RECEIVED
OFFICE OF THE DIRECTOR
DEPT. OF HEALTHEXECUTIVE CHAMBERS
HONOLULU

'90 SEP -5 A10:35

JOHN WAIHEE
GOVERNOR

August 23, 1990

MEMORANDUM

TO: The Honorable Edward Y. Hirata, Director
Department of Transportation

SUBJECT: Final Environmental Impact Statement for the Kahekili Highway
Widening and Interchange

Based upon the recommendation of your office, I am pleased to accept the Final Environmental Impact Statement for the Kahekili Highway Widening and Interchange Project as satisfactory fulfillment of the requirements of Chapter 343, Hawaii Revised Statutes. This environmental impact statement will be a useful tool in the process of deciding whether the action described therein should be allowed to proceed. My acceptance of the statement is an affirmation of the adequacy of that statement under applicable laws and does not constitute an endorsement of the proposed action.

When the decision is made regarding the proposed action itself, I expect the proposing agency to weigh carefully whether the societal benefits justify the environmental impacts which will likely occur. These impacts are adequately described in the statement, and, together with the comments made by reviewers, provide a useful analysis of the proposed action.

JOHN WAIHEE

cc: / Dr. Bruce S. Anderson

TEXT OF FINAL
Environmental Impact Statement
REPORT NO.: FHWA-HI-EIS-89-01-F
KAHEKILI HIGHWAY WIDENING AND INTERCHANGE
City and County of Honolulu, Hawaii
State Project No. 83F-01-75 and 63A-05-68
Federal-Aid Project No. F-083-1(26)

Submitted Pursuant to 42 USC 4332(2)(c)
and
Chapter 343, Hawaii Revised Statutes (HRS)

U.S. Department of Transportation
Federal Highway Administration
and
State of Hawaii Department of Transportation
Highways Division

June 1990

OA
431A

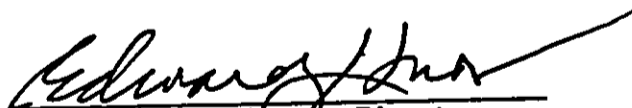
FINAL ENVIRONMENTAL IMPACT STATEMENT

FOR

KAHEKILI HIGHWAY WIDENING AND INTERCHANGE
State Project No. 83F-01-75 and 63A-05-68

Submitted Pursuant to
Chapter 343, Hawaii Revised Statutes (HRS)

State of Hawaii
Department of Transportation
Highways Division



Edward Y. Hirata, Director
Department of Transportation

JUL _ 9 1990

Date


FHWA-HI-EIS-89-01-F

KAHEKILI HIGHWAY WIDENING AND INTERCHANGE
City and County of Honolulu, Hawaii
State Project No. 83F-01-75 and 63A-05-68
Federal-Aid Project No. F-083-1(26)

Final
Environmental Impact Statement
Submitted Pursuant to 42 USC 4332(2)(c),
and
Chapter 343, Hawaii Revised Statutes (HRS)

U.S. Department of Transportation
Federal Highway Administration
and
State of Hawaii Department of Transportation
Highways Division

Date of Approval



Edward Y. Hirata, Director
State of Hawaii Department of
Transportation

Date of Approval

Federal Highway Administration
Region IX

The following persons may be contacted for additional information concerning this document:

Mr. William R. Lake,
Division Administrator
Federal Highway Administration
U.S. Department of Transportation
Box 50206
300 Ala Moana Boulevard
Honolulu, Hawaii 96850
Tel.: (808) 541-2700

Mr. Edward Y. Hirata, Director
State of Hawaii
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813
Tel.: (808) 548-3205

The proposed project involves the construction of a traffic interchange at the intersection of Likelike Highway (FAP 63) and Kahekili Highway (FAP 83), and the widening of Kahekili Highway from the interchange to Kamehameha Highway, a distance of 4.4 miles. The project is located in Koolaupoko, Windward Oahu.

SUMMARY

A. PROPOSED ACTION

This Final Environmental Impact Statement addresses the anticipated environmental effects of proposed highway improvements for the existing Kahekili Highway corridor on the Island of Oahu, State of Hawaii.

The Kahekili Highway Widening and Interchange project is located on the Windward side of Oahu between Likelike Highway in Kaneohe and Kamehameha Highway near Kahaluu Stream. Kahekili Highway passes through Kaneohe, Heeia, Haiku and Ahuimanu. The proposed project involves the construction of a traffic interchange at the intersection of Likelike (FAP 63) and Kahekili (FAP 83) Highways and the widening of Kahekili Highway from a two-lane road to a multi-lane (4 to 6-lane), divided facility from the interchange to Kamehameha Highway, a distance of approximately 4.4 miles.

The existing Kahekili Highway, a two-lane facility, intersects Likelike Highway, a four-lane, divided facility, at a T-type of intersection. A third lane between Likelike Highway and Haiku Road was recently completed to accommodate left turning movements in both directions. Kahekili Highway was constructed as the first increment of a future four-lane divided highway within a minimum 120 feet right-of-way. Kahekili Highway is a principal arterial roadway which connects the communities of Kahaluu and the Koolauloa Coast to Likelike Highway. The other major roadway in the Kaneohe-Kahaluu corridor is Kamehameha Highway. Kamehameha Highway is a major collector road which passes through Kaneohe Town.

The region surrounding Kahekili Highway has experienced considerable population growth. Traffic volumes on Kahekili Highway have grown along with this growth. Average daily traffic on Kahekili Highway near the intersection with Likelike Highway increased from about 15,500 vehicles in 1970 to nearly 27,000 vehicles currently. Congestion in the area has worsened as a result of the increase in traffic. The proposed Kahekili Highway Widening and Interchange project will alleviate the existing congestion along the highway and greatly enhance traffic safety.

B. OTHER MAJOR GOVERNMENTAL ACTIONS IN THE AREA

Interstate Route H-3 which is presently under construction and scheduled for completion in 1994, will provide a third Trans-Koolau highway facility connecting Windward to Leeward Oahu. Interstate Route H-3 will provide an interchange (Kaneohe Interchange) with Likelike Highway at a location

approximately 3/4 of a mile mauka (or southwest) of Kahekili Highway. Kahekili Interchange will be designed with direct ramp connections to and from the Kaneohe Interchange.

C. PREFERRED ALTERNATIVE

The preferred design alternative for Kahekili Interchange is the full interchange, Scheme A-4, underpass. This scheme, a full interchange which eliminates all at-grade traffic conflicts, would provide overpass ramps for left turn movements from Kahekili Highway onto Likelike Highway and from Likelike Highway onto Kahekili Highway. There would also be a depressed access ramp for right turn movements from Kahekili Highway onto Likelike Highway and H-3. For Leeward Oahu-bound movements, the traffic from each highway would be separated in a configuration of braided (grade-separated) ramps which would connect to Wilson Tunnel and H-3. It would preclude the need for traffic signals and a weaving section. (See Exhibit II-3.)

The preferred alternative for the widening of Kahekili Highway is to widen from Likelike Highway to Kamehameha Highway in increments. The first increment will be to construct the Kahekili Interchange and to widen Kahekili Highway to the vicinity of Haiku Road. Future widening of Kahekili Highway from Haiku Road to Kamehameha Highway will provide for the long-term travel needs and will be undertaken after 1995 as indicated in the Koolaupoko Development Plan of the City and County of Honolulu. (See Exhibit II-8.)

D. ALTERNATIVES CONSIDERED

1. General

Four (4) types of alternative actions were considered to improve traffic operations on Kahekili Highway. These are:

- a. "No Action"
- b. Transportation System Management (TSM) alternatives
- c. Improving an existing or constructing new parallel corridors
- d. Kahekili improvement alternatives

The "No Action" TSM alternatives do not provide enough capacity or reduce traffic sufficiently to address the existing and future needs along Kahekili Highway. Additional improvements are needed in order to relieve congestion and promote public safety during all hours

of travel. Existing problems will be exacerbated with the traffic growth expected for the project region. Travel time to work and other destinations will lengthen with increased traffic congestion and have adverse effects on the social and economic well-being of area residents.

Alternative parallel corridors considered for improvements other than Kahekili Highway were the existing Kamehameha Highway and two new southwest routes. The widening or development of any of these corridors in comparison with the proposed Kahekili widening or interchange alternative schemes would cost more, would not serve traffic needs as well, and would have considerably more adverse environmental impact.

Accordingly, improving Kahekili Highway is the only reasonable action which will solve the long-term transportation needs of the area.

Alternatives for the proposed improvements to Kahekili Highway can be categorized into two separate components: Likelike/Kahekili Highway intersection alternatives and the Kahekili Highway Widening alternatives.

2. Likelike/Kahekili Highway Alternatives

Alternative improvements for the Likelike intersection include:

1. Full interchange, Schemes A-1 and A-4
2. Partial interchange, Schemes B, B-1, C and C-1
3. At-grade intersection improvements

The operational difference between these schemes is that the full interchange, Scheme A-4, grade-separates all conflicting and weaving movements while the partial interchange (Schemes B and C) grade separates some of the conflicting movements and the at-grade intersection is fully operated by a traffic signal. (Diagrams of these Schemes are shown in Exhibits II-3 to II-6.)

Scheme A-4 is the preferred alternative because it has a higher level of service, safety and road user savings benefits. Scheme A-4 provides safer and more efficient movement of people and goods to and from Interstate Route H-3, Likelike Highway (FAP 63) and Kahekili Highway (FAP 83).

3. Kahekili Widening Alternatives

Alternatives for the proposed widening of Kahekili Highway include:

- a. Widening from Likelike Highway to Haiku Road.
- b. Widening from Likelike Highway to Ahuimanu Place.
- c. Widening from Likelike Highway to Kamehameha Highway, i.e., the entire length of the project.

Widening Kahekili Highway to Kamehameha Highway on an incremental basis is preferred because it is the only alternative that will improve traffic operation and safety along the entire length of Kahekili and provide for the long term travel needs of the area. It is also consistent with the land use plans of the area. Present traffic already justifies the widening to Ahuimanu Place. If Kahekili Highway is not widened the entire length of the project, Kahekili Highway will be operating at level of service F in the design year 2008 in those sections that are not widened.

The environmental impact of each additional increment is generally not considered significant since no relocation of households is required and the widening will be generally accomplished within the existing right-of-way except for some minor slope easements in certain areas. The perception that widening the entire length of Kahekili will induce urban growth will only be realized if current land use plans are changed. Impacts on water quality, aquatic habitat and noise can be adequately mitigated by certain construction and design measures for all alternatives.

E. ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

It is anticipated that the potential environmental impacts from the proposed project will be: noise, floodplain, water quality, erosion control during construction, residential relocation, and social impacts and economic impacts. The following measures have been incorporated into the project to mitigate the environmental impacts of constructing the proposed action. All practicable measures to minimize environmental harm have been incorporated into this decision.

1. Noise - Noise barriers will be implemented along the highway right-of-way in those areas where noise impacts have been identified and abatement measures are reasonable and feasible. The final design of the noise barriers will be coordinated with the affected property owners.

2. Floodplain - The drainage system will be constructed to National Flood Insurance Program (NFIP) floodway standards.
3. Water Quality - Culvert floor outlet elevations will be placed at streambed level to maintain or return the stream to a natural hydraulic condition. Drainage outlets will be designed to simulate natural stream conditions.

Intercept ditches will be constructed along the highway embankment to catch runoff before it reaches the streams.

The removal of streamside vegetation will be minimized and those areas which need to be cleared will be replanted with plant species typical of the streamside area.

All of the above mitigating measures will continue to be developed in consultation with the Corps of Engineers, the Section 404 resource agencies, and the Hawaii Department of Land and Natural Resources (DLNR) and will be implemented in accordance with the Corps of Engineers Nationwide Section 404 permits and the Hawaii DLNR stream channel alteration permits and in compliance with the recommendations of the Non-Point Source Water Pollution Management Plan.

4. Erosion Control - Graded areas will be reduced to the extent possible. Where cuts, fills, and other grading work is required, City and County grading standards will be enforced to reduce erosion. Bare slopes will be avoided where possible by frequent seeding and mulching or the use of jute matting during construction. Revegetation will follow soon after grading operations and, if possible, native species will be utilized. Fresh cuts and fills will be mulched and seeded incrementally, so that no area remains unplanted for very long during construction.

Runoff of drainage water during construction will be controlled by such methods as proper grading, slope rounding, warping and contouring. Berms at the top of cuts will divert water from the cut face. Sediment basins, debris basins, or desilting basins, where feasible, will remove sediment from runoff before it leaves the construction area.

5. Construction - The Construction phase will produce short-term adverse effects on noise levels, air and water quality, and will be a temporary inconvenience to motorists making frequent use of Kahekili Highway.

6. Residential Relocation - The Conceptual Relocation Plan Appendix D has indicated that replacement housing is available for the 3 households that will be displaced with Scheme A-4.
7. Social and Economic - Scheme A-4 and widening all of Kahekili Highway would improve traffic flow, reduce travel time and increase traffic safety. The impact on the economy will be positive as a result of the construction jobs created by the project.

F. AREAS OF CONCERN

Based on comments received at the public information meetings (February 1983, March 1983, August 1983, and December 1987), the public hearing (August 1989) held by the State of Hawaii Department of Transportation and written responses to the Environmental Impact Statement Preparation Notice, the principal areas of controversy surrounding the proposed project appear to be as follows:

1. Potential inducement of urban growth in Windward Oahu. Widening of the entire length of Kahekili Highway would tend to induce urban growth in the less urbanized areas in Kahaluu and beyond, into the Koolauloa Development Plan area.
2. Noise impacts. A potential increase in traffic noise would affect residents in the project area, particularly near the intersection of Kahekili Highway and Likelike Highway.
3. Effects on access for pedestrians. Residents on either side of Kahekili Highway have expressed concern about how Highway widening would affect pedestrians crossing the road, particularly children walking to and from school or Kaneohe District Park during peak periods of traffic.

H. UNRESOLVED ISSUES

The unresolved issues relate to obtaining all of the permits and approvals listed in the following section.

I. OTHER GOVERNMENTAL ACTIONS REQUIRED

The following permits and approvals will be obtained prior to the construction of the proposed action:

- o U.S. Corps of Engineers - Section 404 Nationwide Permit
- o State of Hawaii, Board of Land and Natural Resources
 - Conservation District Use Permits
 - Channel Alteration Permit for Protection of Instream Uses of Water, Windward Oahu

- o City/County of Honolulu, City Council
 - Amendment to the Public Facilities map for Koolaupoko
 - Special Management Area Use Permit (SMP)
- o City County of Honolulu, Department of Public Works
 - Grading, Grubbing and Stockpiling Permit

TABLE OF CONTENTS

	<u>Page</u>
Cover Sheet	i
Summary	ii
Table of Contents	ix
 CHAPTER I: PURPOSE AND NEED FOR ACTION	
A. BACKGROUND	1
B. TRAFFIC CONDITIONS	1
 CHAPTER II. ALTERNATIVES INCLUDING PROPOSED ACTION	
A. INTRODUCTION	10
B. "NO ACTION"	10
C. TRANSPORTATION SYSTEM MANAGEMENT ALTERNATIVE	10
1. Municipal Bus Service	11
2. Controls and Incentives	11
D. HIGHWAY CORRIDOR ALTERNATIVES	12
1. Kamehameha Highway Improvements	12
2. New Southwest Routes	14
E. KAHEKILI HIGHWAY IMPROVEMENT ALTERNATIVES	15
1. Likely Highway Intersection Schemes	15
a. Full Interchange	15
Scheme A-4 (underpass)	15
Scheme A-1 (overpass)	17
b. Partial Interchange	17
(1) Scheme B-1 (underpass)	17
Scheme B (overpass)	17
(2) Scheme C-1 (underpass)	17
Scheme C (overpass)	21
c. Intersection Improvements	21
2. Widening Alternatives	21
a. Likely Highway to Haiku Road	24
b. Likely Highway to Ahuimanu Place	26
c. Likely Highway to Kamehameha Highway	27

	<u>Page</u>
3. Castle Hills Connection to Kealahala Road	27
F. ALTERNATIVES CONSIDERED IN DEIS	27
G. COMPARISON OF ESTIMATED EARTHWORK REQUIREMENTS FOR PROJECT ALTERNATIVES	30
H. COMPARISON OF TENTATIVE CONSTRUCTION SCHEDULES AND COST ESTIMATES	30
I. BENEFIT COST ANALYSIS OF PROJECT ALTERNATIVES	33
J. SUMMARY COMPARISON OF ENVIRONMENTAL AND SOCIAL IMPACTS FOR PROJECT ALTERNATIVES	35
K. SELECTION OF PREFERRED ALTERNATIVE	37
CHAPTER III: AFFECTED ENVIRONMENT	
A. NATURAL ENVIRONMENT	38
1. Geology, Topography and Soils	38
2. Climatology and Hydrology	40
a. Climate and Air Quality	40
b. Wetlands and Streams	40
c. Floodplain	42
3. Vegetation, Fish and Wildlife	43
4. Visual Quality	46
B. SOCIAL ENVIRONMENT	46
1. Population and Housing	46
2. Cultural Aspects	48
3. Archaeological Aspects	50
4. Trucks, Buses and Bicycles	51
5. Utilities	52
6. Public Institutions, Recreation and Community Facilities	54
7. Neighborhoods	57
8. Traffic Safety	58
C. ECONOMIC SETTING	58
1. Land Improvements and Tax Base	58

	<u>Page</u>
D. AREA WIDE PLANS AND POLICIES	62
1. State of Hawaii	62
a. The Hawaii State Plan Revised	62
b. State of Hawaii, Energy Plan	63
c. State Transportation Plan	64
d. State Land Use Law	64
e. Hawaii Coastal Zone Management Program (HCZMP)	66
f. Water Quality Standards	67
g. Department of Health Draft Nonpoint Source Water Pollution Management Plan	67
h. Ambient Air Quality Standards and Controls	68
i. Noise Control	68
2. City and County of Honolulu	68
a. General Plan	68
b. Koolaupoko Development Plan	71
c. Koolauloa Development Plan	73
d. Special Management Area (SMA)	75
e. Flood Hazard District	75

CHAPTER IV: ENVIRONMENTAL CONSEQUENCES

A. INTRODUCTION	78
B. PHYSICAL IMPACTS	78
1. Topography	78
2. Air Quality	78
3. Noise	80
4. Energy	88
5. Floodplain	90
6. Coastal Zone	93
7. Wetlands and Streams	95
8. Water Quality	98
9. Threatened or Endangered Species	101
10. Prime and Important Agricultural Lands	101
11. Hazardous Waste Sites	102

	<u>Page</u>
12. Construction	102
a. Air Quality	108
b. Noise	108
c. Water Quality	109
d. Socio-Economic Impacts	109
e. Hazardous Waste Sites	111
C. COMMUNITY IMPACTS	111
1. Traffic Efficiency and Safety	111
2. Property Values and Neighborhood Cohesion	112
3. Relocation and Public Revenues	113
4. Land Use and Development	120
5. Pedestrians and Bicyclists	121
6. Visual	121
7. Regional Section 4(f) Resources	124
D. HISTORIC AND ARCHAEOLOGICAL PRESERVATION	127
E. THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY	127
F. UNAVOIDABLE IMPACTS AND IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES	128
CHAPTER V: PUBLIC AGENCY COORDINATION LETTERS	129
CHAPTER VI: MINUTES OF PUBLIC INFORMATION MEETINGS AND SUMMARY OF PUBLIC HEARING	143
CHAPTER VII: ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE COMMENT LETTERS AND RESPONSES	179
CHAPTER VIII: DEIS COMMENT LETTERS AND RESPONSES	243
LIST OF AGENCIES, ORGANIZATIONS AND PERSONS TO WHOM COPIES OF THE DEIS WERE SENT	301
LIST OF PREPARERS	307
LIST OF REFERENCES	309
INDEX	313

APPENDICES

	<u>Page</u>
APPENDIX A: AIR QUALITY IMPACT ANALYSIS	A-1
APPENDIX B: NOISE IMPACT ANALYSIS	B-1
April 12, 1990 memo	
March 30, 1988 memo	
May 4, 1984 memo	
April 23, 1984 memo	
July 12, 1983 memo	
APPENDIX C: WATER QUALITY AND BIOLOGICAL IMPACT ANALYSIS	C-1
APPENDIX D: RELOCATION PLAN	D-1
APPENDIX E: ARCHAEOLOGICAL REPORT	E-1
APPENDIX F: ENGINEERING DRAWINGS OF DRAINAGE IMPROVEMENTS AT STREAM CROSSING	F-1
APPENDIX G: 176D HAWAII REVISED STATUTES	G-1
APPENDIX H: OMPO/CAC WINDWARD CORRIDOR STUDY GROUP RECOMMENDATIONS	H-1

LIST OF EXHIBITS

<u>Number</u>	<u>Title</u>	<u>Page</u>
I-1	System Linkage Map	2
I-2	Location Map	3
I-3	Traffic Assignment	5
I-4	Estimated Travel Times	6
I-5	Current and Projected Traffic Volumes on Kahekili Highway Between Intersections, 1987 and 2008	9
II-1	Corridor Alternatives	13
II-2	Design Criteria for Intersection Schemes and Highway Widening	16
II-3	Likely Highway Intersection Alternatives Full Interchange (Scheme A-4) underpass Full Interchange (Scheme A-1) overpass	18 18
II-4	Likely Highway Intersection Alternatives Partial Interchange (Scheme B-1) underpass Partial Interchange (Scheme B) overpass	19 19
II-5	Likely Highway Intersection Alternatives Partial Interchange (Scheme C-1) underpass Partial Interchange (Scheme C) overpass	20 20
II-6	Likely Highway Intersection Alternatives Intersection Improvements	22
II-7	Typical Cross-Section of Proposed Highway Widening	23
II-8	Widening Alternatives	25
II-9	Proposed Connector to Kealahala Road	28
II-10	Estimated Earthwork Requirements for Project Alternatives	31
II-11	Benefit-Cost Analysis of Project Alternatives for Kahekili Highway	32
II-12	Tentative Schedule and Costs for Project Phases	34

<u>Number</u>	<u>Title</u>	<u>Page</u>
III-1	Soil Associations in Project Region	39
III-2	Wetlands and Streams	41
III-3	Floodplain Map Kahekili Region	44
III-4	Communities and Neighborhoods in Project Region .	47
III-5	Demographic Data	49
III-6	Existing and Proposed Sewer and Water Facilities	53
III-7	Schools, Hospital, Parks and Public Housing . . .	55
III-8	Facilities Map of Kaneohe District Park	56
III-9	Traffic Accident Rate on Kahekili Highway by Highway Segment	59
III-10	Existing Land Uses in Project Area	60
III-11	Major Commercial Centers in Project Region . . .	61
III-12	State Land Use Designation Map	65
III-13	Development Plan Areas of Oahu	69
III-14	Koolaupoko Development Plan Land Use Map	72
III-15	Koolaupoko Development Plan Public Facilities Map	74
III-16	Special Management Area	76
III-17	Required Permits and Approvals	77
IV-1	Intersections Where Projected CO Levels Exceed State Standards	79
IV-2	Federal Highway Administration Noise Level Standards Hourly A-Weighted Sound Level - Decibels (dBA)	82
IV-3	Typical Present and Future Traffic Noise Levels in Areas Potentially Impacted by Improving the Intersection at Kahekili and Likelike Highways, Equivalent Steady-State Sound Level During Worst (Noisiest) Hour	83

<u>Number</u>	<u>Title</u>	<u>Page</u>
IV-4	Typical Present and Future Traffic Noise Levels Along Kahekili Highway, Equivalent Steady-State Sound Level During Worst (Noisiest) Hour	84
IV-5	Noise Barrier Walls	87
IV-6	Significant Agriculture Lands	103
IV-7	Agricultural Lands in Scheme A-4	104
IV-8	Agricultural Lands in Scheme B-1	105
IV-9	Agricultural Lands in Scheme C-1	106
IV-10	Agricultural Lands in Intersection Improvements .	107
IV-11	Residential Relocation Required for Proposed Kahekili/Likeline Highway Intersection Schemes .	115
IV-12	Likeline Highway Intersection Proposed Right-of-Way Full Interchange Scheme A-4 (underpass) . .	116
IV-13	Likeline Highway Intersection Proposed Right-of-Way Partial Interchange Scheme B-1 (underpass) .	117
IV-14	Likeline Highway Intersection Proposed Right-of-Way Partial Interchange Scheme C-1 (underpass) .	118
IV-15	Likeline Highway Intersection Proposed Right-of-Way Intersection Improvements	119
IV-16	Regional Section 4(f) Resources	125

CHAPTER I

**PURPOSE
AND
NEED FOR ACTION**

CHAPTER I: PURPOSE AND NEED FOR ACTION

A. BACKGROUND

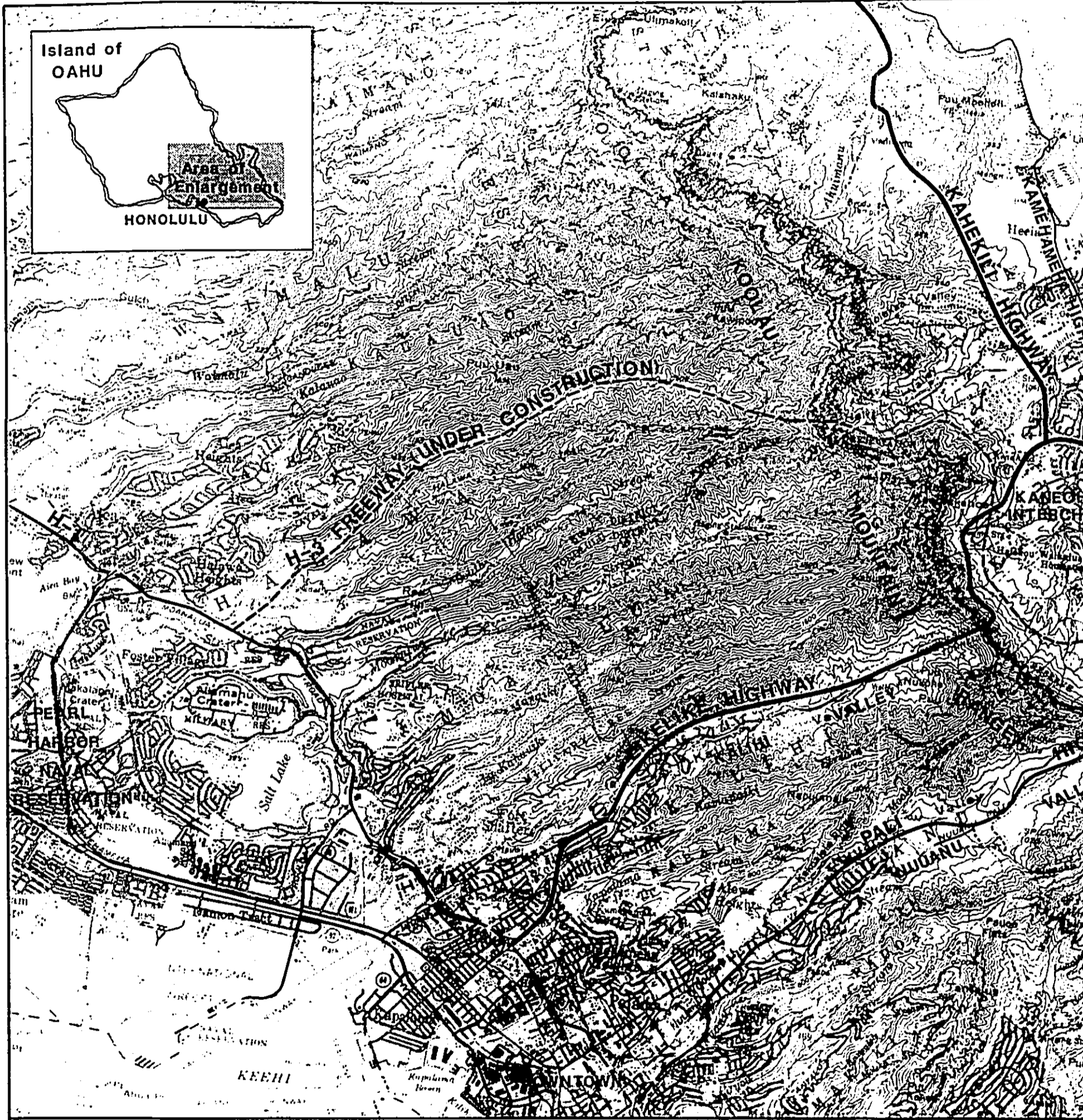
The portion of Kahekili Highway between Likelike Highway and the Ahuimanu area was constructed by the City and County of Honolulu under an improvement district in 1966. Although the construction was for a two-lane highway, a 120-foot wide right-of-way was acquired in anticipation of a future need for a wider highway. Thus, there is at present the basic right-of-way width for a four-lane divided highway.

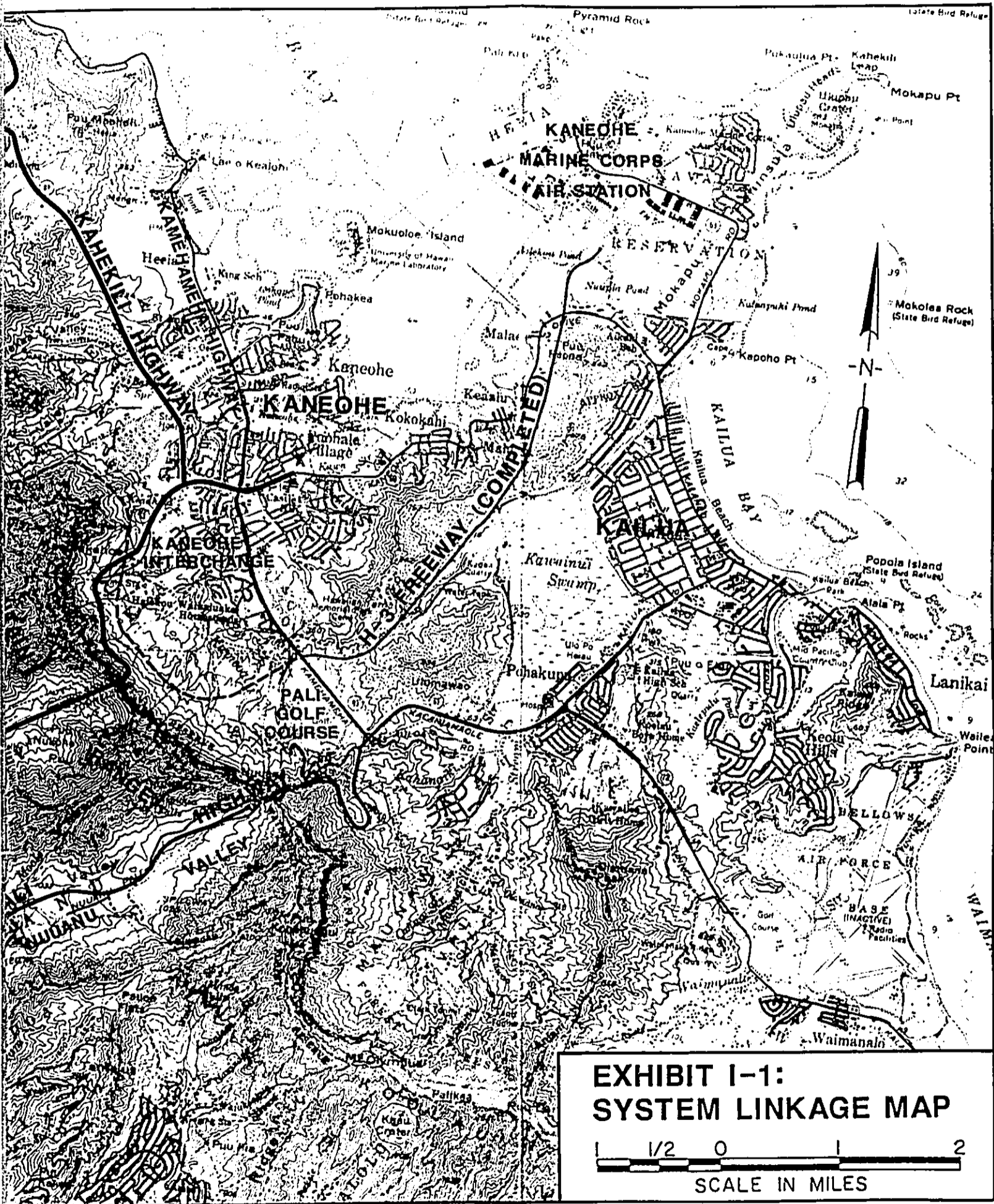
Highway widening and an interchange at the Likelike Highway intersection are listed in the State of Hawaii's Capital Improvements Program for highways as Projects No. 83F-01-75 and 63A-05-68, respectively. Both projects are in conformance with the State Transportation Plan. The Oahu Metropolitan Planning Organization (OMPO) includes an interchange at the intersection of Kahekili and Likelike Highways in its islandwide alternative transportation study (Hali 2000). The Hali 2000 study also includes widening Kahekili Highway to 6 lanes from Likelike Highway to Haiku Road and to 4 lanes from Haiku Road to Kamehameha Highway. These improvements will also be reflected in OMPO's 2005 Long Range Plan which is currently being developed. The widening of Kahekili Highway to Kamehameha Highway and an interchange at Likelike Highway are also indicated in the City and County of Honolulu's Development Plan for the project region (Koolaupoko).

An EIS Preparation Notice was published in the OEQC Bulletin on December 23, 1982. Since then, the planning for the project was delayed and no EIS was completed. (Comment and response letters from the 1982 EIS Preparation Notice from individuals and agencies who did not respond in 1987 are included in Chapter VII.) On September 23, 1987, the Department of Transportation recirculated the EIS Preparation Notice to update the comments from interested agencies, organizations and the general public on the preparation of the EIS and to proceed with the EIS process. The Draft EIS was published in June 1989 and was circulated for comments.

B. TRAFFIC CONDITIONS

Kahekili Highway is located in the Windward - or east central - area of the Island of Oahu. The region served by Kahekili Highway is predominately a suburban community, many of whose residents commute to jobs in Honolulu and Leeward Oahu, located on the other side of the Koolau Mountain Range. The System Linkage map shows how Kahekili links with the other highways in the area. The location map shows the area in the immediate vicinity of Kahekili Highway. (See Exhibits I-1 and I-2.)





**EXHIBIT I-1:
SYSTEM LINKAGE MAP**

1/2 0 1 2
SCALE IN MILES

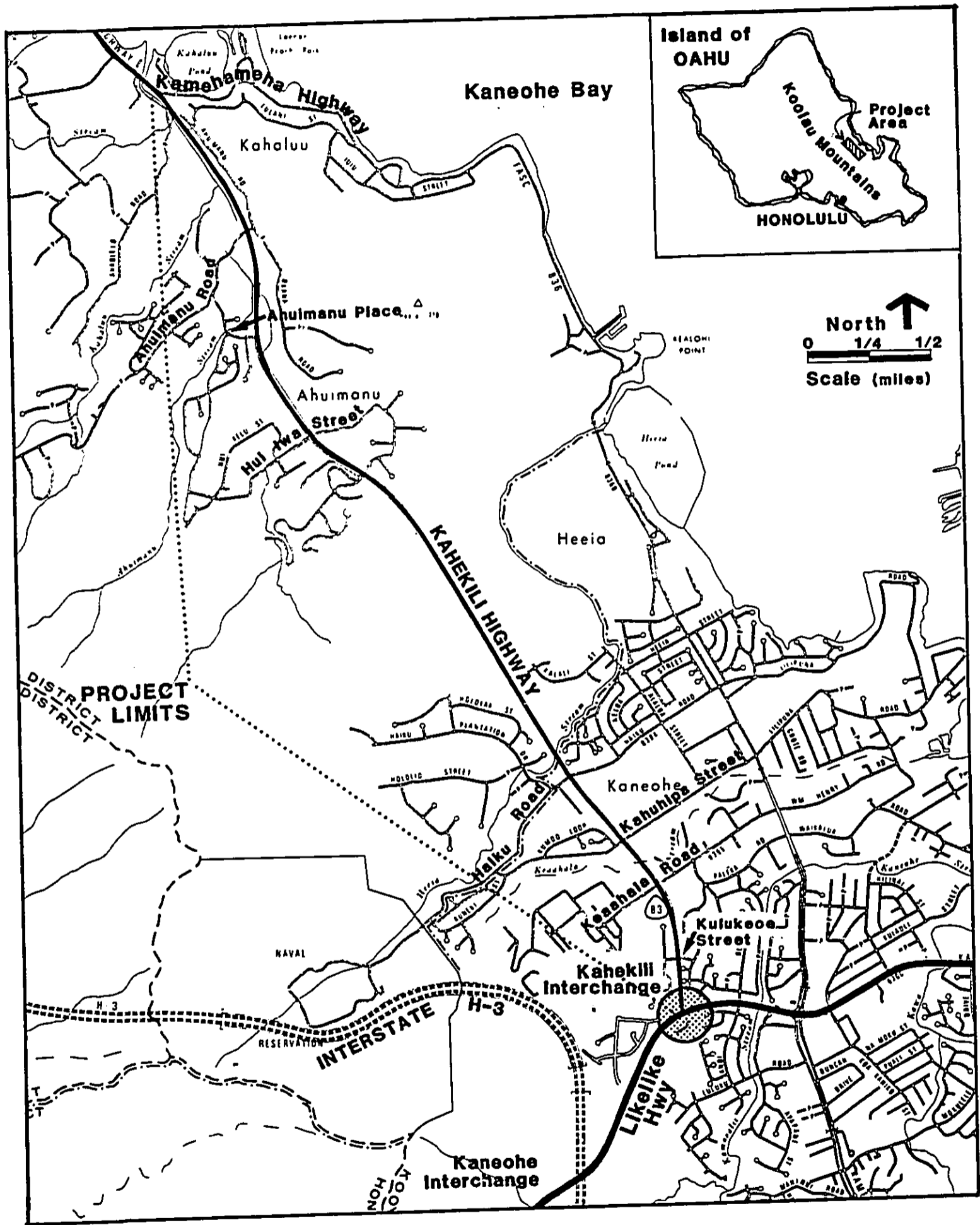


EXHIBIT I-2: LOCATION MAP

Kahekili Highway is a 4.4-mile major arterial road with an asphalt concrete pavement width of 24-34 feet and paved shoulders varying from 4 to 10 feet. Some intersections are channelized with auxiliary lanes for left turns. At its southern terminus, Kahekili Highway forms a T-type intersection with Likelike Highway, a four-lane divided facility which is presently one of two trans-Koolau routes linking Windward Oahu with Honolulu and Leeward Oahu. Interstate Route H-3 which is presently under construction will provide a third trans-Koolau route connecting Windward to Leeward Oahu by late 1993. Interstate Route H-3 includes an interchange (Kaneohe Interchange) with Likelike Highway located mauka (or southwest) of Kahekili Highway.

At its northern terminus, Kahekili Highway (FAP 83) meets Kamehameha Highway in Kahaluu. FAP 83 then continues as Kamehameha Highway to the North Shore areas of Oahu.

The region surrounding Kahekili Highway has experienced considerable population growth since 1940. The most dramatic growth period occurred between 1940 and 1960. Since that time, the rate of growth has tapered somewhat, but is still well above the Oahu average.

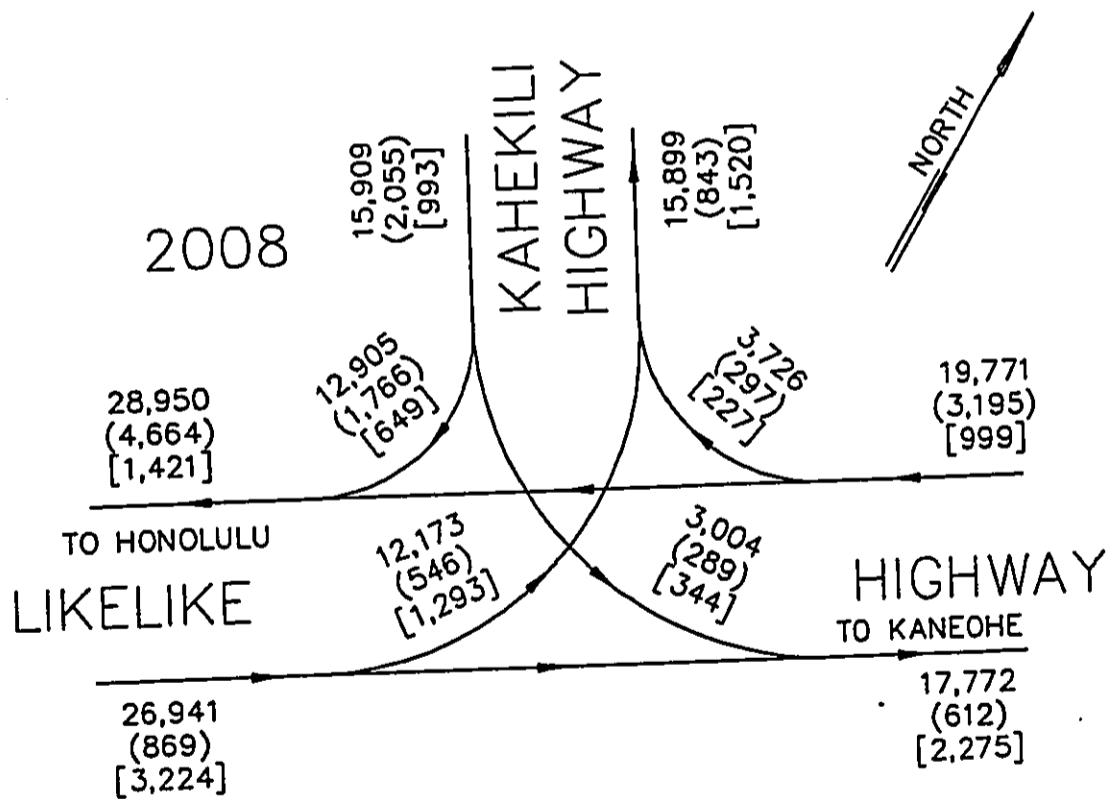
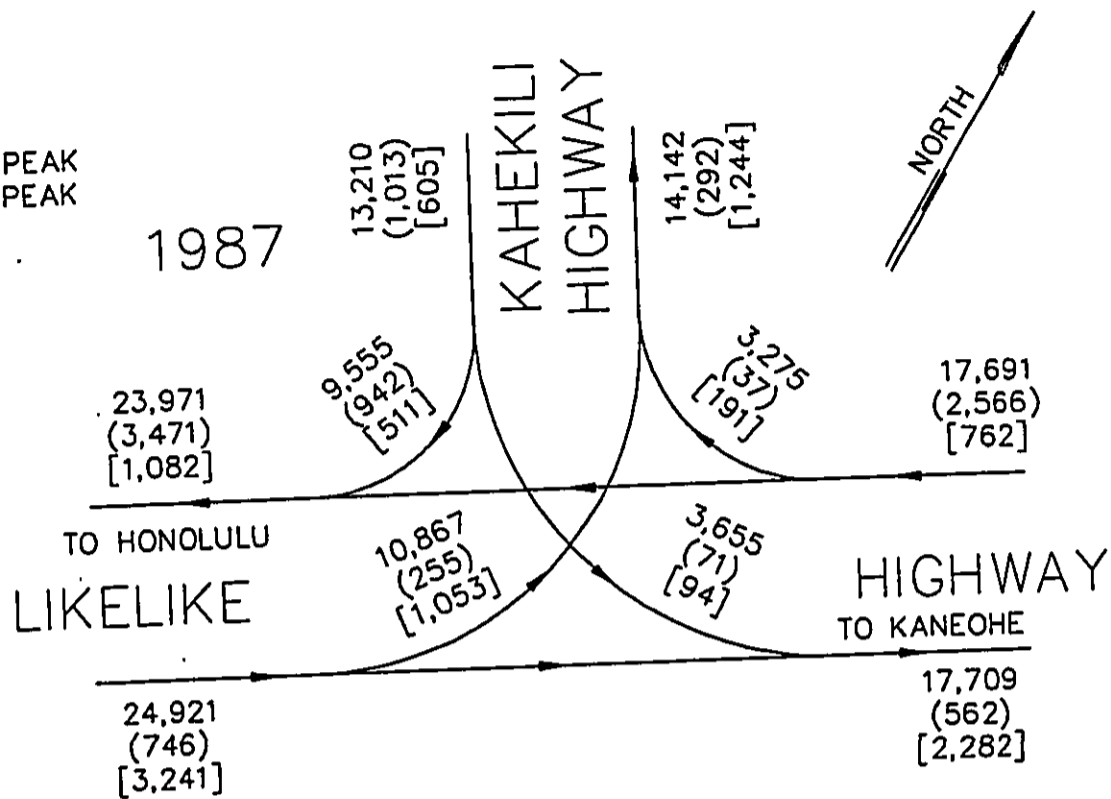
Traffic volumes on Kahekili Highway have correspondingly grown with the region's population growth. Average daily traffic (ADT) on Kahekili Highway near the intersection with Likelike Highway increased from about 15,500 vehicles in 1970 to about 27,400 in 1988.

During both the A.M. and P.M. peak periods, the travel demand exceeds the capacity of Kahekili Highway and traffic is extremely congested. As the traffic has increased, the travel times have also lengthened. Today, travel from Kamehameha Highways to Likelike Highway which normally takes 10 minutes during the off-peak periods takes approximately 24 minutes during the A.M. peak hour.

The State Department of Transportation has implemented a contraflow operation with a continuous left turn lane from Likelike Highway to Haiku Road in the peak direction of travel. This operation will remain in effect until a long-term solution is implemented.

It is anticipated that traffic congestion will continually worsen on Kahekili Highway and Likelike Highway if improvements aren't implemented. Projections have been made of traffic volumes between the intersections of the highway in the year 2008, based on traffic analysis factors, such as future land use patterns and trends in travel behavior. These projections of traffic volume, termed "traffic assignments", take into account a declining rate of population growth in the region and the recent adoption of land use plans assuming continuance of this slower growth rate. (See Exhibit I-4.)

LEGEND
 XXX = ADT
 (XXX) = AM PEAK
 [XXX] = PM PEAK



**EXHIBIT I-3:
 TRAFFIC ASSIGNMENT**

EXHIBIT I-4

ESTIMATED TRAVEL TIMES

A. Southbound, Kamehameha Highway to Likelike Highway

	1987		2008	
	<u>A.M. Peak</u>	<u>Off-Peak</u>	<u>A.M. Peak</u>	<u>Off-Peak</u>
1. Without Widening or Intersection Improvement at Likelike Highway	24 min.	10 min.	79 min.	10 min.
2. With Widening and				
a. Full Interchange, Scheme A-4	10.5	9.0	11.0	9.0
b. Partial Interchange, Scheme B-1	10.5	9.2	11.2	9.2
c. Partial Interchange, Scheme C-1	10.5	9.1	11.1	9.1
d. Intersection Widening	10.5	9.3	11.3	9.3

B. Northbound, Likelike Highway to Kamehameha Highway

	1987		2008	
	<u>A.M. Peak</u>	<u>Off-Peak</u>	<u>A.M. Peak</u>	<u>Off-Peak</u>
1. Without Widening or Intersection Improvement at Likelike Highway	12 min.	9 min.	13 min.	9 min.
2. With Widening and				
a. Full Interchange, Scheme A-4	8.3	8.0	8.6	8.0
b. Partial Interchange, Scheme B-1	8.3	8.0	8.6	8.0
c. Partial Interchange, Scheme C-1	8.3	8.0	8.6	8.0
d. Intersection Widening	8.5	8.4	9.3	8.4

Based on these traffic projections, travel time even with the contraflow lanes operating in peak morning traffic, from Kamehameha Highway to Likelike on Kahekili Highway, without any improvements which now take 24 minutes will take approximately 79 minutes in the year 2008. Kahekili Highway will operate at a Level of Service F during the A.M. peak hour traffic between Likelike Highway and Ahuimanu Road and backups on Likelike Highway would remain 2-1/2 miles long during the P.M. peak hour even with the relief to be provided by H-3.

Exhibit I-5 relates traffic conditions at peak hours along the various segments of Kahekili Highway to highway capacities by means of a rating system developed by the Highway Research Board. The rating system consists of a scale describing the "Level of Service" of the highway facility. Level of Service (LOS) describes traffic conditions in terms of speed and travel time, freedom to maneuver, traffic interruptions, comfort, convenience and safety. Level of Service ratings range from the best free flow conditions with little or no delay at intersection (LOS A) to the worst traffic conditions of forced flow with "stop and go" operations and long delays at intersection (LOS F).

As indicated in Exhibit I-5, traffic congestion, or Level of Service E and F, presently occurs during both A.M. and P.M. peak hours at the southern end of the highway, from Likelike Highway to Haiku Road. During the P.M. peak hour, the lane on Likelike Highway for left turns into Kahekili Highway usually backs up to the Likelike Tunnel or 2-1/2 miles.

In addition to traffic congestion, Kahekili Highway experiences a higher than average rate of traffic accidents (for a suburban 2-lane expressway) in the area between Likelike Highway and Haiku Road and in the area along Kahekili Highway between Ahuimanu Road and Kamehameha Highway. For more information see Chapter III, the Traffic Safety Section.

Therefore, the primary need to improve Kahekili Highway is to relieve existing and projected traffic congestion and improve traffic operations and safety. Improvement of Kahekili Highway would also entail the improvement of the Likelike Highway intersection to remove the bottleneck and backups and assure efficient and safe movement of traffic between these two major highways.

If no improvements are undertaken existing traffic problems will be exacerbated with the population growth expected under officially adopted land use plans for Windward Oahu.¹ The mobility of area residents will be severely restricted

1. City and County of Honolulu, 1983. Ordinance No. 83-8
Relating to the Development Plan for Koolaupoko. (adopted May,
1983.)

as travel times lengthen and peak periods are further extended. Emitted vehicle pollutant levels will increase as traffic volumes and travel times increase and speed decreases. Movement in and out of the communities served by Kahekili Highway will be increasingly difficult and Oahu's employment centers in Honolulu will become less accessible to area residents.

**EXHIBIT I-5
CURRENT AND PROJECTED TRAFFIC VOLUMES
ON KAHEKILI HIGHWAY
BETWEEN INTERSECTIONS, 1987 AND 2008**

<u>INTERSECTION</u>	<u>Average Daily Traffic</u>	<u>*** A.M. Peak</u>	<u>Level of Service without widening</u>	<u>Level of Service with widening</u>	<u>*** P.M. Peak</u>	<u>Level of Service without widening</u>	<u>Level of Service with widening</u>
Likelike Highway**							
*1987 (estimated)	27,352	1300/893	F	F	752/1528	E	B
2008 (projected)	31,808	2055/843	F	F	993/1520	F	B
W/Full Interchange, Scheme A-4	-	-	-	D	-	-	A
W/Partial Interchange, Scheme B-1	-	-	-	E	-	-	A
W/Partial Interchange, Scheme C-1	-	-	-	E	-	-	A
W/Intersection Widening	-	-	-	E	-	-	D
Kulukeoe Street**							
1987 (estimated)	27,188	1260/749	F	A	768/1467	D	B
2008 (projected)	31,454	2022/855	F	A	1010/1452	D	B
Kealahala Road**							
1987 (estimated)	28,709	1218/579	F	B	716/1532	D	B
2008 (projected)	30,681	2151/623	F	B	950/1525	D	B
Kahuhipa Street**							
1987 (estimated)	23,857	1062/469	F	B	650/1408	D	B
2008 (projected)	26,761	1955/474	F	B	877/1387	D	B
Haiku Road**							
1987 (estimated)	25,927	1358/413	F	B	676/1591	B	A
2008 (projected)	27,220	1978/395	F	B	907/1590	D	B
Hui Iwa Street (south)							
1987 (estimated)	22,755	1322/399	E	B	614/1429	E	C
2008 (projected)	23,878	1933/377	F	C	837/1410	E	C
Hui Iwa Street (north)**							
1987 (estimated)	21,073	683/476	C	C	643/995	B	B
2008 (projected)	22,263	1607/379	F	D	831/1206	C	C
Ahuimanu Place							
1987 (estimated)	16,423	474/315	C	B	516/933	D	B
2008 (projected)	17,995	1304/262	F	B	729/859	D	B
Ahuimanu Road							
1987 (estimated)	16,593	495/385	C	B	608/811	C	B
2008 (projected)	18,243	1347/356	F	B	830/725	D	B

Sources: 1) Highways Division, State of Hawaii Department of Transportation, "T.A. No. 87-7. Kahekili Interchange and Widening Project Nos. 83-F-01-75 and 63A-05-68, April 1987, 2) 1987 AM peak southbound adjusted by ParEn Inc.

- * H-3 was not operating when traffic counts were taken. Traffic volumes on Kahekili will not be affected by H-3 being operational.
- ** Signalized Intersections govern level of service.
- ***For peak hour traffic data, the figures to the upper left of the diagonal slash indicate south-bound traffic; figures to the lower right indicate north-bound traffic.

11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

CHAPTER II

ALTERNATIVES

CHAPTER II: ALTERNATIVES INCLUDING PROPOSED ACTION

A. INTRODUCTION

Three (3) types of alternative actions were considered to improve traffic operations on Kahekili Highway. There are:

1. "No Action"
2. Transportation System Management (TSM) alternatives
3. Improving an existing corridor or constructing new corridors
4. Kahekili improvement alternatives

This chapter discusses these alternatives. However, of these alternatives improving Kahekili Highway and its intersection with Likelike Highway is the only reasonable action which will solve the long term transportation needs of the project area.

B. "NO ACTION"

The "no action" alternative would mean making no major physical modifications to Kahekili Highway or parallel highways in the project region. Only minor physical improvements for safety and maintenance purposes and transportation system management improvements are to be made.

As stated in Chapter I, if "No Action" is taken, existing traffic problems will be exacerbated with the expected population growth. Travel time in 2008 morning peak hour traffic, from Kamehameha Highway to Likelike on Kahekili Highway, without any improvements, will take approximately 79 minutes. It is three times the amount of time that it took to travel the same distance in 1987. The mobility of area residents will be severely restricted as travel times lengthen and peak periods are further extended. Movement in and out of the communities served by Kahekili Highway will be increasingly difficult and Oahu's employment centers in Honolulu will become less accessible to area residents.

C. TRANSPORTATION SYSTEM MANAGEMENT ALTERNATIVE

There are several kinds of measures short of major physical modifications to the highway which might be termed Transportation System Management (TSM) alternatives to the proposed project such as improvements to the municipal bus system or various traffic engineering controls and incentive programs.

1. Municipal Bus Service

The possibility of improving the municipal bus service in the project region was considered, particularly at peak hours. The projected vehicular traffic assignments for Kahekili Highway (see Exhibit I-2) already assume an increased percentage of bus riders during peak hour. It is not expected that further increased bus service will significantly reduce the predicted traffic volumes for passenger vehicles. Improvements to Kahekili Highway will still be needed. Effective bus service depends upon highway improvements that promote efficient traffic flow. Steps to improve municipal bus service may be seen as a concurrent action rather than a pre-emptory alternative.

2. Controls and Incentives

Various transportation system management alternatives are currently being used in Oahu that affect the traffic on Kahekili Highway. Higher gasoline taxes, staggered work hours and the high cost of parking in downtown Honolulu are all factors that possibly contribute to the amount of traffic on Kahekili Highway. These factors attempt to make the use of automobiles more expensive or to induce changes in travel habits. Other factors which could be implemented include:

- o Improved synchronization of traffic signals.
- o Providing assistance to and promotion of ride sharing programs such as Van-Go or a high occupancy vehicle lane (HOV). (The provision of a HOV lane would need to be continuous to Honolulu to be successful.)
- o Providing contraflow lanes in the peak direction of travel.

Improving the synchronization of traffic signals from Haiku Road to Likelike Highway will not significantly improve traffic operation. The signals at all of the intersections have already been timed to operate optimally through all phases of the signal cycle fully loaded.

Ridesharing is already being actively promoted by the State Department of Transportation to increase vehicle occupancy rates during peak commute periods. The objective of the State's ridesharing program plan of action is to provide an effective mechanism for coordinating and implementing ridesharing and other para-transit services among government agencies, neighborhood and community groups, private employers, schools and other organizations.

The State DOT has implemented a contraflow operation as of August 1988, with the continuous left turn lane on Kahekili Highway from Likelike Highway to Haiku Road in the peak direction of travel. This has maximized the capacity through this area and provided some short-term immediate relief. This operation will remain in effect until a long-term solution is implemented.

None of the TSM alternatives mentioned above either separately or in combination provides enough capacity or reduces traffic sufficiently to address the existing and future needs along Kahekili Highway. Additional improvements are needed in order to relieve congestion and promote public safety during all hours of travel. Existing problems will be exacerbated with the traffic growth expected for the project region.² Travel time to work and other destinations will lengthen with increased traffic congestion and have adverse effects on the social and economic well-being of area residents.

D. HIGHWAY CORRIDOR ALTERNATIVES

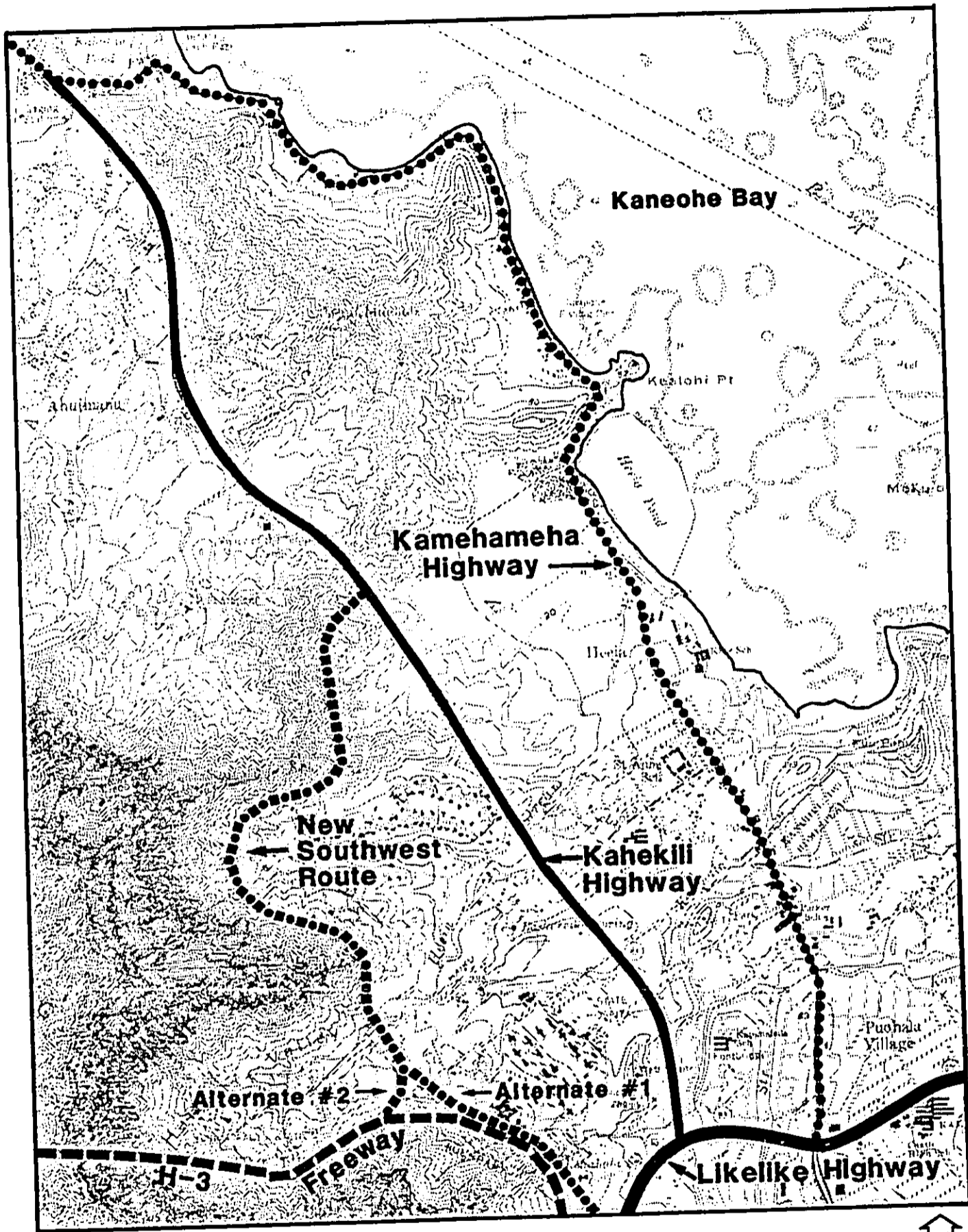
Two parallel corridor alternatives to Kahekili Highway were studied: Kamehameha Highway and two new routes to the southwest. (See Exhibit II-1.)

1. Kamehameha Highway Improvements

This alternative would entail the widening of Kamehameha Highway to a minimum 120-foot wide right-of-way from Kaneohe Town to the intersection with Kahekili Highway. This would require the acquisition or partial acquisition of 280 parcels of land, mostly residential lots. Many of these lots would be affected to such an extent that the occupants would have to relocate. A preliminary cost estimate for right-of-way acquisition alone is \$28 million.³ Because of Kamehameha Highway's relative proximity to Kaneohe Bay and its route through the Heeia Wetland area (see Figure III-2. Wetlands and Streams), the widening of this highway would have greater adverse impact on water quality and aquatic habitats than the proposed project on Kahekili Highway. The visual impact would also be greater, particularly in Heeia and to the north. The impacts on air quality and noise levels would be about the same as those of the proposed project.

2. Highways Division, State of Hawaii Department of Transportation, "T.A. No. 87-7. Kahekili Widening and Interchange Project Nos. 83F-01-75 and 63A-05-68, April 1987.

3. This number is based on an average lot cost of \$100,000.



**EXHIBIT II-1:
CORRIDOR ALTERNATIVES**

In addition to these considerations, this section of Kamehameha Highway is primarily a collector road serving local traffic in the Kaneohe area. It is not linked as directly to trans-Koolau traffic routes as Kahekili Highway is, so the widening of this highway would not do as much to improve peak hour traffic conditions in the area. As a result, the alternative of widening Kamehameha Highway has been eliminated from further consideration.

2. New Southwest Routes

There are two alternative southwest routes. (See Exhibit II-1.) Alternative #1 would connect Likelike Highway with Kahekili Highway at a point between Haiku Road and Hui Iwa Street, skirting existing residential areas. Alternative #2 connects Kahekili Highway directly with H-3.

Both alternatives would require the acquisition of a new right-of-way in relatively undeveloped areas which have been designated for preservation in the City and County of Honolulu's Development Plan.

Land acquisition costs and difficult topography combine to make this a very expensive alternative. Road construction would require steep grades, more and sharper curves, deeper cuts and higher fills. Alternative #2 with a direct connection to H-3 in the mountain would be more expensive to construct due to extensive cuts (150 feet high) and fills and a long viaduct.

The environmental consequences would be increased siltation in streams, with resulting ecological and aesthetic degradation. Many areas such as Iolekaa Valley, which are dominated by native species of plants and inhabited by native forest birds and other biota, would be disrupted. An important archaeological site (Leleahina Heiau) may also be adversely affected.

In addition to these environmental and cost considerations, both of the new southwest route alternatives have several transportation planning and engineering drawbacks. Alternative #1 would create an additional intersection along Kahekili Highway and make a connection to the proposed Interstate Route H-3 difficult and expensive to construct. Like the Kamehameha Highway alternative, the new routes would not be as centrally located as Kahekili Highway and would not solve the congestion problem on Kahekili Highway between Likelike Highway and Haiku Road. As a result the Southwest Routes are no longer being considered as alternatives.

E. KAHEKILI HIGHWAY IMPROVEMENT ALTERNATIVES

Alternatives for the proposed physical modifications to Kahekili Highway can be broken down into two separate components: Likelike Highway intersection schemes and Kahekili Highway widening alternatives.

The design criteria on which the intersection alternative schemes and highway widening are based is summarized in Exhibit II-2.

1. Likelike Highway Intersection Schemes

The intersection of Kahekili Highway with Likelike Highway receives the highest existing and projected traffic volume of any intersection along Kahekili Highway. Modification of this intersection is proposed to facilitate the flow of traffic. Three interchange schemes and one intersection improvement have been studied. They range in degree of modification from construction of a full interchange to an at-grade intersection improvement. The full interchange would provide a complete separation of conflicting traffic flows by overpasses and underpasses at the intersection. A partial interchange would only completely separate the major conflicting traffic flows. The other traffic flows, left or right turns, would be controlled by signals or stop signs.

At the Kahekili/Likelike Interchange preliminary plans for drainage improvements include installing an 84 inch concrete pipe (culvert) to drain existing stormwater flows crossing Likelike Highway. The proposed culvert would convey the stormwater under the proposed ramp (nearest to Hinamoe Loop) and into a channelized drainage stream known as Kaneohe Stream which then passes through an existing culvert under Likelike Highway. (See Appendix F and Exhibit III-2.)

A major variant for each of the potential interchange schemes is the use of either an underpass or an overpass for access ramps crossing Likelike Highway. When elevated above Likelike Highway, the access ramp(s) will have a maximum height of 25 feet. When depressed below Likelike Highway, the access ramp(s) will have a minimum clearance of 16.5 feet.

a. Full Interchange (Exhibit II-3)

Scheme A-4 (underpass)

This scheme, a full interchange which precludes all at-grade traffic conflicts, would provide overpass ramps for left turn movements from Kahekili Highway onto Likelike Highway and from

EXHIBIT II-2
DESIGN CRITERIA FOR
INTERSECTION SCHEMES AND HIGHWAY WIDENING

Highway Classification	Kahekili Highway Widening Alternatives	Intersection Schemes (All)	
	Arterial Highway	Likely Highway	Ramps
Access Control	Partial	Full	Full
Design Speed	50 mph	50 mph	50 mph (major) 25 mph (minor)
Posted Speed	35 mph	45 mph	35 mph (major) 25 mph (minor)
Shoulder Width	8-10 ft (right) 4 ft (left)	10 ft (right) 4 ft (left)	8 ft (right) 4 ft (left)
Minimum Right-of-Way	Existing 120 ft	Existing 140 ft	—
Minimum Curve Radius	Existing 1000 ft	Existing 1900 ft	700 ft (major) 1500 ft (minor)
Maximum Superelevation	Existing 9%	8%	10%
Maximum Grade	6%	6%	6% (upgrade) 6.5% (downgrade)
Minimum Grade	0.5%	0.5%	0.5%

Likelike Highway onto Kahekili Highway. There would also be a depressed access ramp for right turn movements from Kahekili Highway onto Likelike Highway and H-3. For Leeward Oahu-bound movements, the traffic from each highway would be separated in a configuration of braided (grade-separated) ramps which would connect to Wilson Tunnel and H-3. It would preclude the need for traffic signals and a weaving section.

Scheme A-1 (overpass)

The interchange configuration is identical to that of Scheme A-4. However, the depressed access ramps described above would be elevated.

b. Partial Interchange

A partial interchange would provide grade separation of major traffic conflicts while the lesser conflicts cross at grade. There are two configurations of the partial interchange scheme. For each configuration there is an overpass and an underpass variation:

(1) Scheme B-1 (underpass) (Exhibit II-4)

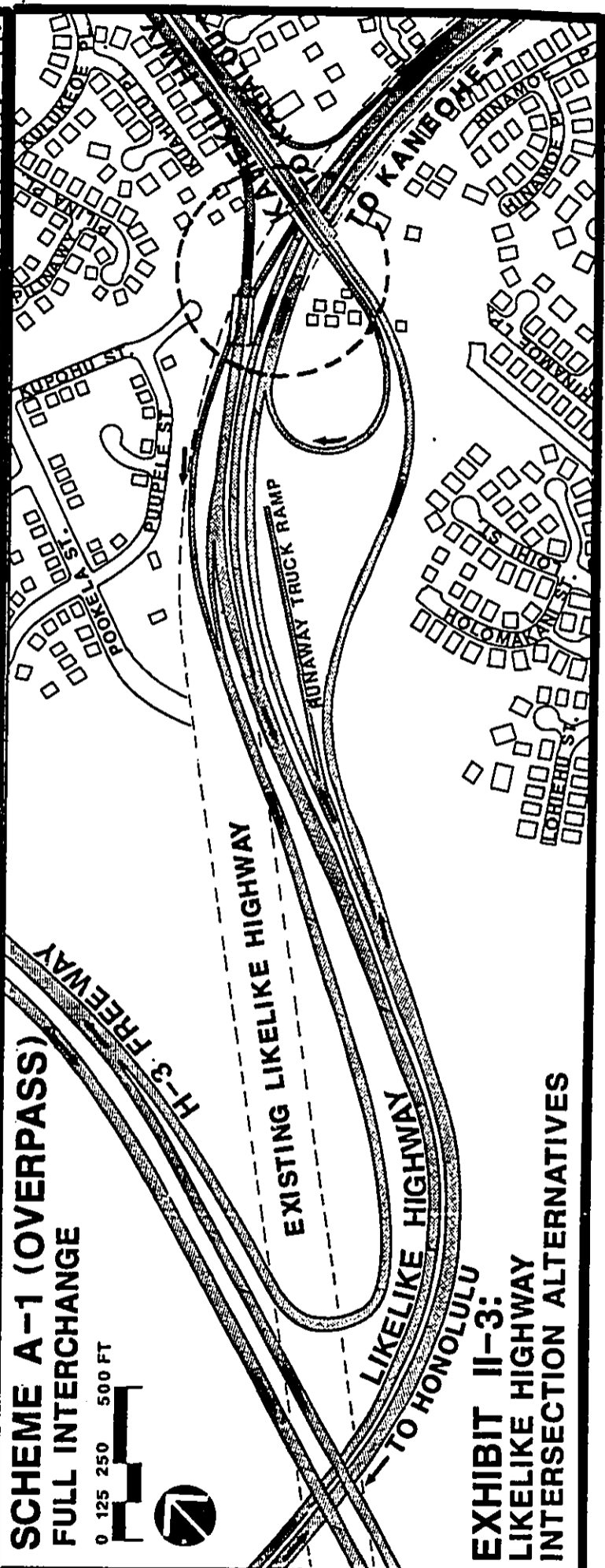
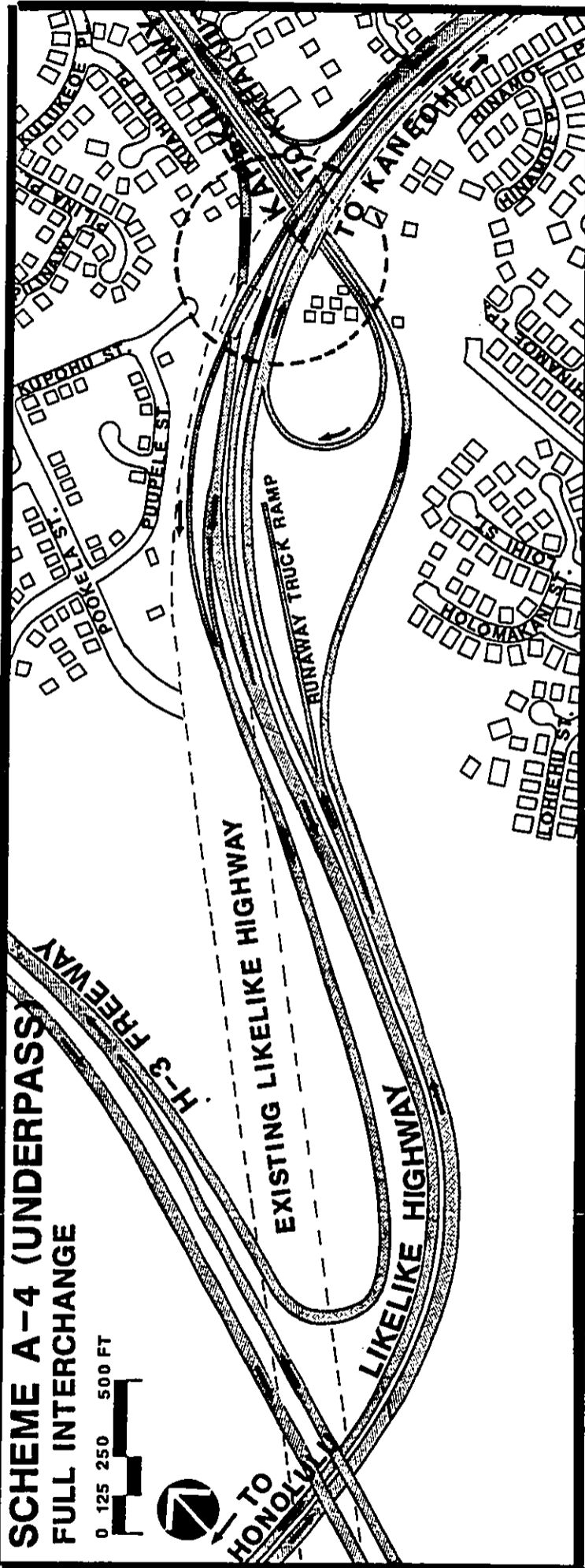
This interchange scheme would provide an depressed ramp for left-turn movements from Likelike Highway onto Kahekili Highway. However, the relatively few left-turn movements from Kahekili Highway onto Likelike Highway (to Kaneohe) would be made through an at-grade intersection controlled by traffic signals. These signals would stop Honolulu bound and Kaneohe bound traffic on Likelike Highway. The Leeward Oahu-bound traffic from both highways would weave through a section of widened Likelike Highway and separate into Wilson Tunnel-bound and H-3-bound traffic.

Scheme B (overpass)

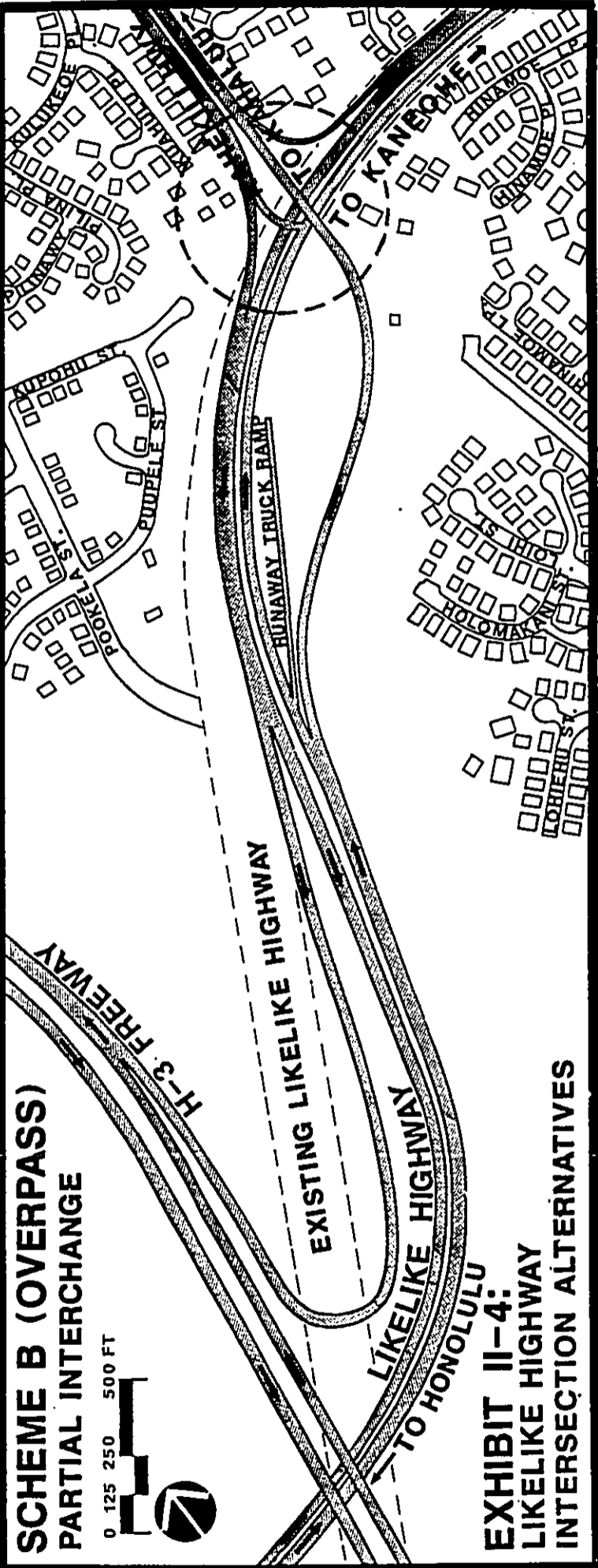
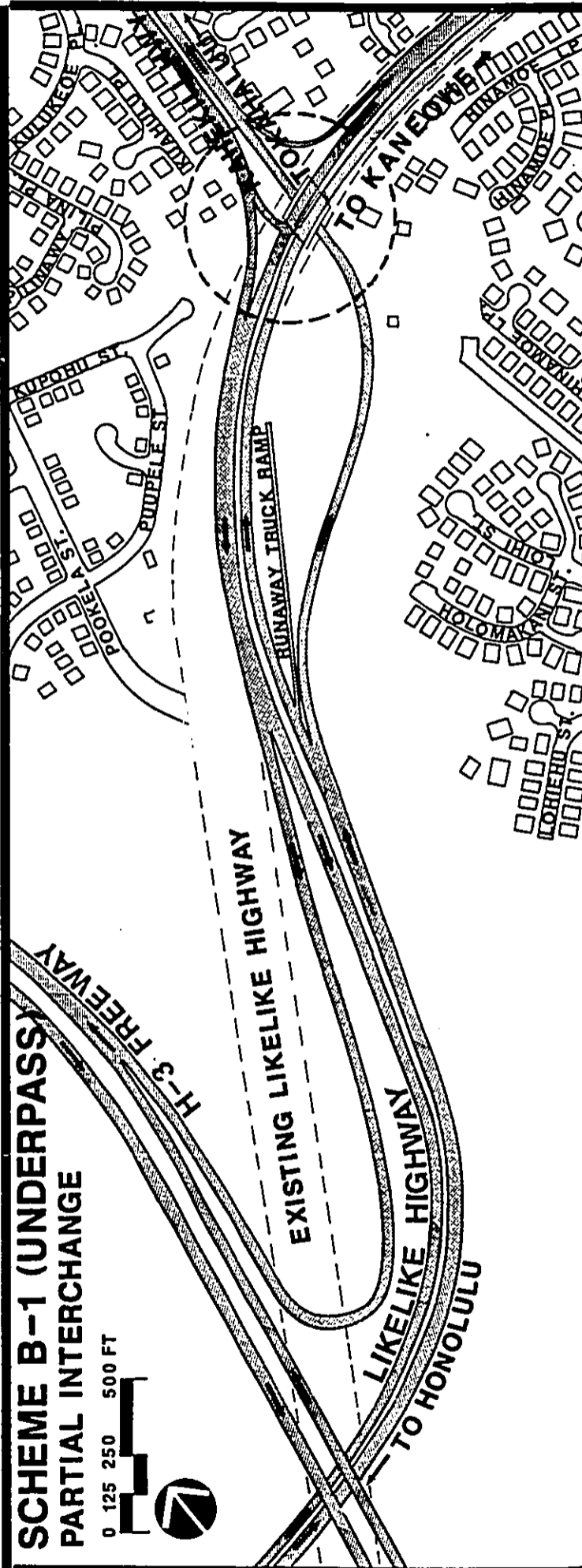
The interchange configuration is identical to that of Scheme B. However, the depressed ramp described above would be elevated.

(2) Scheme C-1 (underpass) (Exhibit II-5)

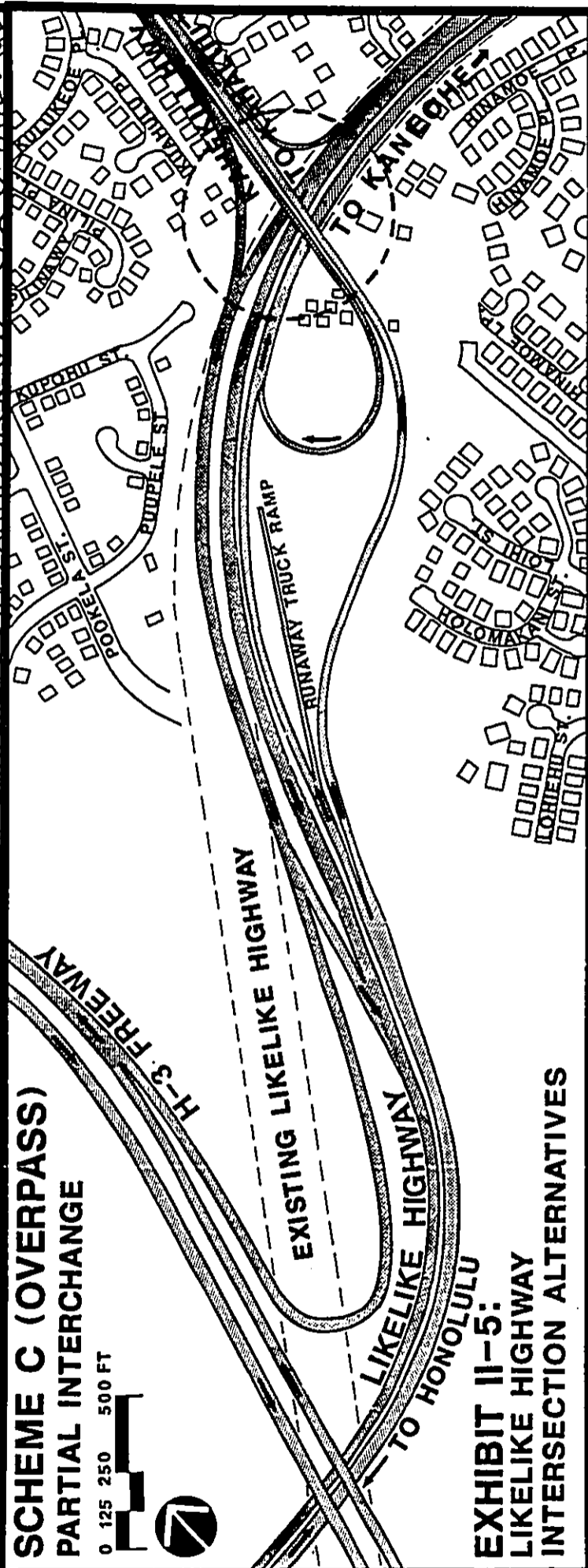
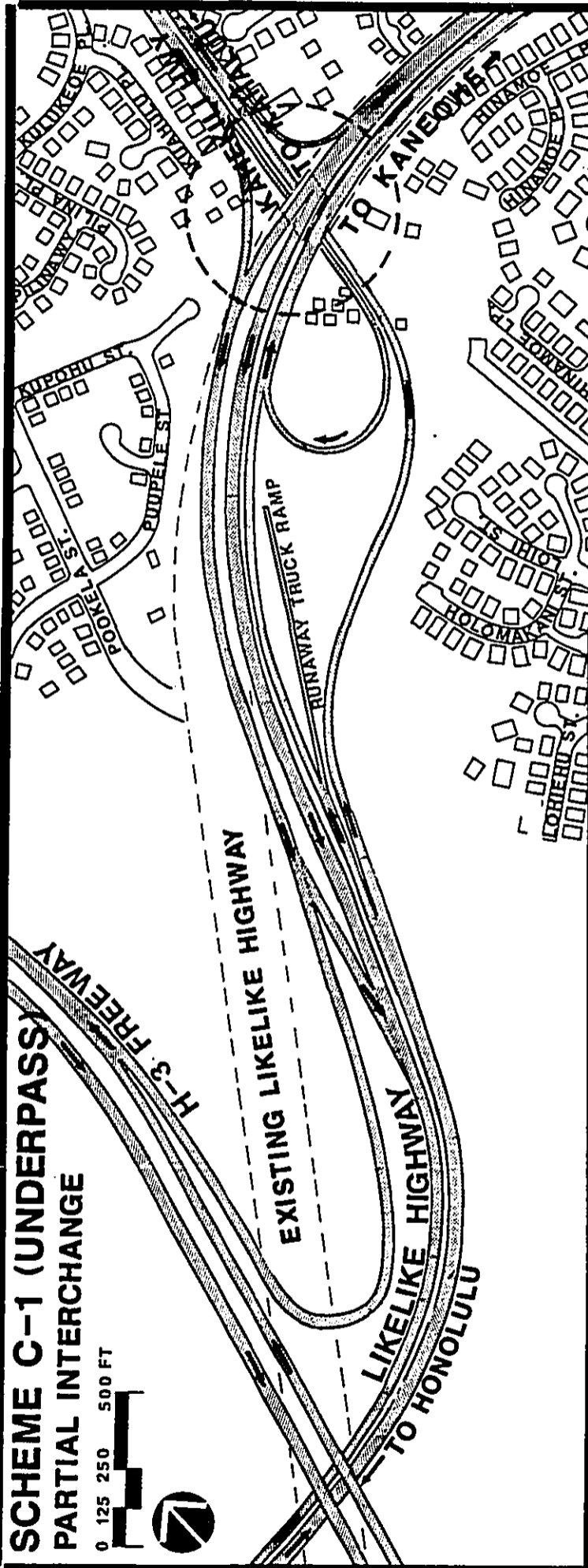
This scheme would provide depressed ramps for both left-turn movements. It would also provide a weaving section for the Honolulu-bound traffic. This scheme does not stop Kaneohe bound or Honolulu bound traffic with a traffic signal.



**EXHIBIT II-3:
LIKELIKE HIGHWAY
INTERSECTION ALTERNATIVES**



**EXHIBIT II-4:
LIKELIKE HIGHWAY
INTERSECTION ALTERNATIVES**



**EXHIBIT II-5:
 LIKELIKE HIGHWAY
 INTERSECTION ALTERNATIVES**

Scheme C (overpass)

The configuration would be identical to that of Scheme C-1. However, the depressed ramps described above would be elevated.

c. Intersection Improvements (Exhibit II-6)

This scheme would increase laneage on both Kahekili Highway and Likelike Highway for left turn movements and for a connection to the proposed H-3 and thus avoid grade-separated ramps.

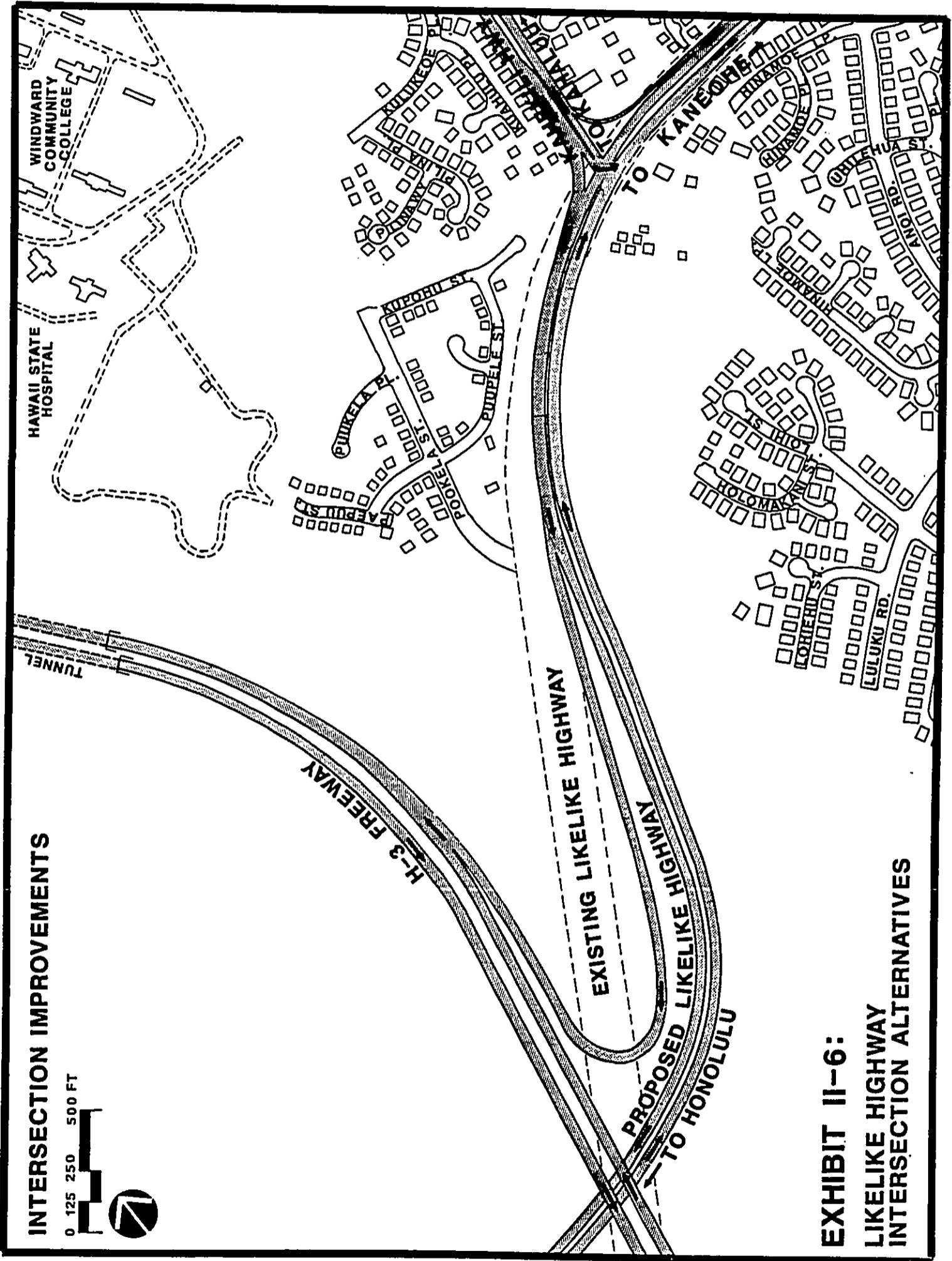
This would require two left turn lanes on Kahekili Highway in addition to the proposed six through lanes. Likelike Highway will have two Kaneohe-bound through lanes and two lanes for left turns into Kahekili Highway. The Honolulu-bound lanes will be widened to four lanes, two of which will continue into Wilson Tunnel and the other two will connect to a proposed on-ramp to H-3 for Honolulu-bound traffic.

2. Widening Alternatives

The design capacity of Kahekili Highway can be increased by widening the existing two lanes to a multi-lane divided highway. Alternatives vary according to both the number of lanes which are added and the length of highway which is widened. A minimum of 120 feet of right-of way was purchased in preparation for widening. The existing two-lane road would be converted to northbound lanes and additional southbound lanes will be constructed on the mauka or northwest side of the existing highway.

The number of lanes along a particular section of highway is dependent upon the traffic volume projection and a balance between the desired level of service and the cost of improvement. A typical cross-section of a four to six-lane width is shown in Exhibit II-7. In addition to the lanes for moving traffic, shoulders 10 feet wide, (6 to 8 feet of which will be paved), will be provided on either side of the roadway for disabled vehicles and bicyclists. A medial barrier separating the opposite flows of traffic will also be provided.

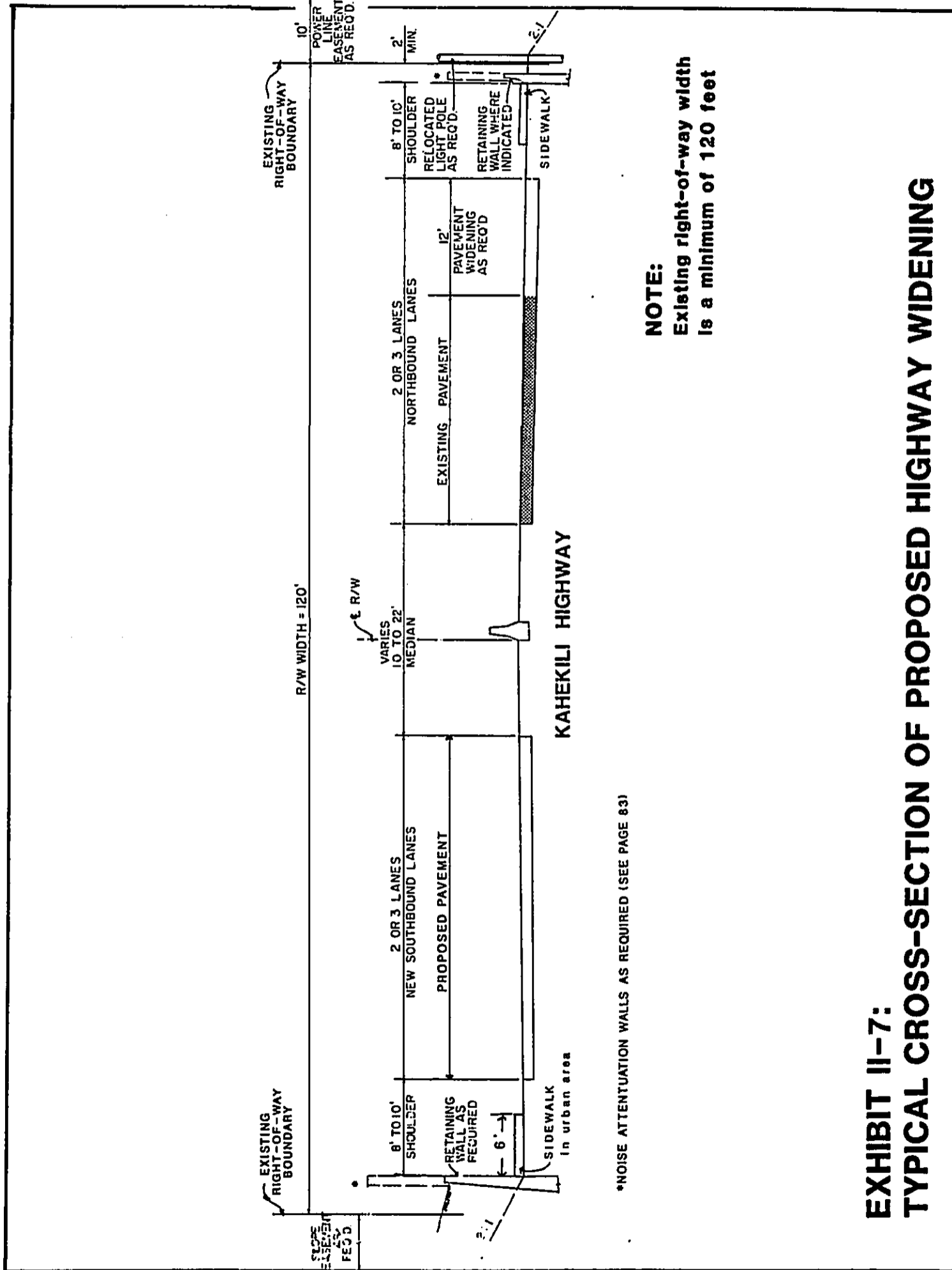
Retaining walls and sound barrier walls of concrete masonry construction will be built near the edge of the right-of-way in areas where changes of topography require fairly steep cuts or fills or where nearby residences or other use areas may be affected by traffic noise. These walls will generally not exceed six feet in height, except in certain cases noted below.



INTERSECTION IMPROVEMENTS



**EXHIBIT II-6:
LIKELIKE HIGHWAY
INTERSECTION ALTERNATIVES**



NOTE:
Existing right-of-way width
is a minimum of 120 feet

*NOISE ATTENUATION WALLS AS REQUIRED (SEE PAGE 83)

**EXHIBIT II-7:
TYPICAL CROSS-SECTION OF PROPOSED HIGHWAY WIDENING**

Drainage improvements will be constructed at the same time as the highway widening. The highway and drainage improvements will be the property of the State of Hawaii. The State of Hawaii will coordinate with the City and County of Honolulu Department of Public Works regarding the drainage improvements for the project.

Since existing and projected peak hour traffic is heaviest toward the Likelike Highway intersection, all widening alternatives include additional laneage at this end of the highway. (Exhibit I-4.) The alternatives differ, then, in the extent to which widening would occur in the northerly direction. The widened portions would provide a Level of Service A to D during the peak hours in the design year 2008. The following are the three widening alternatives. (See Exhibit II-8.)

a. Likelike Highway to Haiku Road

The section of Kahekili Highway between Likelike Highway and Kahuhipa Street would be widened to six lanes. Between Kahuhipa Street and Haiku Road there would be five lanes, four for through traffic and the fifth lane for southbound traffic. The fifth lane is needed to accommodate the morning peak period. The widening would then continue through the Haiku Road intersection and taper down to the existing roadway 1,000 feet north of Haiku Road.

Due to steep road cuts in the vicinity of the Keaahala Road intersection, high retaining walls will be necessary. On the mauka (west) side of the road, alongside Kaneohe District Park, there will be a wall approximately 550 feet long with a height ranging from 4 to 40 feet. The taller sections would probably be terraced with a planter strip at the top of the lower portion.

Between Likelike Highway and Haiku Road Kahekili Highway crosses the following streams that will require drainage improvements: Kapunahala (or Aolani) Stream, Keaahala Stream and Haiku Stream.

The preliminary design for these drainage improvements include:

- o Kapunahala (or Aolani) Stream drainage improvements include adding a 6 feet by 10 feet control box drain from which the Stream will flow under the road through a 9.5 feet by 18 feet box culvert. Downstream of Kahekili Highway Kapunahala (or Aolani) Stream will flow through a 9.5 feet by 18 feet concrete channel.

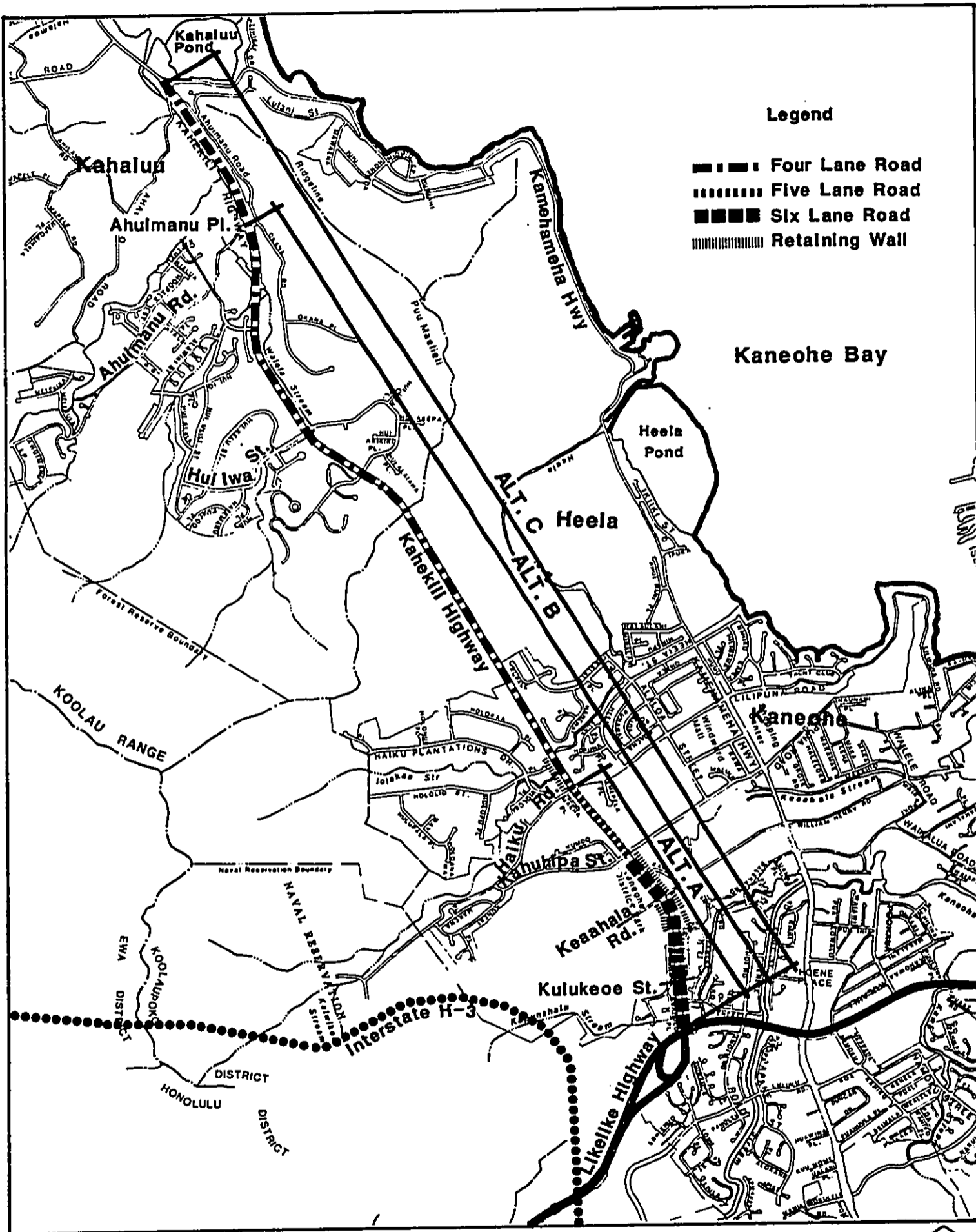


EXHIBIT II-8: WIDENING ALTERNATIVES

1"=2,640'

- o Kealahala Stream improvements include the extension of the existing 9 feet by 10 feet box culvert under the new part of Kahekili Highway.
- o Haiku Stream improvements include extending a 42 inch pipe and constructing an inlet structure.

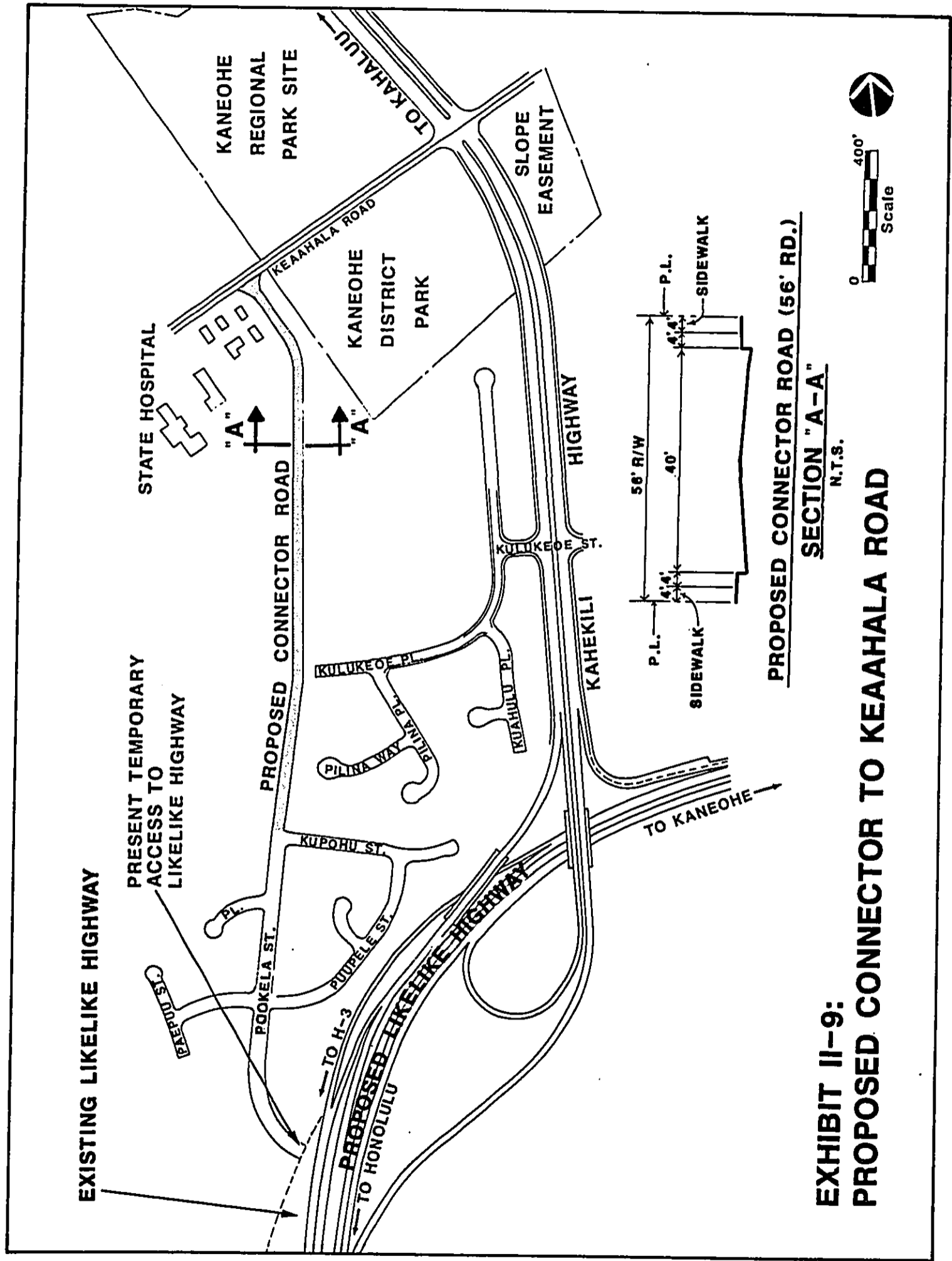
b. Likelike Highway to Ahuimanu Place

Kahekili Highway between Likelike Highway and Haiku Road would be widened as described above. The four-lane divided highway would continue beyond Haiku Road to Ahuimanu Place. The widening would continue through the intersection and taper to the existing roadway 1,000 feet north of Ahuimanu Place. Ahuimanu Place is the last major access to residential areas in Ahuimanu Valley, so there is a significant drop in the traffic volume along Kahekili Highway beyond this intersection.

The added lanes will be built on fill over culverts for Heeia Stream, just north of the Haiku Road intersection. Walls up to 40 feet in height will be necessary below the road surface to retain the fill within the existing right-of-way. North of this, near the edge of the Haiku Plantations subdivision, the road will be in cut, requiring retaining wall up to 40 feet in height and 800 feet in length. Between Haiku Plantations and Valley of the Temples, deep cuts into hillsides will be required for road widening. Since this is undeveloped area, it would be possible to acquire additional easement to re-grade the slope. A retaining wall up to height of 50 feet at the right-of-way boundary could be built instead of, or in combination with the additional slope easement. A less extensive road cut north of the Valley of the Temples will require a retaining wall up to 14 feet in height. An extensive additional slope easement in this section is not practical because of existing adjacent development.

Between Haiku Road and Ahuimanu Road Kahekili Highway crosses Heeia Stream, Puolena Stream, Waiola Stream and Ahuimanu Stream. The preliminary design for drainage improvements planned for Heeia Stream include a retaining wall, an inlet structure and the addition of an 168 inch round concrete pipe. (There are two 12 feet by 7.5 feet box culverts under Kahekili at this time.

- o Puolena Stream is an intermittent stream and no additional structures are planned.



**EXHIBIT II-9:
PROPOSED CONNECTOR TO KEAAHALA ROAD**

**PROPOSED CONNECTOR ROAD (56' RD.)
SECTION "A-A"
N.T.S.**



CORRECTION

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

- o Keaahala Stream improvements include the extension of the existing 9 feet by 10 feet box culvert under the new part of Kahekili Highway.
- o Haiku Stream improvements include extending a 42 inch pipe and constructing an inlet structure.

b. Likelike Highway to Ahuimanu Place

Kahekili Highway between Likelike Highway and Haiku Road would be widened as described above. The four-lane divided highway would continue beyond Haiku Road to Ahuimanu Place. The widening would continue through the intersection and taper to the existing roadway 1,000 feet north of Ahuimanu Place. Ahuimanu Place is the last major access to residential areas in Ahuimanu Valley, so there is a significant drop in the traffic volume along Kahekili Highway beyond this intersection.

The added lanes will be built on fill over culverts for Heeia Stream, just north of the Haiku Road intersection. Walls up to 40 feet in height will be necessary below the road surface to retain the fill within the existing right-of-way. North of this, near the edge of the Haiku Plantations subdivision, the road will be in cut, requiring retaining wall up to 40 feet in height and 800 feet in length. Between Haiku Plantations and Valley of the Temples, deep cuts into hillsides will be required for road widening. Since this is undeveloped area, it would be possible to acquire additional easement to re-grade the slope. A retaining wall up to height of 50 feet at the right-of-way boundary could be built instead of, or in combination with the additional slope easement. A less extensive road cut north of the Valley of the Temples will require a retaining wall up to 14 feet in height. An extensive additional slope easement in this section is not practical because of existing adjacent development.

Between Haiku Road and Ahuimanu Road Kahekili Highway crosses Heeia Stream, Puolena Stream, Waiola Stream and Ahuimanu Stream. The preliminary design for drainage improvements planned for Heeia Stream include a retaining wall, an inlet structure and the addition of an 168 inch round concrete pipe. (There are two 12 feet by 7.5 feet box culverts under Kahekili at this time.

- o Puolena Stream is an intermittent stream and no additional structures are planned.

- o Waiola Stream has an existing bridge which is wide enough for the proposed Kahekili widening project.
- o Ahuimanu Stream improvements include a new inlet structure and an extension of the 7 by 25 box culvert.

c. Likeline Highway to Kamehameha Highway

This alternative would continue the four-lane divided highway to the point where Kahekili meets Kamehameha Highway, so that the entire length of Kahekili Highway would be widened. Most of the area to be widened in this section is on level ground which has already been graded. The additional lanes would therefore not be as costly or as difficult to construct. No additional retaining walls would be necessary.

3. Castle Hills Connection to Keaahala Road

A feature common to all of the interchange schemes would be the construction of a new connector road leading from the Castle Hills residential development northwest to Keaahala Road. This connector will replace the temporary access to Likeline Highway which Castle Hill currently uses.⁴ (See Exhibit II-9.)

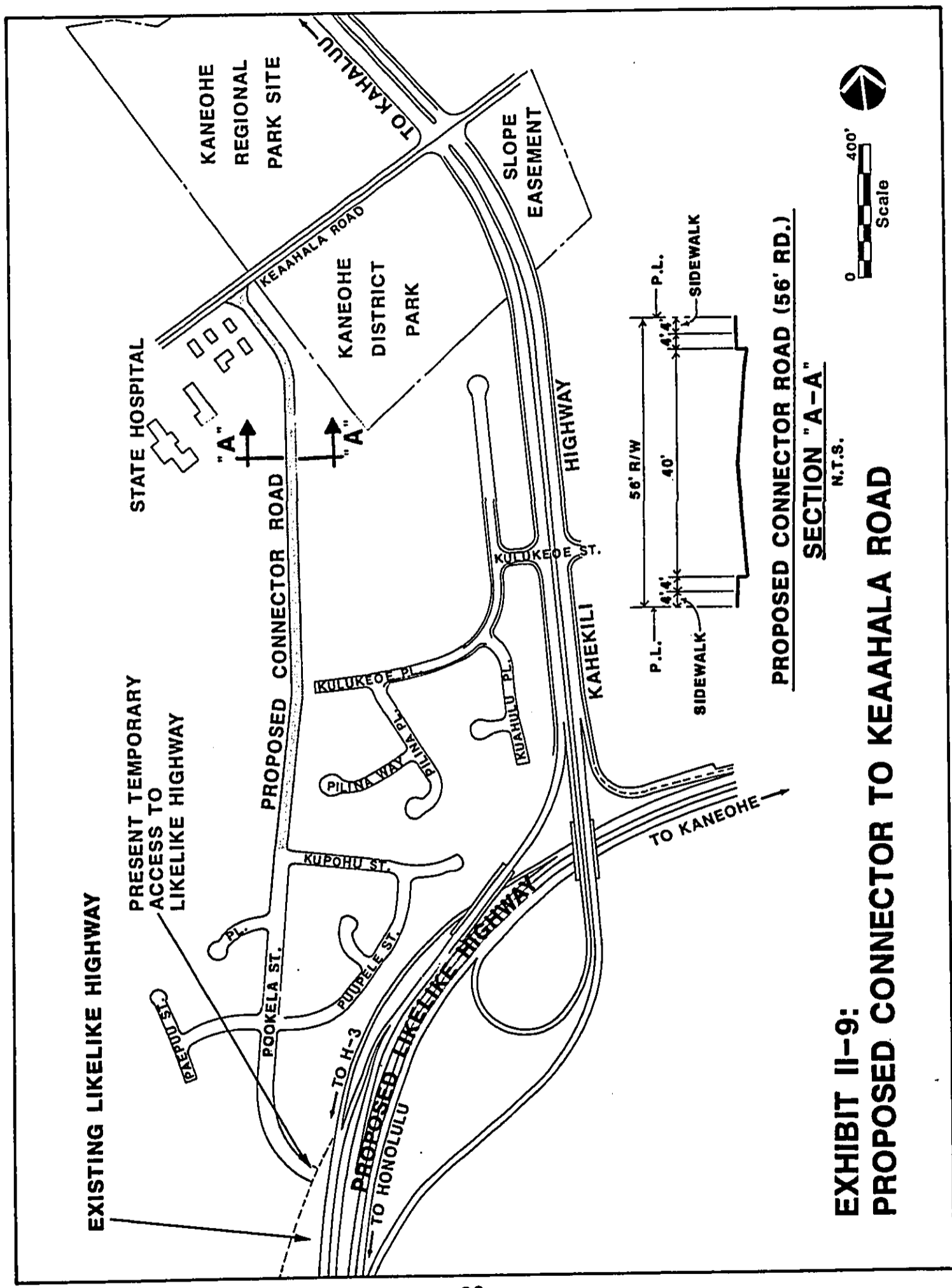
F. ALTERNATIVES CONSIDERED IN DEIS

Many of the "no action" or Traffic System Management (TSM) alternatives have been and will continue to be pursued as interim and long-term measures to alleviate traffic congestion along Kahekili Highway. These measures are not, in themselves, sufficient to satisfy traffic needs along Kahekili Highway.

The highway corridor alternatives (the new Southwest Routes and widening Kamehameha Highway through Kaneohe) have been eliminated from further consideration because they have been found to be impractical, expensive and undesirable. The new Southwest Routes:

- o Are prohibitively expensive to construct.
- o Would be constructed in preservation land.

 4. The new connector would be a secondary road with a right-of-way width of 56 feet. The pavement width will be 40 feet, with a 4-foot wide sidewalk and 4-foot wide curb and grassed strip on either side. The total length of this new connector road would be approximately 2,200 feet. The grade would not exceed 4 percent.



**EXHIBIT II-9:
PROPOSED CONNECTOR TO KEAAHALA ROAD**

- o Would require excessively high cuts and fills and a long viaduct.
- o Would not solve the existing congestion problem on Kahekili Highway.

The overpass variation of the various interchange schemes have also been eliminated. The overpass is a less desirable solution than the underpass scheme in this location for a variety of reasons:

- o An overpass requires more right-of-way
- o An overpass is more expensive to construct
- o An overpass in this area would cause stability problems on the existing ground because of the weight of the high fills required for the overpass schemes.

The overpass schemes (A-1, B and C) do not give any more benefits than their counterpart underpass schemes (A-4, B-1, and C-1).

The DEIS addressed the environmental setting and probable environmental impacts of the following:

- o "No Action"
- o Traffic System Management Alternatives
- o Likely Highway Intersection Alternatives
 - Full Interchange
 - Scheme A-4 (underpass)
 - Partial Interchange
 - Scheme B-1 (underpass)
 - Scheme C-1 (underpass)
 - Intersection Improvements
- o Kahekili Highway Widening Alternatives
 - Likely Highway to Haiku Road
 - Likely Highway to Ahuimanu Place
 - Likely Highway to Kamehameha Highway
- o Castle Hills Access
 - New Connector Road to Keahala Road

Discussion of the preferred alternative will occur at the end of this chapter.

G. COMPARISON OF ESTIMATED EARTHWORK REQUIREMENTS FOR PROJECT ALTERNATIVES

Estimates for widening Kahekili from Likelike to Haiku with the Underpass Interchange Schemes:

- o Full Interchange A-4,
- o Partial Interchange B-1 and
- o Partial Interchange C-1,

show that no borrow⁵ is required. Widening from Haiku Road to Kamehameha Highway also does not require any borrow. The new road connecting Castle Hills to Kealahala requires 3,000 cubic yards of borrow. All of the overpass Schemes A-1, B and C required over 300,000 cubic yards of borrow which in comparison to the underpass schemes made them less desirable alternatives in terms of stability and cost. In terms of earthwork the intersection improvements alternative is the most desirable alternative. (See Exhibit II-10.)

H. COMPARISON OF TENTATIVE CONSTRUCTION SCHEDULES AND COST ESTIMATES

The design phase will begin in late 1990. Right-of-way acquisition activities will begin in mid 1991. Right-of-way acquisition and final design will be completed in this phase, then construction will begin. Estimated costs for each phase are shown in Exhibit II-11. The cost comparison of the first phase is quite variable due to the wide variation in the scope of work being considered for the Kahekili/Likelike Highway intersection ranging from 12.8 to 27.8 million dollars.

The first increment of construction, would include improvements from the Likelike Highway intersection up to Haiku Road, would begin in late 1992 and continue until mid 1995. The second increment, from Haiku Road to Ahuimanu Place, would begin after 1995. The final increment, from Ahuimanu Place to Kamehameha Highway, would begin after the second increment is finished and take 2 years to complete. The implementation of this schedule will depend upon the availability of funds.

5. Borrow is defined as fill material which must be brought to the site from another location.

EXHIBIT II-10

ESTIMATED EARTHWORK REQUIREMENTS FOR PROJECT ALTERNATIVES

<u>Highway Segment</u>	Thousands of Cubic Yards of Material for:		
	<u>Roadway Excavation</u>	<u>Roadway Embankment</u>	<u>Borrow (including surcharge)*</u>
Widening of Likelike Highway to 1,000 ft. north of Haiku Road			
(1) With Interchange Scheme			
A-4	400	185	0
B-1	220	180	0
C-1	330	185	0
(2) With Intersection Improvements			
	125	158	41
Haiku Road to 1,000 ft. north of Ahuimanu Place			
	380	68	0
Ahuimanu Place to Kamehameha Highway			
	21	0	0
Connector to Keahala Road			
	8	11	3

*Surcharge is defined as additional fill material necessary to achieve a certain degree of compaction.

EXHIBIT II-11

TENTATIVE SCHEDULE AND COSTS FOR PROJECT PHASES

	Approximate Construction State Date/Completion Date	Estimated Cost (1990 \$ million)	
		Construction Cost	Land Cost
Increment I			
Likelike Highway to Keaahala Road	Late 1992/Late 1994		
a. with full interchange (Scheme A-4)		26	1.8
b. with partial interchange (Scheme B-1) (Scheme C-1)		18 23	.8 1.6
c. with intersection improvements		12.4	.4
d. Keaahala Road* connector		1.2	
Keaahala Road to Haiku road	Late 1993/Mid 1995	8	
Increment II Haiku Road to Ahuimanu Place	After 1995/No Definite Schedule	11	
Increment III Ahuimanu Place to Kamehameha Highway	After Increment II	3	
Land cost for widening all of Kahekili Highway			.8
	TOTAL COST	35.6-49.2	1.2-2.6

*The connector road will be constructed with State funds.

The Federal government will pay approximately 75% of the costs, with the State of Hawaii providing the balance. The Kealahala Connector Road will be constructed with State funds.

Funding for the construction of Kahekili Widening and Interchanges has not been approved. Federal Aid Primary (FAP) program funds may not be adequate for scheduled activities and phases of project development.

Federal government	\$27.6-38.5 million
State of Hawaii	<u>\$ 9.2-13.3 million</u>
TOTAL	\$36.8-51.8 million

I. BENEFIT COST ANALYSIS OF PROJECT ALTERNATIVES

A cost effective analysis was incorporated into the preliminary design studies of project alternatives. The cost effective analysis produces a numerical ratio called the "benefit to cost ratio" (BCR) which is useful for deciding whether the costs are justified and to make a comparative overall assessment of the different alternatives with each other. If the BCR is greater than one (1), the project is deemed economically justified because the stream of benefits is greater than the stream of costs.

The "benefits" side of the ratio consists of various factors which are favorable to highway users, including reductions in vehicle operating costs, and travel time. These benefits are expressed in dollar amounts, based on conversion factors developed by the American Society of State Highway Transportation Officials. The "costs" side consists of the design, construction and land acquisition costs shown in Exhibit II-12, as well as annual maintenance and administrative costs. Both costs and benefits are amortized over the useful life of the highway improvements being made.

Exhibit II-11 provides a summary of the cost effective analysis for each project alternative. All of the alternatives have a BCR greater than one and are therefore economically justifiable. The BCR shows that the most cost effective solution would be widening Kahekili Highway to Ahuimanu Road or Kamehameha Highway with the Kahekili/Likelike Intersection Improvement alternative which has a BCR of 1.25.

There are, however, a few cautions regarding the use of these standard ratios for comparing project alternatives. First, the BCRs do not include, on the benefit side, the estimated value of accident reductions. If it did, Scheme A-4 would have the highest BCR because all traffic conflicts would be separated. The number of accidents along the separate segments of Kahekili Highway is too small to serve as a reliable comparative indicator for project widening

EXHIBIT II-12

BENEFIT-COST ANALYSIS OF PROJECT ALTERNATIVES
 FOR KAHEKILI HIGHWAY
 (Benefit to Cost Ratios)
 BCR

<u>Likely Highway Intersection Alternatives</u>	<u>Likely Highway to Haiku Road</u>	<u>Likely Highway to Ahuimanu Road</u>	<u>Likely Highway to Kamehameha Highway</u>
Intersection Improvements	1.09	1.25	1.25
Interchange Underpass schemes			
Scheme A-4	1.04	1.17	1.18
Scheme B-1	1.04	1.20	1.20
Scheme C-1	1.12	1.23	1.24

Source: Methods for deriving Benefit to Cost Ratios are from American Society of State Highway Transportation Officials, A Manual on User Benefit Analysis of Highway and Bus-Transit Improvements: 1977, Washington D.C., 1978.

alternatives. Second, the BCRs do not take into account the many physical, environmental and socio-economic factors which weigh in the selection of a project alternative. Most of these factors, while important considerations, are difficult to represent in dollar values. Third, the "useful life" of the highway improvement alternatives is defined in this analysis as 20 years. This is a conservative estimate which tends to favor the smaller, less costly project alternatives. In actuality, the highway improvements will almost certainly last longer than 20 years, which would enhance the relative user benefits of the more extensive project alternatives. Again changing this factor alone would cause interchange Scheme A-4 to have a higher BCR.

J. SUMMARY COMPARISON OF ENVIRONMENTAL AND SOCIAL IMPACTS FOR PROJECT ALTERNATIVES

In order to determine the preferred alternative for the project the environmental and social impacts were evaluated. The noteworthy categories considered were: earthwork, air quality, noise, floodplain, stream, agriculture lands, relocation, safety, cost, travel time and traffic efficiency.

Earthwork - Intersection alternatives A-4 and C-1 require the most earthwork. B-1 requires more grading than the at-grade Intersection Improvements alternative. The Intersection Improvements alternative has the least impact on the environment.

Air Quality - If the highway is widened the CO concentration pattern will decrease slightly by the year 2008 along most of the highway with only a small section near the Likelike Highway intersection above Hawaii's ambient air quality standards. The different interchange schemes only marginally affect CO levels. They rank from most estimated CO concentration to least as follows: Intersection Improvements, B-1, A-4 and C-1. (A-4 and C-1 have the same amount of estimated CO.)

Noise - The noise levels are highest with the interchange schemes that allow the higher vehicular speeds. Therefore the schemes may be ranked from the highest potential noise output to lowest as: A-4, C-1, B-1 and the Intersection Improvements scheme. The noise levels will have the highest potential noise impact with widening all of Kahekili Highway. Widening Kahekili Highway to Ahuimanu Road would have more impact than just widening to Haiku Road.

Floodplain - The widening alternatives and intersection schemes will not have a significant impact on the base floodplain because proposed improvements will actually improve flood protection for the existing highway and residences.

Streams - Kapunahala (or Aolani) Stream and Keaahala Stream are urbanized streams which are channelized through pipes and culverts. There is no significant impact on these streams

environmental quality as a result of the Interchange alternatives and widening of Kahekili Highway to Haiku Road. The alternative of widening only to Haiku Road would avoid further modification to the streams (Haiku Stream, Heeia Stream, Puolena Stream, Waiola Stream and Ahuimanu Stream) on the Kahaluu side of the intersection. Heeia Stream flows into Heeia Wetland and has the most natural areas downstream of Kahekili Highway. The other two widening alternatives would cross all of the streams. Improvements are planned that would improve the existing stream crossings in a way less detrimental to fauna habitat.

Prime and Important Agriculture Lands - Scheme A-4 requires the removal of 19.2 acres of agriculture land. Scheme B-1 requires the removal of 14.1 acres of agriculture land. Scheme C-1 requires the removal of 19.7 acres of agriculture lands. The at-grade Intersection Improvements requires the 5.3 acres of agriculture lands. From the standpoint of preserving agricultural lands the at-grade Intersection Improvements alternative has the least impact.

Relocation - Schemes A-4 and C-1 require the displacement of 3 households. Schemes B-1 and Intersection Improvements require the displacement of 2 households. The Conceptual Relocation Plan (Appendix D) indicates that replacement housing is available for all displacees.

Safety - In terms of safety the intersections alternatives can be ranked from most safe to least safe as follows: A-4, C-1, B-1 Intersection Improvements. The full interchange, Scheme A-4, with all traffic flows separated, would improve safety the most. Widening the entire length of the highway would provide the greatest measure of traffic safety because medial barriers will be provided in the areas Kahekili Highway is widened.

Cost - In terms of cost the interchange schemes can be ranked from highest to lowest as follows: A-4, C-1, B-1, Intersection Improvements. The widening alternatives can be ranked in terms of cost from highest to lowest as follows: from Likelike Highway to Kamehameha Highway; from Likelike to Ahuimanu Road, from Likelike Highway to Haiku Road.

Travel Time - The most significant traffic benefit would be reduced travel time during peak hours. Widening all of the highway and any of the interchange schemes or Intersection Improvement scheme would dramatically reduce travel time (Exhibit I-3). The travel time improvements for the various intersection schemes with widening can be ranked from fastest to slowest as follows: A-4, C-1, B-1, Intersection Improvements.

Traffic Efficiency - In terms of traffic efficiency or level of service the intersection alternatives with widening all of Kahekili Highway for the year 2008 can be ranked from most

efficient to least efficient as follows: A-4, B-1 and C-1, Intersection Improvements. (B-1 and C-1 have the same level of service) (See Exhibit I-5.)

K. SELECTION OF PREFERRED ALTERNATIVE

The preferred design alternative for Kahekili Highway is the full interchange Scheme A-4 underpass and widening all of Kahekili Highway in increments. After eliminating the overpass schemes the remaining Likelike/Kahekili intersection alternatives were:

- 1) Full Interchange A-4
- 2) Partial Interchange Scheme B-1 and C-1
- 3) At-grade intersection improvements

The operational advantage of the full interchange of Scheme A-4 is that it grade-separates all conflicting and weaving movements while the partial interchange B-1 and C-1 grade separates only some of the conflicting movements. The at-grade intersection is operated by a traffic signal which results in stop and go traffic and long waits. Although Scheme A-4 costs more and requires more earthwork the benefits over time outweigh the initial costs. The improved level of service, safety and travel time associated with Scheme A-4 make it the preferred alternative.

The preferred alternative for the widening of Kahekili Highway is to widen from Likelike Highway to Kamehameha Highway in increments. The first increment will be to construct the Kahekili Interchange and to widen Kahekili Highway to the vicinity of Haiku Road. Future widening of Kahekili Highway from Haiku Road to Kamehameha Highway will provide for the long-term travel needs and will be undertaken after 1995 as indicated in the Koolaupoko Development Plan of the City and County of Honolulu. Widening only a portion of Kahekili Highway would not provide for long-term travel needs.

The section of Kahekili Highway between Likelike Highway and Kahuhipa Street will be widened to six lanes. Between Kahuhipa Street and Haiku Road there would be five lanes, four for through traffic and the fifth lane for southbound traffic. The fifth lane is needed to accommodate the morning peak period. The section from Haiku Road to Kamehameha Highway will be widened to four lanes.

The following chapters address the environmental setting and probable environmental impacts of the preferred alternative which is the full interchange Scheme A-4 Underpass and widening of Kahekili from Likelike to Kamehameha Highway in increments.

CHAPTER III

**AFFECTED
ENVIRONMENT**

CHAPTER III: AFFECTED ENVIRONMENT

A. NATURAL ENVIRONMENT

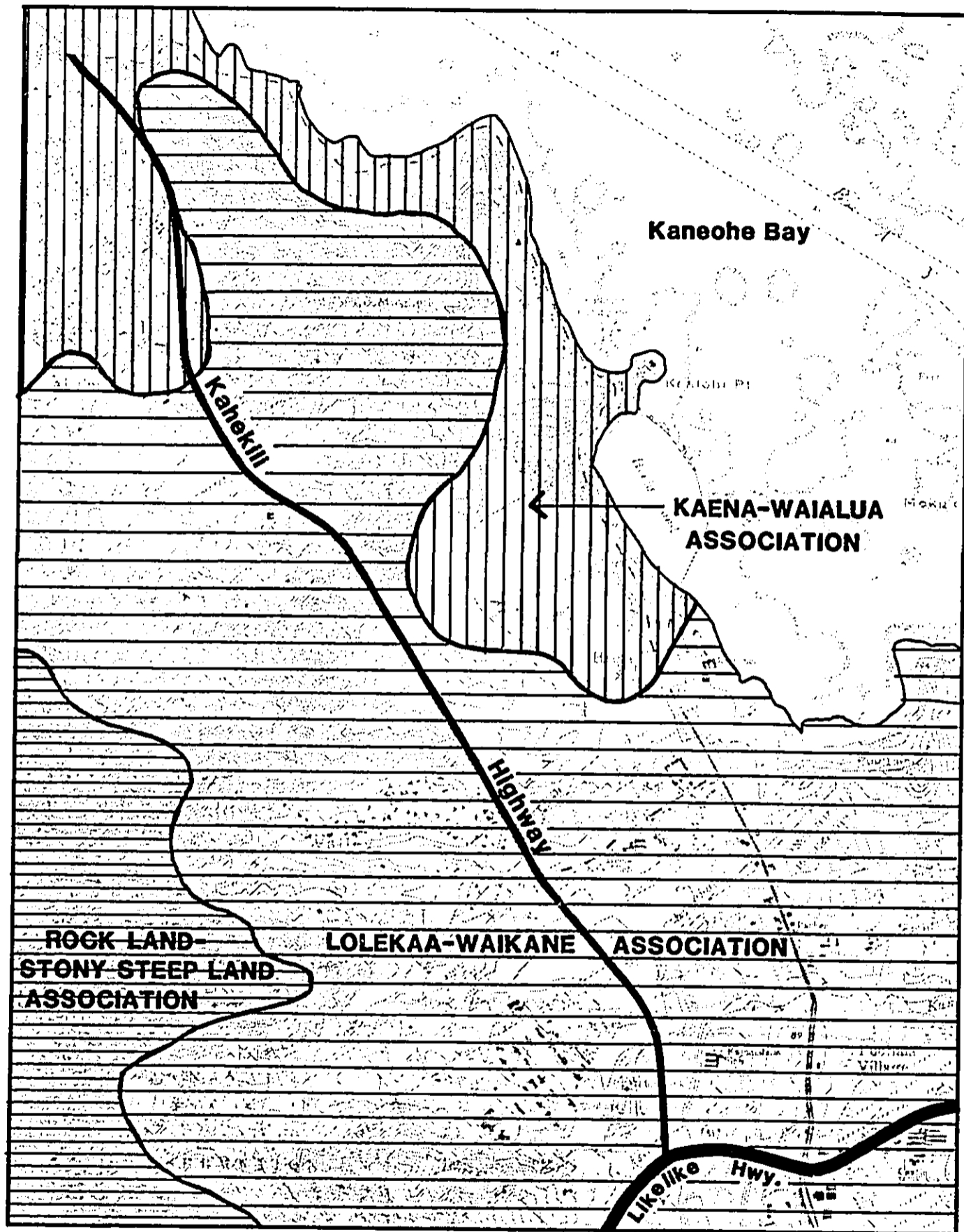
1. Geology, Topography and Soils

Kahekili Highway lies on a plain which was formed by the eruptions of the Koolau shield volcano in the Tertiary geologic period and subsequent flooding erosion in the Pleistocene period. While much of this plain is gently rolling, there are a number of grade changes along either side of the highway which have resulted in fairly steep embankments for road cuts and fills, notably at Kaneohe District Park, Temple Valley Shopping Center and in the Heeia area. The area around Kahekili Highway can be described geologically as alluviated valley bottoms and weathered ridges with dike intruded basalt.

Soils consist of the Lolekaa-Waikane Association and the Kaena-Waiialua Association. (See Exhibit III-1.) The Lolekaa-Waikane Association consists of well-drained soils developed from old alluvium and colluvium (i.e. rock and soil accumulated at the foot of the slope) of basic igneous rock. It occupies gently sloping to moderately steep alluvial fans and terraces and steep colluvial slopes.

The Kaena-Waiialua Association consists of very poorly drained soils developed from recent alluvium. It occupies the gently sloping valley bottoms lands adjacent to the ocean and along the streams.

The most prevalent type of soil, found along approximately 24 percent of the length of the highway, is Hanalei silty clay soil type (HnA) which is a member of the Lolekaa-Waikane Association. It has slopes between 0 and 2 percent. Highly erosive soil with slopes between 40 and 70 percent and rapid runoff occur along slightly more than 14 percent of the highway. According to the Soil Conservation Service Engineering interpretations the Hanalei soils (HnB) found in the area of the Kahekili/Likeli Intersection have a high water table and are subject to flooding. It also states that the Hanalei soils show a moderate shrink-swell potential.




 1" = 2440'

**EXHIBIT III-1:
SOIL ASSOCIATIONS IN PROJECT REGION**

2. Climatology and Hydrology

a. Climate and Air Quality

The climate in the project region may be characterized as windy, warm and moderately wet. Northeasterly tradewinds prevail approximately 80 percent of the year and are particularly prevalent from April through November. Southerly (or "Kona") winds occur near half the time during the months of December through March. Average annual wind speeds are approximately 15 miles per hour, with speeds in the summer months being generally greater. Calm conditions occur about 3 percent of the time over the average year. Average annual temperature is about 75°F, with little seasonal variation. Average annual rainfall is about 75 inches, with winter months being generally the wettest.⁶

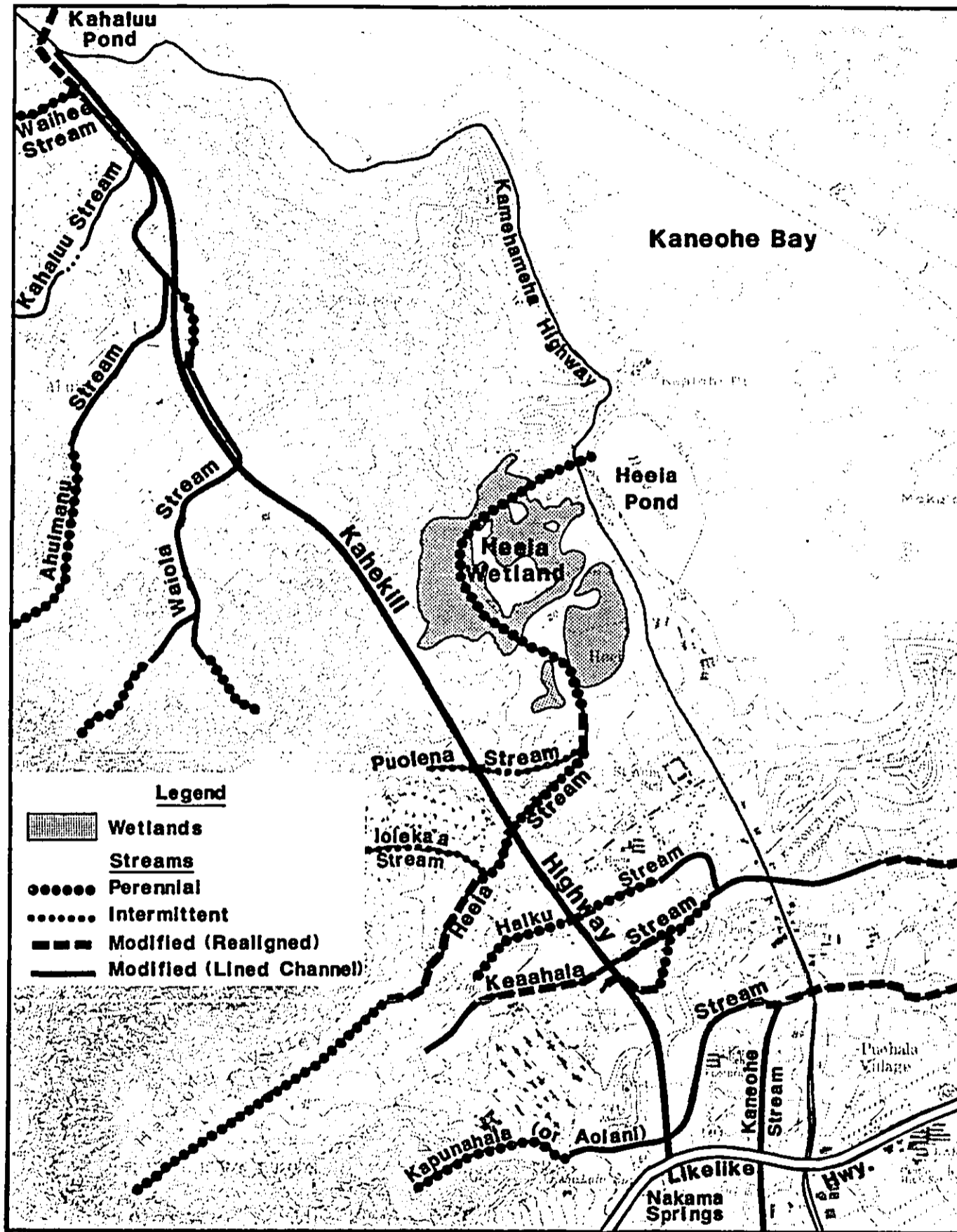
Based on the CALINE4 modal emission model and the CALINE3 dispersion model run for each intersection, it is estimated that, at present, there are violations of the Hawaii air quality standards for carbon monoxide in the area of the Kahekili/Likelike intersection. However the national air quality standard for carbon monoxide are not violated along the highway. For the complete air quality report see Appendix A.

b. Wetlands and Streams

Kahekili Highway crosses several streams. The highway runs parallel to sections of the Kahaluu Stream System (which is made up of Waiola, Ahuimanu, Kahaluu and Waihee Streams) for about 1.3 miles. Waiola Stream crosses Kahekili Highway twice. Kahekili Highway is also crossed by Puolena, Heeia, Keaahala, Haiku and Kapunahala (or Aolani) Streams. (See Exhibit III-2.)

All but one of the streams are perennial at Kahekili Highway, with natural continuous flow to Kaneohe Bay year-round. The Puolena Stream is an intermittent tributary which joins Heeia Stream west of Kahekili Highway. Haiku Stream is a small tributary to Keaahala Stream. The channels of all the streams have been altered by partial realignments, lined channels and or elevated culverts. Many of these modifications are associated with the original construction of Kahekili Highway. Others are the result of flood protection measures for nearby residential areas.

6. University of Hawaii Department of Geography, 1983. Atlas of Hawaii (Honolulu: The University Press of Hawaii), p. 62.



**EXHIBIT III-2:
WETLANDS AND STREAMS**

1" = 2440'

In most streams, testing showed a trend of increased suspended solids and increased soluble petrochemicals carried by each stream below the highway as compared with above the highway. At this time maximum allowable values of soluble petrochemicals are not addressed in State Water Quality standards and no practical means exist to prevent the movement of these compounds from the highway surface into the stream environment. The major impact of increased suspended solids is usually a short term one associated with construction. However if graded slopes are left unvegetated the impact on the streams and Kaneohe Bay will be exacerbated.

The Kahaluu Stream System surveys indicated that the streams have been altered a great extent by lined channels and culverts and the flood control drainage channel which parallels the highway.

The lower course of the Heeia Stream wetland includes a swamp, marsh and pond. The designated wetland is (at its closest point) about 300 feet east of the highway. See Exhibit III-2. The extent of open water in the upper marsh area has been reduced considerably by siltation deposited by Heeia Stream. In this sense, the wetland has served as a sedimentation filter, protecting the water quality of Kaneohe Bay. Much of the stream bed downstream of Kahekili Highway is natural and generally of high habitat quality represented by the variety of waterbirds in the Heeia Wetlands.

Keaahala Stream and Haiku Stream are lined with concrete channels and pass through urbanized Kaneohe and are considered lower in quality than Heeia Stream.

Kapunahala (or Aolani) Stream has been substantially altered by flood control projects and is in the same quality category as Keaahala Stream.

For nearly all of the streams surveyed, natural stream environments comprise only a small portion of the streams downstream of Kahekili Highway. Heeia Stream is an exception.

c. Floodplain

Due to high rainfall and the confluence of several streams, a portion of Kahekili Highway near Kahaluu is within or near the 100-year flood zone.

7. Ahuimanu Productions, Inc., 1977. An Ornithological Survey of Hawaiian Wetlands (Honolulu: U.S. Army Corps of Engineers).

(See Exhibit III-3.) The 100-year flood has one percent chance of occurring within a given year. Based on a detailed analysis by the U.S. Army Corps of Engineers (COE), all but about a 150-foot length of Kahekili Highway's road surface is above base flood elevations.

Federal Flood Insurance Rate Maps (FIRM) do not indicate any other 100-year flood zones in the immediate vicinity of Kahekili Highway. Detailed study of the flood boundaries of Kapunahala (or Aolani), Kealahala, Heeia, Puolena and Waiola Streams was limited to areas below (or east) of the highway in the preparation of FIRM maps.

A detailed drainage study conducted as part of the preliminary design phase of the proposed highway widening project revealed that, with Kahekili Highway's present drainage facilities, both the 100-year and the 50-year floods would overtop the road surface and inundate three dwellings just upstream of the highway on either bank of Kapunahala (or Aolani) Stream. (See Exhibit III-3.) Near Heeia Stream, the 100-year flood would inundate nine dwellings upstream of the highway for a period of several hours but the road surface would not be overtopped. (Exhibit III-3.) The 100-year flood would not overtop the highway or inundate any dwellings upstream of the highway at Waiola Stream or Puolena Stream.

3. Vegetation, Fish and Wildlife

Because of previous and prolonged disturbance from urban and agricultural development, plants and terrestrial animals found in the vicinity of Kahekili Highway are predominately introduced species, many of which are considered pestiferous.

The biological habitats of major interest in the project region are the Heeia Wetland, Kaneohe Bay and the streams.

The Heeia Wetland is now covered mainly by California grass (Brachiara mutica) with some honohono (Commelina diffusa).⁸ Much of the area is used for cattle pasture. Two species of mangrove (Rhizophora mangle and, less commonly, Bruguiera gymnorhiza) congest the outlet of the Heeia Stream, which courses through the wetland and floods periodically.

8. Elliot, Margaret, and Erin Marie Hall, 1977. Wetlands and Wetland Vegetation of Hawaii (Honolulu: U.S. Army Corps of Engineers).

LEGEND



SPECIAL FLOOD HAZARD AREAS INUNDATED BY 100-YEAR FLOOD

ZONE A No base flood elevations determined.

ZONE AE Base flood elevations determined.

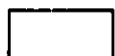


FLOODWAY AREAS IN ZONE AE



OTHER FLOOD AREAS

ZONE X Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood.



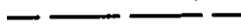
OTHER AREAS

ZONE X Areas determined to be outside 500-year flood plain.

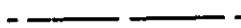
ZONE D Areas in which flood hazards are undetermined.



Flood Boundary



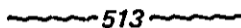
Floodway Boundary



Zone D Boundary



Boundary Dividing Special Flood Hazard Zones, and Boundary Dividing Areas of Different Coastal Base Flood Elevations Within Special Flood Hazard Zones.



Base Flood Elevation Line; Elevation in Feet*



Cross Section Line

(EL 987)

Base Flood Elevation in Feet Where Uniform Within Zone*

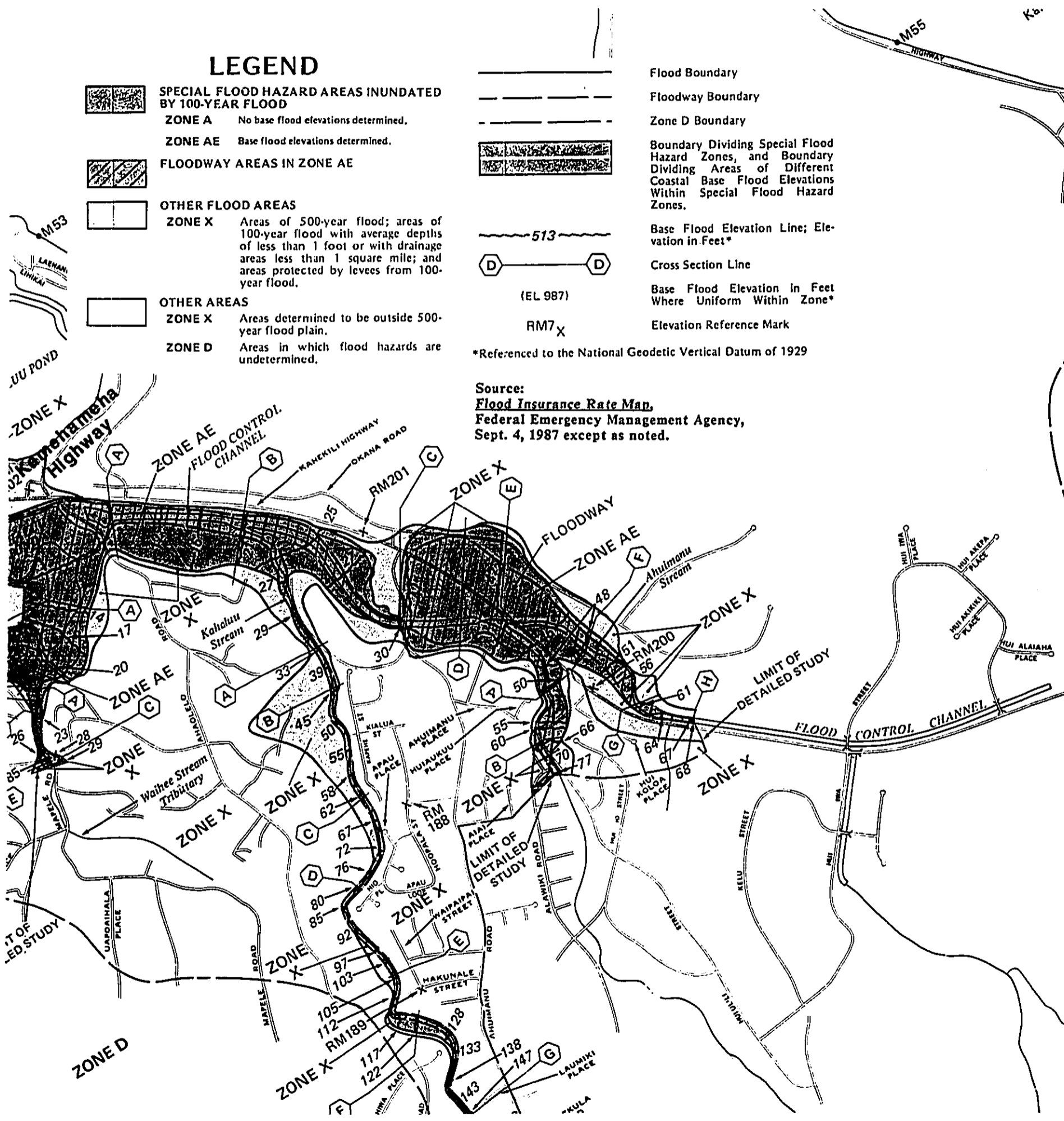
RM7_x

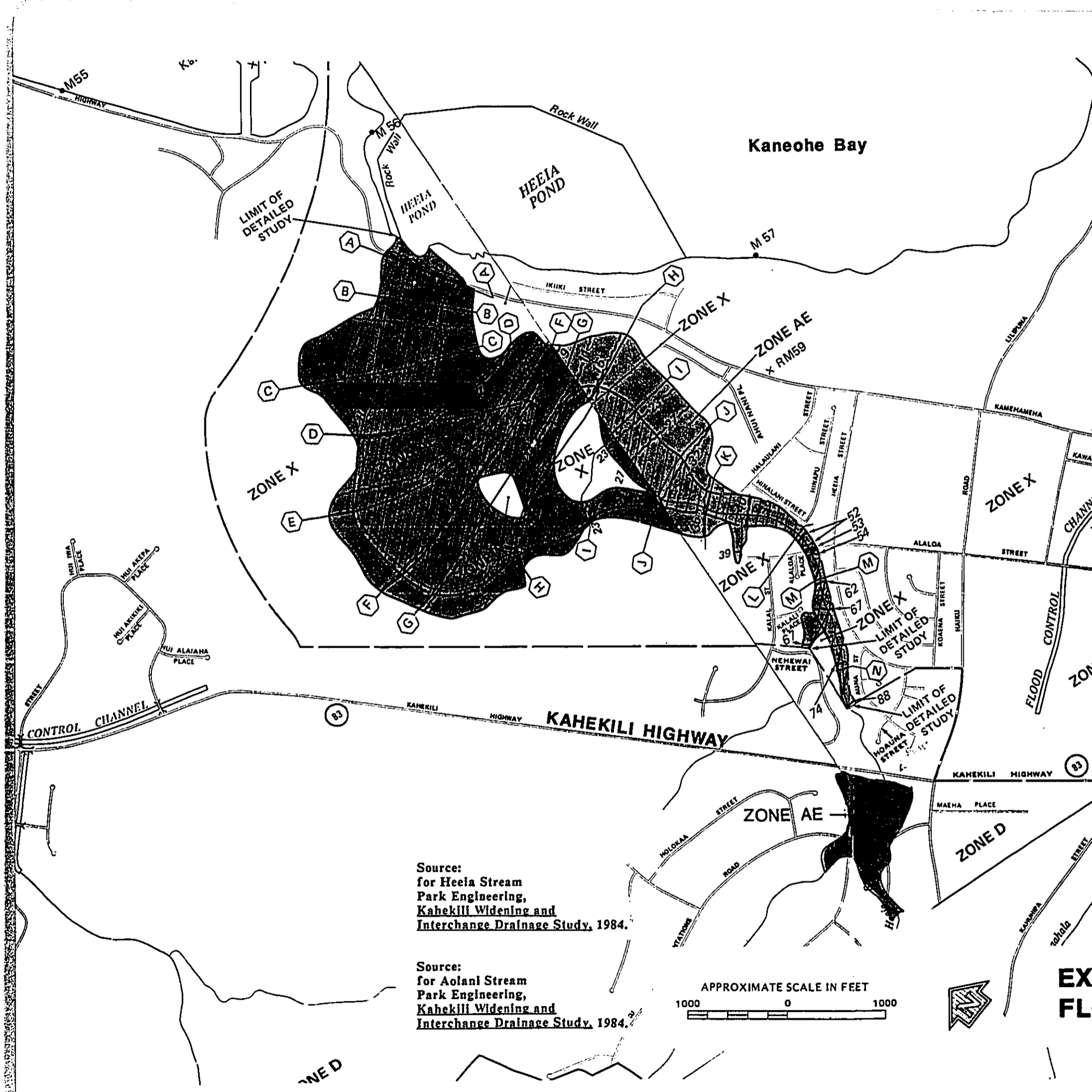
Elevation Reference Mark

*Referenced to the National Geodetic Vertical Datum of 1929

Source:

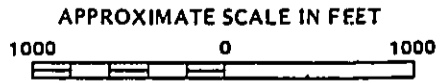
Flood Insurance Rate Map,
Federal Emergency Management Agency,
Sept. 4, 1987 except as noted.





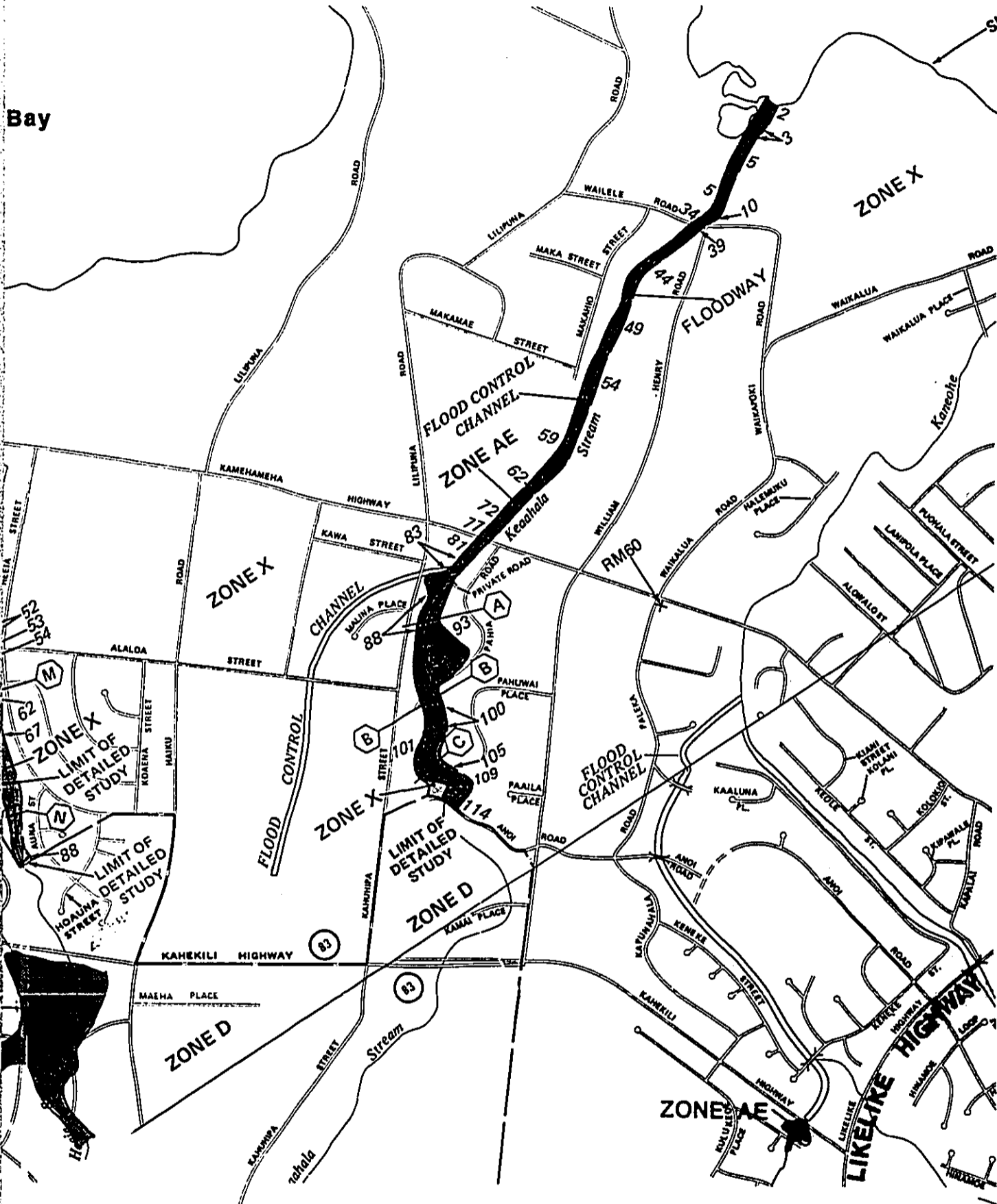
Source:
 for Heeia Stream
 Park Engineering,
 Kahekili Widening and
 Interchange Drainage Study, 1984.

Source:
 for Aolani Stream
 Park Engineering,
 Kahekili Widening and
 Interchange Drainage Study, 1984.



EX
 FL

Bay



**EXHIBIT III-3:
FLOODPLAIN MAP, KAHEKILI REGION**

Heeia Wetland, (located 300 feet away from Kahekili Highway at its closest point) is an important waterbird habitat. Biennial surveys are conducted by the State of Hawaii Department of Land and Natural Resources. The Hawaiian Waterbirds Recovery Plan, completed by the U.S. Fish and Wildlife Service, designates the Heeia Wetland owned by Bishop Estate as an essential habitat area and is identified as suitable for acquisition, to protect waterbird habitat.⁹ According to the Fish and Wildlife Service¹⁰ any move toward acquisition would be up to the State of Hawaii.

Kaneohe Bay, whose shoreline is approximately parallel to Kahekili Highway is composed of a barrier coral reef across its mouth with patch and fringing reefs in the lagoon behind the barrier reef. Kaneohe Bay is unique in Hawaiian Islands in its extent of patch and barrier reef development. Red algae, and stony corals build the reef and sponges, echinoderms, mollusk and certain groups of fishes feed from the reef. Decreases in water quality due to sedimentation and nutrient loading has reduced the amount of suitable habitat for many reef species.¹¹ Sedimentation impacts on the contributing streams to the Bay are important. Of particular concern are silt-laden runoff from exposed soil and nutrients and toxic substances from fertilizers, pesticides, petroleum products and sewage. Construction of a new sewer outfall in 1978, removed the major point-source pollution from the Bay. As a result, water quality has improved and there are signs that the reef is beginning to recover.¹² The slower rate of urbanization, more enlightened grading and soil conservation practices in recent years have probably also contributed to this recovery.

The streams along Kahekili Highway contain an abundance of various species of freshwater fishes and mollusks. In general, native species are more common in streams

9. Hawaiian Waterbirds Recovery Team, 1985. Hawaiian Waterbirds Recovery Plan (Honolulu: U. S. Fish and Wildlife Service), 1985.

10. Phone conversation with John Ford, Fish and Wildlife Service, December 1988.

11. Smith, S.V., et. al., 1981. "Kaneohe Bay Sewage Diversion Experiment: Perspectives on Ecosystem Response to Nutrient Perturbation", in Pacific Science, 35(4).

12. Jokiel, Paul, 1983 (work in progress). Kaneohe Bay benthic studies, Kaneohe, Hawaii: unpublished material by Hawaii Institute of Marine Biology.

which have been subject to less alteration, and are virtually absent in the portions which have been lined with concrete, flat-bottomed channels.¹³

4. Visual Quality

The visual character of the proposed project area can be divided into three geographic segments. The area from Likelike Highway to the Haiku Road intersection is distinctly suburban in character and is visually dominated by the built environment, consisting primarily of single-family residences, with townhouses and mid-rise apartment buildings between the Kahuhipa Street and Haiku Road intersections. In most areas, residential development screens views of the Koolau Range and Kaneohe Bay from the highway. Near the Likelike Highway intersection, however, topographic conditions permit panoramic views of both mountains and sea.

The second segment, between Haiku Road and the southern leg of the Hui Iwa Street intersection, is predominantly undeveloped. Kahekili Highway intersects several ridges and passes along the edge of the Heeia meadow lands, which can be seen below from the highway. Panoramic views extend both to the west and the east, with the latter offering glimpses of Heeia Fish Pond and Kaneohe Bay.

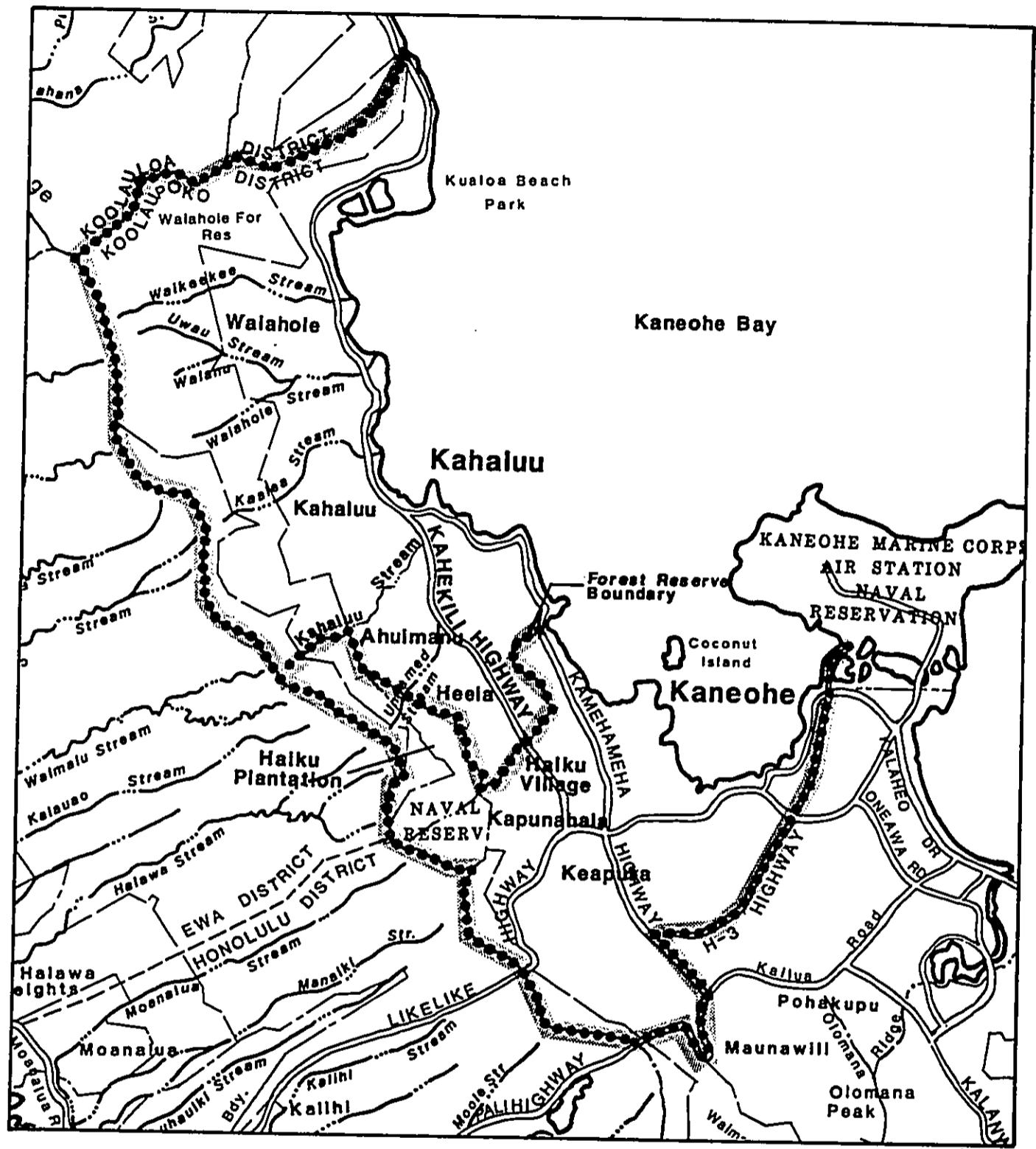
The third segment, from Hui Iwa Street to Kamehameha Highway, includes a portion of built-up area in suburban Ahuimanu Valley, but is predominately an open, rural environment. Panoramic views extend to the west across several small farms and nurseries toward the Koolau Mountain Range. On the east there is a high bluff which screens Kaneohe Bay from view.

B. SOCIAL ENVIRONMENT

1. Population and Housing

Kahekili Highway serves primarily the region comprised of the communities of Kahaluu and Kaneohe. (See Exhibit III-4.) The population of these communities has increased faster than that of the Island of Oahu as a whole in the years since 1941, when the Kaneohe Naval Air Station was established on Mokapu Peninsula. The decade of most rapid growth was the 1950's, when the region's population increased over 190 percent. Since

13. Timbol, Amadeo S., and John Maciolek, for the U.S. Fish and Wildlife Service, 1978. Stream Channel Modification in Hawaii; Part A: Statewide Inventory of Streams, Habitat Factors and Associated Biota (Honolulu: Cooperative Fisheries Unit.).



Legend

Community Boundary*
Kahaluu Community Name
 Kahaluu Neighborhood Name

*Source: Neighborhood Statistics Program Areas, The State of Hawaii Data Book, 1986, p.560.

1" = 9000'

**EXHIBIT III-4:
COMMUNITIES AND NEIGHBORHOODS
IN PROJECT REGION**

1960, there has been a downward trend in the rate of population growth, as there has been islandwide. Nevertheless, the region's population has continued to grow faster than the islandwide population. (See Exhibit III-5.)

According to 1980 Census Information¹⁴ the median income for Kahaluu and Kaneohe was \$24,984 and \$28,652 respectively which was higher than Oahu's median income of \$21,077. The Oahu percentage of high school graduates was 75.6% in Kahaluu and Kaneohe there was a higher percentage of high school graduates with 84.0% and 80.0% respectively.

The occurrence of single-family, owner-occupied dwellings in the region is greater and the average household size larger than the Island of Oahu's. (See Exhibit III-5.) The single family dwellings in the immediate vicinity of Kahekili Highway are in relatively older residential areas. There are, however, some dwellings which appear to be less than 10 years old. Newer residences along either side of the highway tend to be of the "townhouse" type, notably in the Haiku and Ahuimanu areas. There are also a couple of apartment buildings along the eastern side of Kahekili Highway, near the intersection with Kahuhipa Road.

2. Cultural Aspects

The Kaneohe Bay region is estimated to have had a population somewhere between 15,000 and 17,000 in 1779, when the first Westerners arrived in the area, and was probably one of major areas of early Hawaiian settlement.¹⁵ Only a few archaeological remains from the pre-contact era are in good condition today. Many sites were destroyed years ago when the area was used for pineapple cultivation.¹⁶ Three sites in relatively good condition and of major interest are the Kahaluu and Heeia Fish Ponds and the Leleahina Heiau, none of which are in the immediate vicinity of Kahekili Highway. Most of the areas to either side of the road have been disturbed by previous construction or agricultural activities.

14. The 1980 Census Data is the most recent data available for this area.

15. Devaney, Dennis M., Marion Kelley, Polly Jae Lee and Leo S. Motteler, for the U. S. Army Corps of Engineers, 1976. Kaneohe: A History of Change (Honolulu: Bernice P. Bishop Museum).

16. Sterling, Elspeth P., and Catherine C. Summers, 1978. Sites of Oahu, (Honolulu: Bernice P. Bishop Museum).

EXHIBIT III-5
DEMOGRAPHIC DATA

<u>Population</u>	<u>Project Region^a</u>	<u>Oahu</u>
1960 Census	15,291	500,409
1970 Census	31,560	630,528
1980 Census	47,335	762,534
 <u>Percent Change in Level of Population</u>		
1950-1960	192%	42%
1960-1970	106%	26%
1970-1980	50%	21%

<u>Housing^b</u>	<u>Kahaluu</u>	<u>Kaneohe</u>	<u>Oahu</u>
% in one unit structure	68.2%	75.1%	47.1%
% Owner-occupied	66.2%	72.0%	49.9%
Average household size	3.5	3.59	3.15

<u>Socio-economic data^b</u>	<u>Kahaluu</u>	<u>Kaneohe</u>	<u>Oahu</u>
% High School Graduate	84.0%	80.0%	75.6%
Median household income	\$24,984	\$28,652	\$21,077

NOTES:

- a. The "project region" consists of the communities of Kahaluu and Kaneohe.
- b. Statistics are based on 1980 Census data.

Until the early 1940's, the project region could be described as being predominately rural, with the exception of the small core of Kaneohe Town. Rapid population growth since that time has transformed the region into a suburban community.

Along Kahekili Highway, the area near the intersection with Likelike Highway was the first to be developed for residential use. The pattern of development has generally proceeded toward Kahaluu, but not necessarily in an even fashion. Major townhouse development occurred in the Ahuimanu area, near Kahaluu, in the early and middle 1970's. In the late 1970's and early 1980's, several "in-fill" townhouse and single family developments were built on vacant parcels. An undeveloped stretch of about 0.8 miles still remains in Heeia where a large meadow and marshland lie below the road on one side and fairly steep slopes stand on the other. The other major remaining stretch of mostly undeveloped land is between Ahuimanu and Kahaluu, where the character of the area begins to change from suburban to rural. In this area, as well as the Heeia meadowlands areas, there are remnants of the previous agrarian life-style.

3. Archaeological Aspects

The only known archaeological sites in close proximity to the project area is the Luluku Discontiguous Archaeological District. It is located in the H-3 Kaneohe Interchange area above Kahekili Highway. (See Appendix E.) The District is comprised of eighteen archaeological sites. The sites range in type from simple, discrete, stone structures to multiple-feature complexes and represent traditional Hawaiian/prehistoric style of sites as well as historic period sites with evidence of foreign influences. The Luluku agricultural terraces are considered to be among the most extensive windward agricultural complexes recorded in the Hawaiian Islands. Both wetland and dryland agricultural features that were used for taro farming during both the precontact and historic periods are represented. Additional site types include possible habitation features, burials, boundary walls, and historic period artifact concentrations and charcoal kilns. These sites are eligible for inclusion in the National Register of Historic Places.¹⁷

17. U.S. Department of Transportation, Federal Highway Administration and State of Hawaii Department of Transportation. Final Third Supplement to the Interchange Route H-3 Environmental Impact Statement (1987).

Upon the recommendation of the State of Hawaii Office of Historic Preservation, archaeological reconnaissance was completed in the Kahekili Highway widening and interchange areas. Two archaeological sites were encountered in the Kahekili/Likelike interchange area, that were previously recorded and mapped in 1987 as part of the Luluku Discontiguous Archaeological District. In the Kahekili widening corridor no archaeological sites were found.

The two archaeological sites in the interchange area are the Punaluu mauka cemetery/historic period compound (G5-88) and an 'ili¹⁸ boundary wall (G5-89). The cemetery is still in use and is maintained by the family living near the site. The boundary wall marks the division between the areas known as Punaluu Mauka and Kapalai. See Appendix E. For more information see Appendix E for the complete archaeological report.

4. Trucks, Buses and Bicycles

The right-of-way for Kahekili Highway is used by trucks, buses, bicycles and pedestrians as well as automobiles.

An estimated 4 percent of the highway's average daily vehicular traffic, as shown in Exhibit I-2, between Likelike Highway and Ahuimanu Road consists of trucks, approximately half of which are heavy-duty rigs of three axles or more. Between Ahuimanu Road and the intersection with Kamehameha Highway, the percentage of trucks in the average daily traffic increases to about 5.5%.¹⁹

Route No. 55 of the municipal bus system runs along Kahekili Highway between the hours of 5:10 A.M. and 10:15 P.M. and provides local service, with the frequency of trips varying according to the time of day and week. There are two express bus lines during morning and afternoon peak hours. Route No. 88 has two runs in both the morning and afternoon between the Ahuimanu area and Honolulu. The express Route No. 88A makes one run in the morning. Route No. 85A has three runs in both the morning and afternoon between the Kapunahala-Haiku areas and Honolulu. Buses have a 41-49 seat capacity (depending on the model) with standing room for up to 40 passengers.

18. An 'ili is a land section next in importance to ahupua'a. It is usually a subdivision of an ahupua'a.

19. State of Hawaii, Department of Transportation, Highways Division, Kahekili Highway Widening and Interchange Project No. 83F-01-75 Ref. No. TA 82-5, June 1982.

Presently, there is only one 3,000 foot stretch of the highway, between Keaahala and Haiku Roads, where formal bike lanes are provided. The rest of Kahekili Highway generally has road shoulders which are unpaved and not suitable for bicycle travel. The State of Hawaii master plan for bikeways designates a bike lane along the entire length of the highway.²⁰

There are no sidewalks along either side of Kahekili Highway, but pedestrian crossings are provided at signalized intersections.

5. Utilities

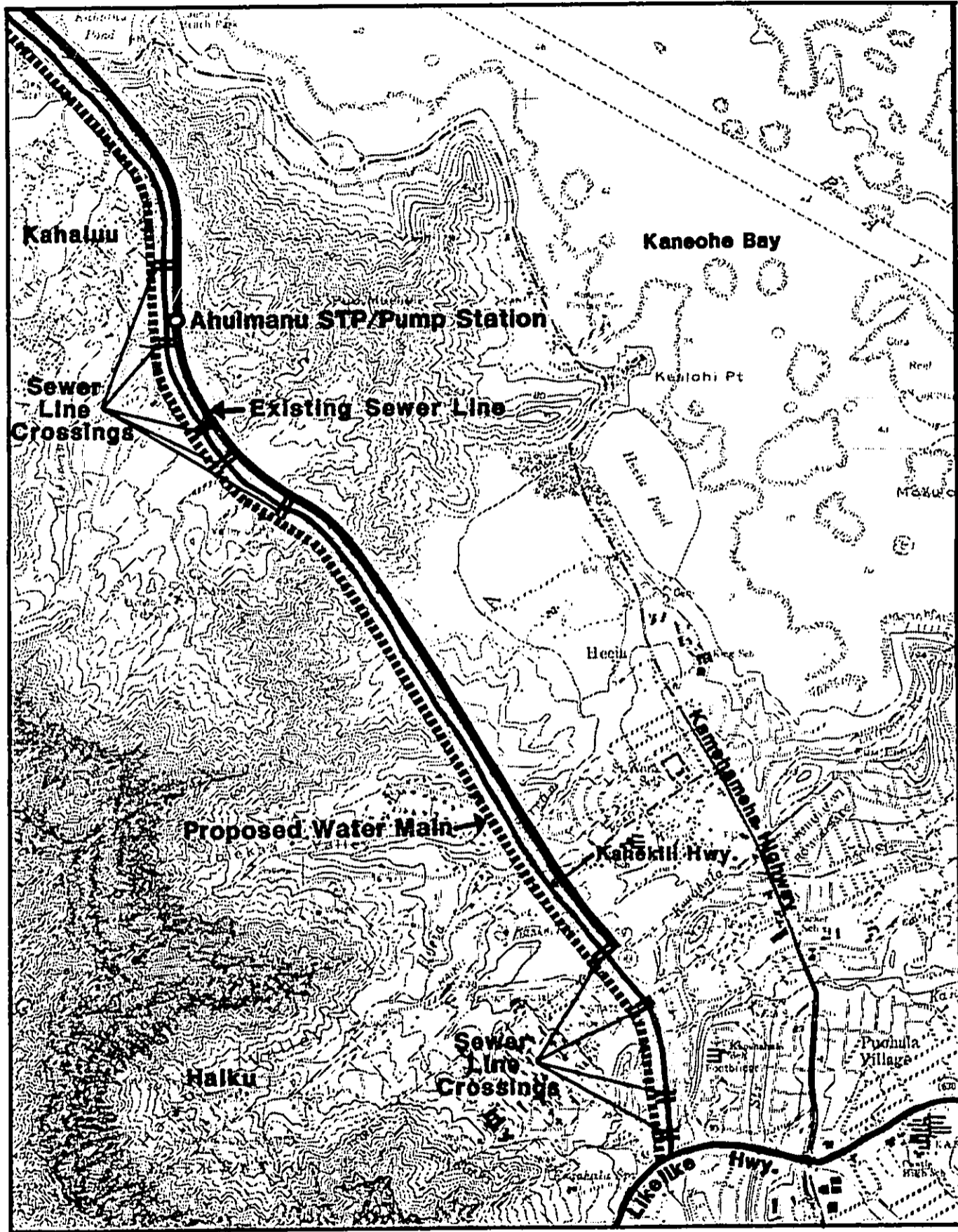
The Honolulu Board of Water Supply (BWS) has several major existing and planned projects in the Kahekili Highway region. A new 42-inch main is planned to be installed along the entire length of Kahekili Highway between Kamehameha Highway and Likelike Highway. The pipeline will be installed in coordination with the State Department of Transportation interchange and widening project. (See Exhibit III-6.)

Sewer system improvements along Kahekili Highway include: Ahuimanu Sewage Treatment Plant (STP) on the east side of Kahekili Highway near Ahuimanu Place (which has been converted to a pump station although it will retain its secondary sewage treatment functions until the Kailua Sewage Treatment Plant comes on line in 1989); a 4,000-foot force main along the highway from the Ahuimanu STP to the eastern end of Hui Iwa Street; and sewer lines that cross Kahekili approximately 1,000 feet southeast of the Haiku Road intersection, at the Kahuhipa, Keaahala and Kulukeoe intersections and near the Likelike Highway intersection. (See Exhibit III-6.) The Kahekili Highway widening will occur north on the west side of the road. The City and County of Honolulu Department of Public Works is currently designing another proposed force main that will run from the future Ahuimanu Pump Station to Kamehameha Highway.

There are existing storm drainage culverts along Kahekili Highway. The existing culverts were determined by engineering studies to be adequate or a recommendation is made for an addition or a replacement in the case where the existing culvert is inadequate.²¹ (See Appendix F Drainage Improvements.)

20. State of Hawaii Department of Transportation, 1977. Bikeplan Hawaii, 1981.

21. Park Engineering, Kahekili Highway Drainage Study - Final, June 1987.



**EXHIBIT III-6:
EXISTING AND PROPOSED
SEWER AND WATER FACILITIES**

1" = 2440'

The Hawaiian Electric Company and the State of Hawaii will probably enter an agreement about relocation of overhead and underground electric lines which will be impacted by the proposed project.

6. Public Institutions, Recreation and Community Facilities

Kahekili Highway serves as a transportation link to numerous public facilities in the project region (Exhibit III-7.) Four elementary schools are within half a mile of the highway: Kahaluu Elementary School, near the intersection with Kamehameha Highway; Ahuimanu Elementary School, north of Valley of the Temples Cemetery; Heeia Elementary School, east of Kahekili Highway on Haiku Road; and Kapunahala Elementary School, on Anoi Road east of the highway. Each of these schools has an enrollment of at least 300 students, and all of them adjoin community playgrounds that contain comfort stations, various playing courts and fields and children's play apparatus. On Keaahala Road is Windward Community College, a two-year junior college with a student population of approximately 2,000. The Seicho-No-Ie Hawaii Jisso Center, a Buddhist day care center, is located on Kahekili Highway at the intersection of Hui Iwa Road.

Ahuimanu Neighborhood Park, owned and operated by the City and County of Honolulu, is a 4.0-acre park (tax map key 4-7-60:29) situated on the mauka (western) side of Kahekili Highway, between the two points where Hui Iwa Street intersects with the highway. It is bordered by Ahuimanu Elementary School and serves as a playground for the school as well as the general neighborhood. Playground equipment and a comfort station constitute the present facilities.

Kaneohe District Park is administered by the City and County of Honolulu's Department of Parks and Recreation on land owned by the State of Hawaii. The park use is authorized by an Executive Order (E.O. 2528) of the Governor, but final documentation on the transfer of land to the City and County for this purpose has not been completed. The park is located on the mauka (western) side of Kahekili Highway and consists of two parcels situated on either side of Keaahala Road. The parcel south of Keaahala Road covers 12.573 acres and contains most of the 31.367-acre park's present facilities. (See Exhibit III-8.) Facilities include a gymnasium, restrooms and various playing fields and courts. Site improvements to the park are planned over the next several years. While designed primarily for softball and baseball, the playing fields are used also

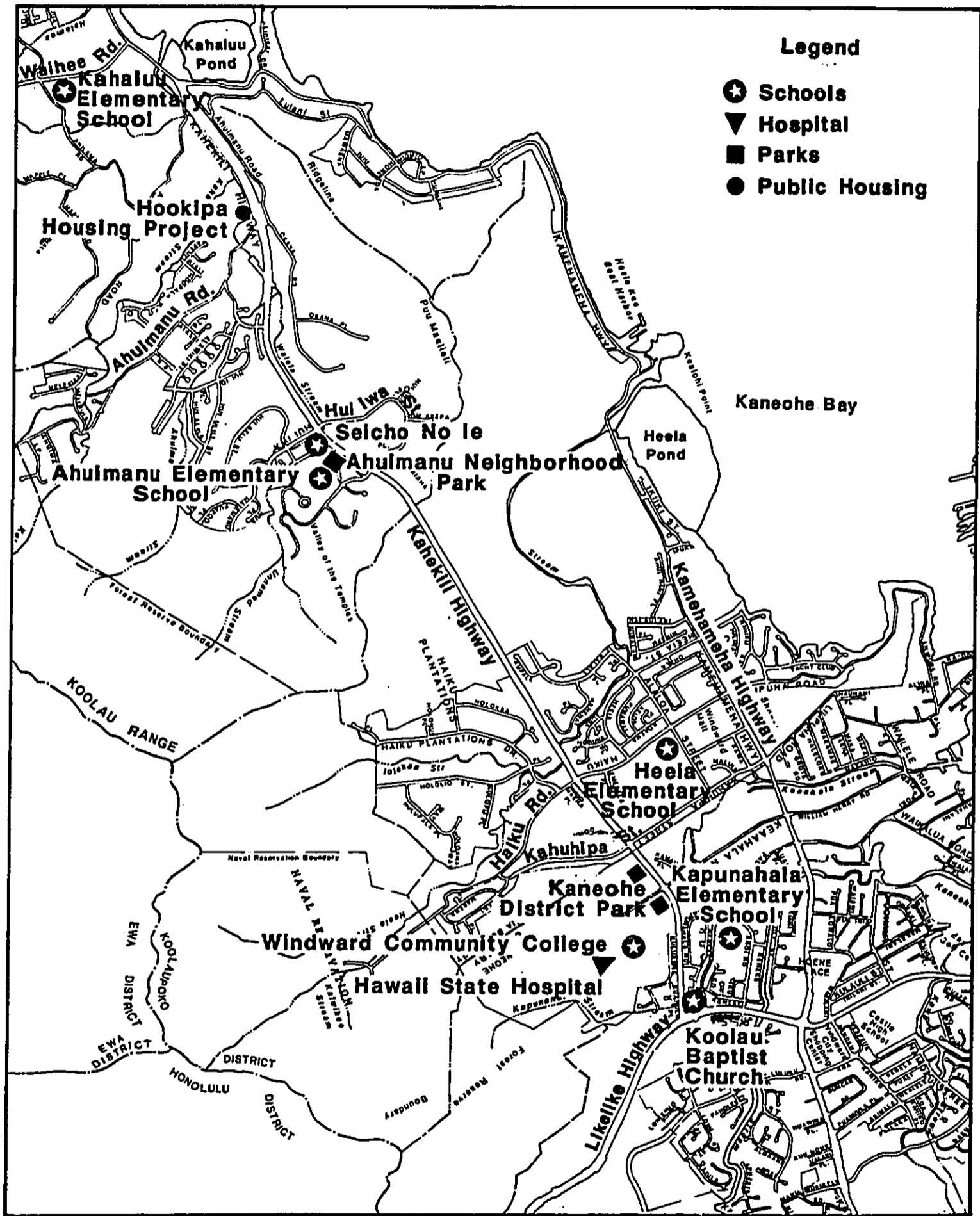


EXHIBIT III-7: SCHOOLS, HOSPITAL, PARKS & PUBLIC HOUSING

1"=2,640'

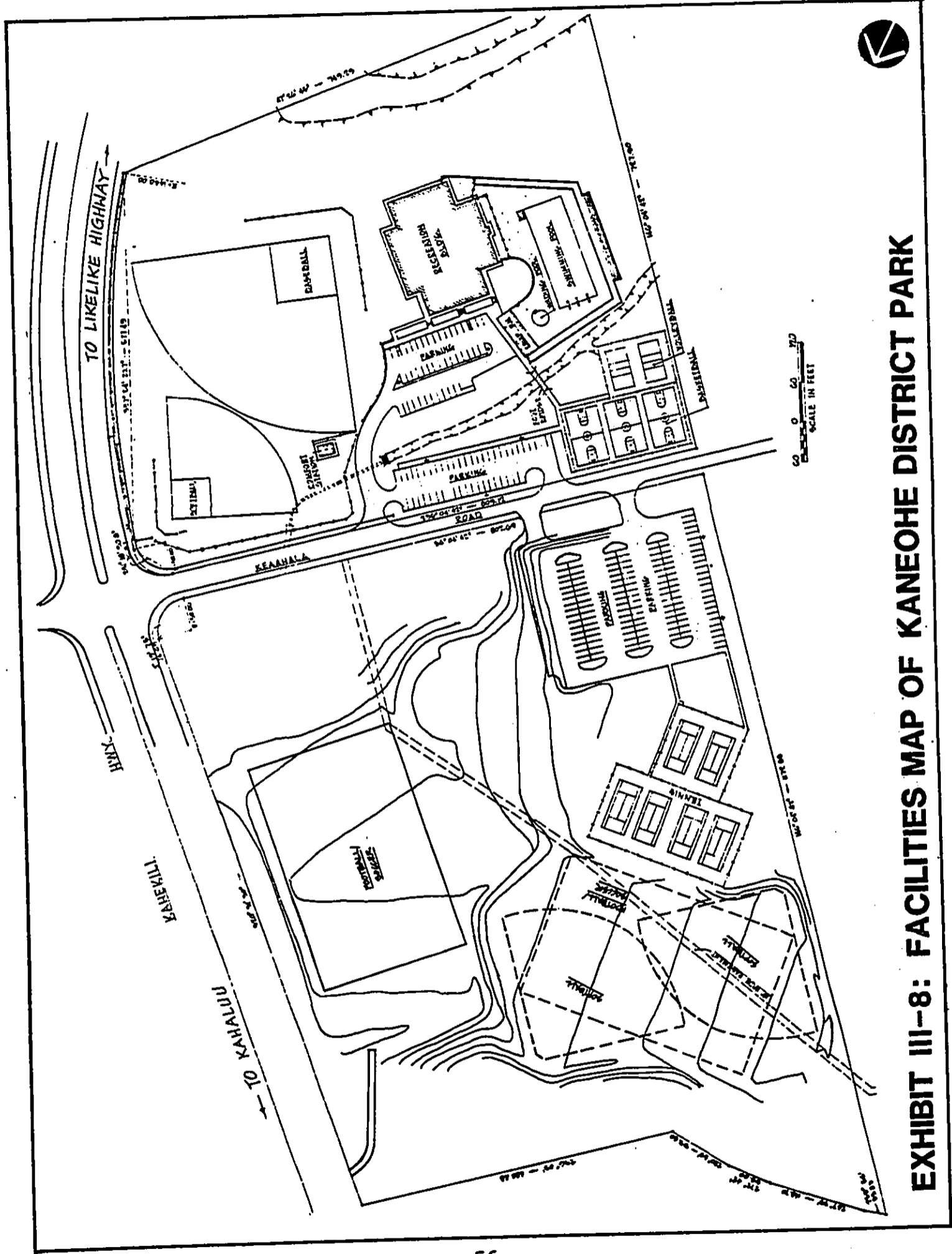


EXHIBIT III-8: FACILITIES MAP OF KANEOHE DISTRICT PARK

for soccer and football, depending upon the season, and are utilized almost daily throughout the year. The period of most heavy usage is between 3:00 P.M. to 4:00 P.M.

Three health facilities are located west of the District Park and the proposed connector road. Kaneohe State Hospital, a psychiatric facility, contains 220 beds. The Habilitat Community Service Center, a special treatment facility for substance abusers and the emotionally disturbed, accommodates day programs. Windward Comprehensive Health Center contains a dental clinic, public health nursing offices and mental health counseling center for out-patients.

Several churches, temples and other public facilities are located along Kahekili Highway. The Koolau Baptist Church is located near the intersection of Kahekili Highway and Likelike Highway. The Valley of the Temples cemetery and associated facilities are also located on Kahekili Highway. The Hookipa Public Housing Project with 52 units is located on Ahuimanu Road.

7. Neighborhoods

Within the communities described as the "project region", there are residential subdivision and townhouse developments which, either separately or in clusters, are commonly identified by name and can probably be defined as a "neighborhood". The following neighborhoods are located along Kahekili Highway, proceeding from Likelike Highway northward.

<u>Community</u>	<u>Neighborhood</u>	<u>Type of Development</u> ²²
Kaneohe	Keapuka	SF
	Kapunahala	SF
	Haiku Village	T, A
	Haiku Plantations	SF
Kahaluu	Heeia	SF, O, Ce
	Ahuimanu	SF, T, A, C
	Kahaluu	SF, C, Ag

 22. Key: SF is single-family residential; T is townhouse; A is apartment; C is retail commercial; Ag is agriculture; Ce is cemetery; O is open.

8. Traffic Safety

According to readily available data, traffic accident rates along Kahekili Highway varied between an average of .88 and 3.81 accidents per million vehicle miles (MVM) between 1982 and 1985. The area between Likelike Highway and Haiku Road showed the highest rate of accidents (3.81) in that time period. The rate of 3.81 accidents per MVM was higher than the national average (2.34)²³ for accidents per MVM for a suburban two-lane expressway with partial access control.²⁴ The accident rate between Haiku Road and Ahuimanu Road was below the average accident rate for the suburban two-lane expressway with partial access control. The section of Kahekili Highway between Ahuimanu Road and Kamehameha Highway had a rate of 3.44 accidents per MVM which was also higher than the national average.

Portions of Kahekili Highway with accident rates of 3.81 and 3.44 (Likelike to Haiku Road and Ahuimanu to Kamehameha Highway) were higher than the average accident rate for 1981-1985 for the Pali Highway which was 2.43²⁵ accidents per MVM. (The Pali Highway is a divided highway which eliminates most head on collisions.)

Average accident rates, between 1977 and 1981 show different values which can be explained in part by roadway improvements such as the addition of turning lanes. (See Exhibit III-9.)

C. ECONOMIC SETTING

1. Land Improvements and Tax Base

Development along Kahekili Highway consists primarily of residential uses, with public facility uses interspersed. (See Exhibit III-10.) The only commercial development along the highway is Temple Valley Shopping Center, located in the Ahuimanu area.

There are several other major commercial facilities in the region within 2 miles of the highway. (Exhibit III-11.)

23. AASHTO A Manual on User Benefit Analysis of Highway and Bus-Transit Improvements, 1977. Published by American Association of State Highway and Transportation Officials, Washington D.C., p. 67.

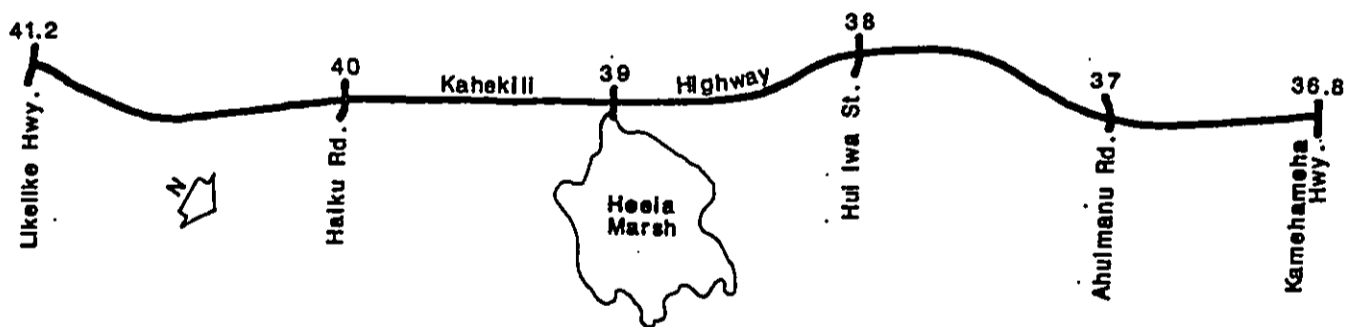
24. Partial access control means that no driveways are allowed immediate access on the highway.

25. Unpublished data from the State of Hawaii, Department of Transportation, Traffic Branch.

EXHIBIT III-9

TRAFFIC ACCIDENT RATE^a ON KAHEKILI HIGHWAY,
BY HIGHWAY SEGMENT

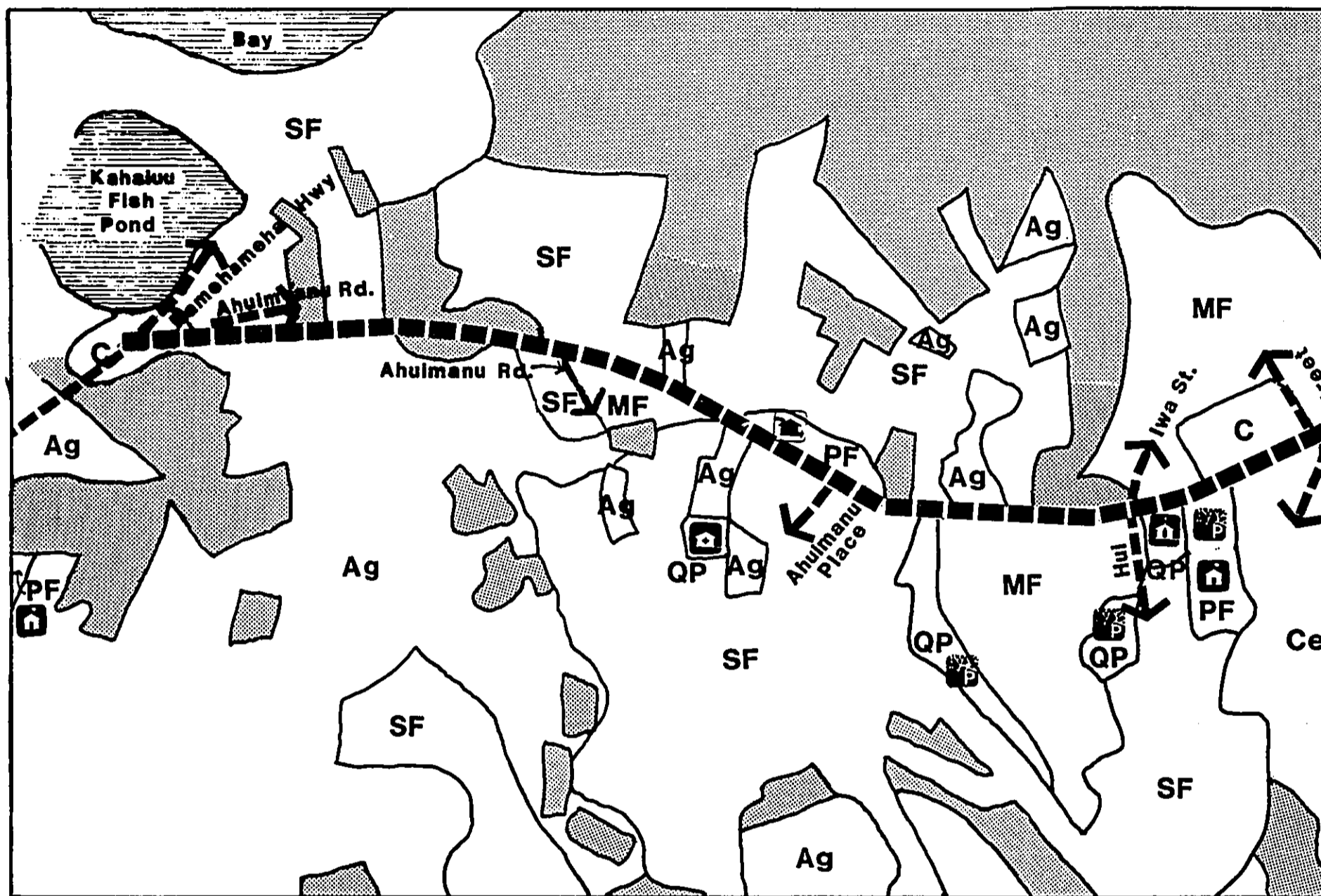
Highway Segment (Mileposts and approximate reference points)	Average 1977-1981	Average 1982-1985
Mile 41.2-40 (Likelike Highway intersection to Milepost 40)	3.25	3.81
Mile 40-39 (Haiku Road intersection to Milepost 39)	1.29	.88
Mile 39-38 (Undeveloped area adjacent to Heeia Marsh to Milepost 38)	3.14	2.27
Mile 38-37 (Intersection with northern leg of Hui Iwa Street to Milepost 37)	2.16	1.69
Mile 37-36.8 (The Ahuimanu road intersection to just north of Kahekili- Kamehameha Highway intersection)	4.70	3.44




NOTES:

- a. Accident rate is expressed in number of incidents per million vehicle miles.

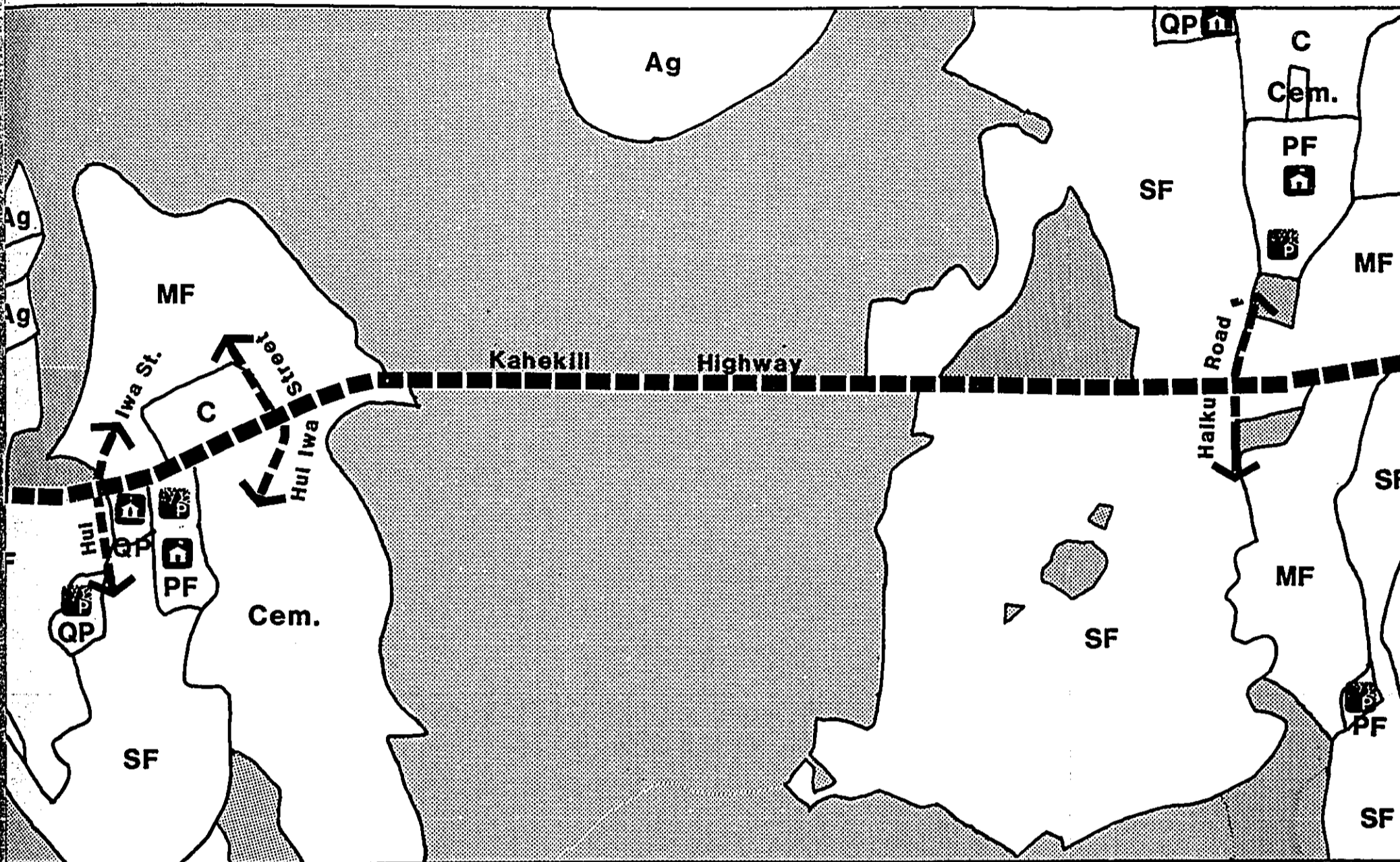
Source: Information compiled by Park Engineering from Accident Analysis DOT-4-313, State of Hawaii, Department of Transportation, Highways Division.






LEGEND

-  Vacant
- SF** Single Family Residential
- MF** Multi-Family Residential
- C** Commercial
- I** Industrial
- Ag** Agricultural
- Cem.** Cemetery

- PF** Public Facilities
 -  School
 -  Sewer Treatment Plant
 -  Park
 -  Hospital
- QP** Quasi-Public Facilities
 -  Church
 -  Park

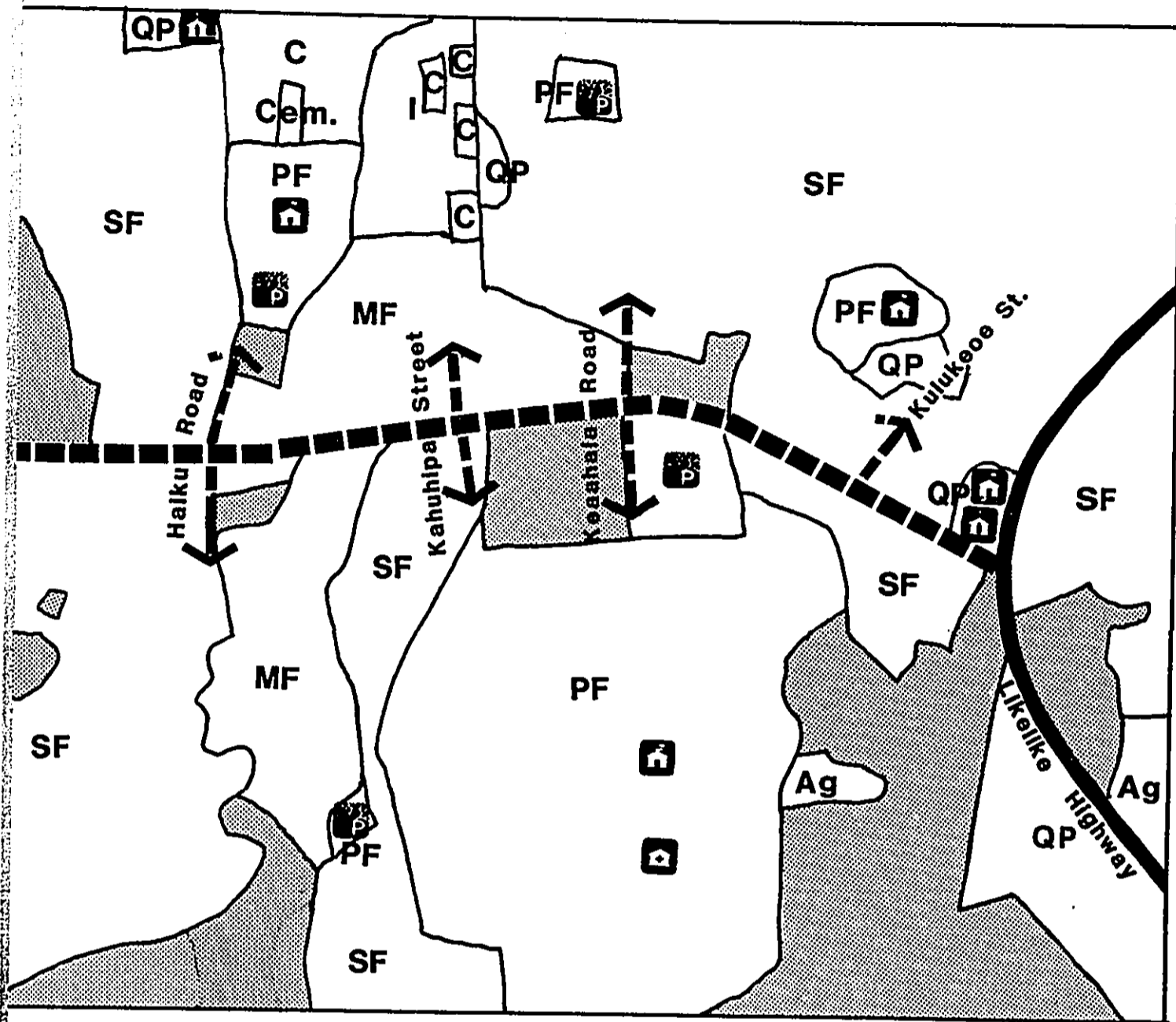


-  Kahekili Highway
-  Likelike Highway
-  Intersection with Secondary Roads

ant

98

EXP
EXI



Approx. Scale: 1" = 1000'

**EXHIBIT III-10:
EXISTING LAND USES IN PROJECT AREA**

EXHIBIT III-11

MAJOR COMMERCIAL CENTERS IN PROJECT REGION

<u>Name</u>	<u>Location</u>	<u>Opened</u>	<u>Acreage</u>	<u>Bldg Area (sq ft)</u>	<u># Stores</u>
Temple Valley Shopping Center	corner of Kahekili & Hui Iwa	1974	10.3	102,000	25
Windward Mall	corner of Kamehameha & Haiku	1982	32.0	530,000	98
Kaneohe Bay Shopping Center	corner of Kamehameha & Haiku	1973	10.0	106,000	19
Kaneohe Shopping Center	corner Wm Henry Road & Kamehameha Highway	1957	3.3	45,000	9
Windward City Shopping Center	corner of Kaneohe Bay Drive & Kamehameha	1959	15.0	210,000	40

Source: Hawaii Chapter of International Council of Shopping Centers and Chamber of Commerce of Hawaii, Hawaii Shopping Centers Directory, 1987 Edition.

There is a small light industrial area along Kahuhipa Street. Like the retail commercial and office uses, these light industrial uses are oriented to the needs of area residents. Windward Mall is the one commercial facility which clearly has a wider service area.

Because the project region is predominately a "bedroom community" rather than an employment center, property tax revenues are derived largely from residential development.

There are a number of agricultural operations in the project region, although mostly of a small scale. The meadows around Heeia wetlands are used for pasturing cattle by small family operations. Northwest of Kahekili Highway between Ahuimanu and Kahaluu, there are a couple of commercial nurseries as well as subsistence farms within view of the road. In Kahaluu and beyond, where the character of area becomes increasingly rural, a substantial number of residents engage in farming for subsistence or supplemental income.

D. AREA-WIDE PLANS AND POLICIES

1. State of Hawaii

- a. The Hawaii State Plan Revised is a general policy document adopted in 1986. Applicable "Objectives and policies for facility systems - transportation" are as follows:
- o Planning for the State's facility systems with regard to transportation shall be directed towards the achievement of the following objectives:
 - An integrated multi-modal transportation system that services statewide needs and promotes the efficient, economical, safe, and convenient movement of people and goods. (Sec. 226-17-(a)-1)
 - A statewide transportation system consistent with planned growth objectives through out the State. (Sec. 226-17-(a)-2)
 - o To achieve the transportation objectives, it shall be the policy of this State to:
 - Design, program, and develop a multi-modal system in conformance with desired growth and physical development as stated in this chapter. (Sec. 226-17-(b)-1)

- Coordinate state, county, federal, and private transportation activities and programs toward the achievement of statewide objectives.
(Sec. 226-17-(b)-2)
- Encourage a reasonable distribution of financial responsibilities for transportation among participating governmental and private parties.
(Sec. 226-17-(b)-3)
- Encourage transportation systems that serve to accommodate present and future development needs of communities.
(Sec. 226-17-(b)-6)
- Encourage the development of transportation systems and programs which would assist statewide economic growth and diversification.
(Sec. 226-17-(b)-9)
- Encourage the design and development of transportation systems sensitive to the needs of affected communities and the quality of Hawaii's natural environment.
(Sec. 226-17-(b)-10)
- Encourage safe and convenient uses of low-cost energy efficient, non-polluting means of transportation.
(Sec. 226-17-(b)-11)

b. The State of Hawaii, Energy Plan²⁶ is a functional plan adopted by Executive Order and used as a policy guideline by the State Administration. It states as a land use and support facility system concern the following policies which are relevant to the proposed project:

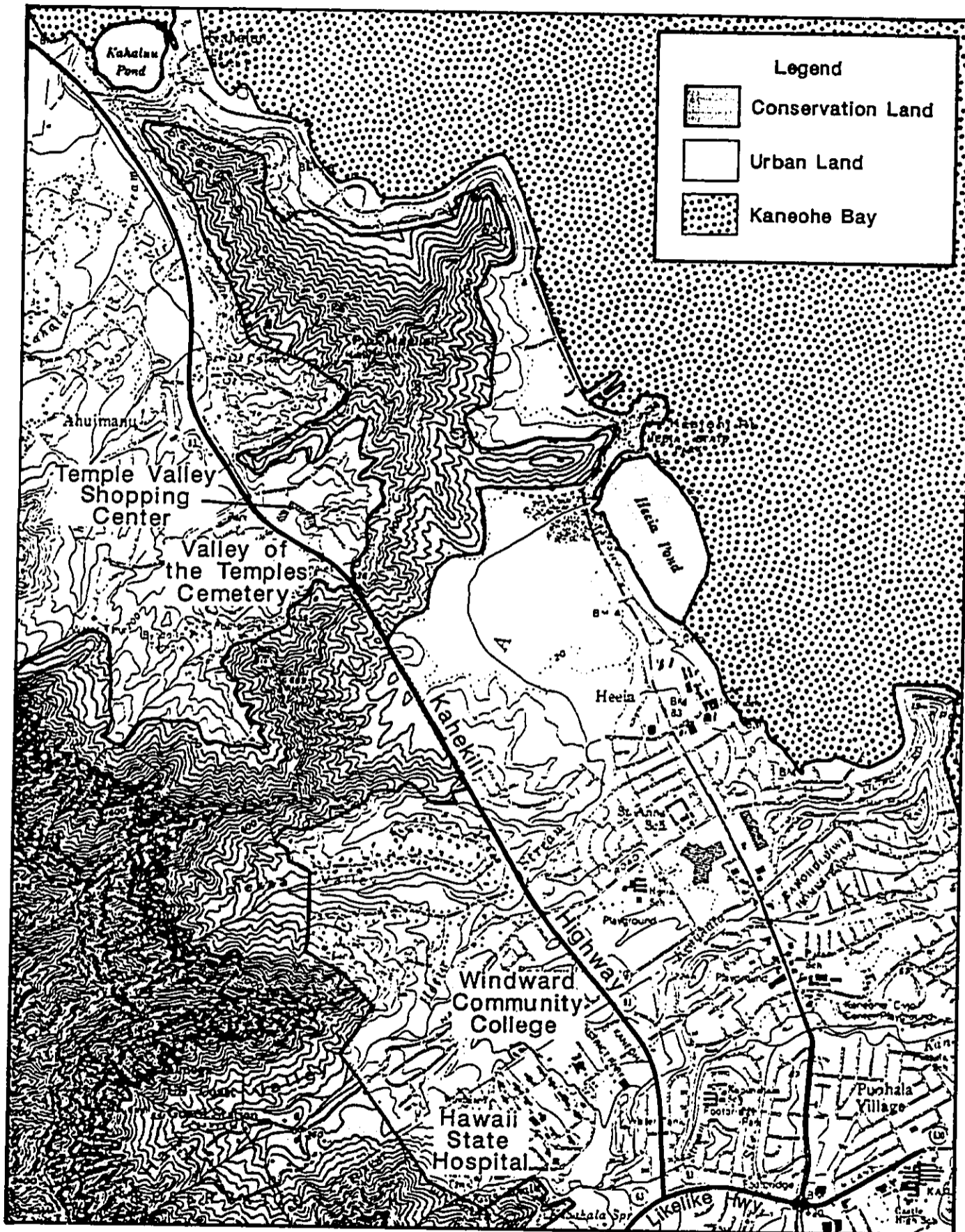
- o Increase efficiency in personal energy consumption patterns in the use of ground transportation fuels, electricity and water. Implementing actions:
 - Car pool, van pool and Public Transportation Promotion Program
 - Provide additional bus routes and bus services for commuters

26. State of Hawaii, Energy Plan, prepared by State of Hawaii, Department of Planning and Economic Development, May 1982. p.22.

- Support implementation of transportation networks which encourage the use of energy conserving mini-vehicles, bicycles, and walking as safe and convenient alternatives to the private automobile.
- c. State Transportation Plan²⁷ is also a functional plan adopted by Executive Order. It contains the following policies pertinent to the proposed project:
 - o Base transportation and transportation-related improvements on a cooperative, comprehensive and continuing transportation planning process.
 - o Promote the planning for and improvement of the primary, secondary, and urban highway and street systems consistent with State and County plans to promote growth.
 - o Encourage energy conservation by developing transportation systems which support more compact and concentrated developments within existing urban areas.
 - o Promote and encourage transportation system management strategies which promote energy conservation and transportation efficiency.
- d. State Land Use Law (Chapter 205, Hawaii Revised Statutes) creates land use districts and general use regulations for these districts Statewide. Kahekili Highway is mostly in the Urban District, which permits highway use, as well as other types of urban uses, subject to further regulation by the City and County of Honolulu.

Approximately 0.25 miles of the highway in the Heeia area is in the Conservation District, which places it under the jurisdiction of the State of Hawaii Board of Land and Natural Resources (BLNR). Regulation No. 4 of the BLNR establishes sub-zones of the Conservation District and permitted and conditional uses for each of these sub-zones. Kahekili Highway is in the General Subzone, which permits highway use as a conditional use. The proposed project will require approval of a Conservation District Use Application by the BLNR. (See Exhibit III-12.)

27. State Transportation Plan, prepared by the State of Hawaii the Department of Transportation, Honolulu, Hawaii 1982.



**EXHIBIT III-12:
STATE LAND USE DESIGNATION MAP**

↑
1:24,000

- e. The State of Hawaii Coastal Zone Management Program (HCZMP) is a "management network" consisting of various State statutes, regulations, plans and review processes for activities affecting Hawaii's land and ocean environment. The statutory cornerstone is Chapter 205A, Hawaii Revised Statutes, which sets overall objectives and policies for management of the coastal zone. The following objectives and policies are applicable to this project:
- o Recreational resources
Providing and managing adequate public access, consistent with conservation of natural resources, to and along shorelines with recreational value.
(Sec. 205A-2-c-1-B-iii)
 - o Historical resources
Identify and analyze significant archaeological resources.
(Sec. 205A-2-c-2-B)
 - o Coastal ecosystems
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. (Sec. 205A-2-c-4-C)
 - o Economic uses
Provide public or private facilities and improvements important to the State's economy in suitable locations. (Sec. 205A-2-b-5)
 - o Coastal hazards
Reduce hazard to life and property from tsunami, storm waves, stream flooding, erosion, and subsidence. (Sec. 205A-2-b-6)
 - o Managing development
Improve the development review process, communication, and public participation in the management of coastal resources and hazards.
(Sec. 205A-2-b-7-A)

Since HCZMP is a Federally-approved program, Federal agencies are required by Federal regulations (15 CFR 930) to obtain a determination that their proposed activities in Hawaii are

consistent with the HCZMP. The State of Hawaii Office of Planning determines project consistency with the HCZMP.

- f. The State's Water Quality Standards (Chapter 54, Public Health Regulations) apply to all streams and coastal waters. Substantial revisions to the State water quality standards were adopted in 1979, subsequent to the completion of the Water Quality Management Plan for the City and County of Honolulu (208 Plan). Relevant to the construction of the proposed project alternatives are the standards for turbidity and sediment deposits in streams and Kaneohe Bay. The Bay is designated as Class AA marine waters, which is the most restrictive class of water:

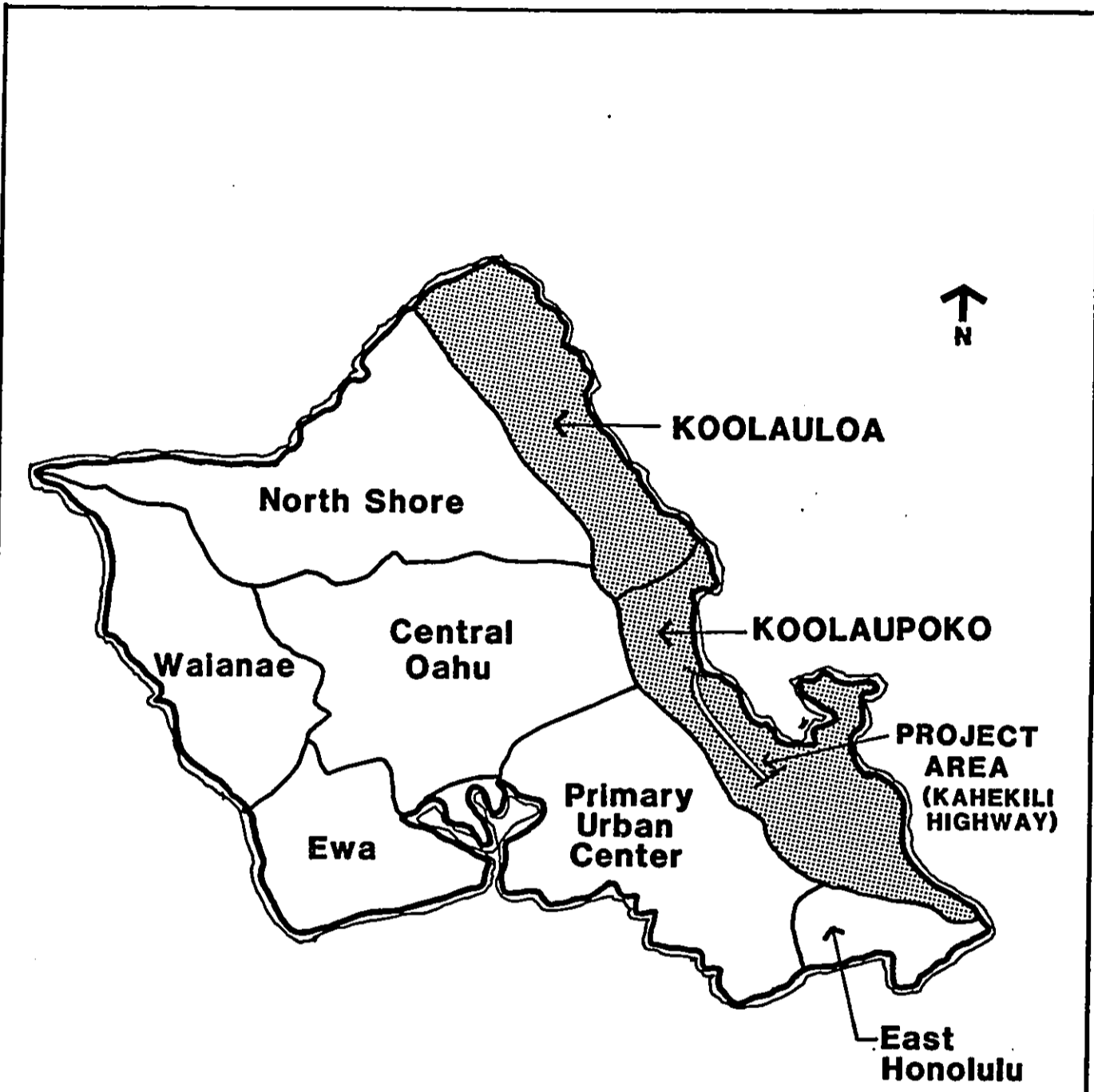
"It is the objective of this class (i.e., AA) that these waters remain in their natural pristine state as nearly as possible with an absolute minimum of pollution or alteration of water quality from any human-caused source or actions."

- g. The Federal Clean Water Act was amended in 1987 by the addition of Section 319 Nonpoint Source Water Pollution Management Programs. Section 319 requires States to assess nonpoint source water pollution problems, develop nonpoint source pollution management programs, and implement controls to protect and improve water quality and beneficial uses. In compliance with Section 319 two draft reports were issued for review in July 1989: "Hawaii's Assessment of Nonpoint Source Pollution Water Quality Problems" and "Hawaii's Nonpoint Source Pollution Management Plan." Controls to protect and improve water quality from nonpoint source water pollution have not yet been implemented, except in practices affecting coordination with existing permit systems which monitor water quality such as SCS Section 404 permits, etc. Compliance with the "Management Plan" is on a voluntary basis at this time. In the "Assessment" waterbodies which without additional action to control nonpoint sources of pollution would not reasonably be expected to attain or maintain State Water Quality Standards were listed as Water Quality-Limited Segments (WQLSs). Selection of these areas was based on ambient monitoring and best professional judgment. Kaneohe Bay is listed as a Water Quality-Limited Segment.

- h. The State's Ambient Air Quality Standards and Controls (Chapters 59 and 60, Public Health Regulations) are much more stringent than the National Ambient Air Quality Standards. A maximum of only 4.5 parts per million (ppm) of carbon monoxide (CO) (5 mg/m^3) are permitted as an average acceptable pollution level over an eight-hour period, and a maximum of 9 ppm of CO (10 mg/m^3) as an average acceptable level over a one-hour period. The national primary ambient air quality standards for carbon monoxide are 9 ppm (a 10 mg/m^3) for an 8 hour period not to be exceeded more than once per year and 35 ppm (40 mg/m^3) for a 1-hour average concentration not to be exceeded more than once a year. The State of Hawaii Air Pollution Control Implementation Plan is based on the Federal standards, since State standards are not recognized by the U.S. Environmental Protection Agency.
- i. Pertinent State standards for noise control are contained in Vehicular Noise Control for Oahu (Public Health Regulations, Chapter 42) and Community Noise Control for Oahu (Public Health Regulations, Chapter 43). The vehicular noise regulations set maximum A-weighted decibel (dBA) limits for both light and heavy vehicles traveling on roads with various posted speeds and at various measurement distances. The community noise standards set a maximum interior noise level of 50 dBA for school classrooms, libraries, multipurpose rooms, hospitals or rest homes. No proposed highway or highway improvement that is expected to result in this limit's being exceeded can be constructed without first providing noise control measures to reduce the expected noise level to no more than 50 dBA. There are no State standards for exterior or interior exposure to vehicular noise in residential areas. However, the Federal Highway Administration has established such standards, as well as guidelines for mitigating noise impacts. These are discussed in Chapter IV, in the section dealing with noise impacts.

2. City and County of Honolulu

- a. The General Plan of the City and County of Honolulu was adopted in 1977 and revised in 1982. The traffic projections used in planning the proposed project are based on the assumption that the Koolaupoko Development Plan Area, in which Kahekili Highway is located, will have a 12.4 - 13.6 percent share of the islandwide population forecasted for the year 2000 which is 113,800 - 124,800 people. (See Exhibit III-13.) Based on the 1980 Census population of 109,373 for



**EXHIBIT III-13:
DEVELOPMENT PLAN AREAS OF OAHU**

the area, allows for population growth of 4,400 to 15,400 people. This is consistent with the population distribution recommended in the General Plan and Koolaupoko Development Plan.

The General Plan contains the following policy statements in the Transportation and Utilities section relevant to the proposed project.

- o Develop and maintain an integrated ground-transportation system consisting of the following elements and their primary purposes:
 - (1) Public transportation - for travel to and from work, and travel within Central Honolulu;
 - (2) Roads and Highways - for commercial traffic and travel in nonurban areas;
 - (3) Bikeways for recreational activities and trips to work, schools, shopping centers, and community facilities; and
 - (4) Pedestrian walkways for getting around Downtown and Waikiki, and for trips to schools, parks, and shopping centers. (Policy 1)
- o Provide transportation services for people living outside the Pearl City-Hawaii Kai corridor primarily through a system of express- and feeder-buses and limited to moderate highway improvements. (Policy 3)
- o Improve transportation facilities and services in the Ewa corridor and in the trans-Koolau corridors to meet the needs of Ewa and Windward communities. (Policy 4)
- o Improve roads in existing communities to reduce congestion and eliminate unsafe conditions. (Policy 5)
- o Consider both environmental impact as well as construction and operating costs as important factors in planning alternative modes of transportation. (Policy 6)
- o Promote the use of public transportation as a means of moving people quickly and efficiently, of conserving energy, and of guiding urban development. (Policy 7)

- o Promote programs to reduce dependence on the use of automobiles. (Policy 9)
- o Discourage the inefficient use of the private automobile, especially in congested corridors and during peak-hours. (Policy 10)

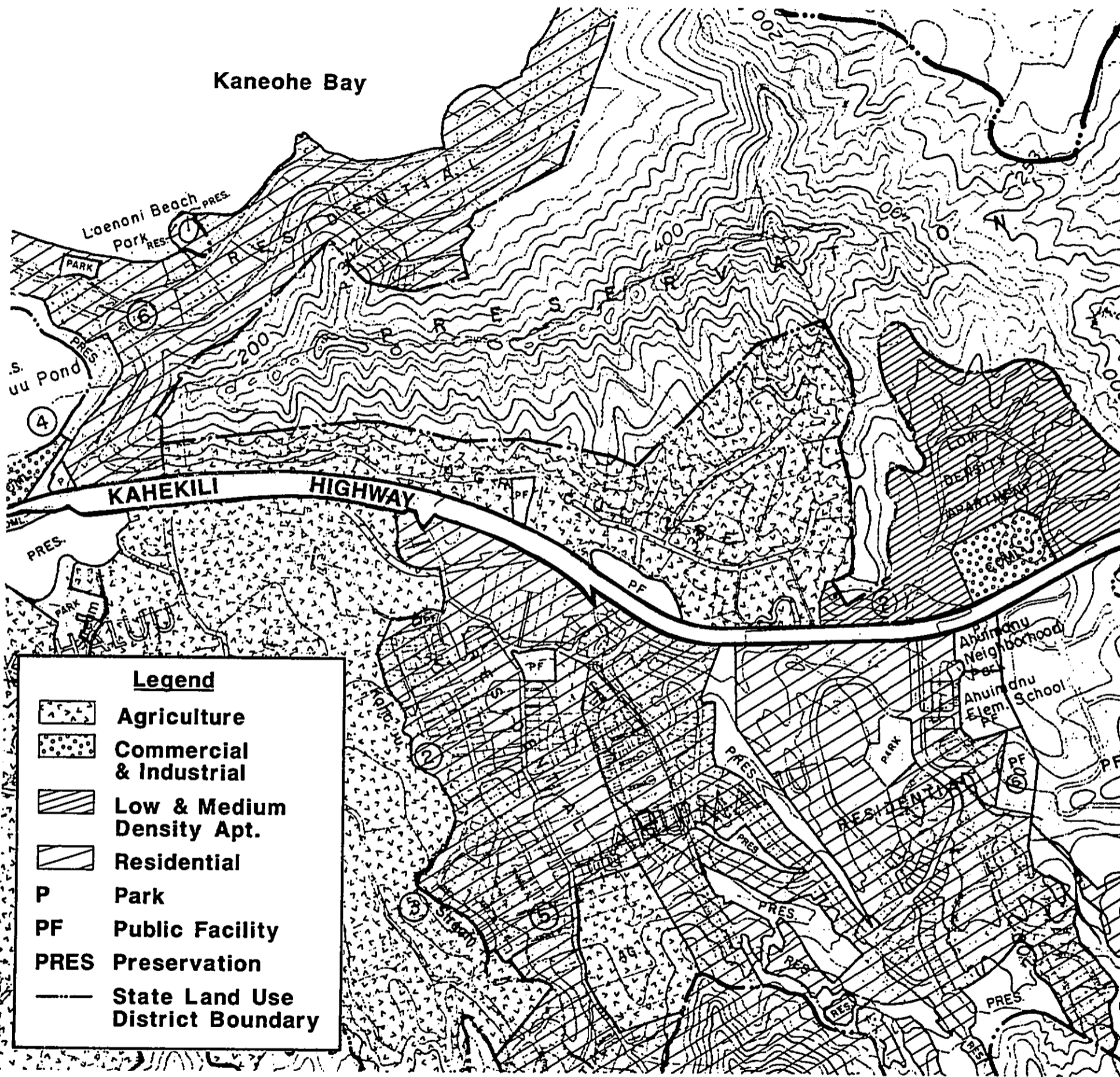
To maintain transportation and utility systems which will help Oahu continue to be a desirable place to live and visit. (Objective D)

- o Give primary emphasis in the capital improvement program to the maintenance and improvement of existing roads and utilities. (Policy 1)
- o Use the transportation and utility systems as a means of guiding growth and the pattern of land use on Oahu. (Policy 2)
- o Encourage the study and use of telecommunications as an alternative to conventional transportation facilities. (Policy 3)
- o Evaluate the social, economic, and environmental impact of additions to the transportation and utility systems before they are constructed. (Policy 4)

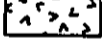
- b. The Koolaupoko Development Plan encompasses the entire Kaneohe Bay watershed, as well as areas to the north above Kualoa and to south, up to Makapuu Point. It contains a land use map, a public facilities map and a set of policies, principles and controls to guide the development of the area. (See Exhibit III-14.) The following description provides a summary of the legislative intent for the project region:

"It is intended that the communit[y] of ... The general plan's description of the area as both "urban-fringe" (for Kailua and Kaneohe) indicates that the existing suburban and agricultural character of the various communities is to be maintained. ... The communities of Kahaluu, Waiahole-Waikane and Kualoa are to remain [a] relatively lightly settled, rural area with the exception of limited areas in Heeia Kea and Ahuimanu Valley, where residential development of a low-density character already exists."

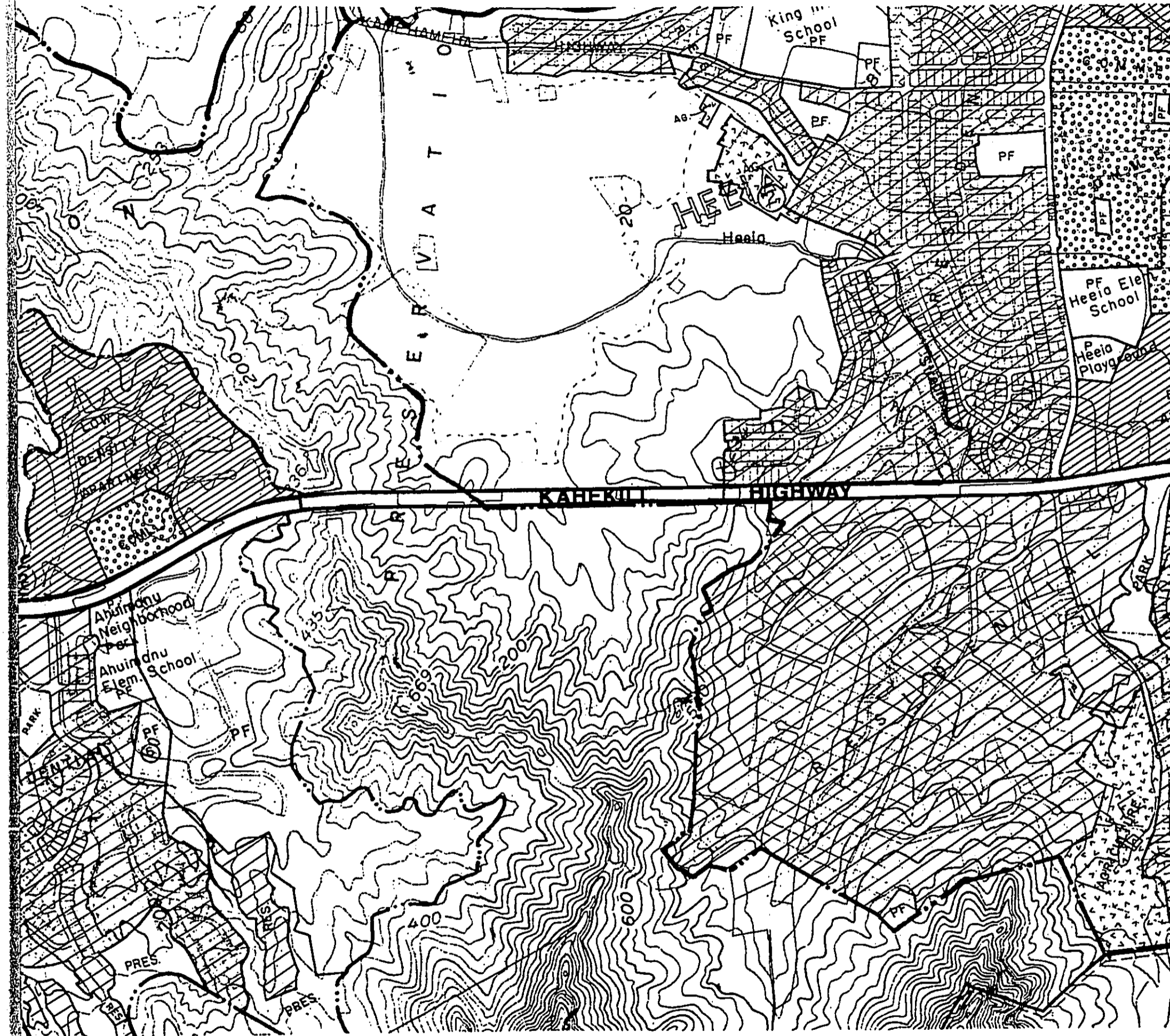
Kaneohe Bay



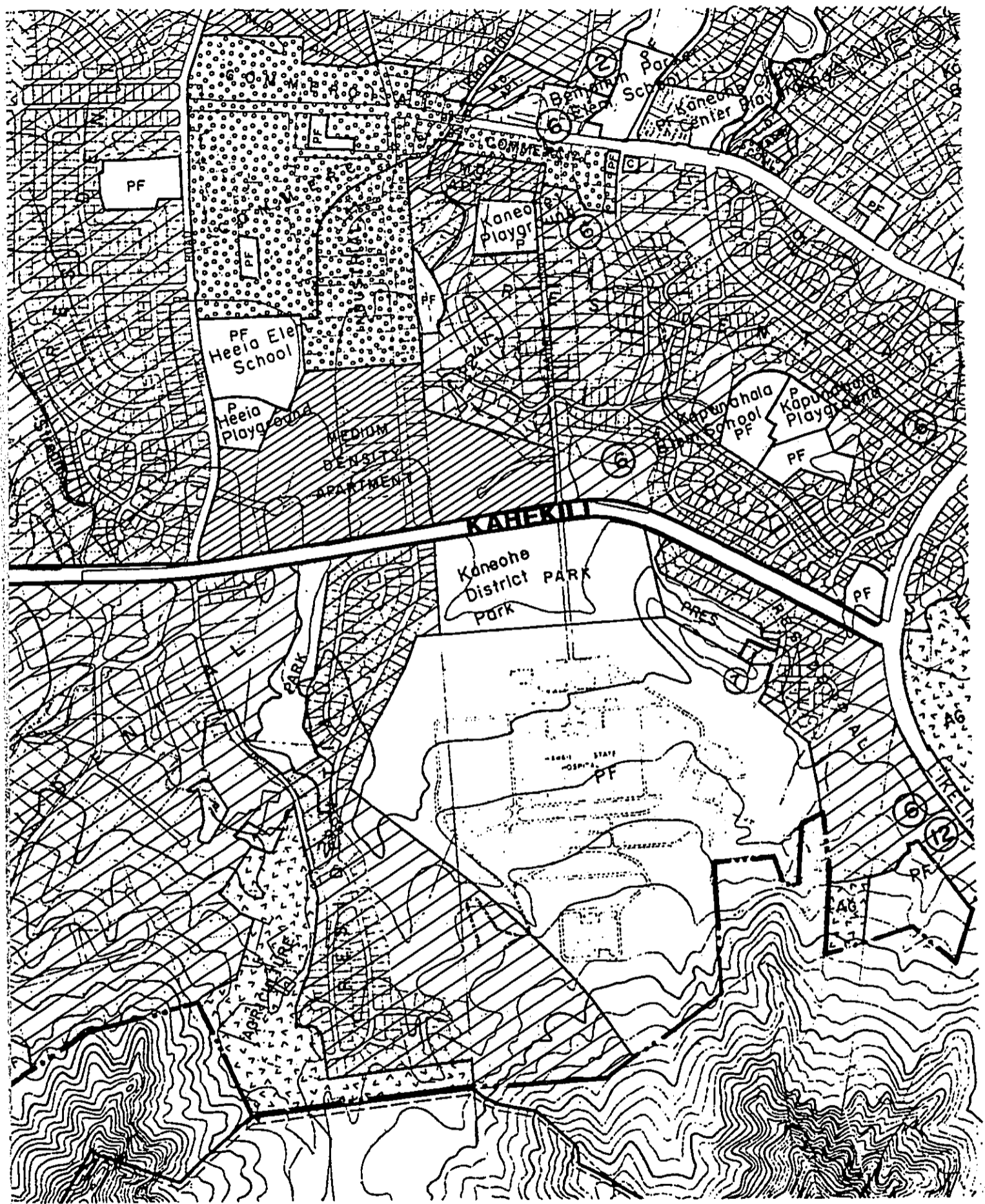
Legend

-  Agriculture
-  Commercial & Industrial
-  Low & Medium Density Apt.
-  Residential
- P** Park
- PF** Public Facility
- PRES** Preservation
-  State Land Use District Boundary

1"=1000'



**EXHIBIT III-1
KOOLAPOK**



**EXHIBIT III-14:
KOOLAUPOKO DEVELOPMENT PLAN LAND USE MAP**

"In addition public plans, projects, and programs in Koolaupoko shall support the following...The improvement of the State highway transportation system."

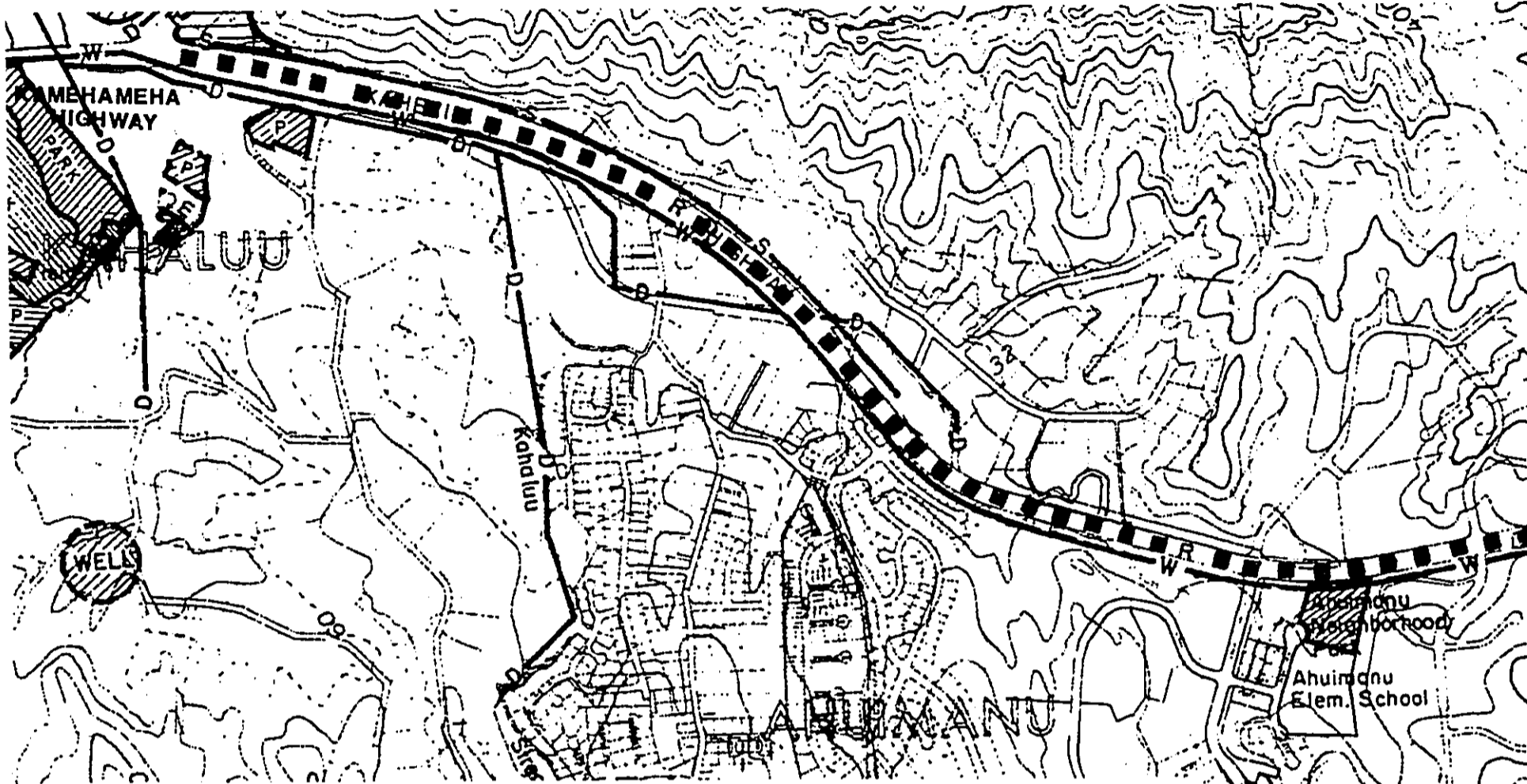
The Development Plan Public Facilities Map for Koolaupoko includes roadway improvements and right-of-way acquisition within the next six years 1994 for the Likelike/Kahekili Interchange and for Kahekili Highway between the Likelike Highway and Haiku Road. The Public Facilities Map also includes roadway improvements and right-of-way acquisition beyond six years (1994 and beyond) for Kahekili Highway from Haiku Road to the Kamehameha Highway. (See Exhibit III-15.)

Improvement of Keaahala Road (as shown on the Public Facilities Map) to connect with Kamehameha Highway may reduce the turning traffic to and from Kamehameha Highway by way of Likelike Highway.

The Public Facilities Map also shows the proposed sewer and water facility improvements. (Refer back to Exhibit III-6.) Improvements to City and County facilities at Kaneohe District Park and Ahuimanu Neighborhood Park, both of which are along or near Kahekili Highway, are also shown.

The Long-Range Plan, adopted by the Department of Parks and Recreation in 1980, calls for additional land acquisition and various capital improvements to upgrade Ahuimanu Neighborhood Park to Community Park status. Proposed improvements to Kaneohe District Park include the addition of additional parking facilities and site work for softball and football fields for the adjacent portion to the north.

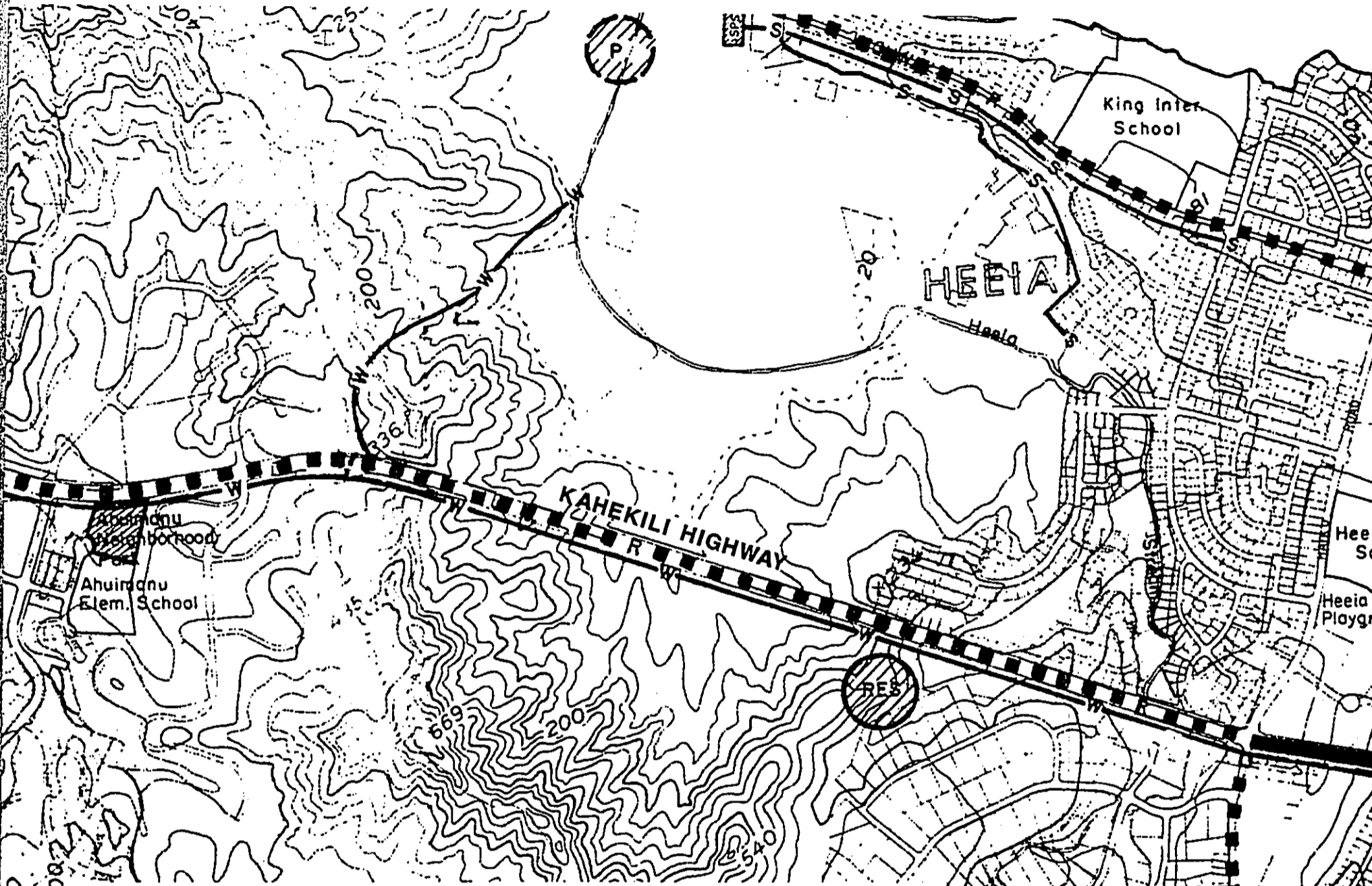
- c. The Koolauloa Development Plan covers the area of Windward Oahu that begins several miles north of the project region and extends to the northernmost portion of the island. While the proposed project is outside of Koolauloa, Kahekili Highway serves as a transportation link to this area. The General Plan revisions of 1982 provide a range of 1.3 to 1.5 percent for the area's share of Oahu's population by the year 2000. These percentages translate into a population range of 13,800 to 15,600 people. In 1980, Koolauloa had a 1.4 percent share of the islandwide population. The Koolauloa Development Plan therefore provides capacity for an additional 1,000 to 3,000 residents in the area within the next two decades.




LEGEND

	GOVERNMENT OR PUBLIC UTILITY PROGRAMMED FOR COMMENCEMENT OF LAND ACQUISITION AND/OR CONSTRUCTION (WITHIN 6 YEARS)	GOVERNMENT OR PUBLIC UTILITY PROGRAMMED FOR COMMENCEMENT OF LAND ACQUISITION AND/OR CONSTRUCTION (BEYOND 6 YEARS)	PRIVATE FUNDING (NO TIMING SCHEDULE)
SEWER SYSTEM	S ——— S ——— S	S - - - S - - - S	S S S
WATER SYSTEM	W ——— W ——— W	W - - - W - - - W	W W W
DRAINAGE SYSTEM	D ——— D ——— D	D - - - D - - - D	D D D
TRANSPORTATION SYSTEMS			
ADDITIONAL RIGHT OF WAY AND NEW STREETS	▬ R ▬ ▬ ▬	▬ R ▬ ▬ ▬	□ □ □ R □ □ □
IMPROVEMENTS WITHIN EXISTING RIGHT OF WAY TRANSIT CORRIDOR	● ● ● R ● ● ● ● ● ● TC ● ● ●	○ ○ ○ R ○ ○ ○ ○ ○ ○ TC ○ ○ ○	○ ○ ○ R ○ ○ ○ ○ ○ ○ TC ○ ○ ○
PUBLIC FACILITY			
SITE DETERMINED (BY PROPERTY LINE)	▨ STP	▨ STP	▨ STP
SITE UNDETERMINED (IN GENERAL AREA)	○ STP	○ STP	○ STP
MODIFY EXISTING FACILITY	▨ STP/M	▨ STP/M	▨ STP/M

- LIB - LIBRARY
- P - PARK AND REC PROMENADE,
- CF - CORRECTIONAL
- CY - CORPORATION
- FS - FIRE STATION
- GB - GOVERNMENT
- GC - GOLF COURSE
- PS - POLICE STATION
- SW - SOLID WASTE
- TC - TRANSIT CORRIDOR
- TS - TRANSIT STATION
- CH - COMMERCIAL

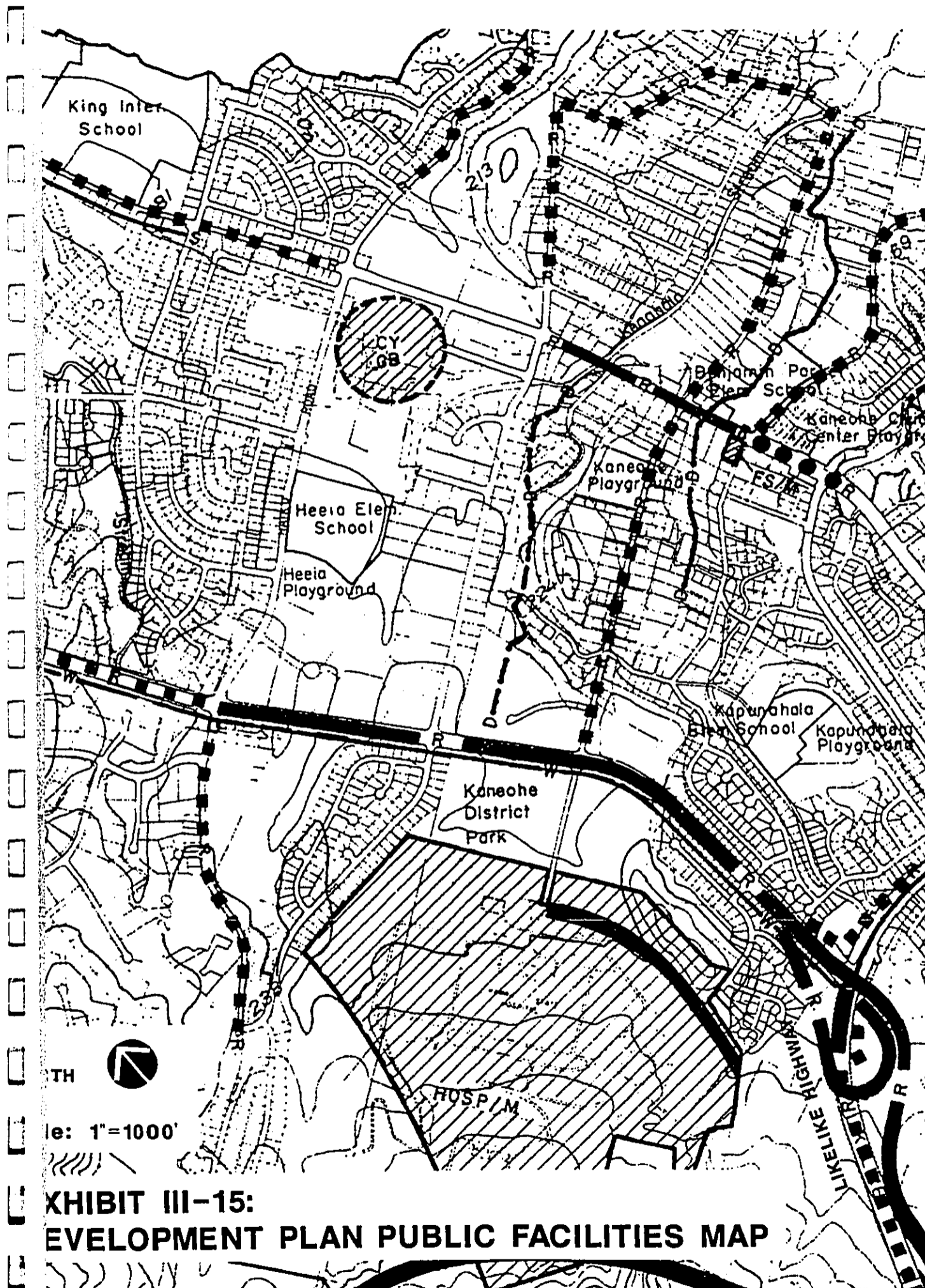


- | | |
|--|------------------------------|
| LIB - LIBRARY | MALL - PEDESTRIAN MALL |
| P - PARK AND RECREATION (PARKWAY, PROMENADE, ETC.) | RES - RESERVOIR |
| CF - CORRECTIONAL FACILITY | SPS - SEWAGE PUMP STATION |
| CY - CORPORATION YARD | STP - SEWAGE TREATMENT PLANT |
| FS - FIRE STATION | WELL - WATER WELL |
| GB - GOVERNMENT BUILDING | E SCH - ELEMENTARY SCHOOL |
| GC - GOLF COURSE | HISCH - HIGH SCHOOL |
| PS - POLICE STATION | I SCH - INTERMEDIATE SCHOOL |
| SW - SOLID WASTE | COLL - COLLEGE |
| TC - TRANSIT CORRIDOR | RM - RECREATION MARINA |
| TS - TRANSIT STATION | IC - INTERCHANGE |
| CH - COMMERCIAL HARBOR | EG - ENERGY GENERATION |

NORTH 

Scale: 1"=1000'

**EXHIBIT III-15:
DEVELOPMENT PLAN**



TH

Scale: 1" = 1000'

**EXHIBIT III-15:
DEVELOPMENT PLAN PUBLIC FACILITIES MAP**

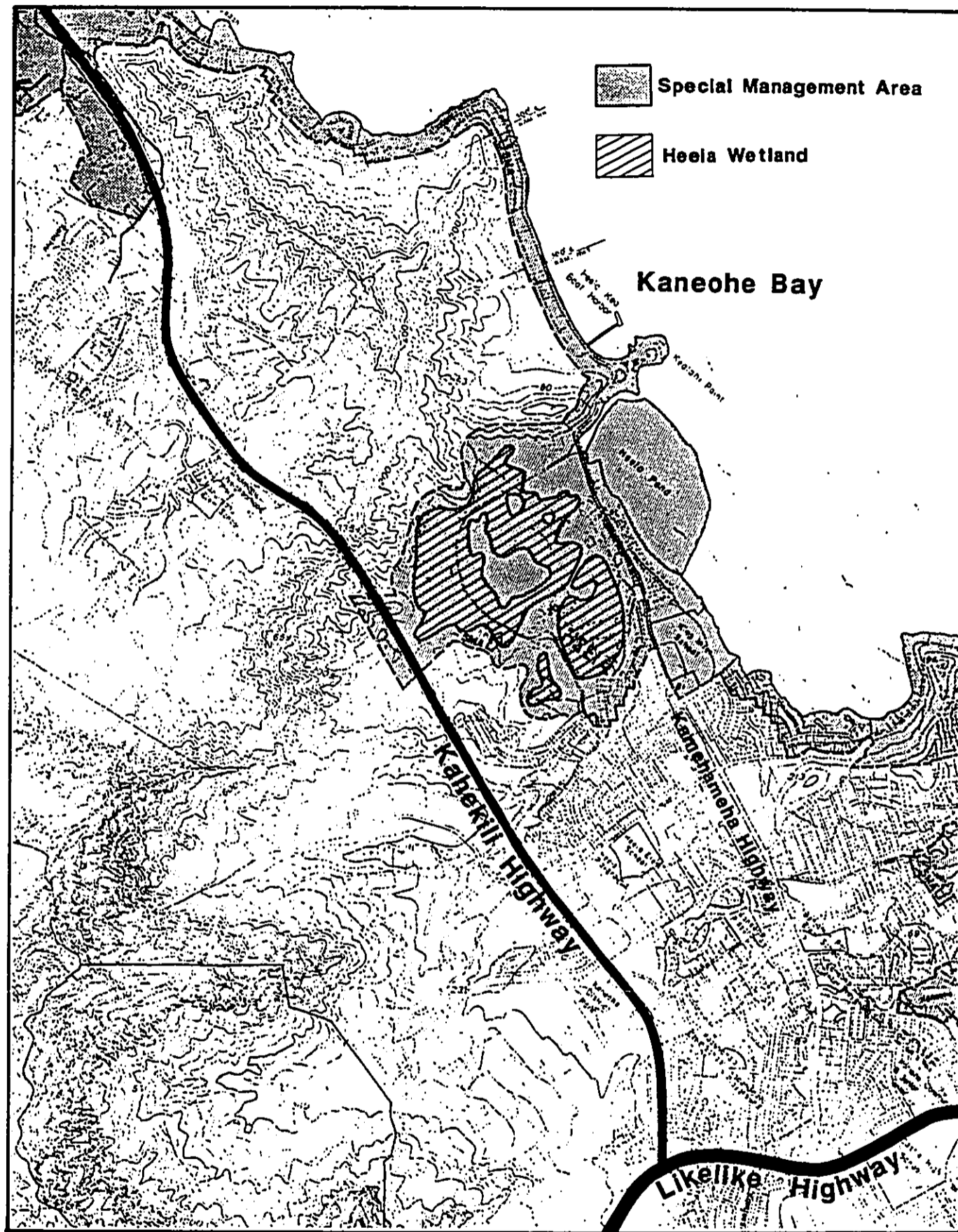
- d. The Special Management Area (SMA) of Oahu, is the land area near the shoreline which has been placed under special development controls as part of the State of Hawaii's Coastal Zone Management Program. A portion of Kahekili Highway near Kahaluu and around Heeia Wetland is in the SMA. (See Exhibit III-16.) The purpose of the development controls, as stated in Ordinance No. 84-4, is as follows:


"... to preserve, protect, and where possible, to restore the natural resources of the coastal zone... Special controls on development within an area along the shoreline are necessary to avoid permanent loss of valuable resources and foreclosure of management options, and to insure that adequate public access is provided to public owned or used beaches, recreation areas, and natural reserves, by dedication or other means."

All proposed development projects in the SMA whose cost exceeds \$65,000 require permit approval by the City Council.

- e. Controls for the Flood Hazard District have been incorporated into the City and County's Comprehensive Zoning Code and are consistent with Federal standards for flood insurance. The maps delineating the flood-prone areas subject to these controls are based on studies conducted by the U.S. Army Corps of Engineers for the Federal Flood Insurance Administration. The portions of Kahekili within or near the 100-year flood zone are shown in Exhibits III-3.

Depending upon the alternative chosen, the various permits and approvals required prior to completion of final project construction documents are listed in Exhibit III-17.




 1"=2440'

**EXHIBIT III-16:
SHORELINE MANAGEMENT AREA**

**EXHIBIT III-17
REQUIRED PERMITS AND APPROVALS**

<u>Issuing Agency</u>	<u>Approval/Permit</u>	<u>Review Criteria</u>
United States Department of Army Corps of Engineers	Army 404 Permit	Required for all discharges of dredged or fill materials into waters of the United States.
State of Hawaii Board of Land and Natural Resources	Conservation District Use	Consistency of project with objectives of the General Sub-zone of the Conservation District
State of Hawaii Board of Land and Natural Resources	Stream Channel Alteration Permit	Consistency of proposed project with protecting instream uses of: outdoor recreation activities, maintenance of ecosystems, aesthetic values, navigation, instream hydropower, maintenance of water quality, conveyance of irrigation and water supplies and traditional Hawaiian rights.
State of Hawaii Department of Business and Economic Development	Concurrence with Consistency Determination	Consistency of proposed project with objectives of Hawaii's Coastal Zone Management Program
City and County of Honolulu City Council (via Department of General Planning)	Amendment to the Public Facilities map of the Develop- ment Plan for Koolaupoko*	Consistency of the project's design and timetable with the objectives of the Development Plan
City and County of Honolulu City Council (via Department of Land Utilization)	Special Management Area Use Permit	Consistency of the project with the objectives of Special Management Area of Oahu (Ordinance No. 84-4)
City and County of Honolulu City Council (via Department of Land Utilization)	Flood Hazard District	Consistency of project with flood control measures.
City and County of Honolulu Department of Public Works	Grading, Grubbing and Stockpiling Permit	Consistency with erosion hazard control guidelines, management practices and engineering standards.

*An amendment may be required depending on the alternative chosen and the construction timetable.

CHAPTER IV

**ENVIRONMENTAL
CONSEQUENCES**

CHAPTER IV: ENVIRONMENTAL CONSEQUENCES

A. INTRODUCTION

The anticipated environmental impacts of all the alternatives presently under consideration are evaluated in this chapter. In the following discussion, environmental impacts are considered to be approximately the same for all alternatives unless otherwise indicated. Many of the categories of environmental impacts could occur during the construction phase. These short-term effects are discussed in a separate section titled "Construction," of this chapter. Where mitigation measures are appropriate, they follow the discussion of each category of environmental concern.

B. PHYSICAL IMPACTS

1. Topography

The steep grade of Likelike Highway appears to warrant an interchange with Kahekili Highway for highway safety. Scheme A-1 appears to provide a better grade for the directional ramps.

2. Air Quality

Carbon monoxide (CO) is far more likely to create air quality problems than any other pollutant from vehicular emissions. An estimated two-thirds of all CO emissions in Hawaii are from motor vehicles.²⁸ CO, a colorless, odorless gas, has observed toxic effects in humans and animals, depending upon the levels of concentration and the duration of exposure.

CO levels in the vicinity of a highway are influenced by various factors such as traffic volume, mode of vehicular operation, atmospheric dispersion rates and vehicle emission characteristics. Windy, turbulent weather tends to disperse CO emission while calm conditions allow CO to build up in the vicinity of the highway.

If the highway is not widened, CO concentrations will increase along most of the highway with two areas projected to reach above Hawaii's ambient air quality standards (AAQS) for CO. The two areas are located along Kahekili Highway at the intersection of Haiku Road and the intersection with Ahuimanu Road. (See Exhibit IV-1.) If the highway is widened the

28. State of Hawaii Department of Planning and Economic Development, 1980. Hawaii Integrated Energy Assessment, five volumes.

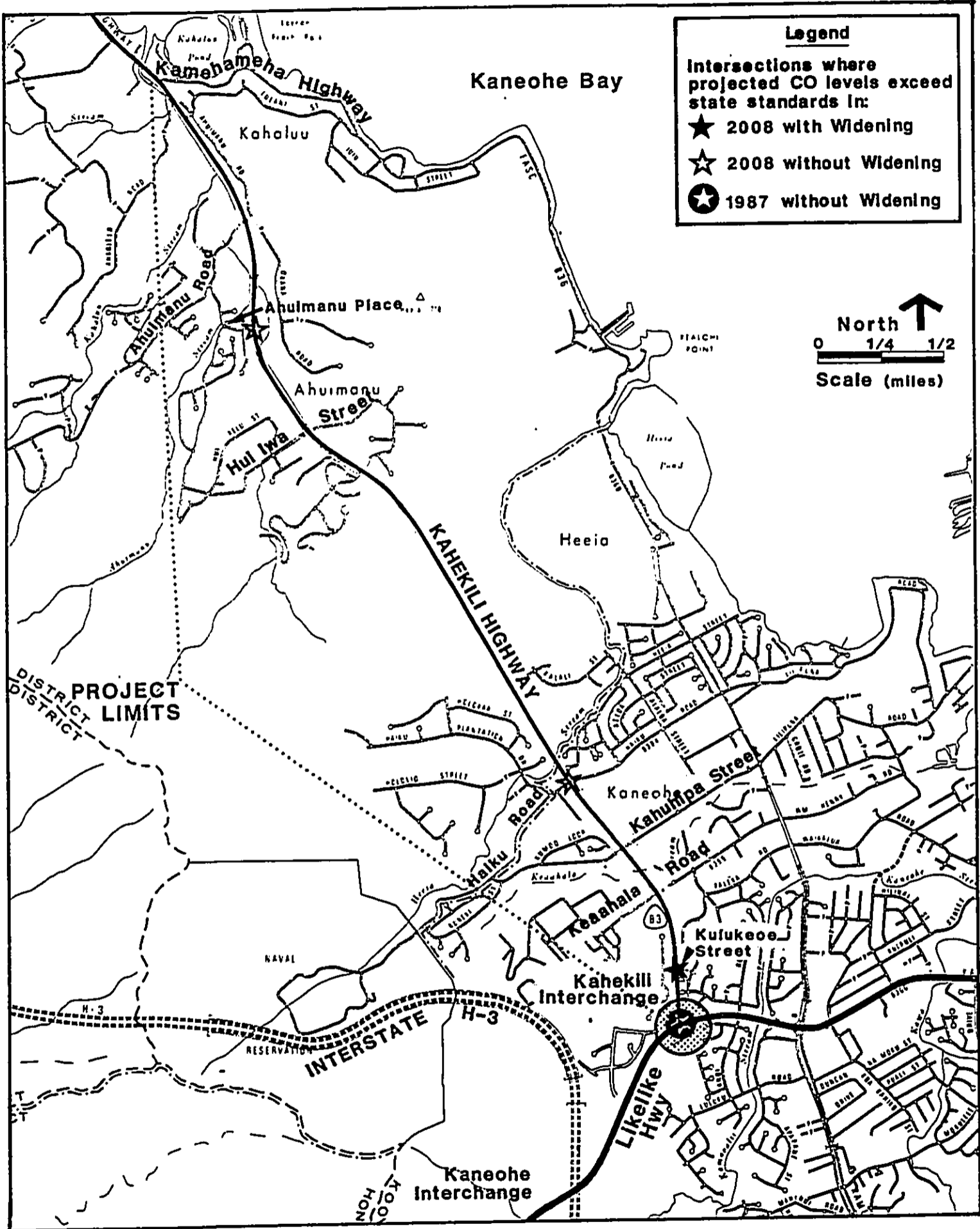


EXHIBIT IV-1: INTERSECTIONS WHERE PROJECTED CO LEVELS EXCEED STATE STANDARDS

concentration pattern will decrease slightly by 2008 along most of the highway with only a small section near the Likelike Highway above the standards. These conclusions are based on the CALINE3 and CALINE4 dispersion models developed by EPA. Estimated concentrations are about five times higher than previous estimates using the earlier model Highway-2.

The CALINE4 modal emission model and the CALINE3 dispersion model run for all intersections of the highway predict that widening the highway will reduce idle time and emissions, and allow higher cruising speeds which will also lower emissions. However, the emission reductions in these two modes is offset by more time spent in the acceleration/deacceleration modes which will with widening in 2008 contribute about half of the total emissions along the highway. Widening will also significantly increase traffic volumes with corresponding increased emission.

While traffic volumes are projected to increase significantly by the year 2008, particularly with widening this potential increase in the amount of CO emissions would be offset by the mitigating effects of Federal automobile pollution controls in future years.

No Federal air quality standard is predicted to be exceeded in the project area. This project is in an area where the State Implementation Plan does not contain any transportation control measures. Therefore, the conformity procedures of CFR 23770 do not apply to this project. For the full report on the air quality methodology and results see Appendix A.

3. Noise

a. Noise Study

A noise study was conducted to identify and evaluate the noise impacts of the alternative designs of Kahekili Interchange and the widening of Kahekili Highway. A full report on the assumptions, methodology, and results of this analysis is contained in Appendix B.

b. Noise Impacts

Activities impacted by highway noise from the project are residences, parks, schools, and a church. The applicable exterior Federal noise abatement criteria for these activities is 67 dBA (Leq). (See Exhibit IV-2). For interiors of schools, residences, and churches FHWA sets a noise exposure standard of 52 dBA. The State of Hawaii Department of Health requires that highway construction include noise control measures if the

highway noise would cause the interior noise levels to exceed 50 dBA in existing schools, libraries, hospitals or rest homes.

Federal regulations describe a traffic noise impact as that which occurs when the predicted traffic noise levels approach or exceed the noise abatement criteria or when the predicted traffic noise levels substantially exceed the existing noise level. If traffic noise impacts occur, noise abatement measures to mitigate these impacts must be considered.

Noise measurements were taken in 1983 and updated by 1987 traffic counts along Kahekili Highway and the Likelike/Kahekili intersection. The level of traffic noise depends on a combination of traffic volume, percentage of trucks in the traffic volume, and the average operating speed of the vehicles. For some locations the "worst hour" occurs in the morning after peak hour when traffic is flowing freely at the posted speed and trucks constitute a greater percentage of the traffic volume. Traffic counts indicated that in 1987, noise levels in the project area ranged between 60 to 67 dBA (Leq). (See Exhibits IV-3 and IV-4).

If the proposed action is implemented, several areas may be exposed to noise level approaching or in excess of the FHWA standards under conditions predicted for the year 2008.

In the area around the Kahekili/Likelike Highway intersection the noise levels will increase at the Koolau Baptist Church and some of the residential areas in Castle Hills for certain alternatives. The private school on the grounds of Koolau Baptist Church near the Likelike Highway intersection has a projected exterior noise level of 64 to 67 dBA (for schemes A-4, C-1 or B-1).

Housing in Castle Hills subdivision closest to the highway right-of-way are estimated to have traffic noise levels in excess of 67 dBA (Leq) for schemes A-4, C-1, and B-1. For the improved intersection alternative, noise levels are predicted to remain about the same as current levels. (See Exhibit IV-3).

Generally, the traffic noise levels will be highest for the intersection schemes that allow higher vehicle speeds. Therefore, the schemes may be ranked from the highest potential noise output to lowest as: A-4, C-1, B-1 and the Intersection Improvement Scheme.

EXHIBIT IV-2

FEDERAL HIGHWAY ADMINISTRATION NOISE LEVEL STANDARDS
HOURLY A-WEIGHTED SOUND LEVEL - DECIBELS (dBA)

AND

STATE OF HAWAII DEPARTMENT OF HEALTH
TITLE 11 CHAPTER 43 - HIGHWAY NOISE LEVELS

<u>Activity Category</u>	<u>L_{eq}^(h) dBA</u>
<u>FEDERAL</u>	
A. Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.	57 (Exterior)
B. Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.	67 (Exterior)
C. Developed lands, properties, or activities not included in Categories A or B above.	72 (Exterior)
D. Undeveloped lands.	--
E. Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.	52 (Interior)
<u>STATE</u>	
A. Existing school classroom, library, multipurpose room, hospital or resthome.	50 (Interior)

Sources: Federal-Aid Highway Program Manual - 23 CFR.

State of Hawaii, Department of Health Title 11
Chapter 43 Community Noise Control for Oahu.

EXHIBIT IV-3

TYPICAL PRESENT AND FUTURE TRAFFIC NOISE LEVELS
IN AREAS POTENTIALLY IMPACTED BY IMPROVING THE
INTERSECTION AT KAHEKILI AND LIKELIKE HIGHWAYS

EQUIVALENT STEADY-STATE SOUND LEVEL
DURING WORST (NOISIEST) HOUR

<u>Description</u>	<u>L_{eq}^(h) dBA (rounded)</u>	
	<u>1987</u>	<u>2008</u> Interchange Design Scheme A-4
Koolau Baptist Church and School	62	69 3'* (66)
Housing adjacent to and elevated above Likelike Highway (Castle Hills)	67	71 7'* (66)

Sources: Darby and Associates, 1990. "Findings and Recommendations for Noise Control--Kahekili Highway Improvements, Oahu, Hawaii."

Darby and Associates, 1988. "Review of Traffic Noise Impact for Proposed Improvements to Kahekili Highway and Various Alternative Schemes for Improvement of the Intersection at Kahekili and Likelike Highways, Oahu."

Darby-Ebisu & Associates, 1983. "Noise Impact Assessment for Proposed Kahekili Highway Widening and Interchange Project."

*Approximate noise barrier height.

() Sound level with acoustical barrier constructed is in parentheses.

**EXHIBIT IV-4
TYPICAL PRESENT AND FUTURE TRAFFIC NOISE LEVELS
ALONG KAHEKILI HIGHWAY EQUIVALENT STEADY-STATE
SOUND LEVEL DURING WORST (NOISIEST) HOURS**

<u>Description</u>	<u>Present (1987)</u>	<u>Leq(h) dBA 2008 with Widening</u>	
		<u>(Base Case)</u>	<u>(With 7' Noise Wall)</u>
A. <u>Residences From Likelike to Kaneohe District Park</u>			
Mauka Side	[64]	72	66
Makai Side - At Kulukeoe St. Intersection*		63 to 67 70	(3' Wall in base case)
B. <u>Near Kahuhipa St. Intersection</u>			
Hale Kupona*		72	68 [71]
Haiku Hale*		72	68 [71]
Residences on Kumoo Loop		72	68 [67]
C. <u>Near Haiku Road Intersection</u>			
Residences on both sides	[64]	73	65
Windward Estates*	[66]	73	65 [72]
Residences on Auna & Hoana Sts.	[62]	[61]	No Wall
D. <u>Haiku Plantation Structure Above Hwy. (60' from ROW)*</u>			
	[64]	[68]	No Wall
E. <u>Housing Above Hwy. on Kupale St.</u>			
	[66]	[67]	No Wall
F. <u>Kahaluu Gardens*</u>			
	[67]	68 [68]	65 [68]
G. <u>Housing Above Hwy. on Hui Oo Places</u>			
	[66]	[66]	No Wall
H. <u>Seicho-No-Ie Hawaii Jisso Center</u>			
	[60]	[65]	No Wall

*Areas where noise levels are projected to exceed federal standards in the year 2008.

Base Case - The noise level at a location in yards halfway between the R.O.W. and the structure at 5 feet above ground level. This calculation takes into account noise barrier effects in basic design on highway such as ramps, berms, or walls.

[dBA Levels] are predicted at structures rather than in yard.

Note - Noise wall may shield only yard and 1st floor units. Worst case shown for multi-story structures.

Sources: Darby and Associates 1990. "Findings and Recommendations for Noise Control--Kahekili Highway Improvements, Oahu, Hawaii."

Darby & Associates, 1988. "Review of Traffic Noise Impact for Proposed Improvement to Kahekili Highway and Various Alternative Schemes for Improvement of the Intersection at Kahekili and Likelike Highways, Oahu."

Exhibit IV-4 shows existing and predicted noise levels in various areas along Kahekili Highway between Likelike Highway and Kamehameha Highway where exterior noise exposures may approach or exceed the FHWA standard of 67 dBA (Leq) in the year 2008. In the Draft EIS it was stated that in 2008, projections showed that noise levels at the following residential areas would exceed the federal standard of 67 dBA (Leq): the 2nd and 3rd story apartments in Windward Estates, the Haiku Plantations housing 60 feet from R.O.W., housing in Heeia on Kupale Street, and 2nd and 3rd story apartments in Kahaluu Gardens. Noise levels will approach 67 dBA (Leq) for residences adjacent to Kahekili Highway in housing facing Kuahulu Place, and housing on the west side of Kahekili Highway from the vicinity of Kahuhipa Street to Haiku Road. Noise barrier walls will be built where feasible. The locations of the walls are described in the following Mitigation Measures Section and Exhibit IV-5.

Noise levels along Kaneohe District Park and Ahuimanu Park will not increase appreciably and will be below the Federal criteria of 67 dBA. Park activities will not be affected by noise.

c. Mitigation Measures

Possible noise mitigation measures which have been considered to minimize noise impacts of the proposed action included the following:

- i. Restricting the growth in the number of noisy buses, heavy trucks, and motorcycles. The percentage contribution to the total traffic noise by heavy trucks, buses, and other noisy vehicles is expected to remain at the current level which is approximately 5% of the total traffic. Elimination of these vehicles is impractical since trucks and buses are needed to service the adjacent land uses. Kahekili Highway is also the truck route used to Kahaluu and areas beyond. Reducing or restricting the growth rate of these vehicles would not be practical and not worth the level of regulatory efforts required.
- ii. Alteration of horizontal or vertical alignment of the Improvement. The horizontal and vertical alignments for the alternative schemes of Kahekili Interchange cannot be adjusted further due to the constraints of topography and existing adjacent land uses. The ramps have been designed to maximize the separation distance from the proposed travelway to

adjacent activities, consistent with highway design standards. The horizontal and vertical alignment of Kahekili is already fixed. Elevating or depressing the existing roadway is not practical or cost effective.

- iii. Acquisition of Real Property Interests to Serve As a Noise Buffer Zone. Where multi-story structures or residences elevated above the highway rights-of-way are within the noise impacted area, the use of sound attenuating walls is not practical due to the excessive heights required to shield the highway noise. The acquisition of property for the creation of noise buffer zones is also not practical due to the high cost of real property in Hawaii. Furthermore, the noise impacts of the project are not considered severe enough to justify such actions, since Kahekili Highway is an existing facility and the predicted traffic noise levels do not substantially exceed the existing noise levels.

Construction of Noise Barriers along the Highway Right-of-Way. Because many of the noise sensitive sites for the proposed action are predicted to have future exterior noise levels approaching or slightly exceeding 67 dBA, consideration of noise abatement measures to reduce exterior noise levels in residential areas of frequent use and in first story residential units by approximately 5 dBA or more are warranted. Construction of noise attenuation walls along the highway right-of-way is reasonable and feasible and is the recommended noise mitigation measure for this project. See Exhibit IV-5. Noise walls are "likely" to be incorporated into the project in the following areas:

Walls with a Height of Seven Feet

- Ramps from Kahekili Highway and Likelike Highway to H-3 at the R.O.W. line (for Scheme A-4) along Castle Hills subdivision.
- West side of Kahekili Highway fronting Kapunahala Subdivision.
- East and west side of Kahekili Highway from the vicinity of Kahuhipa Street to the vicinity of Haiku Road.
- East side of Kahekili Highway facing lower levels of Kahaluu Gardens, (for widening alternative beyond Haiku road).

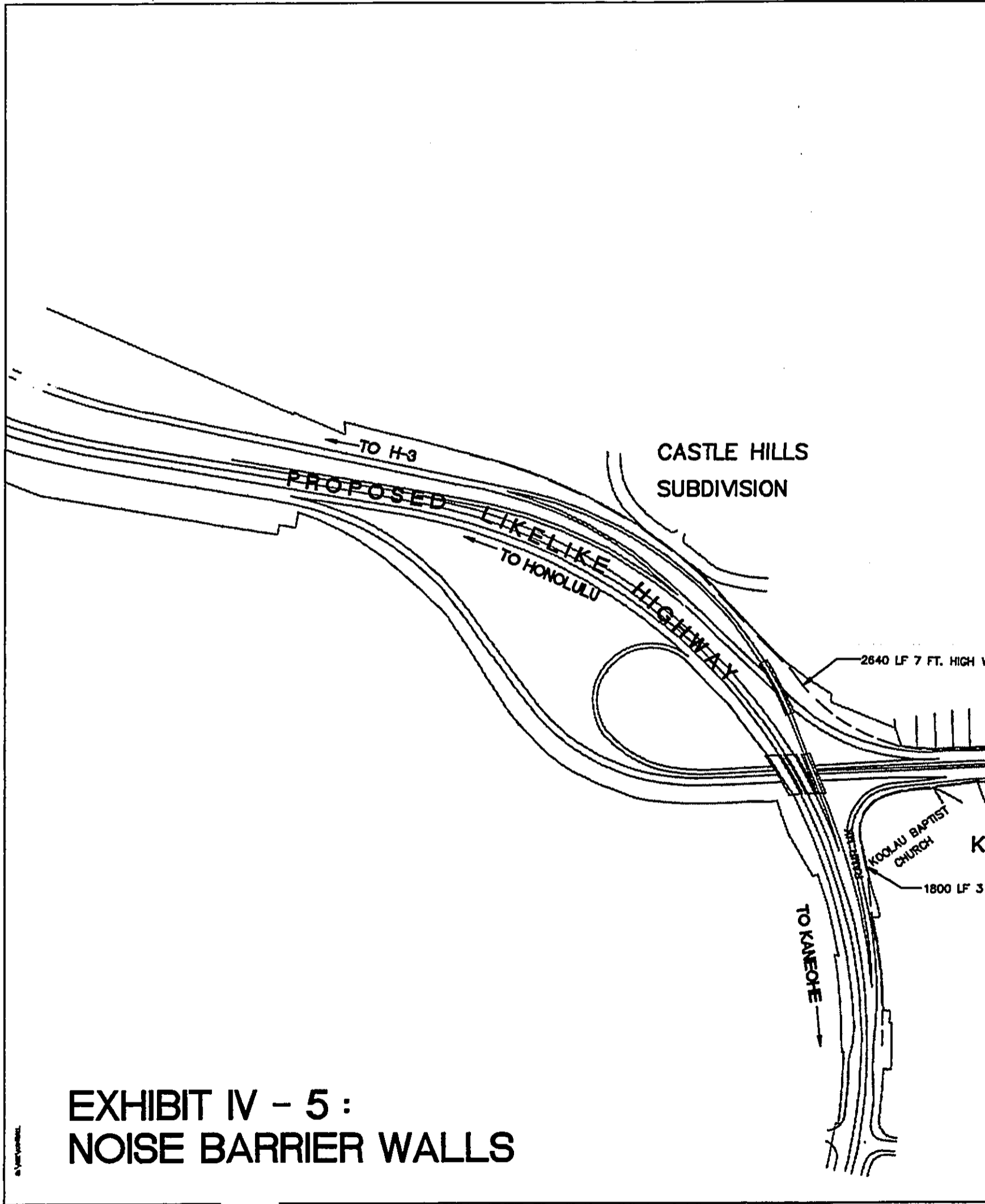


EXHIBIT IV - 5 :
NOISE BARRIER WALLS

HILLS
SION

2640 LF 7 FT. HIGH WALL

KAPUNAHALA SUBDIVISION

800 LF 7 FT. HIGH WALL

KANEOHE
DISTRICT
PARK

KANEOHE
REGIONAL
PARK SITE

180 LF 7 FT. HIGH WALL

840 LF 7 FT. HIGH WALL

KOOLAU BAPTIST
CHURCH

KAHEKILI

KULUKEOE ST.

HIGHWAY

1080 LF 3 FT. HIGH WALL

1800 LF 3 FT. HIGH WALL

TO KANEOHE

KEAAHALA RD.

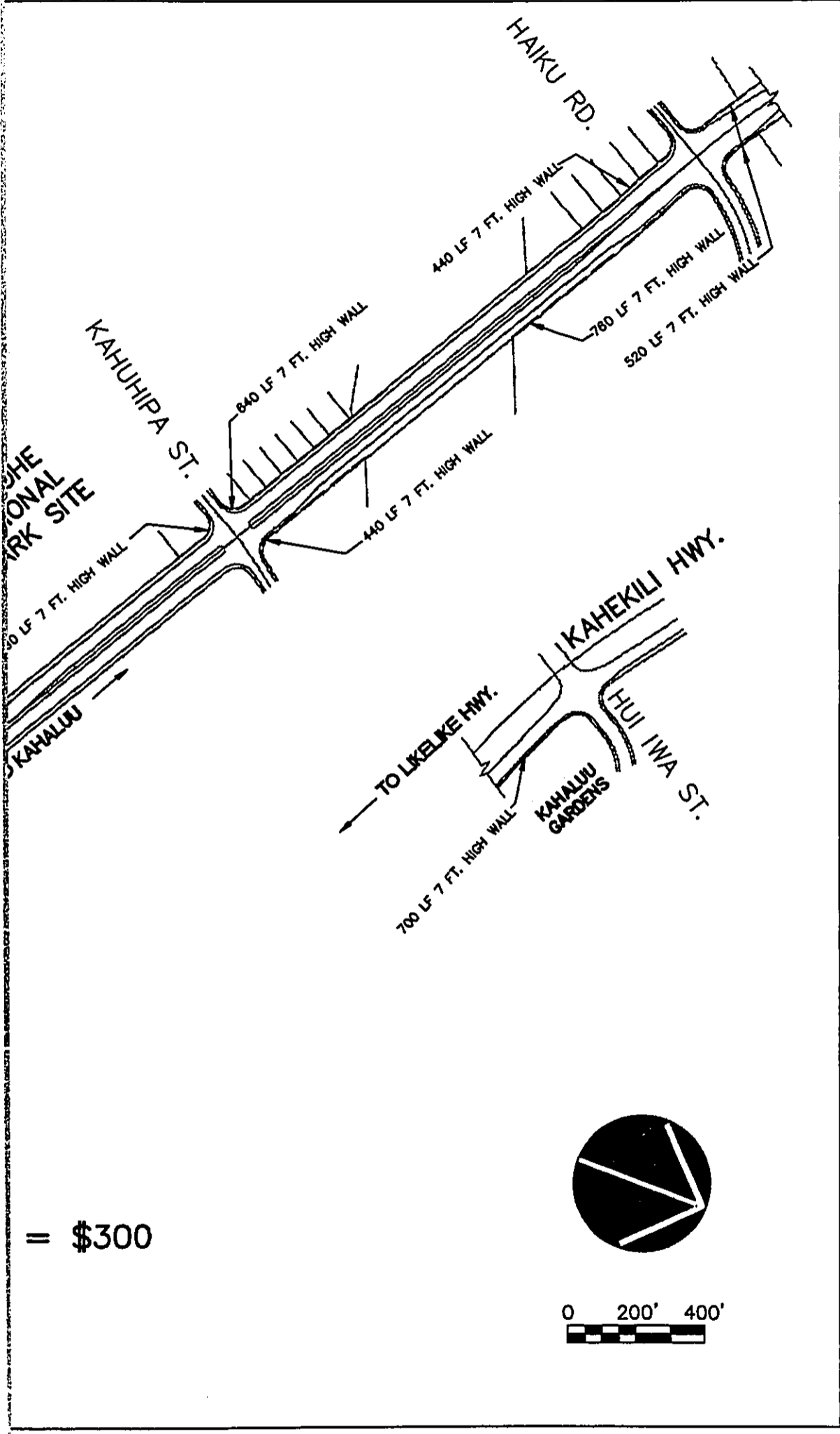
KAHUHIPA ST.

TO KAHALU

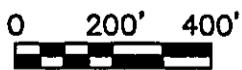
NOISE BARRIER WALLS

TOTAL COST = \$3,000,000

AVG. COST PER LINEAR FOOT = \$300



= \$300



Walls with a Height of Three Feet

- At the edge of the berm near the R.O.W. for Ramp MK off Likelike Highway (near Koolau Baptist Church School) to Kulukee Street.
- On the east side of Kahekili Highway fronting subdivision with Punahala Road across the street from Kapunahala Subdivision.

Noise Insulation of Public Use or Non-Profit Institutional Structures. The Koolau Baptist Church and the Seicho-No-Ie Jisso Center (a Japanese Preschool) fall into this category. Interior noise levels were taken to determine, if air conditioning or soundproofing is needed to meet federal and state requirements.

- In order to satisfy interior noise levels of L_{10} 50dBA in classrooms (as required by State DOH noise regulations) at the Baptist Church Complex, all the windows can be upgraded, the classrooms can be air-conditioned, and a 3-foot height noise barrier wall can be built.
- In order to satisfy DOH noise regulations at the Seicho-No-Ie Jisso Complex, air conditioning, and acoustic absorptive treatments such as carpet and wall coverings can be added to the Japanese Language classroom.

The final design of the noise abatement measures will be coordinated with the affected property owners.

4. Energy

Construction and maintenance of the proposed highway improvements will consume energy. Against this energy consumption must be balanced the reduced vehicular fuel consumption as the result of the various project alternatives. More efficient traffic flow, with vehicles travelling at higher average speeds with fewer stops and starts, will in turn reduce fuel consumption. Studies have shown that most cars have a fuel-efficient speed somewhere between 35 to 45 miles per hour. If, for example, a car gets 22 miles per gallon (mpg) at 45 miles per hour (mph), the mileage is equivalent to 14 mpg at 10 mph.²⁹

29. Webb, Jim E., 1981. Reduction in Vehicle Fuel Consumption. (Washington, D.C.: Public Technology, Inc.)

Proposed project alternatives will have the most significant effect on traffic flow during peak hours, particularly where there is congestion under present conditions in the southern portion of Kahekili Highway.

The energy consumed in a year by vehicles travelling along the highway at peak hours is of a greater order of magnitude than the construction and maintenance cost of any of the project alternatives when pro-rated annually. The energy-consumed in building and maintaining any one of the project alternatives is more than offset by the conservation of energy through more efficient traffic flow during peak hours alone. The energy benefits are most obvious for the project alternative which would widen the southern portion of Kahekili Highway, between Likelike Highway and Haiku Road.

It might be argued that the proposed project, by reducing travel time, may encourage more frequent use of the private passenger vehicle, thereby nullifying some of the energy benefits. Private automobiles usually offer greater convenience than other transportation modes, particularly in suburban areas such as the project region. Another very significant factor to consider, however, is the effect of gasoline prices. Sharp rises in gasoline prices during the 1970's had a dramatic effect on travel behavior. Mass transit ridership increased and the marketability of fuel-efficient automobiles soared. Clearly, fuel cost is a very significant influence. In addition, there are considerations specific to Hawaii and the project region which affect travel behavior. As mentioned previously, Hawaii has an unusually high percentage of households with more than one employed person. This, in addition to school trips at peak hours, encourages ride-sharing in passenger vehicles. Indeed transportation surveys conducted for the preparation of the Hali 2000 plan indicate that home-based work and school trips have become quite "complex" with less direct commutation than previously believed. More than one stop for either dropping off passengers or doing an errand is common.

The proposed project facilitates modes of travel other than private passenger vehicles, such as the municipal bus system, including express lines, by reducing the level of congestion. Reduced travel time for the express service may promote ridership and justify the addition of more buses during peak hours.

In order to minimize long-term energy consumption it is necessary to implement design and other measures to encourage the use of ride-sharing and municipal buses, in the Kahekili Highway corridor, consistent with overall project objectives.

Proposed project alternatives will have the most significant effect on traffic flow during peak hours, particularly where there is congestion under present conditions in the southern portion of Kahekili Highway.

The energy consumed in a year by vehicles travelling along the highway at peak hours is of a greater order of magnitude than the construction and maintenance cost of any of the project alternatives when pro-rated annually. The energy consumed in building and maintaining any one of the project alternatives is more than offset by the conservation of energy through more efficient traffic flow during peak hours alone. The energy benefits are most obvious for the project alternative which would widen the southern portion of Kahekili Highway, between Likelike Highway and Haiku Road.

It might be argued that the proposed project, by reducing travel time, may encourage more frequent use of the private passenger vehicle, thereby nullifying some of the energy benefits. Private automobiles usually offer greater convenience than other transportation modes, particularly in suburban areas such as the project region. Another very significant factor to consider, however, is the effect of gasoline prices. Sharp rises in gasoline prices during the 1970's had a dramatic effect on travel behavior. Mass transit ridership increased and the marketability of fuel-efficient automobiles soared. Clearly, fuel cost is a very significant influence. In addition, there are considerations specific to Hawaii and the project region which affect travel behavior. As mentioned previously, Hawaii has an unusually high percentage of households with more than one employed person. This, in addition to school trips at peak hours, encourages ride-sharing in passenger vehicles. Indeed transportation surveys conducted for the preparation of the Hali 2000 plan indicate that home-based work and school trips have become quite "complex" with less direct commutation than previously believed. More than one stop for either dropping off passengers or doing an errand is common.

The proposed project facilitates modes of travel other than private passenger vehicles, such as the municipal bus system, including express lines, by reducing the level of congestion. Reduced travel time for the express service may promote ridership and justify the addition of more buses during peak hours.

In order to minimize long-term energy consumption it is necessary to implement design and other measures to encourage the use of ride-sharing and municipal buses, in the Kahekili Highway corridor, consistent with overall project objectives.

5. Floodplain

Since Kahekili Highway is an existing facility, the extent to which project alternatives might result in floodplain impacts can be defined by present conditions and the proposed drainage improvements. All proposed alternatives must be made to comply with Federal Executive Order 11988, which establishes regulatory standards for floodplain management and protection. Regulatory floodway floodplain areas will not be confined or obstructed either vertically or horizontally. This will provide for the discharge of the base flood so that the cumulative increase in water surface elevation is no more than the designated amount established by the Federal Emergency Management Agency (FEMA).

Widening of Kahekili Highway between Kamehameha Highway and approximately one-half mile South of Ahuimanu Place would involve locations in a 100-year flood zone designated on the Federal Flood Insurance Rate Maps. Within this section of the flood zone the highway crosses a regulatory floodway. (See Exhibit III-3.) The existing culverts within the floodplain were determined to be adequate or a recommendation is made for an additional or replacement culvert.

Drainage studies done in connection with preliminary design work for this project indicate that the existing bridge along the portion of roadway presently within the designed 100-year floodplain of Ahuimanu Stream provides adequate area for design flood flows.³⁰

Improvements to the stream channel running alongside the highway as part of the Kahaluu Watershed Project have effectively reduced the extent of the 100-year floodplain in the area. The channel and lagoon were designed to contain runoff from a 100-year 6-hour storm below the roadway level.

Drainage studies indicate that upstream residential areas along the highway at the crossings of Kapunahala (or Aolani) Stream and Heeia Stream, while not covered by Federal Flood Insurance Rate Maps (FIRM), are subject to inundation by the 100-year flood.³¹

30. Park Engineering, Inc., for the State of Hawaii Department of Transportation, 1984. "Kahekili Highway Widening and Interchange Drainage Study".

31. Ibid.

Since Kapunahala (or Aolani) Stream is located near the intersection of Likelike Highway, the impact of highway improvements on the 100-year floodplain depends upon which of the project alternatives for the Likelike Highway intersection is selected. The proposed finished road elevation at the stream crossing varies among the intersection schemes.

If the Intersection Improvement alternative or Partial Interchange Scheme B-1 (Underpass) was selected, the roadway level would be about the same as it is at present. The new construction would cross the floodplain of Kapunahala (or Aolani) Stream, but this would not significantly alter existing floodplain conditions or place additional residences in the 100-year floodplain. Since Partial Interchange Scheme B-1 (Underpass) would also require the removal of one of the flood-prone dwellings, there would, in effect, be a net reduction of one residence in the 100-year floodplain. (See Appendix D Conceptual Relocation Plan.)

The Full Interchange Scheme A-4 (Underpass) and the Partial Interchange C-1 (Underpass) schemes have road elevations at Kapunahala (or Aolani) Stream which are about 11 feet lower than at present. Without drainage facilities, this would result in the road surface's being overtopped by both the 100-year and the 50-year floods. However, because the barrier effect of the highway would be eliminated, none of the dwellings upstream of the highway would be in the 100-year floodplain.

Modification or replacement of the existing pipe culverts at the Kapunahala (or Aolani) Stream crossing would clearly be required for all alternatives to accommodate standards based on the 50-year flood. The addition of pipe culverts to the four existing 48-inch pipes at Kapunahala (or Aolani) Stream to increase the drainage capacity is unfeasible because of the restricted width of the existing downstream concrete-lined channel. Replacement of the existing pipe culverts with a single 8-foot by 10-foot box culvert at lower elevation would protect nearby residential areas from inundation by the estimated 100-year flood peak of 1100 cfs.

With the modification to the existing pipe culverts at Kapunahala (or Aolani) Stream, there are no significant base floodplain encroachments for each of the alternatives: A-4, A-1, B-1, B, C-1 and C.

At the Heeia Stream crossing, highway widening would occur on the upstream side, but will not encroach into the 100-year floodplain. Instead, a retaining wall would be constructed at the right-of-way and the widened highway built on fill between the new retaining wall and the existing slope.

To eliminate the ponding which presently places nine of the residences upstream of the highway in the 100-year flood zone, it would be necessary to add a 156-inch concrete pipe tunnel adjacent to the existing box culvert underneath the highway at the same invert elevation and slope. This would keep the flood water from rising above the lowest dwelling floor level.

Downstream of the highway, Heeia Stream flows through a 1/4-mile stretch of deep ravine with an average slope of 1.8%, which is more than adequate to contain the 6,000 cfs peak flow after the additional culvert is installed. The next quarter mile of the stream is channelized, but has a flatter slope and is presently overgrown with vegetation. Since this portion passes through a residential area, better stream maintenance may be required.

The increase in paved surface from highway widening will contribute in a very minor way to stormwater discharge, which in turn will flow into existing streams and drainage ditches. According to the Park Engineering, Kahekili Highway Drainage Study, this is not expected to result in any flooding of downstream areas which are urbanized or are likely to be urbanized.

In summary, all of the widening alternatives and intersection schemes will be constructed to meet State of Hawaii drainage facility standards. Highways are exempt from National Flood Insurance Program standards, according to Honolulu Ordinance No. 80-62, Article 11, subsections 21-11.15 (k) and (n). Kahekili widening and intersection improvements will not have a significant impact on the various aspects of the base floodplain because:

- a. The proposed project will have a minimal or no effect on the natural and beneficial floodplain values such as water quality, fish, wildlife, plants, open space, natural beauty, outdoor recreation or agriculture.
- b. Landscaping will be incorporated to restore and preserve the natural and beneficial floodplain values impacted by the proposed highway.

- c. The flooding risks associated with the highway improvements are negligible because: 1) Kahekili is an existing highway which currently crosses several streams so the impacts are measurable and known. 2) Proposed improvements to the drainage system will improve flood protection for existing residences.
- d. The proposed improvements to the existing drainage system in the flood zone areas will improve the hydraulic aspects of the existing highway, thereby reducing the potential for the interruption or termination of emergency vehicles or as an evacuation route.
- e. None of the project alternatives would encourage development specifically in the floodplain.
- f. The City and County of Honolulu's zoning code complies with National Flood Insurance Program standards. Therefore, future housing in the area will be adequately protected against the 100-year flood.

6. Coastal Zone

Two portions of Kahekili Highway are in the Special Management Area (SMA): near the junction with Kamehameha Highway and near the Heeia Wetland area. The SMA program was established under Hawaii's Coastal Zone Management (CZM) Program.

The objectives of Hawaii's CZM Program, regarding the various factors of accessibility to recreational resources, historic resources, scenic and open space resources, coastal ecosystems, economic use, coastal hazards and managing development as they relate to the Kahekili/Likelike interchange and Kahekili widening are as follows:

Accessibility to Recreational Resources

- o The Kahekili Highway improvements will improve access to the recreational opportunities on the Windward coast of Oahu.

Historic Resources

- o Archaeological reconnaissance was done in the area of the Kahekili/Likelike interchange and in the area where Kahekili will be widened to determine if there were any archaeological resources. The archaeological resources were identified and protected.

Scenic and Open Space Resource

- o The widening of Kahekili Highway in the area of Heeia Wetland will preserve and maintain the existing visual resource (i.e. the view of the wetland) from Kahekili Highway.

Coastal Ecosystems

- o The drainage system improvements at the stream crossings along Kahekili Highway have been designed to minimize disruption or degradation of riparian habitat downstream. Prompt revegetation to reduce erosion from construction has been planned to maintain the existing level of water quality. The design of the elevation of the culvert outlets have been changed to be at ground level to minimize the number of "waterfalls" and thus 1) reduce downstream water velocity and 2) reduce damage to riparian habitat and 3) reduce stream bank erosion.

Economic Use

- o Kahekili/Likelike Interchange and Kahekili Highway widening will provide a necessary improvement to an important existing link in the transportation network for residents and businesses of Windward Oahu.
- o If existing land use plans are adhered to, the improvements to Kahekili Highway alone would not affect the level of growth or development outside presently designated areas along the windward coast.

Coastal Hazards

- o Kahekili/Likelike Interchange and Kahekili Highway widening plans will help expedite evacuation in the event of a tsunami.
- o Improvements will comply with Federal Flood Insurance Program requirements.

Managing Development

- o Several public information meetings have been held in the Kaneohe area to communicate the plans to the public for the Kahekili/Likelike Interchange and the Kahekili widening improvements.

The Hawaii (CZM) Assessment Form has been submitted to the Office of State Planning for their determination of the project's consistency with the Hawaii CZM Program.

The project was assessed as being conditionally consistent with the Hawaii CZM program.

- o Appropriate measures to mitigate sediment runoff during and after construction will be taken.
- o Stream flows will be maintained and not restricted. The Office of State Planning letter is in Chapter VIII DEIS Comments and Responses.

7. Wetlands and Streams

As defined by the U.S. Army Corps of Engineers (ACOE), the type of vegetation, soils and water are the basis for delineating an area as a wetland. According to the ACOE definition:

"... wetlands are those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (33 CFR 323.2(c)).

This includes, but is not limited to swamps, marshes, bogs, sloughs, potholes, wet meadows, river overflows and tidal overflows, as well as estuarine areas, and shallow lakes and ponds with emergent vegetation. Areas covered with water for such a short time that there is no effect on moist soil vegetation are not included in the definition, nor are the permanent waters of streams, reservoirs and deep lakes.³² The only identified wetland near Kahekili Highway is Heeia Wetland, a mangrove swamp and marsh. At its closest point it is approximately 300 feet away from the Highway.³³ The coastal zone Special Management Area extends on the mountain side west of Kahekili Highway around watershed area which feeds Heeia Wetland. There will not be any construction in Heeia Wetland by any of the project alternatives.

Various streams and drainage ditches cross Kahekili Highway. The streams are important not only because they are aquatic habitats themselves but also because they discharge into Kaneohe Bay and flow through other ecologically sensitive areas, such as the Heeia

32. United States Department of Transportation Order 5660.1A, Section 4A.

33. Heeia Wetland boundaries are shown in Wetlands and Wetland Vegetation of Hawaii, by Margaret E. Elliott and Erin Marie Hall which was prepared for the United States Corps of Engineers Pacific Ocean Division, Fort Shafter.

Wetland. As mentioned earlier, several of these streams have abundances of native stream fauna, notably endemic Hawaiian gobies (or 'o'opu). They are sensitive to stream alterations which create barriers to their migratory cycle, reduce their habitat and elevate water temperatures.³⁴

There is unavoidable alteration to the stream bed and riparian habitat in the area where Kahekili will be widened primarily in the form of fill for the highway widening and the extended or modified culverts. The construction of concrete-lined, flat-bottom channels and elevated culverts and the removal of streamside vegetation are the forms of alteration which appear to have particularly severe impacts on native stream fauna populations. Most of the streams crossed by Kahekili Highway have already been modified in one or more of these forms. (See Exhibit III-2.)

At the proposed Kahekili/Likelike Interchange the preliminary design recommendation for drainage improvements include installing an 84 inch concrete (culvert) to drain existing stormwater flows crossing Likelike Highway. The 84 inch culvert would convey the stormwater under the proposed ramp (nearest to Hinamoe Loop) and into a channelized stream known as Kaneohe Stream which then passes through an existing culvert under Likelike Highway. (See Appendix F and Exhibit III-2.)

The preliminary design recommendation for highway widening drainage improvements include the addition of larger, extended or modified culverts or bridges at Kapunahala (or Aolani) Stream, Keaahala Stream, Haiku Stream, Heeia Stream, Puolena Stream, Waiola Stream and Ahuimanu Stream. (See Appendix F for Engineering Drawings of these drainage improvements.)

Kapunahala (or Aolani) Stream improvements include adding a 6 feet by 10 feet control box drain from which the stream will flow under the road through a 8 feet by 10 feet box culvert. Downstream of Kahekili Highway the Aolani Stream will flow through a 9.5 feet by 18 feet concrete channel.

Keaahala Stream improvements include the extension of the existing 9 feet by 10 feet box culvert under the new part of Kahekili Highway.

34. Timbol, Amadeo S., and John Maciolek, for the U.S. Fish and Wildlife Service, 1978. Stream Channel Modification in Hawaii; Part A: Statewide Inventory of Streams, Habitat Factors and Associated Biota (Honolulu: Cooperative Fisheries Unit.).

Haiku Stream improvements will include extending a 42" pipe and constructing an inlet structure on the upstream side of Kahekili Highway.

Heeia Stream crossing improvements include a retaining wall, an inlet structure and the addition³⁵ of an 168" round concrete pipe. Grading will extend 100 feet downstream from Kahekili Highway.

Puolena Stream improvements include the extension of the existing four 36 inch pipes and construction of an inlet structure.

Waiola Stream improvements include a new inlet structure and an extension of the existing 25 x 7 box culvert.

Ahuimanu Stream improvements include widening the existing bridge and extending the lined channel.

The alternative of widening only up to Haiku Road will avoid further modification to the several stream crossings on the Kahaluu side of this intersection. From this standpoint then, widening up to Haiku Road would seem to be preferable. The other two widening alternatives, which cross all of the streams, present an opportunity to improve existing stream crossings in a way which is less detrimental to fauna habitat.

Section 404 permits are required for all discharges of dredged or fill material into waters of the United States. Coordination with the U.S. Corps of Engineers has occurred regarding the Kahekili Highway Stream crossings. Documentation of this coordination is included in Chapter V.

Beneficial instream uses such as aquatic habitat stream ecosystems and maintenance of water quality will be protected on Kaneohe, Kapunahala (or Aolani), Puolena, Waiola, Ahuimanu and Kahaluu Streams according to Chapter 176 D Hawaii Revised Statutes. A permit for stream alterations will be required from the State of Hawaii Department of Land and Natural Resources (DLNR). Protection is provided by maintaining a sufficient flow of water to preserve these uses. This is done by (1) setting an instream flow standard and (2) by regulating stream channel alterations. Compliance with these requirements assures that:

35. There are two 12 feet by 7.5 feet box culverts under Kahekili Highway at this time.

- (1) Channel alterations that adversely offset the quantity and quality of the stream water in ecology will be minimized.
- (2) Where instream flow standards in interior instream flow standards have been established, channel alterations which diminishes the quantity in quality of stream water below the minimum established to support identified instream uses, as expressed in the standards, will not be allowed.
- (3) Channel alterations will not interfere substantially and materially with existing instream or non-instream uses or with channel alterations previously permitted.

At the application to DLNR for permits to modify the stream channels, the proposed project will comply with the above measures.

The only freshwater springs in the project area is Nakama Springs. An approximate location is shown on Exhibit III-2. Water from the spring is being used by farmers. The Board of Water Supply has also indicated its intention of using the freshwater springs as a Potable water source. The design of the interchange will be coordinated with the BWS to assure protection of the water source. Coordination with the owner users will be included in the final EIS.

8. Water Quality

Another form of potential adverse impact on these streams and their receiving waters will be the sediment and organic material carried in the storm-water runoff from the road surface. Sediment can be minimized by landscaping exposed areas after construction. The flood control lagoon built as part of the Kahaluu Watershed Project is designed to trap a significant amount of sediment that would otherwise be carried into Kaneohe Bay.³⁶

Runoff from the new highway surfaces will unavoidably contain pollutants in the form of grease and oil from vehicular traffic, as well as other types of litter and debris associated with roadside areas; and this, in turn, will degrade water quality in receiving streams and drainage channels and groundwater. The drainage design includes collecting surface runoff and providing subdrainage for the pavement and walls, which will be transported by channels and streams to the ocean.

36. AECOS, Inc., 1983. "Stream Surveys for the Kahekili Highway Widening, Oahu, Hawaii."

Since the proposed project is the modification of an existing highway corridor, it is not expected that this impact will differ markedly from what would occur if the project were not built. It is not likely, that the proposed project will have a significant long-term adverse effect on the aquatic and avifauna habitats of areas such as Heeia wetlands, Kaneohe Bay, or Heeia and Kahaluu Fish Ponds, or on the organisms dependent on those habitats.

Modifications to proposed and existing steep embankments with little ground cover, such as the creation of gentler slopes more amenable to revegetation or the construction of retaining walls, where necessary, can and will be incorporated into project design to correct existing soil erosion problems within the right-of-way and interchange schemes.

In voluntary compliance with the Nonpoint Source Water Pollution Management Plan of Section 319 of the Clean Water Act the proposed project will implement the following mitigation measures in the construction and maintenance phases of the project.

- o Critical Area Planting. Vegetation such as trees, shrubs, vines, grasses or legumes will be planted on highly erodible or critical eroding areas such as on highway embankments around drainage easements and streams.

The removal of streamside vegetation will be minimized and those areas which need to be cleared will be replanted with plant species typical of the streamside area.

- o Diversion. Permanent diversions³⁷ will be constructed across the slope of embankments along the highway to control erosion during construction and to trap pollutants when the project is completed.
- o Drift Control Agents. Drift control agents stabilize herbicides by increasing the droplet size which in turn reduces evaporation and drift from target areas to non-target areas.

Drift control agents will be used in the herbicides used along Kahekili Highway.

37. A diversion is a channel constructed across the slope with a supporting ridge or berm on the lower side.

- o Field Windbreak and Borders. Field windbreaks³⁸ and borders will be planted along the project boundaries to reduce soil blowing during construction and reduce erosion throughout the life of the project. Trees will also be planted between the residences in Kapunahala that back up to the new Castle Hills Connector Road to provide screening and privacy.
- o Proper Design of Culvert and Outlets. Stream flows will be maintained and not restricted. Culvert floor outlet elevations will be placed at streambed level to maintain or return the stream to a natural hydraulic condition. Drainage outlets will be designed to simulate natural stream conditions.
- o Hillside Ditch. Hillside ditches³⁹ will be constructed along highway embankments to divert runoff water on steeper slopes to a protected outlet and reduce slope lengths to minimize erosion and runoff.
- o Mulching. Mulch will be applied to the banks of the project to help establish plant cover, reduce runoff and erosion, conserve moisture, and prevent surface compaction and control weeds. Fresh cuts and fills will be mulched and seeded incrementally, so that no area remains unplanted for very long during construction.
- o Terrace. Terraces are used to reduce slope length, reduce erosion, and reduce sediment content in runoff.

Terraces will be built to prevent erosion and runoff and sedimentation which would impact water quality.

 38. A field windbreak is a strip of trees or shrubs established to reduce soil blowing or dust and increase the natural beauty of the area. A field border consists of a strip of perennial vegetation at the edge of fields to control erosion.

39. A hillside ditch is a channel constructed across the slope with a supporting ridge on the lower side at definite vertical intervals and gradient, with or without, a vegetative barrier to detain or control the flow of water to a protected outlet and to check erosion on sloping land.

- o Underground Outlet. Underground outlets⁴⁰ will be used to dispose of excess surface water if surface outlets are impractical because of stability problems, land use or traffic.
- o Scheduling. Grading will not be done during times of heavy rainfall.

Graded areas will be reduced to the extent possible. Where cuts, fills, and other grading work is required, City and County grading standards will be enforced to reduce erosion.

All of the above mitigation measures, including the need to monitor the effectiveness of these measures, will continue to be developed in consultation with the Corps of Engineers, the State Department of Land and Natural Resources, and the City and County Department of Public Works and will be implemented in accordance with the Section 404 Nationwide permit, the Channel Alteration permit, and the County Grading permit, respectively.

9. Threatened or Endangered Species

According to the U.S. Fish and Wildlife Service no species of plant or animal designated as rare, threatened or endangered by the U.S. or State of Hawaii governments would be found in the vicinity of the construction nor are there any species which would be affected by the project. (See comment letter of the U.S. Fish and Wildlife Service dated October 26, 1988.)

10. Prime and Important Agricultural Lands

The widening of Kahekili Highway in the area between the Likelike Highway and Kamehameha Highway will not require the taking of additional agricultural lands as the widening will basically occur within the existing right-of-way. However, the construction of the improvements at the intersection of Kahekili and Likelike Highway will require the use of some prime agricultural lands and other important agricultural lands as classified by the U.S. Department of Agriculture, Soil Conservation Service. (See Exhibit IV-6.)

In accordance with 7 CFR 658 "Farmland Protection Policy" coordination has been completed with the U.S. Soil Conservation Service. Documentation of this coordination is included in Chapter V. The land with

40. An underground outlet is a conduit installed to collect surface water and convey it to a suitable outlet.

agricultural soils⁴¹ to be converted to highway according to the various intersection schemes under consideration are as follows:

<u>Intersection Scheme</u>	<u>Acres of Prime Ag Land</u>	<u>Acres of Important Ag Land</u>
A-4	7	12.2
B-1	5	9.1
C-1	8	11.7
Intersection Improvements	1	4.3

Based on the Farmland Conversion Impact Rating land evaluation criteria, all alternatives were found to be consistent with the Farmland Protection Policy Act (FPPA). It is anticipated that removal of these relatively small acreage of land with agricultural soils would not have a significant impact on the total agricultural lands on Oahu. (See Chapter V.) Moreover, according to field observation by the State of Hawaii Department of Transportation there were no farms in operation in the areas targeted for acquisition.

11. Hazardous Waste Site

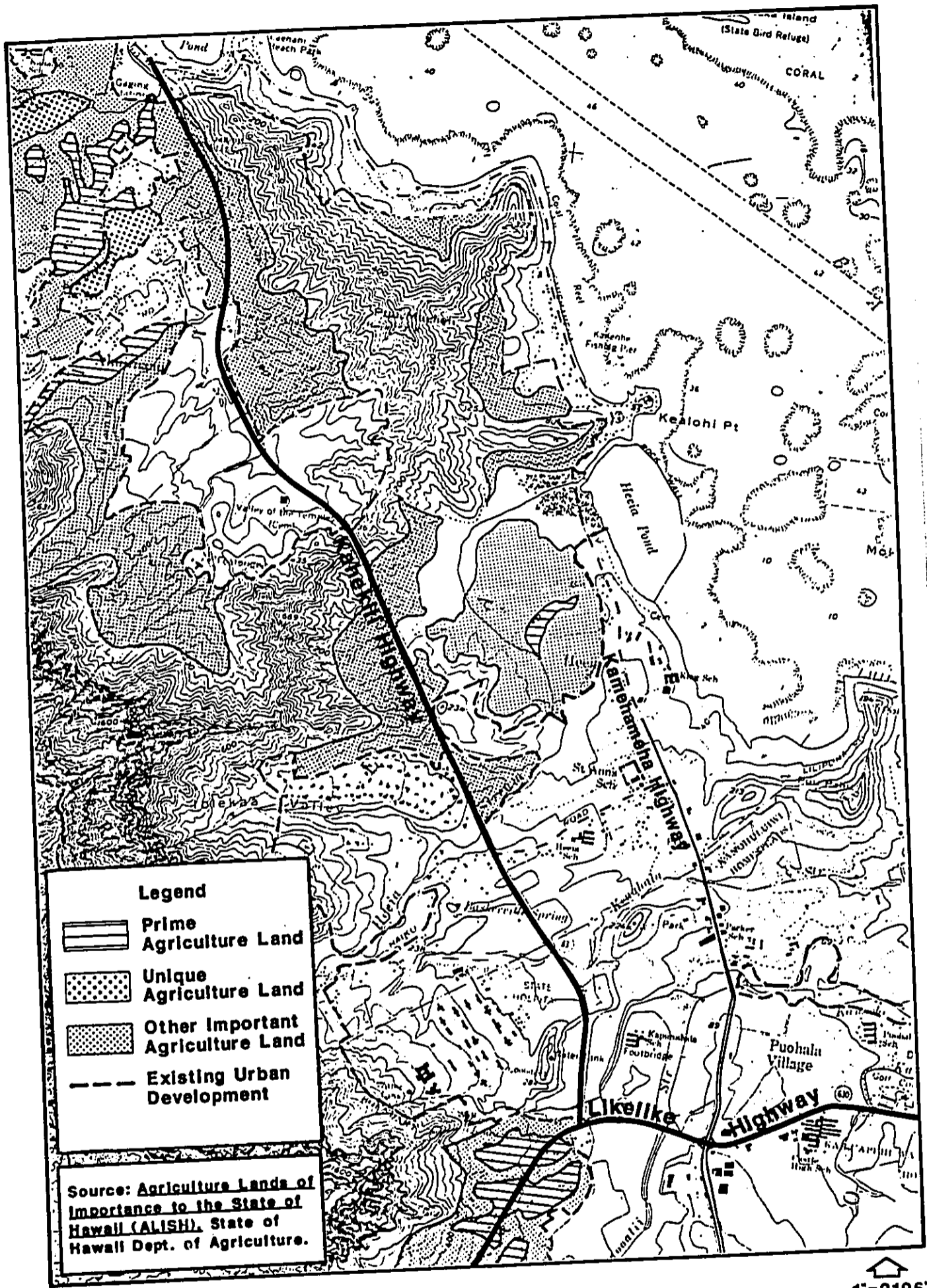
There are no hazardous waste disposal sites on the island of Oahu according to Dean Higuchi of the U.S. Department of the Interior Environmental Protection Agency.⁴²

12. Construction

There will be a rather wide range of environmental impacts during the construction phase for the proposed project, including adverse effects on noise levels, air and water quality, and both beneficial and adverse effects on socio-economic conditions. Because of the short-term nature of these effects, they are treated as a separate category of environmental concern.

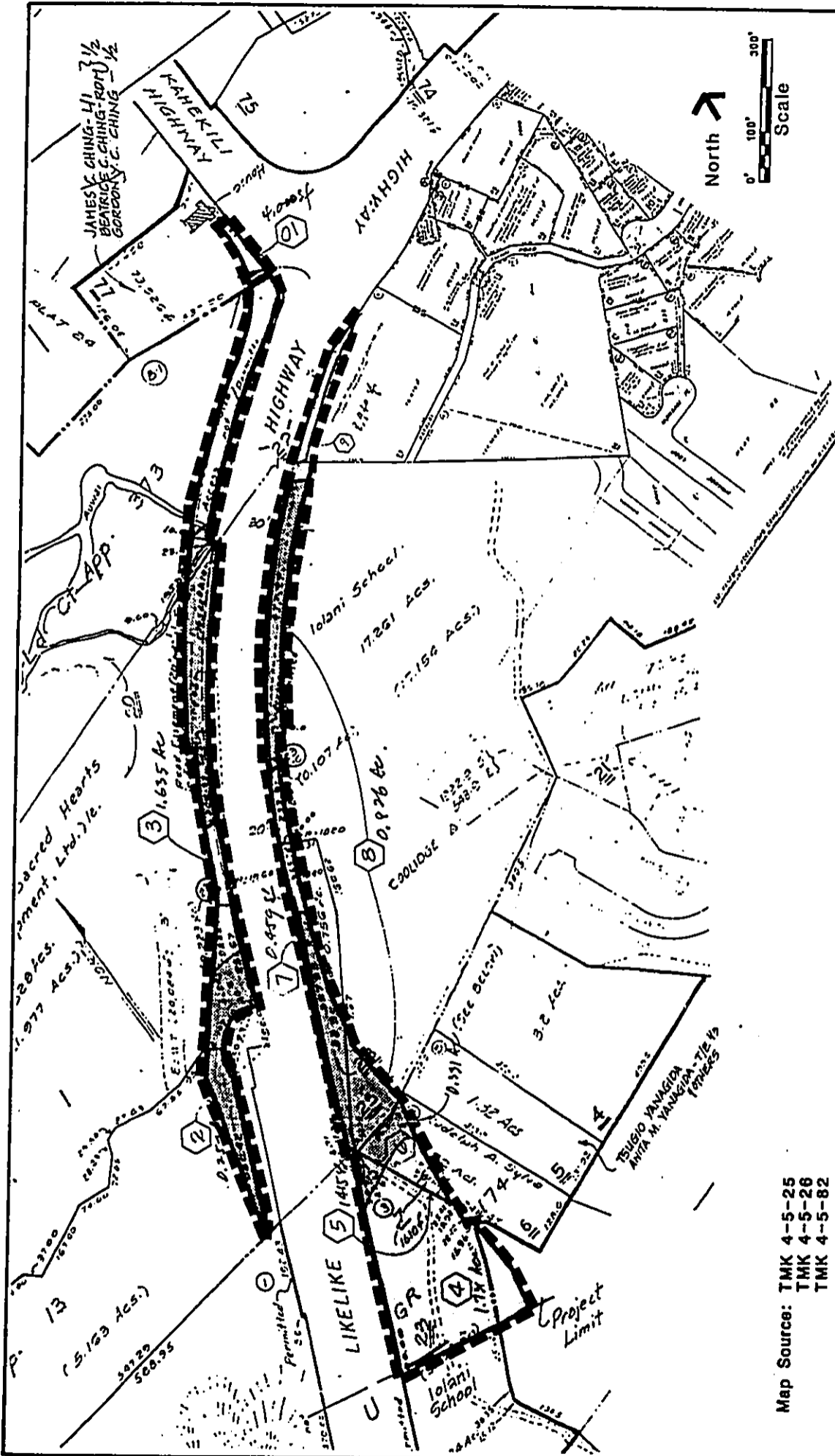
41. Information based on U.S. Department of Agriculture Farmland Conversion Impact Rating Form prepared by the Soil Conservation Service in 1987.

42. Phone conversation with Dean Higuchi of the U.S. Department of the Interior Environmental Protection Agency, December 1988.



**EXHIBIT IV-6:
SIGNIFICANT AGRICULTURE LANDS**

1"=2196'



Map Source: TMK 4-5-25
 TMK 4-5-26
 TMK 4-5-82

**EXHIBIT IV-10:
 AGRICULTURAL LANDS IN INTERSECTION IMPROVEMENTS**

a. Air Quality

Grading, excavation and exhaust from construction equipment will increase the amount of air-borne particulate and gaseous emissions in the project vicinity. Suspended dust is the most significant concern during this period. The volume of particulate material will depend upon soil and weather conditions at specific sites, which can vary greatly. In view of the average silt content in the area's soils and the probability that construction will take place during some dry and windy periods, construction of the proposed project could produce up to 1.2 tons of particulates per month per acre. This figure would be substantially lower when weather is damp and/or calm. Since the project area has a moderately wet climate, it is not likely that high levels of dust will be generated over a sustained period. In dry weather, dust will be controlled by sprinkling exposed construction areas with water, which will reduce dust generation by approximately 50 percent.⁴³

b. Noise

The operation of construction equipment will raise noise levels in the project vicinity. Generally, the areas expected to be most affected by vehicular traffic noise will also be those affected by construction noise. Assuming the construction work will require the use of bulldozers and graders which will be stored on-site and no blasting will be required, the average noise level at 50 feet from the construction area will be about 79 dBA.⁴⁴ Since the intensity of sound decreases by about 6 dBA for each doubling of the distance from the source, the sound level will be about 73 dBA at 100 feet and 67 dBA at 200 feet. Almost all of the affected residences are more than 50 feet from proposed road construction activity. Noise emissions will be controlled by State of Hawaii, Title 11, Administrative Rules on vehicular and community noise control.

43. U. S. Environmental Protection Agency, 1977. Compilation of Air Pollutant Emission Factors With Supplements 1-7, Third Edition (Washington D.C.: U. S. Government Printing Office).

44. Bolt, Beranek and Newman, 1971. Noise from Construction Equipment and Operations, Building Equipment and Home Appliances (Washington, D.C.: U.S. Environmental Protection Agency).

c. Water Quality

The exposure of soil during construction will increase the sediment load in stormwater runoff and could contribute to the siltation of nearby streams and drainage ways. This will be controlled by minimizing the areas of soil exposure and constructing temporary silt basins to trap sediments from the runoff before it flows into stream and channels.

Erosion and sedimentation resulting from construction will be mitigated by conforming to strict erosion control measures, including Chapter 23, Grading, Soil, Erosion, and Sediment Control, Revised Ordinances of Honolulu 1978, as amended; the USDA Soil Conservation Services Erosion and Sediment Control Guide for Hawaii, 1981; and the State Department of Health's Water Quality Standards, Chapter 54, Title 11, Administrative Rules and the Section 319 of the Clean Water Act. Approval by the City and County of Honolulu Department of Public Works will be required to ensure proper erosion control.

In compliance with Section 319 of the Clean Water Act temporary debris basins will be constructed across streams during construction to trap sediment from construction and to reduce pollution by providing a place to catch silt, sand, gravel, stone and other detritus to preserve the existing water quality downstream, in Heeia Wetland and in Kaneohe Bay.

Wastewater from equipment cleaning and construction operations will not be permitted to discharge directly into the streams (and thus indirectly into Kaneohe Bay). Oil, grease, construction debris, silt, sediment and concrete waste materials resulting from construction activities will be controlled as required by Public Health Regulations, Chapter 54, and appropriate safeguards during design and construction will be established in coordination with the State Department of Health.

d. Socio-Economic Impacts

The construction phase of the proposed project will create both adverse and beneficial socio-economic effects. The adverse impact of the construction phase of the proposed project will be the inconvenience to motorists who frequently use Kahekili Highway. Travel time for work and school trips will increase for residents in the project region during the construction phase. A

comprehensive traffic plan for the construction period will be prepared as part of the design documents for the proposed project. The plan's purpose will be to insure that all procedures necessary to minimize impacts on traffic flow are considered during each phase of the project. A primary objective of this plan will be maintenance of the same number of traffic lanes as presently exist on Kahekili Highway and Likelike Highway during peak periods of travel in the peak direction of the traffic. This is to insure that construction activities will have the least effect on traffic during periods when use of the highway is most in demand. Detour plans will be posted along the highway in advance of construction. Advance notices will also be published in newspapers and sent to community associations in the area and property owners along the highway.

A socio-economic benefit will be the creation of jobs during the construction phase. The total earnings of construction workers will vary according to the relative cost and project construction time for each of the schemes being considered.

The economic impact of sales, income and employment impacts resulting from construction of the proposed project, (which is estimated to have an expenditure depending on the alternative chosen of between 36.8 and 51.8 million dollars) are determined by multiplying the appropriate multipliers from the Hawaii Input-Output Model to determine the economic impacts in dollars. The multipliers used include direct, indirect, and induced effects. Two different ways of looking at the economic impact of the construction costs are the impact on household income and the employment impact.

- 1) Impact on Household Income - The total household income (direct, indirect and induced) generated by construction of the proposed project can be estimated by multiplying the total construction expenditure times the "income coefficient" for the construction category which is .86.

$$\begin{aligned} \$36.8-51.8 \text{ million} \times .86 &= \\ \$31.6-44.5 \text{ million} & \end{aligned}$$

Of the \$36.8-51.8 million spent for construction \$31.6-44.5 million goes toward household income.

- 2) Employment Impact - In 1984, on the average, there was one direct job in the construction industry for every \$77,000 worth of construction put in place. (This information is based on the Department of Planning and Economic Development's book, The State of Hawaii Data Book, 1985, November 1985.) Using the same ratio for the proposed project, it can be estimated that about 478-673 jobs will be directly generated by the construction of the project.

\$36.8-51.8 million divided by \$77,000 =
478-673 direct jobs

The total number of jobs generated in the economy by the project can be estimated by multiplying the number of direct jobs generated by the construction of the project times the State multiplier. The employment multiplier from the Hawaii Input-Output Model is 1.85.

478-673 direct jobs x 1.85 =
885-1,245 total jobs

e. Hazardous Waste Sites

There are no known hazardous waste site in the project area. If any hazardous materials are discovered during construction the Hawaii State Department of Health Environmental Protection Division Hazardous Waste Program will be contacted immediately for technical assistance and proper disposal information.

c. COMMUNITY IMPACTS

1. Traffic Efficiency and Safety

The most significant traffic benefit would be reduced travel time during peak hours. Widening the highway between Likelike Highway and Haiku Road would result in the most dramatic reduction in travel time as shown in Exhibit I-4. Widening beyond Haiku Road and the various design schemes for an interchange at the Likelike Highway intersection would reduce travel time, but to a less significant degree. Nevertheless, during peak hours in 2008, the difference between the Intersection Improvements alternative and the various Interchange design schemes would be noticeable.

Intersection Improvements would create a Level of Service E, while the Interchange schemes would provide a Level of Service D and E during the A.M. and D and A respectively during the P.M. peak. (See Exhibit I-5.)

Traffic safety would be enhanced as the result of both the widening and the intersection improvements. The provision of a medial barrier will reduce the incidence of head-on collisions, in sections of the highway between intersections which are the most threatening type of vehicular accidents to human life. Widening the entire length of the highway would provide the greatest measure of traffic safety. If the highway were widened only to Haiku Road or to Ahuimanu Place, a medial barrier in the northern section of the highway would not be included, resulting in less protection against head-on collisions. In the years between 1978 and 1985, 26 percent of the accidents of this type occurred between Ahuimanu Place and Kamehameha Highway, and 72 percent occurred between Haiku Road and Kamehameha Highway.⁴⁵ Of the Likelike intersection schemes, a full interchange would improve safety the most as a result of the separation of traffic flows.

2. Property Values and Neighborhood Cohesion

The impact of proposed highway improvements on property values is determined by various factors including: location, land use, access and screening. Among other reasons, land values in Mililani, increased after the completion of the Interstate Route H-2, which primarily serves this development. The proposed project is not likely to produce such increases in land value in adjoining areas because it is merely the modification of an existing highway rather than construction of a new facility. On the other hand, the nuisance aspects of highway traffic, particularly higher noise levels, have a countervailing, dampening effect on residential property values.⁴⁶ In a broader community level perspective highway construction has a net positive effect on the value of adjacent properties, since the benefit of improved accessibility (or reduced travel time to destinations such as work places) tends to outweigh the adverse effects of traffic noise.

45. The most current traffic accident data that is readily available is for 1985.

46. Gamble, Hays B., et. al., 1974. "Adverse and Beneficial Effects of Highways on Residential Property Values", in Social, Economic, Behavioral and Urban Growth Considerations in Planning. Transportation Research Record 508. (Washington, D.C.: Transportation Research Board, National Research Council).

In general, highway construction projects can weaken the social cohesion of an area when they cut through established neighborhoods and act as a barrier.⁴⁷ However, none of the proposed project alternatives are expected to result in major effects on existing neighborhoods for the following reasons. The proposed project entails widening of an existing highway rather than the construction of a new route through established neighborhoods. The present highway was built prior to most of the residential developments it serves except for the Kapunahala neighborhood. The highway, then, tends to define the boundaries of neighborhoods rather than sever them.

3. Relocation and Public Revenues

Relocation assistance to households which are displaced as the result of highway projects is required under both Federal and State of Hawaii law. The acquisition and relocation program will be conducted in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended. Relocation resources are available to all residential relocatees without discrimination. The Relocation Advisory Assistance Program will be carried out in a manner consistent with the requirements of Title VI of the Civil Rights Action of 1964.

The State of Hawaii Department of Transportation administers two services to aid persons who must be relocated because of highway construction: Relocation Advisory Assistance and Relocation Payments. Relocation Advisory Assistance provides displaced households with housing referrals, advisory assistance and instructions for obtaining relocation payments. Relocation payments are available to both displaced owners and tenants for moving and other expenses required to obtain replacement housing. Payments in addition to moving expenses are also made to residential property owners or tenants in certain cases where the Department of Transportation has determined that comparable replacement housing has a greater market value or higher rent than the original dwelling.

The relocation of tenant households may be a problem. There are not many rentals available in the Windward area, especially 2-bedroom dwellings. The "Last Resort

47. Voorhees, Alan M., and Associates, Inc., 1975. The Impact of Transportation on Land Development: North American Experience (McLean VA: Alan M. Voorhees & Associates, Inc.).

Housing"⁴⁸ procedure would be implemented if comparable housing is not available or not within the financial means of the displaced families or individuals.

Monetary compensation and relocation advice will mitigate the hardship on displaced households, but the psychological difficulty of moving from their homes may be unavoidable for some. For more information see the Relocation Program Plan at Conceptual Stage in Appendix D.

The acquisition of private residential property for additional right-of-way will reduce the real property tax revenue to the City and County of Honolulu. Exhibit IV-10 indicates the annual estimated reduction in public revenues for each of the alternatives, as measured by 1987 property values and real property tax rates.

Widening Alternatives

The Kahekili Highway alternatives would require the acquisition of portions of parcels and some slope easements. Twenty-two minor partial property takings will be necessary to provide adequate right-of-way. The size of slope easements will be determined during the design phase.

Likeline Highway Intersection Alternatives

The schemes for the Likeline Highway intersection would require the acquisition of several properties and the displacement of residences. The underpass schemes, Full Interchange A-4, Partial Interchange B-1, and Partial Interchange C-1 would have greater impacts than the intersection improvement alternative. (See Exhibit IV-11.) A more detailed description of affected properties is contained in Appendix D. The footprints of the residences to be displaced are shown as dashed outlines on the schematic plans for the intersection schemes in Exhibits IV-12, IV-13, IV-14, and IV-15. The preferred alternative Scheme A-4 requires the displacement of 3 households.

Castle Hills Connection to Kealahala Road

No buildings are located on the property of the proposed connector to Kealahala Road, which would be built on State-owned land.

48. The Last Resort Housing is a plan where the government agency can do one of the following: 1) construct replacement housing 2) rehabilitate existing dwellings 3) purchase land with existing housing 4) relocate acquired dwellings 5) increase housing payments beyond statutory limits.

EXHIBIT IV-11

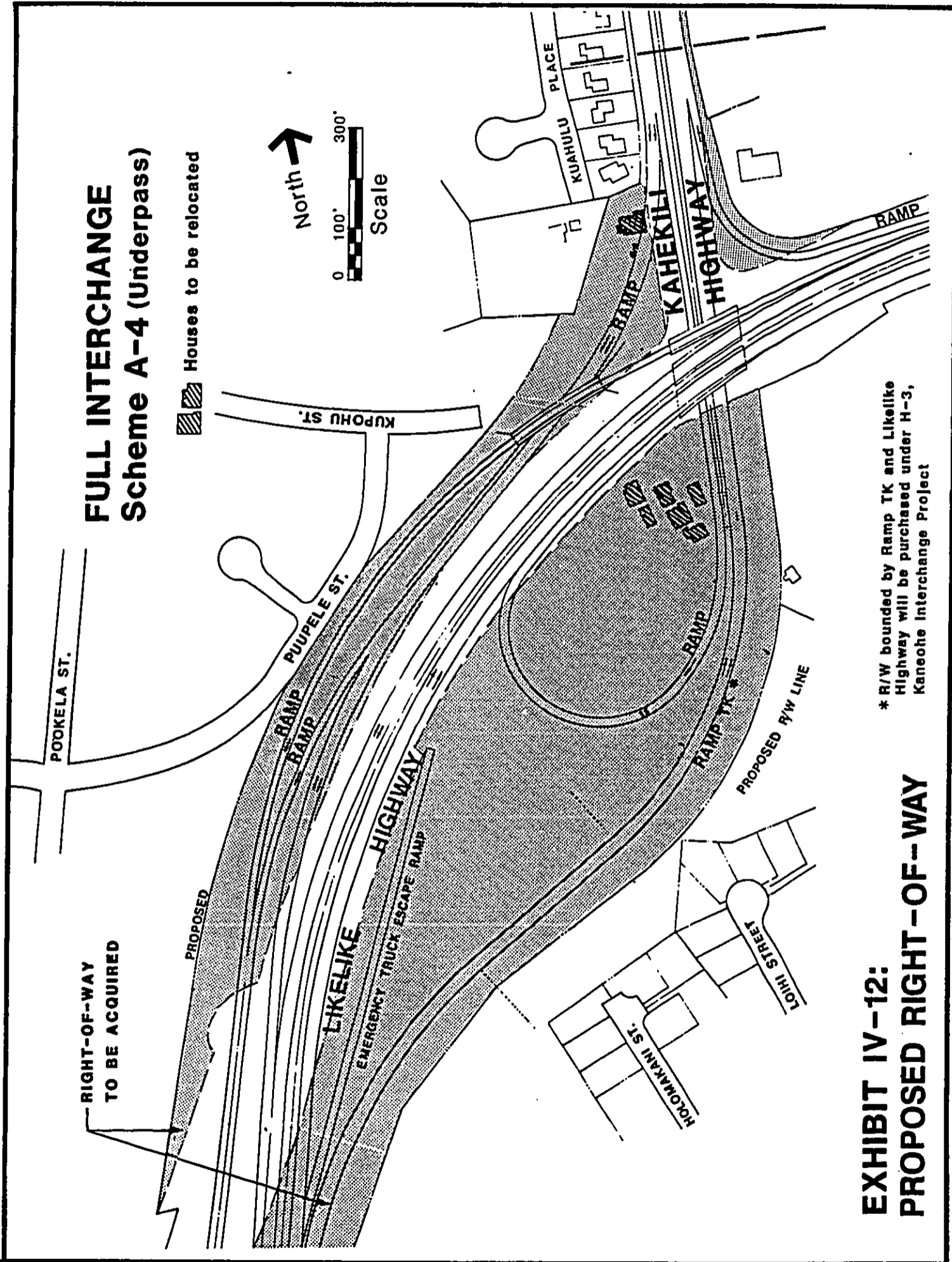
RESIDENTIAL RELOCATION REQUIRED FOR PROPOSED
KAHEKILI/LIKELIKE HIGHWAY INTERSECTION SCHEMES

	<u>Scheme A-4</u>	<u>Interchange Scheme B-1</u>	<u>Scheme C-1</u>	<u>H-3 Ramp Tk</u>	<u>Intersection Improvements</u>
*Number of Parcels Affected	10	8	10	9	3
Number of Residences Removed	3	2	3	6	2
Total R/W Cost Estimate	\$1,814,000	\$763,600	\$1,584,950	\$2,388,900	\$439,600
Annual Loss in Real Property Tax Revenues**	\$12,263	\$5,162	\$10,714	\$16,149	\$2,971

Source: Office of Right-Of-Way and Property Management, State of
Hawaii Department of Transportation.

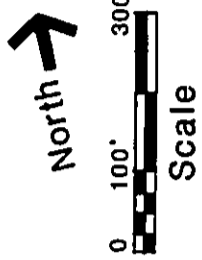
* Includes taking of partial parcels.

**Based on 1987 estimated assessed valuations and property tax
rates.



**FULL INTERCHANGE
Scheme A-4 (Underpass)**

 Houses to be relocated



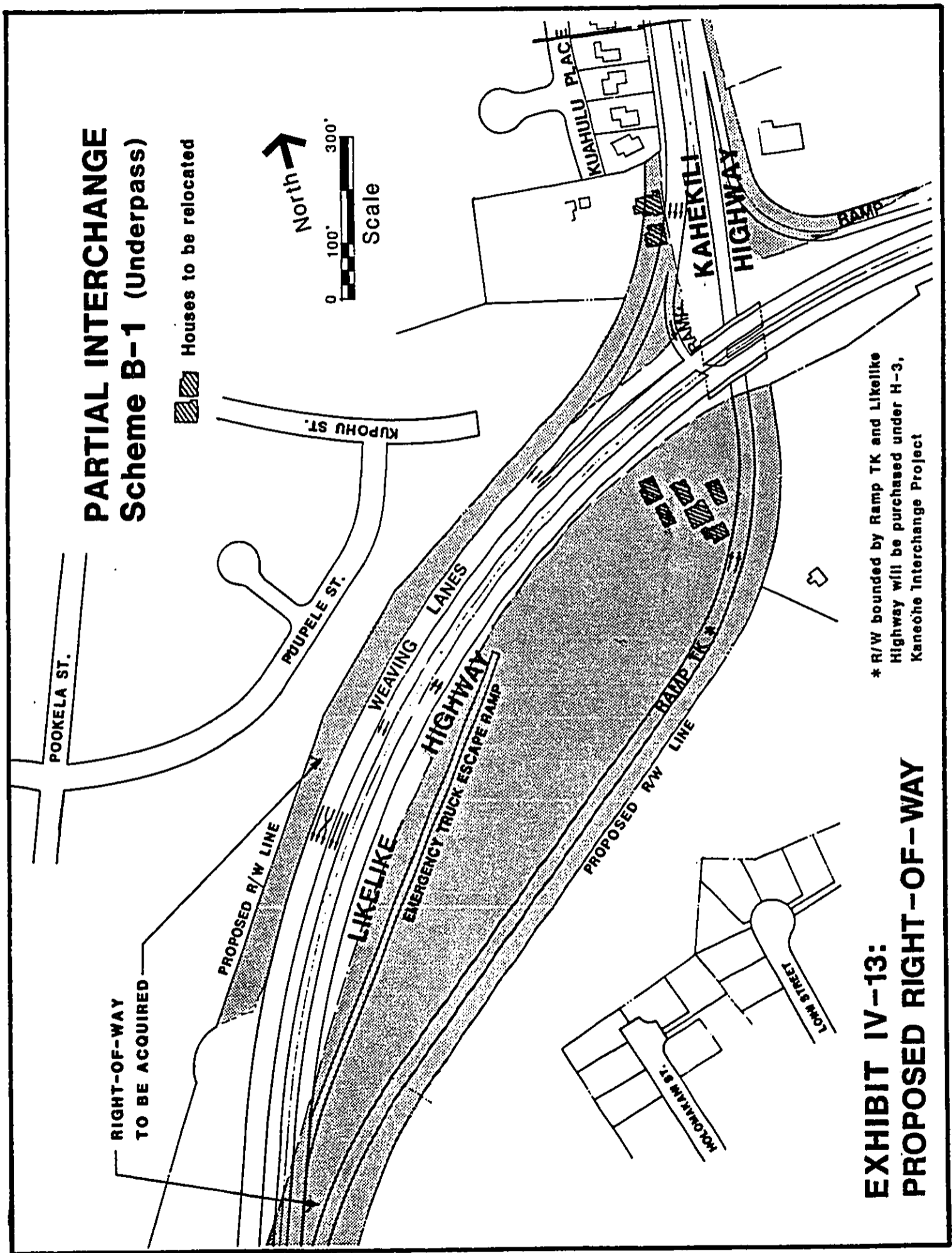
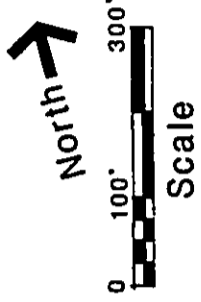
RIGHT-OF-WAY
TO BE ACQUIRED

**EXHIBIT IV-12:
PROPOSED RIGHT-OF-WAY**

* R/W bounded by Ramp TK and Likelike Highway will be purchased under H-3, Kaneohe Interchange Project

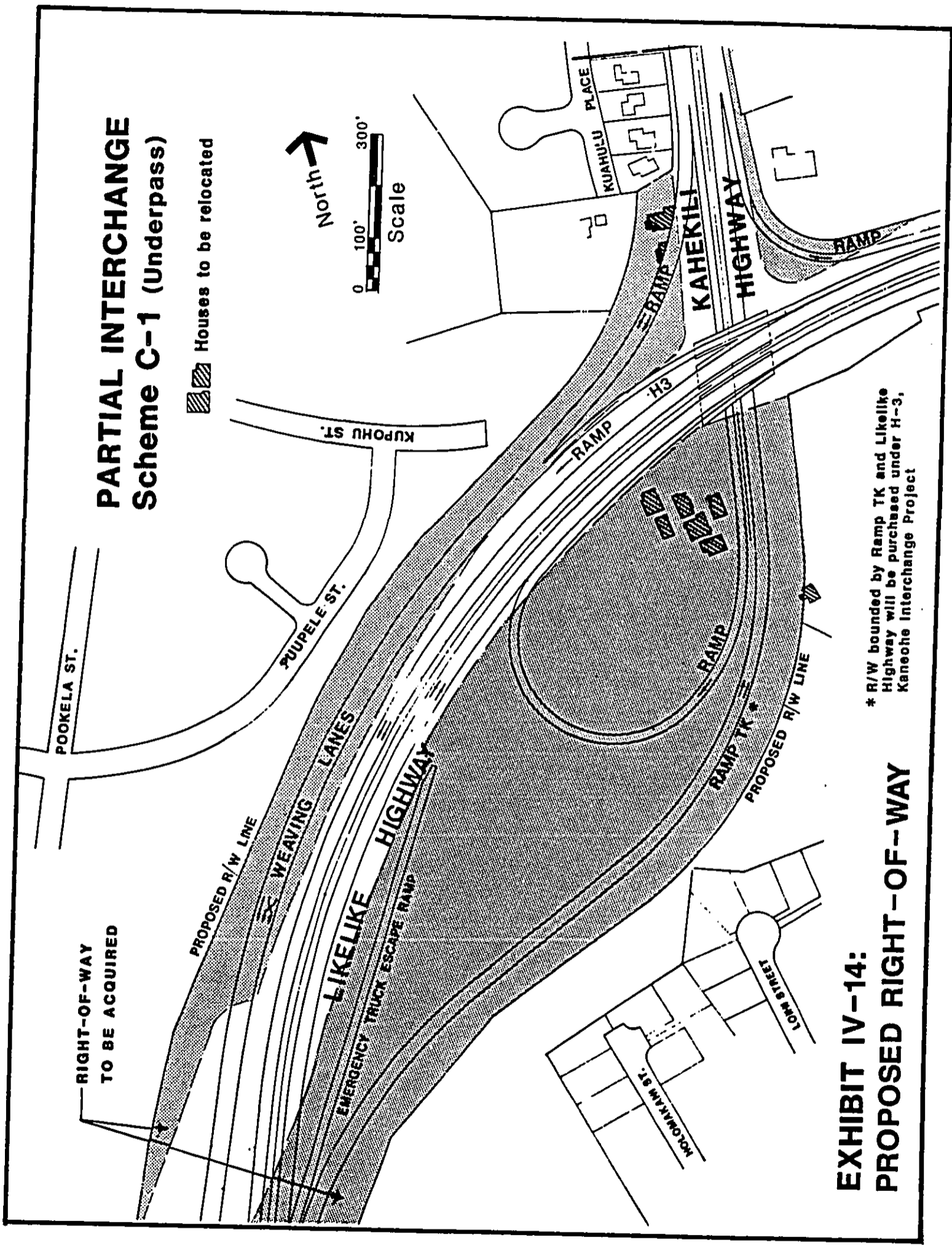
**PARTIAL INTERCHANGE
Scheme B-1 (Underpass)**

 Houses to be relocated




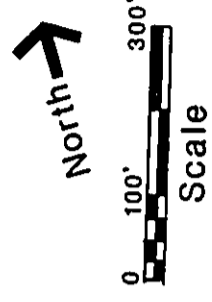
* R/W bounded by Ramp TK and Likelike Highway will be purchased under H-3, Kaneohe Interchange Project

**EXHIBIT IV-13:
PROPOSED RIGHT-OF-WAY**



**PARTIAL INTERCHANGE
Scheme C-1 (Underpass)**

 Houses to be relocated

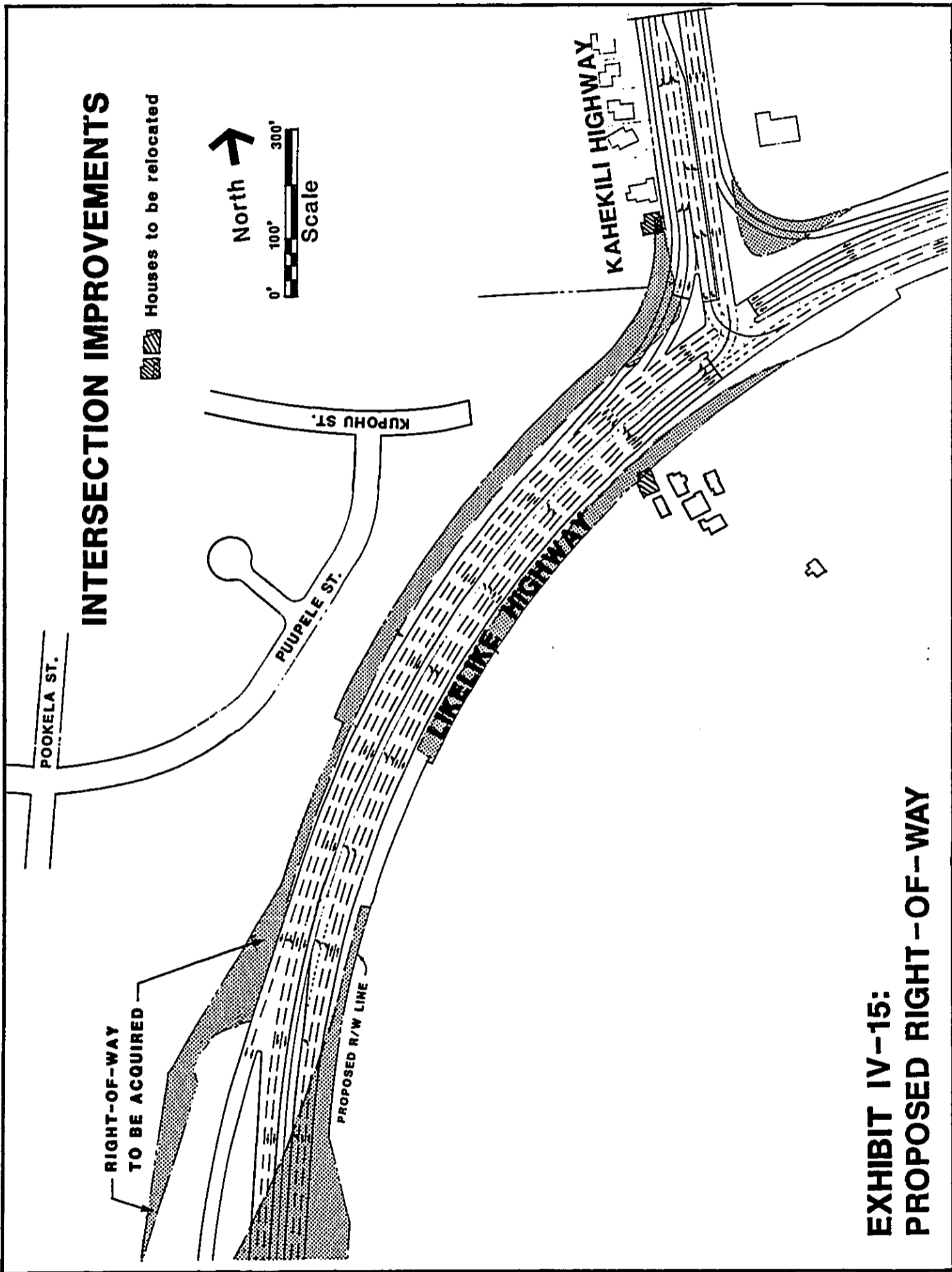


RIGHT-OF-WAY
TO BE ACQUIRED

**EXHIBIT IV-14:
PROPOSED RIGHT-OF-WAY**

* R/W bounded by Ramp TK and Likelike Highway will be purchased under H-3, Kaneohe Interchange Project

INTERSECTION IMPROVEMENTS



**EXHIBIT IV-15:
PROPOSED RIGHT-OF-WAY**

4. Land Use and Development

The Kahekili widening improvements and the Kahekili/Likeliike interchange improvements are consistent with the following development plans which are described in Chapter III:

Hawaii State Plan Revised
State Transportation Plan
State Land Use Law⁴⁹
General Plan of the City and County of Honolulu
Koolaupoko Development Plan
Koolauloa Development Plan
Special Management Area (SMA)⁵⁰

The Kahekili Highway widening to Haiku Road and the Likeliike intersection improvement projects are included in the Public Facilities Map of the City and County of Honolulu's Koolaupoko Development Plan and are scheduled to occur within six years (or by 1994). Widening Kahekili Highway from Haiku Road to Kamehameha Highway is also on the Public Facilities Map to occur after 1994. This indicates that the proposed project is generally consistent with land use plans for the area.

The widening of the entire length of Kahekili Highway may affect prime and unique agricultural lands, in outlying regions. These areas may be subject to urbanizing pressures with improved transportation facilities which decrease travel time to places of employment. Another aspect of this concern is the more intangible value placed on rural and traditional "lifestyles". As an urban fringe area the increasing property values reflect the increasing desirability of the area and its wider range of possible uses.

The nature and degree of the relationship between urban growth and the provision of public facilities, such as highways, sewers and water supply is not easily determined. Most urban planners now agree that there is a relationship between the provision and sizing of municipal sewer systems and the pattern and rate of urban growth.⁵¹ There are also indications that major new interregional freeways can, when combined with

49. Part of the highway is in the Conservation District and a CDUA permit (Conservation District Use Application) will be required.

50. Part of the highway improvements are in the SMA and will require a SMA permit.

51. Binkley, Clark S., et. al., 1975. Interceptor Sewers and Urban Sprawl (Lexington, MA: Lexington Books, D.C. Heath & Co.).

other factors, promote urbanization.⁵² The other factors include the availability of other public facilities and utilities and the degree to which the local and State governments exercise control over land use.⁵³ The proposed project is not a new interregional freeway, but the improvement of an existing arterial highway which serves intraregional transportation needs. It is not likely that any of the alternatives under consideration by themselves will stimulate urban growth to a significant degree.

5. Pedestrians and Bicyclists

At present, Kahekili Highway provides minimal facilities for pedestrians and bicyclists, so project alternatives will include design elements to improve this situation. The sections of Kahekili Highway to be widened will include paved road shoulders on both sides of the roadway to accommodate bikers.

Areas of most frequent pedestrian use, based on surrounding land uses, would appear to be in the Ahuimanu area between the two intersections with Hui Iwa Street and in the Haiku Village and Kapunahala areas between Haiku Road and Kulukeoe Street. A six-foot wide sidewalk is proposed between Kulukeoe Street and Haiku road on the mauka (west) shoulder. Pedestrians are most likely to cross Kahekili Highway at the Hui Iwa Street, Haiku Road, Kahuhipa Street, Keahala Road, and Kulukeoe Street intersections to reach school, park and shopping designations.

Facilities such as sidewalks, pedestrian crossings, highway lighting, signing and signals will be included in the design phase, as appropriate.

A sidewalk/bikeway slightly higher than the travelled surface will be constructed on the northwest side of the Highway.

6. Visual

An important factor in evaluating the visual impact is the vantage point from which one views the project area. Vantage points to Kahekili Highway are of two types: those located outside the project area and those within the project area along the highway itself.

52. Ibid.

53. Burrows, Lawrence B., 1978. Growth Management: Issues, Techniques, and Policy Implications (New Brunswick, NJ: Rutgers University Center for Urban Policy Research).

Critical vantage points outside the project area include Likelike Highway from Wilson Tunnel to the Kahekili intersection, the State Hospital grounds, and residences adjacent to the project area. Due to the height and density of vegetation along the northeast side of Likelike Highway as it descends into Kaneohe, the proposed project area is not visible to viewers from cars, with the possible exception of one short segment with low vegetation. From this area, the proposed interchange at Likelike and Kahekili Highways may be visible to motorists and passengers. But it would be a brief, fleeting glimpse that would not allow the image to become fixed in the observer's memory.

Segments of the existing highway are currently visible from higher elevations on the State Hospital grounds through openings in surrounding vegetation. The visual impact of widening Kahekili Highway will be minimal from these vantage points because the road width is greatly foreshortened from this distance and the evidence of visual change is slight. Although the Likelike Highway intersection is presently screened by vegetation, it is very likely that any of the proposed system of ramps at this intersection will be visible from the State Hospital grounds, and will be an obvious visual change. The new two-lane connector to Keaahala Road, aligned along a swale adjacent to the State Hospital, will probably be visible from many areas of the hospital grounds, but not obtrusive. A long hill will screen views of the connector road from the residential areas near Kahekili Highway.

The most frequent view exposure to Kahekili Highway from outside the right-of-way is from the residential units adjacent to the highway. Nearly all residents west of the right-of-way have attempted to screen the highway from view with fences and vegetation, but this is effective only at ground level. Most two-story houses have an open view to the project area, and the widening will minimize, and in many cases eliminate, the landscape buffer and opportunity for additional screening of the visual intrusion.

Kahekili Highway itself acts as a continuous vantage point for vehicular motorists, passengers and bicyclists who travel it. The additional width of paving and the removal of existing vegetation is one aspect of visual change that will be apparent to viewers along the entire length of the widening.

Another aspect of visual change from road construction and noise barriers as seen from the highway is the effect of the proposed project on the natural landscape features adjacent to and within the right-of-way. The construction of the existing highway resulted in deep cross-cuts along ridges in the Heeia area that are

visually unattractive because no vegetation has grown to cover and protect the steep, red banks. The proposed widening will entail additional cuts into these ridges, resulting in higher banks and in many cases, high retaining walls. The adverse visual impact of exposed banks will be minimized by terracing and planting them in a manner that encourages rapid growth of natural attractive plant material. Kahekili Highway will be widened on the mauka or northwest side of the road rather than on the Heeia Wetland side of the road. Concrete noise barriers with heights of from 6 to 12 feet will be built in the following residential areas:

- o the Likelike/Kahekili intersection
- o the west side of Kahekili Highway near the Kapunahala subdivision
- o the east and west side of Kahekili Highway from the vicinity of Kahuhipa Street to Haiku Street
- o the east side of Kahekili Highway facing the lower levels of Kahaluu Gardens

The visual impact of the noise barriers over six feet high will be softened by landscaping and terracing.

The Full Interchange Scheme A-4, Partial Interchange C-1 and Partial Interchange B-1 schemes, all employ underpasses to cross Likelike Highway. Scheme A-4 employs a more extensive area and more ramps and would have more of a visual impact than Scheme C-1 or B-1. As underpasses, Schemes A-4, C-1, and B-1 will have a lower elevation than the adjacent Castle Hills subdivision. The landscaping of the infield, between the ramps and the highway, and along the edges of the right-of-way can screen views of paved surfaces more effectively than is possible under existing conditions or with the Intersection Improvements scheme. Below are visual impact mitigation measures for the project:

- o Planting will be provided within the right-of-way in selected locations to screen views of the highway from adjacent residences.
- o Unpaved portions of the right-of-way will be graded and planted to provide a gradual transition to relatively open and undeveloped landscapes.
- o Architectural and landscape design treatment will be used to soften and enhance the visual effect of retaining walls, noise barriers and drainage structures.

7. Regional Section 4(f) Resources

Lands protected under the requirements of Section 4(f) of the U.S. Department of Transportation Act include publicly owned lands of a public park, recreation area, or wildlife and waterfowl refuge, or land of an historic site of national, state, or local significance.

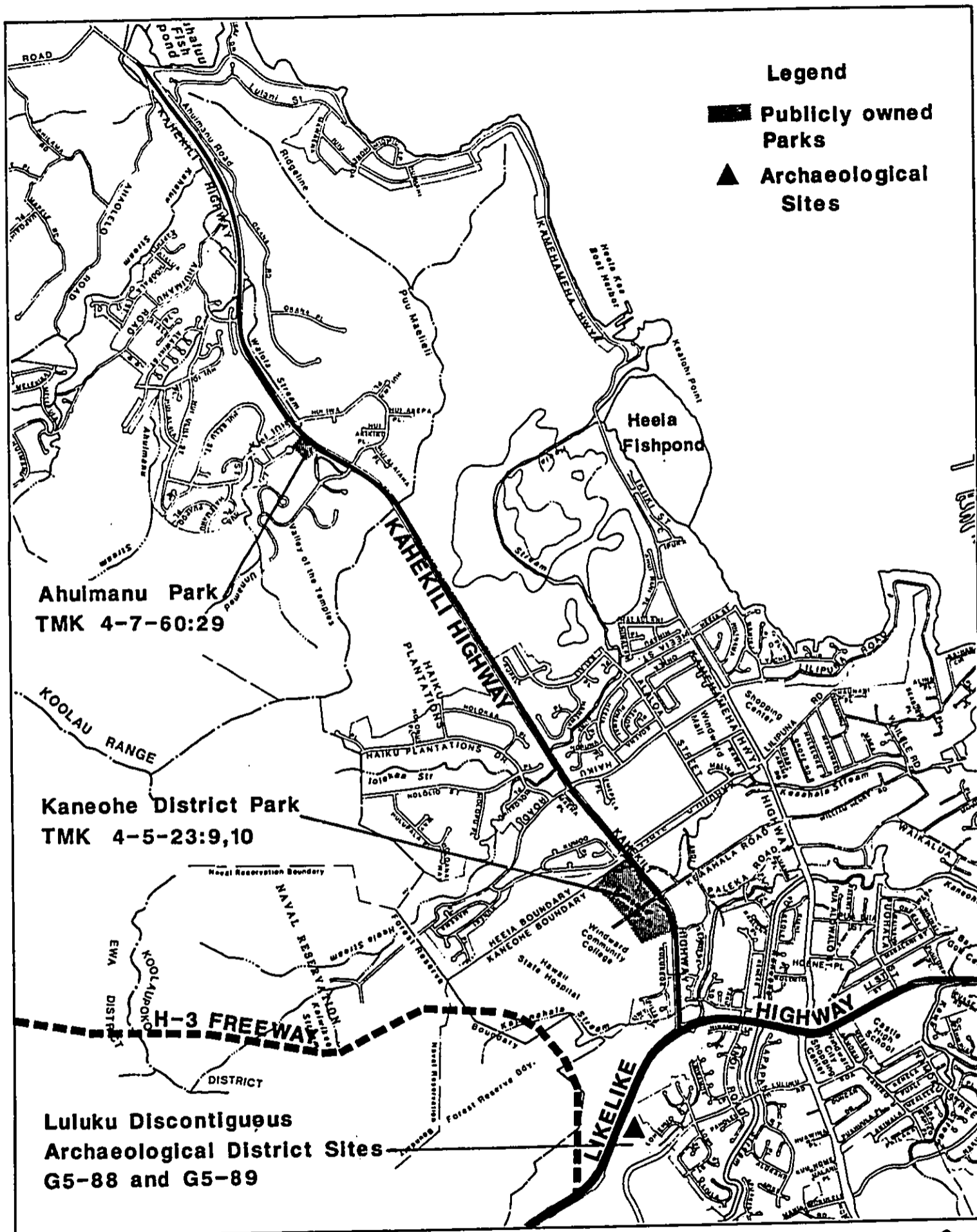
The following areas are Section 4(f) resources in the project region:

Ahuimanu Park
Kaneohe District Park
Luluku Discontiguous Archaeological District

There are two public recreation areas in the immediate vicinity of Kahekili Highway: Ahuimanu Neighborhood Park and Kaneohe District Park. See Exhibit IV-16.

Ahuimanu Park, owned and operated by the State of Hawaii, is a 4.0-acre park (tax map key 4-7-60:29) situated on the mauka (western) side of Kahekili Highway, between the two points where Hui Iwa Street intersects with the highway. It is bordered on its west side by Ahuimanu Elementary School and serves as a playground for the school as well as the general neighborhood. Playground equipment and a comfort station constitute the present facilities. The proposed widening of Kahekili Highway will not result in any physical encroachment into this park. Moreover, the secondary effects of the proposed project on the park are not expected to be significantly adverse. The smoother flow of traffic promoted by highway widening will have a beneficial effect on air quality in the park.

Kaneohe District Park is administered by the City and County of Honolulu's Department of Parks and Recreation on land owned by the State of Hawaii. The park use is authorized by an Executive Order of the Governor. The park is located on the mauka (western) side of Kahekili Highway and consists of two parcels (tax map keys 4-5-23:9 and 10) situated on either side of Kealahala Road. The parcel south of Kealahala Road covers 12.573 acres and contains most of the 31.367-acre park's present facilities. (See Exhibit III-8). Facilities include a gymnasium, restrooms and various playing fields and courts. Site improvements to the undeveloped portion of the park are planned over the next several years. The park's major structures are located several hundred feet or more from Kahekili Highway. The facilities closest to the highway are the softball, baseball and football fields. The outer edges of these facilities are set back a minimum of 70 feet from the present highway right-of-way. While



**EXHIBIT IV-16:
REGIONAL SECTION 4(f) RESOURCES**

1"=2,640'

designed primarily for softball, baseball and football these fields are used also for soccer, depending upon the season, and are utilized almost daily throughout the year. The period of most heavy usage is between 3:00 p.m. to 4:00 p.m.

The proposed new connector road would pass within 30 feet of the basketball and volleyball courts at the western edge of the portion of the park south of Keaahala Road, but because of the relatively low volume of traffic on this road, there will be a negligible effect on these play areas.

Highway widening plans as they affect public parks have been reviewed by the City and County of Honolulu's Department of Parks and Recreation (DPR). The DPR's review comments, indicating concurrence with the highway widening plans, are included in the latter portion of this document (Comments and Responses During the Consultation Phase). Since no park property will be removed from use or adversely affected by highway widening, it appears that the provisions of Section 4(f) are not triggered.

The proposed widening of Kahekili Highway will not result in any physical encroachment or use any portion of parks adjacent to Kahekili Highway. The secondary effects of increased traffic of the proposed project are not expected to impair the function and enjoyment of the parks. Noise levels will not increase significantly and will be below the FHWA noise level standard for the park activities. (See Exhibit IV-2).

Data recovery and the preservation plan for the Luluku Discontiguous Archaeological District is covered in the Memorandum of Agreement for the H-3, Kaneohe Interchange. The proposed action will not have further impacts on the District.⁵⁴

Based on the above evaluations, the proposed action will not physically encroach and will not have any proximity impacts that would substantially impair the function of the Section 4(f) resources. The requirements of Section 4(f) of the Federal Department of Transportation Act are not triggered. Coordination letters with the City and County, Department of Parks and Recreation are included in Chapter V.

54. U.S. Department of Transportation, Federal Highway Administration and State of Hawaii Department of Transportation. Final Third Supplement to the Interstate Route H-3 Environmental Impact Statement, 1987.

D. HISTORIC AND ARCHAEOLOGICAL PRESERVATION

The highway corridor passes through an area which has been heavily disturbed by agricultural and urban development activities in the past century. The only significant archaeological sites located in the proximity of the project area are the sites in the Luluku Discontiguous Archaeological District.

Portions of the two archaeological sites are located in the interchange area. These are the Punaluu mauka cemetery/historic period compound (G5-88) and the Punaluu mauka/Kapalai boundary wall (G5-89). Data recovery for these sites will be undertaken as dictated in the "1987 H-3 Memorandum of Agreement"⁵⁵ with the Office of Hawaiian Affairs for the Luluku Discontiguous Archaeological sites. The Kahekili Interchange project will not have any additional impacts on these sites.

It is always possible that remains will be uncovered during excavation and grading. As a precautionary measure, the following steps will be taken:

- o If foundation related soil boring work is undertaken, a sample from the areas near the interchange and in the Kahekili widening corridor will be analyzed for pollen and other procedures as warranted.
- o Construction crews and supervisors will be alerted to possible archaeological sensitivity in the interchange area near the existing archaeological sites. If remains are uncovered, the State Historic Preservation Office (SHPO) will be consulted immediately to determine appropriate mitigation measures.
- o Conform to the Burial Treatment Plan developed by the Office of Hawaiian Affairs as dictated in the 1987 H-3 Memorandum of Agreement.⁵⁶

E. THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

The proposed action will result in short-term adverse impacts such as increased generation of noise, sedimentation and fugitive dust, and disruption of traffic.

55. U.S. Department of Transportation, Federal Highway Administration and State of Hawaii Department of Transportation, Final Third Supplement to the Interchange Route H-3 Environmental Impact Statement (1987).

56. Ibid.

The long-term productivity of this project will offset these short term adverse impacts. The long-term productivity of this project includes the:

1. Reduction of the massive traffic congestion now experienced on Kahekili Highway and at its intersection with Likelike Highway.
2. Reduction in the number of head on accidents by the installation of a medial barrier and by grade separating conflicting traffic movements at the Kahekili/Likelike intersection.
3. Reduction of energy consumption because of more efficient traffic operation.
4. Implementation of the land use plan for the area.

Based on these considerations, and the fact that the adverse impacts can be minimized, it is considered that the long-term productivity of the project is beneficial for the community, as well as the present and future land uses in the surrounding area.

F. UNAVOIDABLE IMPACTS AND IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

1. Unavoidably, some prime and other important agricultural lands will be committed for the interchange area.
2. Unavoidably with increased traffic, noise levels along Kahekili Highway will increase.
3. Unavoidably, some residences will be displaced if an interchange is constructed at the intersection of Kahekili and Likelike Highways.
4. As in any proposed action involving construction, the proposed action will result in the commitment of various resources which include:
 - a. Fossil fuels and construction materials such as concrete, steel, asphalt, rock, etc., will be utilized. Once used, they will be irretrievably committed.
 - b. Labor for this project will be required for construction, planning, engineering design, landscaping, purchasing, and services, etc. Once utilized, this labor is irretrievable. However, labor can be compensated, thus generating monies into the island's economy.

CHAPTER V

**PUBLIC AGENCY
COORDINATION
LETTERS**

CHAPTER V: PUBLIC AGENCY COORDINATION LETTERS

FARMLAND CONVERSION IMPACT RATING

PART I (To be completed by Federal Agency)
 Name Of Project: Kahekeili Hwy. Widening & Interchange Date Of Land Evaluation Request: October 28, 1987
 Proposed Land Use: Highway Federal Agency Involved: FHWA
 County And State: Honolulu, Hawaii

PART II (To be completed by SCS)
 Date Request Received By SCS: Nov. 19, 1987
 Does the site contain prime, unique, statewide or local important farmland? Yes (No Acres Impaired Average Farm Size)
 (If no, the FPPA does not apply - do not complete additional parts of this form.) 0.0 35,300 119
 Major Crops: SUGARCANE Acres: 151,823 %: 39.2
 Name Of Land Evaluation System Used: LESAC Name Of Local Site Assessment System: NONE
 Date Land Evaluation Returned By SCS: DEC 2, 1987

PART III (To be completed by Federal Agency)

	Site A	Site B	Site C	Site D
A. Total Acres To Be Converted Directly	19.228	14.176	19.752	5.331
B. Total Acres To Be Converted Indirectly				
C. Total Acres In Site	19.228	14.176	19.752	5.331

PART IV (To be completed by SCS) Land Evaluation Information

A. Total Acres Prime And Unique Farmland	7	5	8	1
B. Total Acres Statewide And Local Important Farmland	12.2	9.1	11.7	4.3
C. Percentage Of Farmland In County Or Local Govt. Unit To Be Converted	0.012	0.009	0.013	0.003
D. Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value	40.2	40.1	40.9	39.9

PART V (To be completed by SCS) Land Evaluation Criterion

Criterion	Site A	Site B	Site C	Site D
1. Area In Nonurban Use	15	2	2	2
2. Perimeter In Nonurban Use	10	5	5	5
3. Percent Of Site Being Farmed	20	0	0	0
4. Protection Provided By State And Local Government	20	20	20	20
5. Distance From Urban Building Area	NA	NA	NA	NA
6. Distance To Urban Support Services	NA	NA	NA	NA
7. Size Of Present Farm Unit Compared To Average	10	0	0	0
8. Creation Of Nonfarmable Farmland	25	0	0	0
9. Availability Of Farm Support Services	5	5	5	5
10. On-Farm Investments	20	0	0	0
11. Effects Of Conversion On Farm Support Services	25	0	0	0
12. Compatibility With Existing Agricultural Use	10	0	0	0
TOTAL SITE ASSESSMENT POINTS	180	32	32	32

PART VII (To be completed by Federal Agency)

Relative Value Of Farmland (From Part VI)	Site A	Site B	Site C	Site D
100	50	49	51	45
Total Site Assessment (From Part VI above or a local site assessment)	180	32	32	32
TOTAL POINTS (Total of above 2 lines)	260	81	83	77

PART VI (To be completed by Federal Agency)
 Site Assessment Criteria (These criteria are explained in 7 CFR 658.51a)

Criterion	Maximum Points	Site A	Site B	Site C	Site D
1. Area In Nonurban Use	15	2	2	2	2
2. Perimeter In Nonurban Use	10	5	5	5	5
3. Percent Of Site Being Farmed	20	0	0	0	0
4. Protection Provided By State And Local Government	20	20	20	20	20
5. Distance From Urban Building Area	NA	NA	NA	NA	NA
6. Distance To Urban Support Services	NA	NA	NA	NA	NA
7. Size Of Present Farm Unit Compared To Average	10	0	0	0	0
8. Creation Of Nonfarmable Farmland	25	0	0	0	0
9. Availability Of Farm Support Services	5	5	5	5	5
10. On-Farm Investments	20	0	0	0	0
11. Effects Of Conversion On Farm Support Services	25	0	0	0	0
12. Compatibility With Existing Agricultural Use	10	0	0	0	0
TOTAL SITE ASSESSMENT POINTS	180	32	32	32	32

PART VIII (To be completed by Federal Agency)

Relative Value Of Farmland (From Part VI)	Site A	Site B	Site C	Site D
100	50	49	51	45
Total Site Assessment (From Part VI above or a local site assessment)	180	32	32	32
TOTAL POINTS (Total of above 2 lines)	260	81	83	77

Site Selected: A, B, C or D: (pending) Date Of Selection: (pending)
 Yes No

Reason For Selection:
 Sites A, B, C and D differ only in the extent of right-of-way taking required by the proposed alternatives to improve the intersection of Kahekeili Highway and Likelike Highway. Sites A, B and C represent interchange proposals. Site D represents an at-grade intersection improvement.

Use instructions on reverse side.
 Total Acres in Site is defined as the total acres of land with soils that have potential for agricultural use.
 Form AD-1006 (10-83)

HWY-PA
 2-9602u

OCT 27 1987


Mr. William R. Lake
 Division Administrator
 U.S. Department of Transportation
 Federal Highway Administration
 Box 50206
 Honolulu, Hawaii 96850

Dear Mr. Lake:

Federal Protection Policy Act (FPPA)
 Kahekeili Highway Widening and Interchange
 Project Nos. 63F-01-75 and 63A-05-08

Attached are Form AD-1006 (Farmland Conversion Impact Rating), a project location map, illustrations of Schemes A-4 (Site A), B-1 (Site B), and C-1 (Site C) for the proposed Kahekeili Interchange, and an illustration of an alternative for just improving the at-grade intersection (Site D).

Please transmit the attachments to the U.S. Department of Agriculture, Soil Conservation Service, for their evaluation.

Very truly yours,

 Edward Y. Hata
 Director of Transportation

OL:gm
 Attachments
 cc: HWY-PA

UNITED STATES
DEPARTMENT OF
AGRICULTURE

SOIL
CONSERVATION
SERVICE

P. O. BOX 50004
HONOLULU, HAWAII
96850



U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

REGION NINE
Hawaii Division, P.O. Box 50206
Honolulu, Hawaii 96850

December 2, 1987

December 16, 1987
REC-91

Mr. William R. Lake, Administrator
Hawaii Division
Federal Highway Administration
U.S. Department of Transportation
Box 50206
Honolulu, HI 96850

Mr. Edward Y. Hirata, Director
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Lake:

Subject: Farmland Protection Policy Act (FPPA)
Kahekihi Highway Widening and Interchange

Enclosed is Form AD-1006 with Parts II, IV, and V completed as requested.

If you have any questions, please call Harry Sato at 541-2605.

Sincerely,

W. H. Mamm
RICHARD M. DUNCAN
State Conservationist

Enclosure

cc: Stratford Whiting, DC, SCS, Honolulu FO

Dear Mr. Hirata:

Subject: Hawaii Project F-083-1() and F-063-1(), Farmland Protection Policy Act (FPPA), Kahekihi Highway Widening and Interchange

Please refer to your letter of October 27, 1987, HWY-PA 2.98026 which transmitted copies of Form AD-1006 (Farmland Conversion Impact Rating) for the Kahekihi Highway Widening and Interchange alternatives.

The U.S. Soil Conservation Service has completed their portion of the rating sheet. A copy is enclosed.

Please complete Part VI per 7 CFR 659.5(b), Part VII and the remaining portions of Form AD-1006. A copy of the final rating sheet should be provided to this office.

Sincerely yours,

William R. Lake
Division Administrator

W. L. Arthur
By: W. L. Arthur
Assistant Division Administrator

Enclosure

RECEIVED
Dec 18 9 24 AM '87
DEPT. OF TRANSPORTATION
HAWAII DIVISION

RECEIVED
STATE DEPARTMENT
OF TRANSPORTATION
PLANNING BRANCH
Dec 18 2 26 PM '87

PA

HWY 4891
HWY-PA
2.98862

JAN 14 1968

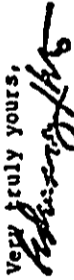
Mr. William R. Lake
Division Administrator
U.S. Department of Transportation
Federal Highway Administration
Box 50206
Honolulu, Hawaii 96850

Dear Mr. Lake:

Farmland Protection Policy Act (FPPA)
Kahakili Highway Widening and Interchange
Project Nos. 83F-01-75 and 63A-05-68

We have completed Step 6 of Form AD-1006, Farmland Conversion
Impact Rating. A copy is enclosed for your determination of
consistency with FPPA.

Very truly yours,



Edward Y. Hirata
Director of Transportation

OL:gm

Enclosure

✓cc: HWY-PA



10/27/88



United States Department of the Interior
FISH AND WILDLIFE SERVICE
PACIFIC ISLANDS OFFICE
P.O. BOX 50167
HONOLULU, HAWAII 96850

OCT 26 1988

Mr. T. Hirano
Chief, Highways Division
State Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Hirano:

This responds to a request we received from your office yesterday for information on species under our jurisdiction which may be found in the vicinity of, or may be affected by, the proposed widening of Kahakili Highway in Kaneohe, Oahu. The work is to occur between Kahakili's intersections with Likelike Highway and Kaneohe Highway.

To the best of our knowledge there are no species of plants or animals which are listed as endangered or threatened which would be found in the vicinity of the construction nor are there any such species which would be affected by the project.

Thank you for allowing us to comment.

Sincerely yours,

Ernest Kosaka
Ernest Kosaka
Field Office Supervisor
Environmental Services

cc: Chief, SE-FWE, FWS, Region 1, Portland, OR (Attn: Swanson)

RECEIVED
OCT 27 9 22 AM '88
DEPT. OF TRANSPORTATION
HIGHWAYS DIVISION

RECEIVED
STATE DEPARTMENT
OF TRANSPORTATION
OCT 27 2 22 PM '88
HIGHWAYS DIVISION
PLANNING BRANCH

HWT-PA
2.79084

January 31, 1984

Mr. William Kramer
Office of Environmental Services
U. S. Department of Interior
Fish and Wildlife Service
300 Ala Moana Boulevard
Box 50167
Honolulu, Hawaii 96850

Dear Mr. Kramer:

Kahakili Highway Widening and
Interchange, Project Nos. 83P-01-75
and 63A-05-68

As part of the section 7 consultation process, we request your confirmation that there are no known listed or proposed endangered species within the project area.

Attached for your information is a copy of the stream survey study conducted for the project.

Very truly yours,

T. HARANO
Chief
Highways Division

DOISY
Enclosure

cc: HWT-PA
FWSA

JOHN HARRIS
DIRECTOR OF LAND

WILLIAM W. MITT, CHAIRMAN
COMMISSION ON LAND AND NATURAL RESOURCES



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF STATE PARKS
P. O. BOX 571
HONOLULU, HAWAII 96809

Doug Orimoto
Page 2
November 20, 1987

LESLIE S. LANGOLF
REPORT
ARCHAEOLOGICAL RESEARCH
PROGRAM
ARCHAEOLOGICAL RESEARCH
CONSTRUCTION AND UTILIZATION
RESEARCH PROJECTS
CONSTRUCTION
ARCHAEOLOGICAL RESEARCH
PROGRAM
CONSTRUCTION AND UTILIZATION
RESEARCH PROJECTS
CONSTRUCTION

November 20, 1987

MEMORANDUM

TO: Doug Orimoto
DOT Highways, Planning Division
1 Kapiolani

FROM: Ralston H. Nagata, State Parks Administrator and Deputy
State Historic Preservation Officer

SUBJECT: National Historic Preservation Act Compliance --
Kahekili Highway Widening and Interchange --
Kaneohe, Koolauloko, Oahu

During a meeting between you and Dr. Joyce Bath of our Historic Sites Section, the following consensus was reached:

1. The proposed interchange of Kahekili Highway and H-3 will adversely affect one of the sites of the Luluku Discontiguous Archaeological District. However, since this interchange is included in the H-3 historic preservation Memorandum of Agreement and this site has been scheduled for archaeological data recovery, following all procedures of the National Historic Preservation Act, it need not be addressed within the context of this project.
 2. The highway widening portion of the project will take place entirely on the inland side of the present highway. The alignment of the highway was never archaeologically surveyed. The majority of the land surface inland of the highway alignment has been altered by residential, highway and drainage construction, and is therefore unlikely to contain significant historic sites. There remains approximately 0.75 miles of highway right-of-way on the inland side of the road which is still unaltered by construction.
- Two of our staff archaeologists checked the 0.75 miles of right-of-way to evaluate the probability of the presence of historic sites and determine the necessity of archaeological survey. Based on the occurrence of, in particular, taro terrace agricultural sites in similar topographic contexts, our evaluation is that the inland right-of-way corridor should have a professional

archaeological survey between stations 89 and 125, as marked on the DOT construction maps. This survey should be designed to determine if historic sites are present and, if so, to gather sufficient information to evaluate each site's significance according to the criteria of the National Register of Historic Places.

We estimate that the survey should cost in the range of \$6,000 to \$9,000, depending on different archaeological contractors' cost variables. This estimate includes fieldwork (15 man days, or 5 field days using 3 surveyors) and report production (approximately 30 days preparation time, after the close of fieldwork).

Once the survey report is submitted to DOT, the federal agency involved and your agency must prepare a written submittal to the State Historic Preservation Officer stating whether significant historic sites are present or not and submitting the archaeological survey report as supportive document. Our office must then comment on your determinations. After this point, mitigation concerns can be addressed, if necessary.

RALSTON H. NAGATA

GEORGE A. BROWN
Chief Engineer



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
1001 KALANOAUENANUI STREET
HONOLULU, HAWAII 96813

WAYNE J. YAMASAKI
Director

DEPARTMENT OF TRANSPORTATION
JOHN W. BARNES, JR., P.E.
CHIEF ENGINEER
ADVISORY ENGINEER

PERMIT REFER TO
HWY-PA
2-82409

Mr. H. Kusumoto
Page 2
6:10 PM

HWY-PA 2-82409

Therefore, it would appear that the proposed work does not require a DA (404) Permit and that this proposed work would be permitted under 33 CFR, Part 330 - Nationwide Permits.

Mr. H. Kusumoto
Division Administrator
U. S. Department of Transportation
Federal Highway Administration
Box 50206
Honolulu, Hawaii 96850

Very truly yours,
Wayne J. Yamasaki
Wayne J. Yamasaki
Director of Transportation

Enclosure

Dear Mr. Kusumoto:
Kahekihi Highway Widening and Interchange,
Project No. 83F-01-75 and 63A-05-68

Transmitted herewith are two (2) copies each of the following for the Heeia Stream and Ahuimanu Stream Tributary crossings:

1. Plans and details.
2. Hydrologic and hydraulic calculations.

This information has been developed as the result of the presubmission meeting with the Corps of Engineers held on September 12, 1984.

We respectfully request that this information be forwarded to the Corps of Engineers, Construction-Operations Division for the purpose of determining whether a DA (404) permit would be required and whether the Corps would be a "cooperating agency" in the proposed action.

Our analysis of the data obtained from the U. S. Geological Survey indicates that the proposed work in Heeia Stream and Ahuimanu Stream Tributary would be above the "headwaters". The term "headwaters" is defined as the point on a non-tidal stream above which the average annual flow is less than five cubic feet per second.



U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

REGION FOUR

Hawaii Division
Box 50206
Honolulu, Hawaii 96813

November 2, 1984

REC-41

Mr. Wayne J. Yamasaki, Director
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Yamasaki:

Subject: Hawaii Project F-083-1(), Kahekili Highway
widening and interchange

Enclosed is a copy of the Corps of Engineers' letter dated October 30, 1984 which advises that the proposed Kahekili Widening and Interchange project is covered by provisions of the nationwide permit under 33 CFR 330.5(a) (26) (i).

The Corps of Engineers will therefore not participate as a cooperating agency in the preparation of the project Environmental Impact Statement.

Please note that the Corps' letter was in response to our letter dated October 16, 1984 and your letter to us dated October 10, 1984. Copies of these letters are also enclosed for your ready reference.

Sincerely yours,

H. Kusumoto
Division Administrator

By: *N. L. Arthur*
N. L. Arthur
Assistant Division Administrator

Enclosures

RECEIVED
Nov 13 10 45 AM '84
DEPT. OF TRANSPORTATION
HIGHWAY DIVISION



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

October 30, 1984

Operations Branch

Hawaii Division
Box 50206
Honolulu, Hawaii 96850

October 16, 1984

HCM-HI

Mr. Kisuk Cheung, Chief
Engineering Division
U.S. Army Corps of Engineers
Pacific Ocean Division, Bldg 230
Fort Shafter, Hawaii 96858

Attention: Construction Operations Division (PODCO-O)

Dear Mr. Cheung:

Subject: Hawaii Project F-083-1(), Kahakili Highway Widening
and Interchange

Enclosed for your consideration is the Hawaii Department of
Transportation's letter of October 10, 1984 with attachments
regarding their compliance with 33 CFR Part 330 - Nationwide
Permits, for the subject project.

Our review of the State's submittal indicates that the proposed
work does not require a DA (404) permit; however, we request
your review comments including a determination whether the
Corps of Engineers will be a cooperating agency on the
proposed project.

The hydrologic information provided by the State was requested
by Messrs. John Emerson and Mike Lee (PODCO-O) during a joint
FHWA/COE/State project coordination meeting held on
September 12, 1984.

Sincerely yours,

H.
H. Kusumoto
Division Administrator

Enclosure

Mr. H. Kusumoto
Division Administrator
U. S. Department of Transportation
Federal Highway Administration
Box 50206
Honolulu, Hawaii 96850

Dear Mr. Kusumoto:

In response to your letter dated October 16, 1984 on the
Kahakili Highway Widening and Interchange, we have reviewed the
plans as well as the hydrologic information provided by the State
with respect to Department of the Army (DA) permit requirements.

Our review indicates that the proposed work at the Heeia
Stream and Ahuimanu Stream Tributary crossings is authorized under
the provisions of the nationwide permit 33 CFR 330.5(a)(26)(1),
which allows such work in non-tidal rivers or streams, that are
located above the headwaters. Based on the hydrologic
information, the activities are located in streams with an average
annual flow of less than 5 cubic feet per second. Consequently,
the subject project will not require an individual DA permit
application.

This determination of DA permit requirements is based on the
plans for stream crossings associated with the total highway
widening project. It is our understanding that no fill is to be
placed in wetland areas adjacent to the streams. Since the
proposed project will be covered under a nationwide permit, the
Corps of Engineers does not need to participate as a cooperating
agency. If you have any questions on this matter, please call the
Operations Branch at 438-9258.

Sincerely,

Everette A. Flenders
Chief, Construction-Operations
Division

Copy Furnished:

Mr. Wayne Yamasaki
Director of Transportation
State of Hawaii

5186

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

EMIKO I. KUDO
DIRECTOR



BILEEN B. ANDERSON
111900

WALTER M. OLSON
DIRECTOR

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



RECEIVED
OCT 19 11 26 AM '87
DEPT OF TRANSPORTATION
PLANNING DIVISION

FRANK P. TAN
111900

DIRECTOR'S OFFICE
OCT 31 11 42 AM '83
TRANSPORTATION

October 26, 1983

Honorable Ryokichi Higashinoma
Director
Department of Transportation
860 Punchbowl Street
Honolulu, Hawaii 96813

Dear Dr. Higashinoma:

SUBJECT: WIDENING OF KAHAKILI HIGHWAY AT KANEHOE DISTRICT PARK

Your proposal for widening of Kahakili Highway and use of a part of Kanehoe District Park land as shown on your revised plan, dated August 9, 1983, is acceptable. Section B-8 as shown on that plan would improve and expand the usable part of the park by flattening the existing steep slope to a 10 percent slope to the proposed retaining wall. Since you are proposing the use of a steep sloping area of the park for widening the highway and you are proposing to make more usable park land, we feel that your plans will be beneficial to Kanehoe District Park.

We would appreciate receiving a set of construction plans for the Kahakili Highway Widening Project in the area that it affects Kanehoe District Park. A park use permit must be obtained by the contractor from our Permit Section prior to any work done in our park.

Sincerely yours,
Emiko I. Kudo
(Mrs.) EMIKO I. KUDO, Director

EIK:VC

RECEIVED
STATE DEPARTMENT
OF TRANSPORTATION
OCT 20 11 20 AM '87
PLANNING BRANCH

October 14, 1987

Mr. Tetsuo Harano, Chief
Highways Division
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Harano:

Subject: Kahakili Highway Widening Notice of Preparation of EIS
for FAP 83 THK: 4-3-23-9 and 10; Ref. HMY-PA 2-97030

Kanehoe District Park is the only facility of the Department of Parks and Recreation that will be directly affected by the widening of Kahakili Highway and that effect is not expected to be adverse. The full 120-ft. right-of-way for a future four-lane divided highway was established when the two-lane highway was constructed so no taking of park land is anticipated.

It is requested that at least a maula side sidewalk/bikeway slightly higher than the traveled surface be incorporated in the highway widening plan between Kuluoke Street in Kapunahala and the Haku Road intersection. This would serve to protect the considerable pedestrian and bicycle traffic to and from the district park on Kahakili Highway.

Sincerely,

Walter M. Olson
FOR
HIRAM K. KAMATA, Director

HKK:ei



DEPARTMENT OF BUSINESS AND ECONOMIC DEVELOPMENT

STATE OF HAWAII
DEPARTMENT OF BUSINESS AND ECONOMIC DEVELOPMENT
1555 ALI'OLE DRIVE, SUITE 200, HONOLULU, HAWAII 96813
TELEPHONE: 521-2200

Ref. No. P-7290 HAWAII STATE ARCHIVE

September 21, 1987

Aug 43.15
JOHN WAHIE
GOVERNOR
ROGER A. UIVELING
DIRECTOR
MURRAY E. TOUILL
DEPUTY DIRECTOR
S. 23
BY PH '87
OFFICE OF TRANSPORTATION
HONOLULU, HAWAII

State of Hawaii, Department of Business and Economic Development
(September 21, 1987)

The EIS will include a discussion of the relevant objectives and policies of the Hawaii CZM Program, as specified in Chapter 205A, Hawaii Revised Statutes.

MEMORANDUM

TO: The Honorable Edward Y. Hirata, Director
Department of Transportation

ATTN: Tetsuo Harano, Chief
Highways Division

FROM: Roger A. Uiveling

SUBJECT: Environmental Impact Statement Preparation Notice, Kahekili Highway
Widening and Interchange

We have reviewed the subject document and have the following comment with respect to the Hawaii Coastal Zone Management Program.

The EIS should include a discussion of relevant objectives and policies of the Hawaii CZM Program, as specified in Chapter 205A, Hawaii Revised Statutes.

Thank you for the opportunity to review this preparation notice.

Murray E. Touill

10/2/89



OFFICE OF STATE PLANNING
Office of the Governor
STATE CAPITAL, HONOLULU, HAWAII 96825

TEL: 521-1100 FAX: 521-1101

Ref. No. P-9795

August 2, 1989

MEMORANDUM

TO: Dr. Marvin T. Miura, Director
Office of Environmental Quality Control

SUBJECT: Draft Environmental Impact Statement (DEIS), Kahakill Interchange and Widening Project, Kaneohe, Hawaii

We have previously reviewed the subject project relative to Hawaii's Coastal Zone Management (CZM) Program and issued our conditional concurrence on July 31, 1989. In addition, we are awaiting acceptance by the Department of Transportation of our conditions. A copy of our CZM consistency conditional concurrence is enclosed for your reference.

Thank you for the opportunity to provide our comments. Please feel free to call our CZM office at 548-8465.

Harold S. Masumoto
Harold S. Masumoto
Director

cc: U.S. Department of Transportation, Federal Highway Administration (w/enc.)
Department of Transportation, State of Hawaii (w/enc.)

RECEIVED
AUG 8 9 53 AM '89
DEPT. OF TRANSPORTATION
HIGHWAYS DIVISION

Ref. No. P-9775

July 31, 1989

MEMORANDUM

TO: The Honorable Edward Y. Hirata, Director
Department of Transportation

SUBJECT: Hawaii Coastal Zone Management (CZM) Program Federal Consistency for the Kahakill Interchange and Widening Project, Kaneohe, Hawaii (P/89-025)

This is to inform you that we have reviewed your assessment of the subject activity's consistency with Hawaii's CZM Program and concur with your finding that the primary route on the Kahakill Highway from the Kahakill Interchange in Kaneohe to Kaneohe Highway near the Kahakill Stream is consistent, provided upon the following conditions.

1. Appropriate measures to mitigate sediment runoff during and after construction such as those proposed in the Draft Environmental Impact Statement (DEIS) will be implemented.
2. Stream flows at stream crossings will be maintained and not restricted.
3. Because the DEIS identifies the alternative highway corridors as having considerably more environmental impacts such as stream siltation, ecological degradation, and adverse impacts such as water quality, aquatic habitats, archaeological resources and visual impacts, we are unable to concur with the alternative highway corridors at this time (DEIS Chapter 11, Section D). In the event that the alternative highway corridors are selected, additional information regarding environmental impact mitigation will be required to assure that use of the corridors will comply with the (CZM) Program.

A copy of this letter we are informing the U.S. Department of Transportation, Federal Highway Administration, of our conditional concurrence. Your written acceptance of the conditions or objection to them should be submitted to us by August 18, 1989, with a copy to the Federal Highway Administration.

The Honorable Edward Y. Hirata
Page 2
July 31, 1989

State of Hawaii, Office of State Planning, Office of the Governor
(August 2, 1989)

The Department of Transportation has accepted the conditions of
your CZM consistency requirements. See attached.

We appreciate your cooperation in complying with the CZM Program.
If you have any questions, please feel free to contact our CZM office at
548-6665.

Harold S. Kusimoto
Harold S. Kusimoto
Director

cc: U.S. Department of Transportation,
Federal Highway Administration
Department of Health
Department of Land and Natural Resources
Department of Land Utilization

-PA

DIR 6383

HNY-PA
2.7823

AUG 14 1989

MEMORANDUM

TO: Mr. Harold S. Masumoto, Director
Office of State Planning

FROM: Director of Transportation

SUBJECT: HAWAII COASTAL ZONE MANAGEMENT (CZM) PROGRAM,
FEDERAL CONSISTENCY FOR THE KAHAKILI HIGHWAY
WIDENING AND INTERCHANGE PROJECT

142.

We accept your consistency finding based on the conditions of
your letter of July 31, 1989.

Edward X. Hirata

Edward X. Hirata

OL:gm

bcc: FHWA, HNY-PA

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

CHAPTER VI

**MINUTES OF
PUBLIC INFORMATION
MEETINGS AND
PUBLIC HEARINGS**

**CHAPTER VI: MINUTES OF PUBLIC INFORMATION MEETINGS
AND PUBLIC HEARING**

Minutes of Public Information Meeting	February 22, 1983
Minutes of Public Information Meeting	February 24, 1983
Minutes of Public Information Meeting	February 25, 1983
Minutes of Public Information Meeting	March 28, 1983
Minutes of Public Information Meeting	August 15, 1983
Minutes of Public Information Meeting	December 16, 1987
Summary of Public Hearing	August 2, 1989

MINUTES OF MEETING

ON KAHEKILI HIGHWAY WIDENING AND INTERCHANGE

DATE: February 22, 1983
TIME: 7:30 P.M.
PLACE: Kaneohe Community and Senior Center

Mr. Ed Tsukasa, past president of the Kapunahala Community Association opened the meeting.

He stated that the purpose of this meeting is to obtain information from the Department of Transportation on the Kahekili Highway Widening and Interchange project. Also, the department is here to receive input from the community.

He introduced Mr. George Shigano from the Planning Branch of the department, who in turn introduced Mr. Jack Richardson, Commissioner of Transportation, Mr. Ah Leong Kam and Mr. Douglas Orimoto of the Planning Branch. He then called on Mr. Yoshinori Nakahodo of Park Engineering, Inc. to make a presentation of the project.

The following is a brief summary of the presentation:

1. The project begins at Likelike Highway and ends at Kamehameha Highway near Kahaluu Stream. The initial segment of Kahekili Highway was built by the City and County of Honolulu in 1966 under an improvement district. In 1974, the State constructed the connecting link to Kamehameha Highway. In both construction, extra right-of-way was acquired in anticipation of a future widening.
2. There is traffic congestion during the P.M. peak hours on the highway, at the intersection with Likelike Highway. Other intersections on the highway carry heavy traffic volumes during the peak hours.
3. A plan for improvements is as follows:
 - a. Widen Kahekili Highway
 - b. Construction a grade separated interchange

Kahekili Highway Widening
and Interchange
(Public Informational Meeting)
Page 2

4. Future Events:

- a. Public hearing in early 1984
- b. Preparation of an EIS
- c. This planning stage will end in late 1984

The following were the comments, questions and replies made after the presentation.

Mr. Tsukasa opened with the question as to what is the status of the access to the Kapunahala Subdivision on the mauka side of Kahekili Highway in the interchange plan.

Mr. Shigano stated that the project planning is starting over again (on the basis of a combined project of widening and interchange). Therefore, the access problem will be addressed again in the development of new alternative plans.

In response to a question as to whether Likelike Highway cannot be lowered in the interchange plan, Mr. Shigano said that we would encounter drainage problems in such a plan. However, it will be looked into again.

Will there be a pedestrian overpass? So far, it cannot be justified on the basis of the number of pedestrian who would use it.

Will there be a traffic light at Kulukeoe Street? As of now, there are no definite plans; the interchange plan will be restudied.

How far down along Kahekili towards Kulukeoe Street are the houses affected by the proposed interchange. Same answer as above.

The discussion that followed was on the proposed interchange on exhibit tonight and the following comments were made from the audience:

1. If we tried to underpass Kulukeoe, there will be a problem with underground water.
2. If Kulukeoe Street remains an at-grade intersection, traffic coming from Kahaluu and wanting to make a left turn towards Kaneohe Town would make it at Kulukeoe street, a short cut, instead of at Likelike Highway. This would cause congestion in the Kapunahala Subdivision.

Kahekili Highway Widening
and Interchange
(Public Informational Meeting)
Page 3

3. The North Shore traffic can bypass the interchange with direct connection to Kahekili Highway from H-3 in Haiku.
4. If the interchange and Bethany Gardens Subdivision are built, won't the access on the mauka side be from Keaahala Road through the back?
5. Which will be constructed first, the widening or the interchange?
6. How high are the ramps?
7. Can you get on the interchange from Kulukeoe Street? Will there be traffic lights?
8. How are the traffic volume estimates made?

There are traffic signals on Keaahala and Kahuhipa intersections; why isn't there any on Kulukeoe where traffic backs up? Signals warrants must be present not only on the main highway but also on the cross street. Kulukeoe Street doesn't have that much traffic. The backup is from Likelike Highway. The questioner disagreed and asked why wasn't any study made on the Kulukeoe Street intersection?

How is the drain problem addressed? Normally, any deficient drainage culvert crossing will be supplemented or replaced with one of adequate size.

In closing, Mr. Tsukasa stated that his committee will consider the information received tonight and work on recommendations. Also, the public informational meeting will be held on February 25, 1983, 7:30 P.M. at the Heeia Elementary School.

Minutes written by


Yoshinori Nakahodo, Park Engineering, Inc.

MINUTES OF MEETING
PUBLIC INFORMATION MEETING
ON KAHEKILI HIGHWAY WIDENING AND INTERCHANGE

DATE: February 24, 1983

TIME: 7:30 P.M.

PLACE: Ahuimanu Elementary School, Kaneohe, Oahu

PRESENT:

Commissioners: Jack Richardson
Kenneth Crow
Bill Nakamatsu

DOT Staff: Tetsuo Harano, Highways Division Chief
Ah Leong Kam, State Transportation Planner
Edward Ochiai, Chief Rights-of-Way Officer

Consultant
for Project: Yoshinori Nakahodo, Park Engineering, Inc.

Public Attendance: 34 People

Commissioner of Transportation, Jack Richardson, opened the public informational meeting on the Kahekili Highway Widening and Interchange project.

He declared his appointment as commissioner and that he is chairing this meeting on behalf of the Director of Transportation. He introduced his fellow commissioners and the DOT staff.

Mr. Richardson stated that the purpose of this public informational meeting is to inform you the present status of the plans and the anticipated time frame of the proposed project. Also that this meeting is part of the community involvement program of the Department of Transportation. He then set forth the procedures and rules to follow in making statements and asking questions from the audience. He emphasized that we are not here to debate but to solicit factual information from the public. He mentioned that the statements will be recorded.

Kahekili Highway Widening
and Interchange
(Public Informational Meeting)
Page 2

He called on Mr. Yoshi Nakahodo of Park Engineering to make the presentation for the Department of Transportation. The following is a brief summary of the presentation:

1. The project begins at Likelike Highway and ends at Kamehameha Highway near Kahaluu Stream. The initial segment of Kahekili Highway was built by the City and County of Honolulu in 1966 under an improvement district. In 1974, the State constructed the connecting link to Kamehameha Highway. In both construction, extra right-of-way was acquired in anticipation of a future widening.
2. There is traffic congestion during the P.M. peak hours on the highway, at the intersection with Likelike Highway. Other intersections of the highway carry heavy traffic volumes during the peak hours.
3. A plan for improvements is as follows:
 - a. Widen Kahekili Highway
 - b. Construct a grade separated interchange
4. Future Events:
 - a. Public hearing in early 1984
 - b. Preparation of an EIS
 - c. This planning stage will end in late 1984

The following were the comments, questions and replies after the presentation:

Mr. Ed Stevens, Chairman of the Kahaluu Neighborhood Board stated that the board has made a detailed study of the EIS Preparation Notice and has responded in writing. He gave the following excerpt from the response.

While the board realizes that there is a clear need for roadway safety and vehicular flow improvements along the entire length of the highway, it is concerned about the growth substance and the emphasis on automobile and improvement priority implied in that preparation notice. The response dealt with three areas:

1. Traffic increases shown in the bar graphs of the presentation are based on faulty growth assumptions. If the general and development plans of the City and County are put into effect, those growths will not be generated.

Kahekili Highway Widening
and Interchange
(Public Informational Meeting)
Page 3

2. Overemphasis on automobile solutions and not enough on factors such as bus service, bikeway, park and ride, etc.
3. The first priority should be a complete improvement of all intersection without widening the highway between them. Improvements should include turning lanes, light synchORIZATION, shoulders, separated bikeway, etc. The second priority, Alternative "A" is to construct a grade separated interchange at Likelike Highway and widen Kahekili to 4 lanes from Likelike to Haiku Road. Second priority, Alternative "B", no interchange, no widening, but improvements in other areas in Kaneohe, especially the Kamehameha-Kahekili intersection at Hygienic Store.

Mr. J. R. Muckridge, President of the Kaaawa Community Association, noticed that there are no sewer lines shown on the plans. Would future lines be installed after the road improvements are made?

Mr. Nakahodo replied that sewer lines will be accommodated where there are future plans for development. We have not gone that far in the planning of the highway improvements.

Mr. Richardson introduced State Rep. Terrance Tom, who had just come to the meeting.

Mr. (J. Haas) ? questioned the usefulness of the Kahekili Interchange wherein traffic must stop for a red light less than a mile from the interchange. Also, what is the cost of the proposed improvements.

Mr. Nakahodo stated that the interchange would handle the tremendous traffic volumes on Likelike Highway, whereas traffic signals would handle the Kahekili traffic reasonably well after the highway is widened. We have not gone so far in the planning as to have a cost estimate of the proposed improvements

Mr. Bruce Shimamoto asked how much more traffic would a four-lane highway carry after the widening. Does increase in capacity mean improved flow of traffic?

Mr. Nakahodo gave the following answer. At the Likelike intersection, the critical movement is the left turn movement into Kahekili Highway. An additional left turn lane would increase that movement by roughly 400 to 500 vehicles per hour. Increasing capacity generally will improve the traffic flow, but the conflicting movements will govern the flow. In this case, the heavy left turn volume is in conflict with the through traffic from the opposite side and we say that widening at the intersection is not enough and that we need an interchange.

Kahekili Highway Widening
and Interchange
(Public Information Meeting)
Page 4

In response to Mr. Shimamoto's query on what the DOT has done in recent years to improve Kahekili Highway prior to this widening proposal, Mr. Harano mentioned that the construction of left turn storage lanes at the intersection and the installation and synchronization of the traffic signals are improvements which DOT has made in recent years.

Mr. Shimamoto continued with comments about the big step from the prior improvements to the widening proposal. He maintained that he has not seen the traffic signals synchronized, signals controlled manually or other constructive improvements.

In reply to Mr. Shimamoto's question on the sources of fund for the project, Mr. Harano stated that the State will have to seek future funding. Right now we have only the preliminary funding. It will be eligible for federal aid. Federal funding isn't appropriated for a particular project but is available for use in projects which become available.

Mr. Charles Reppun, a farmer, commented that in the EIS preparation notice the State's proposals are being made without backup data or analysis, and the alternatives are not feasible. Another question is where is all this traffic going. It is going to be backed up from Likelike Highway. He pointed out the contradiction between the need for the highway improvement which is the increased growth in this area and one of the social impacts which is an accelerated growth rate. It seems like a short term solution. Why plan only up to the Year 2003.

Mr. Reb Bellinger commented that not enough specific information is being given in this meeting. No alternatives to the plan shown tonight are given, no scheduling, phasing and costs are given.

Mr. Richardson commented that this is only the first informational meeting and we do want the public's comments and questions.

A gentleman who lives on the corner of Kahekili and Haiku Road expressed concern about the highway widening encroaching his property and family.

Mr. Nakahodo stated that the State would be installing safeguards as far as it is practicable in residential areas in close proximity to the highway widening.

Representative Tom expressed his opinion that everybody here is in favor of improving the traffic conditions on Kahekili Highway. However, it appears that a lot of questions being asked are not being answered. Still, he is happy that there will be more hearings. How many more hearings or input meetings does the Department plan to have. What kind of time table for project. What is the cost?

Kahekili Highway Widening
and Interchange
(Public Informational Meeting)
Page 5

Mr. Harano answered as follows: We do intend to hold a number of these meetings before finalizing these plans. As for the time frame, we do not have the funding; therefore, the project is 4 or 5 years down the road. As for inconvenience, we hope to lessen it because the existing highway will be in use during the widening.

In reply to Rep. Tom's additional query, Mr. Harano stated that the project was started a number of years ago, but, it was suspended for 4 or 5 years. We would have to go to the legislature for additional funding. It takes 7 or 8 years for these projects to develop and as we move ahead, will have these informational meetings to seek your input to accommodate the needs of the community.

Mr. Richardson introduced Representative Bob Nakata at this time.

Rep. Nakata asked if it is not more realistic to talk in terms 6 to 8 years before this project gets underway when H-3 is completed at the Likelike Highway.

Mr. Harano replied that Kahekili Highway project should stand by itself. He confirmed Rep. Nakata's point that the Department cannot seek early funding because of the tight fiscal situation.

In response to a question as to why the project was suspended, Mr. Harano stated that there were other projects elsewhere in the State with higher priority. Because of the way the project was proceeding at that time as two separate projects, the State felt that it shouldn't be moved. As to whether H-3 had anything to do with it, the answer was no.

In reply to a question regarding alternatives, Mr. Nakahodo stated that he hoped to have alternate plans for the future meetings.

Asked if the same expense will be put into alternative plans as that put into the plans exhibited tonight, Mr. Nakahodo replied yes if there is sufficient merit in the alternative.

On the questions as to whether this proposal is only for the benefit of the area mauka of Kamehameha Highway between Likelike Highway and Hygienic Store, Mr. Nakahodo expressed that any highway has an effect on adjacent areas in that an improved highway would draw traffic away from the roads in the neighboring areas.

Kahekili Highway Widening
and Interchange
(Public Informational Meeting)
Page 6

Mr. Harano stated that he will check on the operating condition of the existing traffic signals in response to the complaint that the cross traffic gets the priority over Kahekili traffic. He briefly explained the workings of the cross traffic detector control system. He will check with the City who operates the system, although the State installed the signals.

A lady who lives in Kahaluu expressed hope that some compromised measure to improve Kahekili Highway can be reached because she being a user of the highway would welcome improvements to lessen congestion on the highway.

Ed Stevens stated that their board realizes that traffic safety and flow must be improved. However, their point is that an added lane does not necessarily increase capacity. They would like to see solutions to improve flow and not adding backup lanes.

There being no further comments and questions, Mr. Richardson advised the audience that if they wished further information on the proposed Kahekili Highway Widening and Interchange Project, they may write the Department of Transportation or call Mr. George Shigano at 548-3258.

The staff of the Department of Transportation will weigh the effects of your input and recommendations presented tonight together with factual data they already have.

Additional conferences between the Department's staff and local officials, and others may be required in order to finalize the action that will best serve the public interest.

Meeting adjourned at 9:30 P.M.

Minutes written by


Yoshinori Nakahodo, Park Engineering, Inc.

Minutes of Meeting
Commission on Transportation
(Public Informational Meeting)

Date: February 25, 1983

Time: 7:30 p.m.

Place: Heeia Elementary School, Kaneohe, Oahu

Present:

Commissioners: Paul Matsumoto, Chairman
William Kennison
Jack Richardson
Keith Oda
Chew Hoy Lee
Norrie Thompson
Mark Tanaka
David Hasegawa
Duane Black

DOT Staff: Tetsuo Harano, Highways Division Chief
Ah Leong Kam, State Transportation Planner
Edward Ochiai, Chief Rights-of-Way Officer

Consultant for Project: Yoshinori Nakahodo, Park Engineering, Inc.

Public Attendance: 60 People

Chairman Paul Matsumoto convened the meeting, introduced Commission members and explained the role of the Commission.

He also introduced:

The DOT Staff
The Consultant for the project
State Representative Terrance Tom
State Senator Charles Toguchi.

He called on Commissioner Jack Richardson to preside over the meeting.

Highway Activities

Mr. Richardson stated that the purpose of this public informational meeting is to inform the public of the future plans of the proposed Kahekili Highway Widening and Interchange project and that this is part of the community involvement program of the Dept. of Transportation. He then set forth the procedures and rules to follow in making statements and asking questions from the audience and stated that the proceedings will be recorded.

He called on Mr. Nakahodo to make the presentation of the project. The following is a brief summary of the presentation:

- 1) The project begins at Likelike Highway and ends at Kamehameha Highway near Kahaluu Stream. The initial segment of Kahekili Highway was built by the City and County of Honolulu in 1966 under an improvement district. In 1974, the State constructed the connecting link to Kamehameha Highway. In both construction, extra right-of-way was acquired in anticipation of a future widening.
- 2) There is traffic congestion during the P.M. peak hours on the highway, at the intersection with Likelike Highway. Other intersections on the highway carry heavy traffic volumes during the peak hours.
- 3) A plan for improvements is as follows:
 - a. Widen Kahekili Highway
 - b. Construct a grade separated interchange
- 4) Future Events:
 - a. Public hearing in early 1984
 - b. Preparation of an EIS
 - c. This planning stage will end in late 1984

Statements and questions were as follows:

Mrs. Jackie Ingledue inquired about some markers she found in her property in Haiku.

Mr. Nakahodo explained that those were probably survey markers which are used to locate existing features in the vicinity.

Mr. Evans Yim, representative of a Kaneohe business group, expressed approval of improving the road system. However, he thinks the plans do not show improvements in turning lanes on Kahekili.

Mr. Harano stated that turning lanes will be a part of the details of the improvement plans as the project develops.

Mr. John Macadangdang of Kapunahala whose property abuts Kahekili Highway on the Waikiki side of Kuluokee asked 1) what will happen to the crossing at Kuluokee and 2) how many properties on the mauka side will be affected.

Mr. Nakahodo replied that we (State) are still working on the plans for the Kuluokee intersection and at this time do not have a firm plan.

Mr. Harano added that we are still in the preliminary stage of the development of these improvements and as we move ahead in our planning studies, we will be looking at these specific problem areas in more detail. We will maintain contact with communities such as yours and there will be future meetings when we can give you more specific information.

In response to a question by a lady in audience, Mr. Harano replied that we think the mauka side of Kahekili Highway (near Kuluokee Street) will be affected, but we are not sure to what extent.

Another lady asked how far beyond Kuluokee (Kahaluu side) will the mauka side be affected.

Mr. Nakahodo replied that as far as the present plan shows, the project does not affect properties beyond Kuluokee. At this stage we cannot say exactly where we will tie into Kahekili.

Mr. Albert Fukushima of Community Planning Inc., planning consultants to two abutting property owners, Iolani School and Midpac Lumber, which is the developer of Bethany Gardens, requested that with the proposed taking of the right-of-way for the interchange, adequate access be given to the abutting properties.

Mr. Dave Simon of Kuluokee Street made a statement about taking of property and access.

RECEIVED
COMMUNITY PLANNING
INC.
1970
MAY 19 10 00 AM
1970

In response to a gentleman inquiring about improving the existing traffic signal systems, Mr. Harano replied that we will certainly study each of the intersections to see if we cannot improve the traffic signal system with traffic actuation and inter-connection.

Mr. Dudley Oldherst of Mount Terrace commented that for the Kahekill Interchange, the State is proposing a system of roads that go from 4 lanes to 3 lanes to 2 lanes on Likelike Highway.

Mr. Harano stated that the interchange plan was developed a number of years ago and it is presented tonight as a preliminary plan which could be adapted to the present planning. The laneage will be studied again.

State Representative Marshall Ige requested special meetings for the Kulukeoe Street people.

Mr. Harano stated that the State will be happy to meet with them to work on the problem. He also assured the people that the State does not intend to close any of the accesses.

Mr. Richardson apologized for not recognizing State Representative Ige earlier.

A resident of Haiku inquired if an alternate route going around Valley of the Temples and Haiku Plantations and connecting to H-3 is a possibility.

Mr. Nakahodo replied that all possible alternatives will be looked into. The alignment mentioned is being studied; but at this time, we do not have an answer as to its feasibility.

In reply to an inquiry by the same resident about pedestrian overpasses, Mr. Nakahodo stated that they have been mentioned in discussions, but at this point in time, we have not gone that far in our study. We are still in the stage of looking at alternatives for the overall improvements. The same man asked what kind of barriers, including noise barriers, are planned for the boundary of the widened highway.

Mr. Nakahodo stated that barriers are another detail in the study.

Mr. Ed. Tsukasa of Kapunahala Community Association stated that they will discuss their problems among themselves and submit written comment and questions to the State.

Responding to a gentleman asking about the schedule of the project, Mr. Harano stated that we are still in the preliminary stages of project planning and it will take a number of years for the planning and design stage before going out to construction. Considering the tight financial situation of the State, we feel that this project is for a number of years in the future.

A resident of Kahuhipa Street is in favor of getting home quicker on the highway and asked if it is proper to ask for a straw vote to see how many are in favor of the proposed improvements and how many against. Mr. Richardson informed him that this was an informational meeting and its purpose does not include voting on the issue.

Mr. Evans Yim, who spoke earlier, asked if Kamehameha Highway from Kaneohe town towards Kahaluu cannot be improved with a better connection to Kahekili Highway.

Mr. Harano replied that section of Kamehameha Highway is a part of the City and County road system. If there is need for improvement, it should be done by the City and County.

At the request of Mr. Danny Smith, Mr. Harano confirmed that a portion between Kaneohe Bay Drive and Kahekili Highway is a part of the City of County road system.

A gentleman posed a question. Wouldn't the widening of the highway mean more housing in Kahaluu.

Mr. Harano replied that highway projects are based on the need of the motoring public. The development of land is controlled by land use and zoning requirements. Our highway planning is based on approved land use plan and zoning.

The same gentleman expressed that development should be in Honolulu; particularly in Kakaako. Isn't there coordination among the government agencies.

Mr. Harano replied that there is total coordination. There is a development plan which has been reviewed and approved. It is this plan and zoning, and not the highway, which determine what will be developed.

A gentleman referred to the bar chart which indicated that 4,000 vehicles per hour go through the Likelike-Kahekili intersection during the P.M. peak hour in 1983. He asked how much faster can the people get home if the highway was widened to two lanes in each direction. How much more traffic can the widening take.

Mr. Nakahodo replied that the bar chart only showed that there are 4,000 vehicles per hour entering the intersection during the P.M. peak in 1983 and that the intersection as it is today cannot handle that volume of traffic.

Another gentleman pursued the previous man's line of questioning and asked what would be the capacity of the proposed interchange.

Mr. Nakahodo replied that it would be more than 5,000 vehicles per hour.

Senator Charles Toguchi expressed the following concerns:

- 1) Safety on highway
- 2) Safety of the residences along the highway
- 3) Highway noise
- 4) Length of the widening
- 5) Extension of the right-of-way for additional cuts and fills
- 6) Communication with the residents on the progress of the project

A gentleman commented that the widening won't help relieve traffic congestion because of traffic backups on Likelike and Kamehameha Highways.

Representative Terrance Tom expressed appreciation for all concerned for the group effort in this project. He has the following questions:

- 1) How long have we been in the planning stage?
- 2) How much longer until construction is completed?
- 3) Is it worth the people's time?
- 4) How much of a guarantee that the project is going to go?
- 5) How much will the construction, the noise, the air, the water and the land affect the residents here on the windward side in life style and living style?

Mr. Harano reviewed the history of the construction of Kahekili Highway. Subsequent to the initial construction, planning had been under way on the interchange and widening as separate projects. These projects were suspended to wait for certain development plans to be coordinated with the highway planning. At that stage the two projects were combined and the planning was resumed with the consultant involved.

Commission on Transportation
(Public Informational Meeting)
Page 7

As for the time table, it is difficult to establish because of the restraints in funding. Planning will take more than another year. After that a design phase, then if necessary, right-of-way acquisition and finally, the construction. So, even projecting optimistically, it will be 5 or 6 years.

A gentleman asked if the interchange design can be independent of H-3 and can there be alternate designs.

Mr. Harano replied that the Kahekili Interchange can stand on its own. We will be studying other schemes.

The same gentleman asked if less extensive type of improvements cannot be made for the more immediate improvements.

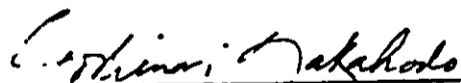
Mr. Harano replied that the State has made many "band-aid" types of improvements on Kahekili Highway over the years with the limited funding that was available.

There being no further comments and questions, Mr. Richardson turned over the meeting back to Mr. Matsumoto.

Mr. Matsumoto thanked the audience for its attendance and advised them that further information may be obtained by writing the Department of Transportation or calling Mr. George Shigano at 548-3248. He also stated that the staff of the department will weigh the input and recommendations presented by the audience together with factual data that it already has. Additional conferences between the staff, local officials and others may be required in order to develop the alternative action that will best serve the public interest.

The meeting was adjourned at 9:00 p.m.

Minutes written by


Yoshinori Nakahodo
Park Engineering, Inc.

DEPARTMENT OF TRANSPORTATION
MEMORANDUM FOR THE RECORD

HIGHWAYS

DIVISION

PLANNING

BRANCH OR SECTION

Date: 3/30/83

PURPOSE OF MEETING:

Meeting with Kapunahala residents to obtain input in the planning of Kahekili Interchange.

DATE, TIME & PLACE:

March 28, 1983; 7:30 p.m.; Kapunahala Elementary School

PARTICIPANTS:

Representative Marshall Ige
Kapunahala Residents - 28 people
SHD: Ah Leong Kam, George Shigano, Douglas Orimoto
Park Engineering: Yoshinori Nakahodo

BRIEF SUMMARY OF MEETING:

1. Representative Ige opened the meeting and introduced Mr. Kam.
2. Mr. Kam & Mr. Nakahodo provided brief background and status of project.

3. Kapunahala resident concerns:

- a. Time schedule for project.
- b. Anticipated traffic increase in the future. *Kulukeoe* *24,000*
(1982) 1204 *24,000*
(1983) 296 *1.75* *24,000*
- c. Safety for motorists and pedestrians from Kulukeoe St.
- Traffic lights and pedestrian overpass should be considered.
- d. Kulukeoe Street should not be closed.
- e. Noise increases with implementation of project.
- f. What are the right-of-way requirements along the Kapunahala subdivision?

Memo for the Record
Page 2
March 30, 1983

HWY-PA

- g. Connection to proposed access road for Bethany Gardens behind Kapunahala would be objectionable.
- h. What are the warrants for installation of traffic signals?

4. State Action Items.

- a. Develop alternatives to downgrade interchange and minimize impact.
- b. Plans should show r/w impacts.
- c. Check warrants for traffic signals at Kuluokee.
- d. Develop accident data.
- e. Provide warrants and traffic assignment to Representative Ige.
- f. Schedule info meeting thru Representative Ige when alternatives have been developed (in 3 to 4 months).

*total
(1-2) not in section
a. b. c.*

/gm


DOUGLAS ORIMOTO

MINUTES OF MEETING
ON KAHEKILI HIGHWAY WIDENING AND INTERCHANGE

DATE: August 15, 1983
TIME: 7:30 P.M.
PLACE: Kapunahala Elementary School
PARTICIPANTS: Representative Marshall Ige
Kapunahala Residents
SHD: Stanley Fujiyama, George Shigano, Douglas Orimoto
Park Engineering: Yoshinori Nakahodo

BRIEF SUMMARY OF MEETING:

1. Representative Ige opened the meeting and stated that the purpose of tonight's meeting is to obtain from the State, an update on the planning of the Kahekili Interchange.
2. Mr. Nakahodo gave a brief description of three additional alternative interchange schemes, an intersection widening plan, four alternative schemes for the Kulukeoe Street access.
3. Kapunahala residents' questions and concerns were as follows:
 - a. What are the bases for the selection of the alternative scheme to be adopted?
The selection will be based on traffic service, environmental impact and the economics of the scheme.

b. What is the schedule of events in the planning process?

A public hearing is expected to be held about January 1984 and the report on the plan selection and the final environmental impact statement will be completed a few months thereafter.

c. What is the impact of the interchange on the properties along Kahekili Highway?

The interchange schemes presented tonight effect four lots on the mauka side and two on the makai side. Only one is impacted to the extent that the residence will have to be removed.

d. What will the road construction be like in the vicinity of Kulukey Street?

A drawing of a typical section and general view was shown. Also, in the overpass scheme for the Kulukey access, the viaduct structure will be about 25 feet above the existing highway level. In the other schemes, the interchange overpass will come down to existing grade before reaching Kulukey Street.

e. Will there be drainage improvements?

Yes, wherever our studies show inadequacies.

f. What are the alternatives schemes for the Kulukey Street access?

- (1) At-grade intersection with Kahekili Highway
- (2) Overpass of Kahekili northbound lanes.
- (3) Combine with Bethany Gardens traffic
- (4) Connect to the Bethany Gardens access to Keaahala Road

g. Should the community recommend its preference for a scheme?

Yes.

h. Is there any way to allow a traffic signal at the Kuluokee Street-Kahekili Highway intersection?

The required technical warrants are not present but other approaches are being considered and tried.

Can old equipment be cannibalized and used here?

This is not desirable because of problems in operations and maintenance.

i. A pedestrian overpass at Kuluokee Street was mentioned as a possibility. However, the general feeling was that these overpasses were mostly bypassed and seldom used.

4. In closing, Representative Ige stated that he would like to meet with the community again and asked that they consider the alternatives and form an idea as to which one would be to their best interest.

Minutes written by:

Yoshinori Nakahodo
Yoshinori Nakahodo, Park Engineering, Inc.

**Minutes of Meeting
Commission on Transportation
(Public Informational Meeting)**

Date: December 16, 1987

Time: 7:37 p.m.

Place: Heeia Elementary School, Kaneohe, Oahu

Present:

Commissioner on Transportation:

Dwayne Black

Director of Transportation:

Edward Hirata

DOT Staff: Tit Mun Chun, Highway Design Branch Head
Ronald Tsuzuki, Highway Planning Branch Head
Clem Gondo, Rights of Way Branch Head

Consultant for Project:

Yoshinori Nakahodo, ParEn, Inc. dba Park

. Engineering

Public Attendance: 53 persons

Dwayne Black, Commissioner on Transportation, who chaired this public meeting on behalf of the Director of Transportation convened the meeting at 7:37 p.m.

He introduced State Senator Jimmy Wong, Representative Reb Bellinger, Representative Marshall Ige and Representative Terrance Tom.

Mr. Black stated that the purpose of this public information meeting is to:

1. Inform the public of the present status of the Department of Transportation's plans and anticipated time frames for the proposed project.
2. To identify those of you who have specific inputs and/or particular prospectives of value to the planning process.
3. To receive public input and recommendations for evaluation in the development of this project.

This public information meeting is a part of the community involvement program of the Department of Transportation. The purpose is not to debate, but solicit factual information from the public.

Director of Transportation, Edward Hirata, made a statement that he lives on the Windward side so he can empathize with the traffic problems that the Windward folks are facing because he faces them too on a day-to-day basis. He wanted to assure the people of this community that the State is doing everything possible to speed up the work to solve the traffic congestion problems on this side of the island.

He also said that the State wants to know exactly how the public feels about the project. The planning is tested that way, and the final product is better.

However, the State does have some financial constraints and we just don't have enough money to get it all done at one time, so we do need the public's understanding.

Ron Tsuzuki made the presentation of the project. He announced that a handout is available for this proposed Kahekili Highway widening and interchange project, which:

1. Provides a project location which shows the general location and limits of the project.
2. Has a brief description and scope of the proposed project.
3. Has the type of alternatives that we are considering for this project.

4. Describes the affected environment and the anticipated impacts.
5. Has information concerning the planning process for this project. This information provides a document that should help comments on this project.

The summary of his presentation was as follows:

The Kahekili Highway widening and interchange project is located between Likelike Highway in Kaneohe and Kamehameha Highway near Kahaluu stream. Kahekili Highway passes through Kaneohe, Heeia, Haiku and Ahuimanu.

The proposed project involves the construction of a traffic interchange at the intersection of Likelike and Kahekili Highways. It also includes the widening of Kahekili Highway to a multi-lane facility with a median from the interchange at Likelike Highway all the way to Kamehameha Highway. The project length is approximately 4.4 miles.

The regions surrounding Kahekili Highway has experienced considerable population growth. The traffic volumes on Kahekili Highway have grown along with the region's population growth. Average daily traffic on Kahekili Highway near the intersection of Likelike Highway has increased from about 15,500 vehicles in 1970 to over 27,000 vehicles at the current time. This increase in traffic with only minor increases in our highway capacity has caused the congestion that we experience today. The projected traffic for year 2008 is 32,000 vehicles per day.

The primary objective of this project are:

1. To relieve both present and future traffic congestion.
2. To improve traffic safety on our highway.

The alternatives being considered for the proposed improvements to Kahekili Highway can be categorized into two separate components.

1. Full interchange, scheme A-4.
2. Two partial interchanges alternatives, schemes B-1 and C-1.
3. Intersection widening only.

Kahekili Highway is being developed in three alternative lengths. These three lengths are:

1. Likelike Highway to Haiku Road
2. Likelike Highway to Ahuimanu Place
3. Likelike Highway to Kamehameha Highway

In each of the alternatives, the existing two lanes will be used for Kahaluu bound traffic. Between Likelike Highway and Haiku Road an additional lane will be built. Therefore, there will be three lanes between Likelike Highway and Haiku Road. This is to accommodate the heavier traffic that is projected for that area.

In the other direction, in the Likelike bound direction, two new lanes will be built on the mauka side of the existing highway. Between Haiku Road and Likelike Highway a third lane will also be constructed, also to handle this heavier traffic that's expected between Haiku Road and Likelike Highway.

At all of the intersections, left turn storage lanes, right turn acceleration lanes and deceleration lanes and also bus turn-outs will be included in both direction.

All of this will be constructed within the existing 120 feet wide right-of-way, except for the following cases.

1. At the Kaneohe District Park, the highway alignment must be shifted away from the park in order to avoid impacting the park during construction. Federal laws require us to avoid impacting any park. This shifting of the highway alignment will require the acquisition of the land across highway from the park.
2. Between Haiku Plantation and the Valley of the Temples area, additional slope easements will be required for the high cuts into the hillside and also the high fills into the gullies. These are necessary for the widening of the highway.
3. Near the end of the project on the Kamehameha Highway end we will require some acquisition from two lots on Kamehameha Highway. This is to provide a very smooth connection between Kahekili Highway and Kamehameha Highway.

The other segments of the widening will require retaining walls for cuts and fills adjacent to residential lots. Those retaining walls precludes any taking of residential lots.

The construction of the section from Likelike Highway to Haiku Road is tentatively scheduled to start in late 1990 and be completed in late 1992.

The schedule is only tentative and it is subject to funds being made available by the State Legislature and also the federal government. In this case the federal government may fund approximately 80% of the cost of this project.

The input we receive from the public will help us prepare a draft environmental impact statement, or an EIS. After that, we will hold a formal public hearing. Only after we have considered all of the comments received at that hearing and also on the draft EIS, will we make a final decision on this project.

Chairman Black announced the following panel to answer questions, comments and concerns, and clarify information:

1. Director Edward Hirata
2. Tit Mun Chun, Head of the Highway Design Branch
3. Clem Gondo, Head of the Rights and Way Branch
4. Yoshinori Nakahodo, of the ParEn, Inc. dba Park Engineering, the project consultant

Statements and questions were as follows:

Tom Sawal, co-chair with the transportation committee, the Kaha-luu Board, informed the meeting that the Board is in favor of the full interchange grade separation on Kahekili and Likelike. Also widening of Kahekili from Likelike through Haiku Road. However, they would like to see something done about the traffic signal system.

Donald Hayashi, a Kapunahala resident, stated that there been no major accident since traffic signals were installed at Kulu-keoe Street and thanked the department for the signals. He is concerned about the traffic from Castle Hills coming into Kapunahala; also, what barrier will you install for noise along the highway that would be elevated?

Mr. Nakahodo replied that:

1. The signals will remain.
2. We have several alternatives proposed for the Castle Hills access. We have not reached a conclusion as to which one should be recommended.
3. Part of our environmental impact statement includes a noise study and from that study we'll propose some noise barrier.

Tom from the Kaneohe Neighborhood Board stated that the Board was certainly concerned with solving the traffic problem. They favor the partial grade separation Scheme C-1, but did the State consider the development plan before designing these options.

Mr. Tsuzuki explained that projection of future traffic is based on the city's development plan.

Mr. Hirata stated that:

When you get to Ahuimanu, it's similar to Kaneohe, Kapunahala and everywhere else. This is not a rural area because you have urbanization. Traffic is backed up from Likelike Highway all the way back to Ahuimanu.

Martha member of the Kaneohe Neighborhood Board said that at its November meeting, Senator Jimmy Wong discussed the need for pedestrian overpasses at Haiku Road and in Ahuimanu. Is there consideration being made for pedestrian overpasses at those areas, especially if the highway is widened.

Mr. Nakahodo replied that we are looking at pedestrian overpasses.

Sam Rosdell asked if it would be correct to say that the chief difference between A-4 and C-1 is the way the mauka bound traffic from Kahekili will merge with Likelike and the H3 on-ramp.

Mr. Nakahodo replied, yes, exactly. In A-4 we grade separate the two movements so they don't have to cross over each other.

A member of Kapunahala Community Association asked for a more detailed explanation of the various schemes and what the State feels now is the recommendation. Also, has the benefit cost ratio been determined.

Mr. Nakahodo explained that in Scheme A-4, all traffic crossing each other are grade separated. The other schemes have more traffic conflicts. The benefit cost ratios are being calculated.

Representative Marshall Ige, a resident of Kaneohe, asked:

1. If pedestrian overpasses at Heeia, Keahala and possibly Kulukeoe are being considered.
2. Are their costs included in the cost estimates?
3. For an explanation of the realignment at Keaahala Road.
4. Will bike lanes be included?
5. How or where would the noise barrier be built?
6. How is the study of the noise barrier being communicated to the community?
7. Is there a study on pollution being done? Would the study report be ready for the residents to comment on it?

Mr. Nakahodo replied that:

1. Pedestrian overpasses are being considered for the intersections.
2. There are contingency amounts added to the major costs to cover the relatively minor costs.

3. There is a federal law that requires avoiding impacting any park if there are alternatives. At Kealahala Road, the alternative would be simply to move the alignment away from the Kaneohe District Park.
4. Bike lanes are being considered to be included in the widening of the highway. The shoulders along side the road will be 8 to 10 feet wide; therefore, the bike lanes can be incorporated in that width.
5. The noise barriers can be built right on top of the retaining walls or at the location where space is provided if a wall is needed.
6. This public meeting is one of the forums for communicating with the community.
7. There is an air quality study being made. The draft environmental impact statement is scheduled to be distributed in April or sometime about then.

Captain Boisse Correa of the Honolulu Police Department, the executive officer for the Kahuku, Waimanalo and Kaneohe, Kailua area. Everyday the police receive a phone call from the Kahekili area asking why are we jammed up in traffic, what are you doing about it. The police refer to traffic engineers, and try to handle them the best they can. Whatever needs to be done, should be done expeditiously as possible because the situation is bad going to worse.

Michael Randall, a resident of Kaneohe, living along Kahekili Highway beyond Haiku Road.

1. Traffic beyond Haiku Road really does not require a four lane highway. He feels that one of the major problems we have in Hawaii is we don't have enough roads. Is there any plan to improve the other arteries, Kaneohe Bay Drive and Kamehameha Highway, by improving the traffic signal system?
2. Will there be a noise abatement wall on the makai side? We would get noise increases because of the traffic density increase.

Mr. Tsuzuki: Kamehameha Highway out toward Kahaluu, actually is under the jurisdiction of the City and County of Honolulu. We can talk to the city about improving the timing of the signals. We are not changing the existing environment as far as moving the highway closer to the residences on the makai side. We are not sure what we can do about getting the federal government to participate in any kind of a noise abatement project for the makai side.

John _____ from the Koolau Baptist Church is concerned about three things.

1. The church is at the intersection of Kahekili and Likelike and has approximately 140 students up to 12th grade. Any type of construction is going to make it hard to keep teaching high school. It can be difficult even now some days when there's a lot of noise in traffic. How effective is a wall in reducing the noise?
2. The school sits below the road by about 15 to 20 feet, is the road going to be lowered 30 feet?
3. How would I be able to know what decision would be made?

Mr. Tsuzuki: We will be doing noise studies according to the EIS process and we'll continue our dialogue with you.

Rep. Bellinger, State Representative from the 15th district which includes Ahuimanu through Laie. He is concerned if we don't look at it in a broader, more long reaching type of program. What we're going to run into is a full series of stop and go's and end up with delays upon delays. He suggests for consideration that when the environmental impact statement is done, that it looks at the entire length of Kahekili Highway. If you've already got our major EIS done, it would be a matter of timing in the improvements. Let's do something that gets some kind of motion going so that there's some positive reaction. When that's finished we'll have some feel for whether or not there's still a problem. At this point, let's take it to the next base and bring it down to Ahuimanu or wherever. It will eliminate a whole series of stop and go's and more environmental impact statement. There won't be a series of different interest groups rise to the occasion and look to the legal system to stop and delay.

Bob _____, who lives in upper Kapunahala would like to see more information about the access schemes for Kapunahala and Castle Hills.

He is extremely disappointed with Castle Hills. There is no need to widen the highway beyond Haiku.

Mr. Hirata: We definitely will meet with the communities when the draft EIS is done.

Bob Nakata, a resident of Kahaluu, said that there is a lot of people in the Ahuimanu Temple Valley area rather than using Kahekili to get to Likilike or Pali Highway, back track a mile and half or two miles back up to Kam Highway and come around that way.

Mr. Hirata concurred that traffic has increased significantly on Kamehameha Highway.

Senator Jimmy Wong had two questions.

1. Has any consideration been given to a portion of the highway be in concrete.

2. When is the actual start of construction?

Mr. Tsuzuki:

1. As far as the paving material that's going to be used for the highway, this is usually determined during the design stage.

Unidentified: How much interference would the traffic flow do you anticipate during construction?

Mr. Tsuzuki:

Whatever you have out there right now will be kept open during the peak traffic periods. During the off peak periods, the contractor maybe closing off a lane.

Unidentified: That makes sense as far as widening Kahekili. How about the interchange?

Mr. Tsuzuki: Same thing applies to the interchange. The police department always tells us about different problems that are occurring during construction and we have to make adjustments with the contractor because of these problems.

Unidentified: wanted to verify the following: Funds have not been granted, you're going to have to go in and ask for the funds?

Mr. Tsuzuki: We still have to get more funds in order to build this project.

Unidentified: So then the earliest you think would happen is in 1990 and that would mean that you have to get the federal funding and get more from the Legislature?

Mr. Tsuzuki: That's right.

Mr. Chun: As far as the funding, it is not necessary that we finish H-3 first before we start construction of the interchange and widening. It could be earlier or it could be deferred. We'll have to go back to the Legislature and ask for matching funds.

Unidentified: Where in the priority of the island of Oahu transportation projects, does this project stand?

Mr. Chun: It's very high priority.

Unidentified: With the project starting in 1990, do you have the projected time frame completion of each phase.

Unidentified: Approximately how long per phase?

Mr. Chun: Because we have to take care of the existing traffic, and because it rains a lot on this side, it would be probably about 18 months for the first phase.

Unidentified: Does that include the interchange?

Mr. Chun: Yes.

Mr. Black announced that if you wish further information about the project, you may write to the Department of Transportation or call Kenneth Au, and his number is 548-3258.

The Department of Transportation will weigh the effects of inputs and recommendations presented together with the factual data they have. Additional conferences between the department staff and local officials and others will be required in order to finalize this action and to best serve the public's interest.

This public information meeting is closed at 9:14 p.m.

SUMMARY OF PUBLIC HEARING

A. The public hearing was held at the Heeia Elementary School Cafertorium on August 2, 1989. A total of 13 testimonies were received at the hearing and an additional eight written testimonies were submitted by August 21, 1989, the close of the commenting period. The following is a brief summary and evaluation of the testimonies received:

1. Verbal Testimony Favoring Kahekili Widening and Interchange

- a. Ed Stevens (Private Citizen)
See written testimony.
- b. Jacqueline Chong (Owner Hygienic Store)
Favors widening Kahekili Highway between Likelike Highway and Haiku Road. Opposes widening Kahekili Highway all the way to Kamehameha Highway. States that traffic begins to crawl after the Temple Valley intersection, Kahekili Highway at Hui Iwa Street. The contraflow lanes has provided smoother traffic flows between Haiku Road and Likelike Highway. Concerned that the widening of Kahekili Highway to Kamehameha Highway will render the Hygienic Store property useless for future commercial venture.
- c. David Simon (Private Citizen)
Residents living on Kulukeoe Street and Pilina Way are concerned about a possible connection from Kulukeoe Street to the proposed connector road and the traffic flow through a peaceful residential community. Request for a meeting to apprise residents should Kulukeoe Street tie in to the connector road.
- d. Guy Nakamoto (Waiahole-Waikane Community Association)
Favors full interchange scheme A-1 and widening Kahekili Highway from Likelike Highway to Haiku Road to four lanes and leaving the section of Kahekili Highway between Haiku Road and Kamehameha Highway as is. Then, the intersections of Kulukeoe Street, Kahuhipa Street, Haiku Road and Hui Iwa Street to be grade-separated with Kahekili Highway passing under at these intersections.
- e. John Reppun (Private Citizen)
States that the Kahaolu Community has had very little information or input. However, favors scheme A as it does not involve the stopping of traffic. Request that the grade-separated intersection alternatives presented by the Citizen's Board through OMPO be addressed in the EIS. Opposes any widening of Kahekili Highway past Haiku Road and any widening between Likelike Highway and Haiku Road should be minimal. Widening Kahekili Highway past Haiku Road will open up land for urban development. Community has fought long and hard to maintain rural type development in the area.

- f. Raymond Koki (Private Citizen)
Concerned about the problem of pollution during construction, runoff and the design of the sound barriers. Does not oppose highway widening provided that concerns are addressed prior to construction. Would like to work with the state to resolve these concerns.
- g. Loretta Schuler (Private Citizen)
Prefers widening Kahekili Highway from Likelike Highway to Haiku Road to four lanes only. Believes that any further widening will cause more development in the area. Concerned that almost every car observed driving on Likelike Highway and Pali Highway has only one person in it. Emphasis should be on improved and more frequent bus service from Kaneohe and Kahaluu to Honolulu. Area also needs storage parks for cars so people can take buses. Kaneohe bus service needs to be improved including bus services into the subdivisions. Does not believe widening will solve the traffic problem unless people learn to car pool. Believes that with more bus service to Kaneohe/Kahaluu and spaces to park cars more people would ride the bus and millions of dollars would not be needed to improve Kahekili Highway.
- h. Bob Nakata (Private Citizen)
First priority for windward commuters are contraflow lanes on Pali Highway and Likelike Highway with the next priority for interchanges at Castle Junction and Kahekili and Likelike Highways. Rather than widen Kahekili Highway to four lanes to the Hygienic Store, funding may be better used to grade separate intersections along Kahekili Highway and the Kaneohe Bay Drive and Kamehameha Highway intersection. Grade separating intersections on Kahekili Highway may divert some of the traffic from Kamehameha Highway. If studies show that widening Kahekili Highway to six lanes to Kealahala Road and five lanes to Haiku Road will divert traffic from Kamehameha Highway, it may be worth doing.

2. Other Testimony

- a. Ron Hales (Kahaluu Neighborhood Board)
Board recognizes the traffic problems and is in favor of "proper" solutions to those problems. Past Board favored the interchange and widening of Kahekili Highway, however present Board takes no position. Offers constructive criticism that in the future the main areas be more involved in the planning stages before a vote is taken at the public hearing.
- b. Thomas Au (Kahaluu Neighborhood Board)
Consideration needs to be given to the intersection of Kahekili Highway and Kamehameha Highway as Noriko's which receives between 50 to 80 buses a day plans to relocate to the property behind H & H Chevron Service Station and Kahaluu Drive-Inn. Anticipates intersection will be jammed with traffic.

- c. Myron Daniels (Private Citizen)
Raised questions regarding traffic control, noise, construction thrash, ingresses, acceleration lanes and roads constructed of concrete rather than asphalt. Needed more time to study entire package. Requested that in the future more time be given to the community to review maps and plans.
- d. Susan Jones (Private Citizen)
Concerned for Ahuimanu students crossing a four-lane divided highway at Hui Iwa Street. Opposes any plan that does not include a pedestrian overpass. Concerned that the rural areas will eventually be lost to the development pressures if the highway is widened to the Hygienic Store.

B. Written Testimony

1. Testimony Favoring Kahekili Widening and Interchange

- a. Ed Stevens (Private Citizen)
Favors a fully grade-separated interchange at the intersection of Kahekili and Likelike Highways be constructed without delay and Kahekili Highway widened to four lanes to Haiku Road and not beyond. Refer to recommendations made by the Windward Oahu Transportation Corridor Study Group on January 8, 1986 and the Report of the OMPO/CAC Corridor Study Groups dated April, 1986.
- b. Jacqueline Chong (Owner Hygienic Store)
See verbal testimony.
- c. Robert Hlivalk (Private Citizen)
See verbal testimony.
- d. Guy Nakamoto (Private Citizen)
See verbal testimony.
- e. Gladys Inada, Peggy Yogi, Susan Jones, Grace Ing and Suzette Woods (Parents, teachers and staff of Ahuimanu Elementary School)
Concerned about the proposed plan to widen Kahekili Highway to four lanes in the Temple Valley area. EIS should include a discussion regarding the traffic consideration for students crossing the highway. Ahuimanu School Community Council met with the Department of Transportation officials and suggested that a pedestrian overpass for the intersection be included in any plans. DEIS makes no mention of an overpass. Concerns are as follows: 1. excessive speed of vehicular traffic can be expected to increase with the widening 2. large numbers of vehicles making left and right turns onto Kahekili Highway between 7:00 AM and 8:00 PM, when children are walking to school 3. inability of young children to assess whether it is "safe" to cross even with a traffic signal 4. enormous expanse of highway that will need to be traversed when two

more lanes are added. Pedestrian overpass will mitigate the above concerns.

- f. K & M Yamada (Private Citizens)
Favors scheme C and widening Kahekili Highway to Kahaluu.

2. Testimony Opposing Kahekili Widening and Interchange

- a. Harry Palmer (Private Citizen)
Strongly disapproves of the proposed widening of Kahekili Highway. Widening the highway will lead to the beginning of the end for the relatively unspoiled areas on the Windward Coast.

3. Other Testimony

- a. John Goodale (Assistant Principal, Koolau Baptist Church Academy)
Concerned about the impact the design and construction of the Kahekili interchange will have upon the children. Confident that the finished project will meet federal regulations governing noise pollution. Koolau Baptist Church Academy students and parents request that the following areas of concerns be addressed: 1. during the construction phase the children's learning ability will be adversely affected and/or severely restricted 2. without physical barriers restricting access children might be enticed to enter the construction site with the possibility of being physically hurt or permanently injured 3. ensure that guidelines and policies for dust reduction are enforced.

CHAPTER VII

**ENVIRONMENTAL IMPACT STATEMENT
PREPARATION NOTICE
COMMENT LETTERS AND RESPONSES**

**CHAPTER VII: ENVIRONMENTAL IMPACT STATEMENT PREPARATION
NOTICE COMMENT LETTERS AND RESPONSES**

An Environmental Impact Statement Preparation Notice on the proposed action was published in the OEOC Bulletin on September 23, 1987. The following comments required responses:

Federal Agencies

Department of the Army - Army Corps of Engineers
Department of Housing and Urban Development
Environmental Protection Agency, San Francisco

State Agencies

Department of Agriculture
Department of Business and Economic Development
Department of Business and Economic Development, Housing
Finance and Development Corporation
Department of Defense
Department of Education Ahuimanu Elementary School
Department of Education Heeia Elementary School
Department of Health
Department of Land and Natural Resources
Office of Environmental Quality Control
University of Hawaii at Manoa Environmental Center

City and County Agencies

Board of Water Supply
Department of General Planning
Department of Housing and Community Development
Department of Land Utilization
Department of Parks and Recreation
Department of Public Works
Department of Transportation Services
Fire Department
Police Department

Other Organizations and Individuals

Ahuimanu Ohana (PTA)
American Lung Association of Hawaii
Haiku Village Community Association
Hui Malama Aina o Koolau
Kaaawa Community Association
Kaneohe Neighborhood Board No. 30
Oahu Metropolitan Planning Organization
Ed Stevens, Land Use Planning and Urban Design

No responses are required for the agencies and organizations and individuals listed below.

Federal Agencies

Department of Agriculture-Soil Conservation Service
Department of the Interior-Fish and Wildlife Service
Department of the Navy

State Agencies

Department of Accounting and General Services-Division of
Public Works
Department of Education

City and County Agencies

Building Department
Oahu Civil Defense Agency
Office of the Mayor

Other Organizations and Individuals

Dayton F. and Lucille O. Caple
Jerome T. Hagen
Hawaiian Telephone
Jane Shafer



DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
BUILDING 230
FT. SHAFTER, HAWAII 96813 -5440

REPLY TO
ATTENTION OF:

October 1, 1987

Mr. Edward Y. Hirata, Director
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Hirata:

We have reviewed the Environmental Impact Statement Preparation Notice for the proposed Kahekili Highway Widening and Interchange project. The following comments are provided:

- a. Based on an earlier review of the plans and hydrologic information in 1984, the work at Aolani, Puolani (Pualena), Waioia, Heeia, and Ahuimanu Stream crossings were considered authorized under nationwide permit, 33 CFR 330(a)(26). This determination was based entirely on plans for stream crossings associated with the total highway widening project; it is our understanding that no fill would be placed in wetland areas adjacent to the streams.
- b. Portions of the project are in Flood Zone AE, (areas within the limits of the 100-year flood). The remainder of the project area is in Flood Zone D, (areas of minimal but possible 100-year flooding). See Attachment 1 and 2.
- c. The EIS Preparation Notice does not indicate that prehistoric and historic era cultural resources survey will be performed. We recommend these surveys be accomplished once the final scope and alignment of the project has been determined.

182

Attachments

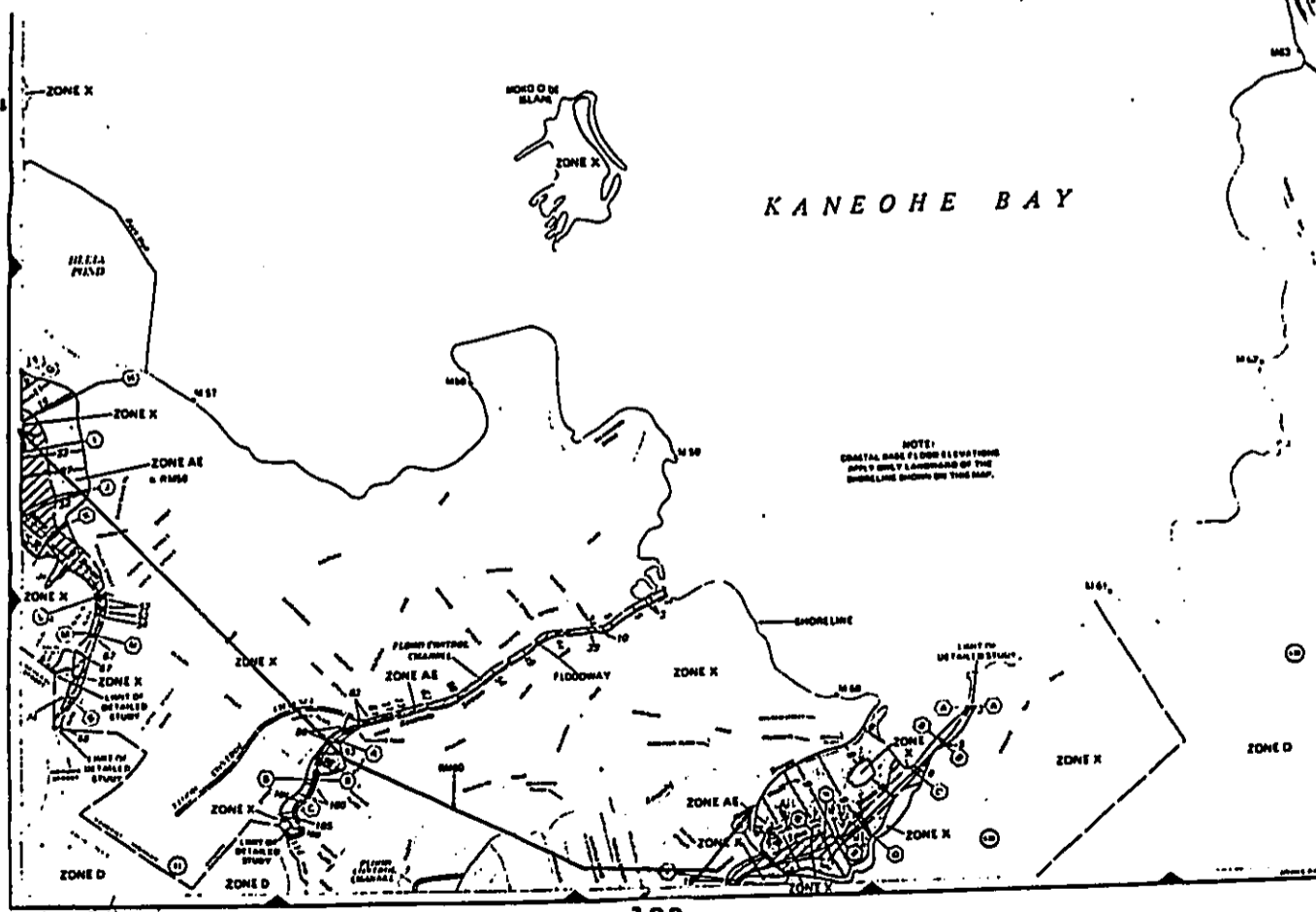
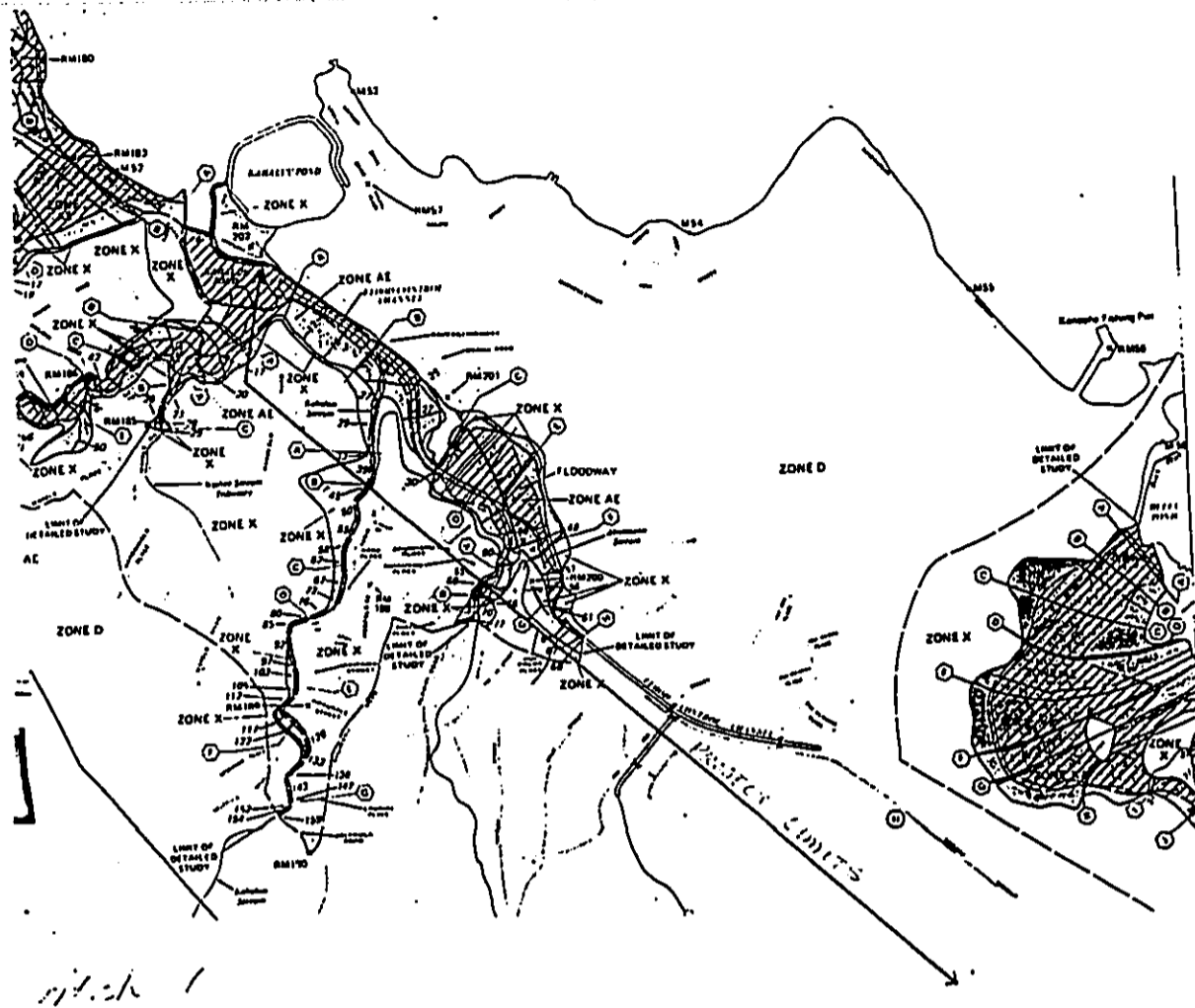
Thank you for the opportunity to comment on this project. Please provide a copy of the EIS when it becomes available.

Sincerely,

James S. Fujii
Clarence S. Fujii, Jr.
Acting Chief, Engineering
Division

RECEIVED
Oct 6 1 33 PM '87
DEPT. OF TRANSPORTATION
HIGHWAYS DIVISION

RECEIVED
OCT 7 11 04 AM '87
HIGHWAYS DIVISION
PLANNING BRANCH
STATE DEPARTMENT
OF TRANSPORTATION



U.S. Department of the Army, Army Engineer District, Honolulu
(October 1, 1987)

1. The Hawaii District Office of the U.S. Army Corps of Engineers has been contacted regarding the need for a Section 404 discharge permit. This project does not require a Section 404 permit. It is noted that the work at Aolani, Puolani, Waiala, Heeia, and Ahuimanu Stream crossings were considered authorized under nationwide permit, 33 CFR 330 (a) (26). The EIS will address the issue of not allowing fill to be placed in wetland areas adjacent to the streams.
2. Floodplain - The EIS will include the floodplain information and exhibits showing flood zones.
3. Archaeology - Most of the project area has been used for agricultural purposes or disturbed for other uses. However, the Department of Land and Natural Resources has determined an area mauka of Kahakili Highway to be studied for the possibility of prehistoric resources. The EIS will include an archaeological evaluation of the area.

U.S. Department of Housing and Urban Development
Honolulu Office, Region IX
300 Ala Moana Blvd., Room 3316, Box 50007
Honolulu, Hawaii 96850-4991



September 21, 1987

Mr. Tetsuo Harano
Chief, Highways Division
Department of Transportation
869 Punchbowl Street
Honolulu, HI 96813

Dear Mr. Harano:


SUBJECT: Environmental Impact Statement Preparation Notice
Kaheki Highway Widening and Interchange
Project No. 83F-01-75 and 63A-05-68

This responds to your request for comments on the proposed widening of Kaheki Highway and the construction of a traffic interchange at the intersection of Likelike and Kaheki Highways.

We have reviewed our file and the proposed action and find that we do not have any additional comments than those submitted to your office on January 10, 1983. (Copy of letter enclosed).

If you have any questions, please call Frank Johnson at 541-1326.

Very sincerely yours,


Calvin Lew
Director
Community Planning and
Development Division

Enclosure

RECEIVED
STATE DEPARTMENT
OF TRANSPORTATION
87-235
SEP 25 10 59 AM '87
COMMUNITY PLANNING BRANCH

RECEIVED
SEP 23 2 04 PM '87
DEPT. OF TRANSPORTATION
HIGHWAYS DIVISION

January 10, 1983

Mr. Ryokichi Higashinoma
Director of Transportation
869 Punchbowl Street
Honolulu, HI 96813

Dear Mr. Higashinoma:

SUBJECT: Kaheki Highway Widening and Interchange
Environmental Impact Statement (EIS)
Preparation Notice

This responds to your request for comments on the subject EIS.

Part C identifies the major issues to be evaluated in depth in the EIS. Though noise will be covered in general terms, HUD is concerned with the impact of increased noise levels on a particular site.

A HUD assisted turnkey low income housing project is under construction for the Hawaii Housing Authority in Kahala and is expected to be completed in November 1983. It is a 66-unit project on Lot 392-A (4.079 acres), Land Court Application 979.

A noise study prepared by Design Engineering, December 21, 1981 was used in siting these buildings to mitigate existing and projected noise levels to the year 2000.

The Department of Housing and Urban Development and Hawaii Housing Authority should be advised of any significant change in right of way alignment or projected traffic levels that would adversely impact this project.

If we can be of any assistance, please contact Frank Johnson of my staff at 546-6583.

Sincerely,

Robert K. Fukuda
Area Manager

U.S. Department of Housing and Urban Development (September 21,
1987 and January 10, 1987)

The noise impact of the widening of Kahekili Highway on the HHA
project in Kahaluu will be evaluated in the EIS.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
 REGION IX
 215 Montgomery Street
 San Francisco, Ca. 94105
 PLANNING BRANCH
 RECEIVED
 OCT 23 11 10 21 AM '87
 DEPT. OF TRANSPORTATION
 HIGHWAYS DIVISION

19 OCT 1987
 Mr. William R. Lake,
 Division Administrator
 Federal Highway Administration
 300 Ala Moana Boulevard
 Box 50206
 Honolulu, Hawaii 96850

Dear Mr. Lake:
 The Environmental Protection Agency (EPA) has reviewed the Notice of Intent (NOI) for the project titled KAHEKILI HIGHWAY WIDENING AND INTERCHANGE PROJECT NO. 83F-01-75 and 63A-05-68, CITY AND COUNTY OF HONOLULU, OAHU, HAWAII.

Section 309 of the Clean Air Act requires that EPA review National Environmental Policy Act documents. Our review is based on the Council on Environmental Quality (CEQ) Regulations (40 CFR Parts 1500-1508). Our comments on this NOI are enclosed.

We appreciate the opportunity to comment on the proposed project. Please send four copies of the DEIS to this office at the same time it is officially filed with our Washington, D.C. office. Please include a copy of the air quality report also. Please notify us of any public hearings or workshops to be held on this project. If you have any questions regarding our comments, contact Enrique Manzanilla, Office of Federal Activities, at (415) 974-0948 or FTS 454-0948.

Sincerely yours,
 Rick Hoffmann
 Environmental Review Coordinator

Enclosures (2 pages)
 cc: Tetsuo Harano, Hawaii Department of Transportation
 Jay Bates, FHWA-San Francisco
 Brian Choy, Hawaii Department of Health

Water Quality Comments

For each alternative, the DEIS should:

1. Fully discuss the project's compliance with State and local water quality management plans and State-adopted, EPA-approved water quality standards.
 - a. We recommend that project planning be fully coordinated with the U.S. Fish and Wildlife Service, Hawaii Department of Health, and the Hawaii Department of Aquatic Resources to ensure that water quality is protected.
2. Completely describe current drainage patterns in the project locale and include hydrologic maps of the area. Effects on erosion potential, soils, vegetation, and/or water quality should be discussed for all affected water courses.
3. Identify any project impacts on riparian habitat or current aquatic conditions such as changes in substrate, direction of stream flow or sediment levels. If highway improvements will require clearing riparian areas, the DEIS should describe impacts of these activities on water quality, especially temperature and turbidity.
4. Describe current ground water conditions in the project locale and determine whether highway construction would adversely affect ground water.
5. Identify appropriate mitigation measures to protect water quality both during and after project construction. For example, protective measures should be included in the roadway design to prevent water contamination from runoff pollutants such as heavy metals, petrochemicals, or sediments.
6. Demonstrate the proposed project's consistency with Executive Order 11988 titled "Floodplain Management," dated May 24, 1977. The evaluation should assess the proposed project's effect upon floodplain development during construction and operation. It is our understanding that the project area often floods.

Section 404 Permit Comments

1. The Hawaii District Office of the U.S. Army Corps of Engineers should be contacted to determine the need for a Section 404 discharge permit for any portion of the proposed project. If a permit is required, EPA will review the project for compliance with Federal Guidelines for Specification of Disposal Sites for Dredged or Fill Material (40 CFR 230),

promulgated pursuant to Section 404(b)(1) of the Clean Water Act.

- a. EPA's evaluation will focus on the maintenance of water quality, the protection of fisheries and wildlife resources, threatened or endangered species, and special aquatic sites, including wetlands.
- b. These regulations require that no discharge shall be permitted which will result in unacceptable adverse impacts on the aquatic ecosystem.
- c. If applicable, the results of further studies should indicate the amount of dredging required, potential disposal sites, types of fill material to be utilized, quantities to be discharged into waters, and special aquatic sites that fall under Section 404 jurisdiction.
- d. Under the Section 404(b)(1) Guidelines, wetlands and riffle and pool complexes are considered "special aquatic sites" (40 CFR 230.3 (q-1), 230.41 and 230.45). The regulations require that, when the project associated with the discharge is not water dependent, the discharge of dredged or fill material into the special aquatic site shall not be permitted unless the applicant can demonstrate that there are no practicable alternatives to the proposed discharge. The term "water dependent" applies to a project that requires access, proximity to, or siting within the special aquatic site in order to fulfill its basic purpose. The purpose of the proposed project must be defined objectively in detail. Examination of practicable alternatives should include but not be limited to consideration of the following points:

- 1) Sites other than the proposed project site (e.g., alternative alignments or locations),
- 2) Rearrangement of the project within the proposed site (e.g., interchange design and highway width variations),
- 3) Downscaling of the project to avoid or minimize impacts to special aquatic sites.

Air Quality Comments

The DEIS should include modeling results of carbon monoxide levels expected to be generated by the project, focusing particularly on the National 8-hour standard. An accepted model, such as CALINE 3, should be used, and its characteristics and input assumptions described.

U.S. Environmental Protection Agency (October 19, 1987)
Water Quality

- 1. The EIS will include a discussion of the project's compliance with State and local water quality management plans and State-adopted, EPA-approved water quality standards. The U.S. Fish and Wildlife Service, the Hawaii Department of Land and Natural Resources Aquatic Resources Division and the Hawaii Department of Health have all responded with comment to the EIS preparation notice.
- 2. A drainage study has been finalized for this project area which includes hydrological information. The erosion potential of the area will be addressed in the EIS. A water quality report will be included in the EIS which will address the effects on water quality on all the streams and wetlands in the area. Measurements will be taken which includes suspended solids and soluble petrochemicals. A soils map is included in the EIS with a description of soil characteristics.
- 3. The EIS will address the impact of the highway improvements on riparian habitat.
- 4. Groundwater conditions and the impacts of highway construction will be addressed in the EIS.
- 5. Mitigative measures will be addressed in the EIS regarding the effects of runoff pollutants such as heavy metals or petrochemicals.
- 6. The EIS will address the project's consistency with Executive Order 11988 titled "Floodplain Management," dated May 24, 1977.

Section 404

- 1. Section 404 Permit requirements will be addressed in the EIS. If a permit is required, the EIS will address the issue of compliance with federal guidelines for disposal of fill materials (40 CFR 230).

Air Quality

- 1. The EIS will include the modeling results of carbon monoxide levels generated by the project.
You will be notified of any public hearings or workshops to be held on this project.

JOHN WAIHEE
GOVERNOR



SUZANNE D. PETERSON
CHAIRPERSON, BOARD OF AGRICULTURE

TADASHI TOJO
DEPUTY TO THE CHAIRPERSON

State of Hawaii
DEPARTMENT OF AGRICULTURE
1428 So. King Street
Honolulu, Hawaii 96814-2512

Mailing Address:
P. O. Box 22159
Honolulu, Hawaii 96822-0159

October 1, 1987

Mr. Edward Y. Hirata, Director
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Attention: Mr. Tetsuo Harano, Chief
Highways Division

Dear Mr. Hirata:

Subject: Environmental Impact Statement Preparation Notice
(EISP/N) for Kahakili Highway Widening and Interchange
Project
HWY-PA 2-97030
THK: 4-5, 4-6 and 4-7 Koolaupoko, Oahu

The Department of Agriculture has reviewed the subject
EISP/N and has the following comments to offer.

We reviewed an earlier EISP/N for the same highway segment
and sent comments to Dr. Ryokichi Higashionna, Director,
Department of Transportation, on January 6, 1983. We ask that
the EIS address the potential impacts of possible urban
development upon existing and potential agricultural activities
in the vicinity of the proposed project, and especially in the
Kahaluu area. Our records indicate several farming operations
along the Kahakili Highway.

Thank you for the opportunity to comment.

Suzanne D. Peterson
SUZANNE D. PETERSON
Chairperson, Board of Agriculture

cc: OEQC

State of Hawaii, Department of Agriculture (October 1, 1987)
The EIS will address the potential impacts of possible urban
development upon existing and potential agricultural activities
in the vicinity of the proposed project.

RECEIVED
STATE DEPARTMENT
OF TRANSPORTATION
OCT 6 2 11 PM '87
HONOLULU PLANNING BRANCH

109





**DEPARTMENT OF BUSINESS
AND ECONOMIC DEVELOPMENT**

STATE OF HAWAII
DEPARTMENT OF BUSINESS AND ECONOMIC DEVELOPMENT
150 SOUTH KING ST., HONOLULU, HAWAII 96813
TELEPHONE: 521-2200 FAX: 521-2201

Rev. 4.3.87
JOHN WAHIEE
GOVERNOR
ROGER A. LITLING
DIRECTOR
REUTHA VE TOWILL
DEPUTY DIRECTOR
SEP 23 9 43 AM '87
STATE STATION
DEPT. DIRECTOR

State of Hawaii, Department of Business and Economic Development
(September 21, 1987)

The EIS will include a discussion of the relevant objectives and policies of the Hawaii CZM Program, as specified in Chapter 205A, Hawaii Revised Statutes.

Ref. No. P-7290 FILED IN ARCH

September 21, 1987

MEMORANDUM

TO: The Honorable Edward Y. Hirata, Director
Department of Transportation

ATTN: Tetsuo Harano, Chief
Highways Division

FROM: Roger A. Ulveling

SUBJECT: Environmental Impact Statement Preparation Notice, Kahikili Highway
Widening and Interchange

190

We have reviewed the subject document and have the following comment with respect to the Hawaii Coastal Zone Management Program.

The EIS should include a discussion of relevant objectives and policies of the Hawaii CZM Program, as specified in Chapter 205A, Hawaii Revised Statutes.

Thank you for the opportunity to review this preparation notice.

Murray S. Towill



JOHN WALKER
Director

RUSSELL N. FUKUMOTO
Acting Executive Director

STATE OF HAWAII
Department of Business and Economic Development
Housing Finance and Development Corporation

P. O. BOX 17887
HONOLULU, HAWAII 96817

State of Hawaii, Department of Business and Economic Development,
Housing, Finance and Development Corporation (October 6, 1987)

Your agency will be kept informed of future developments of this project as information becomes available.

RE: RUSSELL N. FUKUMOTO

TO:

87:PLNG/4314JT

October 6, 1987

Mr. Tetsuo Harano, Chief
Highways Division
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Re: Environmental Impact Statement Preparation Notice
(EISPN) for the Proposed Kehekili Highway
Widening and Interchange Project

Dear Mr. Harano:

The Department of Human Services has forwarded the subject EISPN to us for our comments.

The Housing Finance and Development Corporation (HFDC) was created by Act 337 of 1987, which transferred the housing development, housing finance, residential leasehold and relocation functions of the Hawaii Housing Authority to the HFDC. Due to the potential social impacts of the proposed project; i.e., possible relocation of homes and increased pressure for development, we would appreciate being placed on your mailing list and advised of any further developments.

Thank you for the opportunity to comment.

Sincerely,

Russell N. Fukumoto
RUSSELL N. FUKUMOTO
Acting Executive Director

RECEIVED
OCT 0. 10 15 AM '87
DEPARTMENT OF TRANSPORTATION
HONOLULU, HAWAII

John Waihee
DIRECTOR

MAJOR GENERAL ALBERT T. LUNA
DIRECTOR OF CIVIL DEFENSE
VICE DIRECTOR OF CIVIL DEFENSE



RECEIVED

SEP 4 3 44 PM '87



STATE OF HAWAII
DEPARTMENT OF DEFENSE
OFFICE OF THE DIRECTOR OF CIVIL DEFENSE
3949 DANANOHU HEAD ROAD
HONOLULU, HAWAII 96813

State of Hawaii Department of Defense (September 3, 1987)

Your comment regarding the importance of this project in enhancing your ability to perform evacuations of people in this area will be incorporated in the EIS.

September 3, 1987

HICDFO

Mr. Tetsuo Harano, Chief
Highways Division
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Harano:

State Civil Defense enthusiastically supports the Kahekihi Highway widening and interchange project. In the long run this project should greatly enhance our ability to perform evacuations of people in this area. Also, this project should improve the safety and welfare for the residents that travel these routes.

Sincerely,

Jim Corey
JIM COREY
Vice Director of Civil Defense

STATE OF HAWAII
SEP 8 11 07 AM '87
PLANNING BRANCH

John Waihee
DEPARTMENT OF EDUCATION



STATE OF HAWAII
DEPARTMENT OF EDUCATION

SEP 23 10 53 AM '87

STATE OF HAWAII
DEPARTMENT OF EDUCATION
AHUIMANU ELEMENTARY SCHOOL
12-175 HUI IWA PLACE
LAHONA, HAWAII 96751

Charles T. Foguchi
DEPARTMENT OF HIGHWAYS

RECEIVED
SEP 23 2 00 PM '87
DEPARTMENT OF HIGHWAYS
HIGHWAYS DIVISION

State of Hawaii, Department of Education, Ahuimanu Elementary School (September 22, 1987)

The EIS will address pedestrian safety and the need to ensure the safety of school children. The need for a pedestrian overpass will be addressed in the design stage once a widening alternative is chosen.

September 22, 1987

MEMO TO: Mr. Tetsuo Marano, Chief of Highways Division, Department of Transportation

FROM: Gladys S. Inada, Principal

SUBJECT: Environmental Impact Statement (EIS) Kahekili Highway Widening & Interchange Project No. 83J-01-75 and 63A-05-68

I would like to address the concerns for the safety factor of this project, specifically the safety of our children who are required to cross Kahekili Highway daily to attend Ahuimanu Elementary School. Thirty-five percent of our 615 children live in houses, town houses and condominiums makai of Kahekili Highway.

We have a growing population in Temple Valley, projected to continue increasing for a number of years based on the State Enrollment Projection, 1986-1991. Due to a large percentage of town houses within the Ahuimanu Elementary School service area, young families with young children are the residents.

As plans for the widening of Kahekili Highway are discussed, I would appreciate the inclusion of an overpass be built at the intersection of Kahekili Highway and Hui Iwa Street.

An overpass will ensure the safety of our elementary-aged children to and from school. Motorists will also benefit from an overpass as caution is practiced today by slowing down when children cross this intersection. To date, we have had only one minor accident when a motorist bumped a child enroute home. It is a constant concern that someday a major accident may occur.

Your serious consideration for the inclusion of an overpass at the intersection of Kahekili Highway and Hui Iwa Street as plans for the widening of Kahekili Highway is being discussed. The safety of the children attending Ahuimanu Elementary School is our prime concern.

Mahalo nui loa!

cc: Mrs. Sakae Loo, Windward District Superintendent

AN AFFIRMATIVE ACTION AND EQUAL OPPORTUNITY EMPLOYER

John Waihee
Governor

Charles T. Toquchi
Superintendent



RECEIVED

OCT 7 10 08 AM '87

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION
DEPARTMENT OF EDUCATION
HEEIA ELEMENTARY SCHOOL
45-102 MAIKU ROAD
KAHEKILI, HAWAII 96744

October 2, 1987

OFFICE OF THE
PRINCIPAL

State of Hawaii Department of Education, Heeia Elementary School
(October 2, 1987)

The EIS will address the issue of student safety at the intersection of Haiku Road and Kahekili Highway. Feasibility for the overpass will be addressed in the design stage once a widening alternative is chosen. The need for a pedestrian overpass will be evaluated as a design measure to mitigate the projects impact on pedestrian safety.

MEMO TO: Mr. Tetsuo Harano, Chief, Highways Division
Department of Transportation

FROM: Francine Honda, Principal, Heeia Elementary School

SUBJECT: Environmental Impact Statement (EIS) Preparation Notice for
Kahekili Highway Project No. 83F-01-75 and 63A-05-68

Heeia Elementary School, located on Haiku Road, services students residing in the Haiku area mauka of Kahekili Highway. Student safety to and from school is and continues to be an area of concern for our school and parent community.

I would, therefore, like to request the inclusion of student safety and the construction of an overhead walkway at the intersection of Haiku Road and Kahekili Highway as items to be examined in the E.I.S. for the proposed projects.

Your consideration of this matter is appreciated.

FH:eml

cc: Mrs. Sakae Loo, District Superintendent, Windward Oahu
Senator Jimmy Wong, Senate, 14th Legislature
Heeia School Community Council Chairperson
Heeia School P.T.A. President

STATE OF HAWAII
OCT 8 12 58 PM '87
PLANNING BRANCH

AN AFFIRMATIVE ACTION AND EQUAL OPPORTUNITY EMPLOYER

JOHN HARANO
DIRECTOR OF HEALTH
RECEIVED
OCT 6 1 50 PM '87
STATE OF HAWAII
DEPARTMENT OF HEALTH
DIVISION OF TRANSPORTATION



STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 2075
HONOLULU, HAWAII 96820

October 1, 1987

MEMORANDUM

To: Mr. Tetsuo Harano, Chief, Highways Division
Department of Transportation

From: Acting Chief, Environmental Protection & Health Services Division

Subject: Environmental Impact Statement (EIS) Preparation Notice for Kahakii Highway Widening and Interchange Project

State of Hawaii, Department of Health (October 1, 1987)

1. The project will be designed so that noise levels will not exceed 50 dBA inside any existing classroom, library, multipurpose room, hospital or rest home.
2. The EIS will address the Title 11, Administrative Rules Chapter 43, Community Noise Control for Oahu, and Title 11 Administrative Rules Chapter 42, Vehicular Noise Control for Oahu.
3. Necessary mitigating measures for the potential noise impacts will also fully be discussed in the EIS.
4. The EIS will also address the Title 11 Administrative Rules Chapter 42, Vehicular Noise Control for Oahu.
5. The EIS will also address the projects compliance with 401 Water Quality Certification.

Thank you for allowing us to review and comment on the subject EISPN. In the preparation of an Environmental Impact Statement for the subject project, the following noise concerns must be addressed:

1. The project must be designed so that noise levels generated by highway use at expected capacity will not exceed 50 dBA inside any existing classroom, library, multipurpose room, hospital or rest home.
2. Construction activities must comply with the provisions of Title 11, Administrative Rules Chapter 43, Community Noise Control for Oahu.
 - a. The contractor must obtain a noise permit if the noise levels from the construction activities are expected to exceed the allowable levels of the rules.
 - b. Construction equipment and onsite vehicles requiring an exhaust of gas or air must be equipped with mufflers.
 - c. The contractor must comply with the conditional use of the permit as specified in the rules and conditions issued with the permit.
3. Should there be any backyard or stockpile areas located adjacent to residences, mitigative measures, such as barriers or berms, must be developed in the event that noise complaints are received.
4. Traffic noise from heavy vehicles travelling to and from the project site must be minimized in residential areas and must comply with the provisions of Title 11, Administrative Rules Chapter 42, Vehicular Noise Control for Oahu.
5. The project should also be reviewed for compliance with 401 Water Quality Certification.

James K. Ikeda
JAMES K. IKEDA

B L A N K

John H. ...

RECEIVED
OCT 23 1 16 PM '87
DEPT. OF TRANSPORTATION
HIGHWAYS DIVISION



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P. O. BOX 521
HONOLULU, HAWAII 96809

WILLIAM W. PATY, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

LIBERT S. LINDGREN
SECRETARY

AGRICULTURE DEVELOPMENT PROGRAM
AGRICULTURAL RESOURCES
ENVIRONMENTAL AFFAIRS
CONSERVATION AND
RECREATION
AGRICULTURE PROTECTION
COMPLIANCE AND MONITORING
LAND MANAGEMENT
STATE PLANS
STATE AND LAND DEVELOPMENT

OCT 22
DOC. NO.: 1593E
FILE NO.: 88-113

Mr. Tetsuo Harano, Chief
Highways Division
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Harano:

SUBJECT: Environmental Impact Statement (EIS) Preparation
Notice for Kahakili Highway Widening and
Kahakili-Likelike Interchange, Kaneohe, Heeia,
Kaiku, and Ahuimanu, Koolauapoko, Oahu

Thank you for the opportunity to review the EIS Preparation
Notice cited above. We offer the following comments:

Aquatic Resources Concerns:

We trust that appropriate mitigating measures to reduce
erosion and siltation, and release and/or leaching of pollutants
during construction will be included in the EIS, and that
opportunity will be provided to review the EIS to specifically
address aquatic resource and habitat concerns.

Historic Sites Concerns:

This project by the Department of Transportation, which is
receiving federal aid, must comply with the State and Federal
historic preservation laws. Thus, coordination with our office is
vital.

A review of our records indicates that no archaeological
survey was done in conjunction with the original construction of
Kahakili Highway. Although there has been a fair amount of
residential/urban development along this highway, there are still
stretches of undeveloped land. We strongly recommend that a
professional archaeological survey be conducted to determine if

Mr. Tetsuo Harano

- 2 -

DOC. NO.: 1593E

historic sites are present and, if so, to initially evaluate their
significance. Our office will then need to assess these
evaluations, so they can be finalized. Then if any significant
sites will be adversely affected, appropriate mitigation measures
will need to be devised in consultation with our office. The
Draft EIS will need to clearly determine if significant sites are
present or not and, if so, will need to present general mitigation
measures.

We urge that DOT consult with our Historic Sites Section
(548-7460) as soon as possible on these matters.

Water and Land Development Concerns:

Kahakili Highway crosses Ahuimanu Stream in two places. The
EIS should describe proposed activities that involve work within
the stream channel and the potential impact and proposed
mitigation. A stream channel alteration permit from this
Department may be required for work within the channel, in
accordance with Chapter 176D, HRS, for protection of instream uses
in Windward Oahu streams.

In preparing future EIS's and plans for construction work,
please be aware of the recently enacted State Water Code
provisions for managing water resources and ensuring protection of
instream uses.

Thank you for your consideration of our concerns.

Very truly yours,

William W. Paty
WILLIAM W. PATY, Chairperson
Board of Land and Natural Resources

State of Hawaii, Department of Land and Natural Resources
(October 22, 1987)

1. Aquatic Resources - The EIS will include a discussion of mitigative measures necessary to reduce erosion and siltation and pollution with regard to aquatic resource and habitat concerns.
2. Historic Sites - The EIS will include an archaeological study of the area targeted by your department as having potential archaeological or historic sites.
3. Water and Land Development - The EIS will address the potential impacts and mitigative measures for Ahimanu Stream. The EIS will address the issues discussed in the State Water Code and Chapter 176D, HRS regarding the protection of instream uses.

Mr. Tetsuo Harano
October 23, 1987
Page 2

Thank you for requesting our input on your preparation notice.

Sincerely,

Marvin T. Miura
Marvin T. Miura, Ph.D.
Interim Director
Roy K. Sakamoto
Roy K. Sakamoto
Environmental Technical Specialist

RECEIVED
OCT 26 3 56 PM '87
DEPT. OF TRANSPORTATION
HIGHWAYS DIVISION

OCT 27 11 01 AM '87
PLANNING BRANCH



STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
411 SOUTH KING STREET, ROOM 141
HONOLULU, HAWAII 96813

October 23, 1987

Mr. Tetsuo Harano
Chief
Highways Division
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Harano:

Subject: Kahekili Highway Widening and Interchange
Environmental Impact Statement Preparation Notice

We have reviewed your preparation notice for this project and offer the following comments for your consideration:

1. During the construction phase of the project there will be substantial cuts, fills, and grading along the 4.4 mile area, which will add considerably to soil runoff during rain storms. The large areas to be graded and the heavy rainfall of the windward area leads us to believe that this impact will be large. We suggest that the mitigation of soil runoff be emphasized in your draft EIS.
2. Several alternatives for the Kahekili Interchange are proposed in the EIS preparation notice. All but one alternative involves the use of overhead ramps. We believe that overhead ramps are out of character in a rural setting such as Kaneohe and propose that an on-grade solution be investigated.



State of Hawaii, Office of Environmental Quality Control (October
23, 1987)

1. Mitigation measures to prevent soil erosion in the area will be included in the EIS.
2. Your comments about the overhead ramps being out of character with the rural setting of the area and your suggestion regarding investigating an on-grade solution will also be included in the EIS.



RECEIVED
 Nov 16 1987
 University of Hawaii at Manoa

DEPT. OF TRANSPORTATION
 HIGHWAYS DIVISION
 Environmental Center
 Crawford 317 • 2530 Campus Road
 Honolulu, Hawaii 96822
 Telephone (808) 948-7361

November 10, 1987
 PH:0056

Mr. Tetsuo Harano, Chief
 Highways Division
 Department of Transportation
 869 Punchbowl Street
 Honolulu, Hawaii 96813

Dear Mr. Harano:

Preparation Notice
 Environmental Impact Statement
 Kahekihi Highway Widening
 Kaneohe, Oahu

The Environmental Center has conducted a review of the above referenced Preparation Notice with the assistance of Michael Graves, Anthropology; and Jennifer Crummer, Environmental Center. This project involves the construction of a traffic interchange at the intersection of Likelike Highway in Kaneohe and the widening of the Kahekihi Highway to a multi-lane facility between Likelike Highway and Kaneohe Highway near Kahalu Stream, a distance of 4.4 miles.

We would like to stress that archaeological concerns should be included and recommend that a reconnaissance survey of the project area be undertaken. There is a good possibility that undisturbed archaeological sites exist in the vicinity of the Likelike/Kahekihi intersection which may be affected by the proposed interchange.

We appreciate the opportunity to review this document at the preparation stage and hope that our concerns will be addressed in the Draft EIS.

Yours truly,

John T. Harrison, Ph.D.
 Environmental Coordinator

cc: OEQC
 L. Stephen Lau
 Michael Graves
 Jennifer Crummer

AN EQUAL OPPORTUNITY EMPLOYER

University of Hawaii at Manoa Environmental Center (November 10, 1987)

An archaeologist has been contracted to do a reconnaissance survey for this project. The Kahekihi/Likelike intersection will be surveyed as part of the work. Archaeological concerns will be addressed in the EIS.

TON



BOARD OF WATER SUPPLY, City and County of Honolulu (September 21, 1987)

1. Your comments regarding the use of the fresh water springs near the Likelike-Kahakili Interchange and the proposed 42-inch transmission main will be included in the EIS.
2. Once an alternative is chosen your agency will be contacted regarding coordinating the water main installation with the highway widening project.

774 4276

FRANK F. FASO, Mayor
 DONNA S. GOIN, Chairman
 ERNEST A. WATSON, Vice Chairman
 PAUL O. JOHNSON, Director
 SCOTT W. DANIEL, Manager
 JAMES W. HANAU, Deputy Manager
 JAMES W. HANAU, Deputy Manager and Chief Engineer

SEP 25 1 15 PM '87

September 21, 1987



BOARD OF WATER SUPPLY
 CITY AND COUNTY OF HONOLULU
 630 SOUTH BERTANAMA STREET
 HONOLULU, HAWAII 96813

STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 PLANNING BRANCH

SEP 28 2 59 PM '87

Mr. Tetsuo Harano, Chief
 Highways Division
 Department of Transportation
 State of Hawaii
 869 Punchbowl Street
 Honolulu, Hawaii 96813

Dear Mr. Harano:

Subject: Your EIS Preparation Notice of September 2, 1987 for the Proposed Kahakili Highway Widening and Interchange Project

Thank you for the opportunity to comment on the EIS Preparation Notice for your proposed highway widening project.

We have the following comments for your consideration:

1. There are groundwater springs in the vicinity of the Likelike-Kahakili Interchange which are presently being used by farmers. When the farmers decide to cease their use of the spring, we plan to develop it into a potable source. The water is of high quality where minimal treatment will be needed to make it potable.
2. We have plans to install a 42-inch transmission main along the entire length of Kahakili Highway. The design for our main is completed, and we would like to discuss with you the possibility of installing the main at the same time as your widening project.

Please contact Roy Doi at 527-5235 to arrange for a meeting to coordinate the installation of the main in conjunction with your highway widening project, or Lawrence Whang at 527-6138 if you have any questions on our comments on your EIS.

Very truly yours,

Kazu Hayashida
 KAZU HAYASHIDA
 Manager and Chief Engineer

copy 4772

DEPARTMENT OF GENERAL PLANNING
CITY AND COUNTY OF HONOLULU
RECEIVED
430 SOUTH KING STREET
HONOLULU, HAWAII 96813

SEP 16 2 13 PM '87
SEPT. OF TRANSPORTATION
HIGHWAYS DIVISION



FRANK P. PASI
DIRECTOR

Department of General Planning, City and County of Honolulu
(September 15, 1987)

The EIS will include your comments regarding the effect of this project on traffic problems on the Windward side of Oahu.

DONALD A. CLEGG
Chief Planning Officer
GENE CONNELL
Secretary
WH/DGP 9/87-3034

September 15, 1987

Mr. Tetsuo Harano, Chief
Highways Division
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Harano:

Environmental Impact Statement (EIS) Preparation Notice
Kahakili Highway Widening and Interchange
Project No. 83F-01-75 and 63A-05-68
City and County of Honolulu, Oahu, Hawaii

We have reviewed the subject Environmental Impact Statement Preparation Notice (EISP) and also a prior EISP for the same project which was originally reviewed in December 1982. It is felt that the project will help alleviate existing traffic problems on the Windward side and should proceed. We feel the EISP is adequate and have no comments at this time.

Thank you for the opportunity to review this document. Should clarification be required, please contact Verne Wingquist at 527-6044.

Sincerely,

Donald Clegg
DONALD A. CLEGG
Chief Planning Officer

RECEIVED
STATE DEPARTMENT
OF TRANSPORTATION
SEP 18 11 08 AM '87
HIS PLANNING
CHIEF PLANNING OFFICE BRANCH

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU

150 SOUTH KING STREET
HONOLULU, HAWAII 96813



SEP 28 1 17 PM '87
DEPT. OF TRANSPORTATION
HIGHWAYS DIVISION

HIKE MOON
DIRECTOR
ROBERT MIYASATO
DEPUTY DIRECTOR

September 23, 1987

RECEIVED
STATE DEPARTMENT
OF TRANSPORTATION
SEP 29 10 51 AM '87
HIGHWAYS DIVISION
PLANNING BRANCH

Department of Housing and Community Development, City and County
of Honolulu (September 23, 1987)

Your comments regarding the relationship of this project to the
overall plan of land use will be included in the EIS.

Mr. Tetsuo Harano, Chief
Highways Division
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Harano:

Subject: Environmental Impact Statement
Kahekihi Highway Widening and Interchange Project

Thank you for the opportunity to review and comment on the proposed
Kahekihi Highway widening project.

The undertaking of the proposal is in proper relationship to the overall
plan of land use and will bring positive benefits to Windward Oahu
residents.

Sincerely,

Robert Miyasato
for HIKE MOON
Director

DEPARTMENT OF LAND UTILIZATION
CITY AND COUNTY OF HONOLULU
630 SOUTH KING STREET
HONOLULU, HAWAII 96813

Oct 6 2 11 PM '87
PLANNING BRANCH



JOHN P. WHALEN
DIRECTOR
L09/87-4713(BWH)

RECEIVED
OCT 5 11 15 AM '87
DEPT. OF TRANSPORTATION
HIGHWAYS DIVISION

September 29, 1987

Mr. Edward Y. Hirata, Director
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813

ATTENTION: Mr. Tetsuo Harano, Chief
Highways Division

Dear Mr. Hirata:

Consultation Comments for the Preparation
of an Environmental Impact Statement (EIS)
for the Proposed Kahekili Highway Widening and
Interchange Project (DOT Ref. No. HWY-PA 2-97030)

Thank you for your September 2, 1987 request for consultation
comments. Our comments/questions are as follows:

1. Drainage: A discussion of the effects that the widening will have on the Kahaluu Flood Control system and the Heeia Stream would be appropriate. Indicate the additional volume of flow which will be added.
2. Sewer System: The DPW has plans for sewer improvements under the Kahaluu Sewers, Section 1, Improvement District project. Will the widening of Kahekili Highway affect this project? What will the effects be on the Ahuimanu SPS?
3. View Enhancement: Consideration should be given to enhancing views from Kahekili Highway to Heeia Marsh if possible. A discussion of how this could be accomplished would be appropriate.

Mr. Edward Y. Hirata, Director
Page 2

4. Special Management Area (SMA): Portions of the project occur within the SMA near Kamehameha Highway and at the edge of Heeia Marsh. A SMA permit may be required unless all work is completely within the existing rights-of-way.

If you have any questions, please contact Bennett Mark of our staff at 527-5038.

Very truly yours,

John P. Whalen
JOHN P. WHALEN
Director of Land Utilization

JPW:s1
1315B

Department of Land Utilization, City and County of Honolulu
(September 29, 1987)

1. **Drainage** - A discussion of what effects the widening will have on the Kahaluu Flood Control system and the Heeia Stream (including the additional volume of flow) will be included in the EIS.
2. **Sewer System** - The EIS will address the impact of the highway widening on the Kahaluu Sewers, Section 1, Improvement District project and the Ahuimanu Sewage Treatment Plant which is in the process of being converted to a Pump Station.
3. **View Enhancement** - Kahakili Highway will be widened on the mauka or (northwest) side of the road rather than on the Heeia Marsh side of the road. The EIS will address the analysis of visual impacts.
4. **Special Management Area** - The Kahakili Highway widening near Heeia Marsh and the intersection of Kanehameha Highway will occur within the existing right-of-way. Potential impacts on the Special Management Area will be included in the EIS.

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

RECEIVED

Oct 19 11 26 AM '87
 DEPT. OF TRANSPORTATION
 HIGHWAYS DIVISION



FRANK E. PARK
 DIRECTOR

October 14, 1987

Mr. Tetsuo Harano, Chief
 Highways Division
 Department of Transportation
 869 Punchbowl Street
 Honolulu, Hawaii 96813

Dear Mr. Harano:

Subject: Kahakii Highway Widening Notice of Preparation of EIS
 for FAP 83 HK: 4-3-23:9 and 10; Ref. HMY-PA 2.97030

Kaneohe District Park is the only facility of the Department of Parks and Recreation that will be directly affected by the widening of Kahakii Highway and that effect is not expected to be adverse. The full 120-ft. right-of-way for a future four-lane divided highway was established when the two-lane highway was constructed so no taking of park land is anticipated.

It is requested that at least a mauka side sidewalk/bikeway slightly higher than the traveled surface be incorporated in the highway widening plan between Kukeoe Street in Kapunahala and the Haiku Road intersection. This would serve to protect the considerable pedestrian and bicycle traffic to and from the district park on Kahakii Highway.

Sincerely,

W. K. Kamaea
 FOR: HIRSH K. KAMAEA, Director

HKK:ei

Department of Parks and Recreation, City and County of Honolulu
 (October 14, 1987)

1. The highway will be aligned to avoid impact on the park.
2. Bikeway. Your suggestion to maintain at least a mauka side (northwest) sidewalk/bikeway slightly higher than the traveled surface will be fully explored in the design of the roadway and the potential impacts will be incorporated in the EIS.

IRVING K. KAMAEA
 DIRECTOR
 HONOLULU, HAWAII

RECEIVED
 STATE DEPARTMENT
 OF TRANSPORTATION
 Oct 20 11 20 AM '87
 PLANNING BRANCH

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

Key 47-77

DEPARTMENT OF Public Works, City and County of Honolulu
(September 17, 1987)

1. The existing municipal sewer lines will be attended to in the design of the roadway and noted in the EIS.



FRANK P. FORBES
DIRECTOR

SEP 21 1 25 PM '87
DEPT. OF TRANSPORTATION
HIGHWAYS DIVISION

ALFRED J. TRIEDE
DIRECTOR AND CHIEF ENGINEER

ENV 87-171

September 17, 1987

RECEIVED
STATE DEPARTMENT
OF TRANSPORTATION
SEP 22 10 34 AM '87
HIGHWAYS DIVISION
PLANNING BRANCH

Mr. Tetsuo Harano, Chief
Highways Division
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Harano:

Subject: EISPN for Kahakili Highway
Widening and Interchange Project

208

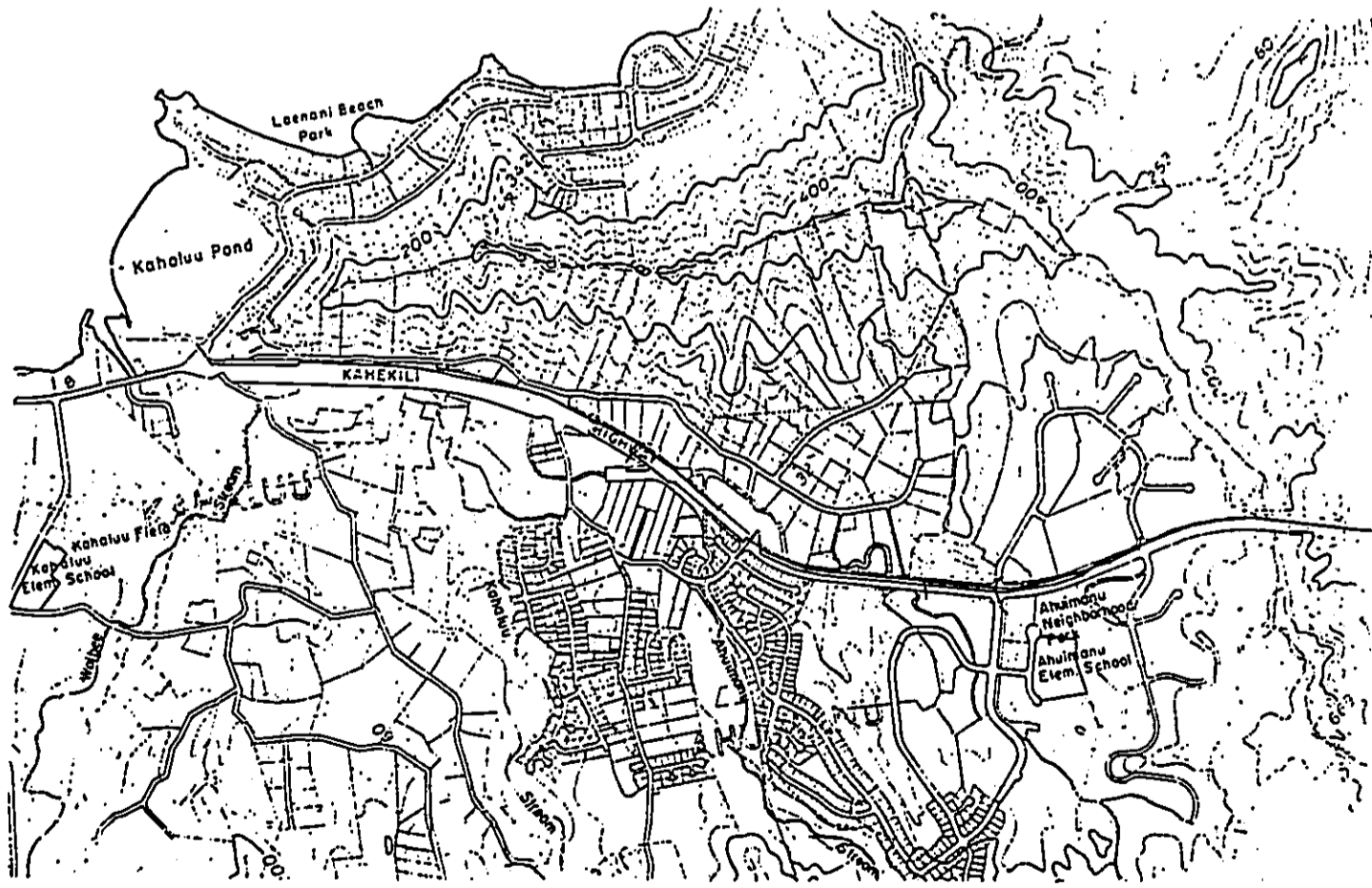
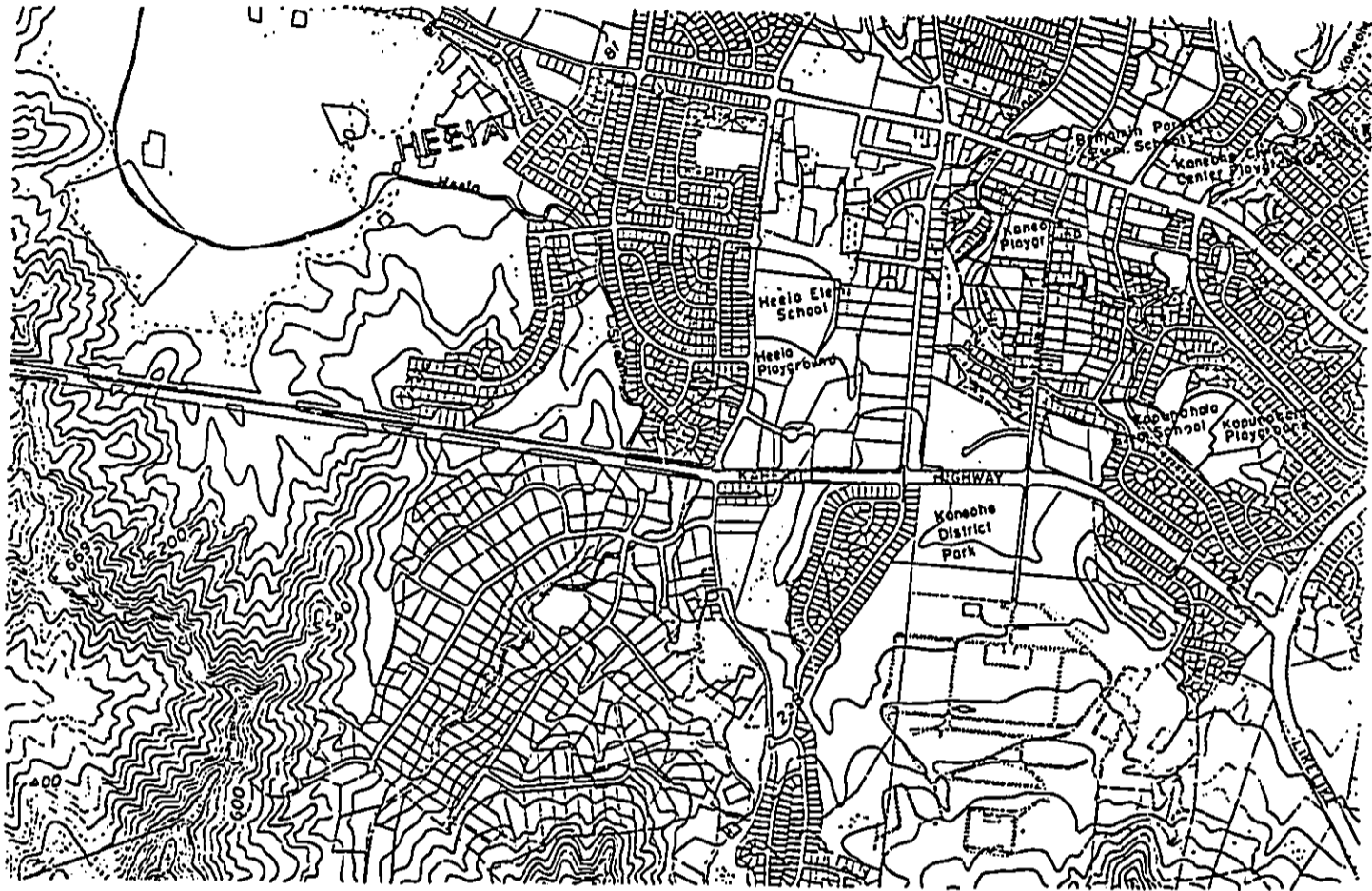
We have the following comments on the subject EISPN:

1. There are existing municipal sewer lines within the highway right-of-way which should be respected. These lines are shown in blue on the attached maps and should be transposed on future construction plans.
2. We have no comment on the drainage.

Very truly yours,

Alfred J. Triede
ALFRED J. TRIEDE
Director and Chief Engineer

Attach.



DEPARTMENT OF TRANSPORTATION SERVICES
RECEIVED AND COUNTY OF HONOLULU
HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

OCT 7 11 28 AM '87
DEPT. OF TRANSPORTATION
PLANNING BRANCH



JOHN E. HIRTEN
DIRECTOR

JOSEPH M. MAGALON, JR.
DEPUTY DIRECTOR

FFF-9273
PL1.0785

October 2, 1987

Mr. Tetsuo Harano, Chief
Highways Division
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Harano:

Subject: Environmental Impact Statement Preparation Notice
for the Proposed Kahakili Highway Widening and
Interchange Project No. 83P-01-75 and 63A-05-68

This is a follow-up response to your letter of September 2, 1987
to Mayor Fasi, regarding the above subject.

We are basically concerned with the construction related impacts
to the surrounding City streets and what mitigating measures are
planned.

We appreciate this opportunity to comment on the proposed
project.

Sincerely,

JOHN E. HIRTEN

cc: Mayor Frank F. Fasi

OCT 8 12 57 PM '87
PLANNING BRANCH

Department of Transportation Services, City and County of
Honolulu (October 2, 1987)

Mitigating measures for the potential construction related
impacts to the surrounding City streets will be fully explored
and discussed in the EIS.

FIRE DEPARTMENT
CITY AND COUNTY OF HONOLULU

1433 S. WELLS STREET, ROOM 305
HONOLULU, HAWAII 96817



RECEIVED

SEP 29 1 48 PM '87

DEPT. OF TRANSPORTATION
HIGHWAYS DIVISION

FRANK P. FASO
CHIEF

FRANK K. KAHOOHARUOHANO
FIRE CHIEF

LOUCEL E. CAMARA
DEPUTY FIRE CHIEF

September 24, 1987

Mr. Tetsuo Harano, Chief
Highways Division
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Harano:

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT FOR PROPOSED
KAHEKILLI HIGHWAYS WIDENING AND INTERCHANGE PROJECT

We received a letter from the Department of Transportation regarding the above subject matter wherein they requested that we submit our comments directly to you.

Our concern regarding this project is fire protection and prevention along the proposed construction route. Presently, we do have Kahala Fire Station (Engine 37) and Kaneohe Fire Station (Engine 17) who will be able to respond to incidents in this area. These parameters are within Fire Department acceptable standards. However, we are concerned about the potential for vehicular incidents in this already accident prone area. Limited water availability to handle hazardous material incidents is a major concern. Also, the nearest available extrication devices are located at Kailua Fire Station (Ladder 18) and Hauula Fire Station (Tanker 15). We request funds be made available to purchase said equipment for Kaneohe Fire Station (Engine 17). This device costs approximately \$12,000 and at this time the Fire Department does not have the funds available.

Should there be any problems, please contact Battalion Chief Kenneth Word at 943-3838 at your earliest convenience.

Very truly yours,


FRANK K. KAHOOHARUOHANO
Fire Chief

FKK:MB:1m

Fire Department, City and County of Honolulu (September 24, 1987)
Your concerns about fire protection and prevention along Kahekili Highway will be incorporated into the EIS.

POLICE DEPARTMENT
CITY AND COUNTY OF HONOLULU

1400 SOUTH HALEKUA STREET
HONOLULU, HAWAII 96813



FRANK P. FOR
MAYOR

OUR REFERENCE MF-LC

10/17/87 5-5

DOUGLAS G. GIBB
CHIEF
DAVID F. FERRELLA
DEPUTY CHIEF

Police Department, City and County of Honolulu (September 11, 1987)

1. Your comments about the traffic congestion on Kahekili Highway having an adverse effect on your ability to provide police service to this area will be noted in the EIS. Your recommendations about needed improvements will also be noted.

September 11, 1987

Mr. Edward Hirata, Director
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Hirata: *Ed*

We have received your Environmental Impact Statement Preparation notice and wish to make the following comments:

1. The traffic congestion on Kahekili Highway is very severe, and has an adverse effect on our ability to provide police services in the Kaneohe area.

The improvements should include widening the highway from Likeli Highway to Kamehameha Highway with full interchanges at Kahekili Highway and Likeli Highway, Kahuhipa Road and Maiku Road, and a partial interchange at Kealahala Road.

2. The District Commander for the Kaneohe area, Major Thomas Pickard, should be consulted during the construction planning. An adequate number of special duty officers should be used during all phases of construction.

We foresee no other impacts upon police services which will be caused by the proposed construction, and appreciate the opportunity to comment on this project.

Sincerely,

Doug
DOUGLAS G. GIBB
Chief of Police

9/25-cc Hwy



AHUIMANU OHANA
 AHUIMANU ELEMENTARY SCHOOL
 47-470 HUI AEKO PLACE
 KANEHOHE, HAWAII 96744

RECEIVED
 OCT 13 1 44 PM '87
 DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS

October 8, 1987

Mr. Tetsuo Harano, Chief
 Highways Division
 Department of Transportation
 666 Punchbowl Street
 Honolulu, Hawaii 96813

Re: Environmental Impact Statement for the proposed Kahakii
 Highway Widening and Interchange Project

Dear Sir:

With respect to the above referenced project, we, the Ahuimanu School Ohana (PTA) and School Community Council, are proposing that in addition to widening Kahakii Highway, a Pedestrian Overpass should be constructed at the corner of Hui Iva and Kahakii Highway.

While the proposed widening of Kahakii Highway has become necessary to accommodate the increasing traffic on the windward side, this project will certainly impact on the many children who must cross Kahakii Highway each day as they go to and return home from Ahuimanu Elementary School. The school has estimated that roughly 35% of our children live in the residential areas across the highway from Ahuimanu. Thus far there have been no fatal incidents; however, last year a child was struck by a car and slightly injured as she was attempting to cross the highway. It is the belief of the Ahuimanu School Ohana and School Community Council that a Pedestrian Overpass at the corner of Hui Iva and Kahakii Highway will protect our children from the increased danger of additional lanes to cross.

Thank you for your consideration of this matter.

Very truly yours,

Karen M. Weller
 Karen M. Weller, President
 Ahuimanu School Ohana

Lynnda Sysko
 Lynnda Sysko, Chairperson
 Student Community Council

cc: Senator Jimmy Wong
 Mrs. Gladys Inada

Ahuimanu Ohana, (PTA), Ahuimanu Elementary School (October 8, 1987)

The EIS will address impacts on pedestrian safety. The need for a pedestrian overpass will be considered as a design measure to mitigate adverse impacts on pedestrian safety.

RECEIVED
 STATE DEPARTMENT
 OF TRANSPORTATION
 OCT 14 11 37 AM '87
 DIVISION
 PLANNING BRANCH

4179
245 North Kukui Street, Honolulu, Hawaii 96817, Telephone (808) 537-5866

AMERICAN LUNG ASSOCIATION of Hawaii
The Christmas Seal People®

American Lung Association (September 3, 1987)

The Caline-4 modeling technique predicting carbon monoxide levels was developed by EPA and is used for the proposed project.

RECEIVED
SEP 4 11 01 AM '87
DEPT. OF TRANSPORTATION
HIGHWAYS DIVISION

September 3, 1987

Mr. Tetsuo Harano, Chief
Highways Division
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Harano:

Subject: EIS Preparation Notice - Kahehili Highway Widening

Thank you for forwarding a copy of the EISPN for the subject project. We note that it is your intention to analyze both short and long-term air quality impacts of the proposed highway widening. In preparing this air quality impact analysis we trust that you and/or your consultants will utilize the latest mobile source emission factors and perform modeling in accordance with EPA modeling guidelines.

When the draft EIS is released, we would appreciate receiving a copy for review.

Sincerely yours,
James W. Morrow
James W. Morrow
Director
Environmental Health

JWH:ict
L8727

cc: OEOC

RECEIVED
STATE DEPARTMENT
OF TRANSPORTATION
SEP 4 2 29 PM '87
HIGHWAYS DIVISION
PLANNING BRANCH

Christmas Seals Fight TB, Asthma, Emphysema, Air Pollution

7453

RECEIVED
 STATE DEPT.
Haiku Village Community Association
 Box 274
 Kaneohe, Hawaii 96741
 LAKIHI BRANCH

September 20, 1987

Mr. Edward Y. Hirata
 Director of Transportation
 State of Hawaii
 Department of Transportation
 569 Punchbowl Street
 Honolulu, Hawaii 96813

RE: H.Y-1A 2-97050

Dear Mr. Hirata:

This is in response to your letter dated September 2, 1987. Please direct all future correspondence to "President, Haiku Village Community Association." The term of office for President is only one year so it would simplify matters if this would be done.

We understand the closing date for comments is October 9, 1987; therefore, we wish to go on record as follows:

1. We support widening of Kahakili Highway from Kasehameha Highway to the interchange at Kahakili and Likelike Highway.
2. We request that the widening begin at the Kahakili/Likelike interchange and work towards Kasehameha Highway. This would accomplish three items:
 - a. Preclude a bottleneck situation at Kahakili and Likelike
 - b. Keep a promise that was made to Haiku Village Community to relieve congestion from the Hokuale 232 home development
 - c. Provide an exclusive right-turn lane from the mauka side of the Kahuhipa/Kahakili Highway towards the Likelike Highway.
3. With regard to your item 5, Findings....:
 - a. Dust can be controlled
 - Excessions may be reduced by keeping equipment properly maintained
 - Vehicular traffic is an acknowledged hazard

215

Mr. Edward Y. Hirata
 September 20, 1987
 Page 2

- b. These can be controlled by filtration dams with spillways
 - c. A consequence of progress
 - d. It is incumbent upon the City and State to maintain fire and police protection
- Relocation of homes can be avoided if good planning is used, coupled with good design; i.e., spend the money!
- e. We appreciate your communication and want to work with you for the good of the community. Please keep this organization informed

Very truly yours,
Elizabeth Shanks
 Elizabeth Shanks
 President
 HCV/SS/lr

RECEIVED
 SEP 23 2 55 PM '87
 DEPT. OF TRANSPORTATION
 HIGHWAYS DIVISION



Haiku Village Community Association (September 20, 1987)

1. The EIS will include your comments regarding your support of the widening of Kahakili Highway from Kamehameha Highway to the interchange at Kahakili and Likelike Highway.
2. The EIS will also note that you support an exclusive right-turn lane from the mauka side of Kahuhipa/Kahakili Highway towards the Likelike Highway.
3. Your comments about construction scheduling, dust control, emission control, water quality and police and fire protection will be also noted.
4. Different alternatives will be considered in this EIS process. Some alternatives involve property acquisition for right of way for the interchange or road widening. In some cases as a result of this property acquisition some homes will have to be relocated. It is important to evaluate all of the alternatives in the EIS.

HUI MALAMA AINA O KOOLAU
47-410 Lulani Street, Manoa, HI. 96744

4 October 1987

OCT 13 11 01 AM '87

PLANNING BRANCH

Mr. Tetsuo Harano, Chief
Highways Division
Dept. of Transportation
896 Punchbowl St.
Honolulu, Hawaii, 96813

Dear Mr. Harano:

Hui Malama has a long-standing concern for control of, and limits to, further urban encroachment in to the rural areas of He'eia Uli, He'eia Kea, Ahuimanu, Kahalu'u, and beyond. We ask that the EIS that is being prepared by your department address this concern - protection of our "rural" character and opportunities.

The proposed widening of Kahekili beyond Haiku Road raises a number of questions. First of all - is it necessary? Will it not have a dangerous tendency to cause considerable additional urban expansion at the expense of our agrarian-based rural areas? Our community has, for a decade now, begun to experience some stability in land-use planning and zoning which has, in turn, spurred the growth of industries and enterprises that are compatible with those land-use designations. For example, we have seen a tremendous increase in the number and variety of nursery operations on Agriculturally-zoned land. Does your EIS address such trends and have you addressed the economic impact of highway expansion on this and similar compatible industries?

We have also seen a surge in the number of jobs created by agricultural enterprises. The increase in numbers of residents trained in the skills required for such work will likely cause an increase in the demand for more agricultural space to start new farms or businesses that are related to this field. We are, as an organization, dedicated to the preservation of such options in our area.

From Haiku to Hygienic Store, the capacity of Kahekili is more than adequate, especially if the proposed Kahekili-Likelike interchange is constructed so as to remove any impediments to continuous flow. The congestion begins at that point! Wouldn't the installation of and improvement in turn lanes be all that is needed to improve traffic flow in the Haiku - to - Kamehameha Hwy. section?

Mahalo for the opportunity to comment and raise questions.

Charles F. Reppun
Charles F. Reppun, President

Hui Malama Aina O Koolau (October 4, 1987)

1. The EIS will also fully discuss the need for the proposed widening.
2. The EIS will address the potential impacts of the proposed widening of Kahekili Highway on your organization's concern regarding the protection of the rural character and agricultural job opportunities.



Ka'a'awa Community Association (October 8, 1987)

We will certainly keep you supplied with more information as it becomes available.

October 08, 1987

STATES
OF HI
OCT 14 11 36 AM '87
PLANNING BRANCH

Mr. Tetsuo Harano, Chief
Highways Division
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Re: Environmental Impact Statement
Kahekili Highway Widening and Interchange
Project No. 83F-01-75 and 63A-05-68

Dear Mr. Harano,

We have received your notice concerning the preparation of an Environmental Impact Statement (EIS) for the proposed widening of Kahekili Highway and the proposed interchange at the intersection of Likelike and Kahekili Highways.

We are most interested in this project as we are certain that the construction of these projects will have a definite impact on Ka'a'awa and its residents.

Please supply this Association with more information on the proposed projects as they become available.

Yours truly,

Brian B. Kanda
President

cc/ Sen. Jimmy Wong
Rep. Reb Bellinger
Koolauloa Neighborhood Board

KANEHOE NEIGHBORHOOD BOARD NO. 30
46-926 KAN PUDING
KANEHOE, HAWAII 96744



November 13, 1987

Mr. Tetsuo Harano, Chief
Highways Division
Department of Transportation
869 Funchow Street
Honolulu, Hawaii 96813

Dear Mr. Harano:

REFERENCE: Preparation Notice for Kahakili Highway Widening and Interchange - Project #83F-01-75 and 63A-05-68 - City and County of Honolulu, Oahu, Hawaii

The members of the Kaneohe Neighborhood Board No. 30 wish to insure that the Environmental Impact Statement (EIS) considers and gives substantial weight to both traffic and land use impacts. The board's position is that widening should not occur beyond Haiku Road from Likelike Highway into areas that are designated agricultural or rural. Traffic design from Haiku Road to Likelike Highway should be developed with urban fringe use in mind. We recommend interchange alternative(c), partial interchange - grade separated be adopted so that the area not be overwhelmed by total involvement in a complete interchange.

Sincerely,

Nancy Clingan
NANCY CLINGAN, Chair

John Goody
JOHN GOODY, Planning Committee Chair

Jih McCormick
JIH MCCORMICK, Transportation Committee Chair

cc: Office of Environmental Quality Control
Senator Jimmy Wong
Rep. Terrance Tom
Rep. Marshall Ige
Senator Clayton Hee
Councilmember David Kahanu

Kaneohe Neighborhood Board No. 30 (November 13, 1987)

1. The EIS will consider traffic and land use impacts.
2. The EIS will fully address the need for the proposed widening.

RECEIVED
NOV 16 9 55 AM 1987
HAWAIIAN TRANSPORTATION DIVISION

OMPO

RECEIVED

SEP 14 3 18 PM '87
DEPT OF TRANSPORTATION
STATISTICS DIVISION

Oahu
Metropolitan
Planning
Organization

540 1509 Street
Honolulu, Hawaii 96813
PHONE: 533-4178
FAX: 548-2638

OMPO, Oahu Metropolitan Planning Organization (September 11, 1987).

The EIS will note that this project is included in OMPO's proposed transportation plan for Oahu.

Mr. Tetsuo Harano, Chief
Highways Division
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Harano:

EIS Preparation Notice - Kaheki Highway

OMPO requests to be informed of the recommended alternative selected for the Kaheki Highway widening and interchange project and its transportation assessment. This project is currently included in our proposed transportation plan for Oahu. Any update to the status of this project will be of interest to us.

220

Thank you for the opportunity to comment on the EIS preparation notice.

Sincerely,

Gordon G.W. Lum

Gordon G.W. Lum
Executive Director

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
SEP 15 1 57 PM '87
PLANNING BRANCH

ED STEVENS
LAND USE PLANNING & URBAN DESIGN
47-385 'AIHUMANU ROAD
KAHALU, O'AHU, HAWAII 96744

December 13, 1987

Ms. Alexis Ainslie
c/o Locations, Inc.
45-681 Kamehameha Highway
Kane'ohe, Hawaii 96744

Kahekihi Highway Widening

Hi Alexis:

Received your "News Flash" on proposed Kahekihi Widening & Likelike Interchange Project et al. In fact, I received three of them - oh, the joys of the computer age (see labels attached).

The Interchange should have been built back in 1962 when Kahekihi was first built. Widening probably is justified from Likelike Highway to Haiku Road - but not beyond - not from Haiku Road to Kamehameha Highway (at Hygienic Store).

The Kahala'u & the Ko'ola'oa Neighborhood Boards, various other Community Groups and many individuals worked for years to bring about the General Plan rural category for the Windward areas from Waihe'e and beyond. And they worked long and hard to protect that category by obtaining the Development Plan agricultural land use designations and the Land Use Ordinance agricultural & country zoning districts. Although it might provide some traffic relief for the suburban 'Ahuimanu area, the widening of Kahekihi past Haiku would aim a transportation arrow directly at those rural/agricultural/country districts and, thus, threaten their very existence. This, in my opinion, would be a crying shame!

Thanks for reminding me to put together my thoughts on this subject. I would hope that you and other reasonable people might feel the same way.

Regards,


Ed Stevens

Attachment: Locations, Inc. "News Flash" (both sides)

Copies: Hawaii State Department of Transportation
Ko'ola'oa Neighborhood Board No. 28
Kahala'u Neighborhood Board No. 29
Kane'ohe Neighborhood Board No. 30
Ka'a'awa Community Association
Waihole-WaiKane Community Association
Hui Malama 'Aina o Ko'olau

ES/mgc

ED STEVENS
LAND USE PLANNING & URBAN DESIGN
47-385 'AIHUMANU ROAD
KAHALU, O'AHU, HAWAII 96744

December 16, 1987

Edward Y. Hirata, Director
State of Hawaii Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

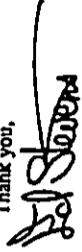
December 16, 1987 Informational Meeting
Department of Transportation
Proposed Kahekihi Highway Widening & Interchange

Dear Mr. Hirata:

A fully grade separated interchange at the intersection of Kahekihi & Likelike Highways should be constructed without delay. Widening of Kahekihi Highway probably is justified from Likelike Highway to Haiku Road - but not beyond - not from Haiku Road to Kamehameha Highway (at Hygienic Store). Please see my December 13, 1987 letter to Locations, Inc. (attached) for more details.

Also, please refer to the recommendations made by the Windward O'ahu Transportation Corridor Study Group on January 8, 1987, and made in the full Report of the OMPO/CAC Corridor Study Groups dated April, 1986 (not attached).

Thank you,


Ed Stevens

Attachment: Stevens letter to Locations, Inc. dated 12-13-87

Reference: OMPO/CAC Windward O'ahu Transportation Corridor Study Report dated 1-8-87

Copies: Locations, Inc.
Ko'ola'oa Neighborhood Board No. 28
Kahala'u Neighborhood Board No. 29
Kane'ohe Neighborhood Board No. 30
Ka'a'awa Community Association
Waihole-WaiKane Community Association
Hui Malama 'Aina o Ko'olau

ES/Mac

Ed Stevens, Land Use Planning and Urban Design (December 16, 1987)

Your comments regarding the Kahakili Highway Widening and Interchange project are appreciated.

1. The EIS will reference the recommendations made by the Windward Oahu Transportation Corridor Study Group of January 8, 1986 and in the report of the OHPO/CAC Corridor Study Groups dated April 1986.

LETTERS WITHOUT RESPONSES

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

UNITED STATES
DEPARTMENT OF
AGRICULTURE

SOIL
CONSERVATION
SERVICE

P. O. BOX 50004
HONOLULU, HAWAII
96850

RECEIVED
SEP 31 10 15 AM '87
DEPT. OF TRANSPORTATION
PLANNING DIVISION

September 30, 1987

John Y. Yee



United States Department of the Interior

FISH AND WILDLIFE SERVICE

300 ALA MOANA BOULEVARD
P. O. BOX 50157
HONOLULU, HAWAII 96810

MAIL ROOM

ES

Room 6307

SEP 6 1987

Mr. Tetsuo Harano, Chief
Highways Division
Department of Transportation
869 Punchbowl Street
Honolulu, HI 96813

Dear Mr. Harano:

Subject: Environmental Impact Statement (EIS) Preparation Notice for
Kahakili Highway Widening and Interchange Project No. 83F-01-75
and 63A-05-68

We have no comments to offer at this time, but would appreciate the
opportunity to review the draft EIS on this project.

Sincerely,

224

Richard H. Duncan
RICHARD H. DUNCAN
State Conservationist

Mr. Edward Y. Hirata
Director of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813

Re: Environmental Impact Statement Preparation Notice for the
proposed Kahakili Highway Widening and Interchange Project

Dear Mr. Hirata:

We have reviewed the referenced notice of intent and have no
specific comments to offer at this time.

We appreciate this opportunity to comment.

Sincerely yours,

Ernest Kosaka
Ernest Kosaka
Project Leader, Environmental Services
Pacific Islands Office

DEPT. OF TRANS.
STATEWIDE TRANS.
PLANNING OFFICE
SEP 14 10 49 AM '87



Save Energy and You Serve America!

9/14 - cc: thuy

DEPARTMENT OF THE NAVY
COMMANDER
NAVAL BASE PEARL HARBOR
BOX 119
PEARL HARBOR, HAWAII 96813



PERMITTING
5090 (0018C)
SER 15B/2367
15 OCT 1987

Mr. Tetsuo Harano, Chief
Highways Division
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Harano:

ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE (EISPN)
KAHEKILI HIGHWAY WIDENING AND INTERCHANGE PROJECT NO. 83F-01-75

The EIS Preparation Notice for the Kahekihi Highway Widening and Interchange Project has been reviewed and we have no comments to offer at this time.

For your information, as of June 1, 1987, our new office code is NS.
Thank you for the opportunity to review the EIS Preparation Notice.

Sincerely,

[Signature]
J. J. [unclear]

RECEIVED
OCT 16 9 03 AM '87
DEPT OF TRANSPORTATION
HIGHWAYS DIVISION

44

MURIEL B. HIGGINS
COMPTROLLER
4TH FLOOR
STATE CAPITOL
LETTER NO. (P)1747.7



STATE OF HAWAII
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
DIVISION OF PUBLIC WORKS
P. O. BOX 111, HONOLULU, HAWAII 96810

RECEIVED
SEP 8 3 43 PM '87
DEPT. OF TRANSPORTATION
HIGHWAYS DIVISION

Mr. Tetsuo Harano, Chief
Highways Division
Department of Transportation
State of Hawaii
Honolulu, Hawaii

Dear Mr. Harano:

Subject: Environmental Impact Statement
Preparation Notice for the Proposed
Kahekihi Highway Widening and Interchange
Project No. 83F-01-75 and 63A-05-68

We have reviewed the subject document and have no comments to offer.

Very truly yours,

[Signature]
TEJUANE TOMINAGA
State Public Works Engineer

EM:jk

RECEIVED
STATE DEPARTMENT
OF TRANSPORTATION
SEP 9 2 57 PM '87
HIGHWAYS DIVISION
PLANNING BRANCH



STATE GOVERNMENT



STATE OF HAWAII
DEPARTMENT OF EDUCATION
P. O. BOX 2289
HONOLULU, HAWAII 96813

OFFICE OF THE SUPERINTENDENT

September 8, 1987

43003
CHARLES T. TOGUCHI
SUPERINTENDENT

RECEIVED
SEP 15 1 38 PM '87
DEPT. OF TRANSPORTATION
HIGHWAYS DIVISION

FRANK F. FASO
DIRECTOR

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



RECEIVED
SEP 18 2 03 PM '87
DEPT. OF TRANSPORTATION
HIGHWAYS DIVISION

HERBERT K. MURAOKA
DIRECTOR AND BUILDING SUPERINTENDENT

PB 87-925

September 11, 1987

Mr. Tetsuo Harano, Chief
Highways Division
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Harano:

SUBJECT: Preparation of an EIS for the Proposed
Kahekili Highway Widening

Our review of your proposed highway widening project indicates
that it will have a negligible effect on our area schools.

Thank you for the opportunity to comment.

Sincerely,

Charles T. Toguchi

Charles T. Toguchi
Superintendent

CTT:JI

cc E. Imai, OES
S. Loo, Windward Dist.

STATE OF HAWAII
SEP 16 1 38 PM '87
PLANNING BRANCH

Mr. Tetsuo Harano, Chief
Highways Division
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Harano:

Subject: EIS Preparation Notice
Kahekili Highway Widening and Interchange
Project No. 83F-01-75 and 63A-05-68

We have reviewed the EIS Preparation Notice for the
proposed Kahekili Highway Widening and Interchange project and
have no comments.

Thank you for the opportunity to review the preparation
notice.

Very truly yours,

Herbert K. Muraoka

HERBERT K. MURAOKA
Director and Building Superintendent

cc: J. Harada

STATE OF HAWAII
SEP 21 11 01 AM '87
PLANNING BRANCH

19 002 1, (5)

OFFICE OF THE MAYOR
CITY AND COUNTY OF HONOLULU

HONOLULU HAWAII 96813 • AREA CODE 808 • 523-4141



FRANK P. PASI
MAYOR

September 11, 1987

DEPT. OF TRANS.
STATEWIDE TRANS.
PLANNING OFFICE
SEP 21 11 23 AM '87

Honorable Edward Y. Hirata
Director
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Hirata:

Thank you for your letter of September 2, 1987 regarding the Environmental Impact Statement for the proposed Kahakii Highway Widening and Interchange project. We appreciate this opportunity to review and comment on the proposed project.

You can be assured that our response will be transmitted to you by October 9, 1987.

Warm personal regards.

Sincerely,
[Signature]

EPF:AC

SEP 23 6 41 AM '87

19 002 1, (5)

OHU CIVIL DEFENSE AGENCY
CITY AND COUNTY OF HONOLULU

630 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE: 522-4111



FRANK P. PASI
MAYOR

STATE OF HAWAII
DEPT. OF TRANSPORTATION
PLANNING BRANCH
SEP 16 1 10 PM '87

September 14, 1987

Mr. Tetsuo Hazano, Chief
Highways Division
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Hazano:

Reference your letter of September 2, 1987, transmitting the Environmental Impact Statement for the proposed Kahakii Highway Widening and Interchange project.

We have no comments to offer.

Sincerely,
[Signature]
GEORGE L. KEKUNA
Deputy Director Designate of
Civil Defense
City and County of Honolulu

SEP 15 1 42 PM '87
DEPT. OF TRANSPORTATION
HAWAII BRANCH

RECEIVED
OCT 5 10 08 AM '87
DEPT. OF TRANSPORTATION
HIGHWAYS DIVISION

TETSUO HARANO
Highways Division Chief

State Officials, both appointed and elected, who are concerned about widening of Kahakili highway

September 21, 1987

Dear Officials:

1. Widen it
2. Widen it from Kam hiway to Likelike highway
3. Do it as soon as possible

Respectfully,

Keone T. Hayden
Keone T. Hayden
Resident & voter

47-504 Waipaipai Street
Kaneohe, Hawaii 96744

STATE OF HAWAII
OCT 6 11 20 AM '87
HIGHWAYS DIVISION
PLANNING BRANCH

11/10/87 4 321

DAYTON F. CAINE
46-145 WACHIB CLUB PLACE
KANEHOE, HAWAII 96741

Sep 18, 1987

Mr Tetsuo Harano
Department of Transportation
865 Pucknaw Street
Honolulu, HI 96813

Subject: Kahakili Options

Dear Mr Harano,
We would like to indicate the two options for Kahakili which we believe would best serve Kaneohe and the rear North Shore.

1. Widen the entire length of Kahakili from Likelike to Kam Highway.
2. Construct a full interchange with turn lanes which take advantage of our new H3 to allow an unimpeded flow of traffic.

We have struggled with Kahakili for 12 years for the privilege of living on the Windward Side. It is time to help us all.

Sincerely,

Dayton F. Caine
Dayton F. Caine

Lucille D. Caine
Lucille D. Caine

cc: Senator Kong
Rep Tom

RECEIVED
SEP 22 12 43 PM '87
DEPT. OF TRANSPORTATION
HIGHWAYS DIVISION

RECEIVED
SEP 23 10 59 AM '87
STATE OF HAWAII
DEPT. OF TRANSPORTATION
HIGHWAYS DIVISION
PLANNING BRANCH

HAWAIIAN TELEPHONE COMPANY
P.O. BOX 2222
HONOLULU, HAWAII 96811

HAWAIIAN TEL **613** RECEIVED

OCT 8 10 15 AM '87
DEPT. OF TRANSPORTATION
HIGHWAYS DIVISION

RECEIVED
OCT 5 10 02 AM '87
DEPT. OF TRANSPORTATION
HIGHWAYS DIVISION
#6-769 HAIKU RD-1
EVEN AT HAIKU RD-1
KANEHOE, HAWAII 96744
OCTOBER 2, 1987

Mr. Tetsuo Harano
Chief, Highways Division
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Harano:

Environmental Impact Statement
Preparation Notice for Kahehiki Highway Widening
and Interchange Project

We have reviewed the Environmental Impact Statement Preparation Notice for the above-mentioned project and have no comments to offer. Please coordinate design and construction of your improvements with our engineers.

Sincerely,

James H. Merrell
James H. Merrell
Acting Engineering Manager
Land & Buildings

OCT 8 10 15 AM '87

Tetsuo Hirano
Department of Transportation
869 Punchbowl St.
Honolulu, Hawaii 96813

Dear Mr. Hirano:

Inasmuch as the State is considering plans to widen Kahehiki Highway and construct a better plan for left turns at the intersection of Likelike Highway, I would like you to have my input. As a resident of Haiku Road, I have noticed an improvement to traffic patterns since the recent road work on Kahehiki; however, with more homes and apartments being under construction, I anticipate the traffic becoming worse before it gets better. I really don't believe that H-3 will make a particle of difference to lessen the congestion on either Kahehiki or Likelike. In addition, that may not come to fruition in my lifetime. I would like to see Kahehiki widened from Ahuimzu Road all the way to Likelike Highway. At that point I think it would be prudent to construct a full interchange, with raised or lowered turn lanes to allow an unimpeded flow of traffic. This would do a great deal to alleviate the flow on Likelike that is caused by the bottleneck at Kahehiki Highway.

I realize that, as a property owner, I am just one small voice, but I believe that it is better to light just one candle than stumble around in the dark.

Thank you for your attention.

Sincerely,

Jane Shafer

STATE OF HAWAII
OCT 6 11 20 AM '87
PLANNING DIVISION



An Environmental Impact Statement Preparation Notice on the proposed action was published in the OEQC Bulletin on December 23, 1982. Comments were made in 1987 by many of the same agencies. The following agencies, organizations and individuals commented in 1983 and have not commented in 1987.

Federal Agencies

Coast Guard
Marine Corps
Department of Transportation-Federal Aviation Administration

State Agencies

Department of Hawaiian Home Lands
University of Hawaii Water Resources Research Center

Other Organizations and Individuals

Kahalu'u Neighborhood Board No. 29
Representative Robert Nakata
Representative Terrance Tom
Sierra Club, Hawaii Chapter
Valley of the Temples



DEPARTMENT OF TRANSPORTATION
 UNITED STATES COAST GUARD
 Dec 28 1 37 PM '82

DEPT. OF
 TRANSPORTATION

Mr. Ryokichi Higashionna
 Director of Transportation
 Department of Transportation
 State of Hawaii
 869 Punchbowl Street
 Honolulu, Hawaii 96813

Dear Mr. Higashionna:

The Fourteenth Coast Guard District has reviewed the Kahakili Highway Widening and Interchange Environmental Impact Statement Preparation Notice and has no objection or constructive comments to offer at the present time.

Sincerely,

J. E. Schwartz
 J. E. SCHWARTZ

Commander, U. S. Coast Guard
 District Planning Officer
 By direction of
 Commander, Fourteenth Coast Guard District

Key 422

COMMANDER (dpl)
 Fourteenth Coast Guard District
 Prince Kaimoemua Federal Bldg.
 300 Ala Moana Blvd.
 Honolulu, Hawaii 96850
 (808) 546-2861
 11000
 Serial 571
 27 December 1982

RECEIVED
 Dec 23 8 26 AM '82
 DEPT. OF TRANSPORTATION
 HIGHWAYS DIVISION

RECEIVED
 DEPARTMENT
 OF TRANSPORTATION
 DISTRICT PLANNING BRANCH
 Dec 29 1 52 PM '82



UNITED STATES MARINE CORPS
MARINE CORPS AIR STATION
KANEHOE BAY, HAWAII 96813

IN REPLY REFER TO:
FDPP/WN/33
11015

2 FEB 1983

May 4 1983

GEORGE R. ABYDOSH
COM-400



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION

845 PUNAHOU STREET
HONOLULU, HAWAII 96813

March 14, 1983

RYOKICHI HIGASHIONNA, PH.D.
DIRECTOR
DEPUTY DIRECTOR
WAYNE J. YAMASAKI
JAMES B. MCCORMACK
JONATHAN K. SHIMODA, PH.D.

IN REPLY REFER TO:
HMV-PA
2-74380

State of Hawaii
Department of Transportation
Attn: Dr. R. Higashionna
889 Punchbowl Street
Honolulu, Hawaii 96813

Dear Dr. Higashionna:

Thank you for the opportunity to review and comment on the Environmental Impact Statement (EIS) preparation notice for the Kahakili Highway Widening and Interchange Project.

Although some inconveniences such as increased noise levels and possible traffic congestion are expected during the construction period, the long-term gain is expected to be substantial.

This project and other related defense highway projects will have a positive long-term impact upon the Station and the surrounding community. This command endorses the proposed project and looks forward to its early accomplishment.

If there are any questions, please contact our Facilities Department engineering representative, W. Nakahara, phone 257-2171.

232

Commanding Officer
Kaneohe Marine Corps Air Station
Kaneohe, Hawaii 96863

Dear Sir:

Kahakili Highway Widening and Interchange
Reference: M. A. Yoshinaga's letter of February 2,
1983 on the EIS Preparation Notice

Thank you for your comment that the proposed project will have a positive long-term impact upon the station and the surrounding community.

Copy to:
COMNAVBASE PH
COMFACNAVFACENGCOM

M. A. YOSHINAGA, P.E.
Deputy Director, Facilities Department
By Direction of the Commanding Officer

Very truly yours,
Ryokichi Higashionna
Ryokichi Higashionna
Director of Transportation

DO:gs

RECEIVED
RECEIVED
FEB 19 9 18 AM '83
DEPT. OF TRANSPORTATION
GENERAL INVESTIGATION
DIVISION

RYOKICHI HIGASHIONNA, Ph.D.
DIRECTOR
DEPUTY DIRECTORS
WAYNE J. YAMASAKI
JAMES B. MCCORMACK
JONATHAN K. SHIMADA, Ph.D.
BY REPLY REFER TO
HWY-PA
2.74047



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
885 PUNCHBOWL STREET
HONOLULU, HAWAII 96813
February 28, 1983

GEORGE R. APTON, JR.
COMMISSIONER

42-67

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

AIRPORTS DISTRICT OFFICE
P.O. BOX 50244
HONOLULU, HAWAII 96850
JAN 13 1983
TRANSPORTATION

JAN 12 1983

Dr. Ryokichi Higashionna
Director
DOT, State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Dr. Higashionna:

In response to your letter HWY-PA 2.73065 dated December 17, 1982, concerning the EIS Preparation Notice for the proposed widening of Kahakili Highway, this is to advise that the project would have no adverse effect on civil aeronautical activities.

Thank you for the opportunity to comment on this proposal.

Sincerely,

James M. Cox
DAVID S. YOKOYAMA
Planning Engineer

James M. Cox
Airports District Office Manager

Mr. James M. Cox
Airports District Office Manager
Department of Transportation
Federal Aviation Administration
P. O. Box 50244
Honolulu, Hawaii 96850

Dear Mr. Cox:

Kahakili Highway Widening and Interchange
Reference: Your letter of January 12, 1983

Thank you for advising us that the subject project would have no adverse effects on civil aeronautical activities.

Very truly yours,

Ryokichi Higashionna
Ryokichi Higashionna
Director of Transportation

RECEIVED
JAN 13 3 59 PM '83
DEPT. OF TRANSPORTATION
AIRPORTS DIVISION

233

GEORGE R. ARTHUR
GOVERNOR OF HAWAII

PROJECT OFFICES
HONOLULU OFFICE
P. O. BOX 175
HONOLULU, HAWAII 96813
HAWAII OFFICE
P. O. BOX 523
HAWAII, HAWAII 96743



STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P. O. BOX 1311
HONOLULU, HAWAII 96813

January 17, 1983

May 4308

PROJECT OFFICES
MAUI OFFICE
P. O. BOX 22
MAUI, HAWAII 96753
MOLOKAI OFFICE
P. O. BOX 198
MOLOKAI, HAWAII 96768
KAUAI OFFICE
P. O. BOX 332
KAUAI, HAWAII 96741



University of Hawaii at Manoa

Water Resources Research Center
Holmes Hall 283, 75-49 Dole Street
Honolulu, Hawaii 96822

May 4324

18 January 1983

The Honorable Ryokichi Higashionna
Director, Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Dr. Higashionna:

SUBJECT: Kahekili Highway Widening and Interchange
Environmental Impact Statement (EIS) Preparation Notice

Thank you for informing us of the proposed project.
The Department of Hawaiian Home Lands does not have any comments to
offer on the project.

234

Sincerely yours,

Georgiana K. Padeten
Georgiana K. Padeten
Chairman

GKP:RF:SM:JM

RECEIVED
JAN 24 1 25 PM '83
DEPT. OF TRANSPORTATION
HIGHWAYS DIVISION

Dr. Ryokichi Higashionna, Director
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813

Attn: Mr. Douglas Orimoto
Dear Dr. Higashionna:

Subject: EIS Preparation Notice, Kahekili Highway Widening
and Interchange, Kaneohe, December 1982

We have reviewed the subject EISFN and have no comment to offer
at this time. Thank you for the opportunity to comment. This
material was reviewed by WANC personnel.

Sincerely,
Edwin J. Murabayashi
Edwin T. Murabayashi
EIS Coordinator

ETM:jm

RECEIVED
FEB 3 1 29 PM '83
DEPT. OF TRANSPORTATION
HIGHWAYS DIVISION

13

20

AN EQUAL OPPORTUNITY EMPLOYER

KAHALUU NEIGHBORHOOD BOARD NO. 29

40 KAHALUU COMMUNITY CENTER
47333 WAIKEE ROAD
KANEIHOE, HAWAII 96744

MERRA BEA, KAHALUU, WAIMEA, OLANOLE, BERGANE, HAKIPIU AND SUALOLA



"Let us not ever have
an unhappy minority"

January 22, 1983

Mr. Douglas Orimoto
Department of Transportation
Highways Division, Planning Branch
State of Hawaii
600 Kapiolani Boulevard
Honolulu, Hawaii 96813

Draft Environmental Impact Statement Preparation Notice

Kahehiki Highway Widening & Interchange
Likelike Highway to Kamehameha Highway
Kaneohe, He'eia & Kahalu'u, Ko'olaupoko, O'ahu, Hawaii

Dear Mr. Orimoto:

The Kahalu'u Neighborhood Board No. 29, at its Regular Meeting of January 12, 1983, thoroughly reviewed and discussed the proposed Kahehiki Highway Widening and Interchange Project as presented in your E.I.S. Preparation Notice.

The Board recognizes that, based on current traffic levels, there is a clear need for roadway safety and vehicular flow improvements along the entire length of Kahehiki Highway. However, we are particularly concerned with the growth assumptions, emphasis on the automobile and improvement priorities implied in the preparation notice.

FAULTY GROWTH ASSUMPTIONS

Under Section D, Need for the Project, the preparation notice discusses possible accelerated population growth and increases in average daily traffic (ADT) on Kahehiki Highway in the vicinity of Haiku Road of 45% by the year 2003.

Please note that such increased traffic flow would imply population growth contrary to the intent of the City & County General Plan and the proposed Ko'olaupoko Development Plan, both of which emphasize the retention of the rural character of Kahalu'u and the coastal communities beyond. So, although ADT increases could be significant from Haiku Road to Likelike Highway, there would not be significant increases from the Kamehameha Highway junction to Haiku Road.

OVER-EMPHASIS ON AUTOMOBILE SOLUTIONS

There is a continuing over-emphasis on automobile solutions to transportation problems. Every effort must be made to lessen reliance on the automobile and to encourage alternate modes of transportation from safe pedestrian ways to first class bike routes to increased bus service with supporting bus lanes and park & ride facilities.

Draft Environmental Impact Statement Preparation Notice
Kahehiki Highway Widening & Interchange
Likelike Highway to Kamehameha Highway
Page 2

PRIORITIES

The following comments are intended to assign priorities to actions that will adequately improve roadway safety, encourage alternate modes of transportation and increase vehicular traffic flow.

FIRST PRIORITY The several proposals below shall be taken as a single first priority:

• Completely redesign and improve all intersections along the entire length of the highway. Improvements must include construction of a full complement of turn lanes allowing turn movements in each direction (see attachment), installation of traffic signals, such signals to be synchronized whenever possible and particularly at peak traffic hours.
Note: Due to increasing number of commercial establishments, particular attention must be given to the design of the Kahehiki/Kamehameha highway junction.

• Provide manned assistance to operate lights and direct traffic during peak hours at Kamehameha/Likelike & Kahehiki/Likelike highway junctions.

• Completely reconstruct and improve all roadway shoulders along the entire length of the highway.

• Encourage use of THE BUS through more frequent service, construction of exclusive bus lanes and park & ride facilities.

• Construct a first class bike route, physically separated from vehicular traffic lanes, along the entire length of the highway.

• Provide safe pedestrian ways and jogging paths along the entire length of the highway.

• Lessen peak hour traffic volumes by initiating staggered school hours and encouraging flex-time working hours by both the private sector and government.

SECONDARY PRIORITY-ALTERNATIVE A The several proposals below shall be taken as a single secondary priority:

• Include all proposals listed under aforementioned first priority.

• Construct a complete grade separated interchange at the Kahehiki/Likelike highway junction.

• Widen the highway to 2 traffic lanes in each direction, separated by a landscaped median, from Haiku Road to Likelike Highway only. We are opposed to any highway widening northward from Haiku Road for fear that such widening would encourage changes to the General Plan and the Development Plan which would, in turn, justify accelerated population growth in Kahalu'u and the communities beyond.

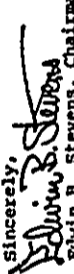
Draft Environmental Impact Statement Preparation Notice
 Kahakili Highway Widening & Interchange
 Likelike Highway to Kamehameha Highway
 Page 3

SECONDARY PRIORITY-ALTERNATIVE B The several proposals below shall be taken as a single secondary priority:

- Include all proposals listed under aforementioned first priority.
- Do not construct a grade separated interchange at the Kahakili/Likelike highway interchange.
- Do not widen any section of Kahakili Highway.
- Instead, use interchange and widening funds to completely redesign and improve all intersections along Kamehameha Highway in Kane'one Town from Haiku Road to Likelike Highway.

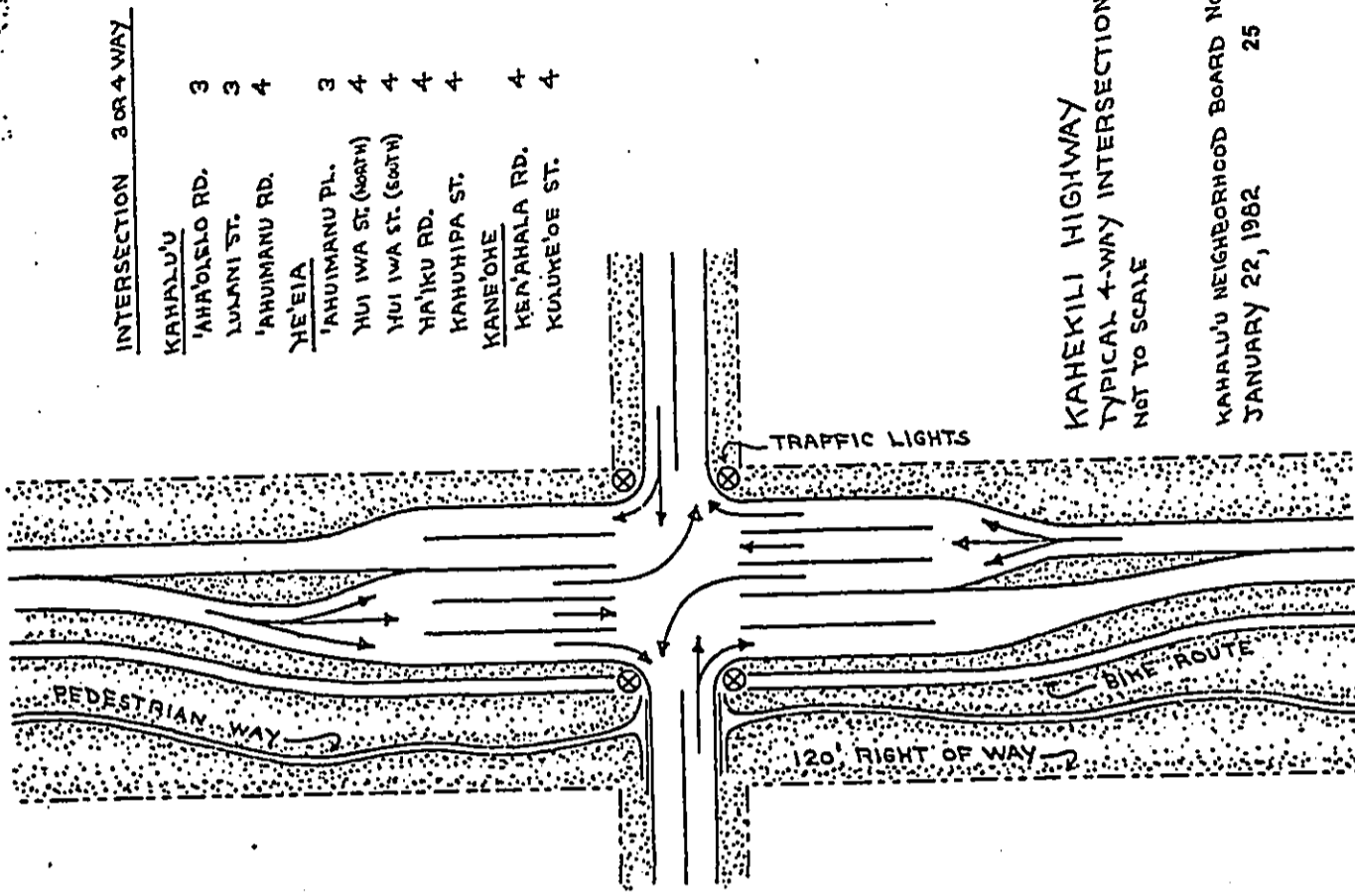
IN CONCLUSION

We trust that you will give each and every one of our comments and proposals your full attention and serious consideration.

Sincerely,

 Edwin B. Stevens, Chairman
 Kahalu'u Neighborhood Board No. 29

Letter & Comments Authorized by Motion 9-0-0
 N.B.#29 Regular Meeting 1-12-83
 (Materials prepared by Members Gans, Shimomoto & Stevens)
 Attachment: Diagram of Typical 4-Way Intersection for Kahakili Highway illustrating full complement of turn lanes.

- Copies:
- Senator Charles Toiguchi
 - Representative Robert Nakata
 - Councilman David Kahanu
 - Chief Planning Officer, Department of General Planning
 - Kane'one N.B.#30
 - Kahalu'u N.B.#29 - Chairman
 - Growth Management Committee
 - Kahalu'u Community Resource Center
 - Neighborhood Commission



HOUSE OF REPRESENTATIVES
THE TWELFTH LEGISLATURE

STATE OF HAWAII
STATE CAPITOL
HONOLULU, HAWAII 96813

January 18, 1983

Dr. Ryokichi Higashionna
Director
Department of Transportation
State of Hawaii
869 Punchbowl St.
Honolulu, Hawaii 96813

Dear Dr. Higashionna:

The EIS for Kahakili should address a number of very important issues. These are:

1. Does it implement the Oahu General Plan?
2. What will be the socioeconomic impact of this widening be on Kahaluu?
3. In terms of priority needs for highway improvements on Oahu, where does it stand? For example, is it more important than lane widening on Kaneohe Highway from Hygenic Store to Vahiway? Is it more important than completing Fort Weaver Road improvements, or Kalaheo congestion, or the clearing up of congestion in downtown Honolulu at rush hour?
4. What are the growth implications for Kahaluu and the Heaia Headlands, in light of the present zoning of those areas?
5. Are there examples of highway improvements that have not stimulated growth?
6. The range of alternatives to this widening should be expanded.
7. What will happen to land values in Kahaluu as a result of this action?
8. If development is increased, what is the impact on traffic in downtown Kaneohe?

HENRY MAULILO PETERS
DANIEL I. EDWARDS
RUSSELL BLAIR
HEAVERT A. SEGAWA

DISTRICT REPRESENTATIVES

- 14 - HERBERT A. SEGAWA
- 23 - ANDREW LEVIN
- 34 - VIRGINIA ISHELL
- 45 - YOSHITO TAKAHARA
- 56 - RICHARD M. NATHAN
- 67 - HERBERT J. WANDA
- 78 - MARK J. ANDREWS
- 89 - JOSEPH M. SOTEI
- 90 - CLAYTON H. W. HEE
- 101 - DONNA E. HEKA
- 112 - MAL JONES
- 123 - BARBARA MARUMOTO
- 134 - FREDERICK WILLIAM ROHLFING
- 145 - CALVIN K. SAY
- 156 - KEN KITAHARA
- 167 - JOAN HAYES
- 178 - DAVID M. MAGNO
- 189 - BRIAN T. TANGUCHI
- 200 - MARTIN S. C. DANG
- 211 - MAZE E. HIRONO
- 222 - RUSSELL BLAIR
- 233 - CATHERINE STANLEY
- 244 - BOO TAN
- 255 - STIGAN W. BAKER
- 266 - DWIGHT L. YOSHIMURA
- 277 - GENE ALBANO
- 288 - PENNIE M. NAKAMOTO
- 299 - RYUICHI OZAWA
- 310 - DONNA MENDOZA KIM
- 321 - CONNIE C. CHEN
- 332 - YOSHIO OKAMURA
- 343 - CLAUDE T. HANSEN
- 354 - ANNE HIRANO
- 365 - ELOISE YAMAMOTO TUNGOPALAN
- 376 - MITSUO "MITSU" SHITO
- 387 - AYES KITAHARA
- 398 - HENRY MAULILO PETERS
- 409 - RON HANSON
- 420 - DANIEL I. EDWARDS
- 431 - ROBERT BUNDA
- 442 - JOSEPH P. LEONG
- 453 - BOB NAKATA
- 464 - TERRANCE W. H. TON
- 475 - MARSHALL E. HEE
- 486 - WYNNE T. ANDERSON
- 497 - JOHN J. NEHELOS
- 508 - MARIYA YUNG
- 519 - PETER E. AYO
- 530 - ALFRED C. LARDEZABAL
- 541 - RICHARD A. KAWAKAWA

11th Floor
11th Floor

HENRY MAULILO PETERS
DANIEL I. EDWARDS
RUSSELL BLAIR
HEAVERT A. SEGAWA

DISTRICT REPRESENTATIVES

- 14 - HERBERT A. SEGAWA
- 23 - ANDREW LEVIN
- 34 - VIRGINIA ISHELL
- 45 - YOSHITO TAKAHARA
- 56 - RICHARD M. NATHAN
- 67 - HERBERT J. WANDA
- 78 - MARK J. ANDREWS
- 89 - JOSEPH M. SOTEI
- 90 - CLAYTON H. W. HEE
- 101 - DONNA E. HEKA
- 112 - MAL JONES
- 123 - BARBARA MARUMOTO
- 134 - FREDERICK WILLIAM ROHLFING
- 145 - CALVIN K. SAY
- 156 - KEN KITAHARA
- 167 - JOAN HAYES
- 178 - DAVID M. MAGNO
- 189 - BRIAN T. TANGUCHI
- 200 - MARTIN S. C. DANG
- 211 - MAZE E. HIRONO
- 222 - RUSSELL BLAIR
- 233 - CATHERINE STANLEY
- 244 - BOO TAN
- 255 - STIGAN W. BAKER
- 266 - DWIGHT L. YOSHIMURA
- 277 - GENE ALBANO
- 288 - PENNIE M. NAKAMOTO
- 299 - RYUICHI OZAWA
- 310 - DONNA MENDOZA KIM
- 321 - CONNIE C. CHEN
- 332 - YOSHIO OKAMURA
- 343 - CLAUDE T. HANSEN
- 354 - ANNE HIRANO
- 365 - ELOISE YAMAMOTO TUNGOPALAN
- 376 - MITSUO "MITSU" SHITO
- 387 - AYES KITAHARA
- 398 - HENRY MAULILO PETERS
- 409 - RON HANSON
- 420 - DANIEL I. EDWARDS
- 431 - ROBERT BUNDA
- 442 - JOSEPH P. LEONG
- 453 - BOB NAKATA
- 464 - TERRANCE W. H. TON
- 475 - MARSHALL E. HEE
- 486 - WYNNE T. ANDERSON
- 497 - JOHN J. NEHELOS
- 508 - MARIYA YUNG
- 519 - PETER E. AYO
- 530 - ALFRED C. LARDEZABAL
- 541 - RICHARD A. KAWAKAWA

11th Floor
11th Floor

HOUSE OF REPRESENTATIVES
THE TWELFTH LEGISLATURE

STATE OF HAWAII
STATE CAPITOL
HONOLULU, HAWAII 96813

9. What will be the effect on Kaneohe Bay from development likely to be induced by this action?
Thank you for the opportunity to comment on this matter.

Sincerely,

Bob Nakata

Representative 43rd District

HENRY MAULILO PETERS
DANIEL I. EDWARDS
RUSSELL BLAIR
HEAVERT A. SEGAWA

DISTRICT REPRESENTATIVES

- 14 - HERBERT A. SEGAWA
- 23 - ANDREW LEVIN
- 34 - VIRGINIA ISHELL
- 45 - YOSHITO TAKAHARA
- 56 - RICHARD M. NATHAN
- 67 - HERBERT J. WANDA
- 78 - MARK J. ANDREWS
- 89 - JOSEPH M. SOTEI
- 90 - CLAYTON H. W. HEE
- 101 - DONNA E. HEKA
- 112 - MAL JONES
- 123 - BARBARA MARUMOTO
- 134 - FREDERICK WILLIAM ROHLFING
- 145 - CALVIN K. SAY
- 156 - KEN KITAHARA
- 167 - JOAN HAYES
- 178 - DAVID M. MAGNO
- 189 - BRIAN T. TANGUCHI
- 200 - MARTIN S. C. DANG
- 211 - MAZE E. HIRONO
- 222 - RUSSELL BLAIR
- 233 - CATHERINE STANLEY
- 244 - BOO TAN
- 255 - STIGAN W. BAKER
- 266 - DWIGHT L. YOSHIMURA
- 277 - GENE ALBANO
- 288 - PENNIE M. NAKAMOTO
- 299 - RYUICHI OZAWA
- 310 - DONNA MENDOZA KIM
- 321 - CONNIE C. CHEN
- 332 - YOSHIO OKAMURA
- 343 - CLAUDE T. HANSEN
- 354 - ANNE HIRANO
- 365 - ELOISE YAMAMOTO TUNGOPALAN
- 376 - MITSUO "MITSU" SHITO
- 387 - AYES KITAHARA
- 398 - HENRY MAULILO PETERS
- 409 - RON HANSON
- 420 - DANIEL I. EDWARDS
- 431 - ROBERT BUNDA
- 442 - JOSEPH P. LEONG
- 453 - BOB NAKATA
- 464 - TERRANCE W. H. TON
- 475 - MARSHALL E. HEE
- 486 - WYNNE T. ANDERSON
- 497 - JOHN J. NEHELOS
- 508 - MARIYA YUNG
- 519 - PETER E. AYO
- 530 - ALFRED C. LARDEZABAL
- 541 - RICHARD A. KAWAKAWA

11th Floor
11th Floor

GEORGE R. ARITON
COMMISSIONER



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
300 KALANIANA'OLE STREET
HONOLULU, HAWAII 96813
February 22, 1983

ROBERT MCLEOD-HOWA, PH.D.
DIRECTOR

DEPUTY DIRECTORS
WAYNE J. TALUSAO
JAMES B. MCCORMACK
JOHNATHAN K. SHIMADA, PH.D.

IN REPLY REFER TO:
HWY-PA
2.73919

The Honorable Bob Nakata
Page 2

HWY-PA 2.73919

With respect to improvements on Kamehameha Highway along the north shore, only safety improvements will be made unless the Oahu Transportation Plan, which is currently being updated by OMPO, directs other kinds of improvements.

In connection with solving congestion in downtown Honolulu, we together with the City Department of Transportation Services are doing our respective parts in relieving them. For example, the State Department of Transportation is studying how Nimitz Highway can be improved to increase the flow of traffic. In addition, we are doing safety improvements along Lunalilo Freeway.

To be sure, we will attempt to respond to your appropriate inquiries in our EIS.

Very truly yours,

Ryokichi Higashionna
Ryokichi Higashionna
Director of Transportation

The Honorable Bob Nakata
Representative, 43rd District
The Twelfth Legislature
State Capitol, Room 427
Honolulu, Hawaii 96813

Dear Representative Nakata:

Kahekili Highway Widening and Interchange
Reference: Your letter of January 18, 1983

Thank you for your comments on the EIS Preparation Notice.

The Draft EIS will attempt to address the issues outlined in your letter. These include consistency with the Oahu General Plan, socioeconomic impacts, growth implications, alternatives to the proposed action, impacts on land values, traffic impacts, and direct impacts on Kaneohe Bay.

In response to your questions on priorities, please be informed that Fort Weaver Road, Kalaniana'ole Highway and Kahekili Highway Widening/Interchange projects are in their implementation phases. Fort Weaver Road, for example, is programmed to be implemented in sections. In this instance, a section is already opened to traffic, another section is under construction, and additional sections are under design.

With respect to Kalaniana'ole Highway, it is in its final design phase.

The Kahekili Highway Widening/Interchange project is in its early implementation phase, i.e. preliminary engineering.

RYOKICHI HIGASHIONNA, Ph.D.
DIRECTOR
DEPUTY DIRECTORS
WAYNE J. YAVUSKAL
JAMES B. MCCORMACK
JOHNATHAN L. SERRAJO, Ph.D.
#1 REPLY REFER ID:
HWY-PA
2-74013

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
185 PUNCHBOWL STREET
HONOLULU, HAWAII 96813
FEB 25 1983

GEORGE H. ARIKOSHA
COMMISSIONER

Aug 22 1983
JAN 11 12 57 PM '83

HOUSE OF REPRESENTATIVES
THE ELEVENTH LEGISLATURE
STATE OF HAWAII
STATE CAPITOL
HONOLULU, HAWAII 96813

January 10, 1983
TRANSPORTATION

Dr. Ryokichi Higashionna
Director of Transportation
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Re: HWY-PA 2.73065 Kahekili Highway and Interchange
Environmental Impact Statement (EIS)
Preparation Notice

Dear Dr. Higashionna:

This is to acknowledge receipt of your department's
above mentioned notice.

As the Representative of the 44th District, I am
extremely interested in the timely implementation of
improvements to Kahekili Highway. However, as you note
in your presentation, adverse environmental and social
impacts must be fully investigated and mitigated. In
this regard, I am particularly concerned with the effects
of the project upon the water quality and character of
my district.

Accordingly, I look forward to reviewing the
completed EIS.

Yours very truly,
Terrance Tom
Terrance Tom
State Representative

JAN 13 10 11 AM '83
DEPT. OF TRANSPORTATION
HIGHWAYS DIVISION

TT/pi

19

The Honorable Terrance Tom
Representative, 44th District
The Twelfth Legislature
State Capitol, Room 325
Honolulu, Hawaii 96813

Dear Representative Tom:

Kahekili Highway Widening and Interchange
Reference: Your letter of January 10, 1983

Thank you for reviewing the EIS Preparation Notice.

The EIS will address any significant effects the project
may have on water quality and the character of the community.
We will provide you with a copy of the draft EIS when it
becomes available.

Very truly yours,
Ryokichi Higashionna
Ryokichi Higashionna
Director of Transportation

19



SIERRA CLUB, HAWAII CHAPTER
P.O. BOX 22897 HONOLULU, HAWAII 96822
(808) 946-8494

January 22, 1983

Mr. Douglas Orimoto
Department of Transportation
Highways Division, Planning Branch
State of Hawaii
600 Kapiolani Boulevard
Honolulu, Hawaii 96813

Draft Environmental Impact Statement Preparation Notice
Kahekili Highway Widening & Interchange
Likelike Highway to Kamehameha Highway
Kane'ohē, He'eia & Kahalu'u, Ko'olaupoko, O'ahu, Hawaii

Dear Mr. Orimoto:

The Conservation Committee of the Honolulu Group of the Sierra Club has discussed the proposal to widen Kahekili Highway, concentrating on the potentially significant impacts and on the growth and development factors, as well as on planning for alternate transportation.

We have testified often on:

1. The importance of maintaining rural areas on O'ahu
2. Maintaining Kane'ohē Bay as an important resource
3. Maintaining remaining streams of high water quality
4. Preserving the unique nature of Kahaluu with its natural systems of mountains with high rainfall, wetlands, rich agricultural lands, streams which flow into the Bay, which, if protected, provide a rich environment for marine life.

We are most concerned with what seem to be faulty growth assumptions which imply population growth contrary to the intent of the City and County General Plan and the proposed Ko'olaupoko Development Plan. The highway does need to be improved in safety and in traffic flow, but we do not agree that widening the full length will accomplish this. We feel rather that a comprehensive transportation plan which includes transportation alternate to the automobile is needed.

37

page 2.

Under energy consumption (page 17), a conservation measure that is not mentioned is the energy saving brought about by an improved bus system, park-and-ride facility, and a complete bikeway system.

Under proposed mitigation measures (pages 17 & 18), it will be most necessary to control erosion and sedimentation to the maximum if Kane'ohē Bay is not to suffer severely. In fact if the road is widened in the SMA section, there will probably result more cumulative impacts with development requests that have been made for the Kam. Hwy. intersection. We suggest that the widening preferably end with Hailu Road, and should most certainly not be done beyond Temple Valley. We would suggest that utility lines should be buried, both for esthetic reasons and to prevent future wind damage which was most severe along Kahekili. In any widening and landscaping that is done, it should be considered that the shoulders are used extensively for jogging and pedestrian traffic. This use should not suffer.

We sincerely hope that you will thoughtfully consider our comments. Thank you.

Mahalo

Lola N. Menck

Lola N. Menck, Vice-Chair
Conservation Committee

copies: Senator Charles Toguchi
Representative Robert Nakata
Councilman David Kahanu
Chief Planning Officer, Department of General Planning

37



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
800 PUNAHOU STREET
HONOLULU, HAWAII 96813
March 9, 1983

RYOKICHI HIGASHIONNA, PH.D.
DIRECTOR
DEPUTY DIRECTOR
WAYNE J. YAMASAKI
JAMES B. ACCORACK
JOHNANAN K. SHAMADA, PH.D.
IN REPLY REFER TO:

HWY-PA
2.74168

Ms. Lola N. Mench
Page 2
March 9, 1983

HWY-PA 2.74168

Potential impact of the project on water quality will be discussed in the EIS. Measures will be taken to control erosion and sedimentation, in compliance with all City and County of Honolulu grading regulations. Plans for utility relocation will be coordinated with Hawaiian Electric Company. Cost is the major factor in considering underground utilities.

Your interest in this project is appreciated.

Ms. Lola N. Mench, Vice-Chair
Conservation Committee
Sierra Club, Hawaii Chapter
P. O. Box 22897
Honolulu, Hawaii 96822

Very truly yours,
Ryokichi Higashionna
Ryokichi Higashionna
Director of Transportation

Dear Ms. Mench:

Kahekili Highway Widening and Interchanges
Reference: Your letter of January 22, 1983

Thank you for reviewing the EIS Preparation Notice.

The EIS will address alternatives for the widening of Kahekili Highway. The Department of Transportation has not yet determined whether the highway should be widened along its entire length.

The traffic forecasts mentioned in the EIS Preparation Notice are based on a trip generation model which incorporates the regional population projections contained in the revised General Plan for the City and County of Honolulu. The basic methodology for these forecasts is explained in Volume III of the Final Supplement to the Interstate Route H-3 Environmental Impact Statement.

Provisions for alternate modes of transportation, such as pedestrian ways, bike routes and bus lanes will be considered. It should be noted, however, that plans for increased bus service is a function of the City and County of Honolulu. Pedestrian and bikeway improvements would have little effect on traffic flow during peak hours, which consists largely of home-based trans-Koolau work trips. The high volumes of traffic at peak hours create the need for more highway capacities. Bikeways and sidewalks would be additions to, rather than replacements of, highway capacities.

GEORGE H. JAMES
COMMISSIONER



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
185 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

February 24, 1983

RYOKICHI HIGASHIONNA, PH.D.
DIRECTOR
DEPUTY DIRECTORS
WAYNE J. YAMAGUCHI
JAMES B. MCCORMACK
JONATHAN F. SHIMADA, PH.D.
IN REPLY REFER TO:
HWY-PA
2.74017

May 4/83

AN ENDOWMENT CARE MEMORIAL PARK

February 4, 1983

State of Hawaii
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Attention: Ryokichi Higashionna
Director of Transportation

Re: Kahekili Highway Widening and
Interchange Environmental Impact
Statement (EIS) Preparation Notice

Gentlemen:

Valley of the Temples has reviewed subject
EIS and supports the earliest possible accomplishment
of the project, primarily for safety but also for
the convenience of the customers (including
funerals) and employees. The slow traffic and
numerous accidents on the existing two-lane highway
are a real problem.

Please let us know if we may be of further
assistance.

Very truly yours,

W. Lawrence Clapp
Chairman of the Board

RECEIVED
STATE DEPARTMENT
OF TRANSPORTATION
FEB 9 10 49 AM '83
HONOLULU PLANNING BRANCH

RECEIVED 38
FEB 0 1 32 PM '83
DEPT. OF TRANSPORTATION
HONOLULU DIVISION

INTERNATIONAL MARKET PLACE / HONOLULU, HAWAII 96815 / TELEPHONE: 925-9871

Mr. W. Lawrence Clapp
Chairman of the Board
Valley of the Temples
International Market Place
Honolulu, Hawaii 96815

Dear Mr. Clapp:

Kahekili Highway Widening and Interchange
Reference: Your letter of February 4, 1983

Thank you for reviewing the EIS Preparation Notice.
Your comments expressing the need for the project are
appreciated.

Very truly yours,

Ayokichi Higashionna
Director of Transportation

38

CHAPTER VIII

**DEIS COMMENT LETTERS
AND RESPONSES**

CHAPTER VIII: DEIS COMMENT LETTERS AND RESPONSES

A Notice of the Draft Environmental Impact Statement was published in the OEOC Bulletin on July 8, 1989. The following comments required responses:

Federal Agencies

Department of the Army U.S. Army Engineer District Honolulu
Streams Division
Department of Housing and Urban Development
Department of the Interior
Geological Survey Water Resources Division
Department of the Interior
Office of Environmental Project Review
Environmental Protection Agency

State Agencies

Department of Accounting and General Services
Division of Public Works
Department of Budget and Finance
Housing Finance and Development Corporation
Department of Education
Ahuimanu Elementary School
Department of Health
Office of Hawaiian Affairs
Office of State Planning
University of Hawaii at Manoa Environmental Center

City Agencies

Board of Water Supply
Department of Land Utilization
Department of Parks and Recreation
Department of Transportation Services
Neighborhood Commission
Police Department

Other Organizations and Individuals

GASCO
Hawaiian Electric Company, Inc.
Kamehameha Schools/Bernice Pauahi Bishop Estate
Koolau Baptist Church Academy
Ed Stevens

No responses are required for the agencies and organizations and individuals listed below.

Federal Agencies

Department of Agriculture
Soil Conservation Service
Department of the Air Force
Department of Health and Human Services
Department of the Navy
Office of the Secretary of Transportation

State Agencies

Department of Agriculture
Department of Business and Economic Development
Department of Defense
Department of Land and Natural Resources

City and County Agencies

Building Department
Department of General Planning
Department of Housing and Community Development
Department of Public Works
Fire Department
Honolulu Community Action Program

Other Organizations and Individuals

City Councilman Arnold Morgado
Haiku Village Community Association
Hawaii Transportation Association
Senator Stan Koki
Harry Palmer
K & M Yamada



DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
BUILDING 270
PT. SHAFER, HAWAII 96861-1400

REPLY TO
ATTENTION OF:

Planning Branch

August 1, 1989

Mt. William R. Lake
Division Administrator
Federal Highway Administration
U.S. Department of Transportation
Box 52266
388 Ala Moana Boulevard
Honolulu, Hawaii 96859

Dear Mr. Lake:

Thank you for the opportunity to review the Draft Environmental Impact Statement (EIS) for Kahekili Highway Widening and Interchange, City and County of Honolulu, Hawaii. The following comments are offered:

a. As noted in our response to the EIS Preparation Notice (letter dated October 1, 1987), portions of the proposed work described in the 1984 project plans were considered authorized under a Department of the Army (DA) nationwide permit. This determination was based upon plans for stream crossings associated with the total highway widening project and with the understanding that no fill would be placed in wetland areas adjacent to the streams. If there have been any changes in the proposed designs since 1984, Operations Branch (438-9258) should be contacted to assure compliance with DA permit regulations.

b. Although the proposed highway would cross various flood zones, highways are exempt from National Flood Insurance Program standards, according to City and County of Honolulu Ordinance No. 88-62, Article 11, subsections 21-11.15(k) and (n).

Department of the Army U.S. Army Engineer District, Honolulu
(August 1, 1989)

1. There have been no design changes since 1984 and no fill will be placed in wetland areas adjacent to streams.
2. Your comment that highways are exempt from National Flood Insurance Program standards will be included in the Final EIS.

We would appreciate receiving a copy of the Final EIS.

Sincerely,

C. J. King
King, Cheung
Chief, Engineering Division



U.S. Department of Housing and Urban Development
 Honolulu Office, Region IX
 200 Ala Moana Blvd., Room 3318, Box 60007
 Honolulu, Hawaii 96810-4891

JULY 20 1989

89-242

Mr. William R. Lake
 Division Administrator
 U.S. Department of Transportation
 Federal Highway Administration
 Box 50206
 Honolulu, HI 96850-4991

Dear Mr. Lake:

SUBJECT: Draft Environmental Impact Statement, FHWA-HS-EIS-89-01-0
 Kahakili Highway Widening and Interchange, Kaneohe,
 Hawaii Project F-083-1(26)


Thank you for the opportunity to comment on the Draft EIS that addresses the environmental impacts that result from the proposed widening of Kahakili Highway and the construction of a traffic interchange at Likelike and Kahakili Highways. We have two concerns, they are:

1. We remain concerned over the potential noise impact on the housing project that we identified in our letter dated January 10, 1983 in response to the EIS Preparation Notice.
2. The procedures for evaluating noise levels are spelled out in Appendix B and express those measurements as Leq(h) dBA.

It is recommended that this data also be expressed in terms of Ldn to reflect the average noise levels over a 24-hour period. This would permit a convenient cross-reference to HUD standards which are expressed as Ldn.

We would appreciate receiving a copy of the Final EIS. Should you have any questions, you may contact Frank Johnson at 541-1327.

Very sincerely yours,


 Jordan Y. Furbant
 Manager

U.S. Department of Housing and Urban Development
 (July 20, 1989)

Kahakili Highway was constructed as a future four lane divided facility. Therefore no additional right-of-way will be required for this project fronting the housing project. The alignment of the roadway will also not change. Traffic projections for Windward Oahu since 1981 has also been reduced because of the City's General Plan intent to keep Windward Oahu rural in nature. Therefore the study conducted by HUD in 1981 to site the location of the housing is still valid and the proposed widening will not have a significant adverse noise impact in this area.



United States Department of the Interior



GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
677 Ala Moana Boulevard, Suite 415
Honolulu, Hawaii 96813

August 17, 1989

Mr. William R. Lake
Division Administrator
U.S. Dept. of Transportation
Federal Highway Administration
P.O. Box 50206
Honolulu, Hawaii 96850

Dear Mr. Lake:

Subject: Draft Environmental Impact Statement,
FHWA-HI-EIS-89-01-D, Kahakili Highway
Widening and Interchange,
Kaneohe, Hawaii Project F-083-1 (26)

The staff of the U.S. Geological Survey has reviewed the subject draft EIS, and we offer the following comments that are relevant to the water resources:

The subject draft EIS lacked discussions on monitoring efforts to measure effectiveness of methods designed to mitigate adverse water-quality impacts. Conforming to erosion control measures, wastewater discharge permits, proper design facilities for stream crossing, intercept ditches, etc., cannot assume to be effective unless so indicated by monitoring data.

The draft EIS adequately addressed the streams affected and the improvements needed to minimize flooding.

Thank you for allowing us the opportunity to review the subject draft EIS.

Sincerely,

William Meyer
William Meyer
District Chief

U.S. Department of the Interior Geological Survey Water Resources
Division (August 17, 1989)

Water quality monitoring during construction will be implemented if required by permits that the project is required to obtain. See Construction Water Quality Section in Final EIS.



United States Department of the Interior

OFFICE OF ENVIRONMENTAL PROJECT REVIEW
BOX 36088, 450 GOLDEN GATE AVENUE
SAN FRANCISCO, CALIFORNIA 94102

August 31, 1989

ER 89/614

William R. Lake, Division Administrator
Federal Highway Administration
Department of Transportation
Post Office Box 50
300 Ala Moana Boulevard
Honolulu, Hawaii 96850

Dear Mr. Lake:

The Department of the Interior has reviewed the Draft Environmental Impact Statement (DEIS) concerning the Kahekili Highway Widening and Inter-exchange, Kaneohe, Hawaii and has the following comments.

FISH AND WILDLIFE RESOURCES

The DEIS overall adequately addresses fish and wildlife resources. In order to conserve habitats for indigenous migratory fishes, the U.S. Fish and Wildlife Service recommends that the Federal Highway Administration consider bridging windward Oahu streams instead of constructing concrete box culverts at each stream crossing.

Thank you for the opportunity to review this document.

Sincerely,

Patricia Sanderson
Patricia Sanderson Port
Regional Environmental Officer

ccs: Director, OEP (w/orig. incoming)
Reg. Dir., FWS

U.S. Department of the Interior Office of Environmental Project Review (August 31, 1989)

Box culverts are the existing drainage improvements for the streams that Kahekili Highway crosses. The additional proposed drainage improvements are the same type of improvement that are already existing. The design of the drainage improvements will be further coordinated with the State Department of Land and Natural Resources to assure instream uses are protected.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
 REGION IX
 215 Fremont Street
 San Francisco, Ca. 94105

18 SEP 1983

William R. Lake, Division Administrator
 Federal Highway Administration
 U.S. Department of Transportation
 Box 50206, 300 Ala Moana Boulevard
 Honolulu, Hawaii 96850

Dear Mr. Lake:

The U.S. Environmental Protection Agency (EPA) has reviewed the Draft Environmental Impact Statement (DEIS) titled KAHAKUII HIGHWAY WIDENING AND INTERCHANGE, city and County of Honolulu, Hawaii. Under the National Environmental Policy Act and Section 309 of the Clean Air Act, EPA is required to review and comment on this DEIS.

We have environmental concerns because the proposed project may have adverse impacts on water quality and natural resources such as fisheries, shellfish populations, coral reefs and wetlands which depend on the protection and enhancement of water quality. It is critical that the Federal Highway Administration, as the lead Federal agency, adopt all feasible or practicable means to protect water quality and associated natural resources in order to fulfill the statutory and regulatory requirements of the Federal Clean Water Act (CWA). We request that the Final Environmental Impact Statement (FEIS) discuss these concerns. Our comments are enclosed.

We have classified this DEIS as Category EC-2, Environmental Concerns - Insufficient Information (please see "Summary of Rating Definitions and Follow-up Actions").

We recognize that the comment period on this DEIS closed several weeks ago. Our office has been developing a new computer system to track our review of other Federal agencies' NEPA documents and the Kahakuii DEIS was one project which did not successfully transfer from our old computer files to our new system. We therefore lost track of it for several weeks. We regret any inconvenience which this may cause your office. However, we would be most appreciative if our concerns could be addressed in the Final Environmental Impact Statement (FEIS).

We appreciate the opportunity to comment on this DEIS. Please send us three copies of the Final Environmental Impact Statement at the same time it is officially filed with the EPA, Washington, D.C. office. If you have any questions, please call me at 415-974-8083 (FTS 454-8083) or have your staff contact Mr. David R. Tomovic at 415-974-7451 (FTS 454-7451).

Sincerely,


 Leahy H. Wiseman, Director
 Office of External Affairs

Enclosures

cc: Willis Kisselburg, FHWA, San Francisco
 Edward Y. Hirata, Director, Hawaii Dept. of Transportation
 Dr. John C. Levin, Director, Hawaii Dept. of Health
 Dr. Marvin Miura, Director, Hawaii Office of Environmental Quality Control

SUMMARY OF RATING DEFINITIONS AND FOLLOW-UP ACTION*

Environmental Impact of the Action

1D—Lack of Objections

The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

1C—Environmental Concerns

The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA would like to work with the lead agency to reduce these impacts.

1D—Environmental Objections

The EPA review has identified significant environmental impacts that must be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

1E—Environmentally Unsatisfactory

The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of environmental quality, public health or welfare. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the Council on Environmental Quality (CEQ).

Adequacy of the Impact Statement

Category 1—Adequate

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2—Insufficient Information

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

Category 3—Inadequate

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

*From: EPA Manual 1640, "Policy and Procedures for the Review of Federal Actions Impacting the Environment."

U.S. EPA COMMENTS TO FEDERAL HIGHWAY ADMINISTRATION (FHWA) ON DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS) FOR KANEHOE BAY WIDENING AND IMPROVEMENT PROJECT, CITY AND COUNTY OF HONOLULU, HAWAII, SEPTEMBER 1989.

Water Quality Comments - Clean Water Act

The DEIS discusses existing water quality and surface waters, potential water quality impacts and mitigation measures in several sections (pages 37-41, 90-95). We appreciate the comprehensive discussion on the area's surface water resources (Maiole, Ahuimanu, Kahaluu, Waihee, Waiolo, Puolena, Heeia, Kealahala, Haiku and Kapunahala Streams; Heeia Wetland; and Kaneohe Bay); existing water quality conditions, and these waters' natural resource values.

The DEIS notes (page 35) that highly erosive slopes with rapid runoff occur along 14 percent of the highway, and that one of the main water quality problems in area streams and Kaneohe Bay is erosion and sedimentation. For example, page 37 notes that "In most streams, testing showed a trend of increased suspended solids and increased soluble petrochemicals carried by each stream below the highway as compared with above the highway." These streams eventually drain into Kaneohe Bay. The DEIS also notes (page 37) that the Heeia Wetland serves as a sedimentation filter, protecting the water quality of Kaneohe Bay.

The DEIS also discusses the natural resources of these surface waters. The DEIS notes (pages 42 and 91) that several of the streams have abundant populations of native stream fauna, notably endemic Hawaii gobies ('o'opu), other species of freshwater fish, and mollusks. The Heeia Wetland is an important waterbird habitat (DEIS, page 42). Kaneohe Bay is "unique in (the) Hawaiian Islands in its extent of patch and barrier reef development" (DEIS, page 42) although decreases in water quality from sedimentation and nutrient loading have reduced the amount of suitable habitat for many reef species.

The DEIS also discusses the State of Hawaii's Water Quality Standards, but does not discuss the State's new Nonpoint Source Assessment and Management Program. In 1987 the Congress amended the Clean Water Act by adding Section 319. Section 319 requires States to assess nonpoint source water pollution problems, develop nonpoint source pollution management programs, and implement controls to protect and improve water quality and beneficial uses.

We request that your office will closely with the Hawaii Department of Health to determine what pollution control measures will be necessary to implement Hawaii's nonpoint source management program. It will be necessary to develop measures to protect water quality during both the construction phase of the project and following construction (i.e., to control the runoff of hydrocarbons, heavy metals, sediment and debris).

U.S. Environmental Protection Agency (September 18, 1989)

1. The discussion of the State's new Nonpoint Source Assessment and Management Program has been included in the Water Quality Sections of the Final EIS. Mitigative measures to protect water quality during the construction and maintenance phases of the project are also included in the Water Quality Sections under Chapter IV: Environmental Consequences.

KAEHEKILI INTERCHANGE

RECEIVED
JUN 21 2 11 PM '83
STATE TRANSPORTATION
DIVISION

(P)1687.9

JUN 20 1983

11-11-83

Dr. Marvin T. Miura
Director
Office of Environmental
Quality Control
465 South King Street, Room 104
Honolulu, Hawaii 96813

Dear Dr. Miura:

Subject: Draft EIS for Kahekili Highway
Widening and Interchange

Thank you for the opportunity to comment on the subject document. DAGS supports the position of the State Hospital and Windward Community College as stated in the attachment.

Should there be any questions, please have your staff contact Mr. Cedric Takamoto of the Planning Branch at 548-7192.

Very truly yours,

D. Tomioka
TEUANE TOMIOKA
State Public Works Engineer

CT:jik
Attachment
cc: State Department of Transportation,
Highways Division w/attachment
U. S. Department of Transportation,
Federal Highway Administration w/attachment
Ms. Valerie Ako w/attachment
Mr. Don Seto w/attachment

In studying the proposal outlined in the letter from the Department of Transportation, it became apparent that there are only three real options that are open to both the State Hospital and Windward Community College (WCC) as follows:

Option 1: Terminate the Connector Road from Castle Hills Subdivision at Kapunahala Subdivision

This option would run the connector road from Castle Hills only to Kapunahala and is preferred by the Hospital and WCC because it would have no impact on Kealahala Road. It would also minimize the amount of Hospital lands required for the roadway.

Option 2: Ev-pass Kapunahala Subdivision and Terminate the Connector Road at Kealahala Road

This is the least desirable option because it would divert all of the Castle Hills traffic to Kealahala Road which will only add to the problems already existing on Kealahala Road. There is no advantage to the Hospital or WCC with this option and therefore would be strongly objected to.

Option 3: Terminate the Connector Road at Kealahala Road but also Connect At to Kapunahala Subdivision

This option is better than Option 2 in that it would give Castle Hill motorists a choice of accessing Kahekili Highway through two points--Kapunahala Subdivision or Kealahala Road. Theoretically, this would ease the load at either point. This option also gives the Hospital and WCC the benefit of using the Connector Road to by-pass the intersection of Kealahala Road at Kahekili Highway--especially during peak traffic hours.

If this option were to be selected by the Department of Transportation, the Hospital and WCC would only agree if the following conditions were met:

1. The alignment of the Connector Road must follow the boundary of the Kaneche District Park as closely as possible to leave as much flat land as possible for the Hospital's future development.
2. Improve traffic flow at the intersection of Kealahala Road at Kahekili Highway by the construction of ramps and overpasses to minimize

cross traffic or widen Kealahala Road to at least 3 lanes and preferably to 4 lanes as follows:

- a. One (1) lane in and two (2) lanes out--1 lane for left turns and through traffic and the other for right turns, or
 - b. One (1) in and three (3) lanes out--1 lane each for left turns, through traffic and right turns.
3. The proposed Connector Road from Castle Hills intersects Kealahala Road at the same place where the Hospital is planning the entrance road to its new development. Therefore, the Connector Road should be designed so that its traffic "yields" to the Hospital traffic.

State of Hawaii, Department of Accounting and General Services,
Division of Public Works (July 20, 1989)

The alignment of the Castle Hills Connector Road to Kealahala Road is being coordinated with DAGS to assure that the concerns of the State Hospital and the Windward Community College are addressed. The access road will not be connected to Kuluokee Street because of impacts to Kupunahala residents.

The traffic flow at the intersection of Kealahala Road and Kahekili Highway will be improved with the widening of Kahekili Highway.

State of Hawaii, Department of Budget and Finance Housing and Development Corporation (July 6, 1989)

Your comments regarding the potential for giving preference to the seven displaced households in proposed rental and for-sale projects in Kakaako, Central Oahu and Ewa will be included in the Final EIS.

JOSEPH E. COHART
Executive Director

RE REPLY REFER TO:



STATE OF HAWAII
DEPARTMENT OF BUDGET AND FINANCE
HOUSING FINANCE AND DEVELOPMENT CORPORATION

1000 WATERLOO PLAZA, SUITE 200
HONOLULU, HAWAII 96813
712 5389 1000

89:PLNG/2559 jt

July 6, 1989

Mr. William R. Lake,
Division Administrator
U.S. Department of Transportation
Federal Highway Administration
Box 50206
Honolulu, Hawaii 96850

Dear Mr. Lake:

Re: Draft Environmental Impact Statement (EIS),
FHWA-HI-EIS-89-01-D, Kahekil Highway Widening and
Interchange, Kaneohe, Hawaii Project P-083-1(26)

We have reviewed the subject draft EIS and offer the following comments.

We note that up to seven households may be displaced as a result of the highway widening project. The HPOC does not have plans to develop housing units in the Windward area at the present time. However, we do have a number of rental and for-sale projects that are planned for development in Kakaako, Central Oahu and Ewa in which these displaced households could be given preference.

Thank you for the opportunity to comment.

Sincerely,

Executive Director

cc: Dr. Marvin T. Miura, OEOC
Dept. of Transportation,
Highways Division

B L A N K



RECEIVED
 AUG 22 9 01 AM '89
 DEPT. OF TRANSPORTATION
 BUSINESS DIVISION
 DEPARTMENT OF EDUCATION
 HAWAIIAN ELEMENTARY SCHOOL
 STATE OF HAWAII
 SUBMITTED BY: MR. EDWARD Y. HIRATA

CHARLES T. TOULSON
 DEPARTMENT OF JUSTICE

TESTIMONY REGARDING KAHEKILI HIGHWAY WIDENING AND INTERCHANGE

Mr. Edward Y. Hirata
 Director
 Department of Transportation
 State of Hawaii
 869 Punchbowl Street
 Honolulu, Hawaii 96813

Parents, teachers, and staff of Ahulmanu Elementary School are concerned with the proposed plans to widen Kahekili Highway to four lanes in the Temple Valley area and request that any plans or consideration of the project, including an Environmental Impact Statement, include a discussion of the traffic considerations for Ahulmanu students crossing the highway going to and from school.

As of August 7, 1989 school records indicate that 139 families who have children attending Ahulmanu live on the makai side of Kahekili. Many of these children walk to school and cross an already busy highway. Although the intersection of Kahekili and Hui Iwa Street is signalized, parents have witnessed several near accidents over the last few years, and one child coming home from school has been hit by a car at the intersection.

The Ahulmanu School Community Council met with State Department of Transportation officials nearly two years ago, expressing its concerns about the proposed widening. Additionally it suggested that a pedestrian overpass for the intersection be included in any plans. The Draft Environmental Impact Statement includes no mention of this. Concerns then and now include:

- 1) the excessive speed at which vehicular traffic travels on this portion of the highway, which can reasonably be expected to increase when two lanes flow in each direction;
- 2) the large numbers of vehicles making right and left turns onto Kahekili from Hui Iwa Street, particularly in the morning hours, specifically 7:00 - 8:00 AM when children are walking to school;
- 3) the inability of young children to accurately assess whether it is "safe" to cross, even with a traffic signal, and their subsequent indecisive actions, sometimes in the middle of the highway;

AN AFFIRMATIVE ACTION AND EQUAL OPPORTUNITY EMPLOYER

4) the enormous expense of highway that will need to be traversed when two more through lanes, any turning lanes, and a medial strip are added.

It seems that many, if not all, of these problems cannot be mitigated unless children and vehicles are separated. A pedestrian overpass can accomplish this.

In anticipation of objections to the proposed overpass we submit that:

- 1) It is unlikely that our community will "grow old" and no longer have children attending Ahulmanu, and thus the overpass would no longer be used. With the exception of the single family homes on Hui O'o Street, the residences on the makai side of the highway are either apartments and townhouses, ideally suited for young families with children. Additionally, the transiency rate at Ahulmanu indicates that few families stay in the area for a lifetime
- 2) We, as parents and educators, are committed to teaching our children to use an overpass. Thus, they will use it. We cannot possibly educate the thousands of motorists who pass the intersection each day to slow down and to watch for humans no bigger than their fenders. Nor can we educate our children what to do in the infinite number of situations that will arise at that intersection. We cannot anticipate all the "whatifs", nor can young children globalize our instructions to a specific situation.
- 3) The cost of an overpass may seem large. However it does not appear unmanageable when considering the projected estimates of \$34.5 to \$52.5 million for construction of the Like Like Interchange and widening of Kahekili, and would obviously be more cost efficient to construct as the highway is widened rather than built separately later. Moreover, the cost cannot be compared to the lives that will be saved by separating cars from kids.

Thank you for this additional opportunity to express our concerns.

Submitted by:
 Principals: Shirley S. Sudd Olney Inada Grace Day Crossing Project
 Chairperson, Hostess in Learning Project
 Chairperson: Peggy Yogi Peggy Yogi Suzette Woods Roger Hite/Suzette Wood
 Chairperson, School Community Council Vice President
 Member, School Community Council: Susan Jones Susan Jones
 Member, School Community Council

Dated: August 9, 1989

State of Hawaii, Department of Education Ahuiamau Elementary School (August 22, 1989)

Your concerns about a pedestrian overpass have been considered and accommodations for an overpass have been included in the planning of the widening. However, the final decision regarding an overpass will be made in the design phase of the project and will be subject to justification and funding.

State of Hawaii, Department of Health (July 11, 1989)

The reference to the public health regulations have been changed to read Title 11, Administrative Rules.

Based on current designs, the Corps of Engineers has indicated the project is authorized under a Department of Army Nationwide Permit. An individual Section 404 permit is not required.



STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 2279
HONOLULU, HAWAII 96821

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

RECEIVED
JUL 19 1 35 PM '89
DEPT. OF HEALTH
NURSING DIVISION

IN REPLY, PLEASE REFER TO
EPW50

July 11, 1989

MEMORANDUM

To: Dr. Marvin T. Miura, Director
Office of Environmental Quality Control

From: Deputy Director for Environmental Health

Subject: Draft Environmental Impact Statement (DEIS) for Kahekihi Highway Widening and Interchange, Koolaukoko, Oahu, Tax Map Keys 4-5-23, 4-5-24, 4-5-25, 4-5-26, 4-5-41, 4-5-79, 4-5-80, 4-5-82, 4-5-108, 4-6-12, 4-6-13, 4-6-18, 4-7-26, 4-7-51

Noise

The DEIS addresses potential noise impacts from construction activities and references State of Hawaii public health regulations on vehicular and community noise control. The Public Health Regulations have been repealed; reference should be directed toward Title 11, Administrative Rules.

Water Pollution

A Section 401 Water Quality Certification could be required if the Corps of Engineers requires a Section 404 permit for work on streams.

Bruce S. Anderson
BRUCE S. ANDERSON, PH.D.

cc: DOT ✓
U.S.DOT
OSP



BLANK

Mr. William R. Lake
Page 2
August 10, 1989

CULT/C/021

August 10, 1989



Mr. William R. Lake
Division Administrator
Federal Highway Administration
Box 50206
Honolulu, HI 96850

SUBJECT: Draft EIS: (FHWA-HI-EIS-89-01-D) Kahekihi Highway
Widening and Interchange, Kane'ohe, O'ahu

Dear Mr. Lake:

- TRUSTEES
- Thomas K. Keolu, Sr.
Trustee at Large
 - Rod Kaimama Burgess
Trustee at Large
 - Vicki Chapman
Trustee at Large
 - Maukahi Alaka
Trustee from Hawaii
 - Deanna F. Chung
Trustee from Oahu
 - A. Francis DeSoto
Trustee at Large
 - Louis Hoo
Trustee from Mokuaia & Lanai
 - Maru Kahawai
Trustee from Maui
 - Moses K. Keolu, Sr.
Trustee from Kauai & Niiha
 - Kevin M. K. "Chubby" Marston
Trustee at Large
- ADMINISTRATOR
Richard K. Pogreben

Thank you for your letter of June 16, 1989, and for the opportunity to comment. In order to notify the public of the potential loss or destruction of significant cultural resources, including archaeological sites, it is necessary for an EIS to provide appropriate documentation concerning the nature and significance of all historic properties subject to impact. Identification of cultural resources is an obvious prerequisite to the evaluation of impact on such resources, and to the planning of methods for the mitigation of such impacts.

Documentary research is the starting place for any identification study. Systematic study and evaluation of documentary data will usually permit predictions to be made about the kinds of historic properties that may be encountered in the area, and about their possible distributions. Such study may also make it possible to develop a broad evaluatory framework within which the significance of particular properties can be judged.

The archaeological survey should include a map which correlates the data from archival maps with the existing surface conditions in the project area. The location of mahaie awards should be shown on a current base map of the area. The information contained in mahaie awards testimonies should be presented in the report. The 1913 topographic map included in the draft EIS in the archaeological reconnaissance report does not accurately depict the location of the project area. The report should contain overlays of the historic period maps of the area to give an indication of the potential for historic archaeology in the project area. The appropriate portion of the detailed engineering map made for the construction of Likele Highway should be included in the archaeological report. The proper analysis of these archival sources will give the reviewer a better understanding of the project area's potential for significant subsurface deposits.

1600 Keolu Blvd., Suite
Honolulu, Hawaii 96814
Pc: (808) 946-2642

2 The information contained in previous archaeological studies should be presented accurately. Kaulaiki Heiau should be spelled correctly. The entire description of the site should be included. The EIS is negligent in omitting the following information about Kaulaiki Heiau: "Facing east is a front terrace 115 feet long and 10 feet high with a 20 foot slope, all that remains, as the rest of the old structure has been destroyed... Large 2-foot stones were used in facing the terrace. The heiau must have been of good size." The archaeological report in the EIS is also incorrect in saying: "Today, the site area is a residential area that is extensively landscaped." More information should be provided. The heiau should be relocated, and its former boundaries determined.

3 The survey should include a systematic effort to identify all properties within the area of concern that might qualify for the National Register, and to record sufficient information to permit their evaluation. The archaeological report in the EIS does not contain enough information on Site GS-88 to allow the reviewer to understand the significance of the site. The site is clearly much more than a "cemetery and historic period compound." It has been identified in previous studies as agricultural terraces, and as a possible heiau site. This information should have been included in the EIS and discussed. In fact, all information included in the H-3 surveys and MOA that is relevant to this project should be included in the EIS.

4 It is puzzling that the survey report does not identify abandoned taro ponds and dryland agricultural fields, such as those shown in Figure 3 of the archaeological report, as archaeological sites. It is also puzzling that no subsurface testing was done to assess the research potential of these field areas. It is important that all historic properties be clearly and completely described. This has not been done.

5 The recommendations contained in the report need to be justified. There is no basis for saying that "the potential for encountering any subsurface remains during related construction activities appears extremely low," especially since no subsurface testing took place. It is also questionable that "based on the paucity of archaeological remains and the extensive surface modifications (bulldozing and cultivation) in the project area no further archaeological field work in the area investigated is necessary prior to construction." To the contrary, based solely on the information presented in the report, quite the opposite conclusion is justified. We recommend that salvage excavations be conducted in the agricultural areas to investigate chronology, spatial distribution of features, artifact assemblages, and environmental data.

1600 Keolu Blvd., Suite
Honolulu, Hawaii 96814
Pc: (808) 946-2642

State of Hawaii, Office of Hawaiian Affairs (August 10, 1989)

1. Documentary research is necessary in researching past land use of specified areas. Archival research, including analyzing early maps is a part of the archaeological investigations. The maps that he references do not need to be included in the archaeological report. The project areas are located on a current USGS topographic map of the area as well as a 1913 Fire control map of the area.
2. Kaulaui was misspelled in the archaeological report. All future distributions of the report will have this mistake corrected. The information regarding the description of Kaulaui does not need to be included in the report. The information is in McAllister which is referenced. This heiau is reported as being destroyed and is located outside of the project area.
3. The statement that "today, the site [Kaulaui Heiau] area is a residential area that is extensively landscaped" is correct. This is the location that our field archaeologists plotted this heiau; if OHA has additional information on the location of this site, we would be most interested in learning about it.
4. The survey was systematic, and every effort was made to identify properties within the project area that might qualify for inclusion of the National Register of Historic Places. Eligibility for National Register of Historic Places was determined for both sites G5-88 and G5-89 in 1986, and both are listed on the register as part of the Luluku Discontiguous District. The location of sites G5-88 and G5-89 are shown on the Section 4f Resources Exhibit.
5. Figure 3 in the Archaeology report does not show abandoned taro pondfields or dryland agricultural fields. The reviewer mistakenly interprets the existence of feral taro as indicating an abandoned agricultural field -- no evidence of a field system was observed.
6. The report reiterates the initial recommendation that the two sites in the project area be preserved, especially the historic cemetery. However, it goes on to recommend that if the sites are to be impacted, then further archaeological research consisting of intensive data recovery and monitoring procedures needs to be conducted. No recommendations for further work are made for the rest of the project area because these areas have been extensively modified and thus have a low potential for containing intact subsurface archaeological deposits.

Mr. William R. Lake
Page 3
August 10, 1989

Please send our office a copy of all archaeological reports that may be done related to this project.

Sincerely yours,

Richard K. Paginawan
Richard K. Paginawan
Administrator

cc: Mr. Edward Y. Hirata, DOT
Dr. Marvin Miura, DEQC
Mr. William Paty, SHPO
Mr. Robert Fink, ACHP

Aug 20/89



OFFICE OF STATE PLANNING

Office of the Governor

STATE CAPITAL, HONOLULU, HAWAII 96825

TELEPHONE 581-1141-1143

AUG 7 11 31 AM '89

Ref. No. P-9795

August 2, 1989

MEMORANDUM

TO: Dr. Marvin T. Miura, Director
Office of Environmental Quality Control

SUBJECT: Draft Environmental Impact Statement (DEIS), Kahakili Interchange and Widening Project, Kaneohe, Hawaii

We have previously reviewed the subject project relative to Hawaii's Coastal Zone Management (CZM) Program and issued our conditional concurrence on July 31, 1989. In addition, we are awaiting acceptance by the Department of Transportation of our conditions. A copy of our CZM consistency conditional concurrence is enclosed for your reference.

Thank you for the opportunity to provide our comments. Please feel free to call our CZM office at 548-8465.

Harold S. Masumoto
Harold S. Masumoto
Director

Enclosure

cc: U.S. Department of Transportation,
Federal Highway Administration (w/enc.)
Department of Transportation,
State of Hawaii (w/enc.)

RECEIVED
AUG 8 9 53 AM '89
DEPT. OF TRANSPORTATION
HIGHWAYS DIVISION

Ref. No. P-9775

July 31, 1989

MEMORANDUM

TO: The Honorable Edward Y. Hirata, Director
Department of Transportation

SUBJECT: Hawaii Coastal Zone Management (CZM) Program Federal Consistency for the Kahakili Interchange and Widening Project, Kaneohe, Hawaii (R/89-025)

This is to inform you that we have reviewed your assessment of the subject activity's consistency with Hawaii's CZM Program and concur with your finding that the primary route on the Kahakili highway from the like-like-ka-ka-kali interchange in Kaneohe to Kaneohe highway near the Kahakili Stream is consistent, predicated upon the following conditions.

1. Appropriate measures to mitigate sediment runoff during and after construction such as those proposed in the Draft Environmental Impact Statement (DEIS) will be implemented.
2. Stream flows at stream crossings will be maintained and not restricted.
3. Because the DEIS identifies the alternative highway corridors as having considerably more environmental impacts such as stream siltation, ecological degradation, and adverse impacts such as water quality, aquatic habitats, archaeological resources and visual impacts, we are unable to concur with the alternative highway corridors at this time (DEIS Chapter 11, Section B). In the event that the alternative highway corridors are selected, additional information regarding environmental impact mitigation will be required to assure that use of the corridors will comply with the (CZM) Program.

By copy of this letter we are informing the U.S. Department of Transportation, Federal Highway Administration, of our conditioned concurrence. Your written acceptance of the conditions or objection to them should be submitted to us by August 18, 1989, with a copy to the Federal Highway Administration.

State of Hawaii, Office of State Planning, Office of the Governor
(AUGUST 2, 1989)

The Department of Transportation has accepted the conditions of
your CZM consistency requirements. See attached.

The Honorable Edward Y. Hirata

Page 2

July 31, 1989

We appreciate your cooperation in complying with the CZM Program.
If you have any questions, please feel free to contact our CZM office at
568-8465.

Harold S. Masumoto

Harold S. Masumoto
Director

cc: U.S. Department of Transportation,
Federal Highway Administration
Department of Health
Department of Land and Natural Resources
Department of Land Utilization

-PA

DIR 6383
BMY-PA
2.7823

AUG 14 1989

MEMORANDUM

TO: Mr. Harold S. Masumoto, Director
Office of State Planning

FROM: Director of Transportation

SUBJECT: HAWAII COASTAL ZONE MANAGEMENT (CZM) PROGRAM,
FEDERAL CONSISTENCY FOR THE KAHEKILI HIGHWAY
WIDENING AND INTERCHANGE PROJECT

We accept your consistency finding based on the conditions of
your letter of July 31, 1989.

Edward Y. Hirata

Edward Y. Hirata

OL:gm
bcc: FHHA, BMY-PA

1989 AUG 14 10 51 AM '89

B L A N K



University of Hawaii at Manoa

Environmental Center
Crawford 317 • 2530 Campus Road
Honolulu, Hawaii 96822
Telephone (808) 948-7961

August 21, 1989
RE:0537

Mr. William R. Laha
Division Administrator
Federal Highway Administration
U.S. Department of Transportation
Box 50206
300 Ala Moana Boulevard
Honolulu, Hawaii 96850

Mr. Edward Y. Hirata, Director
State Department of Transportation
869 Runchoboa Street
Honolulu, Hawaii 96813

Gentlemen:

Draft Environmental Impact Statement
Kohala Highway Widening and Interchange Project
Koolaupeko, Oahu

The above referenced proposed project involves the construction of a
traffic interchange at the intersection of Kohala Highway (FAP 63) and
Kohala Highway (FAP 60), and the widening of Kohala Highway from the
interchange to Koolaupeko Highway, a distance of 4.4 miles. The project is
located in Koolaupeko, Windward Oahu.

This review was prepared with the assistance of Jon Mabeuoka, Sociology/
Barry Follett, Anthropology; Henry Gee and Yu-Si Fok, Water Resources
Research Center; and C. Arva Ulaszewski, Environmental Center.

Social Impact Analysis

According to Page iv, Areas of Concern, it is possible that this project
would induce urban growth in the less urbanized areas; however, this
document does not address how this increase in growth will affect the
existing community. Also, the "Community Impacts" section (page 105), seems
to present conflicting information. Paragraph 2 of subsection 2, states
that the project is not likely to incur increases in land value in adjoining
areas; however, paragraph 3 states that the project will have a net positive

STATE OF HAWAII
AN EQUAL OPPORTUNITY EMPLOYER

Mr. William R. Laha
and Mr. Edward Y. Hirata

-2-

August 21, 1989

effect on the value of adjacent properties. We feel that a clarification is
needed. An analysis of current property values and anticipated changes in
value as a result of this project should be presented for public review.

Noise generated by the project is expected to have an effect on the
community. Additional impacts will be felt as a consequence of household
displacements and relocations. Also, the anticipated need for pedestrian
overpasses indicates that "social cohesion" could, to some degree be
affected. These impacts, combined with possible land value increases will
change the community lifestyle. We do not believe that these issues have
been fully addressed.

Page 120 attempts to relate the short-term adverse impacts to the
environment with long-term productivity; however, long-term impacts, such
as changes to the community lifestyle are not evaluated. The decision to
proceed with this project or not must be based on whether the benefits
outweigh the potential impacts. Without consideration of the long-term
effects on the community, we find it difficult to make such a determination.

Archaeological Survey

We concur that the potential for encountering subsurface remains appears
extremely low. We support the recommendation that the Historic Sites
Section, Department of Land and Natural Resources should be contacted as
soon as subsurface cultural deposits are encountered.

Project Design

Our reviewers did express concern about some aspects of the project
design. This EIS does not seem to take into consideration the impact that
the highway expansion will have on accessibility to the Byodo-in Temple and
the Valley of the Temples Cemetery. The Temple is considered to be one of
the major tourist attractions in the area and is included in one of the
"drive-yourself" mini-tours of the island. At the present time, making a
left turn while exiting from the Valley of the Temples is extremely
hazardous because of the cross traffic and lack of signal light. The
expansion of the highway to four (4) lanes would only exacerbate the
problem.

Also, the exhibits on pages 17, 18, 19, and 20 show the existing
Kohala Highway section. Are there any plans to utilize this section after
the project completion? Will it be converted into a green-grass patch or
just abandoned?

University of Hawaii at Manoa Environmental Center
(August 21, 1989)

1. As stated in the DEIS the project alone would not induce urban growth if it is completed. Urban growth is a product of land use decisions made by elected officials expressing the views of their constituency.
2. As stated in the DEIS there are many economic factors that affect property values. The sum of the "net" effects of the project would be positive on adjacent properties because of reduced travel time.
3. Kahakili Highway is an existing facility and widening it will not further divide the community. All accesses will be maintained and vehicular and pedestrian mobility will be improved. Therefore, it is not anticipated that the project will have a significant impact on "social cohesion."
4. The long term impact to community lifestyles of not providing adequate transportation services are discussed in the Final EIS, Chapter II.B. No Action. Reduced congestion and travel times and increased safety are positive impacts on community lifestyle.
5. Separate left turn lanes will be placed at the intersection of the Valley of the Temple Cemetery entrance road and Kahakili Highway. Traffic signals will be installed, if traffic volume and safety concerns warrant it.
6. Although no specific plans have been developed, that area will probably be cleared and grassed and maintained by the Highways Division.


Mr. William R. Iaha
and Mr. Edward Y. Hirata

-3-

August 21, 1989

Thank you for the opportunity to comment on this document. We hope our comments will be helpful in preparing the final document and we look forward to the opportunity of reviewing it.

Yours truly,


John Harrison
Environmental Coordinator

cc: DEPC

L. Stephen Lau
Jon Matsubara
Barry Rollett
Yu-Si Fok
Henry Gee
C. Anna Ulaszewski

COPY

COPY



Dr. Marvin T. Miura
Page 2
July 27, 1989

July 27, 1989

Marvin T. Miura, Ph.D.
Director
Office of Environmental Quality
Control
State of Hawaii
465 South King Street, Room 104
Honolulu, Hawaii 96813

Dear Dr. Miura:

Subject: Your Transmittal of June 15, 1989 of the Draft
Environmental Impact Statement for the Kahekili
Highway Widening and Interchange Project,
Kaneohe, Oahu, FHWA-HI-EIS-89-01-D, Hawaii
Project P-083-1(26)

269

Thank you for the opportunity to review and comment on the
Draft Environmental Impact Statement for the Kahekili
Highway Widening and Interchange Project.

We have the following comments to offer:

1. Pg. 49 - The discussion on the Board of Water Supply's (BWS) proposed 42-inch transmission main should indicate that the main and the State Department of Transportation (DOT) will be coordinating the installation of the pipeline with the interchange and widening project. The BWS Planning and Engineering Division is the appropriate party to contact to coordinate the design of the 42-inch main and the phasing of the pipeline installation, respectively, once the final alternative is chosen.
2. Pg. 49 - The BWS also has several existing transmission and distribution water mains, in addition to water meters, along the project route. The text should mention that it may be necessary to relocate some of these facilities

and/or take precaution to protect others from damage during construction. Submittal of the design plans for our review and approval will help to minimize these possibilities.

In the event any water meters have to be relocated, all associated costs will have to be paid for by the highway project funds.

3. Pg. 49 - The BWS wells at Kahaluu and Haiku are existing and already a part of our Windward High Service System.
4. Pg. 35 - Proper geomorphic terminology should be used in describing the location of Kahekili Highway.

We would appreciate a copy of the Final Environmental Impact Statement and kept informed on the project.

If you have any questions, please contact Lawrence Whang at 527-6138.

Very truly yours,

Kazu Hayashida
KAZU HAYASHIDA

Manager and Chief Engineer
State Department of Transportation, Highways Division
Division Administrator, U.S. Department of Transportation



City and County of Honolulu, Board of Water Supply
(July 27, 1982)

1. The final EIS will indicate that the pipeline will be installed in coordination with the State Department of Transportation interchange and widening project. The Board of Water Supply Planning and Engineering Division will be contacted regarding coordination of design and phasing of installation.
2. Existing transmission and distribution water mains and water meters along the project route will be either relocated or protected during construction. As soon as final plans are completed they will be submitted to BWS Planning and Engineering for coordination. All associated costs of relocating water meters will be paid for by highway project funds.
3. The sentence regarding the construction of BWS wells will be deleted.
4. The description of the geology of Kahakili Highway will be supplemented with the following:

"The area around Kahakili Highway can be described geologically as a combination of alluviated valley bottoms and weathered ridges with dike intruded basalt."

1. A geological dike is a tabular body of igneous rock that has been injected while molten into a fissure in the ground.

DEPARTMENT OF LAND UTILIZATION
CITY AND COUNTY OF HONOLULU

130 SOUTH KING STREET
 HONOLULU, HAWAII 96813 • PHONE 533-6132



JOHN P. WHALEN
 DIRECTOR
 DEPARTMENT OF LAND UTILIZATION
 106/89-3611(RF)

August 7, 1989

Mr. Marvin T. Miura, Director
 Office of Environmental
 Quality Control
 State of Hawaii
 465 South King Street #104
 Honolulu, Hawaii 96813

Dear Mr. Miura:

Draft Environmental Impact Statement (DEIS)
Kahekeke Widening and Interchange

271

We have reviewed the DEIS and offer the following comments:

- Chapter 1, "Purpose and Need for Action" cites peak hour traffic volumes, travel times, and levels of service based on 1987 traffic counts. In 1988, the Department of Transportation (DOT) instituted contra-flow on Kahekeke Highway during peak hours. This has resulted in a significant improvement in traffic conditions. The DEIS and Tables I-4 and I-5 should be revised to reflect current traffic conditions, and the DEIS should specifically address improvements in traffic conditions resulting from contra-flow.
- According to Exhibit I-5, the DOT projects a 58 percent increase in A.M. peak hour traffic at the Likelike/Kahekeke intersection between 1987 and 2008. This exceeds the rate of population growth projected for the region in the City's General Plan. As amended in 1989, the General Plan calls for a maximum population increase in Koolauoko and Koolauoko combined of only 13 percent by the year 2010.
 The DEIS gives neither population nor development projections for the region served by Kahekeke Highway, nor any other substantiation of its traffic projections. This information should be provided in the DEIS and/or its technical appendices.
- The DEIS provides inadequate justification of the need for the maximum widening alternative of six lanes from Likelike to Haiku Road and four lanes from Haiku Road to Kamehameha Highway. Given that this alternative

Mr. Marvin T. Miura, Director
 Page 2

requires substantial cuts into hillsides and several concrete retaining walls 40 to 50 feet high (one as long as 800 feet), there will be a significant impact on the visual quality of this mostly open, rural environment. We question whether the traffic service needs of the region justify the cost and impacts of the maximum widening alternative.

- Over-sizing of highways can promote further urbanization of agricultural lands in the region. This project, coupled as it is with the H-3 project, could have such an impact.
 Highway improvements should be sized to accommodate existing and projected daily traffic volumes, while peak hour conditions should be addressed via TSM and mass transit improvements. As the DOT has demonstrated with the Kahekeke contra-flow project, substantial improvements in peak hour travel times can be realized through low-cost TSM methods.
- Where the widening project falls within the county's Special Management Area (SMA), an SMA permit will be required.

Thank you for the opportunity to comment.

Very truly yours,

John P. Whalen
 JOHN P. WHALEN
 Director of Land Utilization

JPM:sj
 0237N/19-20

cc: DOT-Highways Division
 ✓ USDOT-Federal Highway Administration

106/89-3611(RF)

City and County of Honolulu, Department of Land Utilization
(AUGUST 7, 1989)

1. Implementation of contraflow lanes between Likelike Highway and Haiku road has resulted in the improvement of traffic conditions and a reduction in travel times, however, not to the point where improvements are not needed. Traffic still flows at level of service F. The travel times and level of service shown in Exhibit I-4 and I-5 are consistent with current conditions.
2. Traffic projections are consistent with the population growth projected for the region in the city's General Plan. The reason for the percentage discrepancy between the population growth and the peak hour projections is that the current peak hour volumes are restrained by the capacity of the existing roadway. The actual peak hour demand exceeds the capacity of the roadway resulting in congestion and extended peak periods. The actual peak hour demand based on historical data is 94 of the average daily traffic (ADT). The ADT for the year 2008 is consistent with the population increases projected for Windward Oahu.

Department of Transportation based traffic projections on a 2010 population projection of 145,000 for Koolauloa and Koolaupoko. The DGP projection for the same area in 2010 is for a population of 135,900. The DOT projection is consistent with H-3 trans Koolau projections and with Hale 2005 projections.
3. The maximum widening alternative provides for the long-term travel needs on Kahakuli Highway. The cost effective analysis shown in Exhibit II-4 indicates that the improvements are economically justified.
4. The proposed project is consistent with the city's General Plan and the Koolaupoko Development Plan. TSM and transit improvements have been considered in the planning of this project. Improvements will be implemented incrementally based on need and availability of funds.
5. The requirement of a SMA Permit is covered in the Final EIS, Exhibit III-17.

DEPARTMENT OF PARKS AND RECREATION
CITY AND COUNTY OF HONOLULU

410 SOUTH KING STREET
HONOLULU, HAWAII 96813



FRANK P. ZAK
DIRECTOR

**City and County of Honolulu, Department of Parks and Recreation
(JULY 11, 1989)**

A mauka-side sidewalk/bikeway slightly higher than the traveled surface will be built between Kuluoke Street in Kapunahala and the Haiku Road Intersection.

RECEIVED
JUL 13 12 59 PM '89
DEPT. TRANSPORTATION
HIGHWAYS DIVISION

WALTER M. OZAWA
DIRECTOR

JUL 14 11 34 AM '89
PLANNING BRANCH

July 11, 1989

Mr. Marvin T. Miura, Director
Office of Environmental Quality Control
465 South King Street #104
Honolulu, Hawaii 96813

Dear Mr. Miura:

Subject: Draft Environmental Impact Statement
FHWA-HI-EIS-89-0-D Kahekili Highway Widening
and Interchange, Kaneohe, Hawaii
Project F-083-1(26)

The proposed Kahekili Highway widening project will pass by two Department of Parks and Recreation facilities, Kaneohe District Park and Ahuimanu Neighborhood Park. Neither will be directly impacted because the 120-foot wide Kahekili right-of-way set aside is adequate without additional taking of land.

We would like to repeat a request made to the State Highways Division on October 14, 1987 for a mauka-side sidewalk/bikeway slightly higher than the traveled surface to be incorporated in the highway widening plan between Kuluoke Street in Kapunahala and the Haiku Road Intersection. This would serve to protect the considerable pedestrian and bicycle traffic to and from the district park on Kahekili Highway.

Sincerely,

Walter M. Ozawa
WALTER M. OZAWA, Director

MMO:a1

cc: Mr. William R. Lake, Division Administrator
Federal Highway Administration, Region Nine
Department of Transportation, Highways Division

HONOLULU, HAWAII 96813

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU

1/14/89

City and County of Honolulu, Department of Transportation Services (August 4, 1989)

- 1. The correct Index page numbers will be shown in the Final EIS.
- 2. All affected intersections will be improved to facilitate access onto Kahakili Highway.
- 3. Construction plans will be submitted for review and comment.



August 4, 1989

Dr. Marvin T. Miura, Director
State of Hawaii
Office of Environmental Quality Control
465 South King Street, Room 104
Honolulu, Hawaii 96813

Dear Dr. Miura:

Subject: Kahakili Highway Widening and Interchange
Draft Environmental Impact Statement
TMK: 4-5-23, 24, 25, 26, 41, 79, 80, 82, 108
TMK: 4-6-12, 13, 14, 4-7-26 and 51

This is in response to your request for our review and comments on the above subject project.

We have the following comments:

- 1. Under the section titled Index, "The Bus" page should be listed as 48.
- 2. All affected intersections should be improved to facilitate access onto Kahakili Highway.
- 3. Construction plans affecting City streets should be submitted for review and comment when they are available.

Should you have further questions, please contact Wayne Nakamoto of my staff at 523-4190.

Very truly yours,

ALFRED C. TRIEDS
Director

cc: State Department of Transportation
U. S. Department of Transportation
Federal Highway Administration

RECEIVED
AUG 8 7 18 AM '89
DEPT. OF TRANSPORTATION
HIGHWAYS DIVISION

TE-3818
PL-1652

NEIGHBORHOOD COMMISSION
CITY AND COUNTY OF HONOLULU

HONOLULU, HAWAII 96813
AREA CODE 808-537-4007



JERRY HARRIS
MANAGING DIRECTOR

FRANK P. FAR
DIRECTOR

July 10, 1989

Mr. William R. Lobe
Division Administrator
Federal Highway Administration
Region Nine
Hawaii Division
P. O. Box 50206
Honolulu, Hawaii 96850

Attention: Dave Reilly
Planning Engineer

Subject: Draft Environmental Impact Statement, Kahukili Highway Widening and
Interchanges

Dear Mr. Reilly:

Regarding your letter dated June 15, please be advised that I cannot provide
any input on information relating to the above subject.

From a public interest standpoint, I feel that the Kaneohe Neighborhood Board
should have an opportunity to share with you their views and suggestions
relative to this project. You might want to make a presentation at a regular
Kaneohe Neighborhood Board meeting where the public is invited to participate
or get comments from the Board itself.

To accomplish this, I suggest you correspond directly with Ray Sweeney, Kaneohe
Neighborhood Board Chair at 44-653 Kaneohe Bay Drive, Kaneohe, Hawaii 96744 or
telephone the Chair at 235-4157.

Best Wishes for a successful project as well as some effective public input.

Sincerely,

John W. Stungard
JOHN W. STUNGARD
Chair

cc: Neighborhood Commission



City and County of Honolulu, Neighborhood Commission
JULY 10, 1989

The State of Hawaii Department of Transportation has held several
public information meetings in Kaneohe. (See Final EIS Chapter
VI.)

10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

B L A N K

City and County of Honolulu, Police Department (July 24, 1989)
We concur with your recommended alternatives.



GASCO, Inc.

515 Kamehameha Street
PO Box 3379 Honolulu, Hawaii 96812
Telephone 808 547-3333 Telex 9777 743282

GASCO PRI (June 26, 1989)

The design of the project will be coordinated with GASCO and plans will be sent to your office for review.

June 26, 1989

U. S. Department of Transportation
Federal Highway Administration
Region Nine
Hawaii Division
Box 50206
Honolulu, Hawaii 96850

Attention: Mr. William R. Lake
Division Administrator

Gentlemen:

Re: Draft Environmental Impact Statement
FHWA-HI-EIS-89-01-D
Kahakili Highway Widening and Interchange
Kaneohe, Hawaii Project No. F-083-1(26)

We refer to your letter of June 16, 1989 regarding our review and comment for the subject highway widening project.

Gasco, Inc. currently has an underground gas utility system within the project limits which serves a group of customers in the area and is interconnected with the utility network in the bordering areas. We would appreciate the consideration of your planners and consultants during the project planning and design process to minimize the conflicts with the proposed improvements and to provide any coordination which may be required during construction.

Thank you for the opportunity to comment on the proposed project. Should there be any questions, or if additional information is desired, please call me at 547-3574.

Very truly yours,

Edwin M. Sava
Manager
Engineering and Projects

ENS:msd

Hawaiian Electric Company, Inc. • PO Box 2750 • Honolulu, HI 96840-01

Hawaiian Electric Company, Inc. (August 4, 1989)

The Final EIS will include the fact that HECO and the State of Hawaii Department of Transportation will probably enter a utility agreement about relocation of overhead and underground electrical wires that are impacted by the project.

ENV 2-1
JA/G

August 4, 1989



William A. Bonnet
Manager
Environmental Department

Mr. William R. Lake
Division Administrator
U. S. Department of Transportation
Federal Highway Administration
Box 50206
Honolulu, Hawaii 96850

Dear Mr. Lake:

Subject: Draft Environmental Impact Statement,
FRWA-HI-EIS-89-01-D, Kahekili Highway Widening and
Interchange, Kaneohe, Hawaii Project F-083-1(26)

We have reviewed the above subject document and have attached a copy of Exhibit III-r which shows the approximate locations of HECO's existing overhead (in red) and underground (in green) facilities.

It would appear that most of these facilities may be impacted by the road widening project. However, since this is a State of Hawaii Department of Transportation and a federal aid project, HECO will probably enter into a utility agreement with the State for any electrical relocation work required of the project and will be working closely with the State of Hawaii engineer or its consultant during the design stage.

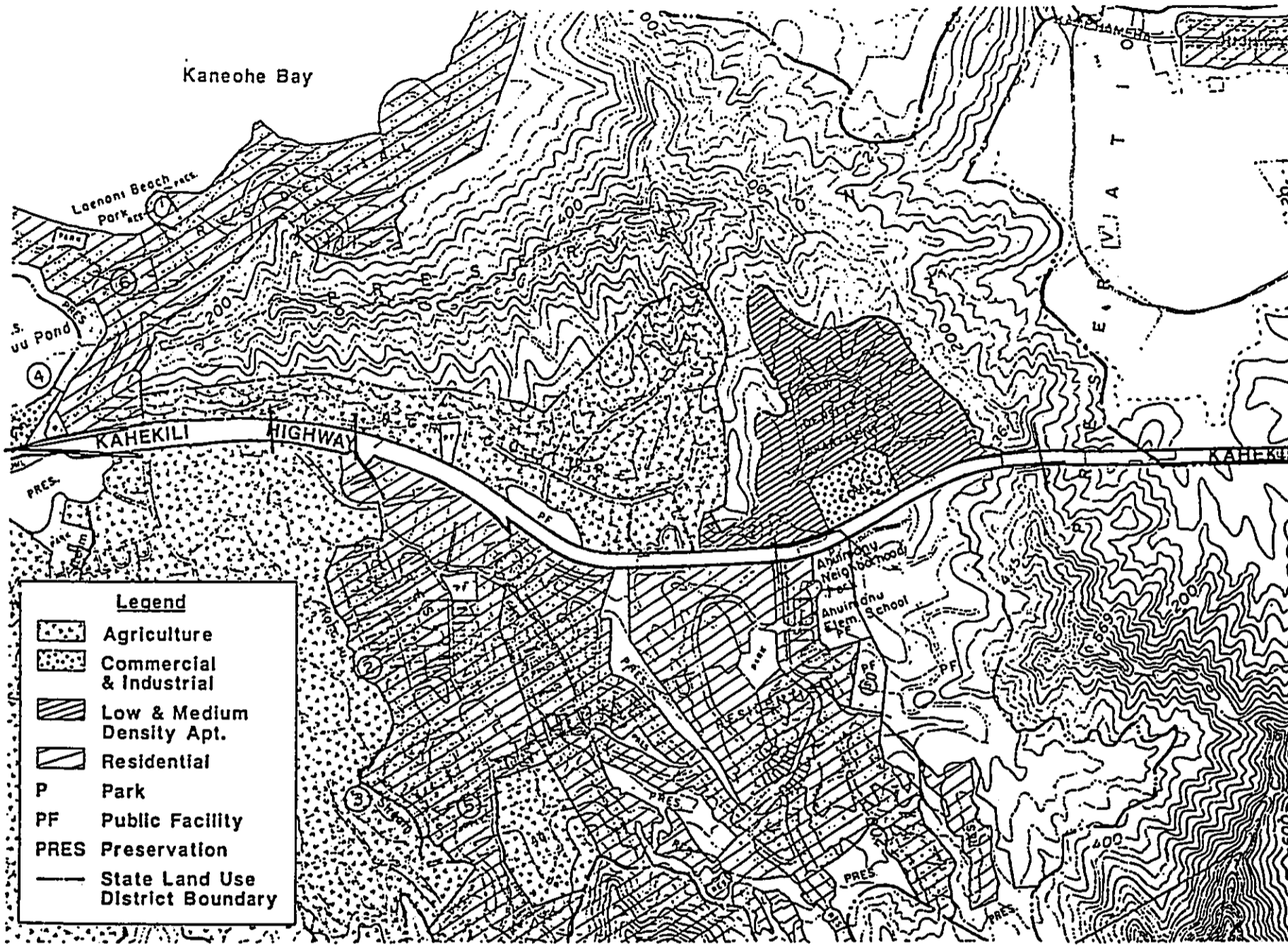
Sincerely,

Attachment

An HEI Company

BLANK

RECEIVED
FEBRUARY 21 1964
U.S. AIR FORCE
HEADQUARTERS
WASHINGTON, D.C.



1"=1000'

69

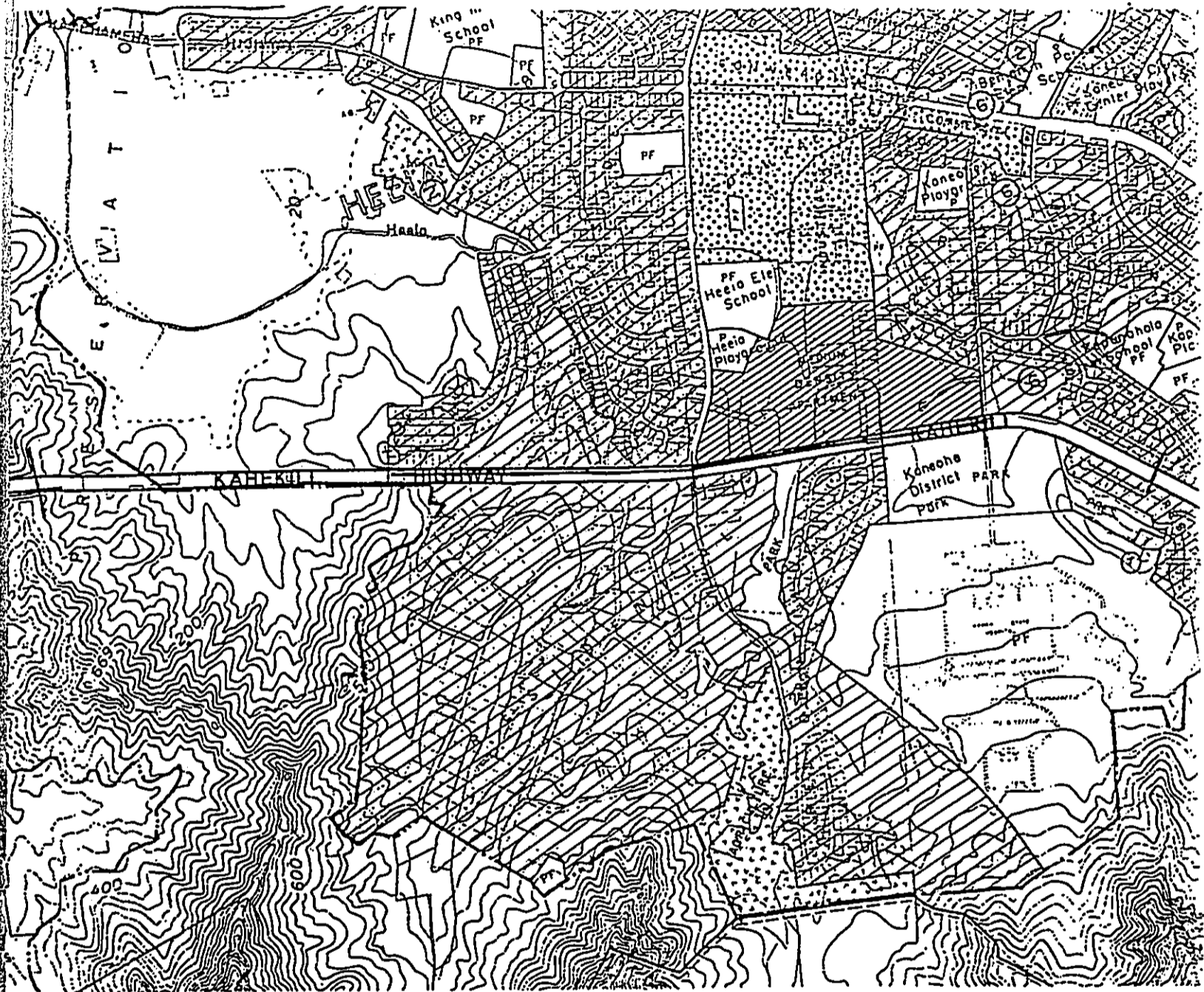


EXHIBIT III-14:
KOOLAUPOKO DEVELOPMENT PLAN LAND

BLANK

KAWAIAHO PLAZA
587 South King Street
Suite 200
P.O. Box 3488
Honolulu, Hawaii 96801
Telephone 523-6200

KAMEHAMEHA SCHOOLS / BERNICE PALAHI BISHOP ESTATE

July 12, 1989

Mr. William R. Lake
Division Administrator
U. S. Department of Transportation
Federal Highway Administration
Box 50206
Honolulu, HI 96850

Dear Mr. Lake:

Response to Draft Environmental Impact Statement (Kahakili Highway Widening),
Project F-083-1(26), Kaneohe

This is in response to your letter of June 16, 1989 regarding the above
subject matter.

We note in the submitted document (DEIS) that it is proposed to widen Kahakili
Highway on the mauka or northwest side from the existing two lanes to four,
five, or six lanes, depending on which alternative is chosen. This is to
inform you that the taking of Kamehameha Schools/Bishop Estate (KS/BE) land
along the mauka boundary of the highway between Haiku Plantation and our
boundary adjacent to the Valley of the Temples Cemetery (see Exhibit A), may
be prohibitively expensive considering our future plans to sell or develop
these areas. That is, we intend to auction for sale a twenty-acre parcel
zoned Country on the Kahaolu side of Haiku Plantation and develop into
agricultural lots the area adjacent to it. These proposed land uses meet a
growing need for agricultural and housing uses which the market has been known
to pay for dearly. Any condemnation for road widening purposes should
carefully consider the valuation consequences of such an action on these
specific KS/BE parcels of land.

Thank you for giving us the opportunity to share our comments. We would
appreciate a copy of the final EIS for our files at the appropriate time.
Please call me at 523-6247, should you have any questions concerning this
matter.

Very truly yours,

Alita Neves
Alita Neves
Land Manager
Windward Oahu

AN:hc
Enclosure

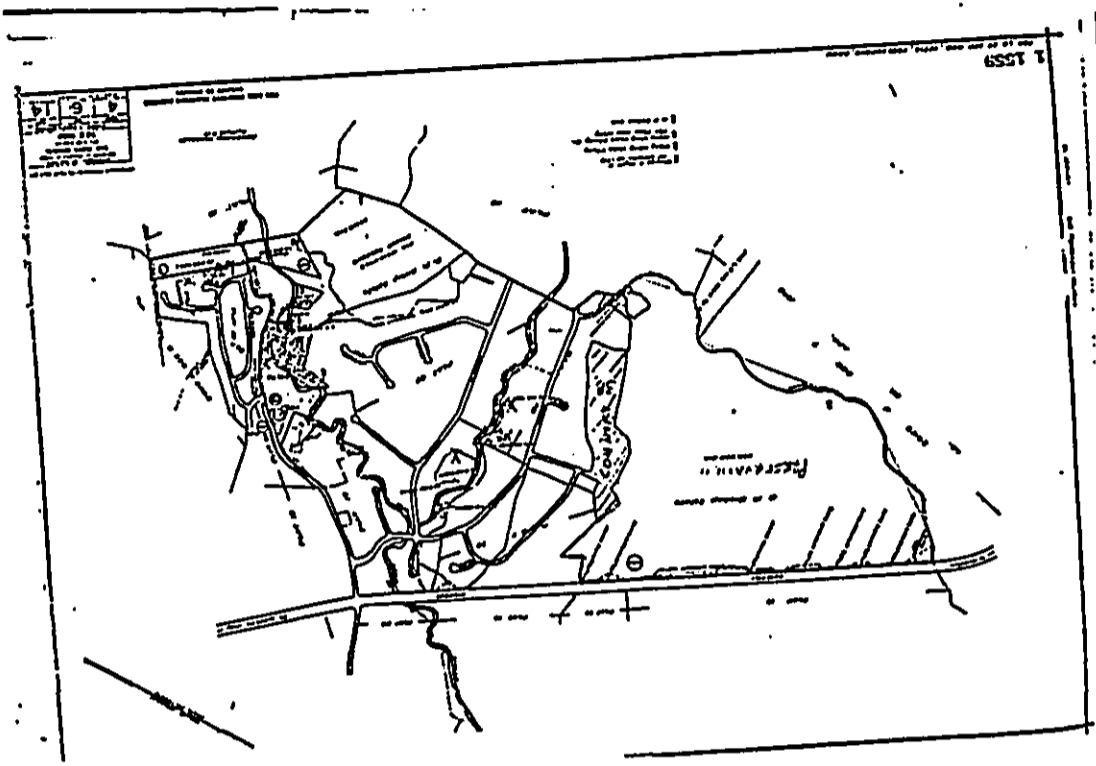


EXHIBIT A

Kamehameha Schools/Bernice Pauahi Bishop Estate (July 12, 1989)

As stated in the DEIS highway right-of-way of 120' has already been purchased for widening. However, a slope easement will need to be purchased from Kamehameha Schools/Bernice Pauahi Bishop Estate.

6537

KOOLAU BAPTIST CHURCH ACADEMY

45-611 KENEKE STREET, HONOLULU, HAWAII 96844 • (808) 242-1377

PLANNING DIVISION
AUG 23 9 35 AM '89

RECEIVED
AUG 23 8 31 AM '89
DEPT. OF TRANSPORTATION
HIGHWAYS DIVISION

August 17, 1989

Mr. Edward Y. Hirata
Director State of Hawaii Department of Transportation
869 Punchbowl St.
Honolulu, HI 96813

Dear Mr. Hirata,

Everyone living and driving on the windward side of Oahu recognizes the need for improved traffic flow along Kahakili Highway. The proposed Kahakili Highway widening and interchange project (State project No. 83P-01-75 and 63A-05-68) should accomplish such in relieving the traffic load. However, as Assistant Principal of Koolau Baptist Church Academy I am very much concerned about the design and construction of the Kahakili interchange upon our children.

I am confident that with proper planning the finished project will meet federal regulations governing noise pollution. However, without careful planning the possibility of serious health and safety problems developing during the construction phase is of great concern to me.

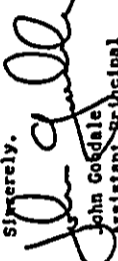
On behalf of Koolau Baptist Church Academy, our students, and their parents, please do all within your power to address the following area of concern.

NOISE: The D.E.I.S. Pg. 102 estimates the noise level at the construction site to be 79 dBA at 50 feet. We have three classrooms within 25 feet of the construction site and all of our classrooms are within 200 feet of the construction site. I am concerned that during the construction phase the children's learning ability will be adversely affected and/or severely restricted.

SAFETY: The Kahakili interchange borders our school playground. The children use this area before, during, and after school. Furthermore, it is used on weekends as well. I am concerned that without physical barriers restricting access, the children might be enticed to enter the construction site. The possibility of children being physically hurt or permanently injured is a real concern. Please provide adequate measures for the children's safety in your planning.

DUST: The D.E.I.S. identifies dust as a potential health hazard that can be alleviated with proper precautions. Please ensure that guidelines and policies for dust reduction are enforced.

Thank you Mr. Hirata for keeping our concerns in mind. Furthermore, I would like to invite you and your fine staff to visit our school. I am sure you would be able to address our concerns better and explain the state's plans to limit the adverse impact of construction upon our students. Please keep us informed.

Sincerely,

John Goodale
Assistant Principal

JG:nc

RECEIVED
AUG 23 1989
DEPT. OF TRANSPORTATION
HIGHWAYS DIVISION

Koolau Baptist Church Academy (August 17, 1989)

1. **Noise:** Mitigation measures are in the planning stages to reduce the noise impact on the school. A noise barrier wall will be constructed to lower the noise level.
2. **Safety:** Physical barriers will be built early in the construction phase to insure the safety of the children.
3. **Dust:** The Department of Health administers and enforces the dust guidelines on an as needed basis when complaints are made.
4. When plans for the noise barrier wall are completed we will meet with you to discuss your concerns regarding these construction plans.

ED STEVENS
LAND USE PLANNING & URBAN DESIGN
47-585' AHUIMANU ROAD
KAHALUPE, O'AHU, HAWAII 96744

William R. Lake, Division Administrator
Federal Highway Administration
U.S. Department of Transportation
P.O. Box 50206
Honolulu, Hawaii 96850

August 2, 1989

Draft Environmental Impact Statement Response
&
August 2, 1989 Public Hearing Testimony
Proposed Kahekill Highway Widening & Interchange Projects

Dear Mr. Lake:


I have reviewed the Draft Environmental Impact Statement for the proposed Kahekill Highway Widening & Interchange Projects and, even though I run the risk of repeating myself, I now request that the following comments be included in the Final Environmental Impact Statement.

1. A fully grade separated interchange at the intersection of Kahekill & Likelike Highways should be constructed without delay. This interchange should have been completed back in 1962 when Kahekill was first built. Widening of Kahekill Highway to 4 lanes probably is justified from Likelike Highway to Haiku Road - but not beyond - not from Haiku Road to Kamchamcha Highway (at Hygienic Store), nor even from Haiku Road to 'Ahuimanu Place.

2. Page iv of the DEIS states "Widening of the entire length of Kahekill Highway would tend to induce urban growth in the less urbanized areas in Kahala'u and beyond, into the Ko'olauloa Development Plan area." The Kahala'u & the Ko'olauloa Neighborhood Boards, various other Community Groups and many individuals worked for years to bring about the General Plan rural category for the Windward areas from Waie'e and beyond. And they worked long and hard to protect that category by obtaining the Development Plan agricultural land use designations and the Land Use Ordinance agricultural & county zoning districts. Although it might provide some traffic relief for the suburban 'Ahuimanu area, the widening of Kahekill past Haiku Road would aim a transportation arrow directly at those rural/agricultural/country districts and, thus, threaten their very existence. This, in my opinion, would be a crying shame!

3. Because transportation alternatives in general and Kahekill Highway in particular were included, please refer to the recommendations made by the Windward O'ahu Transportation Corridor Study Group on January 8, 1986 and in the full Report of the OMOPOCAC Corridor Study Groups dated April, 1986. I am unable to find a reference to these reports in the DEIS, and so have attached a copy of the Windward Corridor recommendations.

Thank you,


Ed Stevens

Attachment: OMOPOCAC Windward O'ahu Transportation Corridor Study, January 8, 1986

Copies: Ronald Hales, Chair, Kahala'u Neighborhood Board No. 29
Debra Shiraitshi, Chair, Sierra Club Honolulu Group Conservation Committee

ES/Mac/dms

Ed Stevens, Land Use Planning and Urban Design (August 2, 1989)
The OMOPOCAC Corridor Study Group Windward Corridor
recommendations will be included in Appendix H of the FEIS.

1. The construction of a fully grade-separated interchange and the incremental widening of Kahekill Highway to Kamehameha Highway is the preferred alternative. The reasons for selection is included in the Final EIS Summary.
2. The issue of the project's impact on growth is discussed in the Final EIS in the Community Impacts Section on Land Use and Development Section.
3. The OMOPOCAC Windward Corridor Study Group's recommendations and evaluation of the recommendations as it relates to Kahekill Highway have been included in the final EIS.

LETTERS WITHOUT RESPONSES

UNITED STATES
DEPARTMENT OF
AGRICULTURE

SOIL
CONSERVATION
SERVICE

P. O. BOX 5000A
HONOLULU, HAWAII
96850

July 13, 1989

Mr. William R. Lake
Division Administrator
U.S. Department of Transportation
Federal Highway Administration
Region Nine, Hawaii Division
P.O. Box 50206
Honolulu, HI 96850

Dear Mr. Lake:

Subject: Draft Environmental Impact Statement (DEIS) -
FHWA-HI-EIS-89-01-D, Kahakii Highway Widening
and Interchange, Kaneohe, HI, Project F-083-1(26)

We have no comments to offer at this time; however, we would appreciate the
opportunity to review the final EIS.

Sincerely,

Warren M. Litz

WARREN M. LITZ
State Conservationist



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 15TH AIR BASE WING (PACAF)
MCCLAM AIR FORCE BASE HAWAII 96853-5000

7 JUL 1989

U.S. Department of Transportation
Federal Highways Administration, Region Nine
Hawaii Division Administrator
ATTN: Mr. William R. Lake
Box 50206
Honolulu, Hawaii 96850

Dear Mr Lake

SUBJECT: Draft Environmental Impact Statement, FHWA-HI-EIS-89-01-D, Kahakii
Highway Widening and Interchange, Kaneohe, Hawaii Project F-083-1(26)

We have completed review of the draft Environmental Impact Statement (EIS) for
the proposed Kahakii Highway Widening and Interchange in Kaneohe and have no
comments. The proposed project does not impact on any Air Force property or
activities.

Thank you for the opportunity to review the draft EIS. If there are any
questions, please contact Mr Robert Leong of my Environmental Planning staff
at 449-8998.

Sincerely

Don A. Lyon
DON A. LYON, Colonel, USAF
Commander

*

HAWAIIAN AIR FORCE BASE HAWAII 96853-5000



DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Centers for Disease Control
Atlanta GA 30333

August 15, 1989



DEPARTMENT OF THE NAVY

COMMANDER
NAVAL BASE PEARL HARBOR
BOX 110
PEARL HARBOR, HAWAII 96860-8070

11010
Ser 03(09P2)/1687
18 JUL 1989

Mr. William R. Lake
Division Administrator
Federal Highway Administration
U.S. Department of Transportation
Box 50206
300 Ala Moana Boulevard
Honolulu, Hawaii 96850

Dear Mr. Lake:

We have reviewed the Draft Environmental Impact Statement (DEIS) for "Kahakili Highway Widening and Interchange, Federal-Aid Project F-083-1(26)." We are responding on behalf of the U.S. Public Health Service. It is clear that the widening of Kahakili Highway and the addition of an interchange will relieve traffic density on this busy state roadway resulting in safer travel.

Our review focused on potential public health and safety impacts resulting from increased carbon monoxide levels, increased noise levels, and the relocation of personal residences. We were pleased to note that the potential relocations of personal residences resulting from this project appear well mitigated. The State of Hawaii Relocation Advisory Assistance is a particularly noteworthy service which should allay fears of homeowners who will be faced with relocations of their personal residences.

While we noted that two thirds of all CO emissions in Hawaii are from motor vehicles, the proposed improvements should result in no significant exceedance of Federal air quality standards. In regard to increased noise levels, we noted that while the noise levels resulting from this project are predicted to exceed Noise Abatement Criteria, the proposed noise barriers and traffic control should adequately mitigate these impacts. We particularly support the strict enforcement of speed limits as an effective and economical method to reduce noise to tolerable levels.

Thank you for sending this document for our review. Please insure that we are included on your mailing list for the Final EIS for this project as well as future documents with potential public health impacts which are developed under the National Environmental Policy Act (NEPA).

Sincerely yours,

David E. Clapp
David E. Clapp, Ph.D., P.E., CIH
Environmental Health Scientist
Center for Environmental Health
and Injury Control

Mr. William R. Lake
Division Administrator
U.S. Department of Transportation
Hawaii Division
Box 50206
Honolulu, HI 96850

Dear Mr. Lake:

DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS), FHWA-HI-EIS-89-01-D
KAHEKILI HIGHWAY WIDENING AND INTERCHANGE, KANEHOE, HAWAII
PROJECT F-083-1(26)

The subject DEIS forwarded by your office has been reviewed, and we have no comments to offer.

Thank you for the opportunity to review the DEIS.

Sincerely,

W.K. Liu
W. K. Liu
Assistant Base Civil Engineer
In direction of
the Commander

Memorandum

U.S. Department of Transportation
Office of the Secretary of Transportation

JOHN HAINES
GOVERNOR



YUKIO KITAGAWA
CHAIRPERSON, BOARD OF AGRICULTURE
SUZANNE D. PETERSON
DEPUTY TO THE CHAIRPERSON

JUL 3 1989

Draft Environmental Impact Statement
Kahehiki Highway Widening and Interchange
Kaneohe, Hawaii
FHWA-BI-EIS-89-01-D

Copy to
Att of

Eugene L. Lehr
Chief, Environmental Division

Eugene W. Cleckley
Chief, Environmental Operations
Division, BEV-11

We appreciate the opportunity to review the subject DEIS. We have no comments.

MEMORANDUM

To: Dr. Marvin T. Miura, Director
Office of Environmental Quality Control

Subject: Draft Environmental Impact Statement (DEIS) for
Kahehiki Highway Widening and Interchange
Department of Transportation, Highways Division
THK: 4-5, 4-6, 4-7 Kaneohe, Oahu

State of Hawaii
DEPARTMENT OF AGRICULTURE
1428 So. King Street
Honolulu, Hawaii 96814-2512
August 14, 1989

FAX: 548-6100
Mailing Address:
P. O. Box 22159
Honolulu, Hawaii 96822-0159

The Department of Agriculture has reviewed the subject DEIS and finds that the concerns expressed in our letter dated October 1, 1987 to Mr. Edward Hirata, Director of the State Department of Transportation, have been adequately addressed.

Thank you for the opportunity to comment.

Yukio Kitagawa

YUKIO KITAGAWA
Chairperson, Board of Agriculture

cc: State DOT - Highways Division ✓
Division Administrator
U. S. Department of Transportation
Federal Highway Administration

89 11
AUG 16 10 53 AM '89
FBI - HONOLULU





DEPARTMENT OF BUSINESS AND ECONOMIC DEVELOPMENT

ENERGY DIVISION, 228 MERCHANDISE BL., 15L, WASHINGTON CENTER, HONOLULU, HAWAII 96850

JOHN WILSON
CONTROLLER
ROGER A. UYVILINO
DIRECTOR
BARBARA EMILY SHANNON
DEPUTY DIRECTOR
LESLIE MAZURKAWA
DEPUTY DIRECTOR

June 22, 1989

Mr. William R. Lake
Division Administrator
U.S. Department of Transportation
Federal Highway Administration
Box 50206
Honolulu, Hawaii 96850

Dear Mr. Lake:

Subject: Draft Environmental Impact Statement, FHWA-HI-EIS-89-01-D,
Kahekihi Highway Widening and Interchange, Kaneohe, Hawaii
Project F-083-1(26)

Thank you for providing us an opportunity to comment on the Draft
Environmental Impact Statement (DEIS) for the proposed Kahekihi Highway
Widening and Interchange project.

We have reviewed the DEIS and have no comments to offer at this time.

Sincerely,

Maurice H. Kaya
Maurice H. Kaya
Energy Program Administrator

MK:if:pc

JUN 27 10 23 AM '89
F.A.S. 3-4850

STATE OF HAWAII
DEPARTMENT OF DEFENSE
OFFICE OF THE ADJUTANT GENERAL
2415 PALM DRIVE, HONOLULU, HAWAII 96819

June 23, 1989

Engineering Office

Dr. Marvin T. Miura, Director
Office of Environmental Quality Control
465 South King Street, Suite 104
Honolulu, Hawaii 96813

Dear Dr. Miura:

Kahekihi Highway Widening & Interchange DEIS

Thank you for providing us the opportunity to review the above subject
project.

We have no comments to offer at this time. Enclosed is the DEIS as
requested.

Sincerely,

Jerry M. Matroda
Major, Hawaii Air
National Guard
Contracting & Engineering Officer

Enclosure

cc: State of Hawaii-Dept of Transportation
(Highways Division)
U.S. Dept of Transportation
(Federal Highway Administration)

JOHN BLUMER
DEPT. OF LAND AND NATURAL RESOURCES



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

P. O. BOX 211
HONOLULU, HAWAII 96850

REF: HP-AL

William R. Lake
Division Administrator
Federal Highway Administration
Hawaii Division
Box 50206
Honolulu, Hawaii 96850

Dear Mr. Lake:

SUBJECT: Draft Environmental Impact Statement,
FHWA-HI-EIS-89-01-D, Kahehili Highway Widening and
Interchange
Kaneohe/Heeia, Koolauloko, O'ahu

Thank you for the opportunity to review this draft EIS.

From the standpoint of historic sites, we concur with your position that archaeological mitigation for this project is covered by the MOA developed for the H-3 project, as the two sites recorded in the Kahehili corridor are also within the H-3 corridor.

Very truly yours,

William W. Paty
Chairperson and State
Historic Preservation Officer

WILLIAM W. PATY, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

LEWIST E. LAROCAL
MAYBERRY TAGAMON
RUSSELL E. FURUKAWA

AGRICULTURE DEVELOPMENT
ADULT EDUCATION
ADULT RESOURCES
CONSERVATION AND
ENVIRONMENTAL AFFAIRS
CONSTITUTION AND
CIVIL RIGHTS
COURTESY AND EMPLOYMENT
COURTESY AND EMPLOYMENT
LAND MANAGEMENT
STATE PLANS
STATE AND LAND DEVELOPMENT

JOHN BLUMER
DEPT. OF LAND AND NATURAL RESOURCES



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

P. O. BOX 211
HONOLULU, HAWAII 96850

REF: OCEA:SOR

JUL 21 1989

MEMORANDUM

TO: The Honorable Marvin T. Miura, Director
Office of Environmental Quality Control

FROM: William W. Paty, Chairperson
Board of Land and Natural Resources

SUBJECT: Kahehili Highway Widening & Interchange DEIS
Kaneohe, Oahu; THK: 4-5-23, 4-5-24, 4-5-25, 4-5-41,
4-5-79, 4-5-80, 4-5-82, 4-5-108, 4-6-12, 4-6-13,
4-6-14, 4-7-26 and 4-7-51

Thank you for giving our Department the opportunity to comment on this matter. We have reviewed the materials you submitted and have the following comments.

We already have replied independently to the Federal Highway Administration, above my signature as the State Historic Preservation Officer, as required by law.

Thank you again for your cooperation in this matter. Please feel free to call me or Jay Lembeck at our Office of Conservation and Environmental Affairs, at 548-7837, if you have any questions.

WILLIAM W. PATY, Chairperson
Board of Land and Natural Resources
and State Historic Preservation
Officer

cc: The Honorable Edward J. Sirate, Director
Department of Transportation,
Mr. William R. Lake, Division Administrator
U. S. Department of Transportation

RECEIVED
JUL 25 3 07 PM '89
DEPT. OF TRANSPORTATION
HIGHWAYS DIVISION

DEPARTMENT OF GENERAL PLANNING
CITY AND COUNTY OF HONOLULU
450 SOUTH KING STREET
HONOLULU, HAWAII 96813



DONALD A. CLEGG
Chief Planning Officer
GENE CORNELL
Chief Planning Officer
HM/DGP 6/89-2280

July 31, 1989

Mr. William R. Lake
Division Administrator
U. S. Department of Transportation
Federal Highway Administration
Box 50206
Honolulu, Hawaii 96850

Dear Mr. Lake:

Draft Environmental Impact Statement
FHWA-HI-EIS-89-01-D
Kahehili Highway Widening and Interchange, Kaneohe,
Hawaii Project F-083-1(26)

We have no objections to the proposal. The subject Draft Environmental Impact Statement, which follows two previous Environmental Impact Statement Preparation Notices in 1987 and 1982, is determined to be conceptually consistent with the Koolauoko Development Plan. It would provide for the general welfare by alleviating existing traffic problems on the windward side.

The Draft Environmental Impact Statement is generally adequate and we have no further comments at this time.

Thank you for the opportunity to review this document.

Sincerely,

Donald Clegg
DONALD A. CLEGG
Chief Planning Officer

DAC:gmj

cc: OEOC
DOT, Highways Division

FRANK F. FAR
DATE

PB 89-564

June 21, 1989

Dr. Marvin T. Miura
Office of Environmental Quality Control
465 South King Street, room 104
Honolulu, Hawaii 96813

Dear Dr. Miura:

Subject: Draft Environmental Impact Statement (DEIS)
Kahehili Highway Widening and Interchange
Kaneohe, Hawaii
Project F-083-1(26)

We have reviewed the subject DEIS and have no comments to offer.

Thank you for the opportunity to review the DEIS.

Very truly yours,

Herbert K. Muraoka

HERBERT K. MURAOKA
Director and Building Superintendent

RM:ly
cc: J. Harada
State of Hawaii, Dept. of Transp.
Division Administrator,
U.S. Dept. of Transp.

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU

630 SOUTH KING STREET, 5TH FLOOR
HONOLULU, HAWAII 96813
PHONE: 933-4437



FRANK P. FARM
MAYOR

RECEIVED
DEPT. OF TRANSPORTATION
HIGHWAYS DIVISION
JUL 11 1 02 PM '89

WALTER H. SCARFONE
DIRECTOR
MICHAEL N. SCARFONE
DEPUTY DIRECTOR

July 5, 1989

Dr. Marvin T. Miura, Director
Office of Environmental Quality Control
465 South King Street, #104
Honolulu, Hawaii 96813

Dear Dr. Miura:

Subject: Draft Environmental Impact Statement
Kahehiki Highway Widening and Interchange

Thank you for the opportunity to review and comment on the
Draft Environmental Impact Statement for the Kahehiki Highway
Widening and Interchange project.

We have no comments at this time. We will retain a copy of
the Draft EIS for our files.

Sincerely,

Michael N. Scarfone

MICHAEL N. SCARFONE
Director

cc: State Department of Transportation
U.S. Department of Transportation

JUL 12 11 25 AM '89
PLANNING BRANCH

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU

465 SOUTH KING STREET
HONOLULU, HAWAII 96813



FRANK P. FARM
MAYOR

SAM CALLEJO
DIRECTOR AND CHIEF ENGINEER
In reply refer to:
ENV 89-121(449)

July 13, 1989

Dr. Marvin T. Miura, Director
Office of Environmental Quality Control
465 South King Street, #104
Honolulu, Hawaii 96813

Dear Dr. Miura:

Subject: Draft Environmental Impact Statement (DEIS)
Kahehiki Highway Widening and Interchange
Kaneohe, Oahu

We have reviewed the subject DEIS and have no comments to offer
at this time.

Thank you for the opportunity to review the DEIS.

Very truly yours,

Sam Callejo

SAM CALLEJO
Director and Chief Engineer

cc: State DOT (Highway Division)
U.S. DOT (Federal Highway Administration)

FIRE DEPARTMENT
CITY AND COUNTY OF HONOLULU
1435 K. MEYERS STREET, ROOM 306
HONOLULU, HAWAII 96813



FRANK P. FAHI
MAYOR

FRANK K. KAIHOHANOHAHO
FIRE CHIEF
LONNEL E. CANARA
DEPUTY FIRE CHIEF

July 24, 1989

Mr. Marvin T. Miura, Director
Office of Environmental Quality Control
465 S. King Street, #104
Honolulu, Hawaii 96813

Dear Mr. Miura:

SUBJECT: Draft Environmental Impact Statement,
FIMA-HI-EIS-89-01-D, Kahekili Highway,
Widening and Interchange, Kaneohe, Hawaii
Project F-083-1(26)

We have reviewed the subject material and have no objections or comments at this time.

Should you have any questions, please contact Battalion Chief Michael Zablan of our Administrative Services Bureau at 943-3838.

Very truly yours,

Frank K. Kaihoaho
FRANK K. KAIHOHANOHAHO
Fire Chief

FKK/MZ:lm

cc: State of Hawaii
Dept. of Transportation
Highways Division
600 Kapiolani Boulevard
Honolulu 96813

Division Administrator
U.S. Dept. of Transportation
Federal Highway Administration
Box 50206
Honolulu 96850



HONOLULU COMMUNITY ACTION PROGRAM, INC.

638 SOUTH BERETANIA STREET, SUITE 202
HONOLULU, HAWAII 96813
TELEPHONE 571-4531

August 21, 1989

Mr. William R. Lake
Division Administrator
Federal Highway Administration
U.S. Department of Transportation
Box 50205
Honolulu, Hawaii 96850

Dear Mr. Lake:

Thank you for the opportunity to review the Draft Environmental Impact Statement for the proposed Kahekili Highway Widening and Interchange project.

Our Windward district office is located mid-point along the Windward coast in Kahaluu. Clients in need of support services come to us from Koolau (Waimanalo, Kailua, Kaneohe, Kahaluu) and Koolauloa (Kasava, Kahana, Hauula, Laie, Kahuku) up to and including Pupukea and Sunset Beach.

Many of our clients include senior citizens and other low-or-fixed income families who do not own cars, and need not be travelling during peak-hour traffic.

However our district staff members travel from Waimanalo and Kaneohe daily and consider themselves very fortunate to be driving against the heavy traffic flow. Our collective observations are that the Kahekili contraflow has made a tremendous difference in relieving the congestion coming in from Kahaluu and points north.

In reviewing the comments and suggestions proposed by the public, we were impressed with the quality of input from the various organizations and individuals. You certainly have a difficult task ahead in determining what the best alternative should be.

While we have no specific comments at this time, please know that on behalf of the communities and families that we represent, we are very appreciative of your efforts. We would appreciate a copy of the Final EIS when it becomes available.

Sincerely,

Martha Kealohapuni Turner
Martha Kealohapuni Turner
District Coordinator

"Equal Opportunity Employer"

CITY COUNCIL
CITY AND COUNTY OF HONOLULU
HONOLULU, HAWAII 96813 / TELEPHONE 523-4000



HAWAII TRANSPORTATION ASSOCIATION
P.O. Box 30106 • Honolulu, Hawaii 96829 • Telephone: 833-6628



ARNOLD MORGADO, JR.
Chair

August 4, 1989

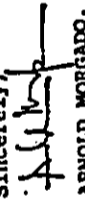
Mr. Dave Reilly, Planning Engineer
U.S. Department of Transportation
Region Nine
P.O. Box 50206
Honolulu, Hawaii 96850

Dear Mr. Reilly:

Thank you for sending a copy of the Draft Environmental
Impact Statement, FHWA-HI-EIS-89-01-D, Kahehiki Widening and
Interchanges, Kaneohe, Hawaii Project F-083-1(26).

At this time, I have no comments to offer. However, I have
asked that the other councilmembers forward their questions
and comments to my office and I will then forward their
concerns to you.

I would also appreciate a copy of the final E.I.S.

Sincerely,

ARNOLD MORGADO, JR.
Chair

AM:nc

June 27, 1989

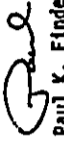
Mr. William R. Lake
Division Administrator
FEDERAL HIGHWAY ADMINISTRATION
P Box 5202
Honolulu, HI 96850

Dear Bill:

Thank you for sending HTA a copy of the Draft Environmental Impact
statement for the proposed Kehehiki Widening and Interchange Project.

Hawaii Transportation Association representing 271 motor carriers of
property and passengers as well as allied members support the project.
Traffic congestion should be alleviated and safety enhanced. Hopefully the
project can proceed without undue delay.

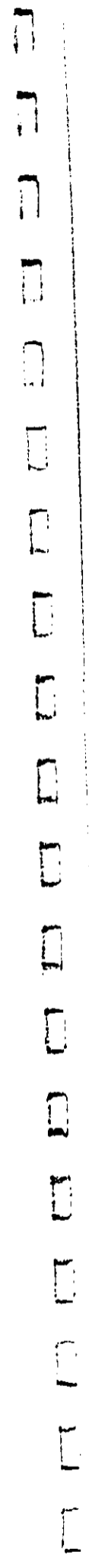
Sincerely,
HAWAII TRANSPORTATION ASSOCIATION


Paul K. Findelsen
Executive Vice President

PKF/bkm



The Voice of Hawaii's Transportation Industry



Dear Mr. William R. Lake, 8-11-87.

Our view on the Kahiki

Hwy. Project: Selama C

(Over pass) - partial interchange is best!

We wish to have Kahiki Hwy. flow smoothly and consistently, with no back-up from a stop light into Like-Like Hwy, heading toward Kam.

Hwy. It seems more economical to have only 2 roads overpass, on the Like-Like Hwy, instead of 3 (as is shown in the C-1 underpass photo). Widening Kahiki down to Kahalaui seems practical, also.

Thank-you for your service to our Community. Milton + Kathy Yamada
Kali Yama
45-811 Kaula Place
Kaneohe Hawaii 96714
808-253-0220

Please get to it, quickly,
It needs it.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50

LIST OF AGENCIES

**LIST OF AGENCIES, ORGANIZATIONS
AND PERSONS TO WHOM COPIES
OF THE D.E.I.S. WERE SENT**

FEDERAL AGENCIES

- U.S. Department of Agriculture
 - Soil Conservation Service
 - Agricultural Stabilization & Conservation
 - Office of the Secretary
 - Land Management Planning

- U.S. Department of Commerce
 - Economic Development Administration
 - National Marine Fisheries Service
 - National Oceanic & Atmospheric Administration
 - National Ocean Survey, Honolulu Field Office
 - Office of Ecology and Conservation
 - Office of Environmental Affairs
 - National Bureau of Standards

- U.S. Department of Defense
 - U.S. Army Corps of Engineers

- U.S. Department of Health, Education, and Welfare
 - Office of Environmental Affairs

- U.S. Department of Energy
 - Division of NEPA Affairs

- U.S. Department of Housing and Urban Development
 - Regional Environmental Standards Officer

- U.S. Department of Interior
 - Assistant Secretary
 - Fish and Wildlife Service
 - Environmental Services
 - Office of Environmental Project Review

- U.S. Department of Transportation
 - Commandant
 - U.S. Coast Guard
 - 14th Coast Guard District
 - Federal Aviation Administration
 - Office of the Secretary

- Department of the Air Force
 - Base Commander
 - 11th Airbase Wing

Department of the Army
Commanding General
Headquarters, U.S. Army Hawaii
Directorate of Engineering

Department of the Army Field Engineers

Department of Housing and Urban Development
Honolulu Insuring Office

Commander Naval Base
Pearl Harbor

Council on Environmental Quality

Environmental Protection Agency
Region IX Library
Office of Federal Activities (A-104)

Federal Emergency Management Agency (FEMA)
Office of Natural and Technological Hazards Programs

Advisory Council on Historic Preservation

U.S. Economic Development Administration

U.S. Geological Survey

STATE LEGISLATORS

The Honorable Richard Wong
Senate President
State Capitol

The Honorable Daniel J. Kihano
Speaker of the House
State Capitol

Senators:

The Honorable Mike McCartney, Senator
The Honorable Stanley T. Koki, Senator

8th District, State Capitol
9th District, State Capitol

Representatives:

The Honorable Reb Bellinger,
Representative
The Honorable Terrance Tom,
Representative
The Honorable Marshall Ige,
Representative

15th District, State Capitol
16th District, State Capitol
17th District, State Capitol

STATE AGENCIES

Department of Accounting & General Services
Department of Agriculture
Department of Business & Economic Development
Department of Defense
Department of Education
Department of Hawaiian Home Lands
Department of Health
Department of Human Services
Department of Land and Natural Resources
 Division of State Parks
Environmental Quality Council
Oahu Metropolitan Planning Organization
Office of Environmental Quality Control
Office of State Planning
University of Hawaii
 Environmental Center
University of Hawaii
 Water Resources Research Center

LIBRARIES

DBED Library
Hawaii State Library
Kaneohe Public Library
Legislative Reference Bureau
 State Capitol
Municipal Reference and Records Center
 City and County of Honolulu
University of Hawaii
 Sinclair Library
 Hamilton Library
Hawaii State Archives

CITY AND COUNTY OF HONOLULU AGENCIES

Board of Water Supply

Building Department

Department of General Planning

Department of Housing and Community Development

Department of Land Utilization

Department of Parks and Recreation

Department of Public Works

Department of Transportation Services

Mr. David Kahanu, Honolulu City Council

Mr. Arnold Morgado, Jr.; Honolulu City Council

Police Department

Fire Department

The Honorable Frank Fasi, Mayor, City and County of Honolulu

Neighborhood Commission (John Stunkard, Chairman)

NEWS MEDIA

Honolulu Advertiser

Honolulu Star Bulletin

Sun Press

PUBLIC UTILITIES

GASCO, Inc.

Hawaiian Electric Company

Hawaiian Telephone Company

OTHER ORGANIZATIONS

Legal Aid Society of Hawaii
Cancer Research Center of Hawaii
Commission on the Handicapped
Conservation Council for Hawaii
American Lung Association of Hawaii
Hawaii Audubon Society
Hawaii Transportation Association
Health and Community Services Council of Hawaii
Historic Hawaii Foundation
Life of the Land
League of Women Voters
The Outdoor Circle
Sierra Club, Hawaii Chapter
Hawaii Bicycle League
The Chamber of Commerce of Hawaii
Hui Malama Aina O'Koolau
Kaaawa Community Association
Waiahole-Waikane Community Association
Punaluu Community Association
Haiku Village Community Association
Kaneohe Business Group
Haiku Plantation Community Association
Haiku Hale Association
Koolau Village
c/o Hawaiian Housing Authority

Haiku Garden Community Association

Valley of the Temples

Windward Estates Home Association

Kapunahala Community Association

Haiku Hale Homeowners Association

Hale Kaponu

Kamehameha Schools/Bernice Pauahi Bishop Estate

Kahaluu-Kaalaea Planning Committee
Honolulu Community Action Program, Inc.

PREPARERS

LIST OF PREPARERS

Below is a listing of persons who were primarily responsible for preparing the Draft Environmental Impact Statement (DEIS) and their titles, experience, educational backgrounds and sections of the DEIS for which they are responsible.

Background/Experience

A. DOCUMENT PREPARATION

DHM inc. (Environmental Consultant)

Duk Hee Murabayashi,
President, DHM inc.
Planner (Environmental
Project Manager)

Twenty years of planning
experience in Hawaii.
B.A. (Sociology, Ewha Women's
University, Seoul, Korea);
M.A. (Sociology, University
of California, Berkeley);
M.S. (Planning, University of
Southern California).

Rachel Sheffield,
Landscape Architect
Planner (General
environmental
research and
principal author
of entire document)

Eight years as landscape
architect and planner.
B.L.A. (Landscape
Architecture, University of
Georgia).

Edie Yamaguchi,
Graphic Artist
(Graphics and visual
analysis)

Three and a half years as a
Graphic Artist.
B.A. (Fine Arts, University
of Hawaii)

State of Hawaii Department of Transportation

Douglas Orimoto,
Highways Division,
(Overall Project Manager)
(Entire Document)

Sixteen years in highway
planning. B.S. (Civil
Engineering, Hawaii).

Owen Liu,
Highways Division
(Reviewer)

Nineteen years in highway
planning. B.S. (Civil
Engineering, Hawaii).

Background/Experience

B. TECHNICAL STUDIES

Dexter Eji,
Civil Engineer
(All engineering studies)

Fourteen years as civil engineer; eight years as a traffic engineer and six years civil design. B.S. (Civil Engineering, Walla Walla College, Washington).

Eric Guinther, AECOS, Inc.
(Water quality and biological resources analysis)

Twenty years in marine and aquatic biological studies in Hawaii. B.A. (Biology, Pacific); Ph.D. candidate (Biology, Hawaii)

Anders Daniels,
University Associates,
(Air quality analysis)

Sixteen years in air quality studies in Hawaii. Lic. (Uppsala-Sweden); M.S. (Meteorology, Alberta-Canada); Ph.D. (Meteorology, Michigan)

Ronald A. Darby,
Darby & Associates
(Noise analysis)

Thirty-three years in acoustical studies, thirteen years in Hawaii. B.S.M.E. (Mechanical Engineering, Penn State); M.S. (Engineering Acoustics, Catholic)

Nancy McMahon
Bishop Museum
(Archaeology)

Fourteen years in archaeological studies, eight years in Hawaii. B.A. (Anthropology, Hawaii); M.A. (Pacific Studies, Hawaii)

C. REVIEWER

Federal Highway Administration

Mr. Glenn Yasui,
Area Engineer
(Reviewer)

Twenty-five years in highway engineering and administration. B.S. (Civil Engineering, University of Hawaii); M.P.A. (Public Administration, University of S. California)

REFERENCES

LIST OF REFERENCES

1. AECOS, Inc., 1982. "Stream Surveys for the Kahekili Highway Widening, Oahu, Hawaii."
2. Ahuimanu Productions, Inc., 1988. An Ornithological Survey of Hawaiian Wetlands (Honolulu: U.S. Army Corps of Engineers).
3. American Society of State Highway Transportation Officials, A Manual on User Benefit Analysis of Highway and Bus-Transit Improvements: 1977, Washington D.C. 1978.
4. Apostolos, J.A., W.R. Shoemaker and E.C. Shirley, 1978. Energy and Transportation Systems (Sacramento: California Department of Transportation).
5. Binkley, Clark S., et. al., 1975. Interceptor Sewers and Urban Sprawl (Lexington, MA: Lexington Books, D.C. Heath & Co.).
6. Bolt, Beranek and Newman, 1971. Noise from Construction Equipment and Operations, Building Equipment and Home Appliances (Washington, D.C.: U.S. Environmental Protection Agency).
7. Burrows, Lawrence B., 1978. Growth Management: Issues, Techniques, and Policy Implications (New Brunswick, NJ: Rutgers University Center for Urban Policy Research).
8. Chamber of Commerce of Hawaii and Hawaii Chapter of International Council of Shopping Centers, Shopping Centers of Hawaii, 1985 Edition.
9. City and County of Honolulu, 1982. Resolution No. 82-188, Amended Draft No. 2, Relating to the General Plan (adopted December, 1982).
10. City and County of Honolulu, 1983. Ordinance No. 83-8, Relating to the Development Plan for Koolaupoko. (adopted May, 1983).
11. City and County of Honolulu, 1983. Ordinance No. 83-9, Relating to the Development Plan for Koolaupoko. (adopted May, 1983).
12. Daniels, Anders, 1982. "Estimates of Carbon Monoxide Levels for the Proposed Kahekili Highway Widening and Interchange Project No. 83F-01.75."
13. Darby & Associates, 1982. "Noise Impact Assessment for Proposed Kahekili Highway Widening and Interchange Project."

14. Devaney, Dennis M., Marion Kelley, Polly Jae Lee and Leo S. Motteler, for the U.S. Army Corps of Engineers, 1976. Kaneohe: A History of Change (Honolulu: Bernice P. Bishop Museum).
15. EDAW inc. for State of Hawaii Department of Transportation, Preliminary Draft EIS, Kahekili Highway Widening and Interchange (FAP Route 83), 1982.
16. Elliott, Margaret E. and Erin Marie Hall, Wetlands and Wetland Vegetation of Hawaii for the U.S. Army Corps of Engineers Pacific Ocean Division, Fort Shafter, September 1977.
17. Federal Emergency Management Agency, Flood Insurance Rate Map, City and County of Honolulu, September 4, 1987.
18. Gamble, Hays B., et. al., 1974. "Adverse and Beneficial Effects of Highways on Residential Property Values", in Social, Economic, Behavioral and Urban Growth Considerations in Planning. Transportation Research Board 508. (Washington, D.C.: Transportation Research Board, National Research Council).
19. Hawaiian Waterbirds Recovery Team, 1985. Hawaiian Waterbirds Recovery Plan (Honolulu: U.S. Fish and Wildlife Service).
20. Jokiel, Paul, 1983 (work in progress). Kaneohe Bay benthic studies, (Kaneohe, Hawaii: unpublished material by Hawaii Institute of Marine Biology).
21. Leung, Ping Sun, and Stuart T. Nakamoto, 1981. "Estimating Annual Vehicle-Miles Travelled (VMT) in the State of Hawaii" (Honolulu: unpublished manuscript by the Department of Planning and Economic Development).
22. Miller, R. 1972. "Threatened Freshwater Fish of the U.S." in Transcripts of the American Fisheries Society 101(2):239-252.
23. Park Engineering, Inc., for the State of Hawaii Department of Transportation, Draft 1984. Final 1987. "Kahekili Highway Widening and Interchange Drainage Study".
24. Smith, S.V., et. al. 1973. Atlas of Kaneohe Bay: A Reef Ecosystem Under Stress (Honolulu: University of Hawaii Sea Grant Program).
25. Smith, S.V. et. al., 1981. "Kaneohe Bay Sewage Diversion Experiment: Perspectives on Ecosystem Response to Nutrient Perturbation", in Pacific Science, 35(4).
26. State of Hawaii, 1986, The Hawaii State Plan Revised.

27. State of Hawaii, Department of Agriculture, Agriculture lands of Importance to the State of Hawaii (ALISH).
28. State of Hawaii Department of Agriculture, 1980., State Agriculture Plan and Technical Reference Document.
29. State of Hawaii Department of Health and City and County of Honolulu, 1980. Water Quality Management Plan for the City and County of Honolulu.
30. State of Hawaii Department of Land and Natural Resources, no date. "Biannual Bird Census" (unpublished).
31. State of Hawaii Department of Land and Natural Resources, 1977. "Conservation District Inventory: Island of Oahu".
32. State of Hawaii Department of Planning and Economic Development, 1980. Hawaii Integrated Energy Assessment, five volumes.
33. State of Hawaii Department of Planning and Economic Development, 1982. State Energy Plan and Technical Reference Document.
34. State of Hawaii Department of Planning and Economic Development, 1982. The State of Hawaii Data Book.
35. State of Hawaii Department of Transportation, 1977. Bikeplan Hawaii, 1981.
36. State of Hawaii Department of Transportation, 1981. "Electric Vehicle vs. Gasoline-Powered Vehicle in Energy Conservation" (unpublished).
37. State of Hawaii Department of Transportation, 1982. State Transportation Plan and Technical Reference Document.
38. Sterling, Elspeth P., and Catherine C. Summers, 1978. Sites of Oahu (Honolulu: Bernice P. Bishop Museum).
39. Timbol, Amadeo S., and John Maciolek, for the U.S. Fish and Wildlife Service, 1978. Stream Channel Modification in Hawaii; Part A: Statewide Inventory of Streams, Habitat Factors and Associated Biota (Honolulu: Cooperative Fisheries Unit.).
40. U.S. Environmental Protection Agency, 1977. Compilation of Air Pollutant Emission Factors With Supplements 1-7, Third Edition (Washington D.C.: U.S. Government Printing Office).
41. U.S. Department of Agriculture, Soil Conservation Service, 1972. Soil Survey of Islands of Kauai, Oahu, Maui, Molokai and Lanai, State of Hawaii (Washington D.C.: U.S. Government Printing Office).

42. U.S. Department of the Interior, Fish and Wildlife Service, 1979. National Wetlands Inventory.
43. U.S. Department of Transportation, Federal Highway Administration, and State of Hawaii Department of Transportation, 1977. Final Supplement to the Interstate Route H-3 Environmental Impact Statement, Volumes I to VII.
44. U.S. Department of Transportation, Federal Highway Administration and State of Hawaii Department of Transportation. Final Third Supplement to the Interchange Route H-3 Environmental Impact Statement (1987).
45. University of Hawaii Department of Geography, 1983. Atlas of Hawaii (Honolulu: The University Press of Hawaii).
46. Voorhees, Alan M., and Associates, Inc., 1975. The Impact of Transportation on Land Development: North American Experience (McLean VA: Alan M. Voorhees & Associates, Inc.).
47. Webb, Jim E., 1981. Reduction in Vehicle Fuel Consumption. (Washington, D.C.: Public Technology, Inc.).

INDEX

INDEX

- Air Quality 40, 68, 78-79, 108, Appendix A
- Accidents 7, 58-59, 128
- Agricultural Lands 60, 101-107
- Archaeology 50, 93, 124, 126-127, Appendix E
- The Bus 11, 51
- Bicycles 51, 121
- Castle Hills Connector Road 27-28, 114
- Climate 40, Appendix A
- Contraflow 4, 11-12
- Earthwork 30-31, 35, 77
- Economic Activity 48, 58-62, 109-111, 115, 122
- Endangered species 101
- Energy 63, 88-90, 128
- Flooding and Drainage 35, 42-44, 75, 90-93
- Government Plans, Policies and Requirements 77
 - City and County of Honolulu
 - Board of Water Supply 52-53
 - Comprehensive Zoning Code - flood hazard district 42
 - Department of Public Works - sewer improvements 52-53, 77
 - General Plan 68-69
 - Koolauloa Development Plan 73, 120
 - Koolaupoko Development Plan 71, 120
 - land use map 72
 - public facilities map 74
 - Special Management Area 75, 77, 93
- Federal
 - U.S. Army Corps of Engineers 75, 77, 95
 - U.S. Department of Agriculture Soil Conservation Service
 - agricultural land classification 101-107
 - U.S. Environmental Protection Agency 102
 - U.S. Fish and Wildlife Service 101
- Oahu Metropolitan Planning Organization Hali 2000 - 1
- State of Hawaii
 - Department of Agriculture
 - agricultural land classification 65
 - Department of Business and Economic Development
 - State Energy Plan 63, 77
 - Department of Health
 - Air Pollution Control Implementation Plan 68
 - community noise standards 68, 80-84
 - vehicular noise control 80-81, 128
 - Water Quality Management Plan for the City and County of Honolulu (Section 208) 67
 - Nonpoint Source Water Pollution Management Plan 67, 99
 - Department of Land and Natural Resources
 - Conservation District 77
 - State Historic Preservation Office 127
 - Stream Channel Alteration Permit 77, 101
 - Department of Transportation
 - State Transportation Plan 1, 64, 120
 - Office of State Planning
 - Coastal Zone Management Program 66, 93-95
- The Hawaii State Plan 62

Hazardous Waste Sites 102, 111
 Heeia Stream 35, 40-42, 95-98
 High occupancy vehicle lane (HOV) 11
 Highway system 1-4
 History 46, 127
 Housing 55-57
 Impacts of highway projects on residential
 property values 112, 115
 Interstate Route H-3 1-4
 Kahekili Highway
 Alternate highway corridors 12-14
 Kamehameha Highway 12
 new southwest routes 14
 Construction Cost 32-35
 Construction Schedule 32
 Cost-benefit-analysis of 33-34
 Level of Service 7-9
 Likelike Intersection Alternatives 15-22
 Traffic safety 58-59, 111, 128
 Traffic system management (TSM) 10
 Traffic volumes 9
 Travel time 6, 35-36
 Widening 21-26, 126
 Kaneohe District Park 54-56
 Koolau Baptist Church 83-88, Appendix B
 Land Use 120
 by neighborhood 57
 Koolaupoko Development Plan 72
 Luluku Discontiguous Archaeological Sites
 50, 124, 126-127, Appendix E
 Nakama Springs 98
 Neighborhoods 57
 No Action 10
 Noise 35, 68, 80-88, 108, Appendix B
 Parks and Recreation 54-56, 124-126
 Pedestrian 121
 Population 46-48
 Property Taxes 115
 Relocation assistance 35, 113-119, 129, Appendix D
 Schools 54-55, 88
 Section 4(f) Resources 124-126
 Seicho-No-Ie-Jisso Center 88
 Sewer Facilities 52-53
 Shopping centers 61
 Soils 38-39
 Streams 35, 37, 95
 Topography 35, 78
 Vegetation 43
 Visual Quality 46, 121-123
 Water Quality 35, 67, 98-101, 109, Appendix C
 Wetlands 35, 40-42, 95-98
 Wildlife 45, 101, Appendix C

APPENDIX A

**AIR QUALITY
IMPACT
ANALYSIS**

**AIR POLLUTION CONCENTRATION ESTIMATES
FOR KAHEKILI HIGHWAY**

1. 1987 without widening
2. 1987 with widening
3. 2008 without widening
4. 2008 with widening and four
interchange alternatives

April 1988

Prepared for:

DHM, Inc.

Prepared by:

University Associates, Inc.
4336 Lanihale Place
Honolulu, Hawaii 96816

This report present estimates of air quality along the Kahekili Highway on the windward side on the island of Oahu, Hawaii. These estimates were made using the MOBILE3(US EPA 1981), the CALINE3 (Benson 1979) and the CALINE4 (Benson 1985a) emission and dispersion models developed by the EPA and the California Department of Transportation Laboratory. The report first describes the links into which the highway and its cross streets were divided. It then describes the traffic data followed by an outline of the emission model used and calculations that produced an emission estimate for each of the street links. Climatological parameters and receptor locations used with the CALINE3 model are then defined. Modeled results and a discussion end the report.

Definition of street links used.

CALINE3, the model used to simulate carbon monoxide levels along Kahekili Highway, calculates concentrations from road links that are straight and with a constant emission rate along the link. The elevation, width or number of lanes, car speeds and number of cars are also constant. Kahekili Highway and cross streets intersecting it was divided into 34 links to satisfy these requirements. The links, the symbol used for each and their lengths are given in Table 1. The location of the links are plotted in Fig. 1.

Traffic data.

The following traffic data were supplied by PAREN, INC for a) north and south bound travel, for b) 1987 and 2008, for c) with and without widening and for d) peak and off peak hour travel for each of the links shown in Table 1:

- * number of cars per hour,
- * cruise speed for Kahekili Highway segments
- * time and number of cars stopping at intersections,
- * time and number of stops within the link excluding intersections (or added stop delay) for Kahekili links
- * the time spent covering the link for Kahekili links

Four Likely Highway interchange exchange alternatives were also included. The first of these, A-4, was used in the calculations for the complete highway. Separate runs were made for the intersection alternatives. For cross streets a cruise speed of 10 mph was assumed. The lengths of these streets were

taken as the straight portions of the street on both sides of the highway. For two of the intersecting streets, Likelike Highway and Haiku Road two additional segments on both sides of Kahekili Highway were used (Fig. 1.). For the no widening alternative two lanes 12 ft wide were used for all links except Likelike Highway where six lanes were used. For the widening alternative four lanes were used for the complete Kahekili Highway. Cross streets were always assumed to have two lanes.

Link name	Name of street	From	To	Dist. mile
a	Likelike Hwy	H-3 interchange	West Kahekili Hwy	0.56
b	Likelike Hwy	West Kahekili Hwy	Kahekili Hwy	0.14
c	Likelike Hwy	Kahekili Hwy	East Kahekili Hwy	0.16
d	Likelike Hwy	East Kahekili Hwy	Kaneohe	0.32
e1	Kahekili Hwy	Likelike Hwy	Kulukeyoe St	0.18
e2	Kahekili Hwy	Kulukeyoe St	South Kealahala Rd	0.27
f1	Kulukeyoe St	West Kahekili Hwy	Kahekili Hwy	0.03
f2	Kulukeyoe St	Kahekili Hwy	East Kahekili Hwy	0.09
g1	Kealahala Rd	West Kahekili Hwy	Kahekili Hwy	0.28
g2	Kealahala Rd	Kahekili Hwy	East Kahekili Hwy	0.16
h1	Kahuhipa St	West Kahekili Hwy	Kahekili Hwy	0.27
h2	Kahuhipa St	Kahekili Hwy	East Kahekili Hwy	0.19
i1	Kahekili Hwy	South Kealahala Rd	Kahuhipa St	0.17
i2	Kahekili Hwy	Kahuhipa St	Haiku Rd	0.46
j	Haiku Rd	West Kahekili Hwy	West Kahekili Hwy	0.21
k	Haiku Rd	West Kahekili Hwy	Kahekili Hwy	0.19
l	Haiku Rd	Kahekili Hwy	East Kahekili Hwy	0.08
m	Haiku Rd	East Kahekili Hwy	East Kahekili Hwy	0.31
n	Kahekili Hwy	Haiku Rd	South Hui Iwa St(s)	1.32
o1	Kahekili Hwy	South Hui Iwa St(s)	Hui Iwa St(s)	0.14
o2	Kahekili Hwy	Hui Iwa St(s)	South Hui Iwa St(n)	0.22
p1	Hui Iwa St(s)	West Kahekili Hwy	Kahekili Hwy	0.13
p2	Hui Iwa St(s)	Kahekili Hwy	East Kahekili Hwy	0.10
q1	Hui Iwa St(n)	West Kahekili Hwy	Kahekili Hwy	0.18
q2	Hui Iwa St(n)	Kahekili Hwy	East Kahekili Hwy	0.14
r	Kahekili Hwy	South Hui Iwa St(n)	South Ahuimanu Pl	0.34
s1	Kahekili Hwy	South Ahuimanu Pl	North Ahuimanu Pl	0.17
s2	Kahekili Hwy	North Ahuimanu Pl	Ahuimanu Rd	0.05
t	Ahuimanu Pl	West Kahekili Hwy	Kahekili Hwy	0.11
u	Kahekili Hwy	Ahuimanu Rd	North Ahuimanu Rd	0.68
v	Kahekili Hwy	North Ahuimanu Rd	Kam Hwy	0.92
w	Kam Hwy	South Kahekili Hwy	North Kahekili Hwy	0.31
z1	Ahuimanu Rd	West Kahekili Hwy	Kahekili Hwy	0.31
z2	Ahuimanu Rd	Kahekili Hwy	East Kahekili Hwy	0.21

Table 1. Definition and length of traffic links used in the calculations (See also Fig. 1).

Emission models.

We had initially planned to use the CALINE3 model (Benson 1979) for the project but as a newer version, CALINE4 (Benson 1984a) became available, the emission model part of this model was adopted and incorporated into CALINE3. The main difference between the two models is that while CALINE3 only uses a single composite emission value for each link based on the mean speed of the vehicles in the link, CALINE4 can use a four part modal emission model which treats the four portions of the driving cycle (idling, accelerating, cruising and decelerating) separately for each link. As the rush hour driving cycle along Kahekili Highway is probably significantly different from the composite urban driving cycle modeled in CALINE3, we felt that the more detailed CALINE4 emissions model would be more appropriate for the project. Using the modal emission cycle complicates the emission pattern significantly as compared with the composite emission model where the emissions and therefore concentrations simply decrease as the average speed increases. The US EPA MOBILE3(1981) composite emission model was used to predict the emission of carbon monoxide (CO) for 1987 and 2008. This model gives the emission as a function of speed (including idle) and year. Emissions in the model decrease significantly with time as better emission controls become available and more frequently used. Only CO is considered in this report as this is by far the most serious vehicular pollutant.

Emission input.

From the traffic data described earlier, the following information was tabulated for the 34 individual links into which Kahekili Highway and its cross streets were divided (Table 1):

Average time spent idling at intersection, TI
Average number of cars stopping at intersection, CI
Average number of stops at intersection, NI
(= 1 if stop; = 0 if no stop)
Average time spent idle per stop within link exc. intersec., TW
Average number of stops within the link exc. intersec., NW
Average number of cars per hours traversing the link, CT
Average time required to transverse link, TT
Length of link, DT
Average cruising speed in the link, SPD

The modal emissions option in CALINE4 (Benson 1984a) assumes a uniform acceleration and deceleration rate between stops:

Acceleration rate, ACCR
Deceleration rate, DCLR

With this assumption the distance and time spent per stop in these two modes can be written as:

$$\begin{aligned} \text{Time accelerating, ACCT} &= \text{SPD} / \text{ACCR} \\ \text{Time decelerating, DCLT} &= \text{SPD} / \text{DCLR} \\ \text{Distance accelerating, LACC} &= \text{ACCR} * \text{ACCT} * \text{ACCT} / 2 \\ \text{Distance decelerating, LDCL} &= \text{DCLR} * \text{DCLT} * \text{DCLT} / 2 \end{aligned}$$

With above symbols the distance covered and the time spent cruising can be written as:

$$\begin{aligned} \text{Distance cruising, DC} &= \text{DT} - (\text{NW} + \text{NI}) * (\text{LACC} + \text{LDCL}) \\ \text{Time cruising, TC} &= \text{TT} - (\text{NW} + \text{NI}) * (\text{ACCT} + \text{DCLT}) - \text{NI} * \text{TI} \\ &\quad + \text{NW} * \text{TW} \end{aligned}$$

These calculations estimated however an unrealistically large range of acceleration and deceleration rates for the links. It was therefore decided to a priori assume a constant acceleration and deceleration rate and let the speed at cruising, SPD become the calculated quantity for above relations.

$$\text{Speed cruising, SPD} = \text{TC} / \text{DC}$$

The calculated cruising speeds were reasonable close to those given previously. In a few cases where the time spent in the link was too short for the prescribed driving cycle, the link time was increased to cover the link with no time spent in the cruising mode.

Thus, from above calculation the time in each of the four modes, idling ($\text{NW} * \text{TW} + \text{NI} * \text{TI}$), accelerating ($(\text{NW} + \text{NI}) * \text{ACCT}$), decelerating ($(\text{NW} + \text{NI}) * \text{DCLT}$) and cruising, TC could be calculated for each link.

$$\text{Assumed rate of acceleration, ACCR} = 0.84 \text{ m/s/s}$$

This value is taken from a California Department of Transportation survey (Benson 1984b, page 55, case 3) for accelerating from 0 to 15 mph in eight sec which seems reasonable for the Kahekili Highway.

It was further assumed that the rate of deceleration was 75% of that for acceleration, a ratio suggested in the same survey.

$$\text{Assumed rate of deceleration, DCLR} = 0.84 * 0.75 = 0.63 \text{ m/s/s}$$

The emissions per unit time for each of the four modes are calculated based on a time rate emission factor, BAG2, defined as (Benson 1984a):

$$BAG2 = EFL * (16 \text{mph}) \text{ [gr/hr]}$$

where EFL is the emission rate per mile given by EPA's MOBILE3(1981) emission model which produces emissions as a function of speed and year. For 1987 the MOBILE3 emission (US EPA 1981) at 16 mph was 69 and for 2008 it was 29 gr/mile.

Idling: EFI. The value given by MOBILE3 was 47 gr/min for 1987 and 9 gr/min for 2008.

$$\text{Accelerating: } EFA = BAG2 * 0.76 * \exp(0.045 * AS)$$

where AS = ACCR * SPD / 2 (mile*mile/hr/hr/s)

$$\text{Decelerating: } EFD = EFI * 1.5$$

$$\text{Cruising: } EFC = BAG2 * (0.494 + 0.000227 * SPD * SPD)$$

(SPD in mph)

The total emission for a car stopping at the intersection of the link, ES, is:

$$ES = (NW + NI) * (ACCT * EFA + DCLT * EFD) + TC * EFC + (NI * TI + NW * TW) * EFI$$

The total emission for all such cars, TES is:
TES = CI * ES

The emission for a car that did not stop at the intersection, EN was calculated by setting NI equal to zero:

$$EN = NW * (ACCT * EFA + DCLT * EFD) + TC * EFC + NW * TW * EFI$$

The total emission from all such cars, TEN:

$$TEN = (CT - CI) * EN$$

The total emission per unit distance and unit car for the link, EM was then calculated as:

$$EM = (TEN + TES) / DT / CT$$

This emission value, the length of the link, DT, the width of the link (= number of lanes * 12 ft + 6 m) and the elevation of the link (set equal to zero) were the input parameters for each link required by the CALINE3 model (Benson 1979). As an example, Table 2 lists number of cars, times and emission rates in the four modes for 1987 and 2008 for widening and no widening for one of the links, 12 (Fig.1). The link speeds and the corresponding MOBILE3 composite emission estimates (US EPA 1981) are also listed.

	No.of cars /hour	Accl. time/ emis.	Decl. time/ emis.	Idle time/ emis.	Cruise time/ emis.	Cruise speed/ M3 emis.	Total time/ emis.
	-----	-----	-----	-----	-----	-----	-----
1987 no widening	1062	0.13/ 14.6	0.18/ 25.1	1.20/ 56.7	2.47/ 66.8	7.5/ 71.0	3.98/ 163.2
1987 with widening	1378	0.32/ 52.2	0.43/ 56.5	0.09/ 3.9	0.71/ 19.9	18.2 32.9	1.55/ 132.5
2008 no widening	1005	0.14/ 6.4	0.18/ 15.2	1.80/ 50.4	2.42/ 27.5	7.6 29.3	4.54/ 99.5
2008 with widening	1756	0.35/ 26.1	0.47/ 36.9	0.15/ 4.0	0.57/ 7.1	19.9 12.9	1.54/ 74.1

Table 2. Number of cars per hour, acceleration time (min) / emission (gr/mile), deceleration time (min) / emission (gr/mile), idle time (min) / emission (gr/mile), cruise time (min) / emission (gr/mile), cruise speed (mph) / MOBILE3 emission (gr/mile) for the cruise speed, total time (min) / emission (gr/mile) for 1987 and 2008 traffic estimates with and without widening along the Kahekili Highway between Kahuhipa Street and Haiku Road (12 in Table 1) for the morning peak hour based on the CALINE4 modal emission model. One stop assumed. Link length 0.46 mile. Acceleration rate 0.84 m/s/s.

Climatological input.

Beside emissions there are a number of climatological parameters in the CALINE models that can significantly affect estimated concentrations even for rather small changes in the parameter. These are discussed below in order of sensitivity to the modeled results:

Wind direction: The model assumes a constant wind direction during the one hour period for which the model is run. A few degree change in this direction significantly alters the estimated concentration. In order to minimize the dependence of the modeled results on the chosen wind direction, the model was run for eleven directions, ten degrees apart centered at a direction parallel to the mid section (link n in Fig 1.) of the highway (=330 deg. true North). The runs were made for the morning peak hour with the winds coming from the top of the page in Fig. 1 (280 to 20 deg).

Wind speed: As the model is used to estimate the highest one hour concentration that will occur in one year, the lowest hourly mean wind speed for this period should be used. As no climatological wind data exist for the area, speeds recommended by California Transportation Laboratory (Benson 1985b) were used. This report discusses worst case wind speeds for a number of locations in California. For a coastal location, the report recommends 1 m/s which was adopted in this report. It seems likely that, if anything, this is a conservative estimate as a land/sea breeze circulation would rapidly develop in the area in a low gradient wind case. Such winds are generally considerably stronger than 1 m/s.

Stability class: Stability class 4 (D) was used for the calculations. It seems unlikely that a more stable situation would occur during the morning rush hour in a coastal area in Hawaii.

Roughness length: A roughness length of 100 cm, representative of a single family residential area, was used.

Mixing height: A mixing height of 1000 m was used. This parameter had no effect on the calculations.

Settling and deposition velocities: As the calculations were done for a gas, zero settling and deposition velocities were used.

Ambient concentration: Lacking specific measurements of the background CO level, a conservative value of one milligram per cubic meter (mg/cum) was used in all the calculations.

Receptor location.

There are two ways of selecting receptor locations to demonstrate the effects of widening namely a) select a location say 2 m from the edge of the road before the widening but let it move with widening so that is 2 m from the edge of the widened road or b) keep the receptor fixed at say 2 m from the edge in the widened case. The first alternative might better illustrate the effect the widening had on air quality while the second alternative shows the effect of widening at e.g. a residence next to the highway. In this report we selected the second approach. The receptors were located two m south of the edge of a cross street at each intersection (= below it in Fig.1) and five m east (= to the left in Fig.1) of the edge of Kahekili Highway after widening to four lanes was completed. This choice was a compromise between being closer which would show the effect of the highway moving too close to the receptor and being further away with lower concentrations. The value for

each receptor used in the results was the highest of the estimates for the eleven directions. A receptor height of 1.8 m above the street was used for all segments. The area was treated as being flat. Only links that ended within 800 m of the receptor were used. Though more than fifteen such links were tried, in general only the four links around the receptor contributed to its concentration.

Results and discussion.

Estimated maximum one hour concentrations of CO are plotted in Figs. 2 - 4. These are all run for Likelike Highway interchange alternative A-4. As can be seen there is neither a simple relationships between the widening and the no widening alternative nor between the estimated 1987 and 2008 concentrations. The reason for this is a complex interaction between changes in traffic volume, time spent in the four different traffic modes and emissions and moving the highway closer to the receptor by widening it.

Widening and no widening 1987.

If the highway had been widened in 1987 (Fig. 3) concentrations would have decreased near the Likelike Highway as a result of higher car speeds and shorter stops. Further down the highway, increased traffic (as a result of the widening) and traffic closer to the receptors (Table 2) would however have produce higher concentrations up to Ahuimanu Place. While before widening only the beginning of the highway is above the State Ambient Air Quality Standards (AAQS) for CO of 10 mg/cum, the area of exceedance expands somewhat and moves further north after widening. The precision and accuracy of the model and its inputs are though not sufficient to estimate an exceedance with an acceptable degree of certainty.

Widening and no widening 2008.

Without widening, concentrations will increase from 1987 (Fig. 2) to 2008 (Fig. 4) north of Kahuhipa Street in spite of substantially lower emission rates per car. Most of this increase is due to increased idling time, which contributes about half of the emissions from the links in this case. Two areas with State AAQS exceedance will develop, one around Haiku Road and the other around Ahuimanu Place. These exceedances are probably significant.

With widening, cars spend much less time idling which now produces only a few percent of the total emission (Fig. 5). Most of the emission now comes from acceleration and deceleration. Only a smaller area around Kulukeoe street might violate State AAQS standards. Eliminating the stop at this intersection would probably decrease the concentrations to below the standards.

Comparison of Likelike Highway interchange alternatives.

The model was run for 2008 and widening for four Likelike interchange alternatives. The results are given in Table 3 for the receptor effected by traffic at the interchange (Fig.1) (Likelike Hwy)

<u>Receptor site (Fig.1)</u>	<u>Alternative</u>	<u>Estimated CO conc. mg/cum</u>
Likelike Highway	A-4	4.3
	B-1	5.0
	C-1	4.3
	Widening	5.2

Table 3. Estimated CO concentrations at the Likelike Highway receptor for four interchange alternatives for 2008 with widening.

As can be seen the different interchanges only marginally affect CO levels.

Summary.

In summary it seems that, without widening, concentrations will increase along most of the highway with two areas probably reaching above Hawaii's AAQS for CO. If the highway is widened only a small section might be above the standard in 2008.

Beside a standard for the (second) highest annual one hour CO level, there is also a similar eight hour AAQS of 5 mg/cum. A one-to-eight hour concentration estimate conversion factor of 0.6 to 0.8 is recommended in a California Transportation Laboratory report (Benson 1985b) for the worst meteorological condition.

Kahekili Highway off peak traffic volumes are about 10% lower than peak hour ones, but mean wind speeds during the day are several times stronger than during the morning peak hour and the stability improves considerably. It seems therefore that a factor of 0.5 is even on the conservative side for estimating eight hour concentrations. If this factor is adopted, then the same conclusions, as for the one hour standard above, applies to the eight hour standard as the AAQS for eight hours is five mg/cum or 0.5 times the one hour standard.

Measurements of CO levels along the highway were made in 1983 (Daniels 1983) and one hour maximum concentrations estimates

made in 1984 (Daniels 1984). These estimates, which were based on a composite emission model (Hiway-2), predicted concentrations about five times lower than the present ones. The major reason for the discrepancy is the difference in emission models used. If e.g. the composite emission model had been used for section 12 (Table 2), the concentrations would have been less than half which would be more in line with the 1983 estimates. Additionally, in the 1983 report, higher car speeds were used which reduces concentration estimates. Stability class C, rather than D, was used in the 1983 report.

Beside State AAQS for CO there are also standards for other pollutants, but these were not included since CO is the by far most important vehicular pollutant.

There are also federal standards for pollutants e.g. a CO standard of 40 mg/cum. None of the federal standards are exceeded along the highway presently or will be so with the proposed modifications.

There are no monitoring stations near the highway that can be used for a meaningful comparison with modeled results.

It must be emphasized that the model used has not been tested under Hawaiian conditions as it has e.g. been in California and the estimates are at best accurate to a few mg/cum. It is recommended that a study be conducted to determine the applicability of the model and develop input parameters for Hawaiian conditions.

References

Benson P. (1979), CALINE3 - a versatile dispersion model for predicting air pollution levels near highways and arterial streets, California Department of Transportation, Nov 1979, FHWA/CA/TL-79/23.

Benson, P. (1984a), CALINE4 - a dispersion model for predicting air pollutant concentrations near roadways. California Department of Transportation, Nov 1984, FHWA/CA/TL-84-15.

Benson, P. (1984b), Development of worst case meteorology criteria. California Department of Transportation, Nov 1985, FHWA/CA/TL-85/14

Daniels, A. (1983), Estimates of carbon monoxide levels for the proposed Kahekili Highway widening and interchange project No. 83F-01-75, University Associates, Inc, submitted to EDAW, 7 July 1983.

Daniels, A. (1984), Estimates of carbon monoxide levels for the proposed Kahekili Highway widening and interchange based on an air quality simulation model. University Associates, Inc, 14 May 1984.

US EPA (1981). Compilation of air pollutant emission factors: Highway mobile sources, U.S. Environmental Protection Agency, EPA 460/3-81-005, March 1981.

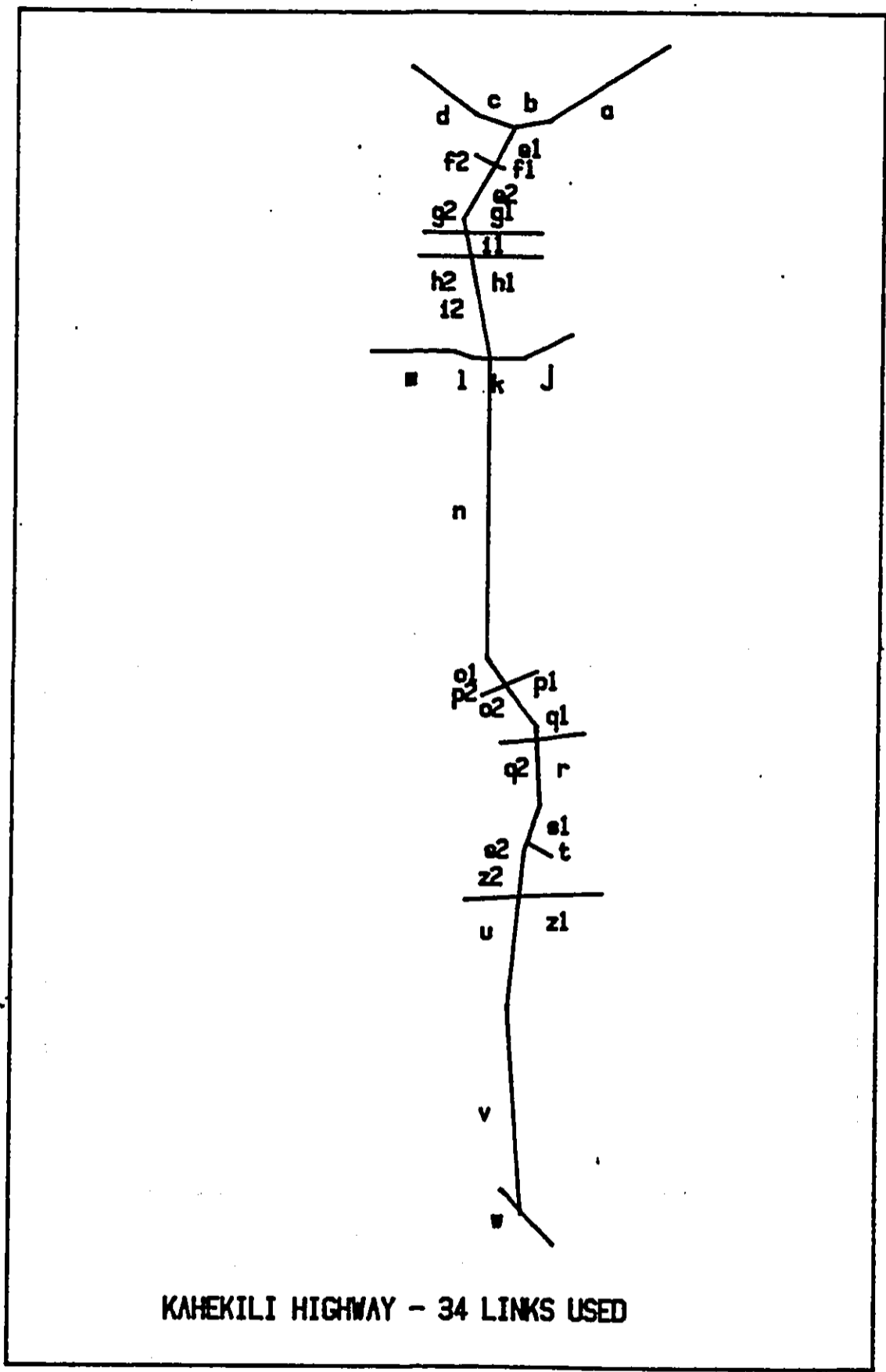


Fig. 1. Links used in the calculations.

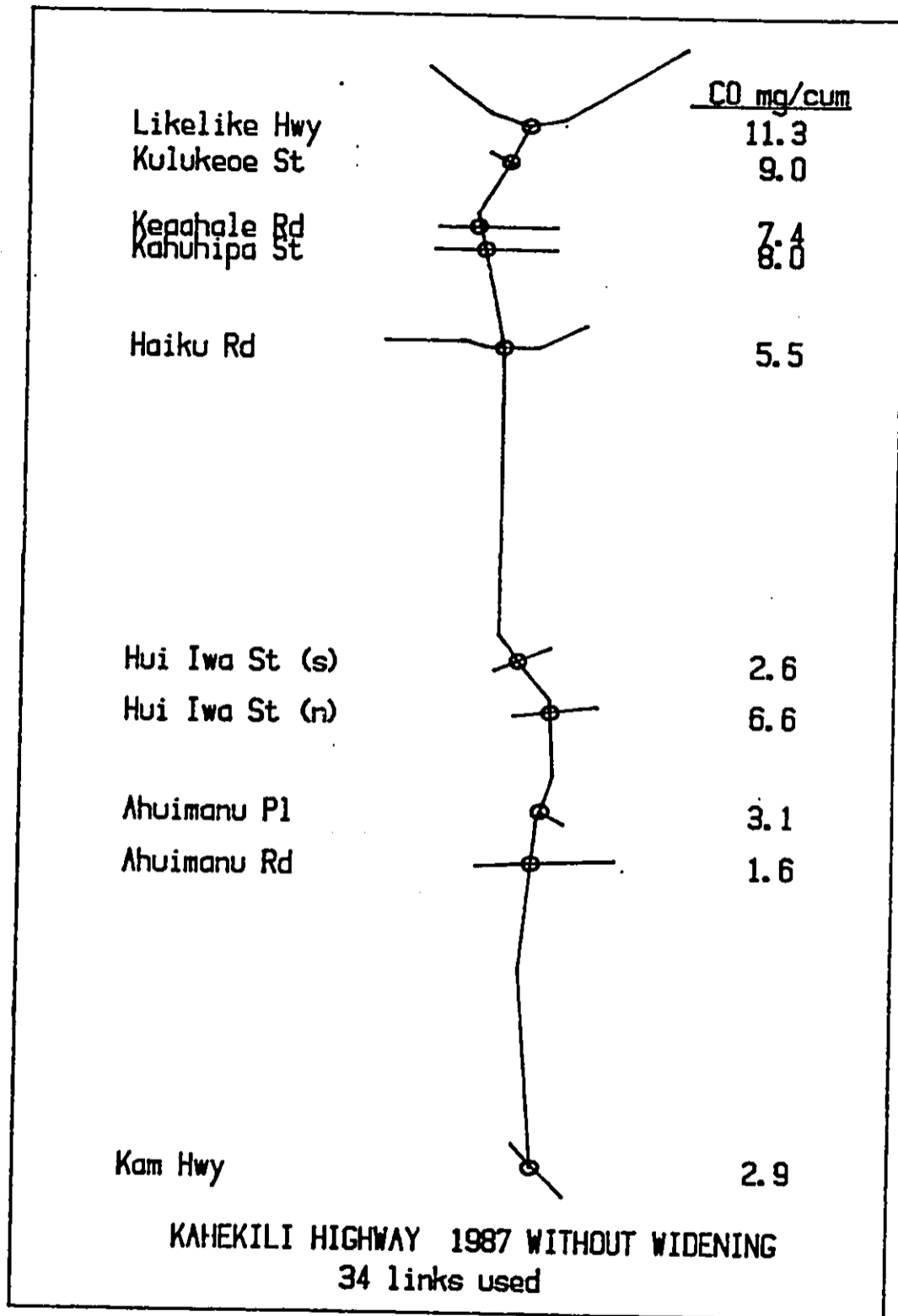


FIG. 2. ESTIMATED ONE HOUR MAXIMUM CONCENTRATION OF CO ALONG KAHEKILI HIGHWAY IN 1987 WITHOUT WIDENING.

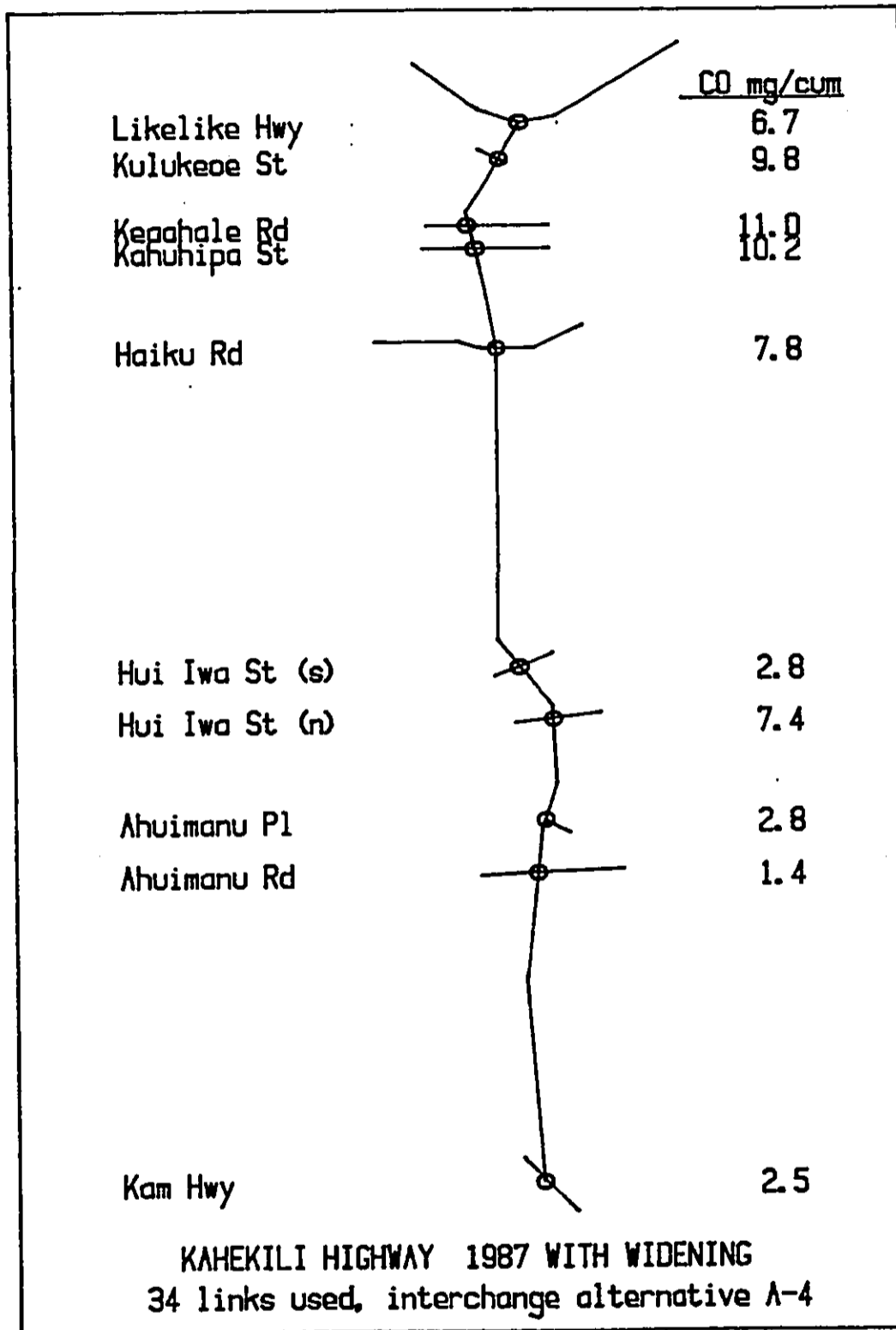


Fig. 3. ESTIMATED ONE HOUR MAXIMUM CONCENTRATION OF CO ALONG KAHEKILI HIGHWAY IN 1987 WITH WIDENING.

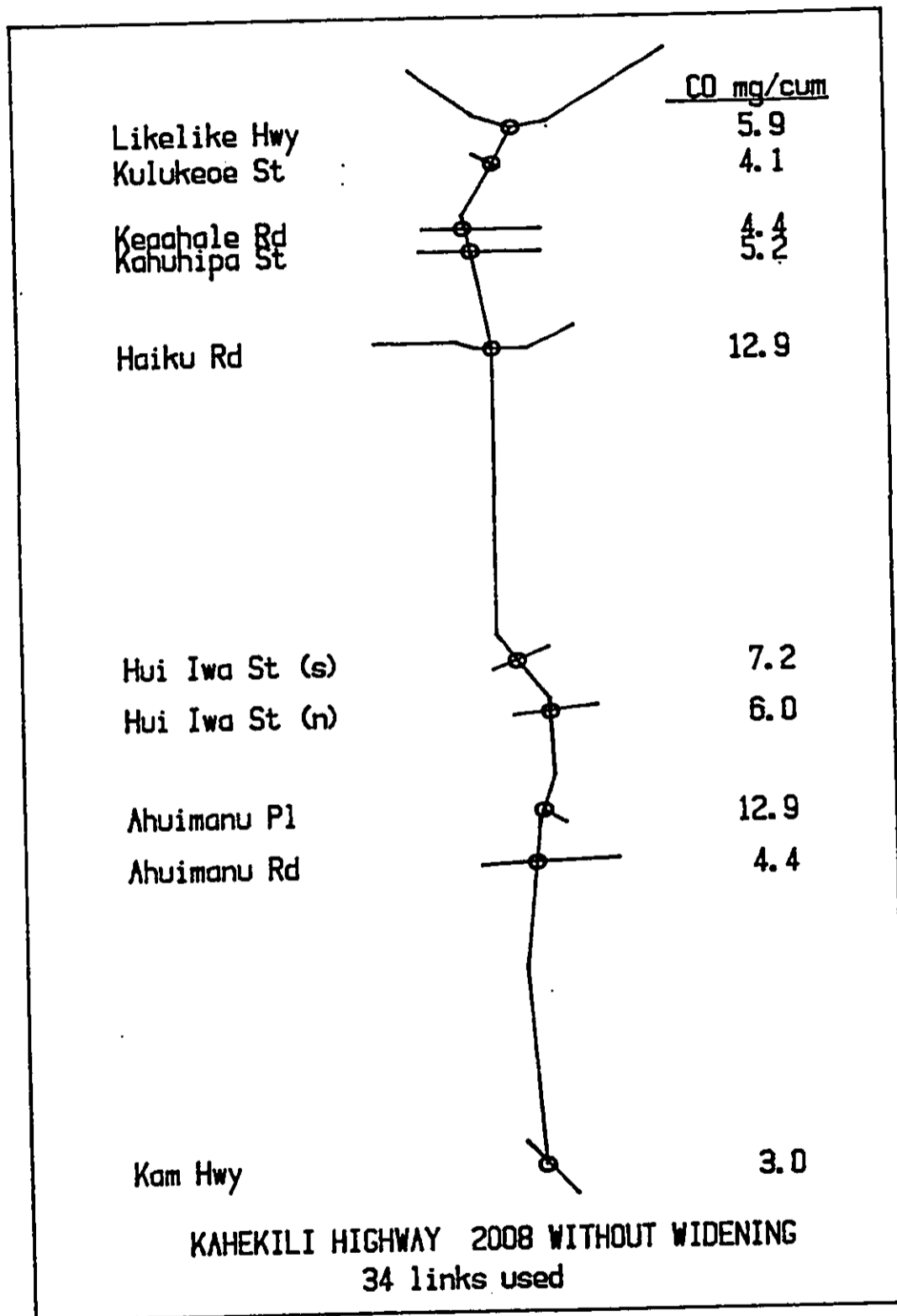


FIG. 4. ESTIMATED ONE HOUR MAXIMUM CONCENTRATION OF CO ALONG KAHEKILI HIGHWAY IN 2008 WITHOUT WIDENING.

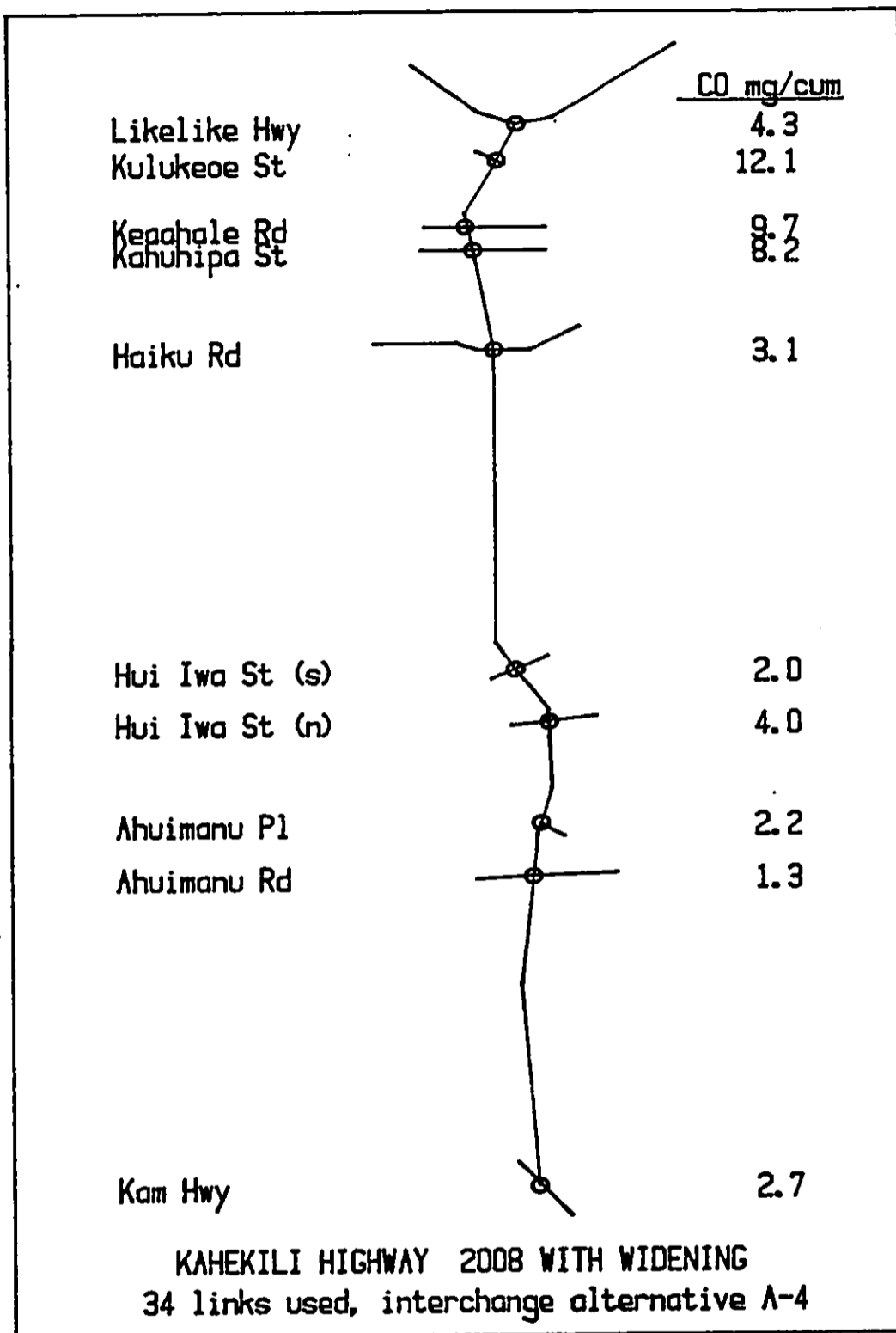


Fig. 5. ESTIMATED ONE HOUR MAXIMUM CONCENTRATION OF CO ALONG KAHEKILI HIGHWAY IN 2008 WITH WIDENING.

APPENDIX B



NOISE
IMPACT
ANALYSIS

APPENDIX B

NOISE IMPACT ANALYSIS MEMOS

- April 12, 1990 "Findings and Recommendations for Noise Control--Kahekili Highway Improvements, Oahu, Hawaii"
- considers mitigation measures such as noise barrier walls and sound attenuation measures for Koolau Baptist Church School and Seicho-No-Ie Jisso Center.
 - reassesses noise impact for 2008 and include potential impact in residential yards, patios and other areas of frequent human use.
- March 30, 1988 "Review of Traffic Noise Impact for Proposed Improvements to Kahekili Highway and Various Alternative Schemes for Improvements of the Intersection at Kahekili and Likelike Highways, Oahu."
- reassesses noise impact for 2008 and includes any new noise sensitive land uses - housing on Hui OO Place and Seicho-No-Ie Jisso Center.
- May 4, 1984 "Evaluation of Potential Noise Impact due to Proposed Access Road for Bethany Gardens [Castle Hills Subdivision] to Kealahala Road; Widening of Kahekili Highway Project."
- April 23, 1984 "Evaluation of Potential Traffic Noise Impact due to Various Alternate Schemes for Improvements of Intersection at Kahekili and Likelike Highways, Oahu"
- considers 1982 and 2003 noise impacts.
- July 12, 1983 "Analysis of Traffic Noise Impacts and Abatement Measures Kahekili Highway Improvements"
- identifies areas that potentially will exceed FHWA traffic noise criteria
 - recommends noise barrier walls - based on 1982 measurements and 2003 projections.

DARBY ACOUSTICAL CONSULTANTS, LTD.
dba



#90-01
April 12, 1990

DHM, Inc.
1188 Bishop Street, Suite 2405
Honolulu, Hawaii 96813

Attention: Mrs. Rachel Sheffield

Subject: Findings and Recommendations for Noise Control--
Kahekili Highway Improvements, Oahu, Hawaii

Dear Mrs. Sheffield:

In response to our fee proposal dated October 18, 1989, and your verbal notice-to-proceed received on January 5, 1990, we provide the following report:

I. Overview

References 1 through 5 are studies which predicted traffic noise levels and evaluated traffic noise impact for the year 2003 and 2008 for the subject project. The information from these studies was summarized in pages 77 to 84 of the June 1989 Draft EIS for the project. The purpose of this letter report is to reassess the noise impact from the project for the year 2008 and to include potential impact in residential yards, patios, and other areas of frequent human use.

Traffic noise levels are estimated for the years 1987 and 2008 based on data provided in references 6 through 8 for Scheme A-4 at Likelike and Kahekili Highways. No new traffic noise level measurements were made since the FHWA Highway Traffic Noise Prediction Model (Reference 9) had been validated with measurements made for the Draft EIS. The mix of vehicles used in the 2008 noise level predictions was based on the data in reference 10.

Exterior and interior noise levels were taken to determine if air conditioning or soundproofing is needed to meet Federal and State requirements at the Koolau Baptist Church and the Seicho-No Ie Jisso Center. Noise insulation measures are recommended.

PALI PALMS PLAZA • 970 NO. KALAHEO AVENUE • SUITE A-311
KAILUA, HAWAII 96734 • (808) 254-3318 • FAX (808) 254-5295

II. Noise Barrier Wall Evaluations

The effectiveness of noise barrier walls is analyzed at the following Areas based on the guidelines presented on page 83 in the Draft EIS, June 1989:

- Area I - Castle Hills
- Area II - Baptist Church Complex
- Area III - Along the Mauka Side of Kahekili Highway from Likelike to Kaneohe District Park
- Area III' - Along the Makai Side of Kahekili Highway from Likelike to Kaneohe District Park
- Area IV - Along the Mauka Side of Kahekili Highway from Kahuhipa to Haiku
- Area IV' - Along the Makai Side of Kahekili Highway from Kahuhipa to Haiku
- Area V - Kahuluu Gardens and Seicho-No-Ie Jisso Complex

Noise levels, with and without barriers located on the R.O.W. boundary, are predicted for locations about halfway between the R.O.W. and the walls of the structures and at elevations of 5 feet above ground level. Noise level reductions by barriers of up to three different heights varying from 3 to 10 feet are calculated for each Area.

Selected cross-sections were provided by Park Engineering in order to provide geometric inputs for the FHWA traffic noise and barrier program. Traffic noise levels were predicted for the year 2008 based on data provided in references 6 through 10. As can be seen in Tables I through VI, calculations were made at each cross-section for the following conditions:

- (a) Direct - The traffic noise level that would exist if there was direct sound propagation; e.g., to an elevated listening location as on a lanai in a highrise at a distance halfway between the R.O.W. and the structure.
- (b) Base Case - The calculated traffic noise level at a location halfway between the R.O.W. and the nearest structure at 5 feet above the ground level. This calculation takes into account any noise barrier effects caused by feature shown in the basic design of the highway, ramps, berms or retaining walls.
- (c) Wall Height - The calculated traffic noise level at the above specified location that would exist if a noise barrier wall of the given height was placed at or near the R.O.W. Note that at

some locations the wall is placed on top of the Base Case barrier feature discussed above which may or may not be at the R.O.W. The recommended added wall is shown in the cross-sections following the Table for each Area. The calculation assumes an infinitely long noise barrier wall. This assumption is an approximation within a decibel or two if the wall extends about 75' on either side of the listener. The main exceptions occur if the wall stops abruptly, such as at an intersecting street, and the noise level is increased significantly in the area of the end residence. Ideally, from acoustical considerations, the walls will turn and wrap around properties at intersections, but line-of-sight safety considerations, aesthetic, etc. must also be taken into account.

The recommended locations and lengths of walls for each Area are provided in the base figure next to the Table. The recommended heights for the walls are provided in the notes under the Table.

The basis for recommending wall heights is the following: The primary FHWA exterior noise abatement criteria level for typical residences is 67 dBA. Noise abatement measures need to be considered when predicted traffic noise levels approach the FHWA noise abatement criteria. Reference 2 indicates that in Hawaii most residences are naturally ventilated the year around and have relatively larger windows and door openings causing typical reductions by structures to range only from 5 to 7 dBA in rooms facing highways. While it may not be practicable to reduce residential noise levels to FHWA interior noise abatement criterial levels for the housing involved because of the lack of shielding; from the stand point of cost effectiveness of reducing substantial noise impacts, additional consideration is given to considering noise abatement measures, such as soundwalls, where the predicted noise levels approach the FHWA exterior noise abatement criterial level of 67 dBA. Because many of the noise sensitive sites for this project are predicted to have future exterior noise levels approaching or slightly exceeding 67 dBA, additional consideration of noise abatement measures to reduce exterior noise levels at frequent human use areas and first story residential walls by approximately 5 dBA or more are warranted. Such mitigation will also be effective in reducing interior noise levels.

III. Koolau Baptist Church Complex Evaluations

Noise measurements were made at the Koolau Baptist Church/School complex at the corner of the Likelike and Kahekili Highways on the afternoon of March 22, 1990, to assess existing and future traffic noise levels at potentially-affected classrooms.

Simultaneous noise measurements of 10 minutes duration were taken inside and outside Classroom 6, facing the Kahekili Highway, with the windows and door open (the normal condition during classes); further measurements were then taken with the classroom windows and door closed. The above procedure was then repeated at Classroom 2 facing the Likelike Highway. Figure VII shows the location of these measurement positions.

The exterior noise readings were taken with a Larson-Davis Laboratories Model 800B Precision Integrating Sound Level Meter, which provided the following data - the Equivalent Continuous Noise Level (Leq), the maximum noise level (Lmax) and the minimum noise level (Lmin). The interior measurements were taken with a Larson-Davis Laboratories Type 700 Sound Level Meter, which, in addition to Leq, Lmax and Lmin, provides statistical noise levels including L1, L10, L50 and L90 (the noise levels exceeded for 1%, 10%, 50% and 90% of the time, respectively).

The results are summarized in Table VII. The existing L10 noise levels inside both classrooms with the windows and doors open significantly exceeded the 50 dBA limit referred to in the DOH's Community Noise Control for Oahu (Reference 11). Even with the classroom doors and windows closed, the interior L10 levels still exceeded 50 dBA. Note, however, that two of the jalousie panes were missing from the windows of Classroom 6, and seven jalousie panes were missing from the windows of Classroom 2. Also, it was difficult to tightly close the upper windows in Classroom 2.

Repair and adjustment of the jalousie windows would result in a small increase in the exterior-to-interior noise reduction - an estimated 1 to 2 dBA improvement (in the case of Classroom 2) and an estimated 6 to 7 dBA improvement (in the case of Classroom 6).

The predicted future Leq noise levels outside Classroom 2 (after completion of the proposed roadway improvements, including the base-case sound barrier wall) are 63 dBA during the peak morning hour and 61 dBA during the peak afternoon hour - less than the 63 to 64 dBA recorded during the short-term measurements on the afternoon of March 22, 1990, because the screening effect of the

base-case sound barrier wall will more than compensate for the projected increase in traffic noise. Assuming that the classroom windows are repaired, the estimated future L10 levels inside Classroom 2 with the door and windows closed are 51 to 52 dBA during the peak morning hour and 49 to 50 dBA during the peak afternoon hour.

The predicted future Leq noise levels outside Classroom 6 (after completion of the proposed roadway improvements, including the base-case sound barrier wall) are 66 dBA during the peak morning hour and 64 dBA during the peak afternoon hour, compared with the 59 dBA recorded during the short-term measurements on the afternoon of March 22, 1990. Assuming that the classroom windows are repaired, the estimated future L10 levels inside Classroom 6 with the door and windows closed are 54 to 55 dBA during the peak morning hour and 52 to 53 dBA during the peak afternoon hour.

Thus, even if the classrooms facing both the Likelike and Kahekili Highways are air conditioned, allowing the existing jalousie windows to be kept closed for noise reduction purposes, and the windows are repaired, the future interior L10 noise levels will still exceed the 50 dBA limit. Because of above considerations and because of the high construction noise levels to which all classrooms will be exposed, particularly those classrooms facing the Kahekili Highway, it is recommended that, in addition to providing air conditioning, all existing classroom jalousie windows be replaced with fixed or operable windows utilizing at least 3/16" thick plate or laminated glass. Apart from ensuring that the interior L10 levels are clearly in compliance with the 50 dBA DOH limit, these measures will also assist in minimizing the impact of construction noise on classroom activities.

Note that the predicted future exterior traffic noise levels, with the base-case sound barrier wall, are in compliance with the FHWA 67 dBA Leq limit. Table II and Figures II, II-A, II-B, and II-D address traffic noise levels in the open areas at a height of 4 to 5 feet above the ground.

IV. Seicho-No-Ie (Japanese School) Complex Evaluations

Noise measurements were made at the Seicho-No-Ie Japanese School, on the mauka side of the Kahekili Highway, on the morning of March 23, 1990. Simultaneous noise measurements of 10 minutes duration were taken inside and outside the closest classroom to the Kahekili Highway, the Japanese Language Classroom (which also serves as the school cafeteria), with the windows and exterior door closed. Further measurements were then taken with the windows and exterior door open.

The same instrumentation was used as for the measurements at the Koolau Baptist Church. The results are summarized in Table III.

The measured Leq levels show that the exterior-to-interior noise reduction increased from 2 dBA to 14 dBA when the exterior door and windows were closed. The interior L10 noise level with the exterior door and windows closed was 51 dBA, marginally higher than the 50 dBA limit for school classrooms referred to in the DOH's Community Noise Control for Oahu (Reference 11).

The predicted future Leq noise levels outside the Japanese Language Classroom (after completion of the proposed roadway improvements) are 62 dBA during the peak morning hour and 61 dBA during the peak afternoon hour. In spite of the significant projected increase in future traffic volumes, these data are comparable to the noise levels recorded during the late morning period on March 23, 1990. The reasons for this apparent discrepancy are that traffic noise levels are strongly dependent on the numbers of heavy vehicles (trucks, buses, etc.) and that there was a relatively high percentage of truck movements on Kahekili Highway during the short-term measurements described above.

Thus, future L10 noise levels will continue to significantly exceed the 50 dBA DOH limit inside the Japanese Language Classroom with the exterior door and/or windows open. It will, therefore, be necessary to air condition the classroom, allowing the exterior door and windows to be kept closed for noise reduction purposes. To further reduce the level of intrusive noise and ensure clear compliance with the 50 dBA criterion, it would also be necessary to provide an acoustically absorptive classroom ceiling (e.g., a suspended acoustical tile ceiling or acoustical panel appliques on accessible areas of the walls and/or ceiling).

Note that the predicted future exterior traffic noise levels are in compliance with the FHWA 67 dBA limit. Table V and Figures V, V-A and V-B address traffic noise levels in the open areas between the nearest structure and the R.O.W. Note also that the other classrooms at the Japanese School are set back further from the Kahekili Highway than the Japanese Language Classroom. In addition, the other classrooms in the complex are well screened from highway traffic noise, whereas the Japanese Language Classroom has direct line-of-sight to the highway. These classrooms should not be significantly impacted by increased highway traffic noise.

DHM, Inc.
April 12, 1990

#90-01
Page 7

Noise barrier wall calculations indicate that it is not feasible to achieve 50dBA in the naturally ventilated Japanese Language Classroom because of the relative height of the window openings and because the wall must stop at the nearly intersection.

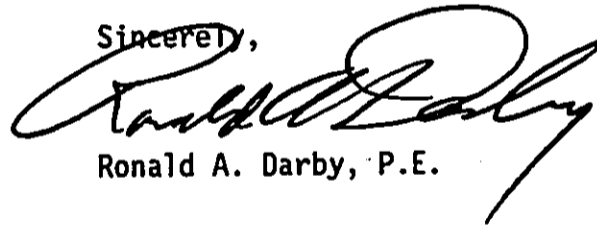
VI. Summary of Recommendations

In order to meet or approach $L_{eq}(60min)$ for FHWA criteria in open spaces between the R.O.W. and structures, noise barrier walls of seven foot height are recommended along the R.O.W. at: Castle Hills; along Kahekili Highway to the mauka side from the Likelike to Kaneohe District Park, and for selected distances between Kahukipa and Haiku, and also near Kahaluu Gardens. Also a three foot high wall is recommended at the edge of the berm near the R.O.W. for Ramp MK off Likelike Highway.

In order to satisfy interior noise levels of L_{10} 50dBA in classrooms (as required by State DOH noise regulations) at the Baptist Church Complex, it is recommended that the windows be upgraded and the spaces be airconditioned. These mitigation measures should be implemented before construction is started because very high noise levels in the classrooms are predictable due to the construction.

In order to satisfy DOH noise regulations at the Seicho-No-Ie Jisso Complex, it is recommended that acoustic absorptive treatment and airconditioning be implemented.

Sincerely,



Ronald A. Darby, P.E.

RAD/ld

Enclosure

References:

1. Letter report to J. Whalen; EDAW, Inc., entitled "Identification of potentially impacted land uses and baseline traffic noise level measurements near proposed project - New Interchange and Widening of Kahekili Highway, Oahu," dated February 24, 1983.
2. Letter report to J. Whalen; EDAW, Inc. entitled "Analysis of Traffic Noise Impacts and Abatement Measures - Kahekili Highway Improvements," dated July 12, 1983.
3. Letter report to J. Whalen; EDAW, Inc. entitled "Evaluation of Potential Traffic Noise Impact due to Various Alternate Schemes for Improvement at Kahekili and Likelike Highways, Oahu," dated April 23, 1984.
4. Letter report to J. Whalen, EDAW, Inc. entitled "Evaluation of Potential Noise Impact Due to Proposed Access Road for Bethany Gardens (now "Castle Hills") to Keaahala Road; Widening of Kahekili Highway Project," dated May 4, 1984.
5. Letter Report to DHM, Inc. entitled "Review of Traffic Noise Impact for Proposed Improvements to Kahekili Highway and Various Alternative Schemes for Improvements of the Intersection at Kahekili and Likelike Highways, Oahu," dated March 30, 1988.
6. "Traffic Assignment Project TA 87-7, Kahekili Interchange and Widening, Project Nos. 83-F-01-75 and 63A-05-68," State of Hawaii Department of Transportation, Highways Division, April 1987.
7. Charts of Kahekili Highway - Travel Times and Speeds, Park Engineering, 3/11/88.
8. Plans and Sections from Park Engineering, 1988 and 1990.
9. "FHWA Highway Traffic Noise Prediction Model," FHWA-RD -77-108.
10. Truck Factors - Kahekili Highway Widening & Interchange, Project No. 83F-01-75, Ref. No. TA 82-5, June 1982.
11. "Title 11, Administrative Rules, Department of Health," Chapter 43, Community Noise Control for Oahu, November 6, 1981.

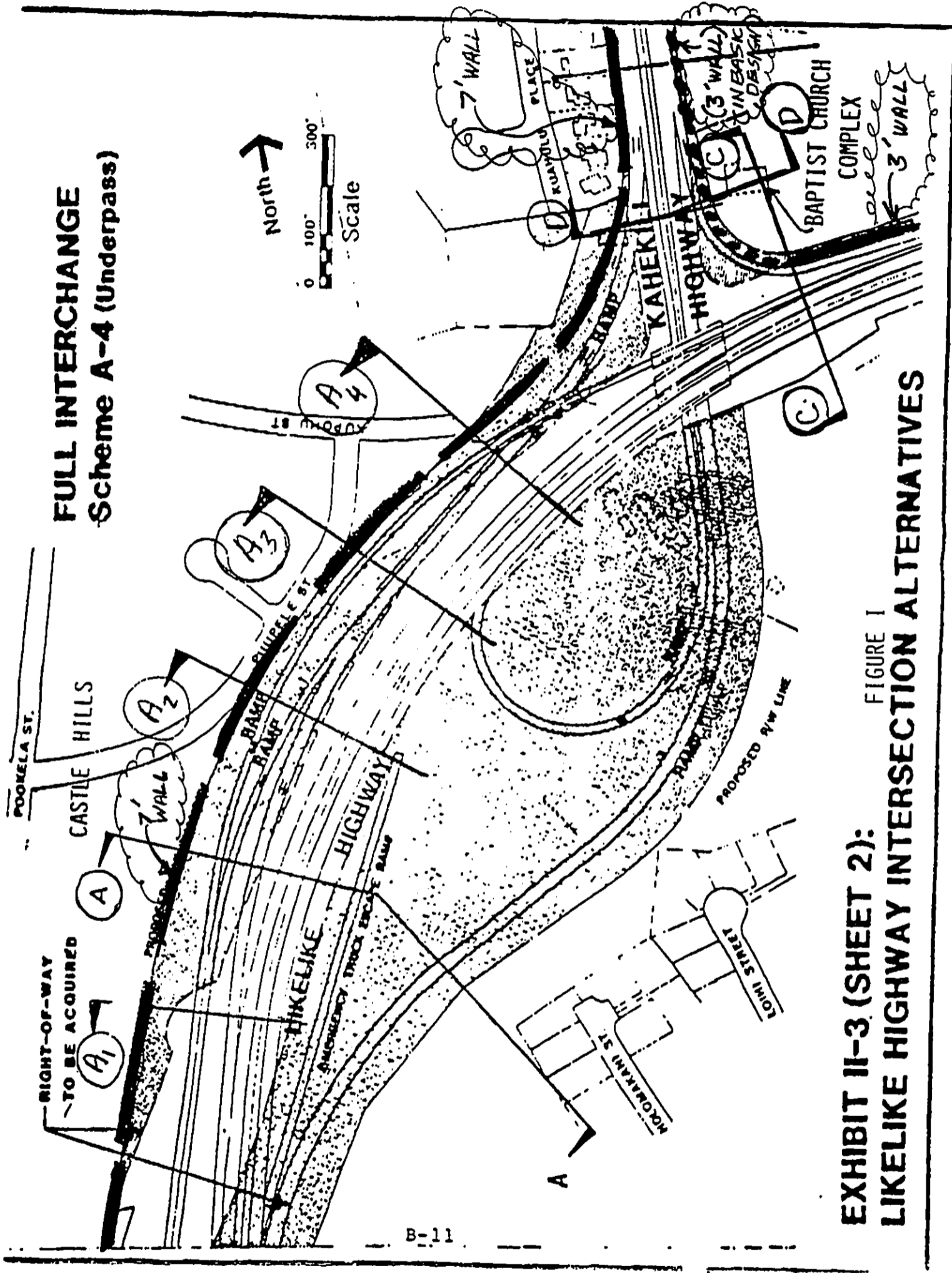
TABLE I

Summary of Predicted Traffic Noise Levels,
dB Leq (60 min) In Castle Hills

Section	Figure	Direct	Base Case	Wall Height					
				3'	5'	6'	7'	8'	10'
AI	I-A	73.6	73.1	73.1	68.7	67.9	66.0	64.0	61.1
A	I-B	75.3	69.3	69.3	68.8	67.4	65.6	64.0	61.8
A2	I-C	74.3	67.9	66.2	64.8				61.5
A3	I-D	74.2	70.3	68.1	67.0		65.6		63.4
A4	I-E	73.5	67.2	65.8	65.3				63.8

Notes: Recommended Wall Height - 7'. See Figure I.
Includes Truck Upgrade Adjustment Factor

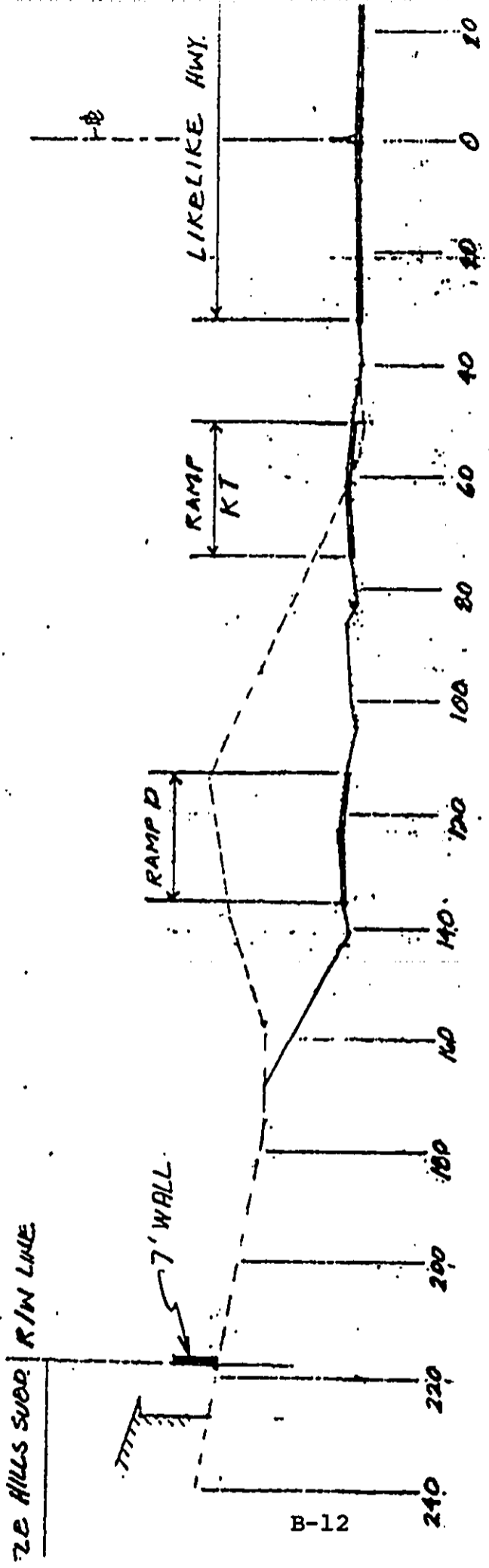
**FULL INTERCHANGE
Scheme A-4 (Underpass)**



B-11

**EXHIBIT II-3 (SHEET 2):
LIKELIKE HIGHWAY INTERSECTION ALTERNATIVES**

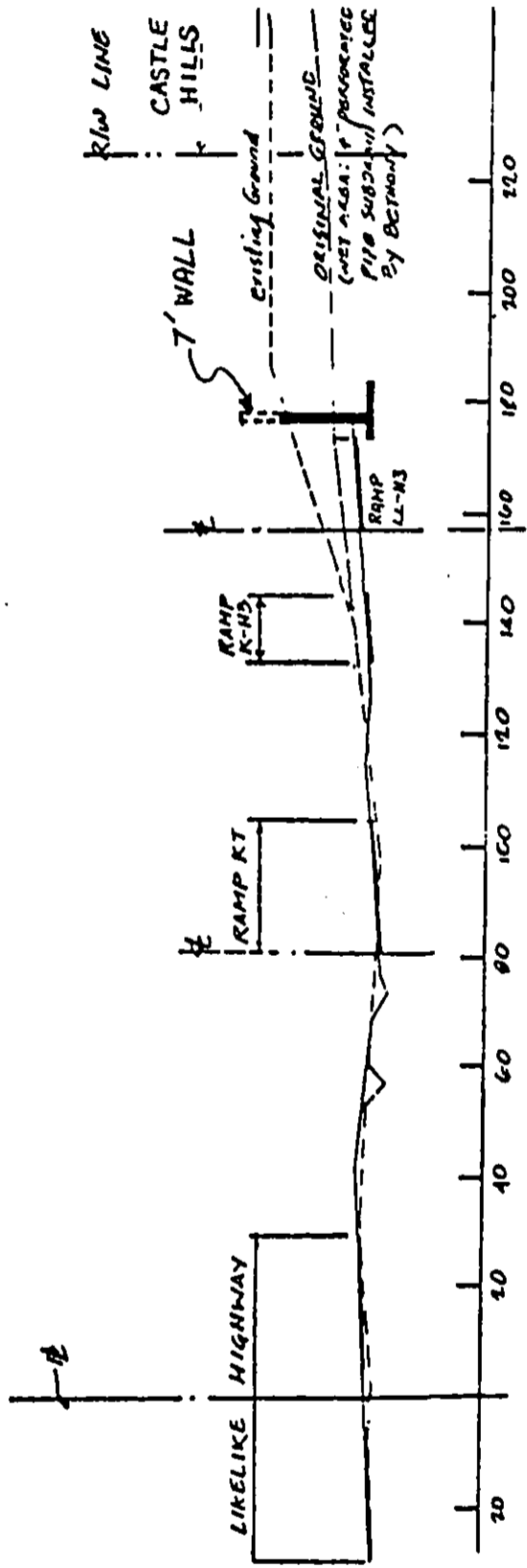
FIGURE I



0 10' 20'
SCALE

SECTION A1

FIGURE I-A



SECTION 'A-A'
 LIKELIKE STA. 75+50
 SCHEME A-4

FIGURE I-B

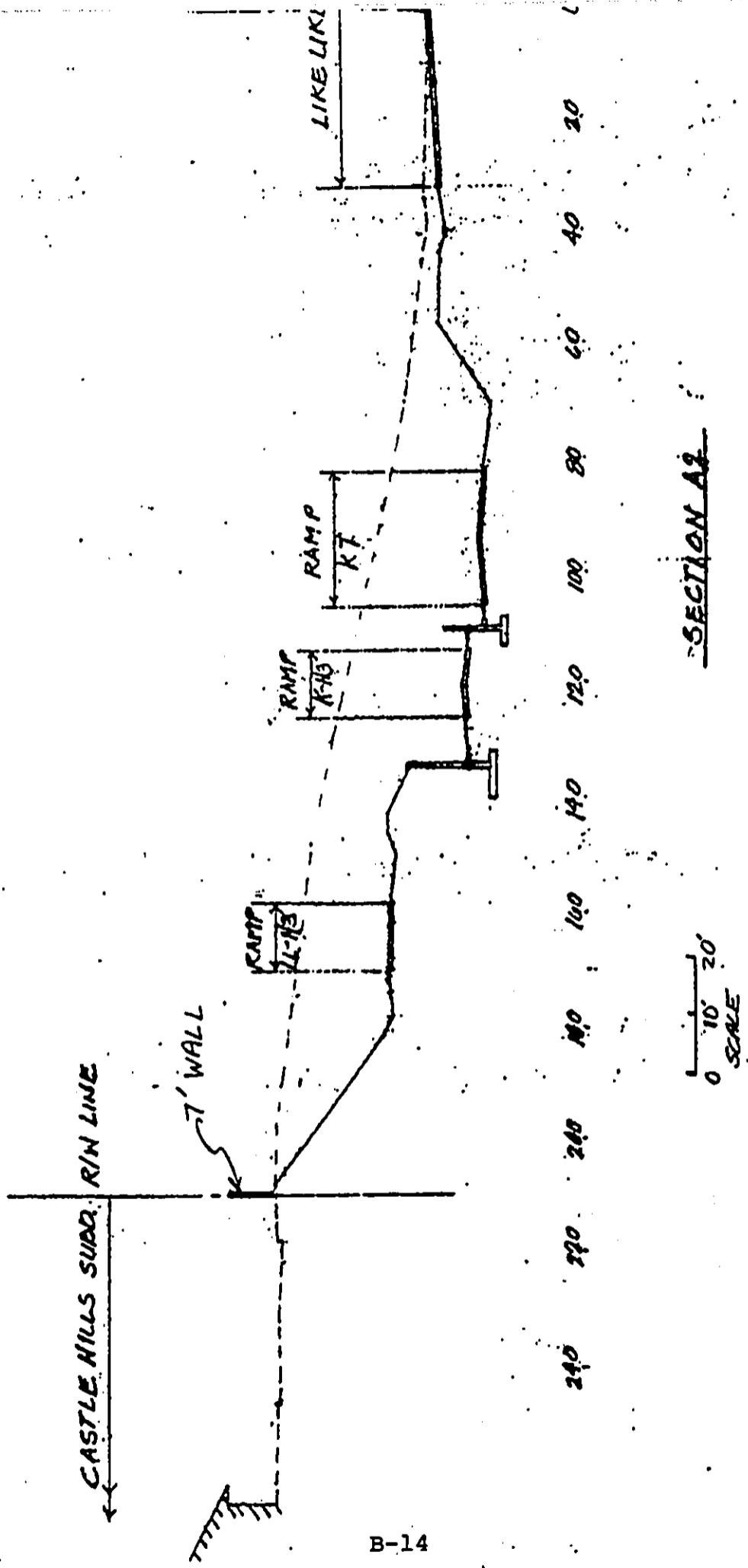


FIGURE I-C

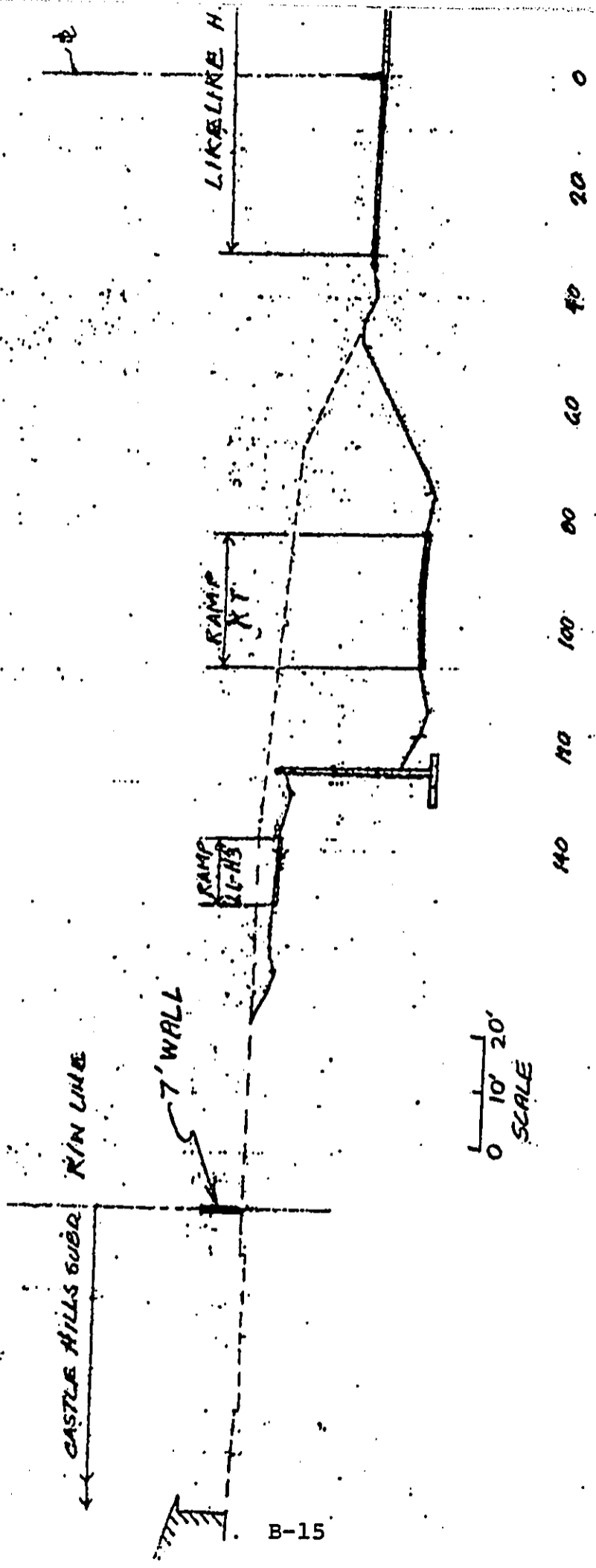
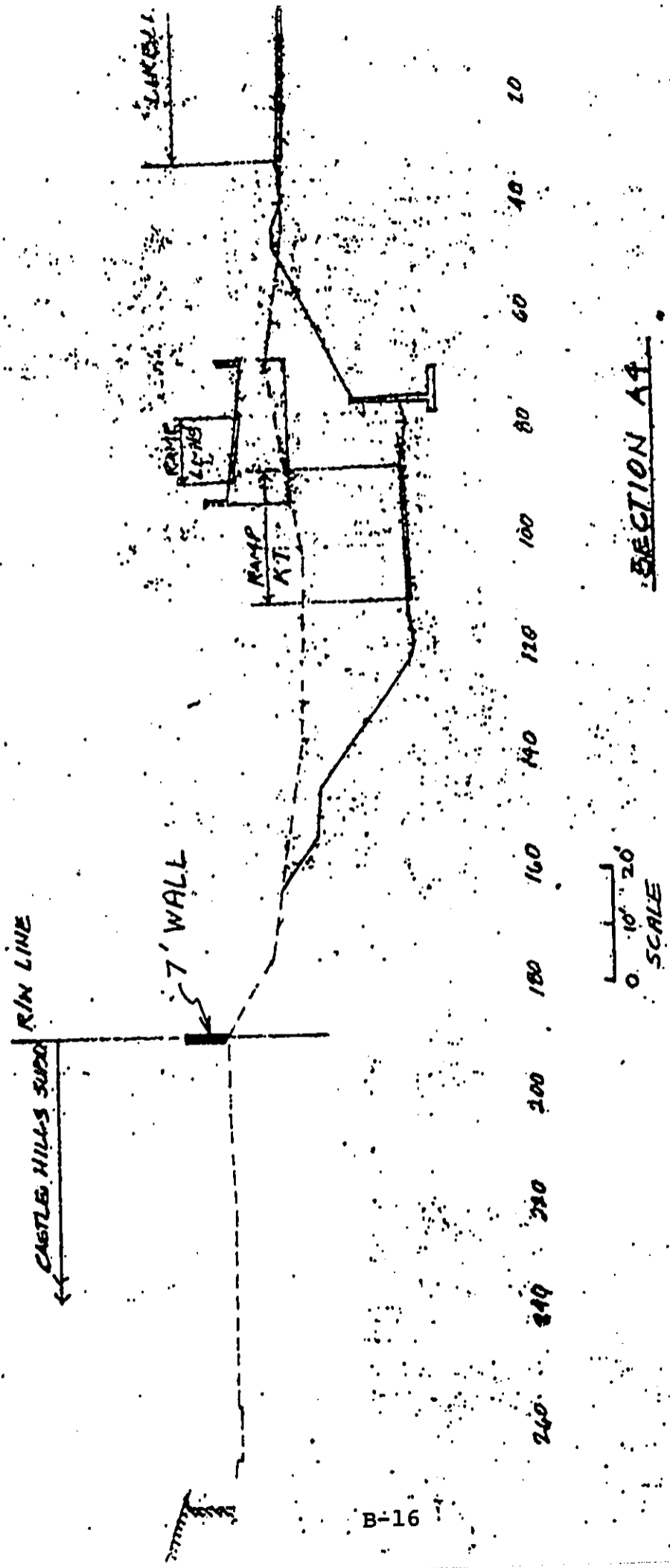


FIGURE I-D





B-16

FIGURE I-E

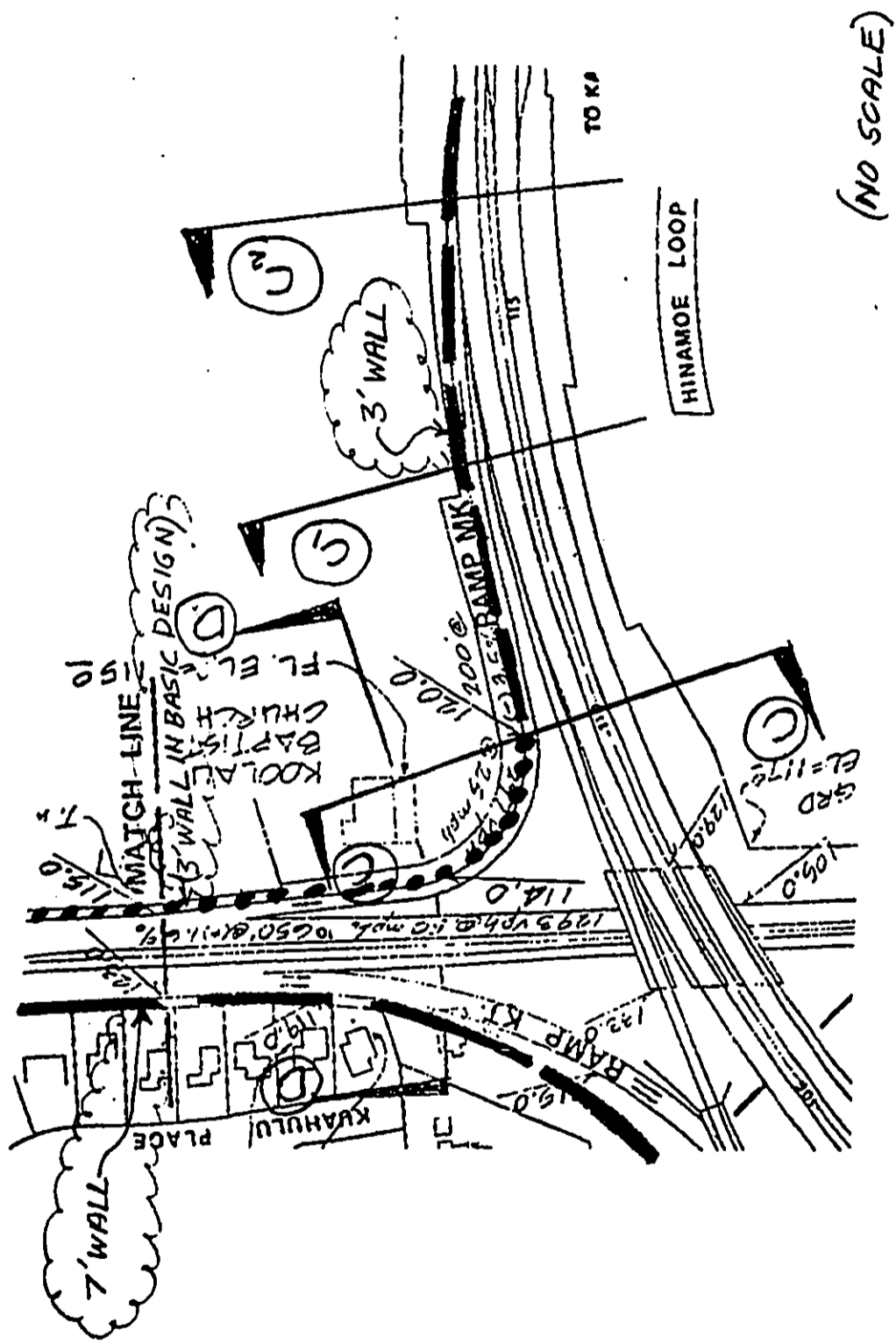
TABLE II

Summary of Predicted Traffic Noise Levels,
dB Leq (60 min) at the Baptist Church Complex
and Likelike Highway Near Intersection

Section	Figure	Direct	Base Case	Wall Height					
				3'	5'	6'	7'	8'	10'
C	II-A	70.6	64.8	62.6	61.1				58.3
C1	II-B	75.0	69.3		67.6		64.9		61.7
C1	II-B	75.0	69.3	66.1*	64.1*		62.3*		
C2	II-C	73.2	66.1						65.6
C2*	II-C	73.2	66.1	63.8*	61.9*		60.4		
D	II-D	70.3	63.8	60.7	58.9				54.9

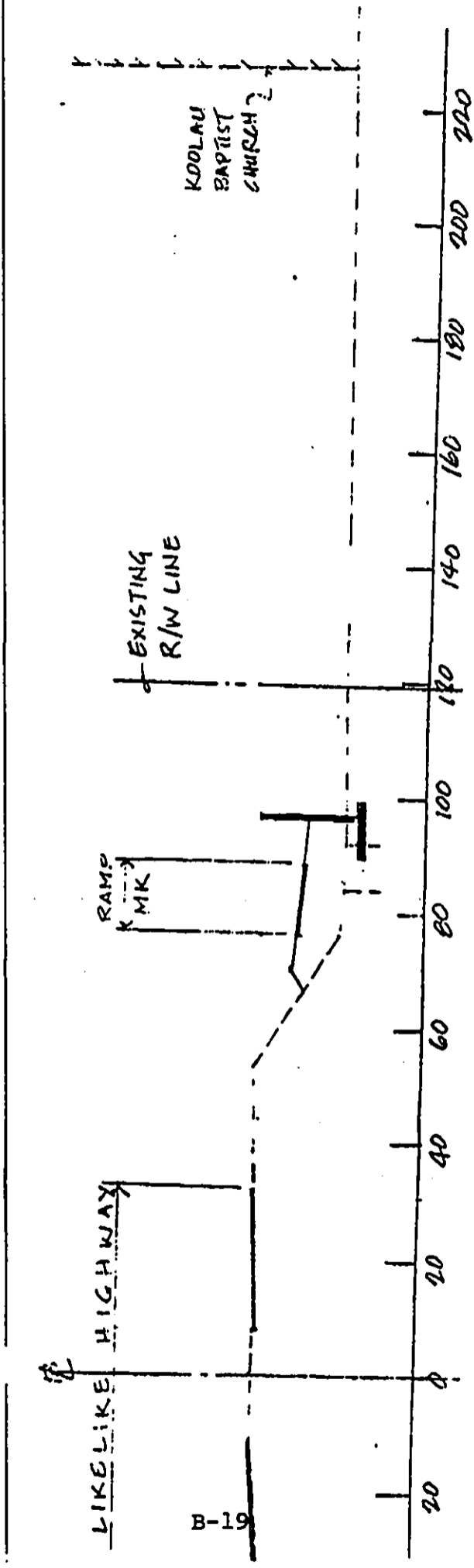
Notes: Three (3) Foot Recommended Wall at the Edge of the Berm shown on
Figures II, II-B, and II-C.

*Wall at Top of Berm



(NO SCALE)

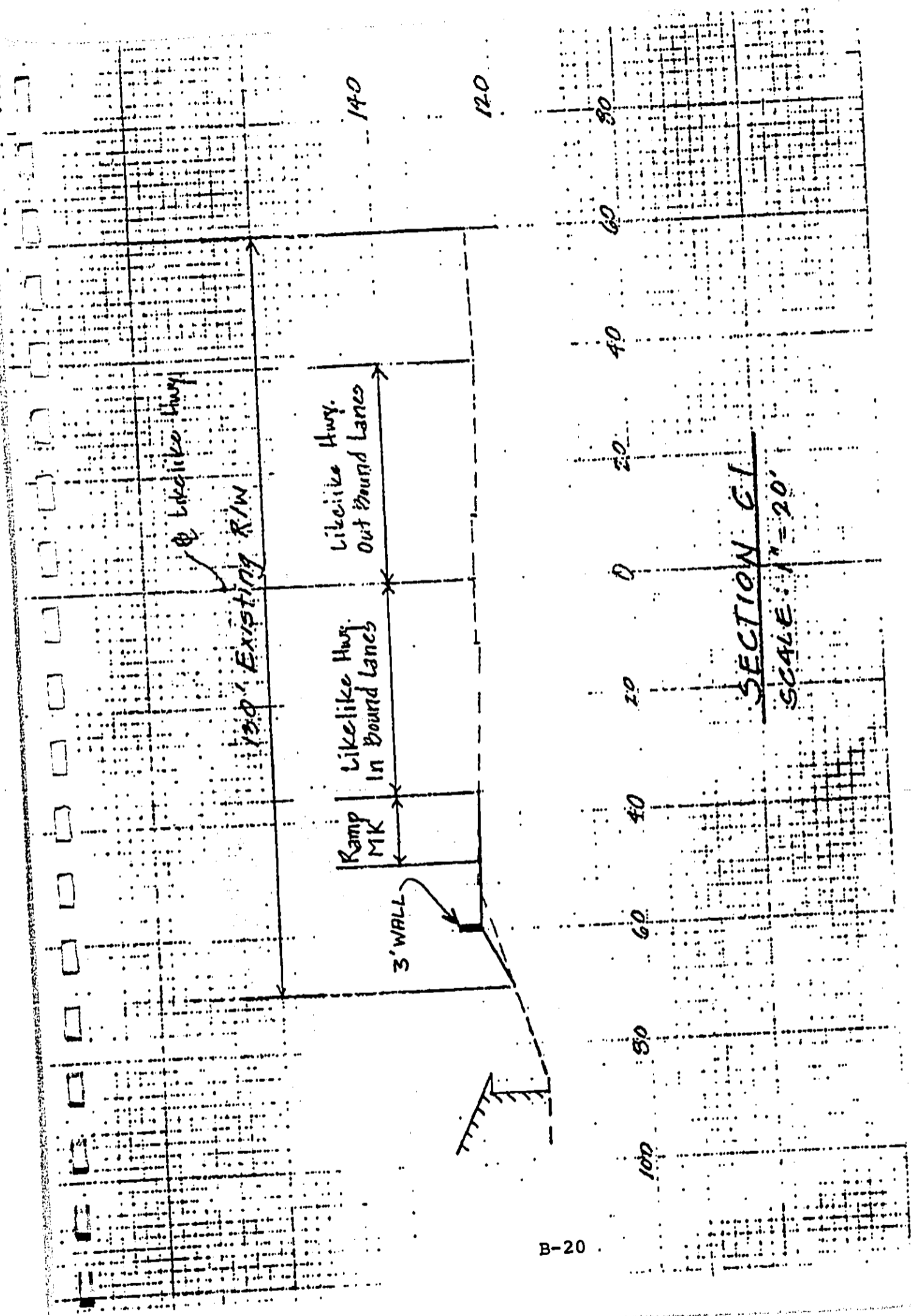
FIGURE II



SECTION 'C-C'
 LIKELIKE STA. 110+25 REV. 2/19/88

FIGURE 11-A

110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300



B-20

FIGURE II-B

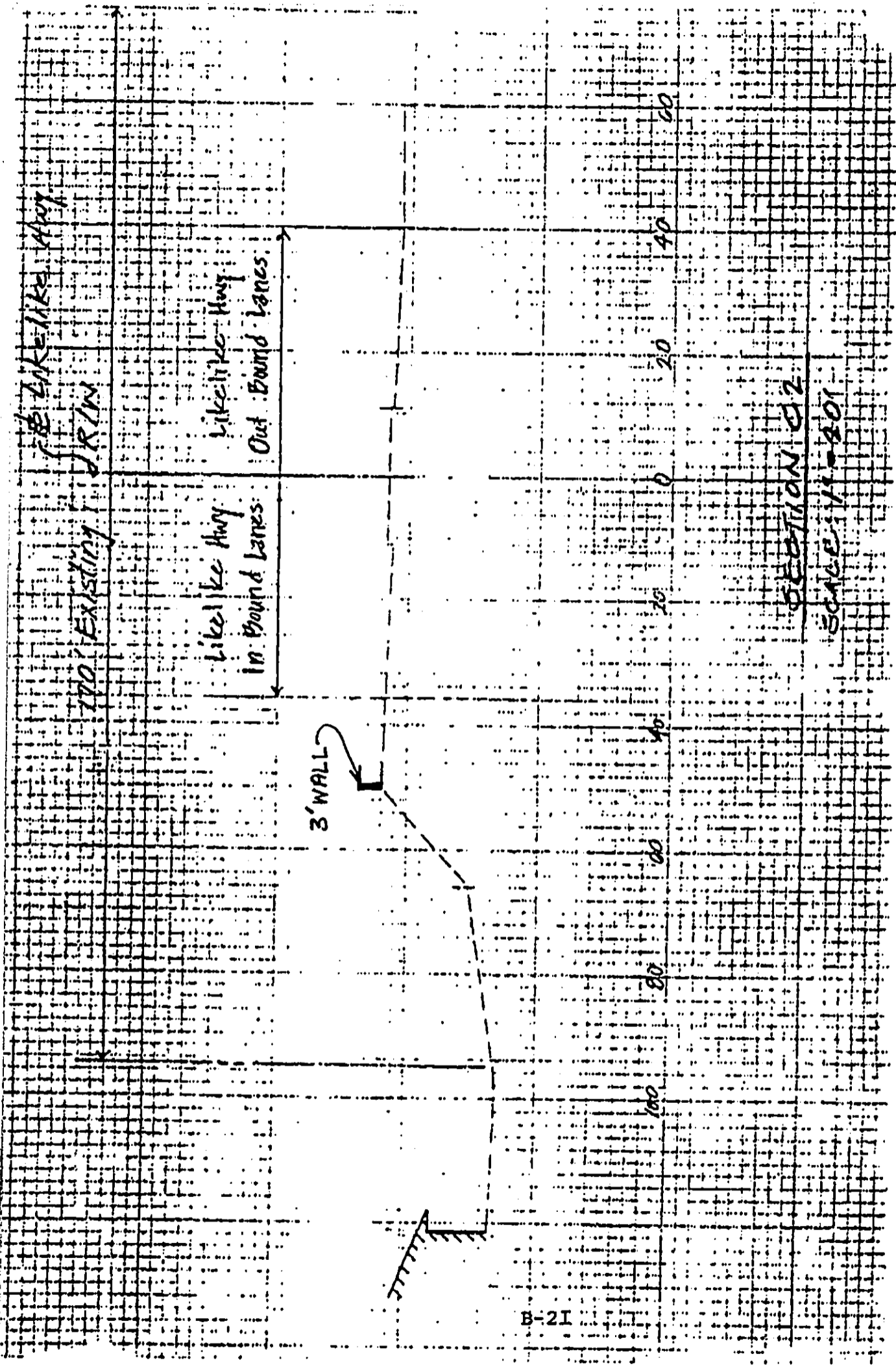
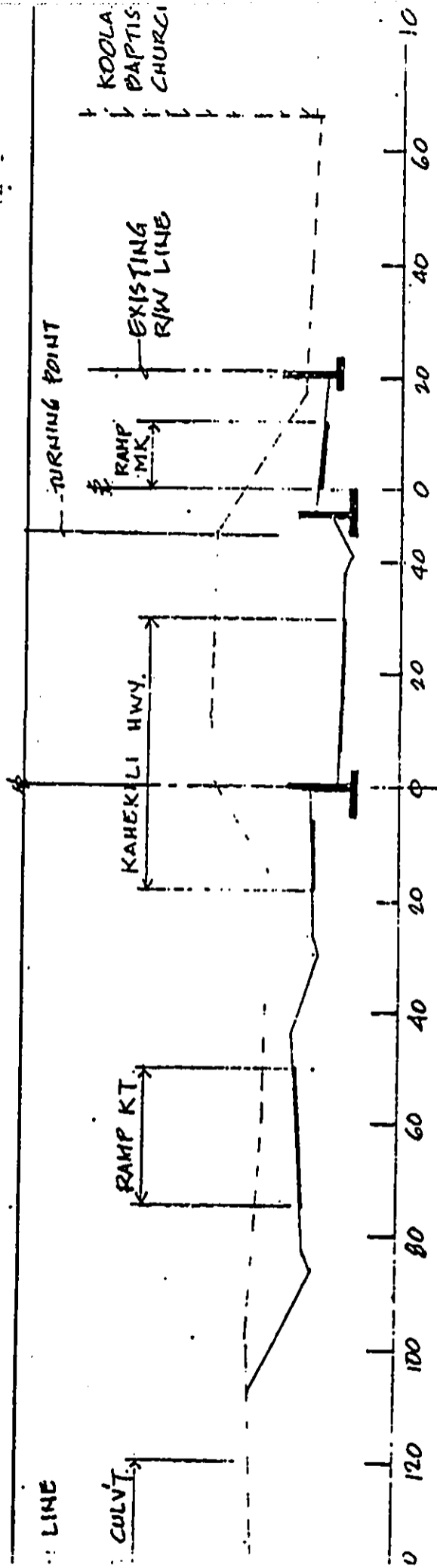


FIGURE II-C



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100



B-22

SECTION 'D-D'

KAHEKILI STA. 8+75 ADDED 4/19/88

KAHEKILI INTERCHANGE SCHEME 'A-4' SECTIONS

SCALE: 1" = 20'

FIGURE II-D

TABLE III
Summary of Predicted Traffic Noise Levels,
dB Leq (60 min) Along the Mauka Side of Kahekili Highway
From Likelike to Kaneohe District Park

Section	Figure	Direct	Base Case	Wall Height					
				3'	5'	6'	7'	8'	10'
D1	III-A	74.4	67.0		62.0				
D2	III-B	73.8	72.7	72.1	70.0		67.1		64.9
D3	III-C	70.1	68.8	68.6	66.8				62.9
D4	III-D	72.7	71.3	66.8	65.4				
D5	III-E	71.9	71.9	70.6	68.3		65.9		63.7
D6	III-F	71.9	71.9	70.6	68.3		65.9		63.7
D7	III-G	71.9	71.9	70.6	68.3		65.9		63.7

Notes: Recommended Wall Height is 7'. See Figures III and III-A through III-G.

TABLE III'

Summary of Predicted Traffic Noise Levels,
 dB Leq (60 min) Along Makai Side of Kahekili Highway
 from Likelike to Kaneohe District Park-Mauka

Section	Figure	Direct	Base Case	Wall Height					
				3'	5'	6'	7'	8'	10'
D1	III-A								
D2	III-B	72.7	66.8	63.5					
D3	III-C	72.5	62.7	59.8					
D4	III-D	72.7	69.8	66.2					
D5	III-E	72.7	66.8	63.5					
D6	III-F	72.5	62.7	59.8					
D7	III-G	72.5	62.7	59.8					

Notes: No Noise Barrier Wall Recommended.

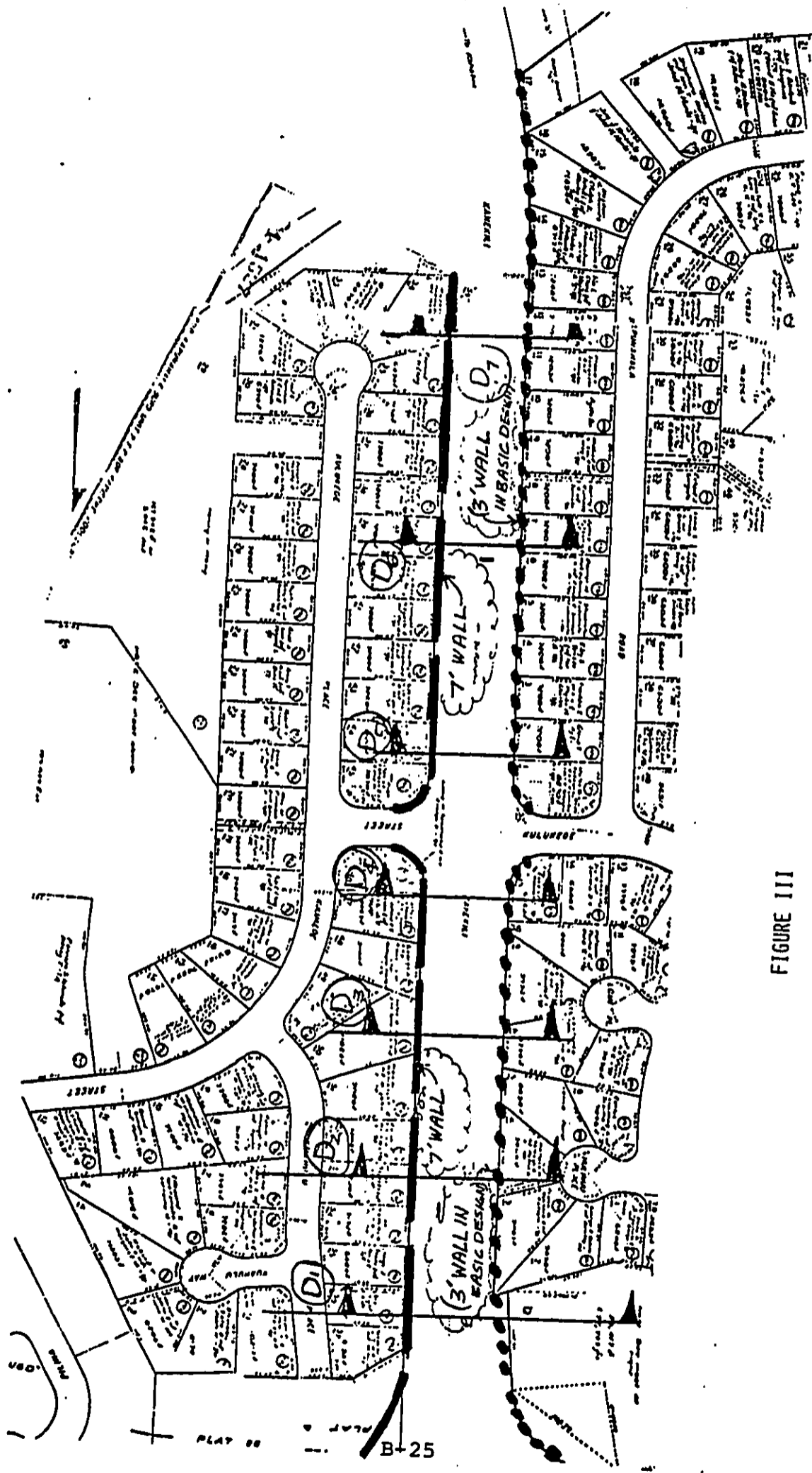
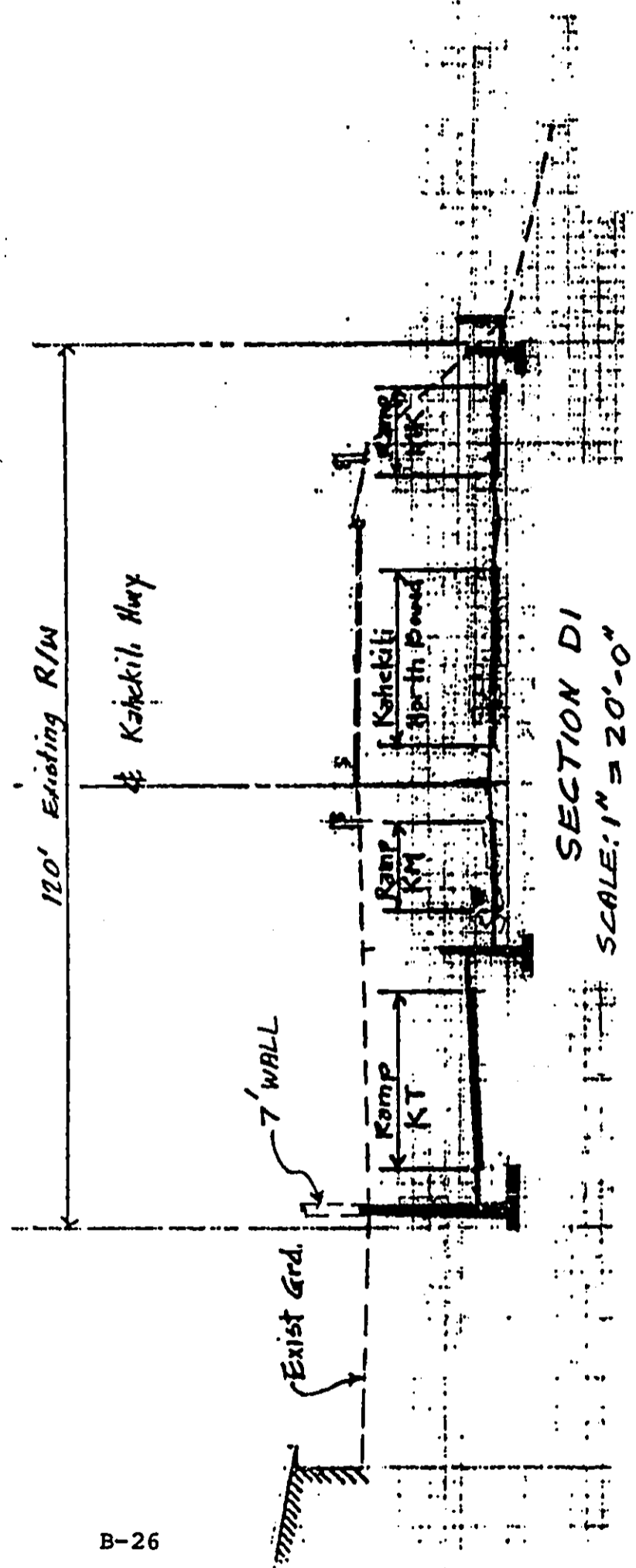


FIGURE III

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

140 120 100 80 60 40 20 0 20 40 60 80 100 120 140



B-26

FIGURE III-A

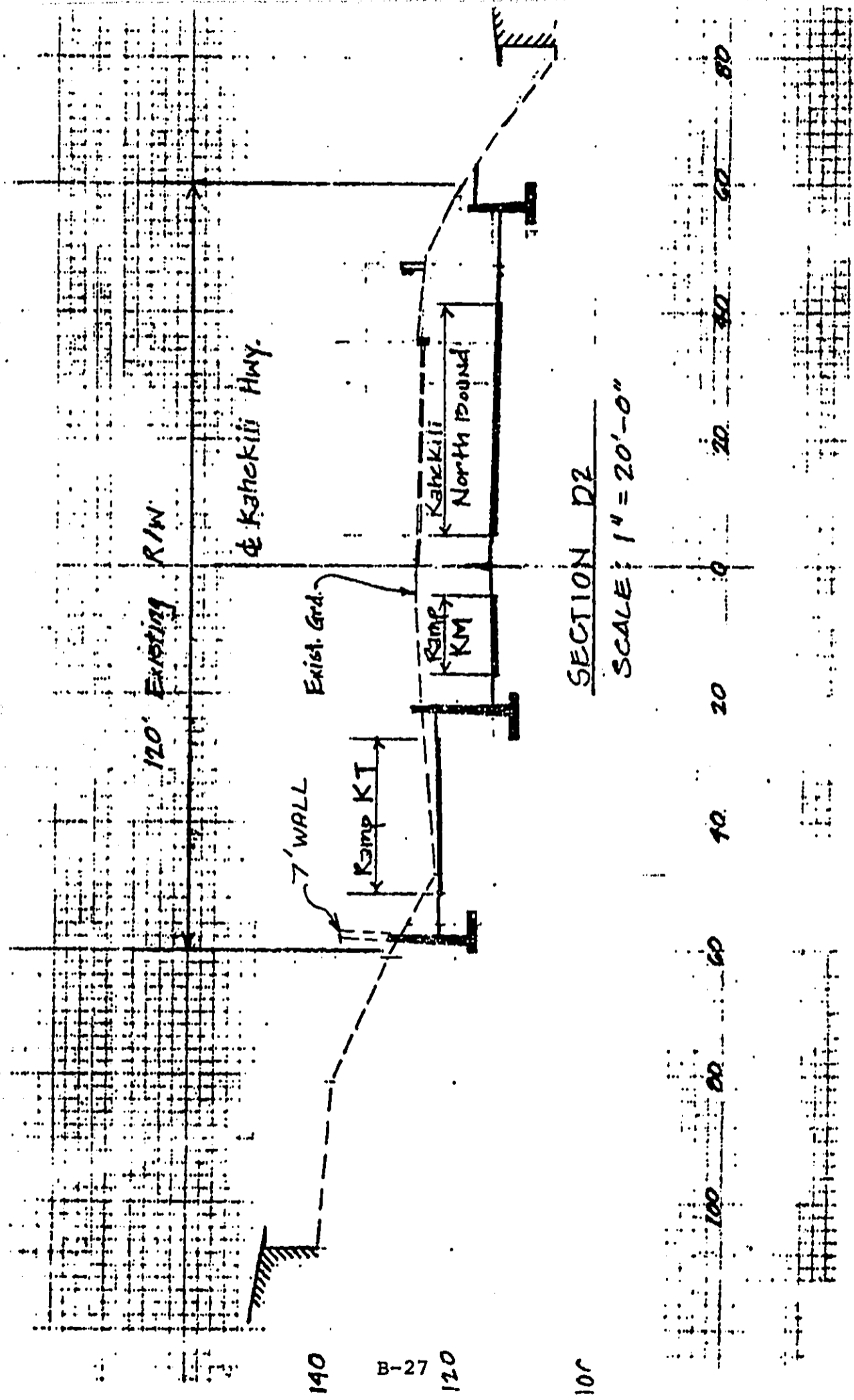


FIGURE III-B

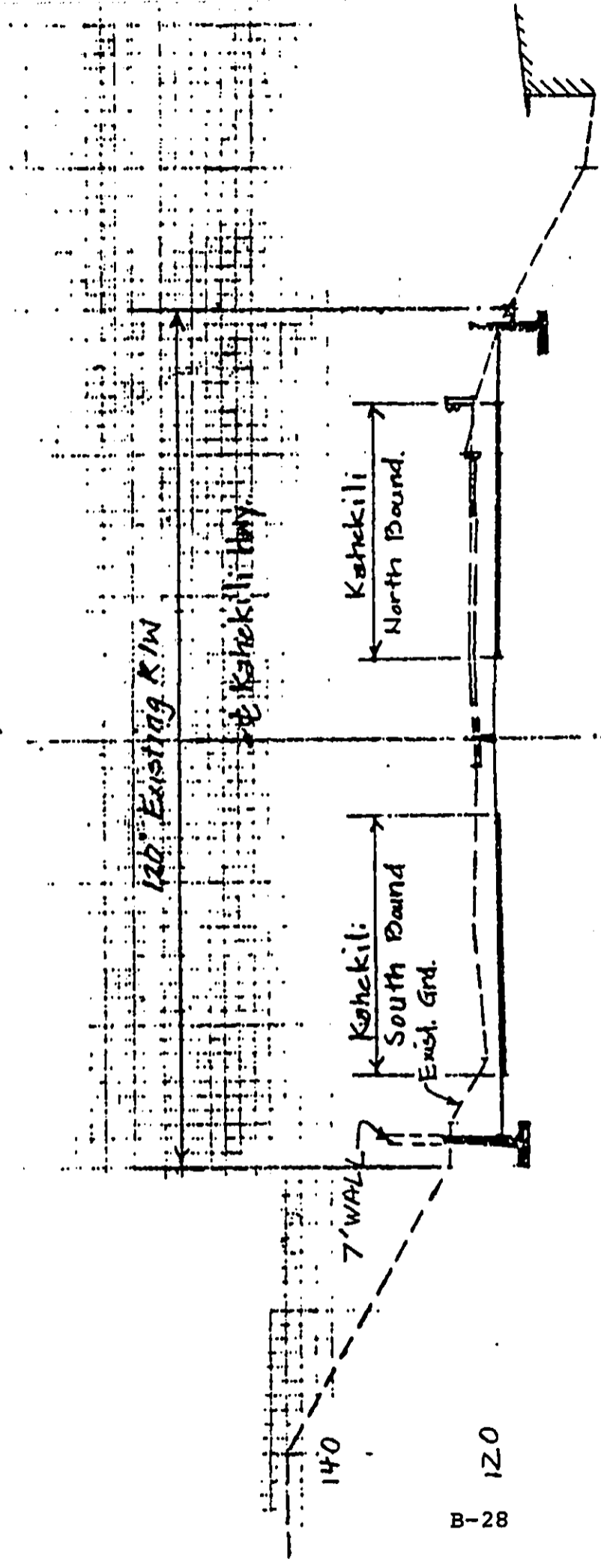
140

B-27

120

100

10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290 300 310 320 330 340 350 360 370 380 390 400 410 420 430 440 450 460 470 480 490 500 510 520 530 540 550 560 570 580 590 600 610 620 630 640 650 660 670 680 690 700 710 720 730 740 750 760 770 780 790 800 810 820 830 840 850 860 870 880 890 900 910 920 930 940 950 960 970 980 990 1000



SECTION D3
SCALE: 1" = 20'-0"

B-28

100

100 20 40 60 80 100

FIGURE III-C

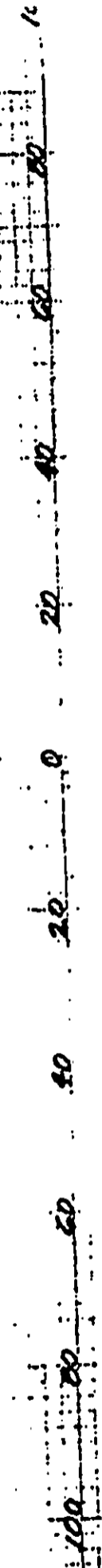
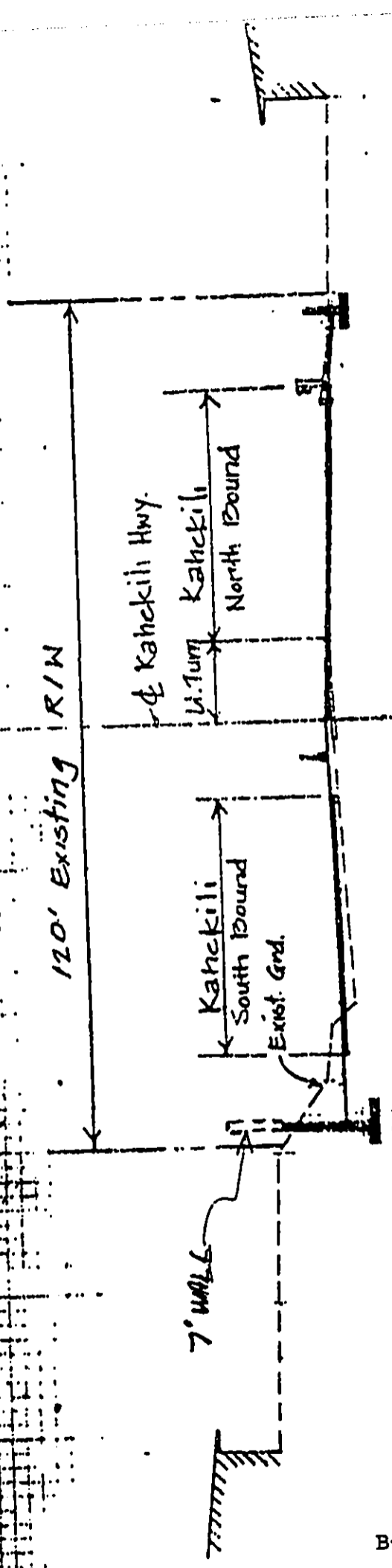
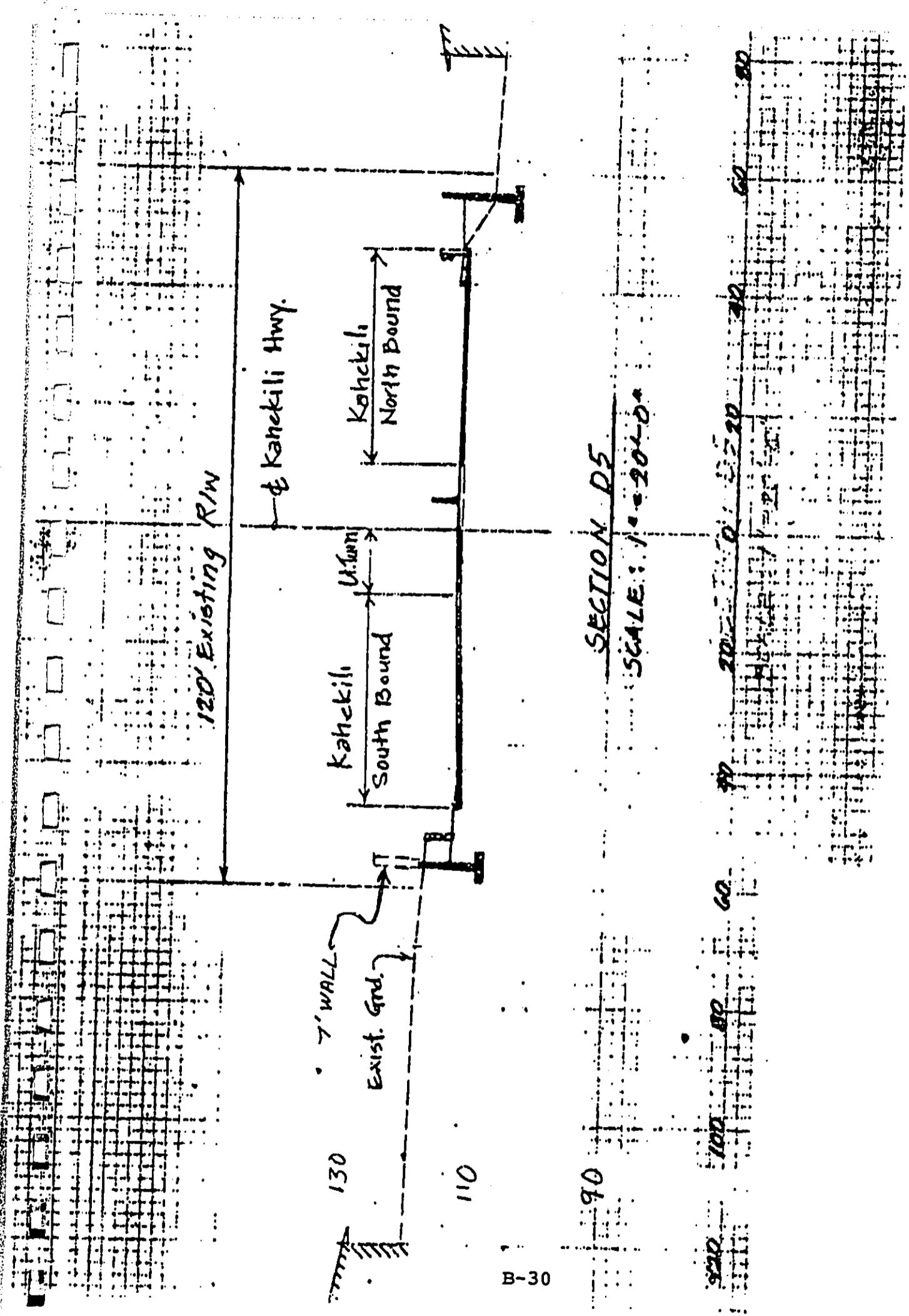
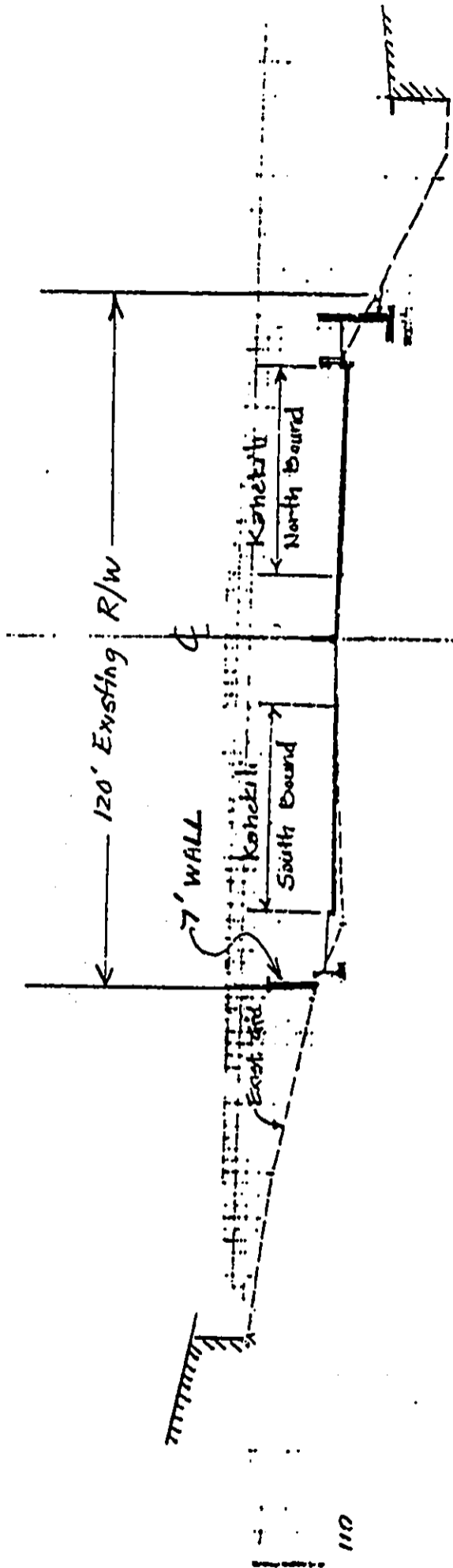


FIGURE III-D



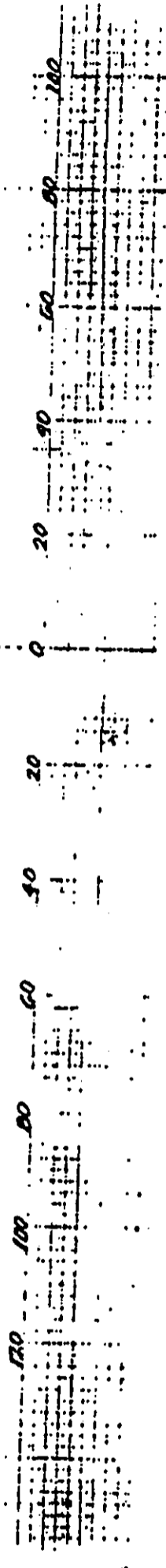
B-30

FIGURE III-E



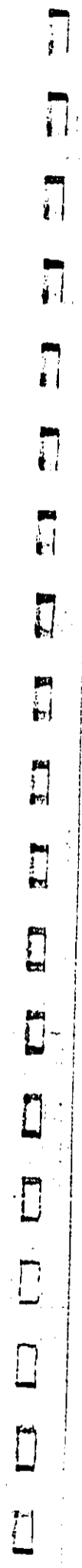
SECTION DG

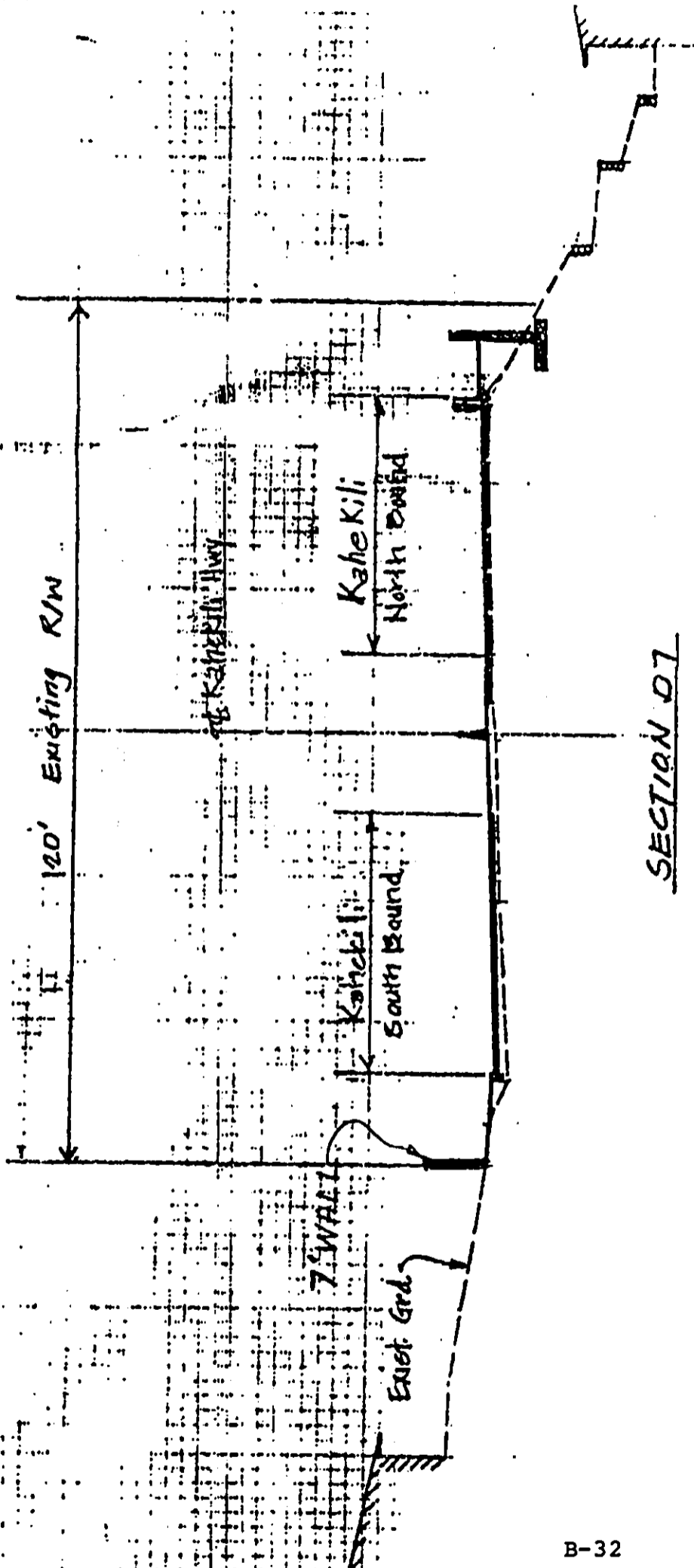
0 10' 20'
SCALE



110
90
B-31

FIGURE III-F





SECTION 07
 SCALE: 1" = 20'-0"

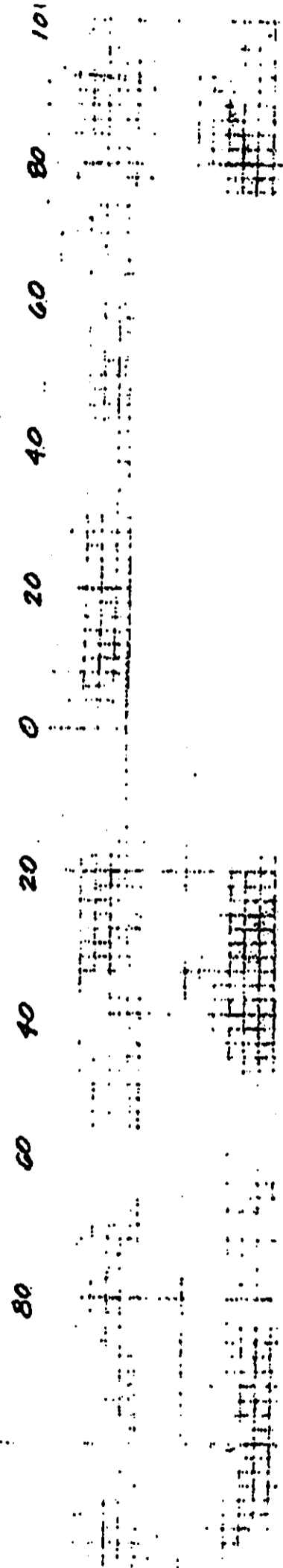


FIGURE III-6

TABLE IV

Summary of Predicted Traffic Noise Levels,
dB Leq (60 min) along the Mauka Side of
Kahekili Highway from Kahuhipa to Haiku

Section	Figure	Direct	Base Case	Wall Height					
				3'	5'	6'	7'	8'	10'
E1	IV-A	72.1	72.1		70.5		67.9		65.1
E2	IV-B	72.1	72.1		70.5		67.9		65.1
E3	IV-C	72.1	72.1		70.5		67.9		65.1
E4	IV-D	73.3	66.0	64.8	61.7				
E5	IV-E	73.5	73.5	67.8	65.0	63.4			
E6	IV-F	72.5	72.5	70.2	66.6		64.9		61.3

Notes: Seven (7) Foot Recommended Walls Shown on Figures IV, IV-A, IV-B, IV-C, IV-E and IV-F.

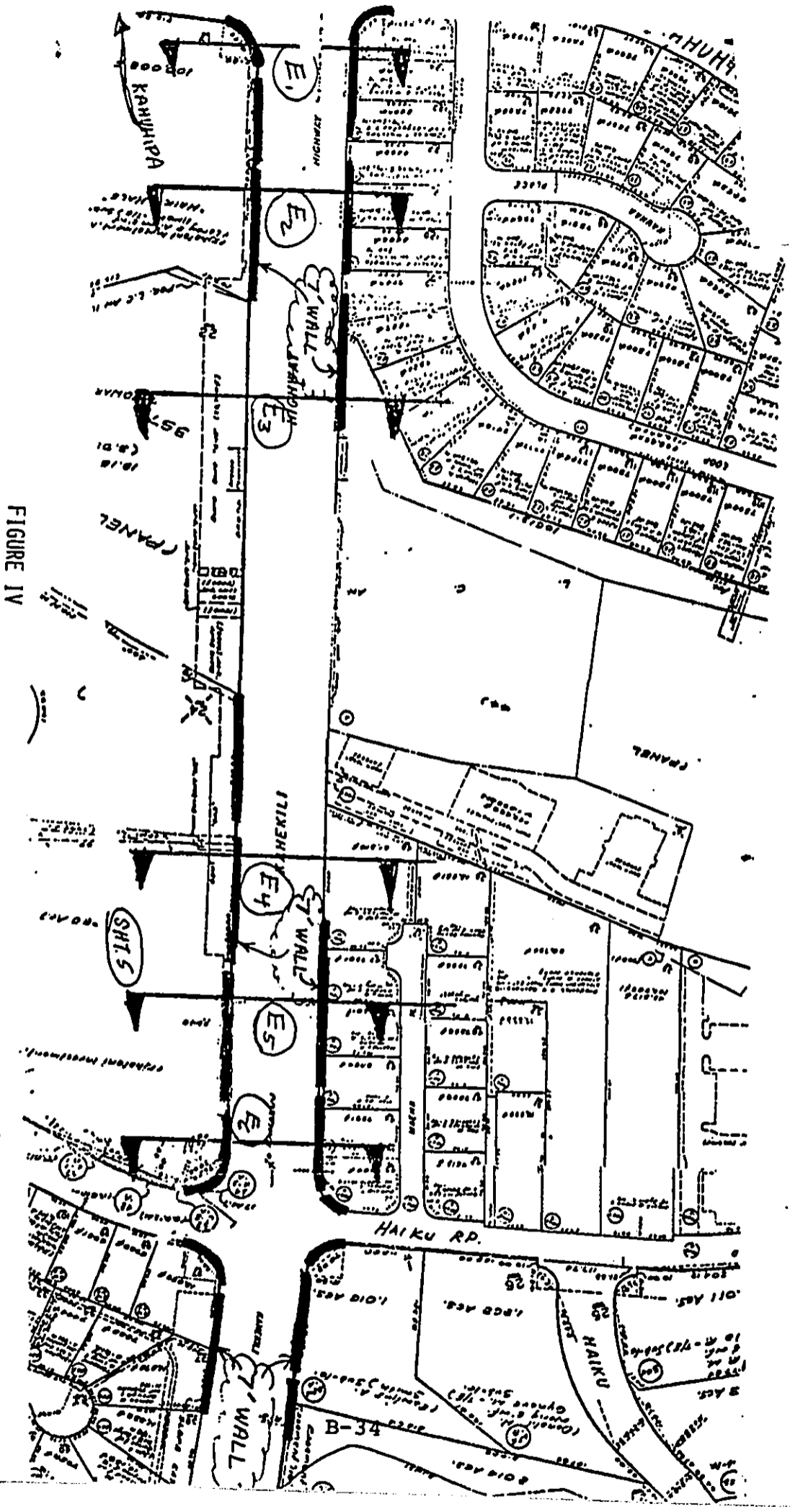


FIGURE IV

(NO SCALE)



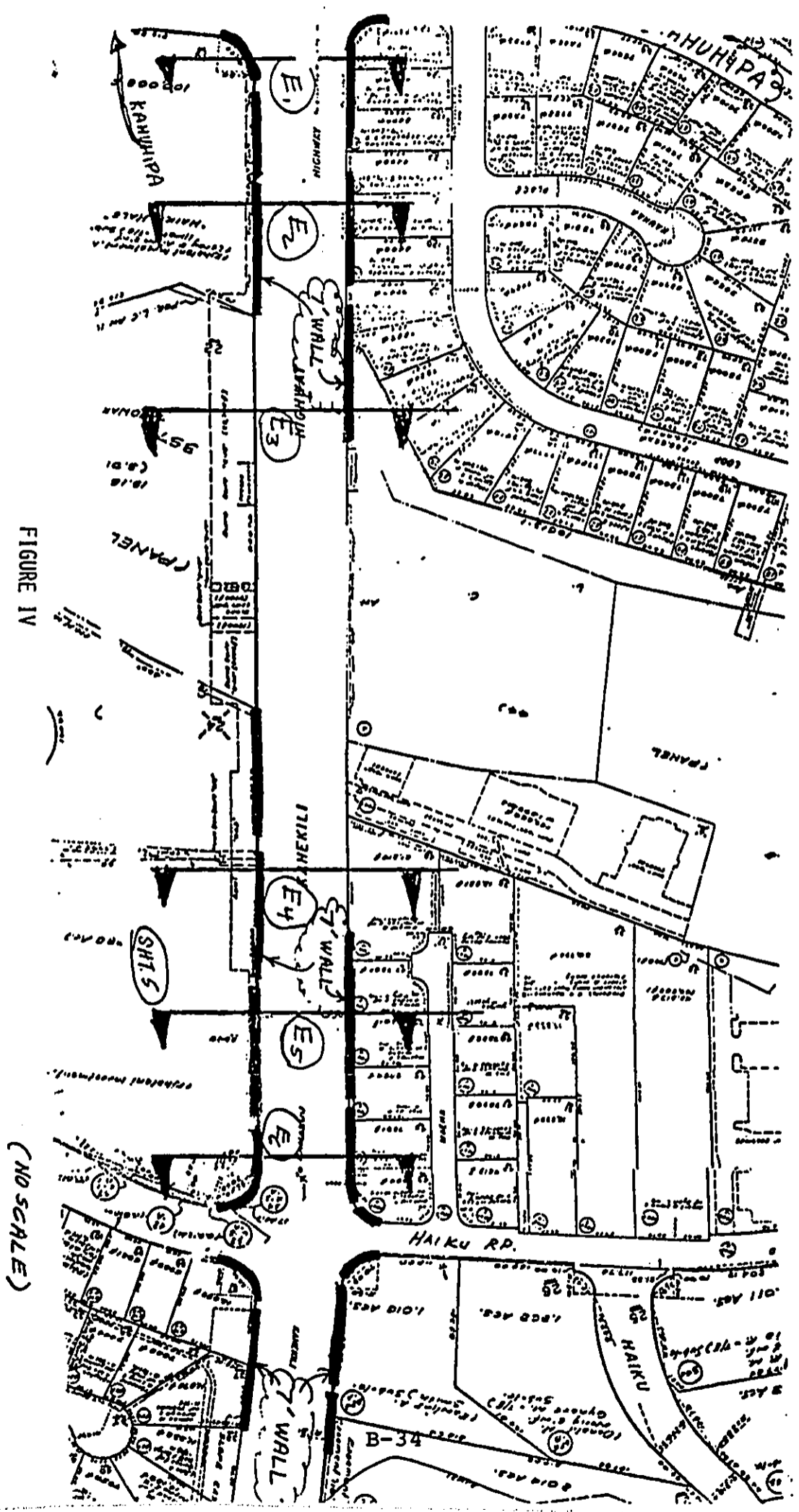
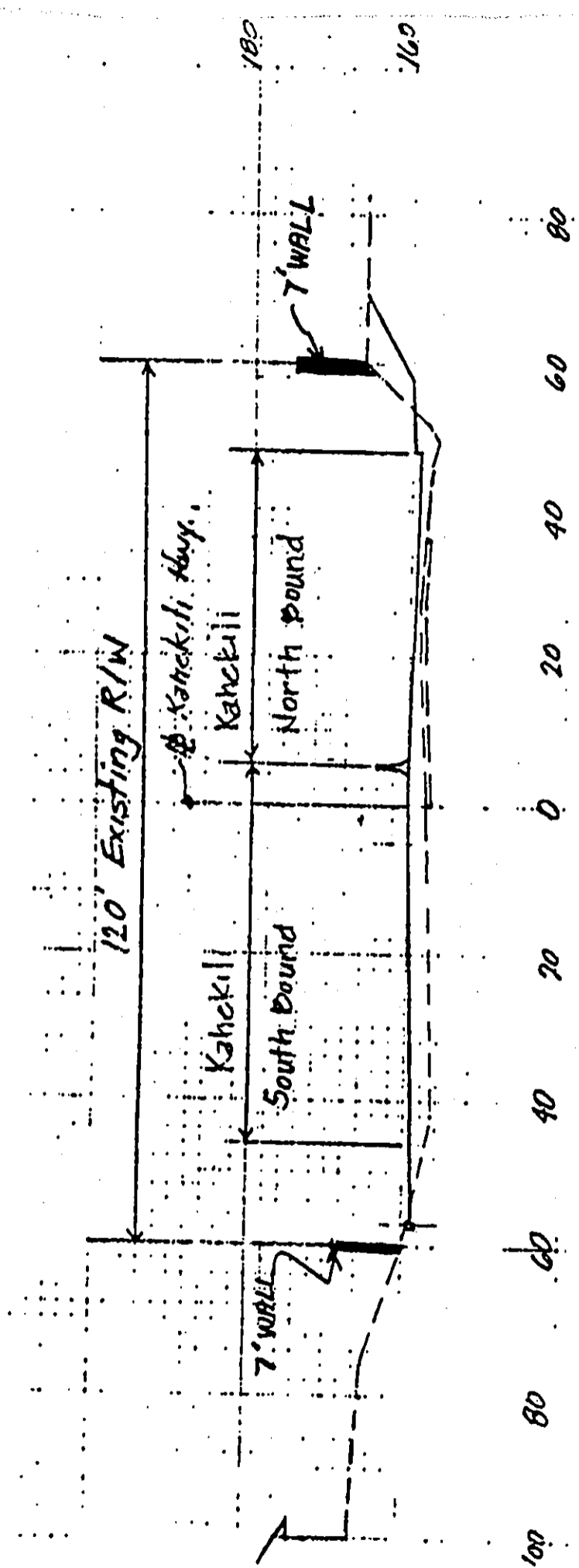


FIGURE IV

(NO SCALE)

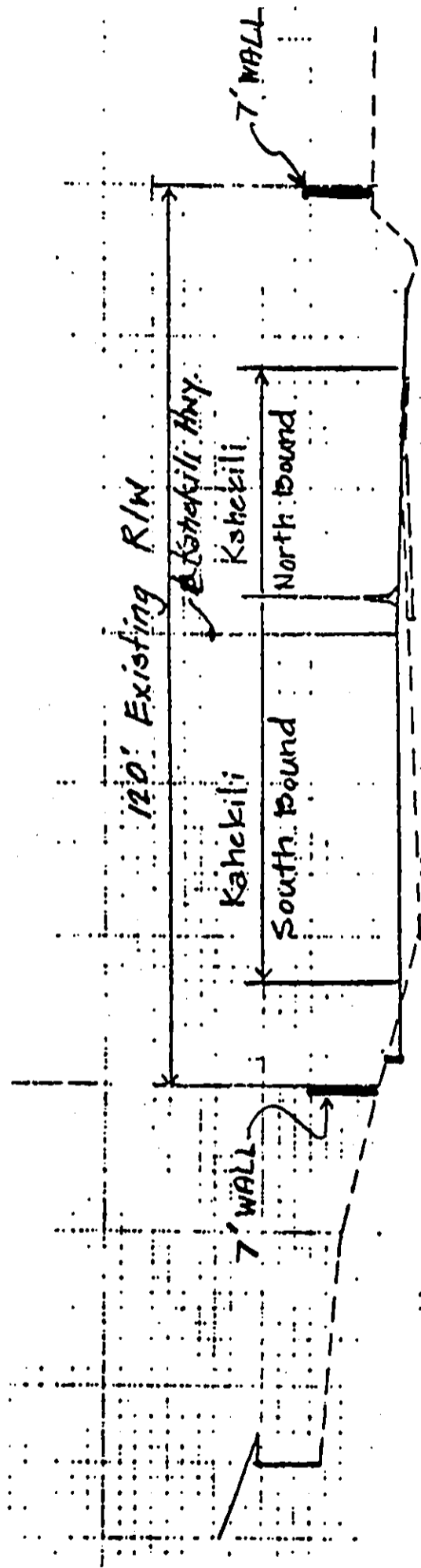




SECTION E1
SCALE: 1"=20'

FIGURE IV-A





120 100 80 60 40 20 0 20 40 60 80

SECTION E2
SCALE: 1"=20'

FIGURE IV-B

120' Existing R/W

Kahakili Hwy.

Kahakili

North Bound

Kahakili

South Bound

7' WALL

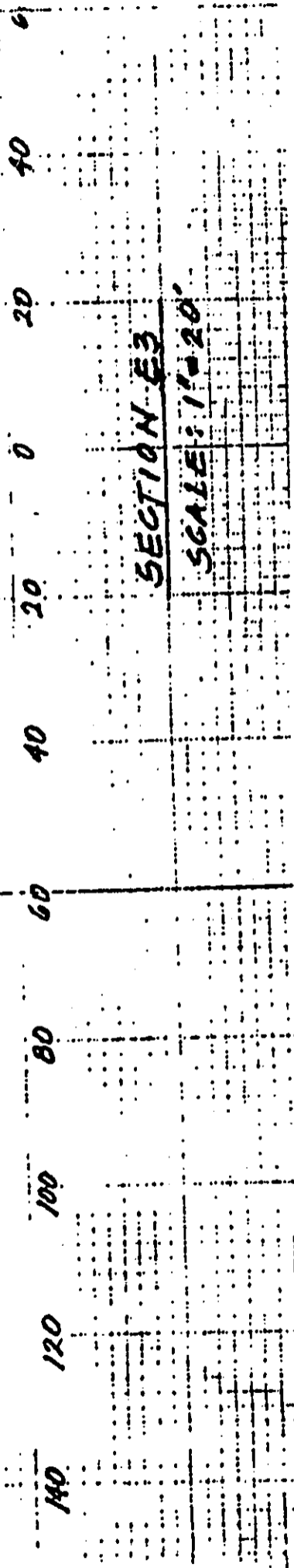
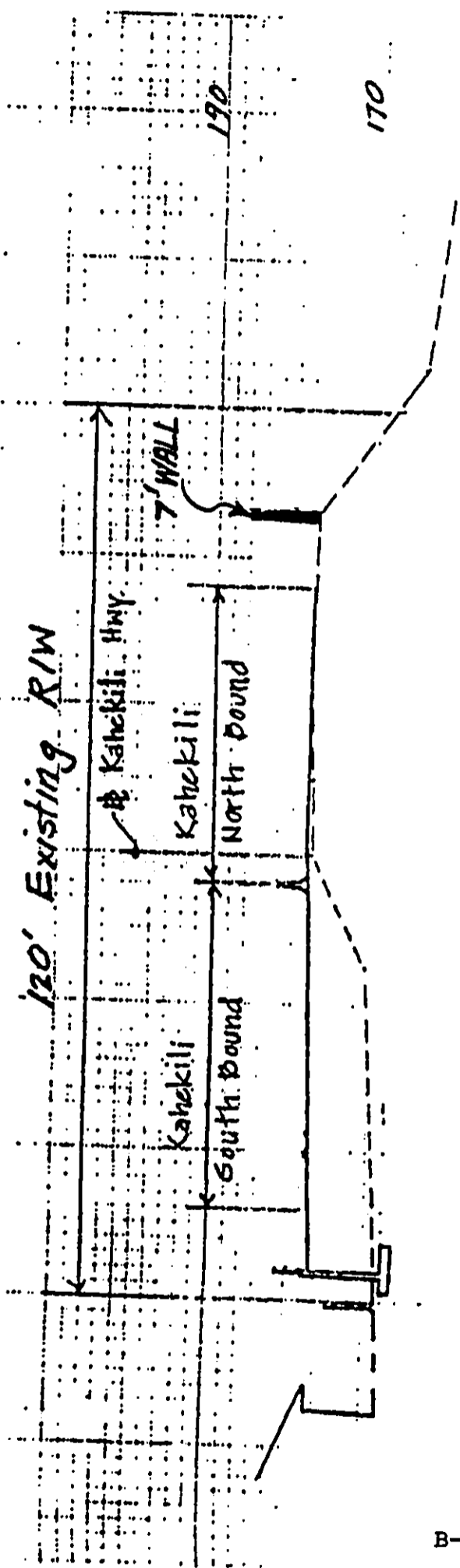


FIGURE IV-C

B-37



B-38

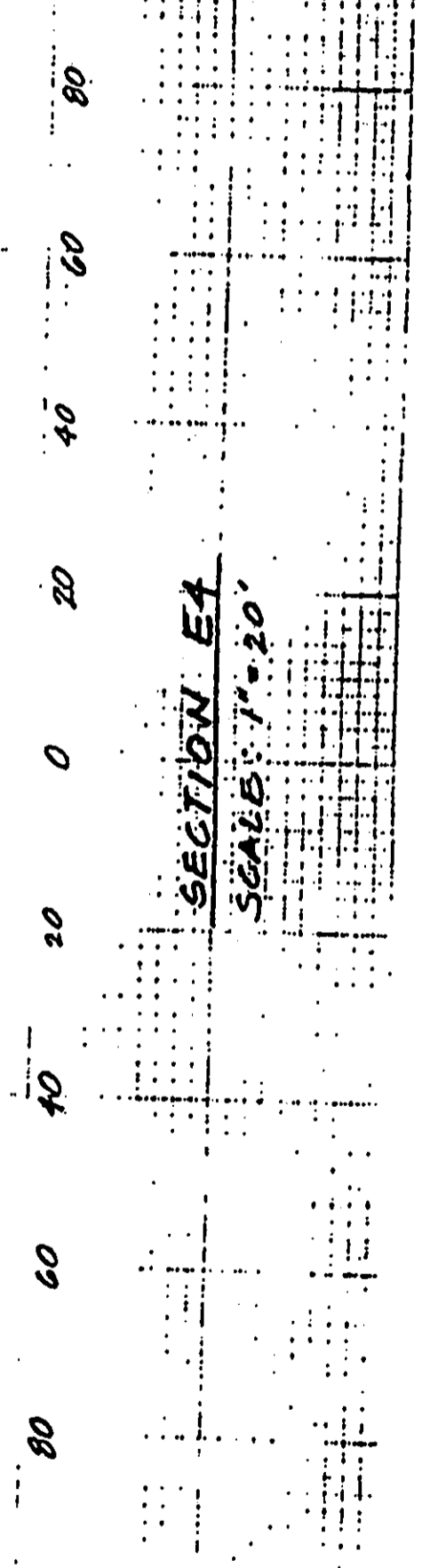
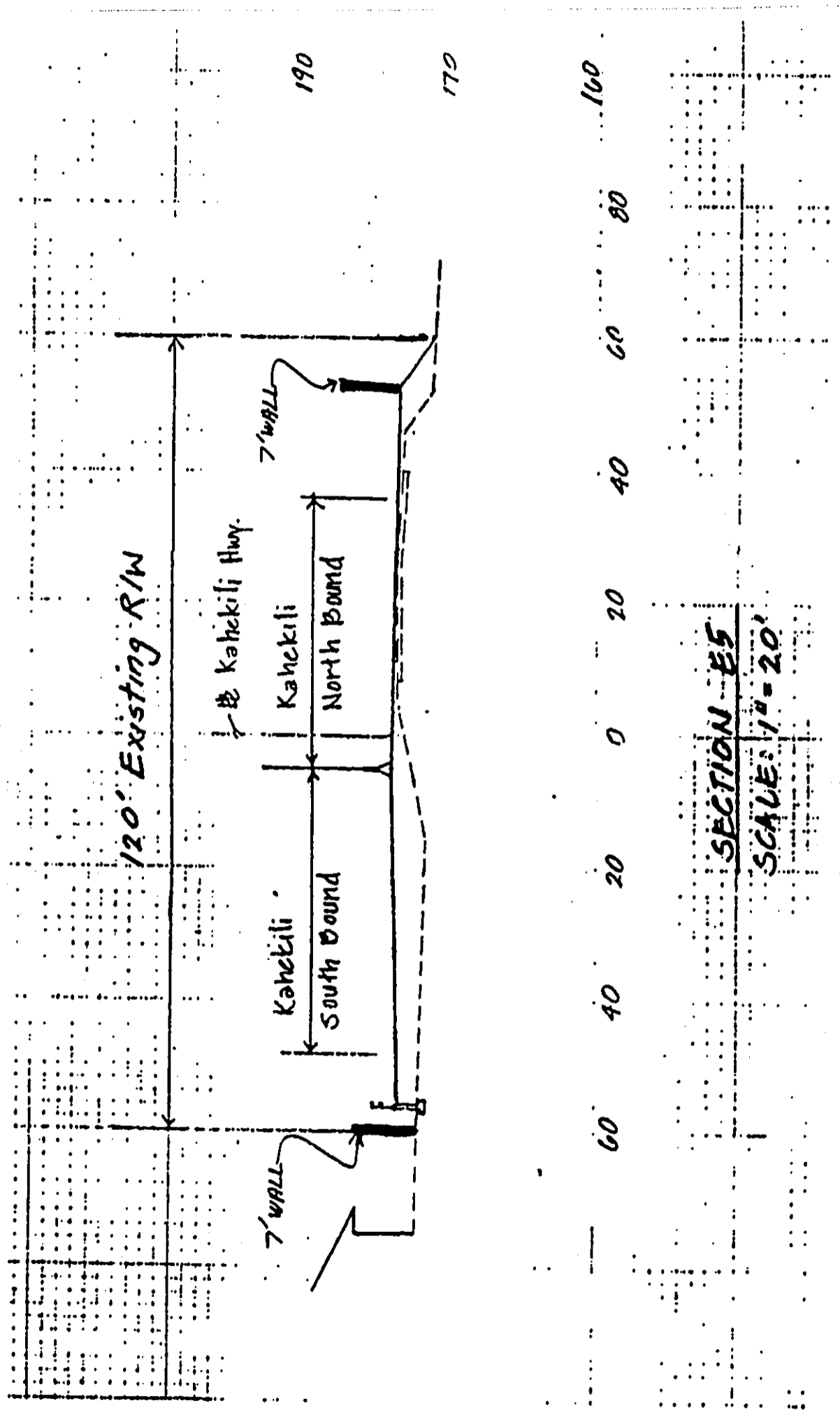


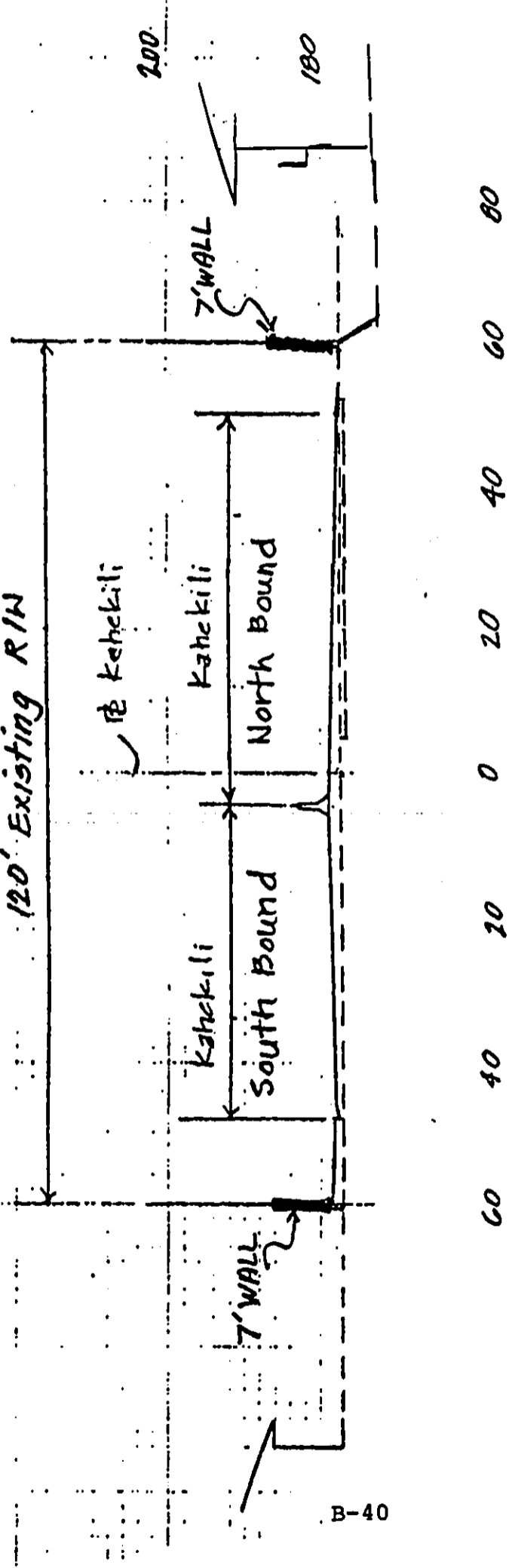
FIGURE IV-D



B-39

FIGURE IV-E

120' Existing R/W



SECTION E6
SCALE: 1" = 20'

FIGURE IV-F

B-40

TABLE V
 Summary of Predicted Traffic Noise Levels,
 dB Leq (60 min)

Section	Figure	Direct	Base Case	Wall Height					
				3'	5'	6'	7'	8'	10'
<u>Kahaluu Gardens</u>									
F1	V-A	67.7	67.7		67.7				66.0
F2	V-B	67.9	67.9		67.0				63.1
<u>Seicho-No-Ie Jisso</u>									
F2	V-B	67.0	67.0						
F2	V-B	64.8*	64.8*		62.9*	62.8*		62.4*	59.0*

Notes: Seven (7) Foot Wall Recommended for Kahaluu Gardens Shown in Figures V, V-A, and V-B.

*At Nearest Structure (150' from R.O.W.)

No Wall Recommended for Seicho-No-Ie Jisso

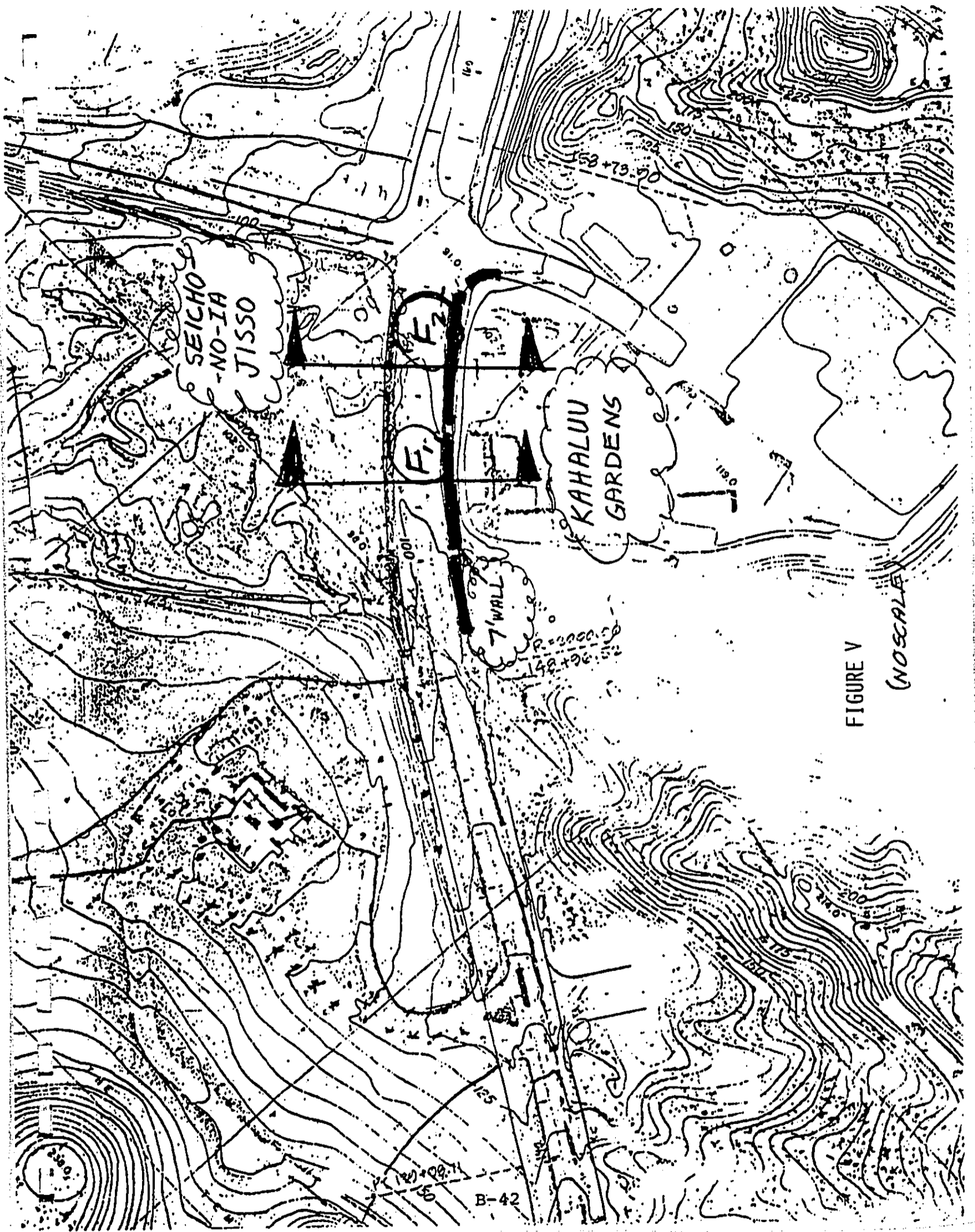


FIGURE V

(NO SCALE)

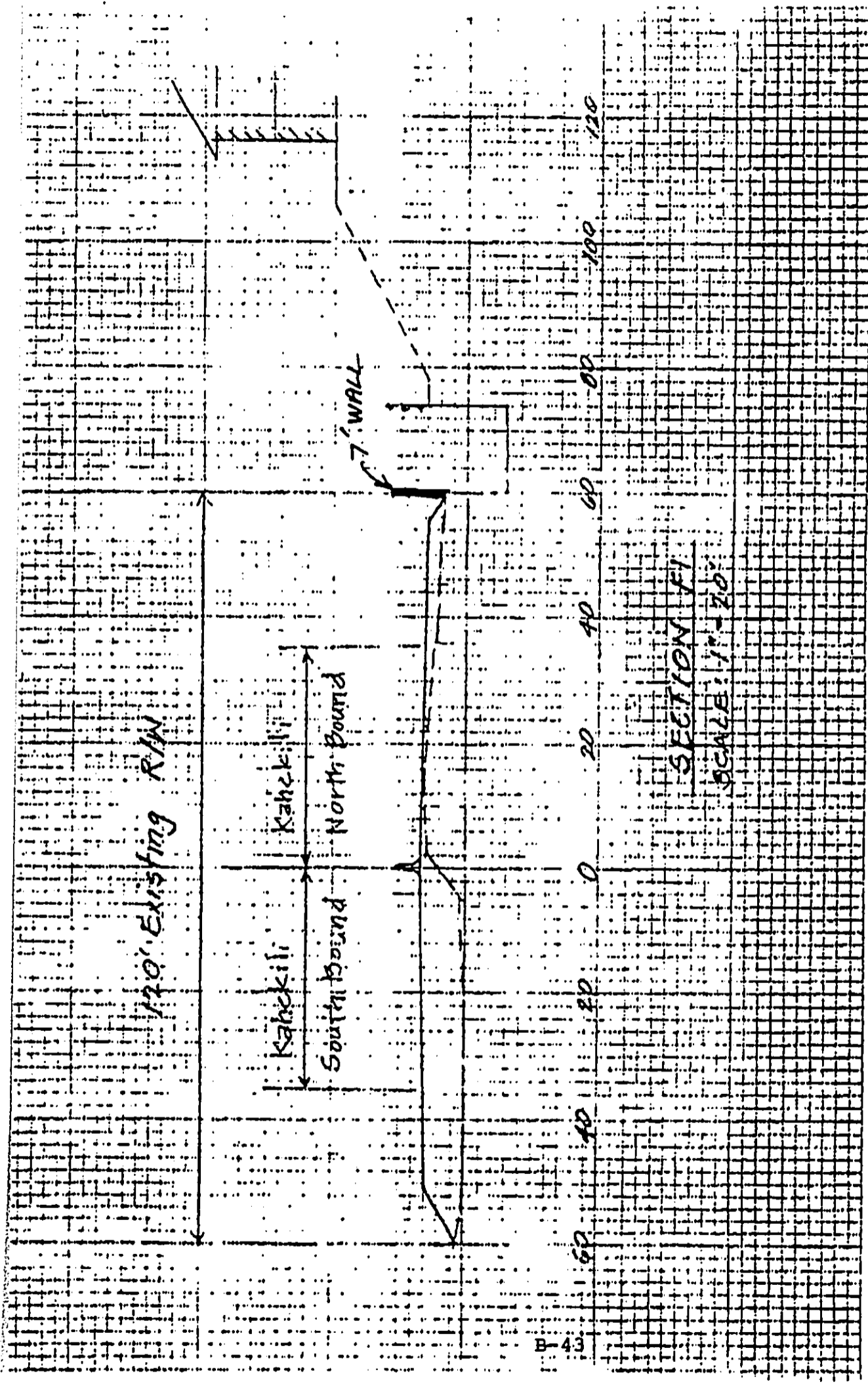


FIGURE V-A

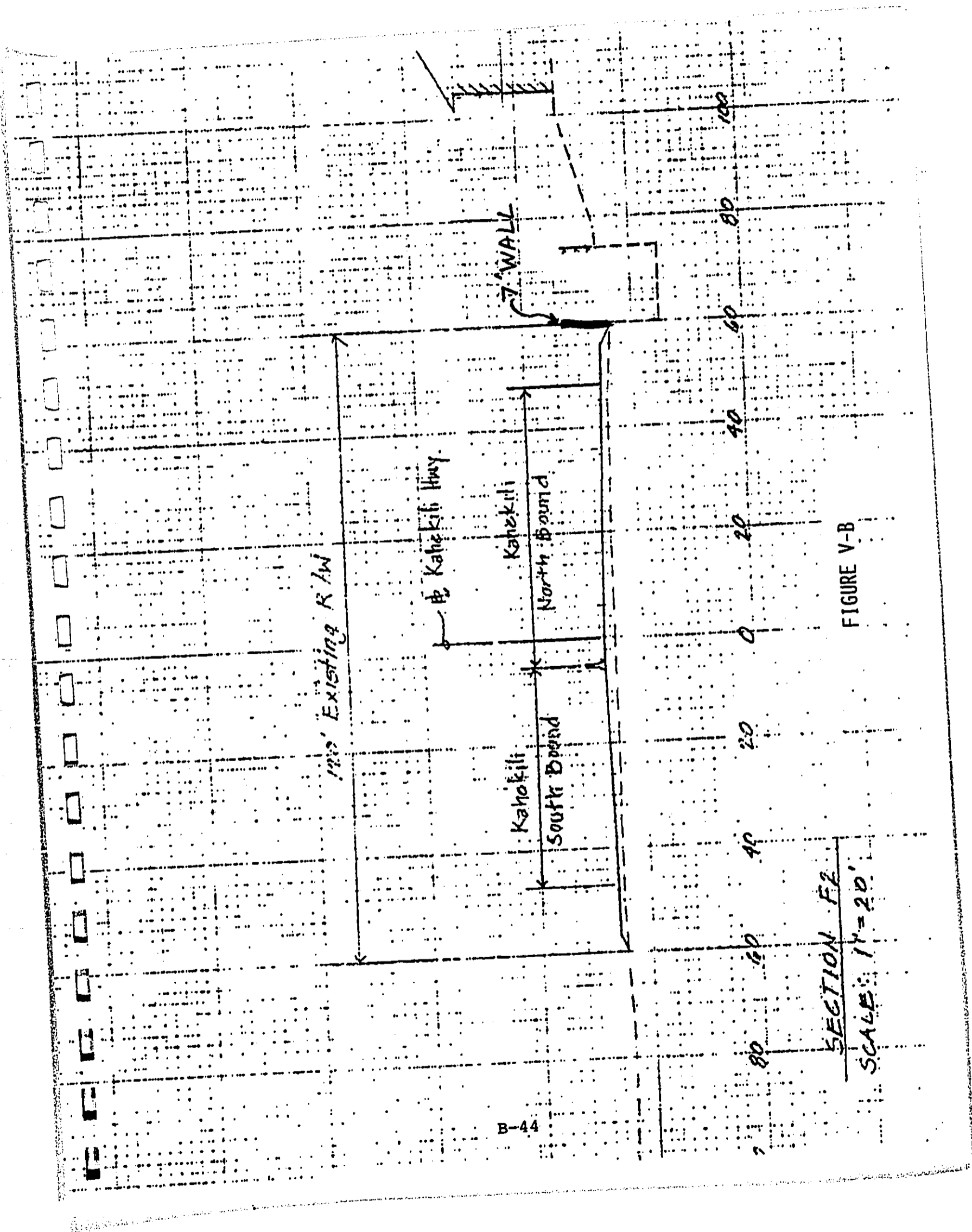


FIGURE V-B

SECTION F2
SCALE: 1" = 20'

TABLE VII

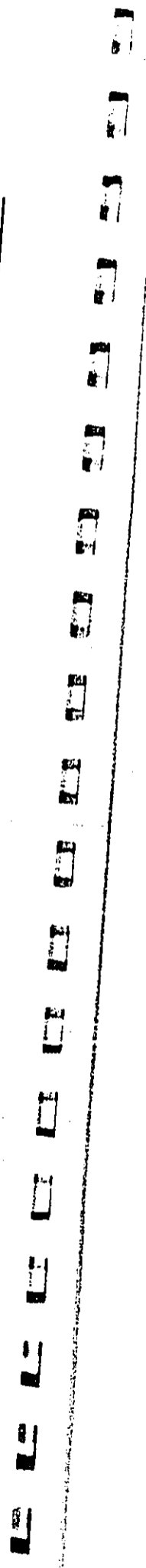
NOISE LEVELS RECORDED AT THE KOOLAU BAPTIST CHURCH/SCHOOL COMPLEX ON MARCH 22, 1990

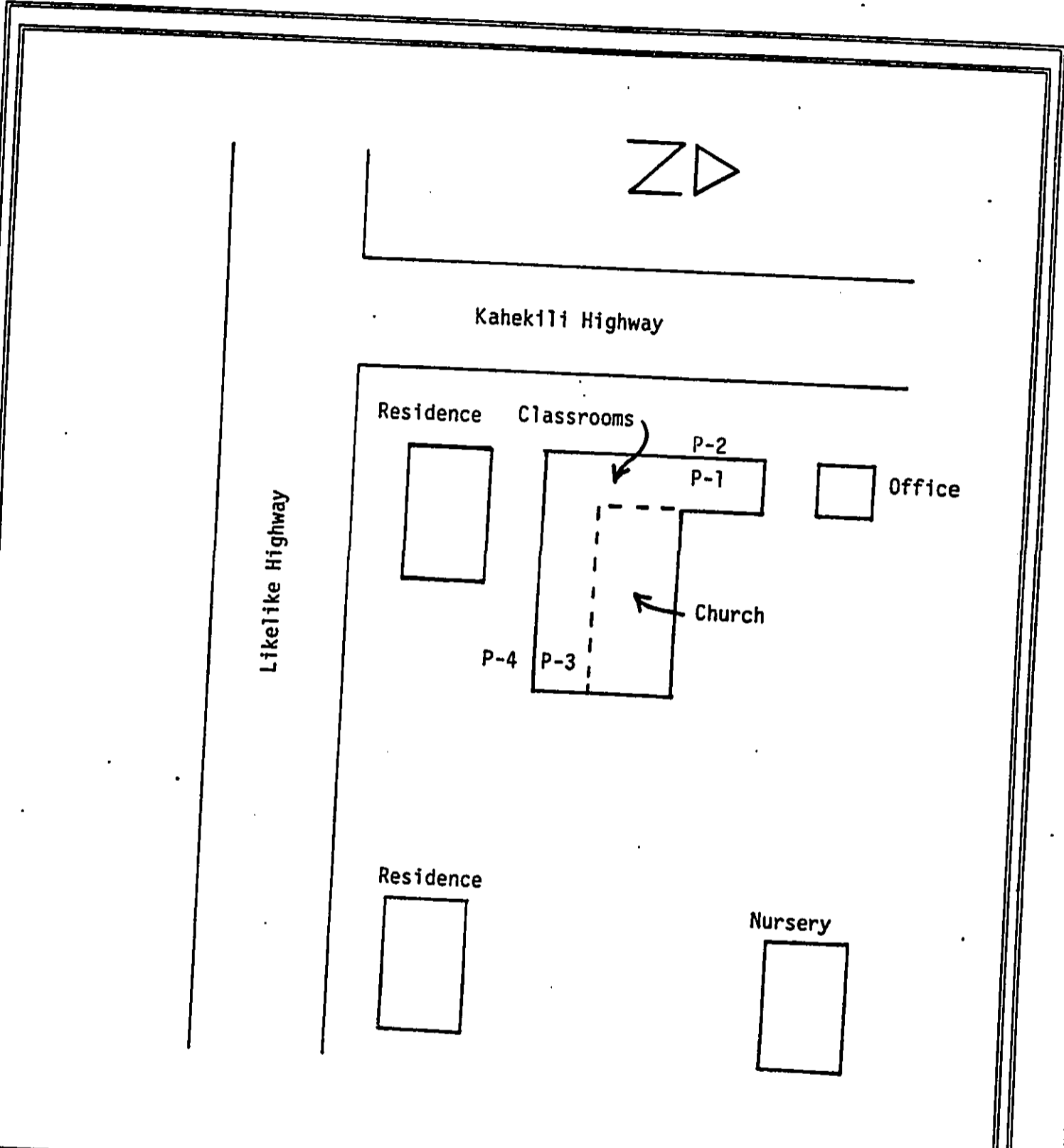
Location (See Figure)	Door/Window Condition	Time	Measured Noise Levels - dBA						
			Leq	Lmax	L1	L10	L50	L90	Lmin
P-1	Open	3:35 - 3:45 pm	59	73	70	61	56	49	47
P-2	"	3:35 - 3:45 pm	64	78					51
P-1	Closed	3:47 - 3:57 pm	50	60	58	53	49	44	42
P-2	"	3:47 - 3:57 pm	63	74					47
P-3	Open	4:05 - 4:15 pm	55	69	66	58	53	51	49
P-4	"	4:05 - 4:15 pm	59	71					52
P-3	Closed	4:19 - 4:29 pm	51	60	58	54	51	47	45
P-4	"	4:19 - 4:29 pm	59	72					53

TABLE VIII

NOISE LEVELS RECORDED INSIDE AND OUTSIDE THE JAPANESE LANGUAGE CLASSROOM AT THE SEICHO-NO-IE JAPANESE SCHOOL ON MARCH 23, 1990

Location	Door/Window Condition	Time	Measured Noise Levels - dBA						
			Leq	Lmax	L1	L10	L50	L90	Lmin
Inside	Closed	11:11 - 11:21 am	48	60	56	51	47	44	42
Outside	"	11:11 - 11:21 am	62	72					54
Inside	Open	11:22 - 11:32 am	59	70	68	62	56	53	48
Outside	"	11:22 - 11:32 am	61	75					50





DARBY & ASSOCIATES
ACOUSTICAL CONSULTANTS

Figure VII Location of Noise Measurement Positions at the Koolau Baptist Church (NTS)



**DARBY
& ASSOCIATES**
ACOUSTICAL CONSULTANTS

#87-35
March 30, 1988

DHM, Inc.
1188 Bishop Street, Suite 2405
Honolulu, Hawaii 96813

Attention: Mrs. Duk Hee Murabayashi

Subject: Review of Traffic Noise Impact for Proposed Improvements
to Kahekili Highway and Various Alternative Schemes for
Improvements of the Intersection at Kahekili and Likelike
Highways, Oahu

Dear Mrs. Murabayashi:

References 1 through 4 are studies which predicted traffic noise levels and evaluated traffic noise impact for the year 2003 for the subject project. The information from these studies was summarized in pages IV-16 to IV-22 of the 1984 Draft EIS for the project. The purpose of this letter report is to reassess the noise impact from the project for the year 2008 and to include any new noise sensitive land-uses that will be impacted.

Traffic noise levels are estimated for the years 1987 and 2008 based on data provided in references 5 through 7. The alternative designs for the intersection at Kahekili and Likelike Highways were essentially the same as addressed in the Draft EIS except the cases of Kahekili Highway having an overpass above Likelike were not evaluated. No new traffic noise level measurements were made since the FHWA Highway Traffic Noise Prediction Model (reference 8) had been validated with measurements made for the Draft EIS. The mix of vehicles used in the 2008 noise level predictions was based on the data in reference 9.

A. Kahekili Highway - All of the potentially impacted sites evaluated in reference 2 were reevaluated for the traffic conditions predicted for the year 2008 using the new data in references 5 and 6. The reevaluation indicated that the 2008 traffic noise levels were generally within a decibel of the levels predicted in the Draft EIS and were usually slightly lower. Two new potentially noise sensitive land uses have come into existence since 1982 along Kahekili Highway: the housing on Hui 00 Place above the highway and the Seicho-no-ei Jesso Center.

PALI PALMS PLAZA • 970 NO. KALAHEO AVENUE • SUITE A-311
KAILUA, HAWAII 96734 • (808) 254-3318 • FAX (808) 254-5295

Table I shows the predicted traffic noise levels for 2008 for the same noise sensitive locations addressed in Exhibit IV-6 in the Draft EIS plus the two new locations. The FHWA exterior noise level standard of 67 dBA is now predicted to be exceeded at only four locations. These are the same four locations sited in the Draft EIS wherein the following statement is still applicable: "In the other four areas, however, the housing is elevated above the highways, so that it is doubtful, at this time, that an effective sound barrier can be provided in the right of way. When detailed topographic and design data become available during subsequent phases of project development, it may be possible to design a noise barrier for specific site conditions and evaluate the benefit of the sound barrier against other considerations such as cost, aesthetics and passage of natural ventilation and light."

The predicted 61.5 dBA for the year 2008 outside of the structure at the Seicho-no-ei Jesso Center implies that; if the structure provides about 12 dBA noise reduction for outside-to-interior noise levels in classrooms, multi-purpose rooms, etc.; then there the condition in the State DOH noise regulations (reference 10) is satisfied; i.e. no new highway should generate more than 50 dBA inside such land uses. Special noise level measurements and detailed analysis of the structure and its openings facing the highway would be required in subsequent phases of the project in order to assess the need for a noise barrier. The evaluation should include the fact that the worst case noise levels at the Center occurs near the a.m. peak traffic hour when the facility will probably not be occupied.

B. Kahekili/Likelike Intersection - Figures 1 through 4 show the alternatives under consideration for the intersection improvement. Of concern are the same land uses addressed in the Draft EIS, i.e. (a.) Castle Hills; (b.) the Koolua Baptist Church Complex; and (c.) residential housing on Likelike and Kahekili near the intersection.

1. Castle Hills - Using Figures 1 through 4, the exterior traffic noise levels at the house closest to the highway located on Section A-A has been evaluated for the various schemes and are summarized in Table II. From the table it is seen that, with Intersection Improvements, the traffic noise levels in 2008 are not predicted to increase above the existing condition of

67 dBA. However, for the full and partial intersection schemes, Table II predicts noise levels 4 to 5 dBA above the FHWA standard of 67 dBA to occur.

The effectiveness of a noise barrier depends upon the geometric relationship between the source, the barrier and the receiver. This relationship varies considerably along the Castle Hills development due to the topography; the curve in the highway; the location of individual housing; and the location of ramps or lanes in the various schemes. This fact is demonstrated in Figures 5 through 7 where Section A-A is provided for Schemes A-4, C-1, and the Improved Intersection respectively. In these figures the location of the proposed noise barrier of height "h" is shown. From Table II, it can be seen that the effectiveness of a 10-foot barrier varies from 8 dBA noise attenuation for Scheme A-4 compared to only a 1 dBA reduction for the Intersection Improvement Scheme.

From these studies it is concluded that except for the Intersection Improvement Scheme, a noise barrier will be required in order to meet the FHWA 67 dBA exterior noise level standard for some housing in Castle Hills. However, the optimum height of the barrier along its length must be determined from more detailed topographic studies in relation to individual housing location and type (single story vs. two stories), and in consideration that selected housing in the project will have traffic noise abatement treatment (reference 11).

2. Koolau Baptist Church Complex - The Baptist Church Complex is potentially impacted by increased traffic noise from both Kahekili Highway (Section D-D) and Likelike Highway (Section C-C) due to the improvement of the intersection (See Figures 1 through 4).

Table III summarizes the predicted noise levels on the mauka side of the structures in 2008 caused by traffic on Kahekili. Figures 8 and 9 show the applicable cross-sections. From the table it is seen that an increase of about 4 dBA over the existing noise level of 62 dBA is predicted for the interchange schemes. However, the Improved Intersection Scheme predicts only 54 dBA due to the slower moving traffic and a "built-in" 8-foot wall that is common to all schemes.

Table IV summarizes the predicted traffic noise levels on the Likelike side of the complex in 2008. Figures 10 and 11 show the applicable cross-sections with all schemes having a built-in 8-foot wall. The variation in the predicted noise level between schemes is attributable to the differences

DHM, Inc.
Attn: Mrs. Duk Hee Murabayashi

March 30, 1988
Page 4

in average traffic speed allowed by the improvements, e.g. the fast moving traffic with Scheme A-4 causes 67 dBA while the Improved Intersection Scheme only causes 60 dBA.

While it is predicted that the FHWA standard for exterior noise levels of 67 dBA will not be exceeded by traffic on either Kahekili or Likelike at the complex in 2008; more thorough investigations are required to determine if the State DOH criterion (reference 10) of 50 dBA is not exceeded inside classrooms, multi-purpose rooms, etc. After identifying the noise sensitive spaces, special measurements would be made to determine interior noise levels and recommend specific abatement measures if required, e.g. increase the height of the "built-in walls", add sound absorption material within the spaces, air condition, etc.

3. Residential Housing - Housing on both sides of Likelike Highway east of the intersection are estimated to have traffic noise levels in 2008 similar to those sited in the Draft EIS, e.g. about 68 dBA without a noise barrier, and 66 dBA if a six-foot barrier is installed.

The housing elevated above Kahekili near the intersection and facing Kauhulu Place, are predicted to have noise levels exceeding 67 dBA as in the Draft EIS and requiring unrealistically high noise barriers if they must be located within the right-of-way. Detailed evaluation of the topography, housing set-backs and types (single-story or two stories) are required in conjunction with the intersection improvement scheme alternatives in order to recommend the most cost effective means of noise mitigation. Noise abatement possibilities include locating noise barriers on private property.

Traffic noise levels in 2008 predicted for housing facing Holomakani Street from the southern most ramp common to the interchange schemes are about the same as in the Draft EIS and are well below the 67 dBA FHWA Standard.

C. Kaneohe District Park - Traffic noise levels predicted for 2008 in the Kaneohe District Park complex or playing fields should not exceed the FHWA criteria of 67 dB. This statement includes both the widened Kahekili Highway and implementation of the connector road between Castle Hills and Kealahala Road.

DHM, Inc.
Attn: Mrs. Duk Hee Murabayashi

March 30, 1988
Page 5

D. Summary - The traffic noise levels for the year 2008 have been predicted at selected locations that will be affected by the proposed intersection improvements and the widening of Kahekili Highway.

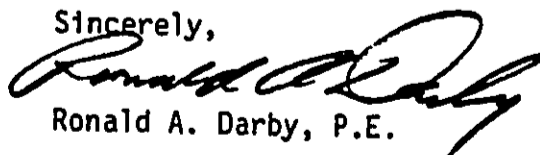
In general, traffic noise levels will be the highest for those intersection improvement schemes that allow higher vehicle speeds. Therefore, the schemes may be ranked from highest potential traffic noise output to lowest as: A-4, C-1, B-1, and Improved Intersection.

Locations that predictably will have traffic noise levels in excess of 67 dBA (the FHWA criterion) for schemes A-4, C-1, and B-1 are some housing in Castle Hills; some housing on both sides of Likelike Highway east of the intersection; and some housing on the mauka side of Kahekili north of the intersection. Noise barriers can be implemented to reduce the traffic noise levels, and sample calculations are provided for typical conditions. However, the optimum height of a barrier along its length must be determined from more detailed studies involving the relationship of individual housing locations and type (single story vs. two stories) to the location of ramps or lanes in the various schemes.

While it is predicted that the FHWA of 67 dBA will not be exceeded by traffic on either Kahekili or Likelike at the Koolau Baptist Church complex in 2008; more thorough investigations are required to determine if the State DOH criterion of 50 dBA is not exceeded inside classrooms, multi-purpose rooms, etc.

Traffic noise levels in excess of 67 dBA in 2008 are predicted to occur at four locations along a widened Kahekili Highway: upper apartment units at Windward Estates and Kahalu'u Gardens as well as elevated housing in Haiku Plantations and on Kapale Street with direct line of sight to the highway. When detailed topographic and design data become available during subsequent phases of project development, it may be possible to design a noise barrier for specific site conditions and evaluate the benefit of the sound barrier against other considerations such as cost, aesthetics and passage of natural ventilation and light. Also, there is a slight possibility that the State DOH criterion of 50 dBA could be exceeded in some classrooms at the Seicho-no-ei Jesso Center.

Sincerely,



Ronald A. Darby, P.E.

RAD:djs
encs.

References:

1. Letter report to J. Whalen; EDAW, Inc., entitled "Identification of potentially impacted land uses and baseline traffic noise level measurements near proposed project--New Interchange and Widening of Kahekili Highway, Oahu" dated February 24, 1983.
2. Letter report to J. Whalen; EDAW, Inc. entitled "Analysis of Traffic Noise Impacts and Abatement Measures - Kahekili Highway Improvements", dated July 12, 1983.
3. Letter report to J. Whalen; EDAW, Inc. entitled "Evaluation of Potential Traffic Noise Impact due to Various Alternate Schemes for Improvement at Kahekili and Likelike Highways, Oahu", dated April 23, 1984.
4. Letter report to J. Whalen, EDAW, Inc. entitled "Evaluation of Potential Noise Impact due to Proposed Access Road for Bethany Gardens (now "Castle Hills") to Kealahala Road; Widening of Kahekili Highway Project", dated May 4, 1984.
5. "Traffic Assignment Project TA 87-7, Kahekili Interchange and Widening, Project Nos. 83-F-01-75 and 63A-05-68", State of Hawaii Department of Transportation, Highways Division, April 1987.
6. Charts of Kahekili Highway - Travel Times and Speeds, Park Engineering, 3/11/88.
7. Plans and Sections from Park Engineering, 1988.
8. "FHWA Highway Traffic Noise Prediction Model", FHWA-RD -77-108.
9. Truck Factors - Kahekili Highway Widening & Interchange, Project No. 83F-01-75, Ref. No. TA 82-5, June 1982.
10. "Title 11, Administrative Rules, Department of Health", Chapter 43, Community Noise Control for Oahu, November 6, 1981.
11. Letter report to D. Garrison entitled "Evaluation and Recommendation Regarding Traffic Noise in Selected Housing Units, Castle Hills, Kaneohe, HI" from R. Darby dated July 31, 1985.

Table I
 PRESENT AND FUTURE TRAFFIC NOISE LEVELS
 AT STRUCTURES ALONG KAHEKILI HIGHWAY
 EQUIVALENT STEADY-STATE SOUND LEVEL
 DURING WORST (NOISIEST) HOUR

<u>Description</u>	$L_{eq}(h)$ dBA	
	<u>1987</u>	<u>2008</u> (with highway widening)
<u>Kapunahala</u>		
Housing facing Kuahulu Place	63.8	65.1
<u>Haiku</u>		
2nd & 3rd Story Apartment Units, 30' from R.O.W. (Windward Estates)	66.4	68.6
Housing facing Maeha Place (Haiku Village)	64.0	65.1
Housing above highway, 60' from R.O.W. (Haiku Plantations)	64.2	67.5
Housing below highway on Huna and Hoa'una Streets	61.9	61.0
<u>He'eia</u>		
Housing above highway on Kupale Street, 100' from centerline of highway	66.3	67.1
<u>Ahuimanu</u>		
2nd & 3rd Story Apartment, (Kahalu'u Gardens)	66.7	68.4
Housing above highway on Hui 00 Place, 65' from R.O.W.	65.8	66.2
Seicho-no-ei Jesso Center, 130' from R.O.W.	60.2	61.5

Table II
Predicted Exterior Traffic Noise Levels in Castle Hills for 2008,
Equivalent Steady-State Sound Level During Worst (Noisiest) Hour.

Scheme	No Barrier	With Barrier	
	$L_{eq}(h)$ dBA	Additional height "h"	$L_{eq}(h)$ dBA
A-4	72	10'	64
C-1	72	10'	70
		16'	65
		17'	64
B-1	71	10'	67
		11'	65
		12'	63
Intersection Improvements	67	10'	66
		11'	62

- Note:
- At closest housing to highway at Section A-A in Figures 1 through 4. Receiving point 12' above ground.
 - Existing (1987) traffic noise level ~ 67 dBA
 - See Figures 5 through 7

Table III

Predicted Exterior Traffic Noise Levels in the Koolau Baptist Church Complex for 2008, Equivalent Steady- State Sound Level During Worst (Noisiest) Hour - Kahekili Highway

Scheme	No Barrier $L_{eq}(h)$ dBA	With Barrier Additional height "h"	$L_{eq}(h)$ dBA
A-4	66	5'	59
C-1	66	8'	61
B-1	65	10'	58
Improved Intersection	54	--	--

- Note:
- See Section D-D on Figures 1 through 4. Receiving point 10' above ground.
 - Existing (1987) traffic noise level ~ 62 dBA
 - See Figures 8 and 9

Table IV

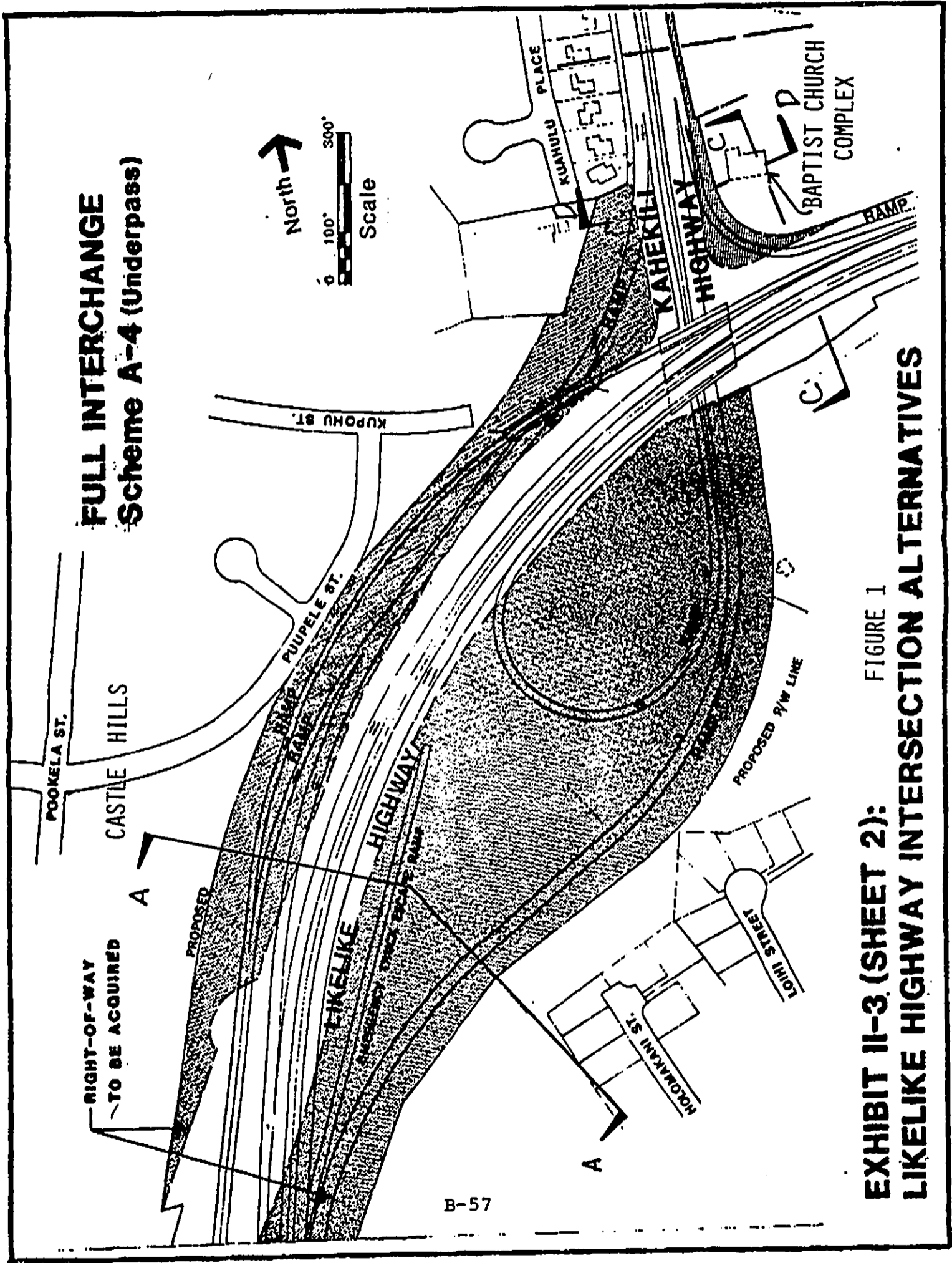
Predicted Exterior Traffic Noise Levels in the Koolau Baptist Church Complex for 2008, Equivalent Steady- State Sound Level During Worst (Noisiest) Hour - Likeline Highway

Scheme	No Barrier $L_{eq}(h)$ dBA	Additional height "h"	With Barrier $L_{eq}(h)$ dBA
A-4	67	8'	59
C-1	66	8'	58
B-1	64	8'	56
Improved Intersection	60	2'	55

Note:

- See Section C-C on Figures 1 through 4. Receiving point 10' above ground.
- See Figures 10 and 11.

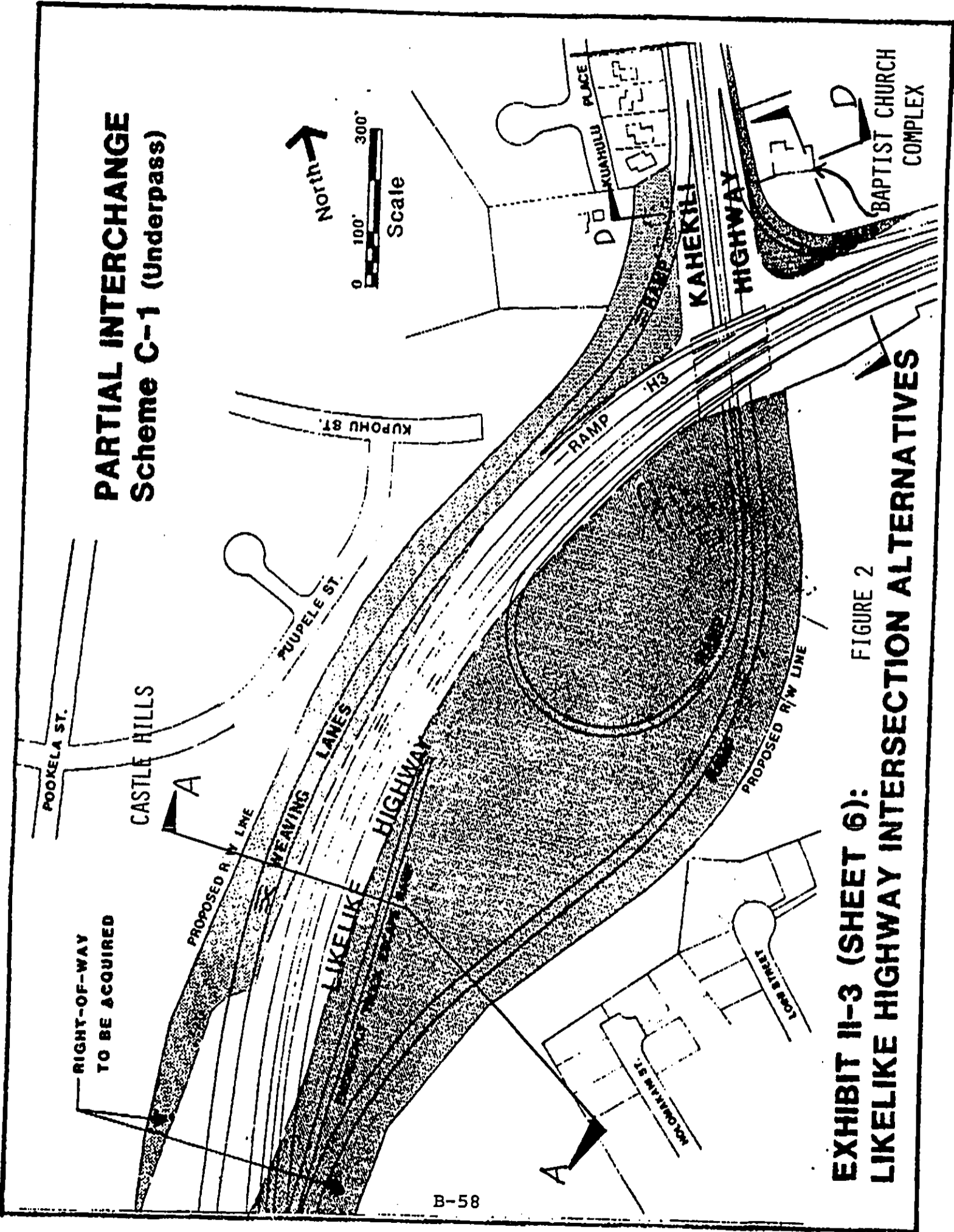
**FULL INTERCHANGE
Scheme A-4 (Underpass)**



**EXHIBIT II-3 (SHEET 2):
LIKELIKE HIGHWAY INTERSECTION ALTERNATIVES**

FIGURE 1

**PARTIAL INTERCHANGE
Scheme C-1 (Underpass)**



**EXHIBIT II-3 (SHEET 6):
LIKELIKE HIGHWAY INTERSECTION ALTERNATIVES**

FIGURE 2

B-58

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

**PARTIAL INTERCHANGE
Scheme B-1 (Underpass)**

RIGHT-OF-WAY
TO BE ACQUIRED

POOKELA ST.
CASTLE HILLS
PUUPELE ST.

PROPOSED R/W LINE

LIKELIKE

WEAVING LANES
EMERGENCY TRUCK ESCAPE PASS
HIGHWAY

PROPOSED R/W LINE

NO. OAKLAND ST.
LOAN STREET



B-59

KUAAHUU PLACE
KAHEKILI HIGHWAY
BAPTIST CHURCH COMPLEX

**EXHIBIT II-3 (SHEET 4):
LIKELIKE HIGHWAY INTERSECTION ALTERNATIVES**

FIGURE 3

INTERSECTION IMPROVEMENTS

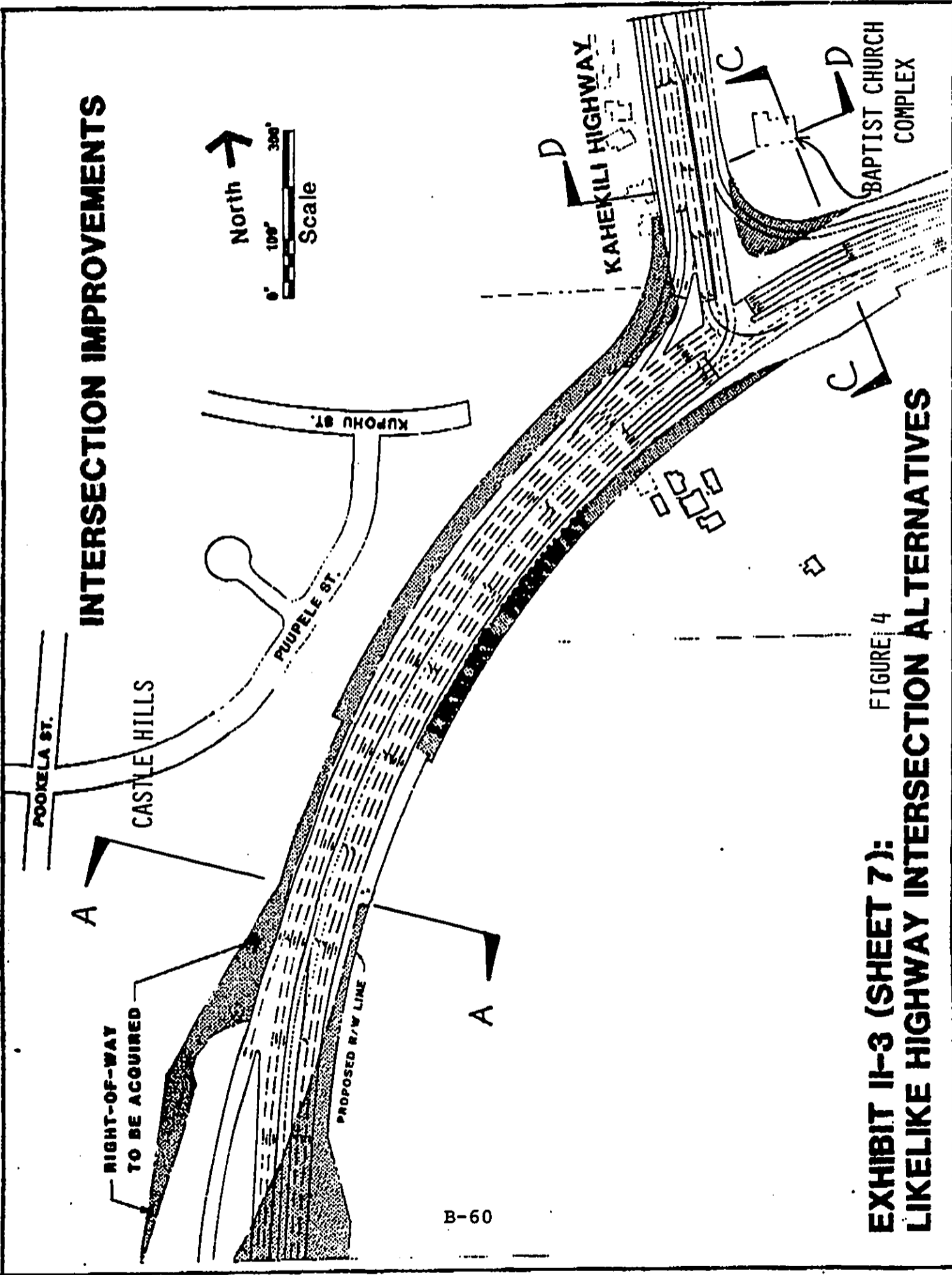
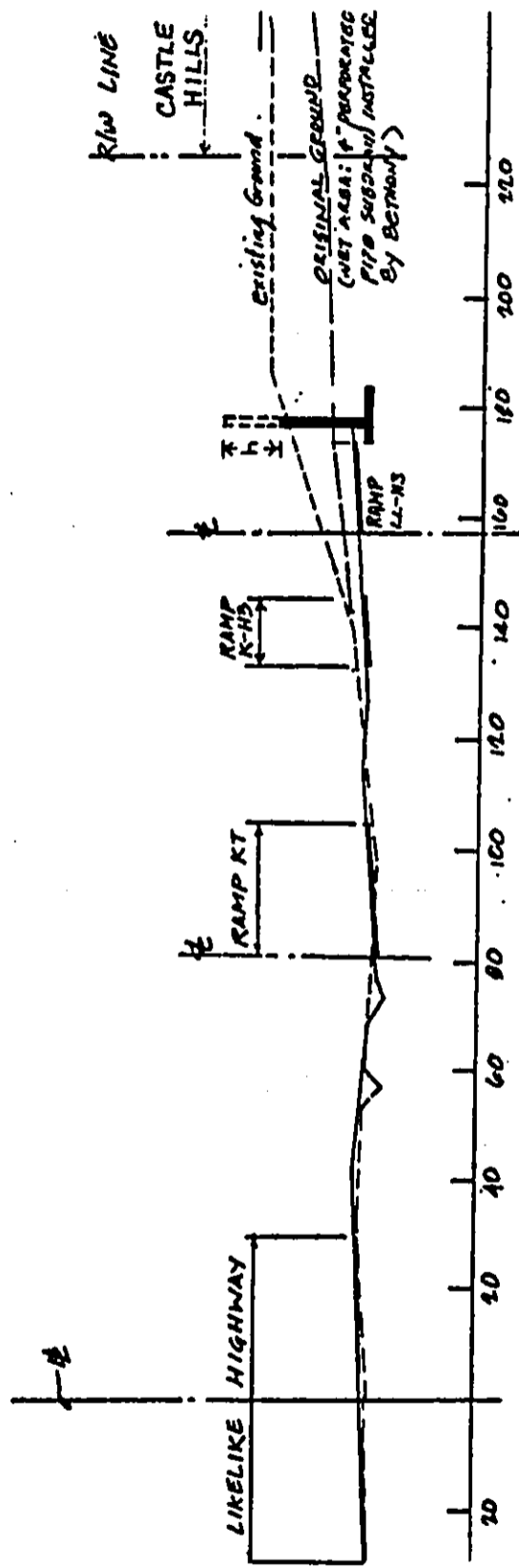


EXHIBIT II-3 (SHEET 7):
LIKELIKE HIGHWAY INTERSECTION ALTERNATIVES

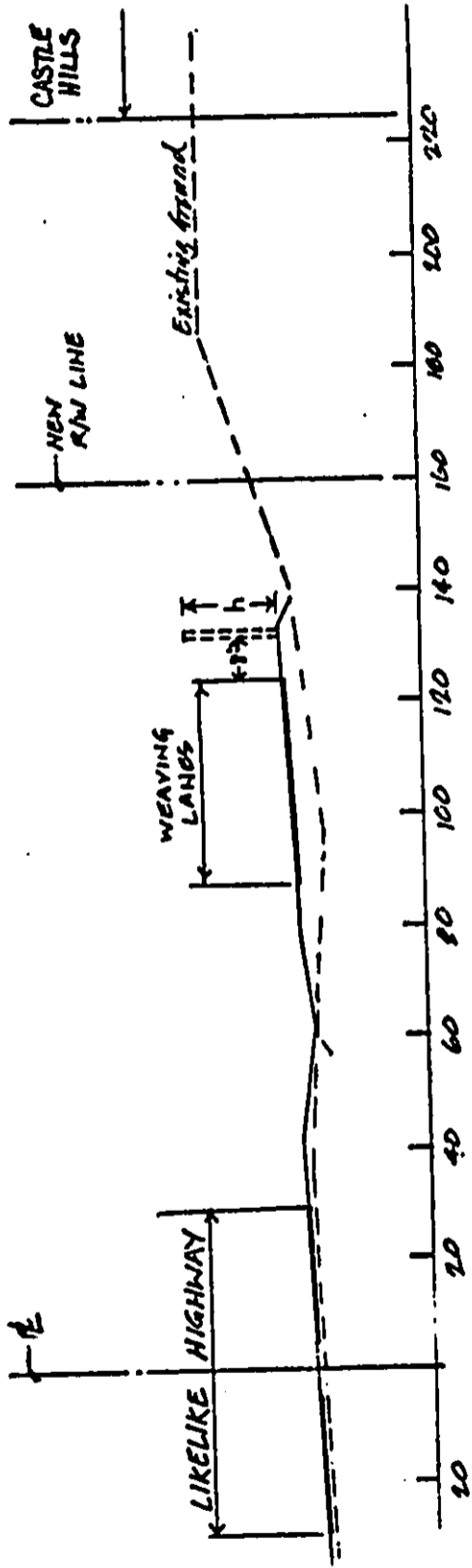
FIGURE 4

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100



SECTION 'A-A' SCHEME A-4
 LIKE LIKE STA. 75+50

FIGURE 5

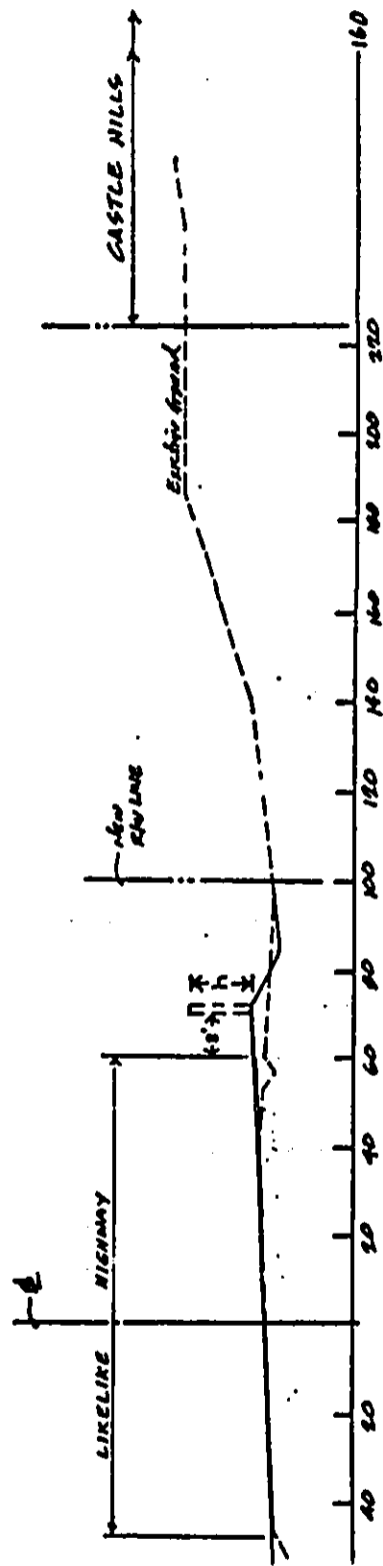


SECTION 'A-A' SCHEME C-1
 LIKELIKE STA. 95+50

B-62

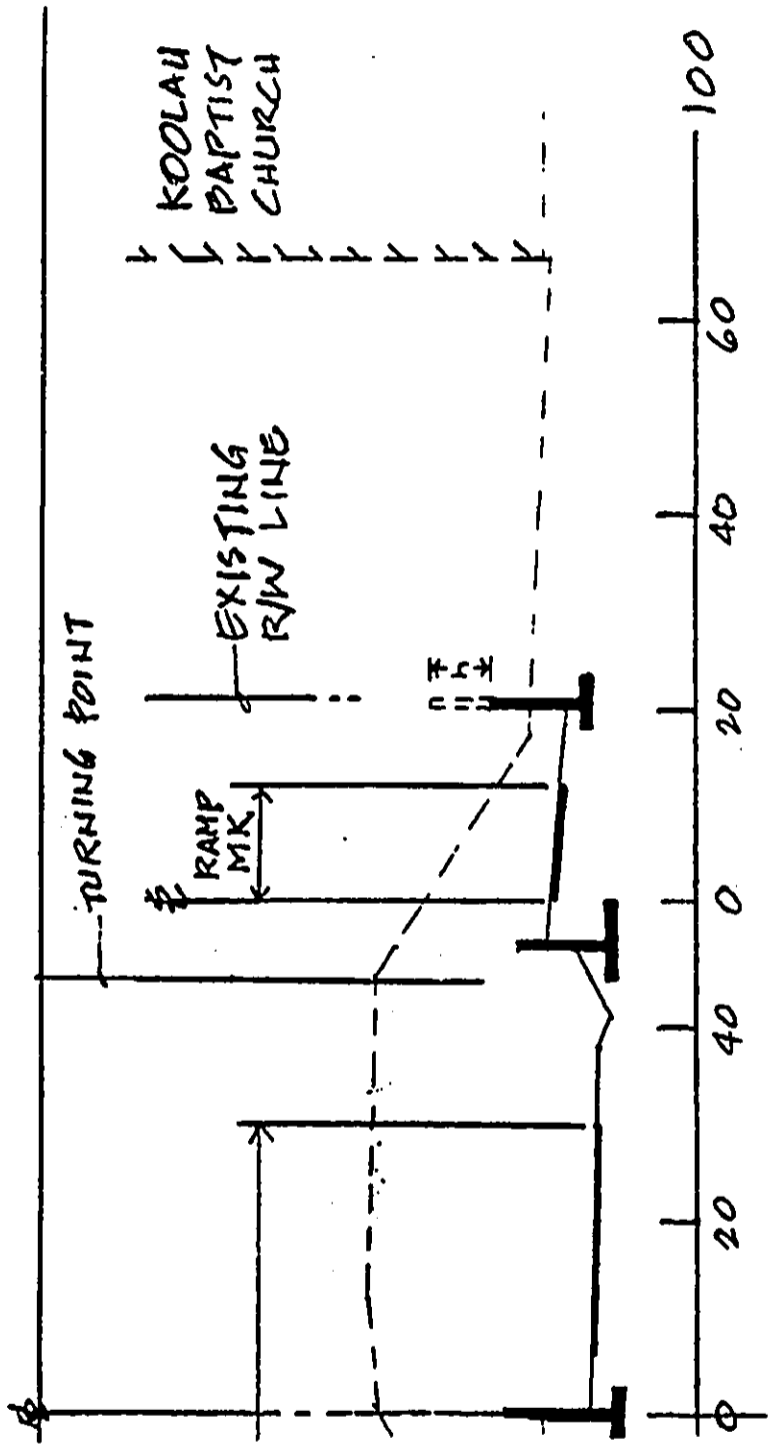
FIGURE 6





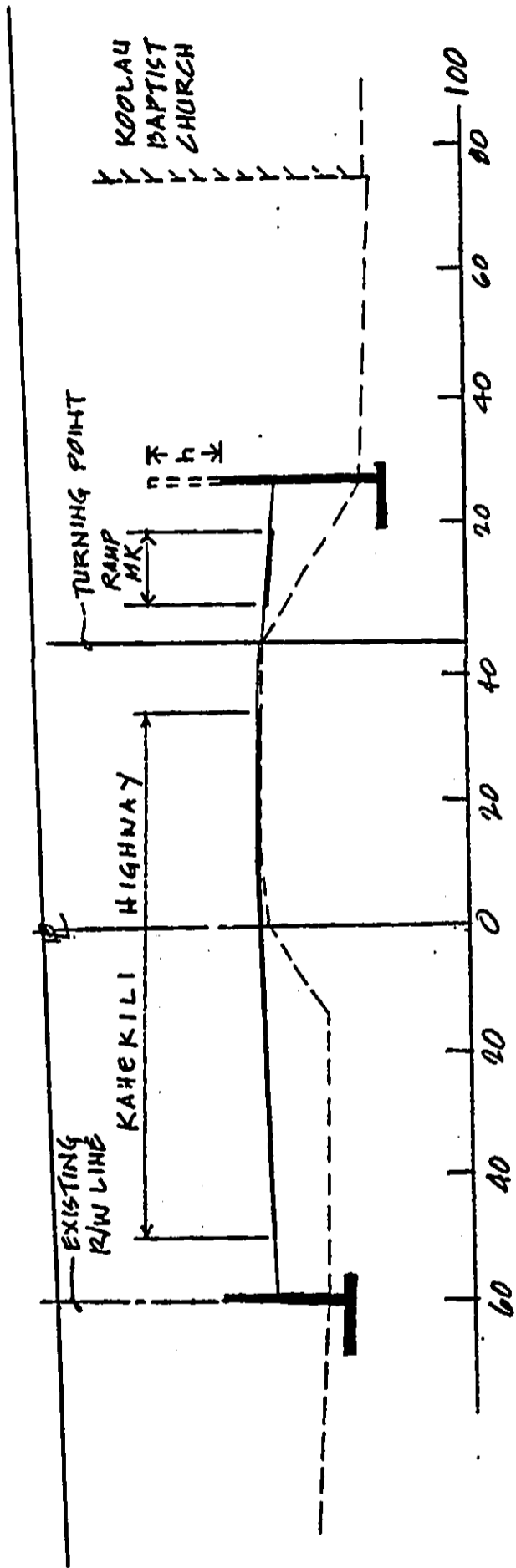
SECTION 'A-A' Improved Intersection
LIKELINE STA. 95+50

FIGURE 7



SECTION D-D
 SCHEMES A-4, B-1, C-1

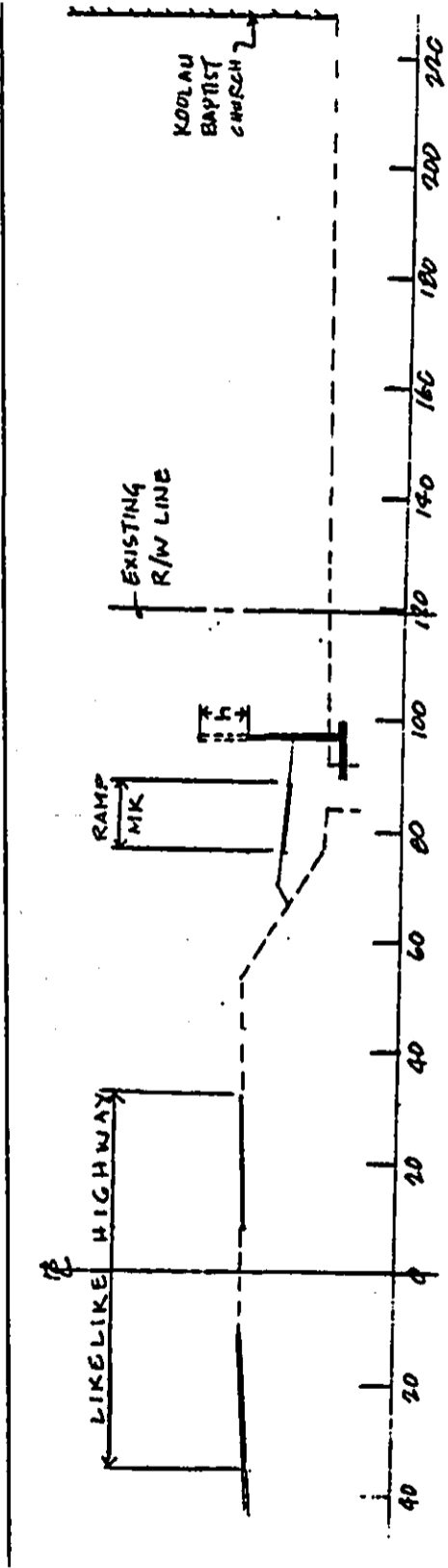
FIGURE 8



B-65

SECTION 'D-D' IMPROVED INTERSECTION
 KAHEKILI STA. 0+75 ADDED 2/20/88

FIGURE 9

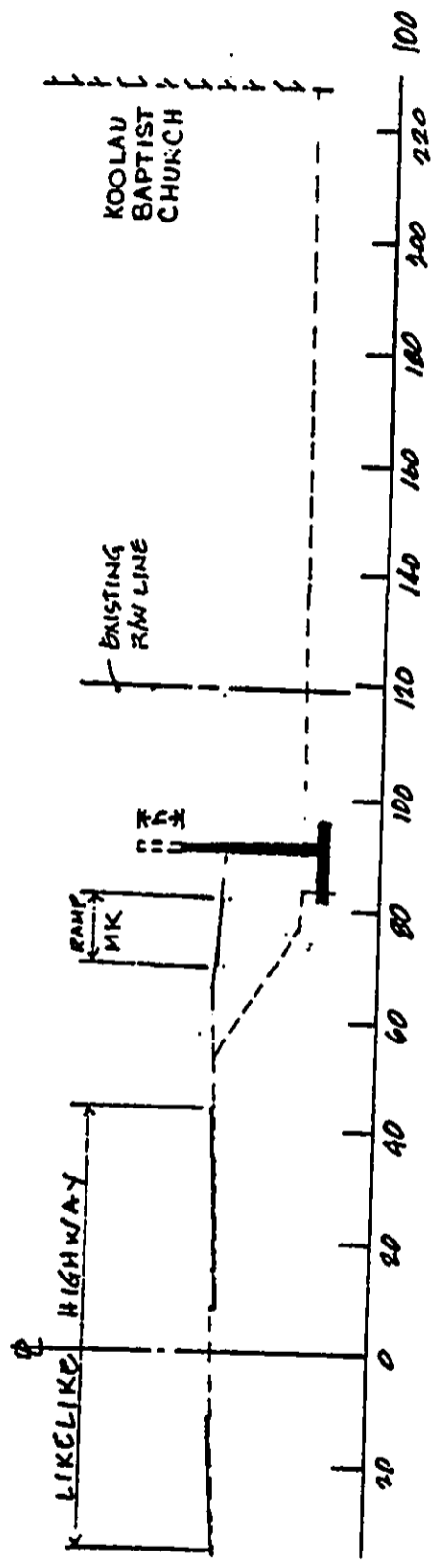


SECTION 'C-C'
 LIKE LIKE STA. 110+25 REV. 2/19/88
 SCHEMES A-4, B-1, C-1

B-66

FIGURE 10





SECTION 'C-C'
 LIKELIKE STA 110+25 REV. 2/20/80
 IMPROVED INTERSECTION

FIGURE 11

DARBY-EBISU & ASSOCIATES, INC.

Acoustical Consultants
1051 Keolu Drive, Suite 201 • Kailua, Hawaii 96734
(808) 261-3727

May 4, 1984

EDAW, Inc.
1121 Nuuanu Avenue, Suite 203
Honolulu, Hawaii 96817

Attention: Mr. John Whalen

Subject: Evaluation of Potential Noise Impact due to Proposed Access
Road for Bethany Gardens to Keahala Road;
Widening of Kahekili Highway Project

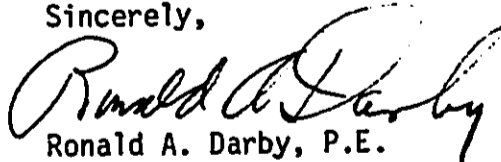
Dear Mr. Whalen:

An evaluation of the potential noise impact from traffic on the proposed access road shown in Figure 1 has been made. The traffic estimates used for the road are 100 vehicles for the a.m. peak hour, 125 vehicles - p.m. peak hour, and 1,250 Average Daily Traffic. The operating speed is assumed to be 35 mph. One heavy truck and four medium trucks are assumed during peak hour traffic.

Calculations predict that a noise level of $L_{eq}(1 \text{ hr}) = 57.2 \text{ dB}$ would exist at 50 feet from the centerline of the access road during the busiest time (p.m. peak hour). This noise level does not represent an adverse impact to any housing, the State Hospital, or recreational areas along the proposed road based upon reference 1.

Residents near the road, persons in the nearest portions of the State Hospital, and persons using the district park will be exposed to construction noise while the road is being built. However, such construction operations will be subject to the noise regulations outlined in references 2 and 3.

Sincerely,


Ronald A. Darby, P.E.

RAD:ss

- References:
1. Procedures for Abatement of Highway Traffic Noise & Construction Noise," FHWA Transmittal 348, HEV-30, 8/9/82
 2. "Chapter 43, Community Noise Control for Oahu," State Dept. of Health, November 6, 1981.
 3. "Chapter 42, Vehicular Noise Control for Oahu," State Dept. of Health, November 6, 1981.

FIGURE 1 - PROPOSED
ACCESS RD. & POTENTIAL NOISE
IMPACTED AREAS



DARBY-EBISU & ASSOCIATES, INC.

Acoustical Consultants
1051 Keolu Drive, Suite 201 • Kailua, Hawaii 96734
(808) 261-3727

DEA Job #82-501

April 23, 1984

EDAW, Inc.
1121 Nuuanu Avenue, Suite 203
Honolulu, Hawaii 96817

Attention: Mr. John Whalen

Subject: Evaluation of Potential Traffic Noise Impact due to Various
Alternate Schemes for Improvement of Intersection at
Kahekili and Likelike Highways, Oahu.

Dear Mr. Whalen:

Table A summarizes the predicted traffic noise levels at selected locations which would be impacted by various alternative schemes for improving traffic conditions at the intersection of Likelike and Kahekili Highways. References 1 and 2 are previous studies of traffic noise impact associated with the project. The following points are made concerning Table A:

- a) Figure A shows the areas near the intersection where typical residential locations were evaluated for noise impact. Note that Area I C2 representing Bethany Gardens has been added to the other areas considered in references 1 and 2.
- b) Work Sheets #1 thru 14 show the assumptions, geometries, and calculations utilized in the evaluation.
- c) It is to be noted that the effectiveness of some noise barriers can be compromised if weather conditions allow traffic noise energy to refract (bend) over the barriers. Thermal inversions and locations downwind of noise sources and barriers allow refraction to occur. The phenomenon is usually significant only when distances, in the order of about 250 feet or greater, exist between the barrier and the source or the receiver. Thus, the effectiveness of barriers protecting the Bethany Gardens area may be reduced during normal tradewind conditions.

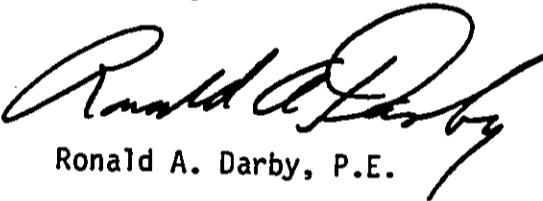
EDAW, Inc.
Attention: Mr. John Whalen

April 23, 1984
Page 2

d) The speed of the traffic is a very important factor in effecting the noise level. Thus, assumptions made concerning traffic speed may control the predicted noise levels between alternative schemes. For example, for Area I A1 in Table A, it was assumed that the average traffic speed would be 35 mph on Likelike Highway for the 1982 and "Improved Intersection" cases and that it would be 45 mph for all other cases.

e) Re-evaluation of the predicted noise levels for the two schemes considered in reference 2 ("Improved Intersection" and "Interchange") has led to changes in Table III of reference 2 as shown in order to have a common basis for comparing all alternatives. These changes have been incorporated into Table A.

Sincerely,



Ronald A. Darby, P.E.

RAD:ss
Enclosures

- References:
1. Letter report to J.Whalen from R.Darby dated 2/24/83.
 2. Letter report to J.Whalen from R.Darby dated 7/12/83.

TABLE A

PRESENT AND FUTURE TRAFFIC NOISE LEVELS AT TYPICAL STRUCTURES IN AREAS POTENTIALLY IMPACTED BY IMPROVING THE INTERSECTION AT KAHEKILI AND LIKELIKE HIGHWAYS
EQUIVALENT STEADY STATE SOUND LEVEL DURING WORST (NOISIEST) HOUR

Area	Description (See Figure A)	1982	Year 2003			
			Improved Intersection	Overpass Braided Ramps (e.g. A-1)	Overpass Weaving Lanes (e.g. B)	Underpass Weaving Lanes (e.g. B-1) Braided Ramps (e.g. A-4)
I A1	Housing facing Hinamoe Loop and Aneko Place (Likelike Highway)	64.4	66.0 w/6' Wall	68.1 65.9 w/6' Wall		
I A3	Housing facing Holomakani Street (Ramp TK, Station 99)	50	50	58.2 52.5 w/6' Wall	63.2 58.2 w/6' Wall	
I B1	Koolau Baptist Church	61.5	60.2 w/32" Wall 57 w/5' Wall	57.0 w/32" Wall	67.4	
I B2	Housing near Church, but elevated	64.4	66.0 63.8 w/6' Wall	68.1 65.9 w/6' Wall	57.5 w/16' to 18' Wall	
I C1	Housing above highway facing Kuahulu Place (Station 115)	63.9		70.0		
I C2	Bethany Gardens at Housing 300' from centerline of Likelike Highway (Station 100)	67.4	69.6 67.1*	61.3 w/18' Wall 68.4 62.2*	69.6 65.3 ⁺	

* Berm &/or Wall at R.O.W. of EL 183'.

+ Berm &/or Wall at R.O.W. of EL 186'.

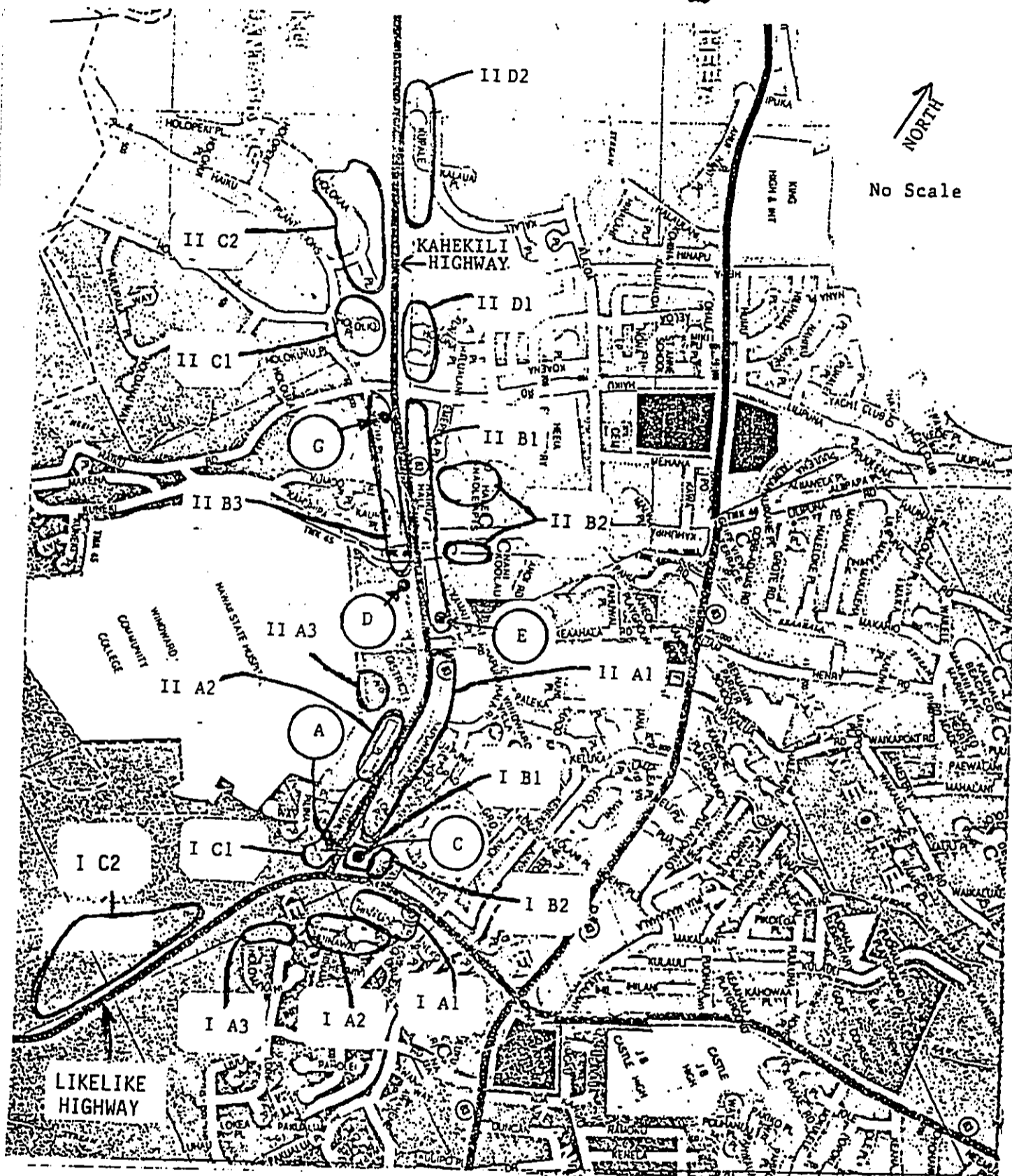


FIGURE A - SOUTHERN PORTION OF KAHEKILI HIGHWAY SHOWING AREAS POTENTIALLY IMPACTED BY NOISE FROM PROPOSED NEW INTERCHANGE AND WIDENING PROJECT (SEE TABLES II AND III IN REFERENCE 1 FOR DESCRIPTION OF AREAS). CIRCLED LETTERS ARE NOISE MEASUREMENT SITES.

TABLE III (reference 2)

PRESENT AND FUTURE TRAFFIC NOISE LEVELS AT STRUCTURES
 IN AREAS POTENTIALLY IMPACTED BY IMPROVING THE
 INTERSECTION AT KAHEKILI AND LIKELIKE HIGHWAYS
 EQUIVALENT STEADY-STATE SOUND LEVEL DURING WORST (NOISIEST) HOUR

Area	Description (See Figures 1 and 2)	-----L _{eq} (h) dBA-----		
		1982	-----2003-----	
			Improved Intersection	Interchange
I A1	Housing facing Hinamoe Loop and Aneko Place (Likelike Highway)	64.4	66.0	68.1 65.9 w/6' Barrier
I A3	Housing facing Holomakani Street (Ramp TK)	< 50	< 50	66.3 62.4 w/32" Wall
I B1	Koolau Baptist Church	61.5	60.2 w/32" Wall < 57 w/5' Wall	57.0 w/32" Barrier
I B2	Housing near Church, but elevated (Likelike Highway)	64.4	66.0	68.1 65.9 w/6' Barrier
I C1	Housing above highway facing Kuahulu Place	63.9	66.7 70.0 58 61.3 w/18' Wall	70.0

DARBY-EBISU & ASSOCIATES, INC.

Acoustical Consultants
1051 Keolu Drive, Suite 201 • Kailua, Hawaii 96734
(808) 261-3727

DEA Job #82-5

July 12, 1983

EDAW, Inc
1121 Nuuanu Avenue, Suite 203
Honolulu, Hawaii 96817

Attention: Mr. John Whalen

Subject: Analysis of Traffic Noise Impacts and Abatement Measures
Kahekili Highway Improvements

Dear Mr. Whalen:

I have completed the analysis of potential traffic noise impact for the subject project and following are my findings:

I.0 INTRODUCTION

It is proposed to widen Kahekili Highway from essentially two lanes to four lanes and to either (a) improve the intersection at Kahekili and Likelike Highways, or (b) implement an interchange involving continuous flow ramps. The procedures provided by the Federal Highway Administration (FHWA) in reference 1 are used to evaluate the potential noise impact from the project. The following excerpts are from reference 1:

"PURPOSE. To provide procedures for noise studies and noise abatement measures to help protect the public health and welfare, to supply noise abatement criteria, and to establish requirements for information to be given to local officials for use in the planning and design of highways approved pursuant to Title 23, United States Code (U.S.C.).

DEFINITIONS

- a. Design Year - the future year used to estimate the probable traffic volume for which a highway is designed. A time, 10 to 20 years, from the start of construction is usually used.
- b. Existing Noise Levels - the noise, resulting from the natural and mechanical sources and human activity, considered to be usually present in a particular area.

- c. Leq - the equivalent steady-state sound level which in a stated period of time contains the same acoustic energy as the time-varying sound level during the same period.
- d. Leq(h) - the hourly value of Leq.
- e. Traffic Noise Impacts - impacts which occur when the predicted traffic noise levels approach or exceed the noise abatement criteria (Table I), or when the predicted traffic noise levels substantially exceed the existing noise levels.

NOISE ABATEMENT

- a. In determining and abating traffic noise impacts, primary consideration is to be given to exterior areas. Abatement will usually be necessary only where frequent human use occurs and a lowered noise level would be of benefit.
- b. In those situations where there are no exterior activities to be affected by the traffic noise, or where the exterior activities are far from or physically shielded from the roadway in a manner that prevents an impact on exterior activities, the interior criterion shall be used as the basis of determining noise impacts.
- c. The noise abatement measures listed below may be incorporated in Type I and Type II projects to reduce traffic noise impacts:
 - (1) traffic management measures (e.g., traffic control devices and signing for prohibition of certain vehicle types, time-use restrictions for certain vehicle types, modified speed limits, and exclusive land designations),
 - (2) alteration of horizontal and vertical alignments,
 - (3) acquisition of property rights (either in fee or lesser interest) for construction of noise barriers,
 - (4) construction of noise barriers (including landscaping for aesthetic purposes) whether within or outside the highway right-of-way.
 - (5) acquisition of real property or interests therein (predominately unimproved property) to serve as a buffer zone to preempt development which would be adversely impacted by traffic noise.

TABLE I

NOISE ABATEMENT CRITERIA
HOURLY A-WEIGHTED SOUND LEVEL - DECIBELS (dBA)⁽¹⁾

<u>Activity Category</u>	<u>L_{eq}(h)</u>	<u>L₁₀(h)</u>	<u>Description of Activity Category</u>
A	57 (Exterior)	60 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (Exterior)	70 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 (Exterior)	75 (Exterior)	Developed lands, properties, or activities not included in Categories A or B above.
D	--	--	Undeveloped lands.
E	52 (Interior)	55 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

⁽¹⁾ Either L₁₀(h) or L_{eq}(h) (but not both) may be used on a project.

Source: Federal-Aid Highway Program Manual

- (6) noise insulation of public use or nonprofit institutional structures.
- d. There may be situations where (1) severe traffic noise impacts exist or are expected, and (2) the abatement measures listed above are physically infeasible or economically unreasonable. In these instances, noise abatement measures other than those listed in paragraph c (above) of this directive may be proposed for Types I and II projects by the highway agency.

TRAFFIC NOISE PREDICTION

- a. Any traffic noise prediction method is approved for use in any noise analysis required by this directive if it generally meets the following two conditions:
 - (1) The methodology is consistent with the methodology in the FHWA Highway Traffic Noise Prediction Model (Report No. FHWA-RD-77-108).
 - (2) The prediction method uses noise emission levels obtained from one of the following:
 - (a) National Reference Energy Mean Emission Levels as a Function of Speed.
 - (b) Determination of reference energy mean emission levels in "Sound Procedures for Measuring Highway Noise: Final Report," Report No. DP-45-1R.
- b. In predicting noise levels and assessing noise impacts, traffic characteristics which will yield the worst hourly traffic noise impact on a regular basis for the design year shall be used.

CONSTRUCTION NOISE. The following general steps are to be performed for all Types I and II projects:

- a. Identify land uses or activities which may be affected by noise from construction of the project. The identification is to be performed during the project development studies.
- b. Determine the measures which are needed in the plans and specifications to minimize or eliminate adverse construction noise impacts to the community. This determination shall include a weighing of

EDAW, Inc.
Attn: Mr. John Whalen

July 12, 1983
Page I-5

the benefits achieved and the overall adverse social, economic, and environmental effects and the costs of the abatement measures.

- c. Incorporate the needed abatement measures in the plans and specifications."

Locally, the State Department of Health (DOH) has noise regulations (reference 2) which state:

"No highway or freeway which can be expected to create at designed capacity operation, a noise level of fifty dBA or more inside any school classroom, library, multi-purpose room, hospital, or rest home already in existence and used for its primary design purpose, shall be constructed without first providing for noise control measures which can be expected to limit the noise level inside the facility to no more than fifty dBA."

EDAW, Inc.
Attn: Mr. John Whalen

July 12, 1983
Page II-1

II.0 IDENTIFICATION OF POTENTIALLY IMPACTED AREAS

Reference 3 identified potentially impacted land uses by the proposed project. Figures 1 and 2 are from reference 3 and identify the areas near the Kahekili/Likelike intersection and the remainder of Kahekili Highway.

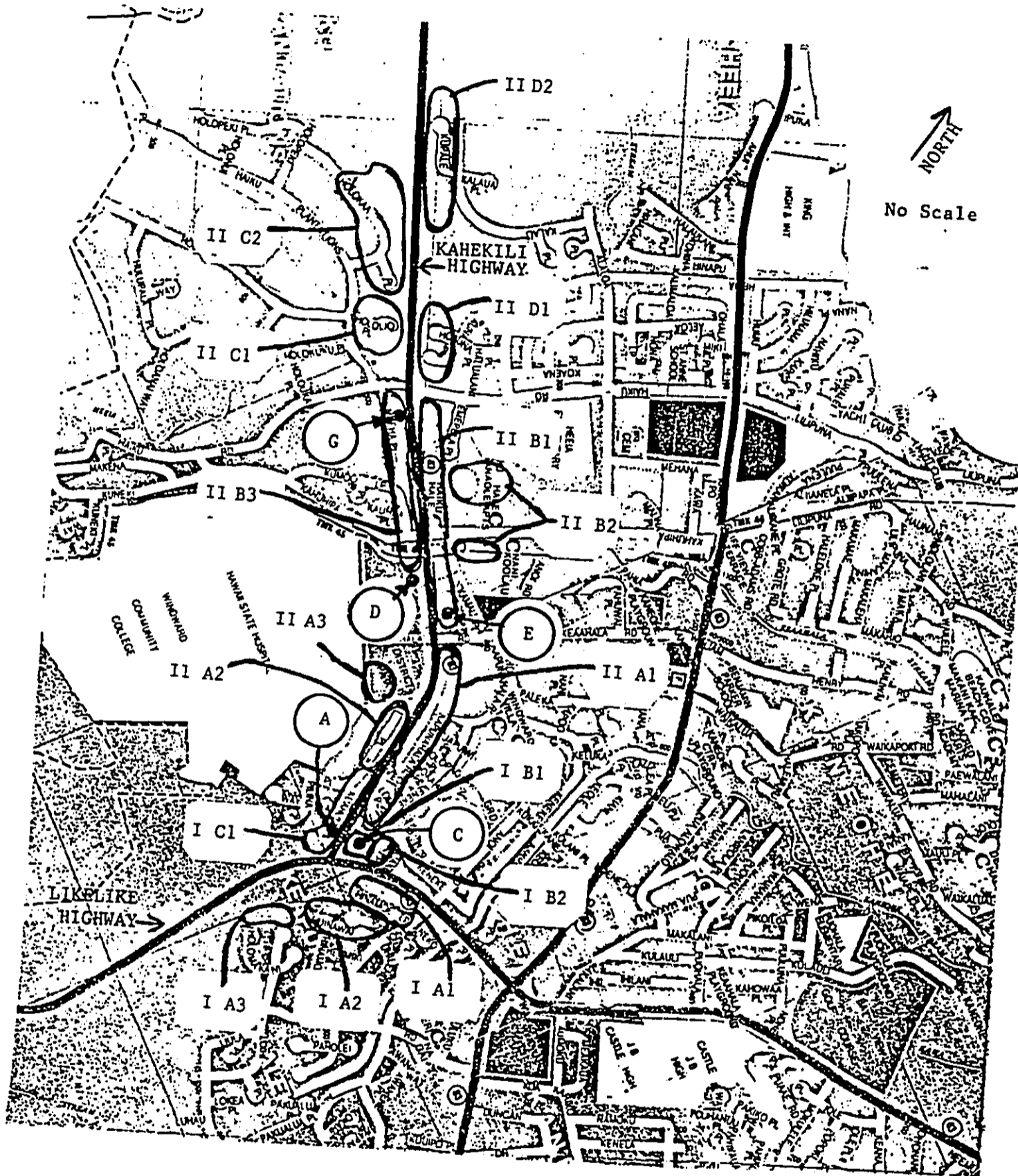


FIGURE 1 - SOUTHERN PORTION OF KAHEKILI HIGHWAY SHOWING AREAS POTENTIALLY IMPACTED BY NOISE FROM PROPOSED NEW INTERCHANGE AND WIDENING PROJECT (SEE TABLES II AND III FOR DESCRIPTION OF AREAS). CIRCLED LETTERS ARE NOISE MEASUREMENT SITES.

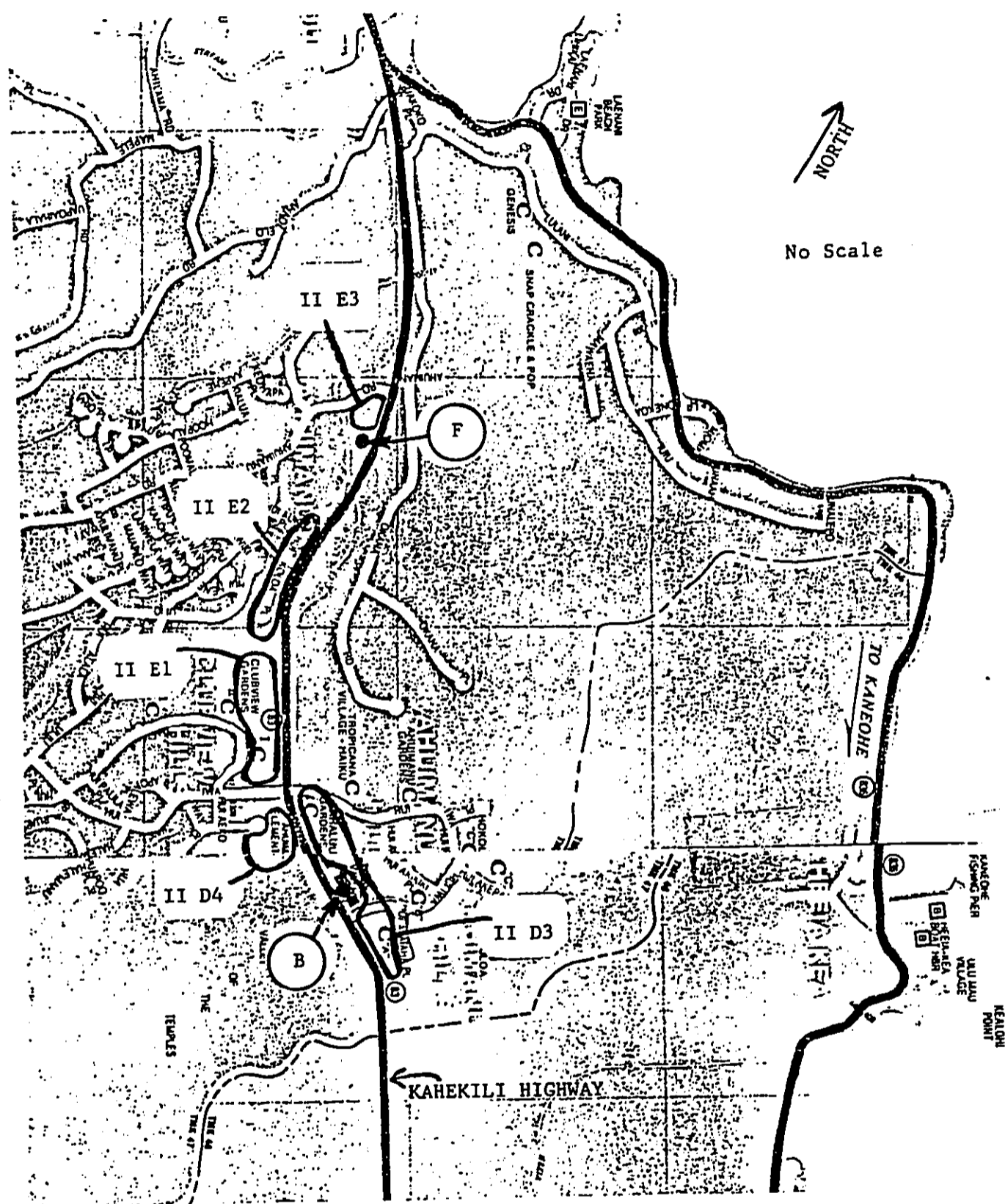


FIGURE 2 - NORTHERN PORTION OF KAHEKILI HIGHWAY SHOWING AREAS POTENTIALLY IMPACTED BY NOISE FROM PROPOSED WIDENING PROJECT (SEE TABLES II AND III FOR DESCRIPTION OF AREAS). CIRCLED LETTERS ARE NOISE MEASUREMENT SITES.

III.0 METHODOLOGY

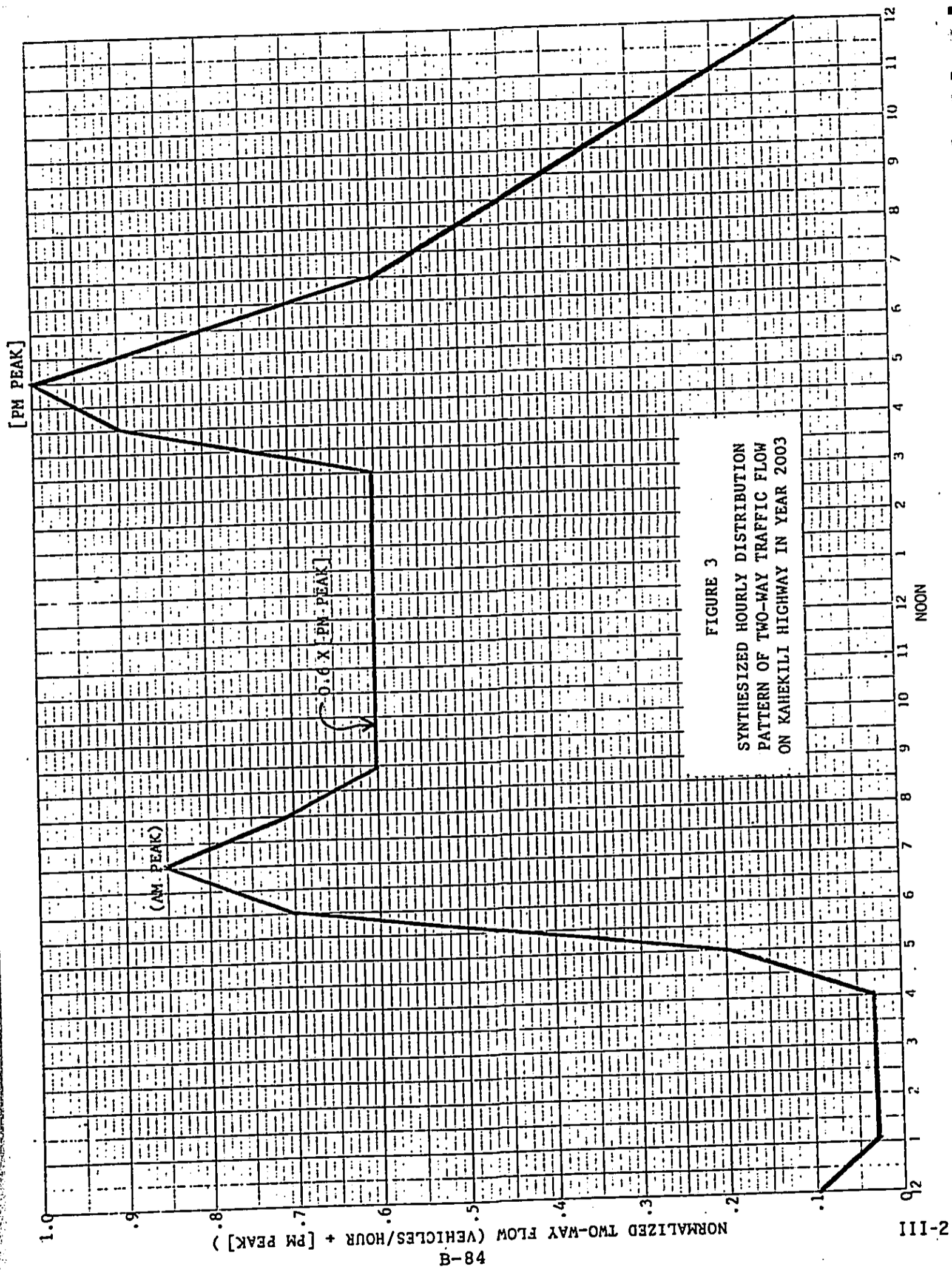
The procedures used to predict traffic noise for present and future times are consistent with those outlined in reference 4. The traffic volume data for the years 1982 and 2003 were obtained from references 5 and 6 respectively. The truck factor data were obtained from reference 7 while basic highway interchange design data were from reference 8.

Reference 1 states that "in predicting noise levels and assessing noise impacts, traffic characteristics which will yield the worst hourly traffic noise impact on a regular basis for the design year shall be used." Thus, some judgment must be made as to which hour will cause the most noise based on the combination of traffic volume, truck mix, and average operating speed. For example, it does not seem possible that the posted speed of 45 MPH can be maintained at the improved intersection in 2003 during P.M. peak hour because of the signalization at the intersection and along Kahekili and Likelike Highways. Thus, for some locations, it is assumed that the "worst" hour would occur in the morning after peak hour when traffic is freely flowing at posted speed. In these situations, the worst case is taken to be a morning hour with $0.6 \times [\text{P.M. PK Hour Volume}]$ using the A.M. truck factor. The basis for this traffic volume is Figure 3 which shows the hourly traffic distribution assumed for the highways in this project. However, in other locations, either the A.M. or P.M. peak hour volume at posted speed was utilized as the worst case, if it was apparent that signalization would not disrupt flow (e.g., morning traffic going to Honolulu with through-flow interchange at Kahekili and Likelike).

The noise measurement and traffic count data reported in reference 3 indicated that use of the posted speed in the traffic noise model for stop-and-go traffic was warranted for other than peak hours.

The basic procedure for predicting noise levels at a given area originally identified in reference 3 as being potentially impacted by traffic was as follows:

- (a) Re-evaluate impact and discard area if no impact foreseen.
- (b) Determine which hour will cause worst traffic noise impact to the area. The three hours used were A.M. Peak, P.M. Peak, or morning traffic at posted speed and at $0.6 \times$ volume of the P.M. Peak.



- (c) From aerial photos and preliminary engineering design data, estimate the setback to a typical structure in the area and estimate the geometric relationship of the structure to the highway. See Figure 4 which represents a typical worksheet.
- (d) Calculate the $L_{eq}(h)$ for the worst hour for the 1982 and 2003 cases. Use methodology in reference 4 to decide whether to treat the sound propagation as for a "hard" or "soft" site. Include any natural barrier effects; e.g., when highway is elevated with respect to property. See Figure 5 as an example for a typical worksheet.
- (e) If the noise level is large enough to be interpreted as an impact by reference 1, determine the effectiveness of a practical noise barrier at the edge of the right-of-way.

KANEKILI HIGHWAY
 HAIKU TO HUIIWA

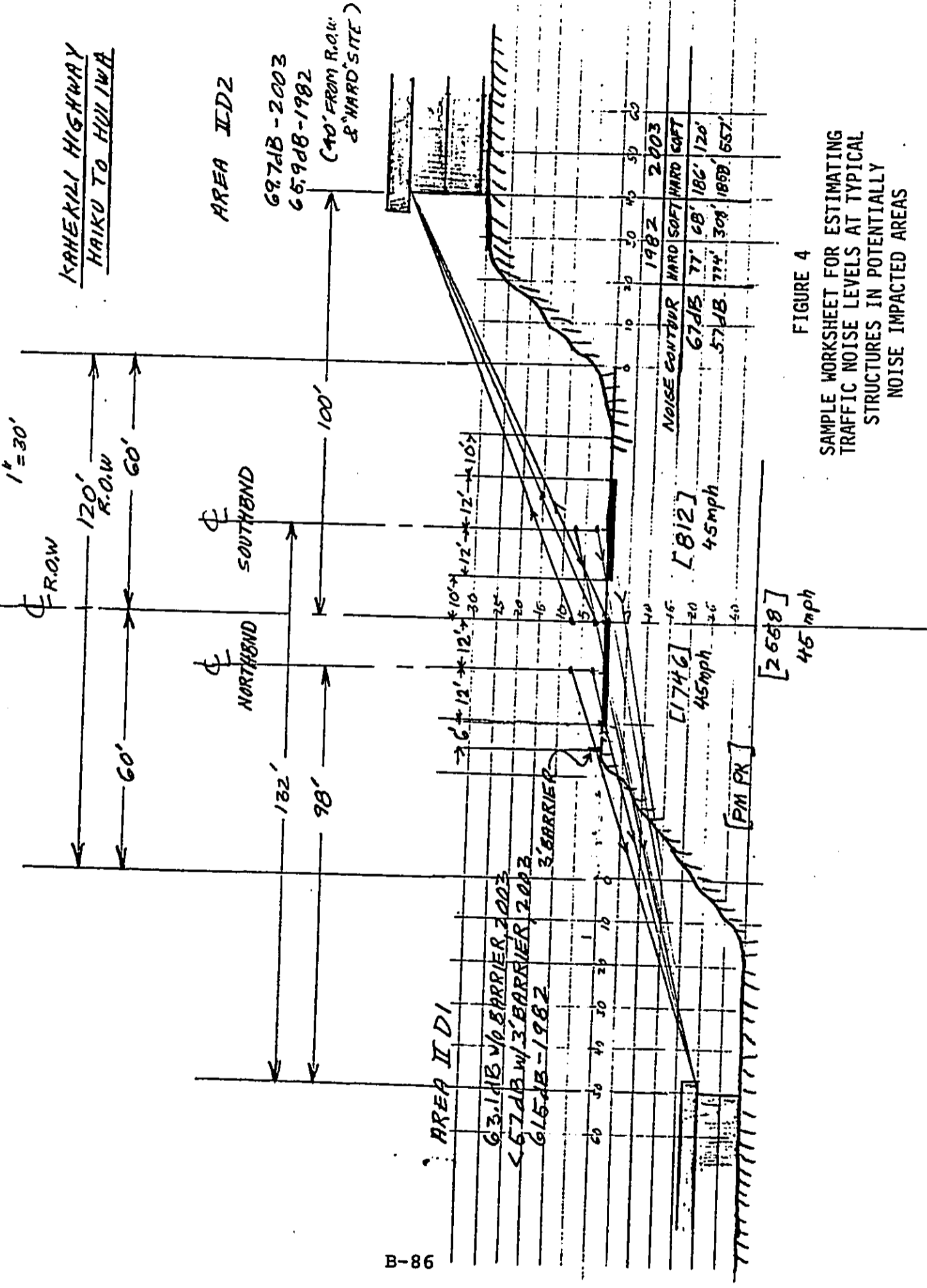


FIGURE 4
 SAMPLE WORKSHEET FOR ESTIMATING
 TRAFFIC NOISE LEVELS AT TYPICAL
 STRUCTURES IN POTENTIALLY
 NOISE IMPACTED AREAS

B-86

LOCATION IDI LOCATION IDI
 NO. OF LANES 2 NO. OF LANES 4
 TRAFFIC TO NORTH TRAFFIC TO N&S

2003			2003			
	AUTO	INVT. TRK.	MED. TRK.	AUTO	INVT. TRK.	MED. TRK.
S 45 MPH	28.1 log S 46.5	14.6 log S 24.1	23.9 log S 39.5	28.1 log S 46.5	14.6 log S 24.1	23.9 log S 39.5
	AM	PM	AM	AM	PM	AM
N VEH/HR [17467] 10 log N =	32.4		29.1		34.1	
L _{eqi}	68.8	65.6	59.6	65.8	62.3	56.3
L _{eq Total} 182'	65.9	62.7	56.7	61.6	58.1	52.1
BARRIER ATTN. FROM ROADWAY	-10	-1	-7.6	15.6	-8.5	-10
L _{eq at 100'}	55.9	61.7	49.1	46.0	49.6	42
	1982		2003		1982	
	43.4	22.5	36.9	72.7 dB	72.7 dB	69.5
[1921]N	32.8			-67.0	-57.0	57.0
L _{eq 60'}	66.4	64.4	57.4	S ₁ = 5.7 dB	S ₂ = 15.7 dB	12.5 = S ₂
L _{eq 98'}	63.5	61.5	54.5	HARD: S ₁ = 10 log d/60 SOFT: S ₂ = 15 log d/60		
BARRIER ATTN	-10	-1	-7.6	log d/50 = S _i /10 → 10 ^{S_i/10} = d/50 → d = 50(10 ^{S_i/10})		
L _{eq Ch}	53.5	60.5	46.9	* → 68.9 dB @ 50' -3 65.9 dB @ 100'		
	61.5	61.5		SOFT SITE 15' @ 60'		

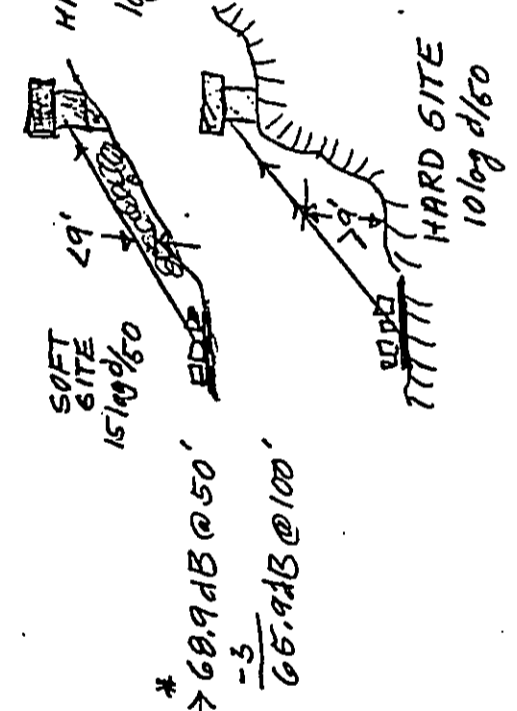


FIGURE 5
SAMPLE WORKSHEET FOR
CALCULATING TRAFFIC NOISE LEVELS
IN POTENTIALLY IMPACTED AREAS

EDAW, Inc.
Attn: Mr. John Whalen

July 12, 1983
Page IV-1

IV.0 TRAFFIC NOISE LEVELS - 1982 & 2003

Using the methodology described above, the traffic noise levels at structures along the highway or interchange have been estimated and are listed in Tables II and III. Appendix A includes the worksheets involved for the different areas. Figures 1 and 2 locate the areas delineated in the tables.

TABLE II

PRESENT AND FUTURE TRAFFIC NOISE LEVELS AT STRUCTURES ALONG KAHEKILI HIGHWAY
EQUIVALENT STEADY-STATE SOUND LEVEL DURING WORST (NOISIEST) HOUR

Area	Description (See Figures 1 and 2)	-----Leq(h) dBA-----	
		1982	2003
II A1	Housing facing Kapunahala and Keneke Roads	60	60
II A2	Housing facing Kuahulu Place	63.9	66.7 59 w/10' Barrier
II A3	Kaneohe District Park, baseball field, 50' from R.O.W.	63.9	66.7
II B1	2nd & 3rd Story Apartment Units, 30' from R.O.W.	66.3	68.3
II B2	Upper stories in high-rise at 500' from R.O.W.	57.0	58.1
II B3	Housing facing Maeha Place	63.9	66.7 59 w/10' Barrier
II C2	Housing above highway, 60' from R.O.W.	63.8	67.6
II D1	Housing below highway on Huna and Hoana Streets	61.5	63.1 <57 w/3' Barrier
II D2	Housing above highway on Kupale Street, 100' from centerline of highway	65.9	69.7
II D3	2nd & 3rd Story Apartment, Kahaluu Gardens	66.3	68.5
II D4	Ahuimanu Elementary School property line	50.5	54.9
II E1	Condo Units in Clubview Gardens, 100' from R.O.W.	60.6	64.3
II E2	Housing facing Hui Koloa Place	60.1	65
II E3	New CMU Multifamily Housing, 100' from R.O.W.	59.6	64.3

TABLE III

PRESENT AND FUTURE TRAFFIC NOISE LEVELS AT STRUCTURES
 IN AREAS POTENTIALLY IMPACTED BY IMPROVING THE
 INTERSECTION AT KAHEKILI AND LIKELIKE HIGHWAYS
 EQUIVALENT STEADY-STATE SOUND LEVEL DURING WORST (NOISIEST) HOUR

Area	Description (See Figures 1 and 2)	-----L _{eq} (h) dBA-----		
		1982	-----2003-----	
			Improved Intersection	Interchange
I A1	Housing facing Hinamoe Loop and Aneko Place (Likelike Highway)	64.4	66.0	68.1 65.9 w/6' Barrier
I A3	Housing facing Holomakani Street (Ramp TK)	< 50	< 50	62.4
I B1	Koolau Baptist Church	61.5	60.2 w/32" Wall < 57 w/5' Wall	57.0 w/32" Barrier
I B2	Housing near Church, but elevated (Likelike Highway)	64.4	66.0	68.1 65.9 w/6' Barrier
I C1	Housing above highway facing Kuahulu Place	63.9	66.7 58 w/18' Wall	70.0

V.0 DETERMINATION OF TRAFFIC NOISE IMPACT AND NEED FOR NOISE ABATEMENT MEASURES

Reference 1 defines FHWA traffic noise impacts as "when the predicted traffic noise levels approach or exceed the noise abatement criteria (Table I), or when the predicted traffic noise levels substantially exceed the existing noise levels." Reference 1 also states that primary consideration is to be given to exterior areas where frequent human use occurs. This is interpreted to imply that an exterior level of $L_{eq}(h) = 67$ dB should not be exceeded near structures in residential areas (Activity Category B).

Reference 1 also establishes that an interior noise level of $L_{eq}(h) = 52$ dB should not be exceeded. This criterion is apparently based on the national average of 15 dB noise reduction of outside noises to inside noises by structures with windows open (reference 9). However, in Hawaii most residences are naturally ventilated the year round and have relatively larger window and door openings causing typical noise reductions by structures to range only from 5 to 7 dB in the rooms immediately facing the trafficway. Thus, if the interior traffic noise level is to be satisfied, the exterior traffic noise level should be in the range of $L_{eq}(h) = 57$ to 59 dB.

Using the FHWA exterior noise level, $L_{eq}(h) = 67$ dB to define noise impact, then from Tables II and III, it can be concluded that presently (1982 traffic data) no traffic noise impacts exist for Kahekili Highway / or for the existing intersection traffic at Likelike Highway. For the year 2003 with Kahekili Highway widened to 4 lanes, Table II indicates that noise impacts may exist in at least four areas--II B1, II C2, II D2, and II D3. See Figures 1 and 2. In each of these cases, the housing units are elevated above the highway such that it appears, at this time, impractical to implement an effective noise barrier within the right-of-way. Perhaps when final grading and alignment of the highway is established, and when detailed topographic data are obtained of the site's specific conditions (e.g., location of fenestration in housing relative to roadway), noise barriers could be designed and evaluated with

respect to the benefit received versus cost, blockage of natural airflow, and light, aesthetics, etc.

From Table III, it can be seen that $L_{eq}(h) = 67$ dB is predicted to be exceeded by the proposed interchange in three areas, I A1, I B2, and I C1. In areas I A1 and I B2 along Likelike Highway, a 6-foot barrier at the edge of the right-of-way would reduce the noise level below 67 dB. At area I C1, facing the lanes leading to Ramp KT, the height of the barrier would vary because the terrain where the housing is varies greatly in elevation. Again, detailed topographic information is needed when the final alignment of the highway is resolved in order to evaluate the cost effectiveness of the barrier if area I C1 is to be shielded.

If the FHWA interior traffic noise criteria of $L_{eq}(h) = 52$ dB is used to define noise impact, then it can be seen from Tables II and III that most areas exceed the required exterior noise levels of 57 to 59 dB both for 1982 and 2003. In some cases; e.g., areas II D1 and I B1, where the structures are below the highway or interchange, a small barrier (2'-8" to 3') can effectively reduce the noise levels to meet the criteria. Otherwise from Tables II and III, it can be seen that barriers from 10 to 18 feet in height are required in some cases to reduce noise levels in one-story housing. Generally, it will be impractical to meet the internal noise standards in naturally ventilated housing facing the highway which is two stories or higher.

The noise level at Ahuimanu Elementary School should not exceed either the FHWA criteria or State DOH noise regulation (reference 2) relating to classroom noise level. The traffic noise levels predicted at the private school spaces operated by Koolau Baptist Church for both the improved intersection and the interchange should be acceptable to both FHWA and State criteria if about 3 or 5-foot walls exist at the edge of the right-of-way. However, a detailed evaluation should be made when intersection or interchange plans are finalized.

EDAW, Inc.
Attn: Mr. John Whalen

July 12, 1983
Page VI-1

VI.0 CONSTRUCTION NOISE IMPACT

All areas shown in Figures 1 and 2, except possibly Area I A2, will be affected by construction of the project. The construction noise controls and curfews in reference 2 will lessen the impact to those who are at home or in the schools during the construction period. Also, all vehicles involved in the project should meet the vehicular noise regulations in effect on Oahu (reference 10).

VII.0 SUMMARY AND CONCLUSIONS

Areas which may be impacted by traffic and construction noise due to the widening of Kahekili Highway and the improvement of the intersection (or the implementation of an interchange) at Kahekili and Likelike Highways have been identified. Determinations of existing and future (year 2003) traffic noise levels have been made for one typical situation in the identified areas

Four areas along the widened highway are identified as possibly exceeding the FHWA exterior traffic noise criteria of $L_{eq}(h) = 67$ dB. However, these four housing areas are all elevated above the highway such that, at this time, it is doubtful that effective noise barriers can be *practically constructed on the right-of-way*. Two housing areas facing Likelike Highway should have traffic noise levels in excess of 67 dB if the proposed interchange is implemented. Noise barriers approximately 6 feet high would be required to adequately reduce the noise levels.

Similarly, some mauka housing on Kahekili closest to Likelike should have traffic noise levels in excess of 67 dB if the interchange is implemented. However, due to the dynamic topography in this area, the effectiveness and practicality of noise barriers must be determined after final plans, alignments, and grades are established.

Existing and future noise level determinations indicate that the interior noise levels in rooms of housing facing the highway probably do, and will, exceed FHWA interior noise criteria of $L_{eq}(h) = 52$ dB. In a few cases, a small practical noise barrier should reduce the interior noise levels adequately, but in most cases, it appears impractical to implement effective barriers on the right-of-way to achieve 52 dB indoors.

Both FHWA and local traffic noise criteria should be satisfied at Ahuimanu Elementary School. Though detailed analysis should be made when final alignments and gradings are established, the traffic noise levels at the private Koolau Baptist Church school should be

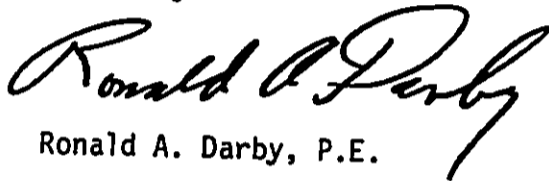
EDAW, Inc.
Attn: Mr. John Whalen .

July 12, 1983
Page VII-2

acceptable if approximately 3 to 5-foot high noise barriers are used at the edge of the ramp or right-of-way respectively.

The areas which will be impacted by project construction noise have been identified. The fact that the contractor must abide by local noise codes for construction activities and for motor vehicles, will lessen the impact.

Sincerely



Ronald A. Darby, P.E.

RAD:ss
Encls.

EDAW, Inc.
Attn: Mr. John Whalen

July 12, 1983

REFERENCES

1. Procedures for Abatement of Highway Traffic Noise and Construction Noise, FHWA Transmittal 348, HEV-30, August 9, 1982.
2. "Title 11, Administrative Rules, Department of Health," Chapter 43 Community Noise Control for Oahu, November 6, 1981.
3. Letter Report to J. Whalen from R. Darby dated February 24, 1983.
4. "FHWA Highway Traffic Noise Prediction Model," FHWA-RD-77-108.
5. Traffic Assignment, Kahekili Highway Widening & Interchange, Project No. 83F-01-75, REF. NO. TA 82-5, June 1982.
6. Traffic Assignment, Kahekili Highway Widening & Interchange, Project No. 83F-01-75, REF. NO. TA 82-5A, October 1982.
7. Truck Factors - Kahekili Highway Widening & Interchange, Project No. 83F-01-75, REF. NO. TA 82-5, June 1982.
8. Highway & Interchange Design Data, Kahekili Highway Widening & Interchange, Project No. 83F-01-75 & 63A-05-68, November 9, 1982.
9. "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety," U.S. Environmental Protection Agency, March 1974.
10. "Title 11, Administrative Rules, Department of Health," Chapter 42 Vehicular Noise Control for Oahu, November 6, 1981.

APPENDIX C

**WATER QUALITY
AND
BIOLOGICAL IMPACT
ANALYSIS**

AECOS No. 352A

REVISED
STREAM SURVEYS FOR THE KAHEKILI HIGHWAY
IMPROVEMENT PROJECT,
KANE'OHE TO KAHALU'U,
O'AHU, HAWAI'I

Prepared For:

DHM Planners, Inc.
1188 Bishop Street, Suite 2405
Honolulu, Hawaii 96813

Prepared By:

AECOS, Inc.
970 N. Kalaheo Ave, Suite A300
Kailua, Hawaii 96744

April 1988

TABLE OF CONTENTS

INTRODUCTION	1
KAHALU'U DRAINAGE SYSTEM	4
WAIHE'E STREAM	4
KAHALU'U STREAM	4
'AHUIMANU STREAM	7
WAIOLA STREAM	8
HE'EIA STREAM DRAINAGE	10
PUOLENA STREAM	10
IOLEKA'A STREAM	10
HE'EIA STREAM	10
KEA'AHALA STREAM DRAINAGE	14
"HAIKU" STREAM	14
KEA'AHALA STREAM	15
KAMO'OALI'I / KANE'OHE DRAINAGE SYSTEM	18
KAPUNAHALA STREAM	18
DISCUSSION	20
CHANNEL MODIFICATION	20
WATER QUALITY	22
BIBLIOGRAPHY	28

INTRODUCTION

This report presents the results of the surveys of streams which cross under Kahekili Highway on windward O'ahu for a proposed highway improvement project. Kahekili Highway extends between Likelike Highway in Kane'ohe and Kamehameha Highway in Kahalu'u (Figure 1). An initial survey of the stream biota and water quality in the area of these stream crossings was made in 1983 (AECOS, Inc. 1983). Much of the discussion and all of the data from the 1983 report are repeated herein. A resurvey, undertaken on December 29, 1987, represents an update of the original study. Emphasis in this most recent survey has been placed on the sampling of water immediately downstream of the proposed highway project to assess wet season water quality as it relates to the State of Hawaii water quality criteria for streams (Dept. of Health, Administrative Rules, Title 11, Chapter 54). A second purpose was to note any changes in the nature of the stream environment that might have occurred in the 4.5 years since the first study was completed.

Kahekili Highway is located in one of the wetter parts of the Island of O'ahu. The area of the highway itself receives on the order of 75 inches of rainfall annually (Taliaferro, 1959). With the exception of the trans-Ko'olau portions of Likelike and Pali Highways, no other major roads on O'ahu are located in wetter areas than Kahekili and that portion of Kamehameha Highway extending north from Kahekili to Hakipu'u at the far end of Kane'ohe Bay. Most of the streams in the project area are perennial at Kahekili Highway, although the normal flow in these streams is great only during major storm events. The drainage basins for these streams are small in area because the distance between the Ko'olau crest and the coastline is a relatively short 2.5 miles. However, not all of the channels crossing Kahekili represent perennial streams. The most recent survey was conducted during the wet season in a wetter than normal year and following by less than one week a significant winter storm. Still, two of the drainages investigated were without flowing water.

Kahekili Highway cuts across at least ten drainages including man-made realigned stream channels and one stream (Waiola) that passes under the highway twice. All of these crossings are achieved with culverts, with the exception of a bridge at the lower Waiola Stream crossing. Most of the streams surveyed are channelized or significantly modified in the segments between Kahekili Highway and the sea, as well in most cases for some distance above the highway. A classification scheme developed by Timbol and Maciolek (1978) for channel modification types is used herein and is briefly described in Table 1.

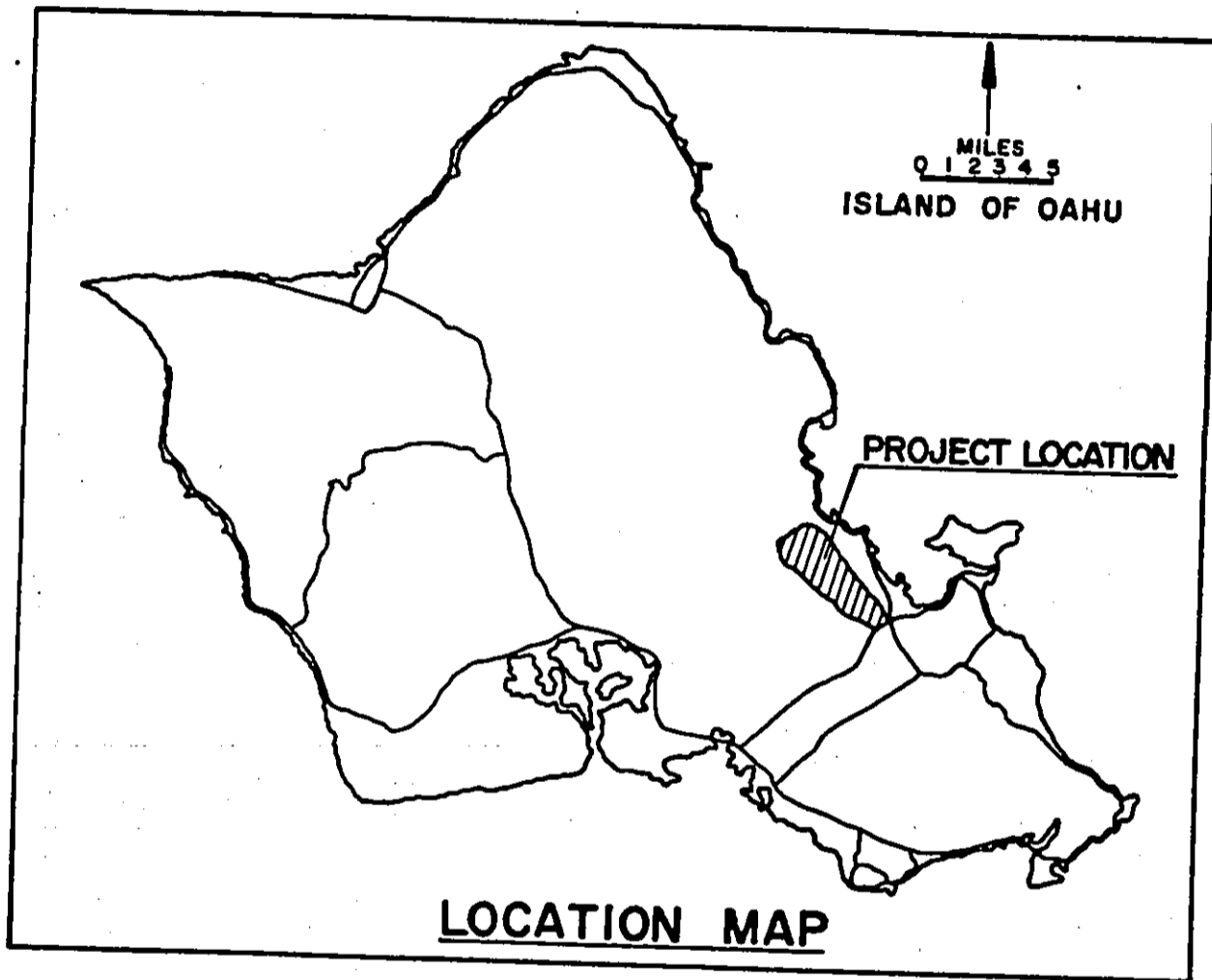


Figure 1. Project location on the windward side of the Island of O'ahu.

The ten channels alluded to here are not the same as the ten drainage basins identified for the project area by Park Engineering (1982). Some of these drainage basins are drained by more than one stream channel crossing under Kahekili, and three of the drainage basins in the project area ('Ahuimanu, Kahalu'u, and Waihe'e) flow together on the upslope side of the highway, and thus do not cross under it. These latter streams are discussed here for completeness.

Table 1. Types of stream modifications defined by Timbol and Maciolek, 1978.

TYPE 1	---	Lined channel. An artificial channel having both natural banks and stream bed replaced, usually with concrete.
TYPE 2	---	Vegetation removed. A (usually) realigned channel with most emergent vegetation removed or maintained.
TYPE 3	---	Elevated culvert. Culverts under highways with downstream end terminating well above the water level of the stream into which the flow drains.
TYPE 4	---	Revetment. One or both banks reinforced with a concrete or rock wall but channel bed not altered.
TYPE 5	---	Blocked or filled in. Part of original channel blocked or filled in.
TYPE 6	---	Extended culvert. A long, buried box or pipe culvert.

KAHALU'U DRAINAGE SYSTEM

The northern portion of the Kahekili Project area encompasses the Kahalu'u drainage system: tributary streams of Kahalu'u Stream, the latter which flows into Kane'ohe Bay adjacent to Kahalu'u Fishpond. The northward flowing lower reach of this system has been extensively modified as part of the Kahalu'u Flood Control Project. Included in this system are Waihe'e, Kahalu'u, 'Ahuimanu, and Waiola Streams (Figure 2).

WAIHE'E STREAM

The drainage basin of Waihe'e Stream encompasses 1528 acres of mostly forested uplands and pasturelands (Park Engineering, 1982). Waihe'e Stream joins Kahalu'u Stream at a point just upstream from the old Aha'olelo Road bridge in Kahalu'u (a little more than 0.2 mile above the Kamehameha Highway bridge). This section of Kahalu'u Stream is part of the Kahalu'u Watershed Project which parallels the northern portion of Kahekili Highway ending in a "lagoon" which is spanned by a highway bridge beyond the project limits. Waihe'e Stream will not be affected directly by the proposed project and was therefore not surveyed or sampled (although Sample 213 was collected below the confluence of Waihe'e and Kahalu'u Streams). Water quality values for two stations on Waihe'e Stream are reported in Dugan and Bartram (1977). A mean total N value of 0.87 mg/L and a mean total P value of 0.10 mg/L based on several grab samples per week for a one year period (February 1974 to February 1975), are reported for lower Waihe'e Stream from the gaging station just above the confluence with Kahalu'u Stream.

KAHALU'U STREAM

Kahalu'u Stream draws from a drainage basin of 940 acres, all of which is above Kahekili Highway (Park Engineering, 1982). A substantial portion of the lowlands surrounding this stream is in residential development. The uplands are forested. The lower course of Kahalu'u Stream parallels Kahekili Highway from a point about midway between Aha'olelo Road and 'Ahuimanu Road to beyond the northern project limit where Kahalu'u Stream flows through the lagoon created by a flood control project and into Kane'ohe Bay just below the Kamehameha Highway bridge. This lower reach (about 0.55 mile upstream from the highway bridge) carries the combined flows of Waiola, 'Ahuimanu, Kahalu'u, and Waihe'e streams in a dredged channel (the "lagoon", a Type 2 stream modification) and a concrete lined channel (a Type 1 modification) above the lagoon portion. Lower Kahalu'u Stream was realigned when Kahekili Highway was constructed, so that all of the stream

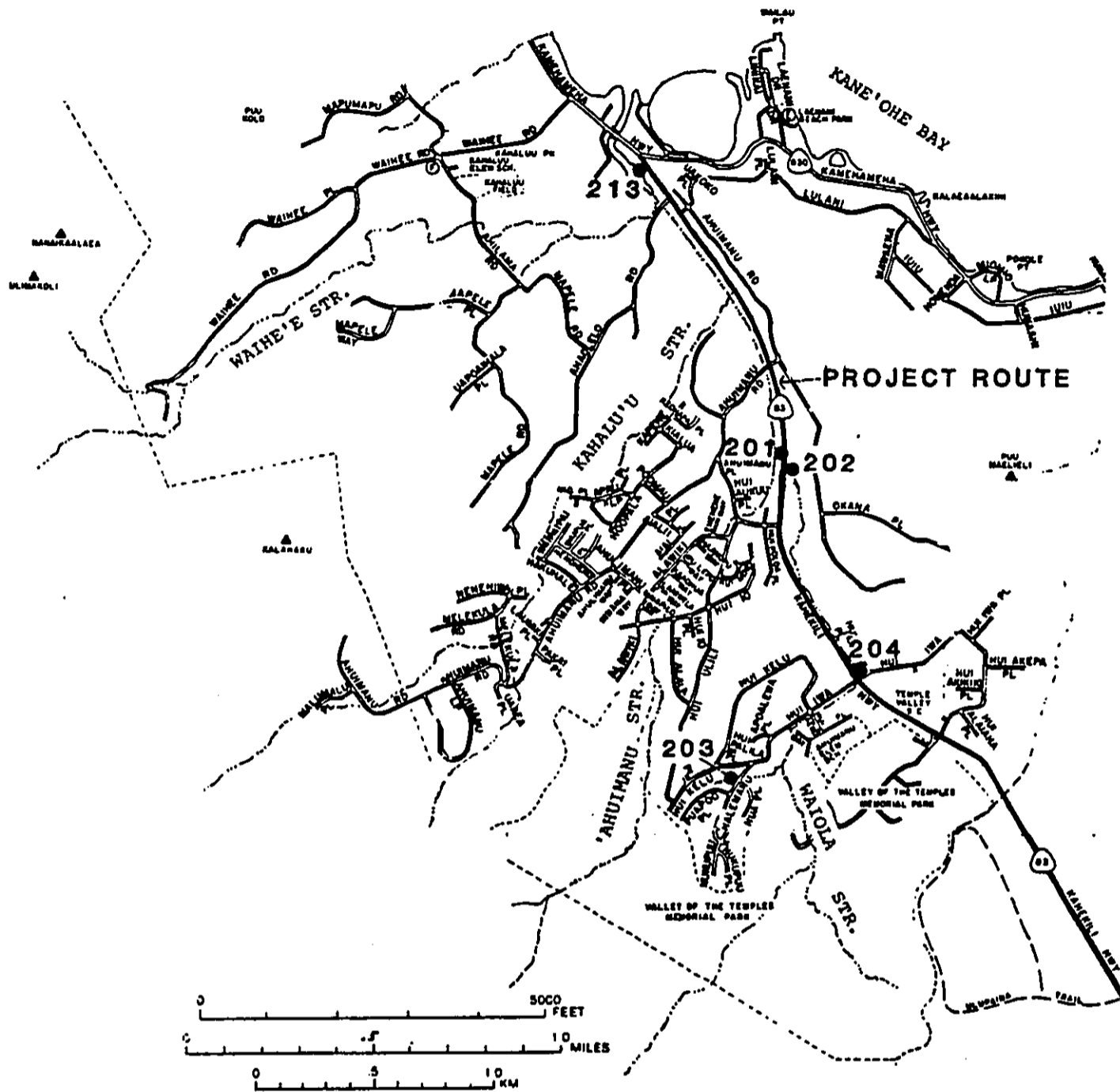


Figure 2. Northwestern project area encompassing the Kahalu'u Drainage Area. The 1987 Sample Stations (201-204 and 213) are indicated.

now flows along the west side of the highway. A natural stream bed, present when the 1983 survey was undertaken, has since been replaced by a concrete lined channel with high vertical walls (Type 1). The channel bottom is smooth and flat, except for a v-shaped groove formed down the middle to maintain some depth of water during low-flow (normal) conditions.

A survey of the biota in Kahalu'u Stream (conducted 0.6 mile upstream of the section which parallels the highway) by Timbol and Maciolek (1978) revealed native goby fish or o'opu (Eleotris sandwicensis), a number of exotic fishes (Poecilia mexicana, P. reticulata, Sarotherodon mossambica, and Xiphophorus maculatus), and crayfish (Procambarus clarki). Shortfin mollies (Poecilia mexicana) were seen at Station 213 when sampled in 1987. The In-stream Use Study (Wilson Okamoto & Assoc., 1983) rates as high the potential for stream fauna habitat in the lower reach of Kahalu'u Stream (essentially the "lagoon" or estuarine segment), but the remainder of the lowland reach is rated as having low stream habitat potential.

 Table 2. 1987 Water Quality Results, Kahalu'u Drainage Area

STATION: STREAM:	213 Kahalu'u	201 Waiola	202 Waiola	204 Waiola	WQ Criteria *
ANALYTE	-----	-----	-----	-----	=====
Temperature (°C)	23.0	25.0	23.0	23.0	<1 C°
pH (units)	7.54	7.76	7.70	7.89	5.5-8.0
Turbidity (ntu)	5.5	7.2	6.7	3.4	25.0
NFR (mg/L)	3.8	3.2	3.4	2.8	80.0
DO (mg/L)	7.6	8.4	7.3	8.7	>6.96
TKN (mg/L)	0.042	0.100	0.120	0.187	0.80
Nitrate+nitrite	0.464	0.396	0.432	0.044	0.30
Total P (mg/L)	0.007	0.007	0.007	<0.001	0.15

 * For nutrients and NFR, value is not to be exceeded during the wet season (November-April).
 =====

Water quality Station 213 was located on the lagoon section just above the Kamehameha Highway bridge in 1983. This station was located further upstream in 1987, yet still within the man-made lagoon. The water here is brackish, although salinity was very low at the time of the wet season (1987) sampling. Water quality results for this station are summarized in Table 2. All of the other stream samples collected from this drainage system in 1987 were from along the branch known as Waiola Stream and are discussed elsewhere below.

'AHUIMANU STREAM

'Ahuimanu Stream is a tributary of Kahalu'u Stream, joining the latter about 0.55 mile upstream of the Kamehameha Highway bridge and paralleling Kahekili Highway for an additional 0.4 mile. The drainage basin of 'Ahuimanu Stream is 357 acres (Park Engineering, 1982). The stream bed has been modified (Type 1) and realigned so that, like Waihe'e and Kahalu'u streams, 'Ahuimanu Stream is now entirely on the west side of Kahekili Highway. Since the 1983 survey, the lower reach has been confined within a steep-sided, concrete culvert. A v-shaped notch in the bottom of this culvert extends upstream to a point just below the confluence with Waiola Stream. There are no significant flora or fauna in the lower reach of 'Ahuimanu Stream, nor is there ever likely to be.

A survey of the biota in 'Ahuimanu Stream (conducted 0.4 mile upstream of the section which parallels the highway) by Timbol and Maciolek (1978) revealed several native goby fishes (o'opu nakea or Awaous stamineus, o'opu naniha or Awaous genivittatus, and o'opu okuhe or Eleotris sandwicensis), a number of exotic fishes (Sarotherodon mossambica, Poecilia mexicana, P. reticulata, P. vittata, Sarotherodon mossambica, and Xiphophorus helleri and Clarias fuscus), Tahitian prawn (Macrobrachium lar), and crayfish (Procambarus clarki). The Instream Use Study (Wilson Okamoto & Assoc., 1983) rates as low the potential for stream fauna habitat in the lower reach of 'Ahuimanu Stream.

In 1983, water quality Station 201 was sampled at a point downstream of where Waiola Stream enters 'Ahuimanu Stream. In 1987, this station was moved to Waiola Stream about 10 feet upstream of the confluence with 'Ahuimanu. Thus, 'Ahuimanu Stream was not sampled in 1987 (see, however, Station 213 results). Extensive water quality data was collected by Dugan and Bartram (1977) at a station on lower 'Ahuimanu Stream approximately 1500 feet downstream of the Ahuimanu WWTP. This would be a short distance below the 1983 Station 201 (see below).

WAIOLA STREAM

Waiola Stream arises near the Ko'olau crest, flowing behind the Valley of the Temples, then through relatively new residential areas off of Hui 'Iwa road, and under Kahekili Highway at the intersection of the highway and Hui 'Iwa. The stream is contained in a Type 1, concrete culvert where it parallels Hui Iwa Street and where it parallels the east side of Kahekili Highway, but a small segment of natural stream bed remains from just above the 'Ahuimanu WWTP to just above the point where the stream again crosses under Kahekili and joins with 'Ahuimanu Stream. The Kahalu'u Watershed Project includes plans to contain this remaining natural segment in a concrete structure (U.S. Dept. of Agriculture, 1975). The drainage basin is given as 857 acres (Park Engineering, 1982).

The stream is contained in a box culvert beneath Kahekili at Hui 'Iwa and a Type 1, concrete channel under the Kahekili Highway bridge further downstream.

Within the natural segment, surveyed in 1983 under the highway bridge and just upstream, the stream bed consisted of small to medium size basalt boulders. Much of the stream bed was overgrown with Job's tears (Coix lachryma-jobi) and California grass (Brachiaria mutica). Water depth generally did not exceed 6 inches. Exotic fishes were abundant and included shortfin mollies (Poecilia mexicana), guppies (Poecilia reticulata), and tilapia (Sarotherodon mossambica). Bullfrogs (Rana catesbiana) and bullfrog tadpoles were common. The dominant fish seen in 1987 at Station 202 was the sailfin molly (Poecilia latipinna).

The 1983 water quality samples from Waiola Stream were taken to compare soluble petrochemicals above and below Kahekili Highway (Station 203 versus Station 204) and nutrients above and below the 'Ahuimanu WWTP (Station 204 versus 202). The 1987 survey provides for the same comparisons, with the variation that Station 201 was located on Waiola Stream just above the confluence with 'Ahuimanu Stream. The stream segment between Station 202 and Station 201 is the uppermost section of the Type 1 channel modification representing stream alterations made since 1983. Station 203 in 1987 was sampled on the tributary of Waiola Stream which passes under Halemanu Street.

Previous water quality measurements in lower Kahalu'u Stream (Lau, et al., 1976; AECOS, Inc., 1983) noted the influence of the 'Ahuimanu WWTP effluent into Waiola Stream on several water quality parameters. A mean total N value of 1.58 mg/L and a mean total P value of 0.24 mg/L, from several grab samples per week for a one year period, are reported by Dugan and Bartram (1977) for 'Ahuimanu Stream just below the confluence of Waiola Stream.

The WWTP effluent has since been diverted from the stream. Total nitrogen and total phosphorus appear to have decreased significantly since 1983 (see Table 3), although inorganic nitrate and remains high in water downstream of the WWTP (see Table 2). The source of this inorganic nitrate is not known (the wastewater treatment plant and a pig farm are adjacent to the stream between Stations 202 and 204), but the stream below Station 204 appears not to meet the State Water Quality Criterion (DOH, 11-54-05(a)) for nitrate plus nitrite. Phosphate is also being contributed to the stream between Station 204 and Station 202.

A comparison of the 1987 sampling results at Stations 201 and 202 (see Table 2) shows only slight differences in water quality which are probably not significant. However, the increase in temperature (from 23 to 25 °C) may be real and not unexpected given that the stream flow is spread out as a shallow sheet of water as it flows across the concrete floor of the culvert. Thus, the channel modifications appear to violate the State's Water Quality Criterion (DOH, 11-54-05(a)) by affecting a 2 °C rise in water temperature.

 Table 3. Comparison of Total N and Total P values in Windward O'ahu stream samples collected in 1983 and 1987. The 1983 samples were reported as an Addendum to AECOS, 1983; the 1987 values are from the present study.

Station	Stream	Total N		Total P	
		1983	1987	1983	1987
201	'Ahuimanu (B)	4.49	0.50	1.35	0.01
202	Waiola (B)	9.46	0.55	2.75	0.01
203	Waiola (A)	0.19	--	0.03	--
204	Waiola (B)	0.19	0.23	0.07	<0.001
205	He'eia (A)	0.13	--	0.04	--
206	He'eia (B)	0.20	0.52	0.10	0.01
207	"Haiku" (B)	0.45	0.35	0.05	0.05
208	"Kea'ahala" (B)	---	0.14	0.01	<0.001
209	"Kea'ahala" (A)	0.64	--	0.02	--
210	Kapunahala (A)	0.11	--	0.02	--
211	Kapunahala (B)	0.10	0.22	0.02	0.01
212	"Haiku" (A)	0.14	--	0.04	--
213	Kahalu'u (B)	0.89	0.51	0.09	0.01
214	Kane'ohe (B)	0.45	--	0.02	--
215	Kea'ahala (B)	--	0.49	--	<0.001

=====

HE'EIA STREAM DRAINAGE

The central portion of the Kahekili Project area encompasses the He'eia drainage system: streams which are tributary to He'eia Stream discharging into Kane'ohe Bay adjacent to He'eia Fishpond (Figure 3). The drainage basin encompasses a total of 2,750 acres above and below Kahekili Highway (Wilson Okamoto & Assoc., 1983). Some portions of this stream system -- through lower Haiku Valley and Crown Terrace subdivision in Kane'ohe -- are modified (Types 2 and 1, respectively); most of the channels remain in a natural condition. Lower He'eia Stream flows through a broad marshland (He'eia meadow) and a mangrove swamp before entering Kaneohe Bay. Included in the following discussion are Puolena, Ioleka'a, and He'eia Streams.

PUOLENA STREAM

Puolena Stream is a tributary of He'eia Stream arising in a small valley north of Haiku Plantations. This stream is called "Ioleka'a" on some maps. The drainage basin is included by Park Engineering (1982) in Ioleka'a Valley as the stream drains the northern part of this valley. Puolena Stream passes under Kahekili Highway upstream of the confluence with He'eia Stream. The Instream Use Survey (Wilson Okamoto & Associates, 1983) indicates this to be an intermittent stream. The 1987 survey was undertaken in the wet season during a month of above average rainfall, and yet no water was present in the channel at Kahekili Highway. No additional survey was made of Puolena Stream.

IOLEKA'A STREAM

Ioleka'a Stream is a tributary of He'eia Stream arising in Ioleka'a Valley behind Haiku Plantations. This stream flows into He'eia Stream above Kahekili Highway. The drainage basin for this and Puolena Stream is 543 acres (portion above Kahekili Highway, Park Engineering, 1982). This stream was not surveyed.

HE'EIA STREAM

He'eia Stream arises in the back of Haiku Valley where it is sometimes referred to as Haiku Stream (e.g., water level gage 2750). It runs more or less parallel with Haiku Road, passing under Kahekili Highway a little north of the intersection of the two roads. The drainage basin is 812 acres in area above Kahekili Highway (Park Engineering, 1982). At the Kahekili Highway culvert, water flow includes that of Ioleka'a Stream which enters He'eia Stream just above the bridge on Haiku Plantation

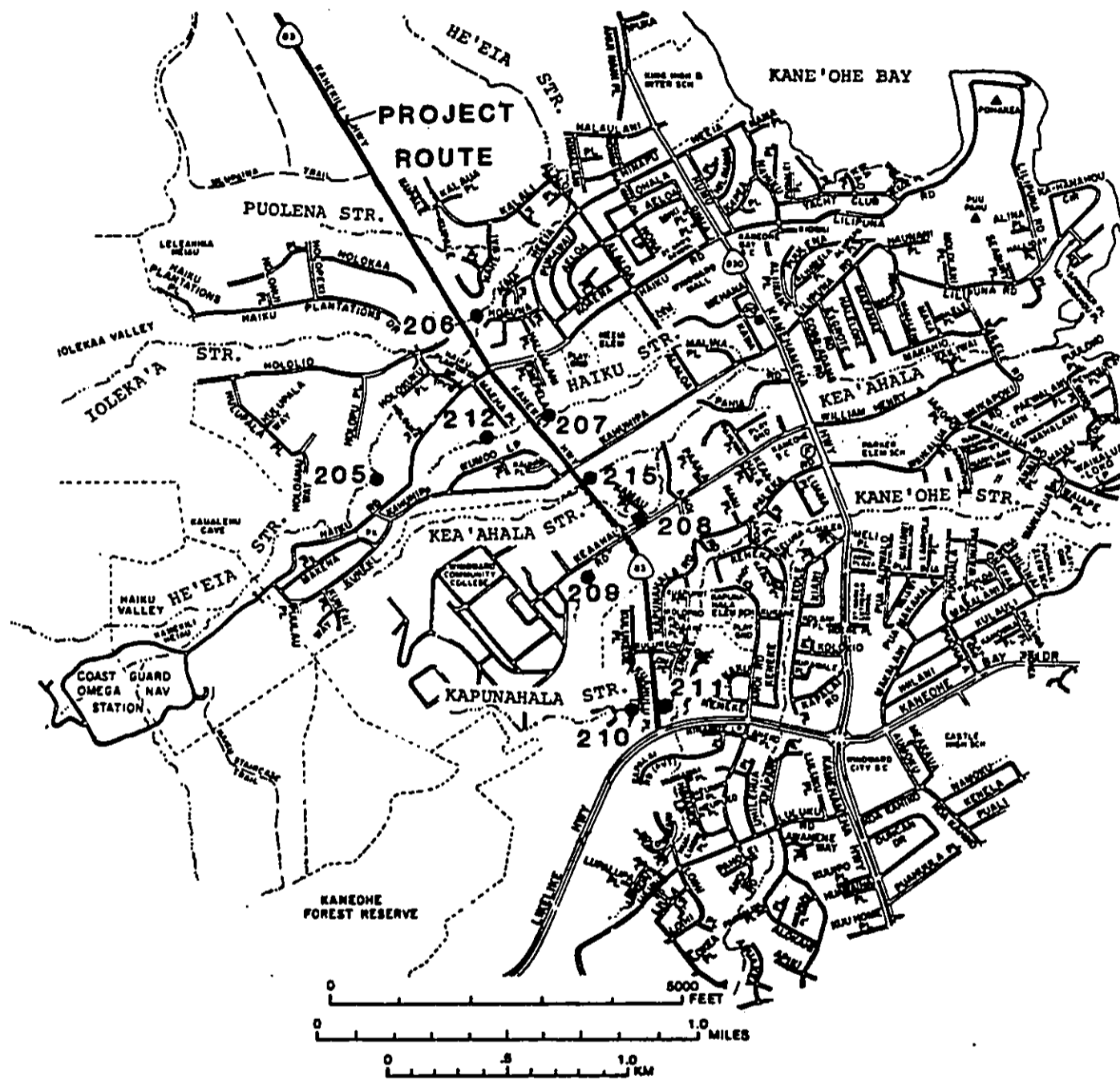


Figure 3. Southeastern project area encompassing He'eia, Kea'ahala, and Kamo'oali'i/Kane'ohe Drainage Areas. The 1987 Sample Stations (205 through 212 and 215) are indicated.

Road. Base flow of this stream was estimated by Takasaki et al. (1969) at 1.79 mgd, with Ioleka'a contributing perhaps another 0.35 mgd.

He'eia Stream was sampled above Kahekili Highway (Station 205) at a point behind Haiku Eden condominium and downstream of the highway (Station 206) at a point off Nahewai Street. In 1983, Station 206 was downstream of a waterfall and pool complex ("swimming hole"). Water samples were collected from just above this waterfall in 1987.

The upstream section is a natural stream bed within a forested area. The stream is characterized by large boulders, and a typical complex of riffles and small pools. Swordtails (Xiphophorus helleri) occur in the pools. Timbol and Maciolek (1978) report mosquitofish (Gambusia affinis), loach or dojo (Misgurnus anguillicaudatus), shortfin molly (Poecilia mexicana), and guppy (P. reticulata) as common exotic fishes found upstream of our Station 205. The endemic shrimp or 'opae kalaole (Atya bisulcata) and crayfish (Procambarus clarki) were found here as well. Plants common along the stream just above Haiku Eden are basketgrass (Oplismenus hirtellus), wedelia (Wedelia trilobata), sword fern (Microsorium scolopendria), and mosses. Trees overhanging the stream include rose apple (Eugenia jambos), guava (Psidium guajava), macaranga (Macaranga grandifolia), octopus tree (Brassaia actinophylla), and hau (Hibiscus tiliaceus).

The stream bed is modified (Type 2) below Haiku Eden (Station 205) where it passes through Haiku Plantations, and is again in a natural channel from Kahekili Highway to a point just above Alaloa Street. A raised box culvert (modification Type 3) passes under Kahekili Highway.

The reach immediately downstream of Kahekili Highway is in a deep gully. The stream bed is overgrown with honohono, Job's tears, and mulesfoot fern. Also present are yellow ginger (Hedychium flavescens), ape (Alocasia macrorrhiza), umbrella sedge (Cyperus alternifolius) and impatiens (Impatiens sultani). The report by Timbol and Maciolek (1978) includes a list of stream animals from this section of the stream. A number of exotic fishes, including Chinese catfish (Clarias fuscus), guppy (Poecilia reticulata), green swordtail (Xiphophorus helleri), loach or dojo (Misgurnus anguillicaudatus), and shortfin molly (Poecilia mexicana) were observed. The Tahitian prawn (Macrobrachium lar) and the crayfish (Procambarus clarki) were also common. Native o'opu or gobies (Awaous genivittatus and Eleotris sandwicensis) were present but rare.

Water quality at both Stations 205 and 206 was deemed excellent in 1983 and was found to be such in 1987 (see Table 4).

He'eia Stream just above Alaloa Street was sampled for a number of water quality parameters by WRRC in 1975-76 (Lau, et al., 1976). Suspended solids and streambed sediment grain-size distribution are reported for a 1969 sample in Fan and Burnett (1969). This sample was collected well up into Haiku Valley.

 Table 4. 1987 Water Quality Results, He'eia Drainage Area

STATION: STREAM:	206 He'eia	WQ Criteria *
ANALYTE	-----	-----
Temperature (°C)	22.0	<1 C°
pH (units)	7.83	5.5-8.0
Turbidity (ntu)	1.5	25.0
NFR (mg/L)	1.1	80.0
DO (mg/L)	8.55	>7.04
TKN (mg/L)	0.218	0.80
Nitrate+nitrite	0.304	0.30
Total P (mg/L)	<0.012	0.15

 * For nutrients and NFR, value is not to be exceeded during the wet season (November-April).

The unmodified stream below Kahekili Highway was rated as having a high potential as stream habitat in the Instream Use Survey by Wilson Okamoto & Assoc. (1983). Timbol and Maciolek (1978) rate the entire stream as having moderate to high quality water and/or natural values.

KEA'AHALA STREAM DRAINAGE

Kea'ahala Stream drains a relatively small area essentially between Haiku Road and Keaahala Road in Kane'ohe. The drainage basin is not well separated from the adjacent larger basins of He'eia Stream on the north and Kamo'oali'i / Kane'ohe Stream on the south. Significant segments of the stream flow are interrupted and most of the channel is modified. This system drains Haiku Village, Hokulele Subdivision, the State Hospital, Windward Community College, and Kaneohe District Park.

"HAIKU" STREAM

This is a small tributary of Kea'ahala Stream arising from Baskerville Spring near the pond at Haiku Gardens Restaurant off Haiku Road. The stream is unnamed, although sometimes referred to as "Haiku", a name also given to the segment of He'eia Stream above the confluence with Ioleka'a Stream. This stream is not shown on most maps of the area, although appears to be continuous flowing. The stream crosses under Kahekili Highway just south of Haiku Road and joins Kea'ahala Stream near the intersection of Kawa and Kahuhipa Streets in Kane'ohe town. In the drainage study by Park Engineering (1982), this stream was lumped with the Haiku Valley/He'eia Stream basin.

This stream was sampled both in 1983 and 1987 at a point above Kahekili Highway (Station 212) adjacent to the Haiku Gardens condominium and at a point immediately downstream of the highway (Station 207).

The upstream channel is in a natural setting surrounded by guava (Psidium guajava), macaranga (Macaranga grandifolia), hau (Hibiscus tiliaceus), honohono (Commelina diffusa), wedelia (Wedelia trilobata), California grass (Brachiaria mutica), and ferns. The reach immediately above the highway is a broad gully and meadow overgrown with California grass which obscures the stream bed. Numerous crayfish (Procambarus clarki), bullfrogs (Rana catesbiana), and poeciliid fishes occur in the stream.

The reach downstream of Kahekili Highway is contained in a gully supporting a somewhat open growth of java plum (Eugenia cumini), koa-haole (Leucaena leucocephala), and hau (Hibiscus tiliaceus). Much of the stream bed is completely overgrown with California grass (Brachiaria mutica) and Job's tears (Coix lachryma-jobi), except where heavily shaded by large trees.

KEA'AHALA STREAM

Kea'ahala Stream arises from springs in lower Haiku Valley. The measured flow from one spring in October 1961 was 0.22 mgd (Takasaki, et al., 1969). The location of this particular spring is unclear, but is somewhere between the highway and the State Hospital grounds. The mean flow of Kea'ahala Stream near its mouth is 3.4 mgd; ninety percent of the time (Q_{90}) the flow is greater than 2.2 mgd. The total area of the drainage basin is 600 acres (City and County of Honolulu, 1975); the portion above Kahekili Highway is 219 acres in extent (Park Engineering, 1982).

The stream and its tributaries cross under Kahekili Highway at three points between Kea'ahala Road and Kahuhipa Street. These streams were investigated by AECOS (1987) for a housing project (Hokulele Subdivision) above the highway and several stream sources were revealed. The northernmost channel (Type 1 above the highway) represents a realignment of Kea'ahala Stream which is interrupted between a concrete culvert just above the highway and a box culvert (Type 6) within the upper section of Haiku Village subdivision. In 1983, this land was a broad swale covered in open forest and meadowland, but has since been graded and cleared for a housing project now under construction and for expansion of the District Park on Kea'ahala Road. The stream bed is being contained in an underground box culvert (Type 6 modification) and open trapezoidal culvert (Type 1) to connect with the Type 1 channel of the realigned Kea'ahala Stream.

A box culvert under Kahekili Highway empties the stream flow into a mud bottom pool inhabited by guppies (Poecilia reticulata), sailfin mollies (P. latipinna), and crayfish (Procambarus clarki). The downstream end of this shallow pool was Station 215 sampled only in 1987.

The natural swale of Kea'ahala Stream directs the flow toward pipe culverts under Kahekili Highway midway between Kahuhipa and Keaahala Streets. Perennial flow through these culverts seeps from under a recently built concrete and boulder revetment located about 20 meters upstream of the roadway. Silt and soil from land-clearing run-off has mostly plugged the three pipe culverts. Above the revetment, the stream "channel" represents a Type 5 modification.

A "south fork" of Kea'ahala Stream is the source of much of this stream's water volume (although a significant portion is contributed by "Haiku" Stream described above). This south tributary arises behind the hill overlooking the Kapunahala area, flows through the Kaneohe District Park (between the parking lot and the swimming pool), crosses under Keaahala Road and then under Kahekili Highway near the intersection with Keaahala Road.

Station 209 was located in the District Park in 1983, but was moved upstream of the park in 1987. Flow from the middle culvert joins this south fork just above Kamau Place (in the small park adjacent to Ko'olau Village). Station 208 was located immediately upstream of the Kamau Place bridge. The water flow in the two streams which feed into a large pool at Station 208 is generally sluggish as evidenced by an extensive slime coating of iron-bacteria on the stream bed and banks. The stream here is contained in a Type 2 modified channel which approximates a natural condition.

 Table 5. 1987 Water Quality Results, Kea'ahala Drainage Area

STATION: STREAM:	207 Kea'ahala "Haiku"	215 Kea'ahala	208 Kea'ahala So.Fork	WQ Criteria *
ANALYTE	-----	-----	-----	=====
Temperature (°C)	22.0	23.5	24.5	<1 C°
pH (units)	7.54	8.03	7.50	5.5-8.0
Turbidity (ntu)	2.2	0.8	8.5	25.0
NFR (mg/L)	4.2	0.5	2.8	80.0
DO (mg/L)	7.45	7.65	8.0	>7.0
TKN (mg/L)	0.079	0.105	0.115	0.80
Nitrate+nitrite	0.269	0.387	0.025	0.30
Total P (mg/L)	0.050	<0.001	<0.001	0.15

 * For nutrients and NFR, value is not to be exceeded during the wet season (November-April).
 =====

Previous surveys of the biota in Kea'ahala Stream were made in conjunction with the proposed channelization of the middle reach of the stream by the City & County of Honolulu (1975) and by Timbol and Maciolek (1978) for a location near the Kamau Place box culvert. Fishes reported by these authors include the short-fin molly (*Poecilia mexicana*), guppy (*P. reticulata*), and swordtail (*Xiphophorus helleri*). The latter two species were observed as common in the December 1987 survey. Crustaceans ob-

served by Timbol and Maciolek (1978) were the crayfish (Procambarus clarki) and native 'opae (Atya bisulcata). In commenting on the City & County EIS, the U.S. Fish and Wildlife Service noted that crayfish, native goby fish (Awaous stamineus), and snails (Physa spp.) also lived in the stream.

 Table 6. Suspended Solids and Soluble Petrochemicals in samples from Kea'ahala Stream tributaries collected October 27, 1983 (AECOS, 1987).

Sample No.	Location	Suspended Solids (NFR) ¹	Soluble Petrochemicals ²
392/1	Middle culvert (A)	0.2	0.07
392/2	Spring, Windward College (A)	0.9	0.10
392/3	50 m above Sta. 208 (B)	4.8	0.11

 (A) above Kahekili Highway; (B) below Kahekili Highway.
¹ - in mg/L
² - in ug/L as phenanthrene.
 =====

KAMO'OALI'I / KANE'OHE DRAINAGE SYSTEM

The drainage system which feeds Kane'ohe, Kea'ahala, and Kawa Streams and several minor drainages along the south side of Kane'ohe Bay covers 6,300 acres (Wilson Okamoto & Assoc., 1983). However, the majority of this area feeds Kane'ohe Stream which enters the bay adjacent to Kaneohe Beach Park (Figure 3).

KAPUNAHALA STREAM

Kapunahala Stream (Bryan, 1983) is a tributary of Kane'ohe Stream, also known as Aolani (Timbol & Maciolek, 1978) or Analani Stream (name on bridge at Keneke Street) or Anolani (reference in Wilson Okamoto & Assoc., 1983). The drainage basin above Kahekili Highway is 154 acres in area (Park Engineering, 1982). The stream arises on the north side of the crest line extending down from the south face of inner Haiku Valley (behind the Kaneohe State Hospital). Kea'ahala Spring feeds this stream (Takasaki, et al., 1969). The stream is confined to a concrete-lined (Type 1) channel as it passes through a small housing area before entering a culvert (Type 3) structure beneath Kahekili Highway approximately 400 feet north of the intersection with Likelike Highway. Station 210 was located just upstream of the pipe culverts in 1983, and moved further upstream to just above the culvert under Kuahulu Place in 1987 (in a Type 1 channel).

The pipe culverts under Kahekili are elevated (modified Type 3, shown in Figure 6 of Timbol and Maciolek, 1978). Stream water falls into a concrete basin, then drops again into an elongated, shallow pool (Station 211 - Type 4 channel) before flowing into a concrete-lined (Type 1) channel downstream of Ko'olau Baptist church.

The stream section above Kahekili Highway is less overgrown with emergent vegetation than the downstream section. Common vegetation in and around the stream at the highway includes honohono (Commelina diffusa), wedelia (Wedelia trilobata), Job's tears (Coix lachryma-jobi), impatiens (Impatiens sultani), umbrella sedge (Cyperus alternifolius), primrose willow (Ludwigia octovalvis), and koa-haole (Leucaena leucocephala). Both short-fin mollies (Poecilia mexicana) and guppies (P. reticulata) occur in the stream above and below the culvert structure. The snail, Melania sp., is very abundant in the downstream pool. A survey of Kane'ohe Stream by Timbol and Maciolek (1978) in the general vicinity of our Station 214 (1983 only -- immediately downstream of the Kamehameha Highway bridge) revealed the presence of most of the common exotic stream fishes and crustaceans found on O'ahu. Also present were Hawaiian prawn (Macrobrachium grandimanus) and o'opu (Awaous stamineus and Eleotris sandwicensis).

Table 7. 1987 Water Quality Results, Kane'ohe Drainage Area

STATION: STREAM:	211 Kapunahala	WQ Criteria *
ANALYTE	-----	=====
Temperature (°C)	24.0	<1 C°
pH (units)	7.78	6.5-8.0
Turbidity (ntu)	4.2	25.0
NFR (mg/L)	2.1	80.0
DO (mg/L)	8.2	>6.8
TKN (mg/L)	0.217	0.80
Nitrate+nitrite	0.079	0.30
Total P (mg/L)	0.012	0.15

 * For nutrients and NFR, value is not to be exceeded during the wet season (November-April).
 =====

Kapunahala Stream is a small tributary of the Kane'ohe / Kamo'oali'i Stream system and not specifically addressed in the Instream Use Study (Wilson Okamoto & Assoc., 1978). One section of Kane'ohe Stream below Kapunahala Stream was rated by this study as having "high" stream fauna habitat potential, presumably because a native goby or o'opu nakea (Awaous stamineus) was observed.

DISCUSSION

The proposed project will widen an existing highway without any significant realignments. With respect to construction activities related to streams and drainage channels, it is proposed to make improvements in existing culverts as required to accommodate the additional traffic lanes and as deemed appropriate to increase flow capacity through the roadway penetrations. The potential impacts of these alterations on existing stream habitat will be assessed below with regard to direct construction impacts, habitat modification, and short and long-term water quality effects.

CHANNEL MODIFICATION

The modification of stream channels is a subject of continuing concern among aquatic biologists because of the significant degradation of aquatic habitat and loss of aesthetic values that can result from engineered improvements in channel flood capacity. The impact of stream modification on the unique native stream fauna of Hawai'i is described in Timbol and Maciolek (1978). Several species of native stream animals can no longer be found on the Island of O'ahu where channel modification is most extensive: 57% of the perennial streams on O'ahu had altered channel sections in 1976. These authors found 83.3 miles of modified channels on O'ahu, of which 43% were Type 1 modifications (See Table 1). These numbers have increased over the last decade, and probably significantly so.

In no case will the Kahekili Highway crossings of streams result in a change from a natural stream channel to one accommodated in a modified channel. Only one bridge crossing is involved: that over Waiola Stream (Station 202). The channel bottom under this bridge was natural at the time of the initial survey in 1983, but has since been altered by the construction of a concrete floor and side walls as part of a flood control project. All of the other channel penetrations are culverts of various dimensions and designs. In many cases, these culverts connect natural stream channels on either side of the highway, a condition which will not be altered by the planned highway improvements, although presumably culvert size (capacity) and length would be increased in some cases.

Stream segments which are unmodified, or if modified have a stream bed which is natural (modification Types 2 and 4) occur immediately upstream of the existing Kahekili Highway at Waiola (Sta. 202 only), Puolena, He'eia, and Haiku streams. The middle and south forks of Kea'ahala Stream are small capacity, Type 2 modifications (essentially ditches) on both sides of the highway.

Stream segments which are either unmodified or have a more or less natural bed downstream of a Kahekili Highway culvert include Puolena, He'eia, Haiku, and all three Kea'ahala tributaries. The elevated culvert for Kapunahala (Aolani) Stream empties onto a concrete "splash" structure directly beyond which is a Type 4 modified channel (for about 50 feet) followed by a Type 1 channel.

Puolena Stream is intermittent at the highway, flowing only during periods of intense rainfall on the watershed. Either none or only a small portion of Waiola Stream above the highway bridge would be directly in the path of the proposed widening project. As noted above, Kea'ahala Stream tributaries are clearly Type 2 modified channels the exchange of which for a longer buried culvert will be inconsequential with respect to impacts on stream biota. Thus, only He'eia and Haiku streams can be assessed as having natural aquatic habitats within the project boundaries and subject to direct construction impacts. For these streams, as well as others with modified or unmodified sections within the project area, the nature of the culvert penetration is of greater consequence to stream ecology than the extension and/or enlargement of culverts which already exist.

One of the unique aspects of the native Hawaiian stream fauna is the high percentage of diadromous species. These are animals which spend some part of their life cycle in the sea and some part in freshwater streams. Maintaining populations of these species in streams requires preservation of stream habitats throughout a significant length of the channel upstream from the mouth. Modifications of a channel, even where confined to the lower reach, can ultimately eliminate animal populations throughout a stream system by interfering with reproduction and recruitment of the diadromous species. The introduced species in Hawaiian streams are not dependent upon a migratory pathway to and from the sea and can replace native species in suitable habitat because of the native population's dependence upon the entire length of a stream for successful reproduction and recruitment.

Channel modifications which appear to be particularly detrimental to diadromous species are flat concrete floors which present a wide, very shallow flow of water (sheet flow), and conduits which terminate at their downstream end elevated above the stream. Clearly in some situations it is an engineering challenge to design and build a culvert structure which smoothly transitions the stream bed on either side of the highway, while avoiding both a gradient or slope which is too steep and an elevated downstream end. To the extent that new conduits or extensions on existing conduits under Kahekili Highway avoid creating "detrimental" stream reaches, the major long-term impacts of the

project on stream ecology can be mitigated.

WATER QUALITY

The State of Hawaii, Water Quality Standards provide a basis for assessing water quality in terms of appropriate parameters and numerical ranges based on natural, unperturbed systems. In assessing water quality characteristics of a stream, a single sample may not be particularly representative of the stream as a whole or even a part of the sampled reach for any meaningful period of time. The State standards incorporate a recognition of the variability inherent in any series of samples, and particularly the deviations which can occur as a result of infrequent events such as storms. The standard for most of the parameters is embodied in more than one numerical expression, even within a given class of water. For these water quality parameters, the criteria include:

- 1) the geometric mean of all measurements is not to exceed one certain value;
- 2) 10% of the measurements should not exceed a second (higher) value; and
- 3) no individual measurement should exceed a third (usually highest) value at any time (DOH, 1977).

Where a single value is to be used as a basis for comparison and assessment, only the expression given in 3) can be applied because the other expressions require a minimum of three separate measurements from which to calculate a geometric mean. Ideally, multiple samplings should span a characteristic range of conditions for the site. A single sample can be compared with the "not-to-exceed" value (or range in some cases) as at least a first approximation of the existing water quality and this is done in text tables 2, 4, 5, and 7 (see the far-right column in each table). When the comparison of a water quality result with the appropriate criterion shows the body of water to be substantially lower than the criterion, it can be concluded, although tentatively (with reservation stemming from a lack of knowledge about variability), that the system is not seriously perturbed with respect to that parameter.

For the stream samples analyzed in 1987, only the nutrient concentrations in some streams appear excessive relative to the standards (State water quality criteria). Although stations located on Kahalu'u and Waiola Streams below the 'Ahuimanu WWTP (see Table 2) stand out in this regard (particularly in 1983), nitrate plus nitrite and TKN values close to or exceeding the least stringent criterion are apparent for samples of He'eia Stream (Table 4), Kea'ahala Stream tributaries (Table 5), and

Kapunahala Stream (Table 7). Essentially most of the streams sampled in the study area have moderately high dissolved and total fixed nitrogen concentrations. The values are not unusual, however, if compared with the extensive measurements made in Waihe'e, Ahuimanu, Luluku, and Kamo'oali'i Streams by the University of Hawaii, Hawaii Environmental Simulation Laboratory (Dugan and Bartram, 1977) and a comparable study by the Water Resources Research Center (Young, et al., 1976) incorporating some of the same sampling locations in addition to others in the Kane'ohe Bay watershed. The nitrogen and phosphorus results from these two surveys are partly summarized in Table 8.

Table 8. Summary and comparison of HESL¹ and Water Resources Research Center² water quality studies of selected windward Oahu streams (1974-75) with closest comparable stream stations from the 1983³ and the present studies. Units are mg N/liter and mg P/liter.

	NO2-NO3	Total N	PO4	Total P
Upper Waihe'e (1974-75) ¹	0.072	0.253	0.028	0.036
Upper Waihe'e (1975) ²	0.058	0.10	0.028	0.039
Lower Waihe'e (1974-75)	0.235	0.866	0.079	0.095
Lower Waihe'e (1975)	0.448	1.34	0.169	0.262
Ahuimanu (1974-75)	1.28	1.42	0.216	0.238
Kahalu'u (1975)	0.277	0.82	0.090	0.129
Waiola (1975)	3.42	5.19	0.480	0.810
Waiola (202)(1983) ³	--	9.46	--	2.75
Waiola (202)(1987) ⁴	0.432	0.552	--	0.007
Kane'ohe (1975)	0.055	0.19	0.012	0.018
Kapunahala (211)(1983)	--	0.10	--	0.02
Kapunahala (211)(1987)	0.079	0.22	--	0.01
Luluku (1974-75)	0.165	0.435	0.027	0.039
Kamo'oali'i (1974-75)	0.250	0.504	0.018	0.026
Kamo'oali'i (1975)	0.380	0.50	0.017	0.024
Kamo'oali'i (1979) ⁵	0.514	0.637	0.022	0.054

- ¹ Dugan and Bartram (1977) - Median annual monthly median values.
² Young, et al. (1976) - median values.
³ AECOS (1983) - Single measurements.
⁴ Present study - Single measurement
⁵ AECOS (1981) - Single measurement taken 12/8/79.

The 1983 water quality sampling effort for the proposed project (AECOS, 1983) emphasized a comparison of suspended solids and soluble petrochemicals at stream locations above and below the highway crossings because these are parameters most likely to be influenced by the project. The results (Table 9) demonstrate trends, in most cases, of increased suspended solids and increased soluble petrochemicals carried by each stream below the highway as compared with the same stream above the highway. Waiola Stream was somewhat an exception, giving high suspended solids at an upstream site (Station 203) and particularly high soluble petrochemical concentrations at two sites (Stations 202 and 204). The latter was attributed to construction work along the bank near Station 204.

 Table 9. Results of 1983 measurements of suspended solids (NFR) and soluble petrochemicals in water samples from streams in the vicinity of Kahekili Highway, O'ahu paired to show upstream and downstream values.

Station No.	Stream	NFR ¹	Sol. Pet. ²
213	Kahalu'u (B)	6.4	0.50
202	Waiola (A)	26.0	2.17
201	'Ahuimanu (B)	4.3	1.10
203	Waiola (A)	26.8	0.59
204	Waiola (B)	12.4	3.23
205	He'eia (A)	1.8	0.12
206	He'eia (B)	1.0	0.15
212	"Haiku" (A)	6.4	0.33
207	"Haiku" (B)	9.2	0.36
209	Kea'ahala (A)	5.6	0.25
208	Kea'ahala (B)	6.6	0.45
210	Kapunahala (A)	2.4	0.09
211	Kapunahala (B)	3.2	0.24
214	Kane'ohe (B)	4.8	0.82

¹ In mg/L

² As phenanthrene in micrograms per liter (ug/l).

For the soluble petrochemicals, the earlier sampling effort was repeated in 1987. Although similar trends were again evident (Table 10), for some streams there was not a marked difference above and below the highway. Although these measurements suggest, as expected, that runoff from the highway contributes petrochemicals to the streams, it is likely that petroleum hydrocarbons increase generally downstream, because these water courses flow through progressively more urbanized watersheds below Kahekili Highway (refer to Station 214, Table 9, representing Kane'ohe Stream just below Kamehameha Highway). It is expected that highway improvements will produce both short-term and long-term increases in the loadings of soluble and insoluble organics from petroleum products. Short-term pollution will be contributed by oil and fuel spills from road-working equipment and the release of mobile components in the new asphalt. Long-term increases will result from having a greater pavement surface handling (in all probability) more vehicular traffic.

 Table 10. Results of 1987 suspended solids and soluble petrochemicals in water samples from streams in the vicinity of Kahekili Highway, O'ahu paired to show upstream and downstream values.

Station No.	Stream	NFR	Sol. Pet. ¹
213	Kahalu'u (B)	3.8	---
202	Waiola (A)	3.4	0.33
201	Waiola (B)	3.2	0.22
203	Waiola (A)	---	0.16
204	Waiola (B)	2.8	0.20
205	He'eia (A)	---	<.01
206	He'eia (B)	1.1	0.40
212	"Haiku" (A)	---	0.27
207	"Haiku" (B)	4.2	0.44
209	Kea'ahala (A)	---	0.28
208	Kea'ahala (B)	2.8	0.27
210	Kapunahala (A)	---	0.42
211	Kapunahala (B)	2.1	0.46

¹ As phenanthrene in micrograms per liter (ug/l).
 =====

The term "soluble petrochemicals" refers to certain organic compounds found in crude oil and processed petroleum products which are slightly soluble in water. Included are a number of different compounds, mostly falling within the class of compounds called aromatic hydrocarbons or polynuclear aromatic hydrocarbons (PAH). These compounds include benzene and heavier polycyclic and heterocyclic hydrocarbons with two or more benzene (six carbon) rings. Included are compounds such as acenaphthylene, anthracene, fluorene, naphthalene, phenanthrene, and pyrene.

Because a diverse class of compounds is involved, the toxicity characteristics of petroleum and petroleum products is far from straight forward. Concern with adverse impacts on the environment from petroleum spills has produced a number of toxicity studies, but most do not partition the individual affects contributed by the many components.

The primary purpose of the 1983 and 1987 samples was to establish baseline values for the stream segments directly impacted by the project. At the present time, however, maximum allowable concentrations of soluble petrochemicals or individual components are not addressed in State Water Quality Standards, and no practical means exists to prevent the movement of these compounds from the highway surface into the stream environment. The Environmental Protection Agency has established criteria for naphthalene in aquatic environments based on the lowest observed effect level (USEPA, 1980). Acute and chronic toxicity to freshwater aquatic life occur at concentrations as low as 2.300 ppm and 0.620 ppm, respectively.

Non-filterable residue measures the weight of solid material (essentially sediment) suspended in the water. The finer fractions (very fine sand, silt, and clay) may remain suspended and be carried to the stream mouth, or may settle out in quiet water (pool) sections of the stream. The introduction of quantities of soil to the stream during construction will cause a sharp rise in suspended solids which may significantly alter stream habitats wherever the material accumulates. The coarser material introduced at the same time, will tend to move downstream as bedload material, also altering stream habitats.

The impact of increased suspended and bed-load materials is usually a short-term one associated directly with construction activities, although if graded slopes are left unvegetated, the severity of the impact on the stream(s) and on Kane'ohe Bay can be exacerbated. The impact of construction generated sediment has been discussed for each major stream in an earlier assessment (AECOS, 1983) and need only be summarized herein. For nearly all of the streams surveyed, natural stream environments comprise only a small portion of the reaches downstream from Kahekili

Highway and these are generally of poor habitat quality. No unique aquatic habitats or biota will be threatened by sediment additions arising from construction of the proposed project. The channelized segments that are present will tend to move the fine material rapidly into Kane'ohe Bay.

He'eia Stream is an exception. Much of the stream bed downstream is natural, and of generally high habitat quality. The marshland in He'eia Meadow supports endangered Hawaiian waterbirds such as coot (Fulica americana alai) and gallinule (Gallinula chloropus sandvicensis) (Ahuimanu Productions, 1977). Impacts on the marsh, mangrove swamp, and Kane'ohe Bay from short-term degradation of mid-reach He'eia Stream will be minor. The marshland and mangrove swamp will tend to remove suspended solids from the stream under all but flood stage conditions. Minimizing the introduction of sediments to He'eia Stream by appropriate construction practices should be a priority, however, because of the sensitive stream habitats found immediately below the highway.

BIBLIOGRAPHY

- AECOS, Inc. 1981. Final report on monitoring activities for the Kaneohe-Kailua flood control project. Prep. for U.S. Army Corps of Engineers, Pacific Division. 56 p.
- _____. 1983. Stream surveys for the Kahekili Highway improvement project, Kane'ohe to Kahalu'u, O'ahu, Hawai'i. Prep. for EDAW, Inc., Honolulu, Hawaii. 20 p. plus Addendum A.
- _____. 1987. Stream surveys for a Hawaii Housing Authority project, Kea'ahala, Ko'olaupoko, O'ahu. Prepared for Gerald Park, Urban planner, Honolulu, Hawaii. March 1987 revision, 14 p.
- Ahuimanu Productions. 1977. An ornithological survey of Hawaiian wetlands. Vol. 2. Site discussions. Prep. for U.S. Army, Engineer District, Honolulu. 406 p.
- Bartram, P. 1972. Flood hydrology in the Kaneohe Bay drainage area: background and models. Hawaii Environmental Simulation Laboratory, Working Paper WP 72-005.
- _____. 1976. Kaneohe's sediment problem: Part I: Available information on sediment yields and methods of estimation in Kaneohe drainage basins. In: Kaneohe Bay Water Resources Data Evaluation. Appendices I & II. Prep. for U.S. Army Engineer District, Honolulu, Oahu.
- Bauman, R.D., and D.C. Cox. 1972. The Moanalua corridor: environmental problems along the proposed route of Hawaii Interstate H-3. HESL Working Paper WP 72-001.
- Bryan, E.H., Jr. 1982. Bryan's Sectional Maps of O'ahu. Revised December 1982. Published by Pacific Scientific Information Center, B.P. Bishop Museum.
- City and County of Honolulu. 1969. Watershed Work Plan, Kahaluu Watershed. Prep. by Windward Oahu Soil and Water Conservation District and the City and County of Honolulu. 72 p. plus maps.
- _____. 1972. Drainage Master Plan for Oahu. City Council Resolution No.121. City and Council of Honolulu, Department of Public Works.
- City and County of Honolulu, Dept. of Public Works. 1975. Final Environmental Impact Study for Keaahala Stream Flood Control Project. Prep. by Div. of Engineering, Dept., Public Works, City & County of Honolulu. 17 p. + appendix.

- Dugan, G.L. 1976. Kaneohe Bay tributary stream water quality program. In: Kaneohe Bay Water Resources Data Evaluation. Appendices I & II. Prep. for U.S. Army Engineer District, Honolulu, Oahu.
- _____, and P.D. Bartram. 1977. Management considerations for small Hawaiian watersheds. Final Report. Watershed Management Unit, Hawaii Environmental Simulation Laboratory, University of Hawaii, Honolulu. 89 p. + appendices.
- Ekern, P. 1976. Turbidity and sediment load of central and windward Oahu streams. In: Kaneohe Bay Water Resources Data Evaluation. Appendices I & II Prep. for U.S. Army Engineer District, Honolulu, Oahu.
- Fan, P.F., and W.C. Burnett. Sedimentation. In: Estuarine Pollution in the State of Hawaii. Part II. Kaneohe Bay Study. Univ. Hawaii, Water Resources Research Center Tech. Rpt. No. 31.
- Fowler, Bergman, and Assoc., Inc. 1973. Environmental factors of the Kaneohe Bay region. Prep. for U.S. Army Corps of Engineers.
- Gordon, D.C., P.D. Keizer, and J. Dale. 1974. Estimates using fluorescence spectroscopy of the present state of petroleum hydrocarbon contamination in the water column of the northwest Atlantic Ocean. Mar. Chem., 2: 251-261.
- Lau, L.S., R.H.F. Young, S.K. Konno, R.J. Oldnall, and H.H. Lee. 1976. Wet-weather water quality monitoring. Kaneohe Bay, Oahu, Hawaii. Univ. Hawaii, Water Resources Research Center, Tech. Rept. No. 100. 121 p.
- Neff, I.M. and J.W. Anderson. 1975. An ultraviolet spectrophotometric method for the determination of naphthalene and alkylnaphthalenes in the tissues of oil-contaminated marine animals. Bull. Environ. Cont. and Tox., 14 (1): 122-128.
- Park Engineering, Inc. 1982. Kahekili Highway Widening and Interchange Drainage Study. Prep. for State of Hawaii, Dept. Transportation. Proj. No. 83F-01-75 and 63A-05-68.
- Quan, E.L., R.H.F. Young, N.C. Burbank Jr., L.S. Lau. 1970. Effects of surface runoff and waste discharge into the southern sector of Kaneohe Bay: January-April 1968. Univ. of Hawaii, Water Resources Research Center, Tech. Rept. No. 35. 39 p.

- Standard Methods. 1980. Standard Methods for the examination of water and wastewater. 15th edition. Published jointly by the APHA, AWWA, and WPCF. Washington, D.C. 1134 p.
- State of Hawaii, Department of Health. 1975. Water quality data for Kaneohe Bay area streams.
- , Department of Land and Natural Resources. 1970. Keaahala Stream flood hazard area; Kaneohe, Oahu, Hawaii.
- , -----, 1973. Heeia flood hazard area; Heeia, Oahu, Hawaii.
- Stevens, E. 1981. Water Resources Map. Kahalu'u Neighborhood Board No. 29. 3/11/81. 1 sheet.
- Takasaki, K.J., G.T. Hirashima, and E.R. Lubke. 1969. Water resources of windward Oahu, Hawaii. U.S. Dept. Interior, Geol. Survey Water-Supply Paper 1894. 115 p.
- Timbol, A.S., and J.A. Maciolek. 1978. Stream Channel Modification in Hawaii. Part A: Statewide Inventory of Streams; Habitat Factors and Associated Biota. University of Hawaii; Hawaii Cooperative Fishery Research Unit for U.S. Dept. Interior, Fish and Wildlife Service, Biological Services Program. FWS/OBS-78/16, April 1978. 157 p.
- U.S. Department of Agriculture. 1975. Kahaluu Watershed Project, City and County of Honolulu, Hawaii. Final Environmental Impact Statement. USDA-SCS-EIS-WS-(ADM)-75-3(F)-HI.
- U.S. Environmental Protection Agency. 1980. Ambient Water Quality Criteria for Naphthalene. EPA 440/5-80-059. U.S. Environmental Pollution Agency, Washington, D.C.
- Wilson, Okamoto, & Associates, Inc. 1983. Instream Use Study. Windward Oahu. Prep. for State of Hawaii, Dept. Land & Natural Resources. Rept. R68. 154 p.
- Young, R.H.F., L.S. Lau, S.K. Konno, and H.H. Lee. 1976. Water quality monitoring: Kaneohe Bay and selected watersheds July to December 1975. Univ. of Hawaii, Water Resources Research Center, Tech. Rept. No. 98, 86 p.
- Zsolnay, A. 1973. Determination of aromatic hydrocarbons in sub-microgram quantities in aqueous systems by means of high performance liquid chromatography. Chemosphere, 6: 253-260.

APPENDIX D

**RELOCATION
PLAN**

RELOCATION PROGRAM PLAN AT CONCEPTUAL STAGE

Kahekili Highway Widening, Project No. 83F-01-75,
Kahekili Interchange Project No. 63A-05-68 and
H-3 Ramp T. K.

This relocation program plan is formulated to comply with the requirements stipulated in Volume 7, Chapter 5, of the Federal-Aid Highway Program Manual and the Rules and Regulations of Act 166, Session Laws of Hawaii, 1970 as amended.

It analyzes the characteristics and needs of the individual and family households to be displaced by Schemes "A-4", "B-1", "C-1", Kahekili-Likelike Intersection Improvement of the proposed Kahekili Interchange, Project No. 63A-05-68 and H-3 Ramp T. K., and suggests solutions to their needs based on a visual inspection and other available secondary source data. The relocation program plan is based on data obtained during October 1987 and updated October 1989.

Kahekili Highway Widening, Project No. 83F-01-75, will not displace any person (individual, family or farm). It has been omitted, therefore, from the discussions that follow below.

There will be a total of 39 parcels of land to be affected by all the various schemes and Ramp T. K. Of these, 7 parcels are whole takings and 32 partial takings.

Of the four alternatives for Kahekili Interchange, Project No. 63A-05-68, Schemes "A-4" and "C-1" will cause the displacement of three households, two tenant occupied households and one owner occupied household. However, H-3 Ramp T. K. will be the most disruptive in terms of the number of displacements, as it will cause the displacement of six households; two owner-occupied and four tenant occupied households. Both Schemes "A-4" and "C-1" will cause the same displacements of households, therefore the two schemes are covered together in the relocation program. The other two schemes, Kahekili-Likelike Intersection Improvement and "B-1" will be likewise covered together as both will cause the same displacement of households.

1. Schemes "A-4" and "C-1":

These two schemes affect two houses on TMK 4-5-26:77 and one house on TMK 4-5-08:81. The schemes will displace three households.

a. Displacements - TMK 4-5-26:77

Household Displacees:

Two households will be displaced from TMK 4-5-26:77. The displacements are two tenant households. Displaced from the two houses (a four-bedroom and a three-bedroom) is a household of four, comprised of a mother and her three (3) young children. They occupy the 4-bedroom house at a monthly rental of approximately \$700. The other is a household of two related adults. They occupy the 3-bedroom house which rents for approximately \$655.

b. Displacements - TMK 4-5-108:81

Household Displacees:

Only one household will be displaced from TMK 4-5-108:81. An owner-occupant (leasehold) will be displaced from the property. This family occupies a newly built (less than two years old) two-story dwelling.

2. Schemes "B-1" and Kahekili-Likeli Intersection Improvement:

These two schemes affect only two tenant occupied households on TMK 4-5-26:77. These two schemes affect the same property with the tenant occupied households. These are the same tenant households mentioned in Schemes "A-4" and "C-1", therefore will not be discussed.

3. H-3, Ramp T. K.:

This ramp project will affect five (5) households on TMK 4-5-82:53 and one (1) household on TMK 4-5-82:56. A total of six (6) households will be displaced.

a. Displacements - TMK 4-5-82:53

Household Displacees:

Five (5) households will be displaced from TMK 4-5-82:53. The displacements are one owner-occupant household and four (4) tenant households. The owner-occupant household consisting of a widow and one grown son occupies

an old 4-bedroom house. The four tenant households consist of (1) a mother, her two children and a grandmother; (2) a retired married couple and their grown daughter; (3) a married couple (retired) and (4) a retired couple. Each of the tenant-households occupies a separate house. There are two 2-bedroom houses and two 3-bedroom houses. The rental for the 2-bedroom is about \$230 and the 3-bedroom is \$350.

b. Displacements - TMK 4-5-82:56

Displaced from the one-bedroom house on TMK 4-5-82:56 will be the owner-occupant. He is the only resident of this property.

Housing:

A study of the real estate market revealed the existence of an adequate supply of homes for sale in the windward (Kaneohe-Kailua) area. The Honolulu Board of Realtor's multiple listing service dated August 1989 lists 24 single family dwellings with three or four bedrooms in the Kaneohe area for sale. The asking price ranged from \$190,000 to \$350,000.

Consultations with real estate brokers and rental agents indicated that there are not many rental available in the windward area, especially the 2-bedroom dwellings. The market rent for available 2-bedroom houses range from \$700 to \$900 and for the 3-bedrooms, from \$925 to \$1,000 and above per month.

Following are three State low-income housing projects located in the windward area:

"Koolau Village" - a low-income townhouse project on Kamau Place, Kaneohe. It has a total of 80 units as follows:

8 1-bedroom units
24 2-bedroom units
36 3-bedroom units
12 4-bedroom units

"Hookipa Kahaluu" - a low-income townhouse project on 41-330 Ahuimanu Road, Kahaluu. It has a total of 56 units as follows:

8 1-bedroom units
32 2-bedroom units
16 3-bedroom units

"Kaneohe Apartments" - a low-income housing project on 45-507 Pahia Road, Kaneohe. It has a total of 24 units as follows:

12 1-bedroom units
12 2-bedroom units

Relocation:

The relocation of the owner-occupant household on TMK 4-5-82:53, TMK 4-5-82:56 and TMK 4-5-105:81, should not pose a problem. The owners could apply the payment for their property received from the State towards the purchase or rental of a replacement house. Furthermore, relocation advisory assistance services and payments will be made available to the owner-occupants as provided by law.

Relocation of the four tenant-occupants on TMK 4-5-82:53 may be problematic. Based on the approximately \$230 to \$350 in rent each pays, it is probable that they may qualify for low-income housing. In the event the displacees qualify for low income housing and are desirous of relocating into the above-mentioned State housing project, we will seek the assistance of the Hawaii Housing Authority, the agency that administers State housing, to provide rental units for the highway displacees. Tenants displaced by government action are given priority into State housing, more so if they are elderly.

If the displacees agree to accept public subsidies, another possibility is to utilize government-sponsored rent supplement programs. A federal funded program known as Section 8, "Existing Housing Program," gives preferential treatment to families displaced by government action. It pays the remaining rent within certain limits after the qualified family pays 10% of

gross income or 30% of adjusted income, whichever is greater, toward the rent. Another program is the State Rent Supplement Program which supplements the rent payment by paying the remaining rent after the qualified family pays at least 20% of the gross family income for rent, up to a maximum of \$70 per month for a non-elderly family and \$90 per month for an elderly family.

All eligible displaced tenants will be provided with relocation advisory assistance services and payments as prescribed by law.

In the event all the available resources have been exhausted without achieving satisfactory results, a procedure called "Last Resort Housing" would be implemented. Under this plan, the government agency responsible for the displacement may do one of the following: (1) construct the replacement housing; (2) rehabilitate existing dwellings; (3) purchase land with existing houses; (4) relocate acquired dwellings; or (5) increase the housing payment beyond statutory limits.

4. Summary:

To briefly summarize the discussions in this relocation program plan at conceptual stage, it can be stated that:

- (1) Relocation of some of the tenant households displaced by H-3 Ramp T. K. and Schemes A-4, C-1, B-1 and Kahekili-Likelike Intersection Improvement may turn out problematical if replacement housing within their financial means are unavailable;
- (2) The displacements to be caused by H-3 Ramp T. K. and Schemes A-4, C-1, B-1 and Kahekili-Likelike Intersection Improvement may have somewhat of an unfavorable impact on the community by the depletions that may result in the housing resources of the area. There will be no impact on the economy.

Request for R/W Cost Data
DOT 4-149
(HWY-R 9/69)

Date NOV 20 1989

To: HWY-PA
Branch and/or Section

THROUGH: CHIEF, HIGHWAYS DIVISION

FROM: Right-of-Way Branch

SUBJECT: PREPARATION OF: CIP COST DATA
FA PROGRAM
DETAIL ESTIMATE
JOB AUTHORIZATION

x

Check
Applicable
Boxes

for Kahekili Highway Widening, Project No. 83F-01-75
Project Number and Title

The following information is hereby furnished for the subject project:

- (1) Work Scope Acquisition of 12 partial takings and 10 slope easements along Kahekili Highway.
- (2) Justification HWY-P
- (3) Cost Estimate:

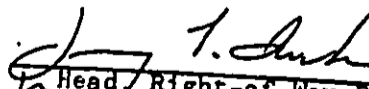
R/W		
State Forces (R/W Branch only)		\$ 275,300
Appraisal Fees		19,000
Relocation Assistance		
Residential	<u>0</u>	
Business	<u>0</u>	
		<u>\$ 294,300</u>
Acquisition		
Whole Taking	No. of Parcels <u>0</u>	\$.
Partial Taking	No. of Parcels <u>22</u>	\$ 463,500
*Total R/W Cost		<u>\$ 757,800</u>

- (4) Schedule of Expenditures: (By Month)
- (5) No relocation assistance and payment costs or property management costs anticipated. Slope Easement Parcel No. 3 redesigned to 1,043sq, per D. Orimoto 11/2/89.

*Subject to Change.

DKY:btv

cc: HWY-SM


Head, Right-of-Way Branch

Request for R/W Cost Data
DOT 4-149
(HWY-R 9/69)

Date NOV 20 1989

TO: HWY-PA
Branch and/or Section

THROUGH: CHIEF, HIGHWAYS DIVISION

FROM: Right-of-Way Branch

SUBJECT: PREPARATION OF: CIP COST DATA
FA PROGRAM
DETAIL ESTIMATE
JOB AUTHORIZATION

Check
Applicable
Boxes

for Kahekili Highway Widening & Interchange, Off-site work
Project Number and Title

The following information is hereby furnished for the subject project:

(1) Work Scope: Acquisition of 221.4 acres roadway parcel, 2 slope easements to Kealahala Road, 3 partial takings in Kulukeos Street extension, and widening of southwest corner of Kahekili Highway - Kealahala Road Junction.

(2) Justification HWY-P

(3) Cost Estimate:

R/W		
State Forces (R/W Branch only)		
Appraisal Fees		\$ 69,800
Relocation Assistance		4,000
Residential	<u>0</u>	---
Business	<u>0</u>	---
		<u>---</u>
		\$ 73,800

Acquisition			
Whole Taking	No. of Parcels	<u>0</u>	\$ ---
Partial Taking	No. of Parcels	<u>7</u>	\$ 67,700
*Total R/W Cost			<u>\$ 141,500</u>

(4) Schedule of Expenditures: (By Month)

(5) No relocation assistance, payment costs or property management costs anticipated.

*Subject to Change.

DKY:btj

cc: HWY-SM

Jay L. Cook
Head, Right-of-Way Branch

Request for R/W Cost Data
DOT 4-149
(HWY-R 9/69)

Date NOV 20 1989

TO: HWY-PA
Branch and/or Section

THROUGH: CHIEF, HIGHWAYS DIVISION

FROM: Right-of-Way Branch

SUBJECT: PREPARATION OF: CIP COST DATA
FA PROGRAM
DETAIL ESTIMATE
JOB AUTHORIZATION

	Check
	Applicable
x	Boxes

for Kahekili-Likelike Intersection Improvement.
Project Number and Title

Project No. 63A-05-68

The following information is hereby furnished for the subject project:

(1) Work Scope: Acquisition of 3 partial takings along Kahekili Highway. 2nd Likelike Highway (parcels no. 2 2nd 3)

(2) Justification HWY-P

(3) Cost Estimate:

R/W		
State Forces (R/W Branch only)		\$ 51,600
Appraisal Fees		3,000
Relocation Assistance		
Residential	<u>2</u>	12,200
Business	<u>0</u>	---
		<u>\$ 66,800</u>

Acquisition			
Whole Taking	No. of Parcels	<u>3</u>	\$ 372,800
Partial Taking	No. of Parcels	<u>0</u>	---
*Total R/W Cost			<u>\$ 439,600</u>

(4) Schedule of Expenditures: (By Month)

(5) Per D. Orimoto, Parcel Nos. 1, 4, 5, 6, 7, 8, 9 into H-3 ramp - tunnel to Kahekili. Dwellings on TMK: 4-5-26-77 affected by proposed takings.

*Subject to Change.

DKY:btj

cc: HWY-SM

D-8

[Signature]
Head, Right-of-Way Branch

Request for R/W Cost Data
DOT 4-149
(HWY-R 9/69)

Date NOV 20 1989

To: HWY-PA
Branch and/or Section

THROUGH: CHIEF, HIGHWAYS DIVISION

FROM: Right-of-Way Branch

SUBJECT: PREPARATION OF: CIP COST DATA
FA PROGRAM
DETAIL ESTIMATE
JOB AUTHORIZATION

X

Check
Applicable
Boxes

for Kahekili Interchange, Project No. 63A-05-68, Scheme A-4
Project Number and Title

The following information is hereby furnished for the subject project:

(1) Work Scope Acquisition of 2 whole takings and 8 partial takings
for the Kahekili Interchange project.

(2) Justification HWY-P

(3) Cost Estimate:

R/W		
State Forces (R/W Branch only)		\$ 152,800
Appraisal Fees		10,000
Relocation Assistance		
Residential	<u>3</u>	35,800
Business	<u>0</u>	---
		<u>\$ 198,600</u>

Acquisition			
Whole Taking	No. of Parcels	<u>2</u>	\$ 1,131,500
Partial Taking	No. of Parcels	<u>8</u>	\$ 483,900
*Total R/W Cost			<u>\$ 1,814,000</u>

(4) Schedule of Expenditures: (By Month)

(5) Parcel Nos. 1, 4, 5, 6, 7, 8, 9, 10, 11 transferred into H-3 ramp - tunnel to Kahekili, per D. Orimoto. Two dwellings on TMK: 4-5-26-77 and 1 dwelling on TMK: 4-5-108-81 affected by proposed takings.

*Subject to Change.


Lead, Right-of-Way Branch

DKY:btv

cc: HWY-SM

Request for R/W Cost Data
DOT 4-149
(HWY-R 9/69)

Date NOV 20 1989

TO: HWY-PA
Branch and/or Section

THROUGH: CHIEF, HIGHWAYS DIVISION

FROM: Right-of-Way Branch

SUBJECT: PREPARATION OF: CIP COST DATA
FA PROGRAM
DETAIL ESTIMATE
JOB AUTHORIZATION

x

Check
Applicable
Boxes

for Kahekili Interchange, Project No. 63A-05-68, Scheme B-1
Project Number and Title

The following information is hereby furnished for the subject project:

(1) Work Scope Acquisition of 8 partial takings for the Kahekili Interchange project.

(2) Justification HWY-P

(3) Cost Estimate:

R/W	State Forces (R/W Branch only)		\$ 120,100
	Appraisal Fees		8,000
	Relocation Assistance		
	Residential	<u>2</u>	12,200
	Business	<u>0</u>	
			<u>\$ 140,300</u>

Acquisition	Whole Taking	No. of Parcels	<u>0</u>	\$ ---
	Partial Taking	No. of Parcels	<u>8</u>	\$ 623,300
	*Total R/W Cost			<u>\$ 763,600</u>

(4) Schedule of Expenditures: (By Month)

(5) Parcel Nos. 1, 3, 4, 5, 6, 7, 8, 9 transferred into H-3 ramp - tunnel to Kahekili, per D. Orimoto. Two dwellings on TMR: 4-5-26-77 affected by proposed takings.

*Subject to Change.

DKY:bty

cc: HWY-SM

J. T. Dubh
Head, Right-of-Way Branch

Request for R/W Cost Data
DOT 4-149
(HWY-R 9/69)

Date NOV 20 1989

To: HWY-PA
Branch and/or Section

THROUGH: CHIEF, HIGHWAYS DIVISION

FROM: Right-of-Way Branch

SUBJECT: PREPARATION OF: CIP COST DATA
FA PROGRAM
DETAIL ESTIMATE
JOB AUTHORIZATION

	Check Applicable Boxes
x	

for Kahekili Interchange, Project No. 63A-05-68, Scheme C-1
Project Number and Title

The following information is hereby furnished for the subject project:

(1) Work Scope: Acquisition of 1 whole taking and 9 partial takings
for the Kahekili Interchange project.

(2) Justification: HWY-P

(3) Cost Estimate:

R/W		
State Forces (R/W Branch only)		\$ 152,800
Appraisal Fees		10,000
Relocation Assistance		
Residential	<u>3</u>	35,750
Business	<u>0</u>	
		<u>\$ 198,550</u>

Acquisition		
Whole Taking	No. of Parcels <u>1</u>	\$ 369,800
Partial Taking	No. of Parcels <u>9</u>	\$ 1,016,600
*Total R/W Cost		<u>\$ 1,584,950</u>


(4) Schedule of Expenditures: (By Month)

(5) Parcel Nos. 1, 4, 5, 6, 7, 8, 9, 10, 11 transferred into H-3 ramp - tunnel to Kahekili, per D. Orimoto. Three dwellings on TMK: 4-5-26-77 and TMK: 4-5-108-81 affected by the proposed takings.

*Subject to Change.

DKY:bty

cc: HWY-SM


Head, Right-of-Way Branch

Request for R/W Cost Data
DOT 4-149
(HWY-R 9/69)

Date NOV 20 1989

To: HWY-PA
Branch and/or Section

THROUGH: CHIEF, HIGHWAYS DIVISION

FROM: Right-of-Way Branch

SUBJECT: PREPARATION OF: CIP COST DATA
FA PROGRAM
DETAIL ESTIMATE
JOB AUTHORIZATION

x

Check
Applicable
Boxes

for Kaneohe Interchange, Project No. I-H3-1()
Project Number and Title

The following information is hereby furnished for the subject project:

(1) Work Scope: Acquisition of 4 whole parcels and 5 partial takings
for the subject project.

(2) Justification HWY-P

(3) Cost Estimate:

R/W		
State Forces (R/W Branch only)		\$ 153,800
Appraisal Fees		9,000
Relocation Assistance		
Residential	<u>6</u>	70,400
Business	<u>0</u>	
		<u>\$ 233,200</u>

Acquisition		
Whole Taking	No. of Parcels <u>4</u>	\$ 1,960,200
Partial Taking	No. of Parcels <u>5</u>	\$ 195,500
*Total R/W Cost		<u>\$ 2,388,900</u>

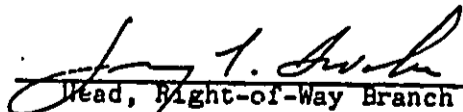
(4) Schedule of Expenditures: (By Month)

(5) Relocation assistance and payment costs for TMK Nos. 4-5-82-53 and 56. Parcels transferred from Kahekili Interchange, Project No. 63A-05-68, ramp area, tunnel to Kahekili Highway.

*Subject to Change.

DKY:bty

cc: HWY-SM


Head, Right-of-Way Branch

APPENDIX E

ARCHAEOLOGICAL
REPORT

MS. 041288

ARCHAEOLOGICAL RECONNAISSANCE SURVEY FOR THE PROPOSED
KAHEKILI HIGHWAY WIDENING AND INTERCHANGE
KĀNE`OHE, KO`OLAUPOKO, O`AHU ISLAND
(TMK 4-05-25:05, 06, 07, 23, 25;
TMK 4-05-82:52, 53, 56;
TMK 4-06-14:05)

by
Nancy McMahon

for
DHM, Inc.
1188 Bishop Street
Suite 2405
Honolulu, Hawai`i 96813

April 1988

PUBLIC ARCHAEOLOGY SECTION
Applied Research Group
Bishop Museum
Honolulu, Hawai`i

INTRODUCTION

Under contract to DHM, Inc., the Applied Research Group, Bishop Museum, conducted an archaeological reconnaissance survey and archival research of the proposed Kahekili Highway widening and interchange areas. The project area in Kāne`ohe; on the windward side of O`ahu Island, is comprised of two separate parcels of land (TMK 4-05-25:05, 06, 07, 23, and 25; TMK 4-05-82:52, 53, and 56; and TMK 4-06-14:05). This project was completed between 23 and 30 March 1988 by the author with the assistance of Scott Williams.

SCOPE OF WORK

The scope of work for this reconnaissance survey includes:

1. Background research consisting of a brief overview of the history and previous archaeological work of Kāne`ohe. Included in this research is an environmental and historical description along with a historical map of the survey area.
2. Field work consisting of a walk-through surface survey to determine the presence/absence and general nature of archaeological remains within the project area with limited subsurface testing as warranted.
3. Recommendations regarding further archaeological work that may be necessary.

PROJECT LOCATION

The project area is located in Kāne`ohe and He`eia ahupua`a, Ko`olaupoko District, O`ahu, and is separated into two specific areas (Fig. 1):

Likelike Highway Interchange; a 20 acre land parcel located south of the Kahekili and Likelike Highway junction; and

Kahekili Highway Widening Corridor; a 100-ft wide corridor extending c. 2 mi. along the inland edge of the existing Kahekili Highway, beginning c. 1 mi. northwest of Ha`ikū Road and ending c. 1000 ft southeast of the Avenue of the Temples.

Most of the Likelike Highway Interchange is within the Kapalai `ili, although the southern portion (containing Sites 50-0a-G5-88 and -89) is

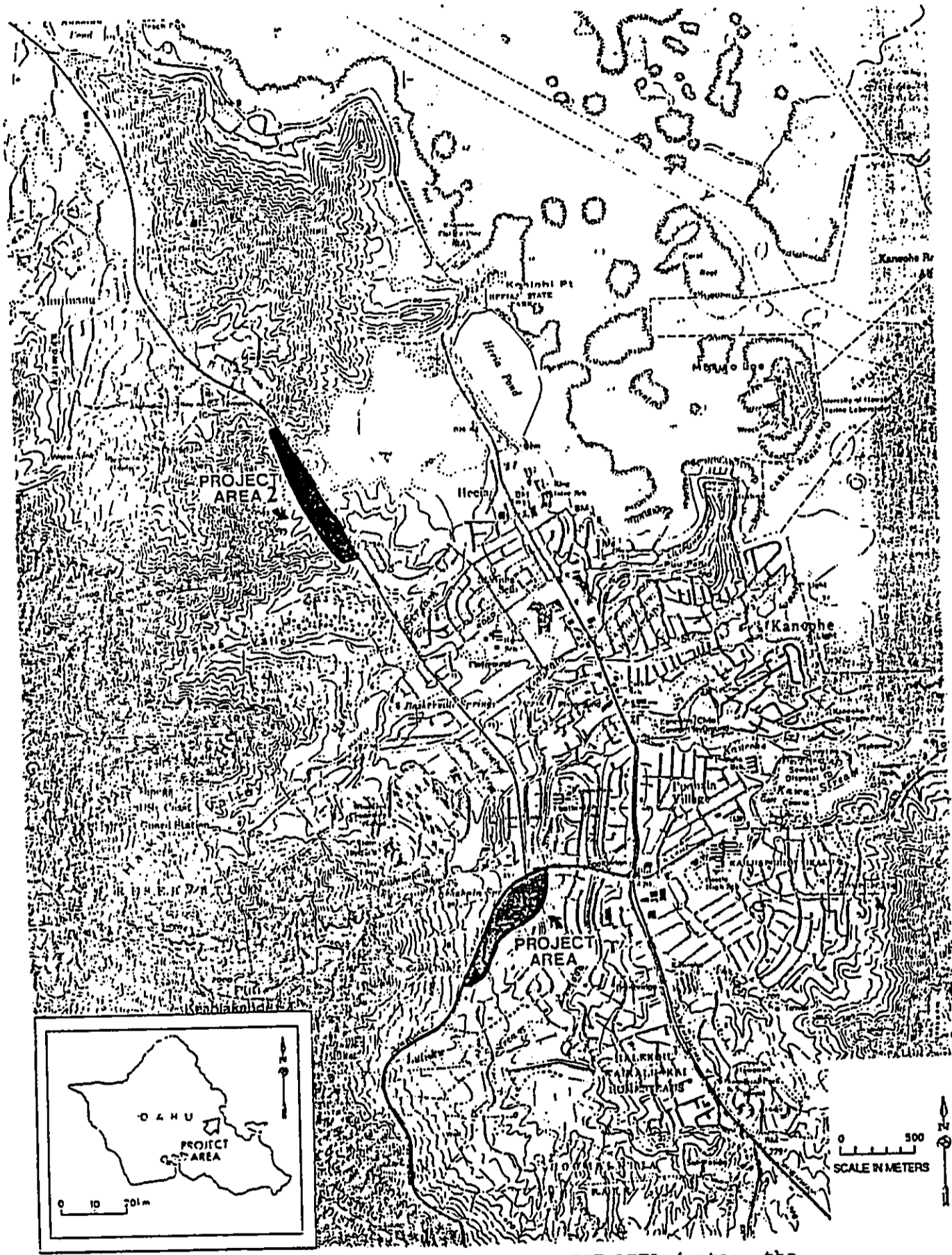


Fig. 1. TOPOGRAPHIC MAP SHOWING PROJECT AREA (note: the north arrow on all maps represents True North).
E-3

within Punalu'u Mauka 'ili. A portion of the project runs along the mauka side of Kahekili Highway and is within Kea'ahala 'ili.

The Likelike Highway Interchange includes the following TMKs: 4-05-25:05, 06, 07, 23, 25, and 4-05-82:52, 53, and 56. TMK 4-06-14:05, a corridor along Kahekili Highway Widening Corridor, belongs to Bishop Estate.

PREVIOUS ARCHAEOLOGICAL WORK

In 1930, McAllister conducted a survey of archaeological sites in the Ko'olaupoko area of O'ahu (McAllister 1933; Sterling and Summers 1978). Although there were no known sites in the Kahekili Highway Widening Corridor, McAllister located several sites nearby. These sites are listed below.

SITE 50-0a-G4-23 (Site 328) KAUALAUKI HEIAU

This site was recorded by McAllister as Site 328, now described as: "Located on the edge of the ridge on the mountain side of He'eia. The structure has been destroyed by the pineapple growers in attempting to cultivate this region" (McAllister 1933; Sterling and Summers 1978:199).

This site appears to be located on the mauka side of Kahekili Highway and about half a mile northwest of Ha'ikū Road. Today, the site area is a residential area that is extensively landscaped.

SITE 50-0a-G4-24 (Site 329) LELEAHINA HEIAU, 'IOLEKA'A, HE'EIA

This site was recorded by McAllister as Site 329. It is located near the foot of the pali. According to McAllister (1933) the site is fairly disturbed (Sterling and Summers 1978:199). The site is near the mauka end of Ha'ikū Plantation Drive.

Archaeological work conducted recently in Kāne'ohe are concentrated in the lands near the current Likelike Highway Interchange. Five projects have been conducted by Bishop Museum: the Kamo'oali'i Stream Projects (Rosendahl 1976; McCoy and Sinoto 1972) and four surveys for the H-3 Highway (Cleghorn and Jourdane 1976; Dye 1977; Streck 1982; and Allen 1987).

Two archaeological sites have been previously recorded in the project area; 50-0a-G5-88, a historic period cemetery and house compound on top of a possible prehistoric agricultural terrace, and 50-0a-G5-89, a portion of an 'ili boundary wall incorporated into the 50-0a-G5-88 complex. In addition, the Luluku Field System 50-0a-G5-85 and associated sites are nearby south of the present project area (see Allen 1987 for detailed description and discussion).

Historical Research

Kāne`ohe was an important area in the history of Hawai`i and is also mentioned in several Hawaiian myths and oral traditions. Because of the availability of fresh water from its many streams and springs, and its location along the bay with its fishing resources, Kāne`ohe was a major population center of O`ahu. Much has been written about the Kāne`ohe area, and Kelly has compiled a comprehensive history of Kāne`ohe dealing with land and change from 1778 to 1950 (Devaney et al. 1982).

Pineapple cultivation became a major industry in the Kāne`ohe area from 1910 to 1925. Kaneohe Ranch and Heeia Agriculture Company leased a considerable amount of land to Libby, McNeill & Libby. A few years later, more land was acquired by Libby, McNeill & Libby. At least five archaeological sites were damaged or destroyed during the pineapple era in the Kāne`ohe area (Devaney et al. 1982:63). Unfortunately, maps could not be found to show the exact location of Libby, McNeill & Libby plantations.

During the Great Mahele of 1848, one-half of Kapalai 'ili was claimed as government lands. In addition, four land commission awards were granted. These were LCA 1889, 11.8 acres to Lihue; LCA 233, 5.79 acres to Luluu; LCA 7534, 2.02 acres to Kahawai; and LCA 4452, part of Queen Kalama's property. Parts of LCA 1889 and 7233 are within the project area. LCAs 7534 and 4452 may possibly adjoin the Interchange area. In the Kahekili Widening Corridor, LCA 10613 was awarded to A. Paki (Indices of Awards 1929).

Kahekili Highway was first planned in 1962 by the City and County of Honolulu. The State of Hawaii purchased it in 1980. The first plan for Likelike Highway was proposed in 1957 and was called the Kaneohe Approach. A survey map by R.M. Towill in 1957 shows the planned Likelike Highway Interchange. Several houses were removed when the current highway was

constructed. Site 50-0a-G5-89, an 'ili boundary wall, extended all the way across the existing highway.

Environmental Setting

The project area is situated at the foothills of the Ko'olau Mountain Range. Elevation ranges from 30 to 250 ft and rainfall varies from 50 to 80 in. annually. The mean annual temperature is between 70 and 73° F. Soils include alluvium in the valleys and dark reddish brown residual soils on the plateaus. Numerous crop growing areas exist, including wetland taro sites, pineapple, and sugarcane. The flatter areas are used for grazing.

Soils in the project area, which consist of well-drained soils on fan, terraces, and uplands, are of the Lolekaa-Waikane association and are nearly level to very steep. According to the soil survey manual for O'ahu (Foote et al. 1972), the soils developed from material derived from basic igneous rock and are used for pastures, truck crops, orchard crops, and homesites. Soils are a mixture of well-drained fine-texture and moderately fine-texture. Lolekaa soils make up 20% of the association and Waikane soils about 20%. Lolekaa soils are dark brown silty clay with gravelly alluvium substratum. Waikane soils are dark brown silty clay, dark reddish brown silty subsoil, and a gravelly alluvium substratum (Foote et al. 1972).

The soils and climate described above support a varied flora. Table 1 lists common and scientific names for both native and exotic flora observed in the project area.

In the Kahekili Highway Corridor, erosional gullies were predominant in the landscape. Both Rosendahl (1976) and Allen (1987) noted this in their project areas. Landscape modifications due to cultivation is suggested even though no surface archaeological signs remain visible due to the dominance of grasses on the slopes, e.g., uluhe (Allen 1987:26).

METHODS

The reconnaissance survey began in the Kahekili Highway Widening Corridor. The survey was conducted with the aid of the planning map from the

Table 1
FLORA OBSERVED IN PROJECT AREA

Genus or Species	Common Name	Hawaiian Name
<u>Bambusa</u> sp.	Bamboo	<u>`Ohe</u>
<u>Oplismenus hirtellus</u>	Basket grass, false honohono	<u>Honohono kukui;</u> <u>honohono maoli</u>
<u>Paspalum conjugatum</u>	Hilo grass	<u>Mau`u Hilo, mau`u</u> <u>malihini</u>
<u>Chloris inflata</u>	Swollen fingergrass	<u>Mau`u lei</u>
<u>Brachiara mutica</u>	California grass	--
<u>Cyperus kyllingia</u>	Kyllingia	<u>Kaluhā</u>
<u>Wedelia trilobata</u>	Wedelia	--
<u>Mangifera</u> sp.	Mango	<u>Manakō</u>
<u>Persea americana</u>	Avocado	--
<u>Eugenia cumini/cumini</u>	Java plum	<u>Palama</u>
<u>Aleurites moluccana</u>	Candlenut	<u>Kukui</u>
<u>Eucalyptus</u> sp.	Eucalyptus	<u>Nuhōlani</u>
<u>Psidium guajava</u>	Guava	<u>Kuawa</u>
<u>Psidium cattleianum</u>	Strawberry guava	<u>Waiawi `ula`ula</u>
<u>Schinus terebinthifolius</u>	Christmas-berry	<u>Wilelaiki</u>
<u>Ficus retusa</u>	Banyan (Chinese)	--
<u>Brassaia actinophylla</u>	Umbrella tree	--
<u>Musa paradisiaca</u>	Banana	<u>Mai`a</u>
<u>Colocasia esculenta</u>	Taro	<u>Kalo</u>
<u>Cocos nucifera*</u>	Coconut palm	<u>Niu</u>
<u>Cordyline terminalis</u>	Ti	<u>Ki</u>
<u>Microsorium scolopendria*</u>	Maile-scented fern	<u>Laua`e</u>
<u>Dryopteris dentata</u>	Oak fern	--
<u>Lantana camara</u>	Lantana	<u>Lākana</u>
<u>Hibiscus tiliaceus*</u>	Hau	<u>Hau</u>
<u>Dicranopteris linearis*</u>	False staghorn fern	<u>Uluhe</u>
<u>Sphenomeris chusana</u>	Lace fern	--
<u>Prosopis pallida</u>	Kiawe	<u>Kiawe</u>

Table 1. Continued.

Genus or Species	Common Name	Hawaiian Name
<u>Anthurium</u> sp.	Anthurium	--
<u>Plumeria</u> <u>acuminata</u>	Plumeria	--
<u>Eugenia</u> <u>malaccensis</u>	Mountain apple	<u>ʻōhi`a`ai</u>
<u>E. jambos</u>	Rose apple	<u>ʻōhi`a`loke</u>
<u>Roystonea</u> <u>elata</u>	Royal palm	--
<u>Strelitzia</u> <u>reginae</u>	Bird of paradise	--
<u>Capsicum</u> sp.	Red pepper	<u>Nīoi</u>
<u>Arundina</u> <u>bambusifolia</u>	Orchid, bamboo	--
<u>Spathoglottis</u> sp.	Orchid, ground	--
Zingiberaceae	Ginger	<u>ʻAwapuhi</u>
<u>Rubus</u> sp.	Raspberry	<u>ʻAkalakala</u>
<u>Sadleria</u> <u>cyatheoides</u> **	Sadleria	<u>ʻAma`u</u>
<u>Averrhoa</u> <u>carambola</u>	Starfruit	--
<u>Areca</u> sp.	Areca palm	<u>Nīoi pekela</u>
<u>Monstera</u> <u>deliciosa</u>	Monstera	--
<u>Passiflora</u> <u>edulis</u>	Passion fruit	<u>Liliko`i</u>
<u>Impatiens</u> sp.	Impatiens	<u>ʻŌlepe</u>

*Indigenous--native to Hawai`i and elsewhere.

**Endemic--native only to Hawai`i

State Department of Transportation (HDOT) to determine the exact location, boundaries and slopes of the area. The walk-through survey included the impact areas of the proposed highway expansion.

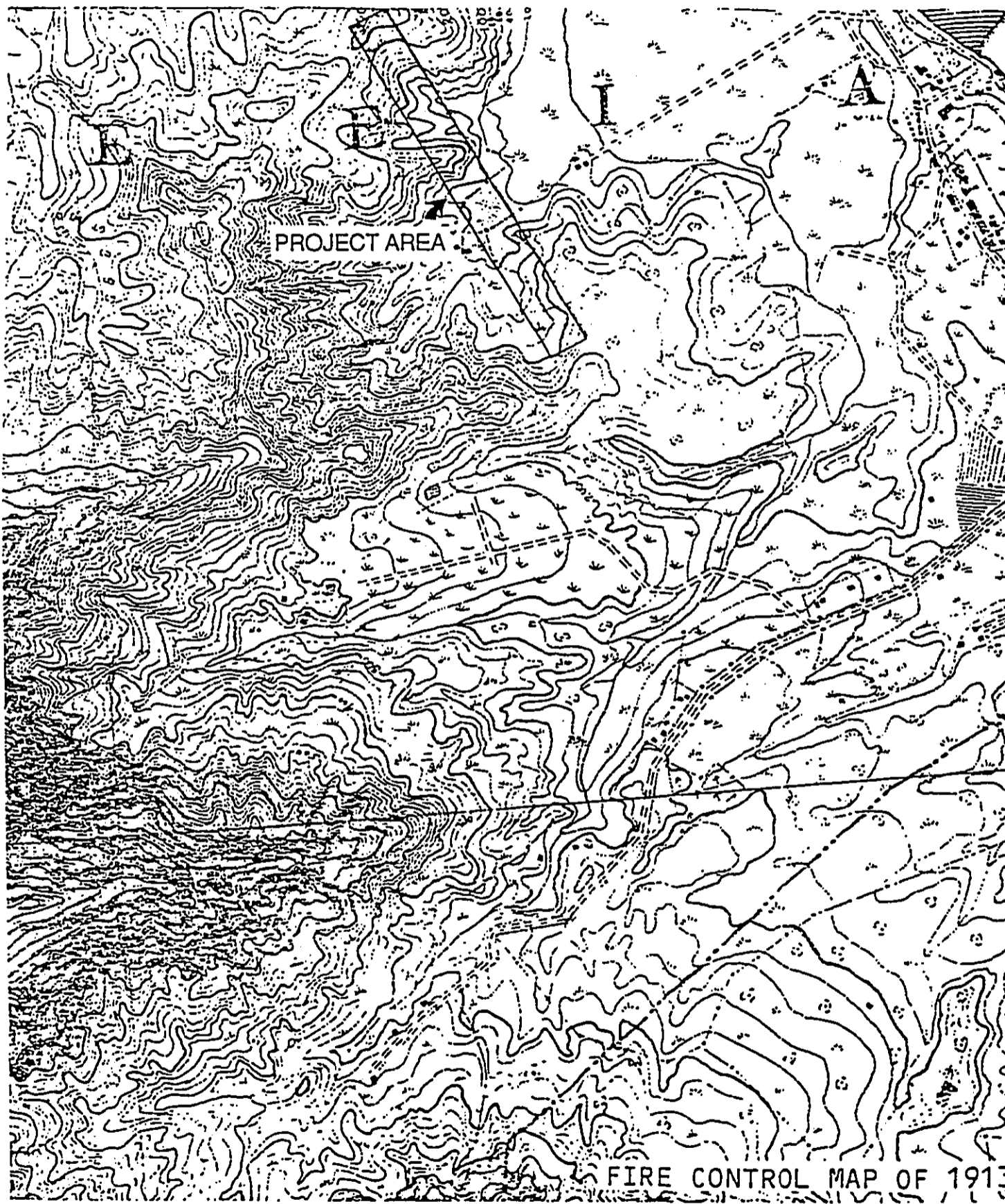
A systematic walk-through survey of the Likelike Highway Interchange was conducted with the aid of aerial photographs (Allen 1987) and the planning map from HDOT to determine the boundaries of the area. Since the mauka portion of the Likelike Highway Interchange was investigated by Allen (1987) the main focus of the survey involved traversing the makai section of the area, where possible terracing may have existed.

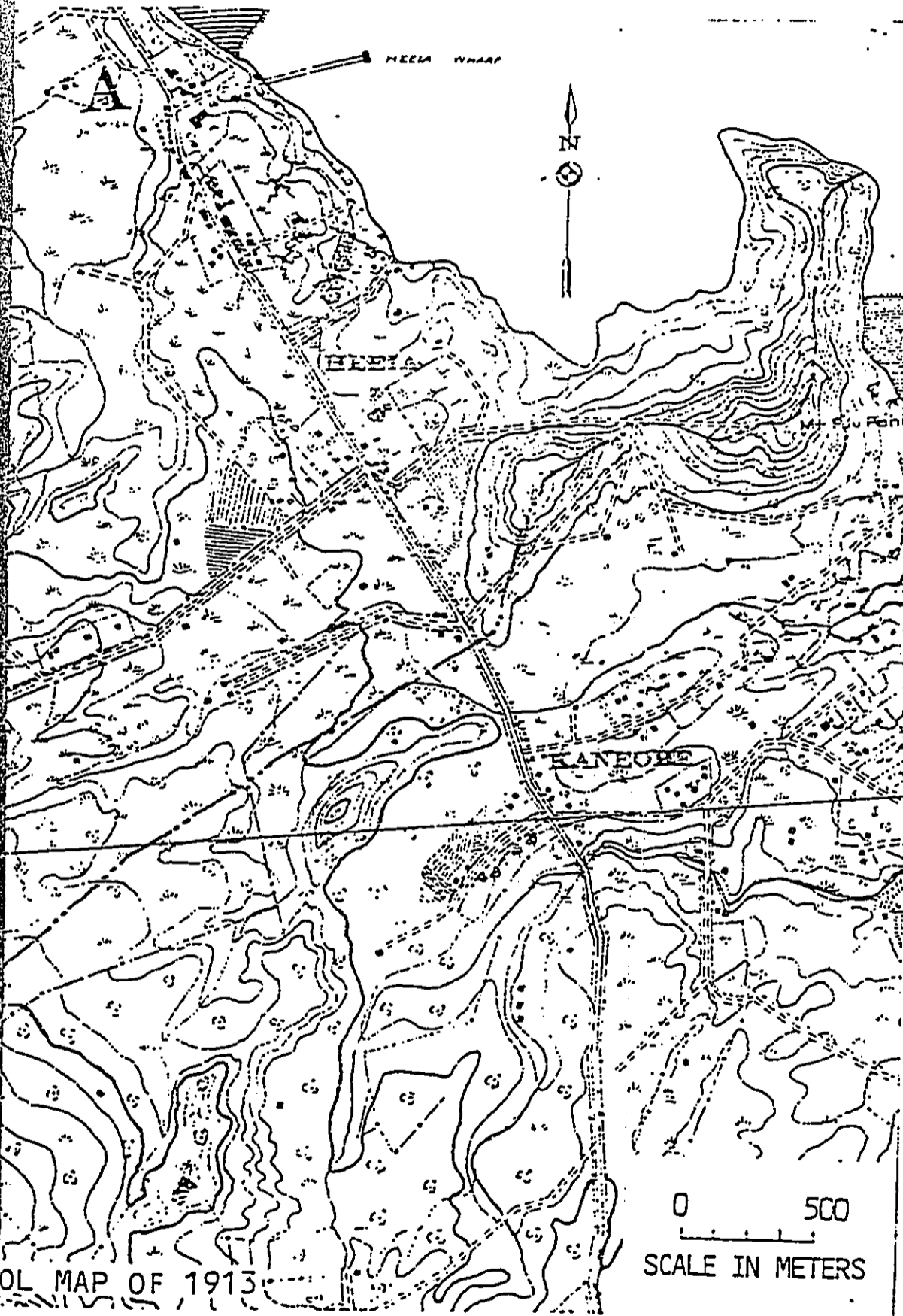
All field notes, drawings, and photographs are on file in the Department of Anthropology, Bishop Museum.

SURVEY RESULTS

Only two archaeological sites were encountered during the reconnaissance survey, and these were previously recorded and mapped by Allen (1987). No subsurface testing was done due to the low potential for buried deposits. Verbal concurrence was obtained from the Historic Sites Section, Department of Land and Natural Resources.

In the Kahekili Highway Widening Corridor, the vegetation was dense and the terrain rugged. No archaeological sites were found during the reconnaissance survey. The lowlands of the corridor were marsh lands and full of weeds and grasses. These areas were very near the existing Kahekili Highway and may be landscape modifications due to highway construction. Historic period trash from the highway and old abandoned cars dating from about the 1960s were found. Currently the area is being used for dirt bike trails. During the survey an old narrow road was found. The cut in the embankment distinguished it from the dirt bike trails. This road was either used in conjunction with the highway construction (it is near the highway but only in the lowlands) or perhaps used as a plantation road during the pineapple cultivation. The Fire Control Map of 1913 (Fig. 2) shows the extent of the He'eia marsh land, which may possibly be the same marshy area that was found during the reconnaissance survey. The marsh area may also be the result of highway construction.





OL MAP OF 1913

0 500
SCALE IN METERS

In the Likelike Highway Interchange area, no new archaeological sites were found during the reconnaissance survey. Cesspools and modern period trash (bottles not more than 40 years old) were noted (Fig. 3) as were remnants of a pig pen. Tax records indicate it was salvaged in 1964. It was probably destroyed due to highway construction. No terracing was noted. Marsh land existed in the low areas near the banana patches. Feral taro was noticed growing among banana. The vegetation in the marsh was dense and full of various grasses. If terraces once existed, they may well be beneath this area. Near Likelike Highway a well-drained soil berm follows the outline of the edge of a banana patch for 200 m. The height of the berm ranges from 3 to 6 m. It was probably made during the construction of Likelike Highway. Most of the Likelike-Kahekili Highway Interchange will be on level terrain that has been extensively bulldozed.

The following sites below (Fig. 4) were relocated and photographed.

1. Site 50-Oa-G5-88. Punalu'u Mauka Cemetery and historic period compound. The cemetery is still in use and maintained by the family living near the site.

2. Site 50-Oa-G5-89. Punalu'u Mauka/Kapalai Boundary Wall (Allen 1987:7-8, 44-45, 102-103, 114-120, 266).

RECOMMENDATIONS

Table 2 presents a summary and initial significance assessments Allen made for the sites (1987). Allen recommended that both sites, especially the cemetery, be preserved. If damage to the sites is imminent, intensive data recovery and monitoring will be necessary before and during construction.

The potential for encountering any subsurface remains during related construction activities appears extremely low. Based on the paucity of archaeological remains and the extensive surface modifications (bulldozing and cultivation) in the project areas no further archaeological field work in the area investigated is necessary prior to construction. The Historic Sites Section, Department of Land and Natural Resources, should be contacted if construction activities uncover any subsurface cultural deposits.

Table 2
 ELIGIBILITY, SIGNIFICANCE, AND RECOMMENDATION SUMMARY FOR SITES IN THE H-3 KANE' OHE PROJECT AREA*

Site Number 50-0a-	Eligibility	Significance						Recommendations					Initial Significance Assessment*** A B C D E		
		Has Produced Information Concerning:		Has Potential to Provide Further Information Concerning:		Integrity		Excavation		Preservation				Monitoring	
		Traditional Hawaiian Culture and History/Prehistory	Foreign Influences on Hawaiian Culture and History	Traditional Hawaiian Culture and History/Prehistory	Foreign Influences on Hawaiian Culture and History	State of Preservation of Site*	State of Preservation of Surrounding Area**	Complete Excavation	Intensive Data Recovery Partial Excavation	For Future Research	For Interpretive Display	As Gravesites			
05-88	X	X	X	X	X	1	a	--	X	--	--	X	X	X	X
05-89	X	X	X	X	X	1	u-a	--	X	X	--	--	X	X	X

*Based on Allen 1987.

**1 = excellent, 2 = good, 3 = fair, 4 = poor.

***u = unaltered, a = modified, s = significantly altered.

****Based on criteria of the National Register of Historic Places:

Criterion A specifies association with events or broad patterns important in the history of an area (e.g., Contact, the development of the state system of government, the expansion of agriculture into upland areas).

Criterion B reflects association with persons important in the history of an area (e.g., Queen Lili'uokalani).

Criterion C applies to sites that reflect architectural achievements (e.g., extensive terracing, certain roads, and historic period buildings).

Criterion D specifies that the site has yielded or has the potential to yield information significant for our understanding of traditional culture, history, prehistory, and/or foreign influences on traditional culture and history.

Criterion E, currently in draft status, applies to sites perceived by the contemporary community as having traditional cultural value.

If foundation-related soil boring work is undertaken, a sample from each of the marshy areas (Likelike Highway Interchange area and the Kahekili Highway Widening Corridor) should be analyzed for pollen and retained for other procedures as warranted.

REFERENCES CITED

- Allen, Jane, ed.
1987 Five Upland 'Ili: Archaeological and Historical Investigations in the Kane'ohē Interchange, Interstate Highway H-3, Island of O'ahu. Departmental Report Series 87-1. Honolulu: Dept. Anthropology, Bernice P. Bishop Mus.
- Cleghorn, P., and E. Rogers-Jourdane
1976 "Archaeological Reconnaissance Survey of the Windward Portion of Route H-3, District of Koolaupoko, Oahu Island." MS. in Dept. Anthropology, B. P. Bishop Mus., Honolulu.
- Devaney, D. M., M. Kelly, P. J. Lee, and L. S. Motteler
1982 Kāne'ohē: A History of Change. Departmental Report Series 76-2. Honolulu: The Bess Press.
- Dye, T. S.
1977 "Archaeological Phase I Survey of the Windward Portion of Proposed Interstate H-3 Halekou Interchange to Windward Portal of Koolau Tunnel, Oahu." MS. in Dept. Anthropology, B. P. Bishop Mus., Honolulu.
- Foote, D. E., E. L. Hill, S. Nakamura, and F. Stephens
1972 Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii. Soil Conservation Service. Washington DC: U.S. Government Printing Office.
- Indices of Award
1929 Indices of Awards Made by the Board of Commissioners to Quiet Land Titles in Hawaiian Islands. Honolulu Comm. Pub. Lands. Terr. Hawai'i.
- McAllister, J. G.
1933 Archaeology of Oahu. B. P. Bishop Mus. Bull. 104. Honolulu.
- Neal, M. C.
1965 In Gardens of Hawaii. B. P. Bishop Mus. Spec. Publ. 50. Honolulu: Bishop Mus. Press.
- Pukui, Mary Kawena, Samuel H. Elbert, and Esther T. Mookini
1974 Place Names of Hawaii. Honolulu: Univ. Hawaii Press.
- Rosendahl, Paul, ed.
1976 Archaeological Investigations in Upland Kane'ohē. Departmental Report Series 76-1. Honolulu: Dept. Anthropology, B. P. Bishop Mus.
- Sterling, E. P., and C. C. Summers
1978 Sites of Oahu. Honolulu: Depts. Anthropology and Education, B. P. Bishop Mus.

CORRECTION

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

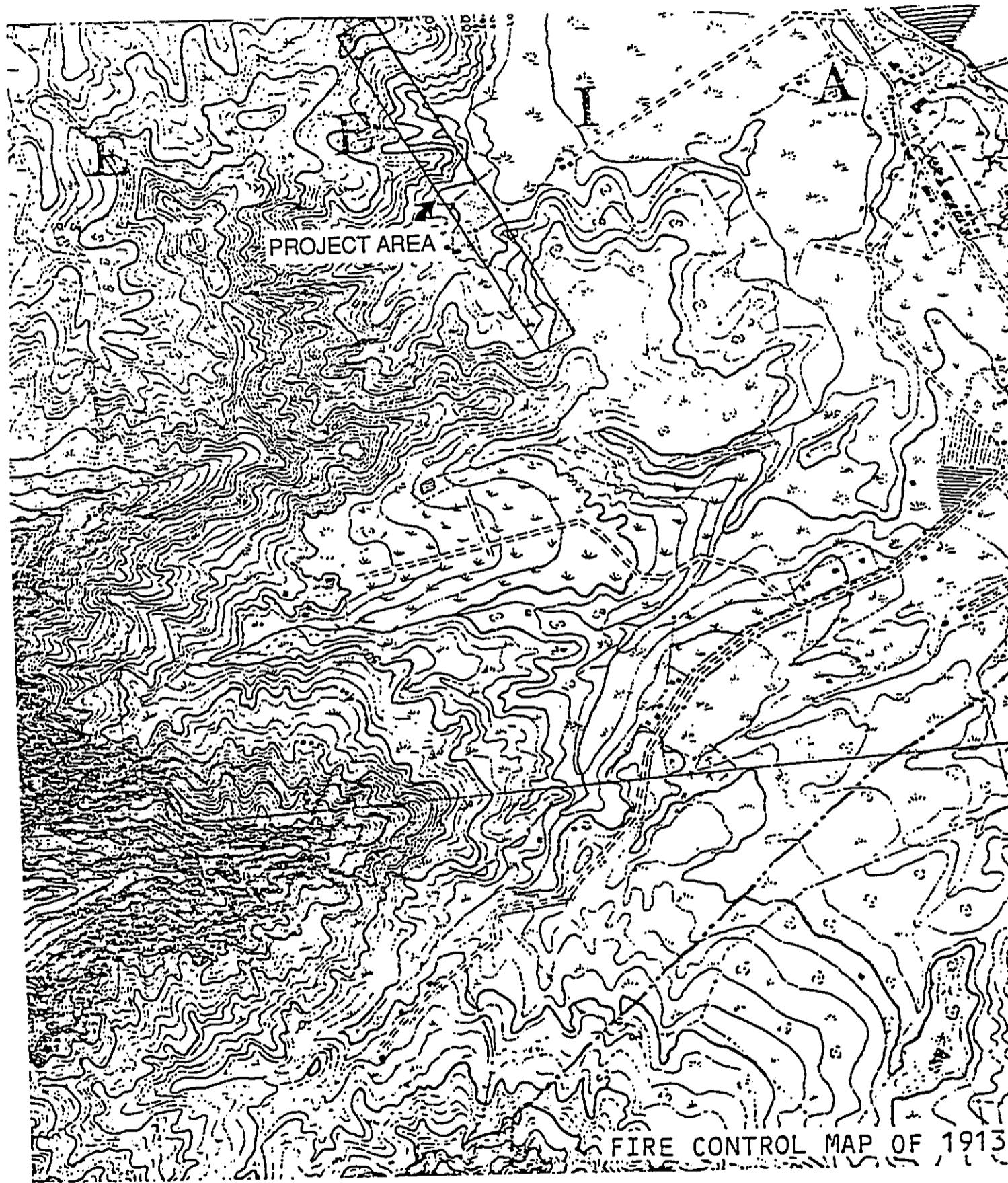
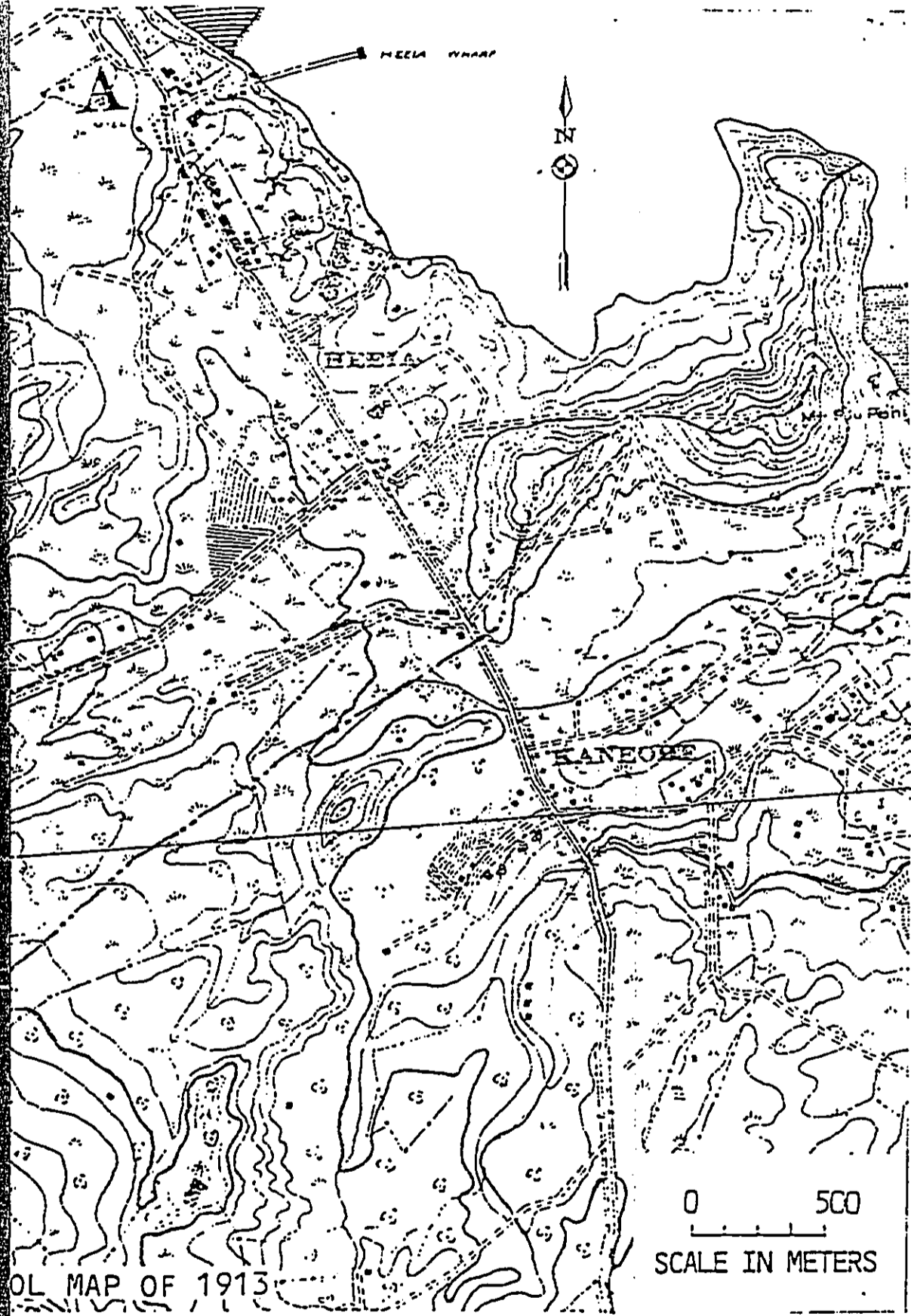


Fig. 2. FIRE CONTROL MAP OF 1913.



OL MAP OF 1913

0 500
SCALE IN METERS

In the Likelike Highway Interchange area, no new archaeological sites were found during the reconnaissance survey. Cesspools and modern period trash (bottles not more than 40 years old) were noted (Fig. 3) as were remnants of a pig pen. Tax records indicate it was salvaged in 1964. It was probably destroyed due to highway construction. No terracing was noted. Marsh land existed in the low areas near the banana patches. Feral taro was noticed growing among banana. The vegetation in the marsh was dense and full of various grasses. If terraces once existed, they may well be beneath this area. Near Likelike Highway a well-drained soil berm follows the outline of the edge of a banana patch for 200 m. The height of the berm ranges from 3 to 6 m. It was probably made during the construction of Likelike Highway. Most of the Likelike-Kahekili Highway Interchange will be on level terrain that has been extensively bulldozed.

The following sites below (Fig. 4) were relocated and photographed.

1. Site 50-0a-G5-88. Punalu'u Mauka Cemetery and historic period compound. The cemetery is still in use and maintained by the family living near the site.
2. Site 50-0a-G5-89. Punalu'u Mauka/Kapalai Boundary Wall (Allen 1987:7-8, 44-45, 102-103, 114-120, 266).

RECOMMENDATIONS

Table 2 presents a summary and initial significance assessments Allen made for the sites (1987). Allen recommended that both sites, especially the cemetery, be preserved. If damage to the sites is imminent, intensive data recovery and monitoring will be necessary before and during construction.

The potential for encountering any subsurface remains during related construction activities appears extremely low. Based on the paucity of archaeological remains and the extensive surface modifications (bulldozing and cultivation) in the project areas no further archaeological field work in the area investigated is necessary prior to construction. The Historic Sites Section, Department of Land and Natural Resources, should be contacted if construction activities uncover any subsurface cultural deposits.

Table 2
 ELIGIBILITY, SIGNIFICANCE, AND RECOMMENDATION SUMMARY FOR SITES IN THE K-3 KANE'ONE PROJECT AREA*

Site Number	Eligibility	Significance						Recommendations					Initial Significance Assessment** A B C D E			
		Has Produced Information Concerning:		Has Potential to Provide Further Information Concerning:		Integrity		Excavation			Preservation			Monitoring		
		Traditional Hawaiian Culture and History/Prehistory	Foreign Influences on Hawaiian Culture and History	Traditional Hawaiian Culture and History/Prehistory	Foreign Influences on Hawaiian Culture and History	State of Preservation of Site*	State of Preservation of Surrounding Area**	Complete Excavation	Partial Excavation	Intensive Data Recovery	For Future Research	For Interpretive Display			As Gravesites	
05-88	X	X	X	X	X	1	u	--	X	--	--	X	X	X	X	X
05-89	X	X	X	X	X	1	u-a	--	X	X	--	X	X	X	X	X

*Based on Allen 1987.
 *1 = excellent, 2 = good, 3 = fair, 4 = poor.
 **u = unaltered, m = modified, s = significantly altered.
 ***Based on criteria of the National Register of Historic Places:
 Criterion A specifies association with events or broad patterns important in the history of an area (e.g., Contact, the development of the state system of government, the expansion of agriculture into upland areas).
 Criterion B reflects association with persons important in the history of an area (e.g., Queen Lili'uokalani).
 Criterion C applies to sites that reflect architectural achievements (e.g., extensive terracing, certain roads, and historic period buildings).
 Criterion D specifies that the site has yielded or has the potential to yield information significant for our understanding of traditional culture, history, prehistory, and/or foreign influences on traditional culture and history.
 Criterion E, currently in draft status, applies to sites perceived by the contemporary community as having traditional cultural value.



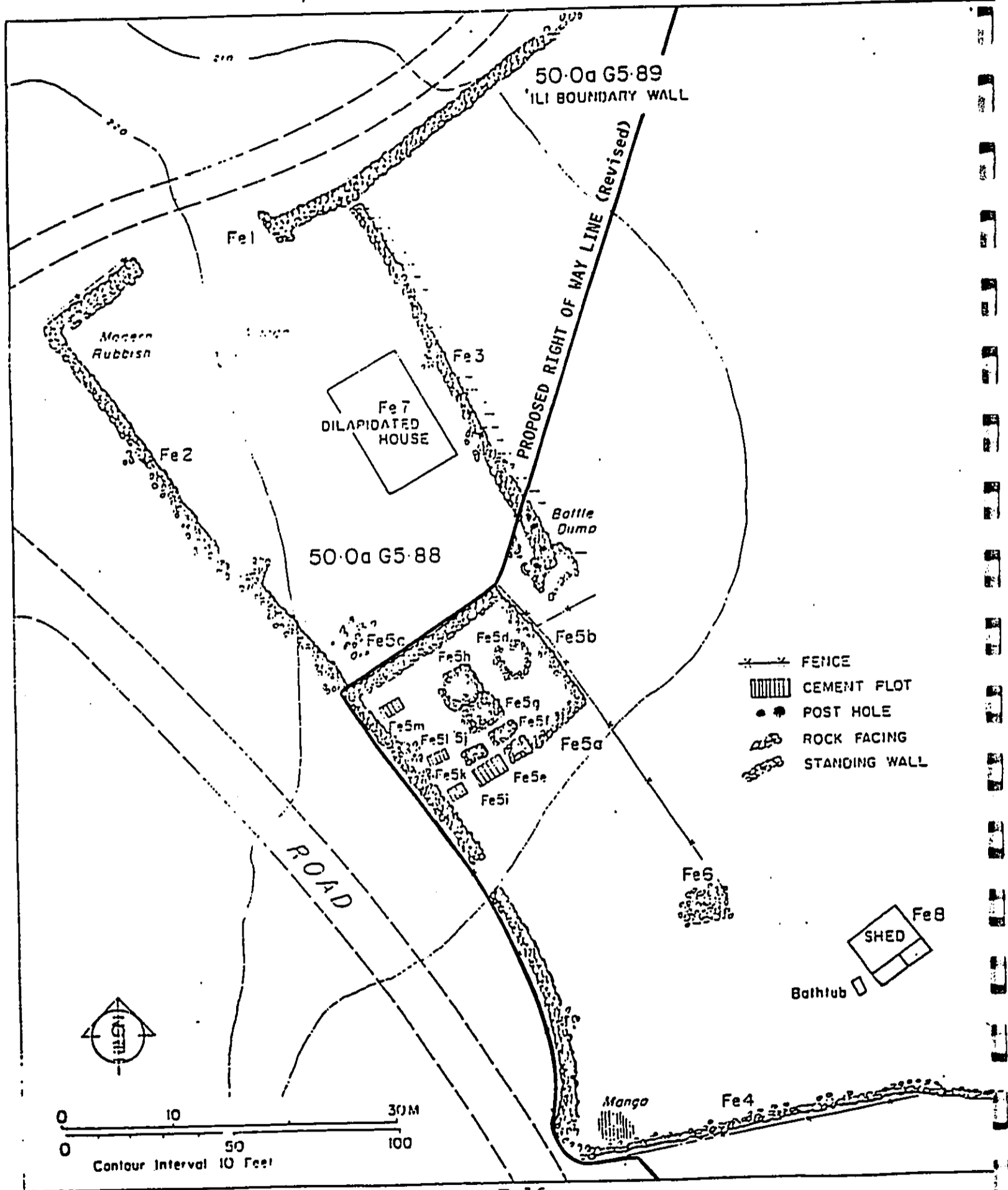
REFERENCES CITED

- Allen, Jane, ed.
1987 Five Upland 'Ili: Archaeological and Historical Investigations in the Kane'ohē Interchange, Interstate Highway H-3, Island of O'ahu. Departmental Report Series 87-1. Honolulu: Dept. Anthropology, Bernice P. Bishop Mus.
- Cleghorn, P., and E. Rogers-Jourdane
1976 "Archaeological Reconnaissance Survey of the Windward Portion of Route H-3, District of Koolaupoko, Oahu Island." MS. in Dept. Anthropology, B. P. Bishop Mus., Honolulu.
- Devaney, D. M., M. Kelly, P. J. Lee, and L. S. Motteler
1982 Kāne'ohē: A History of Change. Departmental Report Series 76-2. Honolulu: The Bess Press.
- Dye, T. S.
1977 "Archaeological Phase I Survey of the Windward Portion of Proposed Interstate H-3 Halekou Interchange to Windward Portal of Koolau Tunnel, Oahu." MS. in Dept. Anthropology, B. P. Bishop Mus., Honolulu.
- Foote, D. E., E. L. Hill, S. Nakamura, and F. Stephens
1972 Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii. Soil Conservation Service. Washington DC: U.S. Government Printing Office.
- Indices of Award
1929 Indices of Awards Made by the Board of Commissioners to Quiet Land Titles in Hawaiian Islands. Honolulu Comm. Pub. Lands. Terr. Hawai'i.
- McAllister, J. G.
1933 Archaeology of Oahu. B. P. Bishop Mus. Bull. 104. Honolulu.
- Neal, M. C.
1965 In Gardens of Hawaii. B. P. Bishop Mus. Spec. Publ. 50. Honolulu: Bishop Mus. Press.
- Pukui, Mary Kawena, Samuel H. Elbert, and Esther T. Mookini
1974 Place Names of Hawaii. Honolulu: Univ. Hawaii Press.
- Rosendahl, Paul, ed.
1976 Archaeological Investigations in Upland Kane'ohē. Departmental Report Series 76-1. Honolulu: Dept. Anthropology, B. P. Bishop Mus.
- Sterling, E. P., and C. C. Summers
1978 Sites of Oahu. Honolulu: Depts. Anthropology and Education, B. P. Bishop Mus.

If foundation-related soil boring work is undertaken, a sample from each of the marshy areas (Likelike Highway Interchange area and the Kahekili Highway Widening Corridor) should be analyzed for pollen and retained for other procedures as warranted.

Streck, C.
1982

"Archaeological Reconnaissance Survey for Route H-3
(Alternative A), Kane`ohe, O`ahu, Hawai`i." MS. in Dept.
Anthropology, B. P. Bishop Mus., Honolulu.



E-16
 Fig. 4. PLAN OF SITES G5-88 AND G5-89 (from Allen 1987).

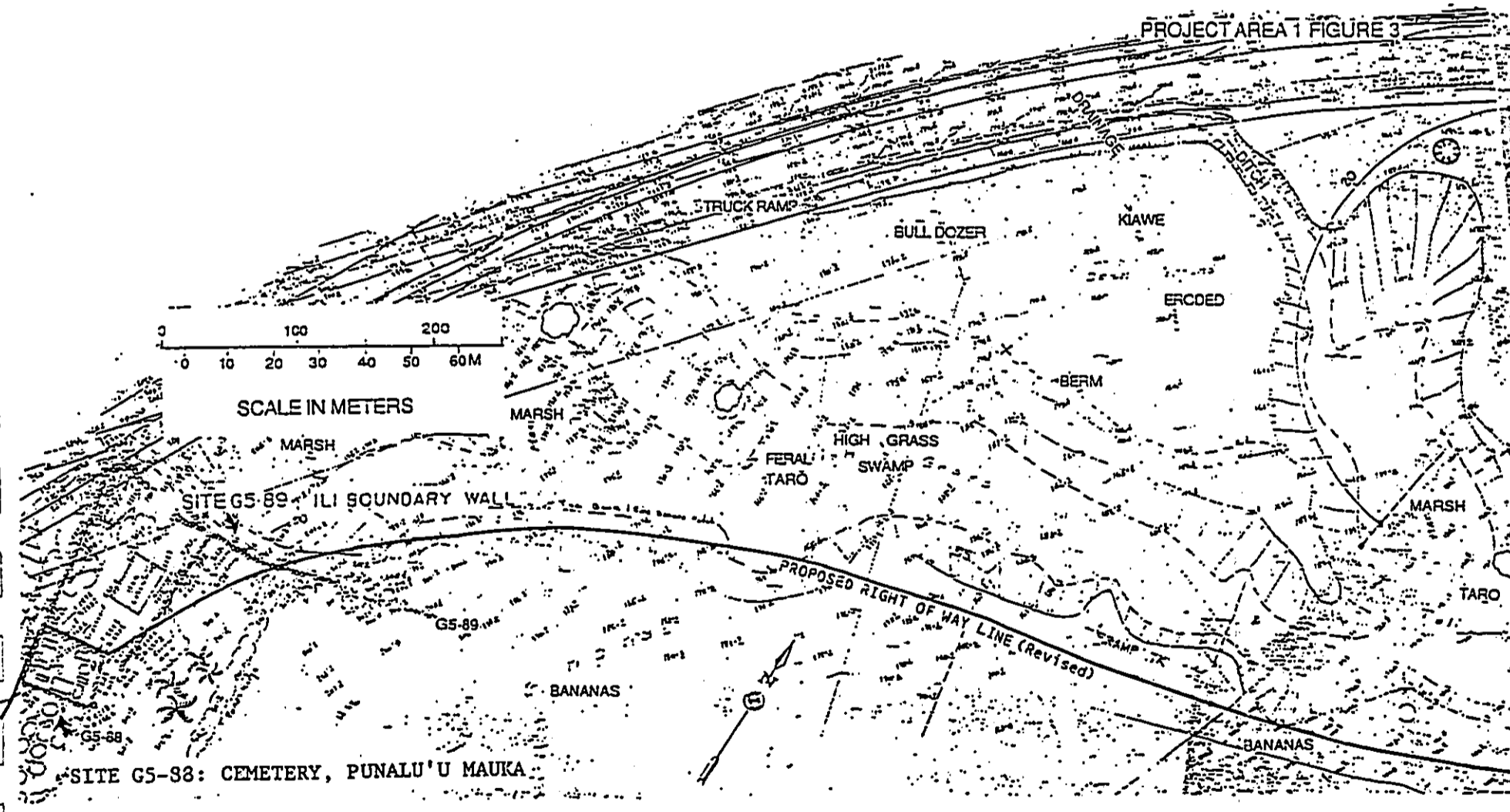
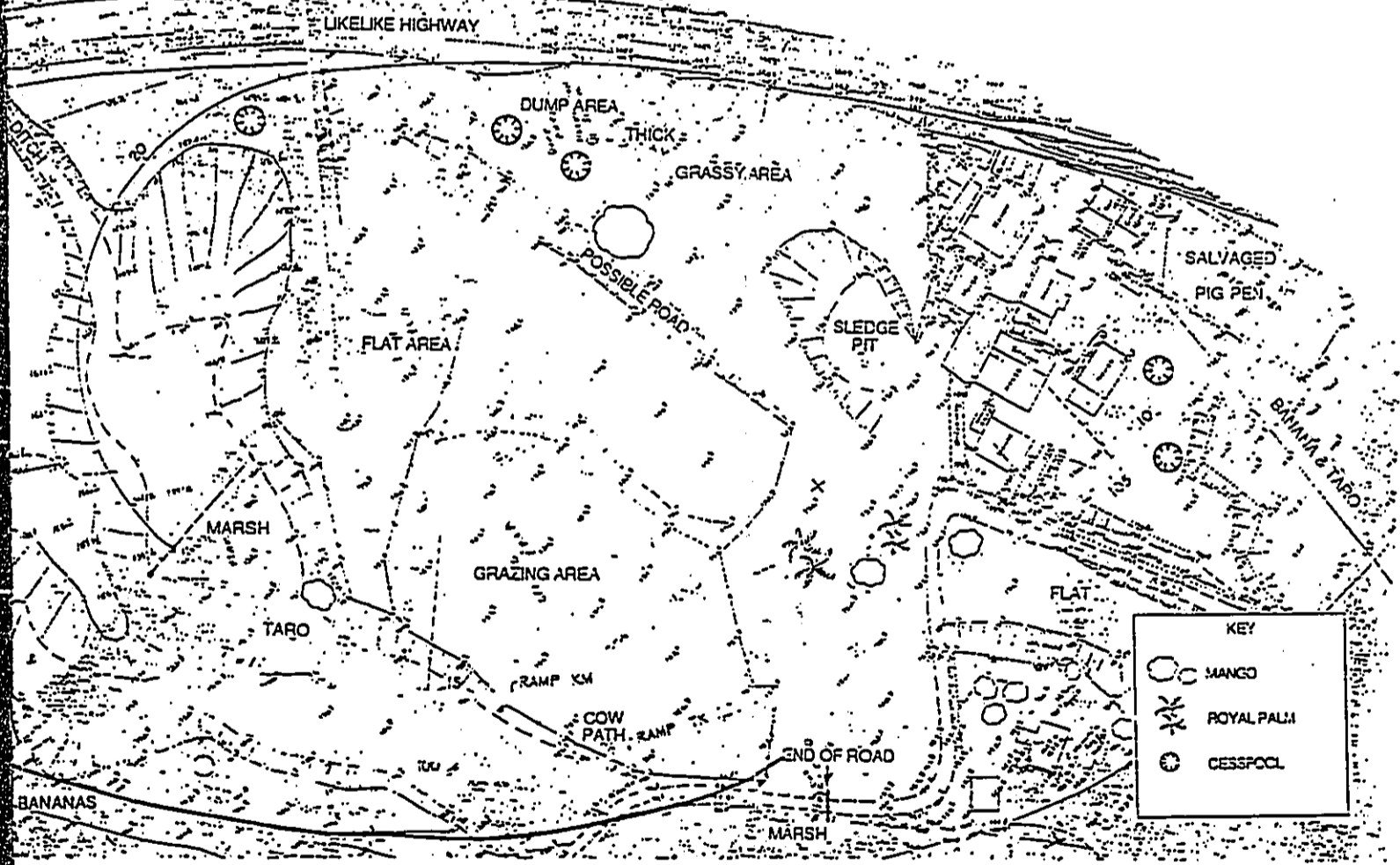


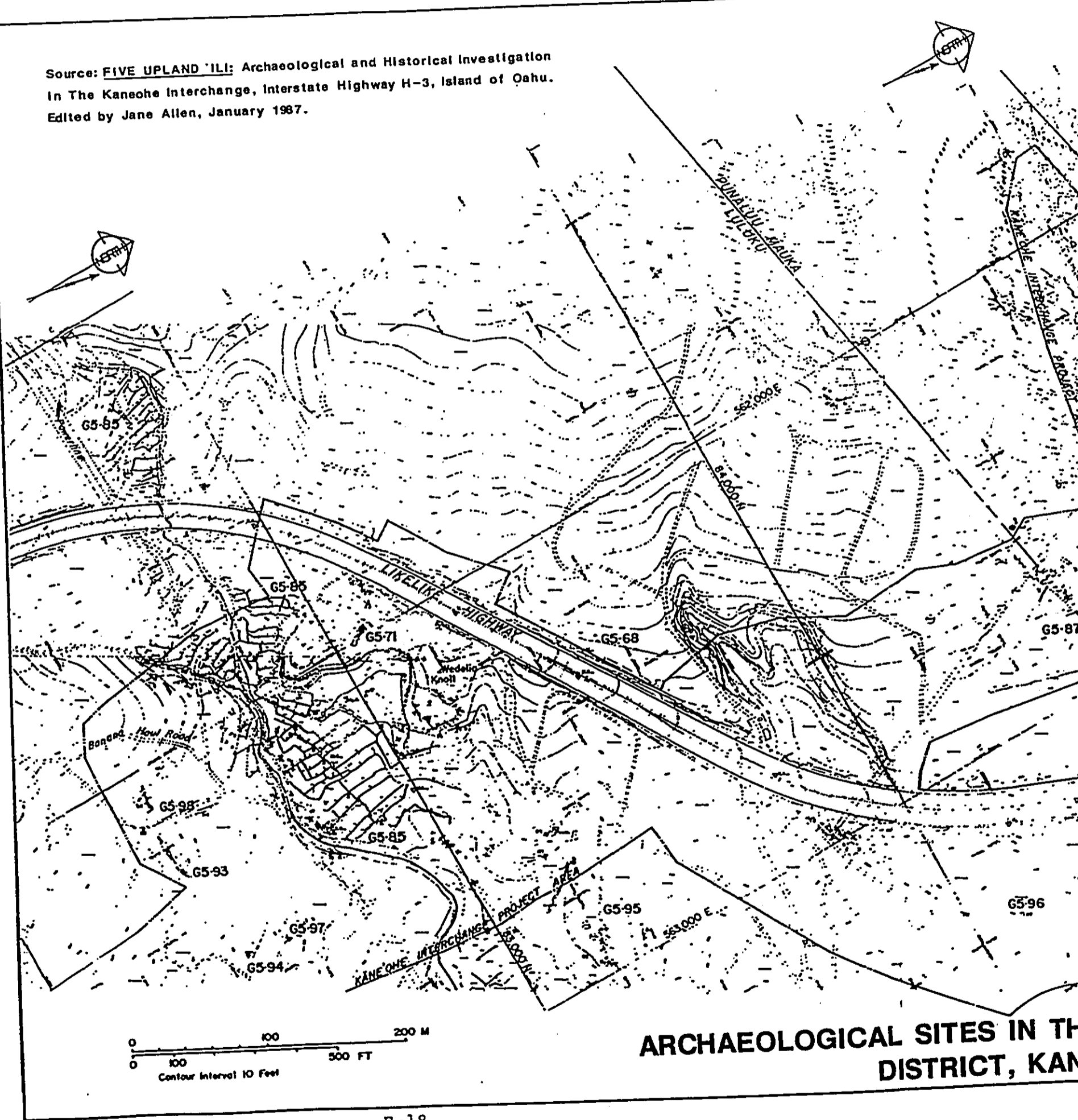
Fig. 3. MAP OF ARCHAEOLOGICAL SITE

AREA 1 FIGURE 3

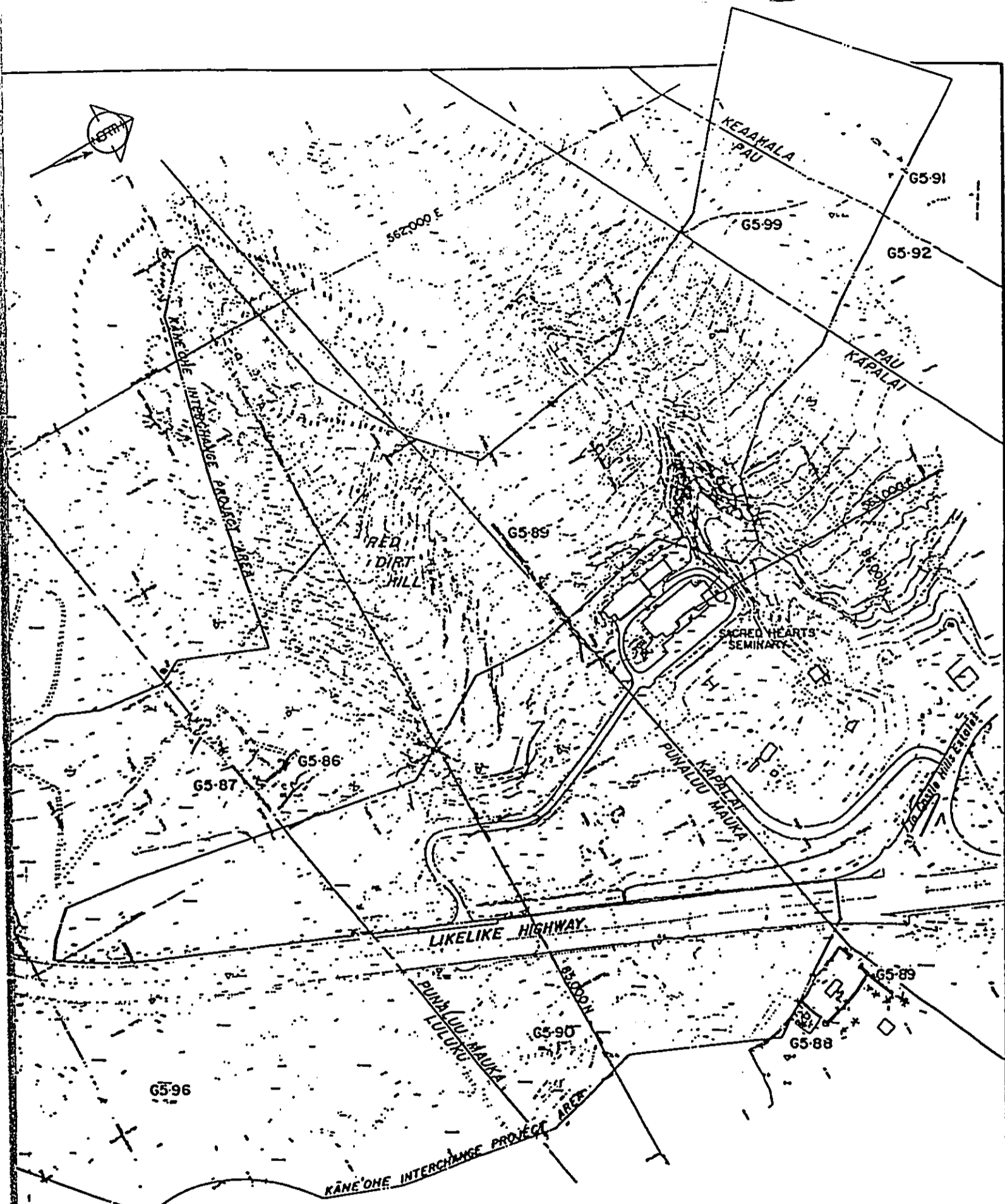


OF ARCHAEOLOGICAL SITES.

Source: FIVE UPLAND 'ILI: Archaeological and Historical Investigation
In The Kaneohe Interchange, Interstate Highway H-3, Island of Oahu.
Edited by Jane Allen, January 1987.



ARCHAEOLOGICAL SITES IN THE DISTRICT, KANE'ONE



SITES IN THE LULUKU DISCONTIGUOUS ARCHAEOLOGICAL DISTRICT, KANE'ONE INTERCHANGE, INTERSTATE ROUTE H-3

Table A:1
SITES AND FEATURES IN LINE OF DIRECT IMPACT, MODIFIED LOOP RAMP

Site (50-0a-)	Feature Number	Form	Function	Highway Construction Technique
G5-85	43	Facing, terrace	Agricultural	Viaduct
	101	Rock wall	Stream retention	Viaduct
	108*	Rock alignment	Agricultural or slope retention	Fill
	109*	Artifact concentration	Basalt tool production	Fill
	110*	Artifact concentration	Refuse dump	Fill
	123*	Uprights	Hearth	Near relocated Likelike Highway; at grade
	124*	Facings, terraces	Agricultural water diversion	Near relocated Likelike Highway; at grade
G5-86	1, 2, 4	Facings, terraces	Agricultural	Fill
	3	Rock-lined depression	Charcoal kiln	Fill
	5	Rock alignments	Trail	Fill
	6	Rock mounds, facings	Agricultural and possible habitation	Fill
	8	Rock concentrations	Agricultural	Cut
G5-87		Rock wall remnant	<u>Ili</u> boundary	Fill
G5-88	1	Rock wall	<u>Ili</u> boundary; historic- period habitation	Cut and fill
	2	Rock wall, facing	Agricultural; historic- period habitation	Cut and fill
	7	Terrace	Historic-period habitation and prob. agriculture	Cut and fill
G5-89		Rock wall	<u>Ili</u> boundary	Cut and fill
G5-90		Artifact concentra- tions; rock mounds	Refuse dump; possible structures	Fill
G5-91	1 to 5	Rock mounds	Agricultural	Cut
G5-92		Rock alignment	<u>Ili</u> boundary	Cut
G5-93		Artifact concentration	Refuse dump	Fill
G5-94		Artifact concentration	Refuse cache	Fill
G5-95	1	Rock-lined compartment	Possible grave	Viaduct
	2	Rock platform	Possible habitation	Viaduct
	3	Artifact concentration	Refuse dump	Viaduct
	4	Rock platform	Possible grave	Viaduct
	9	(Road)	Historic-period road	Viaduct
	10	(Ditch)	Historic-period ditch	Viaduct
G5-96	1	Rock mound	Possible burial	Fill
	2	Excavated cave	World War II bomb shelter	Fill
G5-97		Rock-lined compartment	Probable burial	Viaduct
G5-99	2	(Road)	Historic-period road	Cut and fill
		Rock mounds	Probable agricultural	
G5-105*	17	Rock mound	Agricultural	Fill

*Needs intensive survey including mapping as part of impact mitigation.
E-19

Table A:2
SITES LOCATED ENTIRELY OUTSIDE IMPACT ZONE

Site (50-0a-)	Feature Number	Form	Function	Highway Construction Technique
G5-68	All	Rock mounds	Agricultural	--
G5-71	All	Platform; rock-lined compartments	Habitation or religious; probable burials	--
G5-98	All	Rock mound; facing; alignments	Agricultural; water diversion; trail	--

Source: Archaeological Mitigation Plan, Kaneohe Interchange Interstate H-3 Highway Oahu included in H-1 E.I.S. 87-01-F(S) for Interstate Route H-3.

APPENDIX F

**ENGINEERING DRAWINGS
OF DRAINAGE IMPROVEMENTS
AT STREAM CROSSING**

Exhibit A

KAHEKILI HWY. WIDENING

AND INTERCHANGE

PROPOSED BOX CULVERT
AT AOLANI STRM. CROSSING

AUG. 1984

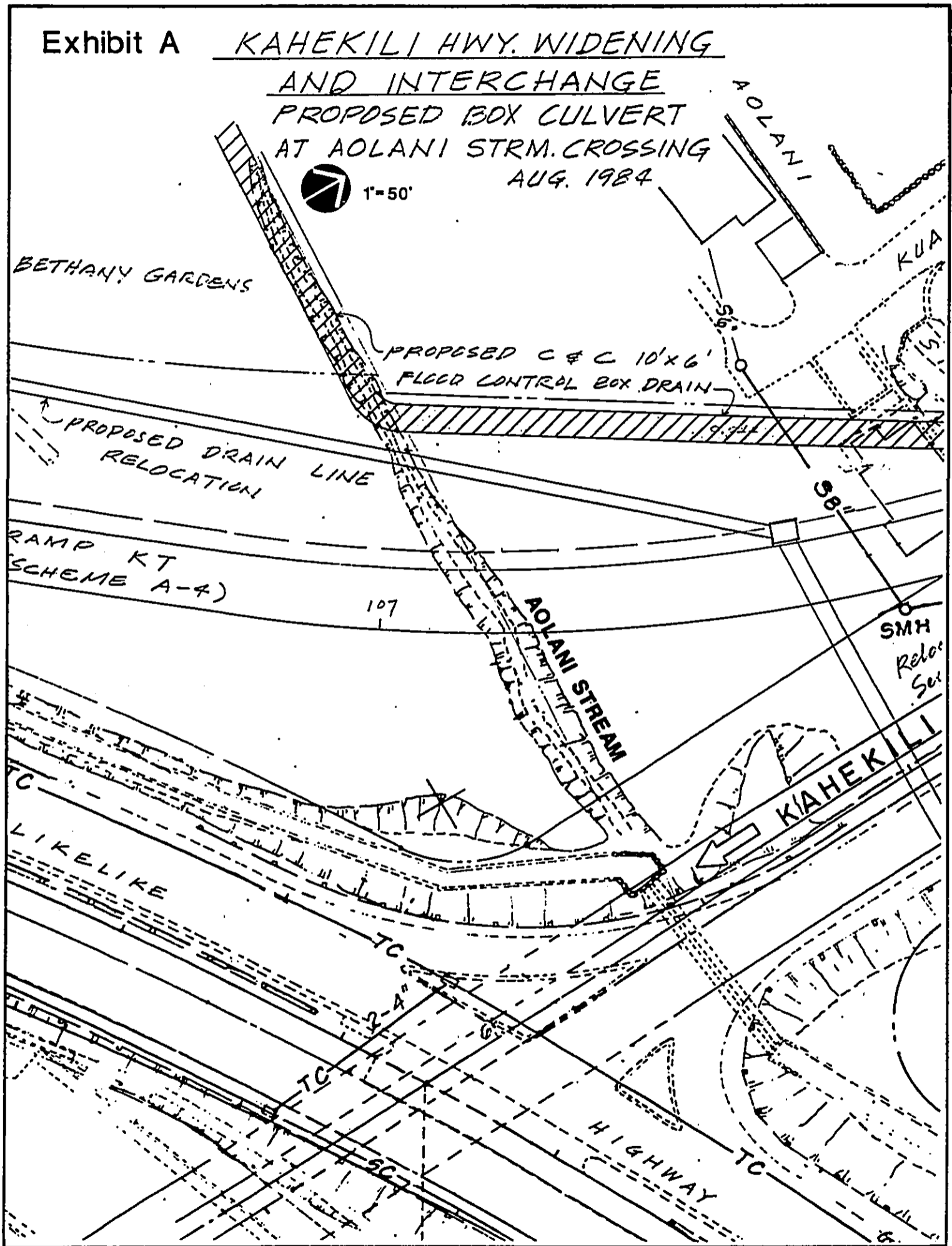


Exhibit B

**KAHEKILI HWY. WIDENING
EXISTING BOX CULVERT AT
KEAAHALA STRM. CROSSING**



1"=46'

AUG. 1984

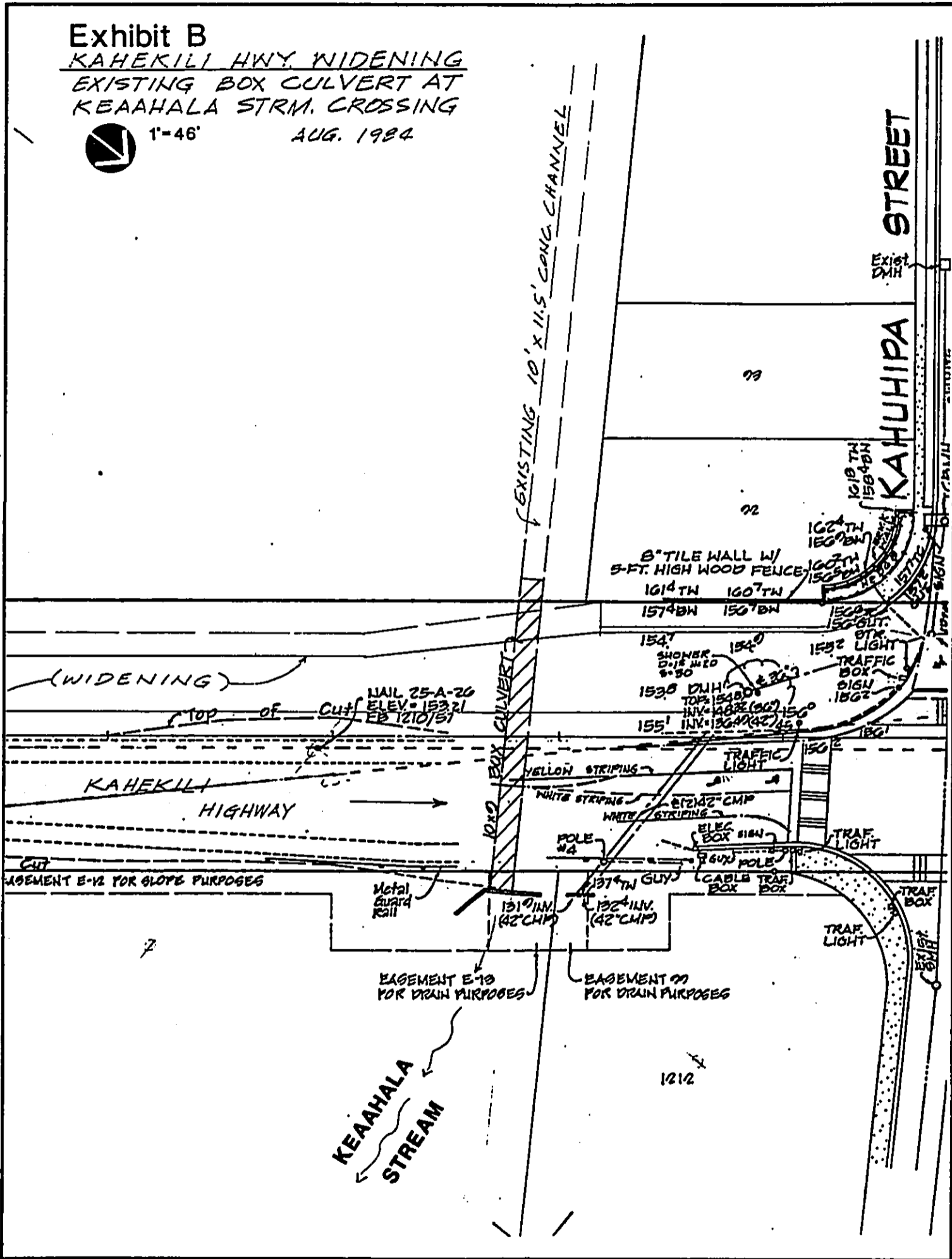
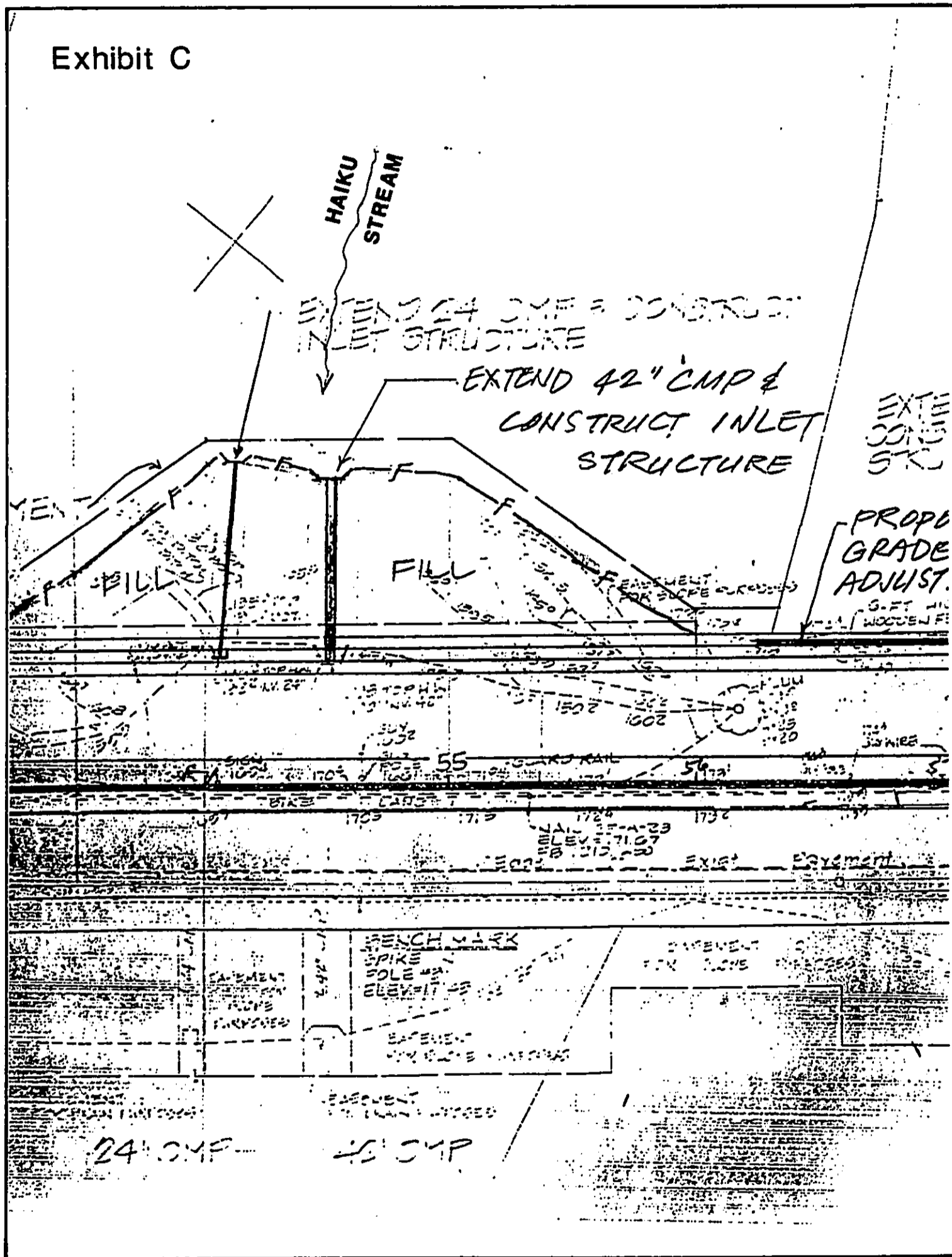


Exhibit C



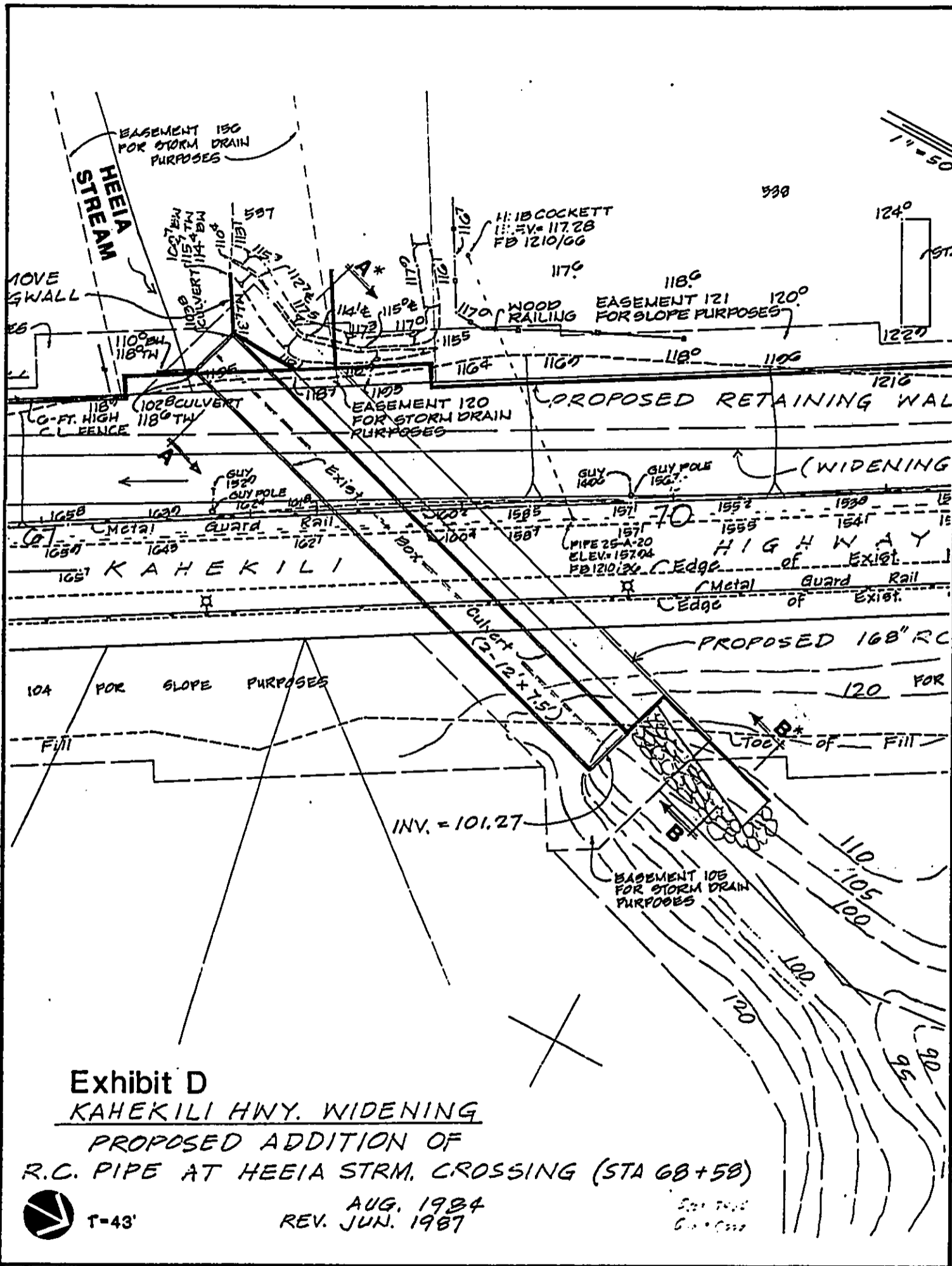
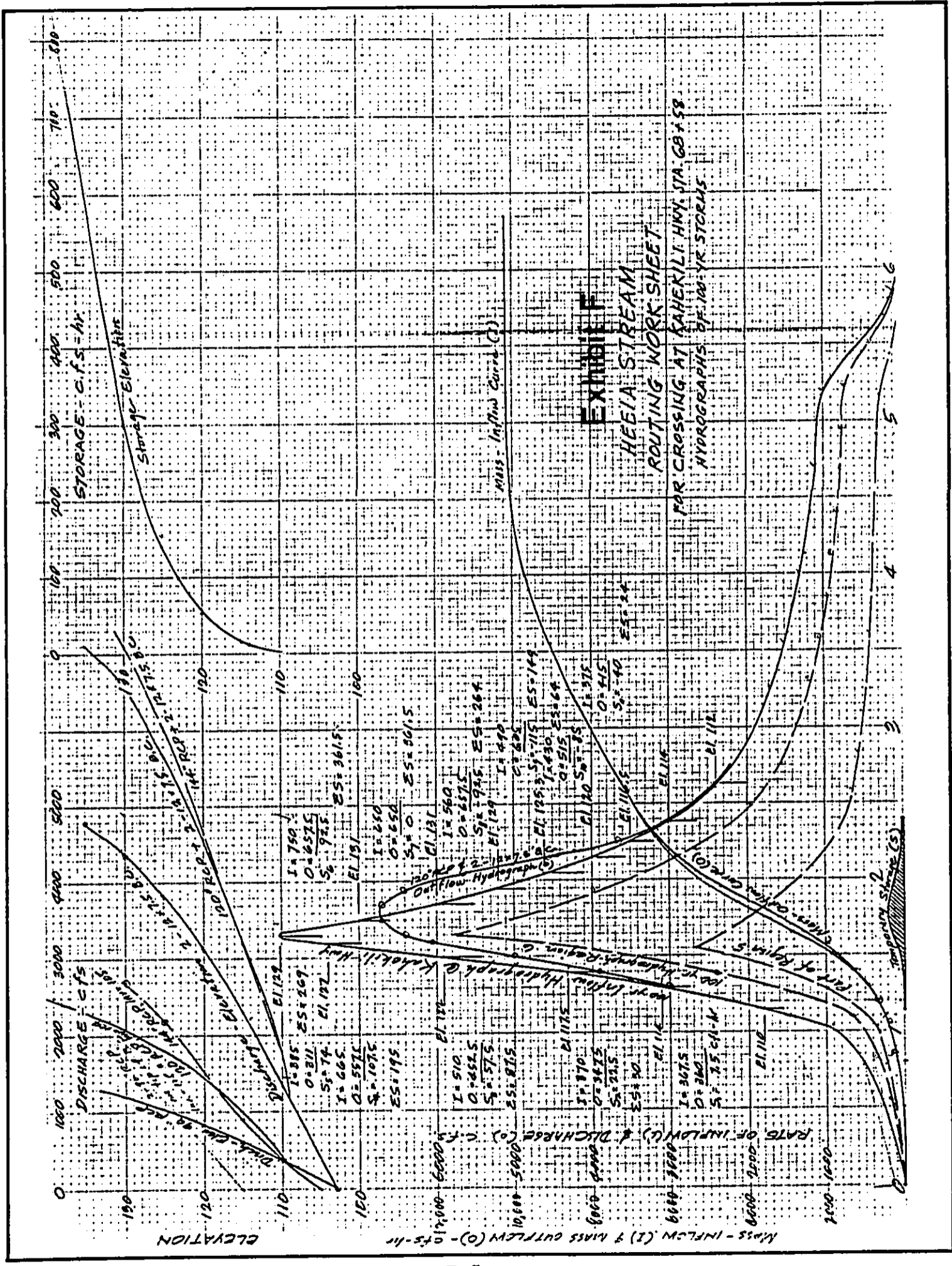


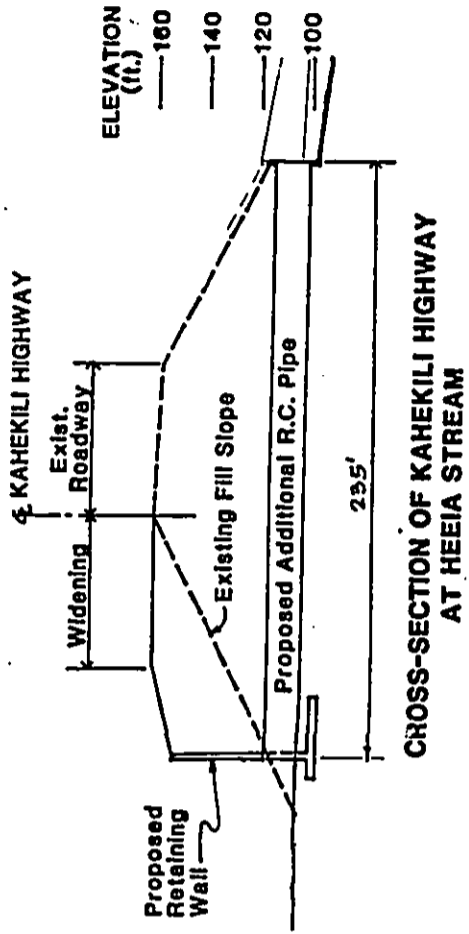
Exhibit D
KAHEKILI HWY. WIDENING
PROPOSED ADDITION OF
R.C. PIPE AT HEEIA STRM. CROSSING (STA 68+58)

 T-43'

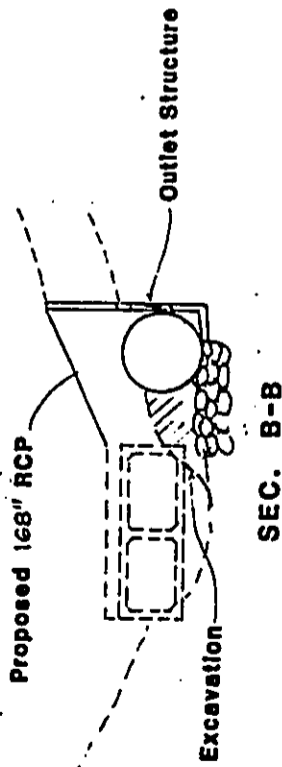
AUG. 1984
 REV. JUN. 1987

SEE PLAN
 FOR DETAILS



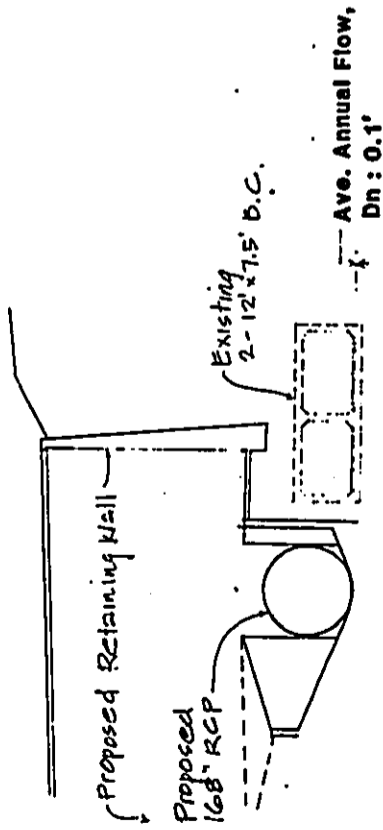


CROSS-SECTION OF KAHEKILI HIGHWAY AT HEEIA STREAM

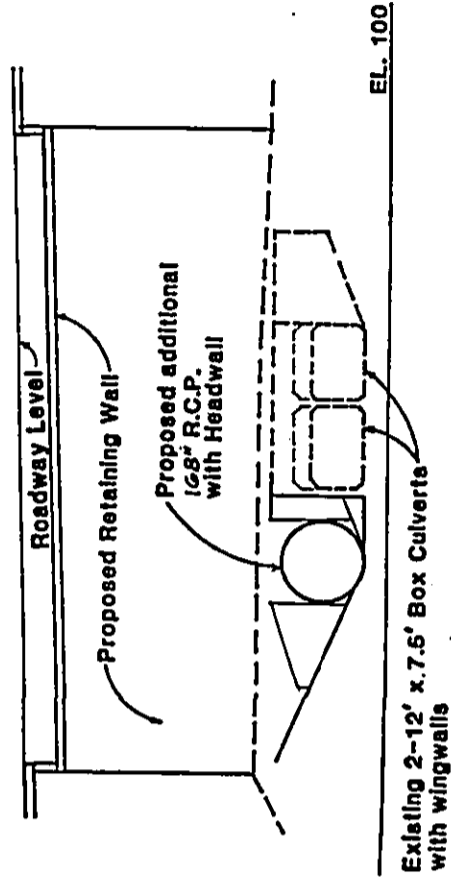


SEC. B-B

NOTE: Maintain Existing Banks to Keep Ave. Annual Flow out of Trench and Pipe during Construction Period.



SEC. A-A



FRONT VIEW OF DRAINAGE INLET AT HEEIA STREAM

Exhibit E
PROPOSED R. C. PIPE
AT HEEIA STREAM

REV. 6/1/87
9/20/84

Exhibit G

KAHEKILI HWY. WIDENING PROPOSED EXTENSION OF G.M. PIPES AT PUOLENA STRM.



1"=48'

AUG. 1984.

554

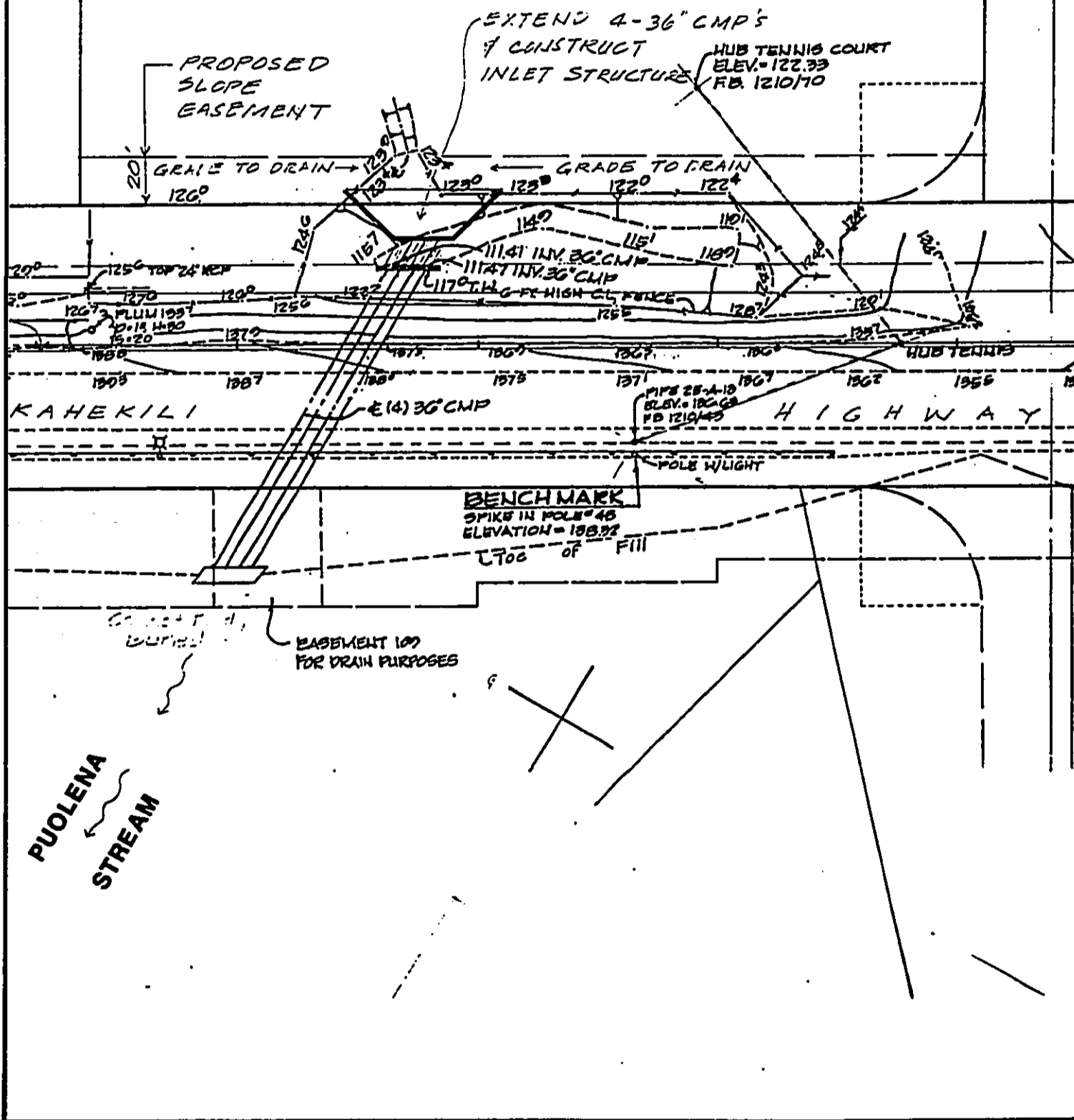
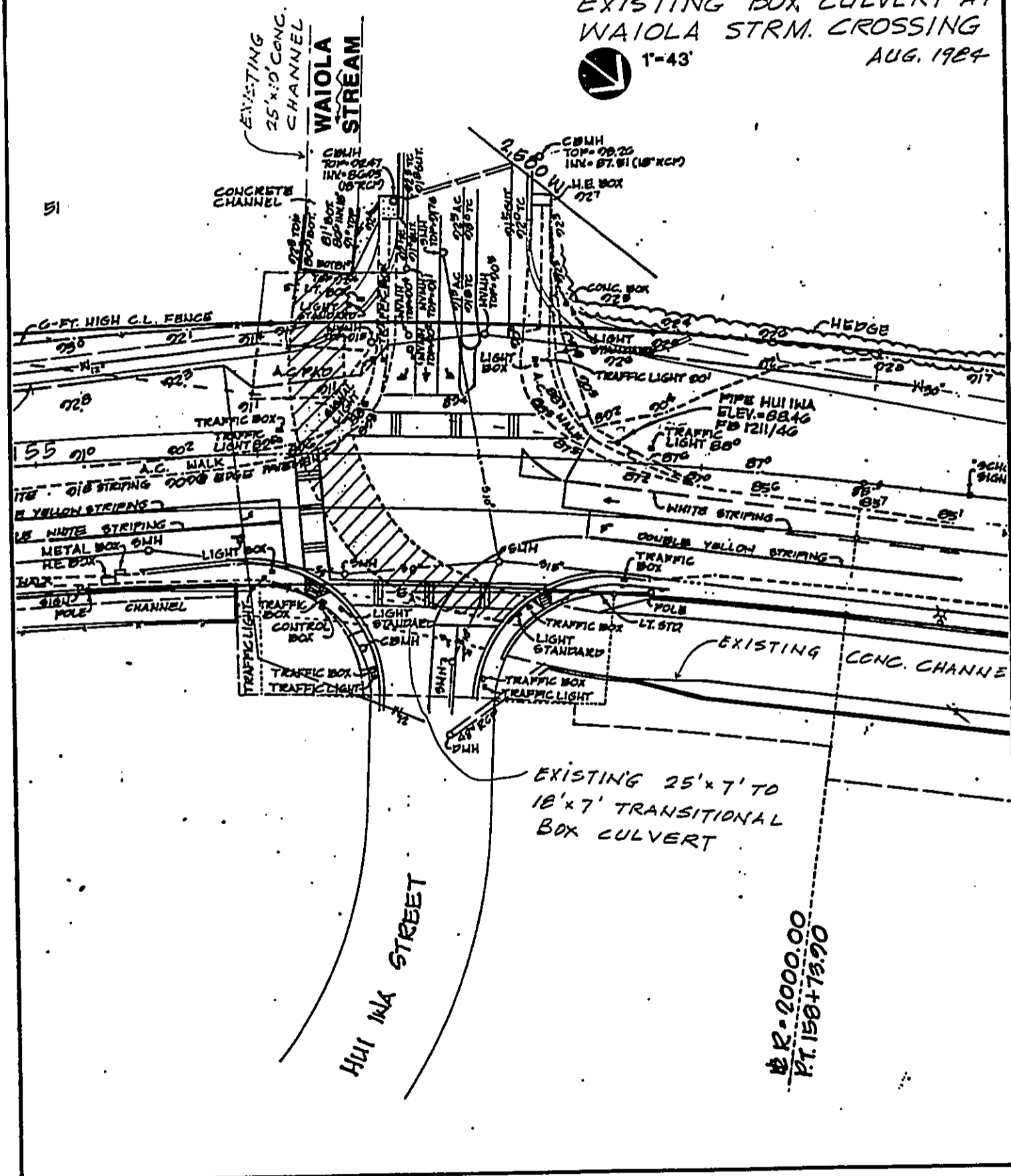


Exhibit H

KAHEKILI HWY. WIDENING
EXISTING BOX CULVERT AT
WAIOLA STRM. CROSSING



AUG. 1984



\$ R. 2000.00
P.T. 158+73.90

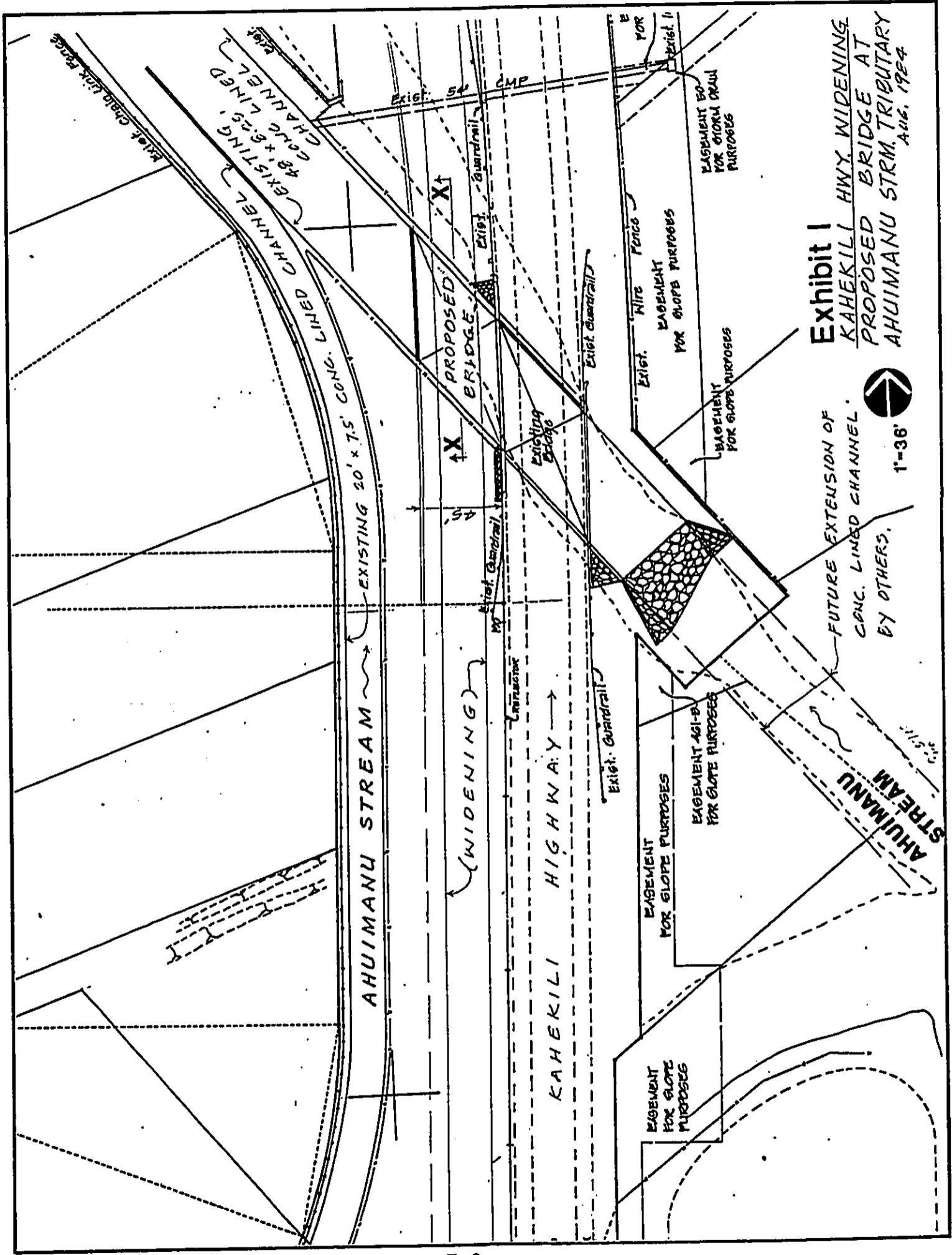


Exhibit I
KAHEKILI HWY. WIDENING
PROPOSED BRIDGE AT
AHUIMANU STRM. TRIBUTARY
 AUG. 1954



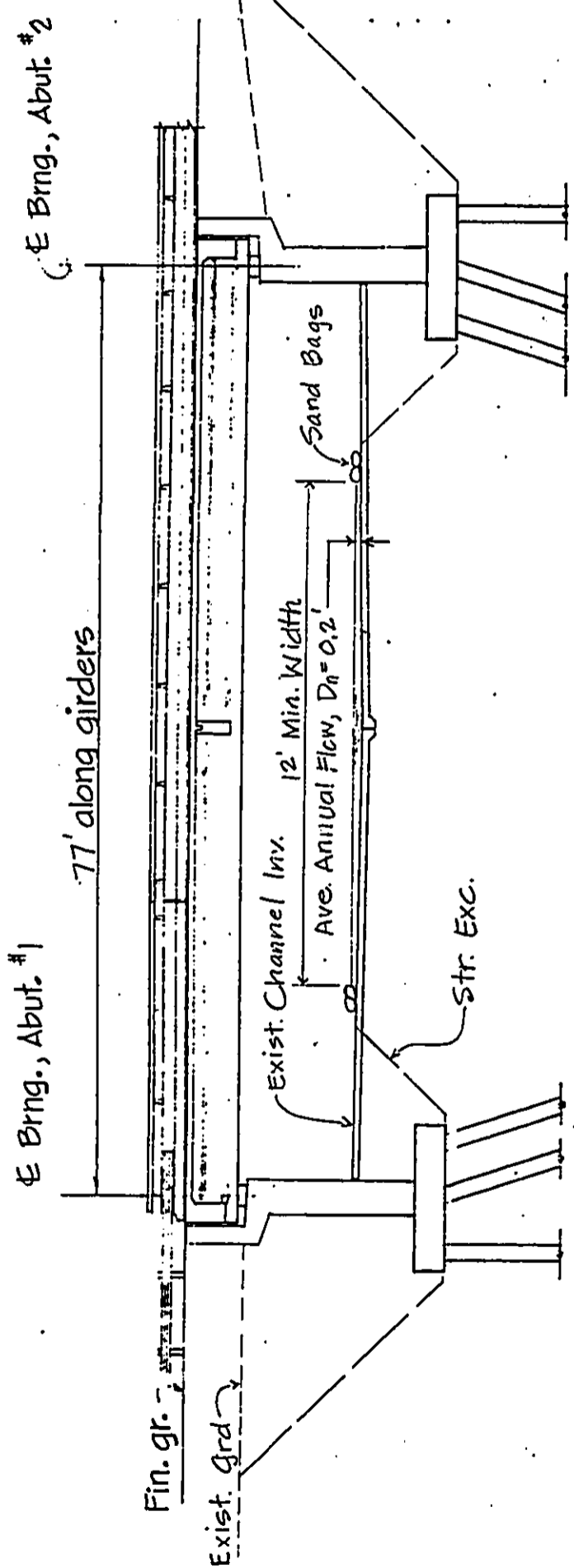


Exhibit J
 LONG. SEC. X - X
 PROPOSED BRIDGE
 AT AHUIMANU STRM. TRIB.

1" = 7 1/2'

9/20/84

APPENDIX G

**176D HAWAII
REVISED STATUTES**

INSTREAM USES OF WATER

176D-1

§176-6 **Publication of information.** The board of land and natural resources shall keep all information assembled by it concerning the water resources of the State on file in its offices and available for public inspection, and shall publish so much of the same in compilation or other convenient form from time to time as may be necessary or desirable for the use and guidance of the major users or suppliers of water and the public. [L 1961, c 166, pt of §5; Supp, §87A-7; HRS §176-6]

§176-7 **Qualified personnel.** Qualified geologists, hydrographers, and other scientific and technical personnel necessary to carry out the purposes of this chapter may be engaged by the board of land and natural resources without regard to the requirements of chapters 76 and 77 and section 78-1. [L 1961, c 166, pt of §5; Supp, §87A-8; HRS §176-7]

§176-8 **Planning water systems.** The board of land and natural resources shall assist and cooperate with the several boards of water supply and water departments, the Hawaiian homes commission, and industry in the State in investigating and planning the development and use of water for domestic and industrial water supply systems when requested so to do by any of them and upon arrangements being made concerning payment by them for the services of the board in such connection. In addition to the authority vested in the board by section 174-20, the board is authorized to design or construct domestic or industrial water systems. [L 1961, c 166, pt of §5; Supp, §87A-9; HRS §176-8]

§176-9 **Functions of boards of water supply and water departments unimpaired.** Nothing in this chapter shall be deemed to restrict or modify the powers and duties of the several boards of water supply and water departments, or to prevent any of them from continuing to carry out such investigations, studies, and planning as may be necessary or convenient to their proper and efficient management and operation and the accomplishment of the purposes of the legislation governing them. [L 1961, c 166, pt of §5; Supp, §87A-10; HRS §176-9]

[CHAPTER 176D] PROTECTION OF INSTREAM USES OF WATER

SECTION

- 176D-1 SHORT TITLE
- 176D-2 DECLARATION OF PURPOSE
- 176D-3 DEFINITIONS
- 176D-4 GENERAL POWERS AND DUTIES OF THE BOARD OF LAND AND NATURAL RESOURCES
- 176D-5 ENACTMENT OF RULES AND REGULATIONS
- 176D-6 VIOLATIONS; PENALTIES
- 176D-7 JUDICIAL REVIEW

Note

This chapter shall expire upon the enactment of a statewide water code. L 1982, c 185, §3. Advisory study commission on water resources and formulation of state water code. L 1982, c 170.

[§176D-1] Short title. This chapter shall be known and may be cited as the "Hawaii Instream Use Protection Act of 1982." [L 1982, c 185, pt of §1]

379

[§176D-2] Declaration of purpose. The legislature finds and declares that the people of the State have a vital interest in the protection and enhancement, where practicable, of beneficial instream uses of water. Existing laws authorize only fragmented protection and enhancement measures and do not provide a comprehensive planning process for the protection and enhancement where practicable of beneficial instream uses of water such as fishery, water-related wildlife resources, recreational, aesthetic, scenic, and other environmental opportunities.

The legislature further finds and declares that the health, safety, and welfare of the people of the State require that there be a comprehensive program to provide for the protection and enhancement, where practicable, of beneficial instream uses.

It is the intent of the legislature that the State shall develop instream flow standards and instream flow programs to protect and enhance, where practicable, beneficial instream uses of water. [L 1982, c 185, pt of §1]

[§176D-3] Definitions. The following terms, whenever used and referred in this chapter, shall have the following respective meanings, unless a different meaning clearly appears in the context:

"Alteration" means to obstruct, diminish, destroy, alter, modify, relocate, or change the natural existing shape of the channel or to change the direction of flow of water of any stream channel. It will include the removal of material from the stream channel and replacement of material or structures in other stream channels.

"Board" means the board of land and natural resources.

"Continuous flowing water" means a sufficient flow of water that could provide for migration and movement of fish, and includes those reaches of streams which, in their natural state, normally go dry seasonally at the location of the proposed alteration.

"Department" means the department of land and natural resources.

"Instream flow standard" means a quantity or flow of water or depth of water which is required to be present at a specific location in a stream system at certain specified times of the year to protect fishery, wildlife, recreational, aesthetic, scenic, and other beneficial instream uses.

"Instream use" means the beneficial use of water for significant purposes which are located in the stream and which are achieved by leaving the water in the stream. Beneficial instream uses include, but are not necessarily limited to, the maintenance of fisheries and water-related wildlife resources; outdoor recreational activities; ecosystems such as estuaries, wetlands, and stream vegetation; aesthetic values such as waterfalls and scenic waterways; navigation; hydropower generation; water quality maintenance; and the conveyance of irrigation and domestic water supplies to downstream points of diversion. The diversion of irrigation and domestic uses of stream waters are considered beneficial uses of stream waters.

"Person" means any person, firm, association, organization, partnership, business trust, corporation, company, the State and its agencies and departments, political subdivisions of the State, and the United States and any of its agencies and department.

"Stream channel" means a natural watercourse with definite beds and banks which confines and conducts continuous flowing water. The channel referred to is that which exists at the present time, regardless of where the channel may have been located at any time in the past.

INSTREAM USES OF WATER

176D-4

"Stream system" includes stream, lake, or other body of water, and tributaries and contributory sources, or a segment of any of these. [L 1982, c 185, pt of §1]

Revision Note

Definitions rearranged.

§176D-4 General powers and duties of the board of land and natural resources. The board of land and natural resources shall establish and administer the instream use protection program provided by this chapter for windward Oahu districts. In carrying out this chapter, the board shall cooperate with the United States government or any of its agencies, other state agencies, and the county governments and any of their agencies. In the performance of its duties the board shall:

- (1) Establish instream flow standards for the windward Oahu districts whenever necessary to protect the public interest in waters of the State.
 - (A) The board, on its own motion, may determine that the public interest in the waters of the State requires the establishment of an instream flow standard for streams in windward Oahu districts.
 - (B) In acting upon the establishment of instream flow standards, the board shall set forth in writing its conclusion that the public interest does or does not require, as is appropriate, an instream flow standard to be set for the stream, the reasons therefor, and the findings supporting the reasons.
 - (C) Each instream flow standard shall describe the flows necessary to protect the public interest in the particular stream. Flows shall be expressed in terms of variable flows of water necessary to protect adequately fishery, wildlife, recreational, aesthetic, scenic, or other beneficial instream uses in the stream in light of existing and potential water developments.
 - (D) Establishment or modification of an instream flow standard shall be initiated by the board by providing notice of its intention to set an instream flow standard in a newspaper of general circulation published in the vicinity of the stream in question, and to persons who have previously requested such notice.
 - (E) After giving notice of its intention to set an instream flow standard, the board or other agencies in participation with the board shall investigate the stream. During the process of this investigation, the board shall consult with and consider the recommendations of the department of health, the United States Fish and Wildlife Service, and other agencies having interest in or information on the stream, and may consult with and consider the recommendations of persons having interest in or information on the stream. In formulating the proposed standard the board shall weigh the importance of the present or potential instream values with the importance of the present or potential uses of water from the stream for non-instream purposes, including the economic impact of restriction of such uses. In order to avoid or minimize the impact on existing uses

381

CONSERVATION AND RESOURCES

of preserving, enhancing, or restoring instream values, the board shall consider physical solutions, including water exchanges, modifications of project operations, changes in points of diversion, changes in time and rate of diversion, and uses of water from alternative sources or any other solution.

- (F) Before adoption of an instream flow standard or modification of an established instream flow standard, the board shall give notice and hold a hearing on its proposed standard or modification.
- (2) Establish interim instream flow standards.
 - (A) Any person may petition the board to adopt an interim instream flow standard for streams of the windward Oahu districts in order to protect the public interest pending the establishment of a permanent instream flow standard.
 - (B) Any interim instream flow standard adopted under this section shall terminate upon the establishment of a permanent instream flow standard for the stream on which the interim standard was adopted.
 - (C) A petition to adopt an interim instream flow standard under this section shall set forth data and information concerning the need to protect and conserve beneficial instream uses of water, and any other relevant and reasonable information required by the board.
 - (D) In considering a petition to adopt an interim instream flow standard, the board shall weigh the importance of the present or potential instream values with the importance of the present or potential uses of water for non-instream purposes.
 - (E) The board shall grant or reject a petition to adopt an interim instream flow standard under this section within one hundred eighty days of the date the petition is filed. The one hundred eighty days may be extended a maximum of one hundred eighty days at the request of the petitioner and subject to the approval of the board.
- (3) Protect stream channels from alteration whenever practicable in windward Oahu to provide for fishery, wildlife, recreational, aesthetic, scenic, and other beneficial instream uses.
 - (A) The board shall require persons to obtain a permit from the board prior to undertaking a stream channel alteration in windward Oahu.
 - (B) The board shall establish guidelines for processing and considering applications for stream channel alterations.
 - (C) The board shall require filing fees by users to accompany each application for stream channel alteration.
- (4) Establish an instream flow program for windward Oahu to protect, enhance, reestablish, where practicable, beneficial instream uses of water. The board shall conduct investigations, and collect instream flow data including fishing, wildlife, aesthetic, recreational, water quality, and ecological information and basic streamflow characteristics necessary for determining instream flow requirements. [L 1982, c 185, pt of §1; am L 1983, c 124, §5]

[§176D-5] Enactment of rules and regulations. The department shall

GROUND-WATER USE

176D-7

enact necessary rules and regulations within one and one-half years from July 1, 1982. [L 1982, c 185, pt of §1]

Revision Note

"July 1, 1982" substituted for "the effective date of this chapter".

[§176D-6] **Violations; penalties.** Any person violating any provision of this chapter or any permit condition or limitation established pursuant to this chapter or negligently or wilfully failing or refusing to comply with any final order of the board issued as provided herein, shall be liable for a civil penalty not to exceed \$1,000 for such violation and an additional civil penalty not to exceed \$500 for each day during said violation continues. [L 1982, c 185, pt of §1]

§176D-7 **Judicial review.** Any person who is aggrieved or adversely affected by an order or action by the board shall be entitled to judicial review in accordance with chapter 91. [L 1982, c 185, pt of §1; am L 1983, c 124, §6]

CHAPTER 177 GROUND-WATER USE

SECTION

- 177-1 SHORT TITLE
- 177-2 DEFINITIONS
- 177-3 REGULATIONS OF GROUND-WATER RESOURCES
- 177-4 ADMINISTRATION BY BOARD OF LAND AND NATURAL RESOURCES
- 177-5 GENERAL POWERS
- 177-6 DEPARTMENTAL COOPERATION
- 177-7 RULES AND REGULATIONS
- 177-8 ACTION OF OTHER GOVERNMENT AGENCIES AND MUNICIPALITIES
- 177-9 INVESTIGATIONS
- 177-10 INJUNCTIONS
- 177-11 HEARING PROCEDURES
- 177-12 JUDICIAL REVIEW
- 177-13 CONTINUATION AND INITIATION OF DOMESTIC USES
- 177-14 SHORTAGE AND EMERGENCY POWERS
- 177-15 PRESERVATION OF EXISTING USES
- 177-16 CERTIFICATION OF EXISTING USES
- 177-17 EXCHANGE OF PRESERVED USES
- 177-18 EXTINGUISHMENT OF PRESERVED USES
- 177-19 PERMITS FOR GROUND-WATER USE
- 177-20 PERMITS TO SUPPLY GROUND WATER
- 177-21 APPLICATION AND NOTICE
- 177-22 GRANTING OF PERMITS
- 177-23 CLASSES OF PERMITS
- 177-24 DURATION OF PERMITS
- 177-25 CONDITIONS OF PERMITS
- 177-26 PERMITS INTERFERING WITH PRESERVED, DOMESTIC OR PERMITTED USES
- 177-27 COMPULSORY RELINQUISHMENT OF PERMITS
- 177-28 RENEWAL OF PERMITS
- 177-29 REVOCATION OF PERMITS
- 177-30 INJUNCTIONS
- 177-31 INJURY TO PROPERTY RIGHTS, DAMAGES
- 177-32 FEES FOR PERMITS
- 177-33 WATER SHORTAGES
- 177-34 EMERGENCY POWERS
- 177-35 EFFECT ON OTHER STATUTES

383

APPENDIX H

OMPO/CAC
WINDWARD CORRIDOR STUDY
GROUP RECOMMENDATIONS

January 8, 1986

TO: Citizen Advisory Committee
FROM: Windward Corridor Study Group
SUBJECT: Recommendations Relating to Transportation Issues

Grade-Separated Intersections

1. It is felt that Highways without traffic lights will increase carrying capacity more efficiently than highways with additional lanes.
2. Substitute grade-separated intersections and reverse loops for intersections with traffic lights where possible. Substitute reverse loops for intersections and left turns where there are no traffic lights.
3. At grade-separated intersections streets running parallel to the shoreline should be at or below ground level and streets running mauka/makai should be elevated to keep ocean-to-mountain views clear where possible.
4. See attached for existing and proposed highway intersections.

Revised Bus System

1. Restrict trans-Koolau buses to those units capable of maintaining 30 mph minimum climbing speed. (The Gillig Phantom appears to be capable.)
2. Identify locations for overnight bus parking lot for 50 buses. The bus lot is to have minimum service such as fueling and interior cleaning and not general mechanical repair or maintenance.
3. Re-examine windward bus routes to implement "windward only" service with windward buses linking with a trans-Koolau terminal. "Windward only" buses could be low-capacity, frequent-schedule buses similar to existing Lanikai-Maunawili shuttles. They would not be required to transport passengers over Koolau routes.
4. Provide a trans-Koolau transfer terminal in the Kailua area. The terminal is to provide park/ride capability and perhaps, by private enterprise, a mini convenience center consisting of coffee shop, taxi stand, cleaner/laundry. The terminal is to remain open from 5 am to midnight serving as a windward terminus for evening-hour, once-hourly trans-Koolau bus service until midnight. Late evening service from the transfer terminal to rider's destination would be via taxi or private vehicle.
5. Modifications to service are not intended to replace present "Express" bus schedules operating during morning and afternoon rush hours.

Highway Maintenance and Improvements (Essential for safe motoring)

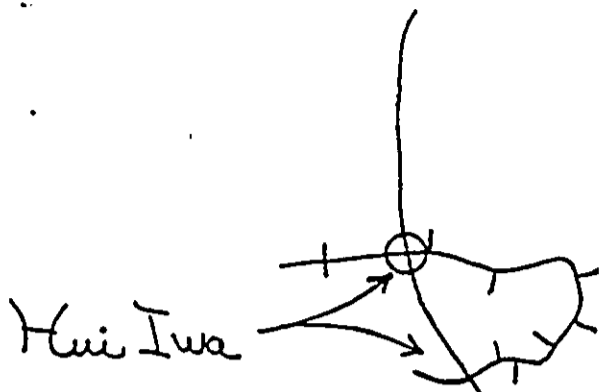
1. Improve the drainage in areas where sections of highway frequently erode because of undermining.
2. Avoid any delays in filling potholes and resurfacing. Some sections of highway have gone unattended for years.
3. Widen sections of highway on dangerous curves.
4. Construct seawalls in Kaaawa, Punaluu, and Hauula where high surf frequently deposits sand, coral and debris on the highway. Discontinue the costly practice of using work crews and heavy equipment to remove rubble after each occurrence.
5. Minimize the grade difference between highway and shoulder in order to provide for safer pull off and recovery (e.g. Kahana, Kualoa/Hakipuu).
6. Install additional street lights along dark stretches of highway in areas such as Kahaluu along Kahekili Highway and Kahuku along Kamehameha Highway.
7. Develop measures to prevent mud and rock slide impacting the highway (e.g. Pali Highway).
8. Provide for greater use and maintenance of safety devices such as reflectors and white and yellow lines.
9. Provide safe pull off spots for sightseeing and prohibit stops by tour buses in dangerous areas.

Increased Efficiency of Vehicular Movement on Trans-Koolau Routes

1. Limit bus and heavy trucks to the right lane 24 hours per day.
2. Deny heavy trucks the use of trans-Koolau routes during peak hours.
3. Implement a system of coned lanes for Honolulu-bound traffic on Pali Highway during morning peak hours.
4. Reinstate the use of licensed jitney vehicles which would operate on a non-regulated basis.

Other Recommendations

1. Explore the feasibility of a light rail system for the windward area.
2. Where possible, some projects listed in the TIP should be moved up in the timetable.



OMPO/CAC
 Windward Corridor Committee
 December 2, 1985
 Nakamoto/Stevens

Kahakuli/Likelike Highways
 1" = 2,000'

Existing Configuration

⊕ Traffic Lights

Kahakuli →

Haiku →

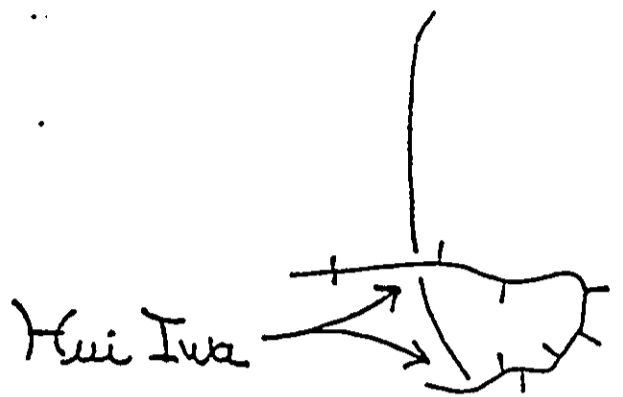
Kakuhipa →

Kealahala →

Kuluke'oe →

← Kamehameha

← Likelike



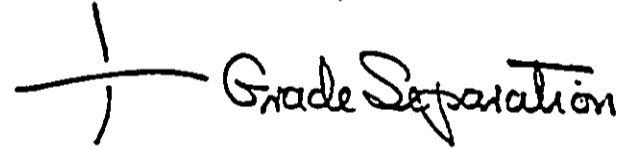
Hui Iwa

OMPO/CAC
 Windward Corridor Committee
 December 2, 1985
 Nakamoto/Stevens

Kahakili/Likelike Highways
 1" = 2,000'

Kahakili →

Proposed Improvements



Haiku →

Kahuhipa →

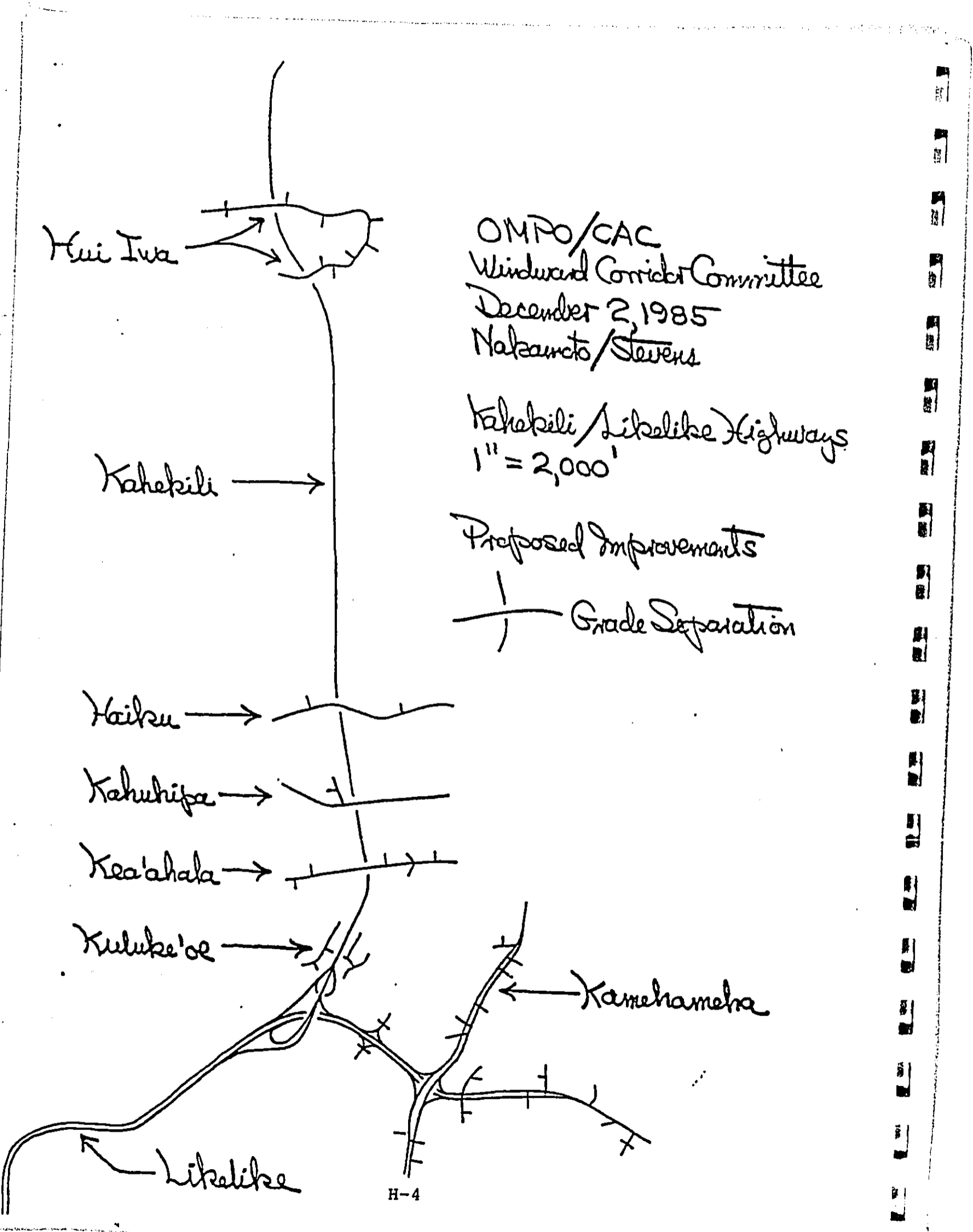
Kea'ahala →

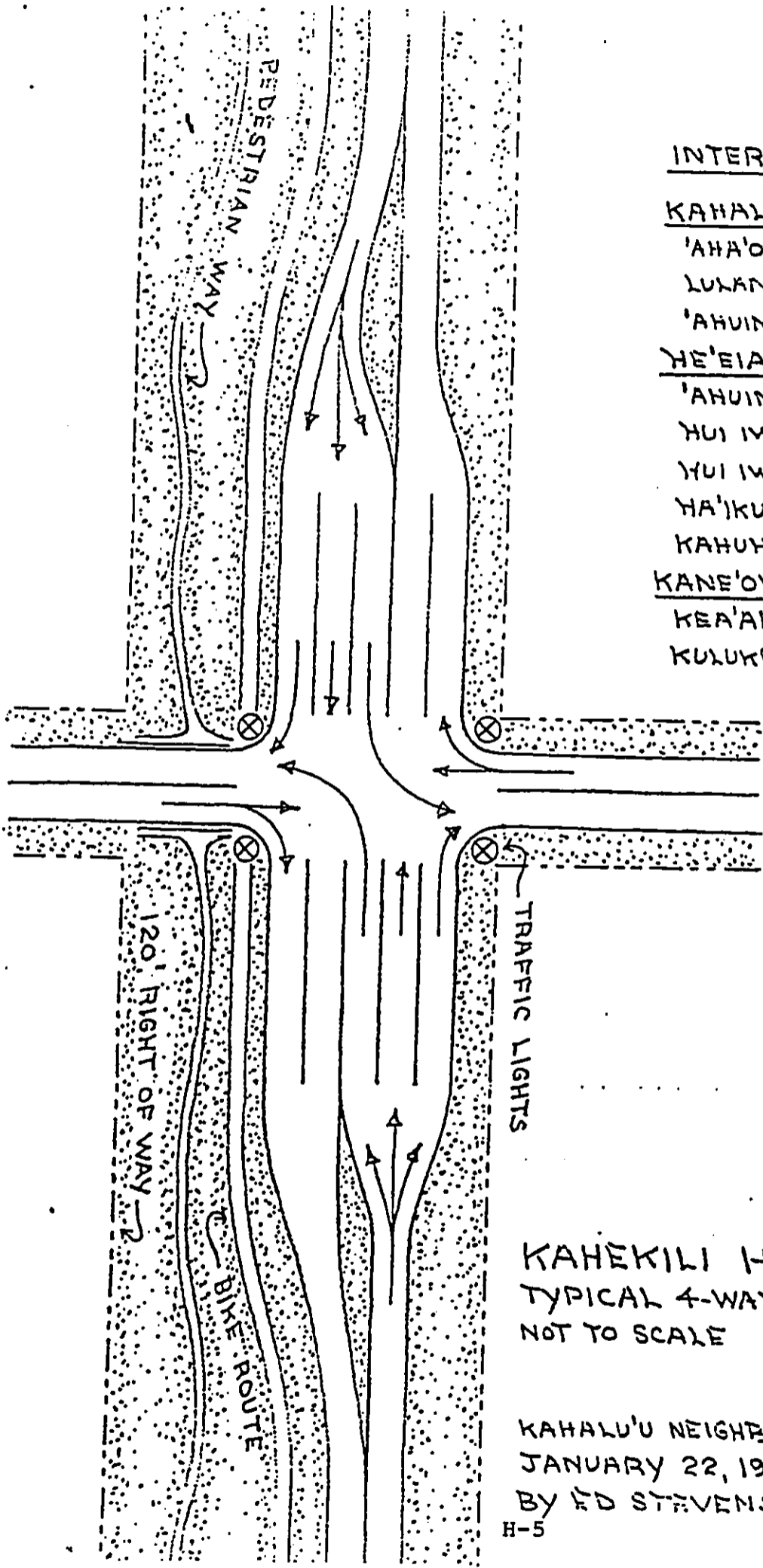
Kuluke'oe →

Kamehameha ←

Likelike ←

H-4





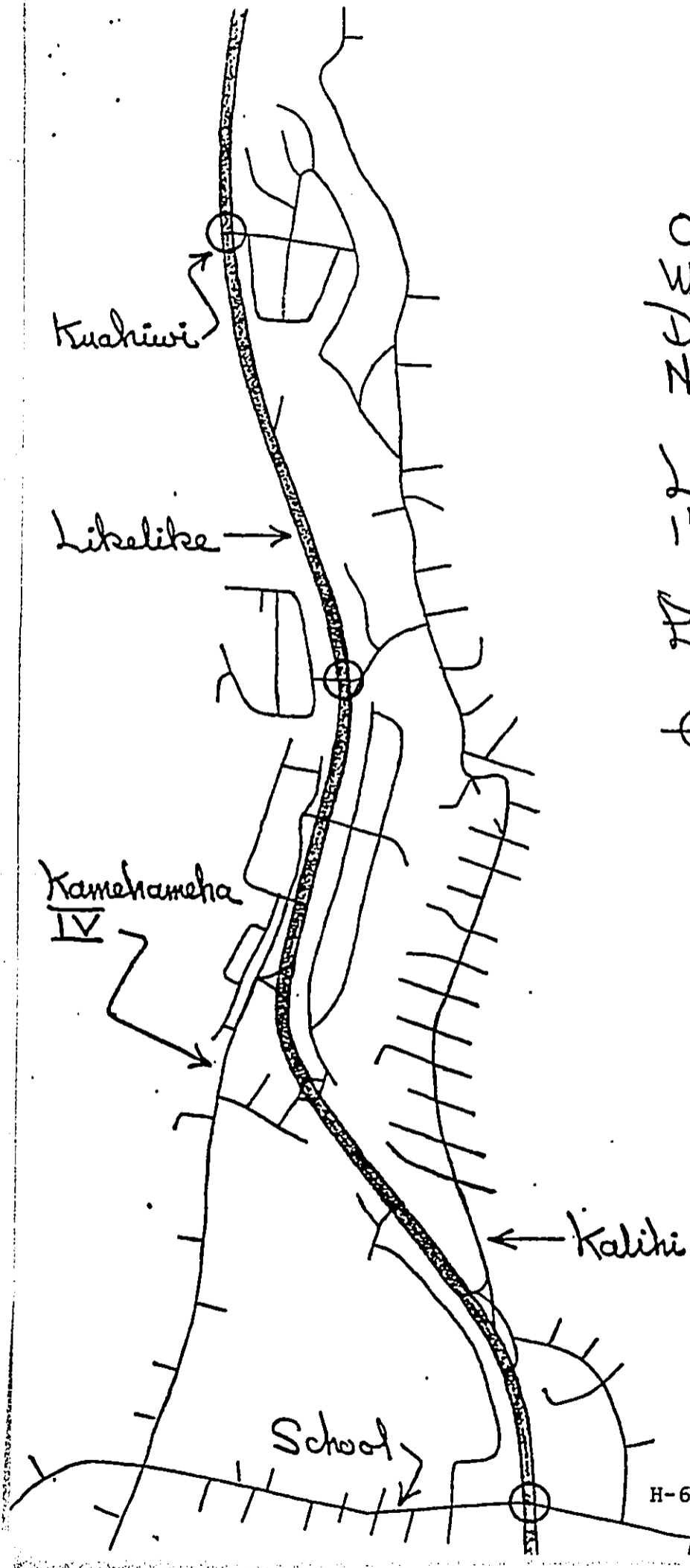
INTERSECTION 3 OR 4 WAY

<u>KAHALU'U</u>	
'AHA'OLELO RD.	3
LULANI ST.	3
'AHUIMANU RD.	4
<u>HE'EIA</u>	
'AHUIMANU PL.	3
HUI IWA ST. (NORTH)	4
HUI IWA ST. (SOUTH)	4
HA'IKU RD.	4
KAHUHIPA ST.	4
<u>KANE'OHE</u>	
KEA'AHALA RD.	4
KULUKE'OE ST.	4

TRAFFIC LIGHTS

KAHAKILI HIGHWAY
 TYPICAL 4-WAY INTERSECTION
 NOT TO SCALE

KAHALU'U NEIGHBORHOOD BOARD No.29
 JANUARY 22, 1982
 BY ED STEVENS
 H-5



OMPO/CAC
 Windward Corridor Committee
 December 2, 1985
 Nakamoto/Stevens

Likelike Highway (Kalihiki)
 1" = 1,000'

Existing Configuration

⊕ Traffic Lights

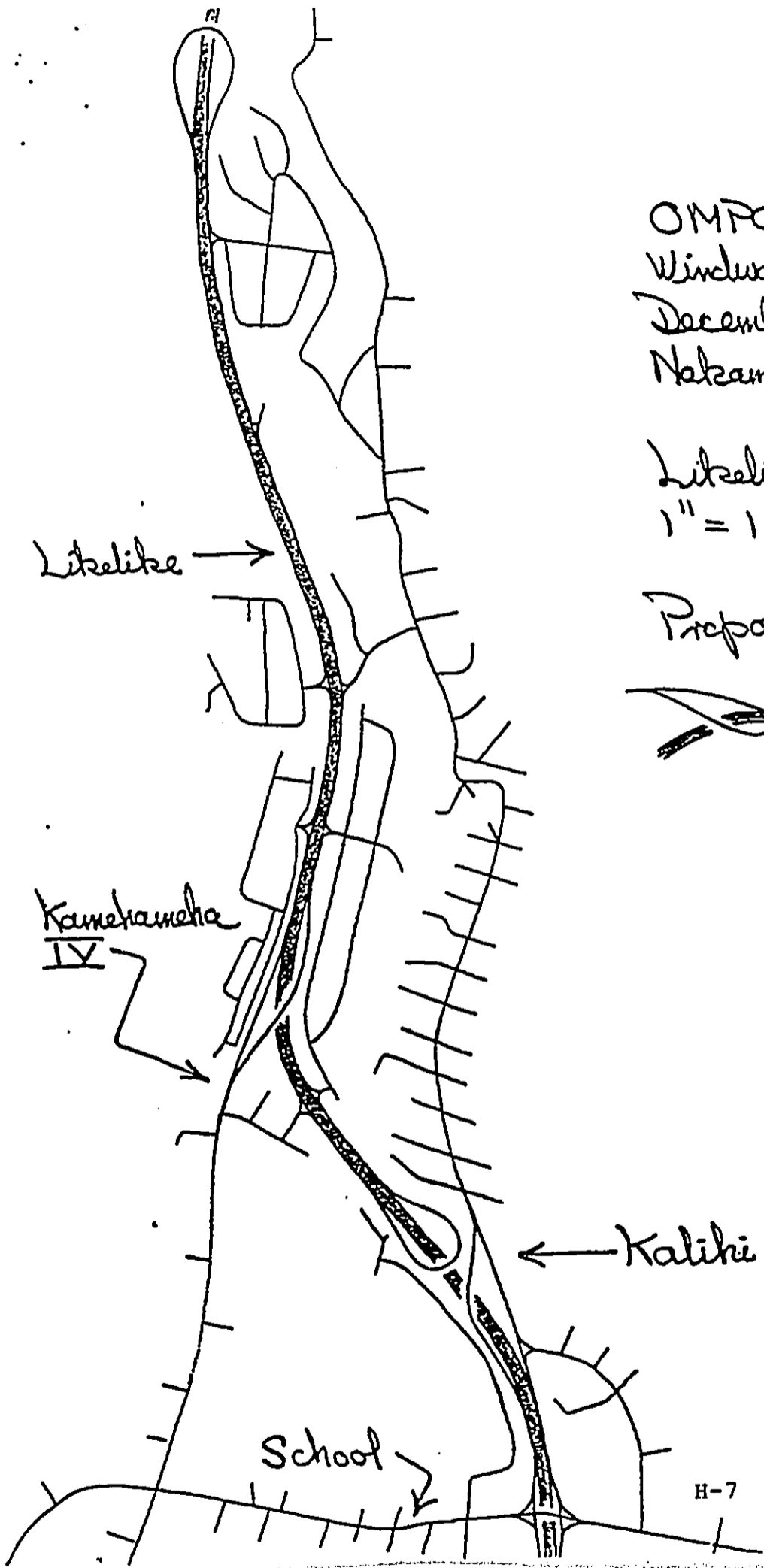


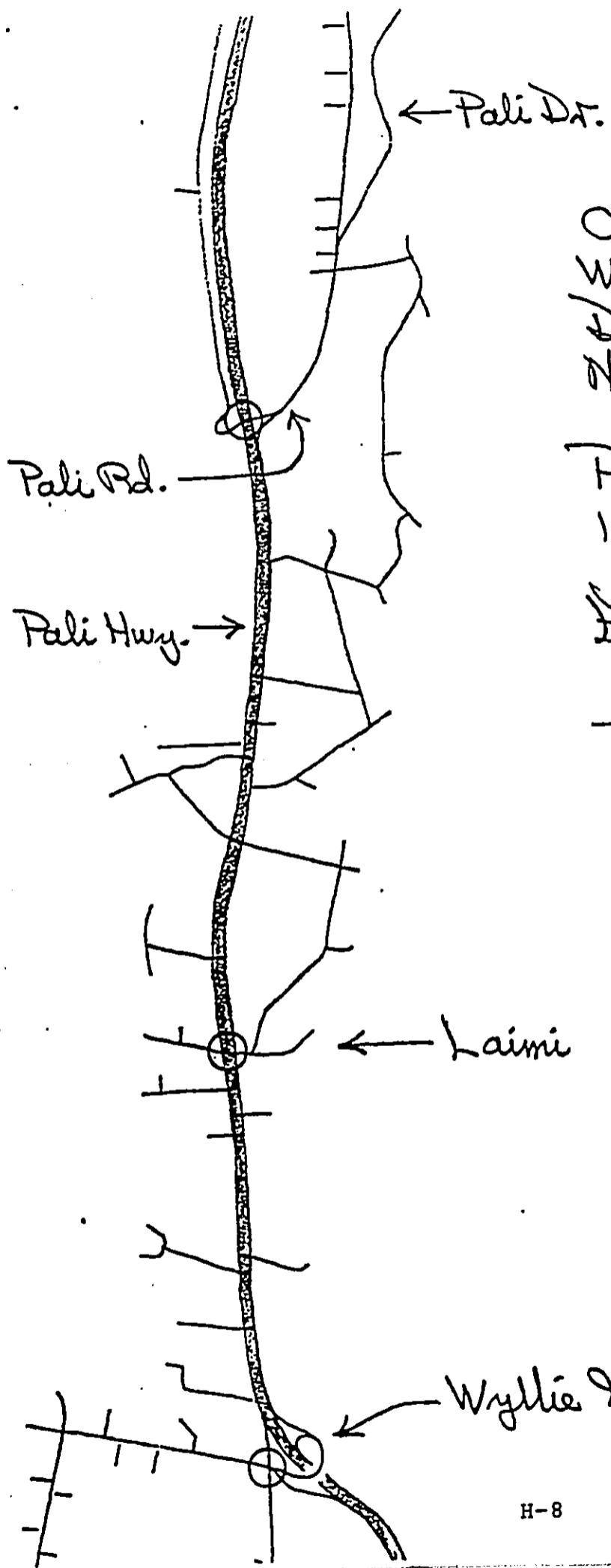
OMPO/CAC
Windward Corridor Committee
December 2, 1985
Nakamoto/Stevens

Likelike Highway (Kaliki)
1" = 1,000'

Proposed Improvements

 Grade Separation

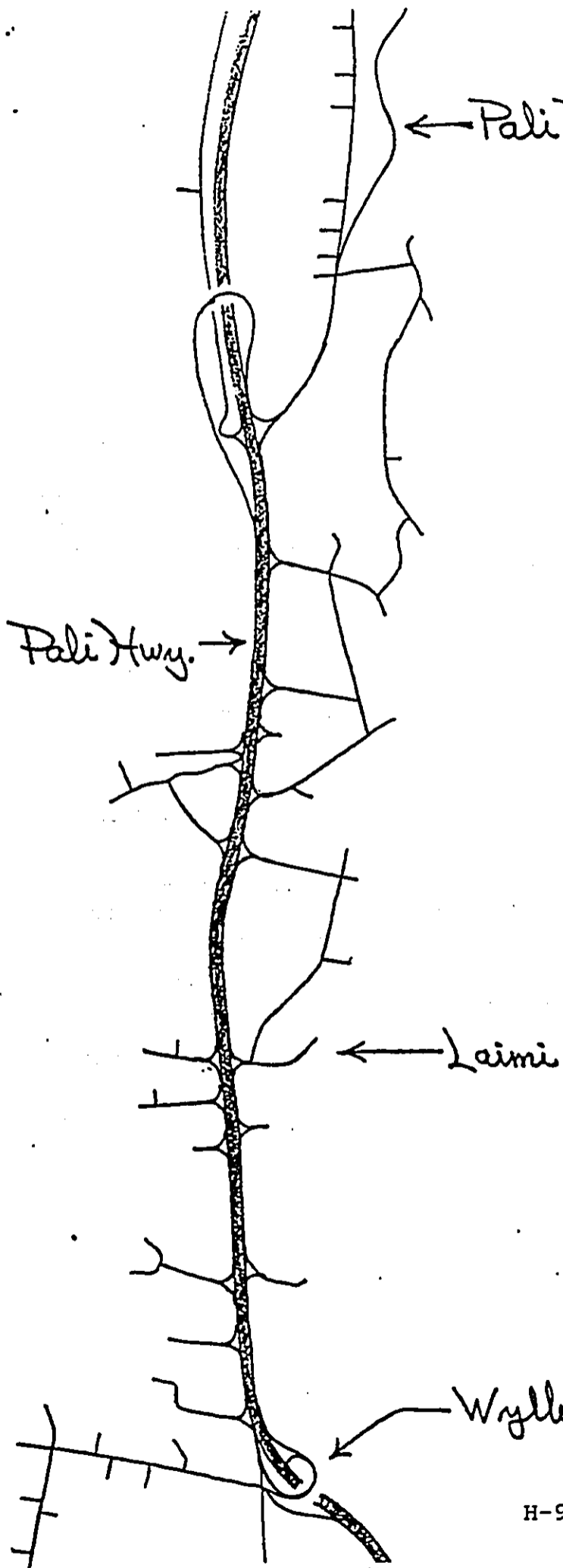




OMPO/CAC
 Windward Corridor Committee
 December 2, 1985
 Nakamoto/Stevens

Pali Highway (Nu'uuanu)
 1" = 1,000'

Existing Configuration
 ⊕ Traffic Lights



OMPO/CAC
 Windward Corridor Committee
 December 2, 1985
 Nakamoto/Stevens

Pali Highway (Nu'uana)
 1" = 1,000'

Proposed Improvements

Grade Separation

EVALUATION OF WINDWARD CORRIDOR STUDY GROUP'S RECOMMENDATIONS

The OMPO/CAC Windward Corridor Group recommended that all intersections on Kahekili Highway be grade-separated and the widening of Kahekili Highway to a four lane divided facility be limited to the vicinity of Haiku Road. They further recommended that Kahekili Highway be at or below ground level to keep mountain and ocean views clear where possible.

To make this alternative physically workable, Kahekili Highway would be depressed at the intersections and the crossroads (Haiku, Kahuhipa, Keaahala) remain at ground level. Elevating the crossroad over Kahekili Highway would sever all of the accesses on the crossroad located within 300 to 500 feet from Kahekili Highway. Because of the relatively close distance between Haiku Road, Kahuhipa Street, and Keaahala Road, frontage roads on both sides Kahekili Highway are needed to provide access to and from the crossroads. The intersection at Kulukeye Street will be closed and access for upper Kapunahala replaced to the Castle Hills connector road.

The Highways Division evaluated this alternative and decided that it was not a viable solution because the increased cost and impacts on adjacent land uses. This alternative has the following disadvantages when comparing it with the preferred alternative discussed in the Final EIS:

1. Streambed elevations must be lowered to accommodate the depressed roadway. This will adversely affect instream uses.
2. Right-of-way beyond the existing 120 feet is required. Residents adjacent to Kahekili Highway will be dislocated and the Kaneohe District Park will be impacted.
3. Construction related impacts would be much more severe. (noise, dust, erosion, traffic)
4. This alternative costs much more than an at-grade widening solution.
5. Widening only to Haiku Road will not provide for the long-term travel needs on Kahekili Highway.