKDAYS, CY 2032)

STREET SECTION	NOISE LEVEL INCREASE DUE TO: NON-PROJECT TRAFFIC	PROJECT TRAFFIC	
Mokulele Hwy., N. of N. Kihei Rd.	1.3	0.2	
Piilani Hwy., Between Uwapo & N. Kihei *	1.4	0.4	
Piilani Hwy., Between Uwapo & Ohukai	0.0	0.4	
Piilani Hwy., Between Ohukai & Kaonoulu	0.0	0.5	
Piilani Hwy., Between Kaonoulu & Kulanihakoi	0.2	0.7	
Piilani Hwy., Between Kulanihakoi & Piikea	0.3	0.5	
Piilani Hwy., South of Piikea	0.1	0.4	
N. Kihei Rd., West of South Kihei	1.2	0.6	
N. Kihei Rd., Between Piilani & S. Kihei	1.3	0.5	
S. Kihei Rd., South of N. Kihei Rd.	1.4	0.3	
Uwapo Rd., W. of Piilani	1.8	0.6	
Kaiwahine St. E. of Piilani	5.0	0.2	
Ohukai Rd., W. of Piilani	-0.1	0.0	
Ohukai Rd., E. of Piilani	0.3	-0.6	
Kaonoulu St., Between Piilani & Kenolio	2.9	2.9	
Kaonoulu St., Between Kenolio & Alulike	5.1	3.6	
Kaonoulu St., Between Alulike & S. Kihei	3.1	3.1	
S. Kihei Rd. N. of Kaonoulu	2.3	0.3	
S. Kihei Rd. S. of Kaonoulu	2.2	0.6	
E. Kaonoulu St. E. of Piilani	N/A	63.1	*
Kulanihakoi St. W. of Piilani	0.1	2.0	
Kulanihakoi St. E. of Piilani	53.6	0.7	*
Piikea Ave. W. of Piilani	0.6	0.5	

Notes:

1. "*" Large DNL values result from comparisons of future roadway DNL values with currently non-existing roadways.
2. "N/A" results from lack of applicable traffic data for that roadway.

TABLE 7B

CALCULATIONS OF PROJECT AND NON-PROJECT TRAFFIC NOISE CONTRIBUTIONS (SATURDAY, CY 2032)

STREET SECTION	NOISE LEVEL INCREASE DUE TO: NON-PROJECT TRAFFIC	PROJECT TRAFFIC	
Mokulele Hwy., N. of N. Kihei Rd.	1.2	0.4	
Piilani Hwy., Between Uwapo & N. Kihei *	1.3	0.4	
Piilani Hwy., Between Uwapo & Ohukai	0.2	0.4	
Piilani Hwy., Between Ohukai & Kaonoulu	0.3	0.5	
Piilani Hwy., Between Kaonoulu & Kulanihakoi	0.4	0.7	
Piilani Hwy., Between Kulanihakoi & Piikea	0.4	0.5	
Piilani Hwy., South of Piikea	0.3	0.5	
N. Kihei Rd., West of South Kihei	1.5	0.6	
N. Kihei Rd., Between Piilani & S. Kihei	1.4	0.6	
S. Kihei Rd., South of N. Kihei Rd.	1.5	0.3	
Uwapo Rd., W. of Piilani	0.7	0.6	
Kaiwahine St. E. of Piilani	3.0	1.0	
Ohukai Rd., W. of Piilani	0.5	0.3	
Ohukai Rd., E. of Piilani	2.5	-0.2	
Kaonoulu St., Between Piilani & Kenolio	3.4	2.7	
Kaonoulu St., Between Kenolio & Alulike	5.2	3.3	
Kaonoulu St., Between Alulike & S. Kihei	3.2	3.0	
S. Kihei Rd. N. of Kaonoulu	2.5	0.3	
S. Kihei Rd. S. of Kaonoulu	2.3	0.6	
E. Kaonoulu St. E. of Piilani	N/A	62.7	*
Kulanihakoi St. W. of Piilani	-0.1	2.2	
Kulanihakoi St. E. of Piilani	N/A	0.0	
Piikea Ave. W. of Piilani	1.1	0.4	

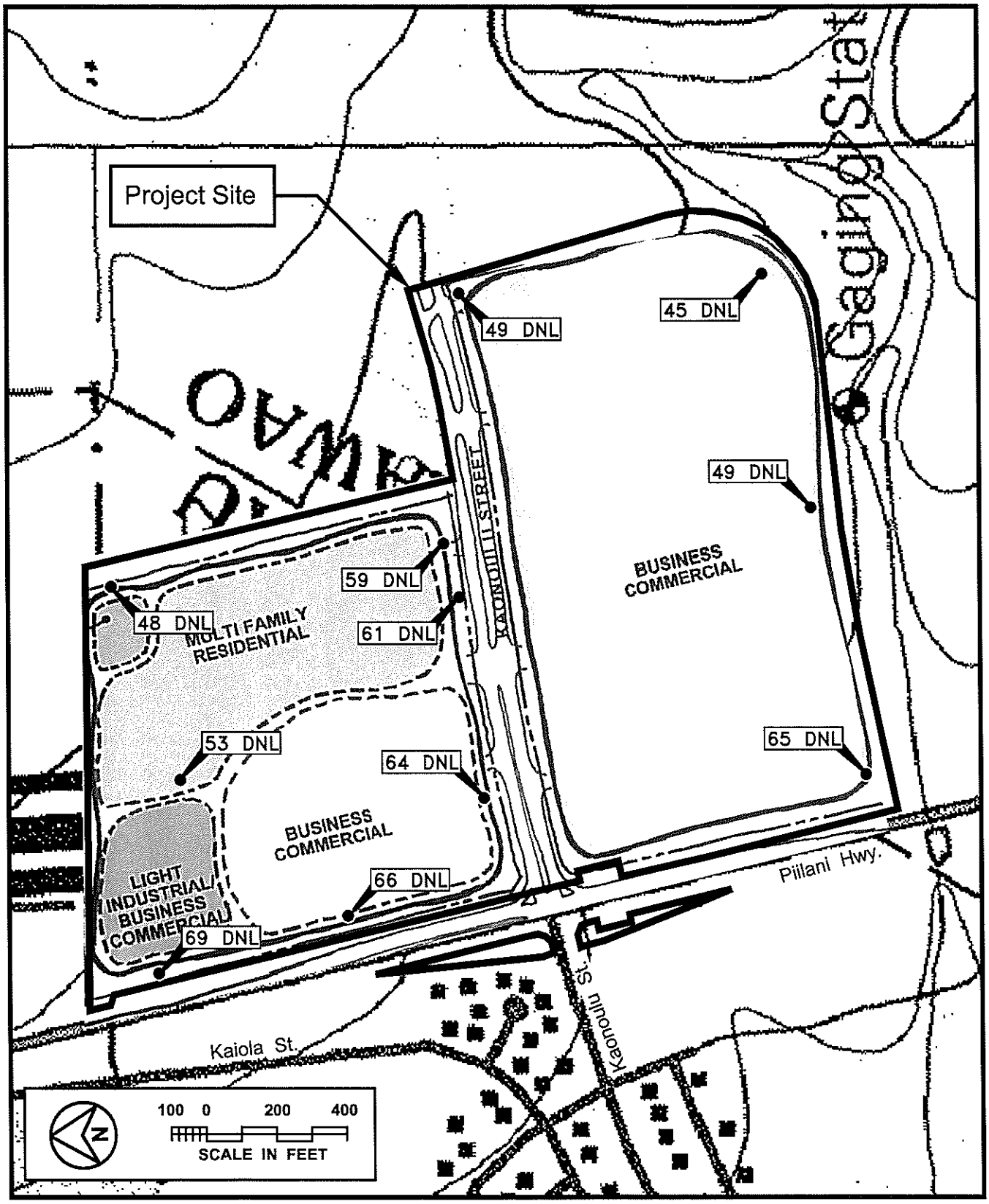
Notes:

1. "*" Large DNL value results from comparisons of future roadway DNL values with currently non-existing roadways.
2. "N/A" results from lack of applicable traffic data for that roadway.

category, and less than 65 DNL at 53 feet or greater distance from the roadways' centerlines.

The dominant traffic noise sources in the project environs will continue to be traffic along Piilani Highway and South Kihei Road. The new section of Kaonoulu Street east of Piilani Highway will also be a dominant traffic noise source on the mauka side of Piilani Highway. Figure 6 depicts the predicted traffic noise levels over the project site under the Build Alternative by CY 2032. The planned multifamily residences of the project fronting Kaonoulu Street should not experience future traffic noise levels greater than the 65 DNL FHA/HUD standard or the 66 Leq noise abatement criteria of the HDOT by 2032 as long as their setback distances from the centerline of Kaonoulu Street are at least 51 feet. While the predicted future traffic noise levels exceed 65 DNL at the project's lots which front Piilani Highway, these predicted levels are compatible with the planned business, commercial, or light industrial uses. The traffic noise levels shown in Figure 6 will probably increase from the values shown following completion of the Upcountry Highway, particularly at the locations near the new section of Kaonoulu Street.

Potential traffic noise levels over the project site following completion of the Upcountry Highway and with Kaonoulu Street accommodating the additional traffic from the Upcountry Highway were estimated using CY 2025 forecasts of traffic volumes along Kaonoulu Street east of Piilani Highway contained in Reference 10. The potential traffic noise contributions from Kaonoulu Street were increased in accordance with the traffic forecasts for Kaonoulu Street from Figure 22 of the earlier traffic study (Reference 10), and were approximately 13 percent larger than the CY 2032 traffic volume forecast of Reference 7. Traffic noise levels along Kaonoulu Street using these assumptions of the Upcountry Highway's contributions increased by 1.0 to 2.0 DNL above the CY 2032 traffic noise level predictions. The traffic noise levels at all units of the proposed multifamily residential parcel will not exceed the HDOT's "15 dB increase" noise abatement criteria as a result of the completion of the Upcountry Highway. For the southernmost buildings of the residential parcel, a minimum setback distance of 70 feet from the centerline of Kaonoulu Street is required so that traffic noise levels do not exceed 65 DNL or the 66 Leq HDOT noise abatement criteria.



PROJECT LOCATION MAP AND FUTURE (CY 2032) TRAFFIC NOISE LEVELS

FIGURE 6

CHAPTER VII. DISCUSSION OF PROJECT-RELATED NOISE IMPACTS AND POSSIBLE MITIGATION MEASURES

Traffic Noise. Existing traffic noise levels along Piilani Highway and South Kihei Road are very high, and are expected to remain so through CY 2032. Traffic noise impacts along those two roadways will continue to occur at noise sensitive receptors which are not provided with noise mitigation measures such as sound attenuating walls and/or closure and air conditioning.

Project related traffic along Piilani Highway and South Kihei Road are not expected to cause significant increases in future traffic noise levels. Increases in future traffic noise levels along Piilani Highway resulting from project traffic are expected to range from 0.4 to 0.7 DNL by CY 2032. The largest increases (2.9 to 3.6 DNL) in project related traffic noise are predicted to occur along Kaonoulu Street, with non-project traffic also contributing with equal or larger increases in future traffic noise levels. Adverse traffic noise impacts along Kaonoulu Street are possible towards the west end of Kaonoulu where relatively small setback distances could result in future traffic noise levels exceeding the 65 DNL FHA/HUD standard by 1 DNL unit in CY 2032. The remaining majority of noise sensitive residential buildings along Kaonoulu Street have adequate setback distances such that predicted CY 2032 traffic noise levels should remain in the "Moderate Exposure, Normally Acceptable" category at these buildings. For these reasons, traffic noise mitigation measures should not be required.

Potential Noise Impacts At Project's 226 Residential Units. Because the Piilani Promenade Project includes proposed residential units within the industrial zoned lands, noise impacts at the residential units from activities associated with the light industrial, business, and commercial uses are possible. In addition, traffic noise impacts from the future traffic on the new mauka section of Kaonoulu Street following completion of the Upcountry Highway are possible. Figure 6 indicted that the project's residential units should not experience traffic noise levels greater than 65 DNL by CY 2032. Future traffic noise levels following completion of the Upcountry Highway could exceed 65 DNL at the southern end of the residential parcel at setback distances less than 70 feet from the centerline of Kaonoulu Street. If this minimum setback distance cannot be achieved, the application of other traffic noise mitigation measures, such as the addition of sound attenuating walls or the use of closure and air conditioning should be considered.

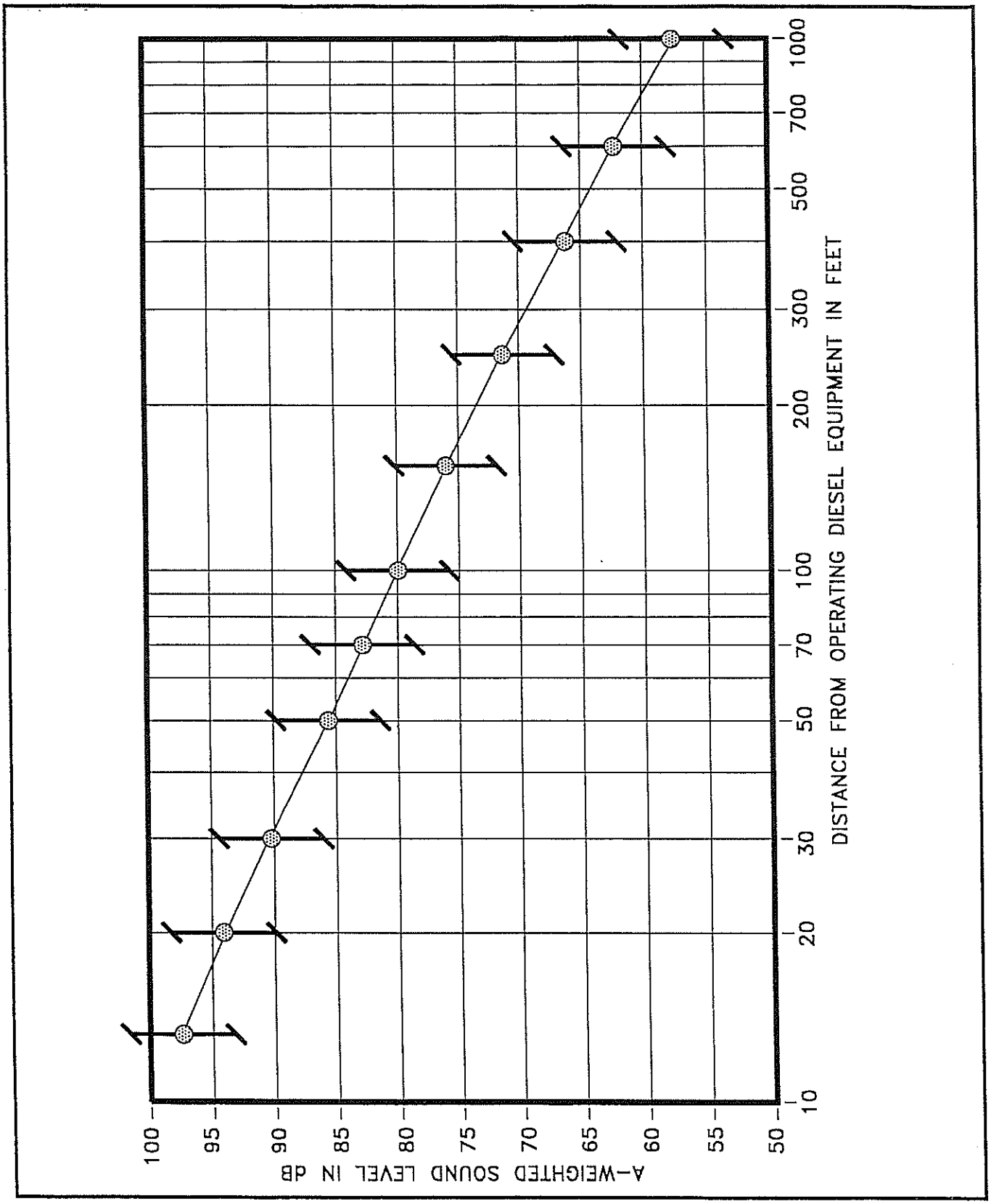
Because the project's residential parcel is adjacent to existing and future nonresidential uses, potential noise impacts and noise complaints may occur due to audible noise emanating from these nonresidential uses. For multifamily residences, the State DOH noise limits are 60 dBA during the daytime (7:00 am to 10:00 pm) and 50 dBA during the nighttime (10:00 pm to 7:00 am). However, because the allowable State DOH noise limits are determined by the lot zoning at the source of the noise, a higher noise limit of 70 dBA during the daytime and nighttime will apply at the proposed residences in accordance with State DOH rules. Both the project and existing parcel

north of the planned residential units are zoned Light Industrial, with applicable limits of 70 dBA during the daytime and nighttime periods. A steady noise level of 56 dBA during the daytime and nighttime would equate to the 65 DNL FHA/HUD standard for noise sensitive properties, so the potential exists for exceeding the 65 DNL standard by 14 dBA at the project's residential units. In situations like this, it would be prudent to include noise limits within the land conveyance documents to limit noise emissions from the tenants of the light industrial, business, and commercial lots to the State DOH limits for multifamily residential properties. These limits are 60 dBA and 50 dBA for the daytime and nighttime periods, respectively. These limits are also identical to the State DOH limits for business and commercial zoned lands.

It would also be prudent to include provisions for nighttime and early morning delivery trucks to ingress and egress the nonresidential lots via internal roadways which maximize the distances between the trucks and the project's residential buildings. These roadways could also include the circulation driveways within the parking areas. The use of beeper type backup alarms should be discouraged, and the use of broadband noise type backup alarms should be encouraged, primarily because the beeper type backup alarms are audible at longer distances than are the broadband noise backup alarms.

A noise conflict situation between light industrial zoned lands and residential uses on adjacent spaces may occur due to existing noise emissions from the existing light industrial subdivision to the north of the proposed residential buildings. Current noise emissions from the existing light industrial subdivision may be exceeding 50 dBA during the daytime and nighttime periods. These noise emission levels are probably in compliance with the State DOH noise limit of 70 dBA, but may be too high for future residences. In situations like these, it may be prudent to include disclosure of the potential 70 dBA noise levels within the rental documents of the proposed residential units. In addition, it may also be mutually beneficial to apply noise mitigation measures to the noise sources within the existing light industrial parcel(s) which exceed 50 dBA at the proposed residential dwellings.

General Construction Noise. Audible construction noise will probably be unavoidable during the entire project construction period. The total time period for construction is unknown, but it is anticipated that the actual work will be moving from one location on the project site to another during that period. Actual length of exposure to construction noise at any receptor location will probably be less than the total construction period for the entire project. Typical levels of exterior noise from construction activity (excluding pile driving activity) at various distances from the job site are shown in Figure 7. The impulsive noise levels of impact pile drivers are approximately 15 dB higher than the levels shown in Figure 7, while the intermittent noise levels of vibratory pile drivers are at the upper end of the noise level ranges depicted in the figure.



ANTICIPATED RANGE OF CONSTRUCTION NOISE LEVELS VS. DISTANCE

FIGURE 7

Figure 7 is useful for predicting exterior noise levels at short distances (within 100 FT) from the work when visual line of sight exists between the construction equipment and the receptor. Direct line-of-sight distances from the construction equipment operating on the mauka side of Piilani Highway to existing residential buildings will range from 150 FT to 1,850 FT, with corresponding average noise levels of 77 to 52 dBA (plus or minus 5 dBA). Typical levels of construction noise inside naturally ventilated and air conditioned structures are approximately 10 and 20 dB less, respectively, than the levels shown in Figure 7.

An existing residence located approximately 900 feet north of the project and south of Ohukai Road is the closest existing residence to the north of the project site. A large number of residences are located beyond 1,200 feet north of the project site across Ohukai Road. The highest noise levels at these residences from construction activities of 58 to 52 dBA are expected to occur during earthwork and site preparation activities near the north end of the Piilani Promenade development. The noise from construction activities on the project site will be audible at long distances from the Ohukai Road residences due to the relatively low (40 to 55 dBA) background noise levels at these residences.

The existing residences across Piilani Highway west of the project site would probably hear any construction activities involving earthwork or landscaping within the State Right-of-Way (ROW) on the makai side of Piillani Highway near the Kaonoulu Street intersection. The noise levels from these close-in construction activities may range from 80 to 95 dBA at existing residences along the makai ROW during work on the Kaonoulu Street intersection improvements. Existing residences along the makai ROW may also hear the construction activities within the main project site mauka of Piilani Highway. The highest noise levels during construction activities on the project site of 75 to 77 dBA are expected to occur at these residences during earthwork and site preparation activities near the mauka ROW of Piilani Highway. The noise from construction activities will decrease and be masked by traffic noise along Piilani Highway at these residences along Piilani Highway as project construction activities move toward the east end of the project site. Adverse impacts from construction noise are not expected to be in the "public health and welfare" category due to the temporary nature of the work, and due to the administrative controls available for regulation of construction noise. Instead, these impacts will probably be limited to the temporary degradation of the quality of the acoustic environment in the immediate vicinity of the project site.

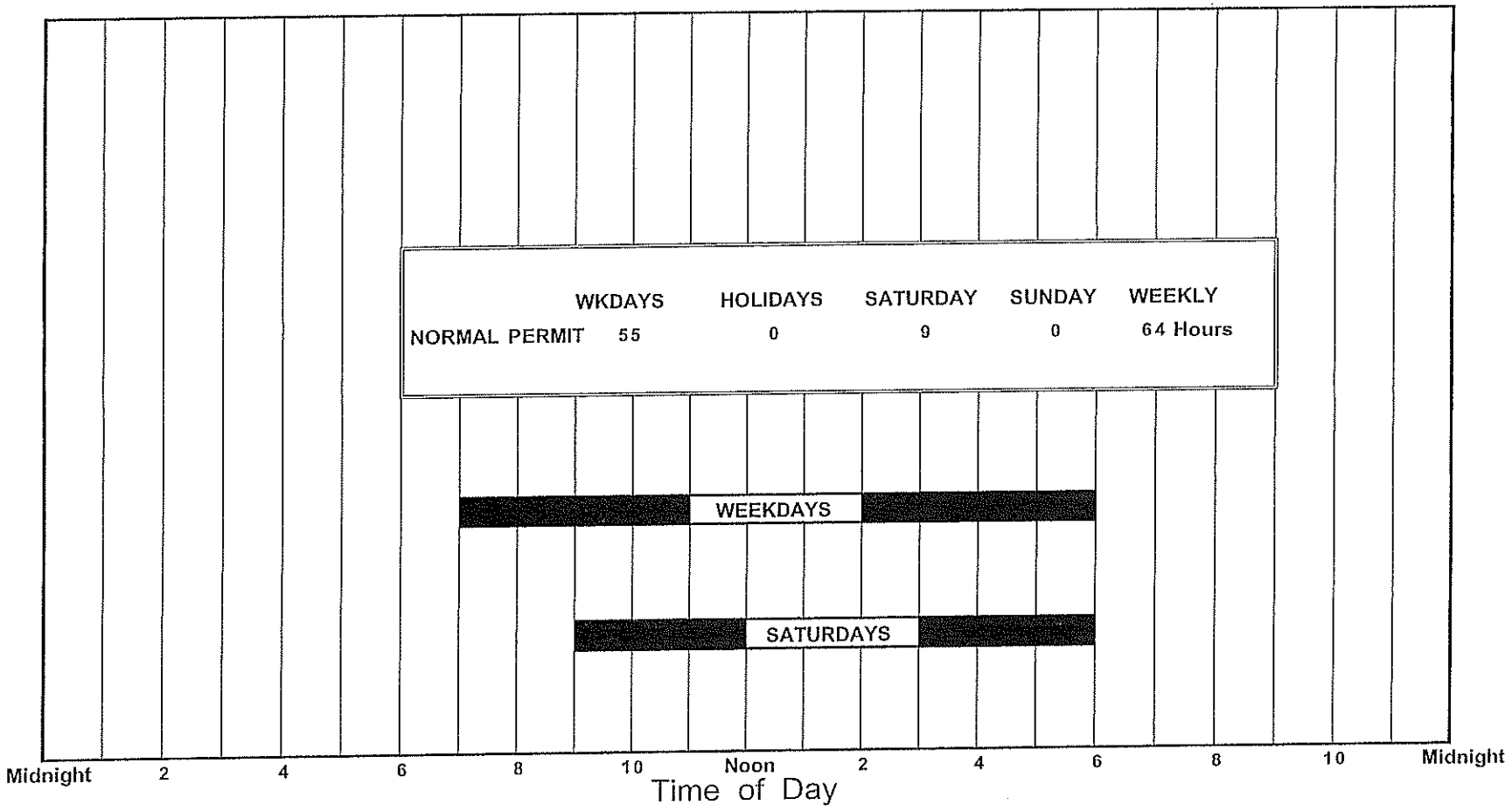
Mitigation of construction noise to inaudible levels will not be practical in all cases due to the intensity of construction noise sources (80 dBA at 100 FT distance), and due to the exterior nature of the work (rock breaking, grading and earth moving, trenching, concrete pouring, hammering, etc.). The use of properly muffled construction equipment should be required on the job site.

Peak airborne noise levels from pile diving may be as much as 15 dBA greater than noise levels shown in Figure 7 for non-impulsive (steady) construction noise

sources. Although the pile driving can produce more intense noise levels, each pulse is of short individual duration (less than one second). Therefore, its impact on speech communication is not as severe as that of a steady source of the same noise level.

Severe noise impacts are not expected to occur inside air conditioned structures which are beyond 200 FT from the project construction site. Inside naturally ventilated structures, interior noise levels (with windows or doors opened) are estimated to range between 65 to 53 dBA at 200 FT to 600 FT distances from the construction site. Closure of all doors and windows facing the construction site would generally reduce interior noise levels by an additional 5 to 10 dBA.

The incorporation of State Department of Health construction noise limits and curfew times, which are applicable throughout the State of Hawaii (Reference 5), is another noise mitigation measure which is normally applied to construction activities. Figure 8 depicts the normally permitted hours of construction. Noisy construction activities are not allowed on Sundays and holidays, during the early morning, and during the late evening and nighttime periods under the DOH permit procedures.



AVAILABLE WORK HOURS UNDER DOH PERMIT PROCEDURES FOR CONSTRUCTION NOISE

FIGURE 8

APPENDIX A. REFERENCES

(1) "Guidelines for Considering Noise in Land Use Planning and Control;" Federal Interagency Committee on Urban Noise; June 1980.

(2) American National Standard, "Sound Level Descriptors for Determination of Compatible Land Use," ANSI S12.9-1998/ Part 5; Acoustical Society of America.

(3) "Environmental Criteria and Standards, Noise Abatement and Control, 24 CFR, Part 51, Subpart B;" U.S. Department of Housing and Urban Development; July 12, 1979.

(4) "Information on Levels of Environmental Noise Requisite to Protect the Public Health and Welfare with an Adequate Margin of Safety;" U.S. Environmental Protection Agency; EPA 550/9-74-004; March 1974.

(5) "Title 11, Administrative Rules, Chapter 46, Community Noise Control;" Hawaii State Department of Health; September 23, 1996.

(6) "FHWA Highway Traffic Noise Model User's Guide;" FHWA-PD-96-009, Federal Highway Administration; Washington, D.C.; January 1998 and Version 2.5 Upgrade (April 14, 2004).

(7) "Piilani Promenade Draft Traffic Impact Analysis Report Update;" SSFM International; March 4, 2016.

(8) Hourly Traffic Counts At Station B74003100000, Piilani Highway Between Kaonoulu Street and Kulanihakoi Road; Hawaii State Department of Transportation; September 28, 2011.

(9) Hourly Traffic Counts At Station B74310000013, South Kihei Road Between Nohokai Street and Piikea Avenue; Hawaii State Department of Transportation; August 19, 2010.

(10) "Traffic Impact Analysis Report for Piilani Promenade;" Phillip Rowell and Associates; December 23, 2013.

APPENDIX B

EXCERPTS FROM EPA'S ACOUSTIC TERMINOLOGY GUIDE

Descriptor Symbol Usage

The recommended symbols for the commonly used acoustic descriptors based on A-weighting are contained in Table I. As most acoustic criteria and standards used by EPA are derived from the A-weighted sound level, almost all descriptor symbol usage guidance is contained in Table I.

Since acoustic nomenclature includes weighting networks other than "A" and measurements other than pressure, an expansion of Table I was developed (Table II). The group adopted the ANSI descriptor-symbol scheme which is structured into three stages. The first stage indicates that the descriptor is a level (i.e., based upon the logarithm of a ratio), the second stage indicates the type of quantity (power, pressure, or sound exposure), and the third stage indicates the weighting network (A, B, C, D, E.....). If no weighting network is specified, "A" weighting is understood. Exceptions are the A-weighted sound level and the A-weighted peak sound level which require that the "A" be specified. For convenience in those situations in which an A-weighted descriptor is being compared to that of another weighting, the alternative column in Table II permits the inclusion of the "A". For example, a report on blast noise might wish to contrast the LCdn with the LAdn.

Although not included in the tables, it is also recommended that "Lpn" and "LepN" be used as symbols for perceived noise levels and effective perceived noise levels, respectively.

It is recommended that in their initial use within a report, such terms be written in full, rather than abbreviated. An example of preferred usage is as follows:

The A-weighted sound level (LA) was measured before and after the installation of acoustical treatment. The measured LA values were 85 and 75 dB respectively.

Descriptor Nomenclature

With regard to energy averaging over time, the term "average" should be discouraged in favor of the term "equivalent". Hence, Leq, is designated the "equivalent sound level". For Ld, Ln, and Ldn, "equivalent" need not be stated since the concept of day, night, or day-night averaging is by definition understood. Therefore, the designations are "day sound level", "night sound level", and "day-night sound level", respectively.

The peak sound level is the logarithmic ratio of peak sound pressure to a reference pressure and not the maximum root mean square pressure. While the latter is the maximum sound pressure level, it is often incorrectly labelled peak. In that sound level meters have "peak" settings, this distinction is most important.

"Background ambient" should be used in lieu of "background", "ambient", "residual", or "indigenous" to describe the level characteristics of the general background noise due to the contribution of many unidentifiable noise sources near and far.

With regard to units, it is recommended that the unit decibel (abbreviated dB) be used without modification. Hence, DBA, PNdB, and EPNdB are not to be used. Examples of this preferred usage are: the Perceived Noise Level (Lpn was found to be 75 dB. Lpn = 75 dB). This decision was based upon the recommendation of the National Bureau of Standards, and the policies of ANSI and the Acoustical Society of America, all of which disallow any modification of bel except for prefixes indicating its multiples or submultiples (e.g., deci).

Noise Impact

In discussing noise impact, it is recommended that "Level Weighted Population" (LWP) replace "Equivalent Noise Impact" (ENI). The term "Relative Change of Impact" (RCI) shall be used for comparing the relative differences in LWP between two alternatives.

Further, when appropriate, "Noise Impact Index" (NII) and "Population Weighed Loss of Hearing" (PHL) shall be used consistent with CHABA Working Group 69 Report Guidelines for Preparing Environmental Impact Statements (1977).

APPENDIX B (CONTINUED)

TABLE I

A-WEIGHTED RECOMMENDED DESCRIPTOR LIST

	TERM	SYMBOL
1.	A-Weighted Sound Level	L_A
2.	A-Weighted Sound Power Level	L_{WA}
3.	Maximum A-Weighted Sound Level	L_{max}
4.	Peak A-Weighted Sound Level	L_{Apk}
5.	Level Exceeded x% of the Time	L_x
6.	Equivalent Sound Level	L_{eq}
7.	Equivalent Sound Level over Time (T) (1)	$L_{eq(T)}$
8.	Day Sound Level	L_d
9.	Night Sound Level	L_n
10.	Day-Night Sound Level	L_{dn}
11.	Yearly Day-Night Sound Level	$L_{dn(Y)}$
12.	Sound Exposure Level	L_{SE}

(1) Unless otherwise specified, time is in hours (e.g. the hourly equivalent level is $L_{eq(1)}$). Time may be specified in non-quantitative terms (e.g., could be specified a $L_{eq(WASH)}$ to mean the washing cycle noise for a washing machine).

SOURCE: EPA ACOUSTIC TERMINOLOGY GUIDE, BNA 8-14-78,

TABLE II

RECOMMENDED DESCRIPTOR LIST

TERM	A-WEIGHTING	ALTERNATIVE[1] A-WEIGHTING	OTHER[2] WEIGHTING	UNWEIGHTED
1. Sound (Pressure)[3] Level	L_A	L_{pA}	L_B, L_{pB}	L_p
2. Sound Power Level	L_{WA}		L_{WB}	L_W
3. Max. Sound Level	L_{max}	L_{Amax}	L_{Bmax}	L_{pmax}
4. Peak Sound (Pressure) Level	L_{Apk}		L_{Bpk}	L_{pk}
5. Level Exceeded x% of the Time	L_x	L_{Ax}	L_{Bx}	L_{px}
6. Equivalent Sound Level	L_{eq}	L_{Aeq}	L_{Beq}	L_{peq}
7. Equivalent Sound Level[4] Over Time(T)	$L_{eq(T)}$	$L_{Aeq(T)}$	$L_{Beq(T)}$	$L_{peq(T)}$
8. Day Sound Level	L_d	L_{Ad}	L_{Bd}	L_{pd}
9. Night Sound Level	L_n	L_{An}	L_{Bn}	L_{pn}
10. Day-Night Sound Level	L_{dn}	L_{Adn}	L_{Bdn}	L_{pdn}
11. Yearly Day-Night Sound Level	$L_{dn(Y)}$	$L_{Adn(Y)}$	$L_{Bdn(Y)}$	$L_{pdn(Y)}$
12. Sound Exposure Level	L_S	L_{SA}	L_{SB}	L_{Sp}
13. Energy Average Value Over (Non-Time Domain) Set of Observations	$L_{eq(e)}$	$L_{Aeq(e)}$	$L_{Beq(e)}$	$L_{peq(e)}$
14. Level Exceeded x% of the Total Set of (Non-Time Domain) Observations	$L_{x(e)}$	$L_{Ax(e)}$	$L_{Bx(e)}$	$L_{px(e)}$
15. Average L_x Value	L_x	L_{Ax}	L_{Bx}	L_{px}

(1) "Alternative" symbols may be used to assure clarity or consistency.

(2) Only B-weighting shown. Applies also to C,D,E,.....weighting.

(3) The term "pressure" is used only for the unweighted level.

(4) Unless otherwise specified, time is in hours (e.g., the hourly equivalent level is Leq(1). Time may be specified in non-quantitative terms (e.g., could be specified as Leq(WASH) to mean the washing cycle noise for a washing machine.

APPENDIX C1

SUMMARY OF BASE YEAR AND YEAR 2032
WEEKDAY TRAFFIC VOLUMES

ROADWAY LANES	**** CY 2016 *****		CY 2032 (NO BUILD)		CY 2032 (BUILD)	
	AM VPH	PM VPH	AM VPH	PM VPH	AM VPH	PM VPH
Mokulele Hwy., N. of N. Kihei Rd. (NB)	1,224	1,477	1,575	1,993	1,600	2,094
Mokulele Hwy., N. of N. Kihei Rd. (SB)	1,170	1,574	1,578	2,131	1,606	2,226
Two-Way	2,394	3,051	3,153	4,124	3,206	4,320
Piilani Hwy., Between Uwapo & N. Kihei (NB)	1,439	1,649	1,892	2,315	1,942	2,517
Piilani Hwy., Between Uwapo & N. Kihei (SB)	1,412	1,753	1,934	2,446	1,990	2,636
Two-Way	2,851	3,402	3,826	4,760	3,932	5,152
Piilani Hwy., Between Uwapo & Ohukai (NB)	1,322	1,728	1,653	2,424	1,715	2,670
Piilani Hwy., Between Uwapo & Ohukai (SB)	1,601	1,716	2,241	2,349	2,307	2,583
Two-Way	2,923	3,443	3,894	4,773	4,021	5,253
Piilani Hwy., Between Ohukai & Kaonoulu (NB)	1,226	1,720	1,590	2,492	1,645	2,751
Piilani Hwy., Between Ohukai & Kaonoulu (SB)	1,747	1,741	2,488	2,408	2,523	2,686
Two-Way	2,973	3,461	4,078	4,900	4,167	5,437
Piilani Hwy., Between Kaonoulu & Kulanihakoi (NB)	1,300	1,799	1,716	2,586	1,833	2,983
Piilani Hwy., Between Kaonoulu & Kulanihakoi (SB)	1,938	1,800	2,722	2,513	2,821	2,939
Two-Way	3,238	3,599	4,438	5,099	4,653	5,922
Piilani Hwy., Between Kulanihakoi & Piikea (NB)	1,276	1,837	1,924	2,640	2,015	2,949
Piilani Hwy., Between Kulanihakoi & Piikea (SB)	1,976	1,789	2,774	2,514	2,853	2,846
Two-Way	3,252	3,625	4,698	5,153	4,868	5,794
Piilani Hwy., South of Piikea (NB)	1,180	1,815	1,797	2,531	1,862	2,755
Piilani Hwy., South of Piikea (SB)	1,758	1,705	2,479	2,359	2,536	2,600
Two-Way	2,938	3,520	4,276	4,890	4,398	5,355
N. Kihei Rd., West of South Kihei (EB)	556	849	681	1,039	724	1,181
N. Kihei Rd., West of South Kihei (WB)	890	727	1,268	1,059	1,305	1,211
Two-Way	1,446	1,576	1,949	2,098	2,029	2,392
N. Kihei Rd., Between Piilani & S. Kihei (EB)	574	589	725	820	753	915
N. Kihei Rd., Between Piilani & S. Kihei (WB)	570	647	728	823	753	924
Two-Way	1,144	1,236	1,452	1,643	1,505	1,839
S. Kihei Rd., South of N. Kihei Rd. (NB)	594	454	981	780	993	831
S. Kihei Rd., South of N. Kihei Rd. (SB)	305	618	370	688	385	735
Two-Way	899	1,072	1,351	1,468	1,378	1,566
Uwapo Rd., W. of Piilani (EB)	193	103	228	163	234	185
Uwapo Rd., W. of Piilani (WB)	60	115	110	165	116	188
Two-Way	253	218	338	328	350	373

APPENDIX C1 (CONTINUED)

SUMMARY OF BASE YEAR AND YEAR 2032
WEEKDAY TRAFFIC VOLUMES

ROADWAY LANES	**** CY 2016 *****		CY 2032 (NO BUILD)		CY 2032 (BUILD)	
	AM VPH	PM VPH	AM VPH	PM VPH	AM VPH	PM VPH
Kaiwahine St., E. of Piilani (EB)	90	202	275	582	281	605
Kaiwahine St., E. of Piilani (WB)	251	119	626	419	632	441
Two-Way	341	321	901	1,001	913	1,046
Ohukai Rd., W. of Piilani (EB)	291	202	311	242	307	234
Ohukai Rd., W. of Piilani (WB)	90	190	120	215	106	223
Two-Way	381	392	431	457	413	457
Ohukai Rd., E. of Piilani (EB)	407	370	482	490	423	408
Ohukai Rd., E. of Piilani (WB)	490	449	600	519	506	486
Two-Way	897	819	1,082	1,009	929	894
Kaonoulu St., Between Piilani & Kenolio (EB)	228	120	361	318	450	614
Kaonoulu St., Between Piilani & Kenolio (WB)	57	150	235	310	328	618
Two-Way	285	270	595	627	777	1,231
Kaonoulu St., Between Kenolio & Alulike (EB)	56	78	176	248	255	517
Kaonoulu St., Between Kenolio & Alulike (WB)	26	57	164	187	250	464
Two-Way	82	135	339	435	504	981
Kaonoulu St., Between Alulike & S. Kihei (EB)	66	154	176	277	246	519
Kaonoulu St., Between Alulike & S. Kihei (WB)	81	76	186	181	265	425
Two-Way	147	230	362	457	511	944
S. Kihei Rd. N. of Kaonoulu (NB)	481	566	810	964	833	1,050
S. Kihei Rd. N. of Kaonoulu (SB)	347	603	606	1,013	626	1,098
Two-Way	828	1,169	1,416	1,977	1,459	2,148
S. Kihei Rd. S. of Kaonoulu (NB)	512	671	871	1,084	916	1,241
S. Kihei Rd. S. of Kaonoulu (SB)	397	622	671	1,042	722	1,198
Two-Way	909	1,293	1,542	2,126	1,638	2,439
E. Kaonoulu St. E. of Piilani (EB)	N/A	N/A	N/A	N/A	371	1,313
E. Kaonoulu St. E. of Piilani (WB)	N/A	N/A	N/A	N/A	369	1,340
Two-Way	N/A	N/A	N/A	N/A	740	2,653
Kulanihakoi St. W. of Piilani (EB)	190	134	240	159	266	244
Kulanihakoi St. W. of Piilani (WB)	96	119	121	149	143	240
Two-Way	286	253	361	308	409	484
Kulanihakoi St. E. of Piilani (EB)	N/A	N/A	480	105	480	105
Kulanihakoi St. E. of Piilani (WB)	N/A	N/A	230	125	230	125
Two-Way	N/A	N/A	710	230	710	230
Piikea Ave. W. of Piilani (EB)	430	564	500	784	526	869
Piikea Ave. W. of Piilani (WB)	530	566	625	756	647	847
Two-Way	960	1,130	1,125	1,540	1,173	1,716

APPENDIX C2

SUMMARY OF BASE YEAR AND YEAR 2032 SATURDAY PEAK HOUR TRAFFIC VOLUMES

ROADWAY LANES	CY 2016 VPH	CY 2032 (NO BUILD) VPH	CY 2032 (BUILD) VPH
Mokulele Hwy., N. of N. Kihei Rd. (NB)	1,246	1,747	1,822
Mokulele Hwy., N. of N. Kihei Rd. (SB)	1,175	1,644	1,730
Two-Way	2,421	3,391	3,552
Piilani Hwy., Between Uwapo & N. Kihei (NB)	1,331	1,984	2,111
Piilani Hwy., Between Uwapo & N. Kihei (SB)	1,243	1,825	1,997
Two-Way	2,574	3,809	4,108
Piilani Hwy., Between Uwapo & Ohukai (NB)	1,346	1,972	2,170
Piilani Hwy., Between Uwapo & Ohukai (SB)	1,290	1,879	2,089
Two-Way	2,636	3,850	4,259
Piilani Hwy., Between Ohukai & Kaonoulu (NB)	1,311	1,984	2,193
Piilani Hwy., Between Ohukai & Kaonoulu (SB)	1,268	1,880	2,118
Two-Way	2,578	3,864	4,310
Piilani Hwy., Between Kaonoulu & Kulanihakoi (NB)	1,375	2,046	2,407
Piilani Hwy., Between Kaonoulu & Kulanihakoi (SB)	1,302	1,945	2,272
Two-Way	2,677	3,991	4,679
Piilani Hwy., Between Kulanihakoi & Piikea (NB)	1,352	1,988	2,272
Piilani Hwy., Between Kulanihakoi & Piikea (SB)	1,332	1,939	2,203
Two-Way	2,684	3,927	4,475
Piilani Hwy., South of Piikea (NB)	1,262	1,808	2,015
Piilani Hwy., South of Piikea (SB)	1,269	1,807	1,999
Two-Way	2,531	3,615	4,014
N. Kihei Rd., West of South Kihei (EB)	650	825	960
N. Kihei Rd., West of South Kihei (WB)	612	957	1,083
Two-Way	1,262	1,782	2,043
N. Kihei Rd., BetweenPiilani & S. Kihei (EB)	486	696	782
N. Kihei Rd., BetweenPiilani & S. Kihei (WB)	504	670	750
Two-Way	990	1,366	1,532
S. Kihei Rd., South of N. Kihei Rd. (NB)	440	768	814
S. Kihei Rd., South of N. Kihei Rd. (SB)	487	547	596
Two-Way	927	1,315	1,410

APPENDIX C2 (CONTINUED)

SUMMARY OF BASE YEAR AND YEAR 2032
SATURDAY PEAK HOUR TRAFFIC VOLUMES

ROADWAY LANES	CY 2016 VPH	CY 2032 (NO BUILD) VPH	CY 2032 (BUILD) VPH
Kaiwahine St., E. of Piilani (EB)	115	245	263
Kaiwahine St., E. of Piilani (WB)	125	245	264
Two-Way	240	490	527
Ohukai Rd., W. of Piilani (EB)	173	218	237
Ohukai Rd., W. of Piilani (WB)	146	206	214
Two-Way	319	424	451
Ohukai Rd., E. of Piilani (EB)	266	601	564
Ohukai Rd., E. of Piilani (WB)	286	611	570
Two-Way	552	1,212	1,134
Kaonoulu St., Between Piilani & Kenolio (EB)	136	329	599
Kaonoulu St., Between Piilani & Kenolio (WB)	100	248	497
Two-Way	236	576	1,096
Kaonoulu St., Between Kenolio & Alulike (EB)	84	249	490
Kaonoulu St., Between Kenolio & Alulike (WB)	50	183	405
Two-Way	134	432	895
Kaonoulu St., Between Alulike & S. Kihei (EB)	120	240	460
Kaonoulu St., Between Alulike & S. Kihei (WB)	86	191	389
Two-Way	205	430	848
S. Kihei Rd. N. of Kaonoulu (NB)	505	877	945
S. Kihei Rd. N. of Kaonoulu (SB)	512	888	968
Two-Way	1,017	1,765	1,913
S. Kihei Rd. S. of Kaonoulu (NB)	589	971	1,116
S. Kihei Rd. S. of Kaonoulu (SB)	549	935	1,065
Two-Way	1,138	1,906	2,181
E. Kaonoulu St. E. of Piilani (EB)	N/A	N/A	1,461
E. Kaonoulu St. E. of Piilani (WB)	N/A	N/A	1,354
Two-Way	N/A	N/A	2,815
Kulanihakoi St. W. of Piilani (EB)	112	127	204
Kulanihakoi St. W. of Piilani (WB)	93	113	185
Two-Way	205	240	389
Kulanihakoi St. E. of Piilani (EB)	N/A	0	0
Kulanihakoi St. E. of Piilani (WB)	N/A	0	0
Two-Way	N/A	0	0
Piikea Ave. W. of Piilani (EB)	491	751	828
Piikea Ave. W. of Piilani (WB)	535	780	852
Two-Way	1,026	1,531	1,680

APPENDIX E-2

Acoustic Study Update
Dated January 23, 2017

Y. Ebisu & Associates
Acoustical and Electronic Engineers

1126 12th Ave., Room 305
Honolulu, Hawaii 96816
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YEA Job #51.032
January 23, 2017

Chris Hart & Partners, Inc.
115 N. Market Street
Wailuku, Maui, HI 96793

Attention: Mr. Brett A. Davis
Land Planner

Subject: Noise Study Report for the Piilani Promenade Project, Kihei, Maui

Dear Mr. Davis:

My noise study report for the subject project dated March 2016 utilized traffic volumes from the SSFM International draft traffic study (TIAR) dated 3/4/16. The final TIAR dated December 20, 2016 contains existing and future traffic volumes which are identical to the volumes in the draft TIAR. Therefore, all conclusions regarding noise impacts as contained in my March 2016 noise study report should be applicable to the proposed development of the Piilani Promenade plus the adjoining Honua`ula offsite workforce housing project.

My March 2016 noise study report did not mention the potential noise impacts of the Piilani Promenade Project on the adjoining Honua`ula offsite workforce housing project. Because the Honua`ula offsite workforce housing project is located mauka of the Piilani Promenade's 226 residential units, and adjoins these residential units on the north side of E. Kanouolu Street, any potential adverse noise impacts at the Honua`ula offsite workforce housing project can be compared to the potential noise impacts which were previously disclosed at the Piilani Promenade's 226 residential units as follows:

1. There should be less exposure to noise from the Piilani Promenade project's noise sources since only the south side of the Honua`ula offsite workforce housing project will face the Piilani Promenade's Business/ Commercial activities;

2. Piilani Promenade traffic on E. Kanouolu Street fronting the Honua`ula offsite workforce housing project should be less than Piilani Promenade traffic on E. Kanouolu Street fronting the Piilani Promenade's 226 residential units. Total predicted traffic noise in 2032 at the Honua`ula offsite workforce housing project should also be less than the 59 to 61 DNL predicted at the Piilani Promenade's 226 residential units (see noise study report Figure 6, page 30).

Let me know if you have any questions or require further clarifications regarding the information provided above.

Sincerely,

Yoichi Ebisu, P.E.

cc: Mr. Charles Jencks