BENJAMIN J. CAYETANO
GOVERNOR

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

BRIAN K. MINAAI
DIRECTOR

DEPUTY DIRECTORS
JADINE Y. URASAKI
Jean L. Oshita

April 25, 2002

RECEIVED
'02 APR 26 P1:47
OFC. OF ENVIRONMENTAL
QUALITY CONTROL

IN REPLY REFER TO:
HWY-M 2.113-02

TO: GENEVIEVE SALMONSON, DIRECTOR
OFFICE OF ENVIRONMENTAL QUALITY CONTROL

FROM: BRIAN K. MINAAI
DIRECTOR OF TRANSPORTATION

SUBJECT: FINAL ENVIRONMENTAL ASSESSMENT – INTERIM PIILANI HIGHWAY IMPROVEMENTS, MOKULELE HIGHWAY TO KILOHANA DRIVE, ISLAND OF MAUI

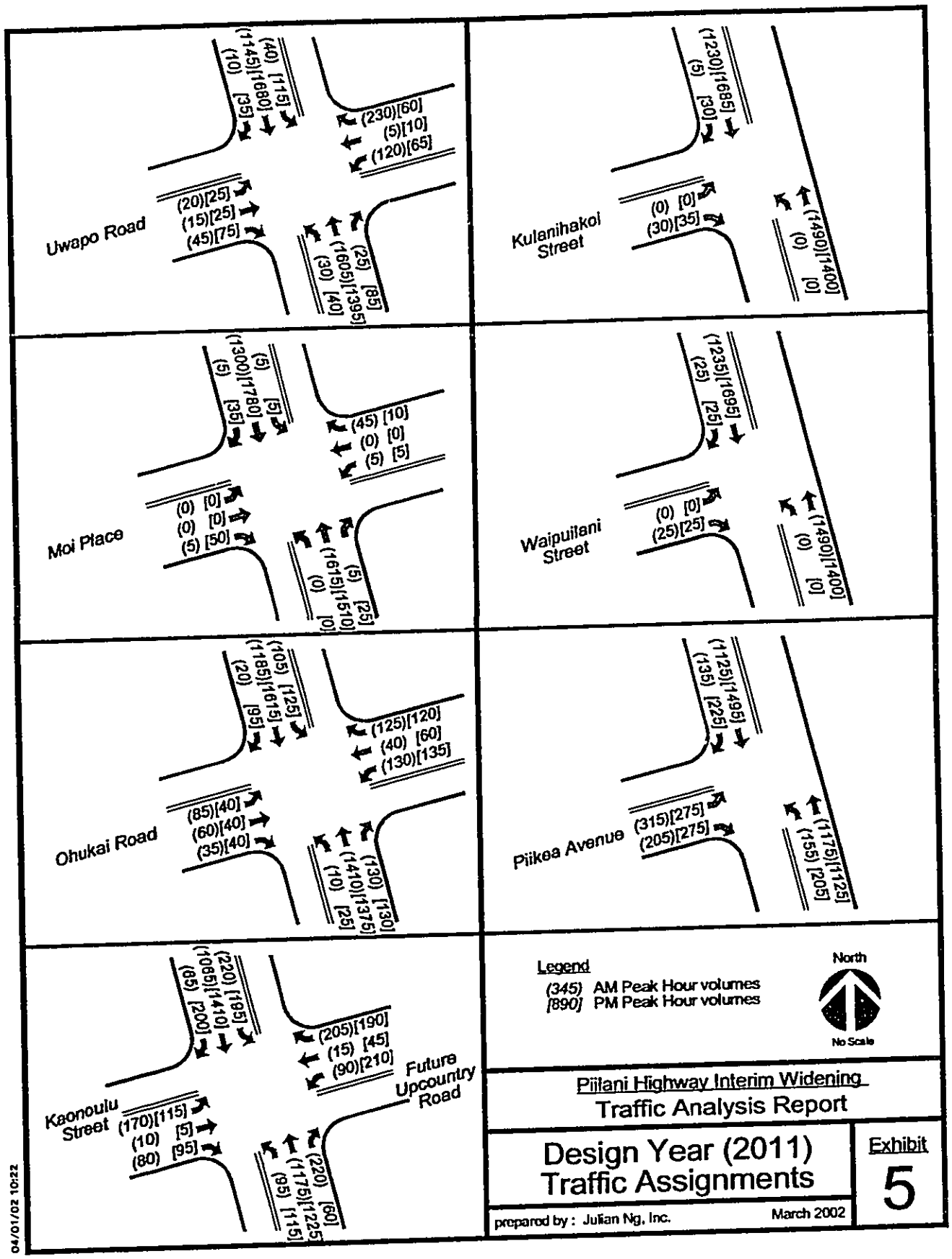
In accordance with the provisions of Chapter 343, Hawaii Revised Statutes, and Title 11, Chapter 200 of the Administrative Rules of the State Department of Health, a Final Environmental Assessment has been prepared for the proposed project.

The Department of Transportation has reviewed comments received during the public comment period and has determined that there will be no significant impacts as a result of the proposed project. Therefore, we are filing a Finding of No Significant Impact (FONSI).

We enclose one copy of the OEQC Publication form and four copies of the Final Environmental Assessment. A revised project summary will be e-mailed to your office for publication. We request that notice of the availability of the Final EA be published in the next edition of the *Environmental Notice.*

If you have any questions, please contact Mr. Ferdinand Cajigal, Maui District Engineer, at (808) 873-3535.

Enclosures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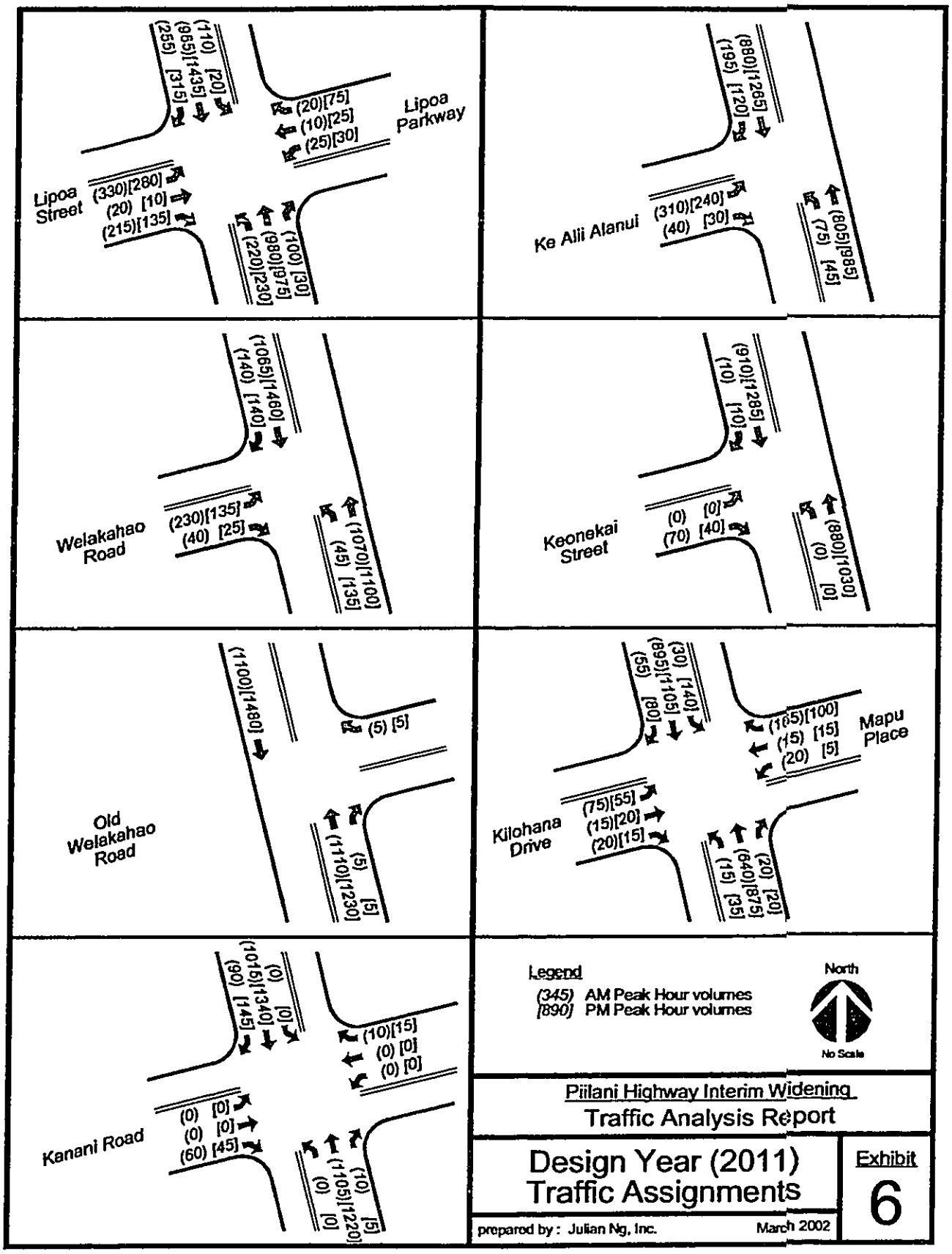
Legend
(345) AM Peak Hour volumes
[890] PM Peak Hour volumes
North
No Scale
Piilani Highway Interim Widening
Traffic Analysis Report
Design Year (2011) Traffic Assignments
Exhibit 5
prepared by : Julian Ng, Inc.
March 2002
04/01/02 10:22



Piilani Highway Interim Widening

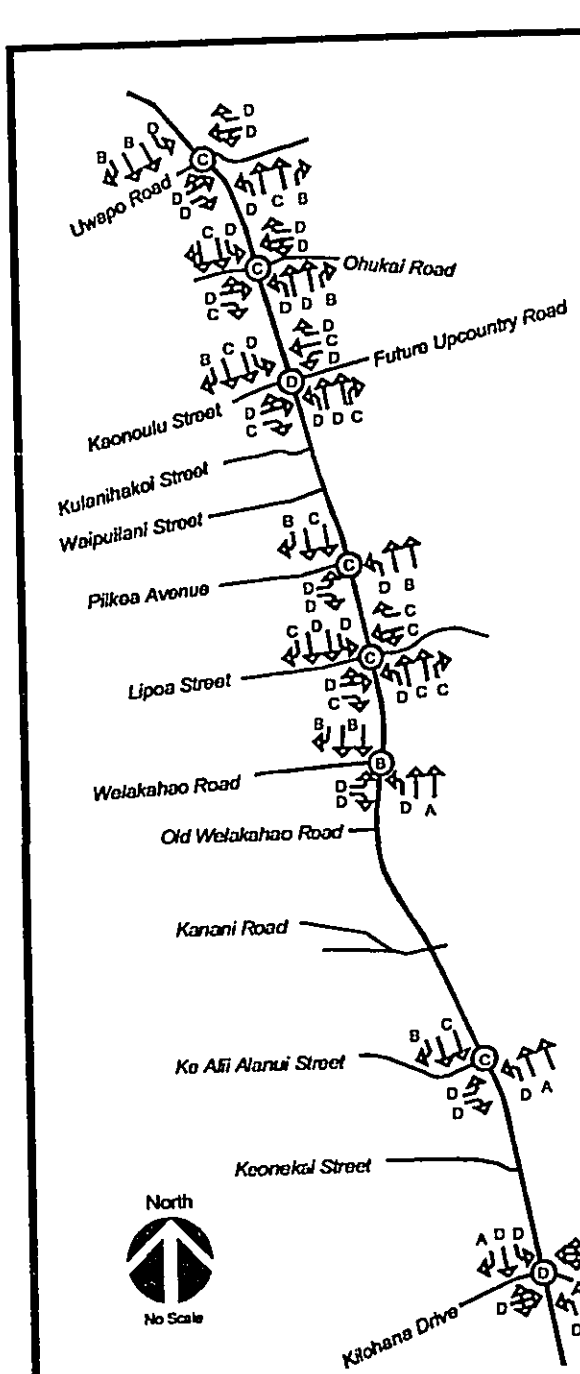
Traffic Analysis Report

Design Year (2011) Traffic Assignments

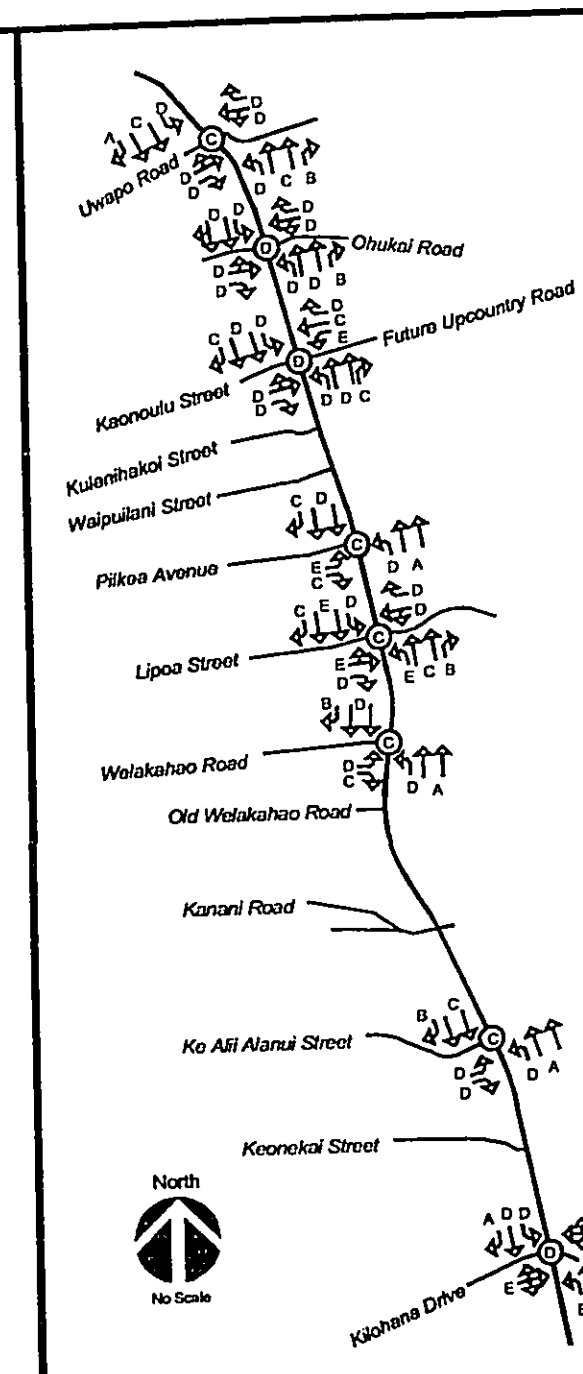
Exhibit 6

prepared by : Julian Ng, Inc. March 2002

03/29/02 07:35



AM Peak Hour



PM Peak Hour

Legend

- Lane Groups at signalized intersection
- B — Level of service for lane or lane group
- (B) — Overall level of service for signalized intersection

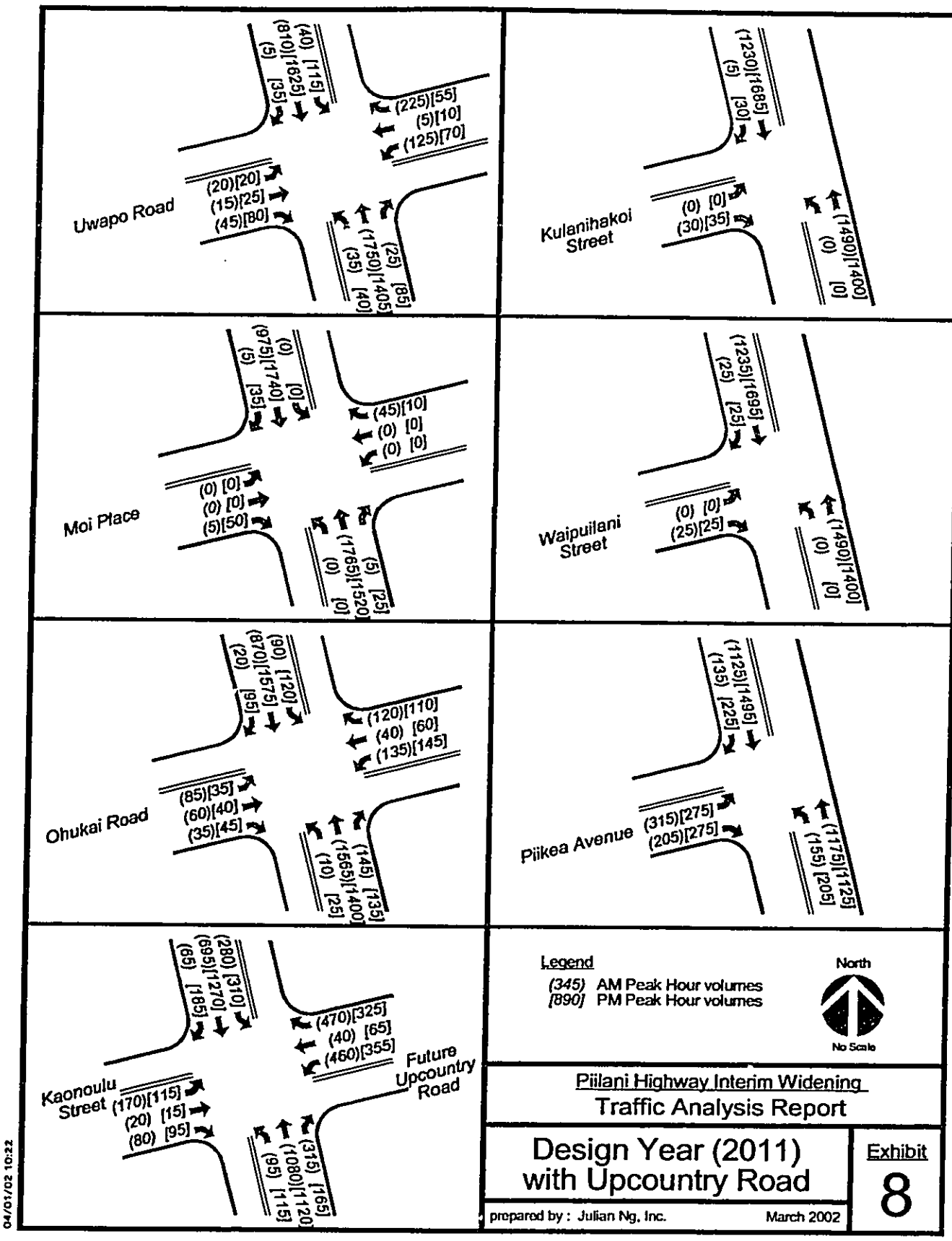
Piilani Highway Interim Widening
Traffic Analysis Report

Future Lane Configurations and LOS

Exhibit 7

prepared by : Julian Ng, Inc. March 2002

04/01/02 10:22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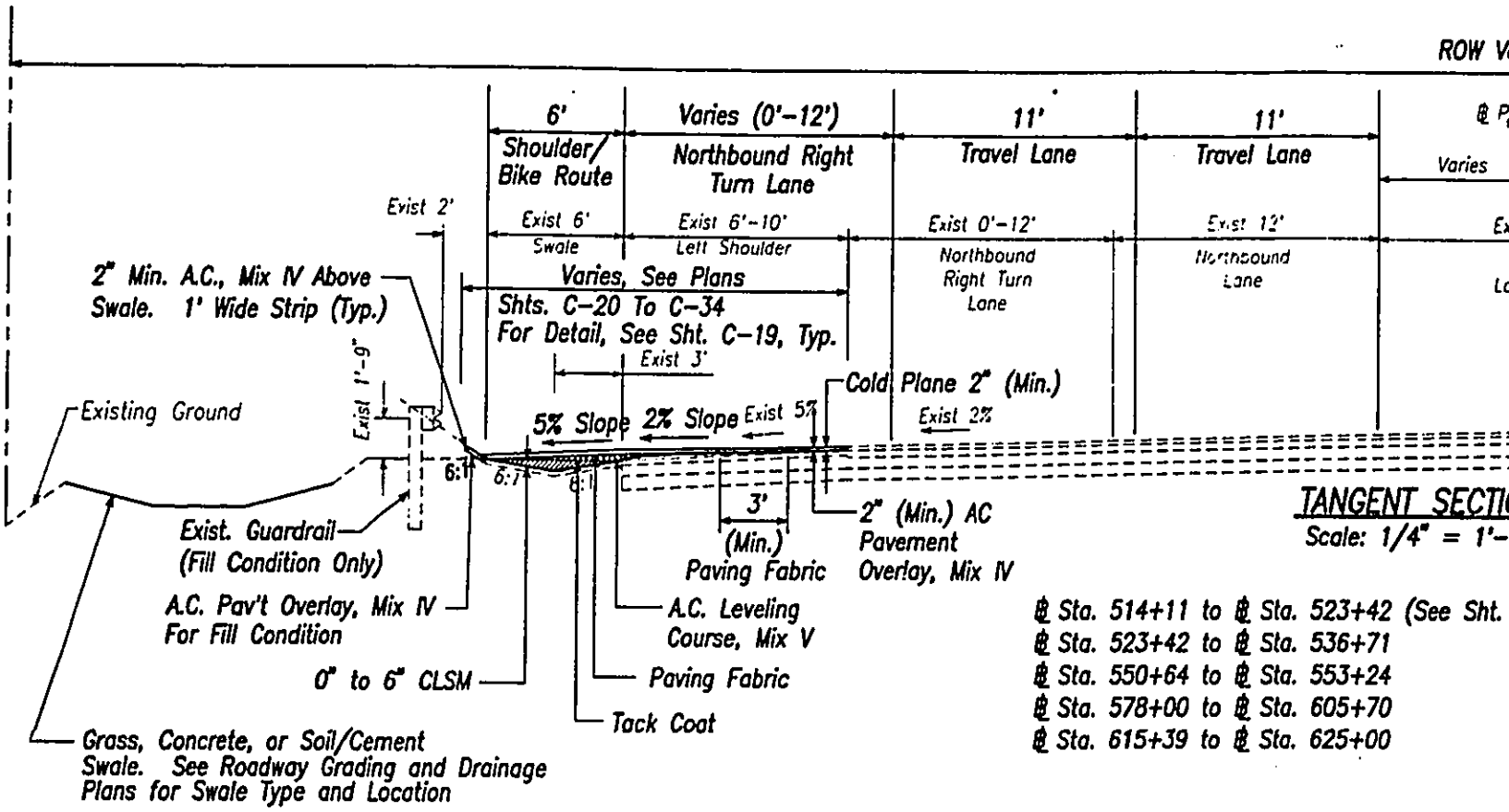
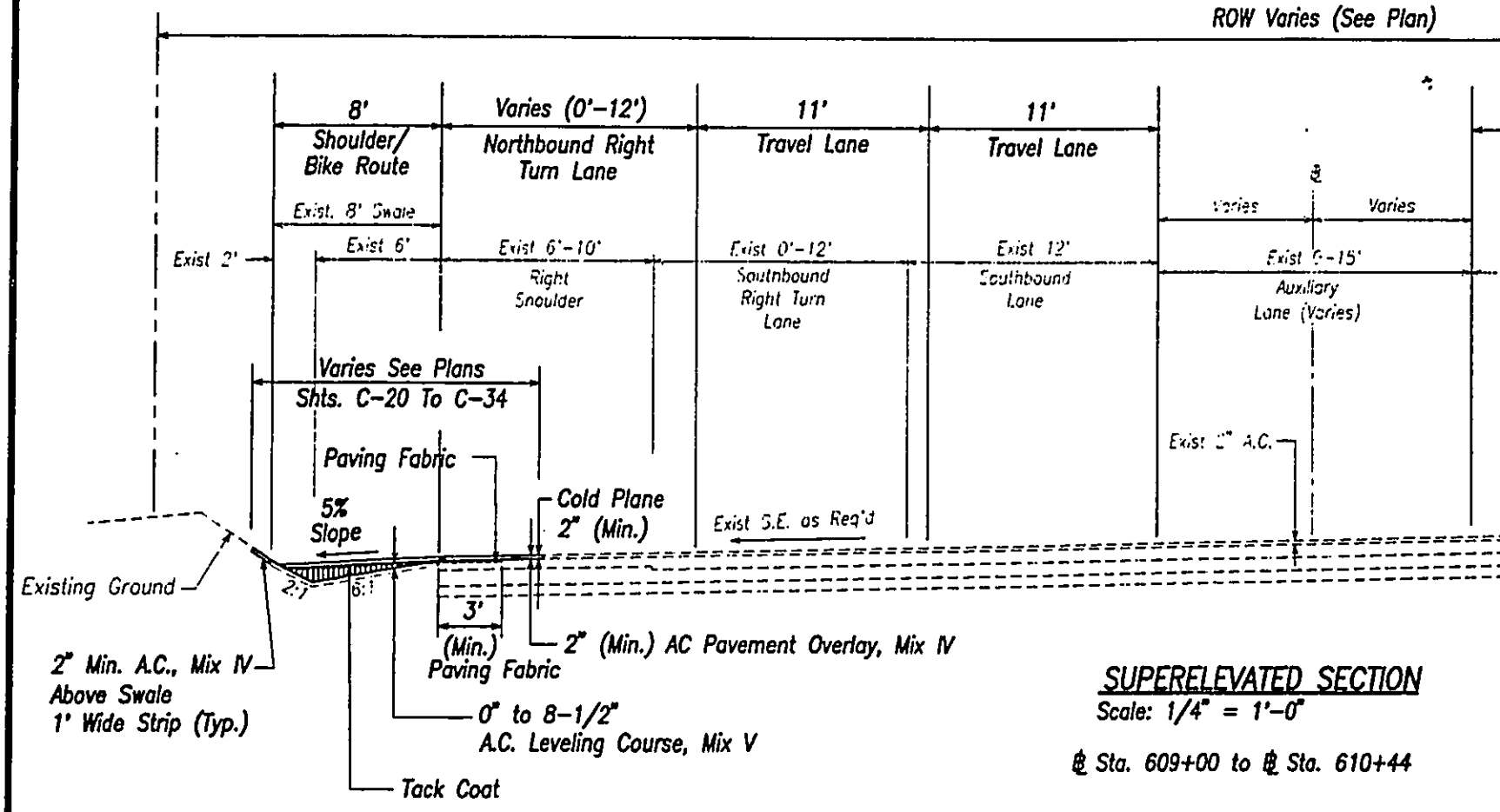
Legend
(345) AM Peak Hour volumes
[890] PM Peak Hour volumes
North
No Scale
Piilani Highway Interim Widening
Traffic Analysis Report
Design Year (2011) with Upcountry Road
Exhibit
8
prepared by : Julian Ng, Inc.
March 2002
04/01/02 10:22

Appendix B

Conceptual Layout - Piilani Highway Interim Improvements Mokulele Highway to Kilohana Drive, March 22, 2002



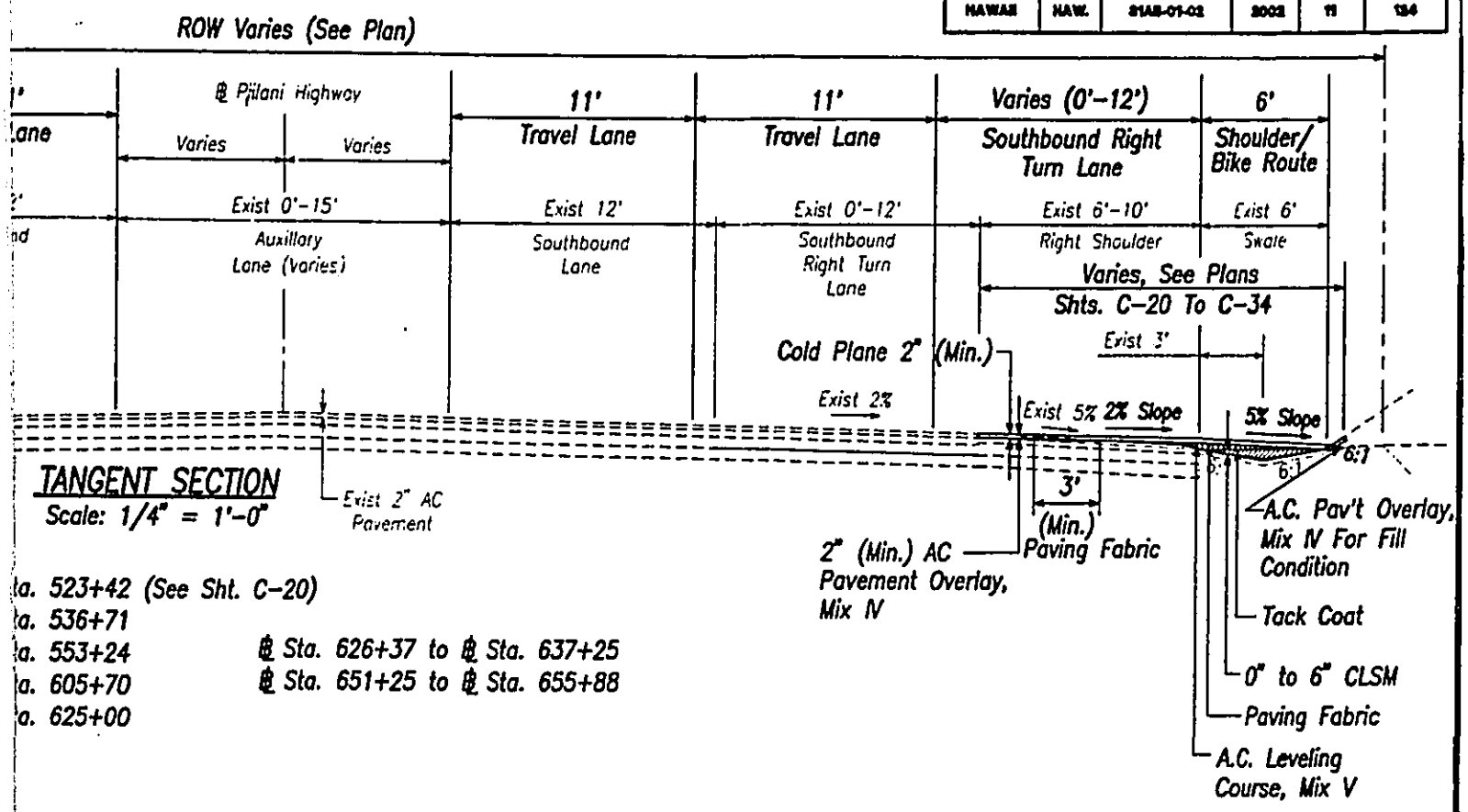


SUPERELEVATED SECTION
Scale: 1/4" = 1'–0"

℄ Sta. 609+00 to ℄ Sta. 610+44

TYPICAL SECTIONS – 1 MOKULELE HWY. TO LIPOA STREET
Scale: As Shown

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	31AB-01-02	2002	11	134



GRAPHIC SCALES

1/4" = 1'-0" 4" 0 4" 8"

1" = 1'-0" 1" 0 1" 2"

CRAIG W. L. LUKE LICENSED PROFESSIONAL ENGINEER No. 6838-O HAWAII, U.S.A.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

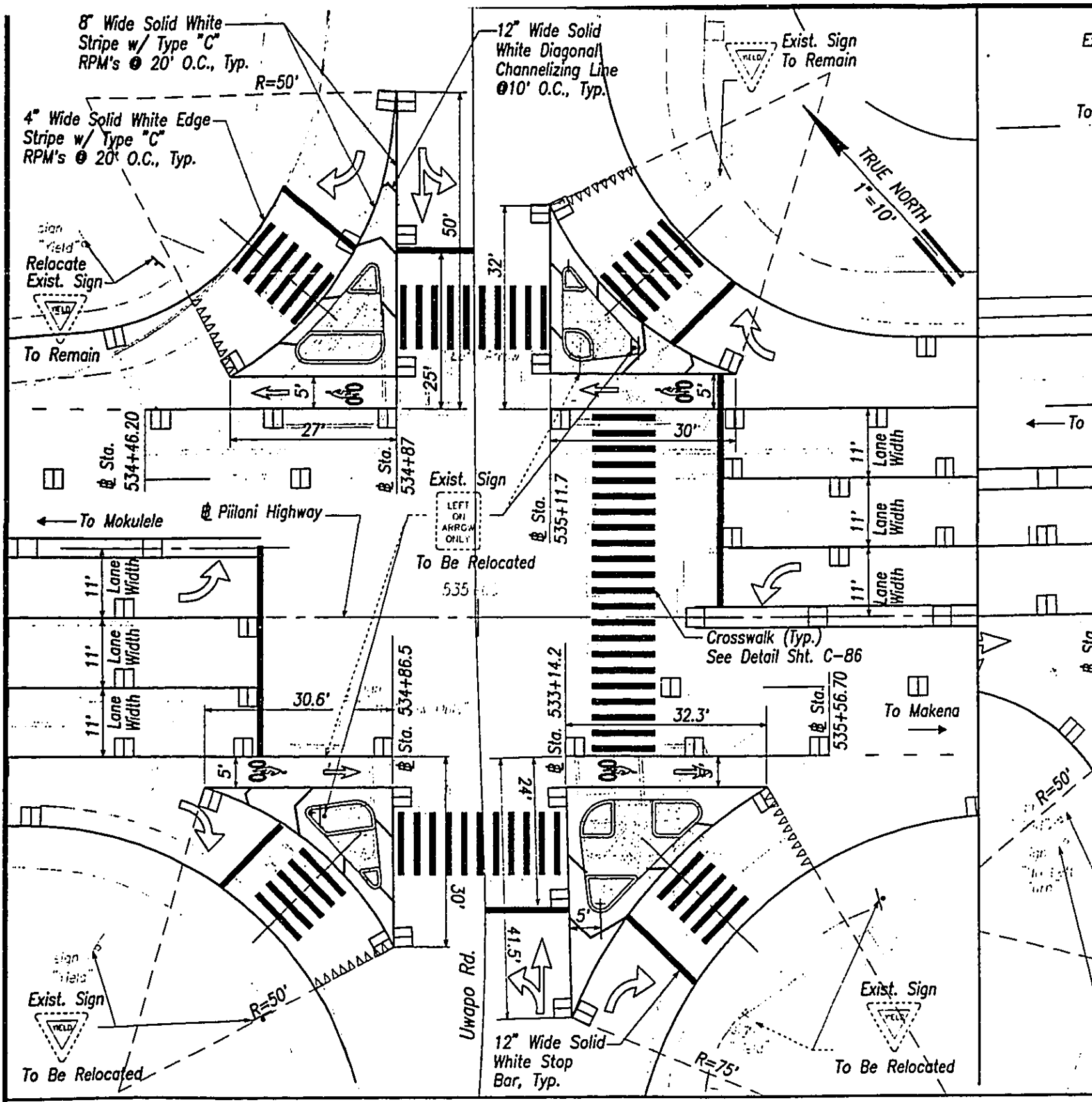
TYPICAL SECTIONS–1

MOKULELE HWY. TO LIPOA STREET

PIILANI HIGHWAY INTERIM WIDENING
Project No. 31AB-01-02

Scale: As Shown Date: March 22, 2002

SHEET No. C-9 OF 124 SHEETS

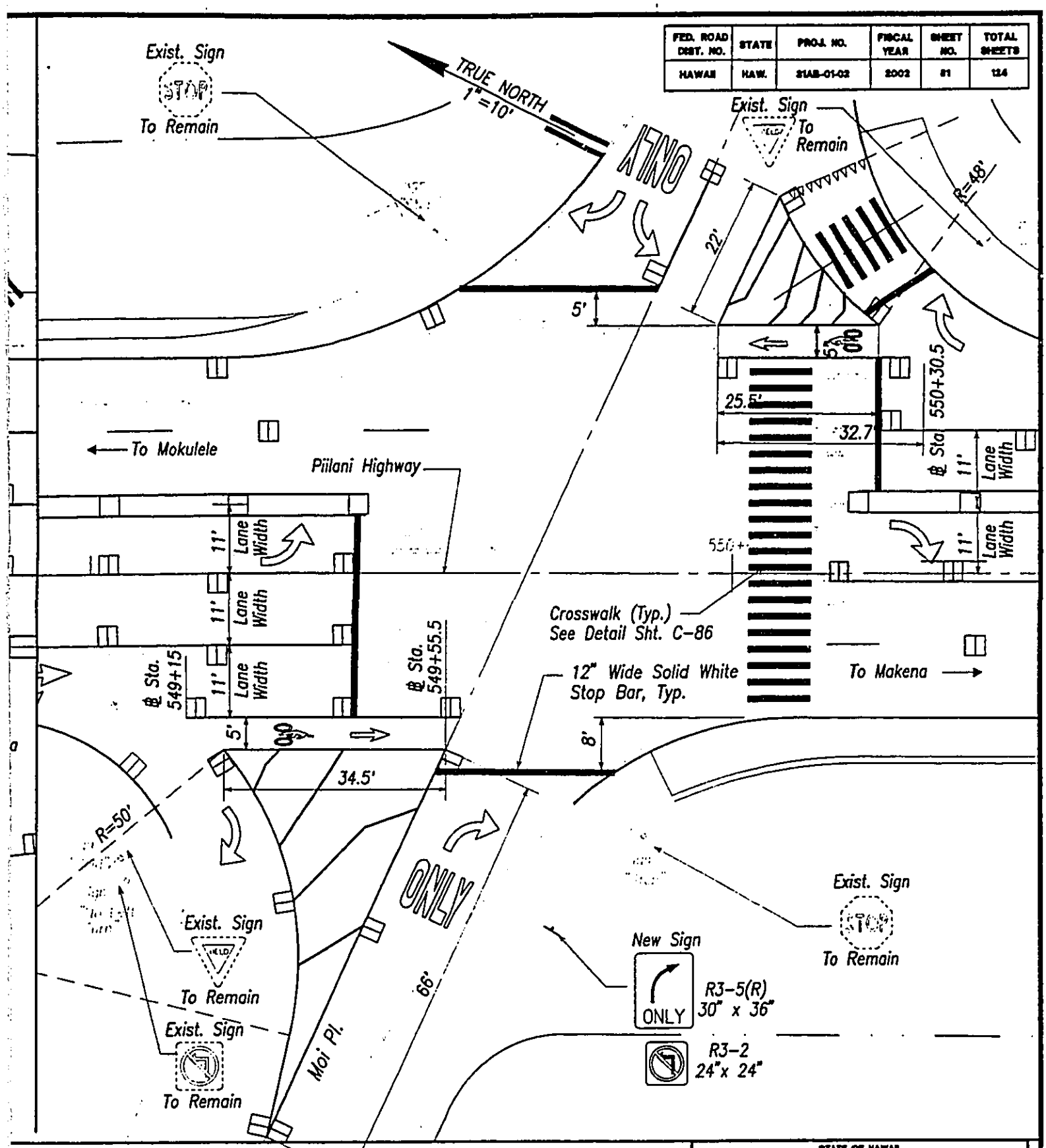


Piilani Hwy. and Uwapo Rd.

Note:
Contractor shall remove Stripings , Markings, and Raised Pavt. Markers that conflicts with New Stripings, Markings, and Raised Pavt. Markers.

SIGNING & STRIPING PLAN – INTERSEC
SCALE: 1" = 10'

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	31AB-01-02	2002	81	124



Piilani Hwy. and Moi Pl.

N – INTERSECTIONS

GRAPHIC SCALE

10' 5' 0 10' 20'

1" = 10'

CRAIG W. L. LUKE LICENSED PROFESSIONAL ENGINEER No. 8836-0 HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

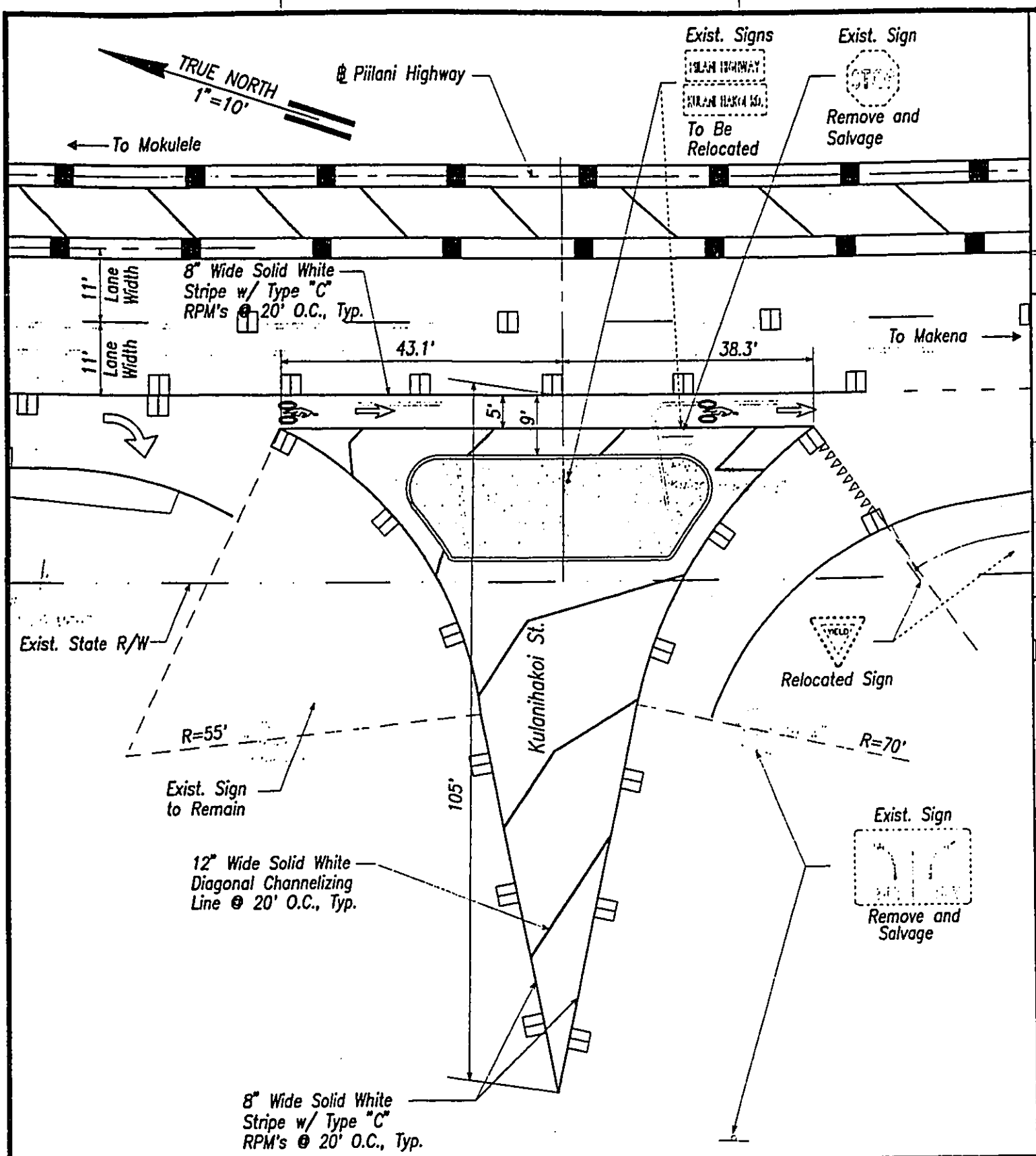
SIGNATURE DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

SIGNAGE AND STRIPING PLAN–1
INTERSECTIONS
Piilani Hwy. and Uwapo Rd. / Moi Pl.
PIILANI HIGHWAY INTERIM WIDENING
Project No. 31AB-01-02

Scale: 1"=20' Date: March 22, 2002

SHEET No.C-79 OF 124 SHEETS

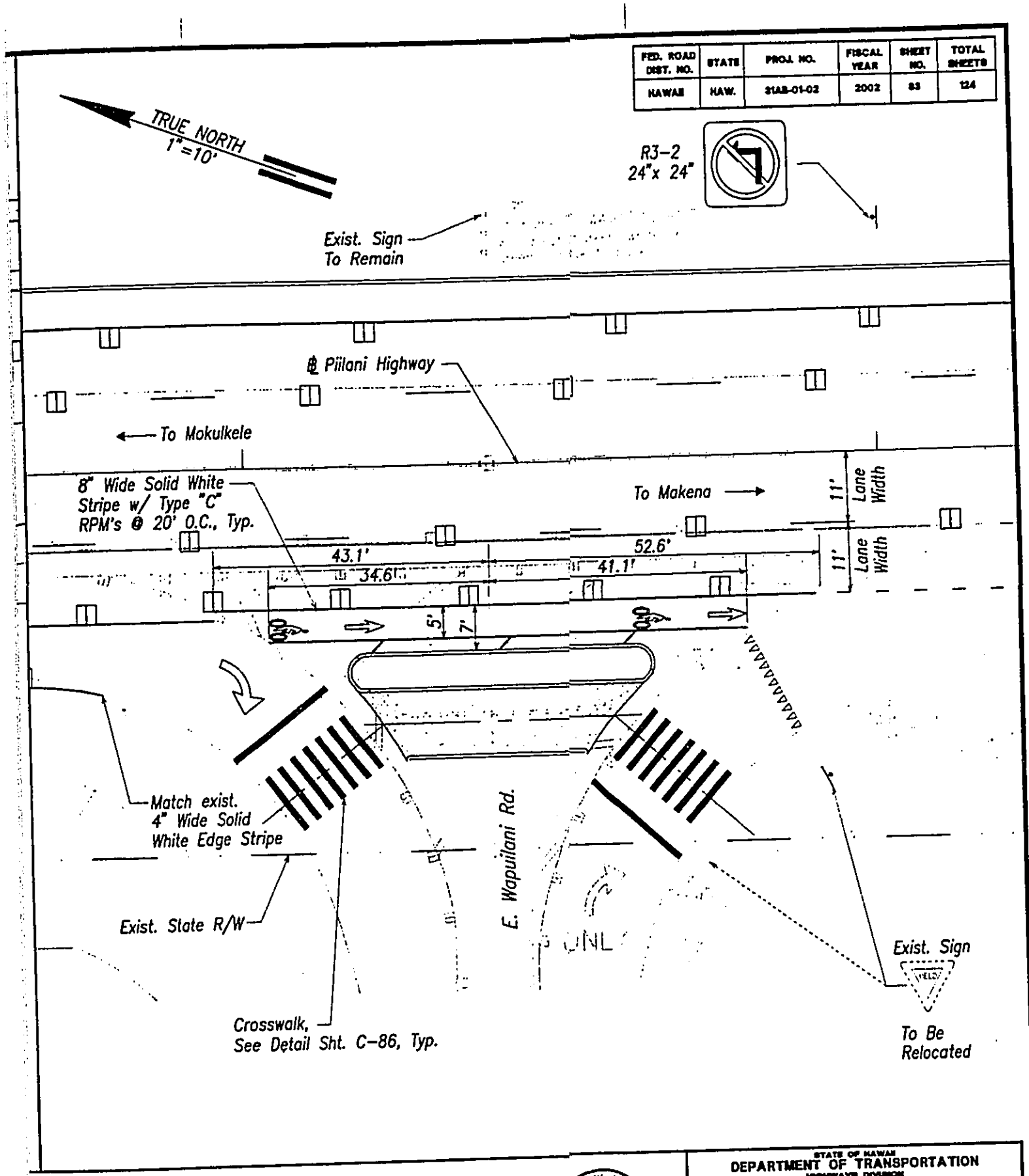


Piilani Hwy. and Kulanihakoi St.

Note:
Contractor shall remove Stripings , Markings, and Raised Pavt. Markers that conflicts with New Stripings, Markings, and Raised Pavt. Markers.

SIGNING & STRIPING PLAN – INTERSECTION
SCALE: 1" = 10'

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	31AB-01-02	2002	83	124



Piilani Hwy. and E. Wapuilani Rd.

- INTERSECTIONS

GRAPHIC SCALE

10' 5' 0 10' 20'

1" = 10'

CRAIG W. L. LUKE
LICENSED PROFESSIONAL ENGINEER
No. 8836-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

SIGNATURE DATE

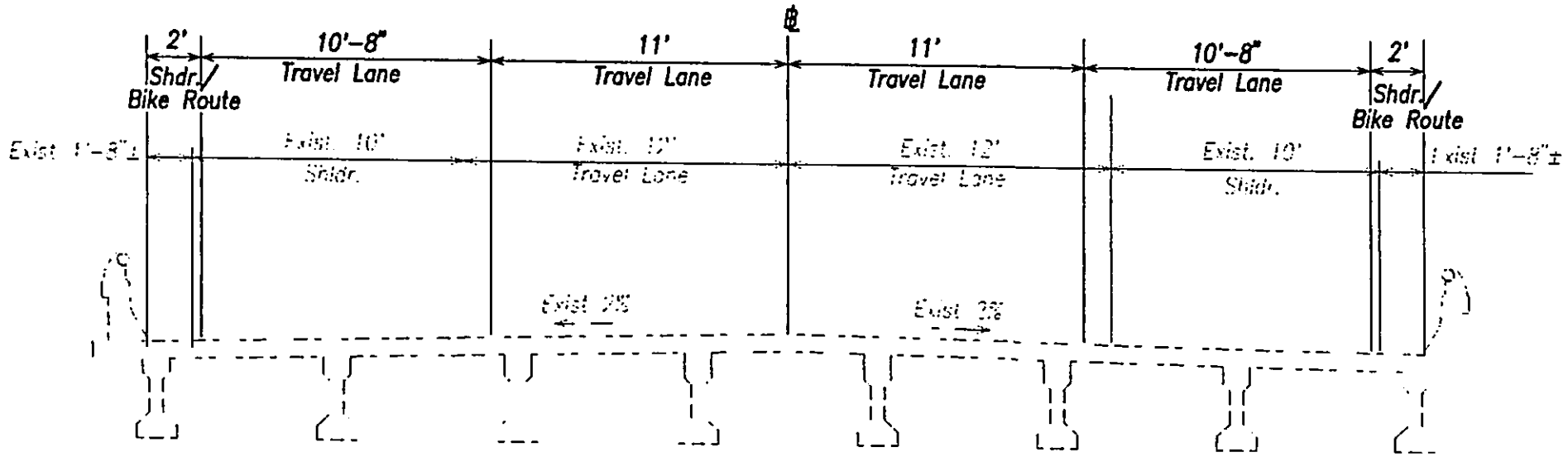
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

SIGNAGE AND STRIPING PLAN-3
INTERSECTIONS
Piilani Hwy. and Kulanihakoi St./E. Wapuilani Rd.

PIILANI HIGHWAY INTERIM WIDENING
Project No. 31AB-01-02

Scale: 1"=20' Date: March 22, 2002

SHEET No. C-81 OF 124 SHEETS



Waiakoa Bridge: *Piilani Highway ℄ Sta. 521+58 – 523+12*

Kulanihakoi Bridge: *Piilani Highway ℄ Sta. 602+35 – 603+87*

Waipuilani Bridge: *Piilani Highway ℄ Sta. 624+84 – 626+16*

Keokea Bridge: *Piilani Highway ℄ Sta. 691+84 – 692+36*

TYPICAL BRIDGE SECTION

Planning - Engineering - Environmental Services - Photogrammetry - Surveying - Construction Management
R. M. TOWILL CORPORATION
808 842 1133 420 Waiakamilo Road Suite 411 Honolulu Hawaii 96817-4941

Typical Bridge Section

Conceptual Layout
Interim Piilani Highway Widening Improvements
Mokulele Highway to Kilohana Drive

Figure

Appendix B-1

Construction Cost Estimate and Schedule

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ENGINEER'S PRELIMINARY DETAIL ESTIMATE

FOR

PIILANI HIGHWAY INTERIM WIDENING
MOKULELE HIGHWAY TO KILOHANA DRIVE
DISTRICTS OF WAILUKU AND MAKAWAO
ISLAND OF MAUI

PROJECT NO. 31AB-01-02

MARCH 22, 2002

Engineer's Preliminary Detail Estimate
Piilani Highway Interim Widening, Mokulele Highway to Kilohana Drive
Project No. 31AB-01-02

April 1, 2002

ITEM NO.	ITEM	QUANTITY	UNIT	PRICE	AMOUNT
202.0400	Removal of Traffic Island (310 S.Y.)	L.S.	L.S.	L.S.	$25,000.00
202.0410	Removal of Drain Inlet (3 Each)	L.S.	L.S.	L.S.	$5,000.00
203.0100	Roadway Excavation	150	C.Y.	$85.00	$12,750.00
206.2020	Structure Excavation for Cement Rubble Masonry Headwall (16 C.Y.)	L.S.	L.S.	L.S.	$3,000.00
206.2030	Structure Excavation for 24-Inch Reinforced Concrete Pipe (890 C.Y.)	L.S.	L.S.	L.S.	$66,750.00
206.7000	Structure Backfill for Cement Rubble Masonry Headwall (10 C.Y.)	L.S.	L.S.	L.S.	$1,000.00
209.0100	Water Pollution and Erosion Control	F.A.	F.A.	F.A.	$75,000.00
304.1110	Aggregate Base	625	C.Y.	$45.00	$28,125.00
305.1110	Aggregate Subbase	700	C.Y.	$45.00	$31,500.00
313.0100	Controlled Low Strength Material (CLSM) Leveling Course	3,475	C.Y.	$80.00	$278,000.00
401.0400	Asphalt Concrete, Mix No. IV	10,660	TON	$75.00	$799,500.00
401.0500	Asphalt Concrete, Mix No. V	7,210	TON	$75.00	$540,750.00
412.0100	Paving Fabric	77,000	S.Y.	$2.25	$173,250.00
503.0030	Concrete in Reinforced Concrete Jacket for 36-Inch Waterline (Class B) (13.5 C.Y.)	L.S.	L.S.	L.S.	$4,800.00
508.0100	Cement Rubble Masonry Headwall (15 C.Y.)	L.S.	L.S.	L.S.	$4,050.00
603.0010	Bed Course Material for Culvert	100	C.Y.	$30.00	$3,000.00
603.1010	24-Inch Reinforced Concrete Pipe, Class III	1,065	L.F.	$75.00	$79,875.00
604.0370	Grated Inlet Box, 4.00 feet to 4.99 feet	4	EACH	$5,500.00	$22,000.00
604.0380	Type 1 Storm Drain Manhole, 0 feet to 6 feet	42	EACH	$3,500.00	$147,000.00
604.0390	Type A Storm Drain Manhole, 6 feet to 6.99 feet	2	EACH	$6,000.00	$12,000.00
604.0400	Swale/Drain Inlet Box, 3 feet to 3.99 feet	1	EACH	$5,000.00	$5,000.00
604.0410	Swale/Drain Inlet Box, 4 feet to 4.99 feet	1	EACH	$5,500.00	$5,500.00
604.0420	Swale/Drain Inlet Box, 5 feet to 5.99 feet	2	EACH	$6,000.00	$12,000.00
606.0100	Strong Post W-Beam Guardrail	5,070	LF	$30.00	$152,100.00
606.0200	FLEAT-350	20	EACH	$4,000.00	$80,000.00
608.1300	Concrete Traffic Islands	270	S.Y.	$50.00	$13,500.00
609.2010	Curb for Traffic Islands, Type 2D	1,115	L.F.	$12.00	$13,380.00
621.4110	Reflector Marker RM-3 without Post	52	EACH	$75.00	$3,900.00

ITEM NO.	ITEM	QUANTITY	UNIT	PRICE	AMOUNT
621.4120	Reflector Marker RM-4 with Post	2	EACH	$150.00	$300.00
621.5000	Regulatory and Warning Sign (10 Square Feet or Less) with Post	59	EACH	$300.00	$17,700.00
621.5110	Regulatory and Warning Sign (10 Square Feet or Less) without Post	38	EACH	$300.00	$11,400.00
621.8010	Relocation of Existing Sign with New Post	33	EACH	$175.00	$5,775.00
623.2008	Type I Traffic Signal Standard, H=10 Feet	14	EACH	$900.00	$12,600.00
623.2016	Remove Type I Signal Standard and Assembly	12	EACH	$500.00	$6,000.00
623.2021	Type II Traffic Signal Standard, 30 Foot Mast Arm	4	EACH	$9,000.00	$36,000.00
623.2022	Type II Traffic Signal Standard, 35 Foot Mast Arm	3	EACH	$10,000.00	$30,000.00
623.2023	Type II Traffic Signal Standard, 40 Foot Mast Arm	1	EACH	$11,000.00	$11,000.00
623.2024	Type II Traffic Signal Standard, 45 Foot Mast Arm	1	EACH	$12,000.00	$12,000.00
623.2029	Remove Type II Signal Standard and Assembly	8	EACH	$1,500.00	$12,000.00
623.2031	Foundation for Type I Signal Standard	14	EACH	$800.00	$11,200.00
623.2032	Foundation for Type II Signal Standard	9	EACH	$1,500.00	$13,500.00
623.4101	Traffic Signal Assembly, (1-Way, 12-Inch, 3-Section , Top of Pole Mount)	4	EACH	$1,100.00	$4,400.00
623.4102	Traffic Signal Assembly, (2-Way, 12-Inch, 3-Section , Top of Pole Mount)	10	EACH	$1,100.00	$11,000.00
623.4103	Traffic Signal Assembly, (1-Way, 12-Inch, 3-Section , Bracket Mount)	2	EACH	$1,100.00	$2,200.00
623.4104	Traffic Signal Assembly, (1-Way, 12-Inch, 3-Section , Mast Arm Mount)	20	EACH	$1,100.00	$22,000.00
623.4105	Pedestrian Signal Assembly, (1-Way, 12-Inch, Bracket Mount)	23	EACH	$850.00	$19,550.00
623.4107	Pedestrian Pushbutton With Instruction Sign	26	EACH	$300.00	$7,800.00
623.4108	Opticom Receiver, (Top of Pole Mount)	7	EACH	$1,200.00	$8,400.00
623.4109	Opticom Receiver, (Mast Arm Mount)	11	EACH	$1,200.00	$13,200.00
623.5001	Traffic Signal Ductline, One-2 Inch Conduit (7,120 L.F.)	L.S.	L.S.	L.S.	$320,400.00
623.5002	Traffic Signal Ductline, Two-2 Inch Conduit (80 L.F.)	L.S.	L.S.	L.S.	$4,400.00
623.5003	Traffic Signal Ductline, Three-2 Inch Conduit (160 L.F.)	L.S.	L.S.	L.S.	$10,400.00
623.5004	Traffic Signal Ductline, Four-2 Inch Conduit (1,070 L.F.)	L.S.	L.S.	L.S.	$80,250.00
623.5006	Traffic Signal Ductline, Six -2 Inch Conduit (130 L.F.)	L.S.	L.S.	L.S.	$11,050.00
623.6001	Traffic Signal Conduit, One-2 Inch PVC Coated Rigid Steel (150 L.F.)	L.S.	L.S.	L.S.	$3,000.00
623.6021	Type A Pullbox	50	EACH	$550.00	$27,500.00

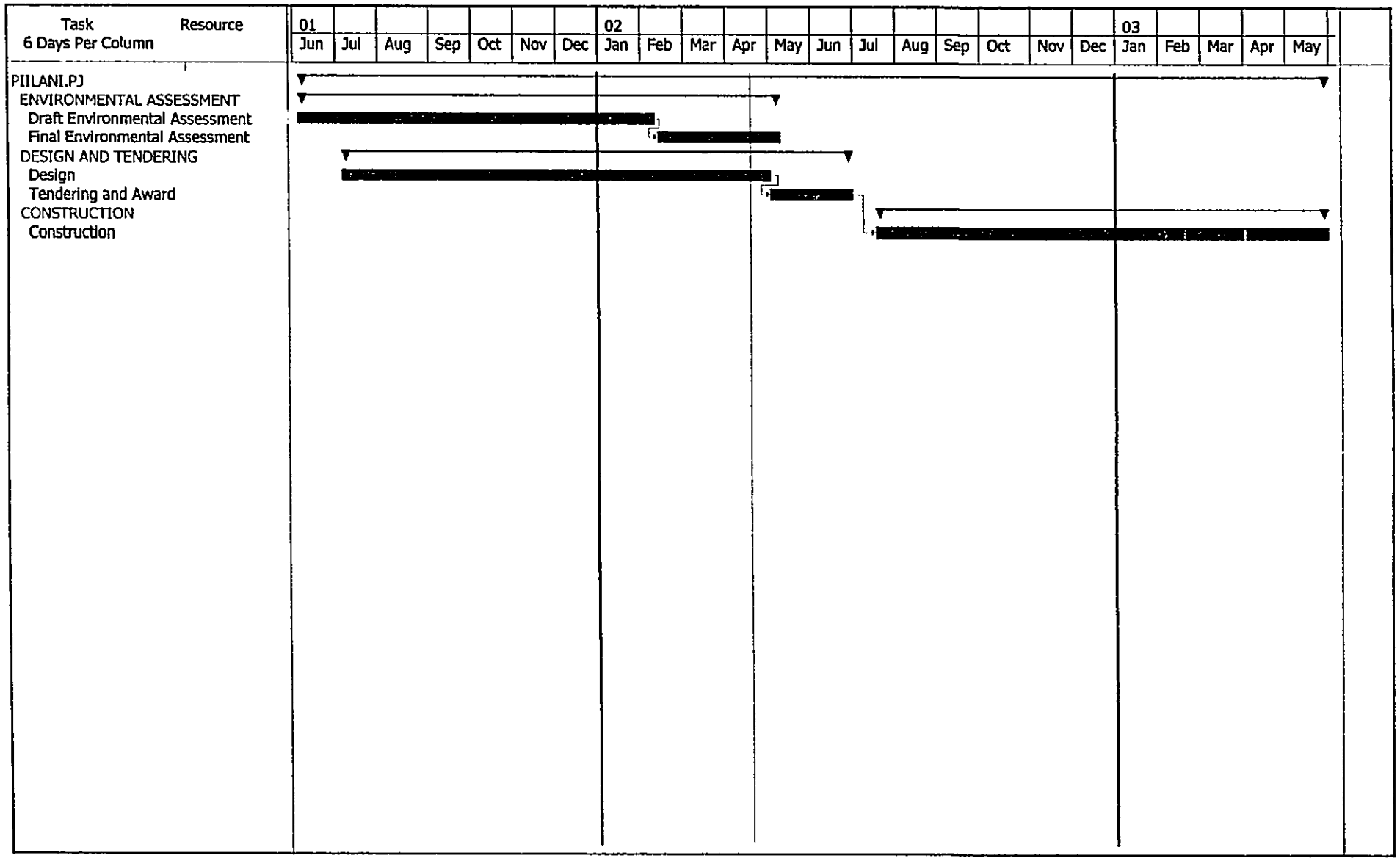
ITEM NO.	ITEM	QUANTITY	UNIT	PRICE	AMOUNT
623.6022	Type B Pullbox	24	EACH	$950.00	$22,800.00
623.6030	Cast Junction Box, 18"x16"x8"	2	EACH	$600.00	$1,200.00
623.6040	Adjust Traffic Signal Pullbox	2	EACH	$700.00	$1,400.00
623.6050	Demolish Traffic Signal Pullbox	23	EACH	$500.00	$11,500.00
623.7010	No. 14, 26-Conductor Traffic Control Cable (1,710 L.F.)	L.S.	L.S.	L.S.	$7,700.00
623.7011	No. 14, 2-Conductor Loop Detector Lead-In Cable (4,900 L.F.)	L.S.	L.S.	L.S.	$10,780.00
623.7012	No. 14, 2-Conductor Pedestrian Pushbutton Cable (3,000 L.F.)	L.S.	L.S.	L.S.	$6,600.00
623.7017	EVP Cable (2,060 L.F.)	L.S.	L.S.	L.S.	$4,700.00
623.7019	No. 19, 24-Conductor Interconnect Cable, 300 Volt (6,830 L.F.)	L.S.	L.S.	L.S.	$39,600.00
623.7020	No. 6, 3-Conductor Electrical Service Cable (230 L.F.)	L.S.	L.S.	L.S.	$1,050.00
623.7104	Loop Detector Sensing Unit (6 Ft. x 6 Ft.), One Loop	20	EACH	$600.00	$12,000.00
623.7105	Loop Detector Sensing Unit (6 Ft. x 6 Ft.), Two Loops	20	EACH	$1,000.00	$20,000.00
623.7106	Loop Detector Sensing Unit (6 Ft. x 6 Ft.), Four Loops	8	EACH	$1,600.00	$12,800.00
623.7107	Loop Detector Sensing Unit (6 Ft. x 6 Ft.), Six Loops	8	EACH	$2,400.00	$19,200.00
623.8001	Controller Reprogramming and Software	L.S.	L.S.	L.S.	$20,000.00
629.1010	12-Inch White Pavement Striping (Thermoplastic Extrusion) (2,050 L.F.)	L.S.	L.S.	L.S.	$9,380.00
629.1011	12-Inch Yellow Pavement Striping (Thermoplastic Extrusion) (3,040 L.F.)	L.S.	L.S.	L.S.	$12,110.00
629.1012	8-Inch White Pavement Striping (Thermoplastic Extrusion) (7,625 L.F.)	L.S.	L.S.	L.S.	$17,155.00
629.1013	6-Inch-White Pavtment Striping (Thermoplastic Extrustion) (64,260 L.F.)	L.S.	L.S.	L.S.	$112,455.00
629.1014	4-Inch White Pavement Striping (Thermoplastic Extrusion) (6,830 L.F.)	L.S.	L.S.	L.S.	$8,540.00
629.1015	4-Inch Dbl. Yellow Pavement Striping (Thermoplastic Extrusion) (21,740 L.F.)	L.S.	L.S.	L.S.	$27,175.00
629.1020	Crosswalk Marking (Thermoplastic Extrusion)	65	LANE	$110.00	$7,150.00
629.1025	Yield Pavement Marking (Thermoplastic Extrusion)	25	LANE	$100.00	$2,500.00
629.1030	Pavement Arrow (Thermoplastic Extrusion)	129	EACH	$90.00	$11,610.00
629.1040	Pavement Word (Thermoplastic Extrusion)	14	EACH	$375.00	$5,250.00
629.1050	Bike Pavement Marking (Thermoplastic Extrusion)	69	EACH	$150.00	$10,350.00
629.2010	Type A Pavement Marker (6,520 Each)	L.S.	L.S.	L.S.	$14,825.00
629.2030	Type C Pavement Marker (3,800 Each)	L.S.	L.S.	L.S.	$46,200.00

ITEM NO.	ITEM	QUANTITY	UNIT	PRICE	AMOUNT
629.2040	Type D Pavement Marker (440 Each)	L.S.	L.S.	L.S.	$3,500.00
629.2070	Type H Pavement Marker (875 Each)	L.S.	L.S.	L.S.	$5,880.00
629.3000	Removal of Existing Pavement Markings	L.S.	L.S.	L.S.	$250,000.00
636.0100	Field Office and Project Site Laboratory (Not to Exceed $54,000.00)	L.S.	L.S.	L.S.	$30,000.00
636.2000	Maintenance of Field Office and Project Site Laboratory	F.A.	F.A.	F.A.	$10,000.00
640.0100	Grass Trapezoidal Type "A" Swale (660 L.F.)	L.S.	L.S.	L.S.	$24,000.00
640.0200	Grass Triangular Swale Type "B" Swale (2,430 L.F.)	L.S.	L.S.	L.S.	$78,200.00
640.0300	Soil Cement Triangular Type "C" Swale (715 L.F.)	L.S.	L.S.	L.S.	$16,000.00
640.0400	Concrete Rectangular Type "D" Swale (3150 L.F.)	L.S.	L.S.	L.S.	$194,000.00
640.0500	Concrete Triangular Type "E" Swale (95 L.F.)	L.S.	L.S.	L.S.	$5,000.00
640.0600	Grouted Rubble Paving Triangular Type "F" Swale (230 L.F.)	L.S.	L.S.	L.S.	$54,600.00
641.0100	Hydro-mulch Seeding	2,950	S.F.	$1.50	$4,425.00
645.1000	Additional Police Officers And/Or Additional Traffic Control Devices	F.A.	F.A.	F.A.	$125,000.00
652.0100	Cold Planing	75,000	S.Y.	$5.00	$375,000.00
699.1000	Mobilization (Not to exceed 10 percent of the sum of all items excluding the bid price of this item, field office and project site laboratory, and force account items)	L.S.	L.S.	L.S.	$473,439.00
	TOTAL FOR CONTRACT ITEMS				$5,447,800.00
	CONTINGENCIES (5%)				$272,400.00
	TOTAL (exclusive of Construction Engineering and Administration)				$5,720,200.00

Columns
04-18-2002

INTERIM PIILANI HIGHWAY PROJECT SCHEDULE

Project: PIILANI.PJ
Revision: 0



Negative Float
Critical Interrupted
Critical
Critical Milestone
Unassigned
Baseline
Milestone
Noncritical Heading
Critical Unassigned
Actual
Actual Milestone
Critical Heading
Interrupted
Noncritical
Baseline Milestone

Appendix C

Acoustic Study for the Interim Piilani Highway Improvements, April 2002

ACOUSTIC STUDY FOR THE INTERIM PIILANI HIGHWAY IMPROVEMENTS MOKULELE HIGHWAY TO KILOHANA DRIVE KIHEI TO WAILEA, MAUI

Prepared for:

MUNEKIYO & HIRAGA, INC.

Prepared by:

Y. EBISU & ASSOCIATES
1126 12th Avenue, Room 305
Honolulu, Hawaii 96816

APRIL 2002

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CHAPTER I. SUMMARY

The existing and future traffic noise levels in the environs of the proposed Interim Piilani Highway Improvements (between Mokulele Highway and Kilohana Drive) Project in Kihei and Wailea on the island of Maui were studied to evaluate potential noise impacts associated with the Build Alternative. Noise measurements were obtained, traffic noise predictions developed, and noise abatement alternatives evaluated.

Existing traffic noise levels in the project area currently exceed the U.S. Federal Highway Administration (FHWA) and Hawaii State Department of Transportation, Highways Division (HDOT) noise abatement criteria. Future (CY 2011) traffic noise levels are expected to exceed the "66 Leq" HDOT noise abatement criteria along the mauka (east) and makai (west) Rights-of-Way, under the Build or No-Build Alternatives. The noise abatement criteria will continue to be exceeded at noise sensitive dwelling units with or without the project, but not at any public use facilities or park lands. Traffic noise mitigation measures in the form of speed reduction or noise barrier construction may be applied at the affected residences, but should be examined according to the criteria of reasonable and feasible. Because of the potential visual impacts of the noise barriers and the potential for graffiti, landscaping should be used on the roadway side of the barrier or the use of lava rock facade is recommended to soften the visual impacts of the walls and to minimize the potential for graffiti.

The following general conclusions can be made in respect to the number of impacted structures and lands which can be expected by CY 2011 under the Build Alternative. These conclusions are valid as long as the future vehicle mixes and average speeds do not differ from the assumed values.

- The HDOT's ">15 dB increase" criteria for substantial change in traffic noise levels will not be exceeded at any noise sensitive structure.

- Under the Build Alternative, future traffic noise levels at residences which are located within 125 to 150 feet of the highway centerline and within the limits of project construction are expected to exceed the HDOT "66 Leq" criteria. No parks or public structures (such as churches) within the limits of project construction should be affected by the proposed project or require noise mitigation measures under the Build Alternative.

- Future traffic noise levels at two commercial structures south of Ohukai Road may exceed current HDOT and FHWA noise criteria. Additional noise mitigation measures should not be required due to the use of closure and air conditioning of both commercial structures.

- With a 5 mile per hour reduction in the average vehicle speed during free traffic flow, the predicted increases in future traffic noise levels at noise sensitive receptors over the ten year period between 2001 and 2011 are typically less than 1.5 dB, and are not considered to be significant. The anticipated increases in

future traffic noise levels with or without the project are also substantially less than the "15 dBA increase", which is considered to be the criteria for substantial change by the HDOT. Because the project is an interim improvement of Piilani Highway, and because the highway noise attenuation measures required by FHWA and HDOT noise abatement criteria are essentially remedial in nature (i.e., directed towards reducing currently high noise levels), substantial capital investments in highway noise mitigation measures should be deferred until more substantial improvements are made to Piilani Highway.

- If the proposed Upcountry Road connection to Piilani Highway is completed by 2011, the resulting traffic volumes and traffic noise levels should not alter the conclusions listed above. Resulting traffic volumes south of Kulanihakoi Street should be the same as those without the Upcountry Road project. North of Kulanihakoi Street, traffic volumes and noise levels should be lower during the critical AM peak hour following completion of the Upcountry Road project.

Potential short term construction noise impacts are possible during the project construction period along the entire project corridor. However, minimizing these types of noise impacts is possible using standard curfew periods, properly muffled equipment, administrative controls, and construction barriers as required.

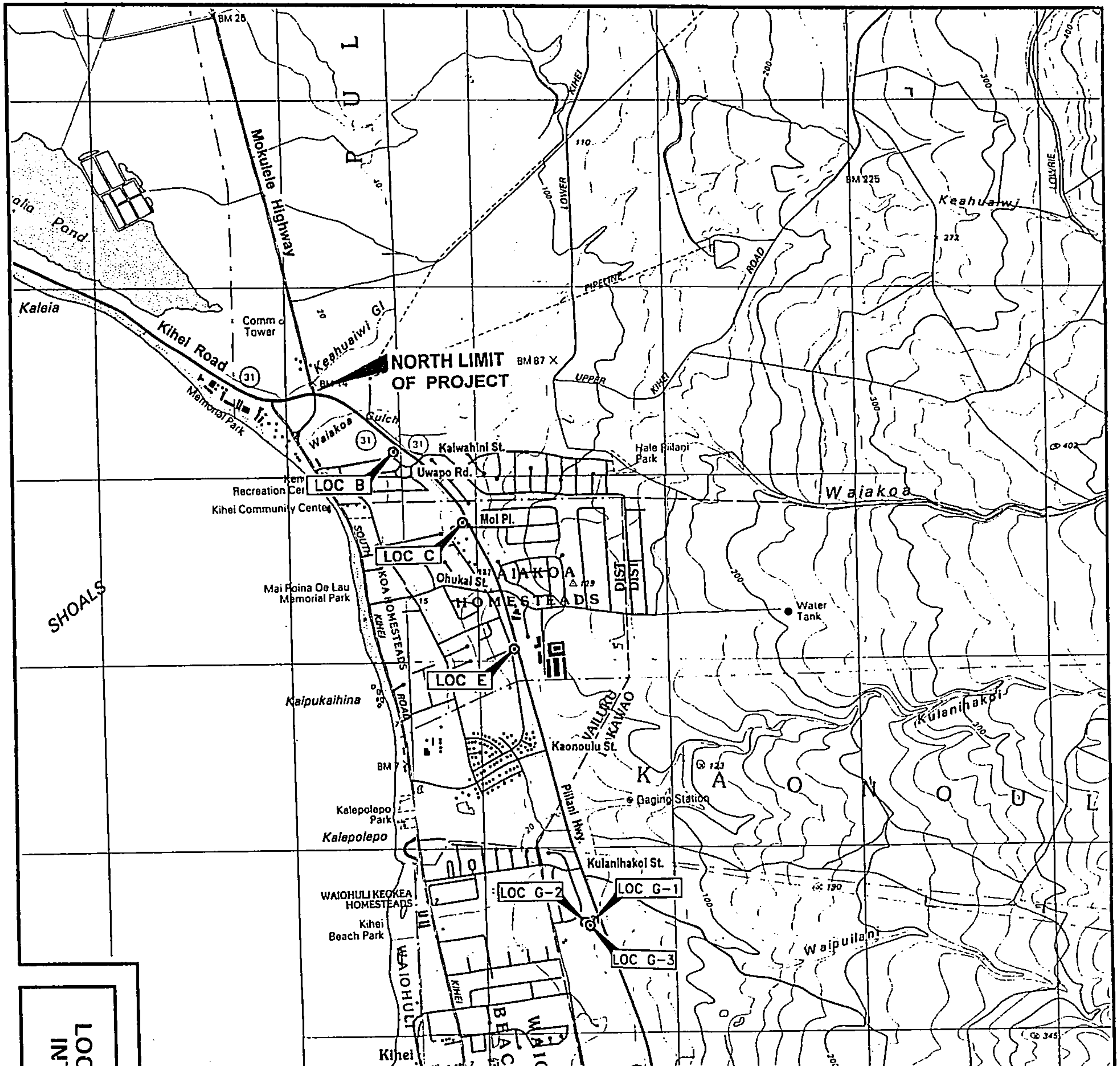
CHAPTER II. GENERAL STUDY METHODOLOGY

Noise Measurements. Existing traffic and background ambient noise levels at sixteen locations in the project area were measured in July 2001. The traffic noise measurements were used to calibrate the traffic noise model which was used to calculate the Base Year (CY 2001) and future (CY 2011) traffic noise levels under the No Build and Build Alternatives. The background ambient noise measurements were used to define existing noise levels at noise sensitive receptors which may be affected by the project. Also, the measurements were used in conjunction with forecast traffic noise levels to determine if future traffic noise levels are predicted to "substantially exceed" existing background ambient noise levels at these noise sensitive receptors, and therefore exceed FHWA and HDOT noise standards and criteria.

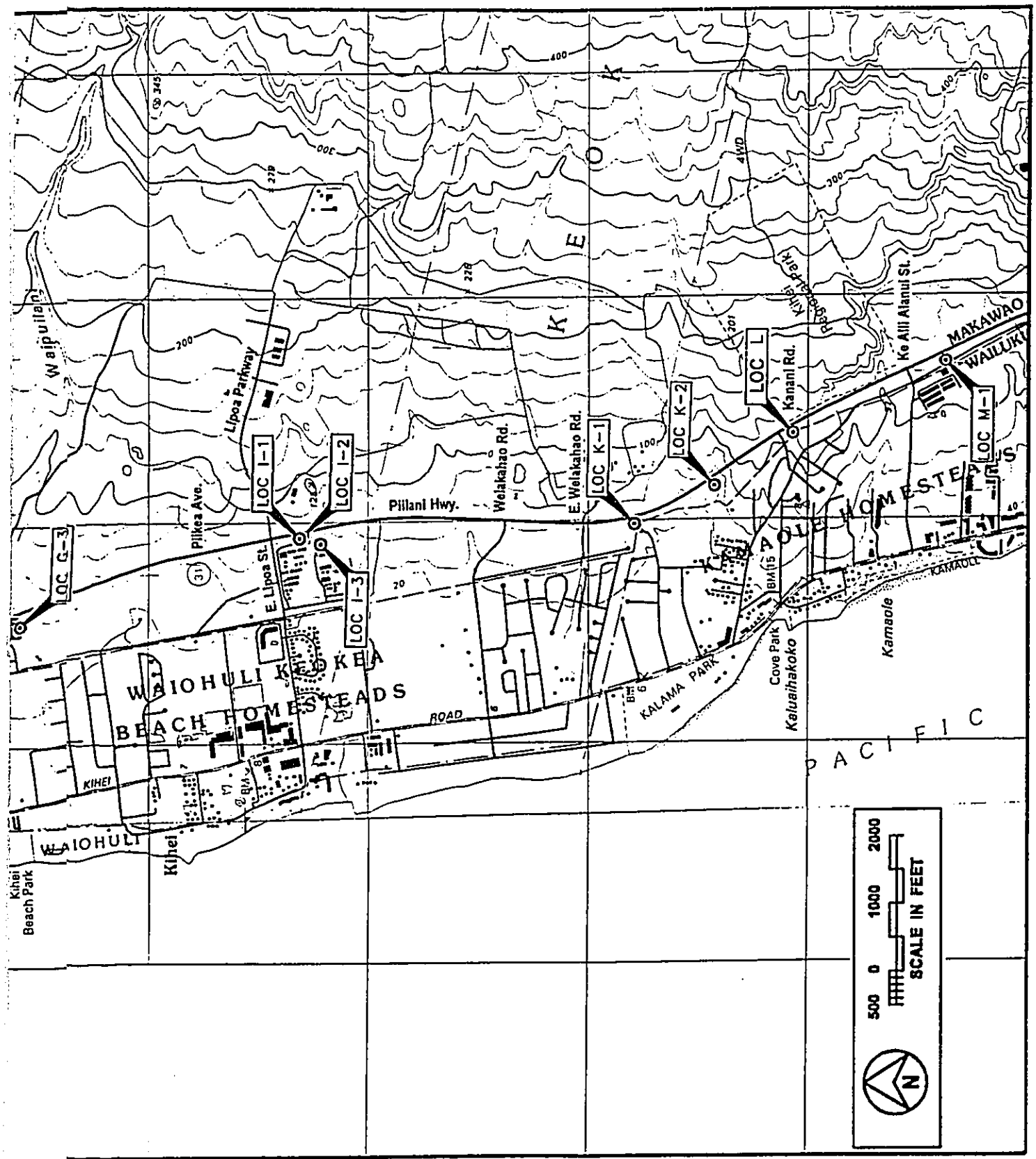
The noise measurement locations ("B" through "N-2") are shown in Figure 1, and the letters of the measurement locations are keyed to the highway segment identifiers shown in Table 1. The results of the traffic noise measurements are summarized in Table 2. In the tables, Leq represents the average (or equivalent), A-Weighted, Sound Level. A list and description of the acoustical terminology used are contained in Appendix B.

Traffic Noise Predictions. The Federal Highway Administration (FHWA) Traffic Noise Model, Version 1.1 (or TNM, see Reference 1) was used as the primary method of calculating Base Year and future traffic noise levels, with model parameters adjusted to reflect terrain, ground cover, and local shielding conditions. At all traffic noise measurement locations along the project corridor, the measured noise levels were compared with model predictions to insure that measured and calculated noise levels for the existing conditions were consistent and in general agreement. As indicated in Table 2, spot counts of traffic volumes were also obtained during the measurement periods and were used to generate the Equivalent Sound Level (Leq) predictions shown in the table. The average vehicle speeds entered into the TNM were higher than posted speeds so as to achieve agreement between measured noise levels and those calculated by the TNM. With these input speed adjustments, the agreement between measured and predicted traffic noise levels was considered to be good and sufficiently accurate to formulate the Base Year and future year traffic noise levels.

Base Year traffic noise levels were then calculated along the project corridor using Base Year (2001) traffic volume data for the AM and PM peak hours from Reference 2. These traffic volumes are summarized in Appendices C and D. Traffic mix by vehicle types and average vehicle speeds for the various sections of the existing and future roadway were derived from observations during the noise monitoring periods and from Reference 2. Determinations of the periods of highest hourly traffic volumes along the project corridor were made after reviewing the AM and PM peak hour traffic volumes from Reference 2 and the noise measurement results. Total two-way traffic volumes were generally highest during the PM peak hour. However, measured and

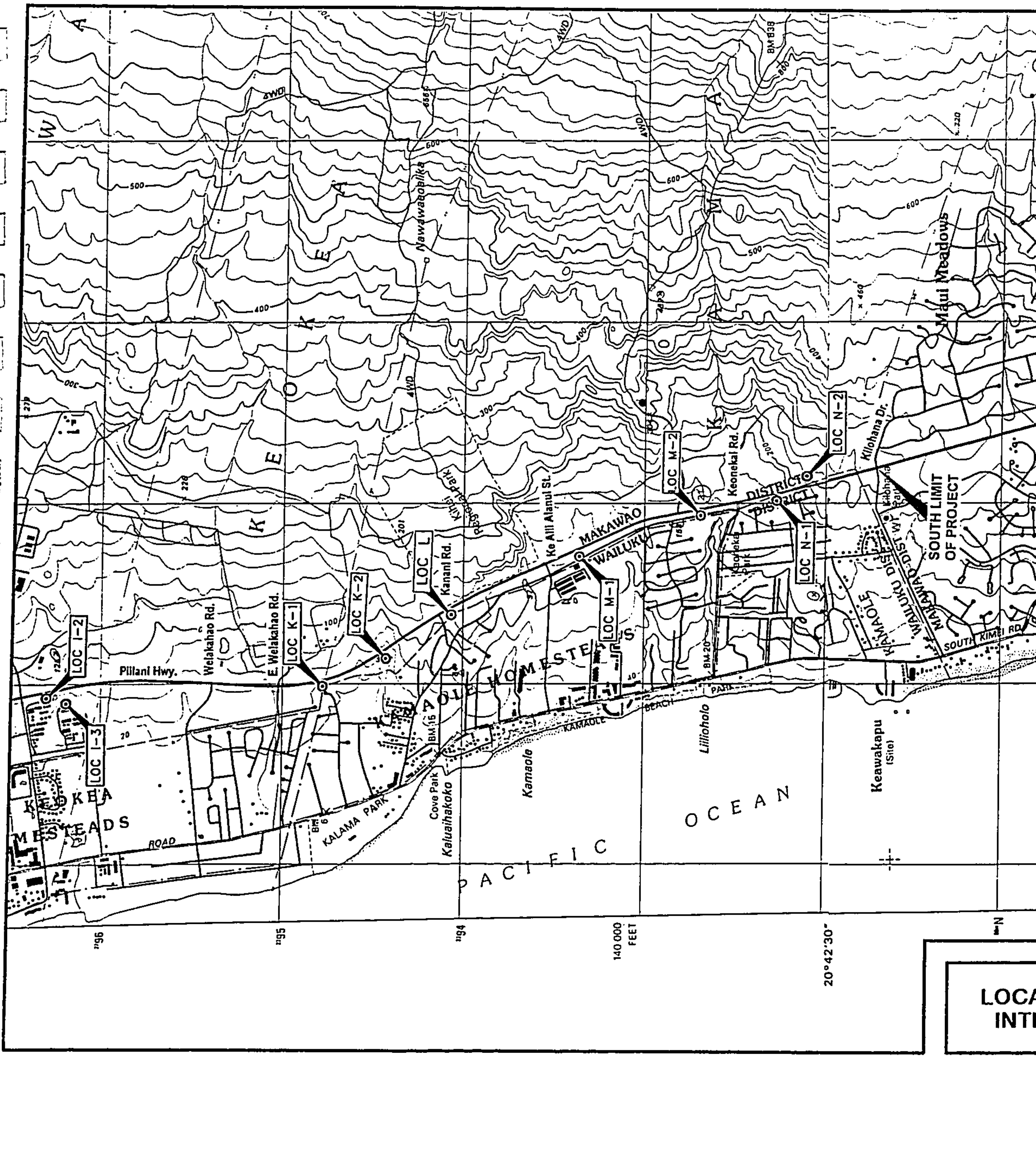


NORTH LIMIT
OF PROJECT
LOC B
LOC C
LOC E
LOC G-1
LOC G-2
LOC G-3
Mokulele Highway
Kihei Road
Piilani Hwy.
Kaleia
Pond
SHOALS
Comm
Tower
Memorial Park
Keahuaiwi Gl
Waiakoa
Gulch
Kaiwahini St.
Uwapo Rd.
Recreation Cer
Kihei Community Center
Moi Pl.
Ohukai St.
AIAKOA
HOMESTEADS
KOA HOMESTEADS
SOUTH
KIHEI
ROAD
Mai Poina Oe Lau
Memorial Park
Kalpukaihina
Kaonoulu St.
VAILURU
KAWAO
Kalepolepo
Park
Kalepolepo
Kulanihakoi St.
WAIOHULI KEOKEA
HOMESTEADS
Kihei
Beach Park
WAIOHULI
Kihei
Hale Piilani
Park
Waiakoa
Water
Tank
Gaging Station
Kulanihakoi
Waipuilani
UPPER
KIHEI
LOWER
PIPELINE
ROAD
LOWRIE
Keahuaiwi
BM 225
BM 87
BM 28
DIST



LOCATIONS OF NOISE MEASUREMENT SITES
INTERIM PIILANI HIGHWAY IMPROVEMENTS

FIGURE
1



LOC I-2
LOC I-3
LOC K-1
LOC K-2
LOC L
LOC M-1
LOC M-2
LOC N-1
LOC N-2
SOUTH LIMIT OF PROJECT
Piilani Hwy.
Welakahao Rd.
E. Welakahao Rd.
Kanani Rd.
Ke Alii Alanui St.
Keonekai Rd.
Kilohana Dr.
Maui Meadows
Nawawaeolika
MAKAWAO
WAILUKU
DISTRICT
KAMAOLE
KALAMA PARK
Cove Park
Kaluaihakoko
Kamaole
Liilioholo
Keawakapu
PACIFIC OCEAN
ROAD
SOUTH KIHEI RD.
140 000 FEET
20°42'30"
LOCA
INTI

LOCATIONS OF NOISE MEASUREMENT SITES
INTERIM PIILANI HIGHWAY IMPROVEMENTS

FIGURE
1 (CONT.)

TABLE 1

IDENTIFICATION OF PROJECT ROADWAY SEGMENTS ALONG PIILANI HIGHWAY

Segment A	North of Mokulele Hwy.
Segment B	Mokulele Hwy. to Uwapo Road
Segment C	Uwapo Road to Moi Place
Segment D	Moi Place to Ohukai Street
Segment E	Ohukai Street to Kaonoulu Street
Segment F	Kaonoulu Street to Kulanihakoi Street
Segment G	Kulanihakoi Street to Piikea Ave.
Segment H	Piikea Ave. to E. Lipoa Street
Segment I	E Lipoa Street to Welakahao Road
Segment J	Welakahao Rd. to E. Welakahao Rd.
Segment K	E. Welakahao Rd. to Kanani Rd.
Segment L	Kanani Road to Ke Alii Alanui
Segment M	Ke Alii Alanui to Keonekai Road
Segment N	Keonekai Road to Kilohana Drive
Segment O	South of Kilohana Drive

TABLE 2
TRAFFIC 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)
L	69 FT from the center-line of Piilani Highway and on top of cut (7/3/01)	1316 TO 1417	45	1,694	26	39	69.2	69.0
N-1	56 FT from the center-line of Piilani Highway (7/3/01)	1429 TO 1533	50	1,573	32	26	69.4	69.6
G-1	70 FT from the center-line of Piilani Highway (7/3/01)	1611 TO 1727	39	2,336	31	16	66.6	66.3
G-2	250 FT from the center-line of Piilani Highway (7/3/01)	1613 TO 1625	39	2,321	36	12	55.0	56.6
G-3	163 FT from the center-line of Piilani Highway (7/3/01)	1626 TO 1724	39	2,342	29	17	58.9	60.3
E	63 FT from the center-line of Piilani Highway (7/4/01)	1115 TO 1220	40	1,582	30	21	66.4	66.4

TABLE 2 (CONTINUED)
TRAFFIC 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)
M-1	186 FT from the center-line of Piilani Highway (7/4/01)	1333 TO 1438	40	1,331	17	0	55.9	56.2
C	75 FT from the center-line of Piilani Highway (7/4/01)	1503 TO 1607	40	1,750	28	13	65.3	65.2
B	96 FT from the center-line of Piilani Highway (7/5/01)	628 TO 731	50	1,615	53	16	66.0	66.1
N-2	59 FT from the center-line of Piilani Highway (7/5/01)	754 TO 857	55	1,114	24	11	69.4	69.0
G-1	70 FT from the center-line of Piilani Highway (7/5/01)	924 TO 1027	53	1,724	57	24	69.4	69.4
I-2	152 FT from the center-line of Piilani Highway (7/5/01)	1057 TO 1204	40	1,597	29	29	59.2	60.7

TABLE 2 (CONTINUED)
TRAFFIC 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)
I-1	219 FT from the center-line of Piilani Highway (7/5/01)	1225 TO 1328	40	1,773	45	36	57.7	58.4
N-1	56 FT from the center-line of Piilani Highway (7/5/01)	1416 TO 1519	53	1,371	23	24	70.1	70.0
N-2	59 FT from the center-line of Piilani Highway (7/5/01)	1530 TO 1634	55	1,629	24	14	70.2	70.5
B	96 FT from the center-line of Piilani Highway (7/5/01)	1655 TO 1758	40	2,148	27	5	63.5	63.8
N-2	59 FT from the center-line of Piilani Highway (7/6/01)	603 TO 706	57	800	22	3	68.6	67.9
B	96 FT from the center-line of Piilani Highway (7/6/01)	721 TO 824	50	1,783	49	34	66.4	66.9

TABLE 2 (CONTINUED)
TRAFFIC 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)
K-1	104 FT from the center-line of Piilani Highway (7/6/01)	852 TO 955	40	1,557	51	19	60.7	61.3
K-2	78 FT from the center-line of Piilani Highway (7/6/01)	1008 TO 1112	38	1,508	23	18	64.2	64.5
I-3	150 FT from the center-line of Piilani Highway (7/6/01)	1145 TO 1248	40	1,735	32	25	57.4	57.3
L	76 FT from the center-line of Piilani Highway (7/6/01)	1325 TO 1428	55	1,825	34	15	70.2	69.6
M-2	123 FT from the center-line of Piilani Highway (7/6/01)	1448 TO 1551	47	1,642	27	10	63.0	63.2
B	96 FT from the center-line of Piilani Highway (7/6/01)	1612 TO 1715	40	2,255	35	9	64.9	64.2

TABLE 2 (CONTINUED)
TRAFFIC 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)
N-2	59 FT from the center-line of Piilani Highway (7/6/01)	1735 TO 1838	55	1,218	9	2	69.0	68.7

predicted traffic noise levels were highest during the AM peak hour at some locations due to traffic congestion and lower average vehicle speeds during the PM peak hour. For this reason, predictions of traffic noise levels for both the AM and PM peak hours were performed for this study, and the periods with the highest noise levels were used to model the highest traffic noise levels.

The Equivalent (or Average) Hourly Sound Level [Leq(h)] noise descriptor was used to calculate the Base Year and CY 2011 traffic noise levels as required by Reference 3. Aerial photomaps, tax maps, and project plans (where available) of the area were used to determine terrain, ground cover, and local shielding effects and distances from building structures, which were entered into the noise prediction model. Topographic maps of the areas outside the highway Rights-of-Way were not available, so receptor elevations were assumed to be equal to the original ground elevations along the highway centerline.

Future year (2011) traffic noise levels were then developed for the No Build and Build (roadway improvement) Alternatives using the future traffic assignments of Reference 2. Forecast traffic volumes, mixes, and speeds for Year 2011 were initially assumed to be identical to their Base Year values for the No Build and Build Alternatives. The CY 2011 traffic assignments for the No Build and Build Alternatives were also assumed to be identical. Future traffic noise levels were also evaluated for conditions with 5 mile per hour reductions in average vehicle speeds, which may occur as a result of reducing the posted speed limit from 45 to 40 mph.

Impact Assessments and Mitigation. Following the calculation of the future traffic noise levels, evaluations of the future traffic noise levels and impacts at noise sensitive receptor locations along Piilani Highway within the limits of construction were made. Comparisons of predicted future traffic noise levels with FHWA and HDOT noise abatement criteria (see Table 3) were made to determine specific locations where the noise abatement criteria are expected to be exceeded.

The HDOT 66 Leq(h) noise abatement criteria and the HDOT "greater than 15 dB increase" criteria were applied to all noise sensitive buildings along the project corridor. By Reference 4, the HDOT has replaced the FHWA 67 Leq(h) criteria with their 66 Leq(h) criteria. Along the project corridor, the locations of the 66 and 71 Leq(h) traffic noise contours, without the benefit of shielding from natural terrain or man-made sound barriers, were also used to identify noise sensitive and commercial receptor locations, respectively, where the HDOT's noise abatement criteria would not be exceeded, and which would not require more detailed evaluations. In addition, the HDOT's criteria of "greater than 15 dB increase above existing background noise levels" was also used as a noise abatement criteria for this project (from Reference 4). Where noise mitigation measures were indicated for this project, the effectiveness of sound attenuation barriers and other possible noise mitigation measures were evaluated. The ability to meet the HDOT criteria of 5 dBA noise reduction was also examined for various barrier heights.

TABLE 3

FHWA & DOTH NOISE ABATEMENT CRITERIA
[Hourly A–Weighted Sound Level––Decibels (dBA)]

ACTIVITY CATEGORY	LEQ (h)*	DESCRIPTION OF ACTIVITY CATEGORY
A	57 (Exterior)	Lands on which serenity and quiet are of extra–ordinary significance and serve an important public need and where the preservation of those qualities is essential if the areas are to continue to serve their intended purpose.
B	67 (Exterior)	Picnic areas, recreation areas, playgrounds, activity sports areas, parks, residences, motels, hotels, churches, libraries, and hospitals.
C	72 (Exterior)	Developed lands, properties, or activities not included in Categories A or B above.
D	------	Undeveloped lands.
E	52 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

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* The Hawaii State Department of Transportation, Highways Division, utilizes Leq criteria levels which are 1 Leq unit less than the FHWA values shown.

CHAPTER III. EXISTING ACOUSTICAL ENVIRONMENT

For the purposes of this study, 2001 was used as the Base Year for computing changes in traffic noise levels between the No Build and Build Alternatives. The Base Year noise environment along the project corridor was described by computing the Hourly Equivalent Sound Levels [Leq(h)] along the existing roadway during the AM and PM peak traffic hours for the 2001 time period. The hourly sound levels, expressed in decibels, represent the average levels of traffic noise along the project roadways during the AM or PM peak hour of the study's Base Year.

Table 4 presents the traffic volume, speed, and mix assumptions used to calculate the Base Year noise levels during the AM and PM peak hours along the existing Piilani Highway. Shown in Table 4 are the calculated AM and PM peak hour Leq(h)'s at reference distances of 50, 100, and 150 FT from the geometrical centerlines of the inbound and outbound lanes of the highway. The calculated distances to the 66 and 71 Leq noise contour lines under unobstructed, line-of-sight conditions to the roadway are shown in Table 5 for the AM and PM peak hours. The actual distances to the contour lines will generally be less than indicated in Table 5 when intervening structures or terrain obstructions exist between the roadway and a receptor. This reduction (or shrinkage) of the traffic noise contour distances from the roadway's centerline is the result of noise shielding (or attenuation) effects caused by the intervening structures or natural terrain features.

By using the traffic noise data shown in Tables 4 and 5, and aerial photomaps of the existing improvements on the west (makai) and east (mauka) sides of the project corridor, the relationship of the existing free-field traffic noise contours to existing noise sensitive dwellings and public use structures in the project area were obtained. No park lands border the project corridor. Additional evaluations were performed using the FHWA Traffic Noise Model at the public and private structures where the HDOT noise abatement criteria may be exceeded along the project corridor during the Base Year.

Table 6 presents the Base Year traffic noise levels at the various noise sensitive structures on both sides of the Rights-of-Way. The relationships of these receptor locations to the existing highway are shown in Figures 2 through 9. The existing traffic noise levels exceed the 66 Leq criteria at approximately 81 single family and one multifamily structures within the limits of project construction. From Table 6, existing traffic noise levels exceed the 66 Leq criteria at most of the residences located within 100 feet from the centerline of the highway. Existing traffic noise levels do not exceed the 66 Leq criteria at the Kihei Community Center/Pool Complex or at the Kihei and Lokelani Intermediate Schools which are located near the South Lipoa Street intersection. Traffic noise measurements at Locations I-1, I-2, and I-3 indicated that existing noise levels do not exceed the 66 Leq criteria at the Kihei and Lokelani Intermediate Schools. The Kihei Community Center is located at least 125 feet from the centerline of Piilani Highway, and is shielded by the edge of the highway cut/berm, and is also air conditioned, so traffic noise mitigation measures at the community center are not required.

TABLE 4

CY 2001 TRAFFIC VOLUMES AND NOISE LEVELS ALONG PIILANI HIGHWAY AND AT VARIOUS DISTANCES FROM THE CENTERLINE

PIILANI HWY. SEGMENT	SPEED (MPH)	TOTAL VPH	AUTOS	MEDIUM TRUCKS	HEAVY TRUCKS	***** HOURLY LEQ IN dB ***** @ 50'	@ 100'	@ 150'
N. of Uwapo Road (Seg. B) (AM)	50	2,160	2,074	54	32	72.1	68.0	64.9
N. of Uwapo Road (Seg. B) (PM)	40	2,295	2,250	34	11	68.9	65.1	62.1
S. of Uwapo Road (Seg. C) (AM)	50	2,065	1,982	52	31	71.9	67.9	64.7
S. of Uwapo Road (Seg. C) (PM)	40	2,320	2,273	35	12	69.0	65.2	62.2
N. of Ohukai Road (Seg. D) (AM)	50	2,025	1,944	51	30	71.8	67.8	64.6
N. of Ohukai Road (Seg. D) (PM)	40	2,355	2,308	35	12	69.0	65.3	62.2
S. of Ohukai Road (Seg. E) (AM)	50	1,950	1,872	49	29	71.6	67.6	64.4
S. of Ohukai Road (Seg. E) (PM)	40	2,300	2,253	35	12	68.9	65.2	62.1
N. of Piikea Avenue (Seg. G) (AM)	52	2,175	2,088	54	33	72.6	68.5	65.3
N. of Piikea Avenue (Seg. G) (PM)	40	2,445	2,396	37	12	69.2	65.4	62.4
S. of Piikea Avenue (Seg. H) (AM)	52	2,110	2,025	53	32	72.5	68.4	65.2
S. of Piikea Avenue (Seg. H) (PM)	40	2,455	2,406	37	12	69.2	65.5	62.4
N. of Lipoa Street (Seg. H) (AM)	52	2,110	2,025	53	32	72.5	68.4	65.2
N. of Lipoa Street (Seg. H) (PM)	40	2,440	2,391	37	12	69.2	65.4	62.4
S. of Lipoa Street (Seg. I) (AM)	52	1,835	1,761	46	28	71.9	67.8	64.6
S. of Lipoa Street (Seg. I) (PM)	40	2,145	2,102	32	11	68.6	64.9	61.8
N. of Ke Alii Alanui St. (Seg. L) (AM)	50	1,620	1,555	41	24	70.8	66.8	63.6
N. of Ke Alii Alanui St. (Seg. L) (PM)	50	1,680	1,647	25	8	70.3	66.2	63.0
S. of Ke Alii Alanui St. (Seg. M) (AM)	45	1,265	1,240	19	6	67.8	63.8	60.7
S. of Ke Alii Alanui St. (Seg. M) (PM)	45	1,435	1,406	22	7	68.3	64.4	61.2
N. of Kilohana Drive (Seg. N) (AM)	55	1,220	1,184	24	12	70.5	66.2	63.0
N. of Kilohana Drive (Seg. N) (PM)	55	1,665	1,615	25	25	72.0	67.6	64.5
S. of Kilohana Drive (Seg. O) (AM)	50	985	955	20	10	68.4	64.3	61.1
S. of Kilohana Drive (Seg. O) (PM)	50	1,365	1,325	20	20	69.9	65.8	62.6

Notes:

1. See Table 1 for identification of Piilani Highway roadway segments.
2. All distances shown are from the center of Piilani Highway.

TABLE 5

YEAR 2001 AND 2011 DISTANCES TO 66 AND 71 LEQ CONTOURS (AM AND PM PEAK HOURS)

STREET SECTION	66 Leq SETBACK (FT) EXISTING	66 Leq SETBACK (FT) CY 2011	71 Leq SETBACK (FT) EXISTING	71 Leq SETBACK (FT) CY 2011
N. of Uwapo Road (Seg. B) (AM)	130	158	60	82
N. of Uwapo Road (Seg. B) (PM)	89	112	34	52
S. of Uwapo Road (Seg. C) (AM)	127	156	58	80
S. of Uwapo Road (Seg. C) (PM)	90	112	35	52
N. of Ohukai Road (Seg. D) (AM)	126	156	57	80
N. of Ohukai Road (Seg. D) (PM)	91	114	34	52
S. of Ohukai Road (Seg. E) (AM)	122	156	55	80
S. of Ohukai Road (Seg. E) (PM)	90	112	34	52
N. of Piikea Avenue (Seg. G) (AM)	137	158	66	82
N. of Piikea Avenue (Seg. G) (PM)	92	108	36	50
S. of Piikea Avenue (Seg. H) (AM)	136	154	64	80
S. of Piikea Avenue (Seg. H) (PM)	94	108	36	50
N. of Lipoa Street (Seg. H) (AM)	136	154	64	80
N. of Lipoa Street (Seg. H) (PM)	92	108	36	50
S. of Lipoa Street (Seg. I) (AM)	126	150	58	77
S. of Lipoa Street (Seg. I) (PM)	87	103	32	47
N. of Ke Alii Alanui St. (Seg. L) (AM)	111	132	48	66
N. of Ke Alii Alanui St. (Seg. L) (PM)	103	132	44	67
S. of Ke Alii Alanui St. (Seg. M) (AM)	75	94	29	44
S. of Ke Alii Alanui St. (Seg. M) (PM)	82	108	31	52
N. of Kilohana Drive (Seg. N) (AM)	103	131	46	67
N. of Kilohana Drive (Seg. N) (PM)	123	150	59	79

Notes:

(1) All setback distances are from the roadways' centerlines.
(2) See TABLES 4 and 7A for traffic volume, speed, and mix assumptions.
(3) Setback distances are for unobstructed line-of-sight conditions.
(4) Soft ground conditions assumed along all roadways.

TABLE 6

EXISTING AND FUTURE TRAFFIC NOISE LEVELS WITHOUT AND WITH 5 MPH SPEED REDUCTION (4.92 FT RECEPTOR, AM OR PM PEAK HOUR)

RECEPTOR LOCATION	PEAK HOUR	EXISTING (CY 2001) Leq	FUTURE (CY 2011) Leq NO BUILD / (CHANGE)	FUTURE (CY 2011) Leq BUILD / (CHANGE)	FUTURE (CY 2011) Leq -5 MPH / (CHANGE)
ROADWAY SEGMENT B (MAKAI):					
Receiver 3-8-77:010	AM	68.2 *	69.9 /1.7 *	69.4 /1.2 *	68.3 /0.1 **
ROADWAY SEGMENT C (MAKAI):					
Receiver 3-8-77:001-A	AM	64.9	66.5 /1.6 *	66.8 /1.9 *	65.7 /0.8 **
Receiver 3-8-77:001-B	AM	65.2	66.8 /1.6 *	67.1 /1.9 *	66.0 /0.8 **
Receiver 3-8-77:001-C	AM	66.9 *	68.5 /1.6 *	68.4 /1.5 *	67.3 /0.4 **
Receiver 3-8-77:001-D	AM	68.4 *	70.0 /1.6 *	70.2 /1.8 *	69.1 /0.7 **
Receiver 3-8-77:001-E	AM	68.6 *	70.2 /1.6 *	70.6 /2.0 *	69.4 /0.8 **
Receiver 3-8-77:001-F	AM	67.2 *	68.8 /1.6 *	69.0 /1.8 *	67.8 /0.6 **
ROADWAY SEGMENT C (MAUKA):					
Receiver 3-8-74:017	AM	64.5	66.1 /1.6 *	66.2 /1.7 *	65.2 /0.7 **
Receiver 3-8-74:016	AM	64.6	66.2 /1.6 *	66.5 /1.9 *	65.4 /0.8 **
Receiver 3-8-74:015	AM	65.8	67.4 /1.6 *	67.2 /1.4 *	66.1 /0.3 **
Receiver 3-8-74:014	AM	63.3	64.9 /1.6	65.2 /1.9	64.2 /0.9
Receiver 3-8-74:013	AM	66.2 *	67.8 /1.6 *	68.3 /2.1 *	67.2 /1.0 **
Receiver 3-8-74:012	AM	68.2 *	69.8 /1.6 *	69.9 /1.7 *	68.7 /0.5 **
Receiver 3-8-74:011	AM	67.7 *	69.3 /1.6 *	69.3 /1.6 *	68.1 /0.4 **
Receiver 3-8-74:010	AM	67.3 *	68.9 /1.6 *	69.0 /1.7 *	67.9 /0.6 **
Receiver 3-8-74:009	AM	68.0 *	69.6 /1.6 *	70.0 /2.0 *	68.9 /0.9 **
Receiver 3-8-74:008	AM	68.8 *	70.4 /1.6 *	70.6 /1.8 *	69.4 /0.6 **
Receiver 3-8-74:007	AM	67.9 *	69.5 /1.6 *	69.8 /1.9 *	68.6 /0.7 **
Receiver 3-8-74:006	AM	69.2 *	70.8 /1.6 *	70.7 /1.5 *	69.6 /0.4 **
Receiver 3-8-74:005	AM	68.4 *	70.0 /1.6 *	70.3 /1.9 *	69.2 /0.8 **
Receiver 3-8-74:004	AM	68.6 *	70.2 /1.6 *	69.6 /1.0 *	68.5 /-0.1 **
Receiver 3-8-74:003	AM	66.5 *	68.1 /1.6 *	68.2 /1.7 *	67.1 /0.6 **
Receiver 3-8-74:002	AM	66.1 *	67.7 /1.6 *	68.0 /1.9 *	66.9 /0.8 **
Receiver 3-8-74:001-A	AM	66.5 *	68.1 /1.6 *	68.3 /1.8 *	67.2 /0.7 **
Receiver 3-8-74:001-B	AM	66.9 *	68.5 /1.6 *	68.5 /1.6 *	67.3 /0.4 **
Receiver 3-8-74:001-C	AM	66.7 *	68.3 /1.6 *	68.8 /2.1 *	67.6 /0.9 **
Receiver 3-8-74:001-D	AM	68.7 *	70.3 /1.6 *	70.3 /1.6 *	69.1 /0.4 **
Receiver 3-9-24:027	AM	67.8 *	69.4 /1.6 *	70.1 /2.3 *	68.9 /1.1 **
ROADWAY SEGMENT D (MAKAI):					
Receiver 3-9-29:031	AM	67.8 *	69.5 /1.7 *	69.3 /1.5 *	68.0 /0.2 **
Receiver 3-9-29:003	AM	67.6 *	69.3 /1.7 *	69.3 /1.7 *	68.0 /0.4 **
Receiver 3-9-29:034	AM	67.4 *	69.1 /1.7 *	69.3 /1.9 *	68.1 /0.7 **
Receiver 3-9-01:139	AM	67.5 *	69.2 /1.7 *	69.3 /1.8 *	68.1 /0.6 **

TABLE 6 (CONTINUED)

EXISTING AND FUTURE TRAFFIC NOISE LEVELS WITHOUT AND WITH 5 MPH SPEED REDUCTION (4.92 FT RECEPTOR, AM OR PM PEAK HOUR)

RECEPTOR LOCATION	PEAK HOUR	EXISTING (CY 2001) Leq	FUTURE (CY 2011) Leq — NO BUILD / (CHANGE)	BUILD / (CHANGE)	-5 MPH / (CHANGE)
ROADWAY SEGMENT D (MAUKA):					
Receiver 3-9-24: 002	AM	66.7 *	68.4 /1.7 *	69.2 /2.5 *	68.0 /1.3 **
Receiver 3-9-47:101	AM	69.6 *	71.3 /1.7 *	72.1 /2.5 *	70.8 /1.2 **
Receiver 3-9-47:102	AM	69.6 *	71.3 /1.7 *	72.2 /2.6 *	70.9 /1.3 **
Receiver 3-9-47:103	AM	69.7 *	71.4 /1.7 *	71.9 /2.2 *	70.6 /0.9 **
Receiver 3-9-47:105	AM	67.4 *	69.1 /1.7 *	69.5 /2.1 *	68.3 /0.9 **
ROADWAY SEGMENT E (MAUKA):					
Receiver 3-9-45:010	AM	69.9	71.8 /1.9 *	72.2 /2.3 *	70.8 /0.9 **
Receiver 3-9-45:007/008	AM	70.3	72.2 /1.9 *	72.7 /2.4 *	71.3 /1.0 **
ROADWAY SEGMENT E (MAKAI):					
Receiver 3-9-39:012	AM	61.0	62.9 /1.9	62.2 /1.2	60.9 /-0.1
Receiver 3-9-39:013	AM	62.3	64.2 /1.9	63.8 /1.5	62.5 /0.2
Receiver 3-9-39:065	AM	63.4	65.3 /1.9	65.5 /2.1	64.3 /0.9
Receiver 3-9-39:048	AM	64.7	66.6 /1.9 *	67.1 /2.4 *	66.0 /1.3 **
Receiver 3-9-48:123	AM	69.0 *	70.9 /1.9 *	70.6 /1.6 *	69.5 /0.5 **
Receiver 3-9-48:126	AM	69.1 *	71.0 /1.9 *	71.1 /2.0 *	69.9 /0.8 **
Receiver 3-9-48:127	AM	68.4 *	70.3 /1.9 *	71.1 /2.7 *	70.0 /1.6 **
Receiver 3-9-48:128	AM	67.7 *	69.6 /1.9 *	70.0 /2.3 *	68.8 /1.1 **
Receiver 3-9-48:129	AM	67.3 *	69.2 /1.9 *	68.9 /1.6 *	67.8 /0.5 **
Receiver 3-9-48:130	AM	66.6 *	68.5 /1.9 *	68.4 /1.8 *	67.3 /0.7 **
Receiver 3-9-48:131	AM	66.5 *	68.4 /1.9 *	68.0 /1.5 *	66.9 /0.4 **
Receiver 3-9-48:133	AM	69.1 *	71.0 /1.9 *	70.9 /1.8 *	69.7 /0.6 **
Receiver 3-9-48:134	AM	68.9 *	70.8 /1.9 *	71.0 /2.1 *	69.8 /0.9 **
Receiver 3-9-48:137	AM	69.4 *	71.3 /1.9 *	71.3 /1.9 *	70.1 /0.7 **
Receiver 3-9-48:138	AM	68.9 *	70.8 /1.9 *	70.8 /1.9 *	69.7 /0.8 **
Receiver 3-9-48:141	AM	67.8 *	69.7 /1.9 *	70.0 /2.2 *	68.8 /1.0 **
Receiver 3-9-48:142	AM	66.7 *	68.6 /1.9 *	69.1 /2.4 *	67.9 /1.2 **
Receiver 3-9-48:146	AM	66.2 *	68.1 /1.9 *	68.1 /1.9 *	67.0 /0.8 **
Receiver 3-9-48:147	AM	65.2	67.1 /1.9 *	67.3 /2.1 *	66.2 /1.0 **
Receiver 3-9-48:148	AM	63.8	65.7 /1.9	65.8 /2.0	64.7 /0.9
ROADWAY SEGMENT F (MAKAI):					
Receiver 2-2-25:018	AM	72.4 *	74.3 /1.9 *	73.8 /1.4 *	72.5 /0.1 **
Receiver 2-2-25:019	AM	64.1	66.0 /1.9	64.6 /0.5	63.4 /-0.7
Receiver 2-2-25:020	AM	66.0	67.9 /1.9 *	67.3 /1.3 *	66.1 /0.1 **
Receiver 2-2-25:021	AM	71.3 *	73.2 /1.9 *	72.0 /0.7 *	70.8 /-0.5 **
Receiver 2-2-25:022	AM	71.2 *	73.1 /1.9 *	71.9 /0.7 *	70.7 /-0.5 **
Receiver 2-2-25:023	AM	71.0 *	72.9 /1.9 *	72.1 /1.1 *	70.8 /-0.2 **

TABLE 6 (CONTINUED)

EXISTING AND FUTURE TRAFFIC NOISE LEVELS WITHOUT AND WITH 5 MPH SPEED REDUCTION (4.92 FT RECEPTOR, AM OR PM PEAK HOUR)

RECEPTOR LOCATION	PEAK HOUR	EXISTING (CY 2001) Leq	FUTURE (CY 2011) Leq NO BUILD / (CHANGE)	FUTURE (CY 2011) Leq BUILD / (CHANGE)	FUTURE (CY 2011) Leq -5 MPH / (CHANGE)
ROADWAY SEGMENT G (MAKAI):					
Receiver 2-2-25:024	AM	70.1 *	71.2 /1.1 *	71.3 /1.2 *	70.1 /0.0 **
Receiver 2-2-25:025	AM	68.6 *	69.7 /1.1 *	70.3 /1.7 *	69.0 /0.4 **
Receiver 2-2-25:026	AM	69.7 *	70.8 /1.1 *	70.1 /0.4 *	68.9 /-0.8 **
Receiver 2-2-25:027	AM	66.2 *	67.3 /1.1 *	67.5 /1.3 *	66.3 /0.1 **
Receiver 2-2-25:028	AM	66.1 *	67.2 /1.1 *	67.8 /1.7 *	66.6 /0.5 **
Receiver 2-2-25:029	AM	66.4 *	67.5 /1.1 *	68.0 /1.6 *	66.8 /0.4 **
Receiver 2-2-25:030	AM	66.7 *	67.8 /1.1 *	68.3 /1.6 *	67.1 /0.4 **
Receiver 2-2-25:031	AM	67.2 *	68.3 /1.1 *	68.9 /1.7 *	67.6 /0.4 **
Receiver 2-2-25:032	AM	68.0 *	69.1 /1.1 *	69.8 /1.8 *	68.6 /0.6 **
Receiver 2-2-25:033	AM	68.8 *	69.9 /1.1 *	69.7 /0.9 *	68.5 /-0.3 **
Receiver 2-2-25:034	AM	68.8 *	69.9 /1.1 *	69.4 /0.6 *	68.2 /-0.6 **
Receiver 2-2-25:037	AM	68.9 *	70.0 /1.1 *	69.2 /0.3 *	68.0 /-0.9 **
Receiver 2-2-25:038	AM	70.2 *	71.3 /1.1 *	70.5 /0.3 *	69.3 /-0.9 **
Receiver 2-2-25:039	AM	69.8 *	70.9 /1.1 *	70.8 /1.0 *	69.6 /-0.2 **
ROADWAY SEGMENT N (MAKAI):					
Receiver 3-9-36:035	PM	69.6 *	71.3 /1.7 *	71.8 /2.2 *	70.6 /1.0 **
Receiver 3-9-36:036	PM	68.7 *	70.4 /1.7 *	70.0 /1.3 *	68.9 /0.2 **
Receiver 3-9-36:037	PM	66.6 *	68.3 /1.7 *	68.0 /1.4 *	66.9 /0.3 **
Receiver 3-9-36:038	PM	66.9 *	68.6 /1.7 *	68.3 /1.4 *	67.1 /0.2 **
Receiver 3-9-36:039	PM	66.9 *	68.6 /1.7 *	68.6 /1.7 *	67.5 /0.6 **
Receiver 3-9-36:040	PM	67.7 *	69.4 /1.7 *	69.0 /1.3 *	67.9 /0.2 **
Receiver 3-9-36:041	PM	67.3 *	69.0 /1.7 *	68.9 /1.6 *	67.8 /0.5 **
Receiver 3-9-36:042	PM	68.7 *	70.4 /1.7 *	71.0 /2.3 *	69.8 /1.1 **
Receiver 3-9-36:043	PM	68.3 *	70.0 /1.7 *	70.2 /1.9 *	69.0 /0.7 **
Receiver 3-9-36:044	PM	68.6 *	70.3 /1.7 *	70.5 /1.9 *	69.4 /0.8 **
Receiver 3-9-37:059	PM	66.8 *	68.5 /1.7 *	68.9 /2.1 *	67.7 /0.9 **
Receiver 3-9-37:058	PM	67.4 *	69.1 /1.7 *	69.4 /2.0 *	68.3 /0.9 **
Receiver 3-9-37:057	PM	69.4 *	71.1 /1.7 *	71.0 /1.6 *	69.8 /0.4 **
Receiver 3-9-37:056	PM	68.6 *	70.3 /1.7 *	70.2 /1.6 *	69.1 /0.5 **
Receiver 3-9-37:055	PM	69.4 *	71.1 /1.7 *	70.9 /1.5 *	69.8 /0.4 **
Receiver 3-9-37:054	PM	68.2 *	69.9 /1.7 *	70.0 /1.8 *	68.9 /0.7 **
Receiver 3-9-37:053	PM	69.3 *	71.0 /1.7 *	71.1 /1.8 *	69.9 /0.6 **
Receiver 3-9-37:052	PM	67.2 *	68.9 /1.7 *	69.2 /2.0 *	68.1 /0.9 **
Receiver 3-9-37:051	PM	66.0	67.7 /1.7 *	68.5 /2.5 *	67.4 /1.4 **
Receiver 3-9-37:050	PM	65.3	67.0 /1.7 *	67.0 /1.7 *	65.8 /0.5 **
Receiver 3-9-37:049	PM	65.1	66.8 /1.7 *	66.6 /1.5 *	65.5 /0.4 **
Receiver 3-9-37:022	PM	59.0	60.7 /1.7	60.3 /1.3	59.3 /0.3

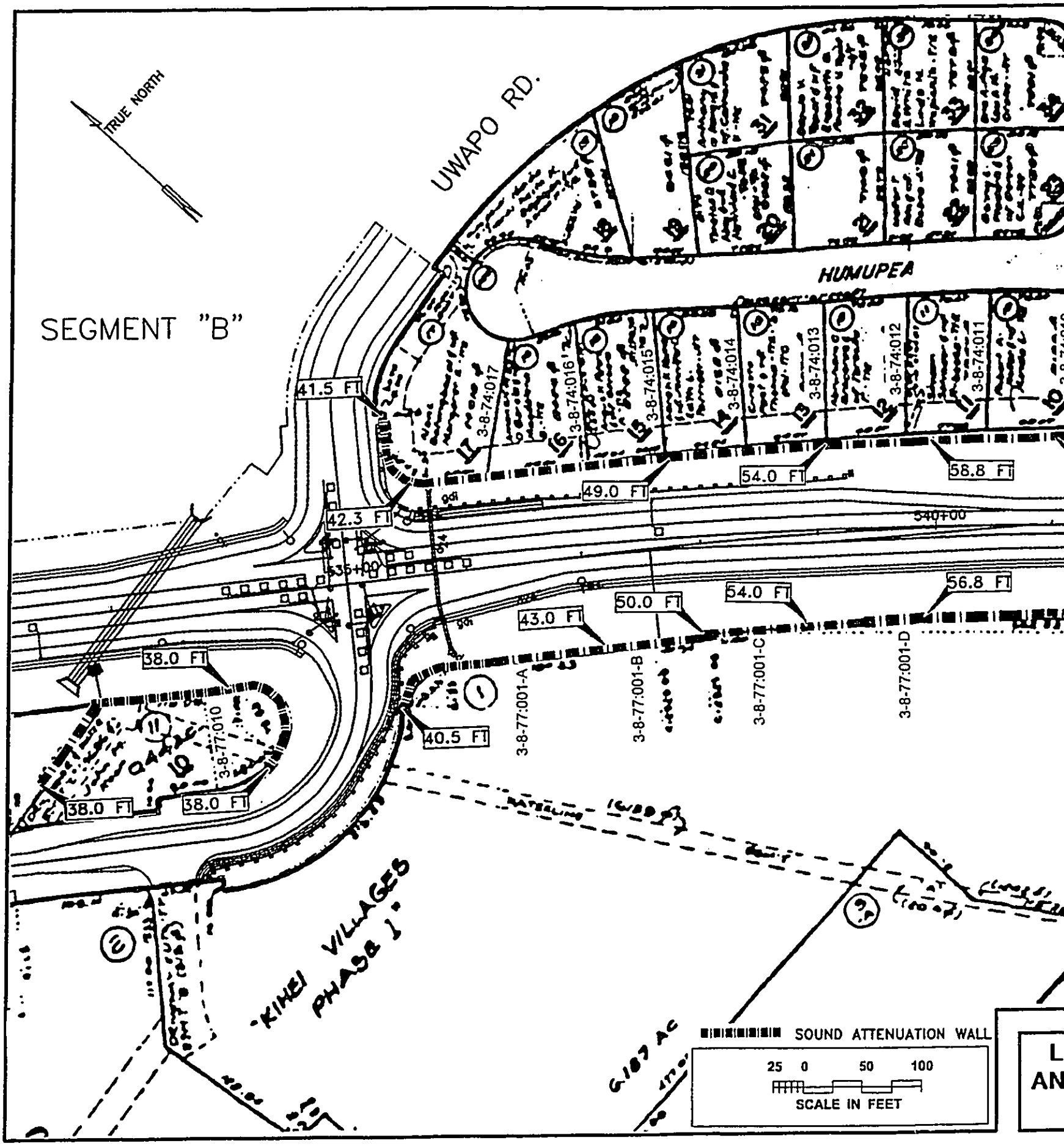
TABLE 6 (CONTINUED)

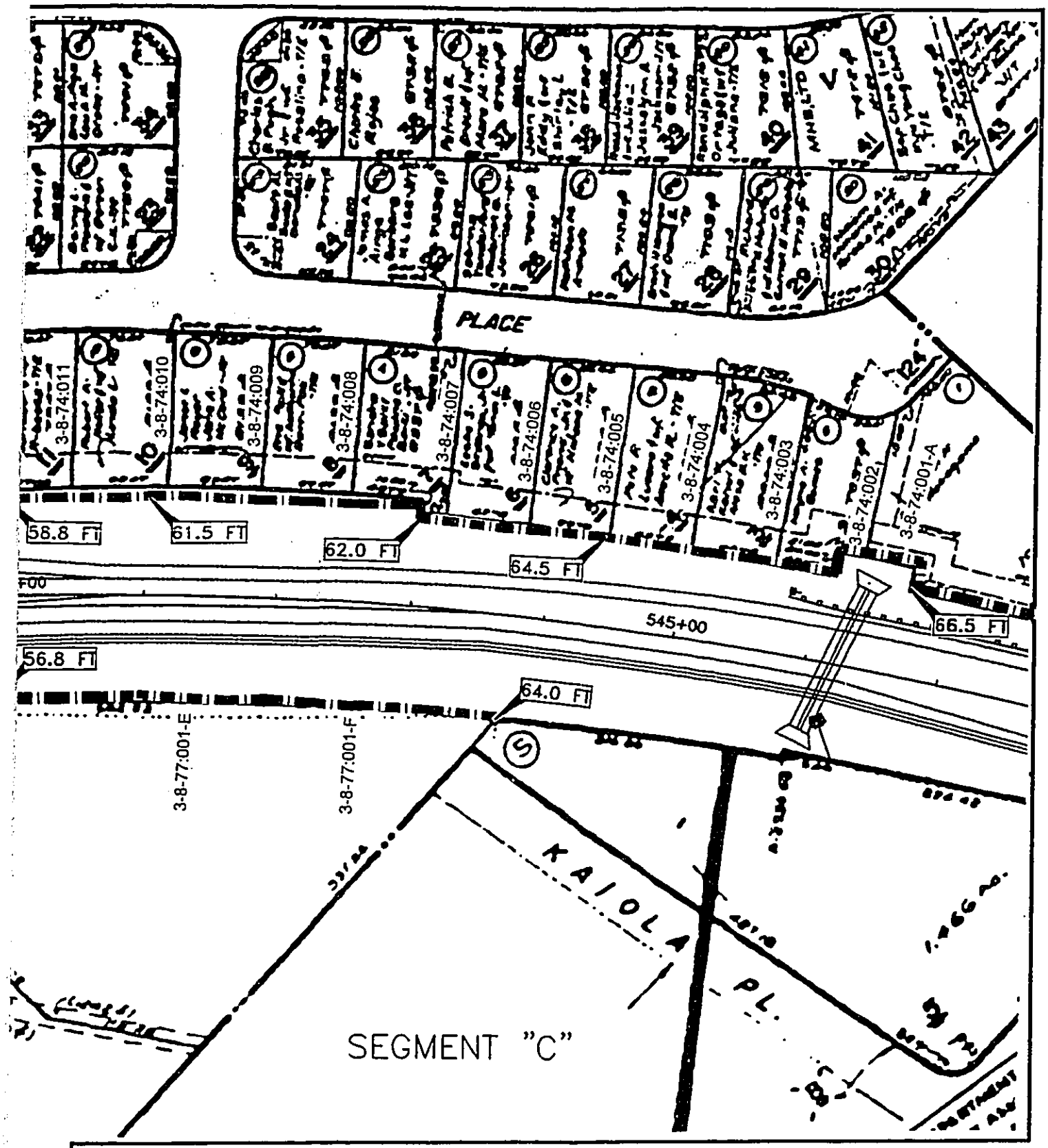
EXISTING AND FUTURE TRAFFIC NOISE LEVELS WITHOUT AND WITH 5 MPH SPEED REDUCTION (4.92 FT RECEPTOR, AM OR PM PEAK HOUR)

RECEPTOR LOCATION	PEAK HOUR	EXISTING (CY 2001) Leq	FUTURE (CY 2011) Leq NO BUILD / (CHANGE)	FUTURE (CY 2011) Leq BUILD / (CHANGE)	FUTURE (CY 2011) Leq -5 MPH / (CHANGE)
ROADWAY SEGMENT N (MAKAI) (Continued):					
Receiver 3-9-37:021	PM	58.2	59.9 /1.7	59.4 / 1.2	58.3 /0.1
Receiver 3-9-37:020	PM	56.7	58.4 /1.7	57.8 / 1.1	56.8 /0.1
ROADWAY SEGMENT N (MAUKA):					
Receiver 2-1-15:016	PM	69.8 *	71.5 /1.7 *	71.3 / 1.5 *	70.2 /0.4 **
Receiver 2-1-15:017	PM	65.6	67.3 /1.7 *	66.6 / 1.0 *	65.5 /-0.1 **

Notes:

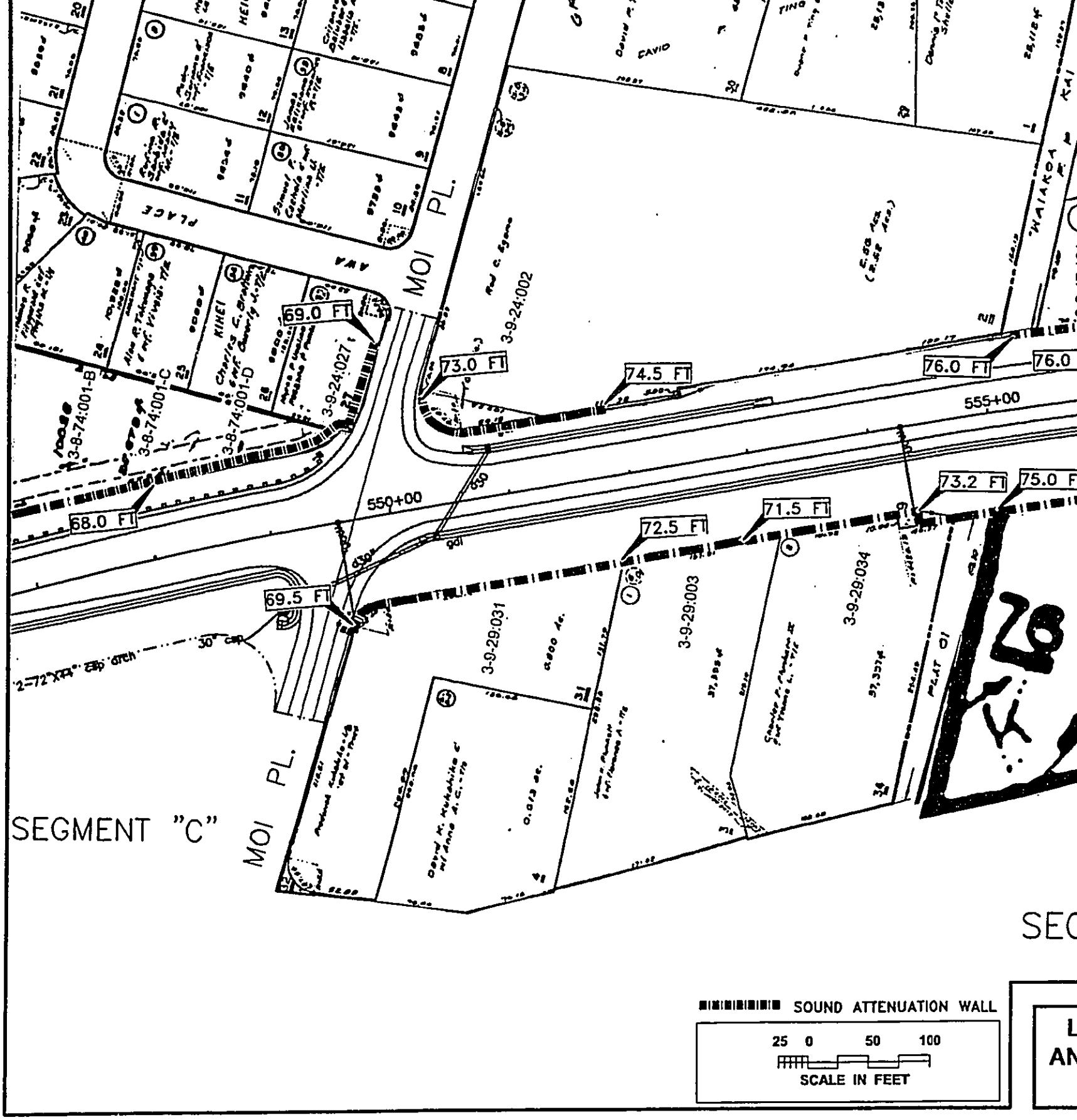
1. All receivers were assumed to be at 4.92 feet above ground level.
2. * Denotes exceedance of HDOT "66 Leq" criteria for residences.
3. ** Denotes noise attenuation does not meet HDOT's 5 dB attenuation criteria for "substantial noise reduction."

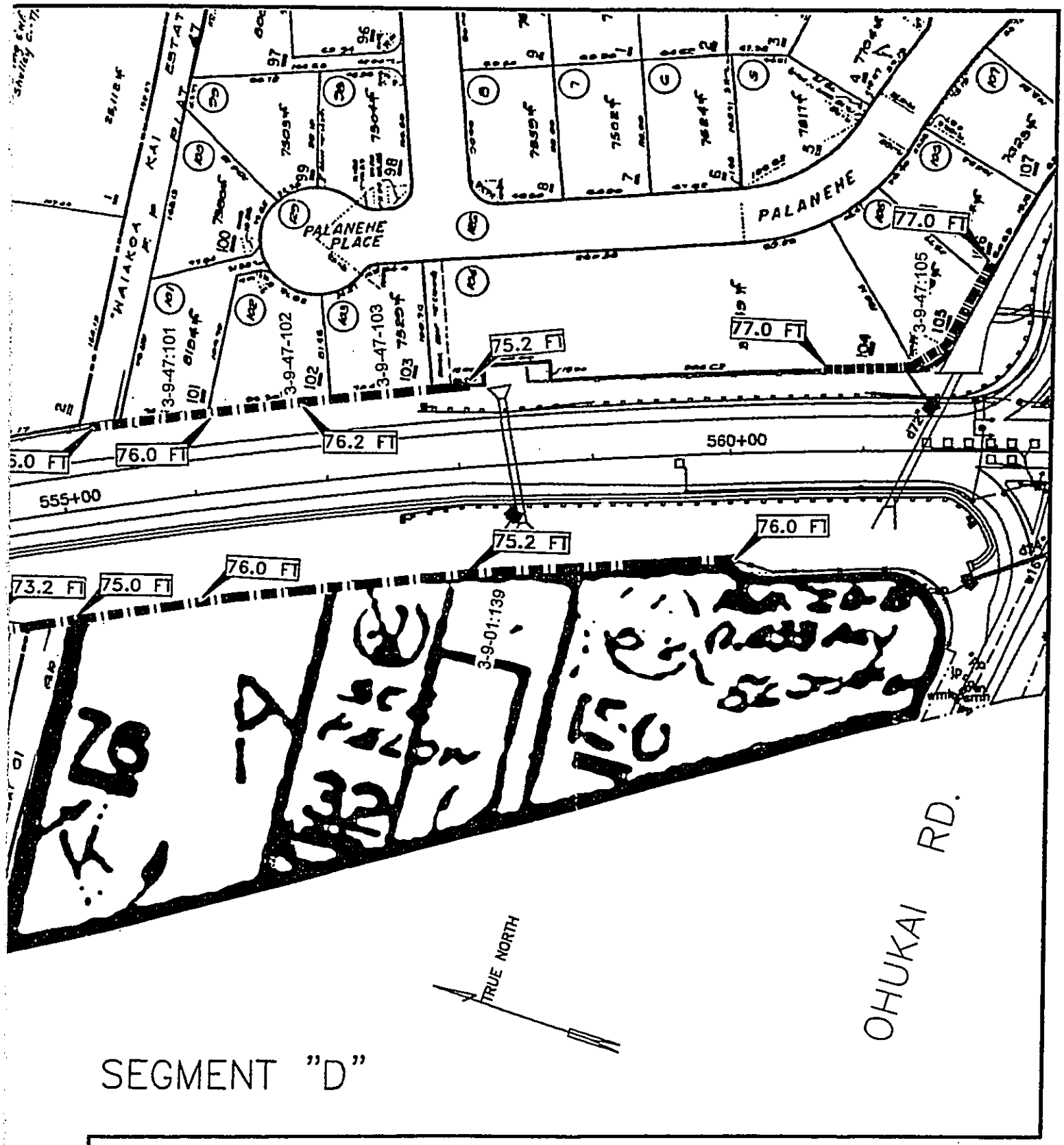




LOCATIONS OF NOISE SENSITIVE RECEPTORS AND TOP ELEVATIONS OF SOUND ATTENUATION WALLS (SEGMENTS B AND C)

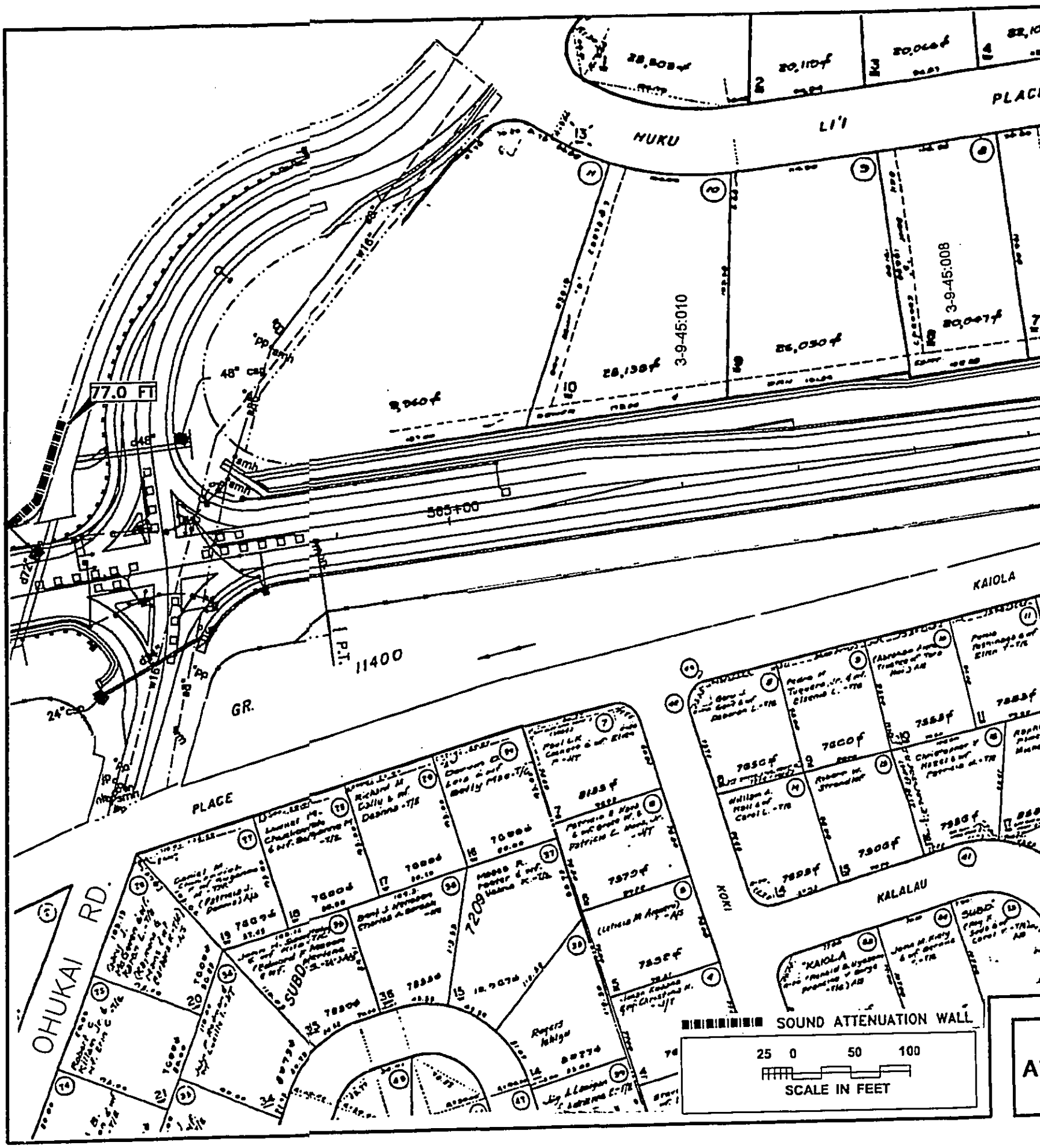
FIGURE 2



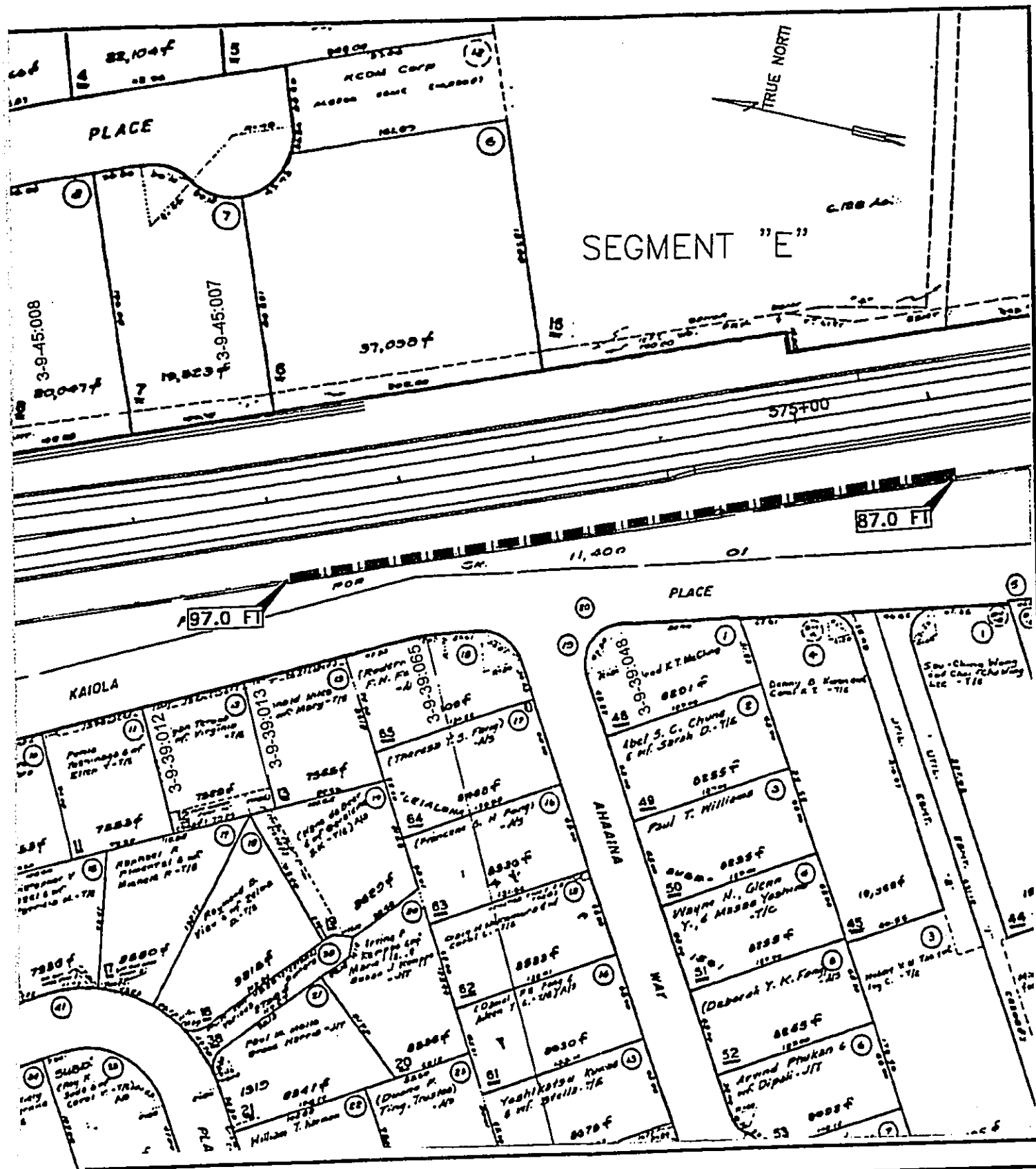


ON WALL	LOCATIONS OF NOISE SENSITIVE RECEPTORS AND TOP ELEVATIONS OF SOUND ATTENUATION WALLS (SEGMENTS C AND D)	FIGURE 3

DOCUMENT CAPTURED AS RECEIVED



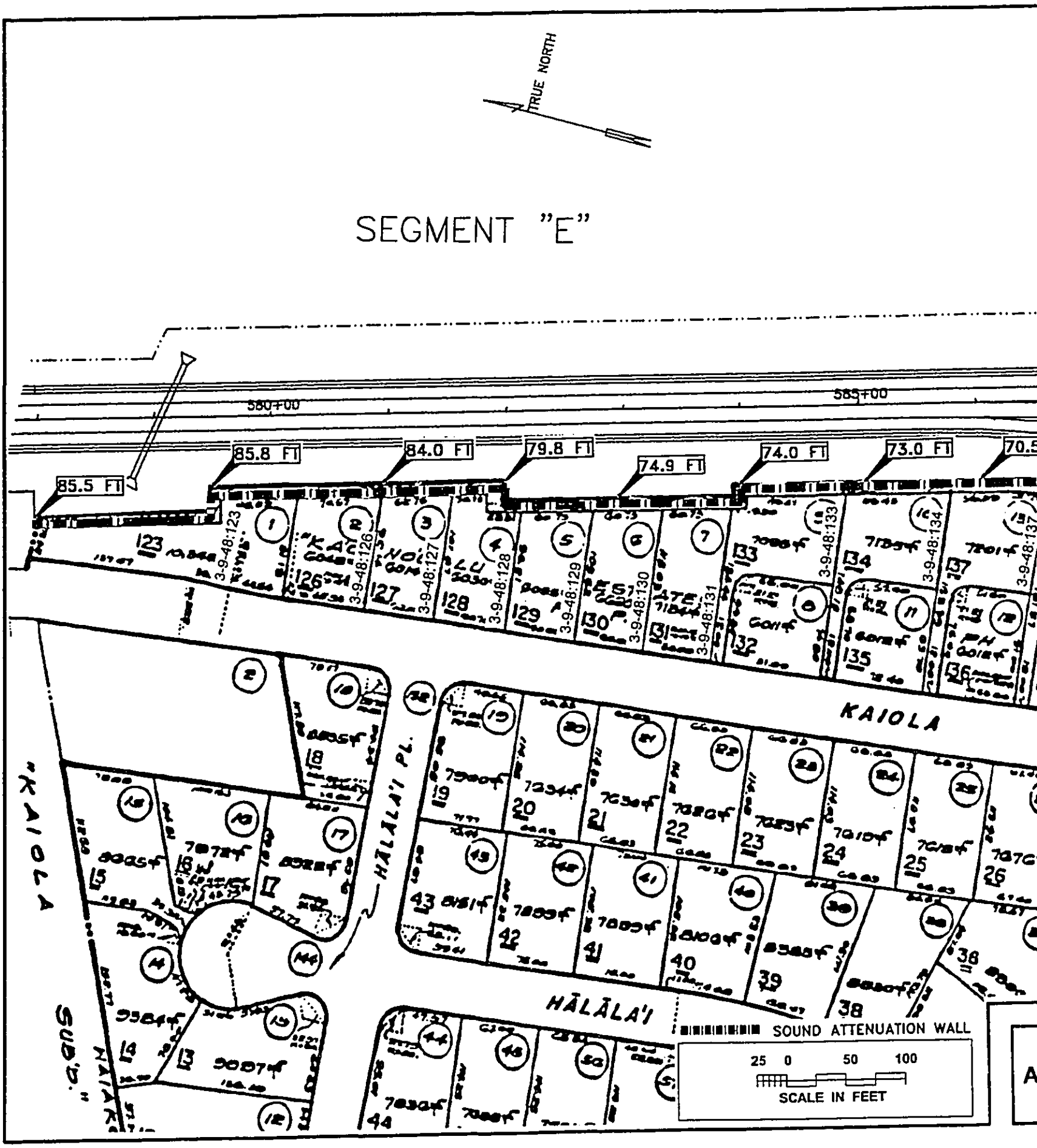
DOCUMENT CAPTURED AS RECEIVED



LOCATIONS OF NOISE SENSITIVE RECEPTORS AND TOP ELEVATIONS OF SOUND ATTENUATION WALLS (SEGMENT E AT OHUKAI RD.)

FIGURE 4

DOCUMENT CAPTURED AS RECEIVED



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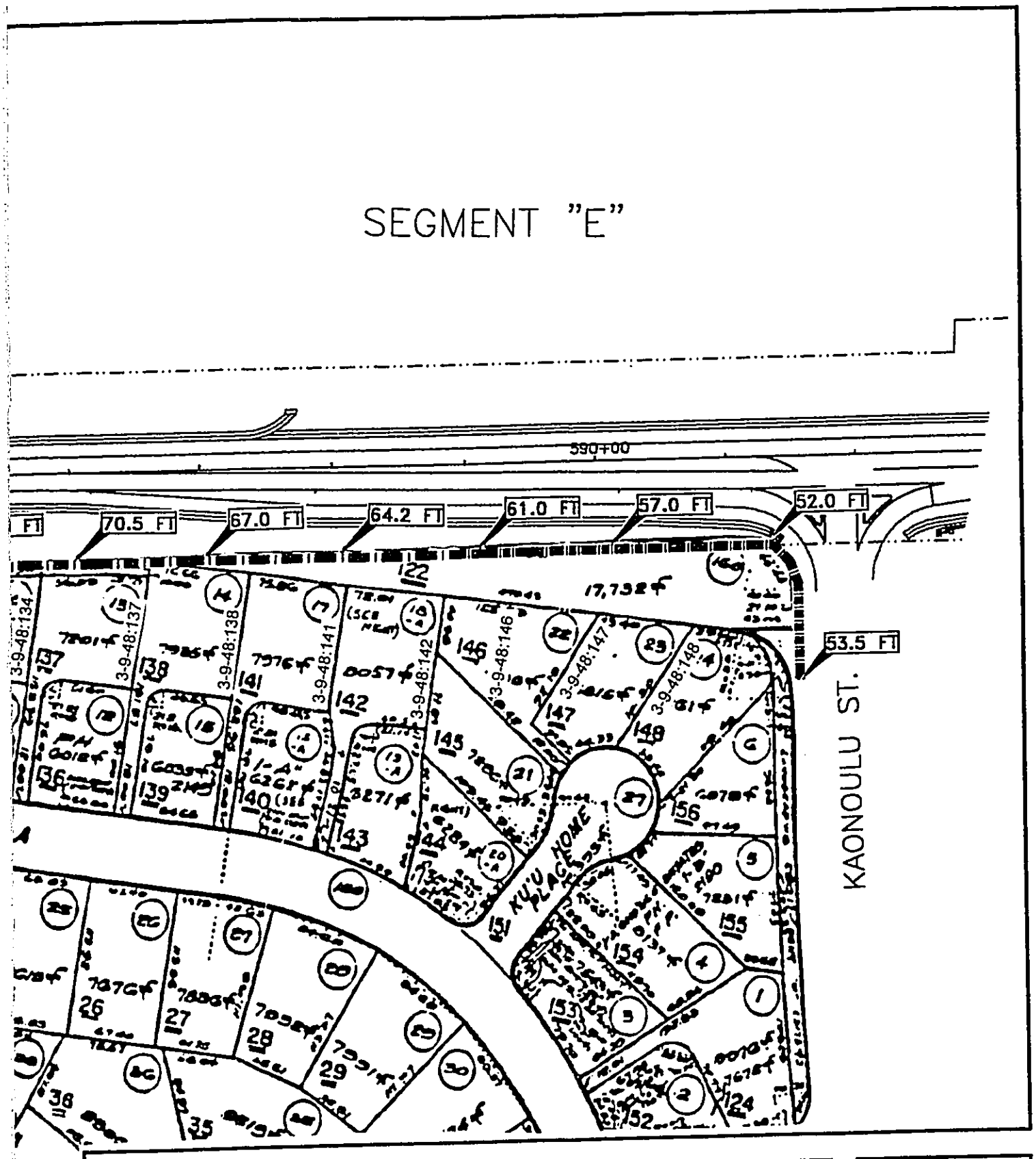
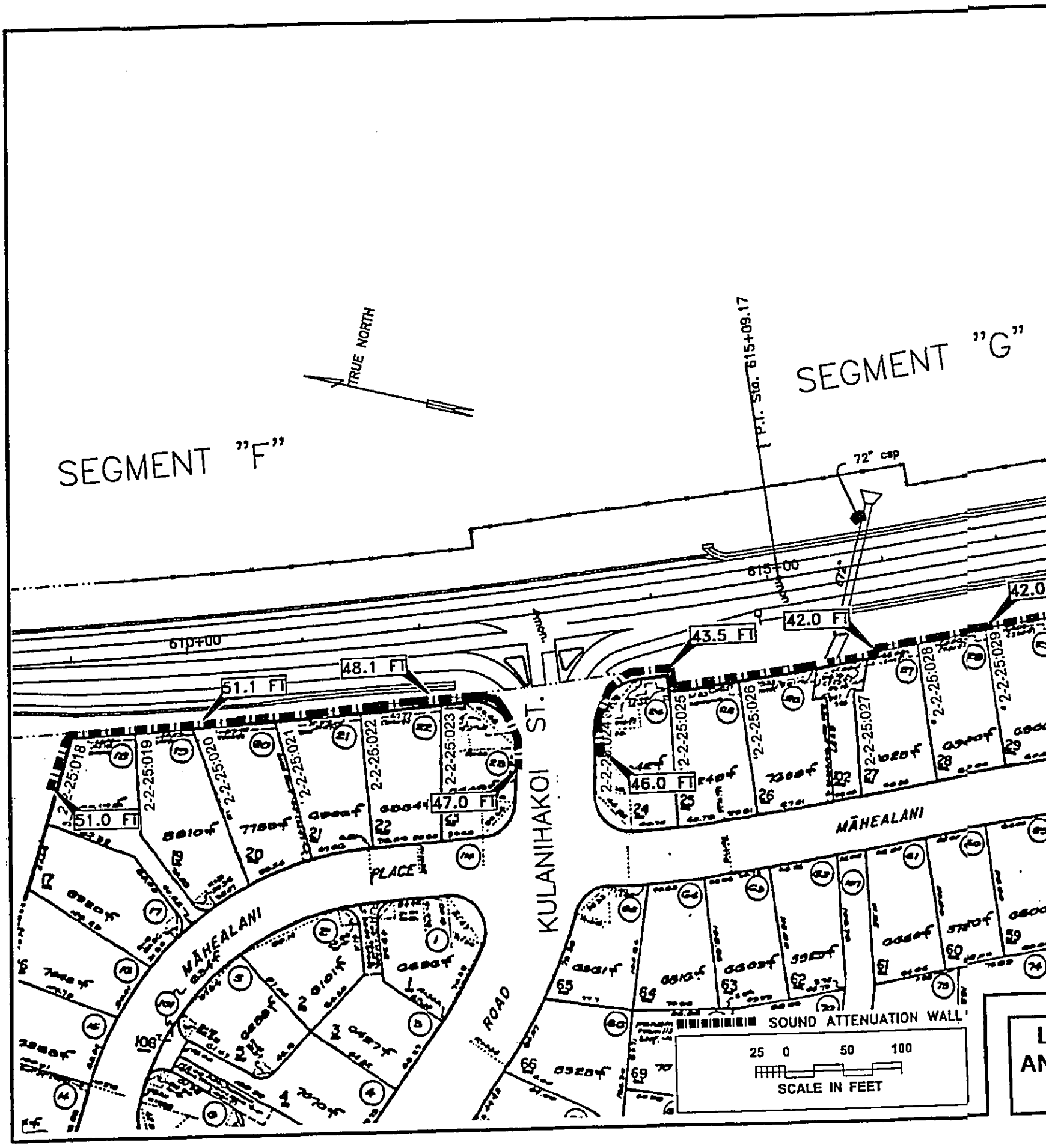


LOCATIONS OF NOISE SENSITIVE RECEPTORS AND TOP ELEVATIONS OF SOUND ATTENUATION WALLS (SEGMENT E AT KAONOULU ST.)

FIGURE 5

DOCUMENT CAPTURED AS RECEIVED



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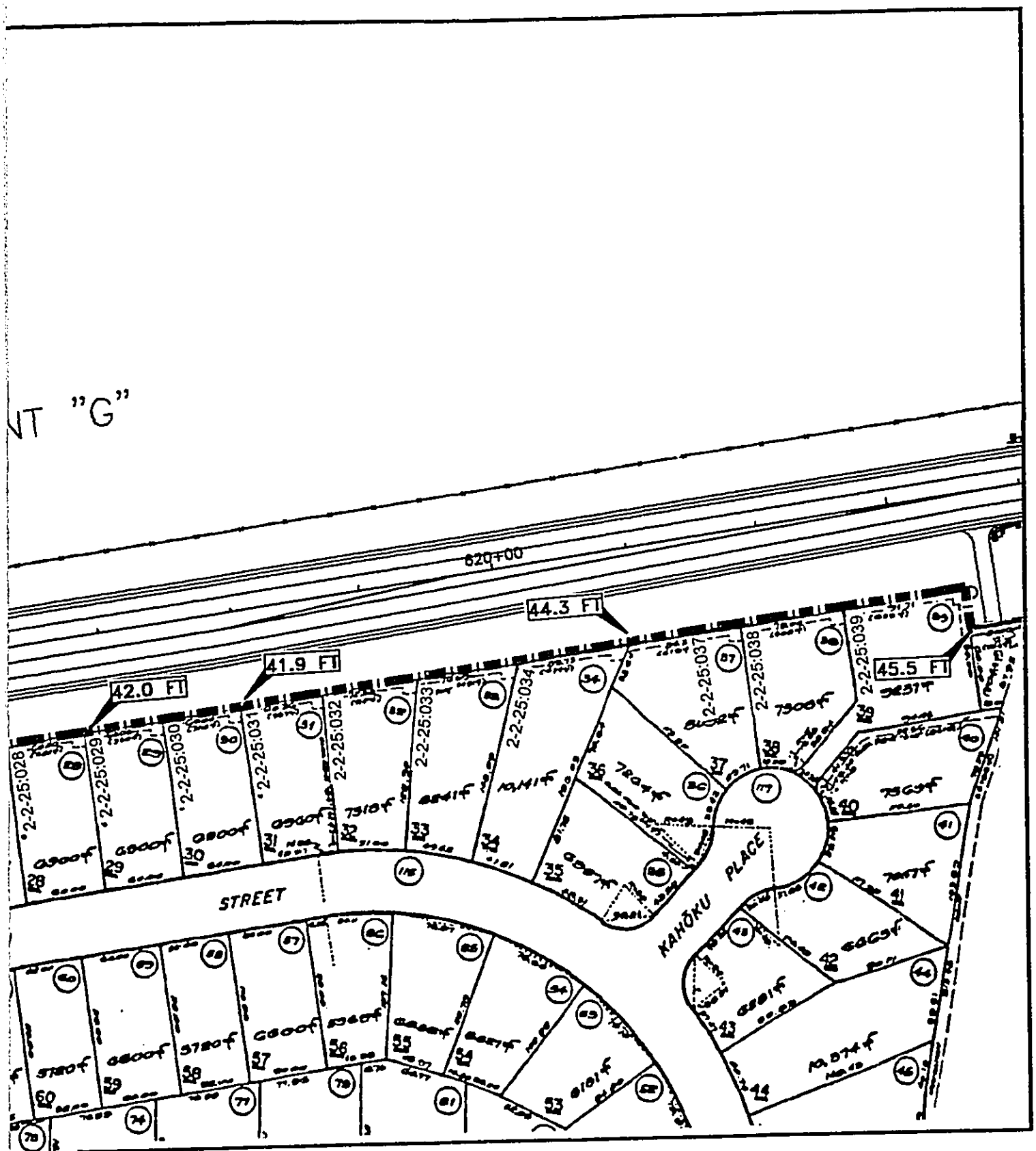
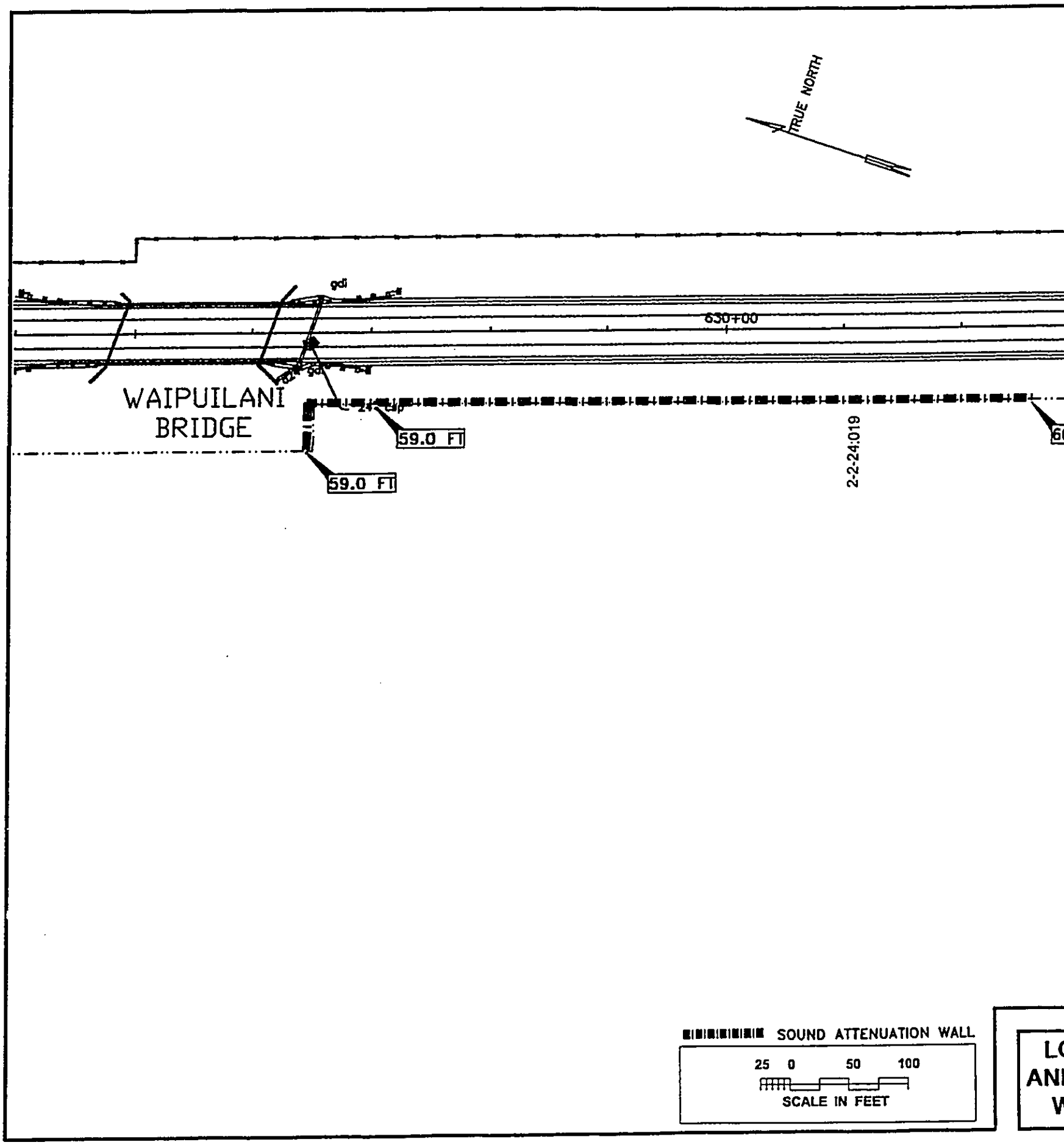
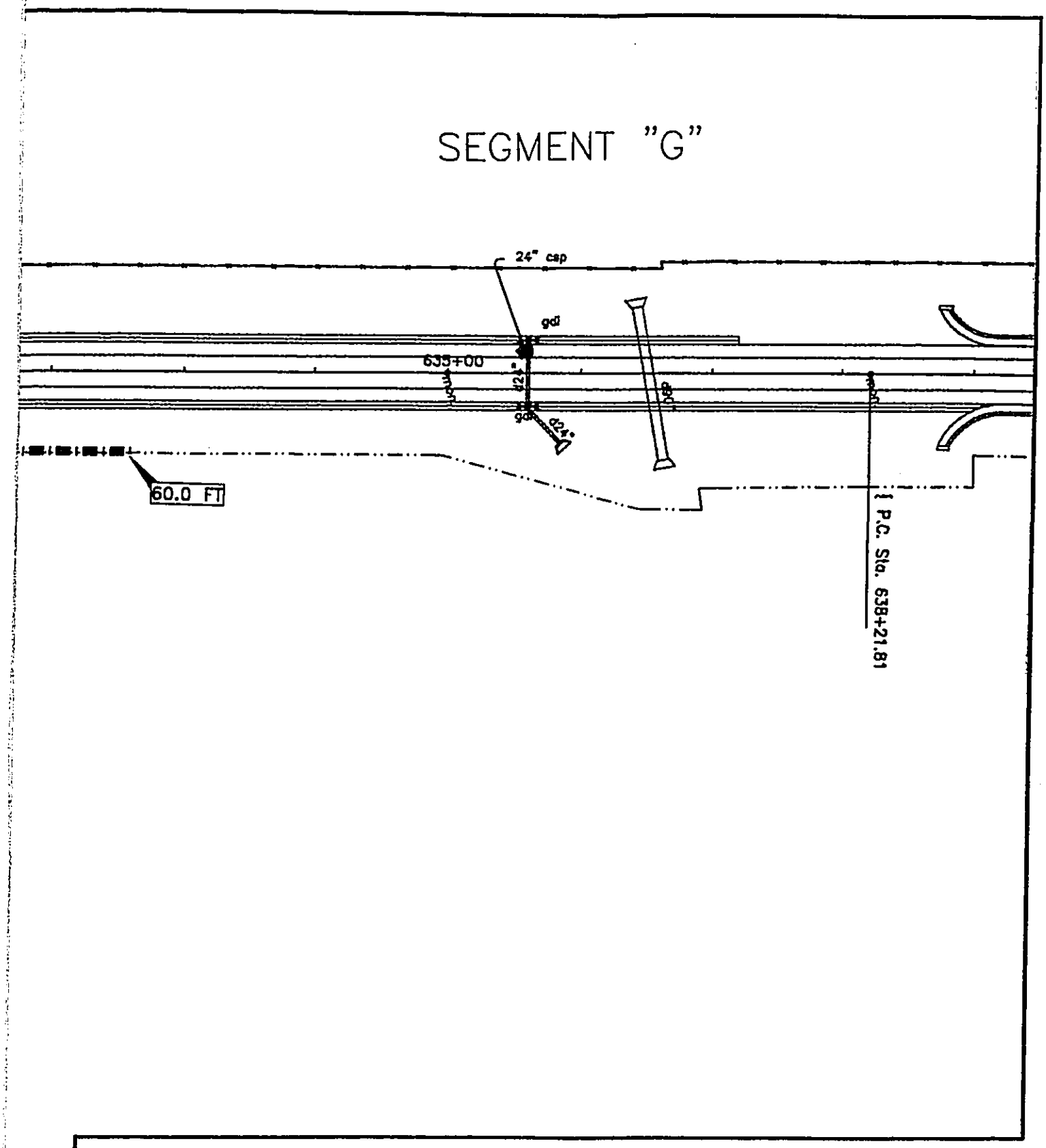


LOCATIONS OF NOISE SENSITIVE RECEPTORS AND TOP ELEVATIONS OF SOUND ATTENUATION WALLS (SEGMENTS F AND G)

FIGURE 6

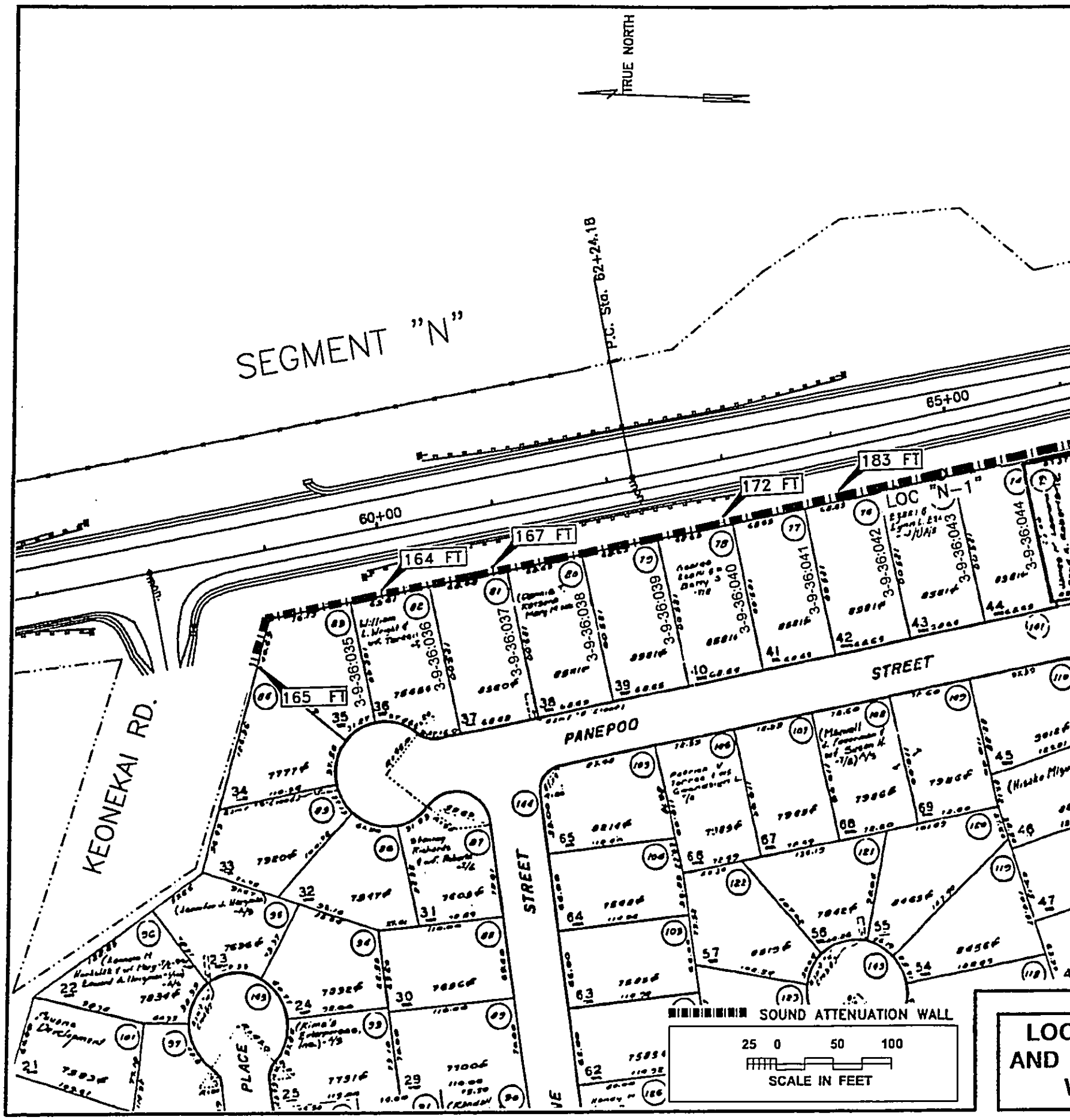

TRUE NORTH
gdi
630+00
WAIPUILANI
BRIDGE
59.0 FT
59.0 FT
2-2-24:019
SOUND ATTENUATION WALL
25 0 50 100
SCALE IN FEET

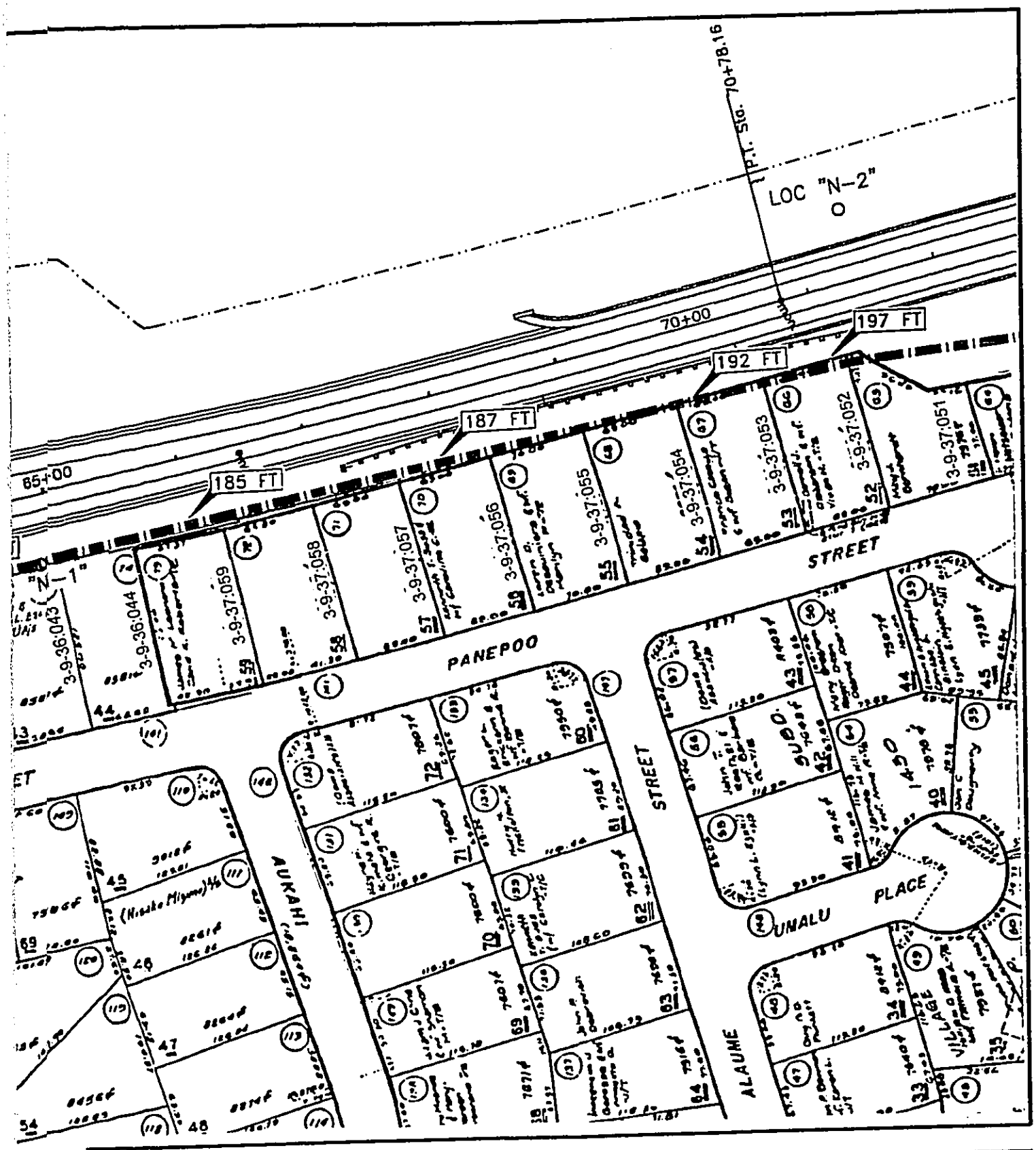


WALL

LOCATIONS OF NOISE SENSITIVE RECEPTORS AND TOP ELEVATIONS OF SOUND ATTENUATION WALLS (SEGMENT G AT WAIPUILANI GULCH)

FIGURE 7

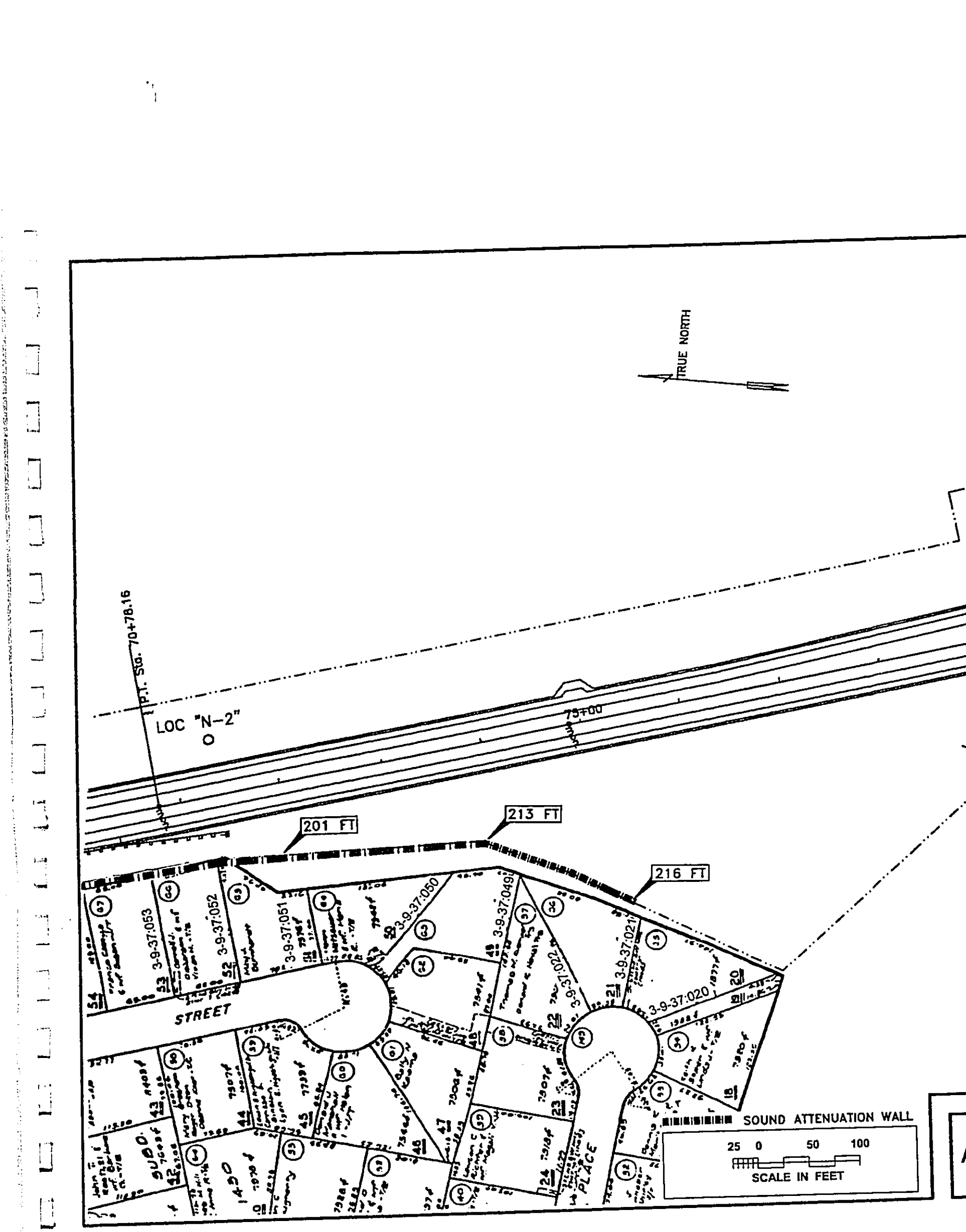

TRUE NORTH
SEGMENT "N"
P.C. Sta. 62+24.18
60+00
65+00
183 FT
172 FT
167 FT
164 FT
165 FT
LOC "N-1"
KEONEKAI RD.
PANEPOO
STREET
PLACE
3-9-36:035
3-9-36:036
3-9-36:037
3-9-36:038
3-9-36:039
3-9-36:040
3-9-36:041
3-9-36:042
3-9-36:043
3-9-36:044
SOUND ATTENUATION WALL
25 0 50 100
SCALE IN FEET

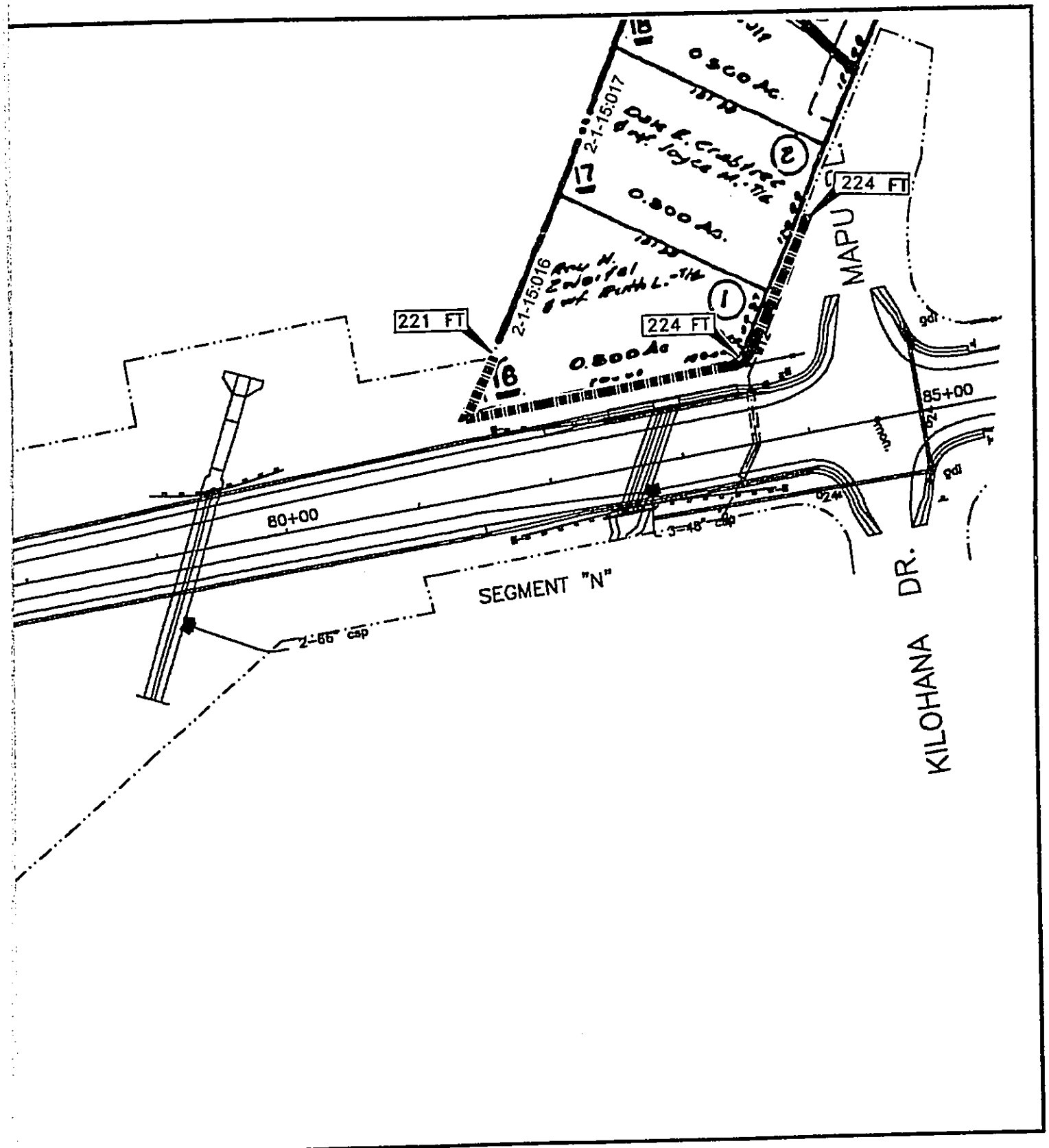


WALL

LOCATIONS OF NOISE SENSITIVE RECEPTORS AND TOP ELEVATIONS OF SOUND ATTENUATION WALLS (SEGMENT N AT KEONEKAI RD.)

FIGURE 8


TRUE NORTH
P.I. Sta. 70+78.16
LOC "N-2"
75+00
201 FT
213 FT
216 FT
3-9-37:053
3-9-37:052
3-9-37:051
3-9-37:050
3-9-37:049
3-9-37:022
3-9-37:021
3-9-37:020
STREET
GUDO
PLACE
SOUND ATTENUATION WALL
25 0 50 100
SCALE IN FEET



LOCATIONS OF NOISE SENSITIVE RECEPTORS AND TOP ELEVATIONS OF SOUND ATTENUATION WALLS (SEGMENT N AT KILOHANA DR.)

FIGURE 9

At areas removed from Piilani Highway, Base Year noise levels are much lower than along the highway's Rights-of-Way due to distance factors and local shielding effects from buildings. Base Year noise levels in areas removed from the highway are typically less than 66 Leq(h), and possibly as low as 55 Leq(h).

CHAPTER IV. DESCRIPTION OF FUTURE TRAFFIC NOISE LEVELS

The future traffic noise levels in the immediate vicinity of the project during CY 2011 were evaluated for the No Build and Build Alternatives. The same methodology that was used to calculate the Base Year noise levels was also used to calculate the Year 2011 noise levels. It should be noted that forecast traffic volumes for both the No Build and Build Alternatives were assumed to be identical along Piilani Highway for the Year 2011. Under both the No Build and Build Alternatives, average vehicle speeds and traffic mix were initially assumed to be identical to the Base Year values.

Tables 5, 6, and 7A summarize the traffic conditions, noise levels, and setback distances for the No Build or Build Alternatives during the AM and PM peak hours in CY 2011. As indicated in Table 6, future traffic noise levels in the immediate vicinity of the project are predicted to increase by approximately 1.1 to 1.9 dB between CY 2001 and CY 2011 solely as a result of projected traffic volume increases under the No Build Alternative. Under the No Build Alternative, the HDOT 66 noise abatement criteria will continue to be exceeded at the majority of the existing dwelling units within 120 feet of the centerline of Piilani Highway. Traffic noise levels should not exceed 66 Leq at public use structures or park lands under the No Build Alternative in CY 2011.

Under the Build Alternative, restriping of the highway is planned so that the existing two, 12 foot wide lanes are to be replaced with four, 11 foot wide lanes. Figures 2 through 9 present the noise sensitive receptor (or receiver) locations where future traffic noise levels were calculated for the No Build and Build Alternatives using the FHWA Traffic Noise Model. Plans for the new homes under construction on the south side of Waipualani Gulch (see Figure 7) were not available, but the lots, house setback distances, and traffic noise levels were assumed to be similar to the existing homes on the north side of the gulch. The predicted CY 2011 traffic noise levels at the various receptor locations along Piilani Highway where traffic noise levels could exceed 66 Leq(h) are shown in Table 6 for the No Build and Build Alternatives. Predictions of future traffic noise levels under the Build Alternative for the condition with average vehicle speeds reduced by 5 miles per hour are also shown in Table 6. Also indicated in Table 6 are the increases in traffic noise levels expected under the No Build and Build Alternatives. Table 7B presents the expected noise levels under the Build Alternative with 5 miles per hour speed reduction during the noisiest peak hours when free flow conditions prevail.

The 66 Leq criteria should not be exceeded at any public use structures or park lands under the No Build or Build Alternatives. The 71 Leq criteria for commercial properties will be exceeded at two multistory commercial buildings on the mauka side of Piilani Highway and south of the Ohukai Road intersection (TMK: 3-9-45:010 and TMK: 3-9-45:007/008). Because both commercial buildings are presently air conditioned, additional noise mitigation measures should not be required.

TABLE 7A

CY 2011 TRAFFIC VOLUMES AND NOISE LEVELS ALONG PIILANI HIGHWAY AND AT VARIOUS DISTANCES FROM THE CENTERLINE (WITHOUT SPEED REDUCTIONS)

PIILANI HWY. SEGMENT	SPEED (MPH)	TOTAL VPH	AUTOS	MEDIUM TRUCKS	HEAVY TRUCKS	***** HOURLY LEQ IN dB ***** @ 50'	@ 100'	@ 150'
N. of Uwapo Road (Seg. B) (AM)	50	3,050	2,928	76	46	74.3	69.7	66.4
N. of Uwapo Road (Seg. B) (PM)	40	3,310	3,243	50	17	71.3	66.9	63.7
S. of Uwapo Road (Seg. C) (AM)	50	2,970	2,851	74	45	74.2	69.5	66.3
S. of Uwapo Road (Seg. C) (PM)	40	3,340	3,273	50	17	71.3	66.9	63.8
N. of Ohukai Road (Seg. D) (AM)	50	2,930	2,813	73	44	74.1	69.5	66.3
N. of Ohukai Road (Seg. D) (PM)	40	3,370	3,302	51	17	71.3	67.0	63.8
S. of Ohukai Road (Seg. E) (AM)	50	2,900	2,783	73	44	74.1	69.5	66.3
S. of Ohukai Road (Seg. E) (PM)	40	3,320	3,253	50	17	71.3	66.9	63.8
N. of Piikea Avenue (Seg. G) (AM)	52	2,750	2,640	69	41	74.4	69.6	66.4
N. of Piikea Avenue (Seg. G) (PM)	40	3,120	3,057	47	16	71.0	66.6	63.5
S. of Piikea Avenue (Seg. H) (AM)	52	2,660	2,553	67	40	74.2	69.5	66.2
S. of Piikea Avenue (Seg. H) (PM)	40	3,100	3,037	47	16	71.0	66.6	63.5
N. of Lipoa Street (Seg. H) (AM)	52	2,660	2,553	67	40	74.2	69.5	66.2
N. of Lipoa Street (Seg. H) (PM)	40	3,100	3,037	47	16	71.0	66.6	63.5
S. of Lipoa Street (Seg. I) (AM)	52	2,505	2,404	63	38	74.0	69.2	66.0
S. of Lipoa Street (Seg. I) (PM)	40	2,835	2,778	43	14	70.6	66.2	63.1
N. of Ke Alii Alanui St. (Seg. L) (AM)	50	2,190	2,102	55	33	72.9	68.2	65.0
N. of Ke Alii Alanui St. (Seg. L) (PM)	50	2,610	2,558	39	13	73.0	68.2	65.0
S. of Ke Alii Alanui St. (Seg. M) (AM)	45	1,800	1,764	27	9	70.1	65.5	62.3
S. of Ke Alii Alanui St. (Seg. M) (PM)	45	2,325	2,278	35	12	71.2	66.6	63.4
N. of Kilohana Drive (Seg. N) (AM)	55	1,860	1,804	37	19	73.1	68.2	64.9
N. of Kilohana Drive (Seg. N) (PM)	55	2,355	2,285	35	35	74.3	69.3	66.0
S. of Kilohana Drive (Seg. O) (AM)	50	1,610	1,562	32	16	71.2	66.5	63.3
S. of Kilohana Drive (Seg. O) (PM)	50	2,055	1,993	31	31	72.5	67.7	64.5

Notes:

1. See Table 1 for identification of Piilani Highway roadway segments.
2. All distances shown are from the center of Piilani Highway.

TABLE 7B

CY 2011 TRAFFIC VOLUMES AND NOISE LEVELS ALONG PIILANI HIGHWAY AND AT VARIOUS DISTANCES FROM THE CENTERLINE (WITH 5 MPH SPEED REDUCTIONS)

PIILANI HWY. SEGMENT	SPEED (MPH)	TOTAL VPH	AUTOS	MEDIUM TRUCKS	HEAVY TRUCKS	***** HOURLY LEQ IN dB ***** @ 50'	@ 100'	@ 150'
N. of Uwapo Road (Seg. B) (AM)	45 (3)	3,050	2,928	76	46	72.9	68.6	65.4
N. of Uwapo Road (Seg. B) (PM)	40	3,310	3,243	50	17	71.3	66.9	63.7
S. of Uwapo Road (Seg. C) (AM)	45 (3)	2,970	2,851	74	45	72.9	68.5	65.3
S. of Uwapo Road (Seg. C) (PM)	40	3,340	3,273	50	17	71.3	66.9	63.8
N. of Ohukai Road (Seg. D) (AM)	45 (3)	2,930	2,813	73	44	72.8	68.4	65.3
N. of Ohukai Road (Seg. D) (PM)	40	3,370	3,302	51	17	71.3	67.0	63.8
S. of Ohukai Road (Seg. E) (AM)	45 (3)	2,900	2,783	73	44	72.8	68.4	65.2
S. of Ohukai Road (Seg. E) (PM)	40	3,320	3,253	50	17	71.3	66.9	63.8
N. of Piikea Avenue (Seg. G) (AM)	47 (3)	2,750	2,640	69	41	73.1	68.6	65.4
N. of Piikea Avenue (Seg. G) (PM)	40	3,120	3,057	47	16	71.0	66.6	63.5
S. of Piikea Avenue (Seg. H) (AM)	47 (3)	2,660	2,553	67	40	73.0	68.4	65.3
S. of Piikea Avenue (Seg. H) (PM)	40	3,100	3,037	47	16	71.0	66.6	63.5
N. of Lipoa Street (Seg. H) (AM)	47 (3)	2,660	2,553	67	40	73.0	68.4	65.3
N. of Lipoa Street (Seg. H) (PM)	40	3,100	3,037	47	16	71.0	66.6	63.5
S. of Lipoa Street (Seg. I) (AM)	47 (3)	2,505	2,404	63	38	72.7	68.2	65.0
S. of Lipoa Street (Seg. I) (PM)	40	2,835	2,778	43	14	70.6	66.2	63.1
N. of Ke Alii Alanui St. (Seg. L) (AM)	45 (3)	2,190	2,102	55	33	71.6	67.2	64.0
N. of Ke Alii Alanui St. (Seg. L) (PM)	45 (3)	2,610	2,558	39	13	71.7	67.1	63.9
S. of Ke Alii Alanui St. (Seg. M) (AM)	45	1,800	1,764	27	9	70.1	65.5	62.3
S. of Ke Alii Alanui St. (Seg. M) (PM)	45	2,325	2,278	35	12	71.2	66.6	63.4
N. of Kilohana Drive (Seg. N) (AM)	50 (3)	1,860	1,804	37	19	71.9	67.2	63.9
N. of Kilohana Drive (Seg. N) (PM)	50 (3)	2,355	2,285	35	35	73.0	68.3	65.1
S. of Kilohana Drive (Seg. O) (AM)	45 (3)	1,610	1,562	32	16	69.9	65.4	62.2
S. of Kilohana Drive (Seg. O) (PM)	45 (3)	2,055	1,993	31	31	71.2	66.7	63.5

Notes:

1. See Table 1 for identification of Piilani Highway roadway segments.
2. All distances shown are from the center of Piilani Highway.
3. 5 MPH reduction in speed assumed.

Appendix D contains the forecast traffic volumes along Piilani Highway if the proposed Upcountry Road is completed by CY 2011. Traffic volumes with or without the Upcountry Road in CY 2011 are expected to be identical south of Kulanihakoi Street. North of Kulanihakoi Street, the traffic volumes (and resulting traffic noise levels) during the AM peak hour are expected to be less with the Upcountry Road than without the Upcountry Road. Because the traffic noise levels are expected to be highest during the AM peak hour, and because the traffic noise study utilized the AM peak hour to evaluate the noise levels along these roadway sections, it was concluded that the completion of the Upcountry Road project by CY 2011 should not alter the results of the current study for the Interim Piilani Highway Improvement Project.

The following general conclusions can be made in respect to the impacted structures and lands which can be expected by CY 2011 under the Build Alternative. These conclusions are valid as long as the future traffic volumes and mixes do not differ from the assumed values.

- The HDOT's ">15 dB increase" criteria for substantial change in traffic noise levels will not be exceeded at any noise sensitive structure.

- Exceedance of the 66 Leq noise mitigation criteria at public use structures or park lands are not expected to occur under the No Build or Build Alternatives.

- Under the No Build or Build Alternatives, with no change in average vehicle speeds, future traffic noise levels at existing single and multifamily dwellings on both sides of the highway will continue to exceed the 66 Leq criteria. At least 94 residential structures are predicted to be affected by future traffic noise levels which exceed the 66 Leq HDOT noise criteria. At two commercial buildings (TMK: 3-9-45:010 and TMK: 3-9-45:007/008) mauka of the highway, future traffic noise levels will exceed the 71 Leq criteria for commercial structures under the Build Alternative.

- Under the Build Alternative, with a reduction of 5 miles per hour in vehicle speeds during free flow conditions, the total number of existing single and multifamily dwellings which experience noise levels above the 66 Leq criteria will be reduced by approximately 9 percent. In addition, the argument for the use of additional traffic noise mitigation measures (such as the construction of sound walls) is less persuasive because the predicted increases in future traffic noise levels under the Build Alternative are not significant (see Table 6) if a reduction in average vehicle speeds (by 5 miles per hour) occurs as a result of the project.

- If the proposed Upcountry Road connection to Piilani Highway is completed by 2011, the resulting traffic volumes and traffic noise levels should not alter the conclusions listed above. Resulting traffic volumes south of Kulanihakoi Street should be the same as those without the Upcountry Road project. North of Kulanihakoi Street, traffic volumes and noise levels should be lower during the critical AM peak hour following completion of the Upcountry Road project.

CHAPTER V. POSSIBLE NOISE MITIGATION MEASURES

Possible noise mitigation measures considered included the following:

A. Restricting the Growth In the Number of Noisy Buses, Heavy Trucks, Motorcycles, and Automobiles with Defective Mufflers. The percentage contribution to the total traffic noise by heavy trucks, buses, and noisy vehicles is currently less than 50 percent, and elimination of these noise sources would reduce total traffic noise levels by less than 3 Leq(h) units. Restricting the growth rate of these vehicles (to growth rates below passenger automobile growth rates) could produce noise reductions in the order of 1 or 2 dB, which are not considered significant for the level of regulatory efforts required.

B. Alteration of the Horizontal Or Vertical Alignment of the Roadway. This project involves the restriping of the northbound and southbound lanes of the highway and does not involve alterations to the vertical or horizontal alignments of Piilani Highway. Major alterations of the horizontal alignment of the existing highway lanes were not considered appropriate due to the scope of this roadway improvement project, and due to the constraints imposed by the locations of the intersections along the project corridor. The majority of the noise sensitive receptor locations where the 66 Leq criteria is exceeded are located on the west (or makai) side of the highway, and mitigation of traffic noise on the west side using roadway realignment techniques would require relocation of the northbound and southbound lanes toward the east by 50 to 100 feet.

C. Acquisition of Property Rights for Construction of Noise Barriers, and/or Construction of Noise Barriers Along the Right-of-Way. For single story, noise sensitive buildings, construction of a sound attenuating wall is normally the preferred noise mitigation measure. The 5 to 7 dB of noise attenuation achievable with a 6 FT high wall is normally sufficient for single story structures. Many of the structures along Piilani Highway are multistory dwelling units, and the upper floors of those structures will not benefit from sound attenuation walls which are 6 to 8 feet high. Wall heights in the order of 15 to 20 feet above ground level will be required to attenuate traffic noise at the upper floor spaces. It should also be noted that the sound barrier will block the views to the roadway which some of the residents may enjoy. For this reason, concurrence from the affected homeowners should be obtained prior to construction of a sound barrier as a noise mitigation measure.

D. Acquisition of Real Property Interests To Serve As A Noise Buffer Zone. Where tall (or multistory) structures are expected to be impacted by future traffic noise, the use of sound attenuating barriers (see para. C above) will not be practical due to the excessive heights required to shield the upper levels from traffic noise. In these situations, the only other noise mitigation possibilities are sound insulation of the affected upper level units or acquisition of the property interests. Noise buffer zones extending approximately 120 to 150 feet from the

center of the highway and at substantial cost would be required to meet the HDOT 66 Leq criteria. In general, the acquisition of property for the creation of noise buffer zones for noise mitigation has seldom been applied in Hawaii.

E. Noise Insulation of Public Use or Nonprofit Institutional Structures. No public use structures should require noise insulation as a result of the proposed highway improvements.

CHAPTER VI. FUTURE TRAFFIC NOISE IMPACTS AND POSSIBLE NOISE MITIGATION MEASURES

Future traffic noise levels are predicted to exceed the HDOT 66 Leq(h) noise abatement criteria by CY 2011 under the Build Alternative at existing noise sensitive structures on both sides of the highway, with the majority of the affected structures located west of the highway and within the limits of construction for this project. Table 8 presents the predicted performances of sound attenuation walls located along the east and west Rights-of-Way in front of the affected structures for the Build Alternative. The locations of the sound attenuation walls are shown in Figures 2 through 9. In the figures, the top wall elevations shown are required to comply with the minimum 5 dB attenuation criteria of HDOT for ground level receptors. It should be noted that accurate topographic maps along the highway Rights-of-Way and at the dwelling units were not available for this study, and the wall heights shown in Figures 2 through 9 are best estimates based on the original highway plans and profiles.

Mitigation of future traffic noise at the second or third floors of the existing apartment building at Uwapo Road (TMK: 3-8-77:010) will not be feasible using a sound wall along the property line, since a wall height in excess of 11 to 13 feet above roadway grade is required to shield the second floor living units from traffic noise, and even higher walls are required for the third floor units. In addition, attenuation of traffic noise at the upper floors of 2-story homes and townhomes which are located on some of the lots along the highway will not be feasible due to the large wall heights required to shield the upper floors from the highway traffic. The other mitigation measures discussed in Chapter V are also not feasible at these upper floor receptor locations. Attenuation of traffic noise to meet HDOT criteria will usually be possible for the ground floors of the affected dwellings using the sound attenuation walls shown in Figures 2 through 9. A sound attenuation wall at the locations of the new housing units which were under construction along the west side of the highway and south of the Waipuilani Bridge is shown in Figure 7. Plans and topographic maps were not available for this development, but a probable wall height of 6 feet above grade is shown in the figure based on the results at the existing housing units north of the bridge (see Figure 6).

The predicted future noise levels for the wall heights shown in Figures 2 through 9 are shown in Table 8 under the "POTEN. WALL" column. Because the HDOT "5 dBA noise reduction" criteria will not be met in all cases with 6 foot wall heights, the construction of 7 to 10 foot high walls will be required at some locations. A variance from local building codes may be required to construct the 7 to 10 foot high walls which are required to achieve at least 5 dBA of noise reduction. The sound attenuating walls must be continuous without see-through openings, and may be constructed from solid materials which have a minimum surface weight of 5 pounds per square foot. Use of landscaping on the roadway side of the wall or the use of lava rock facade are also recommended to soften the visual impacts of the walls and to minimize the potential for graffiti.

TABLE 8

PREDICTED TRAFFIC NOISE ATTENUATION VS. BARRIER HEIGHTS
(4.92 FT HIGH RECEPTOR)

RECEPTOR LOCATION	PEAK HOUR	EXISTING (CY 2001) Leq	FUTURE NOISE LEVELS (CY 2011) Leq			
			W/O BAR./ (CHANGE)	6.0 FT WALL/ (CHANGE)	7.0 FT WALL/ (CHANGE)	8.0 FT WALL/ (CHANGE)	POTEN. WALL/ (CHANGE)
ROADWAY SEGMENT B (MAKAI):							
Receiver 3-8-77:010	AM	68.2 *	69.4 /1.2 *	68.7 /0.5 **	65.5 /-2.7 **	63.0 /-5.2	63.0 /-5.2
ROADWAY SEGMENT C (MAKAI):							
Receiver 3-8-77:001-A	AM	64.9	66.8 /1.9 *	65.0 /0.1 **	62.4 /-2.5 **	61.5 /-3.4	61.5 /-3.4
Receiver 3-8-77:001-B	AM	65.2	67.1 /1.9 *	65.3 /0.1 **	63.0 /-2.2 **	61.4 /-3.8	60.7 /-4.5
Receiver 3-8-77:001-C	AM	66.9 *	68.4 /1.5 *	66.4 /-0.5 **	64.7 /-2.2 **	63.6 /-3.3 **	61.9 /-5.0
Receiver 3-8-77:001-D	AM	68.4 *	70.2 /1.8 *	64.8 /-3.6	63.4 /-5.0	62.3 /-6.1	62.1 /-6.3
Receiver 3-8-77:001-E	AM	68.6 *	70.6 /2.0 *	64.2 /-4.4	63.0 /-5.6	62.1 /-6.5	63.5 /-5.1
Receiver 3-8-77:001-F	AM	67.2 *	69.0 /1.8 *	65.2 /-2.0 **	64.5 /-2.7 **	63.9 /-3.3	63.3 /-3.9
ROADWAY SEGMENT C (MAUKA):							
Receiver 3-8-74:017	AM	64.5	66.2 /1.7 *	65.1 /0.6 **	64.4 /-0.1 **	62.8 /-1.7 **	61.9 /-2.6 **
Receiver 3-8-74:016	AM	64.6	66.5 /1.9 *	65.4 /0.8 **	63.5 /-1.1 **	62.0 /-2.6 **	61.2 /-3.4
Receiver 3-8-74:015	AM	65.8	67.2 /1.4 *	63.4 /-2.4 **	61.5 /-4.3	60.9 /-4.9	60.3 /-5.5
Receiver 3-8-74:014	AM	63.3	65.2 /1.9	N/A	N/A	N/A	59.3 /-4.0
Receiver 3-8-74:013	AM	66.2 *	68.3 /2.1 *	67.0 /0.8 **	65.1 /-1.1 **	64.1 /-2.1 **	62.8 /-3.4
Receiver 3-8-74:012	AM	68.2 *	69.9 /1.7 *	69.2 /1.0 **	66.9 /-1.3 **	64.5 /-3.7	62.7 /-5.5
Receiver 3-8-74:011	AM	67.7 *	69.3 /1.6 *	65.9 /-1.8 **	65.2 /-2.5 **	63.9 /-3.8	62.5 /-5.2
Receiver 3-8-74:010	AM	67.3 *	69.0 /1.7 *	63.9 /-3.4	63.0 /-4.3	62.3 /-5.0	61.9 /-5.4
Receiver 3-8-74:009	AM	68.0 *	70.0 /2.0 *	63.6 /-4.4	62.4 /-5.6	60.3 /-7.7	62.2 /-5.8
Receiver 3-8-74:008	AM	68.8 *	70.6 /1.8 *	63.0 /-5.8	61.6 /-7.2	61.5 /-7.3	62.9 /-5.9
Receiver 3-8-74:007	AM	67.9 *	69.8 /1.9 *	63.6 /-4.3	62.5 /-5.4	61.4 /-6.5	63.5 /-4.4
Receiver 3-8-74:006	AM	69.2 *	70.7 /1.5 *	64.5 /-4.7	62.9 /-6.3	61.7 /-7.5	64.5 /-4.7
Receiver 3-8-74:005	AM	68.4 *	70.3 /1.9 *	64.4 /-4.0	62.6 /-5.8	61.5 /-6.9	63.5 /-4.9
Receiver 3-8-74:004	AM	68.6 *	69.6 /1.0 *	64.6 /-4.0	63.2 /-5.4	62.1 /-6.5	63.2 /-5.4
Receiver 3-8-74:003	AM	66.5 *	68.2 /1.7 *	64.3 /-2.2 **	62.9 /-3.6	62.0 /-4.5	63.0 /-3.5
Receiver 3-8-74:002	AM	66.1 *	68.0 /1.9 *	63.8 /-2.3 **	61.3 /-4.8	59.8 /-6.3	61.3 /-4.8
Receiver 3-8-74:001-A	AM	66.5 *	68.3 /1.8 *	63.3 /-3.2	61.8 /-4.7	59.9 /-6.6	61.8 /-4.7
Receiver 3-8-74:001-B	AM	66.9 *	68.5 /1.6 *	64.7 /-2.2 **	63.3 /-3.6	62.1 /-4.8	63.3 /-3.6
Receiver 3-8-74:001-C	AM	66.7 *	68.8 /2.1 *	65.0 /-1.7 **	63.6 /-3.1	62.3 /-4.4	63.6 /-3.1

TABLE 8 (CONTINUED)

PREDICTED TRAFFIC NOISE ATTENUATION VS. BARRIER HEIGHTS
(4.92 FT HIGH RECEPTOR)

RECEPTOR LOCATION	PEAK HOUR	EXISTING (CY 2001) Leq	FUTURE NOISE LEVELS (CY 2011) Leq			
			W/O BAR./ (CHANGE)	6.0 FT WALL/ (CHANGE)	7.0 FT WALL/ (CHANGE)	8.0 FT WALL/ (CHANGE)	POTEN. WALL/ (CHANGE)
ROADWAY SEGMENT C (MAUKA): (continued)							
Receiver 3-8-74:001-D	AM	68.7 *	70.3 /1.6 *	64.2 /-4.5	62.4 /-6.3	61.0 /-7.7	62.5 /-6.2
Receiver 3-9-24:027	AM	67.8 *	70.1 /2.3 *	63.4 /-4.4	62.0 /-5.8	60.8 /-7.0	63.3 /-4.5
ROADWAY SEGMENT D (MAKAI):							
Receiver 3-9-29:031	AM	67.8 *	69.3 /1.5 *	64.1 /-3.7	62.9 /-4.9	61.9 /-5.9	64.0 /-3.8
Receiver 3-9-29:003	AM	67.6 *	69.3 /1.7 *	65.5 /-2.1 **	63.6 /-4.0	62.4 /-5.2	64.3 /-3.3
Receiver 3-9-29:034	AM	67.4 *	69.3 /1.9 *	64.4 /-3.0 **	63.2 /-4.2	62.0 /-5.4	63.2 /-4.2
Receiver 3-9-01:139	AM	67.5 *	69.3 /1.8 *	64.2 /-3.3	62.7 /-4.8	61.5 /-6.0	64.2 /-3.3
ROADWAY SEGMENT D (MAUKA):							
Receiver 3-9-24: 002	AM	66.7 *	69.2 /2.5 *	65.1 /-1.6 **	64.3 /-2.4 **	63.7 /-3.0	63.7 /-3.0
Receiver 3-9-47:101	AM	69.6 *	72.1 /2.5 *	66.3 /-3.3	64.6 /-5.0	63.3 /-6.3	65.0 /-4.6
Receiver 3-9-47:102	AM	69.6 *	72.2 /2.6 *	66.2 /-3.4	64.4 /-5.2	62.9 /-6.7	66.2 /-3.4
Receiver 3-9-47:103	AM	69.7 *	71.9 /2.2 *	64.7 /-5.0	63.2 /-6.5	61.8 /-7.9	64.7 /-5.0
Receiver 3-9-47:105	AM	67.4 *	69.5 /2.1 *	65.2 /-2.2 **	64.4 /-3.0	63.5 /-3.9	64.4 /-3.0
ROADWAY SEGMENT E (MAUKA):							
Receiver 3-9-45:010	AM	69.9	72.2 /2.3 *	N/A	N/A	N/A	N/A
Receiver 3-9-45:007/008	AM	70.3	72.7 /2.4 *	N/A	N/A	N/A	N/A
ROADWAY SEGMENT E (MAKAI):							
Receiver 3-9-39:012	AM	61.0	62.2 /1.2	N/A	N/A	N/A	59.7 /-1.3
Receiver 3-9-39:013	AM	62.3	63.8 /1.5	N/A	N/A	N/A	59.6 /-2.7
Receiver 3-9-39:065	AM	63.4	65.5 /2.1	N/A	N/A	N/A	59.8 /-3.6
Receiver 3-9-39:048	AM	64.7	67.1 /2.4 *	62.0 /-2.7	61.2 /-3.5	60.5 /-4.2	61.2 /-3.5
Receiver 3-9-48:123	AM	69.0 *	70.6 /1.6 *	62.2 /-6.8	61.3 /-7.7	60.5 /-8.5	62.2 /-6.8
Receiver 3-9-48:126	AM	69.1 *	71.1 /2.0 *	64.9 /-4.2	63.7 /-5.4	62.6 /-6.5	64.9 /-4.2
Receiver 3-9-48:127	AM	68.4 *	71.1 /2.7 *	64.3 /-4.1	63.2 /-5.2	62.3 /-6.1	64.3 /-4.1
Receiver 3-9-48:128	AM	67.7 *	70.0 /2.3 *	63.3 /-4.4	62.3 /-5.4	61.4 /-6.3	63.3 /-4.4

TABLE 8 (CONTINUED)

PREDICTED TRAFFIC NOISE ATTENUATION VS. BARRIER HEIGHTS
(4.92 FT HIGH RECEPTOR)

RECEPTOR LOCATION	PEAK HOUR	EXISTING (CY 2001) Leq	FUTURE NOISE LEVELS (CY 2011) Leq			
			W/O BAR./ (CHANGE)	6.0 FT WALL/ (CHANGE)	7.0 FT WALL/ (CHANGE)	8.0 FT WALL/ (CHANGE)	POTEN. WALL/ (CHANGE)
ROADWAY SEGMENT E (MAKAI): (continued)							
Receiver 3-9-48:129	AM	67.3 *	68.9 /1.6 *	61.3 /-6.0	60.4 /-6.9	59.6 /-7.7	61.2 /-6.1
Receiver 3-9-48:130	AM	66.6 *	68.4 /1.8 *	61.6 /-5.0	60.8 /-5.8	60.0 /-6.6	61.6 /-5.0
Receiver 3-9-48:131	AM	66.5 *	68.0 /1.5 *	61.8 /-4.7	60.9 /-5.6	60.1 /-6.4	61.8 /-4.7
Receiver 3-9-48:133	AM	69.1 *	70.9 /1.8 *	63.9 /-5.2	62.6 /-6.5	61.7 /-7.4	63.9 /-5.2
Receiver 3-9-48:134	AM	68.9 *	71.0 /2.1 *	64.2 /-4.7	62.9 /-6.0	61.9 /-7.0	64.1 /-4.8
Receiver 3-9-48:137	AM	69.4 *	71.3 /1.9 *	64.9 /-4.5	63.4 /-6.0	62.3 /-7.1	64.7 /-4.7
Receiver 3-9-48:138	AM	68.9 *	70.8 /1.9 *	65.0 /-3.9	63.6 /-5.3	62.6 /-6.3	64.8 /-4.1
Receiver 3-9-48:141	AM	67.8 *	70.0 /2.2 *	65.0 /-2.8	63.8 /-4.0	62.8 /-5.0	64.0 /-3.8
Receiver 3-9-48:142	AM	66.7 *	69.1 /2.4 *	64.6 /-2.1 **	63.5 /-3.2	62.5 /-4.2	63.0 /-3.7
Receiver 3-9-48:146	AM	66.2 *	68.1 /1.9 *	65.2 /-1.0 **	63.8 /-2.4 **	62.6 /-3.6	62.7 /-3.5
Receiver 3-9-48:147	AM	65.2	67.3 /2.1 *	64.6 /-0.6 **	63.4 /-1.8 **	62.3 /-2.9	62.3 /-2.9
Receiver 3-9-48:148	AM	63.8	65.8 /2.0	N/A	N/A	N/A	61.4 /-2.4
ROADWAY SEGMENT F (MAKAI):							
Receiver 2-2-25:018	AM	72.4 *	73.8 /1.4 *	63.0 /-9.4	61.8 /-10.6	60.7 /-11.7	63.0 /-9.4
Receiver 2-2-25:019	AM	64.1	64.6 /0.5	N/A	N/A	N/A	59.6 /-4.5
Receiver 2-2-25:020	AM	66.0	67.3 /1.3 *	60.6 /-5.4	60.0 /-6.0	59.5 /-6.5	60.6 /-5.4
Receiver 2-2-25:021	AM	71.3 *	72.0 /0.7 *	62.5 /-8.8	61.5 /-9.8	60.6 /-10.7	62.5 /-8.8
Receiver 2-2-25:022	AM	71.2 *	71.9 /0.7 *	63.0 /-8.2	61.7 /-9.5	60.9 /-10.3	63.0 /-8.2
Receiver 2-2-25:023	AM	71.0 *	72.1 /1.1 *	62.6 /-8.4	61.5 /-9.5	60.3 /-10.7	62.5 /-8.5
ROADWAY SEGMENT G (MAKAI):							
Receiver 2-2-25:024	AM	70.1 *	71.3 /1.2 *	65.9 /-4.2	64.1 /-6.0	62.6 /-7.5	64.1 /-6.0
Receiver 2-2-25:025	AM	68.6 *	70.3 /1.7 *	63.8 /-4.8	62.0 /-6.6	60.9 /-7.7	61.7 /-6.9
Receiver 2-2-25:026	AM	69.7 *	70.1 /0.4 *	65.4 /-4.3 **	63.5 /-6.2	62.1 /-7.6	62.6 /-7.1
Receiver 2-2-25:027	AM	66.2 *	67.5 /1.3 *	64.1 /-2.1 **	62.0 /-4.2	61.3 /-4.9	61.5 /-4.7
Receiver 2-2-25:028	AM	66.1 *	67.8 /1.7 *	66.4 /0.3 **	62.8 /-3.3	62.4 /-3.7	62.2 /-3.9
Receiver 2-2-25:029	AM	66.4 *	68.0 /1.6 *	66.4 /0.0 **	63.1 /-3.3 **	63.3 /-3.1 **	61.6 /-4.8

TABLE 8 (CONTINUED)

PREDICTED TRAFFIC NOISE ATTENUATION VS. BARRIER HEIGHTS
(4.92 FT HIGH RECEPTOR)

RECEPTOR LOCATION	PEAK HOUR	EXISTING (CY 2001) Leq	FUTURE NOISE LEVELS (CY 2011) Leq — W/O BAR./ (CHANGE)	6.0 FT WALL/ (CHANGE)	7.0 FT WALL/ (CHANGE)	8.0 FT WALL/ (CHANGE)	POTEN. WALL/ (CHANGE)
ROADWAY SEGMENT G (MAKAI): (continued)							
Receiver 2-2-25:030	AM	66.7 *	68.3 /1.6 *	64.9 /-1.8 **	63.3 /-3.4	63.2 /-3.5	62.3 /-4.4
Receiver 2-2-25:031	AM	67.2 *	68.9 /1.7 *	64.5 /-2.7 **	63.8 /-3.4	62.7 /-4.5	63.3 /-3.9
Receiver 2-2-25:032	AM	68.0 *	69.8 /1.8 *	64.7 /-3.3	64.4 /-3.6	62.9 /-5.1	64.2 /-3.8
Receiver 2-2-25:033	AM	68.8 *	69.7 /0.9 *	65.3 /-3.5 **	64.0 /-4.8	62.7 /-6.1	64.0 /-4.8
Receiver 2-2-25:034	AM	68.8 *	69.4 /0.6 *	65.6 /-3.2 **	64.0 /-4.8	62.7 /-6.1	64.0 /-4.8
Receiver 2-2-25:037	AM	68.9 *	69.2 /0.3 *	64.9 /-4.0 **	63.4 /-5.5	62.1 /-6.8	63.4 /-5.5
Receiver 2-2-25:038	AM	70.2 *	70.5 /0.3 *	64.5 /-5.7	62.8 /-7.4	61.2 /-9.0	63.1 /-7.1
Receiver 2-2-25:039	AM	69.8 *	70.8 /1.0 *	64.4 /-5.4	62.7 /-7.1	61.1 /-8.7	64.2 /-5.6
ROADWAY SEGMENT N (MAKAI):							
Receiver 3-9-36:035	PM	69.6 *	71.8 /2.2 *	65.0 /-4.6	63.2 /-6.4	61.6 /-8.0	64.1 /-5.5
Receiver 3-9-36:036	PM	68.7 *	70.0 /1.3 *	65.7 /-3.0 **	64.2 /-4.5	62.9 /-5.8	63.5 /-5.2
Receiver 3-9-36:037	PM	66.6 *	68.0 /1.4 *	65.6 /-1.0 **	63.8 /-2.8 **	62.8 /-3.8	61.8 /-4.8
Receiver 3-9-36:038	PM	66.9 *	68.3 /1.4 *	67.2 /0.3 **	64.6 /-2.3 **	64.1 /-2.8 **	62.0 /-4.9
Receiver 3-9-36:039	PM	66.9 *	68.6 /1.7 *	67.3 /0.4 **	64.8 /-2.1 **	64.3 /-2.6 **	62.0 /-4.9
Receiver 3-9-36:040	PM	67.7 *	69.0 /1.3 *	66.1 /-1.6 **	64.4 /-3.3 **	63.6 /-4.1	63.0 /-4.7
Receiver 3-9-36:041	PM	67.3 *	68.9 /1.6 *	64.2 /-3.1 **	62.4 /-4.9	61.2 /-6.1	61.2 /-6.1
Receiver 3-9-36:042	PM	68.7 *	71.0 /2.3 *	66.5 /-2.2 **	65.6 /-3.1	64.9 /-3.8	65.6 /-3.1
Receiver 3-9-36:043	PM	68.3 *	70.2 /1.9 *	63.8 /-4.5	63.0 /-5.3	62.2 /-6.1	63.3 /-5.0
Receiver 3-9-36:044	PM	68.6 *	70.5 /1.9 *	64.1 /-4.5	63.0 /-5.6	62.1 /-6.5	64.0 /-4.6
Receiver 3-9-37:059	PM	66.8 *	68.9 /2.1 *	63.3 /-3.5	62.4 /-4.4	61.6 /-5.2	63.2 /-3.6
Receiver 3-9-37:058	PM	67.4 *	69.4 /2.0 *	64.3 /-3.1	63.1 /-4.3	62.2 /-5.2	64.2 /-3.2
Receiver 3-9-37:057	PM	69.4 *	71.0 /1.6 *	64.9 /-4.5	63.4 /-6.0	62.3 /-7.1	64.9 /-4.5
Receiver 3-9-37:056	PM	68.6 *	70.2 /1.6 *	64.6 /-4.0	63.5 /-5.1	62.3 /-6.3	64.4 /-4.2
Receiver 3-9-37:055	PM	69.4 *	70.9 /1.5 *	65.5 /-3.9	64.1 /-5.3	62.9 /-6.5	64.4 /-5.0
Receiver 3-9-37:054	PM	68.2 *	70.0 /1.8 *	65.1 /-3.1 **	63.9 /-4.3	62.7 /-5.5	63.9 /-4.3
Receiver 3-9-37:053	PM	69.3 *	71.1 /1.8 *	66.0 /-3.3	64.5 /-4.8	63.2 /-6.1	64.2 /-5.1
Receiver 3-9-37:052	PM	67.2 *	69.2 /2.0 *	64.4 /-2.8 **	63.3 /-3.9	62.4 /-4.8	62.2 /-5.0

TABLE 8 (CONTINUED)

PREDICTED TRAFFIC NOISE ATTENUATION VS. BARRIER HEIGHTS
(4.92 FT HIGH RECEPTOR)

RECEPTOR LOCATION	PEAK HOUR	EXISTING (CY 2001) Leq	FUTURE NOISE LEVELS (CY 2011) Leq — W/O BAR./ (CHANGE)		6.0 FT WALL/ (CHANGE)		7.0 FT WALL/ (CHANGE)		8.0 FT WALL/ (CHANGE)		POTEN. WALL/ (CHANGE)	
ROADWAY SEGMENT N (MAKAI): (continued)												
Receiver 3-9-37:051	PM	66.0	68.5 /2.5	*	62.7 /-3.3		61.6 /-4.4		60.7 /-5.3		60.5 /-5.5	
Receiver 3-9-37:050	PM	65.3	67.0 /1.7	*	64.6 /-0.7	**	63.6 /-1.7	**	62.5 /-2.8	**	62.4 /-2.9	***
Receiver 3-9-37:049	PM	65.1	66.6 /1.5	*	64.1 /-1.0	**	63.6 /-1.5	**	63.2 /-1.9	**	63.8 /-1.3	***
Receiver 3-9-37:022	PM	59.0	60.3 /1.3		N/A		N/A		N/A		58.2 /-0.8	
Receiver 3-9-37:021	PM	58.2	59.4 /1.2		N/A		N/A		N/A		55.0 /-3.2	
Receiver 3-9-37:020	PM	56.7	57.8 /1.1		N/A		N/A		N/A		54.6 /-2.1	
ROADWAY SEGMENT N (MAUKA):												
Receiver 2-1-15:016	PM	69.8 *	71.3 /1.5	*	63.2 /-6.6		61.9 /-7.9		60.9 /-8.9		63.2 /-6.6	
Receiver 2-1-15:017	PM	65.6	66.6 /1.0	*	58.9 /-6.7		58.1 /-7.5		57.4 /-8.2		58.9 /-6.7	

Notes:

1. Right-of-Way (R/W) wall locations as shown in Figures 2 through 9.
2. * Denotes exceedance of State DOT "66 Leq" Criteria for Residences.
3. ** Denotes need for additional barrier height to meet State DOT "5 dBA Minimum Attenuation" Criteria.
4. *** Traffic Noise Model is probably over estimating actual noise levels due to large cut in roadway.

In view of the relatively small increases in traffic noise levels attributable to the project, the anticipated costs of sound attenuation walls should be compared to the other construction costs associated with the restriping project. If the costs of the sound attenuation walls are disproportionately high, the inclusion of sound attenuating walls in the project can be considered to be unreasonable, particularly if the added costs of the walls make the highway restriping project unfeasible. Traffic noise levels along the project corridor will remain high and above FHWA and HDOT noise abatement criteria with or without the restriping project, and if a 5 miles per hour reduction in posted speed limit is incorporated into the project as planned, significant or noticeable increases in traffic noise levels may not occur through the Year 2011. When more permanent improvements to the highway occur in the future, the added costs of sound attenuating walls may be more reasonable and feasible, because they will probably be less disproportionate to the total construction costs of the highway improvements.

It is anticipated that potential noise impacts at any new noise sensitive or commercial establishments located in the project area may be mitigated through the inclusion of sound walls or other noise mitigation measures within the individual lot development plans. In addition, any new commercial establishments, public use facilities, or housing units which may be planned alongside the roadway represent areas of potential adverse noise impacts if adequate noise mitigation measures are not incorporated into the planning of these future projects. It is anticipated that the project's roadway improvements will be completed prior to any redevelopment of the presently open areas or commercial lots adjacent to a roadway, and that noise abatement measures such as adequate setbacks, sound attenuating walls or berms, or closure and air conditioning will be incorporated into these new developments along the roadway as required. In any event, new structures whose building permits were obtained after the date of this noise study will not qualify for noise abatement measures under existing HDOT procedures.

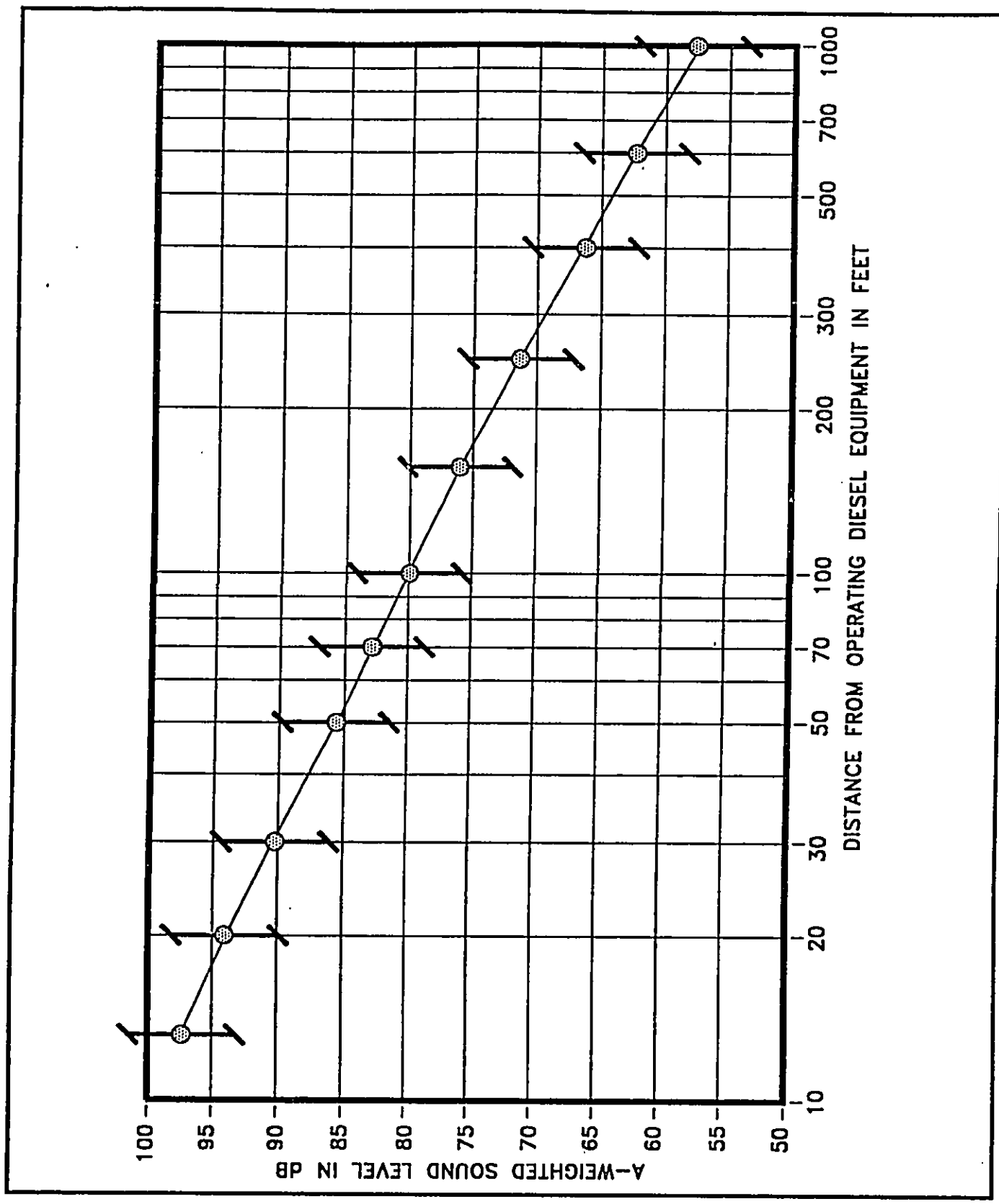
CHAPTER VII. CONSTRUCTION NOISE IMPACTS

Short-term noise impacts associated with construction activities along the existing highway may occur. These impacts can occur as a result of the short distances (less than 150 FT) between existing dwelling units and commercial establishments to the anticipated construction corridor. The total duration of the construction period for the proposed project is not known, but noise exposure from construction activities at any one receptor location is not expected to be continuous during the total construction period.

Noise levels of diesel powered construction equipment typically range from 80 to 90 dB at 50 FT distance. Typical levels of noise from construction activity (excluding pile driving activity) are shown in Figure 10. 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 its regulation. 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.

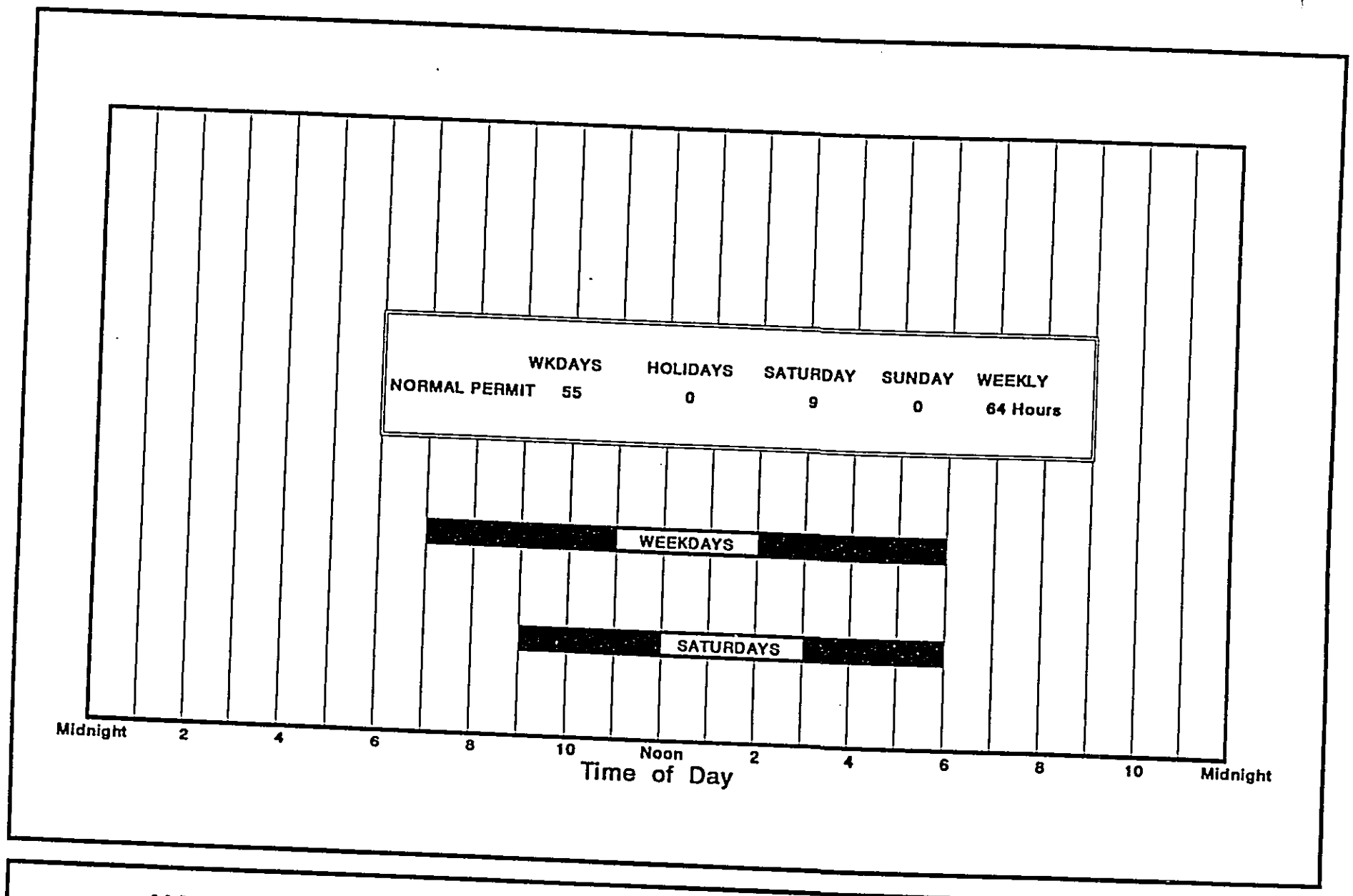
Construction noise levels at existing structures can intermittently exceed 90 dB when work is being performed at close distances in front of these structures. Along the roadway improvement project, distances between the construction sites and receptors are expected to be between 10 and 200 FT, and construction noise levels may intermittently exceed 90 dB. The State Department of Health currently regulates noise from construction activities under a permit system (Reference 5). Under current permit procedures (see Figure 11), noisy construction activities are restricted to hours between 7:00 AM and 6:00 PM, from Monday through Friday, and exclude certain holidays. Noisy construction activities are normally restricted to the hours of 9:00 AM to 6:00 PM on Saturdays, with construction not permitted on Sundays. These restrictions minimize construction noise impacts on noise sensitive receptors along the roadway project corridor, and have generally been successfully applied. In this way, construction noise impacts on noise sensitive receptors can be minimized.

In addition, the use of quieted portable engine generators and diesel equipment should be specified for use within 500 FT of noise sensitive properties. Heavy truck and equipment staging areas should also be located at areas which are at least 500 FT from noise sensitive properties whenever possible. Truck routes which avoid residential communities should be identified wherever possible. The use of 8 to 12 FT high construction noise barriers may also be used where close-in construction work to noise sensitive structures is unavoidable.



ANTICIPATED RANGE OF CONSTRUCTION NOISE LEVELS VS. DISTANCE

FIGURE 10



AVAILABLE WORK HOURS UNDER DOH PERMIT PROCEDURES FOR CONSTRUCTION NOISE

FIGURE 11

APPENDIX A. REFERENCES

(1) "FHWA Highway Traffic Noise Model User's Guide;" FHWA-PD-96-009, Federal Highway Administration; Washington, D.C.; January 1998 and Version 1.1 User's Guide (Addendum) of September 2000.

(2) "Traffic Analysis Report - Piilani Highway Interim Widening, Mokulele Highway to Kilohana Drive;" Julian Ng, Incorporated; March 2002.

(3) Federal Highway Administration; "Procedures for Abatement of Highway Traffic Noise and Construction Noise;" 23 CFR Chapter I, Subchapter H, Part 772;" April 1, 1995.

(4) "Noise Analysis and Abatement Policy;" Hawaii State Department of Transportation, Highways Division, Materials Testing and Research Branch; June 1997.

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

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 Over Time(T) [4]	$L_{eq(T)}$	$L_{Aeq(T)}$	$L_{Beq(T)}$	$L_{peq(T)}$
8. Day Sound Level	L_d	L_{Ad}	L_{Bd}	L_{pd}
9. Night Sound Level	L_n	L_{An}	L_{Bn}	L_{pn}
10. Day-Night Sound Level	L_{dn}	L_{Adn}	L_{Bdn}	L_{pdn}
11. Yearly Day-Night Sound Level	$L_{dn(Y)}$	$L_{Adn(Y)}$	$L_{Bdn(Y)}$	$L_{pdn(Y)}$
12. Sound Exposure Level	L_S	L_{SA}	L_{SB}	L_{Sp}
13. Energy Average Value Over (Non-Time Domain) Set of Observations	$L_{eq(e)}$	$L_{Aeq(e)}$	$L_{Beq(e)}$	$L_{peq(e)}$
14. Level Exceeded x% of the Total Set of (Non-Time Domain) Observations	$L_{x(e)}$	$L_{Ax(e)}$	$L_{Bx(e)}$	$L_{px(e)}$
15. Average L_x Value	L_x	L_{Ax}	L_{Bx}	L_{px}

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

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

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

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

APPENDIX C

SUMMARY OF BASE YEAR AND FUTURE YEAR TRAFFIC VOLUMES

ROADWAY LANES	**** CY 2001 ***** AM VPH	PM VPH	CY 2011 (NO BUILD) AM VPH	PM VPH	CY 2011 (BUILD) AM VPH	PM VPH
North of Uwapo Road (NB)	1,380	995	1,855	1,480	1,855	1,480
North of Uwapo Road (SB)	780	1,300	1,195	1,830	1,195	1,830
Two-Way (Segment B)	2,160	2,295	3,050	3,310	3,050	3,310
South of Uwapo Road (NB)	1,180	1,030	1,660	1,520	1,660	1,520
South of Uwapo Road (SB)	885	1,290	1,310	1,820	1,310	1,820
Two-Way (Segment C)	2,065	2,320	2,970	3,340	2,970	3,340
North of Ohukai Road (NB)	1,140	1,045	1,620	1,535	1,620	1,535
North of Ohukai Road (SB)	885	1,310	1,310	1,835	1,310	1,835
Two-Way (Segment D)	2,025	2,355	2,930	3,370	2,930	3,370
South of Ohukai Road (NB)	1,055	1,030	1,550	1,530	1,550	1,530
South of Ohukai Road (SB)	895	1,270	1,350	1,790	1,350	1,790
Two-Way (Segment E)	1,950	2,300	2,900	3,320	2,900	3,320
North of Piikea Avenue (NB)	1,135	1,130	1,490	1,400	1,490	1,400
North of Piikea Avenue (SB)	1,040	1,315	1,260	1,720	1,260	1,720
Two-Way (Segment G)	2,175	2,445	2,750	3,120	2,750	3,120
South of Piikea Avenue (NB)	1,030	1,125	1,330	1,330	1,330	1,330
South of Piikea Avenue (SB)	1,080	1,330	1,330	1,770	1,330	1,770
Two-Way (Segment H)	2,110	2,455	2,660	3,100	2,660	3,100
North of Lipoa Street (NB)	1,030	1,110	1,330	1,330	1,330	1,330
North of Lipoa Street (SB)	1,080	1,330	1,330	1,770	1,330	1,770
Two-Way (Segment H)	2,110	2,440	2,660	3,100	2,660	3,100
South of Lipoa Street (NB)	925	935	1,300	1,235	1,300	1,235
South of Lipoa Street (SB)	910	1,210	1,205	1,600	1,205	1,600
Two-Way (Segment I)	1,835	2,145	2,505	2,835	2,505	2,835

APPENDIX C (CONTINUED)

SUMMARY OF BASE YEAR AND FUTURE YEAR TRAFFIC VOLUMES

ROADWAY LANES	**** CY 2001 ***** AM VPH	PM VPH	CY 2011 (NO BUILD) AM VPH	PM VPH	CY 2011 (BUILD) AM VPH	PM VPH
North of Ke Alii Alanui Street (NB)	820	875	1,115	1,225	1,115	1,225
North of Ke Alii Alanui Street (SB)	800	805	1,075	1,385	1,075	1,385
Two-Way (Segment L)	1,620	1,680	2,190	2,610	2,190	2,610
South of Ke Alii Alanui Street (NB)	635	725	880	1,030	880	1,030
South of Ke Alii Alanui Street (SB)	630	710	920	1,295	920	1,295
Two-Way (Segment M)	1,265	1,435	1,800	2,325	1,800	2,325
North of Kilohana Drive (NB)	550	730	880	1,030	880	1,030
North of Kilohana Drive (SB)	670	935	980	1,325	980	1,325
Two-Way (Segment N)	1,220	1,665	1,860	2,355	1,860	2,355
South of Kilohana Drive (NB)	375	635	675	930	675	930
South of Kilohana Drive (SB)	610	730	935	1,125	935	1,125
Two-Way (Segment O)	985	1,365	1,610	2,055	1,610	2,055

(APPENDICES C AND D BASED ON MARCH 2002 TRAFFIC STUDY REPORT AND EXHIBITS RECEIVED 3/27/02)

APPENDIX D

SUMMARY OF BASE YEAR AND FUTURE YEAR (WITH UPCOUNTRY ROAD) TRAFFIC VOLUMES

ROADWAY LANES	***** CY 2001 ***** AM VPH	PM VPH	CY 2011 (NO BUILD) AM VPH	PM VPH	CY 2011 (BUILD) AM VPH	PM VPH
North of Uwapo Road (NB)	1,380	995	1,995	1,480	1,995	1,480
North of Uwapo Road (SB)	780	1,300	855	1,775	855	1,775
Two-Way (Segment B)	2,160	2,295	2,850	3,255	2,850	3,255
South of Uwapo Road (NB)	1,180	1,030	1,810	1,530	1,810	1,530
South of Uwapo Road (SB)	885	1,290	980	1,775	980	1,775
Two-Way (Segment C)	2,065	2,320	2,790	3,305	2,790	3,305
North of Moi Place (NB)	1,180	1,030	1,810	1,530	1,810	1,530
North of Moi Place (SB)	880	1,285	980	1,775	980	1,775
Two-Way (Segment C)	2,060	2,315	2,790	3,305	2,790	3,305
South of Moi Place (NB)	1,140	1,045	1,770	1,545	1,770	1,545
South of Moi Place (SB)	885	1,310	980	1,790	980	1,790
Two-Way (Segment D)	2,025	2,355	2,750	3,335	2,750	3,335
North of Ohukai Road (NB)	1,140	1,045	1,770	1,545	1,770	1,545
North of Ohukai Road (SB)	885	1,310	980	1,790	980	1,790
Two-Way (Segment D)	2,025	2,355	2,750	3,335	2,750	3,335
South of Ohukai Road (NB)	1,055	1,030	1,720	1,560	1,720	1,560
South of Ohukai Road (SB)	895	1,270	1,040	1,765	1,040	1,765
Two-Way (Segment E)	1,950	2,300	2,760	3,325	2,760	3,325
North of Kaonoulu (NB)	1,055	1,030	1,720	1,560	1,720	1,560
North of Kaonoulu (SB)	895	1,270	1,040	1,765	1,040	1,765
Two-Way (Segment E)	1,950	2,300	2,760	3,325	2,760	3,325
South of Kaonoulu (NB)	1,130	1,115	1,490	1,400	1,490	1,400
South of Kaonoulu (SB)	1,025	1,310	1,235	1,720	1,235	1,720
Two-Way (Segment F)	2,155	2,425	2,725	3,120	2,725	3,120

APPENDIX D (CONTINUED)

SUMMARY OF BASE YEAR AND FUTURE YEAR (WITH UPCOUNTRY ROAD) TRAFFIC VOLUMES

ROADWAY LANES	***** CY 2001 ***** AM VPH	PM VPH	CY 2011 (NO BUILD) AM VPH	PM VPH	CY 2011 (BUILD) AM VPH	PM VPH
North of Kulanihakoi St. (NB)	1,130	1,115	1,490	1,400	1,490	1,400
North of Kulanihakoi St. (SB)	1,025	1,270	1,235	1,715	1,235	1,715
Two-Way (Segment F)	2,155	2,385	2,725	3,115	2,725	3,115
South of Kulanihakoi St. (NB)	1,135	1,130	1,490	1,400	1,490	1,400
South of Kulanihakoi St. (SB)	1,040	1,315	1,260	1,720	1,260	1,720
Two-Way (Segment G)	2,175	2,445	2,750	3,120	2,750	3,120
North of Waipuilani St. (NB)			1,490	1,400	1,490	1,400
North of Waipuilani St. (SB)			1,260	1,720	1,260	1,720
Two-Way (Segment G)			2,750	3,120	2,750	3,120
South of Waipuilani St. (NB)			1,490	1,400	1,490	1,400
South of Waipuilani St. (SB)			1,260	1,720	1,260	1,720
Two-Way (Segment G)			2,750	3,120	2,750	3,120
North of Piikea Ave. (NB)	1,135	1,130	1,490	1,400	1,490	1,400
North of Piikea Ave. (SB)	1,040	1,315	1,260	1,720	1,260	1,720
Two-Way (Segment G)	2,175	2,445	2,750	3,120	2,750	3,120
South of Piikea Ave. (NB)	1,030	1,110	1,330	1,330	1,330	1,330
South of Piikea Ave. (SB)	1,080	1,330	1,330	1,770	1,330	1,770
Two-Way (Segment H)	2,110	2,440	2,660	3,100	2,660	3,100

Appendix D

Oral Testimony Taken at Informational Open House, March 21, 2002

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

HIGHWAYS DIVISION

INTERIM PIILANI HIGHWAY IMPROVEMENT PROJECT

Taken at the Kihei Community Center, Kihei, Maui, Hawaii, commencing at 6:00 p.m. on March 21, 2002, pursuant to notice.

REPORTED BY: RACHELLE PRIMEAUX, RPR/CSR #370

A P P E A R A N C E S

State Department of Transportation,
Ferdinand Cajigal, District Engineer

Bob Siarot, Consultant

RM Towill Corporation,
Burt Toba
Craig Luke

Julian Ng, Inc.,
Julian Ng

Y. Ebisu & Associates,
Yoichi Ebisu

Munekiyo & Hiraga
Michael Munekiyo
Mitch Hirano

* * *

MR. KENNY BARR: My name is Kenny Barr, B A R R, representing Kihei Taxi. And everyone who drives this highway -- I don't have any comments on the plans. It's obviously going to help, but what I do want to comment on is about the traffic light situation on the highway in that when you're riding along the highway, anytime one car comes up any of the side streets, it trips the trip meter and the highway, no matter how many cars is in a line, have to jam on their brakes and stop.

And my suggestion is that when the cars come up the side streets, that when they hit the trip meter, that it sets a time where for one minute which the lights on the highway will stay green and that the person coming out of the side street would wait up to one minute before the light would change. This way when you're riding down the highway and you see out of the corner of your eye one car coming up a side street that you don't have to jam on your brakes so that the highway has to stop for the one car.

It seems common sense, and I think every driver would feel the same way. And if I'm coming up the side street, I would understand that I'm going to wait a minute to get to the highway, and this way you're

not interrupting the flow of the major highway in Kihei.

MR. JACK CROPPER: My name is Jack Cropper. And I'm visiting here from California. And I worked for the California Department of Transportation since 1948 in planning, design, construction and maintenance, so I know what congestion is. I first came to Maui in 1945 courtesy of the United States Navy and I love this island and I hate to see congestion ruin it.

I'm glad to see that the State is finally recognizing that there is a problem, and I have several suggestions that they and the County might want to consider to overcome the congestion problems. In the Kihei area, you have two transportation corridors, Kihei Road, which is administered by the County and the Piilani Highway, which is administered by the State. These two roads have to be operated in concert.

Whatever is done to one highway has an effect on the other highway. The proposed project I think will go a long way toward solving Kihei's transportation problems. But there are other things that could be done and maybe should be done right now. The first is to perform an origin and destination survey on both roads to find out where the people are going, where

they're coming from and when. Once you have that information, you can move ahead intelligently on improvements.

Thoughts that I think should be considered are stagger the working hours among the employed in the Kihei area. The people who live and work here are the ones that are causing the congestion. Their employers put them on the highway at more or less the same time. Another item that should be strongly considered are increasing the number of carpools and park and ride lots for the working people. I wouldn't go so far as to make carpools mandatory, but it's a very easy way to reduce congestion.

The existing traffic signals need synchronization and coordination. Do not install anymore unless you absolutely have to because traffic signals do nothing but create congestion. Kihei Road should be looked at more closely for more two-way left turn lanes. This will reduce accidents also. It appears as though the new design on the intersections that are not signalized are going to be deficient for acceleration lanes both in the median and on the outside.

There used to be a road that went from the general vicinity of Makena or Wailea up to the highway

that goes by the winery. That road has been closed for a long time, but if it could be replaced with a new minimum standard highway, I would be surprised if it didn't take an awful lot of traffic off of the Piilani Highway. Here again, an O and D survey will show that. O and D is origin and destination.

MR. CHARLES PLUNKETT: My name is Charles Plunkett, yeah. And I live on 251 Kaiola Place, and my concern is that when they widen the road on the shoulder that where I live, there's a drop, you know. What I'm worried about is the safety factor because I don't have no guardrail or anything in front of my house. And what I'm worried about, if cars speed and just fly off the shoulder and end up in my property. So I'm worried about a safety factor for my family and if that do happen, who I going sue? That's about it.

I live between Ohukai and Moi Street. And I live right in between the two streets, and there's like a 6 feet drop right off the shoulder when you widen it, yeah. And I'm really concerned about the safety factor, because there's only a fence that's protecting me and my family, yeah. And I live close to the fence, so I'm worried about the safety issue.

MS. JUANITA KAWAMOTO: I'm Juanita Kawamoto, and I'm President for Royal Kiawe, Inc., which is a

general partner of Royal Kiawe Ventures. It's a family limited liability partnership that's been in my family for over eight years, and we own property on the corner of Lipoa and South Kihei Road. And our interest here is how the Piilani Highway's improvements will affect the traffic flow around our properties. And so far that we can see is it looks like it will reduce traffic. The intention is to reduce traffic off South Kihei Road and draw a lot of it away into the Piilani Highway, so based on that and what we're seeing and hearing from the consultants, it seems like a good idea. And we would like to see traffic minimized on South Kihei Road or to move smoothly because we hope to develop our project someday.

So as far as if it's a question of whether in favor of the development or not in favor, personally, I think I would be in favor of the development expansion.

MS. EUGENIA SMITH: Basically what she feels, and also I guess the idea is to improve traffic for the whole of Kihei and what they explained to us is that they're restriping the highway, which they already have the asphalt laid and everything in place. It's just a matter of restriping the lines to

make the traffic flow better, and there's also some intention to also improve Mokulele Highway, which will create that flow straight through down to the airport, so I think the intentions that they're doing it with good intentions to alleviate traffic on South Kihei Road.

And anything that will try to improve traffic in the whole area of Kihei is just a plus. It just will benefit the whole community and the businesses that reside in the area.

MS. JUANITA KAWAMOTO: One other point is we did hear from some of the people who live in the community and they're very concerned about it actually increasing traffic on South Kihei Road, and that, I don't know how accurate that information is. Based on what we're seeing here today, it's still proposing close to what the master plan was set for 20 years. So if it's a concern to the community though as a whole, then we probably would consider that. We don't see the potential problem right now. It seems to be that some people in the community are against it, and that is a little bit of concern to us, what the others say. That's it.

MR. ARNOLD PRATT: My name is Arnold Pratt, and I just noticed in the newspaper that they were having

a meeting today. And originally I thought it was about the walls they were talking about putting up. But I just thought I would come down anyway to see what else is happening and decided that I should make some comments about what I've been thinking for a long time, the fact that I'm wondering why -- what happened to the alternative roads they talked about, the ones going upcountry especially? Or, you know, even an alternative road going to Kahului from let's say the Kihei side, you know, just to take the traffic off of the Piilani Highway. That's my main concern. Why aren't we working on the alternative roads?

I believe one alternate road, whichever one they take, would alleviate a lot of the traffic, at least one-third. And that would reduce the need of widening the four lanes, of making the Piilani into a four-lane now.

It's primarily all I wanted to put out there. I think just, you know, what happened -- why don't we ever hear anymore about alternative roads and upcountry roads? That's all.

(The meeting concluded at 8:45 p.m.)

C E R T I F I C A T I O N

I, Rachelle Primeaux, Notary Public for the State of Hawaii, certify:

That on the aforementioned date and time the proceedings contained herein were had;

That the proceedings were taken by me in machine shorthand and were thereafter produced in transcript form under my supervision;

That the foregoing represents, to the best of my ability, a true and accurate transcript of the proceedings had in the foregoing matter.

I further certify that I am neither attorney for any of the parties hereto nor in any way concerned with the cause.

Dated this 25th day of March, 2002.

Notary Public, State of Hawaii

My Commission Expires June 14, 2004

2002-05-08-MA-FEA-

Final Environmental Assessment

INTERIM PIILANI HIGHWAY IMPROVEMENTS (MOKULELE HIGHWAY TO KILOHANA DRIVE)

Prepared for:

State of Hawaii,
Department of Transportation

April 2002

MUNEKIYO & HIRAGA, INC.

Final
Environmental Assessment

INTERIM PIILANI HIGHWAY IMPROVEMENTS (MOKULELE HIGHWAY TO KILOHANA DRIVE)

Prepared for:

State of Hawaii,
Department of Transportation

April 2002

MUNEKIYO & HIRAGA, INC.

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Preface

The State of Hawaii, Department of Transportation, Highways Division (DOT), proposes the design and implementation of restriping and related improvements to approximately 5.9 miles of the Piilani Highway from the intersection at Mokulele Highway to the intersection at Kilohana Drive in the Kihei District of the island of Maui, Hawaii. The proposed improvements will utilize the existing highway right-of-way to provide two (2) additional travel lanes, one (1) in each direction. The proposed project will be funded by State and County governments, as well as contributions of planning and design services from Makena Resort Corp. and WCPT Land Associates, LLC.

Pursuant to Chapter 343, Hawaii Revised Statutes (HRS), this Environmental Assessment (EA) documents the project's technical characteristics, environmental impacts and alternatives, and advances findings and conclusions relative to the project.

Chapter I

Project Overview

I. PROJECT OVERVIEW

A. PROJECT LOCATION AND LAND OWNERSHIP

The State of Hawaii, Department of Transportation, Highways Division (DOT) proposes to implement restriping to create two (2) additional lanes and related improvements to a 5.9-mile section of the Piilani Highway from the intersections at Mokulele Highway in the north, to Kilohana Drive in the south on the island of Maui. See Figure 1.

Piilani Highway (Route 31) is a two (2) lane principal arterial from Mokulele Highway to Wailea Ike Drive in Wailea. The highway right-of-way along the project corridor ranges from 105 feet to 225 feet. The highway runs in a north-south direction, with travel lanes separated by a double yellow striped pavement marking. See photographs in Figure 2, Figure 3, and Figure 4. The highway also contains a bike route on each side of the roadway. Piilani Highway provides access to residential and resort areas of Kihei, Wailea and Makena. The posted speed limit is 45 miles per hour. There are fourteen (14) intersections along the proposed project improvement corridor. The intersections are signalized at Mokulele Highway, Uwapo Road, Ohukai Road, Piikea Avenue, Lipoa Street, Ke Alii Alanui and Kilohana Drive.

Within the 5.9-mile project limits, Piiiani Highway traverses lands which are bordered primarily by single-family residences, condominiums, apartment complexes, commercial and retail businesses, schools, public utilities, recreational uses, and agricultural lands.

All proposed works and improvements to the Piilani Highway along this corridor will be conducted within the roadway's existing right-of-way (ROW). (As used in this document, "corridor" or "project corridor" shall be defined as the existing Piilani Highway right-of-way, between Mokulele

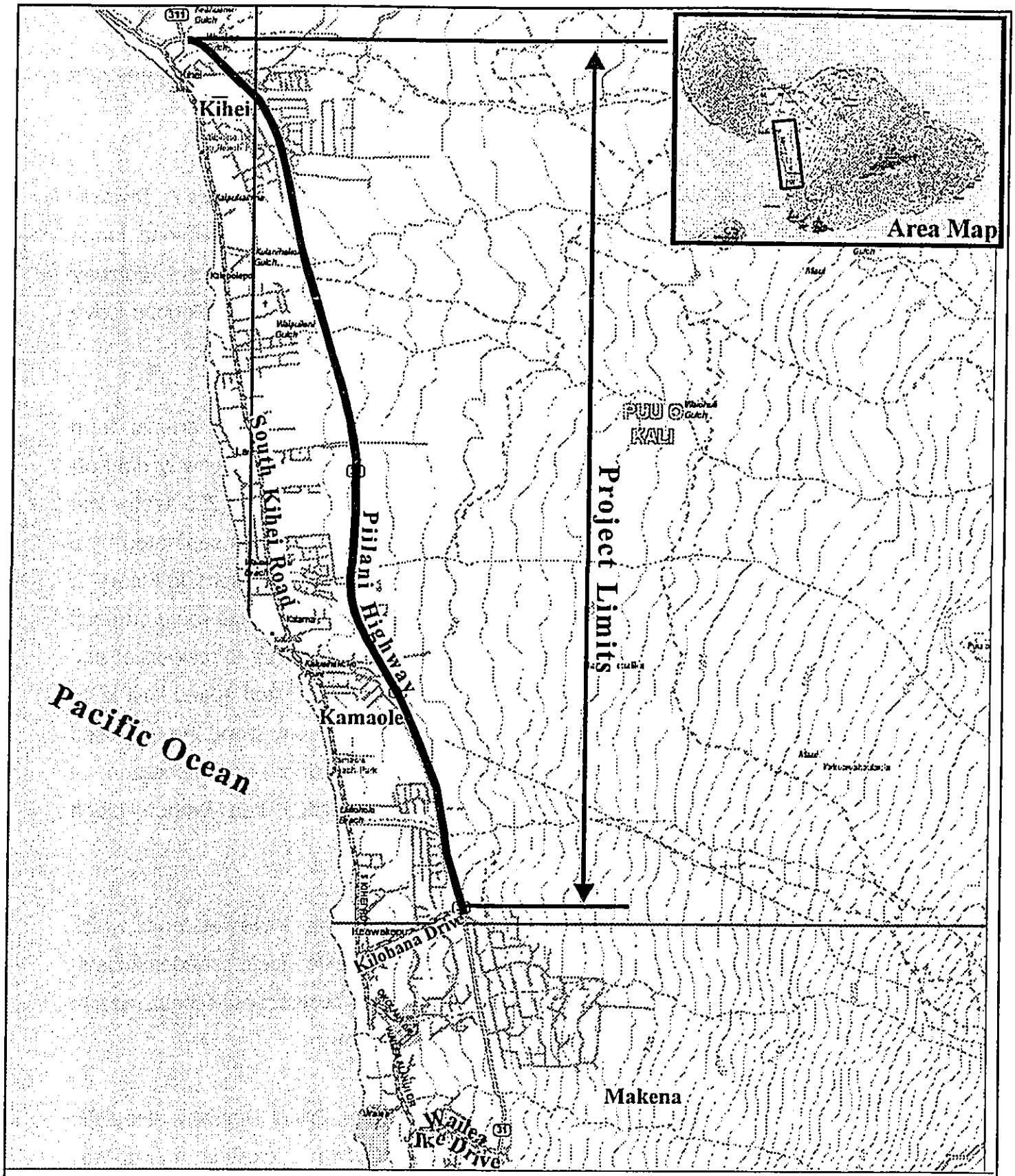


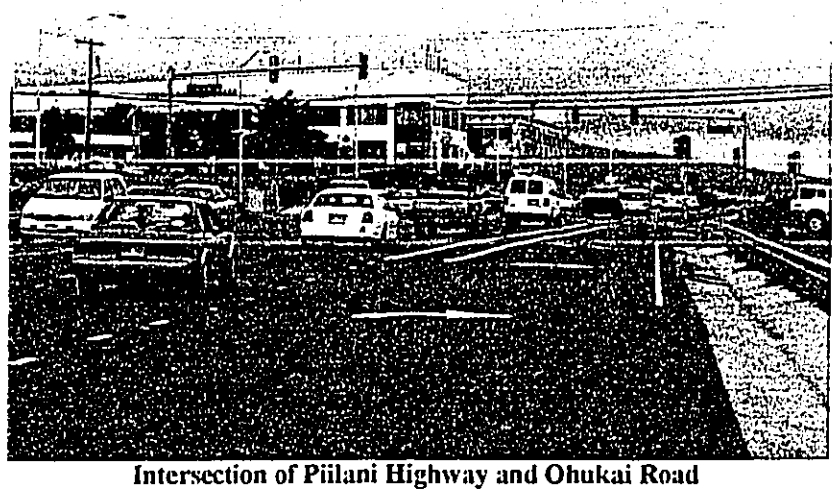
Figure 1

Interim Piilani Highway Improvements

Project Limits

MUNEKIYO & HIRAGA, INC.

Prepared for: State of Hawaii, Department of Transportation



Intersection of Piilani Highway and Ohukai Road
Looking South

Intersection of Piilani Highway and Lipoa Street
Looking South

Source: Munekiyo & Hiraga, Inc.

Figure 2 Interim Piilani Highway Improvements
Photographs of Existing Roadway Conditions

Prepared for: State of Hawaii, Department of Transportation

MUNEKIYO & HIRAGA, INC.

Intersection of Piilani Highway and Ke Alii Alanui
Looking South

Intersection of Piilani Highway and Kilohana Drive
Looking North

Source: Munekiyo & Hiraga, Inc.

Figure 3 Interim Piilani Highway Improvements
Photographs of Existing Roadway Conditions

Prepared for: State of Hawaii, Department of Transportation

MUNEKIYO & HIRAGA, INC.

Piilani Highway segment between Ohukai Road and Kaonoulu Street
South View

Piilani Highway segment between Uwapo Road and Ohukai Road
South View

Source: Munekiyo & Hiraga, Inc.

Figure 4 Interim Piilani Highway Improvements
Photographs of Existing Roadway Conditions

Prepared for: State of Hawaii, Department of Transportation

MUNEKIYO & HIRAGA, INC.

Highway and Kilohana Drive.

The ownership of the Piilani Highway rests with the State of Hawaii. The proposed project is located outside the limits of the Special Management Area (SMA) for the island of Maui.

B. PROPOSED ACTION

1. Project Need

The segment of Piilani Highway that is proposed to be improved begins in the north at the intersection of Mokulele Highway and terminates in the south at the intersection of Piilani Highway and Kilohana Drive, a distance of approximately 5.9 miles. Within this segment of highway, the roadway has a pavement width varying from 50 feet to 89 feet (including shoulders). There are fourteen (14) intersections (including the old and new intersection at Welakahao Road) within this segment of Piilani Highway of which seven (7) (including the Mokulele Highway intersection) are controlled by traffic signals and seven (7) with stop signs.

The Piilani Highway is a key component of the regional transportation system and serves two (2) transportation functions. Primarily, it is the major arterial for the communities of Kihei, Wailea and Makena providing the main north-south transportation corridor to central and west Maui. The Piilani Highway is also used increasingly as an intra-community transportation circulator in certain areas, serving short distance trips of less than one mile for the residents of Kihei, Wailea and Makena.

The need to improve the Piilani Highway from two (2) lanes to four (4) lanes has been identified in the following studies:

a. County of Maui Long-Range Land Transportation Plan, Final Report, February 1997, published cooperatively by the State of Hawaii, Department of Transportation (SDOT), the Maui County Department of Public Works and Waste Management (DPWWM) and the Maui County Department of Planning;

b. Kihei Traffic Master Plan, October 1996, published cooperatively by the State of Hawaii, Department of Transportation (SDOT), the County of Maui, Department of Public Works and Waste Management (DPWWM) and the County of Maui, Department of Planning;

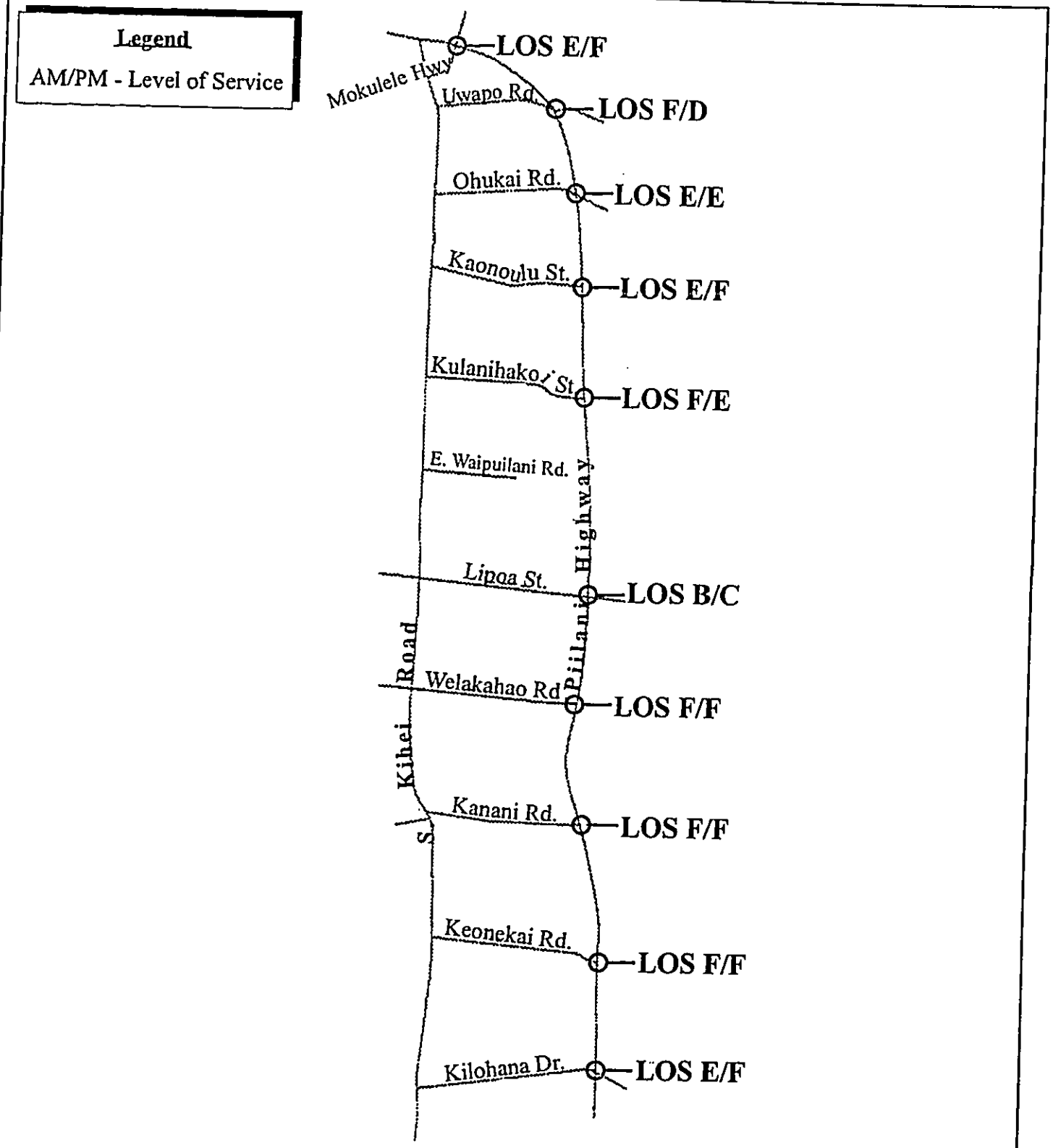
c. Kihei-Makena Community Plan (1998), County of Maui Ordinance No. 2641, Bill No. 5 (1998);

d. Traffic Study, Wailea 670 Development, May 2001, Parsons Brinckerhoff Quade & Douglas for WCPT Land Associates, LLC (owners of Wailea 670 property); and

e. Traffic Assessment Report, Piilani Highway Interim Widening, Mokulele Highway to Kilohana Drive, January 2002, prepared for Makena Resort Corp. and R.M. Towill Corporation, Julian Ng, Incorporated.

The first two (2) plans anticipated the need to widen Piilani Highway from two (2) lanes to four (4) lanes after 2005. However, due to the growth in the Kihei, Wailea and Makena communities, the widening of Piilani Highway is presently needed.

In the Kihei Traffic Master Plan, October 1996, an intersection capacity analysis was carried out on the existing intersections of the Piilani Highway to determine the Level of Service (LOS) during the peak AM and PM periods. LOS designations are qualitative measures ranging from "A" through "F", and are used to describe the condition of traffic operations. LOS "A" defines good conditions, while LOS "E" defines poor conditions. LOS "F" describes over capacity conditions or very long delays. Figure 5



Source: Kihei Traffic Master Plan, 1996

Figure 5

Interim Piilani Highway Improvements

Existing (Year 1994) Intersection Levels of Service

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summarizes the results of the analysis for the 10 existing (1994) intersections within the proposed improvement area of the Piilani Highway.

The LOS recognized in the 1996 study as the minimum Level of Service to reflect the more urban nature of the Kihei area was LOS D.

In 1994 only one (1) intersection at Piilani Highway and Lipoa Street in the project corridor met the acceptable level of service for both the AM and PM peak hour periods. The intersection at Piilani Highway and Uwapo Road/Kaiwahine Street operated at a PM peak hour LOS of D, however, the AM peak hour LOS operated at a LOS F. The other eight (8) intersections along the project corridor operated at a LOS of E or F. The level of service deteriorates south of the Piilani Highway and Lipoa Street intersection to LOS F mainly due to the stop-sign controlled left-turn movements onto the highway.

Since the 1996 study, two (2) new intersections have been developed and an existing intersection has been signalized in the study area. Namely, a new signalized T-intersection has been built at Piikea Avenue and Piilani Highway to service the new Piilani Shopping Center and providing east-west access between South Kihei Road and Piilani Highway; a new signalized T-intersection at Ke Alii Alanui Street which also provides east-west access between Piilani Highway and South Kihei Road has been built; and a traffic signal at the intersection at Kilohana Drive has been installed.

It is estimated by the State Highways Division that traffic volumes on Piilani Highway will continue to increase at an average rate of

approximately three (3) percent per year. The average daily traffic on Piilani Highway for the odd-numbered years since 1991 and projections to 2021 are shown in Table 1.

Table 1

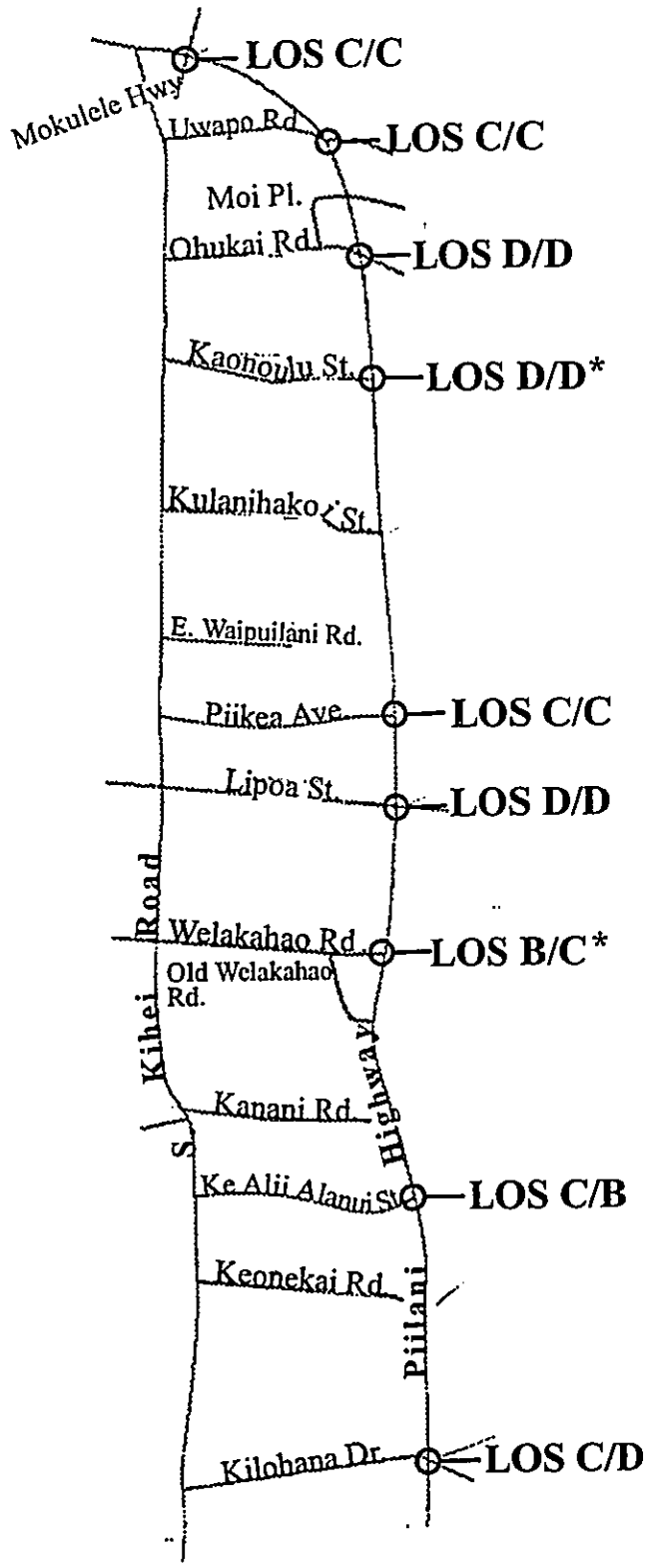
HISTORIC AND PROJECTED DAILY TRAFFIC ON PIILANI HIGHWAY		
Year	*Mokulele Highway to Lipoa Street*	*Lipoa Street to Kilohana Drive*
1991	20,639	15,627
1993	20,757	16,682
1995	23,036	18,585
1997	25,613	19,622
1999	25,852	20,731
2001	27,900	22,400
2011	38,100	30,500
2021	48,200	38,700

Source: Traffic Assessment Report, Piilani Highway Interim Widening, March 2002.

Based on the above projections, the traffic assessment report for the Piilani Highway improvements concluded that the widening of Piilani Highway to four (4) lanes at signalized intersections is necessary to address existing delays. See Appendix A. The report also concluded that the widening of the highway between the intersections would be needed as volume increases. The projected year 2011 overall Level of Service assessment of the signalized intersections with the project, and with new traffic signals at the Kaonoulu Street and the Welakahao Road intersections, for the AM and PM peak periods are presented in Figure 6. The traffic

Legend

AM/PM - Level of Service Overall



* Assumes traffic signals to be in place at these intersections by 2011.

Source: Traffic Assessment Report, Piilani Highway Interim Widening, 2002

Figure 6

Interim Piilani Highway Improvements

Year 2011 Signalized Intersection Overall Levels of Service

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Prepared for: State of Hawaii, Department of Transportation

assessment confirmed that provision of four (4) lanes would be necessary to achieve Level of Service D or better on the highway. See Appendix A.

The traffic study also assessed Level of Service operations at the unsignalized intersections. The results of the unsignalized intersection Level of Service analyses of future peak hour volumes with the right in and right out, only movements (except for southbound left on Moi Place) are presented in Figure 7. The traffic assessment confirmed that restricting turning movements to right turns from and onto the highway would achieve Level of Service D or better at unsignalized intersections.

2. ***Proposed Improvements***

The proposed improvements to the Piilani Highway will involve the following work elements:

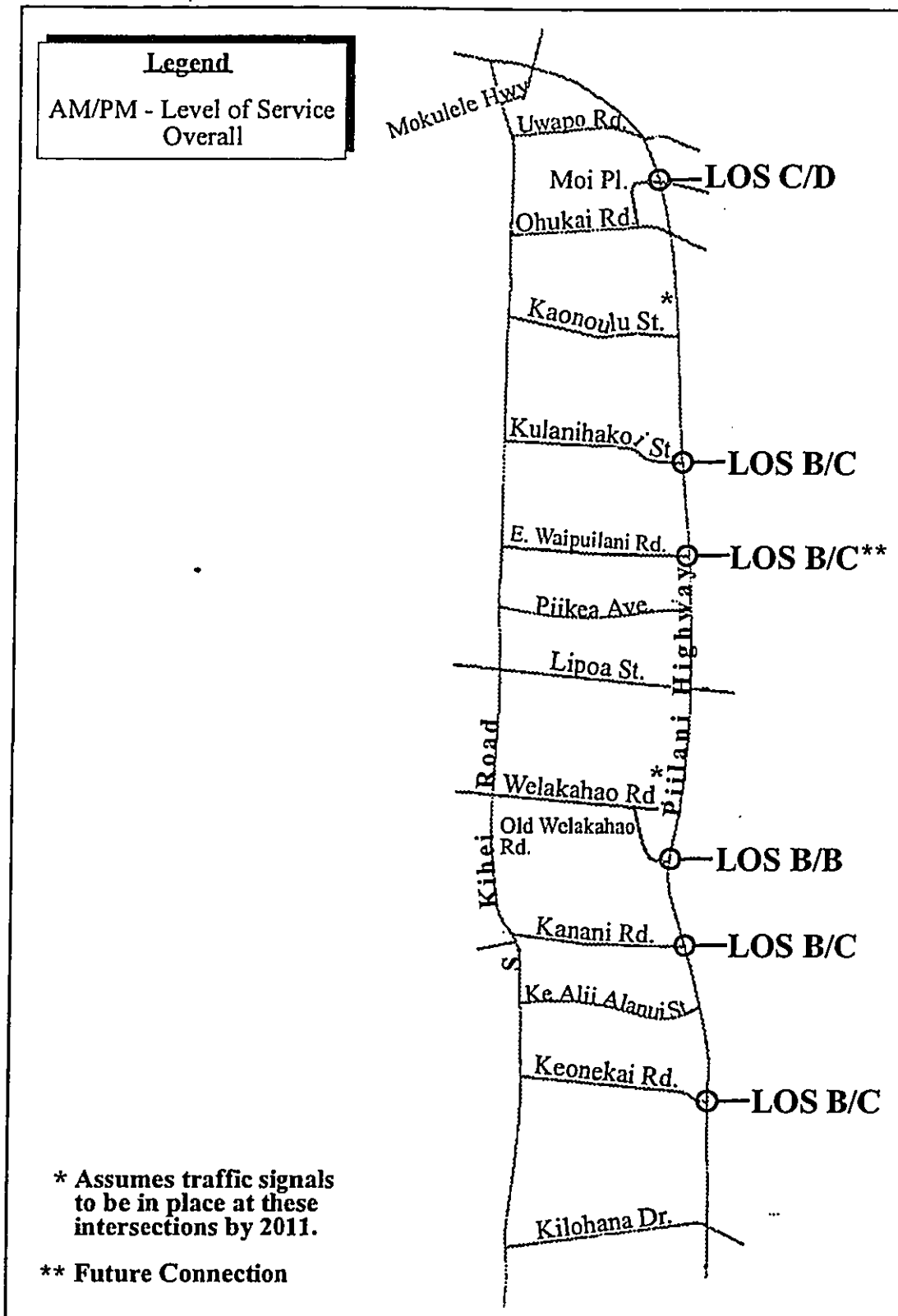
1. Restripe and convert the existing 10 ft. wide paved shoulders on each edge of road to an additional traffic lane. The existing 10 ft. shoulders shall be overlayed with asphaltic concrete to provide proper cross slope.

2. Pave into existing gutters to provide minimum 6 ft. wide paved shoulders. At bridges, a minimum of 2 ft. wide shoulders shall be provided, which will require adjustments to travel lane widths.

3. Construct an operational and functional drainage system as appropriate.

4. Modify intersections by removing and/or relocating median islands in order to permit shoulder lane passage through intersections.

5. Piilani Highway left turn storage lane widths may be narrowed from 12 feet to a minimum of 10 feet to accommodate the shoulder lanes.



Source: Traffic Assessment Report, Piilani Highway Interim Widening, 2002

Figure 7

Interim Piilani Highway Improvements

Year 2011 Unsignalized Intersection Overall Levels of Service

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6. Relocate existing traffic signals, controllers and traffic loops at all applicable intersections as necessary to permit shoulder lane passage through the intersections. These intersections include but may not be limited to Uwapo Road, Ohukai Road, Piikea Avenue, Lipoa Street and Ke Alii Alanui.

7. Replace traffic signal mast arms and add signal heads, as necessary, for the two new shoulder lanes along the route.

8. Restripe intersections and crosswalks.

9. Add, change and/or relocate regulatory traffic signs.

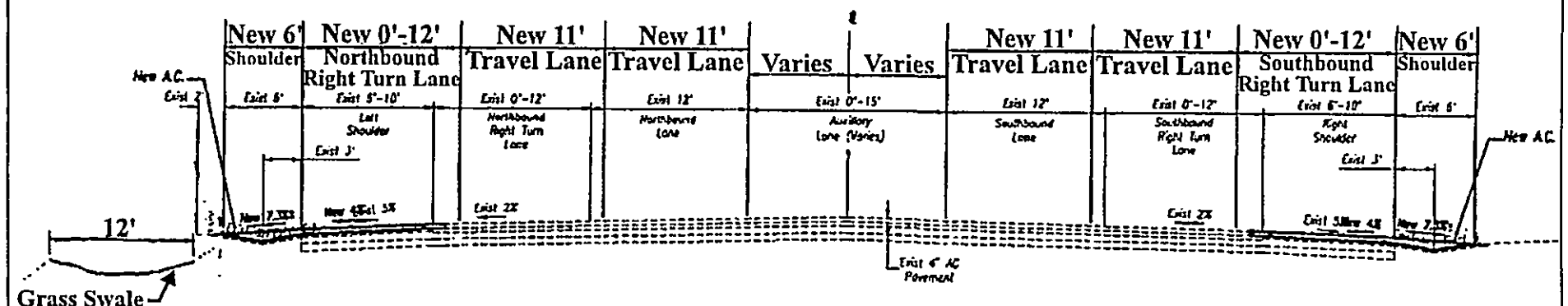
10. Adjust traffic signal phasing and provide coordination between signals, as practical and feasible, to facilitate the flow of traffic during peak hours of congestion. Install interconnect cables to coordinate the traffic signal systems from Mokulele Highway to Ohukai Road.

Left turn movements at unsignalized intersections are proposed to be prohibited at Kulanihakoi Street, Waipuilani Road, and Keonekai Street.

All plans, specifications and estimates shall be in compliance with DOT requirements, with all work being conducted within the existing State right-of-way. See Figure 8. Conceptual engineering plans for these improvements are contained in Appendix B.

3. ***Overall Costs, Cost-Sharing and Time Schedule***

The proposed project will involve the use of State and County funds and a contribution of the planning and design of the project from the private sector, Makena Resort Corp. and WCPT/GW Land Associates, LLC, owners of Makena Resort lands, and Wailea 670, respectively. It is estimated that the planning and design of the proposed project will cost $750,000.00 and construction of the proposed improvements will cost $5.7 million. See Appendix B-1.



Source: R.M. Towill Corporation

Figure 8

Interim Piilani Highway Improvements
Proposed Restriped Tangent Section

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Construction of the project will commence upon the receipt of applicable regulatory permits and approvals and contractor selection. The project is estimated to last about eleven (11) months.

Chapter II

Description of the Existing Environment

II. DESCRIPTION OF THE EXISTING ENVIRONMENT

A. PHYSICAL SETTING

1. Surrounding Land Uses

The project corridor alignment ranges from approximately 0.5 to 1.0 mile inland from the south Maui shoreline in the community of Kihei. It runs in a north to south direction for a distance of 5.9 miles commencing at the intersection of Piilani and Mokulele Highways in the north and terminating at Kilohana Drive intersection in the south.

The area is known for the resort destinations of Kihei, Wailea and Makena, its magnificent beaches, as well as its desirable residential, retail and commercial developments.

These lands are primarily occupied by single-family residences, condominium and apartment complexes, retail and commercial developments, a high-tech office complex, golf course, two (2) elementary schools, one (1) intermediate school, public utilities, recreational uses and agricultural lands. Notable uses along the project alignment include the Kihei Gateway Plaza, Piilani Village Shopping Center, Elleair Golf Course, Kihei Elementary School, Lokelani Elementary School, Kamali'i Elementary School, Kaonoulu residential area, Piilani residential area and the Kihei Wastewater Reclamation Facility.

2. Climate

The Kihei coast is generally sunny, warm and dry the entire year. The average annual temperatures in Kihei range between the low 60's to the low 90's. June through August are historically the warmer months of the year, while the cooler months are January

to March.

Average rainfall distribution in the Kihei-Makena region varies from under ten (10) inches per year to twenty (20) inches per year in the higher elevations. Rainfall in the Kihei-Makena region is highly seasonal, with most of the precipitation occurring in the winter months.

Northeast tradewinds prevail approximately 80 to 85 percent of the time. Winds average ten (10) to fifteen (15) miles per hour during afternoons, with slightly lighter winds during mornings and nights.

3. ***Topography and Soils***

The project corridor is oriented in a north-south direction and ranges approximately 0.5 to 1.0 mile from the shores of Kihei.

The topography along the project corridor gradually inclines from a north to south direction from an elevation of 14 feet to 100 feet above mean sea level (amsl).

Underlying the project corridor are the soils of the Pulehu-Ewa-Jaucas association and Waiakoa-Keahua-Molokai association. The Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai and Lanai, State of Hawaii characterizes the soils of these associations as deep, nearly level to moderately sloping, well-drained and excessively drained soils that have a moderately fine textured to course-textured subsoil or underlying material and well drained soils that have a moderately fine textured subsoil, respectively. See Figure 9.

LEGEND

① Pulehu-Ewa-Jaucas association

② Waiakoa-Keahua-Molokai association

③ Honolua-Olelo association

④ Rock land-Rough mountainous land association

⑤ Puu Pa-Kula-Pane association

⑥ Hydrandepts-Tropaquods association

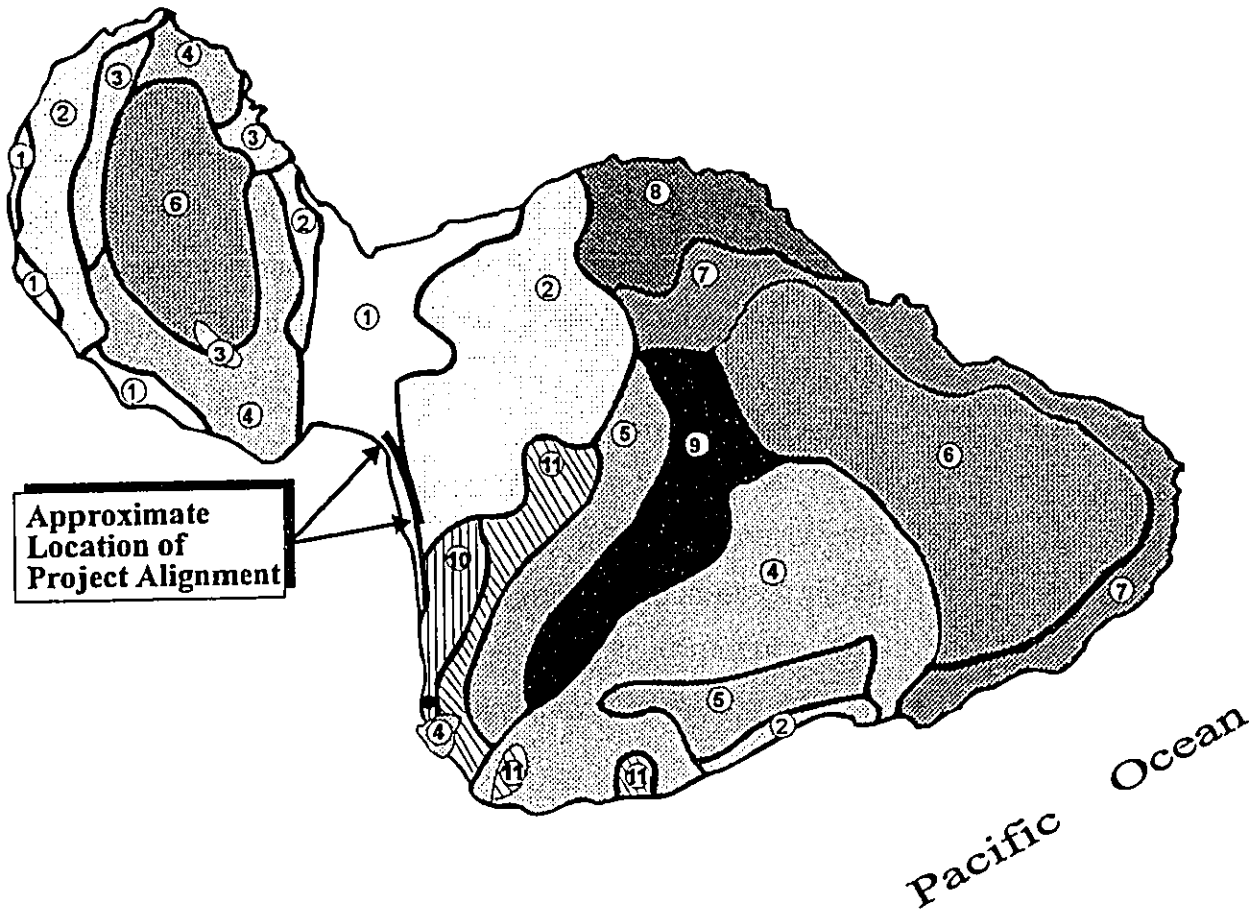
⑦ Hana-Makaalae-Kailua association

⑧ Pauwela-Haiku association

⑨ Laumaia-Kaipoipoi-Olinda association

⑩ Keawakapu-Makena association

⑪ Kamaole-Oanapuka association



Source: USDA, Soil Conservation Service

NOT TO SCALE

Figure 9

Interim Piilani Highway Improvements

Soil Association Map

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Soils underlying the project corridor are of the Puuone sand (PZUE), Pulehu clay loam (PsA), Alae sandy loam (Aab), Waiakoa extremely stony silty clay loam (WID2), Makena loam, stony complex (MXC), and Keawekapu extremely stony silty clay loam (KNXD). See Figure 10.

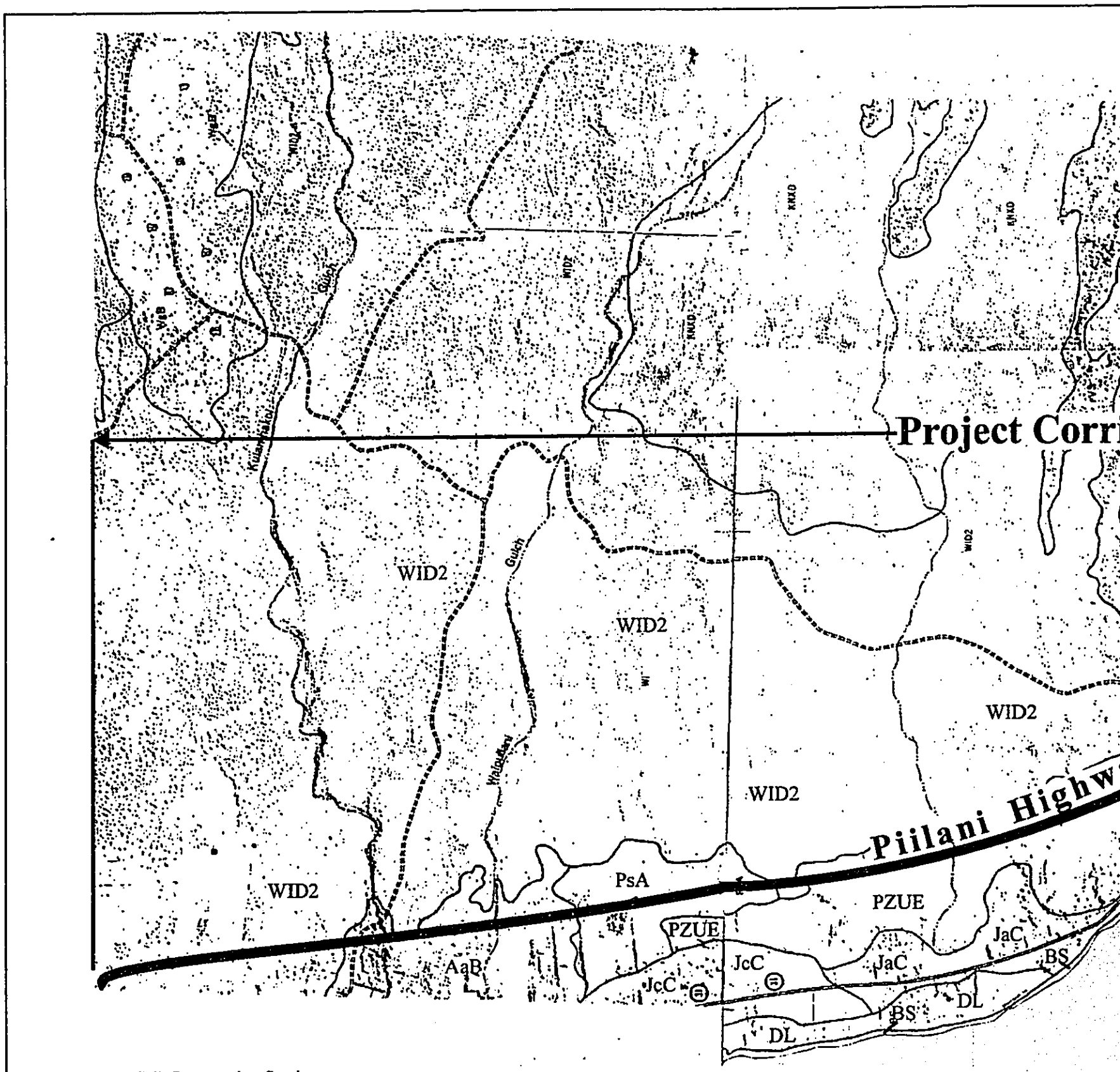
4. ***Flood and Tsunami Hazard***

The Flood Insurance Rate Maps indicate that the northern portion of the project corridor is located in Zones A0 and A4. Zone A0, which extends from the Mokulele Highway intersection south to Uwapo Road, is an area of 100-year shallow flooding where depths are between one (1) and three (3) feet; and Zone A4, which occurs in a small northwestern portion of the intersection with the Mokulele Highway, is an area of the 100-year flood with a base flood elevation of eleven (11) feet. The remainder of the project corridor is situated within Zone C, an area of minimal flooding.

5. ***Flora and Fauna***

Plant life along the project corridor is characterized by the typical flora associated with developed properties for single- and multi-family residences and ornamental landscaping generally associated with condominium and commercial/retail developments. Tree species generally include palms, wiliwili, hibiscus, monkeypod and lauhala.

Plant life in the undeveloped parcels can be grouped into two (2) categories. The first is the disturbance community which is composed mostly of alien species including khaki weed, pakai kuku, cow pea, and spurges. The second category is the dry forest community which is dominated by buffelgrass, kiawe, koa haole,

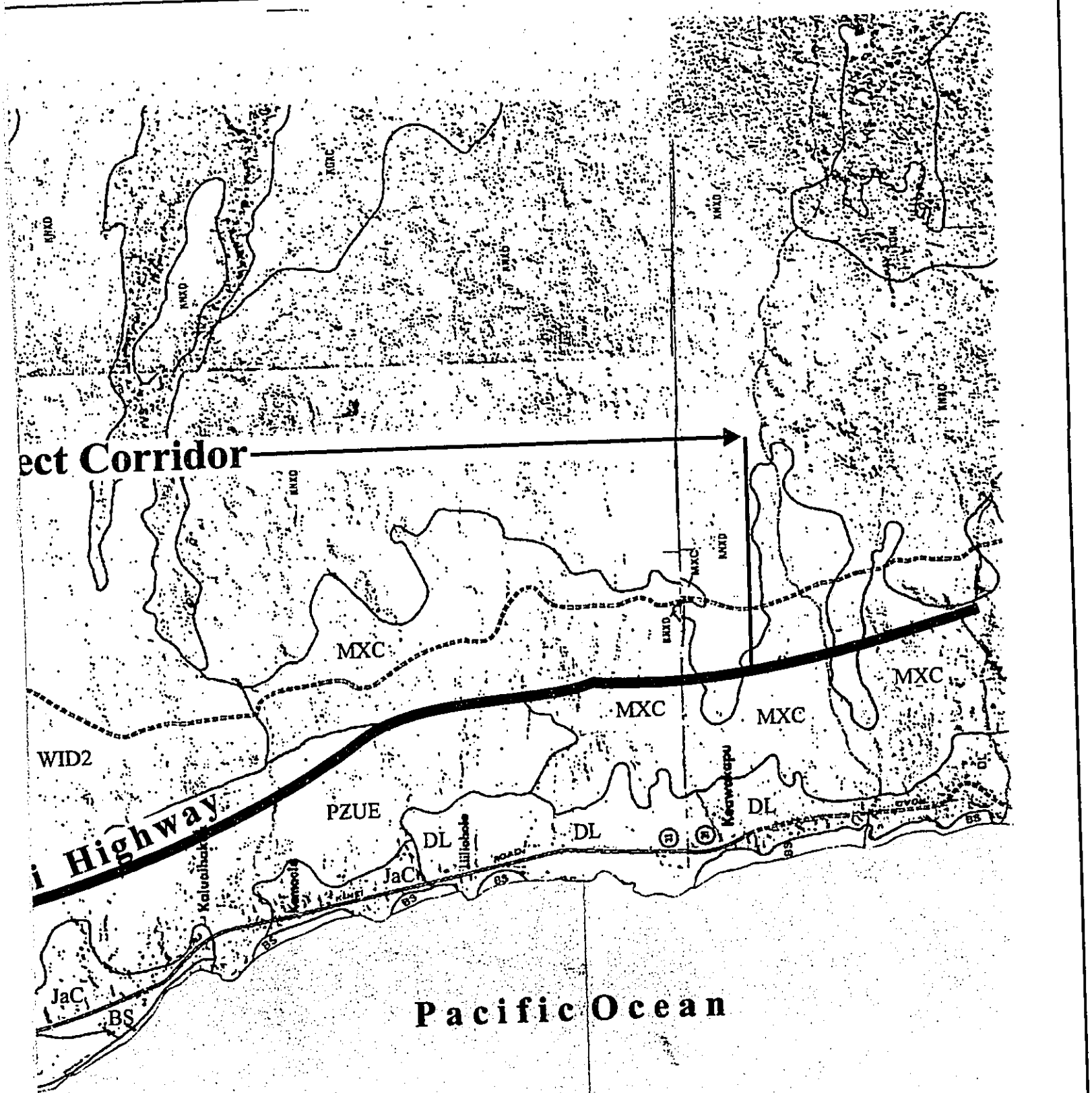


Source: USDA, Soil Conservation Service

Figure 10

Interim Piilani Highway Imp
Soils Classification

Prepared for: State of Hawaii, Department of Transportation



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slender mimosa, as well as two (2) indigenous species, 'ilimi and 'uhaloa (Paul, 1995). There are no legally protected, threatened or endangered species of plant life within the project corridor.

Animal life along the project corridor is typical of the urbanized regions of Kihei. Fauna typically found in the vicinity include cats, dogs, mice, rats, and mongoose.

Kealia Pond is located adjacent to Ma'alaea Bay approximately 0.5 mile northwest from the northern terminus of the project corridor. Kealia Pond is an important nesting and feeding habitat for the Hawaiian black necked stilt (Ae'o). The Ae'o is considered *endemic and endangered. The Ae'o has also been sighted* occasionally at water features within the region's golf courses. Collectively, open bodies of water, such as water hazards at golf courses and irrigation ponds on the island, are used as a limited loafing and feeding habitat for the Ae'o.

The American Golden Plover (kolea) and the Black Crowned Night Heron ('auku'u) also frequent Kealia Pond. The kolea and 'auku'u are considered indigenous but not endangered. Kolea are generally found on mudflats, lawns, and fields. 'Auku'u frequent water features such as ponds, streams, marshes and lagoons.

Other avifauna found in the vicinity of the project corridor include the Northern Cardinal, Grey and Black Francolin, House Finch, Zebra Dove, Spotted Dove, Common Mynah, Ring-necked Pheasant, and the Japanese white-eye.

6. ***Air Quality and Noise Characteristics***

There are no point sources of airborne emissions in the immediate vicinity of the project site. Airborne pollutants are primarily attributed to automobile exhaust from the urban traffic. Another source of airborne emissions may include smoke from sugar cane burning which occurs in the Central Maui isthmus. This source, however, is intermittent. Nevertheless, the air quality of the Kihei area is considered good and prevailing tradewinds quickly disperse particulates which are generated from these sources.

Existing noise along the project corridor is primarily attributed to vehicular traffic. At times, prevailing tradewinds also contribute to ambient noise conditions along the project corridor.

7. ***Scenic and Open Space Resource***

In proximity to the project corridor, the lands makai (west) of the Piilani Highway are predominantly developed with residential, commercial/retail and public facility uses, and defined by the built up urban landscape of Kihei. The lands mauka (east) of the project and in the northern portion of the project corridor are characterized by the residential single-family subdivision of Kihei Heights and the Kihei Gateway Plaza commercial project. Further south along the project corridor mauka of the Piilani Highway, the adjacent landscape is more open and gently landscaped characterized by the Elleair Golf Course. The Kihei Research and Technology Park is located mauka of Piilani Highway in the vicinity of Lipoa Street. Continuing in a southerly direction, the lands are open undeveloped agricultural lands except for the 10-acre parcel utilized for the County of Maui's Kihei Wastewater Treatment Plant. The agricultural lands continue to the residential development of

Maui Meadows which is mauka of the southern terminus of the proposed highway improvements.

While the project corridor is bordered by residential, commercial and public/quasi-public uses to the west, the Pacific Ocean and the offshore island of Kahoolawe to the south and West Maui coastline may be visible from selected points along the roadway. In addition, Haleakala, Upcountry, and the West Maui Mountains comprise the other scenic vistas from the project corridor.

The proposed works within the project corridor will not impinge upon the significant scenic view corridors or open space resources.

8. *Archaeological Resources*

The land underlying the project corridor was previously disturbed during the construction of the Piilani Highway. Since no further expansion beyond the existing right-of-way is planned with the improvements, an archaeological resources inventory will not be required.

B. *SOCIO-ECONOMIC ENVIRONMENT*

1. *Community Character*

From a regional standpoint, the project corridor is in the Kihei-Makena Community Plan region which encompasses the area from Ma'alaea to La Perouse Bay. The region includes a diverse range of physical and socio-economic environments. With its dry and mild climate and proximity to recreation-oriented shoreline resources, the visitor-based economy has grown steadily over the past few years. The town of Kihei serves as the commercial and residential center of the region with the master-planned

communities of Wailea and Makena serving as the focal point for visitor activities.

It is noted in the updated Kihei-Makena Community Plan (1998) that the community is generally characterized by its friendly, capable and caring residents. It is an ethnically diverse community with a strong interest in events or actions which affect the region (Kihei-Makena Community Plan, 1998, p. 13).

2. ***Population***

The population of the County of Maui has exhibited a relatively strong growth over the past decade. Between 1990 and 2000, the U.S. Census found that the State of Hawaii population grew from 1,108,229 to 1,211,537, a 9.3 percent growth over ten years. This translates to an average annual growth rate of 0.89 percent. County of Maui population, however, has grown from 100,374 in 1990 to 128,241 in 2000, an average annual growth rate of 2.7 percent (U.S. Census 2000). Growth in County of Maui is expected to continue, with resident population projections to the year 2010 estimated to be on the order of 140,000 (Community Resources, Inc., January 1994).

The resident population of the Kihei-Wailea-Makena area has increased dramatically in the past two decades. Population gains were especially pronounced in the 1970's as the rapidly developing visitor industry attracted many new residents. The 1990 resident population of the Kihei-Wailea-Makena area was approximately 15,365. The 2000 resident population was 22,420. This represents a 46 percent increase over the 1990 population (County of Maui Data Book, 2001).

3. *Economy*

The economy of Maui is heavily dependent upon the visitor industry. The dependency on the visitor industry is especially evident in Kihei-Makena, which is one of the State's major resort destination areas. The foundation for the region's visitor strength lies in world-class resorts and recreational facilities located in Wailea and Makena. Support for the visitor industry is found in Kihei, where numerous retail commercial centers are found.

During recent years, much of the island's economic growth has been from businesses not directly affiliated with tourism. From May 1997 to May 2000, hotel jobs grew 8.9 percent. Meanwhile, construction jobs grew 41 percent; transportation, telecommunication and utility jobs grew 22.4 percent; agricultural jobs grew 17.5 percent; and federal government jobs grew 80 percent (Pacific Business News, July 28, 2000).

According to data from the State Department of Labor and Industrial Relations, about 71,550 individuals were employed on the island of Maui in September 2001. The island's growth rate remains steady and unemployment continues to be low. In September 2001, Maui's job count was up 8.5 percent from the previous year, while unemployment was down to 4.6 percent.

C. *PUBLIC SERVICES*

1. *Police and Fire Protection*

The County of Maui's Police Department is headquartered in Wailuku at its Mahalani Street facility. The Maui Police Department (MPD) consists of several patrol, investigative and administrative divisions. The MPD's Kihei Patrol covers the Kihei-Makena region.

The department's Kihei Substation is located at the Kihei Town Center about 0.5 mile west of the project corridor.

Fire prevention, suppression and protection services are offered by the County's Department of Fire Control. The department's Kihei Station, which services the Kihei-Makena region is located on South Kihei Road near Kalama Park, approximately 0.5 mile west of the project corridor. Additionally, a new Wailea Fire Station is proposed along Kilohana Drive, just makai (west) of its intersection with Piilani Highway.

2. ***Medical Facilities***

Maui Memorial Medical Center, the only major medical facility on the island, services the Kihei-Makena region. Acute, general and emergency care services are provided by this facility, which is licensed for 196 beds and is situated in Wailuku, in the vicinity of Mahalani Street and Maui Lani Parkway. Privately operated medical/dental offices are located in the Kihei area to serve the region's residents and visitors.

3. ***Recreational Facilities***

Diverse recreational opportunities are available in the Kihei-Makena region. Recreational facilities in Kihei include Kalepolepo Park, the Elleair Golf Course, Kalama Park, and Kamaole Beach Parks I, II and III. Shoreline recreation includes swimming, fishing, picnicking, snorkeling, and windsurfing.

The 36.5-acre Kalama Park is located about 0.5 mile to the west of the project corridor. In addition to shoreline activities, this park has baseball and soccer fields, as well as tennis and basketball

courts.

The Wailea and Makena resort areas to the south offer additional opportunities for golf, tennis and ocean-related activities.

In addition, the County's new Kihei Community Center complex located a quarter of a mile from the project corridor near Lipoa Street, was recently completed and provides for a community center, swimming pool, and athletic playfields.

4. ***Schools***

The State Department of Education (DOE) operates three (3) schools in the Kihei area. Kihei Elementary School and Kamali'i Elementary School cover grades K to 5, with 2000-2001 enrollments of approximately 779 and 848 students, respectively. Lokelani Intermediate School includes grades 6 to 8, with a 2000-2001 enrollment of approximately 673 students. Public school students in grades 9 through 12 attend Maui High School in Kahului.

5. ***Solid Waste***

Single-family residential solid waste collection service is provided by the County of Maui on a once-a-week basis. Residential solid waste collected by County crews are disposed at the County's 55-acre Central Maui Landfill located 4.0 miles southeast of the Kahului Airport. In addition to County-collected refuse, the Central Maui Landfill accepts commercial waste from private collection companies. Privately owned facilities, such as the Maui Demolition and Construction Landfill and the Pohakulepo Concrete Recycling Facility accept solid waste and concrete from demolition and

construction activities. These facilities are located about 3.0 miles to the northwest of the project corridor, near Honoapiilani Highway's junctions with North Kihei Road and Kuihelani Highway. A privately operated green waste recycling facility, Campaign Recycle Maui, is situated near Waikapu, while a County operated facility is located at the Central Maui Landfill.

D. INFRASTRUCTURE

1. Roadway System

Access to the Kihei region from West Maui and the Wailuku area is provided by North Kihei Road, while access from the Kahului and "Upcountry" areas is provided by Mokulele Highway. These roadways are two-lane roadways which are under the control of the State Department of Transportation. North Kihei Road becomes South Kihei Road, near its junction with Mokulele Highway and continues southward through Kihei Town.

In the future, the Mokulele Highway/Piilani Highway intersection will be re-aligned and reconfigured so that both highways will be on the same alignment to form a continuous highway. This new alignment will be mauka of the existing ROWs. North Kihei Road will be extended to intersect the re-aligned highway. The project will go out to bid in 2003 and completed in phases. The proposed interim widening and related improvements are anticipated to start in July 2002 and completed in 2003. No overlap is anticipated between the two (2) projects.

In the Wailea-Makena area, south of Kilohana Drive, both Piilani Highway and South Kihei Road transition into the existing Wailea roadway system. In this system, Wailea Alanui provides primary

north-south mobility. South of Wailea, this road is known as Makena Alanui. Wailea Alanui is a two-lane roadway between Kilohana Drive and Okolani Drive, a 4-lane roadway to Kaukahi Street and a two-lane roadway south of Kaukahi Street.

As previously noted, Piilani Highway is the primary arterial highway for South Maui, beginning at the North Kihei Road-Mokulele Highway intersection and terminating at Wailea Ike Drive in Wailea.

2. ***Bike Route System***

The existing ten (10) foot shoulder along the outer edges of the existing Piilani Highway roadway provides for a bicycle route from the Mokulele Highway intersection in the north to Wailea Ike Drive in the south, a distance of approximately 7 miles. This route is part of a Kihei-Wailea bike route system initiative started by the County in 1991 and designed to circumscribe Kihei by connecting with South Kihei Road and to provide cyclists safe access to Honoapiilani Highway via North Kihei Road. This bike route is also part of the State Department of Transportation's Bike Plan Hawaii Master Plan.

3. ***Water System***

The Kihei-Makena region is served by the Central Maui Water System. The Central Maui Water System is served by the Iao Aquifer which includes the Mokuhau well fields, the CMJV wells, the Waiehu Heights Wells, the Kepaniwai well, and the Iao Tunnel and the Waihee Aquifer which includes the North Waihee, Kupaa and Kanoa wells.

The water system in the area includes a 2.0 million gallon (MG)

reservoir located east of Ohukai Road, approximately 1.0 mile mauka of the project corridor. A 16-inch outflow line connects to an 18-inch transmission line from the Central Maui source. The outflow main crosses under the Piilani ROW at Ohukai Road. The 18-inch transmission line which runs in a north-south direction feeds the distribution system in the Kihei district. The water distribution system crosses under the Piilani Highway ROW at the following intersections: a 12-inch water main along Mokulele Highway, 12-inch main along Uwapo Road, 12-inch main along Moi Place, 16-inch main along Ohukai Road, 12-inch main along Lipoa Street, and a 12-inch main along Kilohana Drive. A 36-inch concrete water main also services the Kihei region and runs in a southerly direction in the vicinity of the project corridor. This main crosses under the Piilani ROW near Kulanihakoi Gulch and parallels the 18-inch transmission line. It connects to a 30-inch line at Welakahao Street and runs south along Kanakanui Road, west along Keonekai Road and south along Kauhale Street to Kilohana Drive.

4. ***Wastewater System***

The service area for the County's Kihei Wastewater Reclamation System extends from North Kihei to Wailea. The system consists of a number of pump stations and force mains which convey wastewater through the County's transmission lines. The combined flows are transported to the Kihei Wastewater Reclamation Facility, which is located adjacent to the Elleair Golf Course. The existing design capacity of the Kihei Wastewater Reclamation Facility is 8.0 million gallons per day (MGD).

5. ***Drainage***

The Kihei watershed is on the western slope of Mount Haleakala on a curved band that extends from the northern terminus of the project corridor to approximately 8 miles to the south in Wailea. It extends eastward approximately 15 miles from the shore to the summit of Haleakala. The coastal area is relatively dry with a mean annual rainfall of 10 inches. The mountain slopes in this watershed are drained by 32 gulches, ravines, and gullies. There are seven (7) well defined watercourses which flow in a westerly direction traversing the project corridor.

Surface runoff along the project corridor is collected in concrete swales on either side of the roadway surface and directed to catch basins and drained into channels discharging into the ocean.

With the proposed project, surface runoff along the project corridor will be channeled or collected in lined or grass swales and directed to catch basins and existing drainage facilities which will drain into existing channels discharging into the ocean.

6. ***Electrical, Telephone and CATV Systems***

Electrical, telephone, and cable television (CATV) services in the Kihei-Wailea-Makena area are provided by Maui Electric Company, Verizon Hawaii, and Hawaiian Cablevision, respectively.

Chapter III

Potential Impacts and Mitigation Measures

III. POTENTIAL IMPACTS AND MITIGATION MEASURES

A. IMPACTS TO THE PHYSICAL ENVIRONMENT

1. Surrounding Land Uses

The proposed action is intended to address existing traffic capacity constraints, as well as projected increases in volume along the project corridor. While additional traffic flows will be accommodated by the improvements, the action is viewed as an interim mitigative measure as opposed to new capacity introduced to facilitate specific growth patterns. Accordingly, land use patterns along the corridor and beyond are not anticipated to change as a result of the proposed action. Land use designations set forth by the Kihei-Makena Community Plan will continue to guide growth and development along the project corridor.

2. Flood and Tsunami Hazard

Although a northern portion of the project corridor is situated within Zones A0 and A4, which are areas of 100-year flooding with depths ranging from one (1) to eleven (11) feet, the highway bed is on fill conditions raising it to approximately 14 feet amsl at the Mokulele intersection and at approximately 41 feet amsl at the Uwapo Road intersection, well above the flood level. The remainder of the project corridor is situated within Zone C, an area of minimal flooding. The existing concrete swales in the project corridor will be paved over to create a 6-foot wide shoulder area. However, lined or grass swales will be constructed to maintain drainage patterns along the project corridor. All runoff will be directed to catch basins and drained into existing channels discharging into the ocean. Drainage intensity and discharge points will generally remain the same after completion of the proposed project. As such, there will be no adverse impacts to surrounding properties

resulting from the proposed project.

3. ***Flora and Fauna***

Work associated with the proposed action will be contained within the existing highway right-of-way. The proposed project will not affect any open bodies of water or wetlands such as Kealia Pond. As such, there should be no adverse impacts to flora, avifauna and fauna within the region.

4. ***Air Quality***

The proposed improvements to the Piilani Highway are required to accommodate existing volumes of traffic and general growth in traffic in the Kihei-Wailea-Makena area. The main source of adverse air quality impacts would be emissions from vehicular traffic. The proposed action is intended to accommodate existing and projected traffic volumes and is not deemed a new traffic generator. In addition, the proposed improvements will facilitate traffic flow and reduce emission concentration levels. The presence of relatively constant tradewinds will dissipate vehicular emissions minimizing the potential adverse air quality impacts.

Localized air quality impacts from construction vehicles may occur during restriping of the roadway and modifications resulting, for example, from paving activities or the relocation of lighting structures and traffic signals at the major intersections. These emissions are anticipated to have a negligible impact on regional air quality as the emissions would be relatively small and readily dissipated.

5. *Noise Characteristics*

There will be short-term noise impacts from construction activity associated with the proposed project. Most of the construction will involve modification to existing traffic signals and underground electrical services and in some cases, may require relocating existing services. The construction noise impacts will be mitigated through compliance with the provision of the State of Hawaii, Department of Health Administrative Rules, Title 11, Chapter 46, "Community Noise Control". These rules require a noise permit if the noise levels from construction activities are expected to exceed the allowable levels set forth in the Chapter 46 rules. In complying with Chapter 46, the contractor will be responsible for minimizing noise by properly maintaining noise mufflers and other noise-attenuating equipment. Construction will be limited to normal daylight hours.

An Acoustic Study for the proposed project was prepared by Y. Ebisu & Associates in January 2002. The existing and future traffic-related noise levels along the project corridor were studied to evaluate potential noise impacts associated with the proposed project. Noise measurements were obtained, traffic noise predictions developed, and noise abatement alternatives evaluated. The Acoustic Study was updated in April 2002 based on data from the Revised Traffic Assessment Report (March 2002). Although minor changes were noted in noise level impacts within certain segments of the roadway, the general conclusion remains as follows.

The study indicates that existing traffic noise in the project corridor area currently exceeds the U.S. Federal Highway Administration

(FHWA) and State Department of Transportation, Highways Division (DOT) noise abatement criteria. This noise abatement level is "66 Leq" which represents the equivalent sound level of 66 decibels (dB). Study measurements recorded levels of 57.7 to 72.6 Leq (dB) at various stations along the project corridor and at ranges from 50 to 150 feet from the centerline.

The study notes that the following general conclusions can be made with respect to potential traffic noise impacts which can be expected by Year 2011 with the proposed improvements.

- *The DOT's ">15 dB increase" criteria for substantial change in traffic noise levels will not be exceeded at any noise sensitive structure.*

- *Under the Build Alternative, future traffic noise levels at residences which are located within 125 to 150 feet of the highway centerline and within the limits of project construction are expected to exceed the HDOT "66 Leq" criteria. No parks or public structures (such as churches) within the limits of project construction should be affected by the proposed project or require noise mitigation measures under the Build Alternative.*

- *Future traffic noise levels at two commercial structures south of Ohukai Road may exceed current HDOT and FHWA noise criteria. Additional noise mitigation measures should not be required due to the use of closure and air conditioning of both commercial structures.*

- *With a 5 mile per hour reduction in the average vehicle speed during free traffic flow, the predicted increases in future traffic noise levels at noise sensitive receptors over the ten year period between 2001 and 2011 are typically less than 1.5 dB, and are not considered to be significant. The anticipated increases in future traffic noise levels with or without the project are also substantially less than the "15 dBA increase", which is considered to be the criteria for substantial change by the HDOT. Because the project is an interim improvement of Piilani Highway, and because the*

highway noise attenuation measures required by FHWA and HDOT noise abatement criteria are essentially remedial in nature (i.e., directed towards reducing currently high noise levels), substantial capital investments in highway noise mitigation measures should be deferred until more substantial improvements are made to Piilani Highway.

6. ***Scenic and Open Space Resources***

Since all work associated with the proposed project are confined within the existing highway right-of-way and developed surfaces, there will be no impact to scenic and open space resources as a result of implementation. The proposed project will not create a visual character inconsistent with its present use nor with surrounding uses.

7. ***Archaeological Resources***

The proposed action will not create any new disturbances outside the area which has already been cleared and developed. Based on the Draft EA review and comments received from the State Historic Preservation Division (SHPD), a mitigation plan will be submitted to SHPD prior to and an archaeological monitor will be present during any ground altering activities within the Puuone sands deposits. These measures will assure that proper mitigation and consultation will occur to protect archaeological and cultural resources which may be encountered during project development.

8. ***Cultural Impact Assessment***

a. ***Settlement Context***

Archaeological research establishes the earliest settlement on the island of Maui to have occurred between A.D. 300-600 along the windward regions. Settlement of the drier, leeward regions of Maui, such as Kihei, is postulated to

have occurred between A.D. 1000-1200 (Kirch 1985, Cordy and Athens 1988). The latter settlements occurred in the upland area of Kula to exploit forest and agricultural resources where dryland taro was cultivated in moist pockets of soil (Handy 1940). As well, the areas along the coast near Kalepolepo in Kihei and Maluaka in Makena were settled to exploit available marine resources. Trails from the mountain (mauka) settlements to the coast (makai) settlements were established to link the settlements to one another. This settlement pattern is developed from archaeological surveys and inventories which have uncovered prehistoric evidence of more permanent habitation along the coast and upland areas. Sites uncovered between these areas, however, are fewer in numbers and more representative of temporary shelters. Ross Cordy (1977) postulated that this area between the inhabited coast and upland area is an intermediate or "barren" zone. Mainly due to the hot, dry and windswept conditions, the area was mainly used for trails and little human prehistoric activity was considered to have occurred in this area.

b. ***Early Archaeology***

Cox (1976) and Cordy (1977) carried out archaeological surveys in association with the construction of the Piilani Highway. In the Cox survey, six (6) sites were located. The only possible prehistoric site was considered to be a boundary marker or a burial. Excavation yielded only a soil fill, but no burial or dates. In the Cordy survey, two (2) sites were uncovered in the project corridor. Both sites were

considered to be prehistoric short-term shelters. Volcanic glass recovered from the site established a date of AD 1724 to 1784. Since these studies, a number of archaeological surveys have been conducted in the Kihei area near the project corridor. Kennedy (1986) conducted a surface reconnaissance survey of 125 acres for the Silversword Golf Course (now Elleair golf course located mauka of the project corridor and Lipoa Street intersection) and reported that no archaeological features were found. Fredericksen (1995) conducted an archaeological inventory survey for the proposed Road "C" corridor (makai of Piilani Highway and Lipoa Street intersection). A low overhang shelter was identified during this survey. Donham (1989) carried out an archaeological survey of 114 acres for the Piilani residential Community Phase I (makai of Piilani Highway and north of Kulanihakoi Road). Five (5) sites were discovered during this survey. The most significant of the sites was recommended for data recovery. Subsurface test excavations did not produce human remains, or evidence of cultural deposits. However, further data recovery (Donham, 1990) indicated a more developed agricultural complex representing modification of natural slopes for cultivation. This has led Donham to suggest that a "coastal perimeter zone" may have occurred which could possibly have been of seasonal usage during periods of increased rainfall or in response to land pressures in the coastal zone (Fredericksen 1995). Sinoto (1992) carried out an archaeological survey for the Kihei Gateway Complex, covering an area of 29 acres located in the northern portion of the project corridor near the intersection with Mokulele

Highway and South Kihei Road. No surface archaeological remains, nor evidence of any other significant cultural activities, were encountered during the survey. All the archaeological evidence corroborates the Cordy (1977) findings which postulates that there is very little prehistoric information of value within the project corridor due to its location in the "barren" zone between the coastal settlements and upland agricultural settlements.

c. ***Historical Documentary Research***

Within the historic cultural context, the project corridor traverses six (6) traditional Hawaiian land units (ahupua'a). The ahupua'a span from the slopes of Haleakala to the ocean. From north to south, the ahupua'a are Pulehunui, Waiakoa, Kaonoulu, Waiohuli, Keokea, and Kamaole. The northern Pulehunui ahupua'a is located in the Wailuku District and the remaining five (5) southern ahupua'a are located in the Makawao District (Modern era). Subsequent to the division of Hawaiian lands, known as the Mahele in the mid-19th century, indication of the historical settlement can be assessed from reviewing Land Commission Awards (LCAs). The LCAs were presented to tenants who could prove occupancy on the parcels before 1845. From the north, in the Pulehunui ahupua'a, only one (LCA #5230) was awarded (Sinoto 1992). In the ahupua'a of Waiohuli, most of the LCAs took place on the coast in Kalepolepo and in Kula. The commission noted that residents with land awards outside of Kalepolepo used their land for the cultivation of Irish potatoes, some taro farming and cattle pasture (Sinoto 1992). However, in the vicinity of the project

corridor, no LCAs of native Kuleana (house and/or garden plots) were awarded (Fredericksen 1995). The lack of LCAs within the vicinity of the project corridor supports the archaeological findings that the area would not likely be considered a traditional Hawaiian settlement area.

Documentary data indicates in the mid- to late-1800's, the lands within the vicinity of the project corridor became more heavily used in association with sugar cane cultivation in the northern area near Mokulele Highway intersection and further south in the Honuaula District. Hawaii Commercial and Sugar Company had large acreages under cultivation in this area, with a narrow gauge railroad in place to transport sugar cane to the mill. In the Honuaula area, M.J. Nowlein and S.D. Burrows leased lands from Kamehameha III at Ulupalakua to grow sugar cane and Irish potatoes. Linton L. Torber expanded sugar cane cultivation and also started cattle ranching. A severe drought in 1878 ended the production of sugar cane and cattle ranching became the dominant agricultural activity in the southern area (Fredericksen 1995). In the early 1900's in the eastern portion of Waiohuli ahupua'a the Haleakala Ranch Company was using the land for cattle grazing. The importation of grasses (i.e., buffelgrass) for livestock feed has altered the natural flora and is still in evidence today. See Figure 11.

d. ***Additional Informant Data***

In order to obtain a range of cultural resource perspectives in the vicinity of the project corridor, interviews were held with two (2) knowledgeable Kihei residents. Interviews with

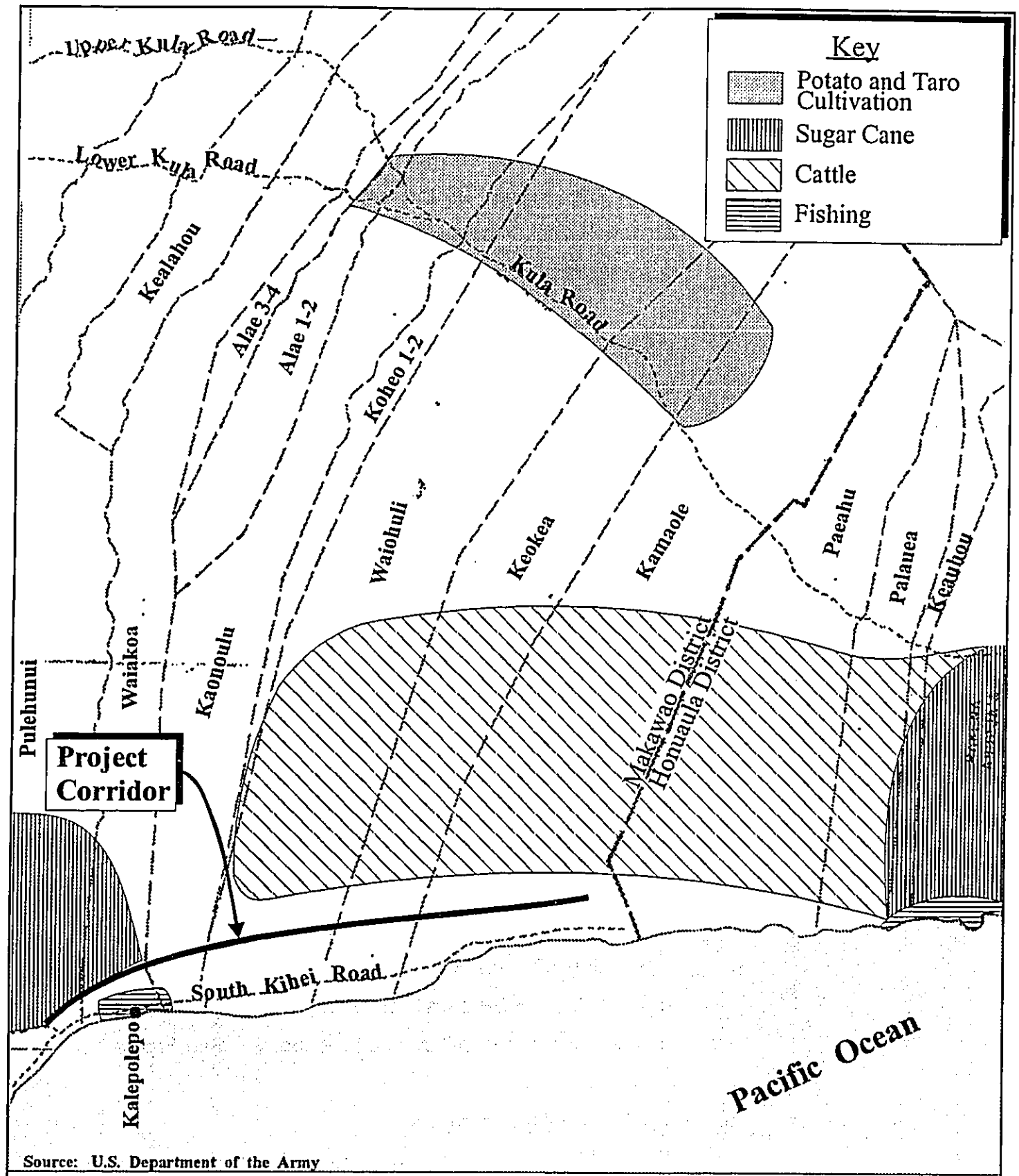


Figure 11 Interim Piilani Highway Improvements

Current Ahupua`a Boundaries and Cultural Land Uses 1850-1900s

0 2500 Feet
1250 5000

Prepared for: State of Hawaii, Department of Transportation

MUNEKIYO & HIRAGA, INC.

Mr. Bully Kapahulehua and Mr. Roy Suda are summarized as follows.

(1) ***Leonard "Bully" Kapahulehua***

Mr. Kapahulehua was born on Kauai in 1947. He graduated from Kauai High School in 1965 and studied business administration for three (3) years at Church College of Hawaii (now Bringham Young University). He moved to Maui in 1970 and has been living in Kihei since 1986. He is a member of the Kihei Canoe Club located in Waiakoa Ahupua'a and Halau Maui Nui-O-Kama, a native cultural organization. He is also president of Ke-ie-ie-loko-ia Fishpond in Kalepolepo. Halau Maui Nui-O-Kama is very active in teaching native cultural practices in hula, chants and dissemination of cultural information. It is presently working in partnership with the U.S. Fish and Wildlife Service identifying native plants, native birds and native insects in the Ma'alaea-Kihei area and with the National Oceanic Atmospheric Administration to identify the sea animals along the coast from Ma'alaea Bay to Makena. Halau Maui Nui-O-Kama teaches native culture at the Kihei Charter High School one (1) hour per week and canoeing and paddling three (3) days per week. In their native cultural studies, the organization actively walks, hikes and paddles the Kihei coastline. They are also active in the reforestation of native plants and sand dune restoration. The main area of their work is in the area makai of South Kihei Road and

along the coast from Ma'alaea Bay to Makena.

Mr. Kapahulehua referred to the area mauka of the project corridor as pasture lands. He identified the Ualoa plant growing in the vicinity of the project corridor. This plant is used for medicinal purposes, such as a cure for a sore throat. However, he mentioned this plant is not harvested near the roadside due to dust and automobile exhaust. He stated that this plant is not endangered or an endemic plant which is specific to the State of Hawaii. He is not aware of any native cultural practices or harvesting of plants in the vicinity of the project corridor.

(2) <u>Roy Suda</u>

Mr. Suda was born and raised in Kihei. He is 58 years old. Mr. Suda's mother and father were born in Puunene. He went to grade school at Kihei Elementary School.

Mr. Suda is owner/operator of Suda Kihei Store, Inc. It is located on the northeast corner of South Kihei Road and Uwapo Road. The store was formerly owned and operated by Alexander and Baldwin Sugar Company. The Suda family took over the store operations in 1965.

Mr. Suda remembers when sugar plantation workers would get vouchers in payment for work from the

company and use the vouchers to purchase items at the company store.

Mr. Suda recalled that the area mauka of the store was full of kiawe bushes. Further beyond the kiawe was A&B sugar cane fields to the north and Haleakala Ranch lands to the east. In the area of the project corridor from Uwapo Road to Ohukai Road was the Hashimoto farm lands. He remembers this farm as a large tract of land in the order of 50 acres. They grew watermelons, tomatoes and mangos. He recalls walking through the kiawe bushes to pick mangos at the Hashimoto farm in his childhood. The farm was in operation from about 1940 to 1986. Another farm, about a quarter of a mile to the south of his store, was owned by the Gushiguma family. They grew tomatoes, onions and watermelon.

During Mr. Suda's early years, most of the activities were along South Kihei Road, since it was the only transportation route in the area. He recalled the old Kihei pier just down the road from the store. About nine (9) tuna boats used to anchor at the pier and the crew used to stay on the boats. The pier was torn down around 1959. He mentioned that you could still see remnants of the old pier.

Mr. Suda recalled a few native Hawaiian families living in the area. He mentioned the Kenolio, Plunkett, Kukahiko, and .Ahsu families living behind

the store. There was an old automobile trail to their homes. Mr. Suda did not recall seeing any native cultural practices being carried out in the area nor the cultivation or use of native Hawaiian plants.

He recalled when the Piilani Highway was built. He said the highway went through kiawe bushes. He said South Kihei Road was the only route in and out of Kihei before Piilani Highway was built. He said he could not imagine the congestion along South Kihei Road if the Piilani Highway was not built.

e. ***Cultural Impact Assessment***

The proposed interim improvements to the Piilani Highway will traverse lands, which in the prehistoric period were used for trails between the mauka and makai settlements and in the period after 1850 was mainly used for cattle ranching. There are no known archaeological resources which will be adversely impacted by the proposed action. Based on informant information and the existing land use context, there is no evidence of current or recently occurring cultural practices along the project corridor. In this regard, the proposed interim improvements are not anticipated to adversely impact cultural resources. To ensure the protection of cultural resources, a mitigation plan will be submitted to SHPD and an archaeological monitor will be present prior to any ground altering activities within the Puuone sands deposits.

B. *IMPACTS TO THE SOCIO-ECONOMIC ENVIRONMENT AND PUBLIC SERVICES*

1. *Economy*

On a short-term basis, the proposed action will support construction and construction-related employment. Over the long term, the proposed project will provide for the more efficient movement of people and goods throughout the Kihei-Wailea-Makena area and thereby improve business production and operation levels. Equally important, the improvements to the Piilani Highway will provide a key component to the orderly development of the regional transportation network in South Maui.

2. *Police, Fire and Medical Services*

Through the increase in the level of service expected to be LOS D or better at peak times on the Piilani Highway resulting from the proposed action, there will be a positive benefit to the service capabilities of police, fire and emergency medical operations by reducing emergency response time in the area.

During project construction, appropriate coordination will be undertaken with emergency services to ensure that response requirements for such services are not adversely impacted due to delays which may be attributed to construction work.

3. *Recreational and Educational Facilities*

The proposed action is not considered a direct population generator, but rather infrastructure services which will provide for an improved regional transportation network. As such, the proposed improvements will not place any new demand on recreational facilities. Similarly, school enrollments or locations will

not be affected by the proposed project.

4. ***Solid Waste***

Construction waste from the removal and alteration to traffic medians, curbs and pavement resulting from the realignment of intersections will not be transported to the County landfill. Instead, alternative sites, such as the Maui Demolition and Construction Landfill and Pohakulepo Concrete Recycling Facility, will be utilized. The proposed action is not anticipated to adversely impact the County's solid waste disposal facilities.

5. ***Public Safety***

The restriping of the travel lanes from 2 to 4 lanes will require the narrowing of the travel lanes from 12 feet to 11 feet and the outside lanes to 10-feet 8-inches at bridges. Consequently, it could limit the safety margins for vehicular movement within each lane, if there were no changes to the posted speed limits. Based on the procedures of the Highway Capacity Manual (2000), a 5 mph reduction in the speed limit along the project corridor from 45 mph to 40 mph would be appropriate as a result of reducing the travel lanes widths. The proposed improvements will maintain and meet all Federal and State DOT standards of criteria for highway vehicular safety.

C. *IMPACTS TO INFRASTRUCTURE*

1. *Traffic*

A Traffic Assessment Report (TAR) dated March 2002, prepared by Julian Ng, Incorporated, analyzed the impact of the proposed interim improvements on highway traffic operating conditions. See Appendix A. This report updated the January 2002 TAR. The following excerpts from the TAR highlights key benefits associated

with the proposed action.

> *The widening of the highway to four lanes not only at signalized intersections, is needed to provide acceptable (Level of Service D or better) conditions...If the Highway were widened only at the signalized intersections, traffic must merge causing fluctuations in the flow...With the highway widened to four lanes, highway conditions would be Level of Service "C" or better during the peak hours. (Page 9)*

The foregoing conclusion is further detailed in Table 2. The TAR confirmed that the signals at the Mokulele Highway, Uwapo Road, and Ohukai Road should be interconnected so they can be coordinated. As noted in the TAR, the 2011 analyses assumed that the realignment of the Mokulele Highway and Piilani Highway intersection would be completed. However, in order to facilitate existing traffic flow, a double left turn from Mokulele Highway onto Piilani Highway has been provided in the proposed project in response to comments by the County of Maui, Department of Public Works and Waste Management during the 30-day agency review period.

Table 2

FUTURE (2011) LEVEL OF SERVICE COMPARISONS				
Peak Hour (AM/PM)	*Two-Lane Highway*		*Four-Lane Highway*	
	Southbound	*Northbound*	*Southbound*	*Northbound*
North of Uwapo Road	D/F	F/D	B/C	C/C
North of Ohukai Road	D/F	E/E	B/C	C/C
South of Ohukai Road	D/E	E/E	B/C	C/C
South of Kaonoulu Street	D/E	D/D	B/C	C/C
South of Piikea Avenue	D/E	D/D	B/C	B/C
South of Lipoa Street	D/E	D/D	B/C	B/B
South of Welakahao Street	C/D	C/D	B/C	B/B
South of Kanani Road	C/D	C/D	B/B	B/B
South of Keonekai Street	C/D	C/C	B/B	A/B
South of Kilohana Drive	C/C	B/C		
Source: Appendix A.				

As previously noted, the traffic assessment report also confirmed that restricting the turning movements at unsignalized intersections to right turns from and onto the highway would be necessary to achieve Level of Service C or better at unsignalized intersections. Left turns at the unsignalized intersections, therefore, will not be permitted at Kulanihakoi Street, Waipuilani Road, and Keonekai

Street. Left-turn movements would be allowed southbound on Piilani Highway onto Moi Place and westbound from Moi Place onto Piilani Highway and southbound from Piilani Highway into the County's Wastewater Treatment Facility mauka of Old Welakahao Road and onto Kanani Road. It should be noted that the 2011 traffic analysis assumed Kaonoulu Street and Welakahao Road would be signalized, Waipuilani Road would be connected to Piilani Highway with right-in and right-out turns, and Old Welakahao Road would be closed makai of Piilani Highway.

The relocation of traffic to nearby signalized intersections resulting from the turn prohibitions at the designated unsignalized intersections were incorporated in the traffic assignments and Level of Service analysis. The signalized intersections were found to operate at LOS D or better, which is considered acceptable for urban conditions. The relocation of traffic to any segment of South Kihei Road is estimated to be no more than 100 movements during the peak hours and less than 35 vehicles per hour for left-turn movements. This additional volume of traffic will not adversely impact Levels of Service at the signalized intersections or South Kihei Road.

Impacts of the proposed project are, therefore, viewed as positive from a traffic circulation standpoint. Moreover, the proposed action will help to establish a hierarchy of roadways that will conduct sub-regional traffic efficiently to and from the Kihei-Makena area.

The accommodation of traffic during project construction will be an area of concern. There will be increased congestion to traffic during the restriping and related improvements. This will be short

term only during the construction stage. Two (2) travel lanes (one lane in each direction) will always be open during construction and construction will not be performed during the peak hours. The work will also be coordinated with County of Maui, Department of Public Works and Waste Management and traffic will be detoured, as necessary, to minimize congestion.

2. ***Bike Route***

The restriping of the Piilani Highway to create two (2) additional lanes will reduce the shoulder widths in typical cross sections of the highway to six (6) feet with a five (5) foot bike route through intersections and a minimum design requirement of two (2) feet at bridges. This restriping would still allow bike use along the route. However, cyclists will have to share the travel lane at bridges. Appropriate signage will be placed where applicable to notify cyclists and drivers to share the lane.

The proposed Kihei Greenway project, a four (4) mile long greenway along the North-South Collector running between and parallel to Piilani Highway and South Kihei Road is being implemented. This route will offer an alternative north-south bike route.

3. ***Water System***

The proposed action will not adversely affect County or private domestic water services and facilities.

Should construction conditions require a need to adjust vertical or horizontal profiles of the County's waterlines, such adjustments will be coordinated with the Department of Water Supply.

4. ***Wastewater***

The proposed restriping and related improvements are not expected to adversely impact the wastewater collection system.

If necessary, relocation or adjustment to wastewater system improvements will be coordinated with the Department of Public Works and Waste Management's Wastewater Reclamation Division.

5. ***Drainage and Erosion Control***

The existing concrete swales on both sides of the roadway will be paved over to create a 6-foot wide shoulder area. Twelve-foot wide grass swales will be constructed at the toe of fill slopes and concrete strips will be laid at the toe of cut slopes to maintain drainage patterns along the project corridor. Drainage intensity and discharge points will generally remain the same after completion of the proposed project.

6. ***Electrical and Telephone Services***

The relocation of poles, utility boxes and transmission lines will be coordinated with Maui Electric Company, Verizon Hawaii Inc. and Hawaiian Cablevision, as necessary. The proposed project is not anticipated to adversely impact electric and telephone services.

Chapter IV

Relationship to Governmental Plans, Policies, and Controls

IV. RELATIONSHIP TO GOVERNMENTAL PLANS, POLICIES, AND CONTROLS

A. STATE LAND USE DISTRICTS

Chapter 205, Hawaii Revised Statutes, relating to the Land Use Commission, establishes the four (4) major Land Use Districts in which all lands in the State are placed. The Districts are classified "Urban", "Rural", "Agricultural", and "Conservation". The project corridor traverses lands located along the "Urban", "Agricultural" and "Rural" districts. See Figure 12. Public roadways are permissible within these districts.

B. HAWAII STATE PLAN

Chapter 226, HRS, also known as the Hawaii State Plan, is a long-range comprehensive plan which serves as a guide for the future long-range development of the State by identifying goals, objectives, policies, and priorities, as well as implementation mechanisms. The objectives and policies which contribute to the implementation rationale for the proposed project include the following:

Sec. 226-14 Objective and policies for facility systems - in general.

Objective (a) — Planning for the State's facility systems in general shall be directed towards achievement of the objective of water, transportation, waste disposal, and energy and telecommunication systems that support statewide social, economic, and physical objectives.

Policy (b) (1) — Accommodate the needs of Hawaii's people through coordination of facility systems and capital improvement priorities in consonance with state and county plans.

Sec. 226-17 Objectives and policies for facility systems - transportation.

Policy (b) (2) — Coordinate state, county, federal, and private transportation activities and programs toward the

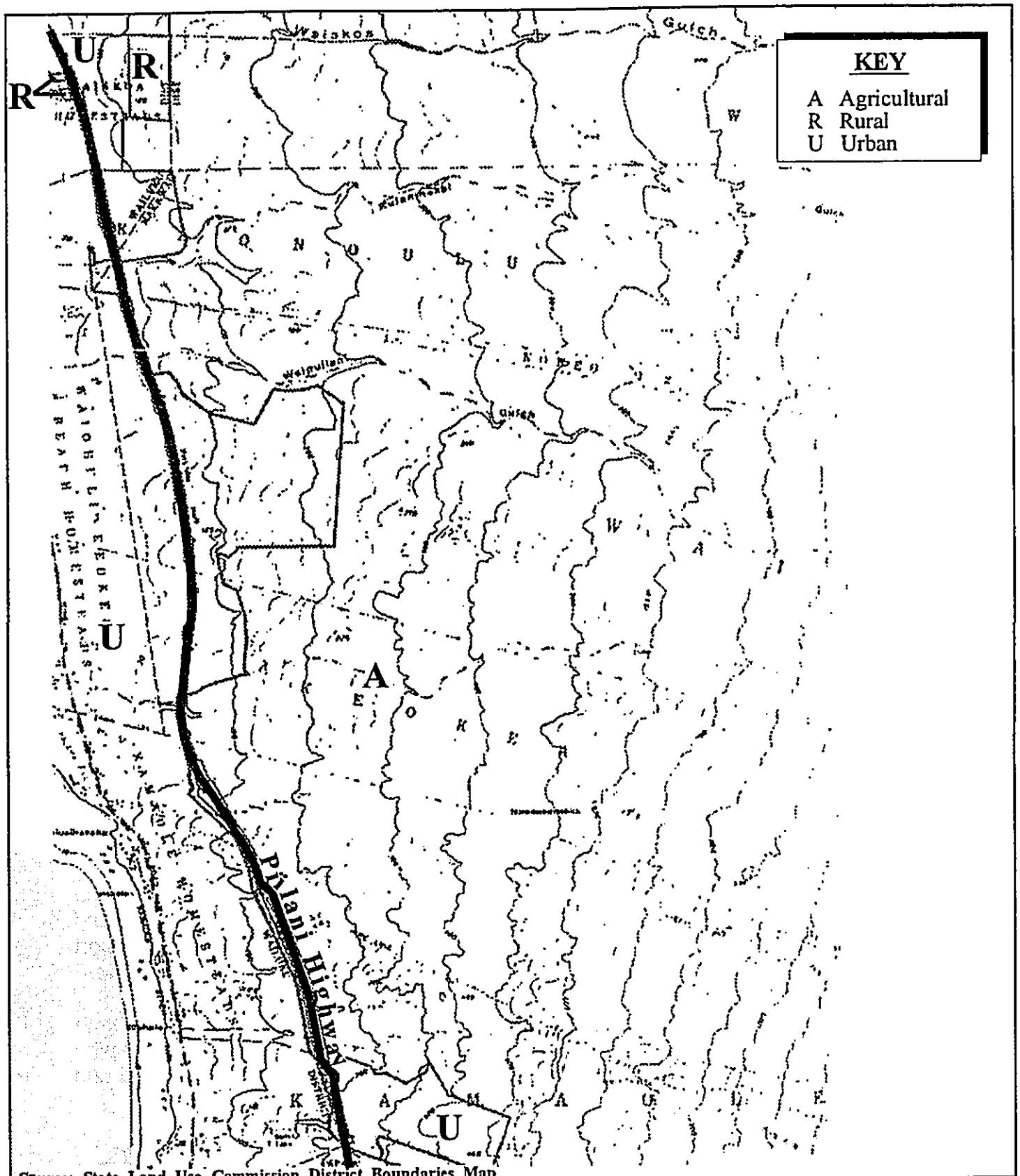


Figure 12

Interim Piilani Highway Improvements

State Land Use District Boundaries

NOT TO SCALE

MUNEKIYO & HIRAGA, INC.

Prepared for: State of Hawaii, Department of Transportation

achievement of statewide objectives.

Policy (b) (6) Encourage transportation systems that serve to accommodate present and future development needs of communities.

Policy (b) (10) Encourage the design and development of transportation systems sensitive to the needs of affected communities and the quality of Hawaii's natural environment.

The proposed project will promote the public health and safety by providing roadway sections which accommodate vehicles and pedestrians in keeping with current design and safety standards.

C. *STATE OF HAWAII, DEPARTMENT OF TRANSPORTATION*

The proposed project supports the long range traffic implementation plan for DOT identified in the Kihei Traffic Master Plan, October 1996 and the Maui Long-Range Land Transportation Plan, Final Report, February, 1997, both published in cooperation with County of Maui, Department of Public Works and Waste Management and County of Maui, Planning Department. In these reports, implementation of a plan to widen the Piilani Highway from two (2) to four (4) lanes in Kihei from Mokulele Highway to Wailea was identified.

D. *MAUI COUNTY GENERAL PLAN*

The Maui County General Plan (1990 Update) sets forth broad objectives and policies to help guide the long-range development of the County. As stated in the County of Maui Charter, "The purpose of the General Plan is to recognize and state the major problems and opportunities concerning the needs and the development of the County and the social, economic and environmental effects of such development and set forth the desired sequence, patterns and characteristics of future development".

The proposed action is in keeping with the following General Plan objectives and policies:

Objectives:

To support an advanced and environmentally sensitive transportation system which will enable people and goods to move safely, efficiently, and economically.

To develop a program for anticipating and enlarging the local street and highway systems in a timely response to planned growth.

Policy:

Ensure that transportation facilities are anticipated and programmed for construction in order to support planned growth.

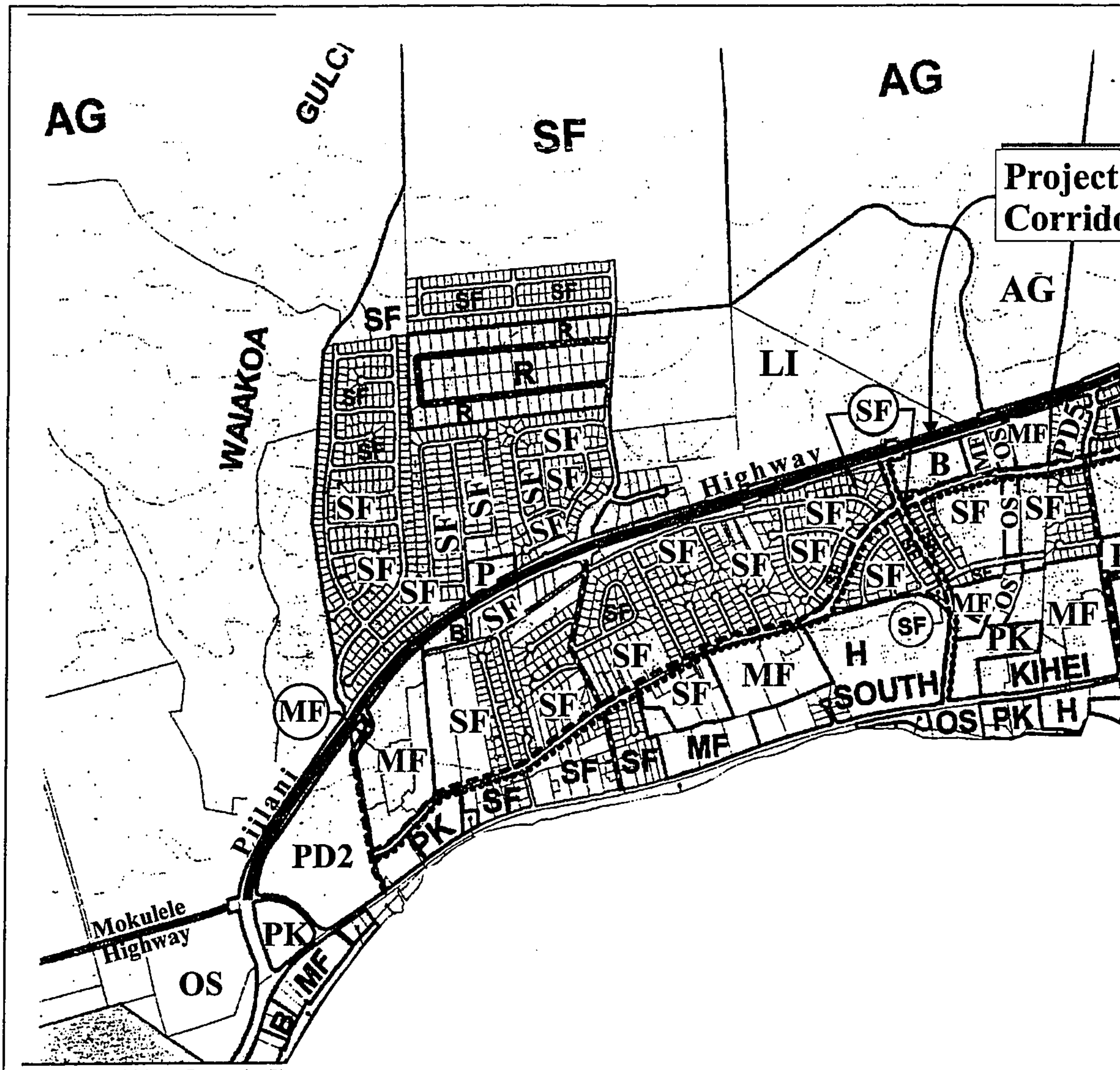
E. KIHEI-MAKENA COMMUNITY PLAN (1998)

The project corridor is located in the Kihei-Makena Community Plan region which is one (1) of nine (9) Community Plan regions established in the County of Maui. Planning for each region is guided by the respective Community Plans, which are designed to implement the Maui County General Plan. Each Community Plan contains recommendations and standards which guide the sequencing, patterns and characteristics of future development in the region.

The lands adjoining the project corridor include the following uses identified by the Community Plan land use map: Single Family and Multi-Family Residential (SF, MF), Project District (PD), Business (B), Light Industrial (LI), Public (P), Agriculture (AG), and Park (Pk). See Figure 13 and Figure 14.

1. Community Plan Theme

In 1998, the County of Maui completed its comprehensive update of the Kihei-Makena Community Plan. One of the underlying



Source: Kihei-Makena Community Plan

Figure 13

Interim Piilani Highway Improvemen
Community Plan Land Use Designations Along Proje

Prepared for: State of Hawaii, Department of Transportation

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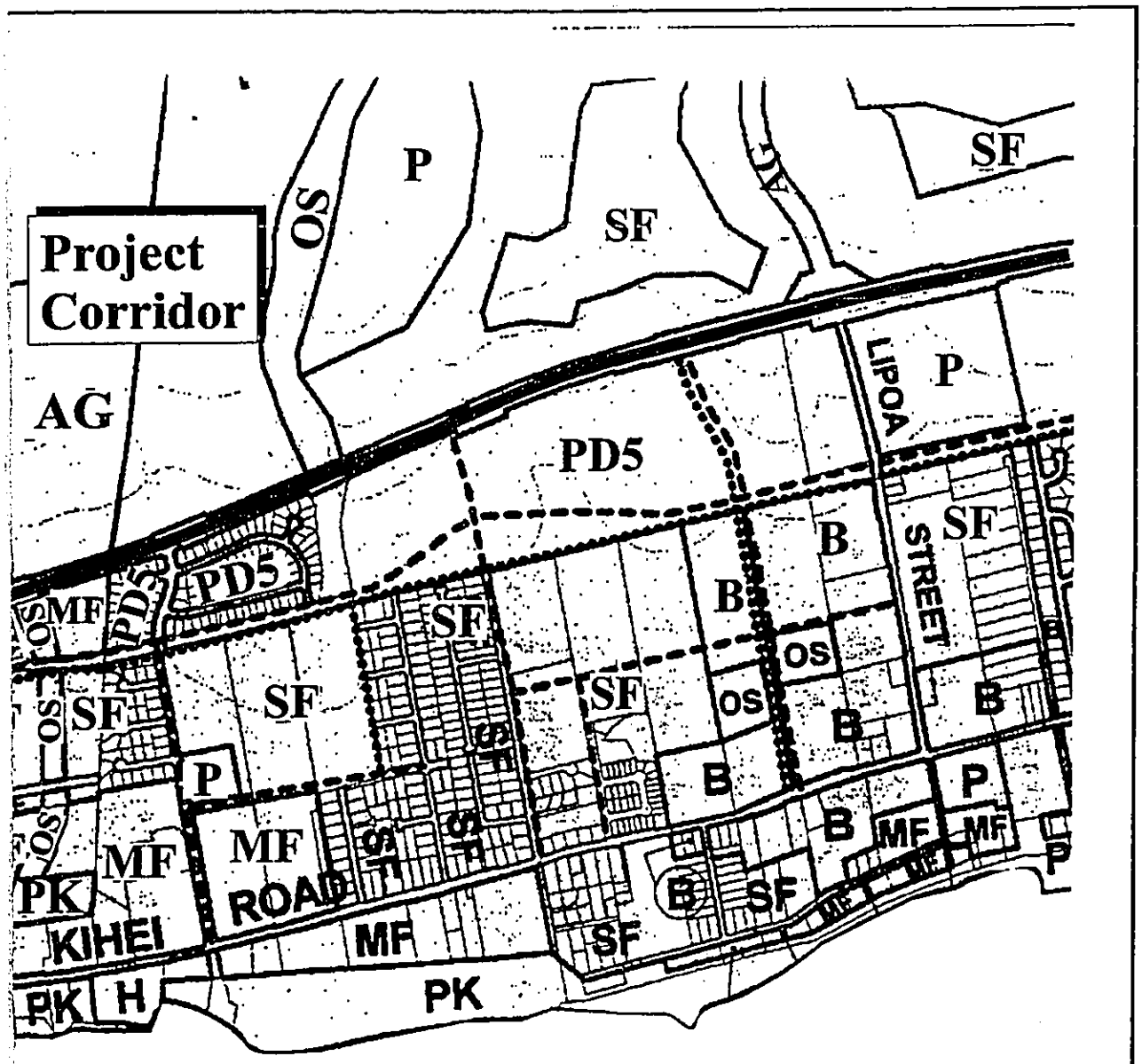

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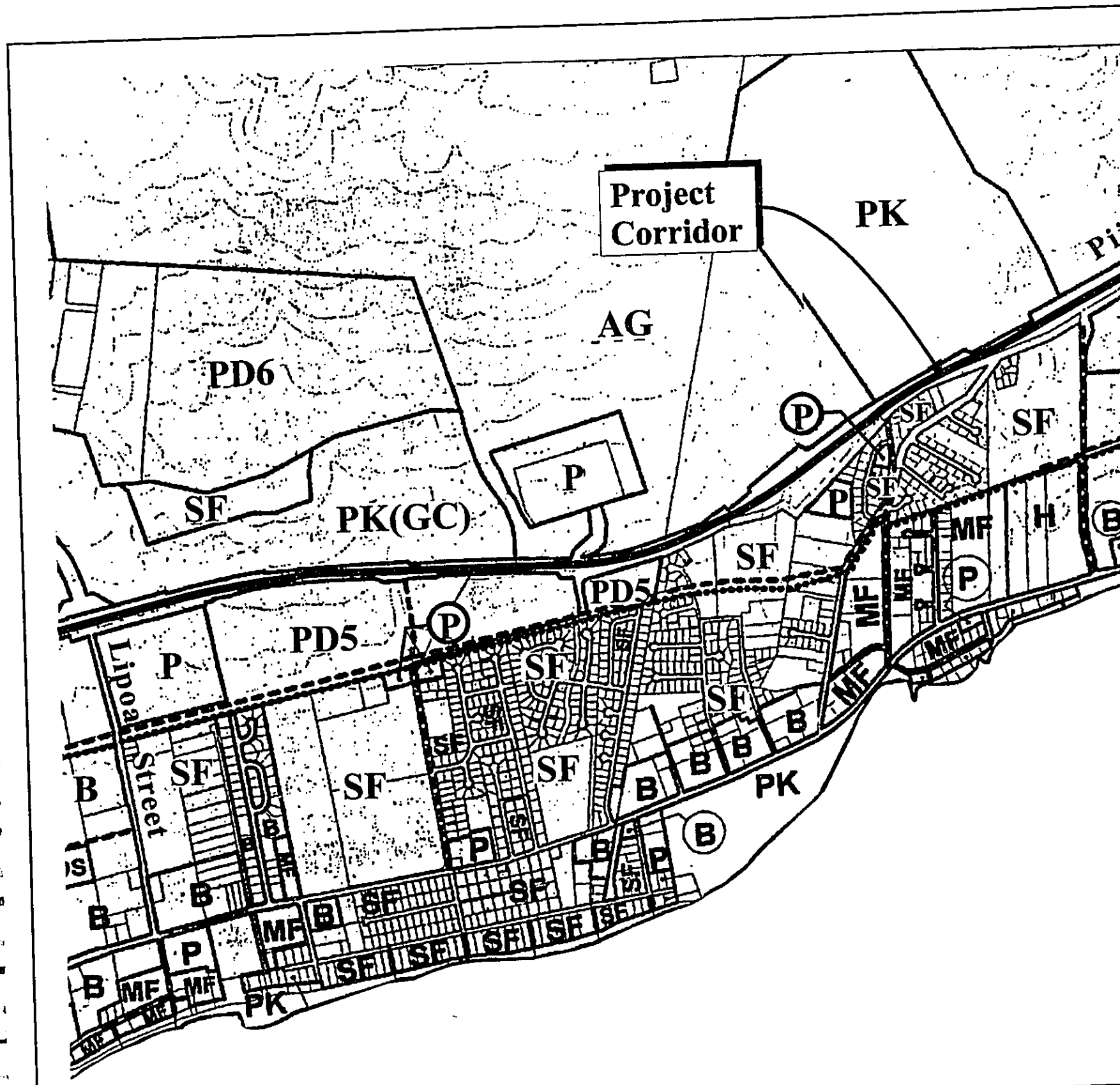
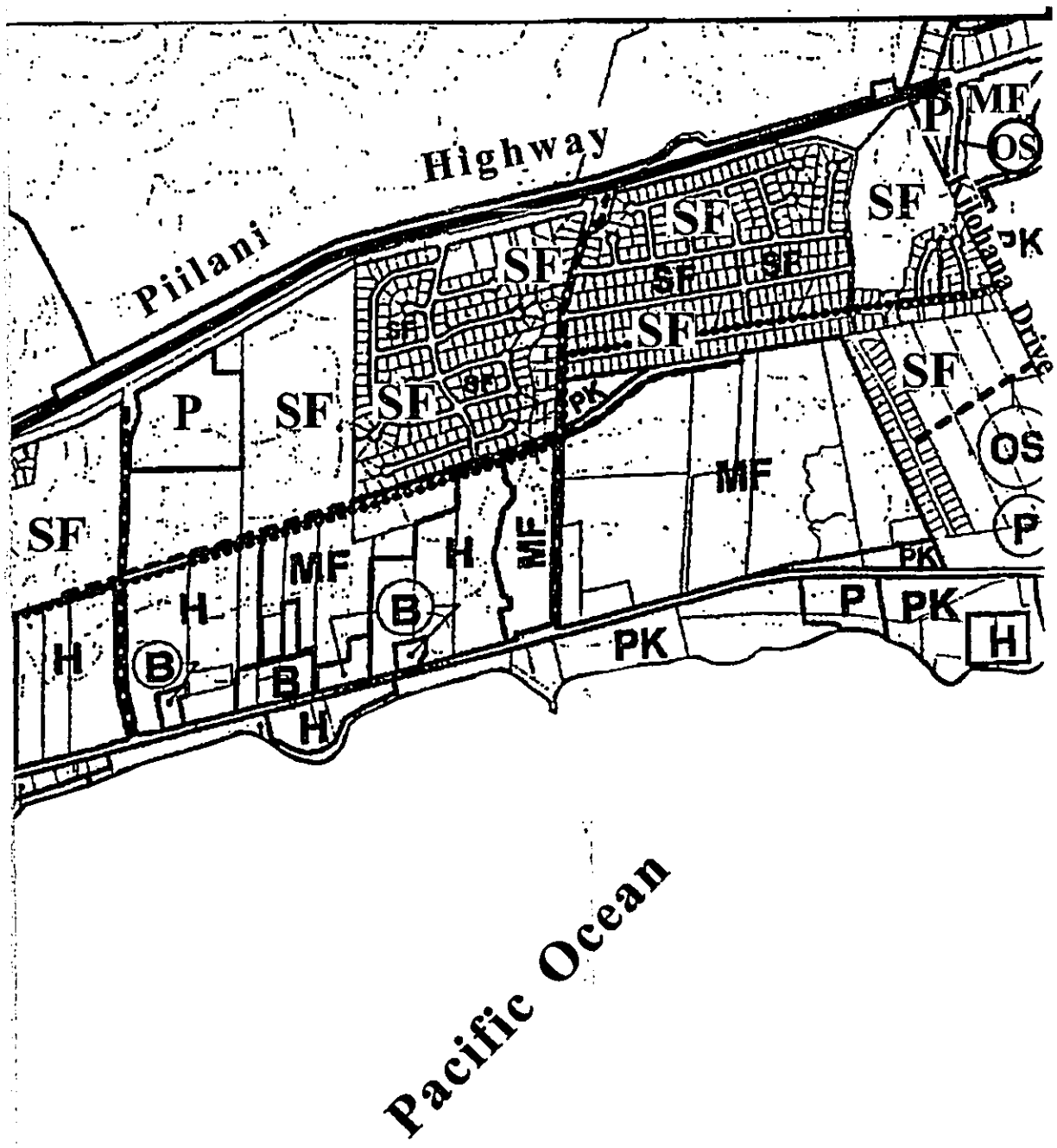


Source: Kihei-Makena Community Plan

Figure 14

Interim Piilani Highway Improvem
Community Plan Land Use Designations Along P

Prepared for: State of Hawaii, Department of Transportation



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themes which provides the basis or rationale affecting a broad spectrum of functional areas is the "provision of needed public facilities and infrastructure". The plan states:

> "The County of Maui in general, and Kihei-Makena in particular, witnessed significant growth in the 1980s and early 1990s. In many instances, however, public facility and infrastructure improvements lagged behind development in the region. As such, a significant upgrade and expansion of existing public facilities and infrastructure is necessary."

The proposed restriping and related improvements to the Piilani Highway is supportive of this basic theme and will help upgrade the transportation infrastructure in the Kihei-Makena area.

2. ***Community Plan Land Use Goal***

A goal in the Community Plan related to land use states:

> "A well-planned community with land use and development patterns designed to achieve the efficient and timely provision of infrastructure and community needs while preserving and enhancing the unique character of Ma'alaea, Kihei, Wailea and Makena as well as the region's natural environment, marine resources and traditional shoreline uses."

The Piilani Highway restriping and related improvements is a response to this goal by providing the timely transportation infrastructure to address community needs.

3. ***Community Plan Implementing Actions***

Three (3) transportation implementing actions set out in the Kihei-Makena Community Plan are:

1. Widen Piilani Highway, between Mokulele Highway and Wailea Ike Drive, to four (4) lanes;

2. Provide clear signage with adequate lighting along Piilani Highway to indicate Kihei access points; and

3. Provide left turn storage lanes and acceleration/deceleration lanes on Piilani Highway, and traffic signals at important intersections along South Kihei Road.

The proposed project supports these implementing actions.

F. COASTAL ZONE MANAGEMENT OBJECTIVES AND POLICIES

Although Piilani Highway is not within the County of Maui's Special Management Area, coastal zone management issues should be examined. See Figure 15. This section addresses the project's relationship to applicable coastal zone management considerations, as set forth in Chapter 205A and the Rules and Regulations of the Maui Planning Commission.

(1) Recreational Resources

Objective:

Provide coastal recreational opportunities accessible to the public.

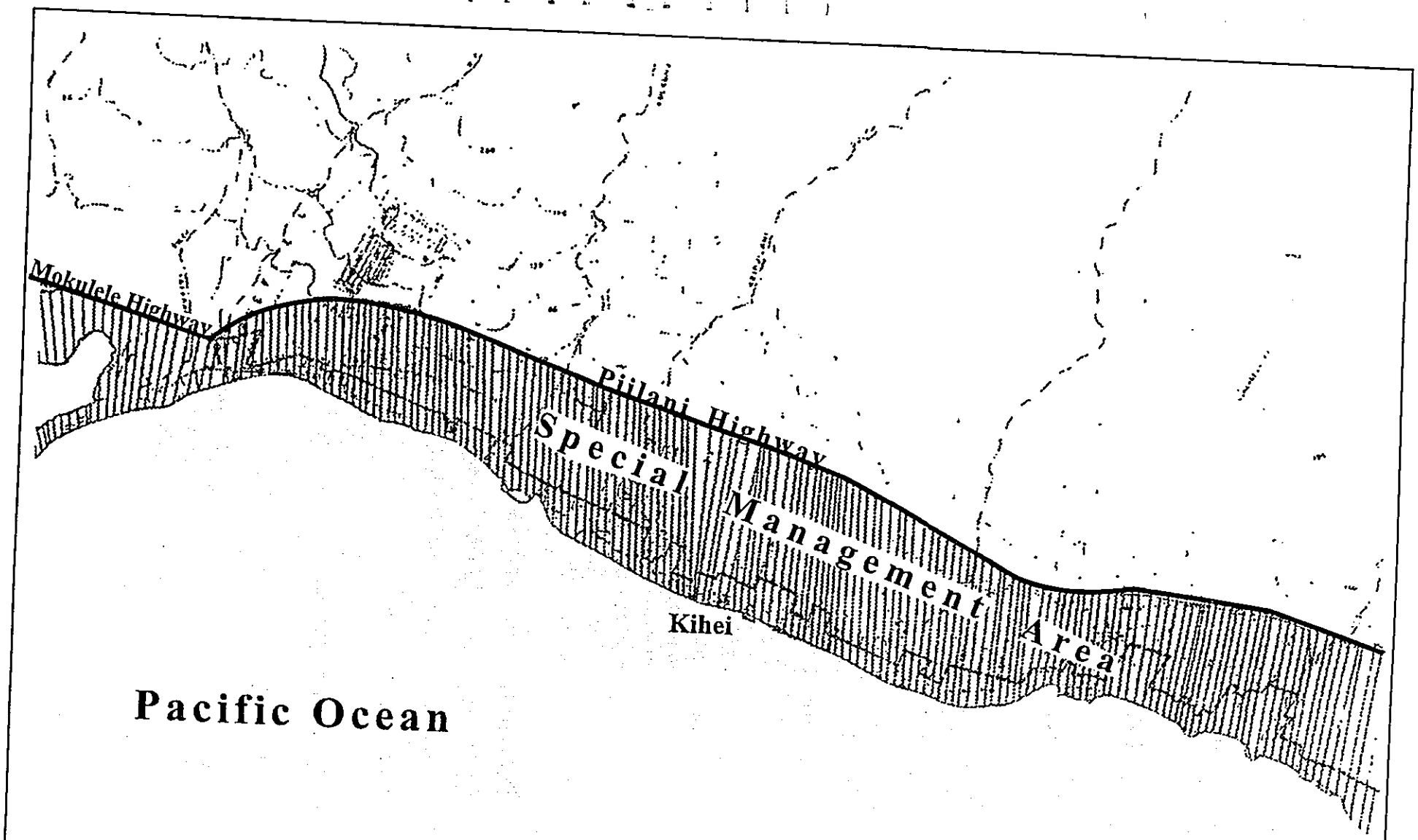
Policies:

(A) Improve coordination and funding of coastal recreational planning and management; and

(B) Provide adequate, accessible, and diverse recreational opportunities in the coastal zone management area by:

  (i) Protecting coastal resources uniquely suited for recreational activities that cannot be provided in other areas;

  (ii) Requiring replacement of coastal resources having significant recreational value including, but not limited to, surfing sites, fishponds, and sand beaches, when



Source: County of Maui Special Management Area Map

Figure 15

Interim Piilani Highway Improvements
Special Management Area Boundary Map

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Prepared for: State of Hawaii, Department of Transportation

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such resources will be unavoidably damaged by development; or requiring reasonable monetary compensation to the state for recreation when replacement is not feasible or desirable;

(iii) Providing and managing adequate public access, consistent with conservation of natural resources, to and along shorelines with recreational value;

(iv) Providing an adequate supply of shoreline parks and other recreational facilities suitable for public recreation;

(v) Ensuring public recreational uses of county, state, and federally owned or controlled shoreline lands and waters having recreational value consistent with public safety standards and conservation of natural resources;

(vi) Adopting water quality standards and regulating point and non-point sources of pollution to protect, and where feasible, restore the recreational value of coastal waters;

(vii) Developing new shoreline recreational opportunities, where appropriate, such as artificial lagoons, artificial beaches, and artificial reefs for surfing and fishing; and

(viii) Encouraging reasonable dedication of shoreline areas with recreational value for public use as part of discretionary approvals or permits by the land use commission, board of land and natural resources, and county authorities; and crediting such dedication against the requirements of Section 46-6, HRS.

Response: The proposed action is not anticipated to affect existing coastal recreational resources. Access to the shoreline areas will remain unaffected by the proposed roadway improvements.

(2) ***Historic Resources***

Objective:

Protect, preserve and, where desirable, restore those natural and manmade historic and prehistoric resources in the coastal zone management area that are significant in Hawaiian and American history and culture.

Policies:

(A) Identify and analyze significant archeological resources;
(B) Maximize information retention through preservation of remains and artifacts or salvage operations; and
(C) Support state goals for protection, restoration, interpretation, and display of historic resources.

Response: All work will be confined to the existing highway ROW. A mitigation plan will be submitted to SHPD and an archaeological monitor will be present during ground altering activities within the Puuone sands deposits. As a result, the proposed project will not affect historic resources.

(3) ***Scenic and Open Space Resources***

Objective:

Protect, preserve and, where desirable, restore or improve the quality of coastal scenic and open space resources.

Policies:

(A) Identify valued scenic resources in the coastal zone management area;
(B) Ensure that new developments are compatible with their visual environment by designing and locating such developments to minimize the alteration of natural landforms and existing public views to and along the shoreline;
(C) Preserve, maintain, and, where desirable, improve and restore shoreline open space and scenic resources; and
(D) Encourage those developments that are not coastal dependent to locate in inland areas.

Response: The proposed project is not anticipated to impact coastal and scenic open space resources.

(4) ***Coastal Ecosystems***

Objective:

Protect valuable coastal ecosystems, including reefs, from disruption and minimize adverse impacts on all coastal ecosystems.

Policies:

(A) Exercise an overall conservation ethic, and practice stewardship in the protection, use, and development of marine and coastal resources;

(B) Improve the technical basis for natural resource management;

(C) Preserve valuable coastal ecosystems, including reefs, of significant biological or economic importance;

(D) Minimize disruption or degradation of coastal water ecosystems by effective regulation of stream diversions, channelization, and similar land and water uses, recognizing competing water needs; and

(E) Promote water quantity and quality planning and management practices that reflect the tolerance of fresh water and marine ecosystems and maintain and enhance water quality through the development and implementation of point and nonpoint source water pollution control measures.

Response: The proposed roadway improvements are not expected to adversely impact coastal ecosystems.

(5) ***Economic Uses***

Objective:

Provide public or private facilities and improvements important to the State's economy in suitable locations.

Policies:

(A) Concentrate coastal dependent development in appropriate areas;

(B) Ensure that coastal dependent development such as harbors and ports, and coastal related development

such as visitor facilities and energy generating facilities, are located, designed, and constructed to minimize adverse social, visual, and environmental impacts in the coastal zone management area; and

(C) Direct the location and expansion of coastal dependent developments to areas presently designated and used for such developments and permit reasonable long-term growth at such areas, and permit coastal dependent development outside of presently designated areas when:

(i) Use of presently designated locations is not feasible;
(ii) Adverse environmental effects are minimized; and
(iii) The development is important to the State's economy.

Response: The project will support short-term construction and construction-related jobs. The project area does not affect coastal development necessary to the State's economy.

(6) Coastal Hazards

Objective:

Reduce hazard to life and property from tsunami, storm waves, stream flooding, erosion, subsidence and pollution.

Policies:

(A) Develop and communicate adequate information about storm wave, tsunami, flood, erosion, subsidence, and point and nonpoint source pollution hazards;
(B) Control development in areas subject to storm wave, tsunami, flood, erosion, hurricane, wind, subsidence, and point and nonpoint pollution hazards;
(C) Ensure that developments comply with requirements of the Federal Flood Insurance Program; and
(D) Prevent coastal flooding from inland projects.

Response: The northern portion of the project corridor between Mokulele Highway and Uwapo Road is located within Zones A0 and A4, which are areas of 100-year flooding with depths ranging from one (1) to eleven (11) feet. The roadbed at these locations

are on fill and raised above the flood level. The remainder of the project corridor lies within Zone "C", which is defined as areas of minimal flooding. It is noted that changes in drainage patterns are not anticipated with the construction of the proposed improvements and no adverse drainage impacts to surrounding properties are anticipated.

(7) ***Managing Development***

Objective:

Improve the development review process, communication, and public participation in the management of coastal resources and hazards.

Policies:

(A) Use, implement, and enforce existing law effectively to the maximum extent possible in managing present and future coastal zone development;

(B) Facilitate timely processing of applications for development permits and resolve overlapping of conflicting permit requirements; and

(C) Communicate the potential short and long-term impacts of proposed significant coastal developments early in their life cycle and in terms understandable to the public to facilitate public participation in the planning and review process.

Response: The proposed project shall be reviewed and processed pursuant to Chapter 343, Hawaii Revised Statutes (HRS). Public review will be coordinated through this process. A public Informational Open House was held at the Kihei Community Center on March 21, 2002 with approximately 30 people in attendance. Information on the proposed project was provided at the Open House.

(8) ***Public Participation***

Objective:

Stimulate public awareness, education, and participation in coastal management.

Policies:

(A) Promote public involvement in coastal zone management processes;
(B) Disseminate information on coastal management issues by means of educational materials, published reports, staff contact, and public workshops for persons and organizations concerned with coastal issues, developments, and government activities; and
(C) Organize workshops, policy dialogues, and site-specific mediations to respond to coastal issues and conflicts.

Response: As noted above, opportunity for public awareness, education and participation pertaining to significant resource attributes of the coastal zone is provided through Chapter 343, HRS procedures.

(9) ***Beach Protection***

Objective:

Protect beaches for public use and recreation.

Policies:

(A) Locate new structures inland from the shoreline setback to conserve open space, minimize interference with natural shoreline processes, and minimize loss of improvements due to erosion;
(B) Prohibit construction of private erosion-protection structures seaward of the shoreline, except when they result in improved aesthetic and engineering solutions to erosion at the sites and do not interfere with existing recreational and waterline activities; and
(C) Minimize the construction of public erosion-protection structures seaward of the shoreline.

Response: The proposed project will not impact shoreline activities. No adverse impact to beach processes is anticipated.

(10) ***Marine Resources***

Objective:

Promote the protection, use, and development of marine and coastal resources to assure their sustainability.

Policies:

(A) Ensure that the use and development of marine and coastal resources are ecologically and environmentally sound and economically beneficial;
(B) Coordinate the management of marine and coastal resources and activities to improve effectiveness and efficiency;
(C) Assert and articulate the interests of the State as a partner with federal agencies in the sound management of ocean resources within the United States exclusive economic zone;
(D) Promote research, study, and understanding of ocean processes, marine life, and other ocean resources in order to acquire and inventory information necessary to understand how ocean development activities relate to and impact upon ocean and coastal resources; and
(E) Encourage research and development of new, innovative technologies for exploring, using, or protecting marine and coastal resources.

Response: The interim improvements proposed for Piilani Highway will not adversely impact ocean resources. Construction activities will be limited to the existing highway ROW.

Chapter V

Summary of Adverse Environmental Effects Which Cannot Be Avoided

V. SUMMARY OF ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

The proposed project will result in impacts as described in Chapter III, Potential Impacts and Mitigation Measures.

Potential effects include noise-generated impacts occurring from construction activities associated with alteration work on intersections and restriping activities. In addition, impacts will result in increased traffic congestion during restriping and work on intersections. These impacts will be temporary and not expected to create long-term adverse environmental effects.

In the long term, traffic noise levels will increase as a result of increased traffic along the corridor. However, by reducing the speed limit from 45 mph to 40 mph along the project corridor, the predicted increases in future traffic noise levels at noise sensitive receptors over the ten-year period between 2001 and 2010 are typically less than 1.5 dB. This increase is not considered to be a significant impact to noise levels.

The restriping of the travel lanes will require the narrowing of the lanes from 12 feet to 11 feet (outer two lanes to 10-feet 8-inches at bridges). This narrowing will limit the margin for vehicular movement within each lane. A 5 mph reduction in the speed limit from 45 mph to 40 mph would be appropriate as a result of narrowing the lanes from 12 feet to 11 feet.

The proposed project is intended to improve roadway operating conditions along Piilani Highway and increase the level of service to LOS D or better during peak flows from the intersection at Mokulele Highway to Kilohana Drive. From a long-term perspective, there are no significant adverse environmental effects anticipated which cannot be mitigated as a result of the proposed highway improvements.

Chapter VI

Alternatives to the Proposed Action

VI. ALTERNATIVES TO THE PROPOSED ACTION

A. PREFERRED ALTERNATIVE

The proposed project represents the preferred alternative. The restriping and related improvements to intersections will improve vehicular traffic flow along the 5.9 mile segment of roadway between Mokulele Highway and Kilohana Drive in Kihei. The proposed improvements are not anticipated to generate new traffic, however, it is anticipated to accommodate present and future traffic along the project corridor with a LOS D or better.

B. CONTRAFLOW ALTERNATIVE

A "contraflow" alternative would include restriping the highway to three (3) lanes and reversing the flow in the third lane during the peak period. This alternative would require that the added lane be provided northbound in the AM peak period and southbound in the PM peak period. Widening to provide two (2) through lanes across each signalized intersection would still be required and merging areas would be needed. Adequate traffic control through merging areas during contraflow operations would be difficult to achieve. With this alternative, densities between Uwapo Road and Kaonoulu Street would remain at Level of Service E and therefore, not an acceptable alternative for consideration.

C. IMPROVING ALTERNATE ROADWAYS

The Piilani Highway is a two-lane arterial roadway that provides regional mobility to the Kihei-Wailea-Makena areas. Another north-south access in the area is provided by South Kihei Road. This road is largely a two-lane collector road providing north-south mobility and property access within the Kihei community. A North-South Collector Road has been an integral part of Kihei planning, however, it has been implemented incrementally as development warrants and is not completed.

Widening South Kihei Road to accommodate more traffic to lessen the volume on Piilani Highway is an alternative that would have considerably greater impacts and costs due to the urban and commercial build up along this roadway.

D. *PERMANENT WIDENING OF PIILANI HIGHWAY*

The proposed action represents an interim measure to provide additional throughput to address existing and near-term capacity issues. From a long-term perspective, permanent improvements will be required to address the region's transportation needs. The scope of permanent improvements would likely involve work outside of the currently improved section of the highway and would result in higher costs with a different set of impact considerations. From a planning, design, funding and implementation standpoint, increasing the scope of work to meet the long-term facility potential of Piilani Highway is not deemed prudent in light of the current capacity constraints which require timely response as provided by the proposed interim action.

E. *NEW HIGHWAY ALIGNMENT ALTERNATIVE*

This alternative would involve a new highway alignment mauka of the existing Piilani Highway. The transportation planning process includes many tiers of evaluation, including regional plans (Maui Long Range Transportation Plan, 1997), sub-regional plans (Kihei Traffic Master Plan, 1996) and project plans, such as the current effort for Piilani Highway. Each tier narrows the scope and each subsequent tier builds upon information from the studies of the broader area. The timeframe associated with a new highway alignment is beyond the regional and sub-regional plans which identified projects for implementation to the year 2020. From a planning and evaluation process perspective, consideration of a new highway alignment is not deemed a prudent alternative in light

of the current capacity constraints which require a timely response as provided by the proposed interim action.

F. NO ACTION ALTERNATIVE

In light of the established need for the proposed improvements, the "no action alternative" does not represent a responsible option toward improving traffic circulation for the Kihei-Makena-Wailea area since problems with traffic congestion and internal circulation will persist.

G. DEFERRED ACTION ALTERNATIVE

A "deferred action" alternative will have similar consequences as a "no action" alternative as problems relating to traffic congestion will continue to persist and potentially increase. Deferring the development of the proposed improvements may also result in higher implementation costs in the future due to inflation.

Chapter VII

Irreversible and Irretrievable Commitments of Resources

VII. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The design and implementation of the proposed project will involve the commitment of certain material and fiscal resources. The commitment of the resources for the project is consistent with the need to improve the existing transportation system in the area. Impacts relating to the use of these resources should be weighed against the expected positive benefits to be derived from the project versus the consequences of taking no action.

Chapter VIII

Findings and Conclusions

VIII. FINDINGS AND CONCLUSIONS

Piilani Highway is a two-lane arterial roadway under the jurisdiction of the State of Hawaii that begins in the north at its intersection with Mokulele Highway and proceeds in a southerly direction to its terminus with Wailea Ike Drive, a distance of approximately 7.0 miles. The proposed project will involve restriping the road to create two (2) additional travel lanes and related improvements to an approximately 5.9 mile segment of Piilani Highway that extends from Mokulele Highway in the north to Kilohana Drive in the south. The proposed project will enhance accessibility and traffic circulation in the area. The proposed improvements will be conducted within the roadway's existing ROW.

Since the proposed action is on State lands and State and County funds are proposed to be utilized for the project, an Environmental Assessment (EA) has been prepared pursuant to Chapter 343, Hawaii Revised Statutes (HRS), and Chapter 200 of Title 11, Administrative Rules of the State Department of Health.

Every phase of the proposed action, expected consequences, both primary and secondary, and the cumulative as well as the short-term and long-term effects of the action have been evaluated in accordance with the Significance Criteria of Section 11-200-12 of the Administrative Rules. Based on the analysis, the proposed project is not anticipated to result in any significant impacts. Discussion of project conformance to the criteria is noted as follows:

1. ***No Irrevocable Commitment to Loss or Destruction of any Natural or Cultural Resource Would Occur as a Result of the Proposed Project***

   Flora occupying undeveloped parcels bordering the project corridor generally consists of kiawe, koa haole, buffelgrass and scrub vegetation, while developed properties are vegetated with landscaping typical of single-family residential developments and ornamental landscaping, such as hibiscus and palms, generally associated with condominiums and

apartment complexes. No wetlands will be impacted by the proposed action.

From an archaeological standpoint, the lands underlying and immediately surrounding the project corridor have been previously altered by existing development of the highway. All work will be carried out within the ROW. A monitoring plan will be submitted to SHPD prior to construction. An archaeologist will monitor construction activity in the Puuone sands deposits to ensure the proposed project will not adversely impact archaeological resources.

The area in the vicinity of the project corridor has not been used for cultural gatherings, nor has it been cultivated using traditional Hawaiian practices. The proposed project is not anticipated to adversely impact cultural resources.

2. ***The Proposed Action Would Not Curtail the Range of Beneficial Uses of the Environment***

The roadway segment encompassed by the proposed project traverses lands which are designated for urban and agriculture uses. The proposed action is not anticipated to have a significant effect on beneficial uses of the environment.

3. ***The Proposed Action Does Not Conflict With the State's Long-Term Environmental Policies or Goals or Guidelines as Expressed in Chapter 344, HRS***

The State Environmental Policy and Guidelines are set forth in Chapter 344, HRS. The proposed action is in consonance with the following policies and guidelines:

Environmental Policy:

Enhance the quality of life by:

* * *

(A) Establishing communities which provide a sense of identity, wise use of land, efficient transportation, and aesthetic and social satisfaction in harmony with the natural environment which is uniquely Hawaiian.

Guidelines:

* * *

Transportation

* * *

(A) Encourage transportation systems in harmony with the lifestyle of the people and environment of the State.

4. ***The Economic or Social Welfare of the Community or State Would Not Be Substantially Affected***

The proposed project will directly benefit the local economy by providing construction and construction-related employment. The proposed project will also have a beneficial effect upon the socio-economic fabric of the community by providing for the safe, convenient and efficient movement of traffic in the Kihei-Wailea-Makena area. By improving roadway conditions, the proposed project will promote the public welfare by providing vehicular facilities which meet current design and safety standards.

5. ***The Proposed Action Does Not Affect Public Health***

No adverse impacts to the public's health and welfare are anticipated.

6. ***No Substantial Secondary Impacts, Such as Population Changes or Effects on Public Facilities, are Anticipated***

No significant population changes are anticipated as a result of the proposed project. The project involves the provision of additional travel lanes and related intersection modifications to improve the level of service along the 5.8 mile section of the Piilani Highway from Mokulele Highway in the north to Kilohana Road in the south.

As necessary, the DOT will coordinate the relocation of improvements (e.g., waterlines, utility poles) with the appropriate agencies and utility companies to ensure that the proposed road widening activities do not impact their facilities.

The improvements would increase the handling capacity of Piilani Highway and provide the necessary transportation infrastructure for the orderly accommodation of near-term traffic projections for the Kihei-Wailea-Makena area.

Stormwater runoff will not be affected by the proposed project and there will be no impact to the existing drainage system. In addition, the proposed project is not anticipated to have any adverse impacts upon public services and facilities.

7. ***No Substantial Degradation of Environmental Quality is Anticipated***

Construction activities will create temporary short-term nuisances related to noise and dust. Appropriate dust control and noise mitigation measures will be implemented by the contractor to ensure that fugitive dust and noise generated in connection with construction is minimized.

8. ***The Proposed Action Does Not Involve a Commitment to Larger Actions, Nor Would Cumulative Impacts Result in Considerable Effects On The Environment***

The proposed action is part of the DOT's ongoing effort to upgrade roadways to accommodate current vehicular traffic requirements. This action is not expected to result in additional environmental effects as all project-related work will be carried out within existing road surfaces and highway ROW.

It is noted that voluntary funding participants for the proposed action include private landowners with plans for future development in the Wailea-Makena subregion. The landowners, Makena Resort Corp. (owner of Makena Resort lands) and WCPT/GW Land Associates, LLC (owner of the Wailea 670 property), have plans which have development schedules spanning 15- to 20-year horizons. Traffic volumes generated by new developments within the Wailea 670 and Makena Resort project areas will be accommodated by the proposed Piilani Highway improvements. However, the project in itself is not a master planned component of the Wailea 670 and Makena Resort projects. It is the intent of the proposed interim widening project to address current and near-term capacity constraints attributed to traffic generated within the greater Kihei-Makena region and beyond. In this context, the proposed action is not considered to be a part of a larger action.

In consideration of cumulative impacts, if the Upcountry Highway is constructed and connected to Piilani Highway opposite Kaonoulu Street, as proposed, it is expected to affect traffic volumes north of Kaonoulu Street. As set out in the Traffic Assessment Report, traffic densities on Piilani Highway north of Kaonoulu Street with the interim improvements and the Upcountry Highway are within the limits for LOS C or better. At

the intersections, conditions in the AM peak hour would not be significantly different than if the Upcountry Highway were not built. Similar layouts with adjustment in signal timing would provide adequate service at the Mokulele Highway, Uwapo Road, and Ohukai Street intersections. At Kaonoulu Street, modifications in signal phasing would be necessary to maintain acceptable conditions at the intersection (Appendix A, Traffic Assessment Report, pages 12 and 13). The cumulative impact on the acoustical environment from the Upcountry Highway would not alter the traffic noise level findings and conclusions (Appendix C, Acoustic Study, page 2). The resulting noise levels south of Kulanihakoi Street would be the same as those without the Upcountry Highway since traffic volumes would remain the same. North of Kaonoulu Street, traffic volumes and noise levels would be lower during the critical (higher) AM peak hour *following completion* of the Upcountry Highway. In consideration of the proposed project and the Upcountry Highway, the cumulative impact would not result in considerable effects on the environment.

9. ***No Rare, Threatened or Endangered Species or Their Habitats Would be Adversely Affected By The Proposed Action***

Rare, threatened or endangered species of flora, fauna, avifauna or their habitats are not expected to be impacted by the proposed project as all work will be conducted within existing roadway rights-of-way.

10. ***Air Quality, Water Quality or Ambient Noise Levels Would Not Be Detrimentally Affected By The Proposed Project***

Construction activities will result in short-term air quality and noise impacts. Dust control measures, such as regular watering and sprinkling, and erection of dust screens will be implemented to minimize wind-blown emissions. Short-term noise impacts will occur primarily from construction equipment. Equipment mufflers or other noise attenuating equipment, as

well as proper equipment and vehicle maintenance, are anticipated to mitigate noise from construction activities.

In the long term, traffic noise levels will increase as a result of increased traffic along the corridor. However, by reducing the speed limit from 45 mph to 40 mph along the project corridor, the predicted increases in future traffic noise levels at noise sensitive receptors over the ten-year period between 2001 and 2010 are typically less than 1.5 dB. This increase is not considered to be a significant impact to noise levels.

11. ***The Proposed Project Would Not Affect Environmentally Sensitive Areas, Such As Flood Plains, Tsunami Zones, Erosion-prone Areas, Geologically Hazardous Lands, Estuaries, Fresh Waters or Coastal Waters***

Existing drainage patterns will be maintained. There will be no net increase in storm water runoff as a result of the proposed project. There will be no adverse impacts to environmentally sensitive areas nor to fresh or coastal waters.

12. ***The Proposed Project Will Not Substantially Affect Scenic Vistas and Viewplanes Identified in County or State Plans or Studies***

The proposed project will not affect coastal scenic and open space resources and will not affect scenic view corridors.

13. ***The Proposed Project Will Not Require Substantial Energy Consumption***

The proposed project will involve the commitment of fuel for construction equipment, vehicles, and machinery during construction activities. However, this use will be short term and is not anticipated to result in a substantial consumption of energy resources.

Based on the foregoing findings, it is concluded that the proposed action is not anticipated to result in any significant impacts. Accordingly, this final environmental assessment is being processed as a final Finding of No Significant Impact (FONSI).

Chapter IX

List of Permits and Approvals

IX. LIST OF PERMITS AND APPROVALS

The following approval will be required prior to the implementation of the project:

State of Hawaii

1. National Pollutant Discharge Elimination System (NPDES) Permit.
2. Work to Perform Within State Highway Right-of-Way.

Chapter X

Public Informational Open House, March 21, 2002

X. PUBLIC INFORMATIONAL OPEN HOUSE, MARCH 21, 2002

The purpose of the Open House was to provide information and to receive public comment on the proposed project. Approximately 30 people attended the informational Open House. Project consultants in highway design, traffic engineering, acoustic engineering, and environmental assessment were available at designated stations to provide information and to respond to questions. Opportunities were also provided for the public to submit written comments and to submit oral testimony on the proposed project.

A summary of the written comments received from the meeting follows.

1. Concern was raised with sound walls and their visual impact on the landscape and viewscape. Suggestions were made to provide more landscaping along the highway right-of-way to reduce noise, to provide visual buffers, and to help reduce carbon dioxide from car exhaust.

2. Concern was raised about a bicycle route next to the highway. It was suggested that the bike route should be located on the North-South Collector route.

3. The narrowing of lanes from 12 feet to 11 feet was raised as a safety concern.

4. The left-turn lanes on to and off of Piilani Highway should be allowed at Kanani and Keonekai Roads.

5. Residents would like to see construction be as low impact as possible with suggestions such as working at night when traffic is minimal, provide traffic control during construction, and requiring Maui Police Department to divert traffic during construction.

6. A new highway mauka of the existing Piilani Highway was also suggested as an alternative.

Five (5) individuals submitted oral testimony on the proposed project. See Appendix D. In general, the oral testimonies were in support of the proposed project. Suggestions were made to synchronize and coordinate the traffic

signals to facilitate traffic flow and to add guardrails near Ohukai Road and Moi Place for safety.

Chapter XI

Agencies Consulted During the Preparation of the Draft Environmental Assessment; Letters Received and Responses to Substantive Comments

XI. AGENCIES CONSULTED DURING THE PREPARATION OF THE DRAFT ENVIRONMENTAL ASSESSMENT; LETTERS RECEIVED AND RESPONSES TO SUBSTANTIVE COMMENTS

The following agencies were consulted during the preparation of the Draft Environmental Assessment. Agency comments and responses to substantive comments are also included in this section.

1. Neal Fujiwara, Soil Conservationist
Natural Resources Conservation Service
U.S. Department of Agriculture
210 Imi Kala Street, Suite 209
Wailuku, Hawaii 96793-2100

2. William Lennan
Department of the Army
U.S. Army Engineer District, Hnl.
Attn: Operations Division
Bldg. T-1, Room 105
Fort Shafter, Hawaii 96858-5440

3. Robert P. Smith
Pacific Islands Manager
U. S. Fish and Wildlife Service
P.O. Box 50167
Honolulu, Hawaii 96850

4. David Blane, Director
State of Hawaii
Office of Planning
Department of Business, Economic Development and Tourism
P.O. Box 2359
Honolulu, Hawaii 96804

5. Paul LeMahieu, Superintendent
State of Hawaii
Department of Education
P.O. Box 2360
Honolulu, Hawaii 96804

6. Gwen Ueoka
Maui District Superintendent
Department of Education
54 High Street, 4th Floor
Wailuku, Hawaii 96793

7. Denis Lau, Chief
Clean Water Branch
State of Hawaii
Department of Health
919 Ala Moana Blvd., Room 300
Honolulu, Hawaii 96814

8. Herbert Matsubayashi
District Environmental Health Program Chief
State of Hawaii
Department of Health
54 High Street
Wailuku, Hawaii 96793

9. Gilbert Coloma-Agaran
State of Hawaii
Department of Land and Natural Resources
P. O. Box 621
Honolulu, Hawaii 96809

10. Don Hibbard
State of Hawaii
Department of Land and Natural Resources
State Historic Preservation Division
601 Kamokila Blvd., Room 555
Kapolei, Hawaii 96707

11. Brian Minaai, Director
State of Hawaii
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

12. Colin Kippen, Deputy Administrator
Office of Hawaiian Affairs
711 Kapiolani Boulevard, Suite 500
Honolulu, Hawaii 96813

13. Clayton Ishikawa, Chief
County of Maui
Department of Fire Control
200 Dairy Road
Kahului, Hawaii 96732

14. Alice Lee, Director
County of Maui
Department of Housing and Human Concerns
200 S. High Street
Wailuku, Hawaii 96793

15. John Min, Director
County of Maui
Department of Planning
250 South High Street
Wailuku, Hawaii 96793

16. Floyd Miyazono, Director
County of Maui
Department of Parks and Recreation
1580-C Kaahumanu Avenue
Wailuku, Hawaii 96793

17. Mayor James Kimo Apana
County of Maui
Office of the Mayor
200 South High Street
Wailuku, Hawaii 96793

18. Tom Phillips, Chief
County of Maui
Police Department
55 Mahalani Street
Wailuku, Hawaii 96793

19. David Goode, Director
County of Maui
Department of Public Works and Waste Management
200 South High Street
Wailuku, Hawaii 96793

20. David Craddick, Director
County of Maui
Department of Water Supply
200 South High Street
Wailuku, Hawaii 96793

21. **Maui Electric Company, Ltd.**
P.O. Box 398
Kahului, Hawaii 96732

22. Barney Eiting, Chair
Planning and Development Committee
Kihei Community Association
P.O. Box 2311
Kihei, Hawaii 96753

23. Rudy Luuwai
Makena Homeowners Association
5100 Makena Road
Kihei, Hawaii 96753

24. Dorothy Williams, President
Maui Meadows Homeowners Association
P.O. Box 1935
Kihei, Hawaii 96753

25. Ron Sturtz, President
Maui Meadows Neighborhood Association
874 Kumulani Drive
Kihei, Hawaii 96753

26. Bill Overton, Manager
Wailea Community Association
555 Kaukahi Street, Suite 214
Wailea, Hawaii 96753

27. Clyde Murashige, Sr. Vice President
Wailea Resort Company, Ltd.
161 Wailea Ike Place
Wailea, Hawaii 96753

NOV 2 1 2001

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

REPLY TO ATTENTION OF

November 20, 2001

Regulatory Branch

Mr. Michael T. Munekiyo, A.I.C.P.
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Mr. Munekiyo:

This letter responds to your request for a jurisdictional determination for the Interim Piilani Highway Widening Improvements project, dated November 12, 2001. Based on the information you provided I have determined that a Department of the Army (DA) permit will not be required for this project.

If you have any questions concerning this determination, please contact William Lennan of my staff at 438-6986 or FAX 438-4060, and reference File No. 200200078.

Sincerely,

George P. Young, P.E.
Chief, Regulatory Branch

MUNEKIYO & HIRAGA, INC.

January 17, 2002

George P. Young, P.E., Chief
Regulatory Branch
Department of the Army
U.S. Army Engineer District, Honolulu
Fort Shafter, Hawaii 96858-5440

SUBJECT: Piilani Highway Widening Improvements, Mokulele Highway to Kilohana Drive (Job No. 31AB-01-02

Dear Mr. Young:

Thank you for your letter of November 20, 2001 on the above subject.

We acknowledge the Department of the Army's (DA) determination that a DA permit will not be required for the project.

Again, thank you for your response.

Very truly yours,

Mich Hirano, AICP

MH:lfm
cc: Roy Figueiroa, Makena Resort Corp.
Charles Jencks, WCPT/GW Land Associates
Fred Cajigal, Dept. of Transportation-Highways Division, Maui
Bob Siarot, Dept. of Transportation-Highways Division, Maui
Bert Toba, R. M. Towill Corporation

BENJAMIN J. CAYETANO
GOVERNOR

BRUCE S. ANDERSON, PH.D., M.P.H.
DIRECTOR OF HEALTH

NOV 2 8 2001

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

In reply, please refer to
EMD / CWB
11076PGY.01

November 23, 2001

Mr. Michael T. Munekiyo, A.I.C.P.
Project Manager
Munekiyo & Hiraga, Incorporated
305 High Street, Suite 104
Wailuku, Maui, Hawaii 96793

Dear Mr. Munekiyo:

Subject: **Interim Piilani Highway Widening Improvements,**
Mokulele Highway to Kilohana Drive, Project No. 31AB-01-02
Kihei, Maui, Hawaii

The Department of Health, Clean Water Branch (CWB) has reviewed the October 17, 2001 transmittal of the subject document and has the following comments:

1. The Army Corps of Engineers should be contacted to identify whether a Federal permit (including a Department of Army permit) is required for any of the future projects. If it is determined that a Federal permit is required for the subject project, then a Section 401 Water Quality Certification would also be required from our office.

2. If the construction project involves any of the following discharges into State waters, a National Pollutant Discharge Elimination System (NPDES) permit coverage is required for each activity:

   a. Storm water runoff associated with construction activities, including clearing, grading, and excavation that result in the disturbance of equal to or greater than five (5) acres of total land area. The total land area includes a contiguous area where multiple separate and distinct construction activities may be taking place at different times on different schedules under a larger common plan of development or sale.

      Note: After March 10, 2003, an NPDES permit will be required for discharges of storm water associated with construction activities, including clearing, grading, and excavation that result in the disturbance of one (1) acre or more.

   b. Hydrotesting water; and

   c. Construction dewatering effluent.

Notices of Intent (NOI) for NPDES general permit coverages should be submitted at least 30 days before the discharge is to occur. NPDES individual permit applications should be submitted at least 180 days before the discharge is to occur. NOI and NPDES individual permit application forms can be downloaded from the CWB website at *http://www.state.hi.us/doh/eh/cwb/forms/index.html.*

The transmittal did not mention when the various activities would begin. The NPDES Notice of General Permit Coverages will expire at midnight September 21, 2002 or when amendments to Chapter 11-55, Appendices (the NPDES general permits) are adopted, whichever occurs first. Therefore, the Permittee would need to reapply for all NPDES general permit coverages prior to the expiration date, if construction will be continued after September 21, 2002, an NPDES individual permit coverage may be issued for a term of less than five (5) years and would eliminate the requirement to reapply for any NPDES general permit coverages if construction was completed within the term of the NPDES individual permit.

If you have any questions, please contact Mr. Gerald Yonashiro of the Engineering Section, CWB, at 586-4309.

Sincerely,

DENIS R. LAU, P.E., CHIEF
Clean Water Branch

GY:cr

MUNEKIYO & HIRAGA, INC.

January 17, 2002

Denis R. Lau, P.E., Chief
Clean Water Branch
Department of Health
P. O. Box 3378
Honolulu, Hawaii 96801-3378

SUBJECT: Interim Piilani Highway Widening Improvements; Mokulele Highway to Kilohana Drive (Project No. 31AB-01-02)

Dear Mr. Lau:

Thank you for your letter dated November 23, 2001 in response to the early consultation letter on the above subject.

The Army Corps of Engineers' response to the early consultation letter is that a Department of Army permit will not be required for this project. A copy of this letter is enclosed for your information and file.

We also note the comments regarding a National Pollutant Discharge Elimination System (NPDES) permit requirements and have forwarded your letter to the project engineer for review and applicability.

Again, thank you for your response to the early consultation letter.

Very truly yours,

Mich Hirano, AICP

MH:lfm
Enclosure
cc: Roy Figueiroa, Makena Resort Corp. (w/ enclosure)
Charles Jencks, WCPT/GW Land Associates (w/ enclosure)
Fred Cajigal, Dept. of Transportation-Highways Division, Maui (w/ enclosure)
Bob Siarot, Dept. of Transportation-Highways Division, Maui (w/ enclosure)
Bert Toba, R. M. Towill Corporation (w/ enclosure)

NOV 27

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

REPLY TO ATTENTION OF

November 20, 2001

Regulatory Branch

Mr. Michael T. Munekiyo, A.I.C.P.
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Mr. Munekiyo:

This letter responds to your request for a jurisdictional determination for the Interim Piilani Highway Widening Improvements project, dated November 12, 2001. Based on the information you provided I have determined that a Department of the Army (DA) permit will not be required for this project.

If you have any questions concerning this determination, please contact William Lennan of my staff at 438-6986 or FAX 438-4060, and reference File No. 200200078.

Sincerely,

George P. Young, P.E.
Chief, Regulatory Branch

NOV 2 6 2001

AQUACULTURE DEVELOPMENT PROGRAM
AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND DIVISION
STATE PARKS
WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION
P.O. BOX 621
HONOLULU, HAWAII 96809

November 21, 2001

LD-NAV

Ref.: PIILANIHWY.RCM

Munekiyo & Hiraga, Inc.
Michael T. Munekiyo. A.I.C.P.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Mr. Munekiyo:

SUBJECT: Review: Draft Environmental Assessment
Project: Piilani Highway Widening Improvements
Location: Mokulele Highway to Kilohana Drive
Job No.: 31AB-01-02

Thank you for your letter dated November 12, 2001, informing the department of the proposed improvement to Piilani Highway.

Please provide four (4) copies of the Draft Environmental Assessment (DEA) document covering the proposed project to the DLNR Land Division located at 1151 Punchbowl Street, Room 220, Honolulu, Hawaii 96813.

The DEA document will be submitted to the following divisions for their review and comment:

Division of Forestry and Wildlife – Commission on Water Resource Management - Land Division Engineering Branch and District Land Office

Should you have any questions, please feel free to contact Nicholas A. Vaccaro of the Land Division Support Services Branch at 1 (808) 587-0438.

Very truly yours,

HARRY M. YADA
Acting Administrator

MUNEKIYO & HIRAGA, INC.

January 17, 2002

Harry M. Yada, Acting Administrator
Department of Land and Natural Resources
Land Division
P. O. Box 621
Honolulu, Hawaii 96809

SUBJECT: Draft Environmental Assessment for Piilani Highway Widening Improvements, Mokulele Highway to Kilohana Drive (Job No. 31AB-01-02

Dear Mr. Yada:

Thank you for your letter of November 21, 2001 on the above subject.

We have noted your comments and will forward four (4) copies of the Draft Environmental Assessment to your department for further review.

Again, thank you for your early consultation letter response.

Very truly yours,

Mich Hirano, AICP

MH:lfm
cc: Roy Figueiroa, Makena Resort Corp.
Charles Jencks, WCPT/GW Land Associates
Fred Cajigal, Dept. of Transportation-Highways Division, Maui
Bob Siarot, Dept. of Transportation-Highways Division, Maui
Bert Toba, R. M. Towill Corporation

DEC 2 4 2001

PHONE (808) 594-1888

FAX (808) 594-1865

STATE OF HAWAI'I
OFFICE OF HAWAIIAN AFFAIRS
711 KAPI'OLANI BOULEVARD, SUITE 500
HONOLULU, HAWAI'I 96813

December 4, 2001

HRD01/367

Mr. Michael T. Munekiyo, AICP
Project Manager
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, HI 96793

Dear Mr. Munekiyo:

Subject: Proposed design and implementation of restriping and related improvements to Piilani Highway

This letter is provided as a response to your early consultation letter and materials concerning the above referenced project. OHA offers the following comments relating to project:

As part of your HRS 343 compliance, OHA reminds SDOT that it must complete a cultural impact statement so that information may be gathered about cultural practices and cultural features that may be affected by actions subject to Chapter 343.

OHA recommends that SDOT seek as broad a consultation as possible with knowledgeable Native Hawaiian organizations and individuals to complete this cultural impact assessment. This consultation should include the incorporation of the contacts listed below to assist you and SDOT in identifying cultural and historic resources, cultural practices and significance, evaluating cultural places implicated by this project, assessing adverse effects to them, and developing appropriate mitigation and alternatives (where necessary):

- Local Hawaiian civic clubs
- Local chapters of the royal societies
- Maui Island Burial Council
- Individuals familiar with cultural practices of the areas affected by your undertaking

OHA's community resource coordinators on the island of Maui may also be of assistance in helping to identify knowledgeable Native Hawaiian organizations and individuals. Their information follows below:

Maui CRC
Thelma Shimaoka
140 Hoohana Street, Ste 206
Kahului, HI 96732
Phone: (808) 243-5219
Fax: (808) 243-5016

Thank you for the opportunity to comment and provide concerns in this phase of the proposed project. We look forward to reviewing your Draft EA when available. If you have any questions, please contact Wayne Kawamura, Policy Analyst at 594-1945, or email him at: waynek@oha.org.

Sincerely,

Colin Kippen, Jr.
Deputy Administrator

cc: BOT
ADM
Maui CRC

MUNEKIYO & HIRAGA, INC.

January 17, 2002

Colin Kippen, Jr.
Deputy Administrator
State of Hawai'i, Office of Hawaiian Affairs
711 Kapi'olani Boulevard, Suite 500
Honolulu, Hawai'i 96813

SUBJECT: Interim Piilani Highway Improvements: Mokulele Highway to Kilohana Drive (Project No. 31AB-01-02)

Dear Mr. Kippen:

Thank you for your letter of December 4, 2001. We have noted your comments and have included a cultural impact assessment in the Draft Environmental Assessment for the proposed project. In obtaining cultural information on the proposed project corridor, we have consulted with Mr. Leonard "Bully" Kapahulehua, who is a respected member of Halau Maui Nui-o-Kama, an active native cultural organization in Kihei and presently working in partnership with the U.S. Fish and Wildlife Service in identifying native plant, birds and insects in the Kihei area and with the National Oceanic Atmospheric Administration to identify the sea animals along the coast of Kihei. Mr. Kapahulehua is also president of Ke-ie-ie-loko-ia Fishpond in Kalepolepo and a member of Kihei Canoe Club. We have also interviewed Mr. Roy Suda, a long time Kihei resident, to obtain cultural resource perspectives in the vicinity of the proposed project.

A copy of the Draft Environmental Assessment will be provided to your office for review and comment.

Again thank you for your response to the early consultation letter.

Very truly yours,

Mich Hirano, AICP

MH:to
cc: Roy Figueiroa, Makena Resort Corp.
Charles Jencks, WCPT/GW Land Associates
Fred Cajigal, Dept. of Transportation-Highways Division, Maui
Bob Siarot, Dept. of Transportation-Highways Division, Maui
Bert Toba, R. M. Towill Corporation

BENJAMIN J. CAYETANO
GOVERNOR

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

OFFICE OF THE SUPERINTENDENT

DEC 11 2001

PATRICIA HAMAMOTO
INTERIM SUPERINTENDENT

December 7, 2001

Mr. Michael T. Munekiyo
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawai'i 96793

Dear Mr. Munekiyo:

Subject: Interim Piilani Highway
Widening Improvements - Early Consultation

The Department of Education has no comment on the proposed project at this time.

Thank you for the opportunity to respond.

Very truly yours,

Patricia Hamamoto
Interim Superintendent

PH:hy

cc: A. Suga, DAS

DEPARTMENT OF
HOUSING AND HUMAN CONCERNS
COUNTY OF MAUI

NOV 26 2001

JAMES "KIMO" APANA
Mayor
ALICE L. LEE
Director
PRISCILLA P. MIKELI
Deputy Director

200 SOUTH HIGH STREET • WAILUKU, HAWAII 96793 • PHONE (808) 270-7805 • FAX (808) 270-7165

November 20, 2001

Mr. Michael Munekiyo, A.I.C.P.
Project Manager
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Mr. Munekiyo:

Subject: Interim Piilani Highway Widening Improvements,
Mokulele Highway to Kilohana Drive
Project No. 31AB-01-02

We have reviewed your November 12, 2001 letter and enclosures and wish to inform you that we have no comments to offer.

Thank you for the opportunity to comment.

Very truly yours,

ALICE L. LEE
Director

ETO:df

c: Housing Administrator

JAMES "KIMO" APANA
Mayor

JOHN E. MIN
Director

CLAYTON I. YOSHIDA
Deputy Director

NOV 2 6 2001

COUNTY OF MAUI
DEPARTMENT OF PLANNING

November 19, 2001

Mr. Michael T. Munekiyo, AICP
Munekiyo,& Hiraga, Inc.
305 South High Street, Suite 104
Wailuku, Hawaii 96793

Dear Mr. Munekiyo:

RE: Pre-Environmental Assessment Comments for the Proposed Interim Piilani Highway Widening Improvements, Mokulele Highway to Kilohana Drive, Project No. 31AB-01-02

The Maui Planning Department has reviewed the summary for the proposed project and has the following comments to offer:

1. The draft environmental assessment should contain maps and written descriptions of the proposed improvements in relation to the County Special Management Area (SMA) and the existing highway right-of-way.

2. On July 11, 2000, the Maui Planning Commission granted a Special Management Area Use Permit (SM1 2000/0007) to the State DOT as part of proposed improvements to Mokulele Highway which included improvements to the intersection of Mokulele and Piilani Highways. Discuss the relationship between the two projects including the phasing of the various improvements and potential overlaps that may occur during implementation.

We will reserve further comments until we have had the opportunity to review a completed document.

250 SOUTH HIGH STREET, WAILUKU, MAUI, HAWAII 96793
PLANNING DIVISION (808) 270-7735; ZONING DIVISION (808) 270-7253; FACSIMILE (808) 270-7634

Should you have any questions, please contact Ms. Robyn Loudermilk, Staff Planner, of this office at 270-7735.

Very truly yours,

for JOHN E. MIN
Planning Director

JEM:RLL:tlm
c: Clayton I. Yoshida, AICP, Deputy Director of Planning
Robyn L. Loudermilk, Staff Planner
Fred Cajigal, Acting District Engineer, Department of Transportation
Roy Figueiroa, Makena Resort
Charles Jencks, Wailea 670 Associates
General File
K:\WP_DOCS\PLANNING\LETTERS\tr2001\piilani hwy improv\Preeacommnets.wpd

MUNEKIYO & HIRAGA, INC.

January 17, 2002

John E. Min, Director
Department of Planning
2200 Main Street, Suite 335
Wailuku, Hawaii 96793

SUBJECT: Proposed Interim Piilani Highway Widening Improvements, Mokulele Highway to Kilohana Drive, Project No. 31AB-01-02

Dear Mr. Min:

Thank you for your letter of November 19, 2001 providing comments to the early consultation letter on the above subject.

We met with the Department of Planning staff representative, Ms. Robyn Loudermilk, on December 3, 2001 to review the project limits in relation to the Special Management Area boundaries. We understand from this meeting that the County SMA boundaries are makai of the Piilani Highway and the Mokulele Highway right-of-ways. Since all the improvements of the proposed project are within the Piilani Highway right-of-way, we believe the actions are outside of the SMA boundaries. We will, however, provide maps and written descriptions of the proposed improvements in relation to the County SMA boundaries in the Draft Environmental Assessment.

We also note your comments regarding discussion of the relationship between the proposed improvements to Mokulele Highway, including improvements to the Piilani Highway intersection that was reviewed by the Planning Department in May 2000 and the improvements proposed in the Interim Piilani Highway Improvement project. We have requested information from the Department of Transportation on the status and timeframe of the Mokulele Highway proposal in order to incorporate discussion of their relationship in the Draft Environmental Assessment.

Again, thank you for your comments.

Very truly yours,

Mich Hirano, AICP

MH:to
cc: Roy Figueiroa, Makena Resort Corp.
Charles Jencks, Wailea 670 Associates
Fred Cajigal, Dept. of Transportation-Highways Division, Maui
Bob Siarot, Dept. of Transportation-Highways Division, Maui
Bert Toba, R. M. Towill Corporation

DEPARTMENT OF
PARKS AND RECREATION
COUNTY OF MAUI

1580-C KAAHUMANU AVENUE WAILUKU, HAWAII 96793

JAMES "KIMO" APANA
Mayor

FLOYD S. MIYAZONO
Director

ELIZABETH D. MENOR
Deputy Director

(808) 270-7230
FAX (808) 270-7934

NOV 3 0 2001

November 27, 2001

Michael T. Munekiyo, A.I.C.P.
Project Manager
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Mr. Munekiyo:

SUBJECT: Interim Piilani Highway Widening Improvements,
Mokulele Highway to Kilohana Drive, Project No. 31AB-01-02

We have reviewed the proposed improvements to Piilani Highway and are in support of the project.

Thank you for the opportunity to review and comment. Should there be any questions, please contact Mr. Patrick Matsui, Chief of Parks Planning and Development, at 270-7387.

Sincerely,

FLOYD S. MIYAZONO
Director

c: Patrick Matsui, Chief of Planning and Development

NOV 2 6 2001

DEPARTMENT OF WATER SUPPLY
COUNTY OF MAUI
P.O. BOX 1109
WAILUKU, MAUI, HAWAII 96793-6109
Telephone (808) 270-7816 • Fax (808) 270-7833

November 19, 2001

Mr. Michael T. Munekiyo, A.I.C.P.
Munekiyo & Hiraga, Inc.
305 High Street
Wailuku, Hawaii 96793

Subject: Interim Piilani Highway Widening Improvements, Mokulele Highway to Kilohana Drive, Project No. 31AB-01-02

Dear Mr. Munekiyo,

Thank you for the opportunity to provide comments in preparation of the Draft Environmental Assessment.

There are several Department water lines in the project area. Construction plans need to be reviewed by the Department of Water Supply. Water valve covers must be lifted to match the finished grade of the roadway. Enclosed are sections of our water system map pertaining to the project area. Please contact our engineering division at 270-7835 in regard to these issues.

We have attached Best Management Practices (BMPs) for principle operations for your reference. These are designed to minimize infiltration from all construction activities and related vehicle operations. Additional information is available from the State Department of Health.

In order to conserve water resources, we recommend the following measures:

- Use non-potable water, where feasible, for dust control and any irrigation during and after construction.
- Use climate-adapted and salt-tolerant native plants where any roadside landscaping is intended and when revegetating the construction corridors. The project site is located in "Maui County Planting Plan" - Plant Zones 3 and 5. Please refer to the "Maui County Planting Plan", and to the attached documents. Native plants adapted to the area, conserve water and further protect the watershed from degradation due to invasive alien species.

Should you have any questions, please contact the Water Resources Planning Division at 270-7199.

Sincerely,

David Craddick
Director
emb

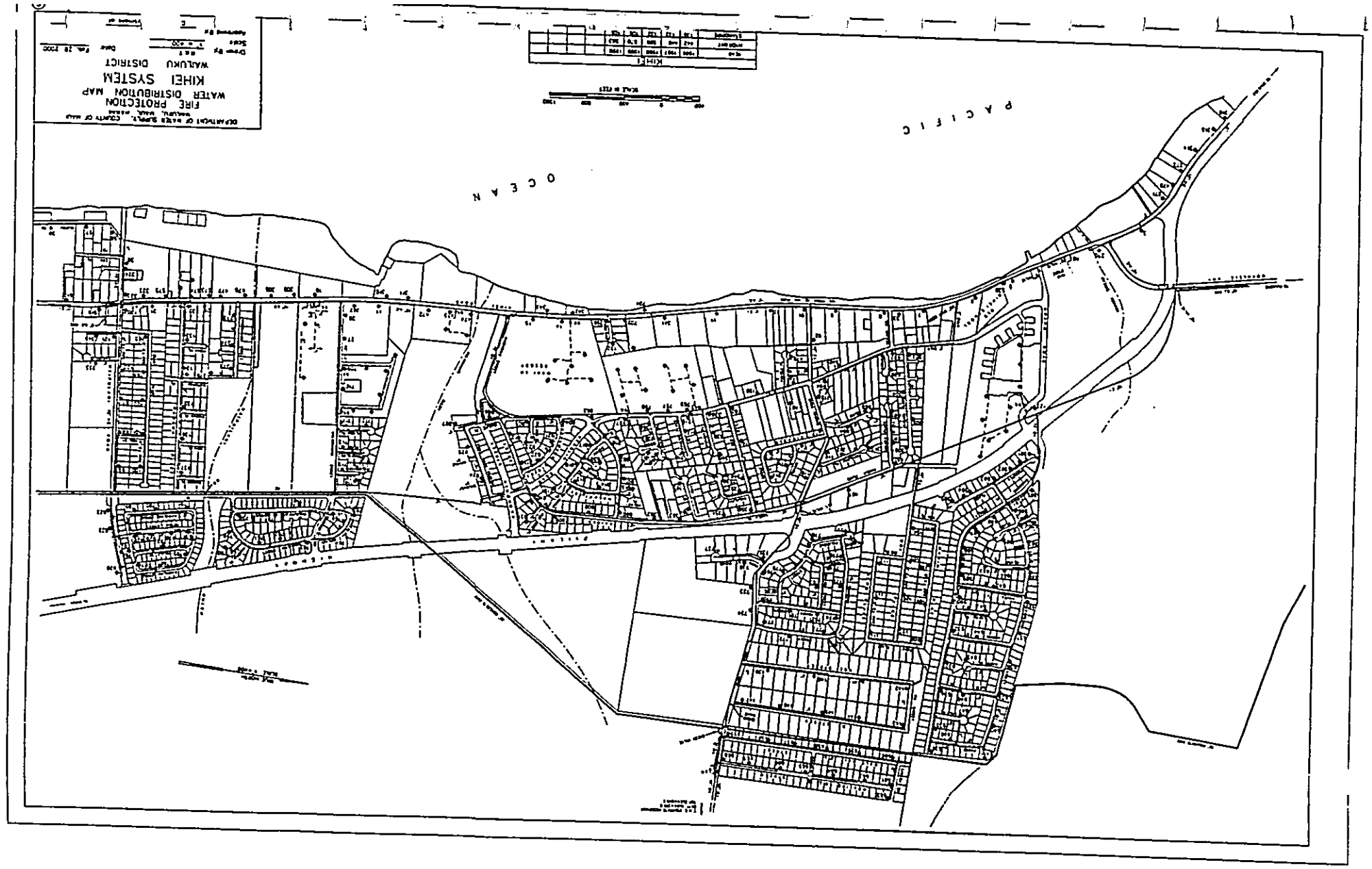
By Water All Things Find Life

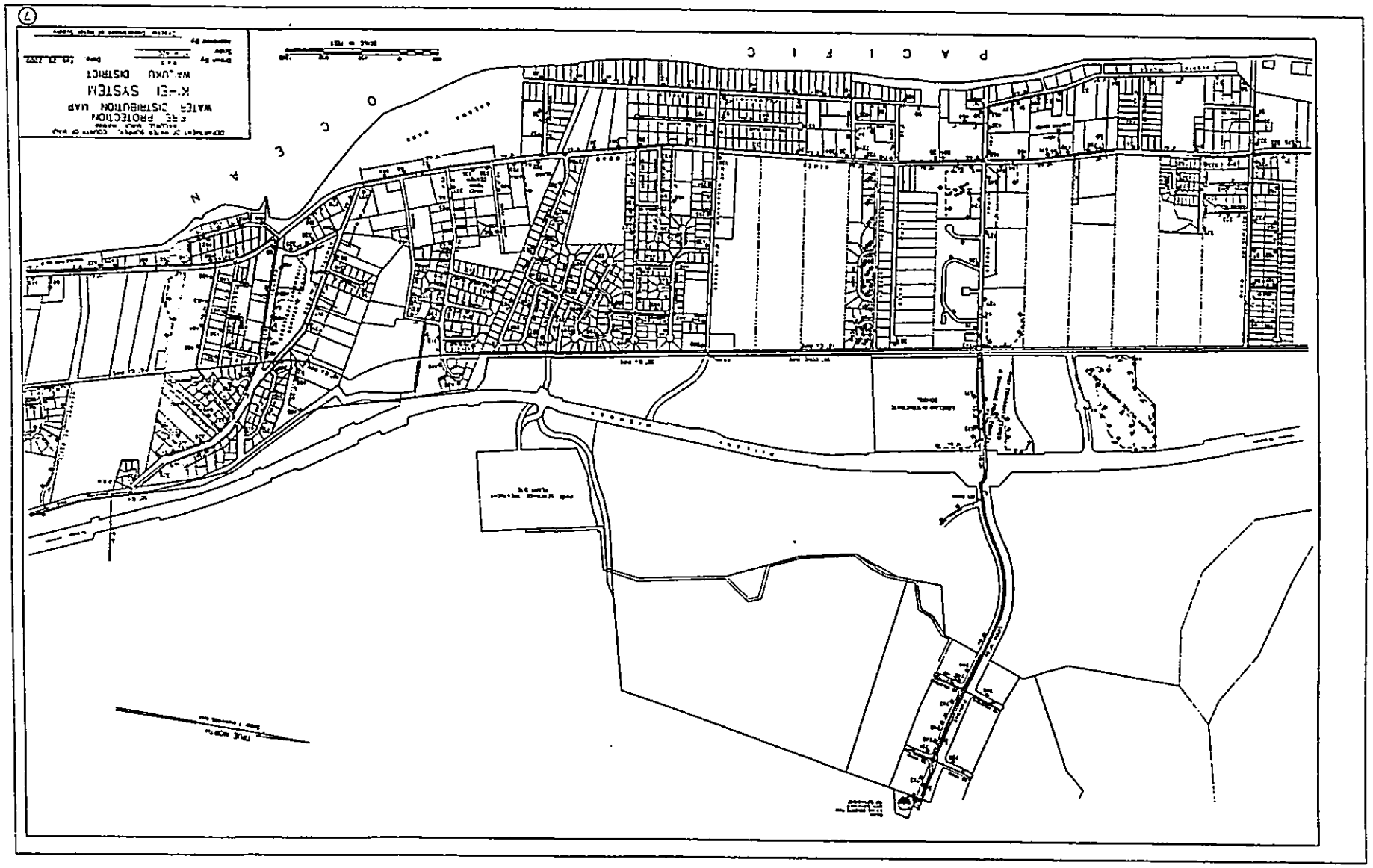
cc: Engineering Division

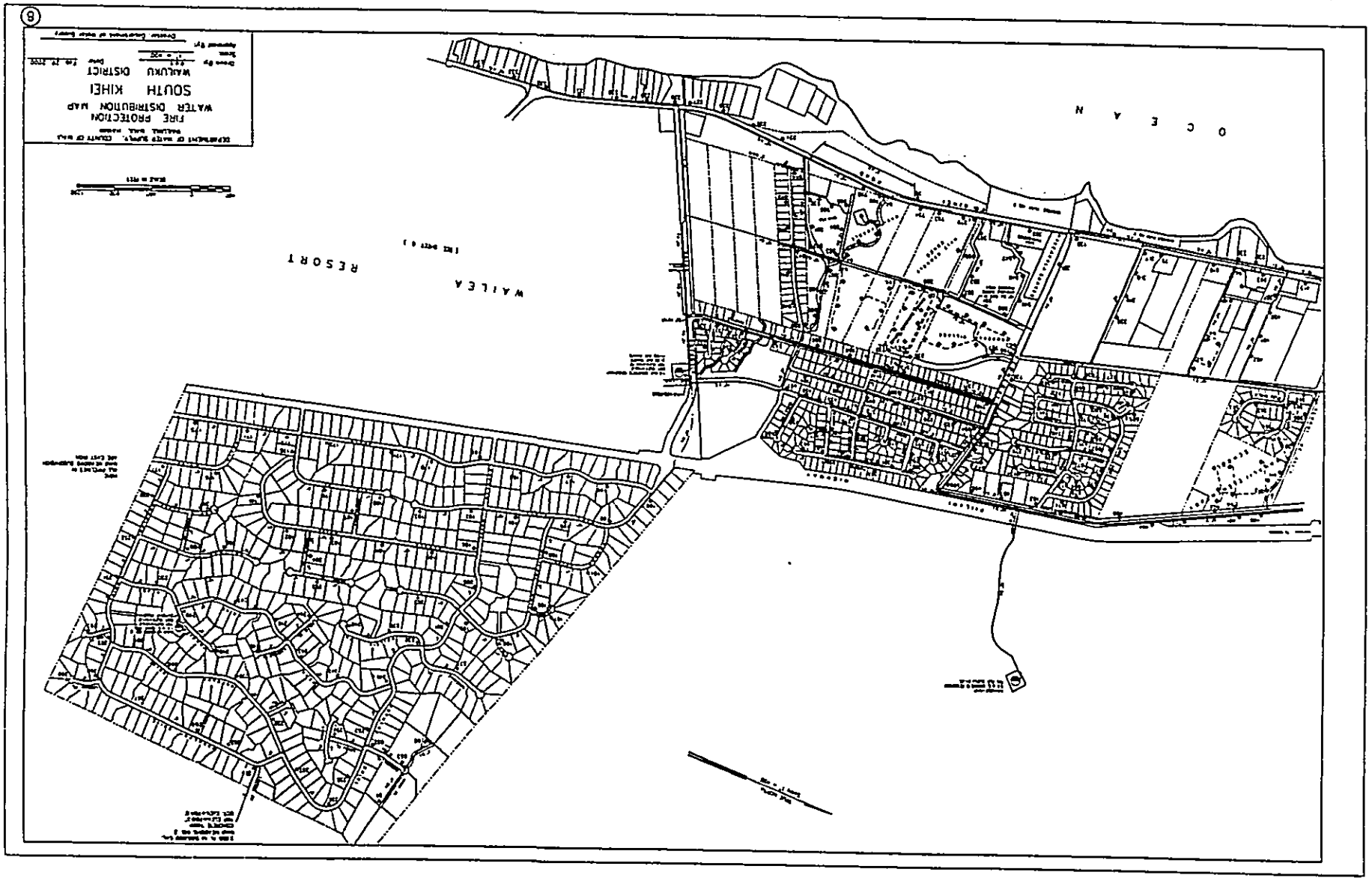
attachments:

1) "Saving Water in the Yard: What & How to Plant in Your Area"
2) Selected BMPs from "Guidance Specifying Management Measures For Sources Of Nonpoint Pollution In Coastal Waters"
3) References for further reading from the "Massachusetts Nonpoint Source Management Manual - The Megamanual"
4) Portions of Department of Water Supply Fire Protection Maps 6 - 8

C:\WPdocs\Permcomm\Interim Piilani Hwy Widening.wpd

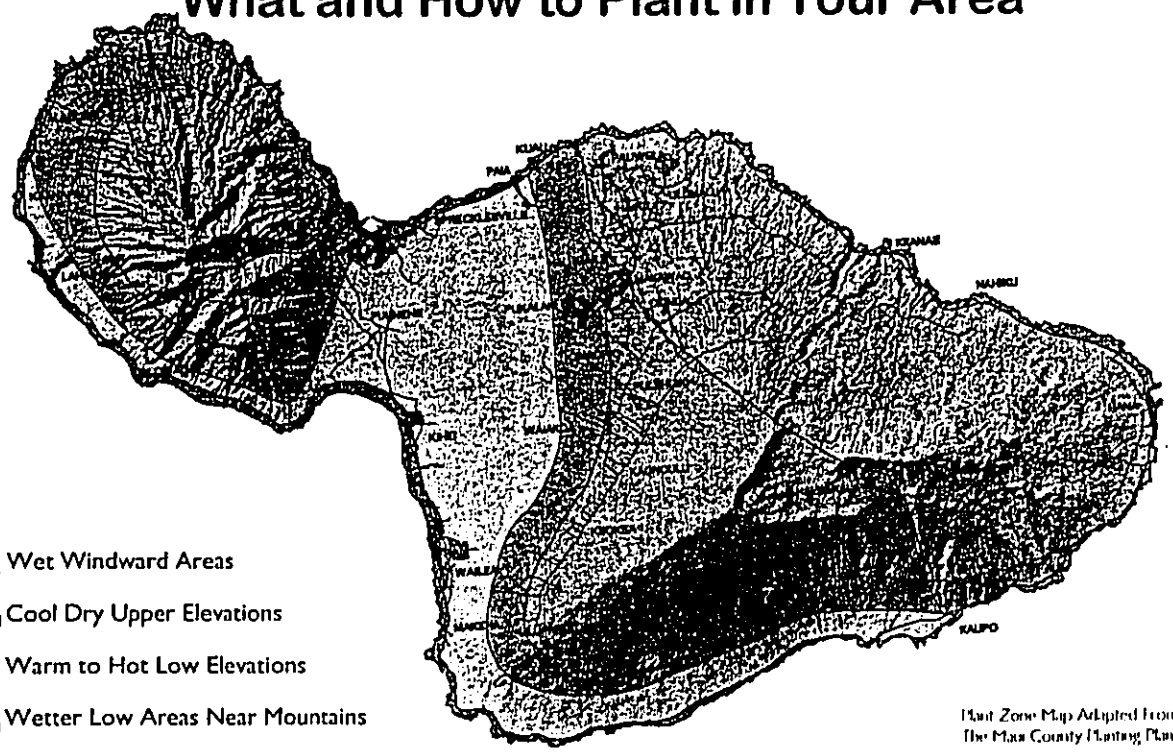






Saving Water in The Yard

What and How to Plant in Your Area



1 Wet Windward Areas

2 Cool Dry Upper Elevations

3 Warm to Hot Low Elevations

4 Wetter Low Areas Near Mountains

5 Windward Coastal Salt Spray Zones

Maui Zone Map Adapted from
The Maui County Planting Plan

Tips From The Maui County Department of Water Supply

By Water All Things Find Life

Selection

As a general rule, it is best to select the largest and healthiest specimens. However, be sure to note that they are not pot-bound. Smaller, younger plants may result in a low rate of plant survival.[1] When selecting native species, consider the site they are to be planted in, and the space that you have to plant. For example: Mountain species such as koa and maile will not grow well in hot coastal areas exposed to strong ocean breezes. Lowland and coastal species such as wiliwili and Kou require abundant sunshine and porus soil. They will not grow well with frequent cloud cover, high rainfall and heavy soil.

Consider too, the size that the species will grow to be. It is not wise to plant trees that will grow too large.[2] Overplanting tends to be a big problem in the landscape due to the underestimation of a species' height, width or spread.

A large, dense canopied tree such as the kukui is a good shade tree for a lawn. However, it's canopy size and density of shade will limit what can be planted in the surrounding area. Shade cast by a koa and ohia lehua is relatively light and will not inhibit growth beneath it.

Keep seasons in mind when you are selecting your plants. Not all plants look good year round, some plants such as ilima will look scraggly after they have flowered and formed seeds. Avoid planting large areas with only one native plant. Mixing plants which naturally grow together will ensure the garden will look good all year round.[3] Looking at natural habitats helps to show how plants grow naturally in the landscape.

When planting an area with a mixed-ecosystem, keep in mind the size and ecological requirements of each plant. Start with the hardiest and most easily grown species, but allow space for fragile ones in subsequent plantings.

Acquiring natives

Plants in their wild habitat must be protected and maintained. It is best and easiest to get your plants from nurseries (see list), or friend's gardens. Obtain proper permits from landowners and make sure you follow a few common sense rules:

- collect sparingly from each plant or area.
- some plants are on the state or Federal Endangered Species list. Make sure you get permits (see app. A,B)

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[1] K. Nagata, P.6

[2] K. Nagata, P.9

[3] Nagata, P.9

Soil

Once you have selected your site and the plants you wish to establish there, you must look at the soil conditions on the site. Proper soil is necessary for the successful growth of most native plants, which preform poorly in hard pan, clay or adobe soils. If natives are to be planted in these types of soil, it would be wise to dig planting holes several times the size of the rootball and backfill with 50-75% compost.[4] A large planting hole ensures the development of a strong root system. The plant will have a headstart before the roots penetrate the surrounding poor soil.[5]

It is recommended that native plants not be planted in ground that is more dense than potting soil. If there is no alternative, dig a hole in a mound of soil mixed with volcanic cinder which encourages maximum root development. Fill the hole with water, if the water tends to puddle or drain too slowly, dig a deeper hole until the water does not puddle longer than 1 or 2 minutes.[6] Well-drained soil is one of the most important things when planting natives as you will see in the next section.

Irrigation

Most natives do very poorly in waterlogged conditions. Do not water if the soil is damp. Water when the soil is dry and the plants are wilting. Once established, a good soaking twice a week should suffice. Deep soaking encourages the development of stronger, and deeper root systems. This is better than frequent and shallow watering which encourage weaker, more shallow root systems.

The following is a watering schedule from Kenneth Nagata's Booklet, *How To Plant A Native Hawaiian Garden*:

WATER REQUIREMENT	WATERING FREQUENCY
Heavy	3x / week
Moderate	2x / week
Light	1x / week

Red clay soils hold more water for a longer period of time than sandy soils do. If your area is very sunny or near a beach, things will dry out faster. Even in the area of one garden, there are parts that will need more or less water. Soils can vary and amount of shade and wind differ. After plants are established (a month or two for most plants, up to a year for some trees), you can back off watering.

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[4] Nagata, p. 6

[5] Nagata, p. 8

[6] Nagata, p. 8

Propagation

There are many ways to propagate and plant-out native Hawaiian species. One of the most thourough and helpful book is Heidi Bornhorst's book, *Growing Native Hawaiian Plants.* The easiest, and best way to obtain natives for the novice gardener is to get them from a reputable nursery (see appendix c). That way all you will have to do is know how to transplant (if necessary) and plant-out when you are ready. These are the two methods I have listed here.

Transplanting

1. Use pots that are one size bigger than the potted plant is in
2. Get your potting medium ready

Good potting medium is a ½, ½ mixture of peat moss and perlite. If the plant is from a dry or coastal area, add chunks of cinder or extra perlite. If it is a wet forest species, add more peat moss or compost. Be aware that peat moss is very acidic and certain plants react severely to acidity.

If the plant is to eventually be planted into the ground, make a mix of equal parts peat moss, perlite, and soil from the area in which the plant is to be planted. Slow-release fertilizer can be mixed into the potting medium.

3. Once pots, potting medium, fertilizer and water are ready, you can begin re-potting.

Keep the plant stem at the same depth it was in the original pot. Avoid putting the plant in too large a pot, as the plant may not be able to soak up all the water in the soil and the roots may drown and rot.

Mix potting medium and add slow-release fertilizer at this time. Pre-wet the medium to keep dust down and lessen shock to the plant. Put medium in bottom of pot. Measure for the correct depth in the new pot. Make sure there is from ½ to 2 inches from the top of the pot so the plant can get adequate water. Try to stand the plant upright and center the stem in the middle of the pot.

Water the plant thoroughly after transplanting. A vitamin B-1 transplanting solution can help to lessen the transplant shock. Keep the plant in the same type of environment as it was before, sun or shade. If roots were broken, trimm off some of the leaves to compensate for the loss.[5]

Planting out

1. Plant most native Hawaiian plants in a sunny location in soil that is well-drained.
2. Make the planting hole twice as wide as the root ball or present pot, and just as deep.

If the soil is clay-like, and drains slowly, mix in some coarse red or bland cinder, coarse perlite or

[5] Bornhorst, p.20-21

Automatic sprinkler systems are expensive to install and must be checked and adjusted regularly. Above-ground systems allow you to monitor how much water is being put out, but you lose a lot due to malfunctioning of sprinkler heads and wind. The most efficient way to save water and make sure your plants get enough water, is to hand-water. This way you are getting our precious water to the right places in the right amounts.[7]

Fertilizer

An all-purpose fertilizer 10-10-10 is adequate for most species. They should be applied at planting time, 3 months later, and 6 months thereafter. Use half the dosage recommended for ornamentals and pay special attention to native ferns which are sensitive to strong fertilizers. Use of organic composts and aged animal manures is suggested instead of chemical fertilizers. In addition, use of cinders for providing trace minerals is strongly recommended.[6]

Natives are plants which were here hundreds of years before the polynesians inhabited the Hawaiian Islands. They were brought here by birds, or survived the harsh ocean conditions to float here. They are well-adapted to Hawaii's varying soil and environmental conditions. This is why they make prime specimens for a xeriscape garden. However, natives will not thrive on their own, especially under harsh conditions. On the other hand, like any other plant, if you over-water and over-fertilize them, they will die. Follow the instructions given to you by the nursery you buy the plant from, or from this booklet. Better yet, buy a book (suggested readings can be found in the bibliography in the back of this pamphlet), read it, and learn more about native plants. I guarantee that you will be pleased with the results.

[7] Bornhorst, p. 19-20

[6] Nagata, p. 6

coarse compost. Place some slow-release fertilizer at the bottom of the hole.

3. Carefully remove the plant from the container and place it in the hole.

The top of the soil should be at the same level as the top of the hole, if it is too high or too low, adjust the soil level so that the plant is at the right depth.

4. Water thoroughly after you transplant.

Mulch

Most natives cannot compete with weeds, and therefore must be weeded around constantly in order to thrive. Mulch is a practical alternative, which discourages and prevents weeds from growing.

Hawaii's hot, humid climate leads to the breaking down of organic mulches. Thick organic mulches such as wood chips and leaves, may also be hiding places for pests.

Stone mulches are attractive, permanent and can help to improve soil quality. Red or black cinder, blue rock chips, smooth river rocks and coral chips are some natural choices.[10] Macadamia nut hulls are also easy to find and can make a nice mulch.[11]

Never pile up mulch right next to the stem or trunk of a plant, keep it a few inches away.

[10] Bornhorst, p. 24

[11] Nagata, p. 7

PLACES TO SEE NATIVES ON:

The following places propagate native Hawaiian plants from seeds and/or cuttings. Their purpose is to protect and preserve these native plants. Please contact them before going to view the sites, they can provide valuable information and referral to other sources.

Maui:

1. Hoolawa Farms, P.O. Box 731, Haiku, Hawaii, 96708	572-4835
2. The Hawaiian Collection, 1127 Manu St., Kula, Hawaii, 96790	878-1701
3. Kula Botanical Gardens, RR 4, Box 228, Kula, Hawaii, 96790	878-1715
4. Maui Botanical Gardens, Kanaloa Avenue across from stadium	243-7337
5. Kula Forest Reserve, access road at the end of Waipouli Rd. Call the Maui District Forester	984-8100
6. Wailea Point, Private Condominium residence, 4000 Wailea Alanui, public access points at Four Seasons Resort or Polo Beach	875-9557
7. Kahanu Gardens, National Tropical Botanical Garden, Alau Pl, Hana, Hawaii, 96713	248-8912
9. Kahului Library Courtyard, 20 School Street, Kahului, Hawaii	873-3097

ZONES

The Maui County Planting Plan has compiled a system of 5 zones of plant growth for Maui County. The descriptions of zones and maps for these zones are as follows:

Zone 1:
Wet areas on the windward side of the island. More than 40 inches of rain per year. Higher than 3,000 feet.

Zone 2:
Cool, dry areas in higher elevations (above 1,000 feet). 20 to 40 inches of rain per year.

Zone 3:
Low, drier areas, warm to hot. Less than 20 inches of rain per year. Sea level to 1,000 feet.

Zone 4:
Lower elevations which are wetter due to proximity of mountains. 1,000 to 3,000 feet.

Zone 5:
Salt spray zones in coastal areas on the windward side.

These zones are to be used as a general guide to planting for Maui County. In addition to looking at the maps, read the descriptions of the zones and decide which zone best fits your area. Plants can be listed in more than one zone and can be planted in a variety of conditions. For best results, take notes on the rainfall, wind, sun and salt conditions of your site. Use the zones as a general guide for selection and read about the plants to decide which best fits your needs as far as care and or function.

PLACES TO BUY NATIVES ON:

Maui:

1. Hoolawa Farms, P.O. Box 731, Haiku, Hawaii, 96708 — 572-4835
   The largest and best collection of natives in the state
   They will deliver, but it's worth the drive to go and see!
   Will propagate upon request
2. Kula True Value Nursery — 878-2557
   Many natives in stock
   Get most of their plants from Hoolawa farms
   They take special requests
3. Kihei Garden and Landscape — 244-3804
4. Maui Garden and Hardware — 877-0447
   Will bring in special orders
5. Kihana Nursery, Kihei — 879-1165
6. Pukalani Plant Company, Jimmy Jones — 572-8950
   Commercial wholesale only
7. The Hawaiian Collection
   Specialize in Sandalwood propagation — 878-1701
   Will propagate special requests

Zone-specific Native and Polynesian plants for Maui County

Zone 3

Type	Scientific Name	Common Name	Height	Spread	Elevation	Water req.
Sh	Argemone glauca var. deciplens	pua kala	3'	2'	sea to 3,000'	Dry to Medium
Sh	Bidens mauiensis	ko'oko'olau	1'	3'	sea to 1,000'	Dry to Medium
Sh	Bidens menziesii ssp. menziesii	ko'oko'olau	1'	3'		
Sh	Bidens micrantha ssp. micrantha	ko'oko'olau	1'	3'		
Sh	Chenopodium oahuense	'aheahea, 'aweoweo	6'		sea to higher	Dry to Medium
Sh	Dubautia sandwicensis	'ükl	2'	2'	1,000' to higher	Dry to Medium
Sh	Gossypium tomentosum	mao, Hawaiian cotton	5'	8'	sea to 1,000'	Dry to Medium
Sh	Hedyotis spp.	au, pilo	3'	2'	1,000' to 3,000'	Dry to Wet
Sh	Lipochaeta lavarum	nehe	3'	3'	sea to 3,000'	Dry to Medium
Sh	Osteomeles anthyllidifolia	'ulei, eluehe	4'	6'	sea to 3,000'	Dry to Medium
Sh	Scaevola sericea	naupaka, naupaka-kahakai	6'	8'	sea to 1,000'	Dry to Medium
Sh	Senna gaudichaudii	kolomana	5'	5'	sea to 3,000'	Dry to Medium
Sh	Solanum nelsonii	'akia, beach solanum	3'	3'	sea to 1,00'	Dry to Medium
Sh	Styphelia tameiameiae	pukiawe	6'	6'	1,000' to higher	Dry to Medium
Sh	Vitex rotundifolia	pohinahina	3'	4'	sea to 1,000'	Dry to Medium
Sh	Wikstroemia uva-ursi kaualensis kaualensis	'akia, Molokai osmanthus				
Sh - Tr	Broussonetia papyrifera	wauke, paper mulberry	8'	6'	sea to 1,000'	Dry to Medium
Sh - Tr	Myoporum sandwicense	naio, false sandalwood	10'	10'	sea to higher	Dry to Medium
Sh - Tr	Nototrichium sandwicense	kului	8'	8'	sea to 3,000'	Dry to Medium
Sh-Tr	Dodonaea viscosa	'a'ali'i	6'	8'	sea to higher	Dry to Medium
Tr	Aleurites moluccana	candlenut, kukui	50'	50'	sea to 3,000'	Medium to Wet
Tr	Calophyllum inophyllum	kamani, alexandrian laurel	60'	40'	sea to 3,000'	Medium to Wet
Tr	Canthium odoratum	Alahe'e, 'ohe'e, walahe'e	12'	8'	sea to 3,000'	Dry to Medium
Tr	Cordia subcordata	kou	30'	25'	sea to 1,000'	Dry to Wet
Tr	Diospyros sandwicensis	lama	12'	15'	sea to 3,000'	Dry to Medium
Tr	Erythrina sandwicensis	wiliwili	20'	20'	sea to 1,000'	Dry
Tr	Metrosideros polymorpha var. macrophylla	ohi'a lehua	25'	25'	sea to 1,000'	Dry to Wet

Zone-specific Native and Polynesian plants for Maui County

Zone 3

TYPE: F Fern G Grass Gr Ground Cover Sh Shrub P Palm S Sedge Tr Tree V Vine

Type	Scientific Name	Common Name	Height	Spread	Elevation	Water req.
F	Psilotum nudum	moa, moa kula	1'	1'	sea to 3,000'	Dry to Wet
G	Colubrina asiatica	'anapanapa	3'	10'	sea to 1,000'	Dry to Wet
G	Eragrostis monticola	kalamalo	1'	2'	sea to 3,000'	Dry to Medium
G	Eragrostis variabilis	'emo-loa	1'	2'	sea to 3,000'	Dry to Medium
G	Fimbristylis cymosa ssp. spathacea	mau'u'aki'aki fimbristylis	0.5'	1'	sea to 1,000'	Dry to Medium
Gr	Boerhavia repens	alena	0.5'	4'	sea to 1,000'	Dry to Medium
Gr	Chamaesyce celastroides var. laehiensis	'akoko	2'	3'	sea to 1,000'	Dry to Medium
Gr	Cressa truxillensis	cressa	0.5'	1'	sea to 1,000'	Dry to Medium
Gr	Heliotropium anomalum var. argenteum	hinahina ku kahakai	1'	2'	sea to 1,000'	Dry to Medium
Gr	Ipomoea tuboides	Hawaiian moon flower, 'uala	1'	10'	sea to 3,000'	Dry to Medium
Gr	Jacquemontia ovalifolia ssp. sandwicensis	pa'u o hi'iaka	0.5'	6'	sea to 1,000'	Dry to Medium
Gr	Lipochaeta integrifolia	nehe	1'	5'	sea to 1,00'	Dry to Medium
Gr	Peperomia leptostachya	'ala'ala-wai-nui	1'	1'	sea to 3,000'	Dry to Medium
Gr	Plumbago zeylanica	'ilie'e	1'			
Gr	Sesuvium portulacastrum	'akulikuli, sea-purslane	0.5'	2'	sea to 1,000'	Dry to Wet
Gr	Sida fallax	'ilima	0.5'	3'	sea to 1,000'	Dry to Medium
Gr	Tephrosia purpurea var. purpurea	'auhuhu	2'	2'	sea to 1,000'	Dry to Medium
Gr - Sh	Hibiscus calyphyllus	ma'o hau hele, Rock's hibiscus	3'	2'	sea to 3,000'	Dry to Medium
Gr - Sh	Lipochaeta rockii	nehe	2'	2'	sea to 3,000'	Dry to Medium
Gr - Sh	Lipochaeta succulenta	nehe	2'	5'	sea to 1,000'	Dry to Wet
Gr - Sh	Lycium sandwicense	'ohelo-kai, 'ae'ae	2'	2'	sea to 1,000'	Dry to Medium
P	Cocos nucifera	coconut, niu	100'	30'	sea to 1,000'	Dry to Wet
P	Pritchardia hillebrandii	lo'ulu, fan palm	25'	15'	sea to 1,000'	Dry to Wet
S	Mariscus javanicus	marsh cypress, 'ahu'awa	0.5'	0.5'	sea to 1,000'	Dry to Medium

Zone-specific Native and Polynesian plants for Maui County

Zone 3

Type	Scientific Name	Common Name	Height	Spread	Elevation	Water req.
Tr	Morinda citrifolia	indian mulberry, noni	20'	15'	sea to 1,000'	Dry to Wet
Tr	Nesoluma polynesicum	keahi	15'	15'	sea to 3,00'	Dry
Tr	Nestegis sandwicensis	olopua	15'	15'	1,000' to 3,000'	Dry to Medium
Tr	Pandanus tectorius	hala, puhala (HALELIST)	35'	25'	sea to 1,000'	Dry to Wet
Tr	Pleomele auwahiensis	halapepe	20'			
Tr	Rauvolfia sandwicensis	hao	20'	15'	sea to 3,000'	Dry to Medium
Tr	Reynoldsia sandwicensis	'ohe makai	20'	20'	1,000' to 3,000'	Dry
Tr	Santalum ellipticum	coastal sandalwood, 'ili-ahi	8'	8'	sea to 3,000'	Dry to Medium
Tr	Thespesia populnea	milo	30'	30'	sea to 3,000'	Dry to Wet

Zone-specific Native and Polynesian plants for Maui County

Zone 5

Type	Scientific Name	Common Name	Height	Spread	Elevation	Water req.
Sh	Hedyotis spp.	au, pilo	3'	2'	1,000' to 3,000'	Dry to Wet
Sh	Lipochaeta lavarum	nehe	3'	3'	sea to 3,000'	Dry to Medium
Sh	Osteomeles anthyllidifolia	'ulei, eluehe	4'	6'	sea to 3,000'	Dry to Medium
Sh	Scaevola sericea	naupaka, naupaka-kahakai	6'	8'	sea to 1,000'	Dry to Medium
Sh	Senna gaudichaudii	kolomana	5'	5'	sea to 3,000'	Dry to Medium
Sh	Solanum nelsonii	'akia, beach solanum	3'	3'	sea to 1,00'	Dry to Medium
Sh	Vitex rotundifolia	pohinahina	3'	4'	sea to 1,000'	Dry to Medium
Sh	Wikstroemia uva-ursi kauaiensis kauaiensis	'akia, Molokai osmanthus				
Sh - Tr	Myoporum sandwicense	naio, false sandalwood	10'	10'	sea to higher	Dry to Medium
Sh-Tr	Dodonaea viscosa	'a'ali'i	6'	8'	sea to higher	Dry to Medium
Tr	Aleurites moluccana	candlenut, kukui	50'	50'	sea to 3,000'	Medium to Wet
Tr	Calophyllum inophyllum	kamani, alexandrian laurel	60'	40'	sea to 3,000'	Medium to Wet
Tr	Cordia subcordata	kou	30'	25'	sea to 1,000'	Dry to Wet
Tr	Hibiscus furcellatus	'aklohala, hau-hele	8'			
Tr	Morinda citrifolia	Indian mulberry, noni	20'	15'	sea to 1,000'	Dry to Wet
Tr	Pandanus tectorius	hala, puhala (HALELIST)	35'	25'	sea to 1,000'	Dry to Wet
Tr	Thespesia populnea	milo	30'	30'	sea to 3,000'	Dry to Wet
V	Ipomoea pes-caprae	beach morning glory, pohuehue	1'			

Zone-specific Native and Polynesian plants for Maui County

Zone 5

TYPE: F Fern G Grass Gr Ground Cover Sh Shrub P Palm S Sedge Tr Tree V Vine

Type	Scientific Name	Common Name	Height	Spread	Elevation	Water req.
G	Colubrina asiatica	'anapanapa	3'	10'	sea to 1,000'	Dry to Wet
G	Eragrostis variabilis	'emo-loa	1'	2'	sea to 3,000'	Dry to Medium
G	Fimbristylis cymosa ssp. spathacea	mau'u'aki'aki fimbristylis	0.5'	1'	sea to 1,000'	Dry to Medium
Gr	Boerhavia repens	alena	0.5'	4'	sea to 1,000'	Dry to Medium
Gr	Chamaesyce celastroides var. laehiensis	'akoko	2'	3'	sea to 1,000'	Dry to Medium
Gr	Cressa truxillensis	cressa	0.5'	1'	sea to 1,000'	Dry to Medium
Gr	Heliotropium anomalum var. argenteum	hinahina ku kahakai	1'	2'	sea to 1,000'	Dry to Medium
Gr	Jacquemontia ovalifolia ssp. sandwicensis	pa'u o hi'iaka	0.5'	6'	sea to 1,000'	Dry to Medium
Gr	Lipochaeta integrifolia	nehe	1'	5'	sea to 1,00'	Dry to Medium
Gr	Sesuvium portulacastrum	'akulikuli, sea-purslane	0.5'	2'	sea to 1,000'	Dry to Wet
Gr	Sida fallax	'ilima	0.5'	3'	sea to 1,000'	Dry to Medium
Gr	Tephrosia purpurea var. purpurea	'auhuhu	2'	2'	sea to 1,000'	Dry to Medium
Gr - Sh	Hibiscus calyphyllus	ma'o hau hele, Rock's hibiscus	3'	2'	sea to 3,000'	Dry to Medium
Gr - Sh	Lycium sandwicense	'ohelo-kai, 'ae'ae	2'	2'	sea to 1,000'	Dry to Medium
P	Cocos nucifera	coconut, niu	100'	30'	sea to 1,000'	Dry to Wet
P	Pritchardia hillebrandii	lo'ulu, fan palm	25'	15'	sea to 1,000'	Dry to Wet
S	Mariscus javanicus	marsh cypress, 'ahu'awa	0.5'	0.5'	sea to 1,000'	Dry to Medium
Sh	Argemone glauca var. decipiens	pua kala	3'	2'	sea to 3,000'	Dry to Medium
Sh	Artemisia australis	'ahinahina	2'	3'	sea to 3,000'	Dry to Medium
Sh	Bidens hillebrandiana ssp. hillebrandiana	ko'oko'olau	1'	2'	sea to 1,000'	Dry to Wet
Sh	Bidens mauiensis	ko'oko'olau	1'	3'	sea to 1,000'	Dry to Medium
Sh	Chenopodium oahuense	'aheahea, 'aweoweo	6'		sea to higher	Dry to Medium
Sh	Dianella sandwicensis	'uki	2'	2'	1,000' to higher	Dry to Medium
Sh	Gossypium tomentosum	mao, Hawaiian cotton	5'	8'	sea to 1,000'	Dry to Medium

DO NOT PLANT THESE PLANTS !!!

Common name	Scientific name	Plant family
	Jasminum fluminense	Oleaceae
	Arthrostema ciliatum	Melastomataceae
	Dissotis rotundifolia	Melastomataceae
	Erigeron karvinskianus	Asteraceae
	Eucalyptus robusta	Myrtaceae
	Hedychium gardnerianum	Zingiberaceae
	Juncus planifolius	Juncaceae
	Lophostemon confertus	Myrtaceae
	Medinilla cumingii	Melastomataceae
	Medinilla magnifica	Melastomataceae
	Medinilla venosa	Melastomataceae
	Melastoma candidum	Melastomataceae
	Melinis minutiflora	Poaceae
	Olea europaea	
	Oxyspora paniculata	Melastomataceae
	Panicum maximum	Poaceae
	Paspalum urvillei	Poaceae
	Passiflora edulis	Passifloraceae
	Phormium tenax	Agavaceae
	Pinus taeda	Pinaceae
	Prosopis pallida	Fabaceae
	Pterolepis glomerata	Melastomataceae
	Rhodomyrtus tomentosa	Myrtaceae
	Schefflera actinophylla	Araliaceae
	Syzygium jambos	Myrtaceae
Australian blackwood	Acacia melanoxylon	Mimosaceae
Australian tree fern	Cyathea cooperi	Cyatheaceae
Australian tree fern	Sphaeropteris cooperi	Cyatheaceae
Beggar's tick, Spanish needle	Bidens pilosa	Asteraceae
California grass	Brachiaria mutica	Poaceae
Chinese banyon, Maylayan banyon	Ficus microcarpa	Moraceae
Chinese violet	Asystasia gangetica	Acanthaceae
Christmasberry, Brazilian pepper	Schinus terebinthifolius	Anacardiaceae
Formosan koa	Acacia confusa	Mimosaceae
German ivy	Senecio mikanioides	Asteraceae
Japanese honeysuckle	Lonicera japonica	Caprifoliaceae
Koster's curse	Clidemia hirta	Melastomataceae
Lantana	Lantana camara	Verbenaceae
Mauritius hemp	Furcraea foetida	Agavaceae
Mexican ash, tropical ash	Fraxinus uhdei	Oleaceae
Mexican tulip poppy	Hunnemannia fumariifolia	Papaveraceae
Mules foot, Madagascar tree fern	Angiopteris evecta	Marattiaceae
New Zealand laurel, karakaranui	Corynocarpus laevigatus	Corynocarpaceae
New Zealand tea	Leptospermum scoparium	Myrtaceae
Pampas grass	Cortaderia jubata	Poaceae
Panama rubber tree, Mexican rubber tree	Castilloa elastica	Moraceae
Shoebutton ardisia	Ardisia elliptica	Myrsinaceae
banana poka	Passiflora mollissima	Passifloraceae

DO NOT PLANT THESE PLANTS !!!

Common name	Scientific name	Plant family
black wattle	Acacia mearnsii	Mimosaceae
blackberry	Rubus argutus	Rosaceae
blue gum	Eucalyptus globulus	Myrtaceae
bocconia	Bocconia frutescens	Papaveraceae
broad-leaved cordia	Cordia glabra	Boraginaceae
broomsedge, yellow bluestem	Andropogon virginicus	Poaceae
buffelgrass	Cenchrus ciliaris	Poaceae
butterfly bush, smoke bush	Buddleja madagascariensis	Buddlejaceae
cats claw, Mysore thorn, wait-a-bit	Caesalpinia decapetala	Caesalpiniaceae
common ironwood	Casuarina equisetifolia	Casuarinaceae
common velvet grass, Yorkshire fog	Holcus lanatus	Poaceae
fiddlewood	Citharexylum spinosum	Verbenaceae
fire tree, faya tree	Myrica faya	Myricaceae
glorybower	Clerodendrum laponicum	Verbenaceae
hairy cat's ear, gosmore	Hypochoeris radicata	Asteraceae
haole koa	Leucaena leucocephala	Fabaceae
ivy gourd, scarlet-fruited gourd	Coccinia grandis	Cucurbitaceae
juniper berry	Citharexylum caudatum	Verbenaceae
kahili flower	Grevillea banksii	Proteaceae
klu, popinac	Acacia farnesiana	Mimosaceae
logwood, bloodwood tree	Haematoxylon campechianum	Caesalpiniaceae
loquat	Eriobotrya japonica	Rosaceae
meadow ricegrass	Ehrharta stipoides	Poaceae
melaleuca	Melaleuca quinquenervia	Myrtaceae
miconia, velvet leaf	Miconia calvescens	Melastomataceae
narrow-leaved carpetgrass	Axonopus fissifolius	Poaceae
oleaster	Elaeagnus umbellata	Elaeagnaceae
oriental mangrove	Bruguiera gymnorrhiza	Rhizophoraceae
padang cassia	Cinnamomum burmanni	Lauraceae
palmgrass	Setaria palmifolia	Poaceae
pearl flower	Heterocentron subtriplinervium	Melastomataceae
quinine tree	Cinchona pubescens	Rubiaceae
satin leaf, caimitillo	Chrysophyllum oliviforme	Sapotaceae
silkwood, Queensland maple	Flindersia brayleyana	Rutaceae
silky oak, silver oak	Grevillea robusta	Proteaceae
strawberry guava	Psidium cattleianum	Myrtaceae
swamp oak, saltmarsh, longleaf ironwood	Casuarina glauca	Casuarinaceae
sweet vernalgrass	Anthoxanthum odoratum	Poaceae
tree of heaven	Ailanthus altissima	Simaroubaceae
trumpet tree, guarumo	Cecropia obtusifolia	Cecropiaceae
white ginger	Hedychium coronarium	Zingiberaceae
white mahoe	Hibiscus popayanensis	Tiliaceae
yellow ginger	Hedychium flavescens	Zingiberaceae

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Guidance Specifying Management Measures For Sources Of Nonpoint Pollution In Coastal Waters

Issued Under the Authority of
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VII. ROADS, HIGHWAYS, AND BRIDGES

NOTE: Management Measures II.A and II.B of this chapter also apply to planning, siting, and developing roads and highways.[6]

A. Management Measure for Planning, Siting, and Developing Roads and Highways.

Plan, site, and develop roads and highways to:

(1) Protect areas that provide important water quality benefits or are particularly susceptible to erosion or sediment loss;

(2) Limit land disturbance such as clearing and grading and cut and fill to reduce erosion and sediment loss; and

(3) Limit disturbance of natural drainage features and vegetation.

1. Applicability

This measure is intended to be applied by States to site development and land disturbing activities for new, relocated, and reconstructed (widened) roads (including residential streets) and highways in order to reduce the generation of nonpoint source pollutants and to mitigate the impacts of urban runoff and associated pollutants from such activities. Under the Coastal Zone Act Reauthorization Amendments of 1990, States are subject to a number of requirements as they develop coastal NPS programs in conformity with this management measure and will have some flexibility in doing so. The application of management measures by States is described more fully in *Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance*, published jointly by the U.S. Environmental Protection Agency (EPA) and the National Oceanic and Atmospheric Administration (NOAA) of the U.S. Department of Commerce.

2. Description

The best time to address control of NPS pollution from roads and highways is during the initial planning and design phase. New roads and highways should be located with consideration of natural drainage patterns and planned to avoid encroachment on surface waters and wet areas. Where this is not possible, appropriate controls will be needed to minimize the impacts of NPS runoff on surface waters.

This management measure emphasizes the importance of planning to identify potential NPS problems early in the design process. This process involves a detailed analysis of environmental features most associated with NPS pollution, erosion and sediment problems such as topography, drainage patterns, soils, climate, existing land use, estimated traffic volume, and sensitive land areas. Highway locations selected, planned, and designed with consideration of these features will greatly minimize erosion and sedimentation and prevent NPS pollutants from entering watercourses during and after construction. An important consideration in planning is the distance between

[6] Management measure II.A applies only to runoff that emanates from the road, highway, and bridge right-of-way. This management measure does not apply to runoff and total suspended solid loadings from upland areas outside the road, highway, or bridge project.

a highway and a watercourse that is needed to buffer the runoff flow and prevent potential contaminants from entering surface waters. Other design elements such as project alignment, gradient, cross section, and the number of stream crossings also must be taken into account to achieve successful control of erosion and nonpoint sources of pollution. (Refer to Chapter 3 of this guidance for details on road designs for different terrains.)

The following case study illustrates some of the problems and associated costs that may occur due to poor road construction and design. These issues should be addressed in the planning and design phase.

CASE STUDY - ANNAPOLIS, MARYLAND

Poor road siting and design resulted in concentrated runoff flows and heavy erosion that threatened several house foundations adjacent to the road. Sediment-laden runoff was also discharged into Herring Bay. To protect the Chesapeake Bay and the nearby houses, the county corrected the problem by installing diversions, a curb-and-drain urban runoff conveyance, and a rock wall filtration system, at a total cost of $100,000 (Munsey, 1992).

3. Management Measure Selection

This management measure was selected because it follows the approach to highway development recommended by the American Association of State Highway and Transportation Officials (AASHTO), Federal Highway Administration (FHWA) guidance, and highway location and design guidelines used by the States of Virginia, Maryland, Washington, and others.

Additionally, AASHTO has location and design guidelines (AASHTO, 1990, 1991) available for State highway agency use that describe the considerations necessary to control erosion and highway-related pollutants. Federal Highway Administration policy (FHWA, 1991) requires that Federal-aid highway projects and highways constructed under direct supervision of the FHWA be located, designed, constructed, and operated according to standards that will minimize erosion and sediment damage to the highway and adjacent properties and abate pollution of surface water and ground-water resources.

4. Practices

As discussed more fully at the beginning of this chapter and in Chapter 1, the following practices are described for illustrative purposes only. State programs need not require implementation of these practices. However, as a practical matter, EPA anticipates that the management measure set forth above generally will be implemented by applying one or more management practices appropriate to the source, location, and climate. The practices set forth below have been found by EPA to be representative of the types of practices that can be applied successfully to achieve the management measure described above.

a. *Consider type and location of permanent erosion and sediment controls (e.g., vegetated filter strips, grassed swales, pond systems, infiltration systems, constructed urban runoff wetlands, and energy dissipators and velocity controls) during the planning phase of roads, highway, and bridges. (AASHTO, 1991; Hartigan et al., 1989)*

b. *All wetlands that are within the highway corridor and that cannot be avoided should be mitigated. These actions will be subject to Federal Clean Water Act section 404 requirements and State regulations.*

c. *Assess and establish adequate setback distances near wetlands, waterbodies, and riparian areas to ensure protection from encroachment in the vicinity of these areas.*

Setback distances should be determined on a site-specific basis since several variables may be involved such as topography, soils, floodplains, cut-and-fill slopes, and design geometry. In level or gently sloping terrain, a general rule of thumb is to establish a setback of 50 to 100 feet from the edge of the wetland or riparian area and the right-of-way. In areas of steeply sloping terrain (20 percent or greater), setbacks of 100 feet or more are recommended. Right-of-way setbacks from major waterbodies (oceans, lakes, estuaries, rivers) should be in excess of 100 to 1000 feet.

d. *Avoid locations requiring excessive cut and fill. (AASHTO, 1991)*

e. *Avoid locations subject to subsidence, sink holes, landslides, rock outcroppings, and highly erodible soils. (AASHTO, 1991; TRB, Campbell, 1988)*

f. *Size rights-of-way to include space for siting runoff pollution control structures as appropriate. (AASHTO, 1991; Hartigan, et al., 1989)*

Erosion and sediment control structures (extended detention dry ponds, permanent sediment traps, catchment basins, etc.) should be planned and located during the design phase and included as part of the design specifications to ensure that such structures, where needed, are provided within the highway right-of-way.

g. *Plan residential roads and streets in accordance with local subdivision regulations, zoning ordinances, and other local site planning requirements (International City Managers Association, Model Zoning/Subdivision Codes). Residential road and street pavements should be designed with minimum widths.*

Local roads and streets should have right-of-way widths of 36 to 50 feet, with lane widths of 10 to 12 feet. Minimum pavement widths for residential streets where street parking is permitted range from 24 to 28 feet between curbs. In large-lot subdivisions (1 acre or more), grassed drainage swales can be used in lieu of curbs and gutters and the width of paved road surface can be between 18 and 20 feet.

h. *Select the most economic and environmentally sound route location. (FHWA, 1991)*

i. *Use appropriate computer models and methods to determine urban runoff impacts with all proposed route corridors. (Driscoll, 1990)*

Computer models to determine urban runoff from streets and highways include TR-55 (Soil Conservation Service model for controlling peak runoff); the P-8 model to determine storage capacity (Palmstrom and Walker); the FHWA highway runoff model (Driscoll et al., 1990); and others (e.g., SWMM, EPA's stormwater management model; HSP continuous simulation model by Hydrocomp, Inc.).

j. *Comply with National Environmental Policy Act requirements including other State and local requirements. (FHWA, T6640.8A)*

k. *Coordinate the design of pollution controls with appropriate State and Federal environmental agencies. (Maryland DOE, 1983)*

l. *Develop local official mapping to show location of proposed highway corridors.*

Official mapping can be used to reserve land areas needed for public facilities such as roads, highways, bridges, and urban runoff treatment devices. Areas that require protection, such as those which are sensitive to disturbance or development-related nonpoint source pollution, can be reserved by planning and mapping necessary infrastructure for location in suitable areas.

5. Effectiveness Information and Cost Information

The most economical time to consider the type and location of erosion, sediment, and NPS pollution control is early in the planning and design phase of roads and highways. It is much more costly to correct polluted runoff problems after a road or highway has already been built. The most effective and often the most economical control is to design roads and highways as close to existing grade as possible to minimize the area that must be cut or filled and to avoid locations that encroach upon adjacent watercourses and wet areas. However, some portions of roads and highways cannot always be located where NPS pollution does not pose a threat to surface waters. In these cases, the impact from potential pollutant loadings should be mitigated. Interactive computer models designed to run on a PC are available (e.g., FHWA's model, Driscoll et al., 1990) and can be used to examine and project the runoff impacts of a proposed road or highway design on surface waters. Where controls are determined to be needed, several cost-effective management practices, such as vegetated filter strips, grassed swales, and pond systems, can be considered and used to treat the polluted runoff. These mitigating practices are described in detail in the discussion on urban developments (Management Measure IV.A).

B. Management Measure for Bridges

Site, design, and maintain bridge structures so that sensitive and valuable aquatic ecosystems and areas providing important water quality benefits are protected from adverse effects.

1. Applicability

This management measure is intended to be applied by States to new, relocated, and rehabilitated bridge structures in order to control erosion, streambed scouring, and surface runoff from such activities. Under the Coastal Zone Act Reauthorization Amendments of 1990, States are subject to a number of requirements as they develop coastal NPS programs in conformity with this management measure and will have some flexibility in doing so. The application of management measures by States is described more fully in *Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance*, published jointly by the U.S. Environmental Protection Agency (EPA) and the National Oceanic and Atmospheric Administration (NOAA) of the U.S. Department of Commerce.

2. Description

This measure requires that NPS runoff impacts on surface waters from bridge decks be assessed and that appropriate management and treatment be employed to protect critical habitats, wetlands, fisheries, shellfish beds, and domestic water supplies. The siting of bridges should be a coordinated effort among the States, the FHWA, the U.S. Coast Guard, and the Army Corps of Engineers. Locating bridges in coastal areas can cause significant erosion and sedimentation, resulting in the loss of wetlands and riparian areas. Additionally, since bridge pavements are extensions of the connecting highway, runoff waters from bridge decks also deliver loadings of heavy metals, hydrocarbons, toxic substances, and deicing chemicals to surface waters as a result of discharge through scupper drains with no overland buffering. Bridge maintenance can also contribute heavy loads of lead, rust particles, paint, abrasive, solvents, and cleaners into surface waters. Protection against possible pollutant overloads can be afforded by minimizing the use of scuppers on bridges traversing very sensitive waters and conveying deck drainage to land for treatment. Whenever practical, bridge structures should be located to avoid crossing over sensitive fisheries and shellfish-harvesting areas to prevent washing polluted runoff through scuppers into the waters below. Also, bridge design should account for potential scour and erosion, which may affect shellfish beds and bottom sediments.

3. Management Measure Selection

This management measure was selected because of its documented effectiveness and to protect against potential pollution impacts from siting bridges over sensitive waters and tributaries in the coastal zone. There are several examples of siting bridges to protect sensitive areas. The Isle of Palms Bridge near Charleston, South Carolina, was designed without scupper drains to protect a local fishery from polluted runoff by preventing direct discharge into the waters below. In another example, the Louisiana Department of Transportation and Development specified stringent requirements before allowing the construction of a bridge to protect destruction of fragile wetlands near New Orleans. A similar requirement was specified for bridge construction in the Tampa Bay area in Florida (ENR, 1991).

4. Practices

As discussed more fully at the beginning of this chapter and in Chapter 1, the following practices are described for illustrative purposes only. State programs need not require implementation of these practices. However, as a practical matter, EPA anticipates that the management measure set forth above generally will be implemented by applying one or more management practices appropriate to the source, location, and climate. The practices set forth below have been found by EPA to be representative of the types of practices that can be applied successfully to achieve the management measure described above.

Additional erosion and sediment control management practices are listed in the construction section for urban sources of pollution (Management Measure IV.A).

- *a. Coordinate design with FHWA, USCG, COE, and other State and Federal agencies as appropriate.*
- *b. Review National Environmental Policy Act requirements to ensure that environmental concerns are met (FHWA, T6640.8A and 23 CFR 771).*
- *c. Avoid highway locations requiring numerous river crossings. (AASHTO, 1991)*
- *d. Direct pollutant loadings away from bridge decks by diverting runoff waters to land for treatment.*

Bridge decks should be designed to keep runoff velocities low and control pollutant loadings. Runoff waters should be conveyed away from contact with the watercourse and directed to a stable storm drainage, wetland, or detention pond. Conveyance systems should be designed to withstand the velocities of projected peak discharge.

- *e. Restrict the use of scupper drains on bridges less than 400 feet in length and on bridges crossing very sensitive ecosystems.*

Scupper drains allow direct discharge of runoff into surface waters below the bridge deck. Such discharges can be of concern where the waterbody is highly susceptible to degradation or is an outstanding resource such as a spawning area or shellfish bed. Other sensitive waters include water supply sources, recreational waters, and irrigation systems. Care should be taken to protect these areas from contaminated runoff.

- *f. Site and design new bridges to avoid sensitive ecosystems.*

Pristine waters and sensitive ecosystems should be protected from degradation as much as possible. Bridge structures should be located in alternative areas where only minimal environmental damage would result.

- *g. On bridges with scupper drains, provide equivalent urban runoff treatment in terms of pollutant load reduction elsewhere on the project to compensate for the loading discharged off the bridge.*

5. Effectiveness Information and Cost Information

Effectively controlling NPS pollutants such as road contaminants, fugitive dirt, and debris and preventing accidental spills from entering surface waters via bridge decks are necessary to protect wetlands and other sensitive ecosystems. Therefore, management practices such as minimizing the use of scupper drains and diverting runoff waters to land for treatment in detention ponds and infiltration systems are known to be effective in mitigating pollutant loadings. Tables 4-7 and 4-8 in Section II provide cost and effectiveness data for ponds, constructed wetlands, and filtration devices.

C. Management Measure for Construction Projects

(1) Reduce erosion and, to the extent practicable, retain sediment onsite during and after construction and

(2) Prior to land disturbance, prepare and implement an approved erosion control plan or similar administrative document that contains erosion and sediment control provisions.

1. Applicability

This management measure is intended to be applied by States to new, replaced, restored, and rehabilitated road, highway, and bridge construction projects in order to control erosion and offsite movement of sediment from such project sites. Under the Coastal Zone Act Reauthorization Amendments of 1990, States are subject to a number of requirements as they develop coastal NPS programs in conformity with this management measure and will have some flexibility in doing so. The application of management measures by States is described more fully in *Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance*, published jointly by the U.S. Environmental Protection Agency (EPA) and the National Oceanic and Atmospheric Administration (NOAA) of the U.S. Department of Commerce.

2. Description

Erosion and sedimentation from construction of roads, highways, and bridges, and from unstabilized cut-and-fill areas, can significantly impact surface waters and wetlands with silt and other pollutants including heavy metals, hydrocarbons, and toxic substances. Erosion and sediment control plans are effective in describing procedures for mitigating erosion problems at construction sites before any land-disturbing activity begins. Additional relevant practices are described in Management Measures III.A and III.B of this chapter.

Bridge construction projects include grade separations (bridges over roads) and waterbody crossings. Erosion problems at grade separations result from water running off the bridge deck and runoff waters flowing onto the bridge deck during construction. Controlling this runoff can prevent erosion of slope fills and the undermining failure of the concrete slab at the bridge approach. Bridge construction over waterbodies requires careful planning to limit the disturbance of streambanks. Soil materials excavated for footings in or near the water should be removed and relocated to prevent the material from being washed back into the waterbody. Protective berms, diversion ditches, and silt fences parallel to the waterway can be effective in preventing sediment from reaching the waterbody.

Wetland areas will need special consideration if affected by highway construction, particularly in areas where construction involves adding fill, dredging, or installing pilings. Highway development is most disruptive in wetlands since it may cause increased sediment loss, alteration of surface drainage patterns, changes in the subsurface water table, and loss of wetland habitat. Highway structures should not restrict tidal flows into salt marshes and other coastal wetland areas because this might allow the intrusion of freshwater plants and reduce the growth of salt-tolerant species. To safeguard these fragile areas, the best practice is to locate roads and highways with sufficient setback distances between the highway right-of-way and any wetlands or riparian areas. Bridge construction also can impact water circulation and quality in wetland areas, making special techniques necessary to accommodate construction. The following case study provides an example of a construction project where special considerations were given to wetlands.

CASE STUDY - BRIDGING WETLANDS IN LOUISIANA

To provide protection for an environmentally critical wetland outside New Orleans, the Louisiana Department of Transportation and Development (DOTD) required a special construction technique to build almost 2 miles of twin elevated structures for the Interstate 310 link between I-10 and U.S. Route 90. A technique known as "end-on" construction was devised to work from the decks of the structures, building each section of the bridge from the top of the last completed section and using heavy cranes to push each section forward one bay at a time. The cranes were also used to position steel platforms, drive in support pilings, and lay deck slabs, alternating this procedure between each bay. Without this technique, the Louisiana DOTD would not have been permitted to build this structure. The twin 9,200-foot bridges took 485 days to complete at a cost of $25.3 million (*Engineering News Record*, 1991).

3. Management Measure Selection

This management measure was selected because it supports FHWA's erosion and sediment control policy for all highway and bridge construction projects and is the administrative policy of several State highway departments and local governmental agencies involved in land development activity. Examples of erosion and sediment controls and NPS pollutant control practices are described in AASHTO guidelines and in several State erosion control manuals (AASHTO, 1991; North Carolina DOT, 1991; Washington State DOT, 1988). A detailed discussion of cost-effective management practices is available in the urban development section (Section II) of this chapter. These example practices are also effective for highway construction projects.

4. Practices

As discussed more fully at the beginning of this chapter and in Chapter 1, the following practices are described for illustrative purposes only. State programs need not require implementation of these practices. However, as a practical matter, EPA anticipates that the management measure set forth above generally will be implemented by applying one or more management practices appropriate to the source, location, and climate. The practices set forth below have been found by EPA to be representative of the types of practices that can be applied successfully to achieve the management measure described above.

Additional erosion and sediment control management practices are listed in the construction section (Section III) of this chapter.

■ *a. Write erosion and sediment control requirements into plans, specifications, and estimates for Federal aid construction projects for highways and bridges (FHWA, 1991) and develop erosion control plans for earth-disturbing activities.*

Erosion and sediment control decisions made during the planning and location phase should be written into the contract, plans, specifications, and special provisions provided to the construction contractor. This approach can establish contractor responsibility to carry out the explicit contract plan recommendations for the project and the erosion control practices needed.

■ *b. Coordinate erosion and sediment controls with FHWA, AASHTO, and State guidelines.*

Coordination and scheduling of the project work with State and local authorities are major considerations in controlling anticipated erosion and sediment problems. In addition, the contractor should submit a general work schedule and plan that indicates planned implementation of temporary and permanent erosion control practices, including shutdown procedures for winter and other work interruptions. The plan also should include proposed methods of control on restoring borrow pits and the disposal of waste and hazardous materials.

c. *Install permanent erosion and sediment control structures at the earliest practicable time in the construction phase.*

Permanent or temporary soil stabilization practices should be applied to cleared areas within 15 days after final grade is reached on any portion of the site. Soil stabilization should also be applied within 15 days to denuded areas that may not be at final grade but will remain exposed to rain for 30 days or more. Soil stabilization practices protect soil from the erosive forces of raindrop impact and flowing water. Temporary erosion control practices usually include seeding, mulching, establishing general vegetation, and early application of a gravel base on areas to be paved. Permanent soil stabilization practices include vegetation, filter strips, and structural devices.

Sediment basins and traps, perimeter dikes, sediment barriers, and other practices intended to trap sediment on site should be constructed as a first step in grading and should be functional before upslope land disturbance takes place. Structural practices such as earthen dams, dikes, and diversions should be seeded and mulched within 15 days of installation.

d. *Coordinate temporary erosion and sediment control structures with permanent practices.*

All temporary erosion and sediment controls should be removed and disposed of within 30 days after final site stabilization is achieved or after the temporary practices are no longer needed. Trapped sediment and other disturbed soil areas resulting from the disposition of temporary controls should be permanently stabilized to prevent further erosion and sedimentation (AASHTO, 1991).

e. *Wash all vehicles prior to leaving the construction site to remove mud and other deposits. Vehicles entering or leaving the site with trash or other loose materials should be covered to prevent transport of dust, dirt, and debris. Install and maintain mud and silt traps.*

f. *Mitigate wetland areas destroyed during construction.*

Marshes and some types of wetlands can often be developed in areas where fill material was extracted or in ponds designed for sediment control during construction. Vegetated strips of native marsh grasses established along highway embankments near wetlands or riparian areas can be effective to protect these areas from erosion and sedimentation (FHWA, 1991).

g. *Minimize the area that is cleared for construction.*

h. *Construct cut-and-fill slopes in a manner that will minimize erosion.*

Cut-and-fill slopes should be constructed in a manner that will minimize erosion by taking into consideration the length and steepness of slopes, soil types, upslope drainage areas, and ground-water conditions. Suggested recommendations are as follows: reduce the length of long steep slopes by adding diversions or terraces; prevent concentrated runoff from flowing down cut-and-fill slopes by containing these flows within flumes or slope drain structures; and create roughened soil surfaces on cut-and-fill slopes to slow runoff flows. Wherever a slope face crosses a water seepage plane, thereby endangering the stability of the slope, adequate subsurface drainage should be provided.

i. *Minimize runoff entering and leaving the site through perimeter and onsite sediment controls.*

j. *Inspect and maintain erosion and sediment control practices (both on-site and perimeter) until disturbed areas are permanently stabilized.*

k. *Divert and convey offsite runoff around disturbed soils and steep slopes to stable areas in order to prevent transport of pollutants off site.*

l. *After construction, remove temporary control structures and restore the affected area. Dispose of sediments in accordance with State and Federal regulations.*

m. *All storm drain inlets that are made operable during construction should be protected so that sediment-laden water will not enter the conveyance system without first being filtered or otherwise treated to remove sediment.*

5. Effectiveness Information and Cost Information

The detailed cost and effectiveness information presented under the construction measure for urban development is also applicable to road, highway, and bridge construction. See Tables 4-15 and 4-16 in Section III.

D. Management Measure for Construction Site Chemical Control.

(1) Limit the application, generation, and migration of toxic substances;

(2) Ensure the proper storage and disposal of toxic materials; and

(3) Apply nutrients at rates necessary to establish and maintain vegetation without causing significant nutrient runoff to surface water.

1. Applicability

This management measure is intended to be applied by States to new, resurfaced, restored, and rehabilitated road, highway, and bridge construction projects in order to reduce toxic and nutrient loadings from such project sites. Under the Coastal Zone Act Reauthorization Amendments of 1990, States are subject to a number of requirements as they develop coastal NPS programs in conformity with this management measure and will have some flexibility in doing so. The application of management measures by States is described more fully in *Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance*, published jointly by the U.S. Environmental Protection Agency (EPA) and the National Oceanic and Atmospheric Administration (NOAA) of the U.S. Department of Commerce.

2. Description

The objective of this measure is to guard against toxic spills and hazardous loadings at construction sites from equipment and fuel storage sites. Toxic substances tend to bind to fine soil particles; however, by controlling sediment mobilization, it is possible to limit the loadings of these pollutants. Also, some substances such as fuels and solvents are hazardous and excess applications or spills during construction can pose significant environmental impacts. Proper management and control of toxic substances and hazardous materials should be the adopted procedure for all construction projects and should be established by erosion and sediment control plans. Additional relevant practices are described in Management Measure III.B of this chapter.

3. Management Measure Selection

This management measure was selected because of existing practices that have been shown to be effective in mitigating construction-generated NPS pollution at highway project sites and equipment storage yards. In addition, maintenance areas containing road salt storage, fertilizers and pesticides, snowplows and trucks, and tractor mowers have the potential to contribute NPS pollutants to adjacent watercourses if not properly managed (AASHTO, 1988, 1991a). This measure is intended to safeguard surface waters and ground water from toxic and hazardous pollutants generated at construction sites. Examples of effective implementation of this measure are presented in the section on construction in urban areas. Several State environmental agencies are using this approach to regulate toxic and hazardous pollutants (Florida DER, 1988; Puget Sound Basin, 1991).

4. Practices

As discussed more fully at the beginning of this chapter and in Chapter 1, the following practices are described for illustrative purposes only. State programs need not require implementation of these practices. However, as a practical matter, EPA anticipates that the management measure set forth above generally will be implemented by applying one or more management practices appropriate to the source, location, and climate. The practices set forth below have been found by EPA to be representative of the types of practices that can be applied successfully to achieve the management measure described above.

The practices that are applicable to this management measure are described in Section III.B.

5. Effectiveness Information and Cost Information

The detailed cost and effectiveness data presented in the Section III.A of this chapter describing NPS controls for construction projects in urban development areas are also applicable to highway construction projects.

Management Measure for Operation and Maintenance

Incorporate pollution prevention procedures into the operation and maintenance of roads, highways, and bridges to reduce pollutant loadings to surface waters.

1. Applicability

This management measure is intended to be applied by States to existing, restored, and rehabilitated roads, highways, and bridges. Under the Coastal Zone Act Reauthorization Amendments of 1990, States are subject to a number of requirements as they develop coastal NPS programs in conformity with this management measures and will have some flexibility in doing so. The application of measures by States is described more fully in *Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance*, published jointly by the U.S. Environmental Protection Agency (EPA) and the National Oceanic and Atmospheric Administration (NOAA) of the U.S. Department of Commerce.

2. Description

Substantial amounts of eroded material and other pollutants can be generated by operation and maintenance procedures for roads, highways, and bridges, and from sparsely vegetated areas, cracked pavements, potholes, and poorly operating urban runoff control structures. This measure is intended to ensure that pollutant loadings from roads, highways, and bridges are minimized by the development and implementation of a program and associated practices to ensure that sediment and toxic substance loadings from operation and maintenance activities do not impair coastal surface waters. The program to be developed, using the practices described in this management measure, should consist of and identify standard operating procedures for nutrient and pesticide management, road salt use minimization, and maintenance guidelines (e.g., capture and contain paint chips and other particulates from bridge maintenance operations, resurfacing, and pothole repairs).

3. Management Measure Selection

This management measure for operation and maintenance was selected because (1) it is recommended by FHWA as a cost-effective practice (FHWA, 1991); (2) it is protective of the human environment (Puget Sound Water Quality Authority, 1989); (3) it is effective in controlling erosion by revegetating bare slopes (AASHTO, 1991b); (4) it is helpful in minimizing polluted runoff from road pavements (Transportation Research Board, 1991); and (5) both Federal (Richardson, 1974) and State highway agencies (Minnesota Pollution Control Agency, 1989; Pitt, 1973) advocate highway maintenance as an effective practice for minimizing pollutant loadings.

Maintenance of erosion and sediment control practices is of critical importance. Both temporary and permanent controls require frequent and periodic cleanout of accumulated sediment. Any trapping or filtering device, such as silt fences, sediment basins, buffers, inlets, and check dams, should be checked and cleaned out when approximately 50 percent of their capacity is reached, as determined by the erodible nature of the soil, flow velocity, and quantity of runoff. Seasonal and climatic differences may require more frequent cleanout of these structures. The sediments removed from these control devices should be deposited in permanently stabilized areas to prevent further erosion and sediment from reaching drainages and receiving streams. After periods of use, control devices may require replacement of deteriorated materials such as straw bales and silt fence fabrics, or restoration and reconstruction of sediment basins and riprap installations.

Permanent erosion controls such as vegetated filter strips, grassed swales, and velocity dissipators should be inspected periodically to determine their integrity and continued effectiveness. Continual deterioration or damage to these controls may indicate a need for better design or construction.

4. Practices

As discussed more fully at the beginning of this chapter and in Chapter 1, the following practices are described for illustrative purposes only. State programs need not require implementation of these practices. However, as a practical matter, EPA anticipates that the management measure set forth above generally will be implemented by applying one or more management practices appropriate to the source, location, and climate. The practices set forth below have been found by EPA to be representative of the types of practices that can be applied successfully apply to achieve the management measure described above.

- *a. Seed and fertilize, seed and mulch, and/or sod damaged vegetated areas and slopes.*
- *b. Establish pesticide/herbicide use and nutrient management programs.*

Refer to the Management Measure for Construction Site Chemical Control in this chapter.

- *c. Restrict herbicide and pesticide use in highway rights-of-way to applicators certified under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) to ensure safe and effective application.*
- *d. The use of chemicals such as soil stabilizers, dust palliatives, sterilants, and growth inhibitors should be limited to the best estimate of optimum application rates. All feasible measures should be taken to avoid excess application and consequent intrusion of such chemicals into surface runoff.*
- *e. Sweep, vacuum, and wash residential/urban streets and parking lots.*
- *f. Collect and remove road debris.*
- *g. Cover salt storage piles and other deicing materials to reduce contamination of surface waters. Locate them outside the 100-year floodplain.*
- *h. Regulate the application of deicing salts to prevent oversalting of pavement.*
- *i. Use specially equipped salt application trucks.*
- *j. Use alternative deicing materials, such as sand or salt substitutes, where sensitive ecosystems should be protected.*
- *k. Prevent dumping of accumulated snow into surface waters.*
- *l. Maintain retaining walls and pavements to minimize cracks and leakage.*
- *m. Repair potholes.*
- *n. Encourage litter and debris control management.*

o. *Develop an inspection program to ensure that general maintenance is performed on urban runoff and NPS pollution control facilities.*

To be effective, erosion and sediment control devices and practices must receive thorough and periodic inspection checks. The following is a suggested checklist for the inspection of erosion and sediment controls (AASHTO Operating Subcommittee on Design, 1990):

- Clean out sediment basins and traps; ensure that structures are stable.
- Inspect silt fences and replace deteriorated fabrics and wire connections; properly dispose of deteriorated materials.
- Renew riprapped areas and reapply supplemental rock as necessary.
- Repair/replace check dams and brush barriers; replace or stabilize straw bales as needed.
- Regrade and shape berms and drainage ditches to ensure that runoff is properly channeled.
- Apply seed and mulch where bare spots appear, and replace matting material if deteriorated.
- Ensure that culverts and inlets are protected from siltation.
- Inspect all permanent erosion and sediment controls on a scheduled, programmed basis.

p. *Ensure that energy dissipators and velocity controls to minimize runoff velocity and erosion are maintained.*

q. *Dispose of accumulated sediment collected from urban runoff management and pollution control facilities, and any wastes generated during maintenance operations, in accordance with appropriate local, State, and Federal regulations.*

r. *Use techniques such as suspended tarps, vacuums, or booms to reduce, to the extent practicable, the delivery to surface waters of pollutants used or generated during bridge maintenance (e.g., paint, solvents, scrapings).*

s. *Develop education programs to promote the practices listed above.*

5. Effectiveness Information and Cost Information

Preventive maintenance is a time-proven, cost-effective management approach. Operation schedules and maintenance procedures to restore vegetation, proper management of salt and fertilizer application, regular cleaning of urban runoff structures, and frequent sweeping and vacuuming of urban streets have effective results in pollution control. Litter control, clean-up, and fix-up practices are a low-cost means for eliminating causes of pollution, as is the proper handling of fertilizers, pesticides, and other toxic materials including deicing salts and abrasives. Table 4-30 presents summary information on the cost and effectiveness of operation and maintenance practices for roads, highways, and bridges. Many States and communities are already implementing several of these practices within their budget limitations. As shown in Table 4-30, the use of road salt alternatives such as calcium magnesium acetate (CMA) can be very costly. Some researchers have indicated, however, that reductions in corrosion of infrastructure, damage to roadside vegetation, and the quantity of material that needs to be applied may offset the higher cost of CMA. Use of road salt minimization practices such as salt storage protection and special salt spreading equipment reduces the amount of salt that a State or community must purchase. Consequently, implementation of these practices can pay for itself through savings in salt purchasing costs. Similar programs such as nutrient and pesticide management can also lead to decreased expenditures for materials.

CMA Eligible for Matching Funds

Calcium magnesium acetate (CMA) is now eligible for Federal matching funds under the Bridge Program of the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991. The Act provides 80 percent funding for use of CMA on salt-sensitive bridges in order to protect against corrosion and to extend their useful life. CMA can also be used to protect vegetation from salt damage in environmentally sensitive areas.

Table 4-30. (Continued)

Management Practice	% Removal TSS	TP	TN	COD	Pb	Zn	Cost
GENERAL MAINTENANCE (e.g., pothole and roadside repairs)							Generally accepted as an economical preventive maintenance program by local and State agencies
Average:	NA						
Reported Range:	NA						
Probable Range:							
PROTECTION OF SALT PILES							For salt storage building -
Average:	NA						Ave: $30/ton salt
Reported Range:	NA						Reported Range: $10-$70/ton salt
Probable Range:	90-100[a]						
MINIMIZATION OF APPLICATION OF DEICING SALTS							Generally accepted as an economical preventive maintenance program by local and State agencies
Average:	NA						
Reported Range:	NA						
Probable Range:	Deicing salts that are not applied to roads will not enter runoff.						
SPECIALLY EQUIPPED SALT APPLICATION TRUCKS							For spread rate control on truck -
Average:	NA						Ave: $6,000/truck
Reported Range:	NA						Reported Range: $6,000/truck
Probable Range:	Deicing salts that are not applied to roads will not enter runoff.						
USE OF ALTERNATIVE DEICING MATERIALS							CMA -
Average:	NA						Ave: $650/ton
Reported Range:	NA						Reported Range: $650/ton
Probable Range:	Deicing salts that are not applied to roads will not enter runoff.						(note: cost of salt $30/ton)
CONTAIN POLLUTANTS GENERATED DURING BRIDGE MAINTENANCE							Varies with method of containment use
Average:	NA						
Reported Range:	NA						
Probable Range:	50-100[b]						

NA = Not applicable.
[a]Measured as reduction in salt.
[b]Measured as reduction of all pollutants.

Table 4-30. Effectiveness and Cost Summary for Roads, Highways, and Bridges Operation and Maintenance Management Practices

Management Practice	% Removal TSS	TP	TN	COD	Pb	Zn	Cost
MAINTAIN VEGETATION							
For Sediment Control							Natural succession allowed to occur -
Average:	90	NA	NA	NA	NA	NA	Avg: $100/ac/year
Reported Range:	50-100	NA	NA	NA	NA	NA	Reported Range: $50-$200/ac/year
Probable Range:	80-100	-	-	-	-	-	
For Pollutant Removal							Natural succession not allowed to occur -
Average:	60	40	40	50	50	50	Avg: $800/ac/year
Reported Range	0-100	0-100	0-70	20-80	0-100	50-60	Reported Range: $700-$900/ac/year
Probable Range:	0-100	0-100	0-100	0-100	0-100	0-100	
PESTICIDE/HERBICIDE USE MANAGEMENT							Generally accepted as an economical program to control excessive use
Average:	NA						
Reported Range:	NA						
Probable Range:							
STREET SWEEPING							
Smooth Street, Frequent Cleaning (One or More Passes Per Week)							Avg: $20/curb mile
Average:	20	NA	NA	5	25	NA	Reported Range: $10-$30/curb mile
Reported Range:	20	NA	NA	0-10	5-35	NA	
Probable Range:	20-50	-	-	0-10	20-50	10-30	
Infrequent Cleaning (One Pass Per Month or Less)							
Average:	NA	NA	NA	NA	5	NA	
Reported Range:	NA	NA	NA	NA	0-10	NA	
Probable Range:	0-20	-	-	-	0-20	0-10	
LITTER CONTROL							Generally accepted as an economical approach to control excessive use
Average:	NA						
Reported Range:	NA						
Probable Range:							

F. Management Measure for Road, Highway, and Bridge Runoff Systems

Develop and implement runoff management systems for existing roads, highways, and bridges to reduce runoff pollutant concentrations and volumes entering surface waters.

(1) Identify priority and watershed pollutant reduction opportunities (e.g., improvements to existing urban runoff control structures; and

(2) Establish schedules for implementing appropriate controls.

1. Applicability

This management measure is intended to be applied by States to existing, resurfaced, restored, and rehabilitated roads, highways, and bridges that contribute to adverse effects in surface waters. Under the Coastal Zone Act Reauthorization Amendments of 1990, States are subject to a number of requirements as they develop coastal NPS programs in conformity with this management measure and will have some flexibility in doing so. The application of management measures by States is described more fully in *Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance*, published jointly by the U.S. Environmental Protection Agency (EPA) and the National Oceanic and Atmospheric Administration (NOAA) of the U.S. Department of Commerce.

2. Description

This measure requires that operation and maintenance systems include the development of retrofit projects, where needed, to collect NPS pollutant loadings from existing, reconstructed, and rehabilitated roads, highways, and bridges. Poorly designed or maintained roads and bridges can generate significant erosion and pollution loads containing heavy metals, hydrocarbons, sediment, and debris that run off into and threaten the quality of surface waters and their tributaries. In areas where such adverse impacts to surface waters can be attributed to adjacent roads or bridges, retrofit management projects to protect these waters may be needed (e.g., installation of structural or nonstructural pollution controls). Retrofit projects can be located in existing rights-of-way, within interchange loops, or on adjacent land areas. Areas with severe erosion and pollution runoff problems may require relocation or reconstruction to mitigate these impacts.

Runoff management systems are a combination of nonstructural and structural practices selected to reduce nonpoint source loadings from roads, highways, and bridges. These systems are expected to include structural improvements to existing runoff control structures for water quality purposes; construction of new runoff control devices, where necessary to protect water quality; and scheduled operation and maintenance activities for these runoff control practices. Typical runoff controls for roads, highways, and bridges include vegetated filter strips, grassed swales, detention basins, constructed wetlands, and infiltration trenches.

3. Management Measure Selection

This management measure was selected because of the demonstrated effectiveness of retrofit systems for existing roads and highways that were constructed with inadequate nonpoint source pollution controls or without such controls. Structural practices for mitigating polluted runoff from existing highways are described in the literature (Silverman, 1988).

4. Practices

As discussed more fully at the beginning of this chapter and in Chapter 1, the following practices are described for illustrative purposes only. State programs need not require implementation of these practices. However, as a practical matter, EPA anticipates that the management measure set forth above generally will be implemented by applying one or more management practices appropriate to the source, location, and climate. The practices set forth below have been found by EPA to be representative of the types of practices that can be applied successfully to achieve the management measure described above.

- *a. Locate runoff treatment facilities within existing rights-of-way or in medians and interchange loops.*
- *b. Develop multiple-use treatment facilities on adjacent lands (e.g., parks and golf courses).*
- *c. Acquire additional land for locating treatment facilities.*
- *d. Use underground storage where no alternative is available.*
- *e. Maximize the length and width of vegetated filter strips to slow the travel time of sheet flow and increase the infiltration rate of urban runoff.*

5. Effectiveness Information and Cost Information

Cost and effectiveness data for structural urban runoff management and pollution control facilities are outlined in Tables 4-15 and 4-16 in Section III and discussed in Section IV of this chapter and are applicable to determine the cost and effectiveness of retrofit projects. Retrofit projects can often be more costly to construct because of the need to locate the required structures within existing space or the need to locate the structures within adjacent property that requires purchase. However, the use of multiple-use facilities on adjacent lands, such as diverting runoff waters to parkland or golf courses, can offset this cost. Nonstructural practices described in the urban section also can be effective in achieving source control. As with other sections of this document, the costs of loss of habitat, fisheries, and recreational areas must be weighed against the cost of retrofitting control structures within existing rights-of-way.

6. Pollutants of Concern

Table 4-31 lists the pollutants commonly found in urban runoff from roads, highways, and bridges and their sources. The disposition and subsequent magnitude of pollutants found in highway runoff are site-specific and are affected by traffic volume, road or highway design, surrounding land use, climate, and accidental spills.

The FHWA conducted an extensive field monitoring and laboratory analysis program to determine the pollutant concentration in highway runoff from 31 sites in 11 States (Driscoll et al., 1990). The event mean concentrations (EMCs) developed in the study for a number of pollutants are presented in Table 4-32. The study also indicated that for highways discharging into lakes, the pollutants of major concern are phosphorus and heavy metals. For highways discharging into streams, the pollutants of major concern are heavy metals—cadmium, copper, lead, and zinc.

Table 4-31. Highway Runoff Constituents and Their Primary Sources

Constituents	Primary Sources
Particulates	Pavement wear, vehicles, atmosphere, maintenance
Nitrogen, Phosphorus	Atmosphere, roadside fertilizer application
Lead	Leaded gasoline (auto exhaust), tire wear (lead oxide filler material, lubricating oil and grease, bearing wear)
Zinc	Tire wear (filler material), motor oil (stabilizing additive), grease
Iron	Auto body rust, steel highway structures (guard rails, bridges, etc.), moving engine parts
Copper	Metal plating, bearing and bushing wear, moving engine parts, brake lining wear, fungicides and insecticides
Cadmium	Tire wear (filler material), insecticide application
Chromium	Metal plating, moving engine parts, break lining wear
Nickel	Diesel fuel and gasoline (exhaust), lubricating oil, metal plating, bushing wear, brake lining wear, asphalt paving
Manganese	Moving engine parts
Cyanide	Anticake compound (ferric ferrocyanide, sodium ferrocyanide, yellow prussiate of soda) used to keep deicing salt granular
Sodium, Calcium, Chloride	Deicing salts
Sulphate	Roadway beds, fuel, deicing salts
Petroleum	Spills, leaks or blow-by of motor lubricants, antifreeze and hydraulic fluids, asphalt surface leachate

In colder regions where deicing agents are used, deicing chemicals and abrasives are the largest source of pollutants during winter months. Deicing salt (primarily sodium chloride, NaCl) is the most commonly used deicing agent. Potential pollutants from deicing salt include sodium chloride, ferric ferrocyanide (used to keep the salt in granular form), and sulfates such as gypsum. Table 4-33 summarizes potential environmental impacts caused by road salt. Other chemicals used as a salt substitute include calcium magnesium acetate (CMA) and, less frequently, urea and glycol compounds. Researchers have differing opinions on the environmental impacts of CMA compared to those of road salt (Chevron Chemical Company, 1991; Salt Institute, undated; Transportation Research Board, 1991).

Table 4-32. Pollutant Concentrations in Highway Runoff (Driscoll et al., 1990)

Pollutant	Event Mean Concentration for Highways With Fewer Than 30,000 Vehicles/Day[a] (mg/L)	Event Mean Concentration for Highways With More Than 30,000 Vehicles/Day[a] (mg/L)
Total Suspended Solids	41	142
Volatile Suspended Solids	12	39
Total Organic Carbon	8	25
Chemical Oxygen Demand	49	114
Nitrite and Nitrate	0.45	0.76
Total Kjeldahl Nitrogen	0.87	1.83
Phosphate Phosphorus	0.16	0.40
Copper	0.022	0.054
Lead	0.080	0.400
Zinc	0.080	0.329

[a]Event mean concentrations are for the 50% median site.

Table 4-33. Potential Environmental Impacts of Road Salts

Environmental Resource	Potential Environmental Impact of Road Salt (NaCl)
Soils	May accumulate in soil. Breaks down soil structure, increases erosion. Causes soil compaction that results in decreased permeability.
Vegetation	Osmotic stress and soil compaction harm root systems. Spray causes foliage dehydration damage. Many plant species are salt-sensitive.
Ground Water	Mobile Na and Cl ions readily reach ground water. Increases NaCl concentration in well water, as well as alkalinity and hardness.
Surface Water	Causes density stratification in ponds and lakes that can prevent reoxygenation. Increases runoff of heavy metals and nutrients through increased erosion.
Aquatic Life	Monovalent Na and Cl ions stress osmotic balances. Toxic levels: Na - 500 ppm for stickleback; Cl - 400 ppm for trout.
Human/Mammalian	Sodium is linked to heart disease and hypertension. Chlorine causes unpleasant taste in drinking water. Mild skin and eye irritant. Acute oral LD_{50} in rats is approximately 3,000 mg/kg (slightly toxic).

MASSACHUSETTS NONPOINT SOURCE MANAGEMENT MANUAL

"THE MEGAMANUAL"

A GUIDANCE DOCUMENT FOR MUNICIPAL OFFICIALS

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APPENDIX C

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Maui Electric Company, Ltd. • 210 West Kamehameha Avenue • PO Box 398 • Kahului, Maui, HI 96733-6898 • (808) 871-8461

NOV 3 1 2001

November 20, 2001

Mr. Michael T. Munekiyo, A.I.C.P.
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, HI 96793

Subject: Interim Piilani Highway Widening Improvements
Mokulele Highway to Kilohana Drive, Project No. 31AB-01-02

Dear Mr. Munekiyo,

We appreciate the opportunity to comment on this project per your letter dated November 12, 2001. We have no objections to your request for the subject project

However, we suspect our Company must review the subject project's detailed plans to address possible relocation of Maui Electric facilities. We would like to take this opportunity to mention that a design submittal and project timeframe from the project's consultant would be greatly appreciated.

Should you have any further questions, please contact me at (808) 871-2366.

Sincerely,

Gregorysenn Kauhi
Distribution Engineering Supervisor

MUNEKIYO HIRAGA, INC.

January 17, 2002

David Craddick, Director
Department of Water Supply
County of Maui
P. O. Box 1109
Wailuku, Hawaii 96793-6109

SUBJECT: Interim Piilani Highway Widening Improvements: Mokulele Highway to Kilohana Drive (Project No. 31AB-01-02)

Dear Mr. Craddick:

Thank you for your letter of November 19, 2001 on the above subject.

Your comments with respect to the waterlines in the project area are noted and your letter has been forwarded to the project engineer for coordination and action.

We have also forwarded the Best Management Practices and recommendations to conserve water resources to the project engineer for consideration.

Again thank you for your comments.

Very truly yours,

Mich Hirano, AICP

MH:lfm
cc: Roy Figueiroa, Makena Resort Corp.
Charles Jencks, WCPT/GW Land Associates
Fred Cajigal, Dept. of Transportation-Highways Division, Maui
Bob Siarot, Dept. of Transportation-Highways Division, Maui
Bert Toba, R. M. Towill Corporation

NOV 2 9 2001

MUNEKIYO & HIRAGA, INC.

January 17, 2002

Gregorysenn Kauhi
District Engineering Supervisor
Maui Electric Company, Ltd.
P. O. Box 398
Kahului, Hawaii 96733-6898

SUBJECT: Interim Piilani Highway Widening Improvements; Mokulele Highway to Kilohana Drive (Project No. 31AB-01-02)

Dear Mr. Kauhi:

Thank you for your letter of November 20, 2001 on the above subject.

We have noted your comments and have forwarded your letter to the project engineer so that possible relocation of Maui Electric facilities could be coordinated with your office.

Again, thank you for your response to the early consultation letter.

Very truly yours,

Mich Hirano, AICP

MH:lfm
cc: Roy Figueiroa, Makena Resort Corp.
Charles Jencks, WCPT/GW Land Associates
Fred Cajigal, Dept. of Transportation-Highways Division, Maui
Bob Siarot, Dept. of Transportation-Highways Division, Maui
Bert Toba, R. M. Towill Corporation

Maui Meadows Homeowners Association
P.O. Box 1935
Kihei, HI 96753

November 27, 2001

Munekiyo & Hiraga, Inc.
305 High St., Suite 104
Wailuku, HI 96793

Subject: Piilani Highway Widening Improvements

Attention: Michael T. Munekiyo,
Project Manager

Thank you for your letter of November 12 on the above subject. Our Board of Directors has decided that we will wait to comment on this project until public comments are solicited as part of the Environmental Assessment process.

Mahalo for your consideration.

James V. Williamson, for
Dorothy R. Williams, President

Chapter XII

Comments Received During the 30-Day Draft Environmental Assessment Comment Period

FEB 13 2002

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

REPLY TO ATTENTION OF

Regulatory Branch

February 11, 2002

RECEIVED
DOT-HWYS
MAUI DISTRICT OFFICE
2002 FEB 13 PM 2:03

Mr. Ferdinand Cajigal
District Engineer
Highways Division
650 Palapala Drive
Kahului, Hawaii 96732

Dear Mr. Cajigal:

This letter responds to your request for comments on the Draft Environmental Assessment for Interim Piilani Highway Improvements, Mokulele Highway to Kilohana Drive, Island of Maui, dated February 5, 2002. My previous letter concerning this project, dated November 20, 2001, is contained in Chapter X. I have no additional comments.

If you have any questions concerning this matter, please ccntact William Lennan of my staff at 438-6986 or FAX 438-4050, and reference File No. 200200078.

Sincerely,

George P. Young, P.E.
Chief, Regulatory Branch

KC: Munekiyo
2114

MAR 08 2002

United States Department of Agriculture
Natural Resources Conservation Service

Our People...Our Islands...In Harmony
210 Imi Kala Street, Suite #209, Wailuku, HI 96793-2100

February 28, 2002

RECEIVED
DOT-HWYS
MAUI DISTRICT OFFICE
2002 MAR -5 PM 3:40

Mr. Ferdinand Cajigal, District Engineer
State of Hawaii
Department of Transportation
650 Palapala Drive
Kahului, Hawaii 96732

Dear Mr. Cajigal,

SUBJECT: Draft EA – Interim Piilani Highway Improvements, Mokulele Highway to Kilohana Drive
HWY-M 2.042-02

We have reviewed the subject Draft EA and offer the following comment; the grass swales providing drainage from the highway should lead to an acceptable outlet. Drainage from the highway should not impact adjacent private properties significantly. Grass variety should be applicable to the area. Bermuda grass is recommended.

Thank you for allowing us to comment.

Sincerely,

Neal S. Fujiwara
District Conservationist

cc: Munekiyo

The Natural Resources Conservation Service works in partnership with the American people to conserve and sustain natural resources on private lands

BENJAMIN J. CAYETANO
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
MAUI DISTRICT
650 PALAPALA DRIVE
KAHULUI, HAWAII 96732

BRIAN K. MINAAI
DIRECTOR

DEPUTY DIRECTORS
JADINE Y. URASAKI
Jean L. Oshita

IN REPLY REFER TO:

HWY-M 2.109-02

April 12, 2002

Mr. Neal S. Fujiwara
District Conservationist
USDA, Natural Resources Conservation Service
210 Imi Kala Street, Suite 209
Wailuku, Hawaii 96793-2100

Dear Mr. Fujiwara:

SUBJECT: Draft Environmental Assessment – Interim Piilani Highway Improvements, Mokulele Highway to Kilohana Drive, Island of Maui

Thank you for your February 28, 2002 comments on the Draft Environmental Assessment for the proposed project.

Grass swales providing drainage from the highway have been designed to discharge into an acceptable outlet. Drainage improvements associated with the project have been designed to maintain the existing drainage pattern along the project corridor and will not impact adjacent properties. Your recommendation regarding planting grass swales with a variety of grass applicable to the area, such as Bermuda, has been incorporated into the construction specifications.

If you have additional comments or concerns, please call me at (808) 873-3535.

Very truly yours,

FERDINAND CAJIGAL
District Engineer, Maui

FC:dmf

BENJAMIN J. CAYETANO
GOVERNOR

OFFICE OF THE SUPERINTENDENT

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

MAR 05 2002

PATRICIA HAMAMOTO
Superintendent

RECEIVED
DOT-HWYS
MAUI DISTRICT OFFICE
2002 MAR -1 PM 2:13

February 26, 2002

MEMO TO: Mr. Ferdinand Cajigal, District Engineer
Highways Division - Maui, DOT

F R O M: Patricia Hamamoto, Superintendent
Department of Education

SUBJECT: Interim Piilani Highway Improvements
Draft Environmental Assessment

The Department of Education has no comment on the draft environmental assessment.

Thank you for the opportunity to respond.

PH:SB:hy

cc: A. Suga, OBS
XC. Alameda

0369

BENJAMIN J. CAYETANO
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF HEALTH
MAUI DISTRICT HEALTH OFFICE
54 HIGH STREET
WAILUKU, MAUI, HAWAII 96793

COPY

BRUCE S. ANDERSON, Ph.D., M.P.H.
DIRECTOR OF HEALTH

LORRIN W. PANG, M.D., M.P.H.
MAUI DISTRICT HEALTH OFFICER

February 19, 2002

RECEIVED
DOT-HWYS
MAUI DISTRICT OFFICE
2002 FEB 21 PM 2:04

Mr. Ferdinand Cajigal
District Engineer
Highways Division
Department of Transportation
650 Palapala Drive
Kahului, Hawai'i 96732

Dear Mr. Cajigal:

Subject: **Draft Environmental Assessment – Interim Piilani Highway Improvements**

Thank you for the opportunity to comment on the Draft Environmental Assessment. Our concerns have been addressed in the document. We have no further comments to offer at this time.

Should you have any questions, please call me at 984-8230.

Sincerely,

Herbert S. Matsubayashi
District Environmental Health Program Chief

xc: Munekiyo (2/22/02)

0312

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION
P.O. BOX 621
HONOLULU, HAWAII 96809

COPY

MAR 13 2002

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
CONSERVATION AND
RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND DIVISION
STATE PARKS
WATER RESOURCE MANAGEMENT

March 7, 2002

LD-NAV
LOG1114/1175/788

DOTPIILANIHWYINPDEA.RCM

RECEIVED
DOT-HWYS
MAUI DISTRICT OFFICE
2002 MAR 11 PM 4:43

Ferdinand Cajigal
District Engineer, Maui
DOT, Highways Division, Maui District
650 Palapala Drive
Kahului, Hawaii 96732

Dear Mr. Cajigal:

SUBJECT: Draft Environmental Assessment for Interim Piilani Highway Improvements Mokulele Highway to Kilohana Drive, Island of Maui, Hawaii

Thank you for the opportunity to review and comment on the subject matter.

A copy of the Draft Environmental Assessment covering the subject matter was transmitted to the following Department of Land and Natural Resources' Division for their review and comment:

- Division of Forestry and Wildlife
- Commission on Water Resource Management
- Land Division Engineering Branch
- Land Division Maui District Land Office

Attached herewith is a copy of the Commission on Water Resource Management and Land Division Engineering Branch Comment.

The Department of Land and Natural Resources has no other comment to offer on the subject matter. Should you have any questions, please feel free to contact Nicholas A. Vaccaro of the Land Division Support Services Branch at (808) 587-0438.

Very truly yours,

HARRY M. YADA
Acting Administrator

C: Maui District Land Office

0413

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

RECEIVED
LAND DIVISION
2002 FEB 26 A 10:05

GILBERT S. COLOMA-AGARAN
CHAIRPERSON

BRUCE S. ANDERSON
MEREDITH J. CHING
CLAYTON W. DELA CRUZ
BRIAN C. NISHIOKA
HERBERT M. RICHARDS, JR.

LINNEL T. NISHIOKA
DEPUTY DIRECTOR

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
P.O. BOX 621
HONOLULU, HAWAII 96809

FEB 26 2002

TO: Mr. Harry M. Yada, Acting Administrator
Land Division

FROM: Linnel T. Nishioka, Deputy Director
Commission on Water Resource Management (CWRM)

SUBJECT: Draft Environmental Assessment for Interim Piilani Highway Improvements Mokulele Highway to Kilohana Drive, Island of Maui

REF: LD-NAV/LOG 788, DOTPIILANIHWYIMPDEA.COM

Thank you for the opportunity to review the subject document. Our comments related to water resources are marked below.

[ ] We recommend coordination with the county government to incorporate this project into the county's Water Use and Development Plan.

[ ] We recommend coordination with the Land Division of the State Department of Land and Natural Resources to incorporate this project into the State Water Projects Plan.

[ ] We are concerned about the potential for ground or surface water degradation/contamination and recommend that approvals for this project be conditioned upon a review by the State Department of Health and the developer's acceptance of any resulting requirements related to water quality.

[ ] A Well Construction Permit and/or a Pump Installation Permit from the Commission would be required before ground water is developed as a source of supply for the project.

[ ] The proposed water supply source for the project is located in a designated water management area, and a Water Use Permit from the Commission would be required prior to use of this source.

[ ] Groundwater withdrawals from this project may affect streamflows, which may require an instream flow standard amendment.

[ ] We are concerned about the potential for degradation of instream uses from development on highly erodible slopes adjacent to streams within or near the project. We recommend that approvals for this project be conditioned upon a review by the corresponding county's Building Department and the developer's acceptance of any resulting requirements related to erosion control.

[ ] If the proposed project includes construction of a stream diversion, the project may require a stream diversion works permit and amend the instream flow standard for the affected stream(s).

[ ] If the proposed project alters the bed and banks of a stream channel, the project may require a stream channel alteration permit.

[X] OTHER:

We have identified six (dry) watercourses within the proposed section of Piilani Highway to be modified. These six watercourses are: Waiakoa, Kulanihakoi, Waipulani, unnamed watercourse between Kihei School and Waipulani Gulch, Kamaole, and Lilioholo.

These watercourses do not have sufficient water to support instream uses, therefore they are not considered to be "streams" as defined in the Hawaii Revised Statutes §174C-3, and would not require a stream channel alteration permit. We will be pleased to discuss other gulches with the applicant to determine whether stream channel alteration permits may be required.

If there are any questions, please contact David Higa at 587-0249.

BENJAMIN J. CAYETANO
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
MAUI DISTRICT
650 PALAPALA DRIVE
KAHULUI, HAWAII 96732

BRIAN K. MIKUAI
DIRECTOR

DEPUTY DIRECTORS
XXXXXXXXXXXX
JADINE Y. URASAKI
Jean L. Oshita

IN REPLY REFER TO:

HWY-M 2.120-02

April 22, 2002

Mr. Harry Yada, Acting Administrator
State of Hawaii
Department of Land and Natural Resources
Land Division
P. O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Yada:

SUBJECT: Draft Environmental Assessment – Interim Piilani Highway Improvements, Mokulele Highway to Kilohana Drive, Island of Maui

Thank you for your March 7, 2002, letter on the reference subject matter.

We acknowledge the CWRM determination that the six watercourses within the proposed project corridor do not require a stream channel alteration permit.

We also acknowledge the Engineering Branch's comments regarding the flood zones in the northern portion of the project corridor and have amended the EA document accordingly.

If you have additional comments or concerns, please call me at (808) 873-3535.

Very truly yours,

FERDINAND CAJIGAL
District Engineer, Maui

FC:dmf

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

HISTORIC PRESERVATION DIVISION
KAKUHIHEWA BUILDING, ROOM 555
601 KAMOKILA BOULEVARD
KAPOLEI, HAWAII 96707

GILBERT S. COLOMA-AGARAN, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCES MANAGEMENT

DEPUTIES
ERIC T. HIRANO
LINNEL NISHIOKA

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND
STATE PARKS

March 11, 2002

Mr. Ferdinand Cajigal
District Engineer, Maui
Department of Transportation - State of Hawaii
Highways Division - Maui District
650 Palapala Drive
Kahului, Hawaii 96732

LOG NO: 29357
DOC NO: 0203CD08

Dear Mr. Cajigal,

SUBJECT: **Chapter 6E-8 Historic Preservation Review Pertaining to the Draft Environmental Assessment for the Proposed Interim Pi'ilani Highway Improvements, Mokulele Highway to Kilohana Drive
Various Ahupua'a, Wailuku and Makawao District, Island of Maui
TMK: (2) 2-1-015; 2-2-002; 2-2-024; 3-9-001; 3-9-024**

Thank you for the opportunity to review and comment on the Draft Environmental Assessment (DEA) pertaining to the proposed Interim Pi'ilani Highway Improvements (Mokulele Highway to Kilohana Drive). Our review is based on reports, maps, and aerial photographs maintained at the State Historic Preservation Division; no field inspection was conducted of the subject parcel.

Based on the submitted DEA, we understand the proposed undertaking will be located along approximately 5.8 miles of the Pi'ilani Highway, extending from the intersection at Mokulele Highway to the intersection of Kilohana Drive. The proposed improvements will be conducted within the existing right-of-way and will include (but are not limited to), constructing an operational and functional drainage system; modifying intersections by removing and/or relocating median islands; relocating existing traffic signals, controllers, and traffic loops; adding, changing, and/or relocating regulatory traffic signs; installing interconnect cables from Mokulele Highway to Ohukai Road.

A search of our records indicates an archaeological inventory survey has not been conducted of the subject parcels. The general area seems likely to have once been the location of pre-Contact farming, perhaps with scattered houses. In addition, the DEA and the USDA Soil Survey indicate that portions of the proposed project corridor extend through Pu'uone Sand deposits. This type of deposit is known to contain both isolated and clusters of human burials, and possibly habitation deposits, as well. As the proposed project area has been previously disturbed during the initial highway construction, we believe it is possible that disturbed remnants of these types of historic sites may be present in portions of the proposed project corridor..

Given the above information, we recommend a qualified archaeological monitor be present during all ground disturbing activities located within the Pu'uone Sand Deposits in order to identify, document, record, and provide appropriate mitigation measures, as necessary. This should mitigate any adverse effects to significant historic sites that might occur. An acceptable monitoring plan will need to be submitted to this office for review prior to the commencement of any ground-disturbing activities. An acceptable report documenting the findings of the monitoring activities will need to be submitted to this office for review within 180 days of the completion of this project.

Please call Cathleen Dagher at 692-8023 if you have any questions.

Aloha,

Don Hibbard, Administrator
State Historic Preservation Division

CD:jen

c: Mr. Jim Nierman, R.M. Towill (fax: 842-1937)

✓ KS: Alunekulo

BENJAMIN J. CAYETANO
GOVERNOR

BRIAN K. MINAAI
DIRECTOR

DEPUTY DIRECTORS
JADINE Y. URASAKI
Jean L. Oshita

IN REPLY REFER TO:

HW-M 2.112-02

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
MAUI DISTRICT
650 PALAPALA DRIVE
KAHULUI, HAWAII 96732

April 15, 2002

Mr. Don Hibbard
State Historic Preservation Division
Department of Land and Natural Resources
Kakuhihewa Building, Room 555
601 Kamokila Boulevard
Kapolei, Hawaii 96707

Dear Mr. Hibbard:

SUBJECT: Draft Environmental Assessment – Interim Piilani Highway Improvements, Mokulele Highway to Kilohana Drive, Island of Maui

Thank you for your March 11, 2002 comments on the Draft Environmental Assessment for the proposed project.

Your recommendation for archaeological monitoring during all ground disturbing activities within the Pu'uone Sand Deposits will be incorporated into the project's specifications and contract documents. Furthermore, submitting an appropriate monitoring plan to your office for review will be included in the specifications.

Again, thank you for your comments and recommendations. If you have any questions or concerns, please call me at (808) 873-3535.

Very truly yours,

FERDINAND CAJIGAL
District Engineer, Maui

FC:dmf

BENJAMIN J. CAYETANO
GOVERNOR

GENEVIEVE SALMONSON
DIRECTOR

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
235 SOUTH BERETANIA STREET
SUITE 702
HONOLULU, HAWAII 96813
TELEPHONE (808) 586-4185
FACSIMILE (808) 586-4186

February 21, 2002

Fred Cajigal
Department of Transportation
650 Palapala Drive
Kahului, HI 96732

Subject: Draft Environmental Assessment (EA)
Piilani Highway Improvements, Mokulele Hwy. to Kilohana Drive, Kihei

Dear Mr. Cajigal:

In the final EA provide a discussion of the cumulative impacts of this project and the proposed Upcountry Highway. The draft EA mentions the status of the Upcountry Highway project as unknown. However, the final EIS has just been completed and submitted to our office.

The Traffic Assessment Report (appendix A) in this draft EA gives a brief discussion of future conditions, considering both projects. The noise study (appendix C) does not mention the latter, however. A discussion of cumulative impacts is required by HAR §11-200.

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

Sincerely,

GENEVIEVE SALMONSON
Director

c: Michael Munekiyo

COPY

APR -4 2002

BENJAMIN J. CAYETANO
GOVERNOR

BRIAN K. MINAAI
DIRECTOR

DEPUTY DIRECTORS
JADINE Y. URASAKI
Jean L. Oshita

IN REPLY REFER TO:
HWY-M 2108-02

PHONE (808) 594-1888

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
MAUI DISTRICT
650 PALAPALA DRIVE
KAHULUI, HAWAII 96732

April 12, 2002

Ms. Genevieve Salmonson, Director
State of Hawaii
Office of Environmental Quality Control
236 South Beretania Street, Suite 702
Honolulu, Hawaii 96813

Dear Ms. Salmonson:

SUBJECT: Draft Environmental Assessment – Interim Piilani Highway Improvements, Mokulele Highway to Kilohana Drive, Island of Maui

Thank you for your February 21, 2002 comments on the Draft Environmental Assessment for the proposed project.

The EA has been amended to assess the cumulative impacts of the subject project and the proposed Upcountry Highway. Additionally, a revision of the Acoustic Study now includes a discussion of the cumulative impacts of both projects.

If you have additional comments or concerns, please call me at (808) 873-3535.

Very truly yours,

FERDINAND CAJIGAL
District Engineer, Maui

FC:dmf

RECEIVED
DOT-HWYS
MAUI DISTRICT
2002 APR -2 PM 2:02

STATE OF HAWAI'I
OFFICE OF HAWAIIAN AFFAIRS
711 KAPIOLANI BOULEVARD, SUITE 500
HONOLULU, HAWAII 96813

March 25, 2002

HRD02/367

Ferdinand Cajigal
District Engineer, Maui
State of Hawaii Department of Transportation
Highways Division, Maui District
650 Palapala Drive
Kahului, HI 96732

Dear Mr. Cajigal:

Subject: Draft Environmental Assessment: Interim Piilani Highway Improvements, Mokulele Highway to Kilohana Drive

This is in response to the above referenced materials. From review of the materials, OHA understands that your determination is that no historic properties or cultural resources will be affected by this project. OHA will rely on your assurances that proper mitigation and consultation shall occur should any unanticipated or unidentified cultural, historic, or burial sites or items be encountered during project development.

Thank you for the opportunity to review and comment regarding the proposed project. If you have any questions, please contact Wayne Kawamura, Policy Analyst at 594-1945, or email him at waynek@oha.org.

Sincerely,

Puaalaokalani D. Aiu
Acting Director, Hawaiian Rights Division

PA:wk

cc: BOT
ADM

BENJAMIN J. CAYETANO
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
MAUI DISTRICT
650 PALAPALA DRIVE
KAHULUI, HAWAII 96732

BRIAN K. MINAAI
DIRECTOR

DEPUTY DIRECTORS
[illegible]
JADINE Y. URASAKI
Jean L. Oshita

IN REPLY REFER TO:

HWY-M 2.119-02

April 22, 2002

Ms. Puaalaokalani D. Aiu
Acting Director
Office of Hawaiian Affairs
711 Kapiolani Boulevard, Suite 500
Honolulu, Hawaii 96813

Dear Ms. Aiu:

SUBJECT: Draft Environmental Assessment – Interim Piilani Highway Improvements, Mokulele Highway to Kilohana Drive, Island of Maui

Thank you for your letter of March 25, 2002, on the referenced subject matter.

We enclose a letter from the Department of Land and Natural Resources, State Historic Preservation Division, requiring a mitigation plan to be submitted to SHPD prior to any ground disturbing activities and that an archaeological monitor be present during these activities within the Pu'uone Sand Deposits.

We confirm that an archaeological monitoring requirement and mitigation plan submittal will be incorporated into the project's specifications and contract documents as required by SHPD. These measures will assure that proper mitigation and consultation will occur to protect cultural resources which may be encountered during project development.

If you have further comments or questions, please call me at (808) 873-3535.

Very truly yours,

FERDINAND CAJIGAL
District Engineer, Maui

FC:dmf
Enclosure

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

RECEIVED
DOT-HWYS
MAUI DISTRICT OFFICE
2002 MAR 14 PM 2:06

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
HISTORIC PRESERVATION DIVISION
KAKUHIHEWA BUILDING, ROOM 555
601 KAMOKILA BOULEVARD
KAPOLEI, HAWAII 96707

GILBERT S. COLOMA-AGARAN, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCES MANAGEMENT

DEPUTIES
ERIC T. HIRANO
LINNEL NISHIOKA

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND
STATE PARKS

March 11, 2002

Mr. Ferdinand Cajigal
District Engineer, Maui
Department of Transportation - State of Hawaii
Highways Division - Maui District
650 Palapala Drive
Kahului, Hawaii 96732

LOG NO: 29357
DOC NO: 0203CD08

Dear Mr. Cajigal,

SUBJECT: **Chapter 6E-8 Historic Preservation Review Pertaining to the Draft Environmental Assessment for the Proposed Interim Pi'ilani Highway Improvements, Mokulele Highway to Kilohana Drive**
Various Ahupua'a, Wailuku and Makawao District, Island of Maui
TMK: (2) 2-1-015; 2-2-002; 2-2-024; 3-9-001; 3-9-024

Thank you for the opportunity to review and comment on the Draft Environmental Assessment (DEA) pertaining to the proposed Interim Pi'ilani Highway Improvements (Mokulele Highway to Kilohana Drive). Our review is based on reports, maps, and aerial photographs maintained at the State Historic Preservation Division; no field inspection was conducted of the subject parcel.

Based on the submitted DEA, we understand the proposed undertaking will be located along approximately 5.8 miles of the Pi'ilani Highway, extending from the intersection at Mokulele Highway to the intersection of Kilohana Drive. The proposed improvements will be conducted within the existing right-of-way and will include (but are not limited to), constructing an operational and functional drainage system; modifying intersections by removing and/or relocating median islands; relocating existing traffic signals, controllers, and traffic loops; adding, changing, and/or relocating regulatory traffic signs; installing interconnect cables from Mokulele Highway to Ohukai Road.

A search of our records indicates an archaeological inventory survey has not been conducted of the subject parcels. The general area seems likely to have once been the location of pre-Contact farming, perhaps with scattered houses. In addition, the DEA and the USDA Soil Survey indicate that portions of the proposed project corridor extend through Pu'uone Sand deposits. This type of deposit is known to contain both isolated and clusters of human burials, and possibly habitation deposits, as well. As the proposed project area has been previously disturbed during the initial highway construction, we believe it is possible that disturbed remnants of these types of historic sites may be present in portions of the proposed project corridor.

Given the above information, we recommend a qualified archaeological monitor be present during all ground disturbing activities located within the Pu'uone Sand Deposits in order to identify, document, record, and provide appropriate mitigation measures, as necessary. This should mitigate any adverse effects to significant historic sites that might occur. An acceptable monitoring plan will need to be submitted to this office for review prior to the commencement of any ground-disturbing activities. An acceptable report documenting the findings of the monitoring activities will need to be submitted to this office for review within 180 days of the completion of this project.

Please call Cathleen Dagher at 692-8023 if you have any questions.

Aloha,

Don Hibbard, Administrator
State Historic Preservation Division

CD:jen

c: Mr. Jim Nierman, R.M. Towill (fax: 842-1937)

✓ VC. Minaai(?)

MAR 1 8 2002

Council Chair
Patrick S. Kawano
Council Vice-Chair
Dain P. Kane
Presiding Officer Pro Tempore
Charmaine Tavares
Council Members
Alan M. Arakawa
Robert Carroll
G. Riki Hokama
Jo Anne Johnson
Michael J. Molina
Wayne K. Nishiki

COUNTY COUNCIL
COUNTY OF MAUI
200 S. HIGH STREET
WAILUKU, MAUI, HAWAII 96793

Director of Council Services
Ken R. Fukuoka

RECEIVED
DOT-HWYS
MAUI DISTRICT OFFICE
2002 MAR 14 PM 2:02

March 11, 2002

Brian K. Minaai, Director
State of Hawaii
Department of Transportation
Highways Division
Maui District Office
650 Palapala Drive
Kahului, HI 96732

Dear Mr. Minaai:

SUBJECT: Draft Environmental Assessment for Interim Piilani Highway Improvements, Mokulele Highway to Kilohana Drive, Maui

Relative to the above Draft Environmental Assessment I would like the applicant to address the following questions and concerns;

During extensive discussion on the Makena Resort Corporations' request for rezoning, your Deputy Directory, Jadine Y. Urasaki, twice told the County Council's Land Use Committee that any restriping of Piilani Highway would require an update to the Maui Long Range Transportation Plan. The Draft EA does not mention any necessary update. Can you please clarify the requirement to make any changes to the existing plan for widening Piilani Highway that is currently in the Maui Long Range Transportation Plan?

Your Draft EA states that it is the Makena Resort Corp. and WCPT/GW Land Associates, LLC who propose to implement restriping of Piilani Highway. Why are they not listed as the proposing applicant?

Both Makena Resort Corp. and WCPT/GW's land (known as Wailea 670) have received State District Boundary Amendments from the State Land Use Commission with conditions to fund, design, and construct their pro-rata share of the

necessary local and regional roadway improvements necessitated by their proposed developments. Has DOT made a determination as to what these pro-rata shares will be? Will the "voluntary" funding by the developer's for the interim restriping of the highway , in the total amount of $750,000 as stated in the Draft EA, be credited toward this eventual "pro-rata" share? Will the developers be required to contribute a pro-rata share to the eventual permanent widening of Piilani Highway?

Will the interim restripping of Piilani Highway delay scheduling and funding of the permanent widening of Piilani Highway as reflected in the Maui Long Range Transportation Plan?

Will the proposed interim alterations to Piilani Highway in any way affect the highways' future eligibility for Federal Highway funding?

Thank you for your attention to these concerns.

Sincerely,

Wayne K. Nishiki
Councilmember
South Maui District

xc: Munekiyo

BENJAMIN J. CAYETANO
GOVERNOR

APR 01 2002
BRIAN H. MINAAI
DIRECTOR

DEPUTY DIRECTORS
JADINE Y. URASAKI
Jean L. Oshita

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
MAUI DISTRICT
650 PALAPALA DRIVE
KAHULUI, HAWAII 96732

IN REPLY REFER TO:
HWY-M 2.094-02

March 27, 2002

The Honorable Wayne K. Nishiki
County Council
County of Maui
200 South High Street
Wailuku, Hawaii 96793

Dear Councilmember Nishiki:

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT FOR INTERIM PIILANI HIGHWAY IMPROVEMENTS, MOKULELE HIGHWAY TO KILOHANA DRIVE, MAUI

Thank you for your comments on the Draft Environmental Assessment for the subject project. We provide the following responses to the issues raised in your letter.

Project Relationship to Maui Long Range Transportation Plan:

The interim widening and related improvements to Piilani Highway, as proposed, are consistent with the findings of the Maui Long Range Transportation Plan (MLRTP). This plan identified the need for two additional lanes on Piilani Highway, from Mokulele Highway to Wailea. The proposed project will provide a short term, interim relief until the permanent widening improvements to Piilani Highway are built. In this context, the proposed project is consistent with the MLRTP.

Proposing Agency/Applicant:

Makena Resort Corp. and WCPT/GW Land Associates, LLC (developers) are not listed as the proposing applicant because this a State of Hawaii, Department of Transportation project. As such, the State of Hawaii, Department of Transportation is the applicant. The role of Makena Resort Corp. and WCPT/GW Land Associates, LLC is limited to their contribution towards the planning and design of the project. We also note that the County of Maui is a funding participant in this project.

Pro-Rata Share Pursuant to SLUC Conditions:

The State of Hawaii, Department of Transportation, has not finalized the pro rata share Makena Resort Corp. and WCPT/GW Land Associates, LLC must contribute towards local and regional roadway improvements as a condition of their State District Boundary Amendments. As established by agreement between the State Department of Transportation and Makena Resort Corp and WCPT/GW Land Associates, LLC, the developers' contribution towards the planning and design of the proposed project will be credited towards their pro rata share of local and regional roadway improvements. Makena Resort Corp. and WCPT/GW Land Associates, LLC may be required to contribute towards the permanent widening of Piilani Highway. As yet, this requirement has not been determined.

Implementation of Permanent Piilani Highway Improvements:

The proposed project will provide a timely response to improve operating conditions to Level of Service "D" or better during peak hour flows on Piilani Highway. As set out in the MLRTP, the permanent widening improvements to Piilani Highway are scheduled to occur between 2006 and 2020. Although the State Department of Transportation hopes to narrow this interval in the next update of the MLRTP, the proposed project will not delay plans for the permanent widening of Piilani Highway. Furthermore, the proposed project will not affect future eligibility for federal funding for the permanent widening of Piilani Highway.

Thank you once again for participating in the environmental review process. If you have any further questions please me at 873-3535.

Very truly yours,

FERDINAND CAJIGAL
District Engineer, Maui

FC:dmf

bcc: HWY (Dir Log #0437)
Munekiyo & Hiraga, Inc. (M. Hirano)

DEPARTMENT OF
HOUSING AND HUMAN CONCERNS
COUNTY OF MAUI

JAMES "KIMO" APA
Mayor
ALICE L. LEE
Director
PRISCILLA P. MIX
Deputy Director

200 SOUTH HIGH STREET • WAILUKU, HAWAII 96793 • PHONE (808) 270-7805 • FAX (808) 270-7165

February 11, 2002

RECEIVED
2002 FEB 19 PM 2:03
DOT-HWYS
MAUI DISTRICT

Mr. Ferdinand Cajigal
District Engineer, Maui
Highways Division
Department of Transportation
State of Hawaii
650 Palapala Drive
Kahului, Hawaii 96732

Dear Mr. Cajigal:

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT-INTERIM
PIILANI HIGHWAY IMPROVEMENTS,
MOKULELE HIGHWAY TO KILOHANA DRIVE,
ISLAND OF MAUI

We have reviewed the draft Environmental Assessment report for the subject project and wish to inform you that we have no comment to offer.

Thank you for the opportunity to comment. We are returning the draft Environmental Assessment report for your use.

Very truly yours,

ALICE L. LEE
Director

ETO:hs

Enclosure

c: Housing Administrator

XC: [illegible], 2/26/02)

0295

JAMES "KIMO" APANA
Mayor

FEB 20 2002
FLOYD S. MIYAZONO
Director

GLENN T. CORREA
Deputy Director

(808) 270-7230
Fax (808) 270-7934

DEPARTMENT OF PARKS & RECREATION

1550-C Kaahumanu Avenue, Wailuku, Hawaii 96793

February 12, 2002

RECEIVED
DOT-HWYS
MAUI DISTRICT OFFICE
2002 FEB 15 PM 6:31

Mr. Ferdinand Cajigal
District Engineer, Maui
State of Hawaii - DOT
Highways Division
650 Palapala Drive
Kahului, Hawaii 96732

Dear Mr. Cajigal:

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT
ITERM PIILANI HIGHWAY IMPROVEMENTS

Thank you for the opportunity to review and comment on the Draft Environmental Assessment for the subject project.

At this time, we have no comments or objections to the proposed action. If there are any questions, please contact me or Mr. Patrick Matsui, Chief of Parks Planning and Development, at 270-7387.

Sincerely,

Floyd S. Miyazono

FLOYD S. MIYAZONO
Director

c: Patrick Matsui, Chief - Parks Planning and Development

XC: Munekiyo (2/19/02)

JAMES "KIMO" APANA
Mayor

JOHN E. MIN
Director

CLAYTON I. YOSHIDA
Deputy Director

COUNTY OF MAUI
DEPARTMENT OF PLANNING

March 12, 2002

RECEIVED
DOT-HWYS
MAUI DISTRICT OFFICE
2002 MAR 19 PM 2:04

Mr. Ferdinand Cajigal, Maui District Engineer
Department of Transportation, Highways Division
Maui District Office
650 Palapala Drive
Kahului, Hawaii 96732

Dear Mr. Cajigal:

RE: Draft Environmental Assessment Comments for Interim Piilani Highway Improvements, Mokulele Highway to Kilohana Drive, Island of Maui

The Maui Planning Department has reviewed the referenced document and notes that our comments on the relationship of the County Special Management Area with the highway right-of-way, and the relationship of this project with the previously reviewed Mokulele Highway improvements have been addressed to our satisfaction.

We have no further comments to offer.

Should you have any questions, please contact Ms. Robyn Loudermilk, Staff Planner, of this office at 270-7735.

Very truly yours,

John E. Min

JOHN E. MIN
Planning Director

JEM:RLL:smb XC: Munekiyo
c: Clayton I. Yoshida, AICP, Deputy Planning Director
Mich Hirano, AICP, Munekiyo and Hiraga, Inc
Roy Figueiroa, Makena Resort
Charles Jencks, Wailea 670 Associates
Robyn L. Loudermilk, Staff Planner
Ann Cua, Staff Planner
Colleen Suyama, Staff Planner
General File
K:\WP_DOCS\PLANNING\LETTERS\ltr 2002\deapiilanihwy\dearesponse.wpd

JAMES "KIMO" APANA
Mayor

DAVID C. GOODE
Director

MILTON M. ARAKAWA, A.I.C.P.
Deputy Director

Telephone: (808) 270-7845
Fax: (808) 270-7955

COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS
AND WASTE MANAGEMENT
200 SOUTH HIGH STREET
WAILUKU, MAUI, HAWAII 96793

RALPH NAGAMINE, L.S., P.E.
Land Use and Codes Administration

TRACY TAKAMINE, P.E.
Wastewater Reclamation Division

LLOYD P.C.W. LEE, P.E.
Engineering Division

BRIAN HASHIRO, P.E.
Highways Division

JOHN D. HARDER
Solid Waste Division

March 25, 2002

Mr. Ferdinand Cajigal
Maui District Engineer
State Department of Transportation
Highways Division
650 Palapala Drive
Kahului, Maui, Hawaii 96732

Dear Mr. Cajigal:

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT FOR INTERIM PIILANI HIGHWAY IMPROVEMENTS (MOKULELE HIGHWAY TO KILOHANA DRIVE)

We have reviewed the subject document and firmly believe that the proposed project represents a significant beneficial step towards improving existing traffic congestion in South Maui. Our public opinion surveys, as well as comments we have received from the public, have consistently indicated that traffic congestion is at or near the top of the list of concerns which the public feels need to be addressed. The Mayor's Transportation Action Committee was convened in early 2001 to discuss directions for the future implementation of short-, mid- and long-term solutions to address traffic issues. Comprised of a broad cross section of the community, it should be emphasized that one of the Committee's recommendations is to restripe Piiiani Highway to allow four (4) lanes of travel.

We appreciate the efforts which the State Department of Transportation has made to expedite the planning and design of this important project. As you know, the process of obtaining approvals to improve an existing road can be quite challenging. We believe that the Department should vigorously pursue implementation of the subject project. Other alternatives such as widening of the Piilani Highway right-of-way to accommodate four (4) lanes or a new bypass highway mauka of Piilani Highway are likely to take significantly longer periods of time to complete construction. Thus, the consequences of delay will only mean worsening traffic congestion in South Maui for residents, businesses and visitors for years to come.

With these issues in mind, we would like to offer the following additional comments to the Draft Environmental Assessment.

We believe that the traffic signals in North Kihei at Mokulele, Uwapo, and Ohukai should be synchronized to maximize traffic flow through the area. Also, the traffic signals in Central Kihei at Piikea and Lipoa should be synchronized. Since the set of North Kihei traffic signals and the Central Kihei signals are located in fairly close proximity with each other, the benefits of synchronization can be maximized.

Since Piilani Highway is being restriped to four (4) lanes with two (2) travel lanes in each direction, the importance of having two (2) left-turn lanes from Mokulele onto Piilani Highway cannot be overemphasized. While we realize that Mokulele Highway improvements are proposed in phases, this project does underscore the importance of expeditiously completing construction at the Kihei end of Mokulele Highway.

Regarding the issue of bikeways, we concur that an alternative bike route is being implemented as part of the County's North-South Collector Road. A segment from Halekuai to Waipuilani is already in place with planning proceeding on the next segment from Waipuilani to Kaonoulu. Moreover, recently redeveloped segments of South Kihei Road also have bike lanes.

We would also like to request that a left-turn lane be included at the entrance to the County's Kihei Wastewater Reclamation Facility. This is also the entrance to Micro Gaia, a construction baseyard, as well as a composting operation. There have been several close calls for vehicles turning left into our facility. A left-turn lane would accommodate increasing vehicular turn movements, as well as improve the safety and operating characteristics of the highway in this vicinity.

Thank you for the opportunity to provide our comments. If you have any questions or need further information, please call me.

Sincerely,

DAVID GOODE
Director

DG:MA:jso
xc: Milton Arakawa, AICP, Deputy Director of Public Works and Waste Management
Lloyd Lee, Engineering Division Chief
s:\milton\dot

BENJAMIN J. CAYETANO
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
MAUI DISTRICT
650 PALAPALA DRIVE
KAHULUI, HAWAII 96732

BRIAN K. MINAAI
DIRECTOR

DEPUTY DIRECTORS
JADINE Y. URASAKI
Jean L. Oshita

IN REPLY REFER TO:

HWY-M 2.118-02

April 22, 2002

Mr. David C. Goode, Director
County of Maui
Department of Public Works & Waste Management
200 South High Street
Wailuku, Hawaii 96793

Dear Mr. Goode:

SUBJECT: Draft Environmental Assessment – Interim Piilani Highway Improvements, Mokulele Highway to Kilohana Drive

Thank you for your letter of March 25, 2002, on the above subject. In response to your comments, we offer the following information:

We acknowledge and agree that the proposed project will help address capacity and near capacity conditions on Piilani Highway. The implementation of this project is considered a high priority for our Department. We also agree with your comments that this project is an interim measure to relieve traffic congestion until the permanent widening of Piilani Highway is implemented or other long-term alternatives are considered.

We acknowledge your comments regarding the synchronization of traffic signals at Mokulele, Uwapo, and Okukai intersections to maximize traffic flow. As mentioned in the Draft EA, the installation of interconnect cables to coordinate the traffic signal system from Mokulele Highway to Ohukai Road was identified in the proposed improvements. The need for the interconnection of signals to facilitate traffic flow along this roadway segment was confirmed in the Traffic Assessment (Appendix A, Draft EA) and will be implemented with the proposed project. As also indicated in the Traffic Assessment Report, the Pi'ikea Street and Lipoa Street signals are already interconnected.

We acknowledge your comment with respect to the importance of having two left-turn lanes from Mokulele Highway onto Piilani Highway to facilitate traffic flow and will accommodate this movement in the proposed project.

We acknowledge your comment regarding the County's implementation of the bikeway system as part of the North-South Collector Road system. As appropriate, we will coordinate with your Department to ensure that adequate bike route linkages between Piilani Highway and local roads are implemented.

We acknowledge your request for a left-turn lane at the entrance to the County's Kihei Wastewater Reclamation Facility mauka of the Old Welakahao intersection. Based on our review of this request, we confirm that provisions for a left turn at this location would be appropriate within the scope of the proposed project.

Again, thank you for your comments. If you have additional concerns, please call me at 873-3535.

Very truly yours,

FERDINAND CAJIGAL
District Engineer, Maui

FC:dmf

APR 05 2002 Munekiyo

DEPARTMENT OF WATER SUPPLY
COUNTY OF MAUI
P.O. BOX 1109
WAILUKU, MAUI, HAWAII 96793-6109
Telephone (808) 270-7816 • Fax (808) 270-7833

March 13, 2002

Mr. Ferdinand Cajigal. District Engineer
State of Hawaii Department of Transportation
Highways Division, Maui District
650 Palapala Drive
Kahului, Hawaii 96732

Subject: Draft Environmental Assessment - Interim Piilani Highway Improvements, Mokulele Highway to Kilohana Drive,

Dear Mr. Cajigal,

Thank you for the opportunity to provide comments to this Draft Environmental Assessment.

Please refer to our comment letter to this project of November 19, 2001. We have no further comments at this time.

Should you have any questions, please contact the Water Resources Planning Division at 270-7199.

Sincerely,

David Craddick
Director
emb

enclosure

cc: Engineering Division

C:\WPdocs\EAs EISs\Interim Piilani Hwy Widening DEA.wpd

DEPARTMENT OF WATER SUPPLY
COUNTY OF MAUI
P.O. BOX 1109
WAILUKU, MAUI, HAWAII 96793-6109
Telephone (808) 270-7816 • Fax (808) 270-7833

November 19, 2001

Mr. Michael T. Munekiyo, A.I.C.P.
Munekiyo & Hiraga, Inc.
305 High Street
Wailuku, Hawaii 96793

Subject: Interim Piilani Highway Widening Improvements, Mokulele Highway to Kilohana Drive, Project No. 31AB-01-02

Dear Mr. Munekiyo,

Thank you for the opportunity to provide comments in preparation of the Draft Environmental Assessment.

There are several Department water lines in the project area. Construction plans need to be reviewed by the Department of Water Supply. Water valve covers must be lifted to match the finished grade of the roadway. Enclosed are sections of our water system map pertaining to the project area. Please contact our engineering division at 270-7835 in regard to these issues.

We have attached Best Management Practices (BMPs) for principle operations for your reference. These are designed to minimize infiltration from all construction activities and related vehicle operations. Additional information is available from the State Department of Health.

In order to conserve water resources, we recommend the following measures:

- Use non-potable water, where feasible, for dust control and any irrigation during and after construction.
- Use climate-adapted and salt-tolerant native plants where any roadside landscaping is intended and when revegetating the construction corridors. The project site is located in "Maui County Planting Plan" - Plant Zones 3 and 5. Please refer to the "Maui County Planting Plan", and to the attached documents. Native plants adapted to the area, conserve water and further protect the watershed from degradation due to invasive alien species.

Should you have any questions, please contact the Water Resources Planning Division at 270-7199.

Sincerely,

David Craddick
Director
emb

MAR 0 5 2002

JAMES "KIMO" APANA
MAYOR

OFFICE OF THE MAYOR
Ke'ena O Ka Meia

COUNTY OF MAUI
Kalana O Maui

200 South High Street
Wailuku, Maui, Hawaii USA
96793-2155
Telephone (808) 270-7855
Fax (808) 270-7870
e-mail: mayors.office@co.maui.hi.us

February 22, 2002

2002 FEB 27 PM 2:15
RECEIVED
MAUI DISTRICT OFFICE
DOT-HWYS

Mr. Ferdiand Cajigal
District Engineer, Maui
State Department of Transportation
650 Papapala Drive
Kahului, HI 96793

Dear Mr. Cajigal:

Re: **Draft Environmental Assessment - Interim Piilani Highway Improvements Mokulele Highway to Kilohana Drive, Island of Maui**

Thank you for the opportunity to comment on the referenced draft Environmental Assessment.

The project entails widening the existing pavement surface in order to accommodate two additional travel lanes, one in each direction. This improvement is deemed to be an interim mitigative measure to meet current traffic demands and is not intended to create additional capacity to meet any future demands created by planned developments.

At the present time the portion of Piilani Highway affected by the project is accessed via 14 intersections 7 of which are signalized. In order for the Level of Service (LOS) to be improved to the target of LOS C, two more signals would need to be installed (Kaonoulu and Welakahao) and the remaining five unsignalized intersections would need to be converted to right-turn movements only. As the plan does not call for any further signalization it is assumed that all seven currently unsignalized intersections would need to be converted to right-turn-in/right-turn-out only. The left-turn movements currently allowed would therefore need to be diverted to signalized intersections. What impacts would this have on other roadway systems in South Maui, particularly South Kihei Road? The current left turn movements onto Piilani Highway from the unsignalized intersections are significant and will likely increase. Also to be considered are the signal timing sequences. If more traffic is diverted to signalized intersections, the green time would likely need to increased on the cross-streets which may impact the efficiency of the planned Piilani Highway widening improvements.

The existing bike route system should be diverted to a location off the Piilani Highway. The plan shows the shoulders being decreased to 6 feet and down to 2 feet across the bridges. Having bicycle traffic competing with automobile traffic for this limited area would not be in the cyclist's best interest even though it is planned to decrease the speed limited to 40MPH due to decreased lane width. A temporary bike path to be located within the county's planned N/S Collector Road right-of-way should be part of this planning initiative.

In the longer term, the Piilani Highway should be considered as a limited-access facility with access at selected locations only via grade separated intersections. Planning and land use allocations should be initiated at this time to achieve this long term goal.

The County of Maui supports this interim measure as it will address current demand situations however would urge the State Department of Transportation to continue with long term plans for permanent highway improvements.

Yours truly,

JAMES "KIMO" APANA
Mayor, County of Maui

cc: David Goode, Director
Department of Public Works and Waste Management
John E. Min, Director
Department of Planning
Don Medeiros, Transportation Coordinator
Brian Miskae, Long Range Planning Division

S/Mayor/letters/Cajugal-PiilaniDEA: JA/BM

ye. Munekiyo

BENJAMIN J. CAYETANO
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
MAUI DISTRICT
650 PALAPALA DRIVE
KAHULUI, HAWAII 96732

BRIAN K. MINAAI
DIRECTOR

DEPUTY DIRECTORS

JADINE Y. URASAKI
Jean L. Oshita

IN REPLY REFER TO:
HWY-M 2.134-02

April 25, 2002

The Honorable James "Kimo" Apana
Mayor, County of Maui
200 South High Street
Wailuku, Hawaii 96793

Dear Mayor Apana:

SUBJECT: Draft Environmental Assessment - Interim Piilani Highway Improvements, Mokulele Highway to Kilohana Drive

Thank you for your letter of February 22, 2002, providing comments in response to the above subject. We wish to respond to your comments as follows.

Interim Improvements

The interim improvements indicate that the project is intended to meet demands for less than the normal 20-year planning horizon. The proposed project will provide a timely response to improve roadway operating conditions and improve the level of service to LOS D or better during peak hour flows on Piilani Highway. The Traffic Assessment Report, prepared by Julian Ng, Inc. estimates that the improvements will increase capacity to meet projected demand over the next few years.

Left Turn Restrictions at Unsignalized Intersections

The net effect of the left turn restriction has been estimated to be less than 100 vehicles per hour in any segment of South Kihei Road, and less than 35 vehicles per hour for left turn movements, which are most affected by increased traffic volumes, at any intersection.

In more general terms, increases in traffic volumes on South Kihei Road will be greater if Piilani Highway is not widened. If improvements are not made on Piilani Highway resulting in increased

peak-hour congestion, some of the traffic that would otherwise use Piilani Highway would seek an alternative path, in this case South Kihei Road. Additional discussion of impacts to other streets in the Kihei area are being addressed in the update to the Kihei traffic master plan that is currently being prepared for the County of Maui.

Bike Route

Based on comments we have received from the public during the Draft EA review period, we have revised our bike route system within the proposed project limits to allow for a 5-foot bike route through the intersections and will provide appropriate signage at bridges to inform both drivers and cyclists of shared road conditions. These revisions would improve safety for cyclists using the bike route. We understand the County is intending to provide an alternative bike path system within the N/S Collector right-of-way as per the Kihei-Makena Community Plan. We acknowledge that in the future further discussion needs to take place between State Department of Transportation and the County to plan for the eventual provision of this alternate route and how the bike route on Piilani Highway can be rerouted to the County bike path.

Long Term Planning for Piilani Highway

Your comments with respect to the long-term plans for Piilani Highway are noted. The State Department of Transportation will review these comments in the context of the next update of the Maui Long Range Transportation Plan.

In closing the State Department of Transportation acknowledges and appreciates the County of Maui's support and funds committed toward the proposed project. We look forward to working with you to ensure the project's timely implementation.

Very truly yours,

Ferdinand Cajigal
District Engineer, Maui

FC:dmf

JAMES "KIMO" APANA
MAYOR

OUR REFERENCE
ty
YOUR REFERENCE

POLICE DEPARTMENT
COUNTY OF MAUI

55 MAHALANI STREET
WAILUKU, HAWAII 96793
(808) 244-6400
FAX (808) 244-6411

MAR 0 6 2002

THOMAS M. PHILLIPS
CHIEF OF POLICE

KEKUHAUPIO R. AKANA
DEPUTY CHIEF OF POLICE

March 1, 2002

RECEIVED
DOT-HWYS
MAUI DISTRICT OFFICE
2002 MAR -5 PM 5:39

Mr. Ferdinand Cajigal
State Dept. Of Transportation
Highways Division
650 Palapala Drive
Kahului, HI 96732

Dear Mr. Cajigal:

SUBJECT: Draft Environmental Assessment - Interim Piilani Highway Improvements, Mokulele Highway to Kilohana Drive

Thank you for your letter of February 5, 2002, requesting comments on the above subject.

We have reviewed the proposed summary and have no comments or recommendations at this time. Thank you for giving us the opportunity to comment on the proposed project. We are returning the Draft EA which was submitted for our review.

Very truly yours,

Assistant Chief Robert Tam Ho
for: Thomas M. Phillips
Chief of Police

Enclosure

c: John E. Min, Planning Department

xc: Munekiyo

APR 17 2002
COPY

KIHEI COMMUNITY ASSOCIATION

P.O. Box 662, Kihei, HI 96753 Phone/Fax: (808) 879-5390 E-Mail: kca@southmaui.org

April 11, 2002

RECEIVED
DOT-HWYS
MAUI DISTRICT OFFICE
2002 APR 15 PM 2:10

Mr. Ferdinand Cajigal
District Manager Dept of Transportation
Highways Division
Maui District
650 Palapala Drive
Kahului, Hawaii 96732

Dear Mr. Cajigal

Subject: Interim Piilani Highway Improvements: (Mokulele Highway to Kilohana Drive)

The Kihei Community Association Planning and Development Committee met Monday March 25 to discuss the Draft Environmental Assessment. The following are comments and concerns.

1. The Kihei Community Association is strongly apposed to any highway plan that is not a divided highway as the Kihei/Makena Community plan demands. This Highway plan, if implemented, will be extremely dangerous to motorists with 10 ft. wide traffic lanes on the bridges per typical bridge section in the EA. The personal injury attorneys must be salivating at the opportunity to litigate cases by their future maimed clients injured in collisions as a result of this design. A grade separated highway median with trees and bushes would certainly be money well spent now to avoid future pain and suffering.

2. The Kihei Community Association is strongly apposed to any Sound Attenuation walls of any kind. Kihei 2000 and KCA have worked years with the DOT to develop the hedge and tree lined highway that exists. The Sound Attenuation walls negate all community plans to preserve open space and view corridors. These walls are not acceptable under any conditions. Here again this problem could be solved with a 4 lane divided highway per the Kihei/Makena Community Plan.

3. We suggest that any highway improvements include a reclaimed water line from the County of Maui wastewater plant to both sides and down the middle graded separation of the highway to water trees and shrubs.

4. A separate bike/pedestrian path must be included to encourage alternative forms of transportation in connecting this linear community especially for kids traveling to the schools and parks.

The Kihei Community Association Planning and Development Committee recognizes the need to make improvements to the Piilani Highway. This highway, 5.8 miles, can to be done with respect for our environment and citizens. The Kihei Community is the fastest growing in the state with Wailea 670 and Makena, large private developments, that plan and build beautiful communities for the future. It is time that Kihei plan and build for the future the right way not with the band-aid short-sited approach this plan represents.

The Kihei Community Association is a non-profit citizens volunteer group with a 42 year track record of promoting the needs of our community. Our mission statement is to create a beautiful town within a park. We prefer to work in partnership with the State DOT.

Sincerely.

Daniel F.Wuthrich
Member Planning and Development Committee
Kihei Community Association

KC: MuneKiyo

BENJAMIN J. CAYETANO
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
MAUI DISTRICT
650 PALAPALA DRIVE
KAHULUI, HAWAII 96732

BRIAN K. MINAAI
DIRECTOR

DEPUTY DIRECTORS
XXXXXXXXXXXXXXXX
JADINE Y. URASAKI
Jean L. Oshita

IN REPLY REFER TO:

HW-M 2.123-02

April 23, 2002

Mr. Daniel F. Wuthrich
Member, Planning and Development Committee
Kihei Community Association
P.O. Box 662
Kihei, Hawaii 96753

Dear Mr. Wuthrich,

SUBJECT: Draft Environmental Assessment - Interim Piilani Highway Improvements
Mokulele Highway to Kilohana Drive

Thank you for your letter of April 11, 2002, presenting the Kihei Community Association Planning and Development Committee's comments on the above subject. We offer the following information in response to your comments.

Response to Item 1.

We acknowledge your comment with respect to the goal of a divided highway with a grade separated highway median. We wish to note that the restriping of the highway from 2-lanes to 4-lanes was identified by the Mayor's Transportation Action Committee after extensive community consultation as an interim action to address present capacity and near capacity conditions on Piilani Highway. Although the grade separated highway median is beyond the scope of the interim improvements, this work may be considered within the scope of future permanent widening improvements. The reduced travel lane widths are based on acceptable guidelines set by the American Association of State Highway Transportation Officials (AASHTO). The typical section illustrated in Appendix B, Draft EA has been adjusted to provide a 2-foot shoulder and four 11-foot travel lanes. Based on the procedures of Highway Capacity Manual (2000) by the Transportation Research Board, National Research Council, there will be a 5 mph reduction in the speed limit due to the narrowing of lanes.

Response to Item 2.

We acknowledge the KCA's position regarding the sound attenuation walls. We confirm that sound attenuation walls are not part of this project since modeled increases in the acoustical environment as a result of the proposed project are well below the State "15 dB increase" criteria for significant change.

Response to Item 3.

We acknowledge your comments regarding inclusion of a reclaimed water line from the County's Kihei Wastewater Treatment Facility for landscape irrigation. Although this work is not provided in the proposed interim project, provision of irrigation for highway landscaping may be considered within the scope of future permanent widening improvements.

Response to Item 4.

The present bike route along the Piilani Highway will be maintained. Pedestrian crosswalks and signalization as appropriate at the intersections will be provided. In regard to your comment about alternative routes, we acknowledge the County of Maui's implementation of the North-South Collector system and the bike and pedestrian facilities planned within this corridor. The Department of Transportation will coordinate with the County of Maui, Department of Public Works and Waste Management, as appropriate, to ensure adequate bike route linkages between Piilani Highway and local roads are implemented.

We acknowledge KCA's recognition for the need to make improvements to the Piilani Highway. In this context, the Department of Transportation considers this improvement project a critical capital project that will address the current and near term capacity issues in a timely manner.

Again, thank you very much your comments on behalf of the Kihei Community Association. We share your desire for a cooperative partnership and appreciate your participation in the project environmental review process.

Very truly yours

FERDINAND CAJIGAL
District Engineer, Maui

FC:dmf

Maui Electric Company, Ltd. • 210 West Kamehameha Avenue • PO Box 398 • Kahului, Maui, HI 96733-6898 • (808) 871-846

February 13, 2002

Mr. Ferdinand Cajigal
District Engineer, Maui
State of Hawaii Department of Transportation
Highways Division, Maui District
650 Palapala Dr.
Kahului, HI 96732

Dear Mr. Cajigal:

Subject: Draft Environmental Assessment – Interim Piilani Highway Improvements, Mokulele Highway to Kilohana Drive, Island of Maui

Thank you for allowing us to comment on the subject project.

In reviewing the information transmitted and our records, we have no objection to the subject project. Please reference Maui Electric's letter dated November 20, 2001 to Munekiyo & Hiraga, Inc. for our earlier comments. (See attached)

If you have any questions or concerns, please call Dan Takahata at 871-2385.

Sincerely,

Neal Shinyama
Manager, Energy Delivery

Attachment

XC: Munekiyo (2/19/02)

Maui Electric Company, Ltd. • 210 West Kamehameha Avenue • PO Box 398 • Kahului, Maui, HI 96733-6898 • (808) 871-64

NOV 2 1 20

November 20, 2001

Mr. Michael T. Munekiyo, A.I.C.P.
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, HI 96793

Subject: Interim Piilani Highway Widening Improvements
Mokulele Highway to Kilohana Drive, Project No. 31AB-01-02

Dear Mr. Munekiyo,

We appreciate the opportunity to comment on this project per your letter dated November 12, 2001. We have no objections to your request for the subject project.

However, we suspect our Company must review the subject project's detailed plans to address possible relocation of Maui Electric facilities. We would like to take this opportunity to mention that a design submittal and project timeframe from the project's consultant would be greatly appreciated.

Should you have any further questions, please contact me at (808) 871-2366.

Sincerely,

Gregorysenn Kauhi
Distribution Engineering Supervisor

BENJAMIN J. CAYETANO
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
MAUI DISTRICT
650 PALAPALA DRIVE
KAHULUI, HAWAII 96732

BRIAN K. MINAAI
DIRECTOR

DEPUTY DIRECTORS
JADINE Y. URASAKI
Jean L. Oshita

IN REPLY REFER TO:

HWY-M 2.111-02

April 15, 2002

Mr. Neal Shinyama
Manager, Energy Delivery
Maui Electric Company, Ltd.
210 West Kamehameha Avenue
Kahului, Hawaii 96732

Dear Mr. Shinyama:

SUBJECT: Draft Environmental Assessment – Interim Piilani Highway Improvements, Mokulele Highway to Kilohana Drive, Island of Maui

Thank you for your letter of February 13, 2002, on the referenced project.

We acknowledge your request to review the project's detailed plans and time frame to address possible impacts on your facilities. The request has been forwarded to the project engineers for their information and appropriate attention.

If you have any further comments or questions, please call me at 873-3535.

Very truly yours,

FERDINAND CAJIGAL
District Engineer, Maui

FC:dmf

Maui Meadows Homeowners Association
P.O. Box 1935, Kihei, Maui, HI 96753

MAR 0 8 2002

February 28, 2002

Ferdinand Cajigal
District Engineer, Maui
State Department of Transportation
Highway Division
650 Palapala Drive
Kahului, HI 96732

Dear Mr Cajigal:

Subject: Draft Environmental Assessment
Interim Piilani Highway Improvement
Mokulele Highway to Kilohana Drive
Island of Maui

2002 MAR -5 P1 5:40
RECEIVED
HWY DIST-MAUI
DEPT OF TRANS

As requested, we have reviewed the referenced Draft EA. The attached letter dated February 28, 2002 from Vice President James Willliamson provides the comments of our Association.

If you have any questions, direct them to him at telephone: 874-6151.

Sincerely,

Dorothy R. Williams

Dorothy R. Williams, President

Enclosure
cc: Mayor James (Kimo) Apana
David Goode, Director, Department of Public Works
Representative Chris Halford
Council Member Jo Anne Johnson
Council Member Pat Kawano, Council Chair
Don Medeiros, County Traffic Coordinator
Brian Minaai, Director, State Department of Transportation
Council Member Wayne Nishiki, South Maui Representative
Tom Phillips, Police Chief
Bob Siarot, State Department of Transportation, Maui District
Bert Toba, R. M. Towhill Corporation
Abraham Wong, Federal Highway Administration, Honolulu

Maui Meadows Homeowners Association
P.O. Box 1935, Kihei, Maui, HI 96753

February 28, 2002

Dorothy R. Williams, President

Subject: Draft Environmental Assessment
Interim Piilani Highway Improvements
Mokulele Highway to Kilohana Drive
January, 2002

As requested, I have reviewed the subject document. My comments to be forwarded to the State Department of Transportation on behalf of the Maui Meadows Homeowners Association. follow:

I. GENERAL

1) The title of this draft EA is misleading.
   a) This is not an INTERIM four lane highway, since no final solution is presented. The term "interim" was apparently introduced so that there is a basis for relaxing highway design standards, including project life, as has been done throughout this document. We, and others, have objected to the interim label, since once this construction to four lanes is completed, it will be almost impossible to obtain financing for a final fix for many years. if ever, beyond 2011.
   b) As I will discuss in my detailed comments, the proposed changes are not IMPROVEMENTS. Instead, the result will be to change the existing Piilani Highway from a well designed two lane arterial highway to a substandard four lane urban road, with reduced speed limit and safety.
   c) The draft EA relates to discontinuing the four lane work at KILOHANA DRIVE at Maui Meadows. Our association, and others, have objected to the concept of only partly making the change to Piilani Highway. Further, at the Maui County Planning Commission workshop on July 32, 2001, the project traffic consultant, Wayne Yoshioka assured all of us that earlier plans to stop the restriping at Kilohana Drive had been scrapped to create the four lane road all the way to Wailea Ike Drive. This was reported in The Maui News; just who are we to believe?

2) The Project Manager in charge of preparing the draft EA is a principal of the firm Munekiyo & Hiraga, Inc. This is a conflict of interest, since this same firm is a consultant to the Wailea 670 developer WCPT/GW Land Associates.

3) The bike lanes as prescribed by Federal Highway administration regulations, have been eliminated. However, the alternative given for the same width limits and continuity of these routes is vague at best.

4) I understand the design on the change to four lanes is proceeding space. The EA process should be completed before any design starts. Following this procedure is essential, since comments on the EA could result in major changes to the project concept and design.

5) I believe that approval of these "improvements" by the Federal Highway Administration is necessary. The existing highway was 90% financed by the FHWA to its standards, and adequate bike lanes incorporated to meet its requirements. How can a structure built using taxpayers' money be changed to a lowered standard of engineering and safety?

6) With all of the adverse impacts of the "improvements" project discussed herein, I believe it requires an EIS rather than an EA.

II. DETAILED COMMENTS

1) P. 10 - It is incomprehensible to me that an INTERIM fix is being contemplated to meet traffic needs on Piilani Highway for only six years (2005 to 2011). The traveling public will be subject to significant disruption during the construction period which I estimate to last for about eighteen months. This, for a six year substandard plan to "improve" the major highway route in South Maui which will cost the County and State millions of dollars. What then! It should be noted that the existing highway has been in operation since 1980.

2) P. 10 - My comments on the traffic assessment are included under Appendix A.

3) P. 12 and Appendix B - "Proposed Improvements"
As I have said before, the devil is in the details:
a) The existing 10 foot shoulders are not being overlayed with asphaltic concrete to "provide proper cross slope." Instead, the AC, with 2% cross slope as shown in Appendix B (versus 5% existing), is necessary to arrive at the same outside pavement thickness as the existing travel lanes for adequate strength.
b) The existing main pavement consists of 5-3/4" AC, 6" aggregate base and 6" subbase, whereas the outer limits of the existing shoulder has only about 2-1/4" AC, presumably on the same underlying thicknesses of base layers. With the corrected cross slope, the structural strength at the edge of the existing shoulder may be adequate. However, immediately beyond this toward the gutter there is a plane of serious weakness unless the basic thicknesses are extended toward the gutter, to provide support for traffic.
c) 2" AC over a "leveling" course for the new shoulder will not provide adequate capacity in the gutter area, and early failures are certain with the arrangement shown.
d) I disagree with eliminating the gutter for this improvement! Much of the highway length is in cut and a grass swale is not possible. Even where the road is in fill erosion of the embankment is again possible.
e) Where the roadway section has rock cuts, the shoulders will meet the toe of the excavation which is another unsafe condition (question: what are concrete strips?).
f) Shoulders of 6 foot width are narrow enough. However, reducing this width at bridges to 2 foot is completely unacceptable and I believe was outlawed by the FHWA for safety reasons years ago. The existing highway not only continues the 10 shoulders across bridges, but in addition provides 2 foot more of clearance. The bridges must be WIDENED.
g) A four lane road without a dividing median strip is marginal. However, a double line between opposing lanes is a must and will reduce the nominal width of lanes to less than 11 feet.
h) Shoulder lane passage through intersections by removing the median islands is considered too hazardous when added to very overcrowded intersections.
i) As discussed in Appendix A, prohibiting left turn movements at unsignalized intersections will be difficult to enforce.
j) It is stated that all work will be conducted within the State right-of-way. However, in a number of locations the existing right-of-way doesn't allow this. For example, top of cut slopes are already at the boundary fence line, and it will be impossible to fit in the new cross section.
k) The cross slopes shown in Fig. 8 do not agree with Appendix B, and this drawing is incorrect.

4) P. 14 - Costs and Time Schedule:
a) It is not possible to make a reasonable estimate of the cost of the work and its schedule, without any solid information being given. The EA has to include a breakdown by item and costs of the various work tasks for a reasonable review to be made. Also, a critical path schedule is a necessary component.
b) There is no backup material to substantiate the total estimated cost of the work at $4 million. In my judgement, the cost will far exceed this estimate and could even be twice that, or more.
c) Similarly, the estimated schedule for construction is not substantiated. It is my judgement that the time could be a least 18 months. Considering the upfront time for the environmental process, permitting, design, contract bidding and award, it would not be reasonable to expect construction to be completed sooner than the end of 2004.

5) P. 29 - There is no way the project can start in July 2002 and be completed in 2003. As stated above, a more reasonable estimate for finishing the work is a year later.

As discussed previously, the public opposed the concept of terminating the improvements at Kilohana Drive instead of Wailea Ike Drive.

6) P. 30, 50 - The Bike Route system, which is also part of the HDOT's own Bike Plan Hawaii Master Plan, will be eliminated. Page 50 discusses the use of the 6 foot shoulders (2 foot, or is it 3 foot at bridges) for bike use. This cannot be a serious suggestion. It would be COMPLETELY UNSAFE for motorists and bikes. Bicycles should be <u>banned</u> from the four lane road.

7) P. 32, 33, 51 - As discussed previously, the concept of collecting drainage in grass swales is not for the most part practical since much of the highway road section is below grade, i.e. in cut. P. 51 relates to concrete strips being laid at the toe of cut slopes, but no details are given. Furthermore, there will not be room available for any kind of drain once the existing gutter is covered over.

8) P. 35, 36 - Regarding noise study and conclusions, see our comments for Appendix C.

9) P. 46, 48 - Because of the restrictions to traffic flow, including the reduction in speed limit, as discussed in my comments for P. 12 and Appendix A, there will probably be a <u>reduction</u> in the level of service with the "improvements."

10) P. 69 - The discussion on alternatives to the proposed action dismisses a permanent solution in view of higher costs and the need for a timely response due to the current heavy traffic situation. These "constraints" are no excuse for the substandard current road proposal with reduced safety. As I said before, let's do it right the first time even if it requires more time

The obvious alternative to the poorly conceived proposal, not mentioned in the EA, is an additional two lanes Mauka generally paralleling the existing highway. This route commencing at the junction of Mokulele Highway would proceed on ranch land around the residential developments near Waiakoa Gulch, Mauka of the Technology Park and Ellair Golf Course, and then going back south, too close to, but separate from the Piilani Highway. It would pass through land zoned agricultural and across some park land. It would terminate at the junction of Piilani Highway and Kilohana Drive. I am unaware of the HDOT's plans for a permanent route, but surely they must have one.

Because of the obvious need to reduce the traffic congestion on the existing highway in a sound engineering manner as soon as possible, I have the following recommendation. Since expanding Piilani must have priority over Mokulele, defer further work on the Mokulele Highway widening project after Phase II A. Use the remaining funds from that project to go toward design and construction of an additional two lanes for Piilani Highway as discussed above, on a fast track basis. This effort will be costly and take time, but it will result in a solution with a long life, like the existing highway, instead of just six years. Further it will be well designed and a safe structure, meeting all applicable AASHTO standards. It will also avoid impacting the existing highway during construction.

11) P. 75 - For reasons discussed previously, the "improvements" will not increase the handling capacity of Piilani Highway, or provide for the orderly accommodation of short-term traffic projections.

12) P. 78 - How can there be a final finding of no significant impact, when these "improvements" change the existing well designed two lane arterial highway to a substandard four lane urban road? The change would result in speed limit reduction. Safety would be lowered with narrow lanes, minimal shoulder width, no median strip and congested intersections.

III. APPENDIX A. Traffic Assessment Report

1) P. 2 - Free flow speed on the highway is 55 mph, but the speed limit is posted at 45 mph What relevance does the free flow speed limit have when the highway cannot now pass the traffic at 45 mph?

2) P. 3 - From our observation looking down on the stretch of Piilani Highway from Kilohana Drive to Wailea Ike Drive, we do not believe that the traffic volume is half that of north of Kilohana. Regardless, if four lanes of traffic is dumped onto a two lane road, there could be congestion problems on this stretch adjacent to Maui Meadows.

3) Table 4 shows that the average delay at the Kilohana Drive traffic signal is much greater than at Ke Alii Alanui. This is not our experience.

4) P. 9 - If the proposed lower speed limit of 40 mph is consistent with the geometry of the proposed roadway, how on earth can the design be based on 50 mph? With the limitations imposed on the design cross section as we have discussed previously, it is doubtful that traffic level of service C and D can be attained. Furthermore, AASHTO requirements could result in an even lower speed limit (e.g. 35 mph) for safety, particularly with two additional traffic signals. Question: how do lower speed limits equate with easing the present traffic congestion?

5) P. 10, 11 - Eliminating left turns from the intersections listed in Table 9 will be difficult to enforce.

6) P. 11 - If an Upcountry Road is connected at Kaonoulu Street, we believe that traffic south of this intersection will be increased, not north of it. This is because much of the existing peak traffic results from upcountry residents traveling to work at South Maui hotels.

IV. APPENDIX C. Acoustic Study

1) P. 1 - The summary states that traffic noise mitigation by noise barriers, complete with landscaping on the roadway side, may be applied at the affected residences. It goes on to say that the need for these barriers should be examined according to criteria of reasonable and feasible.

What is the purpose of preparing a voluminous acoustic study, when the need for mitigation is ignored because it would cost too much (See also p. 42)? In other words, the affected residences will just have to put up with even more noise.

2) P. 2 - Because this is an interim "improvement" project, the rationale is to consider the work as remedial, so that Federal and State noise abatement criteria can be ignored. Hence, investments in noise mitigation should be deferred until more substantial improvements are made to Piilani Highway. This is impossible, since substantial improvements to the highway will be made in another location because there is no room in the existing right-of-way.

3) Table 6, Footnote 3 - Relates to the noise attenuation provided by a 4.92 foot high noise barrier not meeting the HDOT's own 55 dB attenuation criteria for the full length of the highway. Of course, the noise will be much louder, since no such barrier is planned.

4) P. 36 - Landscaping on the roadway side of the 7 to 10 foot high walls is recommended to soften the visual impacts of the walls. It doesn't mention that there is not enough room in the highway right-of-way for even a 5 foot wall, let alone landscaping.

5) P. 42 - States that because of cost, the sound attenuation walls can be considered unreasonable because these added costs could make the highway restriping job infeasible.
So, why do the study when this is known from the beginning?

Any questions call,

James Williamson, Vice President, P.E. 5370

BENJAMIN J. CAYETANO
GOVERNOR

BRIAN K. MINAAI
DIRECTOR

DEPUTY DIRECTORS
JADINE Y. URASAKI
Jean L. Oshita

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
MAUI DISTRICT
650 PALAPALA DRIVE
KAHULUI, HAWAII 96732

IN REPLY REFER TO:

HWY-M 2.126-02

April 23, 2002

Ms. Dorothy R. Williams, President
Maui Meadows Homeowners Association
P.O. Box 1935
Kihei, Maui, Hawaii 96753

Dear Ms. Williams:

SUBJECT: Draft Environmental Assessment - Interim Piilani Highway Improvements(Mokulele Highway to Kilohana Drive), Maui, Hawaii

Thank you for your letter of February 28 on the above subject. We offer the following information in response to your comments.

Response to Item I, General

1. a. The interim improvements indicates that the project is intended to meet demands for less than the normal 20-year planning horizon. In Appendix A, Traffic Assessment Report, Julian Ng, Inc., January 2002, it states, The proposed project is an interim project being designed for traffic volumes expected in year 2011" (Page 7)

b. As set out in the Draft EA, Chapter 1, B. 2., all plans, specifications and estimates for the proposed improvements shall be in compliance with State of Hawaii, Department of Transportation requirements and standards.

c. The project limits were defined as Mokulele Highway to Kilohana Drive. As indicated in the Draft EA, Appendix A, Table 1, existing traffic volumes on the segment from Mokulele Highway to Lipoa Street are about 25 percent greater than traffic volumes on the segment from Lipoa Street to Kilohana Drive. Traffic volumes on the segment between Kilohana Drive and Wailea Ike Drive are about 55 percent of those on the segment from Lipoa Street to Kilohana Drive. The proposed project seeks to improve those portions of the highway that have the greatest need. We note that earlier comments before the Maui Planning Commission relative to the project limits were incorrect.

2. Munekiyo & Hiraga, Inc. are providing consulting services under the direction of the State Department of Transportation, Highways Division. Although contributions towards planning and design are being made by private landowners, project control in terms of design management, design criteria

formation and construction implementation is within the full jurisdiction of the DOT. We also believe that the processes established through Chapter 343, HRS and HAR Title 11 provide a sound mechanism for enabling open public input to project development. In this regard, we do not see any issues of conflict with regard to our consultant team.

3. The existing bike route on Piilani Highway will not be eliminated with the proposed improvements. A 6-foot wide bike route will be provided on both shoulders of the highway, a 5-foot wide bike route will be provided through intersections, and at bridges where only a 2-foot wide shoulder will be provided, bicyclist will share the road with vehicles. Appropriate signage will be posted to warn bicyclists and motorists to share the road at bridges. The bike route is designed according to the Manual on Uniform Traffic Devices (MUTCD).

4. The State Department of Transportation is following a critical path for the proposed project where project design is proceeding in parallel with the environmental assessment and review process. We note that comments received during the 30-day comment period have been considered with respect to the project s basis of design. If design modifications are deemed appropriate as a result of the comments, such modifications will be described in the Final EA, as appropriate. Construction contracts will not be awarded until the Final EA with a Finding of No Significant Impact (FONSI) has been filed with the Office of Environmental Quality Control and published in The Environmental Notice.

5. The proposed improvements are funded by private, State and County funds within the State highway right-of-way. No federal funds will be applied to the proposed project and FHWA approval is not required for the proposed project. We note that the proposed improvements will be constructed in compliance with State highway design standards to ensure the continued functional and operational integrity of the highway.

6. a. The proposed action has been assessed with regard to significance criteria set forth in HAR Title 11. Based on this analysis, we believe the proposed action will have no significant impacts. It is in this context that we anticipate the filing of the Final EA as a Findings of No Significant Impact or FONSI.

Response to Item II, Detailed Comments

1. As stated in the Draft EA (p.76) the proposed improvements are intended to address current and near-term capacity constraints attributed to traffic generated within the greater Kihei-Makena region and beyond. The inconveniences to residents and visitors traveling the Piilani Highway during the construction of the proposed improvements have been identified and discussed in the Draft EA in Chapters III, Potential Impacts and Mitigation Measures and IV, Summary of Adverse Environmental Effects Which Cannot Be Avoided. These impacts were identified as short term, which would only occur during the construction period, estimated to be approximately 11 months. During construction of the proposed improvements, two travel lanes, one lane in each direction, will always be open

and work will not be carried out during the peak hours. As well, DOT will coordinate detour routes with the County of Maui, Department of Public Works and Waste Management, as required to facilitate traffic movement during construction.

2. Refer to Response to Item III, Appendix A.

3. a. The minimum recommended roadway cross slope is 1.5 percent. The designed 2 percent roadway cross slope exceeds the minimum slope requirements and is standard on most roads.

b. The existing AC pavement thickness is 2 inches from Mokulele Highway to Lipoa Street and 4 inches from Lipoa Street to Kilohana Drive. We appreciate your observation regarding the structural strength of the proposed roadway design elements and will finalize the shoulder pavement design and specifications in consultation with the project s geotechnical engineer.

c. As with 3. b) above, the proposed roadway design specifications will be determined in consultation with the project s geotechnical engineer.

d. The proposed drainage improvements were designed to meet the specifications of the DOT's Highway Storm Drainage Design Standards and the project engineers have carried out field investigations along the project corridor to ensure the proposed improvements can be implemented within the existing right-of-way without compromising the functional integrity of the highway drainage system.

e. We acknowledge your comments regarding highway safety and have designed the proposed improvements to meet the specifications of the DOT s Highway Storm Drainage Design Standards and Highway Design Guidelines. The concrete strips converted to AC (asphaltic concrete) are used to prevent erosion.

f. The restriping of the roadway and at bridges meet the DOT design guidelines and the Manual on Uniform Traffic Devices (MUTC). As previously noted, appropriate signage will be placed at bridges to inform users of shared road conditions. Although the widening of bridges are beyond the scope of the proposed project, this work may be considered within the scope of future permanent improvements.

g. We acknowledge and agree with your comments with respect to a double line between opposing lanes and as a minimum condition and have provided a double stripe between opposing lanes. The lane widths are defined from the center line to center line. In the case of the double stripe between opposing lanes of traffic, the measurement is taken in the center of the double stripes to the center of the opposing lane stripes.

h. We acknowledge your comments regarding shoulder lane passage through intersections and safety. Where median islands presently exist, a new median island will be constructed.

i. The restriction of left turn movements onto and off of Piilani Highway at unsignalized intersections will be achieved by lane channelization, highway signage, and pavement markings. Lane channelization would prevent prohibited left turn movements from occurring.

j. The typical sections that were provided in the Draft EA are not applicable to all roadway segments. In the detailed plans the roadway sections may vary from the typical section displayed in the Draft EA due to site specific conditions. However, all improvements will be carried out within the right-of-way and a functional drainage system has been achieved within the design parameters.

k. We acknowledge and agree with your comment that the roadway sections illustrated in Figure 8 and Appendix B of the Draft EA are different. As in the response to II.3.j. above, the typical roadway section as illustrated in Figure 8 of the Draft EA may vary from one particular segment of roadway to another. The Tangent Section and Superelevated Section as noted in Appendix B are for a segment of roadway along the project corridor from Station 662 + 00 to 793 + 15.80 and Station 55 + 00 to 85 + 00.

4. a. We acknowledge your comment and will provide an updated cost breakdown for the proposed project in the Final Environmental Assessment. The updated construction cost estimate is $5.7 million. A detailed project implementation schedule will be formulated in coordination with the project engineer and selected contractor.

b. A breakdown of the project costs is attached for your information and review.

c. We acknowledge your comment and have provided a project schedule in the Final Environmental Assessment. While construction scheduling is subject to administrative procedures (relating to advertising and bid solicitation), as well as pre-construction coordination, we have attempted to narrow our projects implementation objectives to initiate construction by mid-July 2002, with completion by May 2003 covering a period of eleven (11) months.

5. See response to 4.a. above regarding project schedule. In response to the project limits terminating at Kilohana Drive in the south, see response to item I, 1.c.

6. See response to 3.a. above. With respect to the suggestion that bicycles should be banned from Piilani Highway, we note that the County of Maui is intending to provide an alternative bike system within the North-South Collector right-of-way. We acknowledge that discussion between DOT and the County of Maui needs to take place to plan for the eventual provision of this alternate route and how the bike route on Piilani Highway can be rerouted to the County bike path.

7. The proposed drainage system for the Piilani Highway improvements have been designed in accordance with the State Department of Transportation Storm Drainage Standards. Design details will be developed in the grading,

drainage, & erosion control plans. As set out in the scope of work for the proposed project, a functional drainage system with all proposed improvements within the existing highway right-of-way will be provided.

8. See Response to Item IV. below.

9. The highway density analyses in the traffic study which are sensitive to the reduction in speed limit, have considered the level of service analysis. The results from the analyses show improved levels of service.

10. The identification of alternatives were developed within the context of the Kihei Traffic Master Plan, October 1996 and Maui Long Range Transportation Plan, February 1997. The alternative of a new highway mauka of the existing Piilani Highway was not considered in these regional planning processes. Notwithstanding the findings of the Kihei Traffic Master Plan and the Maui Long Range Transportation Plan, the Final EA will address other options which may be deemed appropriate as longer range solutions. In this context, we note that the proposed Interim Piilani improvements are intended to address the immediate capacity issues facing the South Maui community.

We consider the Mokulele Highway widening project to be a critical capital project for Maui. Deferral of this project is not considered an appropriate alternative given the current capacity issues on Mokulele Highway.

11. The analyses carried out and contained in the Traffic Assessment Report, March 2002, (Table 8 and Table 9) show that the widening will improve conditions and will be able to accommodate projected short-term (2011) peak hour traffic volumes to Level of Service D or better. Based on the Highway Capacity Manual (2000) by the Transportation Research Board, National Research Council, Level of Service D is considered acceptable for urban conditions.

12. a. Refer to response to Item I (no. 6). The proposed improvements will provide a level of service D or better for the 2011 traffic conditions, and the roadway design and striping plan meet State Highway guidelines and standards as set out in the project scope of work.

Response to Item III, Appendix A, Traffic Assessment Report (TAR)

1. The free-flow speed of 55 mph is used to describe the highway s geometry and establish the density criteria for the level of service.

2. The volumes shown in Table 1 (TAR) are representative of the extended segments cf highway (Lipoa Street to Kilohana Drive, Kilohana Drive to Wailea Ike Drive) and should not be read as volumes just north or just south of Kilohana Drive. As indicated in the traffic assignments developed for the more detailed analyses, traffic volumes are higher to the north and gradually decrease as one proceeds to the south.

3. Table 4 (TAR) shows the results of the analyses assuming the traffic signals are operated optimally. The table reports the average delay for all users of each intersection and may not correspond to those experienced by a specific user.

4. Speed limits are typically set at 5 to 10 miles per hour less than the design speed. The highway density analyses, which are sensitive to the reduction in speed limit, used a highway speed of 40 miles per hour. The anticipated addition of two new traffic signals should not affect the speed, since the minimum spacing of signalized intersections on the corridor is not affected. Below 40 miles per hour, the density criteria would not apply and intersection conditions will determine the level of service. The easing of present traffic congestion is not due to the lowering of the speed limit; the additional lane in each direction provides the increased capacity to ease existing and future congestion.

5. The design of the unsignalized intersections with the left turn restrictions will be implemented with signage, lane channelization and pavement markings to restrict prohibited turning movements.

6. The traffic analyses recognizes that most of the traffic on a Kihei-Upcountry Road would travel south of the proposed connection at Kaonoulu Street. However, the net result will be of no significant change in volumes to the south because traffic on the Kihei-Upcountry Road would be diverted from Piilani Highway (north of the connection). For example, increases in left turns from the Upcountry road to southbound Piilani Highway have been projected; however, a similar decrease in through traffic from the north can be expected. Volumes on Piilani Highway north of the connection will be affected since there would be decreases due to traffic diverted to the Upcountry road and increases due to traffic that would otherwise have used Mokulele Highway to enter (or leave) Kihei.

Response to Item IV, Acoustic Study

1. A traffic noise study is required for projects of this type by DOT when State funding is used. The detailed study was required to determine where and how high the sound barriers would need to be constructed to comply with DOT s minimum sound attenuation criteria of 5 dBA. The costs associated with constructing the sound barrier were then used to determine if the sound attenuation measures are reasonable and feasible. The application of this methodology is not unique to the present project, and non-application of the noise study methodology could lead to arbitrary conclusions.

2. a. Federal and State noise abatement criteria were not ignored but were applied during the analysis of the location and heights of the sound barriers shown in Figures 2 through 9 on Pages 21 through 28 (Appendix C). For this project, the construction of sound barriers could be considered to be remedial, since the existing traffic noise levels (and not the future traffic noise levels) were the primary determinants of the location and heights of the sound barriers shown in Figures 2 through 9.

b. The highway right-of-way is not always a limiting factor for roadway improvements or noise mitigation measures. As indicated in Chapter V (Page 34) of Appendix C, acquisition of real property and alteration of the highway alignment may also be considered for noise mitigation.

3. Footnote 3 indicates that the double asterisk (**) marking was used at those receptor locations where a 5 mph speed reduction will not be sufficient to meet the State DOT 5 dB attenuation criteria for substantial noise reduction. In this context, we wish to note that the 5 mph speed limit reduction as depicted in Table 6 reduces the projected 2011 year noise level from the present noise level at many locations. We also wish to note that despite the indication of not meeting the 5 dB reduction in noise levels, the increase in noise levels ranges from -0.7 to 2.2, which are well below the criteria for significant change.

4. As indicated in 2.b. above, adequate right-of-way acquisition of real property (as appropriate) could be considered for implementation of the noise mitigation measures, such as a landscaped sound barrier. As previously noted, however, sound walls are not proposed for the interim improvements.

5. The added costs of the sound attenuation walls could not be determined without first performing the study. In this regard, the noise study provides insight as to noise mitigation measures which could potentially be expected with the future permanent improvements.

I hope the above responses have clarified the items raised in your letter.

Thank you again for the comments provided by the Maui Meadows Homeowners Association to the Draft EA.

If you have any further questions please call me at 873-3535.

Very truly yours,

FERDINAND CAJIGAL
District Engineer, Maui

FC/nb
Attachment

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ENGINEER'S PRELIMINARY DETAIL ESTIMATE

FOR

PIILANI HIGHWAY INTERIM WIDENING
MOKULELE HIGHWAY TO KILOHANA DRIVE
DISTRICTS OF WAILUKU AND MAKAWAO
ISLAND OF MAUI

PROJECT NO. 31AB-01-02

MARCH 22, 2002

NO.	ITEM	QUANTITY	UNIT	PRICE	AMOUNT
100	Removal of Traffic Island (310 S.Y.)	L.S.	L.S.	L.S.	$25,000.00
110	Removal of Drain Inlet (3 Each)	L.S.	L.S.	L.S.	$5,000.00
100	Roadway Excavation	150	C.Y.	$85.00	$12,750.00
020	Structure Excavation for Cement Rubble Masonry Headwall (16 C.Y.)	L.S.	L.S.	L.S.	$3,000.00
030	Structure Excavation for 24-Inch Reinforced Concrete Pipe (890 C.Y.)	L.S.	L.S.	L.S.	$66,750.00
000	Structure Backfill for Cement Rubble Masonry Headwall (10 C.Y.)	L.S.	L.S.	L.S.	$1,000.00
100	Water Pollution and Erosion Control	F.A.	F.A.	F.A.	$75,000.00
110	Aggregate Base	625	C.Y.	$45.00	$28,125.00
110	Aggregate Subbase	700	C.Y.	$45.00	$31,500.00
100	Controlled Low Strength Material (CLSM) Leveling Course	3,475	C.Y.	$80.00	$278,000.00
100	Asphalt Concrete, Mix No. IV	10,660	TON	$75.00	$799,500.00
500	Asphalt Concrete, Mix No. V	7,210	TON	$75.00	$540,750.00
100	Paving Fabric	77,000	S.Y.	$2.25	$173,250.00
030	Concrete in Reinforced Concrete Jacket for 36-Inch Waterline (Class B) (13.5 C.Y.)	L.S.	L.S.	L.S.	$4,800.00
100	Cement Rubble Masonry Headwall (15 C.Y.)	L.S.	L.S.	L.S.	$4,050.00
010	Bed Course Material for Culvert	100	C.Y.	$30.00	$3,000.00
010	24-Inch Reinforced Concrete Pipe, Class III	1,065	L.F.	$75.00	$79,875.00
370	Grated Inlet Box, 4.00 feet to 4.99 feet	4	EACH	$5,500.00	$22,000.00
380	Type 1 Storm Drain Manhole, 0 feet to 6 feet	42	EACH	$3,500.00	$147,000.00
390	Type A Storm Drain Manhole, 6 feet to 6.99 feet	2	EACH	$6,000.00	$12,000.00
400	Swale/Drain Inlet Box, 3 feet to 3.99 feet	1	EACH	$5,000.00	$5,000.00
410	Swale/Drain Inlet Box, 4 feet to 4.99 feet	1	EACH	$5,500.00	$5,500.00
420	Swale/Drain Inlet Box, 5 feet to 5.99 feet	2	EACH	$6,000.00	$12,000.00
100	Strong Post W-Beam Guardrail	5,070	LF	$30.00	$152,100.00
200	FLEAT-350	20	EACH	$4,000.00	$80,000.00
300	Concrete Traffic Islands	270	S.Y.	$50.00	$13,500.00
010	Curb for Traffic Islands, Type 2D	1,115	L.F.	$12.00	$13,380.00
110	Reflector Marker RM-3 without Post	52	EACH	$75.00	$3,900.00

NO.	ITEM	QUANTITY	UNIT	PRICE	AMOUNT
120	Reflector Marker RM-4 with Post	2	EACH	$150.00	$300.00
000	Regulatory and Warning Sign (10 Square Feet or Less) with Post	59	EACH	$300.00	$17,700.00
110	Regulatory and Warning Sign (10 Square Feet or Less) without Post	38	EACH	$300.00	$11,400.00
010	Relocation of Existing Sign with New Post	33	EACH	$175.00	$5,775.00
008	Type I Traffic Signal Standard, H=10 Feet	14	EACH	$900.00	$12,600.00
016	Remove Type I Signal Standard and Assembly	12	EACH	$500.00	$6,000.00
021	Type II Traffic Signal Standard, 30 Foot Mast Arm	4	EACH	$9,000.00	$36,000.00
022	Type II Traffic Signal Standard, 35 Foot Mast Arm	3	EACH	$10,000.00	$30,000.00
023	Type II Traffic Signal Standard, 40 Foot Mast Arm	1	EACH	$11,000.00	$11,000.00
024	Type II Traffic Signal Standard, 45 Foot Mast Arm	1	EACH	$12,000.00	$12,000.00
029	Remove Type II Signal Standard and Assembly	8	EACH	$1,500.00	$12,000.00
031	Foundation for Type I Signal Standard	14	EACH	$800.00	$11,200.00
032	Foundation for Type II Signal Standard	9	EACH	$1,500.00	$13,500.00
101	Traffic Signal Assembly, (1-Way, 12-Inch, 3-Section , Top of Pole Mount)	4	EACH	$1,100.00	$4,400.00
102	Traffic Signal Assembly, (2-Way, 12-Inch, 3-Section , Top of Pole Mount)	10	EACH	$1,100.00	$11,000.00
103	Traffic Signal Assembly, (1-Way, 12-Inch, 3-Section , Bracket Mount)	2	EACH	$1,100.00	$2,200.00
104	Traffic Signal Assembly, (1-Way, 12-Inch, 3-Section , Mast Arm Mount)	20	EACH	$1,100.00	$22,000.00
105	Pedestrian Signal Assembly, (1-Way, 12-Inch, Bracket Mount)	23	EACH	$850.00	$19,550.00
107	Pedestrian Pushbutton With Instruction Sign	26	EACH	$300.00	$7,800.00
108	Opticom Receiver, (Top of Pole Mount)	7	EACH	$1,200.00	$8,400.00
109	Opticom Receiver, (Mast Arm Mount)	11	EACH	$1,200.00	$13,200.00
001	Traffic Signal Ductline, One-2 Inch Conduit (7,120 L.F.)	L.S.	L.S.	L.S.	$320,400.00
002	Traffic Signal Ductline, Two-2 Inch Conduit (80 L.F.)	L.S.	L.S.	L.S.	$4,400.00
003	Traffic Signal Ductline, Three-2 Inch Conduit (160 L.F.)	L.S.	L.S.	L.S.	$10,400.00
004	Traffic Signal Ductline, Four-2 Inch Conduit (1,070 L.F.)	L.S.	L.S.	L.S.	$80,250.00
006	Traffic Signal Ductline, Six -2 Inch Conduit (130 L.F.)	L.S.	L.S.	L.S.	$11,050.00
001	Traffic Signal Conduit, One-2 Inch PVC Coated Rigid Steel (150 L.F.)	L.S.	L.S.	L.S.	$3,000.00
021	Type A Pullbox	50	EACH	$550.00	$27,500.00

NO.	ITEM	QUANTITY	UNIT	PRICE	AMOUNT
)22	Type B Pullbox	24	EACH	$950.00	$22,800.00
)30	Cast Junction Box, 16"x16"x8"	2	EACH	$600.00	$1,200.00
)40	Adjust Traffic Signal Pullbox	2	EACH	$700.00	$1,400.00
)50	Demolish Traffic Signal Pullbox	23	EACH	$500.00	$11,500.00
)10	No. 14, 26-Conductor Traffic Control Cable (1,710 L.F.)	L.S.	L.S.	L.S.	$7,700.00
)11	No. 14, 2-Conductor Loop Detector Lead-In Cable (4,900 L.F.)	L.S.	L.S.	L.S.	$10,780.00
)12	No. 14, 2-Conductor Pedestrian Pushbutton Cable (3,000 L.F.)	L.S.	L.S.	L.S.	$6,600.00
)17	EVP Cable (2,080 L.F.)	L.S.	L.S.	L.S.	$4,700.00
)19	No. 19, 24-Conductor Interconnect Cable, 300 Volt (6,830 L.F.)	L.S.	L.S.	L.S.	$39,600.00
)20	No. 6, 3-Conductor Electrical Service Cable (230 L.F.)	L.S.	L.S.	L.S.	$1,050.00
104	Loop Detector Sensing Unit (6 Ft. x 6 Ft.), One Loop	20	EACH	$600.00	$12,000.00
105	Loop Detector Sensing Unit (6 Ft. x 6 Ft.), Two Loops	20	EACH	$1,000.00	$20,000.00
106	Loop Detector Sensing Unit (6 Ft. x 6 Ft.), Four Loops	8	EACH	$1,600.00	$12,800.00
107	Loop Detector Sensing Unit (6 Ft. x 6 Ft.), Six Loops	8	EACH	$2,400.00	$19,200.00
001	Controller Reprogramming and Software	L.S.	L.S.	L.S.	$20,000.00
010	12-Inch White Pavement Striping (Thermoplastic Extrusion) (2,050 L.F.)	L.S.	L.S.	L.S.	$9,380.00
011	12-Inch Yellow Pavement Striping (Thermoplastic Extrusion) (3,040 L.F.)	L.S.	L.S.	L.S.	$12,110.00
012	8-Inch White Pavement Striping (Thermoplastic Extrusion) (7,625 L.F.)	L.S.	L.S.	L.S.	$17,155.00
013	6-Inch-White Pavtment Striping (Thermoplastic Extrustion) (64,260 L.F.)	L.S.	L.S.	L.S.	$112,455.00
014	4-Inch White Pavement Striping (Thermoplastic Extrusion) (6,830 L.F.)	L.S.	L.S.	L.S.	$8,540.00
015	4-Inch Dbl. Yellow Pavement Striping (Thermoplastic Extrusion) (21,740 L.F.)	L.S.	L.S.	L.S.	$27,175.00
020	Crosswalk Marking (Thermoplastic Extrusion)	65	LANE	$110.00	$7,150.00
025	Yield Pavement Marking (Thermoplastic Extrusion)	25	LANE	$100.00	$2,500.00
030	Pavement Arrow (Thermoplastic Extrusion)	129	EACH	$90.00	$11,610.00
040	Pavement Word (Thermoplastic Extrusion)	14	EACH	$375.00	$5,250.00
050	Bike Pavement Marking (Thermoplastic Extrusion)	69	EACH	$150.00	$10,350.00
010	Type A Pavement Marker (8,520 Each)	L.S.	L.S.	L.S.	$14,825.00
030	Type C Pavement Marker (3,800 Each)	L.S.	L.S.	L.S.	$46,200.00

NO.	ITEM	QUANTITY	UNIT	PRICE	AMOUNT
)40	Type D Pavement Marker (440 Each)	L.S.	L.S.	L.S.	$3,500.00
)70	Type H Pavement Marker (875 Each)	L.S.	L.S.	L.S.	$5,880.00
)00	Removal of Existing Pavement Markings	L.S.	L.S.	L.S.	$250,000.00
00	Field Office and Project Site Laboratory (Not to Exceed $54,000 00)	L.S.	L S	L.S.	$30,000 00
)00	Maintenance of Field Office and Project Site Laboratory	F.A.	F A	F A.	$10,000.00
00	Grass Trapezoidal Type "A" Swale (660 L.F.)	L.S.	L.S.	L.S.	$24,000.00
:00	Grass Triangular Swale Type "B" Swale (2,430 L.F.)	L.S.	L.S.	L.S.	$78,200.00
)00	Soil Cement Triangular Type "C" Swale (715 L.F.)	L.S.	L.S.	L.S.	$16,000.00
)00	Concrete Rectangular Type "D" Swale (3150 L.F.)	L.S.	L.S.	L.S.	$194,000.00
)00	Concrete Triangular Type "E" Swale (95 L.F.)	L.S.	L.S.	L.S.	$5,000.00
)00	Grouted Rubble Paving Triangular Type "F" Swale (230 L.F.)	L.S.	L.S.	L.S.	$54,600.00
)00	Hydro-mulch Seeding	2,950	S.F.	$1.50	$4,425.00
)00	Additional Police Officers And/Or Additional Traffic Control Devices	F.A.	F.A	F A.	$125,000.00
)00	Cold Planing	75,000	S.Y.	$5.00	$375,000.00
)00	Mobilization (Not to exceed 10 percent of the sum of all items excluding the bid price of this item, field office and project site laboratory, and force account items)	L.S.	L.S.	L.S.	$473,439.00
	TOTAL FOR CONTRACT ITEMS				$5,447,800.00
	CONTINGENCIES (5%)				$272,400.00
	TOTAL (exclusive of Construction Engineering and Administration)				$5,720,200.00

MAR 11 2002

March 9, 2002

Department of Transportation, Highways Division
650 Palapala Drive
Kahului, Maui, Hawai'i 96762
Attention: Fred Cajigal

OFFICIAL COMMENTS ON DRAFT ENVIRONMENTAL ASSESSMENT FOR INTERIM PIILANI HIGHWAY IMPROVEMENTS (MOKULELE HIGHWAY TO KILOHANA DRIVE)

Dear Sir:

In my capacity as Conservation Chair of the Sierra Club, Maui (SCM), I have reviewed the Draft Environmental Assessment (DEA) for Interim Pi'ilani Highway Improvements (Mokulele to Kilohana Drive). I found it incomplete and deficient in providing specific data to address potential impacts, pursuant to Chapter 343, Hawai'i Revised Statutes (HRS). I hereby request that the Sierra Club, Maui be named as an interested party in the preparation of a complete Environmental Impact Statement, as the issuance of a Finding of No Significant Impact (FONSI) may be injurious to the economic and social welfare of the community, and may involve a commitment for larger actions.

The Sierra Club, Maui Group, is a 501-c(4) non-profit, a member of the Maui community for more than 25 years. With nearly 1000 current members, many of these members reside or work in South Maui and use the Pi'ilani Highway. Furthermore, the Sierra Club has long sought to held advocate sustainable, sensible solutions for Maui's future. It is in this spirit of helping to guide responsible planning for long term vision of preserving and enhancing our quality of life that the following comments are offered.

1. Conflict(s) of Interest.

(a). The DEA has the same agency listed as both the Applicant and the Approving Agency/ Accepting Authority. There can be no independence of judgment in circumstances such as this. While this is a somewhat accepted way of handling EA reviews, it does not engender the intent and integrity of the public review process.

(b). The DEA was prepared for the State of Hawai'i Department of Transportation (DOT) by planning consultants Munekiyo & Hiraga, Inc. The same consultants are involved in planning and consulting with both the Wailea 670 and Seibu/ Makena development proposals. It is noted on page 76 of the DEA that both are voluntary participants in the proposed funding for design of the proposed interim highway improvements. This financial relationship, and the necessity of traffic mitigation before project approvals, underscores the appearance of impropriety. While this may or may not be a legal matter, it is certainly is an ethical matter.

2. Cost of Project.

No budget or cost analysis is provided to support the suggested cost of $ 4.75 million. The section titled Proposed Improvements (page 12 and 14) fails to list replacement of lightpoles and guardrails within the highway Right of Way (ROW). Additionally, a DOT letter dated 2/15/ 2002 to the Maui County Council estimated a cost of $ 85-$ 90 million for construction of Mokulele Highway Widening, a project of similar length. While there are dissimilarities to the projects (e.g., cost of acquiring ROW for Mokulele), there is such a great disparity in pricing that the modest price of interim improvements for the Pi'ilani Highway must be questioned. A budget should have been provided.

3. Projected Duration of Project.

Page 16 of the DEA states that the project is estimated to last about eleven months. However, the above-referenced 2/15/ 2002 letter (attached) from the DOT, states: "...we anticipate to start construction in July 2002 and complete by end of 2003." This represents a duration of 18 months. A project work schedule timeline needs to be incorporated to address this discrepancy.

4. Drainage and Erosion Control.

Page 51 of the DEA states "Twelve-foot wide grass swales will be constructed at the toe of fill slopes and concrete strips will be laid out at the toe of cut slopes." First, this raises the question of improvements makai (seaward) of the existing highway, which is delineating boundary of the SMA (map, page 60). It is stated that all improvements would take place within the existing highway ROW, but that width is never stated, nor is the encroachment into the SMA jurisdiction. Secondly, there are sections of the highway where neither of the alternatives quoted above would be practiable. An example is the end of the project near Kilohana, where steep sections of blue rock preclude either one.

5. Public Safety

Page 47 of the DEA states that the proposed improvements will meet all Federal and State DOT standards for highway vehicular safety. Nothing is said of bicycle safety, or pedestrian safety. Certainly the reduced shoulders and shared lanes on bridges would endanger bicyclists. Reduced lane size would admittedly endanger all motorists, and place the state and county and taxpayers at greater liability. The suggestion of a 5 mph reduction in speed limit as mitigating this risk merely obfuscates this legitimate impact. No supporting evidence or data was supplied for the validity of this mitigating measure.

6. Incomplete Discussion of Alternatives.

As required in HRS 343-5, 343-6, the proposing agency shall analyze alternatives to the proposed action. An often mentioned proposed solution for current Pi'ilani traffic is a new transportation corridor mauka (upslope) of the existing highway. There was no consideration of this alternative, except that implied on page 70 during a discussion of long-term, permanent improvements to the Pi'ilani Highway. Nor was there any consideration of public transportation, staggered work and school schedules, carpooling, or other alternative modes of transportation other than vehicular or bus. "Deferred action" alternative was rejected primarily due to fear of inflated future costs. Anything worth doing is worth doing right, whatever the cost.

7. **Economic Impacts.**

The economic and social impacts to the community are of great concern. Page 46 of the DEA offers the projected impacts as short-term benefits to the construction sector of the economy, and long-term benefit to more efficient movement of people and goods. No studies are submitted to support these hypotheses of economic impacts. Certainly there would be inconvenience to travelers, residents and visitors alike, during the duration of the proposed project. Page 74, under Findings and Conclusions, asserts: "The economic or social welfare of the community or state would not be substantially affected." This is a bold assertion, based on no studies incorporated in the DEA. The economic and social welfare of residents and visitors alike may suffer due to 18 months or more of increased congestion (page 48 and 68) on a highway already suffering from Levels of Service "F" at a majority of intersections (page 8, 1994 study). Visitor preference studies, both formal and informal, have cited concerns over increasing traffic and congested highways on Maui. Review of economic impacts in a formal E.I.S. of this proposed project necessitates inclusion of studies and surveys of this kind.

8. **Emergency Services.**

Pages 46 and 47 of the DEA state that "appropriate coordination" would be undertaken to ensure that emergency services (police, fire, medical), "are not adversely affected." Construction zones typically limit the travel lanes of all highway users, including emergency services, and often bring traffic to a standstill. There is no discussion of how this mitigation might occur.

9. **Traffic Assessment Report.**

The Traffic Assessment Report, Appendix A of the DEA, is deficient of appropriate data, suspect in accuracy, and confusing as to methodology. This report does not fulfill the requirements of a formal Traffic Impact Analysis Report (TIAR). Instead, the report muddles years of the studies(pages 4,5), methods used to project LOS(pages 2,8), projected future traffic volumes(page 7), and trivializes conclusions and recomendations. A complete TIAR is warranted, referencing complete regional and island-wide traffic studies, including projections of traffic from future South Maui development, connection with Kihei to Upcountry roadway(s), and volume of construction traffic (pages 48, 68).

10. **Incomplete Inclusion of Written Comments.**

Pages 80 and 81 of the DEA list Agencies Consulted and Letters Received during the preparation of the DEA, as identified in Subchapter 6 (11-200-10 (3)) of the OEQC rules, titled Determination of Significance. While 27 agencies and individuals are listed, fifteen (15), or more than 50%, are not printed for review in the DEA. The result is an incomplete record of public and official comment and input to the proposed actions.

11. **Incomplete Depiction of Roadway Design.**

Figure 8, page 15 of the DEA, shows a simplified cross-section of proposed highway improvements. There is no depiction of how to handle sections of the highway ROW bordering blue rock, bridges, changes in elevation, guardrails, or dealing with removing and replacing roadway signs, lightpole standards, drainage culverts, and sound walls.

12. **Projected Growth.**

The Traffic Assessment Report(TAR) assumes a projected growth rate of 3% per year (page 7, Appendix A). However, page 25 of the DEA (Description of Existing Environment, B. Socio-Economic Environment, 2. Population) contradicts that figure. It shows an increased growth rate of South Maui (Kihei-Wailea-Makena) of 46% for the ten year period from 1990 to 2000. This multiplier undermines and subjugates all the traffic data proffered in the TAR, and indeed in the entire DEA.

13. **Commitment to Greater Action**

Page 75 of the DEA, under Findings and Conclusions, states; "The proposed action does not involve a commitment to larger actions, nor would the cumulative impacts result in considerable effects on the environment." This is contradicted by an earlier statement on page 69; " The proposed action represents an interim measure..... From a long-term perspective, permanent improvements will be needed to address the region's traffic needs." The very word "interim" demonstrates a temporary fix, and therefore a commitment to the larger action of "permanent improvements." This triggers the earlier referenced rules and regulations pertaining to HRS 343, under 11-200-12(8).

14. **Scenic Vistas.**

Pages 36 and 77 of the DEA state that scenic viewplanes and vistas would not be substantially affected. However, page 34 of Appendix C, (Acoustic Study), admits that sound walls as noise barriers would be a possible noise mitigation measure, due to anticipated rise in decibel levels above federal standards for residential areas. Wall heights are decribed ranging from 6 to 8 feet to 15 to 20 feet for second story levels.

15. **Daytime Construction.**

Page 35 of the DEA states, "Construction will be limited to normal daylight hours." The purpose of this statement appears to be to comply with construction noise levels. However, this consideration may overlook and exacerbate expected increases in traffic congestion during peak daytime hours. An EIS needs to consider nighttime work and costs, especially in sections not bordering populated sections of the highway.

16. **Proposed Improvements.**

A detailed anaysis should be provided to describe Proposed Improvements, above and beyond the cursory listing of pages 12 and 14 of the DEA.
This section overlooks data such as:

(a). Guardrails. No mention is made of relocating guardrails within a foot or two of the existing roadway shoulder North of Ohukai Road (mauka and makai), at Pī'ikea (mauka and makai), between Kanani and Welakahao (makai), at Kananai (mauka and makai), at Alanui Ke Ali'i, and both North and South of Keonekai, (mauka and makai).

(b). Drainage. Particularly at Pī'ikea, Lipoa, and Keonekai, where a severe dropoff would inhibit measures to provide fill within existing highway ROW.

(c). Bridges. Kulanihakoi, Waipuilani, and Welakahao all present substandard widths with regard to roadway safety, bike lanes, pedestrians, and emergency flow.

(d). Lightpoles. Many MECO lightpoles are within a foot or two of the existing highway shoulder, and would have to be relocated. There is incomplete discussion of this in the DEA. There would be six (6) such poles at both Welakahao and Alanui Ke Ali`i roads, and nineteen (19) such poles at the intersection for Kaonoulu.

(e). Roadway signs. Page 14 (9) mentions the need to "Add, change, and/or relocate regulatory road signs. The scope of this work is unreported. By my own count, some 200 signs would require relocating on the mauka side of the Pi`ilani Highway, and approximately 213 signs on the makai side.

17. Conceptual Layout.

No index is provided to describe three conceptual layout maps in Appendix B.

18. Funding Sources.

The key for two foldout pages of Appendix B, titled "Typical Sections", references a Federal Aid Project Number (31AB-01-02). Page 14 of the DEA describes State, County, and private funding sources, but disregards discussion of availabilty or applicability of Federal funding.

19. Bike Corridors.

Pi`ilani Highway, a well-designed two-lane arterial highway with overwide shoulders as bike lanes, has long been used by recreational and competitive joggers and bicylists, both for training, and as part of actual race courses. The proposed actions would diminish these options, and greatly increase safety risks. Such actions would be contradictory to language in the Kihei-Makena Community Plan (1998), discussion of which is marginalized on pages 55 through 59 of the DEA.

20. Incomplete Presentation on Proposed Mitigations.

Suggestions to reduce speed limit from 45 mph to 40 mph, and to prohibit left turns on and off of unsignalized intersections are assumed to be appropriate mitigation measures for safety and LOS concerns, respectively. No supporting studies are provided to demonstate that proposed mitigations would actually improve, and not worsen the problems they are intended to address.

21. Permits and Approvals Needed.

Page 79 of the DEA shows only one needed permit or approval needed, which is clearly an incomplete assessment. The letters and comments section requests at least three other permits or approvals;
(1). Cultural Impact Statement (OHA letter).
(2). NPDES Permit (DOH letter).
(3). Design Submittal (MECO letter).
A FONSI or final EIS approval would be another needed approval omitted.

In summary, there are at least 21 main criteria which were omitted or not adequately met in the initial review titled, "Draft Environmental Assessment: Interim Piilani Highway Improvements (Mokulele Highway to Kilohana Drive)." The Sierra Club Maui, collectively, as well as myself, individually, and representing SCM, find this Draft Enviromental Assessment severly deficient in compliance with HRS 343. As such, a FONSI would be immediately challengeable in Circuit Court, pursuant to HRS 343 and OEQC Rules and Regulations, Subchapter 6, 11-200-11.1. It is our ardent wish that the applicant seek an independent planning consultant, perhaps from out of the state of Hawai`i, to prepare a complete Environmental Impact Statement of the proposed actions for interim restriping and associated improvements to the Pi`ilani Highway. This course of action should help ensure the economic and social welfare, as well as the overall quality of life and public health of the greater community of Maui, Hawai`i.

I look forward to the timely response to the comments and concerns addressed herein.

Mahalo nui loa, malama pono,

Robert Parsons, Conservation Chair
Sierra Club Maui
3318 A Keha Drive
Kihei, Maui, Hawai`i 96753
(808) 875-9956

cc: Munekiyo & Hiraga, Inc.
Genevieve Salmonsen, OEQC Director
John Min, Maui County Planning Director
David Goode, Maui County Public Works Director
Maui County Council Members (all nine)
James Apana, Maui County Mayor

Attached letter: DOT to County Council, et al, 2/15/2002.

BENJAMIN J. CAYETANO
GOVERNOR

BRIAN K. MINAAI
DIRECTOR

DEPUTY DIRECTORS
JEAN L. OSHITA
JADINE Y. URASAKI

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

IN REPLY REFER TO
DEP-P 1.0209

February 15, 2002

The Honorable Patrick S. Kawano, Chair
Maui County Council
200 South High Street
Wailuku, Maui, Hawaii 96793

Dear Mr. Kawano:

Subject: Makena Resort Rezoning
State Department of Transportation Highway Issues

This letter is to inform you that as we are occupied in addressing our current legislative matters here in Honolulu, we are unable to send appropriate staff to attend the rescheduled hearing for the Makena Resort rezoning before the Maui County Council of February 21, 2002. We respectfully provide to you, information that may be of assistance in clarifying or validating the on-going matters that have been brought up in past committees or council meetings related to that of the State Department of Transportation.

1. **Mokulele Highway Widening, Kuihelani Highway to Piilani Highway Project.**

With respect to our Mokulele Highway Widening project, the first phase to be constructed is Phase II-A, Kuihelani Hwy to the vicinity of Cane Haul Rd. Projected Notice to proceed for construction is May 2002. It is anticipated to take approximately 1-1/2 years to construct with appropriate staging of traffic to allow continuing use of a minimum of two lanes (one in each direction) during construction. The project length is 1.4 miles.

The second phase that is phase IIB, from the Cane Haul Rd to the Animal Shelter (No. Mehameha Lp.) will be advertised late this year.

As noted at various hearings, we estimate the construction cost of all 5 phases of the Mokulele Widening to be approximately $85-$90 million.

The construction scheduling for the remaining 3 phases is contingent on the availability of funding as determined by a Statewide Transportation Improvement Program prioritization process.

We have provided with this letter an enclosed schedule that as noted, is subject to change.

2. **Piilani Highway Interim Widening Project, between Mokulele Highway and Kilohana Drive.**

The environmental assessment has been published with OEQC and the project plans are at its prefinal stages. Barring no challenges to the published environmental assessment, we anticipate to start construction in July 2002 and complete by end of 2003. Just to reinforce the scope of work entailed, we will be using the existing paved shoulders for travel lanes so that we may provide four lanes on Piilani Highway. Extensive modifications to adjoining drainage facilities and intersection improvements are required in conjunction with this effort. The State has committed $3 Million and the County of Maui has committed an additional $1M for the construction of the proposed improvements.

3. **Piilani Highway Extension (from Wailea Ike through Wailea 670 to Makena/Ulupalakua).**

The Piilani Highway Extension will primarily service the major developments in the area, providing an alternative access and improved traffic circulation. As such, the costs for the "Extension" should be shared by the developers and made a condition of development.

4. **Developer's Pro-rata Share.**

The State DOT is working with the County of Maui Planning Department to formulate the impact fee assessment.

The State DOT and the developer have a formal agreement under the Piilani Highway Interim Widening Project, which for their contributions to the planning and design of the highway project, the State is also willing to grant the developer credit against the amount of any impact fee which may be assessed against the developer by the state for transportation improvements on the island of Maui during the ten year period following the date of our formal agreement. The State will grant the developer credit against such impact fees as may be assessed by the State in the amount of expenses paid by the developer, approved by the State under the said agreement.

The State and the developer have both acknowledged in writing that although the State is currently developing an impact fee mechanism, the State may implement or assess Impact Fees in the foreseeable future. The developer has agreed to assume the risk that the State may not implement or assess impact fees during the ten year period following the date of the agreement signed between Makena, Wailea 670 and the State DOT, and after the expiration of such ten year period, the State will not be obligated to credit the developer for any expenses paid by the developer against such impact fees. If the state implements or assesses impact fees within such ten year period, the State will credit the developer for any expenses paid by the developer against such impact fees in accordance with said agreement. Notwithstanding the expiration of the State's obligation to credit the developer for any expenses paid by the developer against such impact fees, the State, as per our signed agreement, will recognize the developers partial fulfillment of the participation condition to the extent of the expenses paid by the developer toward the planning and design of the highway project.

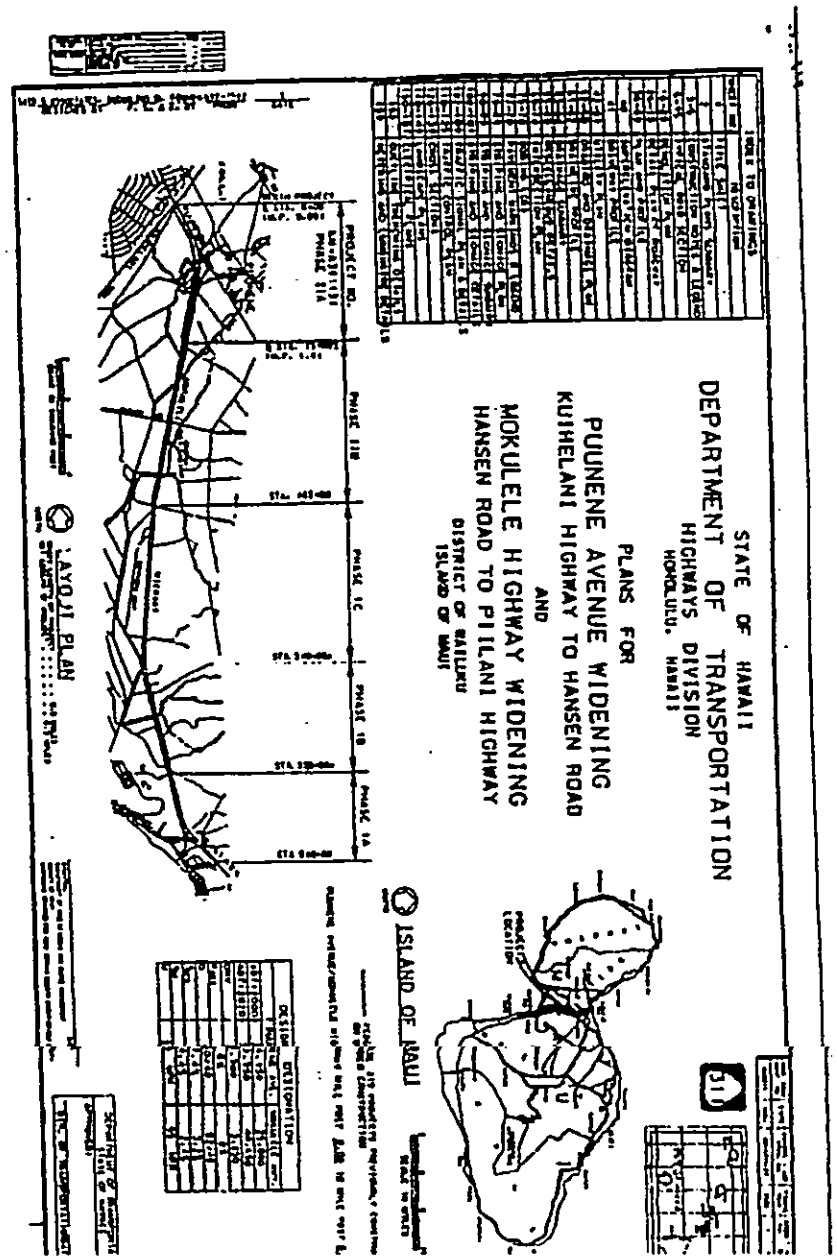
We hope that this meets to your satisfaction.

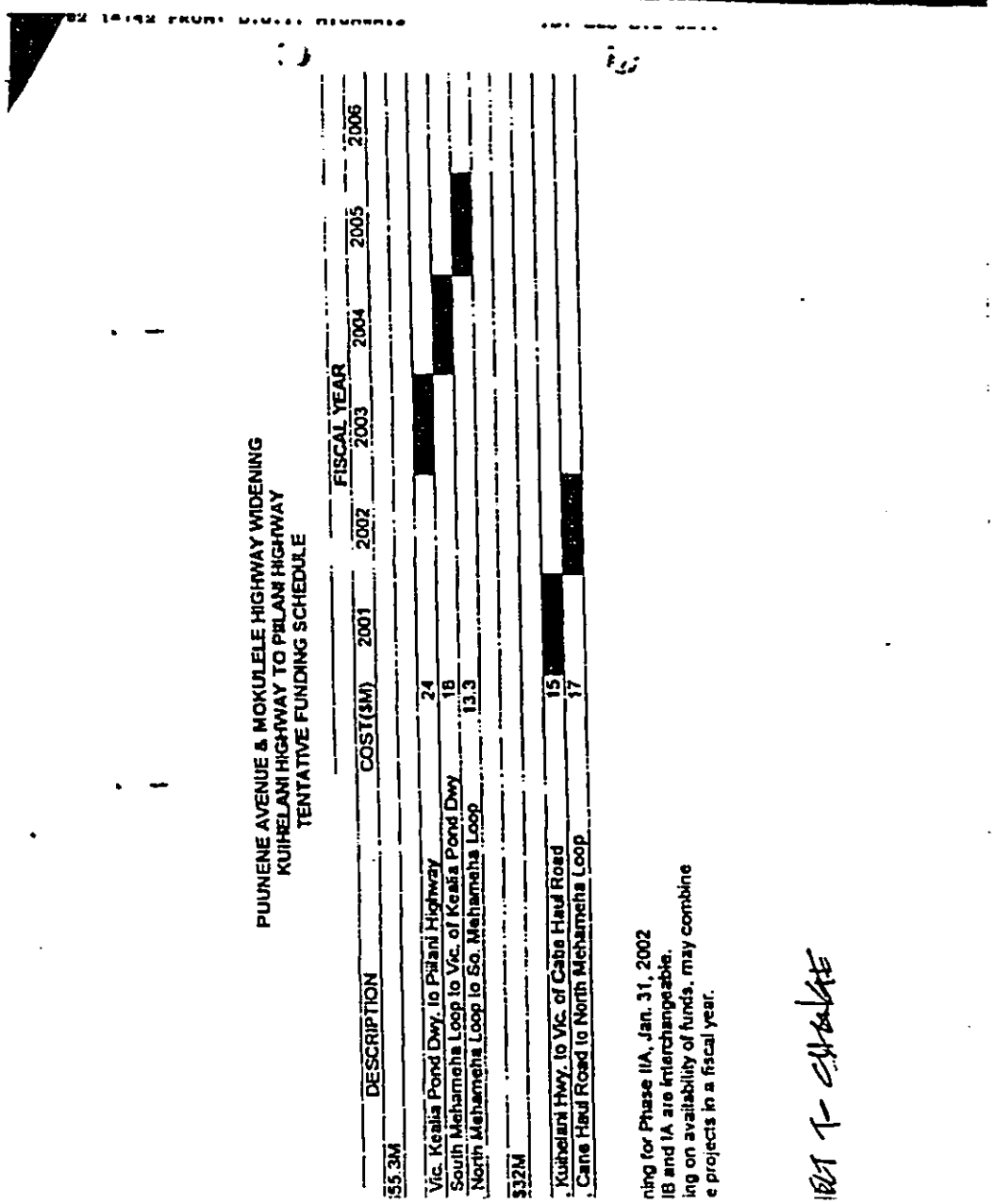
Very truly yours,

BRIAN K. MINAAI
Director of Transportation

Enclosure

cc: Hon. Dain P. Kane, Vice Chair, Maui County Council
Hon. Charmaine Tavares, Council member
Hon. Alan M. Arakawa, Council member
Hon. Robert Carroll, Council member
Hon. G. Riki Hokama, Council member
Hon. Jo Anne Johnson, Council member
Hon. Michael J. Molina, Council member
Hon. Wayne K. Nishiki, Council member
Mr. John Min, Maui County Planning Director
Mr. David Goode, Maui County Public Works Director
Mr. Roy Figueiroa, Makena Resort Corp.





BENJAMIN J. CAYETANO
GOVERNOR

BRIAN K. MINAAI
DIRECTOR

DEPUTY DIRECTORS
JADINE Y. URASAKI
Jean L. Oshita

IN REPLY REFER TO:

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
MAUI DISTRICT
650 PALAPALA DRIVE
KAHULUI, HAWAII 96732

HWY-M 2.125-02

April 23, 2002

Mr. Robert Parsons, Conservation Chair
Sierra Club Maui
3318 A Keha Drive
Kihei, Maui, Hawaii 96753

Dear Mr. Parsons:

SUBJECT: Draft Environmental Assessment - Interim Piilani Highway Improvements (Mokulele Highway to Kilohana Drive), Kihei, Maui

Thank you for your letter of March 9, 2002 on the above subject. We offer the following information in response to your comments.

Response to Item 1. Possible Conflicts of Interest

(a) The Draft Environmental Assessment was prepared pursuant to Chapter 343, Hawaii Revised Statutes (HRS) and Hawaii Administrative Rules (HAR) Title 11 Department of Health, Chapter 200 Environmental Impact Statement Rules. The identification of the accepting authority is in compliance with Subchapter 4, Responsibilities. The identification of the applicant and agency actions pursuant to HRS 343, are in compliance with Subchapter 5, Applicability, Section 11-200-5 (a), (b), and (c). We concur with your observation regarding the need to maintain the integrity of the public review process. In this context, we also believe that the processes established through Chapter 343, HRS and HAR Title 11 provide a sound mechanism for enabling public input to project development.

(b) Munekiyo & Hiraga, Inc. are providing consulting services under the direction of the State Department of Transportation, Highways Division. Although contributions towards planning

and design are being made by private landowners, project control in terms of design management, design criteria formulation and construction implementation is within the full jurisdiction of the DOT. As with our response to 1.a. above, the checks and balances to conflict of interest are provided by the public review process which enables DOT to consider issues of concern to the community.

Response to Item 2, Cost of Project

We acknowledge your comment and have provided an updated cost breakdown for the proposed project in the Final Environmental Assessment. The updated construction cost estimate is $5.7 million. A breakdown of these costs is attached for your information and review. As described in the Draft EA, the proposed improvements involve restriping, relocation of signs and intersection improvements within an existing right-of-way. The construction scope of the Mokulele Highway widening project, on the other hand, involves right-of-way modifications and new roadway construction.

Response to Item 3, Projected Duration of Project

We acknowledge your comment and have provided a project schedule in the Final Environmental Assessment. While construction scheduling is subject to administrative procedures (relating to advertising and bid solicitation), as well as pre-construction coordination, we have attempted to narrow our projects implementation objectives to initiate construction by mid-July 2002, with completion by May 2003 covering a period of 11 months.

Response to Item 4. Drainage

The Piilani Highway Right-of-Way varies along the project corridor from 105 feet to 225 feet. The details of the existing right-of-way are shown on the construction plans. We confirm that all improvements will be carried out within the highway right-of-way. As stated in the Draft EA, Chapter IV. F., the Piilani Highway is not within the County Special Management Area which we understand to be makai of the right-

of-way. The proposed drainage design is in compliance with State Department of Transportation, Highways Division Storm Drainage Design Standards.

Response to Item 5. Public Safety

The reduced travel lane widths are based on acceptable guidelines set by the American Association of State Highway Transportation Officials (AASHTO). The bicycle route is designed according to the Manual on Uniform Traffic Devices (MUTCD). The MUTCD allows for bicyclists to share the lane under the conditions required on the Piilani Highway at bridges where there will be 2-foot shoulders. Appropriate signage will be posted based on the MUTCD to warn bicyclists and motorist to share the road at bridges. With respect to pedestrian safety, the restriping project will provide pedestrian crosswalks and signalization, where appropriate. The 5 mph reduction in the speed limit due to the narrowing of lanes from 12 feet to 11 feet is based on the procedures of the Highway Capacity Manual (2000) by the Transportation Research Board, National Research Council.

Response to Item 6, Discussion of Alternatives

The identification of alternatives were developed within the context of the Kihei Traffic Master Plan, October 1996 and Maui Long Range Transportation Plan, February 1997. Alternatives noted in your comment, including a new highway mauka of the existing Piilani Highway were not considered in these regional planning processes. Notwithstanding the findings of the Kihei Traffic Master Plan and the Maui Long Range Transportation Plan, the Final EA will address other options which may be deemed appropriate as longer range solutions. In this context, we note that the proposed Interim Piilani improvements are intended to address the immediate capacity issues facing the South Maui community.

Response to Item 7, Economic Impacts

The need to minimize inconveniences to the traveling public is a primary objective in the implementation of this project. While delays will be unavoidable, we have instructed our project designers to consider appropriate traffic control options which will maintain traffic flow at its most efficient

levels. During construction of the proposed improvements, two travel lanes, one lane in each direction, will always be open and work will not be carried out during the peak hours. As well, DOT will coordinate detour routes with the County of Maui, Department of Public Works and Waste Management, as required to facilitate traffic movement during construction.

With regard to the conclusions advanced in the Draft EA, we note that upon completion of the project, improved Level of Service measures will offer a significant benefit to the South Maui community. While not based on technical economic analysis and study, we believe the conclusions to be appropriate when viewed in the context of existing highway conditions.

Response to Item 8, Emergency Services

"Appropriate coordination" would include advance notification to emergency service providers informing them of the location of construction zones and potential delays caused by construction so they may plan their travel routes accordingly. Highway construction traffic monitors will always be on site during roadway construction to direct traffic. They will direct traffic to facilitate emergency service vehicle movements within the construction zone at times of heavy congestion.

Response to Item 9, Traffic Assessment Report

A typical Traffic Impact Analysis Report compares future conditions with and without a development project that can be expected to generate new traffic or to significantly alter traffic patterns. The traffic study for this project does not make this comparison because the highway project itself would not generate new traffic and changes to peak hour traffic patterns at any one location would be less than 100 vehicles per hour. The report presents a general overview of existing conditions for the project area using the latest available information for average daily traffic (1999), provides additional details of existing conditions using estimates of traffic volumes during an average day in 2001, and provides estimates of future year (2011) traffic volumes and analyses

of future conditions. Levels of service are identified for the highway based on traffic densities (vehicles per lane per mile) and for intersections based on estimated user delays (seconds per vehicle) at the intersections.

Response to Item 10, Incomplete Inclusion of Written Comments

The list of agencies consulted, responses received and responses to agencies included in Chapter X of the Draft EA was carried out pursuant to Hawaii Administrative Rules, Title 11, Department of Health, Chapter 200, Environmental Impact Statement Rules, Subchapter 6, Section 11-200-9 (1). Early consultation letters providing information on the proposed project were sent to the listed agencies and organizations on November 12, 2001 with a requested response date of November 30, 2001. All responses received up until early January, 2002 were included in the Draft EA. Responses to all substantive comments were sent to the respective agencies and organizations and included in the Draft EA.

Response to Item 11, Incomplete Depiction of Roadway Design

The intent of the Figure 8, Draft EA was to give a typical cross section to conceptually illustrate how the restriping of the roadway would create two additional lanes, change the width of lanes (from 12 to 11 feet), create new shoulders as a result of paving over the existing concrete swales, and establish the drainage pattern along side the new shoulders. The details of roadway improvements along the project corridor are shown in the roadway plans; grading, drainage and erosion control plans; site and grading plans; signage and striping plans; traffic control plans; and traffic signal plans which are more typically reviewed during the construction document phase of the project.

Response to Item 12, Projected Growth

The projected 3 percent traffic growth rate figures included in the Traffic Assessment Report prepared by Julian Ng, Inc. were provided by the State Department of Transportation. These projections were based on historical traffic counts, Kihei Traffic Master Plan, Maui Long Range Transportation Plan, and planned growth as set out in the Kihei-Makena Community Plan. The 46 percent increase in population from

1990 to 2000 for the Kihei-Wailea-Makena region in the Draft EA, Chapter II, B.2., was taken from the County of Maui Data Book based on the census figures for 1990 and 2000, respectively. This translates into a average annual growth rate of 4.6 percent. We note that population increases may not be linearly correlated to vehicle trip increases. For example, a new family moving into the Kihei-Makena Community Plan region would not necessarily increase trip counts by the number of family members.

Response to Item 13, Commitment to Greater Action

The "interim" improvements indicates that the project is intended to meet demands for less than the normal 20-year planning horizon. In Appendix A, Traffic Assessment Report, Julian Ng, Inc., January 2002, it states, " The proposed project is an interim project being designed for traffic volumes expected in year 2011" (Page 7).

With regard to the relationship between the proposed interim improvements and the permanent highway improvements, we note that the full scope of the permanent improvements are not known at this time. Once the permanent widening project has been defined, a decision to carry out an environmental assessment or an environmental impact statement will be made. Implementation of a permanent widening project will be initiated after the impacts of the project are identified and assessed. In this context, the proposed project is considered an action separate from and independent of a permanent improvement action.

Response to Item 14, Scenic Vistas

Construction of sound walls are not proposed as a mitigation for noise within the scope of the interim highway improvements. The increase in noise levels in the year 2011 as a result of the project will be approximately 1.5 dB from existing levels.

Response to Item 15, Daytime Construction

As previously mentioned in Response to Item 7, during construction of the proposed improvements, two travel lanes, one lane in each direction, will always be open and work will not be carried out during the peak hours.

Response to Item 16, Proposed Improvements

The listing of improvements was established to capture the scope of work of the proposed project in order to assess the impacts of the proposed action. Guardrail requirements are determined by the Federal guidelines for guardrail design. Upon field investigation approximately 115 guardrails, totaling approximately 1,200 lineal feet, will require relocation. With respect to your comments on drainage, we agree that where a severe dropoff occurs, this would not allow the provision of fill within the existing highway right-of-way. The restriping plan has been refined to allow for four 11-foot travel lanes and 2-foot shoulders at bridges. The light poles are breakaway type poles and do not have to be relocated according to State Department of Transportation Standards. The proposed striping and signage plans account for all required signage. All signs will not have to be relocated.

Response to Item 17, Conceptual Layout

An index to the conceptual layouts presented in Appendix B of the Draft EA was not provided since each figure is titled.

Response to Item 18, Funding Sources

There will be no federal funds applied to the proposed project. Therefore, there was no discussion on the applicability of federal funding in the Draft EA.

Response to Item 19, Bike Corridors

Piilani Highway provides a north south bike route in South Maui and has been identified in the State of Hawaii bike plan. The proposed project will continue to provide a bike route along the project limits with a 6-foot wide shoulder on either

side of the highway and a 5-foot wide bike route through intersections. Appropriate signage will be posted to warn bicyclists and motorist to share the road at bridges where there will only be a 2-foot shoulder. In the Kihei-Makena Community Plan, reference is made to a proposed trail/greenway/bikeway system to provide an alternate means of transportation. We note that the County of Maui is currently implementing its North-South Collector Road system which will provide an alternative bike route. As appropriate, the DOT will coordinate with the County's Department of Public Works and Waste Management to ensure that adequate bike linkages between Piilani Highway and local roads are implemented.

Response to Item 20, Incomplete Presentation on Proposed Mitigations

The 5 miles per hour reduction in the speed limit due to the narrowing of lanes from 12 feet to 11 feet is based on the procedures of the Highway Capacity Manual (2000) by the Transportation Research Board, National Research Council. The restriction of the left turn movements from and onto Piilani Highway was analyzed in the Traffic Assessment Report prepared by Julian Ng, Inc. The existing lane configurations and LOS are presented in Exhibit 4 (Appendix A) and indicate, for example, the Kanani Road left turn movement is currently operating at LOS F for AM and PM peak hour periods. The future conditions (2011) at the unsignalized intersections are shown in Table 9 (Appendix A) and indicate that the intersection movements at Kanani Road with the left turn restrictions operate at LOS B and C during AM and PM peak hour periods, respectively.

Response to Item 21, Permits and Approvals Needed

We note that in the Environmental Notice, February 8 publication, the Permits required list the National Pollution Discharge Elimination System Permit (NPDES) and Work to Perform Within State Highway Right-of-Way. We acknowledge that the Draft EA did not cite the NPDES and this will be included in the Final EA. The letter from the Office of Hawaiian Affairs points out that a cultural impact assessment be carried out and included in the Draft EA in compliance with

Chapter 343, HRS. The cultural impact assessment was carried out and included in the Draft EA, Chapter III, A.8.. Should the proposed improvements impact MECO facilities, appropriate coordination will be undertaken with MECO.

Thank you again for the comments the Sierra Club has provided on the Draft EA. If there are further questions, or if additional clarification is required, please call me at 873-3535.

Very truly yours,

FERDINAND CAJIGAL
District Engineer, Maui

FC/nb
Attachment

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ENGINEER'S PRELIMINARY DETAIL ESTIMATE

FOR

PIILANI HIGHWAY INTERIM WIDENING
MOKULELE HIGHWAY TO KILOHANA DRIVE
DISTRICTS OF WAILUKU AND MAKAWAO
ISLAND OF MAUI

PROJECT NO. 31AB-01-02

MARCH 22, 2002

neer's Preliminary Detail Estimate
ni Highway Interim Widening, Mokulele Highway to Kilohana Drive
ct No. 31AB-01-02
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1, 2002

O.	ITEM	QUANTITY	UNIT	PRICE	AMOUNT
0	Removal of Traffic Island (310 S.Y.)	L.S.	L.S.	L.S.	$25,000.00
0	Removal of Drain Inlet (3 Each)	L.S.	L.S.	L.S.	$5,000.00
0	Roadway Excavation	150	C.Y.	$85.00	$12,750.00
0	Structure Excavation for Cement Rubble Masonry Headwall (16 C Y)	L.S.	L.S.	L.S.	$3,000.00
0	Structure Excavation for 24-Inch Reinforced Concrete Pipe (890 C.Y)	L.S.	L.S.	L.S.	$66,750.00
0	Structure Backfill for Cement Rubble Masonry Headwall (10 C Y)	L.S.	L.S.	L.S.	$1,000.00
0	Water Pollution and Erosion Control	F.A.	F.A.	F A.	$75,000.00
0	Aggregate Base	625	C.Y.	$45.00	$28,125.00
0	Aggregate Subbase	700	C.Y.	$45.00	$31,500.00
0	Controlled Low Strength Material (CLSM) Leveling Course	3,475	C.Y.	$80.00	$278,000.00
0	Asphalt Concrete, Mix No. IV	10,660	TON	$75.00	$799,500.00
0	Asphalt Concrete, Mix No. V	7,210	TON	$75.00	$540,750.00
0	Paving Fabric	77,000	S.Y.	$2.25	$173,250.00
0	Concrete in Reinforced Concrete Jacket for 36-Inch Waterline (Class B) (13.5 C.Y.)	L.S.	L.S.	L.S.	$4,800.00
0	Cement Rubble Masonry Headwall (15 C.Y.)	L.S.	L.S.	L.S.	$4,050.00
0	Bed Course Material for Culvert	100	C.Y.	$30.00	$3,000.00
0	24-Inch Reinforced Concrete Pipe, Class III	1,085	L.F.	$75.00	$79,875.00
0	Grated Inlet Box, 4.00 feet to 4.99 feet	4	EACH	$5,500.00	$22,000.00
0	Type 1 Storm Drain Manhole, 0 feet to 6 feet	42	EACH	$3,500.00	$147,000.00
0	Type A Storm Drain Manhole, 6 feet to 6.99 feet	2	EACH	$6,000.00	$12,000.00
0	Swale/Drain Inlet Box, 3 feet to 3.99 feet	1	EACH	$5,000.00	$5,000.00
0	Swale/Drain Inlet Box, 4 feet to 4.99 feet	1	EACH	$5,500.00	$5,500.00
0	Swale/Drain Inlet Box, 5 feet to 5.99 feet	2	EACH	$6,000.00	$12,000.00
0	Strong Post W-Beam Guardrail	5,070	LF	$30.00	$152,100.00
0	FLEAT-350	20	EACH	$4,000.00	$80,000.00
0	Concrete Traffic Islands	270	S.Y.	$50.00	$13,500.00
0	Curb for Traffic Islands, Type 2D	1,115	L.F.	$12.00	$13,380.00
	Reflector Marker RM-3 without Post	52	EACH	$75.00	$3,900.00

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NO.	ITEM	QUANTITY	UNIT	PRICE	AMOUNT
20	Reflector Marker RM-4 with Post	2	EACH	$150.00	$300.00
30	Regulatory and Warning Sign (10 Square Feet or Less) with Post	59	EACH	$300.00	$17,700.00
10	Regulatory and Warning Sign (10 Square Feet or Less) without Post	38	EACH	$300.00	$11,400.00
10	Relocation of Existing Sign with New Post	33	EACH	$175.00	$5,775.00
08	Type I Traffic Signal Standard, H=10 Feet	14	EACH	$900.00	$12,600.00
16	Remove Type I Signal Standard and Assembly	12	EACH	$500.00	$6,000.00
21	Type II Traffic Signal Standard, 30 Foot Mast Arm	4	EACH	$9,000.00	$36,000.00
22	Type II Traffic Signal Standard, 35 Foot Mast Arm	3	EACH	$10,000.00	$30,000.00
23	Type II Traffic Signal Standard, 40 Foot Mast Arm	1	EACH	$11,000.00	$11,000.00
24	Type II Traffic Signal Standard, 45 Foot Mast Arm	1	EACH	$12,000.00	$12,000.00
29	Remove Type II Signal Standard and Assembly	8	EACH	$1,500.00	$12,000.00
31	Foundation for Type I Signal Standard	14	EACH	$800.00	$11,200.00
32	Foundation for Type II Signal Standard	9	EACH	$1,500.00	$13,500.00
41	Traffic Signal Assembly, (1-Way, 12-Inch, 3-Section , Top of Pole Mount)	4	EACH	$1,100.00	$4,400.00
42	Traffic Signal Assembly, (2-Way, 12-Inch, 3-Section , Top of Pole Mount)	10	EACH	$1,100.00	$11,000.00
43	Traffic Signal Assembly, (1-Way, 12-Inch, 3-Section , Bracket Mount)	2	EACH	$1,100.00	$2,200.00
44	Traffic Signal Assembly, (1-Way, 12-Inch, 3-Section , Mast Arm Mount)	20	EACH	$1,100.00	$22,000.00
45	Pedestrian Signal Assembly, (1-Way, 12-Inch, Bracket Mount)	23	EACH	$850.00	$19,550.00
47	Pedestrian Pushbutton With Instruction Sign	28	EACH	$300.00	$7,800.00
51	Opticom Receiver, (Top of Pole Mount)	7	EACH	$1,200.00	$8,400.00
51	Opticom Receiver, (Mast Arm Mount)	11	EACH	$1,200.00	$13,200.00
	Traffic Signal Ductline, One-2 Inch Conduit (7,120 L.F.)	L.S.	L.S.	L.S.	$320,400.00
	Traffic Signal Ductline, Two-2 Inch Conduit (80 L.F.)	L.S.	L.S.	L.S.	$4,400.00
	Traffic Signal Ductline, Three-2 Inch Conduit (160 L.F.)	L.S.	L.S.	L.S.	$10,400.00
	Traffic Signal Ductline, Four-2 Inch Conduit (1,070 L.F.)	L.S.	L.S.	L.S.	$80,250.00
	Traffic Signal Ductline, Six -2 Inch Conduit (130 L.F.)	L.S.	L.S.	L.S.	$11,050.00
	Traffic Signal Conduit, One-2 Inch PVC Coated Rigid Steel (150 L.F.)	L.S.	L.S.	L.S.	$3,000.00
	Type A Pullbox	50	EACH	$550.00	$27,500.00

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O.	ITEM	QUANTITY	UNIT	PRICE	AMOUNT
2	Type B Pullbox	24	EACH	$950.00	$22,800.00
3	Cast Junction Box, 18"x18"x8"	2	EACH	$600.00	$1,200.00
3	Adjust Traffic Signal Pullbox	2	EACH	$700.00	$1,400.00
3	Demolish Traffic Signal Pullbox	23	EACH	$500.00	$11,500.00
3	No. 14, 28-Conductor Traffic Control Cable (1,710 L.F.)	L.S.	L.S.	L.S.	$7,700.00
1	No. 14, 2-Conductor Loop Detector Lead-In Cable (4,900 L.F.)	L.S.	L.S.	L.S.	$10,780.00
1	No. 14, 2-Conductor Pedestrian Pushbutton Cable (3,000 L.F.)	L.S.	L.S.	L.S.	$6,600.00
1	EVP Cable (2,060 L.F.)	L.S.	L.S.	L.S.	$4,700.00
1	No. 19, 24-Conductor Interconnect Cable, 300 Volt (6,830 L.F.)	L.S.	L.S.	L.S.	$39,600.00
1	No. 8, 3-Conductor Electrical Service Cable (230 L.F.)	L.S.	L.S.	L.S.	$1,050.00
	Loop Detector Sensing Unit (6 Ft. x 6 Ft.), One Loop	20	EACH	$600.00	$12,000.00
	Loop Detector Sensing Unit (6 Ft. x 6 Ft.), Two Loops	20	EACH	$1,000.00	$20,000.00
	Loop Detector Sensing Unit (6 Ft. x 6 Ft.), Four Loops	8	EACH	$1,600.00	$12,800.00
	Loop Detector Sensing Unit (6 Ft. x 6 Ft.), Six Loops	8	EACH	$2,400.00	$19,200.00
	Controller Reprogramming and Software	L.S.	L.S.	L.S.	$20,000.00
	12-Inch White Pavement Striping (Thermoplastic Extrusion) (2,050 L.F.)	L.S.	L.S.	L.S.	$9,380.00
	12-Inch Yellow Pavement Striping (Thermoplastic Extrusion) (3,040 L.F.)	L.S.	L.S.	L.S.	$12,110.00
	8-Inch White Pavement Striping (Thermoplastic Extrusion) (7,625 L.F.)	L.S.	L.S.	L.S.	$17,155.00
	8-Inch-White Pavtment Striping (Thermoplastic Extrusion) (64,280 L.F.)	L.S.	L.S.	L.S.	$112,455.00
	4-Inch White Pavement Striping (Thermoplastic Extrusion) (6,830 L.F.)	L.S.	L.S.	L.S.	$8,540.00
	4-Inch Dbl. Yellow Pavement Striping (Thermoplastic Extrusion) (21,740 L.F.)	L.S.	L.S.	L.S.	$27,175.00
	Crosswalk Marking (Thermoplastic Extrusion)	65	LANE	$110.00	$7,150.00
	Yield Pavement Marking (Thermoplastic Extrusion)	25	LANE	$100.00	$2,500.00
	Pavement Arrow (Thermoplastic Extrusion)	129	EACH	$90.00	$11,610.00
	Pavement Word (Thermoplastic Extrusion)	14	EACH	$375.00	$5,250.00
	Bike Pavement Marking (Thermoplastic Extrusion)	69	EACH	$150.00	$10,350.00
	Type A Pavement Marker (8,520 Each)	L.S.	L.S.	L.S.	$14,825.00
	Type C Pavement Marker (3,600 Each)	L.S	L.S.	L.S.	$48,200.00

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O.	ITEM	QUANTITY	UNIT	PRICE	AMOUNT
0	Type D Pavement Marker (440 Each)	L.S.	L.S.	L.S.	$3,500.00
0	Type H Pavement Marker (875 Each)	L.S.	L.S.	L.S.	$5,880.00
0	Removal of Existing Pavement Markings	L.S.	L.S.	L.S.	$250,000.00
0	Field Office and Project Site Laboratory (Not to Exceed $54,000.00)	L.S	L.S	L.S.	$30,000.00
0	Maintenance of Field Office and Project Site Laboratory	F.A.	F.A.	F.A.	$10,000.00
0	Grass Trapezoidal Type "A" Swale (660 L.F.)	L.S.	L.S.	L.S.	$24,000.00
0	Grass Triangular Swale Type "B" Swale (2,430 L.F.)	L.S.	L.S.	L.S.	$76,200.00
0	Soil Cement Triangular Type "C" Swale (715 L.F.)	L.S.	L.S.	L.S.	$16,000.00
0	Concrete Rectangular Type "D" Swale (3150 L.F.)	L.S.	L.S.	L.S.	$194,000.00
0	Concrete Triangular Type "E" Swale (95 L.F.)	L.S.	L.S.	L.S.	$5,000.00
)	Grouted Rubble Paving Triangular Type "F" Swale (230 L.F.)	L.S.	L.S.	L.S.	$54,600.00
)	Hydro-mulch Seeding	2,950	S.F.	$1.50	$4,425.00
)	Additional Police Officers And/Or Additional Traffic Control Devices	F.A.	F.A.	F.A.	$125,000.00
)	Cold Planing	75,000	S.Y.	$5.00	$375,000.00
)	Mobilization (Not to exceed 10 percent of the sum of all items excluding the bid price of this item, field office and project site laboratory, and force account items)	L.S.	L.S.	L.S.	$473,439.00
	TOTAL FOR CONTRACT ITEMS				$5,447,800.00
	CONTINGENCIES (5%)				$272,400.00
	TOTAL (exclusive of Construction Engineering and Administration)				$5,720,200.00

FEB 15 2002

Wailea
Wailea Resort Company, Ltd. 161 Wailea Ike Place, Wailea, Maui, Hawaii 96753-8693 • (808) 879-4461 • FAX (808) 874-629
4050 Kabi Wea Street, Wailea, Hawaii 96753

February 11, 2002

Mr. Ferdinand Cajigal
District Engineer, Maui
Highways Division
Department of Transportation
State of Hawaii
650 Palapala Drive
Kahului, HI 96732

RECEIVED
DOT-HWYS
MAUI DISTRICT OFFICE
2002 FEB 13 PM 2:02

Dear Mr. Cajigal:

Subject: Draft Environmental Assessment – Interim Piilani Highway Improvements, Mokulele Highway to Kilohana Drive, Island of Maui

Thank you for the opportunity to review and comment on the above document. Based on the information provided, we have no comments to offer at this time.

Very truly yours,

Clyde Murashige
Senior Vice President

247

APR 0 1 2002

RECEIVED
DOT-HWYS
MAUI DISTRICT OFFICE
2002 MAR 28 PM 3:17

TO:
Ferdinand Cajigal
District manager
Department of transportation
Highways division
650 Palapala Drive
Kahului, Hi 96732

FROM:
RELCYCER
VALUE ENGINEERING
C.E.O. Arnold Pratt
1183 Lauli Pl.
Kihei, Hi 96753
808-879-3269
Consultant to Hi Transportation and planning department
At issue, proposed stripping of Piilani highway to 4 lanes & Mokulele Hwy construction project, both a total waste of limited funding that would be far better spent on a total cure that would be sufficient for decades into the future.
The problem starts at Lipoa ave. traffic light where the traffic quickly backs up coming mainly from Makena & S. Kihei Maui Meadows- the plan of restriping offers a narrow stacking lanes, which is really more stop and go. For 4 lane more congestion Band-Aid cure. Costs for Piilani 1/2 plan 6 mil. Cost for Mokulele? It makes more sense to put the money available on a good plan rather than a Band-Aid project that never really solves issues of the future. Plans should be for the future to consider saving energy, pollution, money, time, stress levels for the public.

Taking a value engineering approach, what is best for public as whole & environment.

Energy savings are of most important priority! Which will be compounded by future costs to all, also to consider POLLUTION and TIME. which can be very critical.
QUESTION:
Has the proposed re-striping of Piilani hwy been reviewed using value-engineering procedures? All large monetary Gov't share funded project should require!

Instead should focus on a 5-mile alternative hwy to bypass congestion area and offer Tsunami Evacuation safety for the populace.

The life you save could be your own or loved ones?

Lets have a public vote on the alternative bypass hwy would be done in stages starting with the most advantageous part 1st.
Lipoa—concrete plant road
Stage 2: Concrete plant road---to Puunene
Stage 3: Puunene---Hana hwy
Stage 4: Lipoa---Makena
Stage 1 of the Alternative Bypass hwy should be prioritized immediately for numerous reasons 1Ooffers emergency tsunami evacuation relief 2) Energy saver 3) costs less 4) Is step in right direction

It's time to make responsible choices! That serves the needs of the entire public. To evaluate the options and prioritize best. Using the Value Engineering approach.
Alternative to Piilani restriping

1. New 2 lane road with pull off shoulders & bike lane same as Piilani present with a first phase 3----5 mile bypass that starts at top end of Lipoa—- and meets at firebreak road and concrete plant road that comes out at animal shelter on Mokulele-

Alternative bypass Rd offers:

1. A true tsunami evacuation route for Kihei and Makena
2. Cheaper to build by far than Mokulele and nonsense restriping Piilani
3. Shorter distance for vehicles to travel=saves time and ENERGY
4. Savings in fuel to each vehicle adds up to thousands of $ per day
5. No stop and go traffic alternative Rd offers steady movement with no traffic lights
6. Need for no bridges. Terrain is relatively flat arid wasteland.
7. With this alternative bypass segment in place Piilani restriping 5 million plus will never need done & Mokulele Hwy widening will also not be needed
8. An alternative Rd is the only sensible solution to Kihei areas traffic dilemma. Because during the construction there will be no delays to the public, throughout its development and building to completion and opening for travel. Enjoy. ETC.

Sincerely, Arnold Pratt, 808-879-3269

BENJAMIN J. CAYETANO
GOVERNOR

BRIAN K. MINAAI
DIRECTOR

DEPUTY DIRECTORS
[redacted]
JADINE Y. URASAKI
Jean L. Oshita

IN REPLY REFER TO:

HWY-M 2133-02

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
MAUI DISTRICT
650 PALAPALA DRIVE
KAHULUI, HAWAII 96732

April 24, 2002

Mr. Arnold Pratt
1183 Lauli Place
Kihei, Hawaii 96753

Dear Mr. Pratt:

SUBJECT: Draft Environmental Assessment – Interim Piilani Highway Improvements, Mokulele Highway to Kilohana Drive

Thank you for your March 28, 2002, comments regarding the above subject matter.

We acknowledge your comments with respect to cost efficiencies of and alternatives to the proposed project. We note that the proposed project is interim to immediately address capacity and near capacity conditions on Piilani Highway. The restriping of the highway from two lanes to four lanes was identified by the Mayor's Transportation Action Committee after extensive community consultation as a short term solution to address traffic issues. Given the overall cost estimate of the project and improvement to the Level of Service over the section of roadway, the Department of Transportation considers the proposed project to be a very effective solution. As mentioned in the Draft EA, Chapter III.B.1., the proposed project will also result in the more efficient movement of people and goods throughout the Kihei-Wailea-Makena region.

The identification of alternatives were developed within context of the Kihei Traffic Master Plan, October 1996, and Maui Long Range Transportation Plan, February 1997. Alternatives noted in your comments, including a new highway mauka of the existing Piilani Highway were not considered in these regional planning processes. Notwithstanding the findings of the Kihei Traffic Master Plan and the Maui Long Range Transportation Plan, the Final EA will address other options which may be deemed appropriate as longer range solutions.

We note your comments with respect to the advantages an alternative bypass route will offer and will consider these points in evaluating longer range alternatives. In this context, we consider the Mokulele Highway widening project to be a critical capital project for Maui. Deferral of this project until a long-term alternative is implemented is not considered an appropriate option given the current capacity issues on Mokulele Highway.

Again, thank you for your comments.

Very truly yours,

FERDINAND CAJIGAL
District Engineer, Maui

FC:dmf

Mr. Cajigal: I believe quality living comes at a price and that price in this case is time. I've lived above the Piilani for 16 years. I am against building the Piilani Hwy into four lanes with ugly walls..Do not be the cause of our businesses losing more money. I get stuck in traffic like everyone else but I am willing to wait for something more appropriate to our island style of living. Your intentions are well- meaning. I ask you to please focus your attention on building another two lane road mauka of the Piilani. Everyone will have more of a choice as to which road to travel. Thank you.

Wanda Ng & John Miller, and sons, Che and Bo
321 Hale Kai St.
Kihei, Hi. 96753
879-0184

fax. No#73-3535

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
MAUI DISTRICT
650 PALAPALA DRIVE
KAHULUI, HAWAII 96732

IN REPLY REFER TO:

HWY-M 2.121-02

April 23, 2002

Ms. Wanda Ng and Mr. John Miller
321 Hale Kai Street
Kihei, Hawaii 96753

Dear Ms. Ng and Mr. Miller:

SUBJECT: Draft Environmental Assessment – Interim Piilani Highway Improvements, Mokulele Highway to Kilohana Drive

Thank you for your comments on the subject matter.

We would like to clarify that sound attenuation walls are not part of this project. Modeled increases in the acoustical environment resulting from the proposed project are well below the State's criteria for significant change. Regarding the restriping of the highway, the Mayor's Transportation Action Committee identified the restriping from two to four lanes as an interim action to address present and near capacity conditions on Piilani Highway.

We acknowledge your comment with respect to an alternate new alignment mauka of the present highway. The identification of transportation alternatives is developed within the context of the Kihei Traffic Master Plan, October 1996, and the Maui Long Range Transportation Plan, February 1997. A new highway mauka of the existing highway was not considered in these regional planning processes. Notwithstanding the findings of the Kihei Traffic Master Plan and the Maui Long Range Transportation Plan, the Final EA will address other options deemed to be appropriate as long range solutions.

Again, thank you for your comments.

Very truly yours,

FERDINAND CAJIGAL
District Engineer, Maui

FC:dmf

21 March 2002

-COMMENTS REGARDING PLANNING FOR SOUTH MAUI TRAFFIC-

The County of Maui has the unique opportunity to truly plan for the future, not merely reach out 3 to 5 years or within a single administration.

With land available (undeveloped and unimproved) the County of Maui should secure the right-a-way for a traffic corridor mauka of the present Pi'ilani "Highway".

While re-striping and widening will "ease" the pain for a couple of years, the opportunity should be seized to plan for the future. Widening will do little more than the earlier plan for four lanes at each signaled intersection. Enforcement of the speed limit will help and calibration of the signals and posting the speed at which they are calibrated should help. (posting the speed which, if maintained, will result in reaching each light on a green signal)

True planning might include:

-An effective transportation link between south Maui and Maui's "business, financial, government and transportation center (are we going to build another airport or harbor??).
-Plan for future right-a-way links for light rail or other mass transit options, "Y" connection to upcountry,
-Plan for a Maui Symbol at the intersection of the "Y" road.
-Recognize future needs will exceed any modifications of the existing traffic grid.
-Other future options to allow for their integration.

Even back then - 65-8 BC - Horace, Odes, was wise enough to recognize "Carpe diem, quam minimum credula postero" - "Seize the day, put no trust in the morrow."

I believe it is a valid interpretation of our present situation (opportunity)

Let's seize the opportunity ("day") - it may not be available tomorrow.

Patrick Ryan
Kihei

BENJAMIN J. CAYETANO
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
MAUI DISTRICT
650 PALAPALA DRIVE
KAHULUI, HAWAII 96732

BRIAN K. MINAAI
DIRECTOR

DEPUTY DIRECTORS
JADINE Y. URASAKI
Jean L. Oshita

IN REPLY REFER TO:

HWY-M 2.110-02

April 15, 2002

Mr. Patrick Ryan
552 Kalola Street
Kihei, Hawaii 96753

Dear Mr. Ryan:

SUBJECT: Draft Environmental Assessment – Interim Piilani Highway Improvements, Mokulele Highway to Kilohana Drive, Island of Maui

Thank you for your comments regarding planning for South Maui traffic.

With respect to the need for long term transportation planning, the Maui Long Range Transportation Plan looks at transportation issues and planning in a 20-year time frame and is updated regularly. Public input is encouraged and your comments may be considered during the review of the MLRTP. Notices will be published when meetings are scheduled for this purpose.

Again, thank you for your comments and interest in the transportation needs affecting the County of Maui.

Very truly yours,

FERDINAND CAJIGAL
District Engineer, Maui

FC:dmf

Madge Schaefer
520 Mikioi Place
Kihei, HI 96753
(808)874-9293
(808)879-1999 FAX

February 26, 2002

VIA FAX (808)873-3544

Mr. Ferdinand Cajigal
District Engineer, Maui
State of Hawaii
Department of Transportation
Highways Division
650 Palapala Drive
Kahului, HI 96732

RE: Draft Environmental Assessment–Interim Piilani Highway Improvements, Mokulele Highway to Kilohana Drive, Island of Maui

Dear Mr. Cajigal:

As a member of the Maui Meadows Neighborhood Association Board of Directors, I have been asked to respond to the draft EIS. Our neighborhood is mauka of the southern terminus of the Piilani Highway.

The immediate question in reading the EIS is why the study stopped at Kilohana/Mapu Drive, 1.2 miles short of Wailea Ike Drive, the terminus of the Piilani. While the document states that "...the project in itself is not a master planned component of the Wailea 670 and Makena Resort projects" references in Appendix A include these projects, which will use the 1.2 miles to Wailea Ike for access. To wit, Appendix A "Traffic Assessment Report", page 7 states "The increase in traffic volumes are from projects already approved in Kihei *as well as additional developments proposed in the Wailea and Makena areas* (italics are mine). Further, in Appendix A, page 10, Table 8 "Future Conditions, Signalized Intersections, shows that Kilohana/Mapu Drive intersection peak a.m. and p.m. v/c ratio's exceeding the 0.85 carrying capacity. Those vehicles will be traveling on the 1.2-mile stretch, which was not part of the study. We would respectively ask that the EIS be expended to measure the impacts all the way to Wailea Ike Drive. We believe that this project will have substantial impacts on our quality of life in Maui Meadows.

Page 2.
Specific Questions and Comments related to the EIS
Specific EIS information is in bold face type.

1. **Page 74 "Findings and Conclusions"**
"5. The proposed action does not affect public health..."
I do not believe this statement is accurate. The health impacts of traffic noise levels above 65 dB in residential areas are well documented but barely mentioned in this report. The noise study indicates that 72 residential structures will be so impacted as to require 6 to 10 foot sound walls to reduce noise levels. It would be better stated to say 72 + families will be adversely affected. The increase in traffic, estimated at 3% per year without any new development will result in detrimental living conditions related to noise in housing areas adjacent to the Piilani. The project seeks deferral for noise abatement due to substantial capital investments in highway noise mitigation measures, unfortunately at the expense of those who live adjacent to the Piilani and will suffer the detrimental effects of unhealthy ambient noise levels as well as economic impacts to their homes.

2. **Page 76**
"8. The proposed action does not involve a commitment to larger actions, etc traffic volumes generated by new developments within the Wailea 670 and Makena Resort project areas will be accommodated by the proposed Highway Improvements. However, the project itself is not a master planned component of the Wailea 670 and Makena Resort projects."
On the official record, these projects have been conditioned by the Kihei Wailea Community Plan (Page 31 of that Plan) with no start in construction until the Piilani Highway has been widened to four lanes between Mokulele Highway and Wailea Ike Drive. This is further justification for the need of the EIS to address the 1.2-mile stretch between Kilohana/Mapu Drive and the terminus. Further, it appears that all studies were done using calculations that included the Wailea 670 and Makena projects. Could you please provide the data used in the categories of "approved" and "proposed"?

3. **Page 76**
"10. Air quality, water quality or ambient noise levels would not be detrimentally affected by the proposed project. (Last paragraph)... the predicted increase in future noise levels at noise sensitive receptors over the ten year period between 2001 and 2010 are typically less than 1.5 dB. This increase is not considered to be a significant impact to noise levels."
While the project itself, the actual widening and re-striping, will not increase the above noted qualities, the study itself recognizes the increased growth impacts with the completion of this four laning. In attempting to be as accurate as possible in this EIS, it should note here that ambient noise levels in some areas adjacent to the Piilani already exceed 65 dB, in some instances 70dB(Leq). A 1.5 dB increase (logarithmic scale) in these areas is substantial!

4. Appendix A
"Page 7–Table 6 Historic Traffic on Piilani–The increase in traffic volumes are from projects already approved in Kihei *as well as additional development proposed in the Wailea and Makena areas.*" (Italics are mine). This table indicates "n.a." for data from Kilohana Drive to Wailea Ike yet the text indicates volumes include approved and proposed projects. What is the raw traffic data being used for Wailea and Makena? This study treats the traffic in this 1.2 mile stretch as if it simply disappears! This is further reason to include the area in the EIS.

5. Appendix A
"Page 7 -8 – Left turns at un-signalized side streets will not be permitted. This will create additional traffic on residential streets adjacent to signalized intersections.

6. Appendix A
Page 10–Table 8 Future Conditions, etc
This Table shows Kilohana/Mapu peak a.m. and p.m. v/c ratios exceeding the 0.85 carrying capacity. How were these numbers arrived at if there were no estimates available for Table 6?

7. Appendix C
"Page 1 – These conclusions are valid as long as the future vehicle mixes and average speeds do not differ from the assumed values.
This study uses a 40 mph free flow average vehicle speed. This EIS states that the current one lane configuration has a free flow average speed of 55 mph despite posted limits of 45 mph. Shouldn't there be different speed scenario calculations as it relates to noise generation? What noise impact would there be if the free flow was at 55 mph? Was 40 mph speed limit used in the Traffic Noise Model? If not, what speed was used? Do the assumptions used in the noise studies include the proposed build out numbers in Wailea and Makena which the traffic study used? Was any consideration given to a study without those proposed build out numbers? If the widening does not include the 1.2 mile stretch, no development can take place in Wailea 670 or Makena.

8. Appendix C
"Page 9 – Table 2 Traffic Noise Measurement Results"
Referencing the N-2 (just north of Kilohana/Mapu) location reading range from Leq 68.6 to 70.2 dB conducted in early July 2001. The Wailea 670 Application contains a Noise Study done by Y. Ebisu which shows a similar location, identified as Location A (near Kilohana/Mapu) measurement done in 1993, which shows an Leq of 62 dB. Based on this comparison there has been a huge jump in noise levels. In another nine years at 1.5 db per year the noise will be intolerable! What are the health implications for those living within 150 feet of the centerline

of this project?

9. Appendix C–Table 6
I do not understand these tables. Where are the receptors located? I would like to speak to consultant who can explain these tables to me.

10. Regarding sound wall construction: Please provide a breakdown of specific areas where there would be 6 foot, 7 foot, 8 foot and 10 foot walls needed to mitigate traffic noise. What is the current average cost for construction of these walls? How would the construction be funded? How would the view shed be affected where sound walls are constructed? Since it is a very real potential, pictures should be provided showing the view-shed impact.

11. Regarding traffic signal installation: Has funding been allocated for the new signalization of intersections in this project?

12. What is the prima fascia speed for four lane highways in the State of Hawaii?

13. Are any federal funds being used for this project? How much is being contributed by private sources to this project?

14. In all the studies covered in this EIS, were the same sets of assumptions used for traffic volumes. What agency provided those numbers?

While the Association recognizes the need for the widening of the Piilani to accommodate current traffic volumes, we also recognize the importance of full disclosure in the EIS. I look forward to your response.

Sincerely,

Madge Schaefer
Vice President
Maui Meadows Neighborhood Association

cc:
MMNA

BENJAMIN J. CAYETANO
GOVERNOR

BRIAN K. MINAAI
DIRECTOR

DEPUTY DIRECTORS
~~XXXXXXXXXXXX~~
JADINE Y. URASAKI
Jean L. Oshita

IN REPLY REFER TO:

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
MAUI DISTRICT
650 PALAPALA DRIVE
KAHULUI, HAWAII 96732

HWY-M 2.127-02

April 23, 2002

Ms. Madge Schaefer
520 Mikioi Place
Kihei, Hawaii 96753

Dear Ms. Schaefer:

SUBJECT: Draft Environmental Assessment - Interim Piilani Highway Improvements (Mokulele Highway to Kilohana Drive), Kihei, Maui, Hawaii

Thank you for your letter of February 8, 2002 submitted on behalf of the Maui Meadows Neighborhood Association on the above subject. We offer the following information in response to the comments provided therein.

Response to Opening General Comments

We wish to clarify that the subject report has been prepared as a Draft Environmental Assessment (EA). The Department anticipates filing the Final EA as a Findings of No Significant Impact or FONSI.

The Project limits were defined as Mokulele Highway to Kilohana Drive. The proposed project seeks to improve those portions of the highway that have the greatest need. As indicated in the Draft EA, Appendix A, Table 1, existing traffic volumes on the segment from Mokulele Highway to Lipoa Street are about 25 percent greater than traffic volumes on the segment from Lipoa Street to Kilohana Drive. Traffic volumes on the segment between Kilohana Drive and Wailea Ike Drive are about 55 percent of those on the segment from Lipoa Street to Kilohana Drive. The updated Traffic Assessment Report, by Julian Ng, Inc. March 2002 which will be included in Appendix A of the Final EA assessed the Level of Service south of Kilohana Drive for the future 2011 condition and concluded that the Piilani Highway would service traffic at Level of Service C or better without improvements through this roadway segment.

Response to Item 1, Findings and Conclusions

The "health" impacts (i.e., causing sickness or disease of some kind) of traffic noise levels above 65 dB in residential areas are not that well documented. However, federal agencies have determined that there are potential adverse "health and welfare" effects of noise above 65 DNL (i.e., 24-hour

average measurement with a night time penalty). These possible effects are loss of sleep, and difficulty in communication. For highway noise and this study, a regulatory threshold of 66 dB was used in place of 65 DNL to define levels above which potential noise impacts occur, which may or may not be "health" related.

Based on the updated Acoustic Study (April 2002) it should be noted that 81 (changed from 72, January 2002) single-family residences represent those which are currently exposed to traffic noise levels above the 66 dB threshold. With a -5mph speed reduction, the future number of residences whose noise levels exceed 66 dB total 86 or 5 more than the existing conditions (i.e., the difference between "Existing" column and "Future -5MPH/CHANGE" column in Table 6 for those single-family residences whose noise levels exceed 66 dB).

Response to Item 2, Commitment to Larger Actions

The 3 percent increase in traffic volume used in the Traffic Assessment Report was based on historical traffic patterns, data from the Kihei Traffic Master Plan (October 1996) and the Maui Long Range Transportation Plan (February 1997), and an assessment of future development based on the Kihei-Makena Community Plan. Much of the increase in traffic is due to new growth in the region. This growth is represented by future development in the Kihei-Wailea-Makena region which will come on stream up to the year 2011. The approved and future projects are not broken down in specific numbers but are captured by the generalized increase in volume up to the year 2011.

Response to Item 3, Noise Levels

Our technical analysis confirms that the 1.5 dB increase over a 10 year period will be difficult to perceive or measure (at 0.15 dB per year) and is not considered to be significant for traffic noise analysis. We note that the present State Department of Transportation criteria substantial increase is defined as a 15 dB increase.

Response to Item 4, Appendix A

See Response to Item 2, above.

Response to Item 5, Restricting Left Turns at Un-signalized Intersections

The restrictions on movements onto or off of the highway will affect traffic volumes on the local streets. There will be increased traffic on streets that connect to Piilani Highway at signalized intersections, which generally are wider and decreased traffic on the other streets. The traffic assignments in Exhibits 5 and 6, Traffic Assessment Report (Draft EA, Appendix A) reflect the proposed turn prohibitions. The net effect of the left turn restriction in any segment of South Kihei Road has been estimated to be less than 100 vehicles per hour, and less than 35 vehicles per hour for left turn movements at signalized side streets.

Response to Item 6, Table 8 Traffic Assessment Report, Future Conditions

The traffic assignments used in the analyses of the Kilohana/Mapu intersection were based on the increases in traffic shown for the segment to the north. Volumes to the south were assumed to increase by a similar amount. We also note that a v/c ratio of 1.00, rather than .85, indicates "carrying capacity" in the current analysis procedure.

Response to Item 7, Appendix C, Page 1

Different speeds ranging from 40 to 55 mph were used for the various highway segments as shown in the "SPEED (MPH)" columns of Tables 4, and 7A, Appendix C, Draft EA. In addition, a condition with a 5 mph reduction of speeds on selected roadway segments was also modeled and shown in Table 7B, Appendix C, Draft EA.

With regard to noise impacts for a free flow speed of 55 mph, in general, the sections of Piilani Highway with the higher average speeds tend to be the south sections where the traffic volumes are lowest. An average speed of 55 mph was used to model the traffic noise in the Segment N (Keonekai Road to Kilohana Drive) and the results for that speed condition are shown in Tables 4, 5, 6 and 7A, Appendix C, Draft EA.

The noise study used traffic projections for the year 2011 provided by the Traffic Assessment Report. Also refer to Response to Item 2, above.

Response to Item 8, Traffic Noise Measurements Results

The 1993 sound level measurements at Location A were obtained at 100 feet from the centerline of Piilani Highway, while the 2001 sound level measurements at Location N-2 were obtained at 59 feet from the centerline. The different setback distances account for 4 dB of the 6.6 dB difference between the 2001 and 1993 measurements. The measured traffic noise level difference (not associated with measurement setback distances) over the 8 year period associated with the increase in traffic volumes is approximately 2.6 dB or 0.32 dB increase per year.

Response to Item 9, Appendix C, Table 6

Table 6 provides the calculated traffic noise levels at receptor locations identified in the first column as "Receiver...", with associated TMK number of the lot. The lots are shown in Figures 2 through 9. The receptor locations are at the setback location of the building on each lot, and were determined from aerial photos. The AM peak hour was used to calculate existing and future traffic noise levels at each receptor (or receiver) location, and the results are shown in the columns labeled "Existing"; "Future No Build"; "Future Build"; and "Future -5 MPH". In each of the four columns, the calculated noise level for the existing, 2011 No Build, 2011 Build, and 2011 Build with 5 mph speed reduction scenarios are shown. In addition, the

change (increase or decrease) in future traffic noise levels from the existing noise levels are also shown in each of the 3 future year columns. The asterisk indicate whether State Department of Transportation noise criteria will be met or not.

Response to Item 10, Sound Wall Construction

Sound walls are not recommended for construction at this time due to the relatively small increase in traffic noise levels forecast over the 10 year planning period. The heights of the walls which would be required to meet the State Department of Transportation 5 dB noise attenuation criteria are shown in Figures 2 through 9, Appendix C, Draft EA.

Response to Item 11, Traffic Signal Installation

Funding has not been allocated for the new signalization of intersections at Kaonoulu Street and Welakahao Road as indicated in the Traffic Assessment Report for the 2011 Future Condition traffic analysis. However, over time, traffic demands at these intersections will increase and when warranted, installation will be funded through developer assessments, state monies, or a combination of both.

Response to Item 12, Highway Speed Limits

Speed limits are determined for specific segments of highway based on the highway's design and traffic conditions. Within the State of Hawaii, multilane highways are posted for speed limits ranging from 25 mph to 55 mph.

Response to Item 13, Funding

No federal funds will be spent on the proposed project. The private sources of funding towards the project as stated in the Draft EA is $750,000. Public sources of funding will be provided by the County of Maui and the State of Hawaii.

Response to Item 14, Assumptions and Source of Traffic Data

The traffic data shown in the Draft EA, Appendix A, Table 6 is the basis for all of the studies. As noted in the table, the State Highways Division provided the traffic volumes.

Thank you again for participating in the environmental review process.

If you have any further questions please call me at 873-3535.

Very truly yours,

FERDINAND CAJIGAL
District Engineer, Maui
FC:nb

RESPONSES TO ORAL TESTIMONY RECEIVED AT MARCH 21, 2002 INFORMATION OPEN HOUSE

BENJAMIN J. CAYETANO
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
MAUI DISTRICT
650 PALAPALA DRIVE
KAHULUI, HAWAII 96732

BRIAN K. MINAAI
DIRECTOR

DEPUTY DIRECTORS

JADINE Y. URASAKI
Jean L. Oshita

IN REPLY REFER TO:

HWY-M 2.106-02

April 8, 2002

Mr. Charles P. Plunkett
251 Kaiola Place
Kihei, Hawaii 96753

Dear Mr. Plunkett:

SUBJECT: Informational Open House - Interim Piilani Highway Improvement Project

We wish to thank you for taking the time to participate in the Informational Open House on March 21, 2002. Your comments and concern in this matter are appreciated.

If you have any questions, please call me at (808) 873-3535.

Very truly yours,

Ferdinand Cajigal

FERDINAND C. CAJIGAL
District Engineer, Maui

FC:dmf

BENJAMIN J. CAYETANO
GOVERNOR

BRIAN K. MINAAI
DIRECTOR

DEPUTY DIRECTORS

JADINE Y. URASAKI
Jean L. Oshita

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
MAUI DISTRICT
650 PALAPALA DRIVE
KAHULUI, HAWAII 96732

IN REPLY REFER TO:

HWY-M 2.106-02

April 8, 2002

Mr. Arnold Pratt
1283 Lauli Place
Kihei, Hawaii 96753

Dear Mr. Pratt:

SUBJECT: Informational Open House - Interim Piilani Highway Improvement Project

We wish to thank you for taking the time to participate in the Informational Open House on March 21, 2002. Your comments and concern in this matter are appreciated.

If you have any questions, please call me at (808) 873-3535.

Very truly yours,

Ferdinand Cajigal

FERDINAND CAJIGAL
District Engineer, Maui

FC:dmf

BENJAMIN J. CAYETANO
GOVERNOR

BRIAN K. MINAAI
DIRECTOR

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JADINE Y. URASAKI
Jean L. Oshita

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
MAUI DISTRICT
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KAHULUI, HAWAII 96732

IN REPLY REFER TO:

HWY-M 2.106-02

April 8, 2002

Ms. Juanita Kawamoto
1747A Huli Street
Honolulu, Hawaii 96817

Dear Ms. Kawamoto:

SUBJECT: Informational Open House - Interim Piilani Highway Improvement Project

Thank you for your time and participation in the Informational Open House on March 21, 2002.

We have reviewed your oral testimony and are pleased of your general support for the proposed project.

Your interest in the transportation needs for Maui is appreciated. If you have any questions, please call me at (808) 873-3535.

Very truly yours,

Ferdinand Cajigal

FERDINAND CAJIGAL
District Engineer, Maui

FC:dmf

BENJAMIN J. CAYETANO
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
MAUI DISTRICT
650 PALAPALA DRIVE
KAHULUI, HAWAII 96732

BRIAN K. MINAAI
DIRECTOR

DEPUTY DIRECTORS
JADINE Y. URASAKI
Jean L. Oshita

IN REPLY REFER TO:

HWY-M 2.106-02

April 8, 2002

Ms. Eugenia Smith
1747A Huli Street
Honolulu, Hawaii 96817

Dear Ms. Smith:

SUBJECT: Informational Open House - Interim Piilani Highway Improvement Project

Thank you for your time and participation in the Informational Open House on March 21, 2002.

We have reviewed your oral testimony and are pleased of your general support for the proposed project.

Your interest in the transportation needs for Maui is appreciated. If you have any questions, please call me at (808) 873-3535.

Very truly yours,

Ferdinand Cajigal

FERDINAND CAJIGAL
District Engineer, Maui

FC:dmf

BENJAMIN J. CAYETANO
GOVERNOR

BRIAN K. MINAAI
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
MAUI DISTRICT
650 PALAPALA DRIVE
KAHULUI, HAWAII 96732

IN REPLY REFER TO:

HWY-M 2.106-02

April 8, 2002

Mr. Jack Cropper
2653 South Kihei Road
Kihei, Hawaii 96753

Dear Mr. Cropper:

SUBJECT: Informational Open House - Interim Piilani Highway Improvement Project

Thank you for your time and participation in the Informational Open House on March 21, 2002.

We have reviewed your oral testimony and are pleased of your general support for the proposed project.

Your interest in the transportation needs for Maui is appreciated. If you have any questions, please call me at 873-3535.

Very truly yours,

Ferdinand Cajigal

FERDINAND CAJIGAL
District Engineer, Maui

FC:dmf

BENJAMIN J. CAYETANO
GOVERNOR

BRIAN K. MINAAI
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JADINE Y. URASAKI
Jean L. Oshita

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
MAUI DISTRICT
650 PALAPALA DRIVE
KAHULUI, HAWAII 96732

IN REPLY REFER TO:

HWY-M 2.106-02

April 8, 2002

Mr. Kenny Barr
P. O. Box 1469
Kihei, Hawaii 96753

Dear Mr. Barr:

SUBJECT: Informational Open House - Interim Piilani Highway Improvement Project

Thank you for your time and participation in the Informational Open House on March 21, 2002.

We have reviewed your oral testimony and are pleased of your general support for the proposed project.

Your continued interest in the transportation needs for Maui is appreciated. If you have any questions, please call me at 873-3535.

Very truly yours,

Ferdinand Cajigal

FERDINAND CAJIGAL
District Engineer, Maui

FC:dmf

PETITION RECEIVED DURING 30-DAY PUBLIC COMMENT PERIOD

(1)

South Kihei, 2/26/02

To Whom It May Concern: MR. CASIGAL?!

We, neighbors of Keonekai Heights and surrounding areas want to express our deep concern about the Pi'ilani Highway and its increasing noise pollution which we have been experiencing in the last few years. We do recognize that there is a traffic problem but the question is: "what is the solution, which will enhance the quality of our community, not diminish it".
We think the County should immediately consider different options to control this noise nuisance, and under no circumstances we want more lanes, more traffic, and therefore more noise pollution without a proper solution to this problem. SOUND WALLS? NOT VERY NICE FOR A RESORT LIKE MAUI. BUILT A NEW HWY MAYBE OF PILANI.!!

Sincerely yours,

Name	Address	Phone	Signature
ALEJANDRO KALEOLANI	152 ILIWAI LOOP	874-9409	
CYNTHIA KOZIOL	152 ILIWAI LOOP	874-9409	
Alicia Molina	155 Iliwai Lp	874-0384	
Leonila Molina	155 Iliwai Lp.	874-0384	
Ed/VanEnyen	151 ILIWAI Lp	874-3586	
~~ROBT VANENYEN~~	151 ILIWAI LOOP	~~874-3586~~	
Robert DeSmia	172 Iliwai Loop	891-2036	
Peter Bach	173 Iliwai Loop	891.9332	
Estelle V Edwards	2600 Kanahanui	879-4572	
Robert Nelson	2640 Kanahanui	879-0467	ROBERT NELSON
Joan M. Nelson	" "	" "	JOAN M. NELSON
Nadia T. Hunter	159 Iliwai Loop	879-3526	Nadia T. Hunter
~~Steve Torres~~	137 Iliwai		
Annie Quitugua	113 Iliwai Loop	891-1795	
Teresa Lopez	116 Iliwai Lp	541-8910	
Suzanne Hageman	124 Iliwai Lp	874-0088	
[illegible]	[illegible]	[illegible]	

(2)

South Kihei, 2/28/02

To Whom It May Concern: MR. CARIGAL?!

We, neighbors of Keonikai Heights and surrounding areas want to express our deep concern about the Pi'ilani Highway and its increasing noise pollution which we have been experiencing in the last few years. We do recognize that there is a traffic problem but the question is: "what is the solution, which will enhance the quality of our community, not diminish it".
We think the County should immediately consider different options to control this noise nuisance, and under no circumstance we want more lanes, more traffic, and therefore more noise pollution without a proper solution to this problem.

Sincerely yours,

Name Address Phone Signature

Brian Vintaver 162 Iliwai Loop 879-4222
Miriam Baker 187 Iliwai Loop 879-1671
Deborah Melanson 167 Iliwai Loop 875-2038
Pax Whitfield 280 Paloma Pl 891-8528
Von Takeuchi 263 Keliina Pl 879-1406
Jodi Lovell 2755 Panepoo St. 875-9285
Barbara Michael 2735 Panepoo St. 875-4778
[illegible] 2749 Panepoo St. 891-0319
Sara Armstrong 2783 Panepoo St 874-0447
Ralph Weaver 2791 Panepoo St. 875-5724
Jan Tamashiro 2797 Panepoo St. 283-3061
William G. Hunter 4th 159 Iliwai Lp. 879-3526
W. Mowry Towns 2825 Panepoo 875-8182
Phyl Redden 2831 Panepoo 879-4176
James Redden 2844 Panepoo 879-6349
Kelly Brunner 2851 Panepoo 879-7763
Ala Maynard 2853 Panepoo St. 879-7542
Matthew Maynard 2853 Panepoo St. 879-7542

(3)

South Kihei, 2/26/02

To Whom It May Concern: MR. CAJIGAL ?!

We, neighbors of Keoneloi Heights and surrounding areas want to express our deep concern about the Pi'ilani Highway and its increasing noise pollution which we have been experiencing in the last few years. We do recognize that there is a traffic problem but the question is: "what is the solution, which will enhance the quality of our community, not diminish it".
We think the County should immediately consider different options to control this noise nuisance, and under no circumstance we want more lanes, more traffic, and therefore more noise pollution without a proper solution to this problem.

Sincerely yours,

Name	Address	Phone	Signature
[illegible]	161 Iliwai Loop Kihei	875-8906	[illegible]
James Eshleman			
Daniel Eshleman	161 Iliwai Loop Kihei	96753	
Luis Madamba	272 Paliuna Pl. Kihei		
Julie McCall	271 Paliuna Pl.		
Ed Morris	2741 Panepoo St Kihei		
Susan Morris	2741 Panepoo St Kihei		
[illegible]	2766 Panepoo St Kihei		
Sandra Archer	2772 Panepoo St. Kihei		
Gabe de Real	2782 Panepoo St. KIHEI		
Marina de Real	2782 Panepoo St. Kihei		
Carol Bazzini	2850 Panepoo St. Kihei		
Loren Norman	2817A Panepoo St Kihei		
BARBARA L. CARTER	2715 PANEPOO ST KIHEI	96753	
Wendy Ching	147 Iliwai Loop, Kihei	283-9457	

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Appendices

Appendix A

Traffic Assessment Report - Piilani Highway Interim Widening Mokulele Highway to Kilohana Drive, March 2002

TRAFFIC ANALYSIS REPORT

PIILANI HIGHWAY INTERIM WIDENING

Mokulele Highway to Kilohana Drive

March 2002

Prepared for:

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Traffic Analysis Report
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March 2002

Introduction

The widening of Piilani Highway, an undivided two-lane highway providing access to Kihei, Wailea, and Makena in the South Maui area, has been identified as a needed improvement in various studies. However, many highway improvements throughout the State of Hawaii are needed and the public funding available for highway improvements has not been able to meet all of the needs. As an interim measure for Piilani Highway, conversion of the existing roadway shoulder to a second traffic lane in each direction has been proposed. This report summarizes the traffic analyses done for these improvements.

Existing traffic volumes were identified for several critical intersections using information from the *Wailea 670 Traffic Report*[1] and the State Highways Division's *Traffic Summary*[2] report. Design year (2011) traffic assignments were developed from future segment volumes on Piilani Highway provided by the State of Hawaii Department of Transportation.

Traffic analyses for the highway and at signalized intersections were based on the concepts described in the *Highway Capacity Manual*[3]. Traffic conditions are described by "Levels of Service" (LOS), which range from LOS A (good conditions) to LOS E (poor conditions). Level of Service F describes over capacity conditions or very long delays. Normally, LOS C is considered acceptable in rural areas and LOS D is considered acceptable for urban conditions. The project is considered to be in an urban area.

The *Highway Capacity Manual* procedure for the analysis of signalized intersections was applied to the signalized intersections within the project limits. In this analysis, delays are computed for each lane group based on intersection layout, saturation flow, and the timing of the traffic signal. An average delay for all vehicles using the intersection is also computed. The computed delays are related to levels of service.

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1 Parsons Brinckerhoff Quade & Douglas, Inc., *Wailea 670 Traffic Report* 2001.

2 State of Hawaii, Department of Transportation, Highways Division, *Traffic Summary- Islands of Maui, Molokai & Lanai 1999.*

3 Transportation Research Board, National Research Council, *Highway Capacity Manual.*, 2000.

The *Highway Capacity Manual* provides an analysis for extended stretches of two-lane highways in which the highway's level of service is related to a driver's ability to pass a slow-moving vehicle, so that delays to the traveler can be minimized. This analysis, however, does not provide a good indicator of conditions on short segments of highway such as on Piilani Highway; traffic densities are used instead to compare conditions on the highway.

Criteria for levels of service at intersections and on the highway are:

LOS	General Description of Estimated Delay	Intersection Delay (seconds/vehicle) Signalized	Unsignalized	Traffic Density (vehicles/lane/mile)
A	Little or no delay	≤ 10	≤ 10	≤ 11
B	Short traffic delays	> 10 and ≤ 20	> 10 and ≤ 15	>11 and ≤ 18
C	Average traffic delays	> 20 and ≤ 35	> 15 and ≤ 25	> 18 and ≤ 26
D	Long traffic delays	> 35 and ≤ 55	> 25 and ≤ 35	>26 and ≤ 35
E	Very long traffic delays	> 55 and ≤ 80	> 35 and ≤ 50	> 35 and ≤ 45
F	Very long traffic delays	> 80	> 50	> 45

Existing Conditions

The proposed project is located in south Maui (Exhibit 1). The existing highway consists of two lanes and shoulders; one lane is provided for traffic in each direction. Each lane is twelve feet wide and shoulders varying in width from six to ten feet wide are provided on each side. The shoulders are also used by bicyclists as Piilani Highway is designated a bike route. The highway is posted with a speed limit 45 miles per hour.

The State Highways Division conducts traffic counts on the island of Maui during odd-numbered years. These traffic counts are used to develop estimates of average daily traffic (ADT) volumes, "K" factors that indicate the peak hour volume as a percentage of the daily volume, and "D" factors that show the directional distribution of the peak hour volumes for defined segments of all highways. This information is reported in biennial reports published by the State Highways Division. The ADTs and the computed peak hour traffic volumes on Piilani Highway for 1999 based on this information are shown in Table 1.

Table 1
1999 Traffic Volumes
Piilani Highway

		Mokulele Highway to Lipoa Street	Lipoa Street to Kilohana Drive	Kilohana Drive to Wailea Ike Drive
1999 Average Daily Traffic		25,852	20,731	10,987
AM Peak Hour	Northbound	1,065	650	230
	Southbound	875	800	540
PM Peak Hour	Northbound	1,100	970	595
	Southbound	1,100	790	395

Existing daily volume in the highway segment north of Lipoa Street is more than twice that for the segment south of Kilohana Drive. Table 2 shows traffic densities over these long segments of the highway at a speed of 45 miles per hour and the corresponding highway levels of service.

Table 2
Existing (1999) Conditions
Piilani Highway

Traffic Density (vehicles per mile) and Highway Level of Service		Mokulele Highway to Lipoa Street	Lipoa Street to Kilohana Drive	Kilohana Drive to Wailea Ike Drive
AM Peak Hour	Northbound	24.1 C	18.1 C	5.2 A
	Southbound	19.8 C	14.7 B	12.2 B
PM Peak Hour	Northbound	24.8 C	17.8 B	8.9 A
	Southbound	24.8 C	21.9 C	13.4 B

Exhibits 2 and 3 show traffic estimates for year 2001 at the intersections within the project limits. These estimates are from various traffic studies done for projects in the area. Traffic densities and highway levels of service at various locations along the highway are shown in Table 3.

Table 3
Existing (2001) Conditions
Two-Lane Piilani Highway

Traffic Density (vehicles per mile) and Highway Level of Service	AM Peak Hour		PM Peak Hour	
	Southbound	Northbound	Southbound	Northbound
North of Mokulele Highway	5.9 A	15.0 B	13.2 B	7.4 A
North of Uwapo Road	18.0 C	31.9 D	29.8 D	23.0 C
North of Ohukai Road	20.5 C	26.3 D	30.0 D	24.2 C
South of Ohukai Road	20.7 C	24.4 C	29.1 D	23.8 C
South of Kaonoulu Street	23.7 C	26.1 D	30.0 D	25.8 C
South of Piikea Avenue	25.0 C	23.8 C	30.4 D	25.7 C
South of Lipoa Street	20.6 C	21.4 C	27.7 D	21.6 C
South of Welakahao Road	19.9 C	20.3 C	25.5 C	21.7 C
South of Kanani Road	18.5 C	19.0 C	23.1 C	20.2 C
South of Keonekai Street	15.5 B	12.7 B	21.5 C	16.9 B
South of Kilohana Drive	13.6 B	8.3 A	16.3 B	14.1 B

The levels of service shown in Table 3 indicate that most of the existing two-lane highway is adequate for existing traffic volumes. Between Mokulele Highway and Welakahao Road, peak hour traffic volumes are high and unstable flow (Level of Service D) occurs. Other segments of the highway have adequate capacity for Level of Service C or better conditions during peak hours. Congestion, however, occurs on the highway as traffic flow is affected by traffic signals. The existing signalized intersections were analyzed to determine intersection levels of service.

Table 4 shows the average delay and overall levels of service for each of the signalized intersections. The greatest delays occur at the intersections with Ohukai Road, Piikea Avenue, and Lipoa Street in the afternoon peak hour. Average delay at many of the other intersections were within the criteria for Level of Service D or better; however, left turn lanes and side street movements typically had greater delays. In most cases, there were very long delays (Level of Service E or F) for turning movements and for minor street movements. The higher volume through movements on the highway typically had less delay and operated at Level of Service D. From Lipoa Street to Mokulele Highway, the intersections were near-capacity (volume-to-capacity ratios of 0.85 or greater) or over theoretical capacity (ratio greater than 1.0) during the peak hours. Exhibit 4 shows the lane configurations at the signalized intersections and the results of the intersection analyses.

Table 4
Existing Conditions
Signalized Intersections Along Piilani Highway

	AM Peak Hour			PM Peak Hour		
	v/c ratio	AD (sec.)	LOS	v/c ratio	AD (sec.)	LOS
Mokulele Highway	0.95	40.6	D	0.99	46.8	D
Uwapo Road	1.00	45.0	D	0.89	37.6	D
Ohukai Road	0.96	45.2	D	1.03	56.7	E
Piikea Avenue	0.92	38.1	D	1.06	53.7	D
Lipoa Street/Parkway	0.93	42.4	D	1.03	56.9	E
Ke Alii Alanui	0.61	20.7	C	0.76	26.6	C
Kilohana Drive	0.56	21.6	C	0.61	27.0	C

AD = Average delay (seconds per vehicle)

At the unsignalized intersections, levels of service were determined for left turns from the highway and side street traffic that is controlled by stop or yield signs. For each intersection, capacities were computed for these movements based on the geometry and other traffic using the intersection. While there were adequate capacities for each movement, some delays were in the range of Level or Service E or F. The volume-to-capacity ratios, computed delays, and levels of service for each controlled movement are shown in Table 5.

Table 5
Existing Conditions
Unsignalized Intersections Along Piilani Highway

	AM Peak Hour			PM Peak Hour		
	v/c ratio	AD (sec.)	LOS	v/c ratio	AD (sec.)	LOS
Moi Place						
westbound approach	0.24	27.3	D	0.10	30.3	D
eastbound approach	0.02	16.2	C	0.25	30.6	D
Kaonoulu Street						
northbound left turn	0.12	10.6	B	0.19	13.6	B
eastbound left turn	0.23	112.5	F	0.43	250.7	F
eastbound right turn	0.48	25.7	D	0.42	35.7	E
Kulanihakoi Street						
northbound left turn	0.02	10.7	B	0.04	12.5	B
eastbound left turn	0.12	99.4	F	0.19	159.7	F
eastbound right turn	0.08	19.6	C	0.17	28.5	D
Welakahao Road						
northbound left turn	0.02	10.0	B	0.07	12.1	B
eastbound left turn	0.77	130.5	F	0.65	168.1	F
eastbound right turn	0.03	15.9	C	0.06	21.1	C
Old Welakahao Road						
southbound left turn	0.01	9.9	A	0.01	10.2	B
westbound shared lane	0.11	48.3	E	0.11	35.2	E
eastbound shared lane	0.17	53.5	F	0.10	88.5	F
Kanani Road						
northbound left turn	0.01	9.8	A	0.01	11.0	B
southbound left turn	0.01	9.6	A	0.01	9.9	A
westbound approach	0.03	15.3	C	0.05	16.4	C
eastbound approach	0.89	116.9	F	0.95	161.9	F
Keonekekai Street						
northbound left turn	0.02	8.9	A	0.02	10.1	B
eastbound left turn	0.56	45.5	E	0.11	47.3	E
eastbound right turn	0.11	13.7	B	0.11	17.8	C

AD = Average delay (seconds per vehicle)

Future Conditions

Traffic volumes on Piilani Highway have been increasing. The State Highways Division has projected that traffic volumes will continue to increase, at an average rate of approximately three percent per year. The average daily traffic on Piilani Highway for the odd-numbered years 1991-1999 and the projections for 2001, 2011, and 2021 are shown in Table 6.

Table 6
Historic Daily Traffic on Piilani Highway

Year	Mokulele Highway to Lipoa Street	Lipoa Street to Kilohana Drive	Kilohana Drive to Wailea Ike Drive
1991	20,639	15,627	7,285
1993	20,757	16,682	9,163
1995	23,036	18,585	10,079
1997	25,613	19,622	10,335
1999	25,852	20,731	10,987
2001	27,900	22,400	n.a.
2011	38,100	30,500	n.a.
2021	48,200	38,700	n.a.

n.a. = not available

Source: State of Hawaii, Department of Transportation, Highways Division. (1991-1999, from *Traffic Summary, Islands of Maui, Molokai & Lanai – 1999;* projections from Highway Planning Branch TA 01-09).

The proposed project is an interim project being designed for traffic volumes expected in year 2011. With the widening of the highway to four lanes, left turns onto the highway at unsignalized intersections would become even more difficult and projected demands will exceed available capacities. New traffic signals at two intersections, Kaonoulu Street and Welakahao Road, are expected to be completed before 2011 to support approved development. At other intersections, however, the side street volumes will not be high enough to warrant traffic signals. Left turns at unsignalized intersections, therefore, will not be permitted at Kulanihakoi Street, Waipuilani Street, and Keonekai Street.

Improvements to Mokulele Highway, including a realignment of the intersection of Mokulele Highway and Piilani Highway, are also being proposed and are expected to be completed before the future analysis year (2011). The analyses of future conditions, therefore, begin at the Uwapo Road intersection. Exhibits 5 and 6 show the traffic

assignments for the design year, reflecting the turn prohibitions and the relocation of the movements to nearby signalized intersections. Table 7 compares the highway levels of service during the future peak hours on a two-lane highway and on a four-lane highway.

Table 7
Future (2011) Conditions
Piilani Highway

Traffic Density (vehicles per mile) and Highway Level of Service	AM Peak Hour		PM Peak Hour	
	Southbound	Northbound	Southbound	Northbound
Two-lane highway				
North of Uwapo Road	27.6 D	42.9 F	41.9 F	34.0 D
North of Ohukai Road	30.3 D	37.4 E	42.0 F	35.2 E
South of Ohukai Road	31.2 D	35.8 E	41.0 E	35.1 E
South of Kaonoulu Street	28.5 D	34.4 D	39.3 E	32.1 D
South of Piikea Avenue	30.7 D	30.7 D	40.5 E	32.1 D
South of Lipoa Street	27.8 D	30.0 D	36.6 E	30.3 D
South of Welakahao Road	25.8 C	25.8 C	33.9 D	28.2 D
South of Kanani Road	24.8 C	25.8 C	31.7 D	28.0 D
South of Keonekai Street	22.6 C	20.3 C	30.3 D	23.5 C
South of Kilohana Drive	20.8 C	15.0 B	25.0 C	20.3 C
Four-lane highway				
North of Uwapo Road	15.5 B	24.1 C	23.6 C	19.1 C
North of Ohukai Road	17.0 B	21.1 C	23.6 C	19.8 C
South of Ohukai Road	17.6 B	20.2 C	23.0 C	19.8 C
South of Kaonoulu Street	16.1 B	19.4 C	22.1 C	18.1 C
South of Piikea Avenue	17.3 B	17.3 B	22.8 C	18.1 C
South of Lipoa Street	15.7 B	16.9 B	20.6 C	17.0 B
South of Welakahao Road	14.5 B	14.5 B	19.1 C	15.9 B
South of Kanani Road	14.0 B	14.5 B	17.8 B	15.7 B

As indicated in Table 7, highway traffic densities generally decrease to the south. As a two-lane highway, traffic densities would be in the congested range (Level of Service E or F) as far south as Welakahao Road. Unstable flow (Level of Service D) would occur as far south as Kilohana Drive. South of Kilohana Drive the two-lane Piilani Highway would serve traffic at Level of Service C or better without any improvements.

A "contraflow" alternative would include restriping the highway to three lanes and reversing the flow in the third lane during peak period. This alternative would require that the added lane be provided northbound in the AM peak period and southbound in the PM peak

period. Widening to provide two through lanes across each signalized intersection would still be required and merging areas would be needed. Adequate traffic control through merging areas during contraflow operations would be difficult to achieve. With this alternative, densities between Uwapo Road and Kaonoulu Street would remain at Level of Service E.

An additional lane in each direction as proposed between Mokulele Highway and Kilohana Drive will mitigate the high densities on the highway. A four-lane Piilani Highway would carry peak hour traffic at highway Level of Service C or better. Between Kanani Road and Kilohana Drive, conditions would be Level of Service B with a four-lane highway.

The *Highway Capacity Manual* procedures recognize that lanes narrower than twelve feet will reduce travel speeds, as would any obstructions within six feet of the travel lanes. For the proposed roadway cross-section with two lanes and a shoulder over twenty-four feet of width in each direction on an undivided highway at the existing bridges, a reduction of 3 to 5 miles per hour would apply. Therefore, the densities and levels of service for the four-lane highway were determined using a lower speed. The proposed lower speed limit of 40 miles per hour is consistent with the geometry of the proposed roadway.

The proposed project would convert the existing shoulder into a travel lane in each direction. At intersections, modifications will be made to existing traffic islands, traffic signal systems, and other physical elements so that the second lane in each direction can carry traffic through the intersections. The widening of the highway to four lanes, not only at signalized intersections, is needed to provide acceptable (Level of Service D or better) conditions, as shown above in Table 7. If the highway were widened only at the signalized intersections, traffic must merge causing fluctuations in the flow. Even without the effects of merging, traffic densities in the two-lane sections will result in poor levels of service. Without the widening to form a continuous four-lane highway, Level of Service E would describe conditions between Welakahao Road and Mokulele Highway. With the highway widened to four lanes, highway conditions would be Level of Service C or better during the peak hours.

Development that has been proposed near Piilani Highway would increase turning traffic and could warrant new traffic signals at the Kaonoulu Street and the Welakahao Road intersections. Exhibit 7 shows the lane configurations and lane group levels of service that were analyzed for the future condition. As shown in Table 8, the overall delay and levels of service for signalized intersections are acceptable (Level of Service D or better).

Table 8
Future Conditions
Signalized Intersections, 4-Lane Piilani Highway

	AM Peak Hour			PM Peak Hour		
	v/c ratio	AD (sec.)	LOS	v/c ratio	AD (sec.)	LOS
Uwapo Road	0.82	30.7	C	0.72	26.5	C
Ohukai Road	0.82	35.5	D	0.85	47.2	D
Kaonoulu Street	0.77	39.3	D	0.84	48.0	D
Piikea Avenue	0.77	27.1	C	0.90	37.6	C
Lipoa Street/Parkway	0.84	40.7	D	0.97	51.9	D
Welakahao Road	0.60	17.7	B	0.74	26.0	C
Ke Alii Alanui	0.62	23.5	C	0.68	21.5	C
Kilohana Drive	0.79	32.4	C	0.88	48.0	D

AD = Average delay (seconds per vehicle)

Due to the high volume of traffic on Piilani Highway, the delays at the intersections, and the proximity with other signalized intersections, the signals at the Mokulele Highway, Uwapo Road, and Ohukai Road should be interconnected so that they can be coordinated. The Piikea Street and Lipoa Street signals are understood to already be interconnected. Other signals are farther apart and interconnection would not be necessary since interconnection would not significantly improve conditions.

At the unsignalized intersections, turning movements will be restricted to right turns from and onto the highway. The stop controls on the right turns will result in acceptable delays (Level of Service D or better) at all intersections. Table 9 shows the results of the unsignalized intersection analyses of future peak hour volumes at these intersections.

Table 9
Future Conditions
Unsignalized Intersections Along Piilani Highway

	AM Peak Hour			PM Peak Hour		
	v/c ratio	AD (sec.)	LOS	v/c ratio	AD (sec.)	LOS
Moi Place, southbound left	0.01	14.9	B	0.01	14.1	B
westbound	0.16	19.1	C	0.10	32.0	D
eastbound	0.01	14.4	B	0.20	22.4	C
Kulanihakoi Street	0.08	14.6	B	0.13	19.3	C
Waipuilani Street	0.06	14.5	B	0.09	18.9	C
Old Welakahao Road	0.01	11.3	B	0.01	14.0	B
Kanani Road, westbound	0.02	13.3	B	0.04	14.2	B
eastbound	0.13	13.6	B	0.13	16.1	C
Keonekai Street	0.14	12.9	B	0.11	15.2	C

Effects on Other Streets in the Area

Peak hour traffic volumes along South Kihei Road will be affected by the restriction of left turn movements onto and off of Piilani Highway at unsignalized intersections. The restrictions are expected to cause the diversion of these movements to adjacent signalized intersections. The streets that intersect Piilani Highway at signalized intersections, therefore, are expected to carry more traffic while less traffic will use those streets that have restricted movements onto or off of the highway. The widening of the highway will allow for modifications to the signal timing at signalized intersections to increase the capacity of the side street approaches.

The effect on other streets would be less. For example, left turns that would be prohibited at Keonekai Street would be made instead at Kilohana Drive or at Ke Alii Alanui. The impact to traffic demand on South Kihei Road would include added traffic on some segments caused by traffic diverting from Keonekai Street (for trips between the highway and origins or destinations along Keonekai Street). The impact also includes a reduction in turns onto or off of Keonekai Street (for those trips between the highway and origins or destinations along South Kihei Road) . Similar effects can be expected at the other South Kihei Road intersections affected by left turn restrictions along Piilani Highway. The analyses of the unsignalized intersections along Piilani Highway indicates that the capacities for left turns onto the highway would decrease as highway volume increases resulting in increased delays

to drivers wishing to make left turns onto the highway. With this condition, some drivers would opt for an alternative path to the highway, in effect partially implementing the left turn restriction. The net effect of the left turn restriction has been estimated to be less than 100 vehicles per hour in any segment of South Kihei Road, and less than 35 vehicles per hour for left turn movements, which are most affected by increased traffic volumes, at any intersection. The effect of the prohibition of left turns at the Piilani Highway intersection will be small in comparison with the change that occurs over time.

In more general terms, increases in traffic volumes on South Kihei Road will be greater if Piilani Highway is not widened. If improvements are not made on Piilani Highway resulting in increased peak hour congestion, some of the traffic that would be otherwise use Piilani Highway would seek an alternative path, in this case South Kihei Road. Additional discussion of impacts to other streets in the Kihei area are being addressed in the update to the Kihei traffic master plan that is currently being prepared for the County of Maui.

Effects of Upcountry Road

Environmental documentation of a proposal to build a new roadway from the Kihei area to Upcountry Maui is currently being processed; however, the timing of construction of this new roadway is uncertain. If this "Upcountry Road" is constructed and connected to Piilani Highway opposite Kaonoulu Street, traffic volumes north of Kaonoulu Street will be affected. Exhibit 8 shows the traffic assignments for the design year with the effects of the Upcountry Road for the segment north of Piikea Avenue (south of Piikea Avenue, traffic assignments would be as shown in Exhibit 6). Traffic densities on Piilani Highway with the interim improvements and the Upcountry Road are Level of Service C or better as shown in Table 10.

Table 10
Future (2011) Conditions
Piilani Highway with Upcountry Road

Traffic Density (vehicles per mile) and Highway Level of Service	AM Peak Hour		PM Peak Hour	
	Southbound	Northbound	Southbound	Northbound
North of Uwapo Road	11.1 B	25.9 C	22.9 C	19.2 C
North of Ohukai Road	12.7 B	23.0 C	23.0 C	20.1 C
South of Ohukai Road	13.5 B	22.4 C	22.7 C	20.3 C
South of Kaonoulu Street	16.1 B	19.4 C	22.1 C	18.1 C
South of Piikea Avenue	17.3 B	17.3 B	22.8 C	18.1 C

At the intersections, conditions in the AM Peak Hour would not be significantly different than if the Upcountry Road were not built. Similar layouts with adjustments in signal timing would provide adequate service at the Mokulele Highway, Uwapo Road, and Ohukai Street intersections. At Kaonoulu Street, modifications in signal phasing would be necessary to maintain acceptable conditions at the intersection. Table 11 summarizes the findings of operational analyses of these intersections with the volumes shown in Exhibit 8.

Table 11
Future Conditions With Upcountry Road
Signalized Intersections, 4-Lane Piilani Highway

	AM Peak Hour			PM Peak Hour		
	v/c ratio	AD (sec.)	LOS	v/c ratio	AD (sec.)	LOS
Uwapo Road	0.80	29.9	C	0.71	26.2	C
Ohukai Road	0.88	38.6	D	0.86	46.4	D
Kaonoulu Street	0.92	52.6	D	0.88	47.8	D

AD = Average delay (seconds per vehicle)

Conclusions and Recommendations

The widening of Piilani Highway to four lanes at signalized intersections between Mokulele Highway and Lipoa Street is necessary to address existing delays at the signalized intersections. Traffic volumes on Piilani Highway are expected to continue to increase, at an average rate of approximately three percent per year. Widening of the highway between Mokulele Highway and Kilohana Drive will be needed to provide acceptable levels of service. The conversion to use the existing highway shoulders as additional lanes is considered an interim improvement and are being designed for traffic volumes projected for year 2011.

The interim improvement to Piilani Highway would utilize the existing shoulders as additional lanes for traffic in the northbound and southbound directions. The project also proposes to reduce the posted speed limit on the highway from 45 miles per hour to 40 miles per hour, consistent with the decrease in free flow speed expected with the narrowing of the travel lanes and the reduction of the lateral distance between the travelway and roadside obstructions. The traffic analyses confirm that widening to four lanes would be necessary to achieve Level of Service D or better conditions on the highway.

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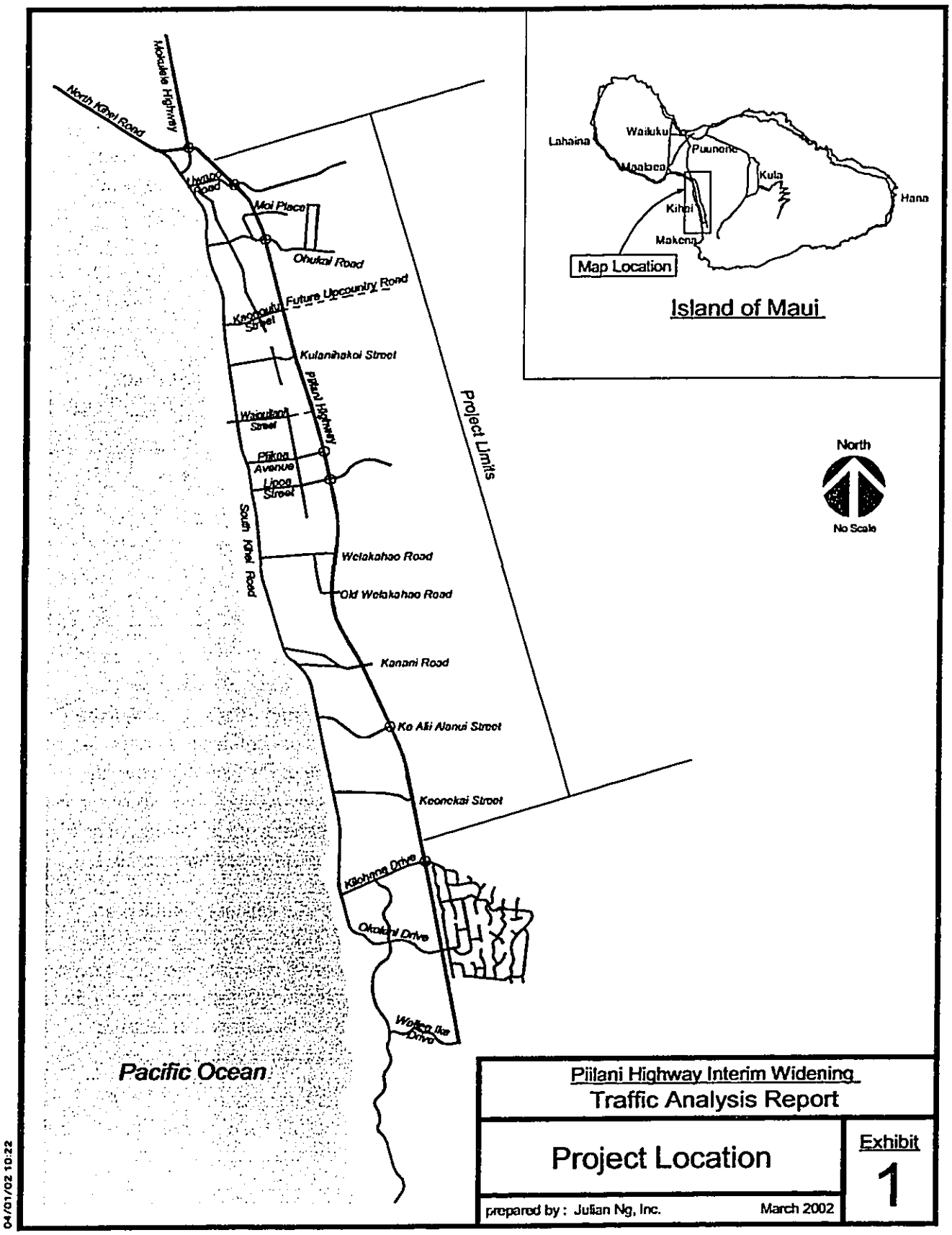
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Project Location
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prepared by : Julian Ng, Inc.
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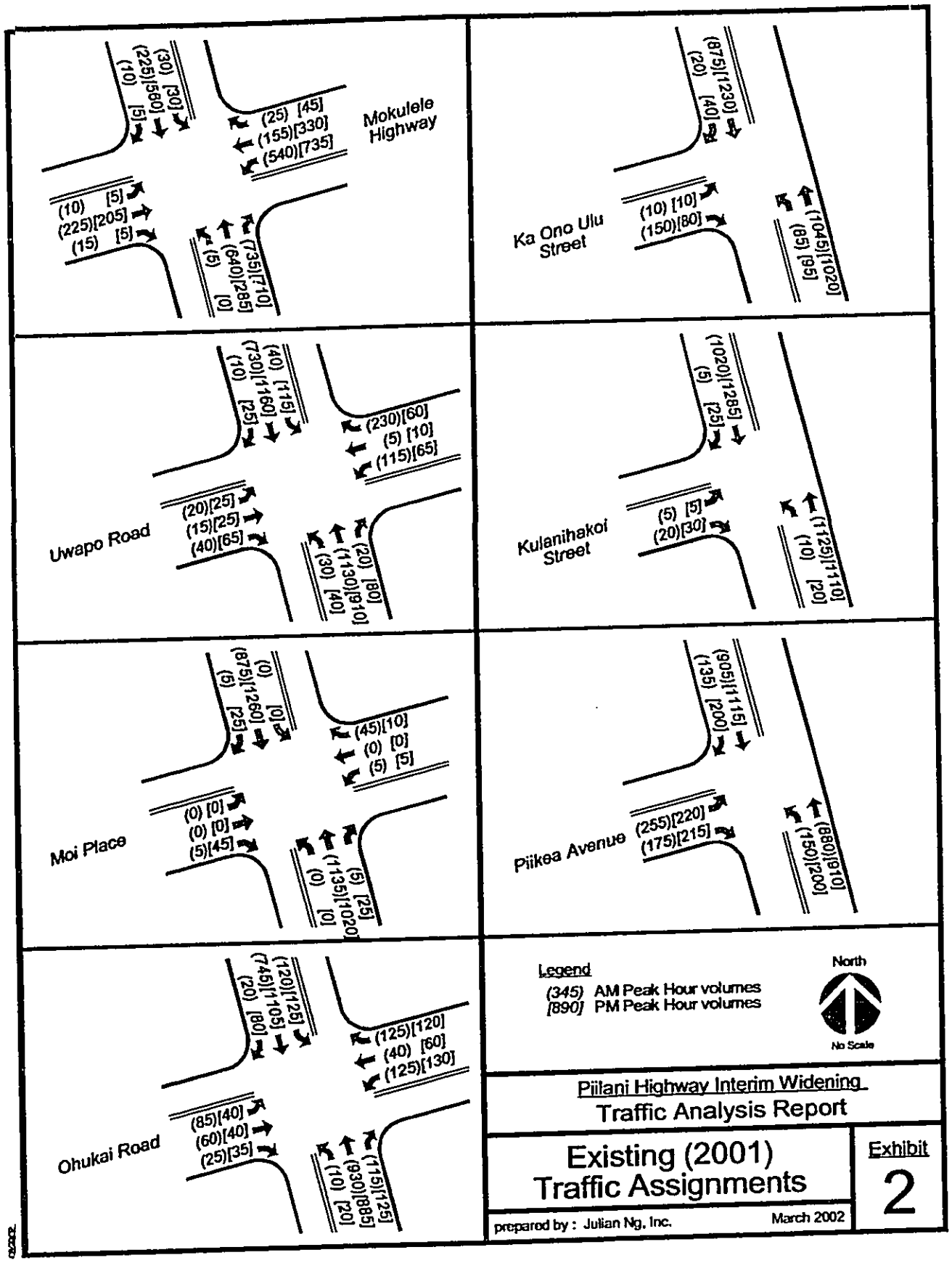
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(10) [20]
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(5) [5]
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(5) [25]
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(255)[220]
(175)[215]
(880)[910]
(150)[200]
Ohukai Road
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(745)[1105]
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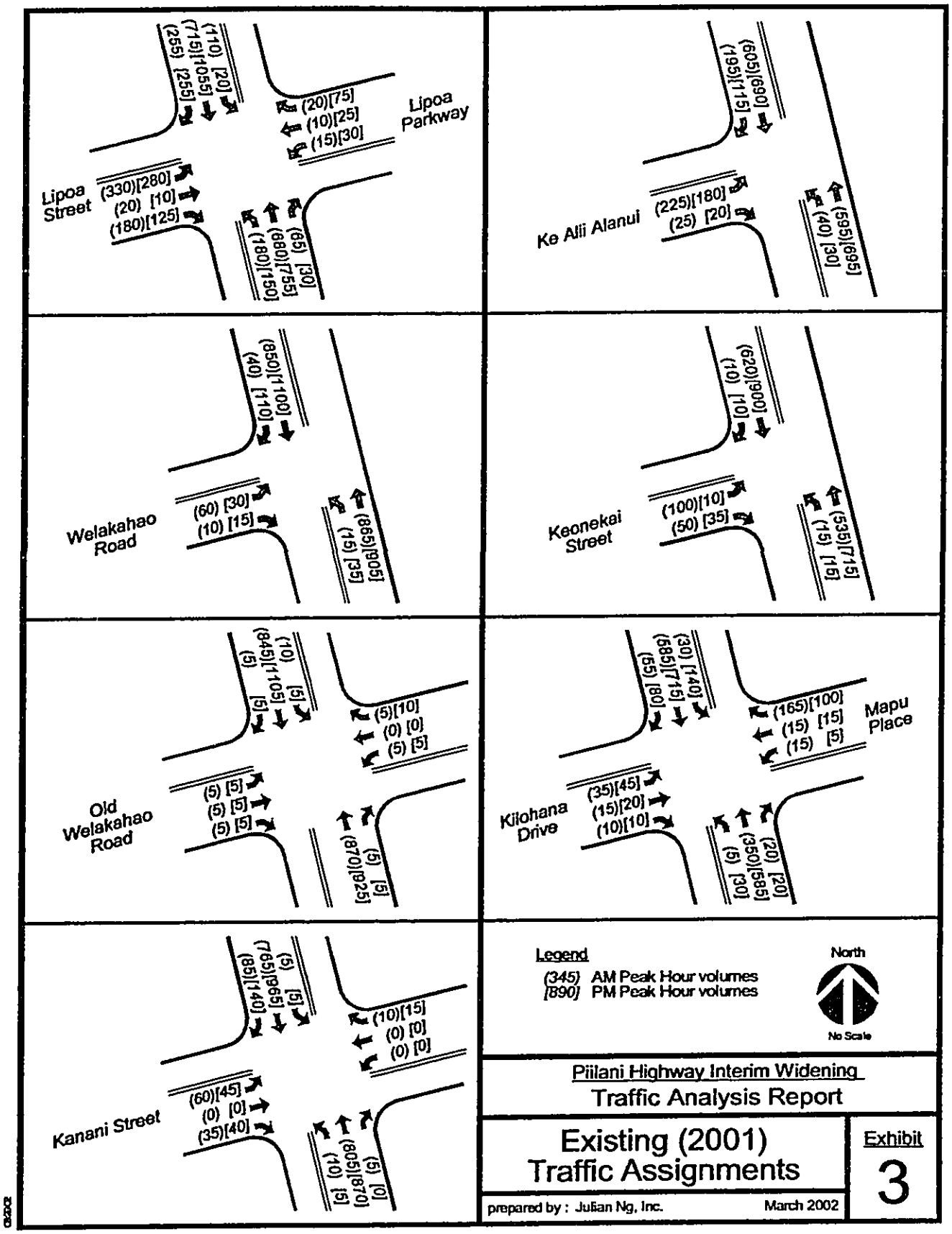
(125)[120]
(40) [60]
(125)[130]
(85)[40]
(60)[40]
(25)[35]
(115)[125]
(930)[885]
(10) [20]
Legend
(345) AM Peak Hour volumes
[890] PM Peak Hour volumes
North
No Scale
Piilani Highway Interim Widening
Traffic Analysis Report
Existing (2001)
Traffic Assignments
Exhibit
2
prepared by : Julian Ng, Inc.
March 2002


Lipoa Parkway
Lipoa Street
(110) [20]
(715)[1055]
(255) [255]
(20)[75]
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(330)[280]
(20) [10]
(180)[125]
(65) [30]
(880)[755]
(180)[150]
Ke Alii Alanui
(605)[690]
(195)[115]
(225)[180]
(25) [20]
(595)[695]
(40) [30]
Welakahao Road
(850)[1100]
(40) [110]
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(10) [15]
(865)[905]
(15) [35]
Keonekai Street
(620)[900]
(10) [10]
(100)[10]
(50) [35]
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(15) [15]
Old Welakahao Road
(845)[1105]
(5) [5]
(10) [5]
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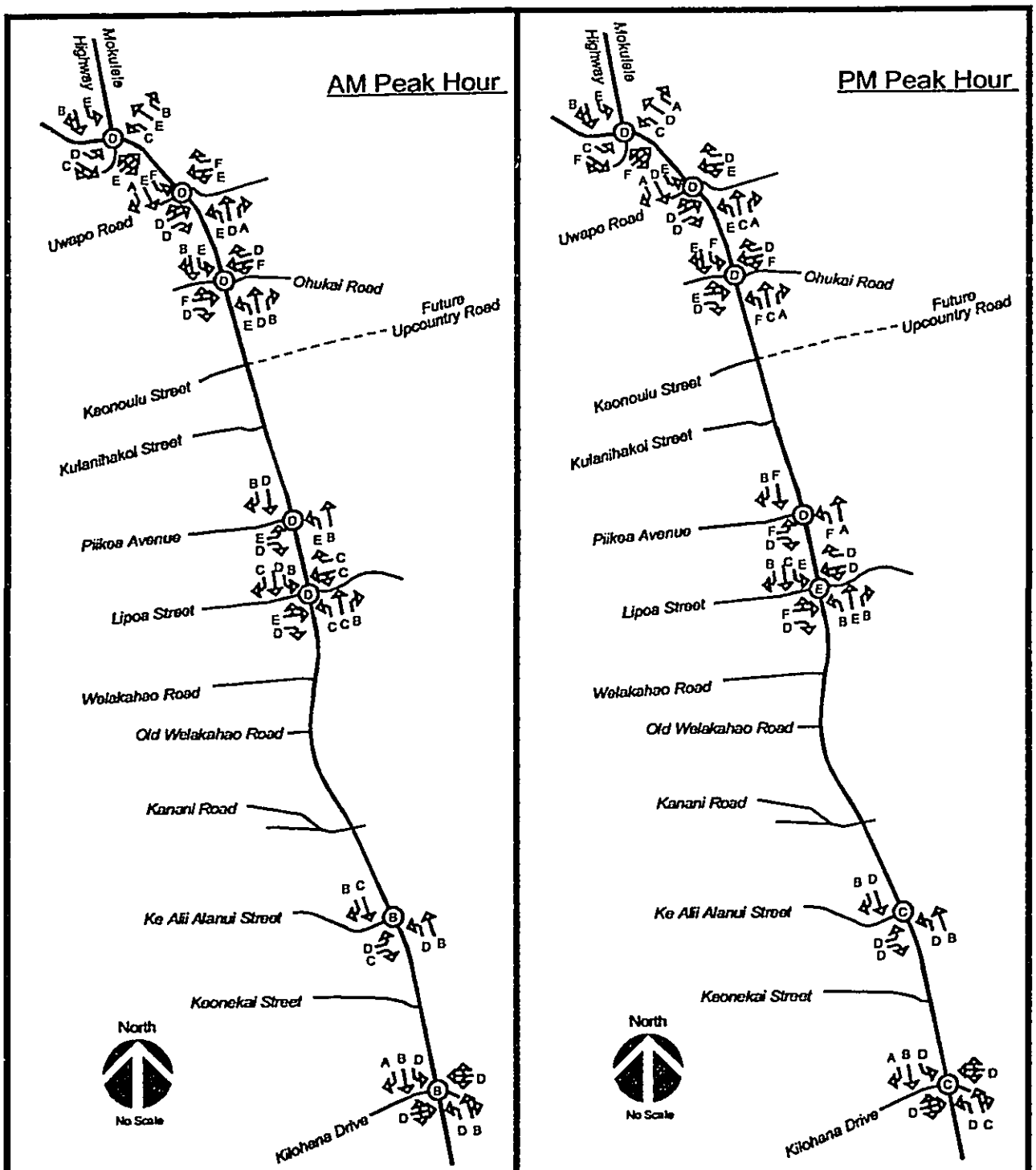
(5) [5]
(5) [5]
(5) [5]
(870)[925]
(5) [5]
Kilohana Drive
(685)[715]
(55) [80]
(30) [140]
(165)[100]
(15) [15]
(15) [5]
Mapu Place
(35)[45]
(15)[20]
(10)[10]
(350)[585]
(5) [30]
(20) [20]
Kanani Street
(765)[965]
(85)[140]
(5) [5]
(10)[15]
(0) [0]
(0) [0]
(60)[45]
(0) [0]
(35)[40]
(805)[870]
(10) [5]
(5) [0]
Legend
(345) AM Peak Hour volumes
[890] PM Peak Hour volumes
North
No Scale
Piilani Highway Interim Widening
Traffic Analysis Report
Existing (2001)
Traffic Assignments
Exhibit
3
prepared by : Julian Ng, Inc.
March 2002



Legend

- Lane Groups at signalized intersection
- B — Level of service for lane or lane group
- (B) — Overall level of service for signalized intersection

04/01/02 10:22

Piilani Highway Interim Widening

Traffic Analysis Report

Existing Lane Configurations and LOS

Exhibit 4

prepared by : Julian Ng, Inc. March 2002